

drinking Englishman, what Franklin was to the London printers. It is beyond the capacity of a well-beered brain even to read the pamphlet on Liberty and Necessity, which Franklin wrote in those times.

The few experiments which have been made, with a view to trace the course of alcohol in the living system, all confirm what all drinkers feel, that it is to the brain that alcohol hurries when it has passed the lips. Some innocent dogs have suffered and died in this investigation. Dr. Percy, a British physician, records, that he injected two ounces and a half of alcohol into the stomach of a dog, which caused its almost instant death. The dog dropped very much as he would if he had been struck upon the head with a club. The experimenter without a moment's unnecessary delay, removed the animal's brain, subjected it to distillation, and extracted from it a surprising quantity of alcohol,—a larger proportion than he could distill from the blood or liver. The alcohol seemed to have rushed to the brain; it was a blow upon the head which killed the dog. Dr. Percy introduced into the stomachs of other dogs smaller quantities of alcohol, not sufficient to cause death; but upon killing the dogs, and subjecting the brain, the blood, the bile, the liver, and other portions of the body to distillation, he invariably found more alcohol in the brain than in the same weight of other organs. He injected alcohol into the blood of dogs, which caused death; but the deadly effect was produced, not upon the substance of the blood, but upon the brain. His experiments go far toward explaining why the drinking of alcoholic liquors does not sensibly retard digestion. It seems that, when we take wine at dinner, the alcohol does not remain in the stomach, but is immediately absorbed into the blood, and swiftly conveyed to the brain and other organs. If one of these "four-bottle men" of the last generation had fallen down dead, after boozing till past midnight, and he had been treated as Dr. Percy treated the dogs, his brain, his liver, and all the other centers of power, would have yielded alcohol in abundance; his blood would have smelt of it; his flesh would have contained it; but there would have been very little in the stomach. Those men were able to drink four, six, and seven bottles of wine at a sitting, because the sitting lasted four, six, and seven hours, which gave time for the alcohol to be distributed over the system. But instances have occurred of laboring men who have kept themselves steadily drunk for forty-eight hours, and then died. The bodies of two such were dissected some years ago in England, and the food which they had eaten at the beginning of the debauch was undigested. It had been preserved in alcohol as we preserve snakes.

Once, and once only, in the lifetime of man, an intelligent human eye has been able to look into the human stomach, and watch the process of digestion. In 1822, at the United States Military post of Michilimackinac, Alexis St. Martin, a Canadian of French extraction, received accidentally a heavy charge of duck-shot in his side, while he was standing one yard from the muzzle of the gun. The wound was frightful. One of the lungs protruded, and from an enormous aperture in the stomach the food recently eaten was oozing. Dr. William Beaumont, U. S. A., the surgeon of the post, was notified, and dressed the wound. In exactly one year from that day the young man was well enough to get out of doors, and walk about the fort; and he continued to improve in health and strength, until he was as strong and hardy as the most of his race. He married, became the father of a large family, and performed for many years the laborious duties appertaining to an officer's servant at a frontier post. But the aperture into the stomach never closed, and the patient would not submit to the painful operation by which such wounds are sometimes closed artificially. He wore a compress arranged by the doctor, without which his dinner was not safe after he had eaten it.

By a most blessed chance, it happened that this Dr. William Beaumont, stationed there on the outskirts of creation, was an intelligent, inquisitive human being, who perceived all the value of the opportunity afforded him by this unique event. He set about improving that opportunity. He took the young man into his service, and, at intervals, for eight years, he experimented upon him. He alone among the sons of men has seen liquid flowing into the stomach of a living person, while yet the vessel was at the drinker's lips. Through the aperture (which remained two and a half inches in circumference) he could watch the entire operation of digestion, and he did so hundreds of times. If the man's stomach ached, he could look into it and see what was the matter; and, having found out, he would drop a rectifying pill into the aperture. He ascertained the time it takes to digest each of the articles of food commonly eaten, and the effects of all the usual errors in eating and drinking. In 1833 he published a thin volume, at Plattsburg, on Lake Champlain, in which the results of thousands of experiments and observations were only too briefly stated. He appears not to have heard of teetotalism, and hence all that he says upon the effects of alcoholic liquors is free from the suspicion which the arrogance and extravagance of some teetotalers have thrown over much that has been published on this subject. With a mind unbiassed, Dr. Beaumont, peering into the stomach of this stout Canadian, notices that a glass of brandy causes the coats of that organ to assume the same inflamed appearance as when he had been very angry, or much frightened, or had over eaten, or had had the flow of perspiration suddenly checked. In other words, brandy played the part of a foe in his system, and not that of a friend; it produced effects which were morbid, not healthy. Nor did it make any material difference whether St. Martin drank brandy, whisky, wine, cider, or beer, except so far as one was stronger than the other.

"Simple water," says Dr. Beaumont, "is perhaps the only

fluid that is called for by the wants of the economy. The artificial drinks are probably all more or less injurious; some more so than others, but none can claim exemption from the general charge. Even tea and coffee, the common beverages of all classes of people, have a tendency to debilitate the digestive organs. \* \* \* The whole class of alcoholic liquors may be considered as narcotics, producing very little difference in their ultimate effects upon the human system.

He ascertained, too, (not guessed, or inferred, but ascertained, watch in hand) that such things as mustard, horse radish, and pepper retard digestion. At the close of his valuable work, Dr. Beaumont appends a long list of "Inferences," among which are the following: "That solid food of a certain texture is easier of digestion than fluid; that stimulating condiments are injurious to the healthy system; that the use of ardent spirits always produces disease of the stomach if persisted in; that water, ardent spirits, and most other fluids, are not affected by the gastric juice, but pass from the stomach soon after they have been received." One thing appears to have much surprised Dr. Beaumont, and that was, the degree to which St. Martin's system could be disordered, without his being much inconvenienced by it. After drinking hard every day for eight or ten days, the stomach would show alarming appearances of disease; and yet the man would only feel a slight headache, and a general dullness and languor.

If there is no comfort for drinkers in Dr. Beaumont's precious little volume, it must also be confessed that neither the dissecting knife nor the microscope afford us the least countenance. All that has yet been ascertained of the effects of alcohol, by the dissection of the body, favors the extreme position of the extreme teetotalers. A brain alcoholized the microscope proves to be a brain diseased. Blood which has absorbed alcohol is unhealthy blood,—the microscope shows it. The liver, the heart, and other organs which have been accustomed to absorb alcohol, all give testimony under the microscope which produces discomfort in the mind of one who likes a glass of wine, and hopes to be able to continue the enjoyment of it. The dissecting knife and the microscope, so far, have nothing to say for us,—nothing at all; they are dead against us.

[To be continued.]

#### THE ARTS AND MANUFACTURES OF SAVAGES.

THE recent lectures of Sir John Lubbock at the Royal Institution, upon the Arts and Manufactures of Savages, contain much useful information of interest not only to mechanics but to ethnologists, and the general reader. We condense from the *Engineer* the substance of a portion of these important lectures.

In the first lecture the speaker called attention to the habits and customs of savages. While speaking of the modes of torture adopted in many tribes to test the powers of endurance of their own warriors, Sir John Lubbock said that cutting and piercing wounds are not always so painful as they look. In proof of this he took a common pin, and with the back of a book beat it up to its head into his leg about eight inches above the knee, then pulled it out and went on with the lecture, saying that the operation caused him very little pain or inconvenience.

This experiment however illustrative or sensational it might have been, is not such as we should advise any of our young readers to repeat. We were once personally cognizant of the death of a shoemaker by lockjaw, resulting from a punctured wound in the thigh caused by the slipping of an awl, which was much less formidable apparently than the self-inflicted puncture in Sir John Lubbock's leg. In the second lecture he dealt more especially with the facts relating to the subject of this article. He said that animals although often using stones to crack nuts, etc., could not properly be said to use implements as everything used by them was in its natural condition.

Man, said the lecturer, was in his lowest state probably able to advance in the construction of implements faster than other animals owing to three causes, namely, mental power, the possession of a hand, and the length of life which permits the accumulation of experience. However this may be, it is a fact that the lowest savages have a considerable variety of implements and weapons. These implements and weapons it is very difficult to classify, but perhaps the hammer and the knife may be regarded as a pair from which all the rest have sprung, even to the steam engine of modern times.

Two facts strike almost every one who examines with attention any good collection of savage implements. First, how the same types are found repeated in different parts of the world, and secondly, how gradually the different types pass into one another. Weapons, which to our eye are very similar, would be far from presenting the same uniformity of appearance to the savage, just as one man prefers one kind of steel pen to another. The simplest of the whole series of human implements is the hammer. That with which the Botocudo in Brazil breaks the hard, thick-walled fruits of his primeval forest, is often nothing but a stone. Stones bearing marks of such use are to be found in all collections of ancient stone implements. Stones also were the earliest missiles of savages, and were thrown at first by hand; there are however, a few records by travelers respecting savages said to be very skillful in throwing stones with their feet. Slings of two kinds are in use among savage tribes—one being the string sling, and the other a stick with a cleft in the top in which the stone is placed. Professor Nilsson has suggested that the sling used by David in his combat with Goliath was probably the latter kind, because the giant said—"Am I a dog, that thou comest to me with staves?"

The passage from the simple stone hammer to the club is easy, as the club is, after all, only an elongated hammer.

Branches of trees, however, naturally take this shape, and were probably used before stone clubs, which are very rare weapons, though they are sometimes used. All savage races have some clubs, which are merely pieces of wood thicker at one end than the other; but besides these, there are generally many of more artificial forms, and which are more or less elaborately carved.

The boomerang may also be regarded as a modification of the club. It is remarkable, not only for its form and properties, but also because it seems to be peculiar to Australia. This was the opinion of Dr. Klemm, the greatest authority on such a subject. It has, indeed, been stated that the natives of the Upper Nile use iron boomerangs, and they do, no doubt, throw a flat iron club or scimitar; but the special characteristic of the boomerang is that of returning to the point from whence it is thrown, and this property, we are expressly told by Sir Samuel Baker, the so-called African boomerangs do not possess. The natives of Guzerat also possess a form of club, which Colonel Lane Fox calls a "boomerang," but in this case also it seems probable that it does not return.

Eyre thus describes the mode of throwing the boomerang:—"Those whose angles are slightly obtuse are usually thrown with the sharp edge against the wind, and go circling through the air with amazing velocity to a great height and distance, describing nearly a parabola, and descending again at the foot of the person who throws them; those which have the largest obtuse angle are thrown generally against the ground, from which they bound up to a great height, and with much force. With both, the natives are able to hit distant objects with accuracy, either in hunting or in war; in the latter case this weapon is particularly dangerous, as it is almost impossible, even when it is seen in the air, to tell which way it will go or where descend. I once nearly had my arm broken by a wangno while standing within a yard of the native who threw it, and looking out purposely for it."

The shield is probably a modification of the club. The shields of the Australians are narrow, and intended rather to ward off the missiles than to arrest them, being only two or two and a half feet long, and at most eighteen inches broad. The shields of the Caffres are very large. Shields among savages are usually made of skin or hide and rarely of wood.

A few very low races of savages are entirely without cutting instruments, though such instances are most rare. The sharp edge of a piece of bamboo or cane forms a very good knife for some purposes, and bone knives are useful even in civilized communities. But the flint-flake is the habitual knife of savage life, and flint has taken a much more important part in the development of human civilization than we should have been disposed to admit a few years ago. The natural edges of some few flints may have given the first idea of a knife-edge, and even in the use of flint as hammer, sharp splinters would occasionally be knocked off. Typical flint-flakes such as these however are not found in nature, nor must it be supposed they are easy to make, a peculiar "knack" being necessary, as anybody may prove by experiment. Among savages flint-flakes are very universally met with. They are more abundant of course, where flint naturally occurs, but they seem to have passed from hand to hand and from one tribe to another, until they have traveled far from their place of manufacture. Some localities are known at which flint-flakes were evidently made in considerable numbers. All flakes having two sharp edges are at once fit for use and serve as knives, spear-heads, arrow-heads, and a variety of other purposes. They have been wrought into fish hooks, and in the Paris Exposition there was a Circassian thrashing machine, consisting of a broad board studded with flint flakes.

The axe, however, is the principal cutting instrument of savages, and the simpler forms of it have been nearly identical all over the world. No axes like those now employed by the Indians of North and South America have been used in Western Europe for many centuries, but in ancient times they were common here. It is so long since such axes were used in Europe that even in the times of the Romans, as now, when found by the ignorant peasantry, they were regarded as thunderbolts. The Danish axes were very well made. Now the question arises—"How were the axes of savages used?" No doubt they were much inferior to metal. Captain Cook tells us expressly that it was necessary to sharpen the South Sea axes "almost every minute, for which purpose a stone and a cocoanut shell full of water are always at hand." Moreover, even with the best of them it took several days labor to cut down a single tree, consequently we may be confident that no people who were acquainted with metal would have gone to the immense labor necessary to make a stone axe and to keep it in working order. They are very liable to break in use, and then have to be thrown away or re-ground. Still with stone axes the South Sea Islanders were able to cut down large trees and build canoes, some of which were ninety feet long. The handles of ancient axes, having been made of wood, have generally perished long ago, though not always. Many of the axes of metal now made and used by savages have unmistakably the old type of the stone blade.

The simplest form of spear is a mere stick of wood pointed at one or both ends, and sometimes hardened by being heated in the fire. The spears of the Australians are from eight to fourteen feet long. Some are merely pointed rods of hard wood, tipped with the sting of the sting-ray, and barbed with other smaller stings. Some have barbs of bone, others have barbs of wood, while others have a slit on one or both sides, in which is a row of pieces of shell or sharp stone. These spears are thrown with great force and skill.



The lecturer having minutely described and exhibited the one pointed spears of different savage tribes, said that the South Sea Islanders occasionally poison their spears by thrusting them into a corpse, and leaving them while the flesh decays.

The spear is generally and was probably originally thrown simply by the hand. Several races however, now possess an implement for the purpose, which is called a "throwing stick" or "spear-caster." This throwing stick is a flat piece of hard wood, generally, but not always, broader in the middle, with a piece of bone or tooth at one end as a catch for the end of the spear, and a lump of gum at the other to keep the hand from slipping. The spear-caster seems to be unknown in Asia, Africa and Europe, but it is used by the Esquimaux, and by one of the Brazilian tribes.

The arrow follows naturally after the smaller spear or javelin—indeed, the only way in which it can be distinguished satisfactorily is by the presence at the hinder end of a notch for the spring; for, though generally feathered at the end, many are bare. The bow and arrow, though very generally distributed, are not universal. The Australians and New Zealanders were entirely ignorant of them, nor are they used by the Caffres. The neighboring Bushmen on the contrary, rely principally on their bows and arrows, which, though weak, are formidable, because poisoned. The form of the bow varies very much. In the south it is said to be much longer than in the north; among equestrian races it is naturally much shorter than among those who go on foot. Among savages the arrows are very carefully made, because a bad shot often involves two or three days labor. Although the gun is gradually superseding the bow, still the latter possesses certain advantages, as it makes no noise, therefore does not frighten the game so much, and is lighter to carry. There is, moreover, a kind of arrow which is not used with a bow, but with a blow pipe, usually from six feet to sixteen feet long. These weapons occur in Sumatra and in the neighboring islands, also in South America, but not in Africa. In Western Europe it is represented by the pea-shooter.

The first traces of art with which we are acquainted began at a very early period, and have been found in a manner quite unexpected. Among the remains of a man discovered in the French caves, and belonging to the reindeer period—that is to say, at a time so early that the reindeer was abundant in the south of France, and when possibly—though on this point there is much doubt—even the mammoth had not entirely disappeared, simple carvings and etchings have been discovered giving unmistakable representations of animals. These works of art are sometimes sculptures, if one may so say, and sometimes drawings made on bone or horn with the point of a flint. They are of peculiar interest, being of far more ancient date than even the monuments of Assyria and Egypt. There are those who express surprise at the skill shown in the drawing of savages, but there is no reason why a savage living unknown ages ago should not draw as well as a child of to-day.

Sir John Lubbock then proceeded to describe at some length the skill in carving exhibited by many savage tribes. He also pointed out that some savages have no ideas of art, and cannot understand a picture when it is shown to them. He added that it is somewhat remarkable that while in the reindeer period we find very fair drawings of animals, in the latest part of the stone age, and throughout that of bronze, they are almost entirely wanting, and the ornamentation is confined to various combinations of straight and curved lines, and geometrical patterns. This he believed would be eventually found to imply a difference of race between the population of western Europe at these different periods.

#### MORE ABOUT SUBMARINE EXPLORATION.

Our description of the submarine apparatus now being used in the attempted recovery of treasure from the wreck of the frigate *Husar*, has given rise to inquiry for further information upon the subject. We herewith give an account of the commencement of submarine exploration, and its progress up to the present time. As we said in our former article, diving without the use of apparatus was the beginning, and it dates back to a very early period. Homer, in the sixteenth book of the *Iliad*, describes Patroclus as taunting Hector's charioteer for falling from his horse when he was slain, as a diver goes into the sea to bring up oysters. Other references to diving are to be found in ancient works. Thucydides speaks of the employment of divers to saw off stockades driven into the bottom of a harbor to prevent Greek ships from entering. Livy gives an account of their employment for the recovery of treasure and merchandise. The story of Antony's fishing and bringing up a salt fish attached to his hook by a diver employed by Cleopatra, is a familiar one. The first attempts to aid divers in their descent, were confined to such rude devices as bladders placed over the mouth and weights to help them to descend and remain more easily. In Pliny's time divers used a long pipe with a floating funnel to enable them to breathe under water while engaged in the operations of ancient warfare. In 1252, Bacon, in his "Discoveries of the Miracles of Art, Nature, and Magic," says: "A man may make an engine whereby without any corporal danger, he may walk at the bottom of the sea or other waters." Like many other hints which were thrown out by Bacon and which have found their interpretation since, in the great inventions which have succeeded them, this was unaccompanied by any detailed description.

The real history of devices for submarine exploration dates from the sixteenth century. From that time to the present, there has been gradual improvement in this art. Not the least meritorious of the inventions which have been made belong to our own time and country, but of them anon.

As all the devices for submarine navigation have hitherto met with little or no success, we shall pass them without remark, and confine ourselves to those devices which have had for their object the simple descent and continuance beneath the surface in safety and comfort. These devices have, comparatively speaking, only lately begun to assume a form approaching perfection. The earliest mention of a diving bell that we can find is in "Beekman's History of Inventions." He says that in the sixteenth century, in the presence of the Emperor Charles V., and several thousand spectators, two Greeks let themselves down under water in a large "inverted kettle" with a burning light and rose again "without being wet." In the latter part of the fifteenth century, some attempts were commenced to recover from the Spanish Armada, the treasure which was lost at the time of its disaster near the Island of Mull in the Hebrides, but without success only three guns being recovered. In this attempt a bell was used devised by the Marquis of Argyll, to whom the British Government pledged all the treasure he should succeed in recovering.

In 1680, William Phipps invented a square box of iron with windows and a seat for divers, with which the Spanish treasure was again sought. After having once failed he was assisted by the then Duke of Albemarle, and succeeded in finding and recovering treasures to the value of \$1,000,000 in gold. For this feat he was knighted. In 1683, Sinclair, the mathematician, published a series of calculations relating to the size of a bell necessary to contain air for a given number of men for a given period, and the proper thickness and shape of its walls to withstand pressure; the depth to which bells of certain construction could safely descend, etc. These calculations were of the greatest value to the advancement of the art. In 1775, the celebrated Dr. Halley contrived a way for supplying air to a submerged bell, by sinking a number of barrels filled with air to the bottom, which was transferred to the bell by means of tubes and cocks, an escape-cock being placed at the top of the bell. With this apparatus, slightly improved, Mr. Spaulding and an assistant attempted to recover the cargo of a vessel wrecked on the coast of Ireland, but by some means they were unable to obtain a supply of air from the barrels and were suffocated. Smeaton was the first to supply air to bells by the use of forcing pumps, and since his time the air pump has been constantly used in similar attempts. We have not space to give in detail an account of the progress of improvement in diving bells in other countries since Smeaton's time. Some very efficient submarine armor has been devised, to which we referred in our former article, together with some difficulties which cannot probably be obviated in this class of devices.

These inventions have, notwithstanding, proved of great service in submarine engineering. In the early part of the present century by the use of a modification of Kleingert's armor, Tonkin recovered treasure from the Abergavenny, sunk near Weymouth, amounting to \$300,000.

We are indebted to Dr. J. A. Weisse for the following particulars of the most recent improvements in diving bells.

"The *Nautilus* Diving Bell, exhibited at the Crystal Palace in New York, was an improvement on all previous diving bells, having within its walls a working chamber, an air chamber, and a ballast or water chamber. The able engineer, William Mont Storm, improved the *Nautilus*, whose patent expired some years ago.

The *Ryerson* Diving Bell, patented October 19th, 1858, had like the *Nautilus*, a working chamber, an air chamber, and a ballast or water chamber with some improvements. In this bell, Otto Sackersdorf, engineer of our Street Department for twenty years, blasted and removed 2,100 cubic yards of Diamond Reef and opened the channel between Governor's Island and Brooklyn.

In a written statement of October 6th, 1864, Mr. Sackersdorf speaks thus of the *Nautilus*, *Maillet's* Bell, and of the *Ryerson* Bell: "The *Nautilus*, although a decided improvement, has not verified its promises. I have tried it at the Navy Yard in 1854. It does not work independently from the surface and uses too much air.

"*Maillet's* Bell has some good features for stationary work, but it is immovable and very dangerous on account of its funnel or man-hole. Absolutely impracticable for any depth of water, say twenty-five or thirty feet or strong tide.

"The *Ryerson* Bell carried about four atmospheres of pressure in the chambers, and its lifting power was up to eight tons. Heavy rocks were taken and dropped in deep water. The bell was independent of anything above water (signal-line excepted), and carrying the means of respiration and motive power in itself; remains any length of time below, or descends or ascends with any velocity you choose. Twenty seconds were more than enough to descend twenty-five or thirty feet. The old fashioned bell required on the same spot sixteen minutes, not mentioning the slow and dangerous mode of entering or leaving. Suffice it to say, that our bell had about nine feet of diameter inside. Five men had ample room to work in. They experienced no difficulty whatever and changed but once a day with the gang on board the vessel above. Any man of common sense can be easily instructed to work the apparatus, so simple is the arrangement thereof. A leak is at once indicated by the barometer, and by this means all danger of drowning made impossible."

William Mont Storm's "Improved Submarine Explorer," to which the Patent Office, May 1, 1866, granted eight new claims of improvement over all its predecessors, has been still further improved by Mr. Wm. R. Taylor.

A report of the principles involved in these bells and of the uses they may be applied to, by Wm. W. Wood, chief engineer of the United States Navy, may be found in the Navy Department, dated February 2, 1865. Admiral Farragut,

looking at a drawing of the Improved Submarine Explorer, observed that naval warfare would soon be carried on as vigorously under as above water.

With this bell, as we stated in our former article, an engineer and four men with provisions, lights, and working tools of every kind, can descend to certain depths of fresh or salt water, work at wrecks, blast rocks, remove harbor obstructions, lay foundations for wharves, piers, docks, lighthouses, bridges, sea walls, fortifications, and repair the same with almost as much facility as on *terra firma*. Thus millions of wrecked treasure and merchandise might be raised, and all the Scylla and Charybdis, Hell Gates, and Cliffs, so much dreaded by mariners, might be widened, deepened, and cleared all over the world.

#### Weight of the Air.

The air is composed of two ingredients, not in combination, but as a mixture, like wine and water. These ingredients are oxygen and nitrogen. They exist in the proportion of 23 of oxygen to 77 of nitrogen in 100 parts. Besides these, the air contains of carbonic acid about 3 parts in 10,000. Our atmosphere is estimated to contain about 1,954,578 cubic miles of oxygen. The respiration of man and animals, together with the combustion of fuel, consumes annually about 2½ cubic miles; consequently 250 cubic miles in 100 years, or only a 10,000th part in this time. The above paragraph reveals even more wonderful facts; a single perusal of it is sufficient to suggest questions of a most startling character.

Thus it appears, that in the course of ages, say 1,000,000 the supply of oxygen would be exhausted, and its beneficial place taken by carbonic acid, generated by respiration and other forms of combustion. But such was not to be. Let us for an instant consider the revelations of geology. It tells us that ages before the creation of man, the atmosphere contained a larger proportion of carbonic acid than it does at the present day. The question then arises, what has become of it? Let us dig into the earth till we discover coal; we then find our answer. The excessive carbonic acid of the early atmosphere has been converted into coal—coal, the remains of trees, which, in their lifetime, possessed the power common to all living plants, that of decomposing carbonic acid; depositing within their cells the carbon, and returning to the air its oxygen, for carbonic acid is only composed of carbon and oxygen.

What does the air weigh? Nothing, many will answer. But this is a great mistake, for every 100 cubic inches of air weigh slightly more than 31 grains. A cubic yard of oxygen weighs 2 lb. 4 oz. 7 dr. Such being the case, a cubic mile of oxygen weighs nearly 5,543,623 tons 10 cwt. By another multiplication sum it is easy to show that the whole of the oxygen in the atmosphere weighs 10,835,444,533,383; and, since the oxygen and nitrogen of the air exist in the proportion of 23 of the former to 77 of the latter, as before stated, the total weight of nitrogen of the air is the amazing amount of 36,275,183,872,630 tons, while the total weight of the air, which is the result of the addition of these two quantities, yields the astonishing quantity of 47,110,628,406,013 tons.—C. H. Piessé.

#### Mock Sun and Mirage.

About this time, last year, a mock sun was visible from Dover. This is a very rare phenomenon, and results from a reflection from clouds in the eastern horizon of the setting sun in the west, there apparently being two suns in the heavens at the same time. The atmosphere of the straits of Dover seems to produce these strange appearances in the sky, for a mirage was lately strikingly conspicuous at Dover. The dome of the cathedral and Napoleon's Pillar at Boulogne were to be seen from the Crescent Walk by the naked eye; but with a telescope of ordinary power the entrance of the port, its lighthouse, its shipping, and the surrounding houses, the valley of the hillside of Capecure, and the little fishing village of Portel were distinctly visible; while on the eastern side the principal features of the country, the lighthouse of Cape Grinez, the adjacent windmill, numerous farms and villages, with their windows illuminated by the setting sun, stood out with extraordinary clearness. While these were under observation, a locomotive was seen to leave Boulogne and travel some miles in the Calais direction, by its puffs and wreaths of white steam. Shortly after sunset the mirage subsided.—C. H. Piessé.

#### Movements of the Sensitive Plant.

M. Bert and M. de Blondeau have published in the *Comptes Rendus* some extremely interesting observations on this subject. M. Bert shows that the natural and regular movements of the leaves, which take place in the sensitive plant, are produced by a different cause from that to which the sudden contraction is due when the plant is touched by the fingers. M. de Blondeau's observations are exceedingly curious and well worth further examination. He submitted three plants to the influence of an electric current from a Ruhmkorff coil. The first he acted on for five minutes; when left to itself, the plant seemed prostrated, but after a quarter of an hour the leaves opened and it seemed to recover itself. The second specimen was acted on for ten minutes. The plant was prostrate for an hour, after which it slowly recovered. The third specimen was galvanised for twenty-five minutes, but it never recovered; and in twenty-four hours it had the appearance of a plant struck with lightning. A fourth plant was etherised and then exposed to the current. Strange to say, the latter had not any effect; the leaves remained straight and open; thus proving, says M. de Blondeau, that the mode of the contraction of the leaves of the sensitive plants is in some way allied to the muscular contraction of animals.



## POLYTECHNIC COLLEGE OF PENNSYLVANIA.

Reported for the Scientific American.

The Annual Commencement of this well known seat of technical education was held in the new and spacious Horticultural Hall, Philadelphia. It was attended by a large audience, comprising many of the leading manufacturers, iron masters, and officers of railways and mines, not only of that city but of the interior of the State. On the stage were grouped leveling and transit instruments, models and apparatus symbolical of architecture, mining, chemistry, and civil and mechanical engineering.

During the performance of a march by the Germania Orchestra, the procession, consisting of the Trustees and Faculty of the College, the reverend clergy and other invited guests, the alumni association, and members of the graduating and other classes of students, entered the hall, and advancing to the stage, took the seats assigned them. The Hon. John P. Vance, President of the Board of Trustees, announced the order of exercises, which were opened with an impressive prayer by Rev. Phillips Brooks, Rector of Holy Trinity Church, Philadelphia. The introductory address was delivered by Gustavus Remak, Esq., who drew a vivid picture of the great undeveloped industrial resources of the country, north, west, and south, and pointed to the polytechnic system of education as the true and proper means whereby such development may be economically secured. Graduates under that system in Europe were chiefly relied on as directors of her great industries, and now that the system had been successfully transplanted to America, those educated with its advantages were found to be most worthy of confidence, and were therefore more and more in demand. He then traced the history of the Polytechnic College of Philadelphia from the date of the incorporation fifteen years ago, and closed by congratulating the officers and students upon its steady and prosperous career. The recent establishment of the Preparatory School, which he said was the first American "Realschule," he hailed as another step toward the attainment of a high standard of polytechnic education in this country.

The degrees of the college were then conferred by the President of the Board of Trustees upon the gentlemen whose names are appended.

The charge to the graduates was delivered by Hon. Titian J. Coffey, whose address was a powerful and convincing argument in behalf of scientific education and against the too exclusive study of the dead languages, which now characterizes the usual college course. That course had remained unchanged for centuries. Meanwhile the labors of the learned had created the natural sciences. Skilled experimenters and artisans had discovered and invented, remodeling the material earth and elevating man. Yet the so-called classical course practically ignored all this progress and denied to its students that robust mental discipline which, severe though it be, the young investigator of modern scientific truth enjoys, as he feels it indeed to be the best training for the sharp conflicts of life. His observation is made acute, and from the habitual determination of the nicer characters of his specimens, he gradually learns to discriminate between men. His imagination finds scope in the theories of chemistry and the study of the imponderable forms of light, heat, and electricity, and his reasoning powers are matured as he solves the sublime problems of terrestrial and celestial mechanics. Mr. Coffey denied that the classical course was the best training for the literary man, and cited in proof a list of the most vigorous, powerful, and influential writers and thinkers of modern times, and adduced the testimony of the first educators and scientific men of Great Britain in behalf of his position. In his closing charge he spoke of the great cause which the graduates had to be proud of the college, and instituted a comparison between their advantages and those of European graduates.

The following is a list of the graduates, of the technical schools in which they studied, and the subjects of their graduating theses:

## I.—SCHOOL OF MINES.

## DEGREE OF BACHELOR OF MINE ENGINEERING.

1. Edward H. Hughes, Newberry, S. C. Origin and Use of Coal.
2. Samuel Hunt, Catasauqua, Lehigh county, Pa. Preparation of Ores.
3. William J. Joffe, Virginia, America's Silver Amalgamation.
4. Richard Lewis, Trevertown, Northumberland county, Pa. The Ventilation of Coal Mines.
5. Gratz Mordcau, Philadelphia, Pa. Preparation of Fuel.
6. Gilbert H. Van Allen, Danville, Montour county, Pa. Metallurgy of Iron.

## II.—SCHOOL OF MECHANICAL ENGINEERING.

## DEGREE OF BACHELOR OF MECHANICAL ENGINEERING.

1. Murray Bacon, On Lubricants.
2. Harry B. Salkeld, Mauch Chunk, Carbon county, Pa. The method of Constructing Steam Boilers.

## III.—SCHOOL OF CIVIL ENGINEERING.

## DEGREE OF BACHELOR OF CIVIL ENGINEERING.

1. John Israel Bishop, Columbus, Burlington county, N. J. Tabular Bridging.
2. Alfred Augustus Curtis, Newark, New Castle county, Del. Under-water Foundations for Bridges.
3. Henry Freedley, Jr., Norristown, Montgomery county, Pa. Iron-girder Bridges.
4. Benjamin P. Howell, Jr., Woodbury, Gloucester county, N. J. Limes, Mortars, and Cements.
5. Samuel H. Ladd, Woodbury, Gloucester county, N. J. Ventilation of Buildings.
6. Herman H. Mund, Philadelphia, Pa. Stone Masonry.
7. Emilio V. Munoz, Santiago, Cuba. Construction of Canals.
8. F. H. Oltmann, Jr., Spring Hill Furnace, Fayette county, Pa. Tunneling Through Rock.
9. Amos M. Shuster, Frenchtown, N. J. Construction of Roofs.
10. Joseph E. Thropp, Valley Forge, Chester county, Pa. Detaching Rock.
11. R. B. Van Dusen, Knoxville, Tioga county, Pa. Permanent Ways.
12. Rowland Whitman, Philadelphia, Pa. Suspension Bridges.
13. A. D. Wright, Farmington Center, Tioga county, Pa. Common Roads.

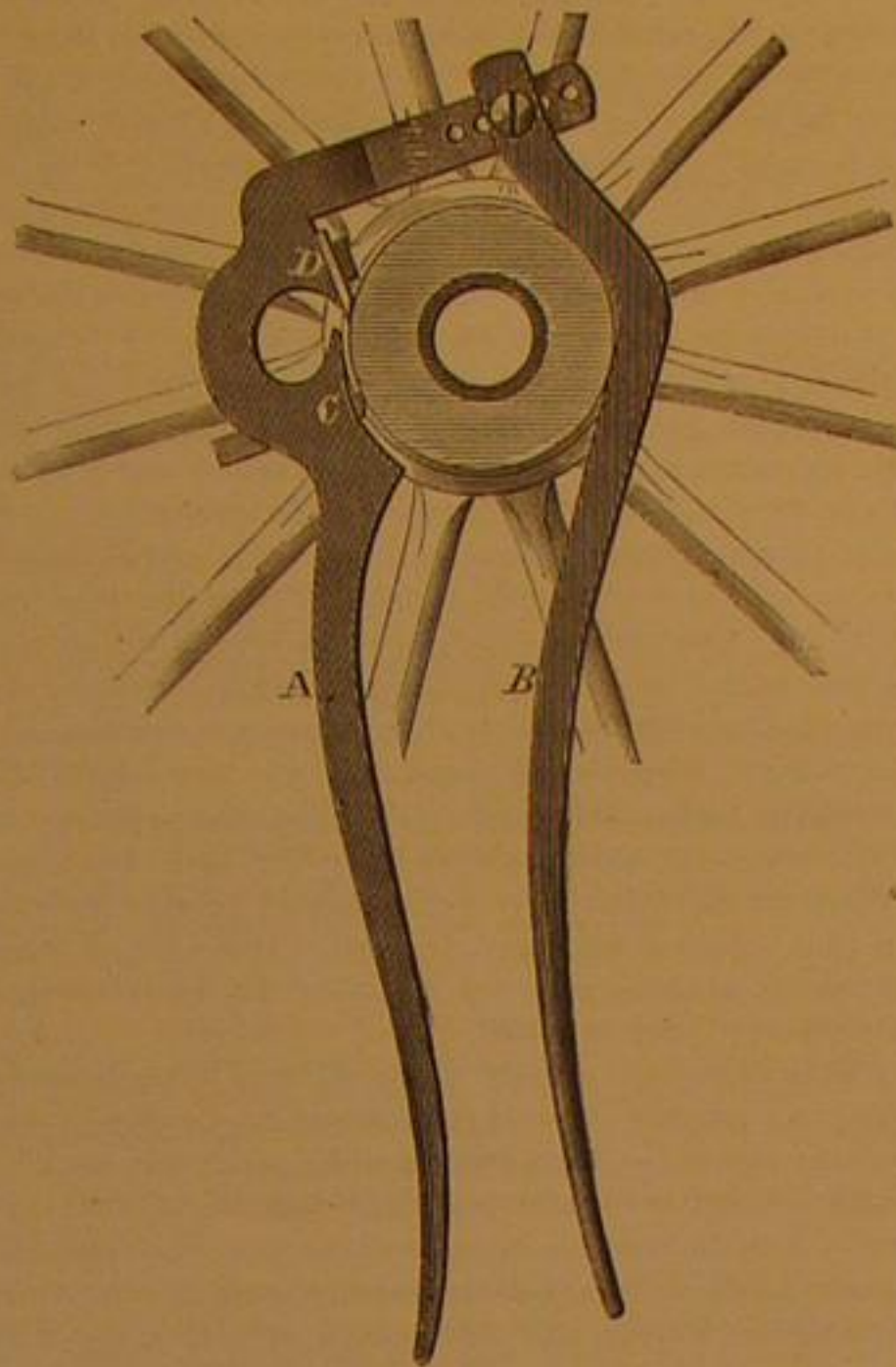
The Master's Degree was conferred upon the following graduates of three years' standing:

Master of Mine Engineering, on Price Wetherill, mining engineer, Mahanoy City, Pa.  
Masters of Civil Engineering—Jonathan R. Jones, C. E., Conshohocken, Pa.; Henry H. Corson, C. E., Plymouth, Pa.

THE Scientific Association at Chicago adjourned on the 12th inst., after the usual resolutions of thanks to all concerned, and the election of Prof. J. W. Foster, of Chicago, as President of the next meeting, to be held August 16, 1869, by invitation, at Salem, Mass.

## STONE &amp; HERBERT'S PATENT TOOL FOR FITTING HUB-BANDS.

The simplicity of this tool is such that the practical carriage maker or wheel-wright will understand at once its action and operation, by an examination of the accompanying illustration. It is intended to save the clipping with mallet and chisel usually practiced to fit the hub of wagon wheels to the band. The implement consists mainly of two handles, A, having a right-angled arm to which B is pivoted by means of a bolt. B is sufficiently bent to bear at two fixed points on the perimeter of a hub, whether it be large or small, and A has also a concave face for the same purpose. To further adapt the instrument to varying diameters, the handle, B, may be set nearer to or farther from the other by shifting its pivot bolt, for which purpose the arm of A is furnished with



a series of holes. C is a marking or scribing cutter, and D, a chisel; both adjustable by means of set screws and slots. In operation the wheel is swung and revolved while the workman holds the tool on the hub.

Patented through the Scientific American Patent Agency, July 14, 1868, by Charles E. Stone, Amesbury, Mass., and Alfred Herbert, Salisbury, Mass. For the entire patent, State rights, or further particulars, address either of the patentees, box 163 Amesbury, Mass.

## Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

## The Union Pacific Railroad Company.

MESSENGERS. EDITORS:—Have you space for a brief article upon the Union Pacific Railroad, and the country which it traverses? I am prompted to write this for your columns, because, having recently traveled over that railroad for a distance of seven hundred miles west from Omaha, and having seen every mile of it by daylight, I am qualified to speak somewhat strongly of its character, and to emphatically deny some of the charges that have been made against it. I was one of the editorial party of thirty who have recently returned from the end of the line, and who were given the fullest opportunity possible for thorough investigation into the construction and management of the road.

I have spoken of charges made against the character of the road. Evidently some of these charges are prompted by prejudice, and more by utter ignorance of the subject. It is not long since a prominent newspaper published a letter of complaints against the Union Pacific Road, the strong points of which were that the bridges were made of pine! and were actually built without arches! The blundering letter-writer was right—the bridges are built of pine, which you know to be the best bridge timber in the world, and every one of them is a Howe truss bridge, whose peculiar strength lies in the fact that there is not a sign of an arch about it. I have now before me two letters published in a Brooklyn paper, evidently written by one person. These have sundry charges against the Union Pacific Railroad, a part of which are frivolous, and others more tangible. Let us see what foundation the writer has for his denunciations.

A large part of the letters is taken up with sneers at "dead-heads," who go over the road at the expense of the company, and are charged with being thereby bribed to tell a flattering tale. I suppose he would include our whole party under that head, because we were invited by the agents of the railroad company; so let us see what our circumstances were. Every invitation to join the party said, in substance, "send some gentleman of sound sense and good judgment, who can state clearly the condition of things as he sees them, and who can criticize intelligently, if he finds occasion to do it at all." In response to this invitation, we had gentlemen of a standing and repute not to be bought up with good eating or comfortable quarters, if such a thing had been desired. Then, the gentlemen in charge of the party, and who represented the railroad company, took a special train

from Omaha, which went fast or slow as was desired, which stopped whenever it was desired by the guests, to examine the road or its surroundings, and which passed over the entire line by daylight, either going or returning. Hence the members of the party had a far better opportunity for seeing the exact character of everything pertaining to the road than the writer referred to, or any traveler by ordinary trains could have. What was the verdict? Hon. Charles A. Dana, editor of the New York Sun, is a credible and responsible witness; and he speaks the sentiment of the entire party when he says:

"Their unanimous opinion is, that the road is constructed in the most thorough and solid manner, and that it is superior in firmness, smoothness, and capacity, for rapid running, to any other new road which they have ever seen. The work is well done, both as respects the judgment with which it is laid out, and the thoroughness of its construction; and there is no part of it which could, under the circumstances, be better than it is. All reports to the contrary are erroneous and mistaken."

The critic referred to says that he anticipated seeing "marvelous cities, beautiful villages, and delightful settlements," all along the line, and seems to have been surprised to find a congregation of bad characters at Cheyenne. Then, he must have known less of the inevitable character of a new country than men of ordinary sagacity. To expect to find New England or eastern Pennsylvania towns in a region just opened to civilization, one or two years ago, shows a credulity which deserves disappointment. But Cheyenne, Laramie, and Benton, have successively deserved the title of "marvelous cities," or villages. There is not a pleasant nor an attractive growth to an eastern man; but Omaha on the one side, and San Francisco on the other, have both passed through similar experience, before law and order succeeded the reign of vice and violence. For one, I have never yet seen any description, even from a "dead-head," of these places, which represented them to be the abodes of peace. The tendency has invariably been to exaggerate their lawlessness, and make the hair of a timid man stand on end at the thought of visiting them.

In regard to the road itself, the paragraph I have quoted above expresses just what we all felt after thorough examination. On our return, we made the run from North Platte to Omaha, a distance of two hundred and ninety miles, at an average rate of over thirty-four miles an hour, and ran fifty-five miles in one hour. No railroad officer in the country would dare do that, or suffer it to be done upon his road, if the latter was not in splendid condition. This portion of our trip was made with as much comfort to us as any other part of the whole run from New York to the Rocky Mountains; and I claim that this one fact will convince any candid man that it is a gross libel to speak of "the miserable and absolutely unsafe manner in which the road is constructed." Here are some of the details of construction: The iron is of the very best American manufacture; the ties number 2,650 to the mile (the average upon the railroads of the country is about 1,700); the rails are all joined by "fish-plates," of a pattern approved by the best railroad engineers; the road is being ballasted with broken stone brought from the Black Hills; the culverts are now made of substantial timber, which would be good for ten years' wear; but the contract is already made for immediately replacing them with heavy dressed masonry. The equipment of the road is superb. The locomotives are of the best Taunton, Providence, Trenton, and Paterson make; while the freight and passenger cars, which are turned out from the company's own magnificently appointed shops at Omaha, are equal in every respect to any that I have ever seen in the course of many years' active traveling. These shops, by the way, cover eight acres of ground, and are manned by about one thousand intelligent artisans, who have all the advantages that the most perfect tools and machinery can give them.

The perfect, almost military discipline, which pervades all the vast operations of the company, is noticeable and pleasurable. Especially is this apparent at the end of the track, where four hundred men are engaged in the track-laying, where every man knows so exactly his place in the grand human machinery, and so promptly and energetically fills it, that no possible improvement can suggest itself. It would take more words than you have space to print, to adequately describe this wonderful march to the western sea.

But I must stop. The theme is inspiring; but there remain all the future ages in which to recount the worth to the country of the Union Pacific Railroad, and the honor due to those men of brains and energy, and indomitable pluck, who have conceived and are so grandly executing this national undertaking.

Let me close with another quotation, this one from the practical, unimpulsive Baltimore American:

"It is proper to say, just here, that the rumors which have been put afloat at the east, that the company is a party of speculators putting down a rude and poorly constructed road, that will be useless, or nearly so, when completed, are falsehoods which could have only been concocted and put in circulation for purposes that would scarcely bear examination. The road is a good one, well and solidly laid, with heavy rail, and twenty-six hundred cross-ties to the mile, over which the cars travel with remarkable smoothness; and the equipments, station-houses, and work shops, all show that it is being built for use and not for speculation."

S. D. P.

## Algebra—Mathematics for Mechanics.

MESSENGERS. EDITORS:—In your issue of the 5th inst., I was quite surprised at the remark of Mr. Horace Greeley on the study of algebra, and quite indignant your opinions on the subject. Any one who knows anything of the study of mechanics, must know that a previous knowledge of geometry and algebra is indispensable to acquire its principles. But, laying aside the question of its after utility, to say its study will clog the brains, is an assertion, which, I think, the writer would retract after mature consideration; for the more one studies, the more is the capacity of the brain for storing



knowledge increased, and the more subjects are opened to one's view as he proceeds, he feels his ignorance, and is thus nerved for stronger efforts to gain the upper branches of the tree of knowledge. In the majority of schools, boys are taught geometry before they have chosen a profession, because it teaches them to reason logically, and expands the mind by causing them to use their common sense; and in the same manner algebra shows them how labor is saved and time gained by the use of symbols, and by preserving a method in all their work, so that if they do not require a knowledge of these subjects in after life, they will have improved the mind so as to ever benefit them. In preparing engineers for the British navy, the plan adopted is, to see that they have a thorough knowledge of geometry and algebra, and with this good groundwork to build on, they take trigonometry, mechanics, and chemistry, hand in hand, as they advance taking the higher branches of mathematics, so that in the end, they have often as good a knowledge of all branches of mechanics as those who have studied at the universities. At the same time, they have a complete knowledge of practical engineering, which, together with the theoretical, makes them fully fit for their arduous duties at sea. J. H. RICKARD.

Clifton Springs, N. Y.

#### Electro-Magnetism as a Motive Power.

MESSRS. EDITORS:—I notice in the SCIENTIFIC AMERICAN of July 8th, under the head, "The Impossible in Constructive Science," a well written article from the *Engineer*, in which "Electro-magnetism as a motive power" seems to be very summarily disposed of. Believing that the ideas set forth in said article are calculated to have a tendency to check the ardor of some who are endeavoring to produce a motive power safer and in all respects more desirable than steam power, I propose, with due deference, to offer a few remarks.

*Engineer* says that "we now know that nothing can be expected from electro-magnetism as a motive power," and that "all the power which an electro-magnetic engine can produce is represented by the oxidation of a given weight of zinc." But what electro-magnetic engine? Henry's, Page's, Vergne's, Wickesham's, or Stewart's? Because each of these will give a different result with a given current. Could the power of steam be definitely ascertained by experimenting with the engines of Hero of Alexandria, Blasco de Garay, the Marquis of Worcester, Denis Papin, Captain Savery, or even of Newcomen? And yet the power of steam was as great 1,000 years ago as to-day. The arrangement of James Watt simply developed a greater percentage of the power of steam than those of his predecessors. Now it is highly probable that the best electro-magnetic engines do not develop one per cent of the electro-motive force, and are in fact mere whirligigs, like the *atopile*, showing something of the velocity with but little of the force of the current.

*Engineer* says it is far more economical to burn coal to store up power in water than to burn it to store up power in zinc. Now the electro-magnetic force is derived from the oxidation of pure zinc, which is obtained from the ore by the combustion of coal. The duty performed by the coal being simply to drive off (not store up) foreign matter, and not oxidize the zinc—a pound of pure zinc giving the maximum of electro-motive force, the combustion of coal being at the minimum (or rather, nothing). So that it is easy, even for an unlettered man, to see that there is no connection or relation whatever between the power represented by the oxidation of a given weight of zinc and the coal necessary to produce the zinc from the ore.

*Engineer* says "that the discovery of the conservation of energy dashed the hopes of the inventor to the ground." But why so? What is the amount of coal necessary to oxidize one pound of zinc? Zinc melts at 773° Fah., and at a considerably higher temperature passes off slowly in the form of vapor. More than one hundred pounds of coal would be required to oxidize one pound of zinc, equal to twenty-five horse-power per hour. But again, Miller, in his work on electricity and magnetism, states that, "from the experiments of Weber it may be calculated that if the whole of the positive electricity required to decompose a grain of water were accumulated upon a cloud 1,000 meters (3,281 feet) above the surface of the earth, the attractive force exerted between the cloud and the portion of the earth beneath it would be equal to 1,497 tons." Now, to decompose one grain of water, 3.63 grains of zinc are required, and the electricity derived from a pound of zinc and situated as above would give an attractive force of 2,384,742 tons! JOHN CLARK.

#### Removing Shellac from Watchmakers' Lathes.

MESSRS. EDITORS:—A steady mode of dissolving shellac upon watchmakers' lathes is needed. The article turned is taken off by the heat of a lamp, and some substance, liquid or solid, which would, with or without heat, soften the shellac, so that it could be quickly removed with the brush, would be a desideratum. Alcohol is used, but it is too slow.

Pa.

S. T. S.

[We know of no ready solvent of shellac that will not act chemically upon metals, except alcohol. Shellac dissolves easily in dilute muriatic and acetic acids. By the aid of heat it is also easily dissolved, by a solution of borax. If any of our correspondents know of anything better than alcohol, we shall be glad to hear from them.—Eds.]

#### Mode of Dividing Glass.

MESSRS. EDITORS:—The following plan, to break a bottle or jar across its circumference, so as to form a battery cup or vessel for other purposes, may be of some service to your readers. I have performed the operation successfully many times. Place the bottle in a vessel of water, to the height

where it is designed to break it; also fill the bottle to the same level. Now pour coal oil inside and out on the water; cut a ring of paper, fitting the bottle. Saturate with alcohol or benzine, so that it touches the oil. Pour, also, some inside the bottle. Set on fire; the cold water prevents the glass from heating below its surface, while the expansion caused by the heat will break the vessel on the water line.

J. T. PEET.

#### PHYSICAL STRENGTH.

The common idea in regard to physical strength is that it depends solely upon the amount and quality of muscle, bone and sinew. In the training of athletes for the performance of physical feats the prominent features are the means for development of the muscular tissue and the inuring of muscles to severe work, so that the soreness which results from the extraordinary exercise of the body not thus inured, shall no longer be a sequence of physical exertion. This is right so far as it goes. Development of muscle, strength of bone, and firm elastic sinews are essential elements of strength as well as endurance, but they are by no means all. Were that the case, strength could be estimated by weight approximately. But the facts are that many small men having no superior training or no better apparent health, have often been more than a match for larger men. The strongest man with whom we were ever acquainted, never weighed over one hundred and fifty pounds. We might tell some large stories of the feats of this remarkable man, but the point which we wish to make will be sufficiently illustrated without any such particulars. The peculiar feature which always forced itself upon our attention when he was powerfully exerting himself was his perfect placidity of countenance, and the want of that turgid congested appearance of the face which often accompanies such exhibitions. Further the muscles not specially employed never exhibited rigidity, as is often seen in feats of strength, but were soft as though he were reclining at his ease. Except he was doing some labor which caused much motion of the muscles of the chest, he never appeared to be "winded," as it is called.

We have often set ourself to the solution of the reason of the different degrees of strength possessed by different individuals, or rather, we have attempted to get at the secret of strength which lies back of bone and muscle, and we have no doubt it is the peculiar exercise of the will: the concentration, so to speak, of the nervous energy upon one muscle or set of muscles, without the distribution of it to muscles not concerned in the act to be accomplished. This was proved in the case alluded to by the fact that in feats which involved the exercise of nearly all the muscles, his power was not so conspicuous. In special feats, as for instance the raising and sustaining a heavy weight at arms length, his great strength, and also the concentration of will to which we have alluded was most conspicuous. This man's strength was undoubtedly to be attributed to his shortness of limb in some degree as, with equal development of muscle increased length of bone is a disadvantage. Each bone in the animal frame is a lever, and the muscles are so attached that the motion they impart to the bones is multiplied through its transmission by them to weights or resistances. Too great length of bone in proportion to amount of muscle is not conducive to superior strength although it adds to fleetness. The differences in the structure of the bulldog and the greyhound are good illustrations of this fact.

The elements of physical strength may then be stated to be in healthy subjects, development of muscle, strength of bone and sinew, small relative length of bone in proportion to muscle, and power to concentrate exclusively upon the muscles employed the nervous energy which produces contraction. There is no doubt that this power can be cultivated, like other powers by proper discipline; and if those who are obliged to lift heavy weights or to make other great exertion at times, would bear this in mind, they would be enabled to accomplish their labor with less exhaustion than is at present the case. The view here taken of the concentration of will seems to be sustained by the opinions of the eminent chemist and physiologist, Liebig, who states that it is just as impossible by the combustion of a piece of dried muscle to calculate its efficiency in the living body (the assumption of some physicists), as it is by the combustion of a dried bee to estimate the work which it accomplishes in its flight of many hours, carrying the weight of its own body several miles.

The muscle in a living body acts like the apparatus in a watch which gradually expends the power stored up in it; a freshly severed frog's leg represents an apparatus of this kind with an escapement, while the newly removed heart of the same animal corresponds to one without any escapement; the frog's heart beating for hours together just as in the living body, while the frog's leg moves as soon as an irritant sets it for a moment free from the escapement, and if small weights are hung on them, it is possible to obtain work from a pair of severed frog's legs; that is, the weights will again and again be alternately raised to a certain height, without blood or the supply of any kind of nutriment.

It would seem from these statements that the muscles are to be considered merely as vehicles of a force which is imparted to them. This force—the nervous energy, whatever that may be—must of course become sooner exhausted, and also lose in immediate efficiency by being distributed to muscles not required for the performance of any specific work.

#### The Chicago Savans.

The American Association for the Advancement of Science, out of gratitude for the hospitality shown them by the citizens of Chicago, admitted to membership some two hundred

prominent business men, lawyers, hotel keepers, pork packers, and so forth. A writer in the *Chicago Tribune* makes this a subject of sport in a very humorous "take off," in which these gentlemen are regarded as professors, reading papers upon the subjects peculiar to their several occupations. We extract the following, which show the satirical humor of the article:

"In looking over the list of the Chicago savans, who can help being proud of the contributions they will make to the scientific knowledge of the world at their first meeting, the record of which will undoubtedly appear in the daily press somewhat after the following fashion:

"The session of the American Scientific Association was one of peculiar interest, from the large number of essays which were read. Professor Jerome Beecher read a paper on the relations between gas and dividends, showing that the pre-historic man never received any profits from its illuminating properties and that Solomon was quite irregular in paying the gas bills of the Temple.

"Professor Edward Ely then occupied the attention of the association with a paper upon coats and neck-ties, illustrated with diagrams, in which he proved conclusively that the automicity of the torso of a coat (that is, a coat without a tail or sleeves), was equivalent to one atom of an element in a coat with a tail, united to one or more atoms of a second hand coat; and that the moral influence of the fluctuations of a neck-tie upon a well regulated mind could hardly be computed.

"Dr. Clinton Briggs gave the algebraic formula, starting on the basis of  $x$ , which keeps Merchants' Union stock at 24. This view was also corroborated by an able paper read by Professor C. B. Farwell. Professor C. M. Cady delivered an oral argument proving that a Steck piano had been dug up underneath the skeleton of a mastodon in an alluvial formation, and that the skeleton of an aborigine was seated at it. From the position of the petrified fingers on the keys, he had discovered a chord in the touching song 'Let me kiss him for his mother,' thus proving the immense age of this ballad.

"Dr. George H. Dunlap, N. W. R. R., read an essay on the coming railroad from Chicago to the moon. He stated that Professor Perry H. Smith would probably locate himself at the moon terminus, to see that its perturbations did not affect the stock, and he had no doubt, moreover, that as soon as they settled the uncertainty relative to the moon's semi-diameter the stock would be at a premium. Telegraph stations would be under the control of the man in the moon—not Professor Smith, but the other man—and the stockholders would be given a free annual ride to the octants in the orbit, corner lots in which were now for sale.

"A recess was then granted, and the association lunched at the residence of Professor Dr. Dyer. During the informal conversation reference was made to the old slow coach days when Chicago had but one *savant*—the late Colonel Graham—and the famous Dyer story was revived. At a dinner party Dr. Dyer sat next to Colonel Graham. In response to a toast the Colonel arose and after paying his respects to the company, said he had an important discovery to make known. He had labored upon it for years, and had now arrived at the conclusion, after long scientific explorations and many anxious nights of study, that there was a tidal wave in Lake Michigan of at least one third of an inch. Dr. Dyer, who was sitting next to the Colonel, sprang to his feet and exclaimed, in utter amazement, 'Good God! Colonel, you don't say so. I always thought there was something the matter with that cursed lake.'

**OXYHYDROGEN LIGHT.**—The experiments commenced last year on the Place de l'Hotel de Ville, in Paris, on the oxyhydrogen light, are about to be continued by order of the Emperor, in the court of the Tuilleries. The magnesia cylinders having been found to corrode and waste away too rapidly for the purpose of a continuous light, an artillery officer, M. Caron, after experimenting with a variety of substances, has adopted zircon, a substance which Berzelius pointed out as infusible, and giving forth a very brilliant light under the blowpipe. It is said that M. Caron has had a cylinder of this substance in use with the oxyhydrogen light for a month without the slightest trace of volatilization. The luminous power of zircon, under the oxyhydrogen jet, is about one-fifth more than that of magnesia. The zircon employed is an oxide of zirconium; it is found principally near Miask, at the foot of the Ural Mountains. M. Caron economizes the zircon by mounting a point of it on a small stick of magnesia or fire-clay, the zircon being made to adhere by compression and afterwards baking.—*Journal of Society of Arts.*

**MILK.**—The milk supply of this city comes chiefly over the Erie and Harlem Railroads. The Erie, however, brings the largest quantity. The milk train on this road runs out as far as Portersville, a distance of seventy-six miles from the city, and gathers up on each trip at the various stations about 3,800 ten gallon cans, the transportation of which yields a revenue to the road of nearly \$2,000 per day, and is probably the most profitable of all the fifty odd trains which daily pass over the eastern division of the Erie.

The milk train arrives at Jersey City a little past midnight, and from that hour until morning a string of milk cars are engaged in carting the milk away for distribution to the families in the city. The conductor assured us that the milk was delivered to the train perfectly pure, and if reduced at all by water it must be done by the milkmen after its delivery to them. Thus, while the denizens of the city are snoring in bed, the agencies employed in supplying their wants are going on with ceaseless energy, reaching to the furthest bounds of the continent.



## Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

**GAS GENERATOR.**—Dr. W. E. Darrab, Baltimore, Md.—The object of this invention is to construct a simple and cheap burner which can be applied to any hydrocarbon lamp, and by the use of which a clearer, whiter, and steadier light can be obtained than from any heretofore brought into public use.

**APPARATUS FOR DRYING BRICKS.**—Wm. O. Leslie, Philadelphia, Pa.—Invention the bricks are dried, preparatory to placing them in the kiln, by being carried on a car into a drying chamber, and subjected to a dry air heated to about 90° Fah., thence passing to a second chamber in which the temperature is about 100°, thence passing to a third, where the temperature is 110°, whence they are taken to the kiln. The construction and arrangement of the drying chambers and heating apparatus are designed to regulate the temperature of the chambers and facilitate the drying of bricks.

**SELF RAKE AND REEL FOR HARVESTERS.**—F. Schurger and N. Allstatter, Hamilton, O.—This invention has for its object to improve the construction of harvester rakes and reels, so that they may be more satisfactory and effective in operation.

**DOUBLETREES, ETC.**—Horace Palmer and A. N. Case, Kingsville, O.—This invention has for its object to furnish a simple attachment for doubletrees, whiffletrees, neck yokes, etc., where the power is applied to the ends of a wooden bar, and the resistance is sustained at its centre, so as to greatly strengthen said bar without materially increasing its weight.

**AIR AND GAS CARBONIZER.**—M. P. Coons, Brooklyn, N. Y.—The nature of my invention relates to improvements in an apparatus for carbonizing atmospheric air or coal gas for illuminating, heating, and other purposes, by the use of petroleum oil, either in a crude state or in a refined state, in its several grades.

**SPIRIT METER.**—Joel D. Weaver, Troy, N. Y.—The nature of this invention relates to improvements in that class of meters for measuring fluids which consist of a piston working within a cylinder. It consists of an improved arrangement of mechanism for operating the valve.

**PARTNERS AND STEPS FOR MASTS OF VESSELS.**—D. S. Stevens and Lambert Smedecor, Red Bank, N. J.—The nature of this invention relates to improvement in means for supporting masts in vessels, the object of which is to provide yielding elastic supports for the same, whereby the strain upon them caused by the irregularly blowing gusts of wind will to a considerable extent be relieved.

**SHUTTLE-BOX MOTION.**—Michael Rice, Upland, Pa.—This invention consists in suspending the shuttle boxes on the outer ends of levers pivoted to the lay, from the inner ends of which are suspended balancing weights, and providing a vibrating wedge-shaped lever which is operated by a tappet wheel deriving motion from a pawl actuated by the driving shaft, which vibrating lever ultimately raises and lowers the outer end of the said shuttle-box levers.

**COMBINED BELT KNIFE, AND Mallet FOR PUNCHING BELTS.**—Henry Blake, East Pepperell, Mass.—This invention consists of a knife punch, the blade of which is formed in a shape particularly adapted to form the elongated perforations necessary for inserting the belt fastenings heretofore patented.

**STAMP MILL.**—Edmund Castle, Lincolnton, N. C.—This invention consists, first, in providing recesses in the lower edges of the dies, and corresponding grooves in the bed plate opening into the recesses of the same in which the dies set, whereby a bent bar may be readily inserted to remove the dies from their beds; second, in the manner of joining together the different parts of the housing frame, and in the arrangement of a swinging gate and adjustable table to govern the delivery of the pulverized ore from the mill.

**BALE TIE.**—J. A. Shone, Holly Springs, Miss.—This invention relates to a new and improved method of tying or fastening the bands on bales of cotton or the bands on other baled articles.

**STENCIL PLATE.**—Eugene L. Tarbox, Nashville, Tenn.—This invention relates to plates through which letters or figures are cut for marking boxes, bales, and other articles called "stencil plates."

**CHUCK.**—J. S. Detrick, San Francisco, Cal.—This invention has for its object to provide a chuck for use on lathes in machine shops, and for other purposes, which shall enable the operator to move the center of his work without removing the chuck from the lathe.

**METALLIC BALE TAG.**—Norman C. Jones, Maltby House, New York city.—This invention relates to a new and improved method of marking and insuring the identification of cotton bales as well as bales of hemp, manufactured goods, and other commodities or goods which are usually confined by ropes, hoops, or ties of any kind.

**FURNITURE CASTER.**—Ezekiah Munroe, Fall River, Mass.—This invention relates to an improvement in casters for furniture, baggage trucks, and other purposes, and it consists in combining a friction roll with the caster spindle.

**ICE ELEVATOR.**—W. T. B. Read, Chicago, Ill.—This invention relates to a new and improved method of constructing machines for elevating ice in the process of filling in houses and handling blocks of ice in other situations where it is necessary to elevate the same.

**FOLDING STOVE AND BAKER.**—D. C. McNeill, De Witt, Iowa.—This invention relates to a new and improved method of constructing stoves whereby they are rendered more portable and easier of transportation, the stove being especially intended for camp use for soldiers, trappers, and emigrants.

**SECRETARY.**—Ezra A. Clearfield, Penn.—This invention consists in providing within a case a series of small cases of drawers or pigeon holes, suspended from rods which are connected at both ends to endless belts arranged upon pulleys at the top and bottom of the large case. The pulleys being actuated by a crank on the shaft of the lower set which projects through the wall of the case whereby the said interior cases may be moved away from or up to an opening provided in the outer case.

**HAND CULTIVATOR.**—Barnett Taylor, Forestville, Minn.—This invention has for its object to furnish an improved hand cultivator for cutting the weeds and stirring the ground between plants, whether of vegetables, grain, or trees, planted in rows or drills.

**SIEVE.**—Mrs. J. D. Jones, Jersey City, N. J.—This invention has for its object to furnish an improved sieve, designed to take the place of the cullenders, sieves, and coarse cloths that are now used for screening and straining pumpkins, apples, etc., and materials for cassups, jellies, etc., which shall be simple in construction and effective and convenient in use.

**MACHINE FOR TINNERS' USE.**—Walter Forshee and Jesse L. Judd, Marathon, N. Y.—This invention has for its object to furnish an improved machine for tinner's use, designed especially for cutting out darning work, such, for instance, as the sides of pans, dials, basins, etc., with dies, which shall be simple in construction, easily operated, effective in operation and readily adjusted to cut out work of different sizes.

**TINSMITHS' STAKES.**—A. W. Whitney, Woodstock, Vt.—This invention has for its object to simplify and improve the construction of tinsmiths' stakes, so as to make them more convenient and less expensive, only one standard being required for a great variety of stakes.

**WATER WHEEL.**—O. M. Pike, North Leverett, Mass.—This invention relates to a new and improved horizontal water wheel, and it consists in combining with the wheel a slotted cylinder or drum, constructed and arranged in such a manner that the cylinder is made to serve as a stop to the water and effectually prevent any water from passing through the wheel case except that which acts upon the buckets of the same.

**DRUM FLASK.**—Wm. T. Fry, New York city.—This invention relates to a new and useful improvement in drum flasks and has for its object the substitution of some cheaper material than leather, but equally as durable, to the exterior of the glass bottle.

**DEVICE FOR PICKING FRUIT.**—N. G. Hughes, Waynesburgh, Pa.—This invention relates to a new and improved device for picking fruit, and it con-

sists in a novel construction of the implement, whereby fruit may be picked from a tree with the greatest facility.

**CONSTRUCTING CAMS ON SHELLS FOR ROTARY BLOWERS.**—F. H. Root and F. M. Root, Connersville, Ind.—The object of this invention is, first, to avoid the necessity of boring out the interior concave surface of the shell or case; and secondly, to obviate the necessity of facing or planing the end or head plates of the case, both of which have always heretofore been done in cases of this kind, which requires the case to be cast in separate parts, while by this method the case is cast in one entire piece.

**CHURN.**—J. Stadler, Detroit, and G. M. Streng, Plymouth, Mich.—This invention relates to a new and improved method of constructing butter churns, whereby butter is more quickly and economically made, and consists of a churn having on the inside a rotating dasher, and provided also on the inside with shifting wings, moved by levers on the outside of the churn, whereby greater or less resistance is offered to whirling the contents of the churn.

**STEAM INDICATOR.**—F. T. Riegel, Philadelphia, Pa.—This invention relates to a device for indicating the pressure in steam boilers, and it consists in arranging a steam chamber in communication with the boiler, and providing the same with a yoke which is held to its seat by a yoke and weight.

**VALVE FOR WATER CLOSET.**—W. Smith, San Francisco, Cal.—This invention relates to a new and improved construction for valves for water closets, and more particularly designed for the kind known as the Hopper water closets.

**GATE.**—Manson F. Kent, West Union, Iowa.—This invention relates to a new and improved method of constructing gates, whereby the same are more easily opened and shut, and whereby the same are less liable to obstruction from heavy snow.

**PISTON PACKING.**—William Wilson, Galesburg, Ill.—This invention relates to a new and improved metallic packing for pistons, and it consists of a peculiar construction and arrangement of rings and points, whereby the packing is allowed to accommodate itself to a cylinder cut perfectly true or round, and requires less steam than usual to adjust it or set it out, and is also allowed to travel over counter bores with facility.

**POWER CRANE.**—W. T. Darfee, New Bedford, Mass.—This invention relates to a new and improved crane, designed more especially to be operated by steam or horse power, and for raising and lowering heavy bodies. The object of the invention is to obtain a crane of the kind specified, which may be operated or manipulated with the greatest facility, be simple in construction, not liable to get out of repair, and which may be constructed at a moderate cost.

**LOOM.**—John J. Switzer, Roxbury, Mass.—This invention relates to a new attachment to looms, which has for its object to instantly cause the stopping of the machinery as soon as one of the warp threads breaks. As threads frequently break during the weaving process; and as by their breaking much annoyance is caused to the weaver, and injury to the fabric, this invention will be of great benefit to all manufacturers of woolen and cotton goods, more so as it is easily applicable to all looms of suitable construction. When a thread breaks, on fine goods, it is not always discovered at once, and if the weaving is continued, the whole fabric is spoiled. This invention is a thread protector, so arranged and applied to any ordinary or suitable loom, that at any moment a thread breaks, the loom will instantly stop, and cannot proceed until the severed thread has been repaired by the attendant.

**TIN CAN.**—G. E. Hegerman, Brooklyn, N. Y.—This invention relates to a new tin can, which is to be more particularly used for the keeping and transportation of petroleum and other liquids. The invention principally consists in providing a cap for such can, which is to be closed by means of a screw plug, that can be removed when the contents are to be discharged. By means of this plug, the can may be opened and closed at pleasure; while the ordinary caps now in use are mostly such that they must be destroyed to open the can.

**PLATFORM SCALE.**—John Decker, Sparta, N. J.—This invention relates to a new platform scale, which is combined with a spring balance in such a manner that the weight of an article placed on the platform will be indicated on the spring balance. The invention consists in the use of a yoke shaped lever, which rests with its two ends upon stationary supports, while its middle is suspended from the hook or spring rod of a spring balance.

**TAILOR'S SEAT.**—Frederick Neubaus, Belleville, Ill.—This invention consists in providing the hinged back support of a tailor's seat, with an adjustable elastic gage, by which its degree of inclination can be regulated. This gage consists of a screw and spring so applied that the aforesaid result will be obtained. The invention consists also in so constructing the leg support with the bar that holds it, that the said leg support may be elastic and also up and down adjustable. The invention finally consists in bending the bar, that slides on the seat, and that supports the legs supports, so as to bring the leg support opposite the middle of the seat.

## Answers to Correspondents.

**CORRESPONDENTS** who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

**SPECIAL NOTE.**—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1 00 a line, under the head of "Business and Personal."

All reference to back numbers should be by volume and page.

**G. W. C.**—If your friends are correct who think that a fly wheel can create force, it ought to do some work independently of any steam cylinder, and the "perpetual motion" is not a chimera, but a possibility within the reach of their inventive skill. The heavier the fly wheel the more force it will absorb when started, and give off when required; but the idea that force can be created by mechanical means, is opposed to theory, practice, and common sense.

**M. W. D., of N. H.**—To prevent condensation in a steam pipe laid under ground, a good plan is to place it inside another larger pipe, filling the intervening space with pulverized charcoal. The outside pipe should have its joints made water tight. We have seen this tried, and know it to be good.

**E. L. G., of N. Y.**—The particular information you want about crystals of alum, we cannot supply.

**J. G. K., of N. Y.**—Your article on Encke's comet is so purely speculative that we cannot find room for it in our paper.

**J. H. H., of N. Y.**—We do not believe in the "momentum" of steam as generated; the production of steam is a gradual process.

**S. C. T., of Colorado.**—How can I separate gold from cast iron when alloyed. Dissolve in "aqua regia" having a slight excess of hydrochloric acid. Add solution of protosulphate of iron and the gold will be precipitated in a metallic state.

**W. P. J., of Pa.**—Castile soap is colored with persulphate of iron, commonly known as green vitriol. To describe to you in full the process of manufacture, would take too much of our time and space. Otto on soap published by D. Van Nostrand, 122 Broadway, New York city, is the book you need.

**L. S. C., of Ill.**—On page 177, Vol. XVII., of the SCIENTIFIC AMERICAN, you will find a drawing of the device used on Grover and Baker Sewing Machine, with full description. By examining that description you will see a difference in mechanism from the device which you defend, which it will pay you to study. "First be sure you are right then go ahead."

**H. C. S., of Chicago.**—In running on a belt from a shaft 4 inches in diameter to a pulley 20 inches in diameter, the shaft making 350 revolutions per minute there should be no shock to the machinery. The best and quickest method of stopping cars, hitherto discovered is to apply the brakes directly to the wheels.

## Business and Personal.

The charge for insertion under this head is one dollar a line.

**N. C. Stiles' pat. punching and drop presses, Middletown, Ct.**

**Siccochast** is a hasty drier for linseed oil, a new discovery by Mr. Asahel Wheeler, of Boston, Mass., which is deserving of the attention of all persons interested in paints. It has received the most critical examination by the United States officials of the Navy Department, and is recommended and adopted by them for general use.

The campaign novelty is a rich thing. Agents guaranteed \$30 per day. Sample 75c. Circulars free. Address J. H. Martin, Hartford, N. Y.

**A.P.S., of Me.**—Please send address to C. Howard, box 5078, postoffice, Boston.

Manufacturers of tub and pail machinery please send catalogue and price list to Redington, Nelson & Co., Whitewater, Wis.

Send circular of the best gas carburetor, without water or heat, to 555 Minor st., Philadelphia, Pa.

Wanted—the best wood knolling machine made. Also, good second-hand ash and blind machinery. Lingle & Son, Rock Island, Ill.

New Brick machine, patented 1868. Bricks dried without floors—spread on the grass or hillside; easily secured from rain; no washed bricks. For pamphlet, address, sending 25c., F. H. Smith, box 556, Baltimore.

The patent sweet fern and chemical lacing, as made by J. H. & N. A. Williams, Utica, N. Y., is far superior in quality and strength to any other belt lacing in market.

For sale—just finished—an 18x42 Wright engine. Address Merrick & Sons, Philadelphia, Pa.

For sale—the whole or a part of a paper mill, all new machinery. For particulars address L. A. Beardsley, Fredericksburg, Va.

Peck's patent drop press. Milo Peck & Co., New Haven, Ct.

Machine shop and foundry to let, well established. First-class tools and patterns, now running on cotton, woolen, and general machinery. Work for seventy-five hands. Ill health sole reason for leaving. A rare chance. Address H. H. Morse, Attorney-at-law, Rhinebeck, N. Y.

For sale—the patent right, in Great Britain, for perforated saws. The manufacture of these saws is now firmly established in the United States, and they are rapidly taking the place of all solid saws. Apply to J. E. Emerson, Trenton, N. J.

Send for description of Huntoon governor on entirely new principles. 103 State st., Boston, or 79 Liberty st., New York.

For descriptive circular of the best grate bar in use, address Hutchinson & Laurence, No. 8 Dey st., New York.

Millstone-dressing diamond machine, simple, effective, and durable. Also, Glazier's diamonds, diamond drills, tools for mining, and other purposes. Send stamp for circular. J. Dickinson, 64 Nassau st., N. Y.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct.

**B.**—You will have no trouble with grease and dirt, and save much oil by using Broughton's lubricator and oil cups. Shaw & Kennedy, Buffalo, have them.

Westerman Iron Co., Sharon, Pa., wish to obtain a machine for testing hoop iron.

Match it. Four-Horse Portable Engines, complete, with Governor, Pump, etc., \$550. Other sizes in proportion. Hampson & Cope-land, —warerooms, 89 Liberty st., N. Y.

## EXTENSION NOTICES.

U. S. PATENT OFFICE.  
WASHINGTON, D. C., July 22, 1868.

William Porter, of Williamsburg, N. Y., having petitioned for an extension of the patent granted to him on the 24th day of October, 1854, for an improvement in "Securing Lamps to Lanterns," it is ordered that said petition be heard at this office on the 19th day of October next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE.  
WASHINGTON, D. C., July 22, 1868.

Clara B. Snow, of Independence, Iowa, executrix of the estate of Harvey Snow, deceased, having petitioned for an extension of the patent granted to the said Harvey Snow the 21st day of November, 1854, for an improvement in "Presser-bar for Planing Machines," it is ordered that said petition be heard at this office on the 24th day of November next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE.  
WASHINGTON, D. C., August 3, 1868.

Chesley Jarnagin, of Bean's Station, Tenn., having petitioned for an extension of the patent granted him on the 31st day of October, 1854, for an improvement in "Seats for Wagons," it is ordered that said petition be heard at this office on the 19th day of October next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE.  
WASHINGTON, D. C., Aug. 3, 1868.

George Miller, of Providence, R. I., having petitioned for an extension of the patent granted to him on the 7th day of November, 1854, for an improvement in "Leather Banding for Machinery," it is ordered that said petition be heard at this office on the 28th day of October next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE.  
WASHINGTON, D. C., Aug. 11, 1868.

George Crompton, of Worcester, Mass., having petitioned for an extension of the patent granted to him on the 14th day of November, 1854, for an improvement in "Looms for Weaving Figured Fabrics," it is ordered that said petition be heard at this office on the 26th day of October next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.



### Improvement in Device for Cleaning Grain.

The design of the machine shown in the engraving is to properly cleanse the grain from smut, straw, etc., before it reaches the grinding hopper, and it consists of a series of cones and fans combined. The grain is fed into the upper cone, A, and fans combined. The grain is fed into the upper cone, A, by the spout, B, which first delivers it to a vibrating screen—not plainly seen in the engraving—but which is driven by means of upright shaft and cam or tappet, C, bar, D, rock-shaft, E, and bar and connection, F. The outer shell of the cone, A, is of perforated sheet metal containing a corresponding sheet metal core mounted on an upright shaft, to which a high velocity is imparted. From this cone the grain passes to a fan blower directly under it, which separates the particles of smut and other foul matter from the grain and blows it out through the spout, G, conveying the grain by another spout to the scouring cone, H, having brushes fixed on its interior surface and containing a rapidly rotating cone, also furnished with brushes; the two sets arranged at such an angle, compared one with another, that they pass each other as the blades of shears. From this cone the grain goes to the blower, I, which drives off the remaining refuse through the spout, J. The grain in the blower, I, is delivered to another vibrating screen, worked in a manner similar to the upper one, and which may be made of such a grade of meshes, if desired, as to separate the kernels according to size. The lower ends of the upright shafts, which drive the inner cones by means of belts and pulleys, rest on suspended cross bars that may be raised to adjust the cores of the cones to the size and character of the grain to be operated upon, by means of screws, the handle of one being seen at K.

This improvement was patented June 23, 1868, by Carl Millar, Sandoval, Ill., who will reply to all communications relating thereto.

### Parton on Alcoholic Drinks.

We do not deem it necessary to offer any apology for the republication, from the *Atlantic Monthly*, of the able article from the pen of James Parton, on the use of alcoholic liquors, entitled "Will the Coming Man Drink Wine?" We consider this article to be so complete a review of the whole subject, both from a scientific and social point of view, and such a masterly plea against the use of alcohol in any form, that it is the duty of the press, without regard to its particular adaptation to the special features of individual publications, to give it as wide a circulation as possible, and thus aid in ridding the world of its greatest curse.

We shall publish the article in two installments, the first of which we give in this number, and we cannot too strongly urge the thousands of young mechanics who weekly peruse our columns, to consider well the points so ably established in this excellent essay; and use their influence and example in helping to uproot the evil of strong drink, which is the fruitful source of more misery and crime than any other cause on earth.

### OBITUARY.

#### DEATH OF A WEALTHY INVENTOR.

Edwin A. Stevens, died in Paris on the 7th inst., of rheumatism. Although for ten years he had suffered more or less from this complaint, his death at this time was unexpected. His father was a co-laborer with Fulton in the introduction of steam navigation, and Mr. Stevens early devoted himself to the study and improvement of marine machinery. The propeller screw was invented by his brother Robert L. Stevens, and his own experiments upon the double screw were crowned with considerable success. The Stevens Battery, to which the modern system of iron plating undoubtedly owes much of its origin, was built by these brothers. The estate known as the Hoboken property, was inherited by him, and by its judicious improvement he amassed an immense fortune, his estate being estimated at \$20,000,000. He was very highly esteemed by all who knew him, and by his death New Jersey loses one of her most influential and worthy citizens.

### FACTS AND CONJECTURES.

In looking over our exchanges, we notice a request from a correspondent to an agricultural paper for information as to how much lime or impurities, in running streams, would render the culture of trout unsuccessful. And he adds, "facts are what we want, not hypotheses." Ah, thought we, how much labor would have been spared the world if that had been made the rule in the past; if, instead of sitting down to frame conjectures as to what things might be, men had set themselves to work to ascertain what they really were. Most of our readers are familiar with the story of the dispute over the question why a bucket filled with water would not overflow when a fish was placed in it. The philosophers framed all sorts of conflicting hypotheses, and grew hot in the defence of their favorite theories, until it was wisely suggested that it would be as well to ascertain what was the fact in the case. When tested, it was found that when the fish was put into the bucket, the overflow took place, and the would-be philosophers were put to shame by a simple fact. Whether this story is a fable, or otherwise, it is a type of many disputes which have seriously engaged the minds of men, whose efforts, rightly directed, might have been of great value. It is only a very

few years since a learned professor in an American college set himself to show that all the facts of the universe, and its phenomena could be determined, *a priori*, and put forth to the world a system of cosmology fully as absurd as the conjectures of the above-mentioned philosophers in regard to the fish. An eloquent reviewer of this most absurd attempt to conjecture causes that would account for universal facts, writes as follows:

"Who that believes in such a philosophy would trouble himself to spend wearisome days and nights in studying the pages of Newton and Laplace? who would scale mountains

erators of even the cheapest sort are built in accordance with it. Ventilation is also frequently secured, at least in a measure. The refrigerator herewith illustrated is not claimed to be markedly superior to every other in these respects. Its main peculiarity and advantages are convenience in construction, compactness of form, and handiness in use. The latter quality is quite noticeable, as the shelves rotate so that the dishes of food can be readily placed in the receptacle, and when required to be removed present themselves successively at the door, obviating the necessity of soiling the dress in reaching over one dish for another.

The engraving exhibits the refrigerator in perspective with the door opened and a portion of the side broken away to show the interior. The outside, which is of an octagonal form, is of wood, as usual, and the inside of zinc, the space between being left either empty or filled with a non-conducting material as desired. The inside is of circular form in its cross section, and under the ice receptacle in the upper part has a series of slatted shelves supported on central pivots at top and bottom on which they turn. The ice is placed on a disk covered with zinc, the edges of which do not touch the inner surface of the refrigerator, but the disk is supported by lugs secured to the walls. The ice disk is double, and just below its lower edge is a gutter around the interior of the cylinder, to receive the drippings from the ice, which are conveyed through the bottom of the refrigerator to any convenient receiver by one or more pipes passing down by the inner wall. The cover is double and has perforated ventilators in each section which convey away the gases arising from the food. The slats of the shelves may be removed for cleaning. This unique contrivance is the subject of two patents obtained through the Scientific American Patent Agency, bearing dates, August 27, 1867, and July 7, 1868. Orders and applications for further information may be sent to the patentee, Anthony B. Sweetland, Fitchburg, Mass., assignor to himself and James Daley of the same place.

### Are Locusts Poisonous?

WE find a number of items in the newspapers this year claiming that locusts, their bite, sting, or eggs, are poisonous. In Georgia it is stated that a young lady lost her life by rubbing her teeth with a twig (of *cornus Florida*, probably, as that is frequently done) in which a locust had deposited its eggs. And somewhere in the West, fishes are said to have been poisoned by berries in which locusts had deposited their eggs, and which had fallen into a stream. And the following items we find in the papers:

"Locust eggs appear to be very deadly in their poisonous effects. A party of little boys was recently killed by eating mulberries in which they had been deposited, and so rapid was the work of the poison that they died under the trees from which they took the berries.

The death of a little girl at Kimmswick, Mo., resulting from the sting of a locust, is noted by the local papers."

Now, "e'en from our boyish days," in the south and south-west, we were familiar with all kinds of locusts, handled and played with them constantly, and knew other children to do the same, and the worst thing we ever knew or heard about them was their intolerable music. This idea of their being poisonous is a new one to us—but, then, this is Presidential year, and it may be that the locusts have become inoculated with the "poison of politics," hence the trouble!

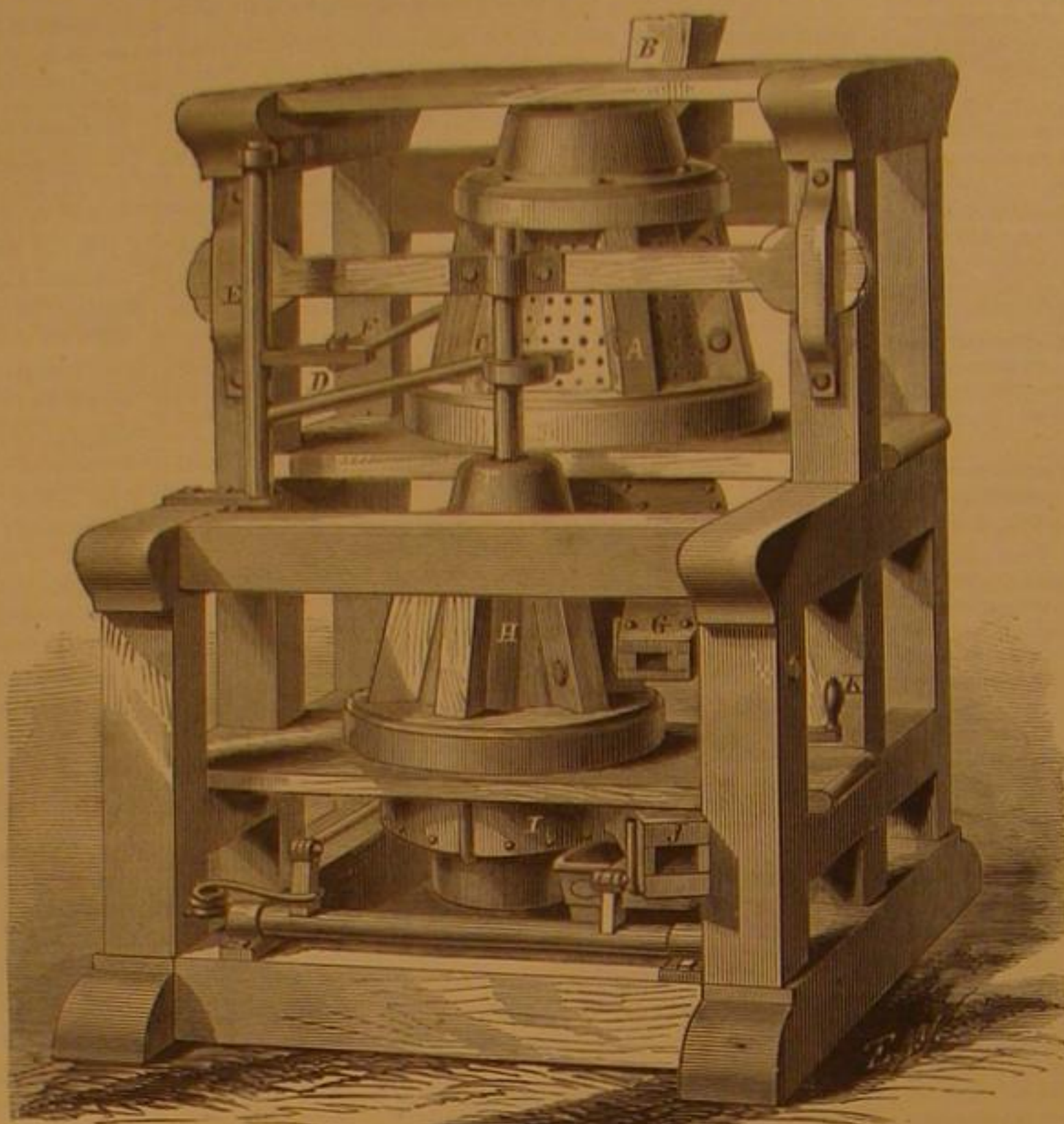
If, however, the locust is really poisonous, it should be known, and our readers will confer a favor by reporting their observations on the subject.—*Medical and Surgical Reporter*.

### The Union Pacific Railroad.

We draw attention to the article from S. D. P., in this issue, relative to this great international work. Being well acquainted with the writer, knowing his superior means of information, and having the utmost confidence in his honesty of purpose, and facilities for obtaining facts, with a talent for presenting them as they really are, we commend his article to our readers as a fair statement of facts which may have been more or less distorted to serve the purposes of stock gamblers.

JUDGE B. F. JAMES, of Illinois, recently appointed Examiner-in-Chief of the Patent Office, has received his commission and entered upon the discharge of his duties. Judge James, for the past seven years has been Principal Examiner in the class of civil and railroad engineering, and his long experience qualifies him for the position to which he has been appointed. The notice of this appointment was accidentally left out of our last week's issue.

In boring an Artesian well at Chicago, a vein of water was found at the depth of 1,200 feet. The direction of the flow was ascertained by lowering into the bore, by means of a fine wire, a long lead plummet. The weight would descend steadily until it reached the stream, when it would be suddenly jerked in the direction of the flow.

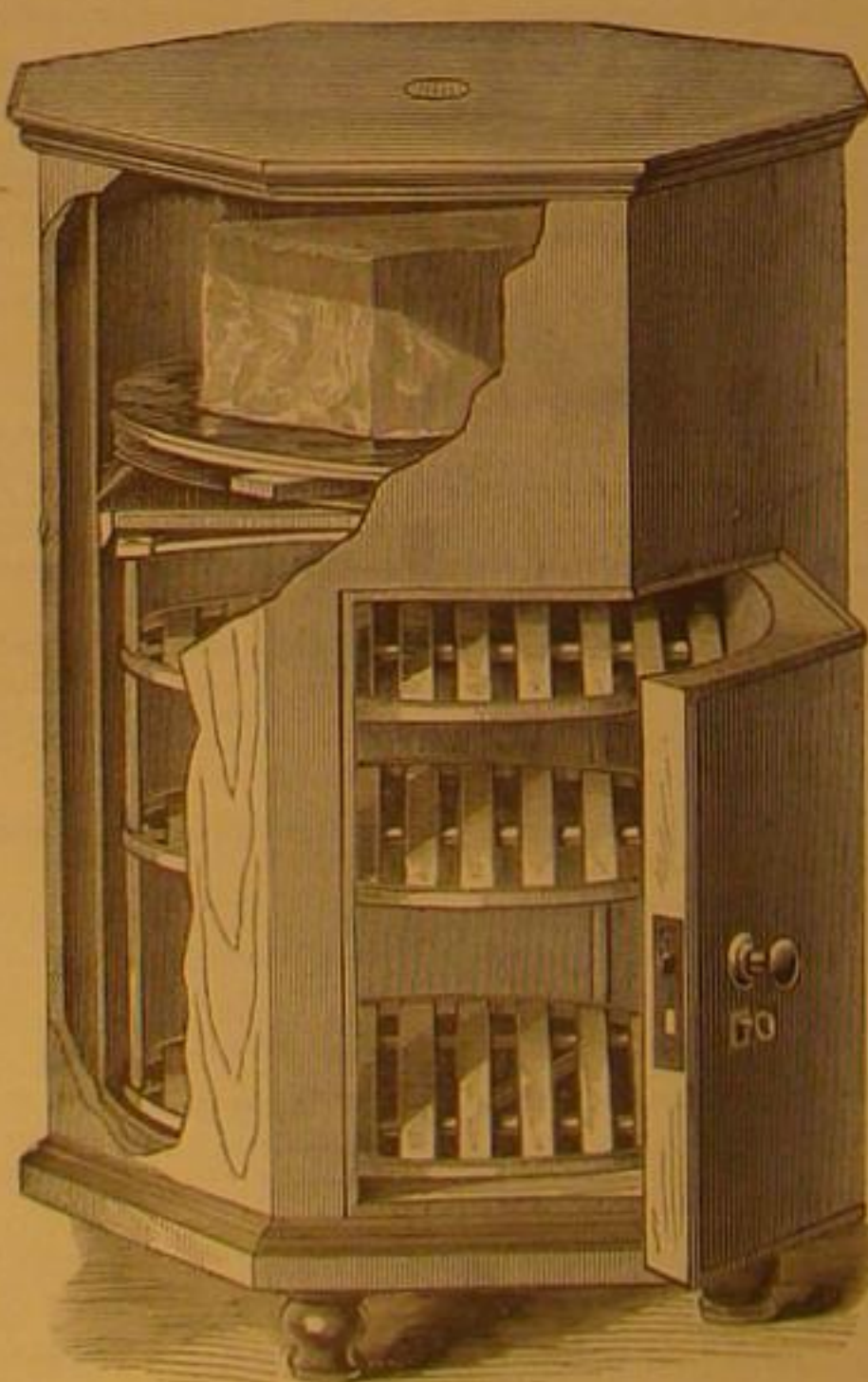


MILLAR'S PATENT SMUT MACHINE AND GRAIN CLEANER.

and penetrate into the frozen regions of the poles in search of knowledge? who would torture Nature in crucibles, drown her in acids, consume her in flames, stretch her upon racks, crush her under weights, in order to wring from her the secrets of her being, when he believes that all he can thus learn can be deduced from pure reason?"

The age for conjecture is past. "Facts are what is wanted," and hypothesis is worthless except as it leads the way to the discovery of realities. Less abstract speculation, less thought upon the imaginary, and more work, more attention to the real, the tangible, and the practical, is the tendency of the time.

### SWEETLAND'S PATENT ROTARY SHELF REFRIGERATOR.



The principle of the preservation of ice in refrigerators, that of prevention of rapid evaporation by inclosing it within non-conducting walls, is generally understood, and refriger-



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## SOME THINGS A MECHANIC SHOULD KNOW.

Subdivision of labor insures skilled work, but the confinement of the mechanic's knowledge to one single manipulation detracts from his usefulness. This apparent paradox is easily explainable. Take the pattern maker as an example. The department that prepares his work is that of the draftsman; that which perfects or ultimate it is that of the molder. Now, although it may be true that the "Jack at all trades is good at none," yet he who understands, at least in a measure, the design or intention of the workman who is his predecessor in the chain of industry, and the duties and needs of him who follows his work, is more capable than the workman who can only mechanically use the tools of his craft. He will not only do his work intelligently, making a perfect job, but will be able to ascertain imperfections and detect omissions in the work of those who preceded him, and suggest, at least, by his own work, the proper method for those who succeed him.

Confining ourselves to the pattern maker, let us see the difference between the workman who knows merely how to get out his stock, prepare the pieces, and put them together in a workmanlike manner, and the workman who conceives and understands the design of the draftsman as imaged on the sheet before him, whether shown in perspective, plan, or section, and knows something of the manipulations of the molder's art. In the one case, the workman must be overlooked, instructed, and guided in every move, by some one who has an educated intellect and understands the object of the work in hand. In the other case, the intelligent pattern maker goes coolly, steadily, and quietly to work, correcting defects, and possibly suggesting improvements. His work is always perfect, and he can be always be depended upon in emergencies. Give him a drawing and he knows the object and intention of the draftsman, perhaps taking time to ascertain them; but when he does understand, he needs no oversight, and when his work is finished it is correct.

There are comparatively few machinists who can work from a drawing. In one shop, with which we were formerly practically acquainted, the workmen at the forge and at the lathe were furnished with a model or pattern of their work, as much as the molders in the foundry. If these workmen had informed themselves, never so slightly, of the principles and practice of mechanical drafting they could have wrought intelligently from drawings. Yet the theoretical and practical knowledge so useful is seldom possessed, when it may be obtained by the devotion of a few hours of attention in the leisure every mechanic has.

Beside this partial knowledge of cognate branches of his business, which every mechanic could and should possess, some knowledge of a technical character, easily obtainable from ordinary school text-books, should also be added. A decent smattering of chemical nomenclature; a knowledge, however limited, of chemical combinations; some ideas of natural philosophy as applied to mechanics; a good acquaintance with arithmetic, including algebra, and a familiarity with the principles of geometry, the science of sciences and the foundation of all that is useful in the arts, should be possessed by the mechanic.

All these may be easily obtained. The way is open, the road easy, and the goal within the reach of all. Success attends endeavor, and success is possible to all. Skilled labor guided by educated brain—discretion, good judgment, common sense, and intelligence—is always a marketable commodity, bringing its full value to its fortunate owner, who may reasonably consider himself the possessor of present independence and prospective competence, and as such the peer of the most favored in the land.

## PROGRESS OF SUBMARINE TELEGRAPHY.

Very few not directly interested in marine telegraphy are aware of the immense progress in this art, or of the solid basis upon which success is predicated, not only of the cables already laid, but of others which are projected. No less than eleven cables are laid between the several islands of the British group connecting that country with Holland, Belgium, Denmark, and the different islands with each other. To these must be added the two cables between Ireland and America, which, in conjunction with the cables connecting Ireland to England and the continent, unite the two hemispheres.

The Islands of Zealand and Funen have been connected to the continent by Denmark. In the Mediterranean Sea there are several cables laid, and working perfectly. France is joined to England by three cables; Asia is in communication with Europe through two cables, while America has united all her possessions in the Atlantic and Pacific by these slender yet powerful bands. In the Indian Seas two cables are working, having stood the test of several years' service.

In the Mediterranean a cable is about to be laid connecting Nice via Corsica with Algeria; while appearances indicate that a new cable will shortly be laid between France and America. This cable will be laid in two sections; the first from Brest to St. Pierre, Miquelon, a distance of 2,688 miles, and from thence to New York, a distance of 950 miles. The time fixed for the completion of this great work is August 15, 1869. An English exchange in speaking of this cable says:

"The grounds upon which the projectors have found favor with the French and New York State Governments have been, chiefly, that the proposed cable will obviate the circuitry and delay incident to the present line; and will also lessen the existing liability to casualties. By the only route we now have not less than four submarine cables have to be employed, while the electric fluid has to perform four land journeys also before a message can be sent from the Continent of Europe to New York. There intervene—1, the North Sea, or the English Channel; 2, the Irish Sea; 3, the Atlantic; 4, the sea between Newfoundland and the American continent; while the wires have also to be carried across England, Ireland, Newfoundland, and, lastly, from the coast of British America southwards to New York. It is, perhaps, surprising that with this circuitry, messages are sent from Europe to the United States as quickly as they are; but there is no doubt that communication will be very much accelerated if, as is said, a merchant or banker at Paris will be able literally to speak into New York. It may possibly be a sanguine calculation that messages between those cities may then be sent and answered in half an hour, and that messages may be sent from Berlin or Frankfurt to New York and answered within an hour; but the difference of time must obviously be very great. It is thought also that the directness and simplicity of this route will very much diminish the chances of communication with America being from time to time put out of gear. Ocean telegraphy has now been carried to such perfection that there is more fear of mishap by land than by sea; and, in point of fact, during the last two winters, when we have several times been alarmed by a stoppage of messages, the explanation has in each case been that storms had blown down the land telegraphs, sometimes in Newfoundland, sometimes on the American mainland. From this danger, whatever it may amount to, the new line will be exempt. As the capital it will represent will, it is stated, be only £1,000,000, and as the working expenses, with only two stations (at Brest and at New York), ought to be very small, it is probable that this project will bring the luxury of telegraphing across the Atlantic within the reach of persons of very moderate means. A cable laid across the English Channel, from Falmouth to Brest, would also give us the benefit of it. It is understood that the new Atlantic cable will be ready for laying next June."

Improvements are being made, not only in the cables and apparatus used for telegraphy, but in the mode of transmitting messages. A newly invented system of telegraphing by code is announced in England. Numbers are used instead of letters, each number indicating a word or a phrase, the translation of the message into the numbers, and *vice versa* being done by clerks. A large saving of time and greater accuracy is claimed for this invention.

Nothing illustrates the general progress of the age so much as the rapidity with which the art of marine telegraphy has spread its lines through the deeps, thus annihilating distance and uniting the nations of the earth into a closer brotherhood.

## MINING AND TUNNELING BY MACHINERY.

During the protracted siege of Sebastopol, Capt. Penrice, of the Royal Engineers, devised a very ingenious machine for tunneling, but the siege was cut short before the merits of the invention could be thoroughly tested. Enough, however, was done to satisfy the inventor that he had contrived a really valuable thing, and since that time, in the face of much doubt and opposition, he has pushed forward the invention to a point where it promises success.

In April last Capt. Penrice called upon us in Paris, and, by the aid of drawings, fully explained his invention, at the same time he invited us to examine a working machine under construction at one of the large machine shops near the city.

The machine resembles a horizontal steam hammer, so modified that the head can rotate as well as strike. The piston is cast in gun-metal in a single piece with the head; the diameter in the 5-foot machine is 28 inches, and the stroke, which varies according to the nature of the rock being operated upon, averages 2 inches, and can increase to 4 inches. The diameter of the head is 5 feet, and this diame-

ter corresponds with the diameter of the level to be driven. The head is a disk, with so much removed as shall leave a Maltese cross, occupying about two-thirds of the area, the remaining third, being open, serves for the passage of the debris to the back of the machine. The entire field of these segments is covered with cutters, in the form of double chisels, and arranged concentrically from the center to the circumference. The piston moves in a cylinder of cast iron, with a flat bottom, and is furnished with a stuffing box in front, the steam being admitted from a secondary regulating cylinder. As to the rotation of the head, there is a transverse horizontal shaft, which, by means of two intermediate shafts, gives a slow motion to another shaft, inclined upon the piston perpendicular to its axis by a screw pinion gearing, with a helicoidal wheel fixed upon the piston by a couple of keys. The debris is drawn to the back of the machine, so soon as broken down, by a series of hoes attached to an endless chain, worked by wheels and pinions, and ample arrangements have been made for providing sufficient space on one side of the machine to enable the face to be reached when the renewal of the chisels or other circumstances require it.

A company has been organized to work the invention, and it is stated in the London *Mining Journal* that they are prepared to guarantee an average progress of twelve feet in granite, and eighteen feet in sandstone rock in 24 hours' work. With regard to the continuity of the working, the sole interruption will be that resulting from the removal of the blunted chisels and the fixing of fresh ones. The changing of the chisels will not, according to Capt. Penrice, occupy more than two hours. All that is necessary is to draw back the machine a few feet, so as to allow a couple of workmen to pass in front of the head through the openings to remove the worn chisels and replace them with new ones, two other workmen behind the head unscrewing and re-tightening the nuts.

A Commission appointed by the French Government have quite recently made a full examination of a six-foot machine now in operation in a quarry at Vaugirard, Paris, and have also seen it in operation there; and, although their official report has not yet been presented, the Commissioners have individually expressed their entire belief in the general utility and extraordinary capabilities contained in the invention. The machine has been at work nearly every day for the last seven or eight weeks, and up to the present time but one set of chisels has been used, and these have not even once been sharpened.

It is worthy of remark, in this connection, that the Emperor Napoleon, with an enlightened regard for the material prosperity of France, took a warm personal interest in this invention, as he has done in many other instances; an example worthy to be imitated by other rulers.

## THE AMERICAN SCIENCE ASSOCIATION.

This distinguished body has again held its annual session, and performed its usual amount of service to the world at large by the elaborate discussion of such subjects as the "Nature of Thought," "The Statics of the Four Types of Modern Chemistry, with Special Regard to the Water Type H<sub>2</sub>O," "The Chemico-Geological Relations of the Metals," "The Stratigraphical Relations of the Fossil Horse in the United States," etc. No doubt the savants have a pleasant time in cracking these hard nuts. Their meats are, however, too indigestible for the mental stomachs of the generality of readers.

It is but just to add, however, that some time has been devoted to more practical subjects, among which we notice "The Effect of Atmospheric Changes on the Eruptions of the Great Geyser of Iceland," by P. A. Chadbourn. The eruptions of the Great Geyser are known to take place more frequently in fair weather, and it has long perplexed travelers to find a solution for this singular phenomenon. Mr. Chadbourn stated that the Great Geyser is a tube ten feet in diameter by seventy in depth, surmounted by a saucer-shaped basin seventy feet broad and four feet deep. When an explosion takes place, the water in the basin, and two-thirds of that in the pipe, is projected into the air. The explosion is caused by the gradual heating of the water far above the boiling point. The water which replaces that blown out by the explosion, has a temperature of 212°. An explosion will again occur when the water at the bottom of the tube becomes heated to 266°. The reason why the explosions are less frequent in January than in August, is that cold water trickling through crevices mixes with the water at the bottom; and prevents the rapid rise of temperature which takes place at the latter period, when the surface is dry.

Prof. Whitney read a valuable paper upon "The Progress and Present Condition of the Geological Survey of California." He dwelt upon the importance of the work, and stated that a great deal of the coast survey work was a fraud on the Government. He also exhibited some fine maps of different parts of California.

An excellent paper was also read by John L. Hayes on "The Recent Contributions of Science to the Arts of Dyeing and Printing Woolen Tissues," which we can not do more than allude to. These latter papers are of the class demanded by the age and the public, and we trust that in the future proceedings of this and similar associations this fact will be borne in mind. People are getting to care less and less for abstract speculation; they want practical knowledge, and will be content with nothing else in this material age.

GRANITE, notwithstanding its exceeding hardness, splits as straight and clean as a chestnut stick. At one of the granite quarries of Maine recently, a block was split out which measured 100 feet long, 8½ feet wide, and 5 feet thick. It weighed over 800 tons.



# OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING AUGUST 11, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each caveat.....	\$10
On filing each application for a patent, except for a design.....	\$20
On issuing each original patent.....	\$50
On appeal to Commissioner of Patents.....	\$20
On application for Renewal.....	\$20
On application for Extension of Patent.....	\$50
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On filing application for Design (three and a half years).....	\$10
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pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying use of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.

**80,798.—EXTINGUISHER FOR LAMPS.**—Chas. E. Abbott, Malden, Mass.

I claim the lid, a, so hinged and supported that when the wick, c, is lowered the lid will fall over it and close the mouth of the wick tube, b, substantially as set forth.

**80,797.—WASH BOILER.**—Joseph Adams, Cleveland, Ohio.

I claim, 1st, The open frame or rack, f, in combination with the removable base, b, and boiler, all constructed and operating substantially as set forth.

2d, The apron, g, and base, b, in combination with the rack or frame, f, substantially as and for the purpose set forth.

**80,798.—PROCESS FOR DESULPHURIZING ORE.**—John F. Alexander, Shelby, N. C., assignor to himself and Peter S. Michie.

I claim the method, herein described of desulphurizing ores, by exposing them to heat in a closed vessel or retort, in contact with charcoal, graphite, or other carbonaceous materials.

**80,799.—SHUTTER OPERATOR.**—James H. Barker (assignor to himself and D. B. Nevins), Washington, D. C.

I claim the jointed bar, g, constructed in the form herein set forth, and applied to the window blind and casing substantially as and for the purposes set forth.

**80,800.—MILK CAN.**—James A. Bennett, Millerton, N. Y.

I claim, 1st, A milk can made with the hollow sheet metal jacket, g, forming non-conducting air chambers, between which jackets the can is exposed, for the purpose set forth.

2d, The removable band, m, in combination with the jacket, g, for covering the can between said jackets, as specified.

**80,801.—JOUCH OR CRADLE.**—A. E. Blood, J. B. Blood, and F. W. Pope, Lynn, Mass. Antedated July 29, 1868.

We claim, 1st, In constructing an infant's couch, the combination of the sides, A, A, in combination with the bows, B, B, substantially as and for the purpose set forth.

2d, Suspending a couch by elastic or spring hangings, so that it may be capable of vertical reciprocating movements, and also admit of being swung laterally, substantially as described.

3d, Arranging the trundle bar, G, in such relation to the couch that it can be raised to connect with and operate the same, and when not in use, to drop clear of the couch, and allow it to be swung laterally, substantially as described.

**80,802.—RECLINING CHAIR.**—Charles Brada, Charlestown, Mass.

I claim, 1st, The seat frame, b, resting loosely on the rear of the main frame, and connected with the foot rest, c, when constructed and operating substantially as set forth.

2d, The combination and arrangement of the pivoted back frame, i, g, the sliding seat frame, b, and the foot rest, c, when constructed and operating substantially as set forth, for the purpose set forth.

**80,803.—SUPPORTING ATTACHMENT FOR SAILS.**—Charles S. Brown, Falmouth, Me.

I claim the combination of the adjustable hook, E, and its runner, D, with the yard, A, such being to operate in the manner and for the purpose specified.

**80,804.—ELEVATOR FOR SHIP PANS.**—Oramus W. Burnham, Hillsborough, and Henry F. Burnham, Acworth, N. H. Antedated March 9, 1868.

We claim, 1st, The elevator, N, rods, h, b, h, cross, H, in combination with arm, C, and brace, D, lever, L, and standard, B, arranged substantially as and for the purpose set forth.

2d, The pan, G, in combination with the books, k, k, k, cross, H, substantially as and for the purpose specified.

**80,805.—MACHINE FOR SHARPENING HORSESHOE CALKS.**—Ensign A. Bushnell, Haverhill, Wis. Antedated July 18, 1868.

I claim the slotted adjustable cage, R, and loop, D, with the screw bolt and set screw, w, in combination with the solid spring, B, main stock and burr, E, as herein described, for the purpose specified.

**80,806.—HAT SPREADER.**—Alex. H. Cary, Groton, Mass.

I claim the combination of the rod, shaft, G, provided with arms, F, hand lever, H, links, E, levers, C, and spreader shaft, B, arranged and operating substantially as and for the purposes set forth.

**80,807.—DIE FOR MAKING THE CALKS FOR HORSESHOES.**—Ethan R. Cheney, South Boston, Mass.

I claim the dies, B, B' and C, C', or their equivalent, constructed and operating substantially as described, for the purpose specified.

**80,808.—BED SPRING.**—Henry F. Clark, Lowell, Mich.

I claim the bed bottom consisting of the double set of slats, F, D, when combined and arranged between the blocks, A, and operating with the independent cross pieces, E, and springs, C, in the manner and for the purposes described.

**80,809.—MANUFACTURE OF RUBBER AND OTHER COATED LATH AND FENCIBLES.**—John W. Cobb, Melrose, and Edwin A. Hill, Quincy, Mass.

We claim the combination of mechanism for spreading rubber or a vulcanizable material on a surface or cylinder, and applying the coating to cloth, in manner as set forth, with mechanism for vulcanizing the coating of rubber or vulcanizable material, while it with the cloth may be passing about the surface or cylinder on which the rubber or said material may be spread.

Also, the combination and arrangement of the steam jacket or heater, K, with the steam heating cylinder, A, and the two cylinders, E, H, arranged and connected so as to operate as and for the purposes specified.

Also, the combination and arrangement of the air protective space, r, the steam chamber, t, g, and the steam cylinders, A, E, H, arranged and connected so as to operate a substantial manner and for the purposes as specified.

Also, our process of applying rubber or vulcanizable material to a vulcanizable material, and vulcanizing such rubber or material after such application on a cylinder or roller in contact with the coating so spread, and vulcanizing it while on the cloth, and while the latter with the rubber or vulcanizable material may be passed about the cylinder, such vulcanizing of the rubber or its equivalent being effected by heat applied to the cloth, or to the rubber, or to the process of spreading the rubber, as set forth, or to them and the material, as described.

Also, the process of making a sheet of rubber or vulcanizable material, and vulcanizing it, the same consisting in spreading the rubber or material on a cylinder or roller by means as described, and vulcanizing the rubber while on cloth, or upon it and a steam jacket arranged with it as specified.

**80,810.—LOOM.**—George Crompton, Worcester, Mass.

I claim in combination with the harness, i, lever operated by hooked jacks, angular lifter, and depresser levers, the inclination, in which is effected by pins or projections from arms, l, working in or against inclines, n, substantially as described.

Also, the arrangement of the inclines, constructed substantially as described, for producing the inclination of the lever levers, substantially as described.

**80,811.—MEAT CHOPPER.**—Andrew J. Curtis, Monroe, Me.

I claim the arrangement of the impeding pawl, N, the arm, O, the ratchet, P, the spring, I, the knife lever, D, and the cam, d, E', as applied to the knife or knives and the tub, as set forth.

Also, the arrangement and combination of the depressing spring, I, its abutment, K, and adjusting screw, L, with the knife lever, D, and the series of cams, E', for operating it, as set forth.

Also, the arrangement of the shaft, d, b, b, and the holes, f, g, g, with the tub and the ratchet, P, arranged therewith, in manner and so as to be operated by an impeding pawl driven by the knife lever, as set forth.

**80,812.—DRILL STOCK.**—C. M. Daholl, New London, Conn.

I claim the arrangement of the several parts as herein described, the rest, B, pocket, K, and flanged plug, n, being combined in said arrangement.

**80,813.—ROTARY EXCAVATOR.**—James Deveraux, Marshall, Mich.

I claim an excavator composed of the standards, A, table, B, disk, 2, the arms, C, and the excavator, D, frame, K, battery, O, plug, P, strings, L, hangers, M, bearing wheels, Q, chains, W, ropes, X, the vertical rotating shaft, D, the horizontal shaft, G, horizontal arms, G, adjustable guide wheels, H, g, g, b, vertical, Y, pulleys, V, cord, U, and capstan, Y, when arranged and operating substantially as described and for the purpose specified.

**80,814.—SAD-IRON SUPPORT FOR STOVES.**—Andrew Dickey, Albany, N. Y.

I claim a sad-iron support bracket B, constructed and adapted for being applied to a stove substantially as described.

**80,815.—MOTIVE POWER FOR SEWING MACHINES.**—A. H. Kuhnle, St. Louis, Mo.

I claim, 1st, The drums and springs when the same are operated by the lever and intermediate pinion wheel, substantially as described, as and for the purpose specified.

2d, The drums, L, L', with their springs, when the same communicate their power to the main driving shaft, or the machine, through a system of intermediate gears, and the whole is so combined and arranged as to operate substantially as described, as and for the purpose specified.

3d, Regulating the speed of the machine by means of the sleeve, E, lever, G, and fan blades, F, F', when the same are constructed and arranged so as to operate substantially as described.

**80,816.—COFFIN.**—Jefferson E. Everts, Madison, Conn.

I claim the application of the substance known as papier-mache, to be used in the construction and manufacture of coffins, substantially as and for the purpose above specified.

**80,817.—BRICK MACHINE.**—John A. Falconer and Robert Graham, Jersey City, N. J., assignors to Egbert C. Bradford, James H. Renick, and Obadiah A. Clough, New York City, assignors to J. H. Renick.

We claim, 1st, The adjustable pin, f, and adjusting holes, f', in combination with and placed in the toothed segment which gears into the rack rod that operates the plunger, substantially as and for the purposes described.

2d, A yielding spring connection, substantially as described, between the rack shaft which operates the plunger frame to drive out the molds and the crank which transmits the driving power of the machine to said rack shaft, said yielding spring connection having sufficient elasticity to maintain its position when the plunger frame and molds are in contact with the driving power of the machine, in order to prevent breakage of the machine, substantially as described.

3d, The hinged hook, L, made in the form substantially as described and shown, the spring, S, and the adjustable clamp, in combination with the connecting rod, M, and crank pin, K, of the crank, K, connected with the driving power of the machine, substantially as and for the purposes described.

**80,818.—MAKING BRAID.**—Joseph Fletcher, Providence, R. I.

I claim my improved method, substantially as herein described, of making braid by a braiding machine, such involving the making of a single strand yarn, and the arrangement of the twists of a portion of them in directions opposite to those of the rest, the same being as and for the purpose specified.

**80,819.—MANUFACTURE OF SUGAR FROM SORGHUM JUICE.**—Addison L. Folger and A. Smith Folger, Sumner, and Henry Henshaw, Kansas City, Mo., assignors to A. L. Folger.

We claim, 1st, The arrangement of a consecutive series of filters, A, C, and a cone-shaped series of precipitating troughs and connecting pipes, and of a series of evaporating pans, two at least of which are connected through a hot filter, substantially as set forth.

2d, In combination with a series of evaporating pans, a water column, N, and series of pipes, for conducting the water into the pans, substantially as and for the purpose set forth.

3d, A transparent granulator, O, substantially as and for the purpose set forth.

**80,820.—HOSE COUPLING.**—Loren B. Forester, Clyde, Mich.

I claim the pipe, B, attached to and surrounding the pipe, A, the packing, C, the ears, D, the door levers, E, provided with shoulders, F, and catches, S, to form that part of my coupling attached to the pipe, A, when operating substantially as and for the purposes herein described.

Also, the coupling pipe, H, provided with shoulder, I, ring, J, pin, K, slot, L, spring, M, in connection with pipe, G, when constructed and operating to form the other part of my coupling.

Also, the combination and arrangement of all the above named parts to form the two parts of a coupling, when constructed and operating, substantially as and for the purposes herein set forth.

**80,821.—STEAM BOILER FURNACE.**—Jerome B. Gardner and Charles H. Swan, New York City, assignors to the American Steam Boiler Co., New York City.

We claim, 1st, The combination of the feed chambers for the furnaces of steam boilers, with the perforated pipes and conductors, E, which are protected by suitable coverings, as described and set forth.

2d, The arrangement of the grate bars, F, F', upon a concave frame, causing the fuel to fall to the center, in combination with the feed chambers and air pipes, and conductors, as described and set forth.

**80,822.—ARTIFICIAL TEETH.**—Jethro J. Griffith, Philadelphia, Pa.

I claim the above described mode of effecting the attachment of pins to artificial teeth in the process of molding.

**80,823.—DUMPING CART.**—Rufus Ham and Joseph Durgin, Bangor, Me.

We claim the spindle-headed post, E, and the plate or circle, F, in combination with the rocker, R, and the trundles, I, I' and I'', constructed and operating substantially in the manner and for the purpose as shown and described.

**80,824.—SAW MILE.**—Martin Hillboldt, Syracuse, Ind. Antedated August 1, 1868.

I claim the side rails, g, g, of the saw carriage, E, constructed in the manner and for the purposes substantially as described and set forth.

**80,825.—BASKET.**—Horace C. Jones, Downington, Mich.

I claim, 1st, Constructing a basket of two thicknesses of staves or splints, the outer thickness being composed of splints which extend from side to side of the basket, beneath its bottom, and the inner thickness or lining being composed of splints which extend from the center to the bottom of the basket to its top edge, substantially as described.

2d, The cap, h, and rivet, g, fastening the tapering points of the lining-splints, b, down to the splints, a, forming the outer thickness of the basket, substantially as described.

**80,826.—MACHINE FOR CLEANING COTTON.**—John Kershaw, Paterson, N. J.

I claim, 1st, The shaft, C, with its disk plates, H, and beater blades, I, in combination with the conically disposed grating, B, covering, E, openings, K, and F, and the roller, or discharge pipe, L, all constructed as and for the purpose herein set forth.

2d, The fan, P, screen, O, and apron, N, when combined together, and with the conically disposed grating, B, of angular section, the cover, E, the feed opening, K, air opening, F, outlet pipe, E, shaft, C, disks, H, and beater blades, I, or their equivalents, all arranged and operating substantially as and for the purposes herein shown and set forth.

**80,827.—WAGON SEAT.**—Israel Kinney, Detroit, Mich., assignor to Edward McGovern and John Webber, Hamilton, Canada.

I claim the ribs or lugs, E, when constructed and connected as herein set forth.

**80,828.—MACHINE FOR TRIMMING THE EDGES OF BOOTS AND SHOES.**—Richard C. Lambert, Raynham, assignor to David Whittemore, North Bridgewater, Mass.

I claim the combination of the jack or shoe-holding carriage, B, the pattern, the stop bolts, n, n, and the cutter carrier, N, provided with mechanism for operating them, substantially as specified, such carrier being provided with a saw, y, a paring knife, x, or the same and another tool or implement for smoothing or finishing the edge of a sole of a shoe.

**80,829.—MACHINE FOR BEAMING HIDES.**—Patrick Lennox, Lynn, Mass.

I claim, 1st, In a machine for beaming hides, or skinning or dressing leather, actuating the movements of the working tool by means of the connecting rod, g, and eccentric rod, h, the former being pivoted at one end to the sliding carriage, and the latter to the beaming tool carrier, and both being connected with the balance wheel by the means above described, the whole being arranged and operating as before described.

2d, The application of the elastic apron to the revolving tablet, in manner and for the purposes as hereinbefore explained.

3d, Applying the revolving tablet to the car-track frame, in such manner as to be enabled to adjust its vertical positions, substantially as herein shown and described.

4th, The means of accomplishing this vertical adjustment of the revolving tablet, the same consisting of the cross frame, o, and treadle, p, combined and arranged and operating as before explained.

5th, The inclination of the outer end of the horizontal beam or guide for elevating the beaming tool, substantially as before explained.

**80,830.—FOLDING MOSQUITO FRAME.**—Sebeus C. Maine, Boston, Mass.

I claim the folding frame, B, with cloth, C, and netting, D, attached, in combination with the rollers, A, and weight, E, the whole operating substantially in the manner and for the purpose specified.

**80,831.—GRIDIRON.**—C. H. Mock (assignor to himself and Israel Dixon) Quincy, Ill.

I claim the spider, A, cover, B, projection and staple, h, air-passage, C, and openings, c, c, for the purpose substantially as herein shown and described.

**80,832.—STOVE-PIPE DAMPER.**—Francis D. Pastorius, Philadelphia, Pa.

I claim, 1st, A valve seat and gas escape, in combination with an automatic self-acting valve, for the purpose specified.

2d, A valve seat and gas escape, in combination with the automatic self-acting valve, D, and the stove-pipe, flue, or other suitable receptacle, A, as shown.

3d, A valve seat and gas escape, B, in combination with the rod, C, valve, D, and the counterpoise, E, as shown.

**80,833.—COMB.**—Leonice Picot, Hoboken, N. J.

I claim a double comb, formed by coupling two combs together at their backs by a sliding coupling, so that they may be detached from each other at pleasure by sliding them apart and used as single combs, substantially as herein shown and described.

**80,834.—CLIPS FOR BOOTS AND SHOES, BELTS FOR LADIES' DRESSER, ETC.**—Elihu W. Francis, Marlboro, Mass.

I claim, 1st, The device of a spiral groove in a clip, in the manner and for the purpose specified.

2d, The attachment of a cover to the clip, substantially as described and for the purpose set forth.

**80,835.—PROCESS OF MANUFACTURING SULPHURIC ETHER.**—Ferdinand Benz (assignor to himself and John A. Bayly), Poughkeepsie, N. Y.

I claim the method or process of making sulphuric ether direct from the steam of boiling masses of corn, barley, or other grains, or molasses, or sugar, substantially as hereinbefore described.

**80,836.—MACHINE FOR BURNISHING AND SPINNING METALS.**—Frederick J. Raymond, Wolcottville, assignor to himself and E. Miller and Company, Meriden, Conn.

I claim, 1st, A revolving chuck or former, in combination with a tool fitted to yield and move automatically, in spinning or burnishing articles of sheet metal upon and over a former, substantially as set forth.

2d, The lever, w, in combination with the tool, i, stock, t', and spring for withdrawing said tool from the work, as set forth.

3d, The roll, i, and set screw, s, for converting said tool into a burnisher, as and for the purpose set forth.

4th, The arrangement of the tool holding slide, s, nut, r', screw, f, and slide rest, g, and screw, 10 10', for the purposes and as set forth.

5th, The tool holding slide, s, to, i, spring, y, lever, w, set rest, g, second slide, i, bed, k, and hand wheel, p, arranged and applied substantially as specified, for spinning or burnishing articles of sheet metal upon a revolving chuck or former, as set forth.

**80,837.—HUB BORING MACHINE.**—A. R. Silver (assignor to himself and John Derrington, Salem, Ohio. Antedated July 28, 1868).

I claim, 1st, The combination of the radially grooved chuck plate, sliding gripper jaws, J, adjusting screw, H', pinions, H, and center spur wheel, G, substantially in the manner and for the purpose specified.

2d, The sections, h, h, of the feed nut, fitted in slotted bed, g', applied to a turning box or cap, D, constructed with a neck, g, substantially as described.

3d, The combination of the expandable nut, h, bed, g', neck, e, set screw, e', and stock, E, substantially as described.

4th, The construction of the gate plate, C, with an oblong opening, d, through it, one side of which is screw-cut to fit the mandrel, and the other side is provided with an adjustable screw-cut gib, C, and set screw, e', substantially in the manner and for the purposes described.

**80,838.—GANG PLOW.**—Andrew Smith and William P. Watson, Portland, Oregon, assignors to William P. Watson and J. Carter.

We claim, 1st, The combination of the rod, K, plate, J, through which the rod, K, screws, and which is attached to the hinge joint, L, hinge plate, I, plow beams, F, F', and standards and plows, G, H, substantially as described.

2d, The combination of the hinged beams, F, F', cord, c, rollers, M and N, ratchet, m, pawl, p, and foot lever, r, substantially as described.

3d, Attaching the rear end of the tongue to the axle, by means of a clevis, t, and a series of holes arranged as described, by which the draft can be changed, as set forth.

**80,839.—HORSE HAY-FORK.**—A. Smith, Schellsburg, Pa.

I claim, 1st, The combination, in a horse hay-fork of the shank, the pivoted teeth, the sliding bar, the sliding locking lever, and the loop, the combination being a d operating substantially as set forth.

2d, The combination of the shank, the locking lever, and the sliding loop, with the slide bar, having a lateral projection on its foot working in the slot of the shank, as pivoted to the teeth by links, for the purposes specified.

3d, The combination, as set forth, of the rectangular slotted shank, the diagonally arranged spear head, the sliding teeth, the slide bar, the loop, and the locking lever, for the purposes specified.

4th, The combination, in a horse hay fork, of a shank, a self-locking lever pivoted on and vibrating parallel with the shank, and a loop sliding on the shank and embracing the shank and locking lever, and operating the latter by its ascent, as set forth.

5th, The combination substantially as set forth, with a horse hay fork, of pins and skewers, to be inserted crosswise into the load, to bind together and compress the hay.

**80,840.—SCREW-CUTTING MACHINE.**—Vincent Smith, Middlebury, Ohio.

I claim modifying the structure of the parts of said combination, and combining with said combination the several devices, in virtue of which the apparatus may be used as a drilling machine, as well as a bolt and nut-threading machine, substantially as described and shown.

**80,841.—POTATO DIGGER.**—W. Stark, White Pigeon, Mich.

I claim, 1st, The angular transverse frame, U, in combination with bars, T, hangers, V, connecting bar, 2, 2, endless chain, P, and arms, V, when operating for the purpose set forth.

2d, Grated section, X, in combination with grated scoop, 5, box, Y, escape-mat, W, ratchet, S, all operating as and for the purposes specified.

3d, The combination of the above named parts with elevator, R, sickle bar, K, pitman, J, crank shaft, F, reel, I, rollers, H, plate, L, provided with angular projecting arms, G, when constructed, arranged, and operating substantially as and for the purposes herein set forth.

**80,842.—GARDEN HAND PLOW.**—John Starr, Grand Rapids, Mich.

I claim a double hand plow, constructed substantially as and for any or all of the purposes specified.

**80,843.—LAMP BURNER.**—Edwin J. Toof, Madison, Iowa.

I claim, 1st, The spring, F, which are so constructed as not only to act as a support to the elevated cone, E, but at the same time to serve to clamp the chimney, whether the same be blazed to or have spring-clip connection with the foraminous air-screen, A, substantially as herein shown and described.

2d, The hinge joint, formed by the bend of the spring support, F, in connection with an aperture or depression in the disk, A, or any attachment thereto, substantially as shown and described.

3d, The spring catch, a, formed by the extension of the spring support, F, and arranged in relation to the cone, E, and locking into the central elevated portion of the air screen, or other convenient attachment to the burner, substantially as shown and described.

4th, The spring



23. The yoke-shaped lever, when pivoted at its end to stationary uprights, which in the middle portion is suspended from a spring, the weighing platform being suspended from the lever, between the supported and suspended part of the same, substantially as herein shown and described.

24. The combination of the elastic straps, b, b, with the curved plates, c, c, for the purpose of suspending the platform from the yoke-shaped lever, substantially as herein shown and described.

25. The arrangement and combination with each other, of the platform, D, straps, b, b, plates, c, c, lever, A, uprights, R, and spring balance, C, all made and operating substantially as herein shown and described.

80,858.—CAR TRUCK.—J. H. Denmore, Boston, Mass., assignor to himself and Hiram Fuller, Hallowell, Me.

I claim the construction and arrangement of safety sleeve, H, substantially as shown and described, in combination with the axle and wheels of car or tender trucks, when the said sleeve is made in two parts and affixed to safety beams, I, all as set forth.

80,859.—PLOW.—John G. Felzer, Brunswick, assignor to Felzer & Woodson, St. Louis, Mo.

I claim the land side, D, when constructed with the assembling bars, d and d', the whole being arranged as herein shown and described.

80,860.—DISTILLING SPIRITS FROM GRAIN.—William Hutson Ford, J. McKinnon, and L. C. Clarke, New Orleans, La.

We claim the process of neutralizing the acid and controlling the fermentation of grain, or other saccharine substance, which has been boiled or otherwise treated with acids for the purpose of effecting a more complete saccharification, whereby the usual loss of alcohol is obviated, by the means and in the manner substantially as set forth.

80,861.—SEWING MACHINE.—George H. Fox and Joseph Hubbard, Boston, Mass.

We claim, in combination with the adjustable fulcrum and guide plate, m, and the adjustable stripper plate, j, the screw and nut, arranged to hold both plates in position, substantially as shown and described.

Also, in combination with the two plates, m and j, and the screw and nut, the friction spring, q, arranged to operate substantially as shown and described.

80,862.—BRICK MACHINE.—Fred E. Frey, Bucyrus, Ohio, assignor to himself, D. J. Sheekier, and James M. Kelley.

I claim, 1st, The lever, j, compressible p. m. in, X, spring, L, nut, M, lever, O, the rack shaft, A, and pinions, q, q, racks, P, P, and press board, G, when constructed, combined, and arranged in the manner and to operate substantially as described.

2d, In combination with the rack shaft, A, pinions, q, q, and racks, P, P, the adjustable plate, y, friction rollers, e, e, and set screws, f, f, when combined and arranged as described, and to operate in the manner and for the purposes set forth.

80,863.—SPINNING MACHINE.—James E. Hooper, Woodbury, Md., and Benjamin Arnold, East Greenwich, R. I.

We claim, 1st, The combination of the bar, a, or its mechanical equivalent, with the ring, rail, for the purpose of throwing off the empty bobbins, substantially as herein set forth.

2d, The combination, with a spinning machine, substantially as described, of the notched bar and sliding thread separator.

3d, The rail, k, and the mechanism for operating it, all constructed substantially as described, and for the purpose set forth.

80,864.—FRUIT PICKER.—N. G. Hughes (assignor to himself and Thomas Braden), Waynesboro, Pa.

I claim the lid or cover, D, spring, E, ring, B, hose, F, and cord, G, constructed and arranged as described, for the purpose specified.

80,865.—PRINTING PRESSES.—J. M. Jones, Palmyra, N. Y., assignor to himself, Henry Johnson, and George M. Bowman.

I claim, 1st, The arm or arms, N, or its or their equivalents, in combination with the plate, Q, or its equivalent, when arranged to engage with the said plate and to draw it against the form to which it has been previously raised substantially as and for the purpose described.

2d, The rocker arm or arms, Q, or its or their equivalents, arranged for operation upon the arm or arms, N, or its or their equivalents, substantially as described for the purpose specified.

3d, The lever or levers, M, or its or their equivalents, when arranged for operation upon the rocker arm or arms, Q, or its or their equivalents, to the impression arm, N, substantially as and for the purpose described.

4th, A movable hook or clasp for holding the sheet to the bed of the press, when operated by lever, a, and arranged for operation substantially as specified.

5th, The lever, G, or its equivalent, in combination with the frame carrying the ink rollers to the press, when arranged for operation therewith, substantially as and for the purpose described.

6th, A box or receptacle, in combination with the frame carrying the plate when arranged thereon for operation, substantially as and for the purpose set forth.

80,866.—KNITTING MACHINE.—Samuel Larkin (assignor to Bridgeport Knitting Co. ny), Bridgeport, Conn.

I claim the finger, a, constructed and operated as described, so as to carry the threads over any given number of needles to form the stitches in the relative position to each other, substantially as set forth.

80,867.—COOKING STOVE.—John Magee, Chelsea, Mass., assignor to Magee Furnace Company.

I claim a cooking closet, C, with a movable lid at its top, when said lid is placed over or above a warming closet, F, and in front of the fire chamber of a cooking stove, substantially as and for the purpose set forth.

80,868.—HAND AX.—Edmond H. Meigs (assignors to Roys, Wilcox, & Co.), East Berlin, Conn.

I claim a hand ax, produced substantially as described, as an improved article of manufacture.

80,869.—SHIPS' DAVIT.—Christian Gotthold Meinhardt, Altoona, assignor to himself and Benjamin F. Bell, Antistown, Pa.

I claim the casing, B, in one end of which swings the davit, A, provided with a castor, g, swinging around the bar, G, which is secured by the three pointed foot, g, and hook, H, and operated by the sleeve, I, substantially as and for the purpose set forth.

80,870.—HORSE HITCH.—William A. Middleton and John A. Haller, Harrisburg, Pa.

We claim, 1st, So forming the slot, K, in the top of the frame, O, O', as to serve the several purposes, substantially in the manner as herein set forth.

2d, The adjustable floor, Z, Z', provided with the trunnion rests, n, n', and the serrated part, l, l', etc., in combination with the frame, W, W', substantially as herein set forth.

3d, The holder, S, when made with the equidistant wings, a, a', and the thumb piece, R, in combination with the frame, O, O', W, W', and floor, Z, Z', for the purpose specified.

80,871.—SAW-SET AND GAGE.—W. B. Noyes and C. S. Baker, Manchester, N. H.

We claim the within described device for gaging and setting the teeth of saws, substantially as described.

80,872.—DOUBLE-TREE.—Horace Palmer and Asa N. Case, Kingsville, Ohio.

We claim the brace rod, D, whose ends enter recesses in the rear edge of the wooden bar, A, and are connected therein by the clevises, B, when said rod is adjusted nearer to or farther from the bar by the eye bolt, E, embracing its center, as herein shown and described.

80,873.—STUMP MACHINE.—Isaac Pardee (assignor to himself and Orson Reed), Buena Vista, N. J.

I claim, 1st, The machine, consisting of the frame, A, having the shaft, B, with the wheels, C, mounted thereon, with the levers, E, F, stirrups, J, and pawls, c, constructed and arranged to operate substantially as described.

2d, In combination with the lever, E, and stirrups, J, the levers, c, arranged as described, for raising the stirrups from the wheels, C.

3d, The pivot handles, H, provided with the stop rod, I, and arranged to operate as set forth.

4th, The hinged bars, h, for supporting the levers E, when arranged as shown and described.

80,874.—WATER-WHEEL.—O. M. Pike (assignor to himself and S. O. Green), North Leverett, Mass.

I claim the rotary slotter, drum, or cylinder, J, in combination with the wheel, B, and case, C, all constructed and arranged to operate in the manner substantially as and for the purpose set forth.

80,875.—WELL TUBE.—E. W. A. Platt, Bristol, and George Platt, East Hartford, assignors to themselves and Linus Wilcox, Middletown, Conn.

We claim a well tube, having lateral perforations and pebbles placed in the lower section, when so arranged that the pebbles shall be moved in their position by the action of the pump, all substantially as and for the purpose described.

80,876.—MECHANISM FOR OPERATING HARNESSES IN LOOMS.—Osgood Plummer and James Schofield, Worcester, Mass.

We claim, 1st, The combination, with the double slotted cam piece, F, of the slotted arm, f, and connection, H, substantially as and for the purposes set forth.

2d, The combination, with the arms, D, D, of the plates, E, E', or their equivalents, substantially as and for the purposes set forth.

3d, The combination, with the arms, D, and plates, E, E', for lifting and depressing the bars, L, of the pieces, C, and B, with which the front ends of said arms are connected, substantially as and for the purposes set forth.

4th, The combination, with the bar, L, or its equivalents, of the lifting and depressing plates, E, E', and arms, D, substantially as and for the purposes set forth.

5th, The combination, with the bars, L, of the roll, N, or its equivalent, substantially as and for the purposes set forth.

6th, The combination, with the mechanism which works against the pattern wheel or chain of a fancy loom, of mechanism for freeing the pattern wheel or chain from contact with said mechanism, for the purposes set forth.

7th, The jacks, J, provided with the slots, 12 and 13, substantially as and for the purposes set forth.

8th, The combination, in a fancy loom, having elevating and depressing arms, working on fixed fulcrums forward of the cloth-making point, of a series of jacks, constructed substantially as described, combined with a series of harnesses by means of cords, or their mechanical equivalent, throwing or motion a roll or rolls, L', so as to give to the harnesses a greater throw or motion than is imparted to the lifting and depressing arms, for the purposes set forth.

9th, The combination, with a jack, J, and bar constructed as described, of a spring, 15, substantially as and for the purposes set forth.

10th, The combination, with a jack, J, of a bar, L, having two front projections, I, and a rear projection, K, substantially as and for the purposes set forth.

80,877.—HYDRAULIC PRESS.—George W. Rawson, Cambridgeport, Mass., assignor to himself and Michael Hittler.

I claim the combination of the platform, G, hydraulic press, C, D, rods, a, and plate, H, arranged to operate substantially as described, for the purpose set forth.

80,878.—SWITCH AND SIGNAL.—John Saxby and John Stinson Farmer, Kilburn, England.

We claim a series of levers, and the within described slides or their equivalents, combined with a switch and signals of a railway junction, substantially as set forth, the whole being arranged and so operating that, after a change in the position of a 10th the levers, connected to signals properly displayed to indicate the condition of the road, are locked in their positions, while the remaining levers may be adjusted so as to change the position of

the signals or switches which are improperly arranged, all substantially as specified.

80,879.—HARVESTING RAKE.—Frank Schuriger and Nicholas Allstetter, Hamilton, Ohio.

We claim, 1st, The combination of the catch, L, sliding bearing, I, and frame or quadrant, K, with each other and with the stop, U, rake shaft, H, and shaft C, substantially as herein shown and described, for the purpose of preventing any motion of the said shaft, H, but one revolution on its axis while the rake head is sweeping over the platform.

2d, The combination of the curved racks, P and R, with each other and with the frame, K, and rake shaft, H, substantially as herein shown and described, for the purpose of partially rotating the shaft, H, and causing the rake head to sweep over the platform.

3d, The combination of the fingers, N and M, with each other and with the shaft, H, and catch, L, substantially as herein shown and described, for the purpose of releasing the catch, L, from the stop, U, at the proper time.

4th, The combination of the clutch, Y, lever, A', and arm, B', with each other and with the shaft, C, collar or sleeve, W, and frame or quadrant, K, substantially as herein shown and described, and for the purpose set forth.

80,880.—MACHINE FOR CUTTING OPEN DITCHES.—Jasper N. Smith and William O. Buckley, Washington, Ill.

We claim, 1st, The hanging the ditcher in a frame, as shown in the drawings, thus avoiding the use of a man, and avoiding all clogging under the beam in machines which make use of a man.

2d, The movable slides, A, A, in connection with the movable knives, B, B, so constructed as to carry on a greater or less width of earth as the machine is cutting.

3d, The form of the rear of the nose, that is, the rear carried up, as shown, to avoid friction, and expanded, as shown, to support the slides.

80,881.—COOKING UTENSIL.—Julius Smith and Isaac E. Hall, Logan, Ohio.

We claim the cooking lid of a steamer by means of spiral springs, whereby all danger from excessive pressure of steam is avoided, substantially as herein set forth.

Also, the cooking apparatus, composed of the reservoir, A, cover, B, lining, C, shell, D, stand, E, vessels, F, and the springs, G, when constructed in the manner and for the purpose set forth.

80,882.—CHURN.—Joseph Stadler, Detroit, and George M. Strong, Plymouth, Mich.

We claim, 1st, The vessel, A, in combination with the rotating dasher-shaft F, and revolving dasher-wings or boards, F', and the shifing wings, a, substantially as shown and described, and for the purposes set forth.

2d, The shifing wings, c, in combination with the vessel, A, substantially as shown and described, and for the purposes set forth.

80,883.—RADIATOR.—William Steffe (assignor to himself and Jesse Reynolds), Philadelphia, Pa.

I claim the radiator wrought into drum or radiator, constructed substantially as herein specified.

80,884.—SECURING MASTS OF VESSELS.—D. S. Stevens and Lambert Snedcor, Red Bank, N. J.

We claim supporting the masts of vessels in flexible and elastic partners and steps, substantially as and for the purpose described.

80,885.—STOP MOTION FOR LOOMS.—John J. Switzer, Roxbury, assignor to himself and Edwin H. Fitz, Northborough, Mass.

I claim, 1st, The wings, K, K, constructed substantially as described, and provided with the warp supporting cords or rods, in combination with the rising and falling board, as and for the purpose set forth.

2d, The wings, K, in combination with the vertically movable frame, F, and the wings, K, as and for the purpose set forth.

3d, The vertically movable frame, F, carrying the flat board, H, and the shaft, G, substantially as herein shown and described.

4th, The lug, r, projecting from the flat board, H, in combination with the lines, p, projecting from the rack shaft, G, all made and operating substantially as and for the purpose herein shown and described.

5th, The slide, J, connected with the shifing lever, I, spring, e', and elbow crank, N, substantially as herein shown and described.

6th, The devices herein shown and described, for transferring motion from the rack shaft, G, to the elbow crank, N, and the shifing lever, I, all made and operating substantially as herein shown and described.

7th, A tread detector consisting of the wings, K, K, threads, m, frame, F, shifing, G, flat board, H, lug, r, cam, d', lever, M, spring, l, pin, v, hook, z, frame, o, cord, y, elbow, N, slide, J, and shifing lever, I, all made and operating substantially as herein shown and described.

8th, The shifing arm, M, cord, l, pin, v, and block, m, in combination with the hook, z, having the inner projection, a', and hinged in the frame, o, and combined with the slide, S, all made as set forth.

80,886.—HEAD FOR BARRELS.—Merritt L. Thompson (assignor to himself and John P. Rittenhouse), Flemington, N. J.

I claim, 1st, A movable head for barrels or casks, formed in sections, with the last section that is introduced, and held down by a turning button, or equivalent clamp, substantially as set forth.

2d, A turning button applied to the inner side of a sectional head, and fitted substantially as specified, so as to be turned from the outside of said head and secure the sections in place, substantially as set forth.

80,887.—KNITTING MACHINE.—James Walde (assignor to himself and Geo. Kennedy), Ipswich, Mass.

I claim a racket wheel, G, with a single or eccentric, H, operated by a slide, F, for carrying away an even number of courses of three or four courses, substantially as set forth.

Also, a racket wheel or disk, P, provided with three or more flanges, constructed as described, in combination with a corresponding number of levers, R, B, and operated by two drivers, B, or one driver, B, and even courses of three or more courses, substantially as and for the purpose set forth.

80,888.—SPIRIT METER.—Joel D. Weaver (assignor to himself, C. A. Snowdon, and L. S. Bunnell), Troy, N. Y.

I claim, 1st, The improved valve actuating mechanism, substantially as herein shown and described, for the purpose set forth.

2d, The improved valve, K, in combination with the valve chest, I, provided with ports, arranged substantially as and for the purpose set forth.

3d, The combination of the sliding rod, E, valve stem, m, e, and spring actuator, F, substantially as and for the purpose set forth.

4th, The combination with the arm, f, of the tube, G, provided with the springs, K, and K', and actuated by the slide, E, substantially as and for the purpose set forth.

80,889.—SEWING MACHINE.—Wm. C. Willmarth (assignor to B. W. Lacy & Co.), Philadelphia, Pa.

I claim the revolving disk, E, arm, L, carrying a detachable needle, n, and the adjustable stop, q, in combination with the vibrating lever, o, and the adjustable stop, q, and the adjustable stop, t, the whole being constructed and operating as and for the purpose described.

80,890.—BAIRN MACHINE.—Philip N. Wolston, Springfield, Ohio, assignor to himself and Ferrell, Ludlow & Rodgers.

I claim, 1st, The die, A, in combination with rods, D, arranged in relation thereto substantially as and for the purpose set forth.

2d, Forming the mouth of the die with the projection, e, in the middle of the sides of A', substantially as and for the purpose set forth.

80,891.—GLOBE.—Graham D. Abbot, New York city.

I claim a globe constructed of flexible material, and distended by means of an elastic rubber bag, or with cork, hair, sponge, or other light elastic substance, substantially as described.

80,892.—CORN PLANTER.—Henry Ackerman, Pittsburg, Pa.

I claim, 1st, Supporting the rear of the planter by a single wheel, B, mounted on a rigid frame, in combination with the side wheels, O, mounted on hinged frames, substantially as and for the purpose described.

2d, The cultivators, m', secured at their upper ends to the angular levers, m, substantially as and for the purpose described.

3d, The removable T-shaped marker, substantially as and for the purpose described.

80,893.—SECRETARY.—Ezra Ale, Clearfield, Pa.

I claim the combination with a secretary or bookcase, of the movable shelves or cases, H, belts, G, and pulleys, E, and F, substantially as and for the purpose described.

80,894.—CLAMP.—Andrew Anderson, Madison, Wis.

I claim the combination of the cams, C, C, the jaws, A, A, the lever, E, the yoke, H, H, and the plunger, F, all constructed, arranged, and operating as and for the purpose set forth.

80,895.—MACHINE FOR PRINTING YARN.—Carl F. Austel, New York city.

I claim the movable carriage, B, carrying two rollers, a, and a rack, c, in combination with printing rollers, e, f, suspended in the standard, g, substantially as and for the purpose herein shown and described.

80,896.—TORPEDOES FOR OIL WELLS.—Alexander T. Ballantyne, Titusville, Pa.

I claim, 1st, The hollow and loaded exploding plunger, E, acting by the pressure of the water on its end, to ignite the charge, substantially as specified.

2d, The combination of the hollow and loaded exploding plunger, E, with the close cylinder or pocket, D, arranged to project down within the body or magazine, A, said plunger and pocket being so constructed as that the latter forms an anvil, and the former carries a percussion cap or pellet, for operation together to fire the charge in the plunger, and through the bursting of the latter and its pocket, also the charge in the body or magazine, A, essentially as herein set forth.

3d, The combination of the free or independent exploding plunger, E, with the body, A, and its ball, G, in such manner as that the torp. do is or may be made to form a foot made in the lowering wire or rope, directly by said plunger, and indirectly by or through its ball, substantially as shown and described.

80,897.—SAFETY BRIDLE.—G. W. Barnes, Mount Vernon, N. Y.

I claim the supplementary straps, E, detachable and adjustable, as applied and combined with the single check strap, A, of the safety bridle, substantially as and for the purpose herein described.

80,898.—TABLE, DESK, ETC.—Elias Becker, Pittsburg, Pa.

I claim the combination with tables, desks, or other similar articles, of the sliding frame, B, provided with the tablet, C, and spring, E, substantially as and for the purpose described.

80,899.—BELT KNIFE.—Henry Blake (assignor to himself, Geo. W. Blake, Ous Blake, and James Blake), East Pepperell, Mass.

I claim the improved belt punching knife herein described, as a new article of manufacture.

80,900.—MACHINE FOR PUNCHING AX POLLS.—Robert Blake, Seranton, Pa.

I claim, 1st, In a machine for punching ax polls and other tools, the combination with the punch, b, and square, g, dies of a 15-end former or die, constructed as herein specified, and applied to the end of the dies in which the bit end of the poll is received or shaped in the manner described, that is to say, so that when the squaring dies are brought together, the said "former" shall completely close the said end of the dies, substantially as herein shown and set forth.

2d, The combination with the shears of the edging dies or formers operating in connection therewith, in the manner described, so that the poll shall

simultaneously be "edged" and severed from the stock, substantially as herein shown and set forth.

3d, The combination of the shears and edging dies with the cross head which carries the squaring dies, under the arrangement and for operation as herein shown and specified.

4th, The combination in a machine such as described, of the squaring dies, "bit end" formers, shears, and edging dies, when the same are operated simultaneously from a single cross head, substantially in the manner and for the purposes shown and set forth.

80,901.—ELBOW SUPPORT FOR FLEXIBLE HOSE.—Augustus O. Bourne, Cranston, R. I.

I claim the improved hose rings, A, A, constructed and held in connection substantially as described, for the purposes specified.

80,902.—FERRY BRIDGE.—John S. Bradford, New York city.

I claim a platform or grating attached to a ferry bridge, whether submerged, or at or above the surface of the water, constructed substantially as herein described and for the purpose set forth.

80,903.—SEWING MACHINE.—James Briggs, Lyons, Ohio.

I claim, 1st, The shaft, B, with gear wheel, b, slave clutch, b', loose gear wheels, b'', the spring, E, lever, F, shaft, G, with gear wheel, g, and pinion, g', the shaft, H, with gear wheels, h, and roller, h', the whole being combined and operated in the manner and for the purpose described.

2d, The standard, C, G, shaft, D, wheel, d, pitman, I, ways, J, and stays, J', in combination with standard, K, shaft, k, and strap, K', when operated in the manner and for the purpose herein set forth.

80,904.—METALLIC HEEL PATTERN.—Jacob Brobst, Fort Wayne, Ind.

I claim the segments, A, A', hinged and operated in the manner and for the purposes described and set forth.

2d, The combination of the hinged segments and curved slotted arm and stud, and set screw, the same being constructed in the manner and for the purpose set forth.

3d, Forming the segments, a, a', on the edge of sections, A, A', for the purpose of admitting the point of a sharp instrument, as described, and for the purposes set forth.

80,905.—PUMP.—John Brockenshire, Oswego, N. Y.

I claim, 1st, The internal chamber, E, E, in conjunction with suction pipe, D, as arranged relatively with the barrels, A, A, plungers, B, B, valves, C, C and discharge outlet, P, substantially as herein described and for the purpose set forth.

2d, In combination with the parts above, the opening in the partition, G, said opening being in line with the section pipe, D, as and for the purpose described.

80,906.—APPARATUS FOR CURING TOBACCO.—Nathaniel W. Broome, Baltimore, Md.

I claim the arrangement of escape pipes and deflectors on the shell or jacket of the heater, so that the rising up of the heated air shall be passed outward and through the escaping products of combustion, and the form and the latter in being uniformly disseminated throughout the curing apartment, substantially as described.

80,907.—SEWING MACHINE.—A. R. Byrkit and C. S. Byrkit, Fairfield, Iowa.

We claim, 1st, The combination with the shuttle face plate arranged obliquely to the feed movement, of the obliquely moving vibrating carrier and double pointed shuttle, substantially as and for the purpose set forth.

2d, The combination of the heart-shaped cam, N, with the feeding mechanism described, for operating the feed, in whichever direction the machine is run, substantially as herein set forth.

80,908.—NEEDLE-SHAPENING ATTACHMENT FOR SEWING MACHINES.—James Callan, Bridport, Conn.

I claim, in combination with a bobbin winder of a sewing machine, a grinding wheel, H, arranged upon the revolving mandrel, substantially in the manner and for the purpose set forth.

80,909.—LAMP BURNER.—Wm. Carleton, Boston, Mass.

I claim, 1st, Forming the elevated deflector and the supporting standards upon its periphery in one continuous piece of metal, substantially as and for the purpose set forth.

2d, Forming the elevated deflector, its supporting standards, and the chimney-holding springs in one continuous piece, substantially as herein shown and set forth.

3d, The arrangement of the standards and chimney-supporting springs in alternate order upon the periphery of the deflector, in the manner shown and described.

4th, The combination with the air distributor and the elevated deflector with its chimney-holding springs and standards, of a bent-over ring for holding the deflector to the air distributor, whether the said ring be formed in one piece with said standards, or separately therefrom, as and for the purposes set forth.

5th, The combination of the elevated deflector and its downwardly extending peripheral springs with the chimney and chimney seat and shoulder formed on said seat, or the air distributor to prevent the excessive yielding of said springs, as herein shown and set forth.

6th, The combination with the base and wick tube of a sleeve for supporting the deflector and air distributor, held upon the base and wick tube, in the manner described, and provided near its lower end with perforations or openings for the supply of air directly to the flame, as set forth.

80,910.—FORM BLOCK FOR BASKETS.—W. H. Carpenter, New York city.

I claim the combination of the expanding or movable sections, E, the supporting ring, D, and the conical wedge, B, substantially as and for the purpose herein specified.

80,911.—OIL CUP FOR STEAM ENGINES.—John C. Carroll, Littlefield, Ill.

I claim, 1st, The oil cup, A, when provided with double valves, B, B', and an internal measuring chamber, b', substantially as herein shown and described.

2d, The combination and arrangement of the screw cap, A, lever, A', and valve rods, B, B', substantially as described and set forth.

80,912.—QUARTZ CRUSHER.—Edmund Castle, Lincolnton, North Carolina.

I claim, 1st, The end housing plates, C, C, of a quartz crushing mill, provided with the grooves for holding the side plates, and the inclined plates, D, E, and the bottom of the hopper, substantially as and for the purpose described.

2d, The combination, with a quartz mill, of the swinging gate, I, provided with a metal plate, the inclined plate, D, and the adjustable plate, f, substantially as and for the purpose described.

80,913.—CARPET LINING.—G. W. Chipman, Boston, Mass.

I claim a carpet lining, the wadding and paper sheets of which are connected together by the lines or spots of cement, substantially as set forth.

80,914.—SHEEP SHEARS.—P. G. Clancy, Augusta, Me.

I claim the employment of the center blade, C, constructed with parallel cutting edges, substantially as and for the purpose set forth.

80,915.—AUGER.—Leander Colt, Niagara Falls, N. Y.

I claim the reversible attachment, B, B, constructed as described, that is, having a bit at one end, and hollow auger at the other, when operated in connection with the gage, c', and auger, A, substantially as and for the purpose set forth.

80,916.—COOKING STOVE.—Thos. Colwell, Troy, N. Y.

I claim, 1st, The employment of the racks, C, constructed and arranged with zigzag bars, a, substantially as shown at fig. 5 of accompanying drawings, in combination with the stationary grate, B, and with the ash pan or drawer, A, the whole being arranged in the manner substantially as herein contained, described, and set forth.

2d, The rake, C, so arranged and constructed with zigzag bars, a, substantially as shown at fig. 6 of the accompanying drawings, and in the manner and for the purposes substantially as herein contained, described, and set forth.

3d, The employment of the handle or lever, J, in combination with the rake C, and with the hearth of the stove, so that the rake, C, may be vibrated in a horizontal plane when used in connection with the grate, B, and ash pan or drawer, A, in the manner substantially as herein described and set forth.

80,917.—COOPERS' CROZE.—C. O. Cook, Rockford, Ill.

I claim the arm, b, shoulder, b', and spring, b', of cutting iron, c, when combined and operated in connection with the head of screw, C, as and for the purpose set forth.

80,918.—CARBURETER.—M. P. Coons, Brooklyn, N. Y.

I claim, 1st, Saturating the pumice stone and the series of corrugated porous bricks, D, contained in the case, A, with hydrocarbon liquid, and drawing off the surplus liquid by means of the siphon pipe, I, communicating with the distributor, G, as herein described, for the purpose specified.

2d, The distributor, G, arranged in the bottom of the case beneath the pumice stone and porous bricks, D, and above the coiled steam pipe, B, as herein described for the purpose specified.

3d, The construction and arrangement of the closed case, filled with pumice stone, and the series of corrugated porous bricks, D, the distributor, G, coiled steam pipe, B, siphon pipe, I, the air pipe, F, extending through the centers of the porous bricks, D, the discharge pipe, K, the air vessel, A, all operating as described, whereby no accumulation of gas is effected, as herein set forth.

80,919.—ROCKING AND RECLINING CHAIR.—David Cox, Cincinnati, Ohio.

I claim, 1st, The combination, substantially as described, of the chair, A, rockers, B, B', restles, C, C', e', e', stops, f, f', seat, g, g', foot rest, i, i', and slotted arms, J, J', K, K', or their mechanical equivalents, or the purpose set forth.

2d, In combination with the elements, A, B, B', C, C', e', e', f, f', g, g', i, i', and J, J', K, K', the studs, L, and fixed hooks, M, for the object stated.

80,920.—DAMPER.—David B. Cox, Troy, N. Y.

I claim the reversible ventilaion check damper, consisting of a damper, F, attached to an extension, e, of the stovepipe, C, projecting in a direction opposite to or different from the said pipe, and reversible with it, substantially as and for the purpose herein specified.

80,921.—CHURN DASHER.—H. A. Crance, Lewisburg, Pa.

I claim the attaching of the cones, C, C, C, to the arms of a churn dasher, in the manner and substantially as described.

80,922.—ELECTRO MAGNETIC ALARM.—Moses G. Crane, Newton, Mass.

I claim, in combination with the electro-magnet and its armature the battery, and the alarm, constructed with the armature mechanism, and arranged to be operated substantially as shown and described.

Also, in combination with the striking mechanism, the stops, x, y, and finger, a', an equivalent locking and disengaging mechanism, substantially as described.

80,923.—LUBRICATOR.—Henry Crossley, Brooklyn, N. Y.

I claim the oil cup, having its upper valve, c, combined with the cover, applied to the cup, all substantially as herein shown and described and for the purposes set forth.

80,924.—BELT BUCKLE.—William Cummings, Sacramento, California.

I claim, 1st, The points, provided with shoulders or rings near the end.

2d, The lever, so arranged as to press said points through the belt and against the plate, substantially as set forth and described.

80,925.—CARPET STRETCHER.—S. G. Dare, New York city.



- I claim a carpet stretcher, having its teeth, a and b, and movable handle, c, arranged substantially as described, whereby it is caused to act upon the under side of the carpet, substantially as herein described.
- 80,926.—VAPOR BURNER.**—Dr. W. E. Darrah, Baltimore, Md.  
I claim the burner, composed essentially of the parts, A, A', and a', having the jets, c, c', when constructed substantially as and for the purpose specified.
- 80,927.—CASING FOR RAILWAY-CAR STOVE.**—S. L. Denney, Christiansburg, Pa. Antedated July 30, 1868.  
I claim, 1st, The casing, A, provided with ribs, 11, in combination with a railroad-car stove, substantially as for the purpose set forth.  
2d, The combination of base, B, with casing, A, as and for the purpose described.
- 80,928.—LATHE CHUCK.**—J. S. Detrick, San Francisco, Cal.  
I claim the back plate, D, constructed as described, in combination with the sliding chuck and adjusting screw, C, all substantially as set forth.
- 80,929.—SAW.**—Charles Disston (assignor to Henry Disston), Philadelphia, Pa.  
I claim a detachable saw tooth having a circular elastic base adapted to a circular recess in the blade, when there is on the edge of the said base a recess, and from the circular line which defines the same, such a projection or protuberance that the elastic base will yield on fitting the tooth to its base, all as herein set forth for the purpose specified.
- 80,930.—POWER CRANE.**—W. F. Durfee, New Bedford, Mass.  
I claim, 1st, The screw, B, with the nut, c', and pulleys, D, D', attached, in connection with the chains, E, E', and carriage, H, all arranged and applied to the crane, to operate in the manner substantially as and for the purposes set forth.  
2d, The lever, F, in combination with the chains, E, E', for the purpose of compensating for any inequality of tension between the two chains, as herein set forth and shown.
- 80,931.—DOOR SPRING.**—Wright Duryea, Glen Cove, N. Y.  
I claim, 1st, The combination, with the hinge proper, of the drum, H, chain or band, L, spindle, G, spring, J, worm wheel, I, and screw, K, for operation together, essentially as herein set forth.  
2d, The arrangement, substantially as described, of the screw, K, relatively to the working mechanism of the hinge, and whereby the tension of the spring may be adjusted from the exterior of the jamb, as specified.
- 80,932.—SWITCHING APPARATUS FOR STREET RAILWAY CAR.**—P. S. Desnoches, New Orleans, La.  
I claim the rocker arm, A, when provided with the radiating guide arm, B, and the weighted arm, C, in combination with the lever, C, and chains, a, e, f, the whole being constructed, arranged, and operating conjointly, substantially as herein described for the purpose set forth.
- 80,933.—TWEED IRON.**—C. F. Espick, Plymouth, assignor to himself and Joseph and John Stough, Marshall county, Ind.  
I claim the arrangement of the screw, D, plate, C, and hinged bottom, E, with the two boxes, constructed and operating as set forth.
- 80,934.—SHOE FOR BATHING AND OTHER PURPOSES.**—Louis Desiré Jeandron-Ferry, Paris, France.  
I claim, 1st, A shoe, constructed with a perforated sole, through which, on the bathers emerging from the water, access is provided for the water from the interior of the shoe, substantially as herein described.  
2d, The metallic gauze, in combination with the perforated sole, substantially as and for the purpose herein specified.
- 80,935.—COAL STOVE.**—G. F. Filley, St. Louis, Mo.  
I claim forming the fire pot of a coal stove of two cones, B and D, having an opening or air stack, a, between their bases, for the admission of atmospheric air, when the cones are arranged, constructed, and operated substantially as herein set forth.
- 80,936.—FIRE AND BURGLAR-PROOF SAFE.**—Daniel Fitzgerald, New York City.  
I claim, 1st, In the construction of safes for security, the employment of the corrugated case or cylinder.  
2d, In combination therewith, the outer cylinder or case, as described.  
3d, The inner cylinder or case in longitudinal sections, in combination with a case or cylinder to surround the same and hold it in place.  
4th, The inner cylinder or case in transverse sections, in combination with a suitable surrounding cylinder or case to hold said sections in place.  
5th, The inserted metallic head, substantially as described.  
6th, In combination with a corrugated case or cylinder, and the outer casing thereto, or the inner case, the filling in of the space formed under the action of said corrugations and other interstices, with a fire-proofing material, substantially as set forth.
- 80,937.—MACHINE FOR TINNERS' USE.**—W. Forshee and J. L. Judd, Marathon, N. Y.  
We claim, 1st, Forming the knives or cutting parts, P, of the die, N, in four or more pieces, separate from and adjustably secured to the body, N, of the die, substantially as herein shown and described and for the purpose set forth.  
2d, Making the grooves, O, which receive the dies, N, adjustable, substantially as herein shown and described and for the purpose set forth.  
3d, The combination and arrangement of the bed plate, A, standard, B, braces, C, curved horizontal guide, D, dies, L, M and N, P, rod, E, hooked lever, G, spring, K, connecting rod, I, and treadle or foot lever, J, with each other, substantially as herein shown and described and for the purpose set forth.
- 80,938.—APPLE CORER AND CUTTER.**—A. Frost, Seymour, Indiana.  
I claim, 1st, The slide, C, provided with rod, d, head, G, and knives, e, e, in combination with tube, b, in the center of the circular hole on the board, D, all constructed substantially as described, for the purpose of cutting the core out of apples, as herein set forth.  
2d, The combination and arrangement of the grooved bed piece, A, board, D, lever, H, slides, B and C, knives, a, a', and annular disk, F, all constructed as described and operating substantially as and for the purposes herein set forth.
- 80,939.—FLASK OR BOTTLE.**—W. T. Fry, New York City.  
I claim a covering for flask or bottle, or other glass vessels, composed of paper-maché, or an analogous substance, or a textile or felted fabric, fitted on the flask or bottle, and coated with Japan or other water-proof varnish, substantially as shown and described.
- 80,940.—MANUFACTURE OF CARBONATE AND OTHER SALTS OF SODA.**—J. M. Gattman, New York City.  
I claim the manufacture of carbonate of soda and the carbonate of soda, by the process substantially as described.
- 80,941.—HOSE TENDER.**—H. A. Gilbertson, New York City.  
I claim a hose tender or carriage having coverings or protectors, b, b', seats, c, c', and brace, d, in substantially the manner described and shown and for the purposes set forth.
- 80,942.—DOVETAILING MACHINE.**—R. E. J. Gould, New-York, N. Y.  
I claim, 1st, The within-described method of cutting dovetails by working from the bottoms of the grooves, or of the spaces between the tenons, consisting of the adjustable stops, e, in the slides of the upright gages, F, J, or any equivalent means which will produce the same result.  
2d, The adjustable stops, e, extending down into the grooves or spaces between the tenons, and secured in the slides, c, which are movable up and down on the upright gages, F, J, substantially as and for the purpose set forth.  
3d, The slotted bracket, h, in combination with the fulcrum pin, g, of the swinging abutment, i', substantially as and for the purpose described.  
4th, The combination of an abutment, i, or i', with an upright gage, F, or J, movable in one direction, and provided with a slide, c, which is movable in the direction at right angles to the motion of the gage, substantially as and for the purpose set forth.  
5th, The double-acting vertically-movable slides, c, in the upright gages, F, J, substantially as and for the purpose described.  
6th, The arrangement of two abutments, i, i', extending across the carriage H, in different directions, and at angles which are supplements to each other, said abutments being provided with upright horizontally-adjustable gages, J, J', and vertically-adjustable slides, c, substantially as and for the purpose set forth.
- 80,943.—MODE OF CANCELING POSTAGE AND REVENUE STAMPS.**—Henry Greenfield, New York City.  
I claim a postage or revenue stamp, prepared with acetate of lead, or other chemical, so that it can be canceled by the action of sulphate of ammonia, or other chemical, as a new article of manufacture.  
Also, the within-described process of canceling postage or revenue stamps simultaneously in quantities by exposing them to the action of fumes of sulphur, or of other chemicals in a gaseous form, substantially as set forth.
- 80,944.—BED BOTTOM.**—Benj. Gregg, Bennington, Vt.  
I claim the bed bottom formed of plate spring, c, attached to the frame, b, by the clamping pieces, d, and formed with the crutches or saddles, e, at their meeting ends, receiving the side, g, g', as and for the purposes specified.
- 80,945.—LIQUID COOLER.**—Emil Haas and M. A. F. Haas, Meadota, Ill.  
We claim the trough, B, and pipe, B', constructed and arranged as described, in combination with fans, E, E', arranged as described, the whole being operated in the manner and for the purpose set forth.
- 80,946.—NUT MACHINE.**—J. S. Hall, Pittsburgh, Pa.  
I claim, 1st, The arrangement of the holing punch, F, cutting-out swaging punch, D, ram, C, and half toggles, H, H', with the weighted levers, V, V', all constructed and operated substantially in the manner described.  
2d, The arrangement of the perforated follower, I, matrix box, H, and holder, J, with slotted lever, M, and weighted crank lever, P, Q, the whole constructed and operated as herein shown and described.  
3d, The improved machine, as described and shown, for making nuts from hot bars of iron, in the manner specified.
- 80,947.—MACHINE FOR HANDLING HIDES.**—John Hammond, Littleburg, Ohio.  
I claim the frame, A, provided with the rollers, a, a, in combination with the cleats, B, B, on the sides of a vat, for the purpose of easier handling the hides, substantially as herein set forth and described.
- 80,948.—LOOSE PULLEY.**—D. Harrington, Worcester, assignor to himself and E. A. Woods, Boston, Mass.  
I claim in combination with the bearing, B, and oil passages leading through it, and the surrounding oil chamber, c, the enlargement of such chamber from its ends toward its center, substantially as and for the purpose set forth.  
Also, in combination with the enlarging chamber, c, the bridges, g, g, for keeping the oil toward the center of the chamber substantially as shown and described.  
Also, the flaring oil passages, d, e, f, substantially as shown and described.
- Also, the collar, l, placed upon the shaft, and leading into chamber, c, substantially as shown and described.
- 80,949.—SPINNING MACHINE.**—C. J. Harris, Warren, R. I.  
I claim, 1st, A cylindrical flyer, a, with a thread-guiding arm, b, hinged therein, constructed substantially as herein described, with the 2d, The arrangement of the flyer, a, b, constructed as described, with the spindle, A, to which it appertains so that the relation of the two shall remain unchanged by causing both to remain in fixed planes during the spinning operation and the winding up of the bobbin, substantially as herein set forth.  
3d, The combination of the flyer, a, b, the independent traverse arm, d, the block, e, all constructed as described, with a suitably operated traverse rail, E, suitably constructed and operated as set forth.
- 80,950.—HORSE HAY FORK.**—G. W. Heath, Burlington, Pa.  
I claim the arrangement of the bars, A, A', and their points, a, a', bars, D, D', pivoted as shown, and with points, b, b', connecting bars, F, F', and lever, E, all constructed and operating as set forth.
- 80,951.—TIN CAN.**—G. E. Hegerman, Brooklyn, N. Y.  
I claim so bending the edges of the plates that form the sides of a sheet metal can, that there may be two rows, c, d, of solder at the junction of every two adjoining plates, substantially as herein shown and described.
- 80,952.—MACHINE FOR SCARPING LEATHER.**—C. H. Helms, Poughkeepsie, N. Y.  
I claim the combination of the stationary horizontal cutter with the rollers, c and e, or either of them, having their edges or peripheries beveled obliquely to the edge of the leather, substantially as herein shown and described and for the purposes set forth.
- 80,953.—HEEL TRIMMER.**—Charles H. Helms, Poughkeepsie, N. Y.  
I claim, 1st, The spindle, F, in combination with the burr-cutter, G, a collar or snapper of metal, J, at its base, substantially as hereinbefore described.  
2d, The combination of the stand or frame, A, with the adjustable table board, D, and spindle, F, substantially as hereinbefore set forth.  
3d, In combination with the adjustable table board, D, the stud or guide roller, K, substantially as hereinbefore set forth.  
4th, The combination of the adjustable table board, D, with the burr cutter, G, and collar, J, substantially as hereinbefore set forth.
- 80,954.—MILSTONE MACHINE.**—E. C. Henderson and R. A. Henderson, Albia, Iowa.  
We claim, 1st, The sliding bearing blocks, B, operated by means of the rack as herein shown and described, for the purpose of moving the millstone, C, in a horizontal motion, substantially as shown and described.  
2d, The shafts, C, D, connected by gearing, K, L, and provided with the pinions, I, and eccentric, O, when said shafts have their bearings in the sliding blocks, B, and are arranged with relation to the rack, J, and frame, A, substantially as herein described and shown.  
3d, The shaft, E, when fitted at one end to turn upon the shaft, C, and with a formed with an elongated eye, P, adapted to receive the eccentric, O, on shaft, D, said lever being arranged to be operated both vertically and horizontally within the frame, A, in the manner and by the means herein shown and described.
- 80,955.—MEAT CHOPPER.**—J. G. Hirzel, Wilmington, Del.  
I claim the combination of an convenient number of knives or blades with the intermittent rotary knife block, B, the rock, K, its toothed rotating metal pin, I, and nut or wing, m, and the pawls, n and o, and guide, all arranged and operating as described.
- 80,956.—STEAM GENERATOR.**—T. Holt, Trieste, Austria. Patented in England June 10, 1867.  
I claim, 1st, The combination of the inclined flues, E, dividing plate, E, and the removable diaphragm, I, in the marine boiler, as herein described for the purpose specified.  
2d, The combination of the flattened tube, E, composed of metallic plates, having expanded ends, and spaced internally by the balls or bars, said tubes being riveted together at their ends to leave water passages between their adjacent sides, as herein described for the purpose specified.
- 80,957.—WATER ELEVATOR.**—J. G. C. Horton, Gillespie, Ill.  
I claim, 1st, The endless chain of buckets, A, a', and the stationary crab, B, when combined and arranged as described and for the purpose set forth.  
2d, The crab, B, when provided with short levers, b, and side apertures, b', and otherwise constructed and arranged as described and shown.
- 80,958.—SCROLL-SAWING MACHINE.**—W. W. Hubbard, Manchester, N. H.  
I claim, 1st, The double yoke, A, B, supporting the slide, C, operating in combination with the bearings, K, K',  
2d, The mode of adjusting the trusses, J, J, by means of bearings, E, E', or their equivalent, in combination with the hollow beams, D, D', substantially as and for the purpose set forth.
- 80,959.—KEY-HOLE GUARD.**—Alfred Huffnagle, Philadelphia, Pa.  
I claim, 1st, The escutcheons, E and F, stud, C, and spring, D, when constructed and used in the manner and for the purpose substantially as herein set forth.  
2d, A manner of retaining the key in the lock by the escutcheon, E, fitting into a groove in the shank of the key, against which it is pressed by a spring, substantially as herein specified.
- 80,960.—PROPELLER.**—Robert Hunter, New York City.  
I claim the oscillating lever, g, adapted to be turned upon its axis for reversing, in combination with a pivot float propeller, substantially as and for the purpose set forth.
- 80,961.—GUIDE AND MARKER FOR SEWING MACHINE.**—E. W. Ingle, New Orleans, La.  
I claim, 1st, The rock shaft, D, when constructed substantially as described, and provided with a spring, c, in combination with the slotted arm, C, when constructed and operating as set forth for the purpose described.  
2d, The combination of the plate, A, with the roller, B, spring, m and n, guide plate, E, rock shaft, D, arm, C, and edge, a, when these several parts are constructed and conjointly operate substantially as herein described for the purpose set forth.
- 80,962.—FENCE POST DRIVER.**—J. D. Israel, Utica, Iowa.  
I claim the combination of the tripod, the hammer, the rope, the sleeve, the hand wheel, and the lever, constructed and arranged substantially as described.
- 80,963.—VENTILATING HAT.**—Thomas Richard Johnson, Montreal, Canada.  
I claim a hat formed in three sections, B, C, E, and F, with their fastenings, D, and apertures, G, H, and I, combined and arranged as herein described, and for the purposes set forth.
- 80,964.—CAR BRAKE AND STARTER.**—William J. Johnson, New Orleans, La.  
I claim the combination of the angular lever, h, the elastic metallic band, j, the hinged block, k, and the counter spring, l, with each other and with the car axle pulley, g, substantially in the manner and for the purposes herein set forth.
- 80,965.—KNITTING MACHINE.**—George Johnstone, Philadelphia, Pa. Antedated August 1864.  
I claim a circular knitting machine, a series of bearded needles, arranged and operating in conjunction with a series of fingers, substantially as and for the purpose described.  
2d, Fingers, substantially such as described, hung to sections admitting of separate and independent movements in the arc of a circle, substantially as set forth for the purpose specified.  
3d, Fingers, substantially such as described, projecting from or forming a part of jacks, to which movements may be imparted by the devices herein described, or any equivalent to the same, that some of the needles may be covered by the fingers to a greater extent than others, for the purpose set forth.  
4th, The adjustable jacks, in combination with the guide bars, C, C', the plate, C, and the slides, 12, 13, or equivalent devices, whereby the jacks may be brought under the control of one or other of the said bars, the whole being constructed and operating substantially as and for the purpose described.  
5th, The combination of jacks, a bar or plate, C', and the slides, I, II, or their equivalents.  
6th, Jacks, substantially such as described, in combination with a Jacquard apparatus, pattern chain, or pattern wheel by which the jacks are controlled through the medium of the devices herein described, or any equivalent to the same.  
7th, The sections, E, with their jacks, in combination with a Jacquard apparatus, pattern wheel, or chain operating on the said sections through the medium of the levers, F, and adjustable rollers, p, p', or their equivalents.  
8th, A presser wheel, having movable plates, secured to or forming a part of the same, so that the said plates may be controlled in the manner and for the purpose set forth.  
9th, The fingers, r, operating in combination with needles of different lengths, substantially as described and for the purpose set forth.
- 80,966.—SILVE.**—Mrs. J. D. Jones, Jersey City, N. Y.  
I claim, 1st, The dish or pan, A, or equivalent vessel, hoop, B, annular plate, C, flanged cylindrical vessel, D, wire cloth, E, and detachable hoop, F, having cross bars, G, attached to it, in combination with each other, said parts being constructed and arranged substantially as herein shown and described.  
2d, The presser and scrapers, I, J, K, L, M, constructed substantially as herein shown and described, in combination with the devices, A, B, C, D, E, F, G, as and for the purposes set forth.
- 80,967.—BALE LABEL.**—Norman C. Jones, New York City, N. Y.  
I claim the metallic tag, A, when constructed and used substantially as and for the purposes herein shown and described.
- 80,968.—HOISTING GEAR.**—W. O. Jones, Portland, Me.  
I claim, 1st, The combination of the geared wheel, f, with the gears, c and e, having pinions, g and h, on the face plate, F, and with the clutch, h, inserted at the recesses in j, substantially as and for the purpose set forth.  
2d, The combination of the clutch, h, on shaft, C, with the gears, a, b, c, d, e, and gear, f, and for the purpose set forth.  
3d, The combinations of the small gears, a, b, c, d, e, both fixed and free, which act in connection with f, and which serve to revolve the face plate, F, as is the case with the gears having shafts, but also as friction rollers for the shaft, C, substantially as herein set forth.
- 80,969.—GATE.**—Munson F. Kent, West Union, Iowa.  
I claim, 1st, The vertical plate, A, connected by the chain, b, to the post, C, all constructed, arranged, and operating substantially as and for the purposes herein set forth.  
2d, The gate post, A, in combination with axle, F and cord K, by means of which said gate is raised, substantially as shown and described, and for the purpose set forth.  
3d, The vertical post, C, in combination with the cord, a' and weight w, by means of which said gate is opened, substantially as shown and described, and for the purpose set forth.
- 80,970.—FANNING AND ROCKING CHAIR.**—Thomas Kerr, York, Pa.  
I claim the combination of the platform, A, A, A, the projecting pins, a, a, the upright, O, O, with lever, B, straps, H, H, strap, F, F, pulley, B, shaft, C, C, and fan, A, as described.
- 80,971.—COMBINED FOOT REST, GRATE, AND FIRE BRICK.**—John H. Keyser, New York City.  
I claim, 1st, Constructing a circular grate or foot rest for a stove, with a receptacle for a fire brick lining, substantially as described.  
2d, Constructing a circular grate or foot rest for a stove with grate bearings, substantially as described.  
3d, The combination of flange, A, collar, c, d, g, and depressions, a, a', substantially as and for the purposes described.
- 80,972.—DOOR PANEL.**—L. W. Kimball, Pittsburg, Vt.  
I claim the panel, A, constructed with side pieces b and chambers B, with braces, arranged substantially as and for the purpose described.
- 80,973.—WAGON LOCK.**—Francis A. Kingston, Mendon, Ill.  
I claim a brake for wagons, adapted for operation by an operator on a high road, and having lever, G, block, H, racket, K, staple, S, and posts, O, O, constructed, arranged, and operating substantially as specified.
- 80,974.—REVERSIBLE LATCH.**—Jacob Kinzer, Pittsburg, Pa.  
I claim constructing the plate, A, of a reversible lock in two pieces, in the manner shown and described, and operating in combination with the latch bolt, C and spring bolt, B, which latter is confined in the lower part of the casing of the lock, in the manner shown and for the purpose set forth.
- 80,975.—SCREEN FOR MACHINES FOR TREATING COTTON.**—Richard Kitson, Lowell, Mass.  
I claim a wire screen cylinder, constructed as described, with wires soldered together at their crossings and at their shutting ends, and the ends of the screen soldered to the heads or ends of the cylinder.
- 80,976.—BRICK MACHINE.**—J. A. Laffor, Albion, N. Y.  
I claim, 1st, The self-releasing crank, I, for operating the swinging press, H, substantially in the manner and for the purpose set forth.  
2d, The method of securing the scrapers and knives, S, a in the shaft E, namely, the hooked tangs, v, in connection with keys, t, and mortised hollow shaft, E, substantially as and for the purpose set forth.  
3d, The combination of the swinging press frame, H, telescopic press box, F, A, slide, B, and driving device, d, I, e, g, working from the foot of the grind shaft, E, all constructed and operating in the manner shown and for the purpose described.
- 80,977.—BRICK PRESS.**—W. O. Leslie, Philadelphia, Pa.  
I claim, 1st, The tilting rack, I, constructed and arranged to operate substantially as described.  
2d, The combination of the stationary plate, C, sliding table, B, with the mechanism for operating the same, and the cams, G and H, when arranged for joint operation, substantially as set forth.
- 80,978.—SPIDER.**—Nelson Lewis, Troy, N. Y.  
I claim, 1st, The employment of the hinged joint, D, containing the stops, E, the same being constructed and arranged upon the said spider, A, and cover B respectively, and so combined as to allow or permit the said cover to swing or turn upon the upper edge of said spider, in the manner substantially as herein described and set forth.  
2d, The damper or ventilator, c, in combination with the spider, A, and cover or lid B, substantially as and for the purposes herein described and set forth.
- 80,979.—TREMULO.**—La Fayette Louis, Boston, Mass.  
I claim, 1st, In combination with a wind actuated wheel, for driving a tremulo valve, or wheel, a finger, or equivalent mechanism, for starting the wheel, substantially as described.  
2d, The employment of a finger, or equivalent device, for arresting the motion of the valve driving wheel, and for holding it stationary, substantially as described.  
3d, The valve and wheel containing cylinder, having a wind pipe and valve openings, arranged substantially as described.  
4th, Combining with the wind pipe, x, a screw or other device for contracting the pipe, substantially as set forth.  
5th, In combination with the wind wheel, t, and v-valve containing case, o, the winzs or guards, c, arranged to operate substantially as and for the purpose described.  
6th, In combination with the wind chest and main and tremulo valve passages, the auxiliary air passage, i, substantially as described.
- 80,980.—HYDROCARBON BURNER.**—David H. Lowe, Boston, Mass.  
I claim the within described apparatus, for producing gas for illuminating purposes, substantially as set forth.  
Also, the combination of a lamp burner with the reservoir, D, for containing the naphtha or gasoline, substantially as described.
- 80,981.—APPARATUS FOR TANNING LEATHER.**—Hiram Lucas, Rowsburg, Ohio.  
I claim the adjustable rack frame, B, and cleats or bearings, I, upon which the frame is pivoted when in operation, in combination with the vat, the said frame being raised or lowered with its load of skins by means of the windlass, substantially as and for the purpose set forth.
- 80,982.—LOOM.**—James Lyall, New York City.  
I claim, 1st, A vibrating lay and a reciprocating shuttle, adapted to passing, either end first, between the warps, in combination with a carrier, provided with actuating rollers that are moved across the vibrating lay on the other side of the warps, and to which an independent rotary motion is communicated in the same direction that the rollers would be rotated by contact with the warps substantially as and for the purpose specified.  
2d, In combination with the reciprocating shuttle and lay, a shuttle driver, provided with rollers, substantially as described, so that the rollers that come in contact with the warps are rotated by contact with the rollers that supported the shuttle driver, substantially as set forth.  
3d, The reed and lay, have a raceway, l, and a shuttle rail, w, substantially as set forth, in combination with the reciprocating shuttle driver and the shuttle that is actuated by said driver, substantially as set forth.  
4th, A vibrating lay, in combination with a reciprocating shuttle, and a shuttle driver, that operates upon the shuttle during its entire reciprocation, the warps intervening, substantially as set forth.  
5th, Two or more moving pulleys, combined with the said shuttle driver and connected to the same, substantially as set forth, so as to multiply the movement in operation on the shuttle driver, as specified.  
6th, The cams, operating substantially as specified, to stop and start the shuttle gradually, and operate while the lay is stationary, in combination with the cams for operating the lay while the shuttle is stationary, substantially as set forth.  
7th, The cam, w', formed of a flange, in combination with the two rollers that are connected with the lay, one of which is yielding, and between which said flange moves, substantially as set forth.  
8th, The shuttle driver, substantially as specified, in combination with cords, or their equivalents, that pass off on opposite sides, and are connected to the actuating mechanism at or near the line of the axis of fulcrum of the lay, substantially as specified.
- 80,983.—DOOR BELL.**—Thomas Lyons, Hartford, Conn.  
I claim the arm, g, in combination with the incline elevating, i' on head, i, and hammer, d, arranged and operating substantially as and for the purpose set forth.
- 80,984.—LAMP BURNER.**—L. J. Marcy, Newport, R. I.  
I claim, 1st, The arched perforated plate, b, arranged between the wick tubes, whereby the upward current of air from the chamber, B, is broken, to prevent the formation of eddies when it encounters the lateral current which enters through the perforations in the upper chamber, A, as herein shown and described.  
2d, The cap or cone, C, when formed with two abrupt lateral shoulders, g, g, substantially as described, and for the purpose set forth.
- 80,985.—BRECH-LOADING FIRE-ARM.**—James E. McBeth, New Orleans, La.  
I claim, 1st, The bolts, C, C', center piece, D, and spring, E, in combination with the projections, d and e, and spring, H, for the purpose of opening the breech by the half-cocking of the piece, substantially as and for the purposes herein set forth and described.  
2d, The elongated slots, k, k', and holes, l, l, in combination with the pivots, 11, and spring bolt, m, for the purpose of removing the lock box from the chamber, and preventing it from falling out at random, substantially as herein set forth.  
3d, The cartridge ejector, J, constructed as described, in combination with the cam, o, on the front pivot, l, for the purpose of ejecting the shell of the old cartridge, substantially as set forth and described.
- 80,986.—FILE-FASTENER.**—E. P. McCeney, Washington, D. C.  
I claim a handle to the lever of a file-fastener, substantially in the manner and for the purpose herein described.
- 80,987.—CAMP-STOVE AND OVEN.**—D. C. McNeill, De Witt, Iowa. Antedated August 1, 1868.  
I claim, 1st, The folding stove, when its sides are hinged together at the angles by the vertical rods, C, extending below the stove, at a, for the purpose of being inserted into the ground, whereby the ground is made to form the bottom of the stove, upon which the fire is built, as herein shown and described.  
2d, In combination with the folding stove, having the open bottom, the chimney, L, when composed of sections hinged together, and adapted to fold down upon the top plate, G, as herein shown and described.  
3d, The radiating oven, F, constructed as described, its top and sides hinged together at the angles, and secured to the frame, H, and to the back plate of the stove, by the extended pinules of the hinges, C', c, as herein described, for the purpose specified.
- 80,988.—CORSET, ABDOMINAL, AND SKIRT SUPPORTER.**—John McNeven, New York City.  
I claim the corset and skirt supporter, constructed as described, of the sections, A, B, C, D, cut out upon the hips, and extended in front to constitute the cover the abdomen, and the stiffened section, E, removably attached at its ends to the extended portion of the section next the hips, substantially as described, for the purpose specified.
- 80,989.—SPRING AND DUSTER FOR WATCH.**—John H. Morse, Peoria, Ill.  
I claim the metal case, D, with its steel spring, F, to be used as a "lift spring" and "duster" for watch cases, in the manner and for the purpose specified.
- 80,990.—CASTER FOR FURNITURE.**—Hezekiah Munroe (assignor to Albert F. Munroe, Fall River, Mass.).  
I claim the arrangement in the horizontal friction roll, C, bearing against the inner surface of the chamber, B, formed at the lower end of the case, E, said spindle being held within the case by the flange, e, and shoulder, f, all constructed as described, for the purpose specified.
- 80,991.—TAILOR'S SEAT.**—Friedrich Neuhaus, Belleville, Ill.  
I claim, 1st, The combination of the leg cushion, F, with the bar, E, socket, e, rod, D, pipe, G, socket, a, and spring, H, all made and operating substantially as herein shown and described, for the purpose of making the said cushion at once elastic and adjustable.  
2d, The combination of the seat, A, and hinged seat back, B, with the spring, j, arm, s, and gage screw, l, all operating substantially as herein shown and described.
- 80,992.—ROAD GATE.**—E. Nicholson, Rockport, Ohio.  
I claim pivoting the gate at a, and to the arm, G, in combination with the shaft, F, and arm, E, operated by means of the starting bars and rods, as and for the purpose set forth.











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# SCIENTIFIC AMERICAN

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## Improvement in Hand Planing.

Rotary cutters are extensively used for truing lumber—getting it out of wind, removing occasional inequalities, etc.—but none of them leave the stock with a smooth surface; that must be obtained by the hand plane. This is one of the instances in which hand work is superior to machinery. But there is a great difficulty in securing perfect joints (edges) by hand planing, especially on long pieces, as the direction of the “bit” or cutter of the plane is guided wholly by the hand of the workman, assisted by his eye and the use of the trying square frequently applied. Of course, this compels such constant care that the work of truing up is a slow process, as it depends wholly upon the skill of the workman. When the piece to be jointed is of considerable length the difficulty of making a uniform joint is increased, as in that case the workman must himself move along the side of the bench, the motion of his body being liable to change the direction of the plane as his criterion of correctness is continually changing with every change in his position.

Under such circumstances it is almost impossible for the workman, however skillful and experienced, to carry a perfectly steady hand and produce perfectly exact work.

The object of the devices illustrated in the accompanying engravings is to obviate these difficulties and to insure perfection of work with rapidity and the smallest expenditure of time and labor. It consists mainly in an attachment to the side of the plane stock which guides the bottom and side of the plane and can be set at any angle to produce the bevel desired. Fig. 1 shows its use in edging a board or plank, giving either a square or an angular inclination to the edge. Fig. 2, a transverse vertical section, and Fig. 3, a perspective view of the device attached, show the appearance and the action of the contrivance. Fig. 4 represents a holding board for edging strips at any angle of the edge. The board, A, is secured in the vise at one end and rests on a pin at the other as usual when edging a board or plank, or it may be permanently fastened to a bench. The adjustable guide board, B, is secured to the board, A, by bolts, C, the heads of which traverse in angular slots, D, by which the guide board may be raised and secured at any height required for the width of the strips. These strips are held firmly against the guide board, B, by buttons, E, and pivoted wedges, F. In Fig. 2 three strips, G, are seen as held on the board or rest and being operated upon by a common jack-plane. This plane has secured to its guide side—that nearest the workman—a strip, H, held by screws at either end of the plane working in adjustable slots, so the strip can be raised or lowered as desired. Its edge rests on the guide board, and its projection below the face of the plane is intended to leave enough of stock to be removed by the jointer, without touching the guide board.

The device for guiding the plane is the attachment seen very plainly in Figs. 2 and 3. In Fig. 2 the contrivance is represented in vertical transverse section, and in Fig. 3 in perspective. The guide or movable part, I, is made of malleable iron, or some other metal, with planed faces bearing against the facing board, B. The bearing of these metal faces is determined by the action of the combined adjusting and check nuts, J and K, which serve to adjust the direction of the guide, I, so that it may be set to any bevel or angle required, and be always a guide to the direction of the face or bottom of the plane. The device or guide that gives direction to the plane may be easily detached or as easily attached by means of angular slots through which pass bolts screwed into the stock of the plane.

By the use of this attachment the workman has only to note

his progress by the scribe mark or gage, there being no necessity of continually resorting to the test of the try-square or bevel. The guide can be set to square or bevel as easily as any piece of work may be so gaged. It is not only useful in ordinary work, but will be found to be specially adapted to the use of tank builders, ship joiners, and millwrights.

Patented by John Woodville, Nov. 6, 1866, who may be addressed at Cincinnati, Ohio. Orders may also be sent to his agent, John L. Frisbie, at 50 John street, New York city.

## Teaching by Machinery.

Mr. Alfred Long has delivered a series of lectures before the Royal Polytechnic Institution of London, upon the use of

made with the view of discovering some new method of protecting cast iron objects from oxidation or rust when exposed to the damp atmosphere. In the first place, he observed that “zinc dust,” which is now extensively produced as a waste product of zinc furnaces, can be applied with considerable advantages. Half an ounce of this zinc dust mixed with one ounce of oil varnish, and rubbed several times upon one square foot of cast iron will, he finds, preserve the metal from rust in a variety of circumstances; but it is not entirely satisfactory when the iron is subjected to soap water or other alkaline liquids.

To be effective against the action of these solutions, the iron must be coated with two parts of waterglass (silicate of

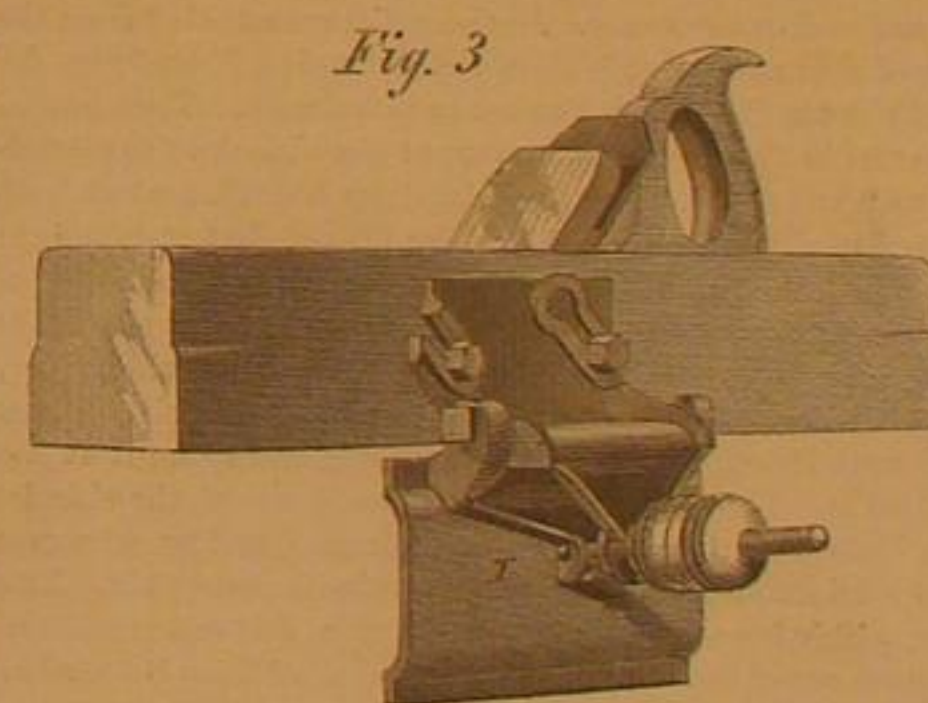
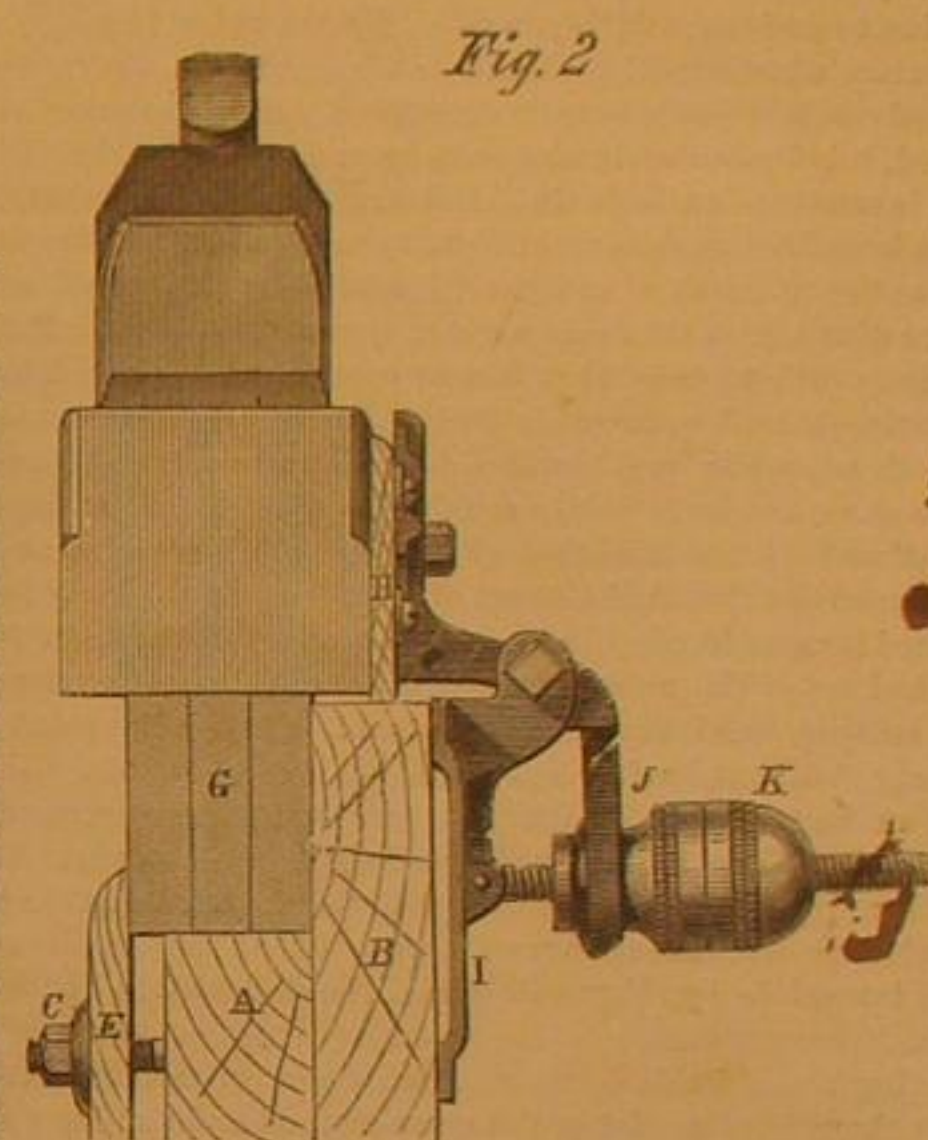
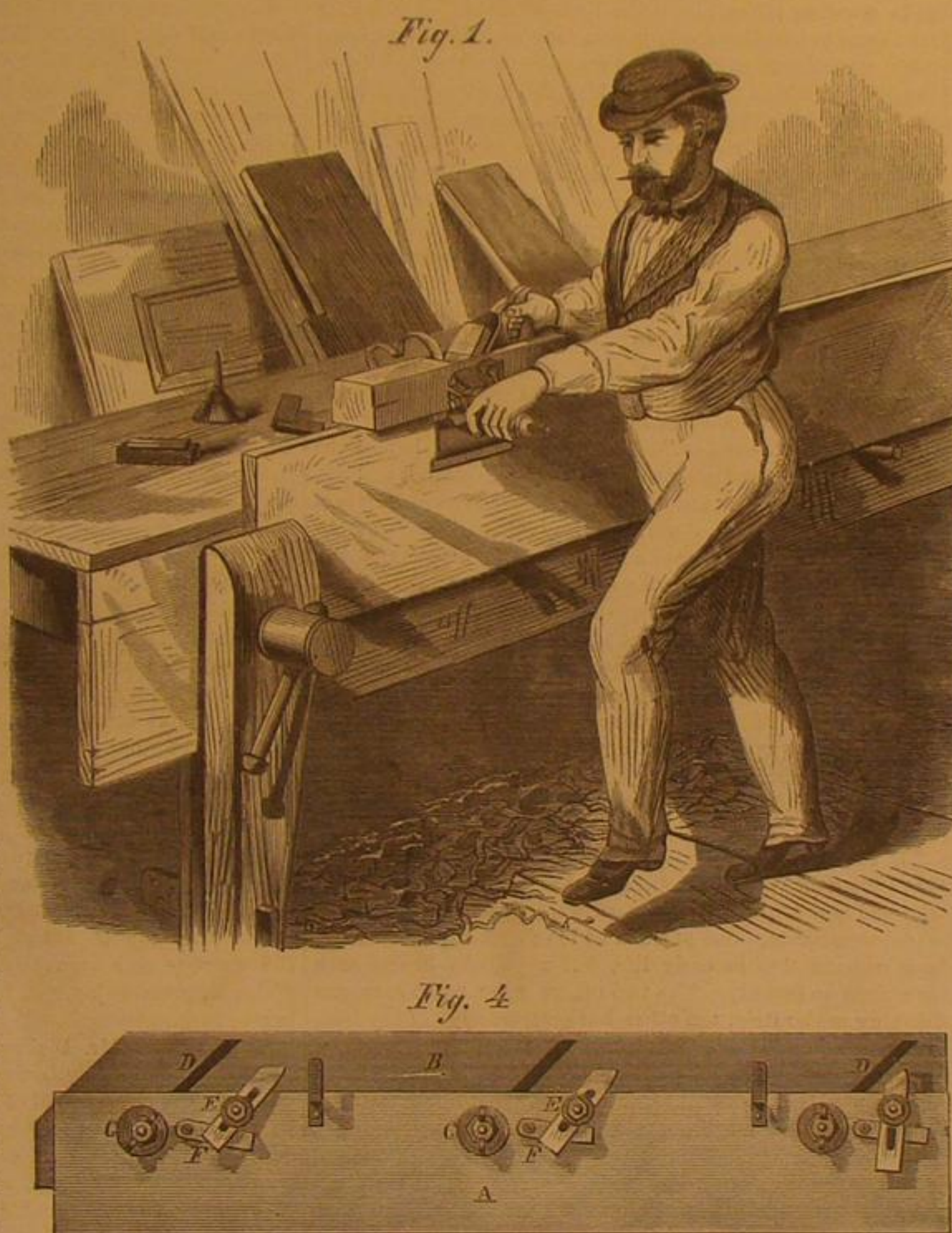
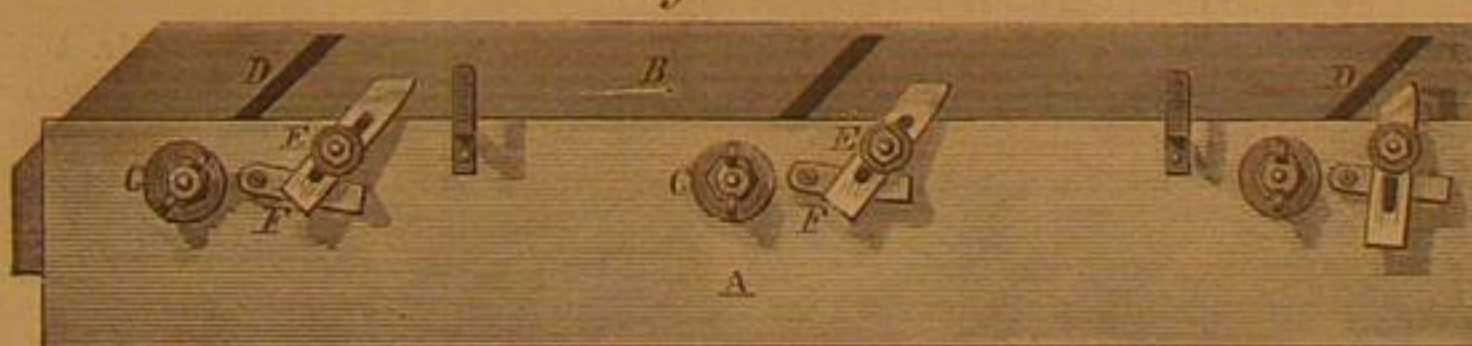


Fig. 4



## WOODVILLE'S SQUARE AND PATENT LEVEL ATTACHMENT TO PLANES.

a machine for purposes of instruction in languages and music, which is really a species of language. He calls his invention a “metabolical machine,” which to those having rhyming tendencies is singularly suggestive. No doubt this machine might be advantageously substituted for many of the human machines called teachers which are so extensively employed at present in the work of education. The metabolical machine is a contrivance for enabling children and others to acquire a knowledge of languages, music, etc., in a much shorter time than they could do so, we are told, without its use. Its action is based upon a principle professed by Mr. Prendergast, which enacts that, in order to acquire a language promptly a small number of words should be chosen at first and presented to the child in every possible kind of arrangement, until he has thoroughly mastered them. The metabolical machine is an ingenious piece of mechanism, capable of being made at a very moderate cost. It consists of a series of cubes inclosed in a box with a glass side; on these cubes are written the words (or notes, in case of music) which it is intended the child shall learn, and then by turning the handle of the machine the words appear in various arrangements, and are read off each time, or translated as they appear, by the pupils.

## Coating of Cast Iron.

Herr W. Lieke, of Hanover, has made a series of practical experiments upon the various processes for covering cast iron with a protecting varnish. The author's observations were

soda), employed in solution, marking 20° Baumé, and one part of zinc oxide intimately mixed together. This material, laid on as a thick varnish, gives the iron a kind of enameled appearance, and the protective coating will not yield to soap water.

In the next place, the author has studied the various methods of coating iron with other metals, such as copper, tin, and zinc, with or without the use of galvanism. In the former case he shows that when acid baths are used for this purpose, the results are always unsatisfactory, and alkalies cannot be used without decomposing the bath. To avoid this, however, Herr Lieke advocates the use of a tartrate either as a soda or a potash salt, especially for coppering iron by means of galvanism. The best results were obtained with a solution of twenty parts of crystallized sulphate of copper in 160 parts of water, which solution is mixed with fifty parts of neutral tartrate of potash dissolved in 650 parts of caustic soda solution of 1.12 specific gravity.

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# WILL THE COMING MAN DRINK WINE?

Continued from page 131.

Of all the experiments which have yet been undertaken with a view to trace the course of alcohol through the human system, the most important were those made in Paris a few years ago by Professors Lallemand, Perrin, and Duroy, distinguished physicians and chemists. Frenchmen have a way of coöperating with one another, both in the investigation of scientific questions and in the production of literature, which is creditable to their civilization and beneficial to the world. The experiments conducted by these gentlemen produced the remarkable effect of causing the editor of a leading periodical to confess to the public that he was not infallible. In 1855 the *Westminster Review* contained an article by Mr. Lewes, in which the teetotal side of these questions was effectively ridiculed; but in 1861 the same periodical reviewed the work of the French professors just named, and honored itself by appending a note in which it said: "Since the date of our former article, scientific research has brought to light important facts which necessarily modify the opinions we then expressed concerning the rôle of alcohol in the animal body." Those facts were revealed or indicated in the experiments of Messrs. Lallemand, Perrin, and Duroy.

Ether and chloroform—their mode of operation; why and how they render the living body insensible to pain under the surgeon's knife; what becomes of them after they have performed that office—these were the points which engaged their attention, and in the investigation of which they spent several years. They were rewarded at length with the success due to patience and ingenuity. By the aid of ingenious apparatus, after experiments almost numberless, they felt themselves in a position to demonstrate, that, when ether is inhaled, it is immediately absorbed by the blood, and by the blood is conveyed to the brain. If a surgeon were to commit such a breach of professional etiquette as to cut off a patient's head at the moment of complete insensibility, he would be able to distill from the brain a great quantity of ether. But it is not usual to take that liberty except with dogs. The inhalation, therefore, proceeds until the surgical operation is finished, when the handkerchief is withdrawn from the patient's face, and he is left to regain his senses. What happens then? What becomes of the ether? These learned Frenchmen discovered that most of it goes out of the body by the road it came in at—the lungs. It was breathed in; it is breathed out. The rest escapes by other channels of egress; it all escapes, and it escapes unchanged! That is the point; it escapes without having left anything in the system. All that can be said of it is, that it entered the body, created morbid conditions in the body, and then left the body. It cost these patient men years to arrive at this result; but any one who has ever had charge of a patient that has been rendered insensible by ether will find little difficulty in believing it.

Having reached this demonstration, the experimenters naturally thought of applying the same method and similar apparatus to the investigation of the effects of alcohol, which is the fluid nearest resembling ether and chloroform. Dogs and men suffered in the cause. In the moisture exhaled from the pores of a drunken dog's skin, these cunning Frenchmen detected the alcohol which had made him drunk. They proved it to exist in the breath of a man, at six o'clock in the evening, who had drunk a bottle of claret for breakfast at half-past ten in the morning. They also proved that at midnight the alcohol of that bottle of wine was still availing itself of other avenues of escape. They proved that when alcohol is taken into the system in any of its dilutions—wine, cider, spirits, or beer—the whole animal economy speedily busies itself with its expulsion, and continues to do so until it has expelled it. The lungs exhale it; the pores of the skin let out a little of it; the kidneys do their part, and by whatever other road an enemy can escape, it seeks the outer air. Like ether, alcohol enters the body, makes a disturbance there, and goes out of the body, leaving it no richer than it found it. It is a guest that departs, after giving a great deal of trouble, without paying his bill or "remembering" the servants. Now, to make the demonstration complete, it would be necessary to take some unfortunate man or dog, give him a certain quantity of alcohol—say one ounce—and afterward distill from his breath, perspiration, etc., the whole quantity that he had swallowed. This has not been done; it never will be done; it is obviously impossible. Enough has been done to justify these conscientious and indefatigable inquirers in announcing, as a thing susceptible of all but demonstration, that alcohol contributes to the human system nothing whatever, but leaves it undigested and wholly unchanged. They are fully persuaded (and so will you be, reader, if you read their book) that, if you take into your system an ounce of alcohol, the whole ounce leaves the system within 48 hours, just as good alcohol as it went in.

There is a boy in *Pickwick* who swallowed a farthing. "Out with it," said the father; and it is to be presumed—though Mr. Weller does not mention the fact—that the boy complied with a request so reasonable. Just as much nutrition as that small copper coin left in the system of that boy, plus a small lump of sugar, did the claret which we drank yesterday deposit in ours; so, at least, we must infer from the experiments of Messrs. Lallemand, Perrin, and Duroy.

The Coming Man, then, so long as he enjoys good health—which he usually will from infancy to hoary age—will not drink wine, nor, of course, any of the coarser alcoholic dilutions. To that unclouded and fearless intelligence, science will be the supreme law; it will be to him more than the Koran is to a Mohammedan, and more than the Infallible Church is to the Roman Catholic. Science, or, in other words, the law of God as revealed in nature, life, and history, and as

ascertained by experiment, observation, and thought—this will be the teacher and guide of the Coming Man.

A single certainty in a matter of so much importance is not to be despised. I can now say to young fellows who order a bottle of wine, and flatter themselves that, in so doing, they approve themselves "jolly dogs": No, my lads, it is because you are dull dogs that you want the wine. You are forced to borrow excitement because you have squandered your natural gaiety. The ordering of the wine is a confession of insolvency. When we feel it necessary to "take something" at certain times during the day, we are in a condition similar to that of a merchant who every day, about the anxious hour of half-past two, has to run around among his neighbors borrowing credit. It is something disgraceful or suspicious. Nature does not supply enough of inward force. We are in arrears. Our condition is absurd, and, if we ought not to be alarmed, we ought at least to be ashamed. Nor does the borrowed credit increase our store; it leaves nothing behind to enrich us, but takes something from our already insufficient stock; and the more pressing our need the more it costs us to borrow.

But the Coming Man, blooming, robust, alert, and light hearted as he will be, may not be always well. If, as he springs up a mountain side, his foot slips, the law of gravitation will respect nature's darling too much to keep him from tumbling down the precipice; and, as he wanders in strange regions, an unperceived malaria may poison his pure and vivid blood. Some generous errors, too, he may commit (although it is not probable), and expend a portion of his own life in warding off evil from the lives of others. Fever may blaze even in his clear eyes; poison may rack his magnificent frame, and a long convalescence may severely try his admirable patience. Will the Coming Man drink wine when he is sick? Here the testimony becomes contradictory. The question is not easily answered.

One valuable witness on this branch of the inquiry is the late Theodore Parker. A year or two before his lamented death, when he was already struggling with the disease that terminated his existence, he wrote for his friend, Dr. Bowditch, "the consumptive history" of his family from 1634, when his stalwart English ancestor settled in New England. The son of that ancestor built a house in 1664, upon the slope of a hill which terminated in "a great fresh meadow of spongy peat," which was "always wet all the year through," and from which "fogs could be seen gathering toward night of a clear day." In the third generation of the occupants of this house consumption was developed, and carried off eight children out of eleven, all between the ages of sixteen and nineteen. From that time consumption was the bane of the race, and spared not the offspring of parents who had removed from the family seat into localities free from malaria. One of the daughters of the house, who married a man of giant stature and great strength, became the mother of four sons. Three of these sons, though settled in a healthy place and in an innoxious business, died of consumption between 20 and 25. But the fourth son became intemperate—drank great quantities of New England rum. He did not die of the disease, but was 55 years of age when the account was written, and then exhibited no consumptive's tendency! To this fact Mr. Parker added others:

"1. I know a consumptive family living in a situation like that I have mentioned for, perhaps, the same length of time, who had four sons. Two of them were often drunk, and always intemperate—one of them as long as I can remember; both consumptive in early life, but now both hearty men from sixty to seventy. The two others were temperate, one drinking moderately, the other but occasionally. They both died of consumption, the eldest not over forty-five.

"2d. Another consumptive family, in such a situation as has been already described, had many sons and several daughters. The daughters were all temperate, married, settled elsewhere, had children, died of consumption, bequeathing it also to their posterity. But five of the sons, whom I knew, were drunkards—some, of the extremest description; they all had the consumptive build, and in early life showed signs of the disease; but none of them died of it; some of them are still burning in rum. There was one brother temperate, a farmer, living in the healthiest situation. But I was told he died some years ago of consumption."

To these facts must be added one more woeful than a thousand such—that Theodore Parker himself, one of the most valuable lives upon the Western Continent, died of consumption in his 50th year. The inference which Mr. Parker drew from the family histories given was the following: "Intemperate habits (where the man drinks a pure, though coarse and fiery liquor, like New England rum) tend to check the consumptive tendency, though the drunkard, who himself escapes the consequences, may transmit the fatal seed to his children."

There is not much comfort in this for topers; but the facts are interesting and have their value. A similar instance is related by Mr. Charles Knight; although in this case the poisoned air was more deadly, and more swift to destroy. Mr. Knight speaks in his *Popular History of England*, of the "careless and avaricious employers" of London, among whom, he says, the master-tailors were the most notorious. Some of them would "huddle sixty or eighty workmen close together, nearly knee to knee, in a room fifty feet long by twenty feet broad, lighted from above, where the temperature in summer was thirty degrees higher than the temperature outside. Young men from the country fainted when they were first confined in such a life-destroying prison; the maturer ones sustained themselves by gin, till they perished of consumption, or typhus, or delirium tremens.

To a long list of such facts as these could be added instances in which the deadly agent was other than poisoned

air—excessive exertion, very bad food, gluttony, deprivation. During the war I knew of a party of cavalry who, for three days and three nights, were not out of the saddle fifteen minutes at a time. The men consumed two quarts of whisky each, and all of them came in alive. It is a custom in England to extract the last possible five miles from a tired horse, when those miles must be had from him, by forcing down his most unwilling throat a quart of beer. It is known, too, that life can be sustained for many years in considerable vigor, upon a remarkably short allowance of food, provided the victim keeps his system well saturated with alcohol. Travelers across the plains to California tell us that, soon after getting past St. Louis, they strike a region where the principal articles of diet are saleratus and grease, to which a little flour and pork are added, upon which, they say, human life cannot be sustained unless the natural waste of the system is retarded by "preserving" the tissues in whisky. Mr. Greeley, however, got through alive without resorting to this expedient, but he confesses in one of his letters that he suffered pangs and horrors of indigestion.

All such facts as these—and they could be collected in great numbers—indicate the real office of alcohol in our modern life: *It enables us to violate the laws of nature without immediate suffering and speedy destruction.* This appears to be its chief office, in conjunction with its ally, tobacco. Those tailors would have soon died or escaped but for the gin; and those horsemen would have given up and perished but for the whisky. Nature commanded those soldiers to rest, but they were enabled, for the moment, to disobey her. Doubtless nature was even with them afterward; but, for the time, they could defy their mother great and wise. Alcohol and tobacco supported them in doing wrong. That is their part—their rôle, as the French investigators term it—in the present life of the human race.

Dr. Great Practice would naturally go to bed at ten o'clock, when he comes in from his evening visits. It is his cigar that keeps him up till twelve and a half, writing those treatises which make him famous, and shorten his life. Lawyer Heavy Fee takes home his papers, pores over them till past one, and then depends upon whisky to quiet his brain and put him to sleep. Young Bohemian gets away from the office of the morning paper which enjoys the benefits of his fine talents at three o'clock. It is two mugs of lager beer which enable him to endure the immediate consequences of eating a supper before going home. This is mad work, my masters; it is respectable suicide, nothing better.

There is a paragraph now making the grand tour of the newspapers, which informs the public that there was a dinner given the other evening in New York, consisting of twelve courses, and kept the guests five hours at the table. For five hours, men and women sat consuming food, occupying half an hour at each vivand. What could sustain human nature in such an amazing effort? What could enable them to look into one another's faces without blushing scarlet at the infamy of such a waste of time, food, and digestive force? What concealed from them the iniquity and deep vulgarity of what they were doing? The explanation of this mystery is given in the paragraph that records the crime: "There was a different kind of wine for each course."

Even an ordinary dinner party—what mortal could eat it through, or sit it out, without a constant sipping of wine to keep the brain muddled, and lash his stomach to unnatural exertion. The joke of it is, that we all know and confess to one another how absurd such banquets are, and yet few have the courage and humanity to feed their friends in a way which they can enjoy, and feel the better for the next morning.

When I saw Mr. Dickens eating and drinking his way through the elegantly bound book which Mr. Delmonico substituted for the usual bill of fare at the dinner given by the Press last April to the great artist—a task of three hours' duration—when, I say, I saw Mr. Dickens thus engaged, I wondered which banquet was the furthest from being the right thing, the one to which he was then vainly trying to do justice, or the one of which Martin Chuzzlewit partook, on the day he landed in New York, at Mrs. Pawkins's boarding-house. The poultry, on the latter occasion, "disappeared as if every bird had had the use of its wings, and had flown in desperation down a human throat. The oysters, stewed and pickled, leaped from their capacious reservoirs, and slid by scores into the mouths of the assembly. The sharpest pickles vanished, whole cucumbers at once, like sugar plums, and no man winked his eye. Great heaps of indigestible matter melted away as ice before the sun. It was a solemn and an awful thing to see." Of course, the company adjourned from the dining-room to "the bar room in the next block," where they imbibed strong drink enough to keep their dinner from prostrating them.

The Delmonico banquet was a very different affair. Our public dinners are all arranged on the English system; for we have not yet taken up with the fine, sweeping principle that whatever is right for England is wrong for America. Hence, not a lady was present! Within a day's journey of New York there are about thirty ladies who write regularly for the periodical press, beside as many more, perhaps, who contribute to it occasionally. Many editors, too, derive constant and important assistance, in the exercise of their profession, from their wives and daughters, who read books for them, suggest topics, correct errors, and keep busy editors in mind of the great truth that more than one half of the human race is female. Mrs. Kemble, who had a treble claim to a seat at that table, was not many miles distant. Why were none of these gifted ladies present to grace and enliven the scene? The true answer is: *Wine and smoke!* Not our wine and smoke, but those of our British ancestors who invented public dinners. The hospitable young gentlemen who



had the affair in charge would have been delighted, no doubt, to depart from the established system, but hardly liked to risk so tremendous an innovation on an occasion of so much interest. If it had been put to the vote (by ballot), when the company assembled, shall we have ladies or not? all the hard drinkers, all the old smokers, would have furiously written "not" upon their ballots. Those who drink little wine, and do not depend upon that little; those who do not smoke, or can easily dispense with smoke—would have voted for the ladies; and the ladies would have carried the day by the majority, it is so hard to get—two-thirds.

It was a wise man who discovered that a small quantity of excellent soup is a good thing to begin a dinner with. He deserves well of his species. The soup allays the hungry savage within us, and restores us to civilization, and to one another. Nor is he to be reckoned a traitor to his kind who first proclaimed that a little very nice and dainty fish, hot and crisp from the fire, is a pleasing introduction to more substantial viands. Six oysters upon their native shell, fresh from their ocean home, and freshly opened, small in size, intense in flavor, cool, but not too cold, radiating from a central quarter of a lemon—this, too, was a fine conception, worthy of the age in which we live. But in what language can we characterize aright the abandoned man who first presumed to tempt Christians to begin a repast by partaking of all three of these—oysters, soup, and fish? The object is defeated. The true purpose of these introductory trifles is to appease the appetite in a slight degree, so as to enable us to take sustenance with composure and dignity, and dispose the company to conversation. When a properly constituted person has eaten six oysters, a plate of soup, and the usual portion of fish, with the proper quantities of potatoes and bread, he has taken as much sustenance as nature requires. All the rest of the banquet is excess; and being excess, it is also a mistake; it is a diminution of the sum total of pleasure which the repast was capable of affording. But when Mr. Delmonico had brought us successfully so far on our way through his book; when we had consumed our oysters, our cream of asparagus in the *Dumas* style, our kettle-drums in the manner of Charles Dickens, and our trout cooked so as to do honor to Queen Victoria, we had only picked up a few pebbles on the shore of the banquet, while the great ocean of food still stretched out before us illimitable. The fillet of beef, after the manner of Lucullus, the stuffed lamb, in the style of Sir Walter Scott, the cutlets, à la Fenimore Cooper, the historic pâtés, the sighs of Mantalini, and a dozen other efforts of Mr. Delmonico's genius, remained to be attempted.

No man would willingly eat or sit through such a dinner without plenty of wine, which here plays its natural part—supporting us in doing wrong. It is the wine which enables people to keep on eating for three hours, and to cram themselves with highly concentrated food without rolling on the floor in agony. It is the wine which puts it within our power to consume, in digesting one dinner, the force that would suffice for the digestion of three.

On that occasion Mr. Dickens was invited to visit us every twenty-five years "for the rest of his life," to see how we are getting on. The Coming Man may be a guest at the farewell banquet which the press will give to the venerable author in 1893. That banquet will consist of three courses, and, instead of seven kinds of wine and various brands of cigars, there will be at every table its due proportion of ladies, the ornaments of their own sex, the instructors of ours, the boast and glory of the future Press of America.

Wine, ale, and liquors, administered strictly as medicine—what of them? Doctors differ on the subject, and known facts point to different conclusions. Distinguished physicians in England are of the opinion that Prince Albert would be alive at this moment if no wine had been given him during his last sickness; but there were formerly those who thought that the Princess Charlotte would have been saved, if, at the crisis of her malady, she could have had the glass of port wine which she craved and asked for. The biographers of William Pitt, Lord Macaulay among them, tell us that at fourteen that precocious youth was tormented by inherited gout, and that the doctors prescribed a hair of the same dog which had bitten his ancestor from whom the gout was derived. The boy, we are told, used to consume two bottles of port a day; and, after keeping up the regimen for several months, he recovered his health, and retained it until, at the age of forty-seven, the news of Ulm and Austerlitz struck him mortal blows. Prof. James Miller, of the University of Edinburgh, a decided teetotaler, declares for wine in bad cases of fever; but Dr. R. T. Trall, another teetotaler, says that during the last twenty years he has treated hundreds of cases of fevers on the cold-water system, and "not yet lost the first one;" although, during the first ten years of his practice, when he gave wine and other stimulants, he lost "about the usual proportion of cases." The truth appears to be that, in a few instances of intermittent disease, a small quantity of wine may sometimes enable a patient who is at the low tide of vitality to anticipate the turn of the tide, and borrow at four o'clock enough of five o'clock's strength to enable him to reach five o'clock. With regard to this daily drinking of wine and whisky, by ladies and others, for mere debility, it is a delusion. In such cases, wine is, in the most literal sense of the word, a mocker. It seems to nourish, but does not; it seems to warm, but does not; it seems to strengthen, but does not. It is an arrant cheat, and perpetuates the evils it is supposed to alleviate.

We drinkers have been in the habit, for many years, of playing off the wine countries against the teetotaler; but even this argument falls when we question the men who really know the wine countries. Alcohol appears to be as pernicious to man in Italy, France, and Southern Germany, where little is taken except in the form of wine, as it is in Sweden, Scot-

land, Russia, England, and the United States, where more fiery and powerful dilutions are usual. Fenimore Cooper wrote: "I came to Europe under the impression that there was more drunkenness among us than in any other country, England, perhaps, excepted. A residence of six months in Paris changed my views entirely; I have taken unbelievers with me into the streets, and have never failed to convince them of their mistake in the course of an hour. \* \* \* On one occasion a party of four went out with this object; we passed thirteen drunken men within a walk of an hour; many of them were so far gone as to be totally unable to walk."

\* \* \* In passing between Paris and London, I have been more struck by drunkenness in the streets of the former than in those of the latter. Horatio Greenough gives similar testimony respecting Italy: "Many of the more thinking and prudent Italians abstain from the use of wine; several of the most eminent of the medical men are notoriously opposed to its use, and declare it a poison. One fifth, and sometimes one fourth, of the earnings of the laborers are expended in wine."

I have been surprised at the quantity, the emphasis, and the uniformity of the testimony on this point. Close observers of the famous beer countries, such as Saxony and Bavaria, where the beer is pure and excellent, speak of this delicious liquid as the chief enemy of the nobler faculties and tastes of human nature. The surplus wealth, the surplus time, the surplus force of those nations are chiefly expended in fuddling the brain with beer. Now, no reader of this periodical needs to be informed that the progress of man, of nations, and of men depends upon the use they make of their little surplus. It is not a small matter, but a great and weighty consideration, the cost of these drinks in mere money. We drinkers must make out a very clear case in order to justify such a country as France in producing a billion and a half of dollars worth of wine and brandy per annum.

The teetotalers, then, are right in their leading positions, and yet they stand aghast, wondering at their failure to convince mankind. Mr. E. G. Delevan writes from Paris within these few weeks: "When I was here thirty years since, Louis Philippe told me that wine was the curse of France; that he wished every grape vine was destroyed, except for the production of food; that total abstinence was the only true temperance; but he did not believe there were fifteen persons in Paris who understood it as it was understood by his family and myself; but he hoped from the labors in America, in time, an influence would flow back upon France that would be beneficial. I am here again after the lapse of so many years, and, in place of witnessing any abatement of the evil, I think it is on the increase, especially in the use of distilled spirits."

The teetotalers have always underrated the difficulty of the task they have undertaken, and misconceived its nature. It is not the great toe that most requires treatment when a man has the gout, although it is the great toe that makes him roar. When we look about us, and consider the present physical life of man, we are obliged to conclude that the whole head is sick and the whole heart is faint. Drinking is but a symptom that reveals the malady. Perhaps if we were all to stop guzzling suddenly, without discontinuing our other bad habits, we should rather lose by it than gain. Alcohol supports us in doing wrong! It prevents our immediate destruction. The thing for us to do is to strike at the causes of drinking, to cease the bad breathing, the bad eating, the bad reading, the bad feeling, and bad thinking, which in a sense, necessitate bad drinking. For some of the teetotal organizations might be substituted Physical Welfare Societies. \* \*

#### NAVAL DEFENCES.

Col. Jervois, R. E., in a recent paper contributed to United Service Institution, makes the following remarks in regard to the use of torpedoes for harbor defence:

The successful results attending the employment of torpedoes as engines, both of attack and defence, by the Americans, and more especially by the Confederates in the recent war, have attracted considerable attention to these engines of destruction. Though the means at command were limited, and the arrangements generally of very crude description, there are official records of the destruction of no less than twenty-four ships of the Federal States, and of the injury of nine others, by means of torpedoes. The progress made in the application of these mines during the civil war in America, is shown by the fact that, while in the year 1862 only one Federal vessel was destroyed, in the first four months of the year 1865 eleven were destroyed or sunk, and four injured.

If it is considered that the area of water or passage to be defended may be perfectly closed against friendly vessels without disadvantage, the employment of torpedoes which are exploded by self-acting mechanical contrivances presents advantages over torpedoes which are exploded by electricity, as being less costly, and more expeditiously placed in position.

This class of explosive machines would be of a size to contain about one hundred and fifty pounds of powder, and would be so moored as to be within the range of the bottoms of vessels of small size. They can be fitted up and placed in position with great expedition, and their cost being comparatively small, their number could be so large that even the most careful search after them by the enemy would fail to render a water safe to their ships.

These mechanical torpedoes are, however, altogether inapplicable in positions where it is desired to keep the water open to friendly vessels, and to close it effectually against an enemy.

In such instances, it is indispensable that submarine mines should be arranged to be exploded by electric currents.

Electric torpedoes or mines may either be self-acting, i. e.,

their explosion may be accomplished by the collision of a ship with them, or with a mechanical arrangement floating near the surface, and connected by an electric cable with the mine beneath; they may also be exploded at will by operators on shore, when a ship is observed to be over them or in their immediate vicinity; or they may be so arranged that the collision of a ship with the self-acting mechanism with which they are provided will instantly give a signal at the station on shore, whereupon the mine may be at once exploded by the operator at the station. Lastly, the torpedoes may, by simple means, be so arranged that they may be either exploded spontaneously by a passing ship, or at the will of the operator on shore, in the possible event of the ship not coming into contact with the self-acting trap.

The torpedoes would be placed some fathoms below the surface, and at such distances apart that the explosion of one would not seriously affect those in its vicinity. Their charges would be sufficiently large to ensure the destruction of a ship by their explosion, not merely when immediately over one of them, but even if any portion of her were within forty or fifty feet of that position. It is obvious that by arranging the torpedoes in two or more checkered lines, a vessel, even if passing harmlessly between two torpedoes in one line, must come within destructive range of a torpedo in the second or the third line. The placing of torpedoes at considerable depths, and their arrangement for optional explosion from on shore, must render it extremely difficult for an enemy to interfere with such a defensive arrangement, and such interference is impossible if the area of water defended is guarded by artillery. It is often stated that the torpedoes may be removed by night, but this objection is effectually met by lighting up the channel by the electric lights or other lights which may be employed for that purpose. The Federals used to bombard Charleston, I was going to say, by candle light. The knowledge and experience acquired within the last few years regarding the application and effects of explosive agents more destructive in their action than gunpowder, have demonstrated that some of them, and especially gun-cotton, may be advantageously employed in submarine mines. The Austrians used gun-cotton as the explosive agent in torpedoes, which were applied by them to the defence of Venice, and the results which they obtained in experiments with these indicated that a submerged charge of 40 lbs. of gun-cotton produced destructive effects at least equal to those obtained with 1,000 lbs. of powder. Improvements recently made by Mr. Abel, the chemist of the War Department, in the preparation of gun-cotton have led to a very considerable reduction in the space occupied by a charge of the material, and experiments with the new form of gun-cotton have demonstrated that very important advantages, both as regards destructive effect and reduction in weight and dimensions of a charge, are secured by the substitution of gun-cotton for gunpowder as the explosive agent in torpedoes.

[Col. Jervois also spoke in terms highly commendatory of Capt. Moncrieff's plan of mounting guns, as follows:]

I must now notice a very important invention with regard to gun-carriages, which, probably, will very greatly affect the construction of the parapets of open batteries, and which, though not a substitute for turrets in all cases, will afford the advantage of lateral range obtainable from turrets and guns on turn-tables or *en barbette*, without exposure of the gun to direct fire, except at the time when it is being laid and discharged.

The principle I refer to is that which has lately been so successfully dealt with by Captain Moncrieff, of the Edinburgh Militia artillery. Very ingenious suggestions, with a view of attaining the same object, have also lately been made by two officers of engineers, Lieutenant Hogg and Lieutenant Lloyd. These two last-named officers proposed to effect the object by different plans, but both by means of two guns, one counterbalancing the other, and to fire alternately.

Captain Moncrieff, in his plan, mounts the gun on a carriage with curved sides, which rock on a level platform; attached to the carriage is a counterpoise weight, rather in excess of the weight of the gun, thus enabling it to get up like a man, to fire over the parapet, while it stores up the recoil, and when fired, the gun makes, as it were, a low curtsey, and retires behind the parapet.

The great point of this invention is, that it enables us to protect guns in open batteries by a parapet unweakened by openings, and thus to have the advantage of the great lateral range of *barbette* batteries even at a low level above the water without exposure, except at the moment of firing; it enables us at the same time to avoid the expense of iron shields for embrasures for open batteries.

Some extra expense may probably be necessary for this gun-carriage as compared with one of the late service-pattern carriages, but I doubt the Moncrieff carriage being dearer than a muzzle-pivoting carriage (which is necessary to afford the smallest opening for an embrasure), and it is with this that its cost should be compared.

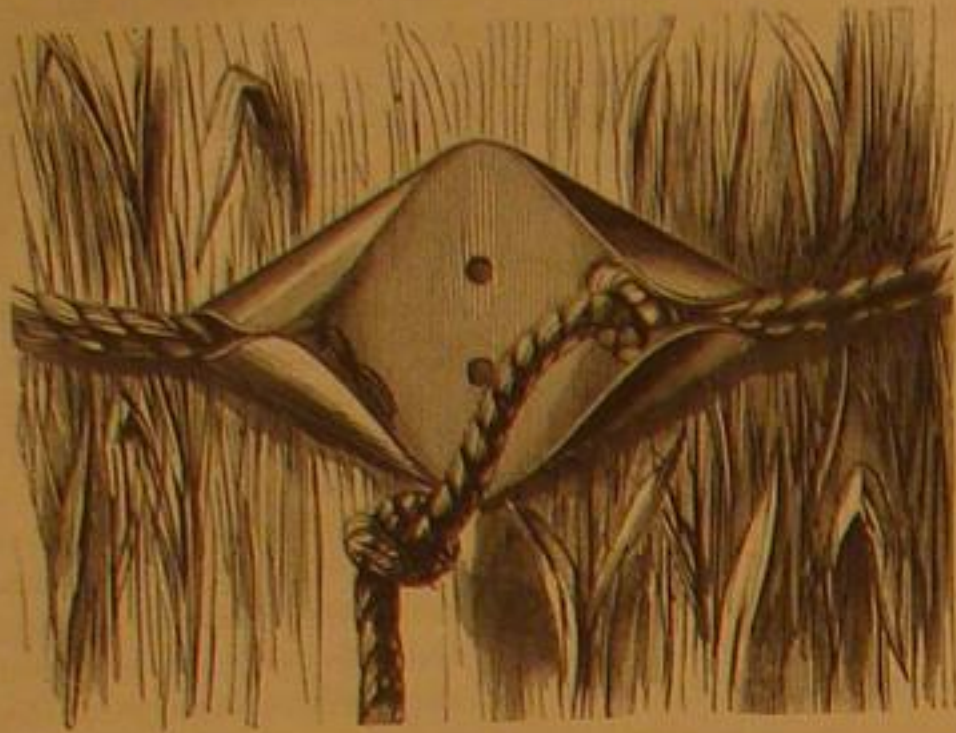
After witnessing the late experiments with this carriage, I did not hesitate at once to submit proposals for the application of the invention to several of our new works of fortification. Works constructed for carriages of this description will not afford protection against vertical fire, nor are they applicable in cases in which casemated structures are necessary.

MR. EZRA CORNELL, the celebrated founder of the Cornell University, at Ithaca, N. Y., announces publicly that young men desirous of paying their own way in obtaining an education, will be given employment upon the large farm connected with the institution, or in its machine shop, where they will be engaged in making tools, machinery, models, and patterns. Better exercise than rowing or football, more remunerative, and conducive to good habits and morals.



### TRUSLOW'S PATENT SHEAF BINDER AND BAG TIE.

The embarrassment of the large western wheat growers caused by the scarcity of skilled binders to follow the reaping machine and secure the crop, with the consequent exorbitant demands of the binders, led to the contrivance of the simple device herewith exhibited. It is so simple in construction and so facile in use that even a child may bind a sheaf with it. The inventor asserts that its use is a great saver of time, an important consideration in the harvesting of cereal crops, so liable to be injured by exposure to the inclemency of the weather. Not unfrequently, also, the straw is weakened by rains or its toughness impaired by the peculiarities of the soil on which the grain is grown, so that it is difficult to make a binding band of it.



The device under consideration is simply a piece of tin or other sheet metal bent in the form shown in the engraving and having attached a knotted cord which readily engages with the turned-up lips of the metal clasp. It is cheap, durable, portable, and easy of application. It is intended also, to be applied to securing the mouths of grain sacks, for which purpose it may be attached permanently to the bag by sewing it on, for which the holes seen in the face of the clasp are intended.

Patented through the Scientific American Patent Agency, June 30, 1868, by Edward Truslow, who may be addressed at 78 Maiden Lane, New York city.

### HIGH HEELS, NARROW TOES, AND OTHER ABSURDITIES OF FASHION.

The medical journals, and some other papers, are making a feeble crusade against the high-heeled and narrow-toed boots now in vogue. This fashion must be creating a rich harvest for the corn doctors, and it is sure to result in a greater or less degree of permanent deformity. Especially may the latter consequence be expected, in the cases of young children. When the heel is raised, as is the prevalent custom, the bones of the thigh, pelvis, and leg, as well as the foot, are thrown into abnormal positions; and while the bones retain their plasticity, the effect of such unnatural tension is sure to be perpetuated, in the shape of crooked shins, bandy legs, elephantine toe joints, and cramped ungraceful gait. Let us hope that before these evils shall have become greatly multiplied, fickle fashion may remove the cause, and give us something more sensible and endurable than these toe-screws, which are giving us the hobbling gait of Chinese women, and which possess neither beauty nor comfort.

The newspapers report that the "Grecian Bend" is all the rage at fashionable watering-places; and one correspondent actually gained the important information from an elderly female acquaintance, as to the *modus operandi* of its accomplishment. The "Grecian Bend" is an S-like curvature of the upper figure, caused by thrusting out the chest, bending forward the head, contracting the stomach, and elevating the hips, the latter effect being aided by wearing very high-heeled shoes, and an arrangement upon the hips called a *patier*, which is, most unsophisticated reader, in plain English, a bustle. The obliging matron above referred to thus discloses the mysteries of this wonderful female structure:

"The 'Grecian Bend' is quite painful and wearisome, and some girls adopt artificial contrivances to aid them in preserving the posture for several consecutive hours. 'A belt is fastened about the waist, under the skirts. From this belt, down either side the hips, two straps, furnished with buckles, descend, and are attached to strong bands made fast around the lower thighs. As the buckles of the straps are tightened, the hips are drawn up and held in 'position.'"

"This," said my amiable informant, "is a relief, of course, to only one part of the frame. The construction of the upper part has to be preserved with no other aids than the stays, and those often render it the more difficult and tiresome."

"You perhaps notice another peculiarity about some of the ladies' dresses. The bodies are not only cut very low, but are so far from clinging jealously to the figure as to seem to challenge the gaze."

"So gracious a condescension on the part of our belles," continued the matron, in a tone tingling with irony, "commends them, you will surely admit, as a far more honest and unequivocal set than the haunts of fashion are used to boast of. And, indeed, this claim might be founded upon proofs even more striking than the one alluded to. Nobody who has been entrapped here, as a spectator of the frequent displays of under-drapery on the stairways and the edges of verandas and colonnades, can doubt that many of the embroidered hose and delicate laces which adorn the limbs of the exhibitors were done as well for beauty as for wear, and that the manner of making a graceful disclosure of them is studied as a fine art."

No sensible person can read this description without regret that we have no Juvenal to sing the flagrant follies (too mild a term) of the age.

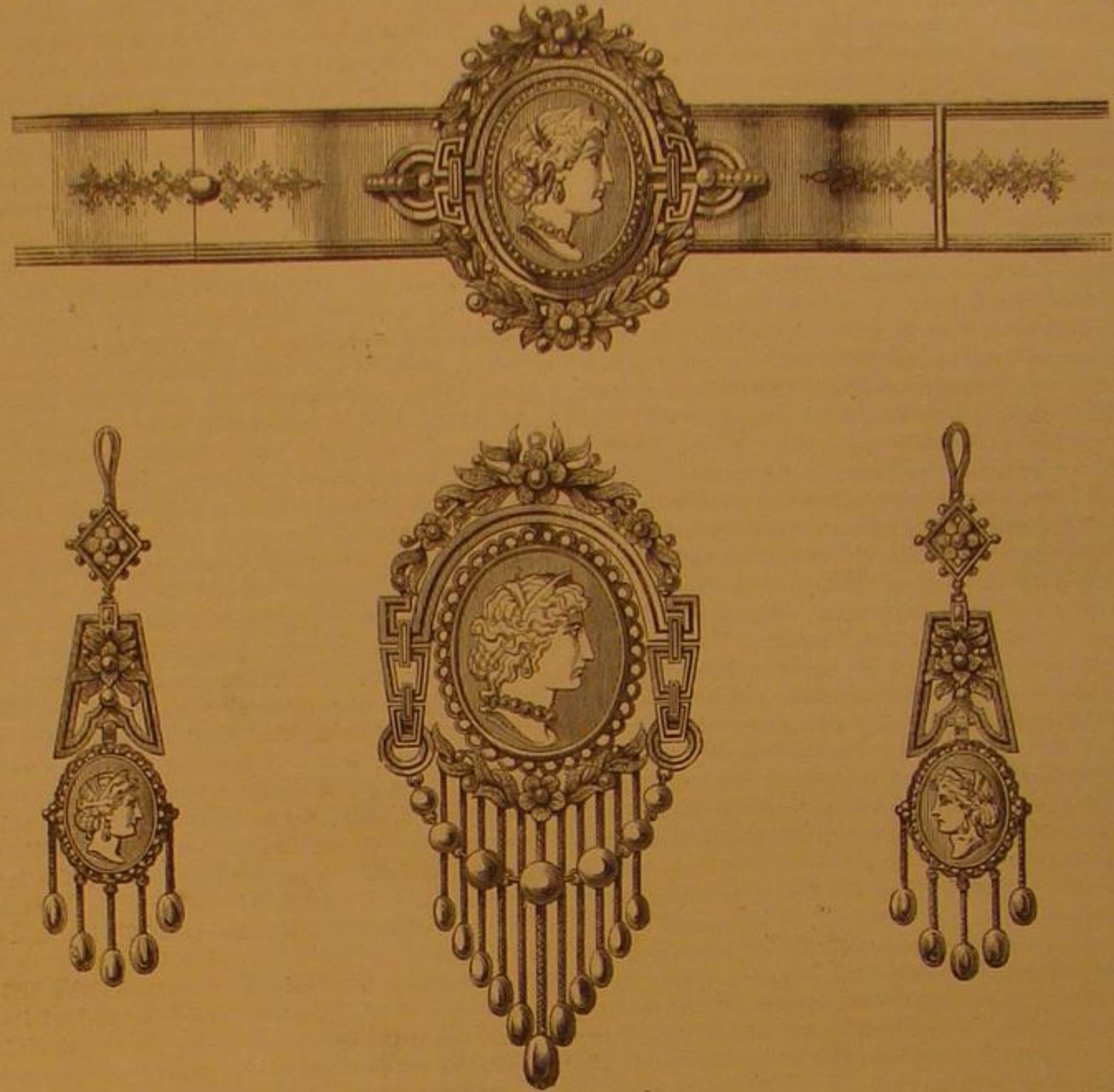
### Appearance of Encke's Comet.

Mr. B. T. Sands, superintendent of the United States Naval Observatory, reported to the Secretary of the Navy that Encke's comet was observed at Washington on the morning of the 13th August by Professor Hall. It was near the place

predicted by Messrs. Becker and Van Asten. At 3 o'clock that morning (15h. m. t.), the comet's right ascension was 6h. 59m. and declination 30° 52m. It is about two weeks behind the time it was expected to appear. Our National Observatory has the credit of being the first to discover it this time. It is nearly in the same position that it was thirty years ago. It is now observable between 3 A. M. and daylight. It will disappear in a week or two, and then reappear in the latter part of September, when it can be seen with the naked eye from 9 o'clock in the evening until 2 o'clock in the morning.

### DESIGNS FOR MODERN ARTICLES OF JEWELRY.

We herewith produce from the Workshop a beautiful design for a set of jewelry, comprising a Bracelet, Brooch, and Ear-



pendants, which will command the admiration of lovers of the beautiful, as well as the large number of our subscribers who are engaged in the manufacture of fine jewelry.

### GREAT MACHINE TOOL-MAKERS.

William Fairbairn, the celebrated machinist, has left it on record that, when he commenced his career at the beginning of the century, the human hand performed all the work that was done. In these days, such a statement seems very strange, and the wonder is, how the craftsmen of the days of our fathers managed to get through the work they did. At the present time, in the vast majority of occupations, we have reversed the old order of things, and machinery may now be said to have superseded the use of the ten fingers, in most cases where rapidly and cheapness of manufacture are required. It is said that the first person who invented labor-saving machines was Bramah, the maker of the patent lock. He found it necessary to give the greatest exactness to every part of the ward and key of this celebrated lock. This he found very difficult to do without employing the very best workmen; and their charges were so exorbitant, that his invention was in a fair way of dropping out of use on account of expense. In this dilemma, he was forced to turn his attention to the introduction of machinery to produce with unerring nicety the different parts of the complicated little apparatus with which his name is yet associated. The workshop in which the many clever contrivances to perform this work with speed were invented, may be said to have been the training school for the early machinists, whose labors have, within the present century, built up the mechanical greatness of England. Accuracy of machine-work before his day was utterly unknown. Watt had the greatest difficulty in getting his first model of the steam engine constructed with sufficient truth to work; its cylinder was not bored, but hammered, and consequently was so imperfect that it leaked in every direction, and, when his "old white iron man" died, he was plunged into despair to obtain another skilled man. Even when he had obtained the trained workmen of the Soho Foundry, they found a difficulty at first in constructing working engines after his design. The accuracy and quality of the best workmen of the day may be gaged by what he says of the working of his steam engine: "The velocity, violence, magnitude, and horrible noise of the engine give universal satisfaction to all beholders,—believers or not." What a contrast this to the smooth, irresistible noiseless action of a steam engine of the present day, constructed with mathematical accuracy and perfect finish! But to attain these qualities, machinery had to be constructed in a wholly different manner to the methods pursued by the old smiths. Every step, in

fact had to be built up. The invention of the famous fixed slide rest by Maudslay, the journeyman, who learned his trade with Bramah, was the first step in a series of inventions leading towards the same end. Before its invention, the turning lathe depended for its accuracy upon the steadiness of the muscles of the workman. If at any moment, in turning a cylinder, for instance, he leaned heavier upon the tool than another, the whole work had to be gone over again. By simply fixing the turning tool, however, this cause of error was entirely obviated, and mathematical accuracy of workmanship was obtained. Maudslay was the man who executed from the drawings of the elder Brunel the series of labor-saving machines at present at work in Portsmouth Dockyard for the manufacture of ships' blocks. These ingenious machines, forty-six in number, were only a few years ago the

curiosities of the place, and may be, for aught we know, yet. They were the first ever set up in a public yard, and, though they have been at work for sixty years, they remain still in capital working order. Maudslay afterward, in conjunction with his partner Field, founded in Lambeth Marsh the famous firm which is still carried on under their names. This firm has done much towards training the splendid machinists which have made English work so famous throughout the world. We are told, indeed, that Belgium is running us hard in this kind of work,—at all events, she is underselling us in cheap locomotives; but we do not fear that any nation will excel us in really conscientious work. We are told, and we believe it, that first class machine makers cannot afford to turn out any but first class work.

Clements was another inventor who learned his art in the school of Bramah, and afterwards worked for Maudslay and Field. This clever machinist invented the planing machine, without which no perfect plane can be made. The value of such a machine is incalculable. Indeed, upon the truth of the plane depends the whole value of modern machinery. Of old, by chipping and filing, an attempt to approach the plane was made, but of course perfect accuracy was out of the question. The fame Clements acquired by his planing machine, directed the attention of Professor Babbage to him when constructing his famous calculating machine. This instrument was, perhaps, the most wonderful specimen of mental labor-saving machine that was ever conceived. Professor Babbage, indeed, only commenced its construction, and before he had proceeded with the working drawings far, we are told that his ideas with respect to its capacity as a calculating machine developed so rapidly, that the Government became frightened. Certain portions of this curious engine were, however, furnished by Clements, and remain now, we believe, in the South Kensington Museum, as splendid fragments of mental and mechanical labor. But, although the English had not the honor of carrying out the idea conceived by one of her sons, yet it did not fall to the ground. The Messrs. Schantz, of Stockholm, followed it out, and, after many years' labor, produced a calculating machine, a copy of which was purchased, some years since, by the British Government, and was subsequently employed in calculating a large volume of life tables, which we are assured by the authorities at Somerset House never would have been undertaken had this machine not been in existence. Everything Clements undertook he did effectually. To this day we all of us have experience of this in the steam whistle, which was invented by him.

Perhaps a still greater pupil of Maudslay was Nasmyth. This remarkable man was the son of the celebrated artist of that name, consequently he sprang of a cultivated stock.



Nevertheless, he commenced work in his master's celebrated shop at ten shillings a week, and worked his way up from the bottom to the top of the ladder in his own walk of art. This ingenious man may be said to have been called forth by Brunel's gigantic design for the Great Eastern steamship. It was originally proposed to propel this vessel by the paddle, but the shaft for this purpose would have been so large that no forging tools then in existence would have been able to turn it out. Brunel accordingly appealed for help to Nasmyth, who responded by sending a drawing, by return post, of his famous steam-hammer. It was, nevertheless, determined to substitute the screw for the paddle, and the drawing was forgotten. Some years afterwards, however, Nasmyth was visiting a celebrated iron foundry in France, and, noticing a piece of forged work that he knew could not have been accomplished by the ordinary means, was curious enough to inquire how it had been produced. The answer was, "Why, with your steam-hammer, to be sure." The Frenchman had been shown the drawing, and rightly estimating its value, he had one made. Large designs call forth large tools, and large tools, in their turn, call forth large designs. Had it not been for Nasmyth's hammer, there would have been no such things as iron-clads, neither would there have been any of the monster cannon built upon the coil system, as they are at present. The steam-hammer enables us to undertake Cyclopean tasks, which we should never have dreamed of otherwise.

The last and best known machinist of the goodly band that issued from the establishment of Messrs. Maudslay & Field is Joseph Whitworth. This celebrated iron worker improved upon Clements planing machine, in his Jim Crow planer. This machine works with a cutter, which reverses itself, cutting backward and forward without losing any time. It was at work, it will be remembered, in the Industrial exhibition of 1862. Whitworth is, perhaps, best known by his rifle gun, the rifling of which is the very perfection of art. Accuracy of work, learned by him from the traditions of the shop in which he was taught, led Whitworth to contrive various machines for the furtherance of that object. He has invented one machine which detects variations of a millionth of an inch. It is very likely that this contrivance will be but rarely used, but the influence of the practice of its inventor must have immense effect upon the trade, and help to keep up a standard of excellence which less known men, if they would succeed, will have to attain. The use of machinery has now become so general, that the perfection of workmanship is almost a necessity. Such contrivances as those we have drawn attention to, would have been beyond the reach of the simple hammer and file of our forefathers; and if the world were reduced once more to the hand of the craftsman for the production of its machinery, all its great operations would gradually be brought to a standstill. Yet it is but little more than half a century since the hand was all we had to depend upon in the world of mechanics. If the reader wishes to measure the difference between the old work and the machine work of the present day, he has only to look down the hold of any small steamer at one of Penn's marine engines, or to behold the splendid specimen on board the *Warrior* iron-clad. This engine was designed, also, by the Messrs. Penn; and the perfection of its workmanship may be estimated by the fact, that, when its five thousand pieces were assembled together for the first time, such was the mathematical accuracy of their fit, that as soon as steam was got up, it began to move with the utmost smoothness. Let the reader, we say, compare this splendid piece of work with the old Newcomen engine in the South Kensington Museum, and he will at once see the ages of mechanical genius we have traversed since Watt took the latter in hand, and by patient thought built up out of it the present steam engine. Yet it is not more than a century ago that the machine represented the most powerful motive engine we possessed, and was as fair a specimen of work as the eighteenth century could turn out. Such are the differences that have been brought about by half a dozen able men carrying out the traditions handed down by Henry Maudslay,—mere workshop traditions, which now are acted upon throughout Europe wherever the machinist's skill is known.—*Cassell's Magazine*.

#### SCARCITY OF PAPER MATERIAL.

The scarcity of paper stock, felt almost immediately after the inauguration of the late war, is not singular. In Bishop's "History of American Manufactures," we learn that in 1748 a similar scarcity existed in the Massachusetts Colony. Thomas Fleet, who (copying his public notice) was "Printer at the Heart and Crown, in Cornhill, Boston," advertises thus:

**CHOICE PENNSYLVANIA TOBACCO PAPER TO** be sold by the Publisher of this Paper (the *Boston Evening Post*), at the Heart and Crown; where may also be had the Bulls or Indulgences of the present Pope Urban VIII., either by the single Bull, Quire, or Ream, at a much cheaper rate than they can be purchased of the French or Spanish Priests.

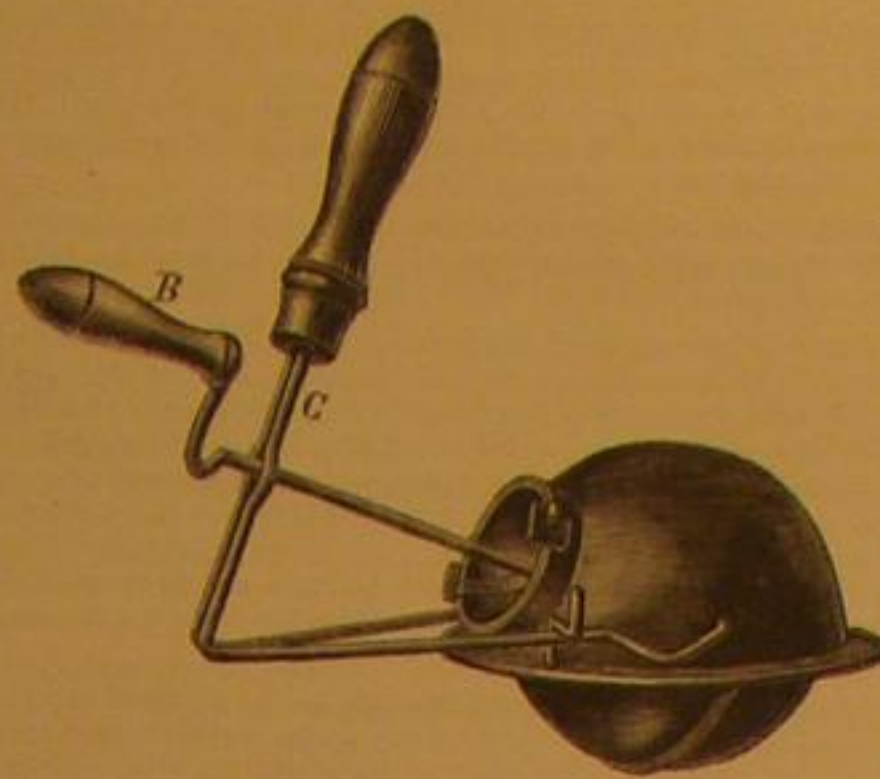
This selling of Papal indulgences and bulls, in Puritan New England, seems odd, but the facts of history account for it. Several bales of the indulgences, printed on one face or page of a small sheet of very good paper, had been taken in a Spanish ship captured by an English cruiser during the war with France and Spain in 1748, of which Mr. Fleet purchased a large quantity. He made use of them for printing ballads, the back of each copy of the bull being large enough for two songs, as "Black-Eyed Susan," etc. "To what base uses do we come at last."

In cutting some timber in Omaha, a few days since, a bullet was found imbedded in the trunk of a rock elm. The grains which had overgrown it show that it must have been deposited there sixty-two years ago, a time when the country had not yet been visited by any white men, except the explorers Lewis and Clarke.

#### SIMPLE DEVICE FOR ROASTING COFFEE.

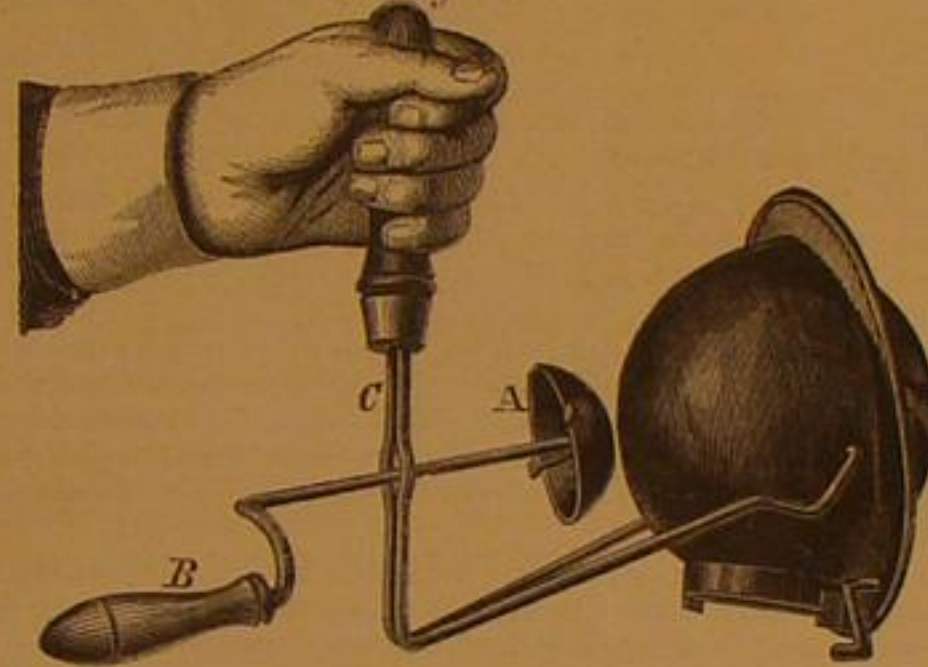
The adulterations perpetrated in the preparation of coffee ready ground for the use of the family have greatly stimulated the sale and use of household devices for the preparation of the berry. One of the best coffee roasters we have seen is that illustrated in the accompanying engravings. It is a hol-

Fig. 1



low globe of cast iron with a circular opening for the reception of the berries, closed by a convex or cup-shaped cover, A, attached to the handle, B, and furnished with lugs engaging with ears on the globe, by which the globe is revolved over the fire. This globe or receptacle turns in a hemispherical cap that is furnished with a flange fitting over the opening in the stove or range. A forked lever, C, the arms of which project on each side of the globe and act as springs, engages with catches fixed on the circular flange to hold the globe in place while being used. A simple movement of the levers, B and C, disengages the cover and reverses the globe, thus discharg-

Fig. 2

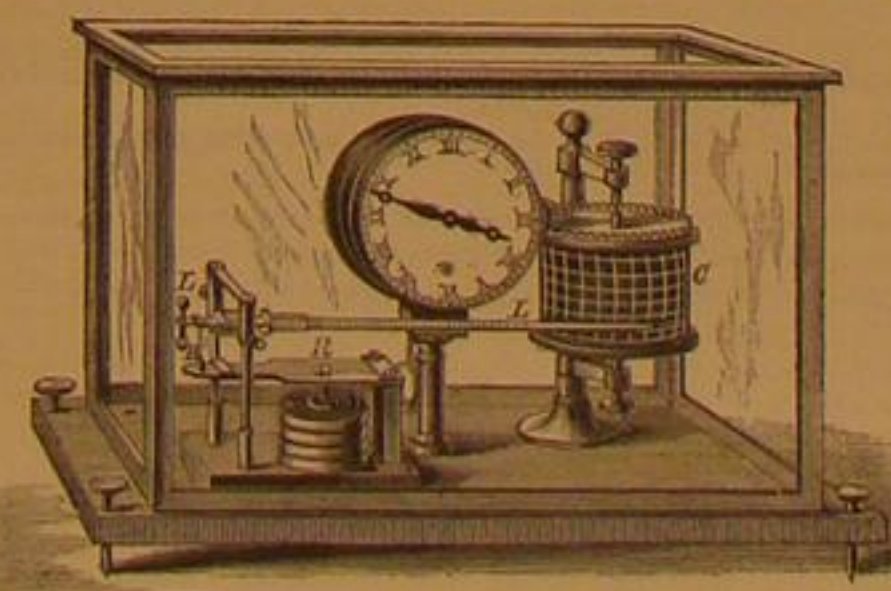


ing its contents. The action of the hand on the lever, C, removes the cover, disengages the catches, and reverses the position of the globe. While in operation, the catches of the lever, C, hold the globe in position for operation.

This improvement was patented by Fred Max Bode, through the Scientific American Patent Agency, July 28, 1868, and assigned to C. G. Mueller, No. 12 Theater Platz, Hanover, Prussia, to whom all communications should be addressed.

#### A NEW REGISTERING BAROMETER.

The following is a description with an engraving of the Barometrograph, recently invented in France. We do not believe it to be as delicate as the Self-registering and Printing Barometer invented by Prof. Hough Astronomer in Charge at



the Albany Observatory, but it seems to be less complicated and expensive.

It is usual in taking barometrical and thermometrical observations for the purpose of registration, as regards changes of weather and for foretelling weather, to take them at stated and regular intervals, so that the variations at those periods may be noted and, if required, plotted out on a chart. Indeed for obtaining quick and useful comparisons, there is nothing compared to the plan of projecting the curves of atmospheric variation on the charts specially prepared for that purpose; it enables one at a glance to see the variations of the barometer during the past day—saving the bother and calculation necessary where the observations are simply noted down as so many figures. But there is one great objection attendant upon observations of this nature; however carefully they may be recorded or described on charts, they are but observations of the time only, and show nothing more. For instance, the height of the barometer at the two

usual times of observing, in the morning and evening, are recorded, and a line drawn on the chart from the one point to the other is assumed to show the variation between those times. True, it does to some extent, but only to the extent of the difference of the two. In stormy or unsettled weather the rise and fall of the barometer may be considerable between the two periods of observation, and yet it is possible that at the two periods the observed indication will be precisely the same. The chart would consequently show an even state of pressure, whereas the opposite would be really the case. Accurate results can, therefore, only be obtained when the observations are made hourly, or, at least, at very frequent intervals. This is, as far as regards personal observation, quite impracticable for the generality of observers; and to give a true and faithful record of the variations of the barometer from minute to minute and from hour to hour we can only look to mechanical means for bringing about this much-desired result.

Among the plans suggested but very few have been ever practically carried out, and of those we have seen their great expense proves an almost insurmountable barrier to their adoption. The "barometrograph" depicted in the accompanying illustration, seems to combine simplicity with cheapness, and accuracy with ease of observation. The records are continuous and comparable, and are produced by the variations of the barometer known as the aneroid. The pressure of the atmosphere affects four metallic boxes, as in the ordinary aneroid, having their upper and under faces undulated; a vacuum is made in each of them separately, and they are attached together in one series, so that for an equivalent variation of pressure the movement is four times greater than it is for one box only. A very strong flat steel spring, R, acts upon the barometric boxes in an opposite direction to the atmospheric pressure. This spring controls the indicating lever, L L, by means of a connecting piece at the point B; this connector receives the action from the extremity of the spring and communicates it to the lever, L L, at a point very close to its axis, from whence it follows that a considerable multiplication of movements is the result.

The indications of the movements of the lever are registered in the following simple manner: A cylinder, C, is revolved by the regular movement of an ordinary pendulum time piece; it makes a complete revolution in one week, and carries a glazed paper, which has been smoked black by means of a candle. At the extremity of the lever is a very fine spring pointed at the end, which rests upon the cylinder and traces a white line upon the black ground. At the end of each week the paper is changed for a fresh one, the old one being prevented from having its record destroyed by having a coat of varnish. The whole operation takes but a little time, including the attachment in a book, or, when required, the record of one week to that of the preceding, so that the indications might be continuous. The barometrical arrangement of this instrument is far less liable to error than the ordinary aneroid, where so many movements and accessories are required to translate the changes of the barometric box to the indicating needle on the face of the instrument. In order to render the indication recorded useful for comparison, the paper can be divided into equal parts, representing the days of the week, and again subdivided to represent the principal divisions of the day; this has been done in practice, and instruments similar to what we have just described have been in use some time, earning great approbation for the fidelity and utility of the observations recorded by them.

#### Reducing Tin for Coating Metals.

THE *Mechanics' Magazine* contains a description of a new method for coating metals with tin which has been recently patented in England. This invention relates to the application of the electro-plastic process for the reduction of pure tin in a metallic state of all thicknesses, so as to render it cohesive, ductile, and of such density that it may be stamped up, drawn, and rolled, and may also be deposited in molds in the same manner as copper by the galvanoplastic process, or on metals, especially lead and its alloys, for coating or plating the same. This reduction is effected whatever may be the nature of the hot or cold alkaline or acid baths used, provided that the salts, oxides, or acids of the tin employed are chemically well prepared, which is an essential condition. The tin reduced by the electro-plastic process, according to this invention, is rendered sufficiently ductile, malleable and cohesive to assume any form by chasing, embossing or engineering without cracking, which is the case when tin used as a plating on lead in thin sheets in ordinary use is stamped up in a similar way.

The tin produced in the manner herein described, may also be applied, first, for forming a relief surface on a plain ground for capsules, covers, and other articles for the purpose of obtaining greater firmness and a more elegant appearance. The relief surface is obtained by stamping or embossing, in the ordinary way, with a male and female die, or when the metal is sufficiently ductile only one die is needed, which would produce an impression or embossed surface in a similar manner to that made by a seal on wax; second, for reproducing figures and ornamentation, such as objects of art, or others, by embossing or stamping in imitation of metal castings by the aid of a die or dies, in the manner above described. Many attempts have been made to produce in metal trade and other distinguishing marks on the corks or stoppers of bottles and other vessels, or on other articles, either by embossing, coloring, or printing, in imitation of those produced in wax or metal capable of receiving an impression. The result has been, however, to produce an inferior impression, the design being obtained on a plain surface, and bearing but an imperfect resemblance to a wax seal.

In order to obtain a mark of a perfect nature, the inventor



first produces the design or mark in wax, and reproduces the impression on a stamp, with which he marks the various articles, their genuine character being thus insured by having the real mark on each. He also, as a substitute for the leaden seals used in the Customs, interposes a soft material between sheets of tin produced in the manner already described, and stamps them together. In this manner is produced a mark covered with tin. Instead of interposing a soft material beneath the tin, tin alone may be used, but somewhat thicker, and doubled together, afterward stamping it as before.

This improved product may also be applied for electro-chemically coating or plating lead and other metals or alloys in any thickness for making cartridge cases, percussion caps, capsules for bottles and other vessels, covers used for preserves and other purposes, wrappers for eatables, and generally in all cases where pure tin and its alloys are employed. Further, for lining pipes, sheets, or ornaments or utensils of lead where tin is employed for preserving it from oxidation. Lastly, the inventor applies the electro-chemical tin, above mentioned for plating glass in imitation of silvering, and for ornamenting articles required to present a silvered effect.

#### Alphabet for the Blind.

REV. C. H. Carpenter American Missionary at Harpoot, Eastern Turkey, has invented a novel alphabet to be used in the instruction of blind Armenians, of which many are found in his field of labor.

"A very small round-topped tack, thrust upright into a piece of pine board, represents the first letter. The same tack inclined to the top, represents the second, and leaning to the bottom, the right hand and the left by turns, the next three. For the next four letters, one side of the tack is then cut off, and the cut portion made to face by turns the top, the bottom, the right and the left hand. The half-headed tack inclined to the top, the bottom, the right and left hand, again by turns representing the next four letters. Essentially the same course is then pursued with the next two styles of tacks, and our alphabet is ready. Other sorts of tacks and variations of them then furnish points for punctuation and the numerals, and with a good supply of tacks and a piece of soft pine board for a page, we are ready to write a chapter of the Bible or a hymn for one blind reader whose sensitive fingers will so learn to run along the line of iron and copper with such speed and assurance as are ours in reading the printed page. The page once committed to memory will be passed along to a second reader, or the tacks withdrawn and like your printer's type, used for printing another page." In this way two or three dollars' worth of tacks may be made available for printing, if he choose, all the chapters of the Bible and the hymns of the hymn book, or anything else which is needed.

#### NEW PUBLICATIONS.

**A SYSTEM OF MINERALOGY.** By James Dwight Dana, Siliman Professor of Geology and Mineralogy in Yale College, aided by George Jarvis Brush, Professor of Mineralogy and Metallurgy in the Sheffield Scientific School of Yale College. Fifth edition. Rewritten and enlarged, and illustrated with upward of six hundred wood cuts. New York: John Wiley & Son, No. 2 Clinton place.

This work might have been aptly entitled a cyclopaedia of mineralogy, as it seems to comprise all the facts relating to it both in mineralogy proper and in the collateral sciences, and lacks nothing except the usual arrangement which is generally expected in a work bearing that title. The new features which we find in this edition, and from additions necessary to bring the work up to the present standpoint of mineralogical science, are "the recognition, and the description of the different varieties of species," the adoption of the new chemical symbols in the formulas given throughout the work, and its valuable historical synonymy. The latter contains the first author and the first publication of each species, and follows with all the names it has borne in their chronological order, with much other matter of interest. Prof. Dana, in the preface to this edition, thus speaks of the recognition and description of varieties: "The first edition of this treatise, that of 1857, was written in the spirit of the school of Mohs. The multitudinous subdivisions into subspecies, varieties, and subvarieties, based largely on unimportant characters, which had encumbered the science through the earlier years of this century, and were nearly smothering the species, were thrown almost out of sight by Mohs, in his philosophic purpose to give prominence and precision to the idea of the species. Much rubbish was cleared away and the science elevated thereby; but much that was necessary to a full comprehension of minerals in their diversified states was lost sight of. In the present edition an endeavor is made to give varieties their true place; and to insure greater exactness with regard to them, the original locality of each is stated with the description." A full exposition of the new nomenclature is given in the introduction, and in the adoption of it in this edition, the foothold which it has attained in the most scientific institutions of our country is brought forcibly to view. The hydrocarbon compounds are most comprehensively treated, and the book will prove a most valuable work of reference upon this subject. The work is printed in clear bold type, and will prove one of the most valuable recent additions to scientific literature.

**ANILINE AND ITS DERIVATIVES.** A Treatise upon the Manufacture of Aniline and Aniline Colors, by M. Reimann, P. D. L. A. M., to which is added in an Appendix, the Report on the Coloring Matters derived from Coal Tar, by Dr. A. W. Hofmann, F. R. S. Published by John Wiley & Son, No. 2 Clinton Hall, Astor place, New York.

We published an extract from this work, entitled "The Aniline Dye," on page 102, No. 7, current volume, with some remarks commending the work. We will add to what we have already said, that further examination and reference to its pages only adds to the good opinion we at first conceived. Not only are a host of facts given relating to the manufacture of this important class of substances, but they are given in a plain and intelligible form. Without ceasing to be scientific he has made his work eminently practical. This is a rare feat of authorship and from its accomplishment we predict a brilliant success for the book.

#### THE LATHE AND ITS USES.

This is the title of an octavo volume of 264 pages published by John Wiley & Son, No. 2 Clinton place, New York city, which is profusely illustrated, and is one of the best compendiums of information relative to the lathe and to lathe work we have yet seen. The lathe has been elevated from a mere machine as so old to the production of works of simple use, to the position of companion and means for employing leisure hours. Its use is one of the pleasantest occupations for a rainy day or otherwise idle hour, and may be made productive and profitable pecuniarily. The growing practice on the foot lathe in this country makes the appearance of this work timely and gainable.

#### MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Erie railroad company have contracted for 8,000 tons of steel rails.

The total value of live stock and agricultural productions in the United States in 1867 was \$2,507,357,005.

Recent dispatches announce another terrible colliery explosion at Jemmapes, in the province of Hainault, Belgium. Fifty-one persons were killed and a great number injured.

**GEORGIA AIR LINE RAILROAD.**—A bill has been introduced into the Legislature of the State of Georgia to aid in the building of the Georgia Air Line Railroad.

The number of miles of railroad in operation in this country is 20,000, and they cost \$78,000,000.

**POLYTECHNIC SCHOOL IN CHICAGO.**—An ordinance appropriating \$25,000 to aid in the establishment of a polytechnic school in Chicago was recently passed by the common council of that city.

**EIGHT HOUR LABOR.**—Fifty-one buildings are being erected on the west side of the city, on which one hundred and fifty workmen are employed on the eight-hour system.

**GOLD DISCOVERIES ON THE CIMARRON RIVER.**—The New York Daily Tribune says: "The discoveries of gold on the Cimarron River, near the corner of Colorado, Kansas, New Mexico, and Texas are creating great excitement, and miners are rushing into the new diggings. The mineral belt is the same that has already been opened and worked from Montana to Mexico. There can be no doubt of the existence of valuable mines on the head waters of the Cimarron, as well as of the Canadian and other forks of the Arkansas heading in the Rocky Mountains. The new diggings are on the line of the proposed extension of the Eastern Division of the Union Pacific Railroad to Santa Fé."

**THE ELEVATED RAILWAY.**—The experiments on the elevated railway in Greenwich street have proved satisfactory to the engineers appointed to test it. It is expected that by the 1st of January next, the road will be finished to Thirteenth street.

**RAPIDITY IN BRIDGE CONSTRUCTION.**—Time is money, and railroad men know it. On Monday evening, July 27, the bridge on the Toledo, Wabash, and Western Railroad, over the Vermillion railroad at Danville, Ill., was entirely burned up. On August 8, a new bridge was completed, and trains crossed on it. The bridge is 1,100 feet long and about ninety-eight feet high above the bottom of the river.

**SUGAR IN RUSSIA.**—The American Consul at Moscow, states in a letter to the Commissioner of Agriculture, that beets are there very largely cultivated for sugar. Almost all the sugar used in Russia is produced in the country.

**REMOVAL OF OBSTRUCTIONS AT HELL GATE.**—The estimated cubic contents of the rocks known as "Frying Pan" and "Pot Rock" at Hell Gate to be removed are, respectively, thirteen hundred cubic yards over an area of twelve hundred square yards, and five hundred and seventy cubic yards over an area of thirteen hundred square yards. These rocks are to be removed to a depth of twenty-five feet mean low water. General Newton, of the United States Engineer Corps, intends vigorously to prosecute the work very shortly.

In the last year, the Marquette district of Lake Superior produced 500,000 tons of ore, or an amount equal to one quarter of the entire product of the iron mines of the United States.

Missouri is literally on her metal. Lead has been discovered in over two hundred different localities, zinc and copper frequently, while the iron under the soil is estimated capable of yielding a supply of one million of tons for over 200 years at least.

The Pittsburgh Port Hill Works have recently made a trip hammer of twenty-one tons, for a new iron shop in the same city. One of the Pittsburgh machine shops have made a locomotive weighing only one ton, for use in a coal mine. By the side of one of the great freight engines of the Pennsylvania railroad, this little worker must have given the appearance of a locomotive with her kitten.

Steam plows have not been eminently successful, but there seems to be a revival of enterprise in this direction. In a short time past, a company has been formed at Chicago, with \$500,000 capital, to manufacture Willard's steam plows which will cost the purchaser about \$2,500 each. Quite recently a citizen of Ohio announced a successful plow, and a Meadville, Pa. inventor has brought out one which on trial is said to have worked perfectly. Last spring it was announced that an English steam plow was coming over to gratuitously overtake 2,000 acres of Illinois prairie, but these things indicate that this trouble need not be taken.

Two monster furnaces have been constructed at Ferry Hill, England, and have operated to a charm. They are both 165 feet high, and 28 feet in diameter and give the works of the company to whom they belong, a capacity of 180,000 tons of pig iron a year.

A gas and water pipe factory, at Newport, Ky., obtains the crude ore from Iron Mountain, Mo., and transmits the ore of one morning into castings on the way to market by the next day at noon. Some of the pipes made by this company have an interior diameter of 40 inches.

HARRY MEIGS left San Francisco a few years since in bad repute, as a million dollar bankrupt. He went to Chili, made friends with the Government, aroused an interest in railroads, and built nearly all the roads in that country. He then went to Peru, repeating his Chilean experience, and has just taken a contract to build 100 miles of railroad for \$120,000 a mile, on which experts figure to Mr. Meigs several millions profit.

#### Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

**SUBMARINE LANTERN.**—Michael Vander Weide, St. Petersburg, Russia.—This invention relates to a new apparatus for submarine lighting for the use of divers, and for other purposes, whereby the difficulties of submarine exploration are greatly diminished.

**CONVERTIBLE AGRICULTURAL IMPLEMENT.**—J. H. Heald, Columbus, Miss.—This invention relates to a new and improved device whereby various implements are formed by different combinations of the parts.

**VARIABLE NOZZLE.**—James A. Cushman, Seneca Falls, N. Y.—This invention relates to the discharging end of a fire engine hose pipe, and especially to the nozzle which is attached thereto, and the invention consists in so constructing the nozzle that the stream of water discharged therefrom may be raised at will by a simple movement of the hand of the operator.

**TOOL HOLDER FOR PLANING MACHINES.**—W. J. Linton, Detroit, Mich.—This invention consists in a bracket which may be secured to the tool slide, and having a right angled arm projecting forward from the cross plate a sufficient length and provided with a pivoted holder for the tool.

**BELT TIGHTENER.**—Samuel Patton, Chatsworth, Ill.—The object of this invention is to provide a simple and effective attachment to belt pulleys, by which the belt can be tightened to any required degree without difficulty.

**COMBINED CORN PLANTER AND CULTIVATOR.**—Geo. W. Kibler, Linden Station, Ohio.—The object of this invention is to provide a combined corn planter and cultivator which shall be economical in construction and convenient in operation.

**FRUIT CRATE.**—W. G. Goodale, Centerville, Ill.—In this invention the fruit is packed in a crate in well ventilated boxes, supported upon springs to prevent their bruising it. The whole crate is very simple, cheap, and durable, and will effectually protect the fruit from injury.

**SCREWDRIVER AND COUNTERSINK.**—Peter N. Jacobus, Flatbrookville, N. J.—The object of this invention is to construct a screw driver in such a manner that it shall grasp the screw by the head and hold it firmly while inserting it into the wood or removing it therefrom; and while inserting the screw, shall ram away the wood around it, so as to form a countersink for its head.

**CUTTER ATTACHMENT TO PLOWS.**—T. E. Marable, Petersburg, Va.—This device is a neat, simple, and cheap cutter, which can be readily attached to the beam of any plow, in front of the collar moldboard, or shovel, and which will graze along the surface of the ground in advance of the plow, cutting up all weeds, grass, etc., and throwing them out of the way on the side opposite to that on which the plow throws its dirt.

**SHOVEL PLOW.**—B. F. McClester, California, Mo.—The object of this invention is so to construct and attach shovel plows to their standards or beams that they can be adjusted at any inclination, and, when worn out or injured in one end, can be reversed without difficulty.

**MEDICAL COMPOUND.**—A. V. Lee, Clayton, Ala.—This invention relates to a combination of ingredients for forming a medium for the cure of diseases which prevail in almost all climates to a greater or less extent, and which diseases have generally baffled the skill of the medical faculty—more particularly bilious diseases, and especially what is known as fever and ague.

**ELEVATOR.**—Erwin T. Hope, Philadelphia, Pa.—This invention consists of an arrangement of a series of vertical telescopic tubes and a plunger, on the top of which the carriage is supported, and moved between suitable vertical guides, when the said telescopic tubes are extended by the action of water forced in at the bottom to the lower tube, which is stationary.

**WINDOW VENTILATOR.**—H. H. Long, Milwaukee, Wis.—This ventilator for windows consists of a frame carrying a pane of glass, so as to be transparent, which frame has an elliptical or other spring applied to one of its sides, and is arranged to move up and down within a frame made of metal or other suitable material, attached to the inside of that section of a sash frame where it is to be located, the glass of which has been cut out to a degree corresponding to that of the supplementary frame having the glass thereon arranged to move or slide.

**MACHINE FOR SAWING SHINGLES OR HEADINGS.**—L. C. Robinson, Shepardsville, Mich.—The nature of this invention relates to improvements in machines for sawing shingles or headings, or other similar articles, whereby it is designed to provide a more simple and effective machine than any now in use, and that will either saw them in a straight or tapered form, cut off the ends and plane the edges, and it consists in the combinations and arrangements of the parts whereby the same is effected.

**CONSTRUCTION OF SCOWS.**—E. J. Allen, Rondout, N. Y.—This invention relates to a new manner of constructing scows, with an object of strengthening the same, and consists first in strengthening the fore and aft partitions by means of trussing work; second, in arranging cross keelsons above and at right angles to the fore and aft keelsons, and in the use of cross beams on head of fore and aft keelsons, and parallel to the cross keelsons; the fore and aft partitions are not only made substantial by means of the trussing work, but still more so by the cross keelsons and beams.

**GATE.**—William E. Nichols, Baldwin, Mo.—This invention consists in an arrangement of cords and pulleys for effecting the above-described object and the necessary posts for supporting the same.

**RAT TRAP.**—M. D. Fowler, Vincennes, Ind.—This invention has for its object to furnish a simple, convenient, and reliable rat trap, which shall be so constructed and arranged as to catch, without fail, any animal that may enter the trap and try to eat the bait.

**IMPROVED FASTENER FOR VEHICLE SEATS.**—Charles Dixon, Weedsport, N. Y.—This invention has for its object to furnish an improved fastener, by means of which the seats of wagons, sleighs, and other vehicles may be conveniently, securely, and detachably secured in place.

**MACHINES FOR UNHAIRING HIDES.**—Elias Brock and Judson Schultz, Ellenville, N. Y.—This invention has for its object to improve the construction of the unhairing machines, patented by Elias Brock June 25, 1867, and numbered 66,124, and by Judson Schultz, June 25, 1867, and numbered 66,176, so as to make said machines more convenient in use and more satisfactory in operation.

**WAGONS.**—Samuel Seltz and L. D. Arnold, Melmore, Ohio.—This invention has for its object to furnish an improvement in the construction of wagon boxes, by means of which the end boards of the box may be securely held in place, and which shall at the same time be durable and allow the end boards to be conveniently and quickly put in and taken out.

**POTATO DIGGER.**—B. D. Vanderveer and Daniel Biddle, Freehold, N. J.—This invention consists in the arrangement of a plowshare to raise the potatoes from the ground and shakers for separating them from the soil, and in a device for cleaning the machine of vines.

**SKATE.**—Charles Gooch, Cincinnati, Ohio.—The present invention relates to that class of skates which are provided with a fastener, that acts upon the boot or shoe hole in the direction of its length and from end to end, and it consists in a novel construction and arrangement of the toe and heel clamps of such fasteners, whereby the skates can be adjusted to more fully and perfectly accommodate the various lengths of boots, and thus the fastener rendered more general in its application or adaptation to the varying sizes on the length of the boots.

**CAR BRAKE.**—J. L. Miller, De Witt, N. Y.—This invention relates to a new and improved car brake, which is applicable to either horse or steam cars, and it consists in a novel construction and arrangement of the brake, where by it is rendered capable of being operated through the medium of a friction wheel, and the brake operated on a single car, or all the brakes of a series of cars comprising a train operated simultaneously.

**CURTAIN FIXTURES.**—J. D. Legg, Long Eddy, N. Y.—This invention relates to a new and useful improvement, or a curtain fixture for which Letters Patent were granted to J. D. and L. W. Legg, May 5th, 1868. The object of the present invention is to obviate the difficulty attending the lowering or drawing down of the shade, and the winding up of the coil springs, the inner ends of the latter being attached to the cylindrical boxes out of or at a short distance from their centers, a necessity in the old arrangement, and which causes the springs to bind after a few convolutions have been drawn together by a few revolutions of the cylindrical boxes, so that the springs cannot be fully wound up.

**APPARATUS FOR ROASTING NUTS.**—D. A. T. Gale, Poughkeepsie, N. Y.—This invention consists of a rotary cylinder suitably confined in a hot-air case and provided with gas burners, and of a warming apparatus to which the tube which supplies gas to the roasting apparatus is connected for supplying heat to it and so arranged that after the nuts have been roasted and placed in the said warming apparatus the flow to the roasting burner may be stopped while that to the warming apparatus continues.

**ROTARY STEAM ENGINES.**—John Woody, Mount Vernon, Ind.—This invention relates to that class of steam engines, known as rotary engines, where the steam acts continuously and the pressure is applied without interruption and with uniform effect.

**EXTENSION CLOTHES-LINE SUPPORTER.**—Francis W. Tilton, and Moses C. Swift, New Bedford, Mass.—The object of this invention is to provide means for supporting clothes lines and elevating the same.

**BUCKLE.**—H. C. Wessel, Indiana, Pa.—This invention relates to a new and improved buckle designed for bridles and other parts of harnesses, and also for other purposes. The object of this invention is to construct a buckle in such a manner that it may be applied without any stitching or sewing and also without the aid of rivets and other permanent fastening and still be readily applied to and detached from the straps which it joins or connects.

**EARY CHAIR.**—Brisson Mares, Hubbardstown, Mass.—This invention consists in attaching the seat to two or more springs and in connecting it with the legs or seats of the chair by links which form joints whereby great elasticity and flexibility are obtained.

**TOOL HOLDER.**—William J. Linton, Detroit, Mich.—This invention consists in a holder having a rectangular slot through a flattened central portion in which are arranged two clamping jaws, one stationary and one movable, and provided with two handles one of which screws into the said flattened central portion for adjusting the movable jaw in a manner similar to the construction of die plates for cutting screws.

**WAGON COUPLING.**—James M. Wynn, Seipio, Ind.—The object of this invention is to provide a simple and effective means of coupling the rear axle of a wagon to the reach pole or perch of the same. It consists of a plate a



fixed to the front ends of the rear hounds for the purpose of holding them rigidly and forming a recess in which the pole rests. It also consists of a bolt or pin passing transversely through the reach pole and the hounds, and held in place by a spring button, together with other devices perfecting the whole.

**HAT FELTING AND NAPPING MACHINE.**—W. J. Benedict and John Wylie, South Norwalk, Conn.—This invention consists of a felting cloth hanging in a bight between two rubbing surfaces, one of which is afforded by a hollow steam bed sliding up and down in a frame, and the other surface by an adjustable apron arranged with reference to the bed, so that as the latter slides up and down in its frame the roll of hat cones or other articles resting in the bight of cloth will be submitted to their felting action.

**WINDOW SASH.**—Wm. Randall, May, Mich.—The object of this invention is to operate window sashes in a cheap and efficient manner and is applicable to all windows where the wall is hollow.

**WAGON HUBS.**—Edwin R. Baker, Fairhaven, Mass.—This invention is designed more particularly as an improvement upon cast metal hubs for wagons, and other vehicles, and consists in forming the same in two parts and uniting them in a more simple and superior manner than has heretofore been done with cast hubs.

**SHEEP-SHEARING MACHINE.**—Hiram A. Reid, Beaver Dam, Wis.—The object of this invention is to accomplish the shearing of sheep by mechanism in an easy and expeditious manner. It consists of a shearing comb containing a serrated shearing wheel which is revolved by means of a flexible shaft, by which the comb is suspended from a crane provided with accessory gearing for transmitting motion to the flexible shaft. Other devices perfecting the whole render this machine the most perfect of its kind.

**MACHINE FOR TURNING BOOT LEGS.**—Jacob Shearman, Fayetteville, Pa.—This invention is a machine for turning boot legs after the same have been sewn wrong side out, as is usual in making boots. It operates in a simple and efficient manner.

**CORN-HUSKING MACHINE.**—Samuel Patton, Chatsworth, Ill.—This invention consists of a pair of pointed spindles, arranged side by side on a two-wheeled conveyance and combined with accessory mechanism for drawing in the corn between the pointed ends of the spindles, which latter in revolving pull the ears from the stalk, together with other devices perfecting the whole.

**APPARATUS FOR PRINTING AND GROUPING PHOTOGRAPHS.**—A. S. Kilby, Huntington, Ind.—This invention provides a simple and convenient apparatus for printing and grouping photographs. It consists of two wooden leaves or boards, hinged together, and provided with an adjustable sun opening and a case containing a reel for holding the sensitized paper, which is drawn off between the boards as wanted, to bring it under the sun opening in which the negative is located.

**FLOOD GATE.**—Joseph Leatherman, Napoleon, Ohio.—This invention has for its object to furnish an improved flood gate for use upon brooks, creeks, and other streams which shall be so constructed that the bars may rise and fall with the rise and fall of the water, and which will allow drift to pass through without becoming choked up.

**WASHING MACHINE.**—Wilhelm Hoeft, Fountain City, Wis.—This invention has for its object to furnish an improved washing machine, simple in construction, easily operated, not liable to get out of order, durable, and which will do its work quicker and better than other machines, and at the same time will not injure the clothes.

**GRATE BARS.**—John W. Griswold and Edgar L. Thomson, Philadelphia, Pa.—This invention has for its object to furnish an improved grate bar constructed in such a way as to cause a more perfect combustion of the fuel, to prevent the bar from being burned or destroyed by the heat, to prevent in a great degree the formation of clinkers, and which shall at the same time be lighter than the ordinary solid bar.

**VAGINA INJECTOR.**—G. W. King, Saratoga Springs, N. Y.—This invention has for its object to furnish an improved instrument to take the place of the female syringe now in use, and which shall at the same time be simpler in construction and more satisfactory in use.

**SCREW CUTTING DIES.**—George Grabel, New Orleans, La.—This invention relates to a new manner of arranging screw cutting dies, with an object of reducing the friction and of obtaining additional power. The invention consists in omitting every other half thread in each cheek of the die, two such cheeks being supposed to constitute the whole die; thereby the aforesaid desired result will be obtained.

**COMPOSITION FOR PRESERVING WOOD.**—B. A. Jeager, Sowers Station, Pa.—The object of this invention is to produce a substance by which wood can be preserved from decomposition, and by which its pores will be filled, to prevent them from receiving moisture and oxygen.

**SHOVEL PLOW.**—Aaron Jennings, West Cairo, Ohio.—This invention relates to a new shovel plow, which is so arranged and constructed that it will uproot and cover weeds or grass close to the plants, and that it will prevent clods from falling upon young plants, such as rice or corn plants.

**EMBROIDERING ATTACHMENT TO SEWING MACHINES.**—William Carpenter Fairbury, Ill.—This invention relates to a new apparatus which is attached to the presser foot of a sewing machine, and which has the object to guide two threads and to cross them at each stroke of the needle in such position that they are caught and held firm by the needle thread. In this manner a beautiful embroidering stitch can be produced by means of a very simple and effective attachment.

**DEVICE FOR TURNING LOGS ON SAW MILLS.**—George Willett, Richburg, N. Y.—This invention relates to a new apparatus for revolving logs on the carriages of circular and other saw mills. Its object is to do away with the jar and shock caused by the ordinary method of turning over the logs.

**PORTABLE STOVES.**—O. B. Hale, Malone, N. Y.—This invention consists of a circular or any other conveniently shaped bed plate supported upon legs, provided with a suitable central depression for an ash chamber, having a door opening downward, and provided also with a fire grate at or about the level of the upper face of the same; from the said upper face rise vertically four or any other suitable number of brackets, supporting a top plate, which is provided with a central hole for kettles, and which, when not in use, is covered in the ordinary manner with a round cover. The said brackets are also provided with vertical grooves on their sides, and the sides of the stove are divided into sections, which are made to slide vertically in the said grooves from the top downward through slats provided for them through the bottom plate, whereby communication may be opened through the sides of the stove with the fire at any desired place. The cooking vessels may be arranged to be suspended at the sides of the stove, when the said side plates are shoved down, thereby bringing the sides of the said vessels toward the stove, directly in contact with the fire.

**BRANCH CEMENT PIPE.**—Lockhart, Roberts & Knight.—In this invention the branch is molded on to the main pipe at the time the pipe is made, and at a trifling additional expense. Where the branch is stuck on to the main pipe in the usual manner it adds very much to the cost besides being less durable. As cement pipes are now being used so generally for sewers, the invention is an important one. Patented July 28, 1868.

**EYE WATER OR MEDICAL COMPOSITION.**—J. Roemheld, Chicago, Ill.—This invention relates to a new medical composition, to be used for curing sore, inflamed, and weak eyes. Patented August 11, 1868.

**RICE-POUNDING MACHINE.**—John H. White, Lima, Peru, S. A.—This invention relates to an improvement in rice-pounding machines whereby the rice may be whitened and cleaned by the use of spring pounders striking the rice in rapid succession, and from the peculiar shape of the mortars which are raised to a point in their centers, will thus prevent the pests from crushing the kernels of rice, and at the same time cause them to spread from under the pests, thereby causing the rice to be kept in constant motion and rapidly agitated. Patented August 11, 1868.

**LAMP BURNER.**—L. J. Marcy, Newport, R. I.—The object of this invention is to obtain increased illuminative power from double wicks, and is intended for burning kerosene oil. It consists in the formation of the cap or cone with two indented shoulders, to properly deflect the air current. Patented August 11, 1868.

**CAR TRUCK.**—J. H. Densmore, Boston, Mass.—This invention consists in the provision of axle sleeves properly affixed to the framework of the truck, and enclosing the whole length of the axle between the wheels in such a manner that should the axle of any one pair of wheels become broken, the wheels will still be held in place on the rails, and continue in motion with sufficient steadiness until the train is stopped, thereby preserving the train from accident. Patented August 11, 1868.

**BEAN PULLER.**—S. R. Niles, Rawsonville, Mich.—The object of this invention is to accomplish the scraping up or pulling of field beans, and other similar plants, in a rapid and expeditious manner, by the employment of horse power. Patented August 11, 1868.

**MILLSTONE DRESSING MACHINE.**—E. C. Henderson, and R. A. Henderson, Albia, Iowa.—The object of this invention is to provide a simple and effective machine for dressing millstones, in a uniform and expeditious manner, whereby the operation of cutting the furrows in the stone, can be performed by a person not necessarily skilled in using the hand pick for the same purpose. It consists of a pick operated by a train of mechanism, the motion of which is produced by simply turning a hand crank. Patented August 11, 1868.

## Answers to Correspondents.

**CORRESPONDENTS** who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

**SPECIAL NOTE.**—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1 00 a line, under the head of "Business and Personal."

☞ All reference to back numbers should be by volume and page.

**J. S. P., of Mo.**—Any wire of whatsoever material becomes intensely heated by the electric current when it is too small to conduct it readily. Use a very small wire and you will have no trouble.

**G. N. J., of Wis.**—The device you describe we believe to be of no practical value. With perfect fitting it would be useless, and it certainly would be without. We have no faith in such things.

**A. J. S., of Md.**—Small streams of water may be used to advantage in hydraulic engines. The valve ports should be larger than those for steam. Such engines are generally not very durable, and have never been much in favor, except for some special purposes.

**A. R. B., of Pa.**—To lay out a mill hopper or other square flaring box, first lay out the proportions of the exterior. The line of junction of the interior can then be laid out upon the other side of the board; it is parallel to the outside line and further in by just the thickness of the board. These lines can be gaged as is well understood by any mechanic.

**J. F. W., of Tenn.**—The drawing you send us is wrong; the movable arms would never be in the position you have shown them, unless so put by some external force. In the position they would naturally assume they would exactly balance, and remain motionless. This experiment has been tried in a thousand forms, and is absolutely worthless.

**R. L. H., of N. H.**—How can I clean white leather or white lamb skin? If not very dirty, only somewhat yellow, rub into it a mixture of fuller's earth and alum. Brush thoroughly, and rub again with dry bran and whiting, then brush again. If very dirty, wash with soap and water; rinse, and when about half dry rub with pipe clay made into a paste with beer. Rub thoroughly and when dry brush. Finally cover with paper, and smooth with a warm iron.

**J. W., of West Va.**—We do not know where the mica glasses can be obtained in this country. You can use all recipes published in the *SCIENTIFIC AMERICAN*, unless they are patented. Water does not burn at any temperature. The hydrogen it contains however burns, when heated with oxygen to about 800° Fah. The other question you ask must remain unanswered. It demands too much time.

**G. B., of Mich.**—What you call a yellow roach is what is generally known as the Croton bug. Phosphorus, mixed with oils of anise seed and rhodium is a deadly poison which is eaten with avidity by these insects. It can be obtained at almost any drug store, ready prepared, but it should be used with caution.

**J. B., of Ill.**—Buildings for the preservation of fruit are constructed of iron, air-tight, having double walls, between which is placed some good non-conducting material as shavings, etc. The air in them is kept by means of ice down to as low a temperature as possible without freezing the fruit. There is such a building at Albany, N. Y., and we have heard there are some further west but we do not know their precise location. They are eminently successful in keeping the fruit. As financial operations they have been reported to pay well.

**T. M. H., of Ohio.**—Can fire produced by lightning be extinguished by water? Yes, if the fire results from the combustion of any material that can commonly be put out by water. The origin of the fire has nothing to do with putting it out.

**C. A. S., of Va.**—If from either side of a piston fitted tightly in a cylinder, the air should be exhausted, and at the same time the air should be condensed upon the other side, the piston would be moved with a force proportional to the size of the piston and the pressure per square inch upon the side next the condensed air. If the air were only exhausted from one side, the piston would move with a force of about 15 lbs. to every square inch of its area, provided the air were freely admitted at the other end. The horse power can not be computed from the data given.

**J. P., of Mass.**—We know of nothing better as a dentifrice—for cleaning the teeth—than borax dissolved in water and applied with a brush. It is excellent also used as a hair wash.

**L. S., of N. Y.** says "If you will examine an almanac you will find that (omitting fractions of a minute) the day begins to lengthen by the late setting of the sun Dec. 14th, but that it does not begin to lengthen by the sun's early rising until January 8th. I am unable to see why it does not increase in length equally from both causes, commencing immediately after the winter solstice." We cannot illustrate and elucidate the subject without the aid of diagrams. The cause is to be found in the inclination of the axis of the earth to the plane of the orbit, and the fact can be demonstrated by the aid of a globe, or the charts usually found in any elementary treatise on astronomy or physical geography.

**A. G. B., of N. B.** wishes to understand the galvanizing of iron in all its varieties. We have given various recipes for which practical men are responsible. We cannot enter into a description of all the processes for different styles of the work. One cannot expect to learn the manipulations of a mechanical business from the pages of a periodical.

**J. F. V., of Tex.**—"Is tin plate injurious to canned fruit? How long should fruit in the can boil, if any?" 1st, Tin plate is not injurious. 2d, Fruit need not boil, but the cans should be placed in boiling water or a steam bath sufficiently long to expel by heat the atmospheric air contained in the cans.

**G. B. R., of R. I.**—A "jump" weld is in some cases much to be preferred to a scarf weld, especially in uniting the ends of two cylindrical pieces as shafts etc. The labor and time required is much less and the results of the job, if properly performed, much superior. "Upset" the ends to be united to allow for waste in working down to size after being united, take a good heat in a clear fire, using clean quartz sand for a flux, and have an assistant who can properly tend his piece in heating and present it properly on the anvil when heated. Be sure to have the two faces to be united perfectly clean and smooth. When the striker lays his end on

the anvil bring the other to it and strike one or two light blows on the end, then disengage with the assistance of the striker until the weld is to be drawn to size. The process is very simple and very effective, and for work that is to be finished in the lathe much to be preferred to scarf welding, which not unfrequently leaves short crooks hard to remove.

**J. F. P., of Ind.**—"I have an engine with cylinder 8 by 12 inches running 150 revolutions, but the steam valve is so made that when one port is just opening the other is barely closed, consequently I cannot cut off to work steam expansively. Can I remedy it by lengthening the valve? If I run my engine at 250 revolutions would I gain power, and what would be the power of my engine at that speed?" Lengthening the valve is the remedy for the difficulty of leading steam the whole length of cylinder. The length of throw of the valve would be the guide for the length of the valve. As the speed of engine is increased so is the consumption of the steam. The power of the engine with an average pressure of 50 lbs. per square inch on the piston would be 21 H. P. But there might be 60 lbs. on the boiler and not 50 on the piston.

**W. F., of N. J.**—What is the difference per cent in point of economy between a variable cut-off engine regulated by the governor or one with ordinary slide valve, steam throttled or wire drawn? The variation in style, build, and duties of engines is so great that it would be difficult to establish an unvarying rule of comparison. In extreme cases the difference in favor of the variable cut-off sometimes reaches 50 or 60 per cent. Where the load on the engine is frequently and suddenly varied, as in sawing and planing and iron rolling mills, the variable cut-off is almost indispensable. Where the load is even the necessity is not so great.

**H. L., of N. J.**, a "practical boiler maker" in reply to J. H. Hasler's inquiry on page 100, current volume, says, "any one desiring to test a boiler can do so by filling the boiler entirely full of water and then firing up on it."

**R. N. of Ga.**—The "American Standard" of nuts, bolts, and screw threads is used by a number of our best manufacturers. J. R. Brown & Sharp of Providence, R. I., make the gages for this system, and they will send you a circular relating to it, or a chart may be obtained of Edward Lyman, New Haven, Conn. We regard the standard as the best and most practical in use, at least in this country, and its general adoption as a desideratum.

**P. J. P., of Ohio.**—The French buhr stone used for millstones is simply a variety of quartz, but it is in part composed of pure siliceous flint. We have before us now a piece chipped from a rough millstone which is pure semi-transparent flint, of a yellowish, creamy color, honey-combed with holes in which were imbedded minute specimens of marine shells. A substitute for the French stone is found in the bituminous coal measures of northwestern Pennsylvania and eastern Ohio, but the French product is preferred. It is filled with the remains of minute fossil shells.

**S. M., of N. Y.**—The statement made lately in a daily cotemporary as to the possible evil effects of the use of soap made from tallow of diseased animals need not cause alarm. The alkali of soap destroys all the noxious and contagious qualities of diseased animal fat. Physicians in dissecting dead bodies protect their hands from possible deleterious effects by the use of iodine or permanganate of potash, or other alkaline salts.

**J. P. B., of Mass.**—Cut nails are toughened by subjection to an annealing process. The nails picked up from among the ruins of a burned building are generally to be preferred to those just from the mill. In driving nails, either wrought or cut, into hard wood, a dipping into grease of any kind will assist greatly in their ease of penetration.

## Business and Personal.

The charge for insertion under this head is one dollar a line.

For sale—State and county rights of a valuable invention, now in successful operation. For particulars address Bass & Co., patentees and manufacturers, Nos. 25 and 27, Haydock st. Philadelphia, Pa.

Manufacturers of fluting machines are requested to send size of machine and price to F. S., lock box 42, Franklin, Pa.

Handle machinery wanted, for turning hammer, hatchet, and chisel handles. Manufacturers will address Page, Garritt & Co., Toledo, O.

Great Inducements to Capitalists.—I want a partner in my patent mill for rolling railroad car axles, or a party who will build a mill for its right and title. For full particulars address Thos. Cooper, Cincinnati, Ohio. Postoffice box 2377.

Wanted—a good second-hand portable burr-stone feed mill, 24 to 30 inches diameter. J. L. Ingalsbe, So. Hartford, N. Y.

Siccochast.—This truly wonderful dryer for paint is astonishing every thinking practical painter—so entirely different from anything heretofore known. Why, the idea of causing common raw linseed oil to dry sooner than boiled, seems like magic. Mr. Asahel Wheeler, of Boston, does it in three hours' time.

Patent office reports wanted. Address box 5, Fishkill, N. Y.

Parties wanting perfectly reliable and enduring water power, in any quantity, for any mechanical or manufacturing business, in one of the best locations in the West, address A. P. Smith, Rock Falls, Ill.

Parties wishing to contract for first class brass and composition castings, please address Ridlon & Bond, Postoffice Box 733, Bladeford, Me.

Peck's patent drop press. For circulars, address the sole manufacturers, Milo Peck & Co., New Haven, Conn.

N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

For sale—just finished—an 18x43 Wright engine. Address Merriek & Sons, Philadelphia, Pa.

For sale—the whole or a part of a paper mill, all new machinery. For particulars address L. A. Beardsley, Fredericksburg, Va.

Machine shop and foundry to let, well established. First-class tools and patterns, now running on cotton, woolen, and general machinery. Work for seventy-five hands. Ill health sole reason for leaving. A rare chance. Address H. H. Morse, Attorney-at-law, Rhinebeck, N. Y.

For sale—the patent right, in Great Britain, for perforated saws. The manufacture of these saws is now fully established in the United States, and they are rapidly taking the place of all solid saws. Apply to J. E. Emerson, Trenton, N. J.

Send for description of Hutton governor on entirely new principles. 103 State st., Boston, or 79 Liberty st., New York.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct.

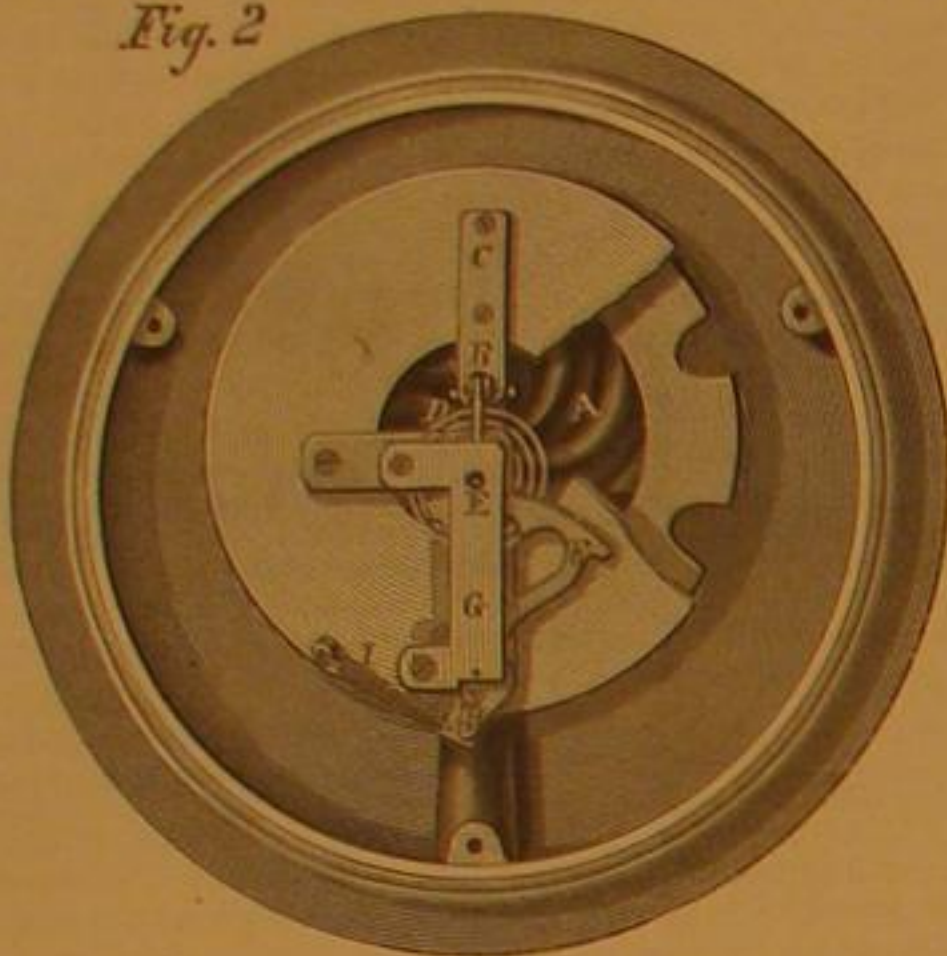
Wanted—a second-hand steam hammer. Norway Manufacturing Company, Wheeling, W. Va.



## Improvement in Steam Gages.

The essential difference between this and all other steam-gages consists in the peculiar method of corrugating the steel diaphragm which receives the pressure, and transmits the motion derived from it to the indicating apparatus. This diaphragm is shown in Fig. 3. Instead of the corrugations being concentric as upon other steam gages in common use, they extend from the center spirally toward the circumference of the diaphragm. The advantages of this construction are increased durability and elasticity, as the strain is transmitted to the several corrugations in such a manner that a slight rotation is given to the center of the diaphragm; causing it to assume a convex shape more gradually and easily, and also transferring the points of greatest tension successively from the center to the circumference, so that at the highest pressure the strain is sustained mostly by the outside portions of the diaphragm. The corrugations are less abrupt in their curves than concentric ones, which also adds to their durability. Fig. 2 represents this gage with dial removed, and also with a portion of the plate which supports the movement, broken off in order to show the corrugations of the

Fig. 2



diaphragm, A. To this plate is screwed a metallic support, C, for the lever, B. This lever has its arms of equal length, and therefore does not multiply the motion of the diaphragm; it only forms a medium through which motion is imparted to the movement. At the end next the diaphragm it has an arm extending at a right angle from it and resting upon the diaphragm. All motion of the diaphragm is communicated to this lever, which is connected by a rod to the lever, H, attached to the axis of the toothed sector, F, which drives a pinion attached to and moving the hand on the dial shown in Fig. 1. The spiral spring, I, shown in Fig. 2 restores the original position of the movement whenever pressure is removed, and also moves the hand backward to suit variations in pressure. The primary adjustment is made by means of a set screw fitted into a slot in the lever H. This lever is thus adjustable so that the motion of the hand upon the dial may be increased or decreased to adapt it to the scale of the dial, or to set the hand to any desired point.

It is claimed for this gage that it possesses greater delicacy than any other, and that on account of the peculiar construction of the diaphragm its motion increases with the amount of pressure, so that instead of working stiffly under high pressures, it becomes more delicate in its action.

This gage was patented by R. C. Blake, of Cincinnati, Ohio, July 31, 1866. All information cheerfully given by Perkins, Livingston & Post, sole manufacturers, Cincinnati, Ohio.

## Improvement in Sawmill Head-Blocks.

The object of this improvement is to overcome the difficulty existing in other machines which will not allow the increasing or diminishing the thickness of boards less than by eighths of inches, and at the same time work accurately, leaving the last board always perfectly even. With this device the thickness of the board can be regulated to the smallest fraction of an inch.

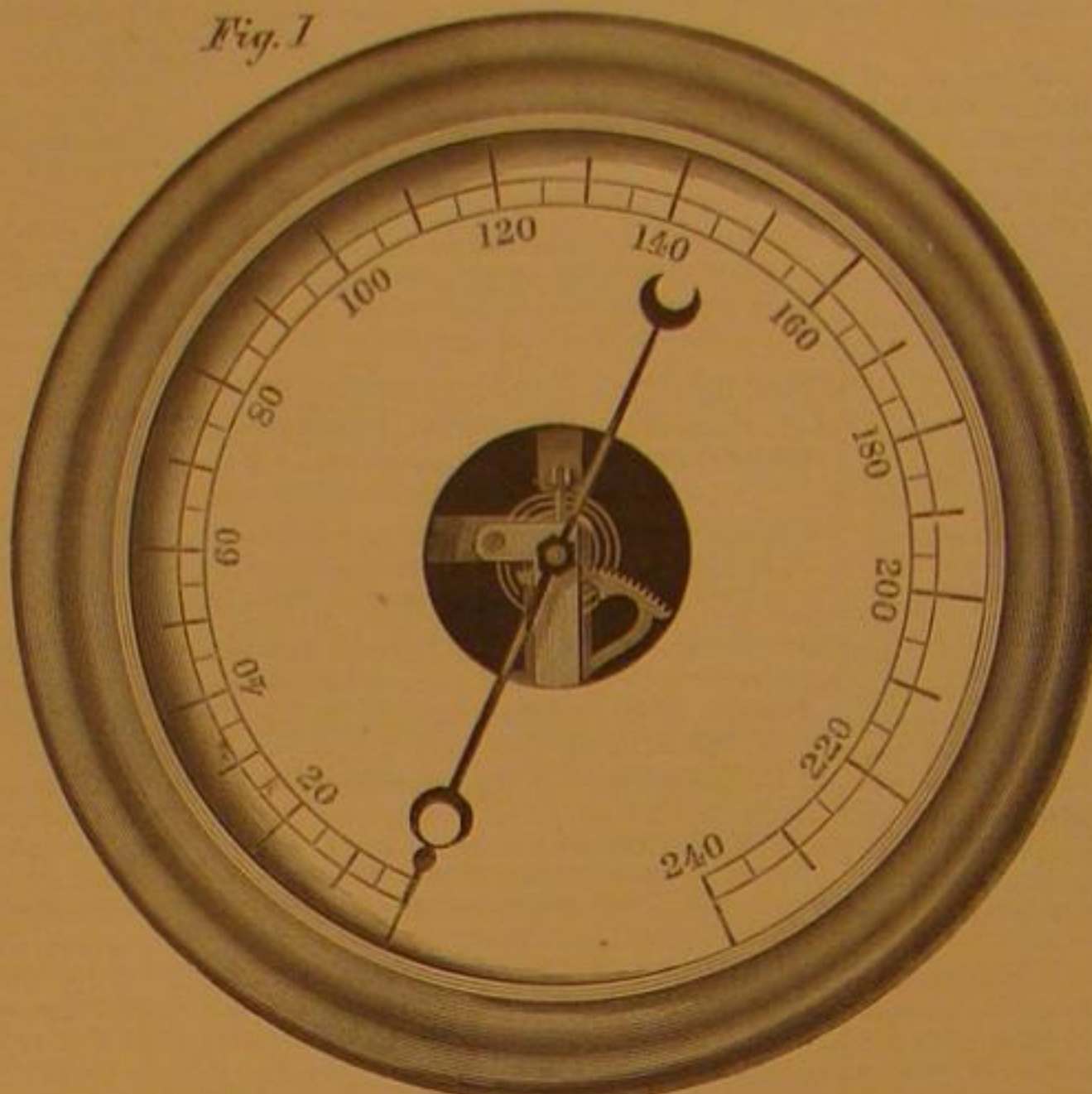
A represents a saw carriage and B the bases of the head-blocks. These may be of any suitable material or form. C is a four-threaded screw with inch and a-half pitch, two inches diameter. D is the standard or knee sliding on the case, B, and having a nut on the under side engaging with the screw, C, and a set bolt to hold it steadily in place.

One revolution of the screw advances or recedes the knee

one and a-half inches. E, on the front of the machine, is a horizontal bar to which is secured by set screws the two racks, a, the teeth of which mesh in pinions turning loosely on the screw shaft, C, the pinions having cast on them ratchets in which engage pawls pivoted to the balance wheels. An inside ratchet is keyed fast to the screw shaft, and is merely for the purpose of holding to its place the screw after it is set. The whole is operated by a hand bar or lever, as shown in the engraving, a full throw of the lever setting the heads for a one and a-half inches board, and a set screw regulating its throw for other thicknesses. The edges of the bases, B, are graduated to inches and their fractions, as a guide to the eye.

The simplicity, accuracy, and durability of these head-

Fig. 1



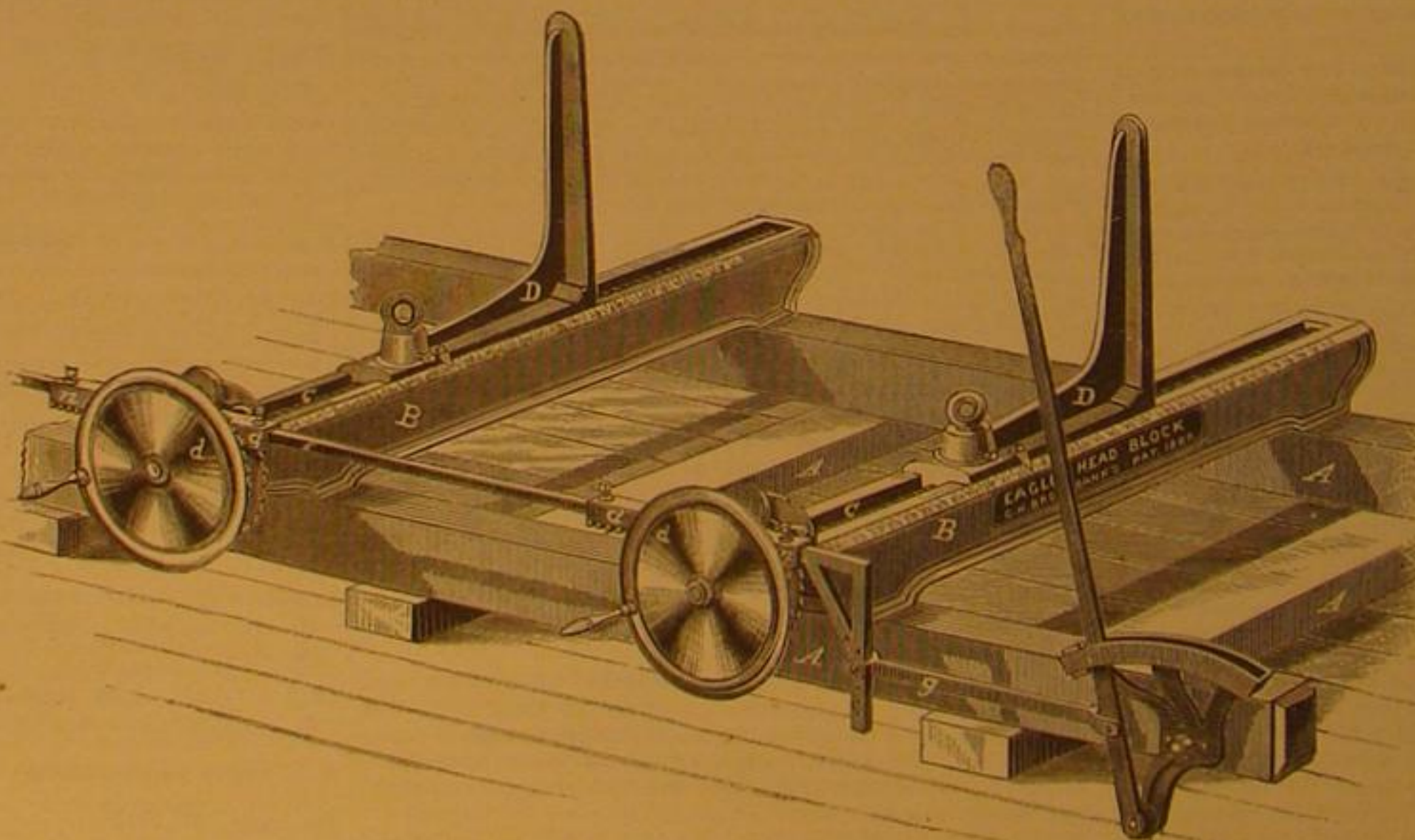
R. C. BLAKE'S PATENT STEAM GAGE.

blocks have commended them to the proprietors of a number of the largest mills in the country, and they have never yet failed to give entire satisfaction. Patented through the Scientific American Patent Agency, Nov. 19, 1867, by Charles H. Brookbank, Connersville, Ind., whom address for machines and shop rights.

## Female Machinists.

MRS. DALL, in her recent book, discussing "Woman's Work," gives the following:

"According to thy request," writes a Quaker friend from



BROOKBANK'S PATENT "EAGLE" HEAD-BLOCK.

Wilmington, Delaware, "I send thee some facts concerning Sarah Ann Seaford. Some fifteen years since, her father became very much involved in debt. He owed some ten or twelve hundred dollars, having lost largely by working for cotton and woolen mills. His business was making spindles and flyers. His daughter, then just sixteen, proposed to go into her father's shop and assist him, she being the eldest of seven children. He accepted her offer, and he told me himself that in twelve months she could finish more work and do it better than any man he had ever trained for eighteen. She earned fifteen dollars a week at the rate he then paid other hands. Her father died. Her two eldest brothers learned the trade of her, and went away. She has now two younger sisters in apprenticeship, and a brother fourteen years of age, all working under her—turning, polishing, filing and fitting all kinds of machinery. I went out to see her last week. She was then making water-runs to force streams into barns

and houses. She is also beginning to make many kinds of carriage axles. She is her own draughtsman, and occasionally does her own forging. To use her own words, "What any do I can but try at." She has a steam engine, every part of which she understands; and I know that her work gives entire satisfaction. When they have steady employment, they clear sixty dollars a week, and she says she would rather work at it for her bread, than sewing for ten times the money. The truth is, it is business she is fond of."

## Ventilation of Large Halls.

THE U. S. Railway Times contains a description of the method lately adopted to ventilate the Massachusetts State House:

"The air is forced into the hall through an opening about an inch wide, extending all around the base of the dome-like ceiling. Its motion is upward along the ceiling, and as the currents meet in the center of the arch a commotion is created. Then the air is drawn down by the exhaust through common ventilating pipes opening in the floor and discharged from the building. There is no lateral movement of the air and no current in the body of the hall. To demonstrate all this, tiny balloons were sent up into the dome, where they were floated along the ceiling to the top of the arched roof.

Fig. 3



Balanced balloons sent to the top of the ceiling were drawn down to the floor, and sought the exhaust openings. White ribbons, fastened just above the openings by which the air enters, fluttered continually upward, and a wind-wheel placed six inches above one of the exhaust openings, was kept in rapid motion by the air which passed out. Then, to show the control over the moisture of the air, steam was introduced into the air in the mixing room in the basement, and very soon the hygrometer indicated 90°. The humidity was then readily reduced. Powder was burnt in various parts of the hall until the chamber was chokingly filled, and in twenty-seven minutes the smoke and odor was completely removed.

At an ordinary rate the apparatus will renew the air of the Representatives' Hall in eleven minutes, and at its highest rate in four minutes. After the experiments the company inspected the engine and the huge fans in the basement. The peculiarity of the fans is that the wings have an eccentric motion combining the simple fan action with that of bellows. As a wing in revolving approaches the opening through which the air comes it goes slower, while the wing at the opening increases speed, and thus a suction is made by the disparity of speed between the two wings. By one of the fans the air is forced into the mixing room, where moisture is added with steam, and thus mixed goes on its mission of health in the numerous rooms above. The moisture is indicated by a hygrometer suspended in the main flue. The exhaust fan is used for the two chambers and

the green room only, the foul air of the other rooms passing from the cupola instead of being drawn down by the exhaust fan. The operation of the machinery was shown to be quite simple and easily controlled."

**WATER METERS.**—The New York Society of Practical Engineers, recently organized, discussed at its first meeting the subject of water meters. It was stated that upwards of sixty patents had been issued in this country for meters, but that none of them met the wants of the public. It was also stated that three times the quantity of water allowed to each inhabitant of London and Philadelphia is consumed in this city, which shows a great and needless waste of the water supply.

It was suggested that the Croton Board offer a prize for a meter that will correctly register the quantity consumed by each family, and a committee was appointed to investigate the subject.



O. D. MUNN, S. H. WALES, A. E. BEACH.

NEW YORK, WEDNESDAY, SEPTEMBER 2, 1868.

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THE VALUE OF EXPERIENCE IN THE MECHANICAL ARTS.

OPTICAL ILLUSIONS.

THE TRANSATLANTIC STEAMSHIP COMPANY.

THE CATTLE PLAGUE.

On Thursday, August 20th, a number of practical railroad men and prominent mechanics, were invited to witness the operation of the above mentioned device, which was illustrated and briefly described on page 277, Vol. XVI, SCIENTIFIC AMERICAN, and patented through this agency. In this case, the apparatus was located on the west side of the Chest-



nut street station, of the New Jersey railroad, in Newark, N. J., and is operated by any one of five switches with which it is connected, the one furthest from the signal being at a distance of 3,000 feet. The signal box is a structure of a pyramidal form, having at the top a disk, glassed and surrounded with a broad black border. A vault, or cellar, under the structure contains a battery which is defended from changes of temperature by being thus sunk in the earth, and from which lead the insulated wires, buried in the ground, beyond the reach of frost, alongside the track, and having terminations at each switch connected with the signal.

The signal itself is simply a disk of red stuff (merino) balanced on one end of a vibrating lever, held in place by the armature of a magneto-electric battery. It is so delicate in operation that the slightest movement of either of the switches, whatever the distance from the signal, produces a movement of the signal; and a connection between the metallic plates representing the poles of the electric current, was made by means of the head and point of a common toilet pin, which easily and instantaneously moved it.

At this place, on the New Jersey Road, which here crosses seven or eight streets, the trains run at full speed in coming into the city, and it is necessary that every means should be used to guard against accidents. This device, having been in use on a portion of the New York and New Haven railroad for more than eighteen months and never having failed in a single instance, was adopted by the New Jersey Railroad and Transportation Company on the most exposed portion of their line, and has proved, by the testimony of Mr. Smith, the section master at that end of the line, and a railroad engineer of some twenty or more years experience, to be absolutely reliable under all circumstances.

The results of the trials made on the occasion referred to were so convincing, as to the advantages of this device, that the unanimously expressed opinion of the gentlemen present was entirely and wholly favorable. Its applicability to bridge draws as well as railway switches, its non-liability of getting out of repair, certainty of action, and simplicity of construction seem to prove its value for general adoption on our railways, as a preventive of the loss of life and destruction of property occasioned by misplaced switches and open drawbridges. It is in use on the New York & New Haven, New Jersey, Morris & Essex, and is being introduced on other roads.

#### OBITUARY.

##### JEREMIAH CARHART.

We have often been called upon lately to record the deaths of distinguished men who, by their inventive genius, have greatly added to the general wealth and prosperity of the country. We have again to perform this sad duty for Mr. Jeremiah Carhart, of this city, an esteemed client, a worthy citizen, and successful inventor, who died at his residence, No. 216 East 19th street, on the 16th inst. Previous to 1846, at which time the firm of Carhart & Needham was formed, Mr. Carhart devoted years of experiment to the improvement of the melodeon, which was at that time an inferior instrument, both in quality of tone and power. In that year he took out a patent for an improvement upon this instrument, the nature of which consisted in drawing the air through the reeds into a bellows, instead of forcing the wind through, out of the bellows, as had been previously the case. Trifling as this change may appear to be to those not familiar with the mechanism of these instruments, it revolutionized the whole business of melodeon manufacture, and so changed the character of the instrument, that the plan has been universally adopted. Having been eminently successful in this improvement he next turned his attention to the perfection of the reeds, or thin strips of metal, the vibration of which produces the tones of the instrument. In this he was also very successful. He invented a machine that would make, rivet, and plane these reeds to the proper size and thickness, and followed up this improvement by the invention of a "tube board" to hold them when finished. Soon after he invented a new reed, the peculiarity of which is, that it is held by its thickness and not by the edge, as had been previously the case. He also invented a machine for riveting the reed to the block which does the work of twenty men with far greater accuracy than it could be possibly done by hand. Another of his inventions was an automatic machine for cutting the cells in the reed board, which is such a marvel of ingenuity that it has been ranked with the celebrated Blanchard lathe. This machine is not only capable of cutting in straight lines, but it curves scrolls with a nicety and rapidly entirely unequalled by hand labor.

His improvements gave the firm the monopoly of the reed manufacture, it being divided with two other firms, which paid a royalty for the privilege. The instruments manufactured by this firm, early took, and have always maintained, a leading rank in the trade.

Mr. Carhart was an industrious, honorable man, and a genial warm-hearted companion. His business success was well merited, and his death will be lamented by a large circle of friends and acquaintances.

##### CAPT. COMSTOCK.

We regret to announce the death of Capt. Joseph Jesse Comstock, who was widely and favorably known as the commander of the steamer *Baltic* and other vessels of the Collins line. Capt. Comstock died at his residence in New York city on the 16th inst., from an attack of pleurisy. He commenced his nautical career, as a boy, on a Long Island schooner. After having served four years on a ship in the China trade, he took the position of first officer on a Liverpool packet. Subsequently, he commanded a steamer on the

Long Island Sound, and remained upon that route until 1850, when he entered the service of the Collins line, remaining in it until its suspension, after which he commanded at different times the *Baltic* and the *Adriatic*, used as transports by the Government. He delivered to the Russian government the *General Admiral* in 1859, the *Re d'Italia* to the Italian Government in 1863, and the famous *Dunderberg* to the French Government in 1867. He was also for two years agent for the New York and Havre line. Upon the sale of the vessels of that company he retired to private life, to enjoy only for a brief season the fruits of an active and useful career. He was an able seaman, and his death will cause pain to many who are indebted to his superior skill for safe and pleasant voyages across the stormy Atlantic, as well to a nearer circle of friends.

#### CHANGES IN THE PATENT OFFICE.

COMMISSIONER FOOTE, of the Patent Office, has promoted Samuel Duncan, First Assistant Examiner, to special duty in the Commissioner's room as his assistant, and V. D. Stockbridge from a clerkship to be Second Assistant Examiner. James L. Norris and Charles Page have also received promotion to the Examining Corps. J. H. Adams of Boston, has been appointed to take charge of the annual "Patent Office Report," in place of Edward H. Knight removed, rumor says on account of his connection with a Patent Agency. Mr. Adams is a very competent man, and, previous to his removal to Boston, was connected with the Examining Corps of the office for many years.

#### Editorial Summary.

THE act of Congress amending the Postal Laws declares that it shall not be lawful to deposit in a post-office, to be sent by mail, any letters or circulars concerning lotteries, so-called gift concerts, or other similar enterprises, offering prizes of any kind, on any pretext whatever. In conformity with this law, Postmaster-General Randall has directed that all such matter be sent to the Dead Letter Office, without being returned to the owners. We hope the result may be to rid the mails of a mass of trash, by means of which ignorant people permit themselves to be swindled, in the delusive hope that somehow they may suddenly get rich, by a matter of chance. But will the system work? We doubt it.

It is a prevalent but mistaken idea in the Eastern States, that there are but few factories in the west. The fact is, that the cities and villages of the west are teeming with busy workshops. For instance, of the cities, St. Louis has over 300 factories and produces nearly \$50,000,000 worth of goods annually, and of the villages, Moline, Ill., among other things, makes 50,000 plows of various kinds a year, and has \$120,000 invested in shops where a log enters one end of the building and emerges from the other in the shape of tubs, pails and churns.

ONE of the divers employed in ascertaining the condition of the harbor bottom at the mouth of the sewer at the Dry dock of the U. S. Navy-yard, was suffocated to death in the diving bell used for that purpose on the 20th inst. A companion who was with him at the time was also rendered insensible so that his life was saved with considerable difficulty. The bell was not built on the same plan of the one used on the wreck of the *Hussar*, recently described in our columns.

ANOTHER NEW PLANET.—Prof. Watson, of the Detroit Observatory, announces the discovery of another new minor planet, which was made by him on the night of August 16th. It appears like a star of the 10th magnitude, and at twilight on the morning of the 17th its right ascension was 35° 24', and its declination 0° 48' south. Its apparent motion is west and north, 34' in right ascension, and 4' of arc in declination.

CHICAGO sent forward to the east last year, 48,000,000 bushels of grain, of which ninety-one per cent. went by water, and nine per cent. by rail. Of the millions of bushels of corn which were forwarded east from the same point, ninety-nine per cent went by water. And all this in face of the four and one-half months of suspension of navigation during the season.

DITCHING is something of a feature in farming operations in the west, especially in Ohio. The work is often performed under supervision of the county authorities. The Commissioners of Paulding county, Ohio, have established a ditch eleven miles long, and one has been completed in Wood county, 12 miles long, at a cost of \$75,000.

AT the recent hurricane in Mauritius all the railway stations were unroofed, the iron doors of an engine shed were torn from their fastenings, and one of them weighing a ton and a quarter is said to have been blown entirely across the line of the railway. Two spans of an iron viaduct one hundred and twenty feet in length were hurled into a ravine below.

WE would call attention to the advertisement headed "To Coal Oil Manufacturers." From the analysis of Professors Ellet and Everett it is shown that Breckinridge coal yields a very large per cent of paraffine and lubricating oil, placing it measurably out of competition with petroleum and putting it, as regards a market, with sperm oils.

QUEEN VICTORIA has just signed an act of Parliament authorizing a company to lay down and work a street railway in the city of Liverpool. Street railways are a very convenient nuisance in this city.

SOME velocipede amateurs of Marseilles, France, are arranging a long journey with this novel means of locomotion. The velocipedes are to start from Marseilles for Genoa by the Corniche road, and thence to Turin and Susa over Mont Cenis, and back to Marseilles by the valley of the Rhone.

It was some time since predicted by some geologists, that naphtha would be found in the Caucasus Mountains. It is now announced that this belief has been realized. A boring 276 feet deep has reached a deposit near Knasso, which is said to be yielding a large daily average.

AN IMPERIAL INVENTOR.—We learn through private advices that the Emperor Napoleon has invented a single-rail railway, which is now working satisfactorily between the villages of Raincy and Montfermeil, near Paris. No description of the improvement has yet been published.

IN some of the large railway stations in France, the walls are decorated by large carefully painted maps of the main line, showing also its connections with branch roads.

A "Labor Parliament" is to be held in London, England, to devise measures for securing seats in Parliament for at least a dozen bona fide workmen.

## OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING AUGUST 18, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each caveat.....	\$10
On filing each application for a Patent, except for a design.....	\$15
On issuing each original Patent.....	\$20
On appeal to Commissioner of Patents.....	\$20
On application for Reissue.....	\$20
On application for Extension of Patent.....	\$20
On granting the Extension.....	\$20
On filing a Disclaimer (three days and a half years).....	\$10
On filing application for Design (seven years).....	\$15
On filing application for Design (fourteen years).....	\$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay \$500 on application.

Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.

81,060.—DEVICE FOR VENTILATING AND DESICCATING.—E. R. Ashcroft, Lynn, Mass.

I claim the combination of the T-shaped pipe, A, and the inner horizontal one, d, constructed and operated in the manner substantially as shown and described, and for the purpose set forth.

81,061.—SOLES FOR BOOTS AND SHOES.—Alexander Joseph Bassett, Philadelphia, Pa.

I claim a sole for boots and shoes, arranged substantially in the manner and for the purpose specified.

81,062.—SUGAR PACKER.—E. J. Biederman, Brooklyn, N. Y.

I claim, in devices for packing barrels with sugar and other substances, the combination of the forked bar, F, with clamps, G, and screws, H, the crank shaft, D, and platform, A, arranged and operating substantially as and for the purpose herein set forth.

81,063.—GAS BURNER.—W. J. Brasington, Brooklyn, N. Y.

I claim, 1st, The valve, A, placed inside of the ordinary gas burner, and operated so as to cut off the force of the gas to the desired quantity necessary to supply a miniature flame, substantially as described.

2d, The valve seat, I H I, formed by the under side of the tip in the ordinary gas burner, against which the valve, A, seats itself, for the purposes specified.

3d, The application of the spiral spring, B, in combination with the valve, A, for the purposes herein specified.

4th, The movable jacket, M, or casing, with the slot, N, in combination with the band, W, for the purposes of receiving the movable glass protector or hood, R, substantially as described.

5th, The combination of the internal movable valve, A, with the elastic packing, F, and plate, G, and screw, D, or their equivalents, substantially as shown and described, for the purposes set forth.

6th, The application and use of the spring point, P, attached to the movable jacket, M, or casing, and the notch, K, to receive the same, for the purpose of securing the aforesaid movable jacket, M, or casing in its proper position, when it is raised to protect the small flame, U, or drawn down to permit a full flame at T, as herein specified.

7th, A pull or handle, O, or other suitable device, attached to the movable jacket, M, or casing, for the purpose of operating the same, either up or down, substantially as described and herein set forth.

81,064.—BEARING FOR FLYERS IN SPINNING MACHINES.—Jas. Brown, Pawtucket, R. I.

I claim the within described arrangement of the confining screws, a, b, the tube, c, the rail, A, and the oil trough, d, placed underneath the rail, the screws by such arrangement being within the rail, and the oil trough being below, and covered by it, in manner as specified.

Also, the arrangement of the confining screws, a, b, the tube, c, the rail, A, provided with oil and air ducts, e, f, the oil trough, d, and the oil duct, i, substantially as described.

81,065.—SOFA BED.—Wm. Brown, Worcester, Mass.

I claim, 1st, The combination, with the sofa bed, of the pieces, d, d, and the loops, a, a', or either, and the spring arms, g, g', substantially as and for the purposes set forth.

2d, The combination, with the hinged legs, G, G', and loops, a, a', of the pieces or legs, H, and arms, g, substantially as and for the purposes set forth.

3d, The combined head board and detachable legs, H, substantially as described.

81,066.—CORN PLANTER.—Jarvis Case, Lafayette, Ind.

I claim, 1st, Connecting the front and rear frames of the machine by means of the flexible plate, t, when said parts are combined substantially as described.

2d, The catch, n, pivoted to the rear frame, and arranged to engage with the bar, U, for locking the front and rear frames rigidly together, substantially as and for the purpose set forth.

3d, The scattering device, arranged in the lower end of the seed tubes, when constructed substantially as described.

4th, The screw, T, when arranged to be adjusted in rear of the axle, or over the front part of the platform, substantially as described.

5th, The combination of the valve, I, pivoted cam, g, and sliding arm, i, attached to the seed slides, constructed and arranged to operate substantially as shown and described.

6th, The removable hopper bottom, C, having the cut-off, e, attached thereto, when constructed and arranged substantially as shown and described.

81,067.—CAR COUPLING.—Ed. W. Chadwick (assignor to himself and Wm. P. Chadwick), Edgartown, Mass.

I claim the arrangement and combination of the chambered cap, C, with the chambered draw bar, A, the spring, b, and the lever catch, B, made as described.

81,068.—ARTIFICIAL TEETH.—J. W. Clark, Philadelphia, Pa.

I claim, 1st, The arrangement of the double notched pin, P, and the manner of securing the same in proper position by means of notches in dies, 1, 2, 3, 4, 5, and 6, and slide, D.

2d, The manner of arranging the dies, 1, 2, 3, 4, 5, and 6, and drawing them out from the sides of the molds; also, the arrangement of the bolts, H, and thumb screw, S, for securing said dies firmly in place.

81,069.—BIT FOR BORING WOOD.—Ransom Cook, Saratoga Springs, N. Y.

I claim the improved spoon bit, constructed substantially as hereinbefore set forth.

81,070.—LOOM.—George Crompton, Worcester, Mass.

I claim, in combination with angular evener levers and horizontal harness levers, operated upon by such eveners (to bring the jack hooks into line), the rocker links, t, which connect such eveners with the slide rods, substantially as set forth.

Also, in combination with jacks operating upon horizontal harness levers, and with angular lifter and depresser levers operating such jacks, the angular lifter and depresser levers, connected to the slide rods by which they are operated, by the rocker links, n, substantially as described.

81,071.—MANUFACTURE OF COMPOUND OILS.—Francis Louis De Gierbath, Dalton, England, assignor to Thomas S. G. Kirkpatrick.

Dated August 18, 1866; patented in England, November 11, 1867.

I claim the production of an oil resembling linseed oil, and applicable to







hot air alternately or together in heating a train of cars, substantially in the manner set forth.

**81,138.—BRAIDING ATTACHMENT FOR SEWING MACHINES.**—Wm. Carpenter, Fairbury, Ill.

I claim, 1st, The combination with a sewing machine of the braiding attachment herein described, consisting of the spiral reel, braid foot, and pivoted guide fingers, substantially as and for the purpose described.

2d, The combination with a sewing machine of the braid foot and pivoted guide fingers, substantially as and for the purpose described.

3d, The combination with the braid foot of the guide fingers, H and I, and guide rod, J, substantially as and for the purpose described.

**81,139.—STOVE GRATE.**—William Cayen, Cincinnati, Ohio.

I claim, 1st, The combination of the grate, D, provided with a central socket, E, handle, G, and pivot, H, the bar, C, provided with the central and F, and extension, C, and the slots or recesses, I, J, all arranged and employed substantially as described, for the purpose specified.

2d, In combination with the elements of the preceding clause, the stop, J, for the purpose explained.

**81,140.—CUTTING PRINTERS' LEADS.**—Wm. E. Clark, Boston, Mass.

I claim, 1st, The arrangement of the guide, b, shell, n, a movable and stationary cutter, and slot, E, substantially as and for the purpose described.

2d, The arrangement of the graduated scale, I, the adjustable gate, H, the movable and stationary cutter, and a guide, b, when constructed and operated as and for the purpose set forth.

**81,141.—CARRIAGE WHEEL.**—Charles Clarke, Coral, Ill.

I claim the brace, C, having the shoulder, d, and spur, f, all constructed as described, and applied to a wheel substantially as and for the purpose set forth.

**81,142.—HORSESHOE.**—John N. Clarke, Cincinnati, Ohio.

I claim the detachable calk for horsehoes consisting of the inwardly curved bars, B, C, calks, b, c, retaining screw, D, and clips, E, either with or without the spurs, E, substantially as herein described and set forth.

**81,143.—SHEET METAL CAN.**—Porter Cook, Baltimore, Md.

I claim an angular sheet metal can having some or all of its sides provided with depressions, a, of increasing depth, forming inward convexities, for the purpose of preventing the bulging outward of said parts by pressure within the can, substantially as described.

**81,144.—SURFACE GAGE.**—Wm. F. Cornell, Adrian, Mich.

I claim, 1st, The T-headed arbor, B, having a semi-cylindrical head, and semi-spherical staple, in combination with the T-headed collar, N, with its concave and semi-cylindrical end, for the purpose of forming a clamp, all constructed in the manner and for the purpose set forth and described.

2d, The conical shaped washer, B, and feather, c, in combination with the clamp, E, nut, D, and nut, D, and T-headed arbor, B, constructed in the manner set forth and described.

**81,145.—RATCHET BRACE.**—Wm. F. Cornell (assignor to himself and Silas Hubbard, Adrian, Mich.)

I claim, 1st, The combination of the socketed arm, B, ratchet wheel, J, and shaft, C, and feed screw, I, substantially as and for the purpose set forth.

2d, The combination of the screw ring cap, E, with the cylindrical socket, A, and ratchet shaft, C, substantially as and for the purpose set forth.

3d, The combination of the counterbore, K, or countersink, M, with ratchet shaft, C, wheel, J, the cylindrical socket, A, shaft, V, feather, c, and seat, I, for the purpose set forth and described.

4th, The combination of the thumb nuts, n and o, with spindle, L, constructed in the manner and for the purpose as set forth and described.

**81,146.—VANE.**—L. W. Cushing and Stillman White, Waltham, Mass.

We claim in the construction of vanes the cast metal outline in combination with the plates forming the sides, substantially as described and for the purpose set forth.

**81,147.—MODE OF PRESERVING THE ROOFS OF BUILDINGS.**—Isaac W. Dean, Franklin, Conn.

I claim saturating the roofs of buildings with preserving material by means of a receptacle, or its equivalent, placed at or near the top of the roof, said receptacle containing the preserving material, substantially as described and for the purpose specified.

**81,148.—PLOW.**—J. H. Dickson, Alford, Ind.

I claim the adjustable plate, C, and the curved knife, D, D, when used in combination with a shovel or other plow, B, and its beam, A, the several parts being constructed and arranged substantially as and for the purpose herein set forth.

**81,149.—MODE OF PREPARING COAL DUST FOR FUEL.**—A. D. Dittmar, Lancaster, Pa.

I claim preparing coal dust for fuel substantially as herein shown and described and for the purposes set forth.

**81,150.—FASTER FOR VEHICLE SEAT.**—Charles Dixon, Westport, N. Y.

I claim the cam or eccentric, D, lever, E, lever hook, F, and ears, C constructed and combined with each other substantially as herein shown and described and for the purpose set forth.

**81,151.—EGG CARRIER.**—George Dorn Albany, N. Y.

I claim the cords, e, e', e'', of twine, rubber, or their equivalents, as described, woven and arranged substantially as described, for the purpose specified.

**81,152.—COMPOUND FOR CURING FELONS AND SIMILAR DISEASES.**—Rachel Feibelman, Columbus, Ind.

I claim the compound for curing felons and similar diseases, compounded from the ingredients, and substantially in the manner set forth.

**81,153.—FRUIT CRATE.**—William G. Goodale, Centralia, Ill.

I claim the fruit crate above described, consisting of the box, A, B, loose plates, C, G, springs, D, S, and boxes, F, F', F'', constructed and arranged in the manner described.

**81,154.—MACHINE FOR COVERING MOLDS FOR TASSELS.**—Charles Feickert, New York City.

I claim, 1st, The movable bracket, G, in combination with the flyer, F, carrying the spools, E, and guides, I, substantially as and for the purpose set forth.

2d, The hooks, I, forming guides for the wires, c, on their passage to the spindle, C, and also for the threads, as the same are deposited on the wires, substantially in the manner herein shown and described.

3d, Depositing the threads on the wires, c, before the same reach the mold, substantially as and for the purpose set forth.

**81,155.—GRATE BARS.**—Addison C. Fletcher, New York City.

I claim, 1st, A grate bar, constructed or provided with separated fuel points of a detachable character, and so that the same may be readily fitted to and retained in the main portion or body of the bar at suitable fixed distances apart, leaving air ducts or spaces between them substantially as specified.

2d, In combination with the main portion or body, A, of the bar, the loose or detachable points, B, when constructed so as to leave air spaces of an enlarged or enlarged capacity in a downward direction between them, essentially as herein shown and described.

3d, The combination, with the body portion of the bar, of detachable separated fuel points, having air ducts or passages through them, substantially as specified.

**81,156.—STIRRER FOR SEED SOWERS.**—F. G. Floyd and E. A. Floyd, Macomb, Ill.

We claim the rotating arm, D, attached to the shaft, C, as shown and described, and arranged to revolve within the hopper, B, for the purpose set forth.

**81,157.—MEANS FOR STOPPING HORSES.**—Norman Fountain, New York City.

I claim, 1st, The spring, c, carrying the pads, g, and adapted to passing across the horse's nose, in combination with the metallic slides, d, introduced in the headstall, and with the rein, f, attached at the back ends of said spring, the parts operating in the manner and for the purposes set forth.

2d, The lever, h, fitted as specified, in combination with the reins, for the purpose set forth.

**81,158.—HARVESTER.**—Herbert E. Fowler, North Branford, Conn.

I claim the arrangement of the eccentric, M, or its equivalent, upon the driving shaft, in combination with the toggle joint, O and P, lever, R, arm, C, and bell crank, S, so as to operate substantially in the manner, herein set forth.

**81,159.—ROASTER FOR NUTS.**—D. A. T. Gale, Poughkeepsie, N. Y.

I claim, 1st, The described arrangement of the perforated case, A, having the hinged cover, B, the rotating cylinder, C, gas pipe, I, provided with burners, C, heating chamber, L, and hot-air chamber, H, as herein described for the purposes specified.

2d, The arrangement of the gas pipe, G, I, having the burners and cocks, with relation to the rotating cylinder, C, and warming apparatus, K, whereby heat is applied to C, E, simultaneously or alternately, as herein described for the purpose specified.

**81,160.—TUCK CREASER FOR SEWING MACHINE.**—Harry C. Goodrich, Chicago, Ill.

I claim the spring, E, when provided with a permanently attached notch, f, which is always in position in relation to the point or blade, b, whatever the position of the plate, A, may be, in combination with the spring arm, D, all constructed and operating substantially as specified.

**81,161.—GRATE BAR.**—John W. Griswold, and Edgar L. Thomson, Philadelphia, Pa.

We claim perforating the bar, A, B, constructed as described, with vertical conical holes, D, substantially as herein shown and described and for the purpose set forth.

**81,162.—TAP AND DIE.**—George Grubel, New Orleans, La.

I claim as my improvement of screw-cutting dies and taps whose threads are divided transversely, so as to present two or more salient cutting points omitting every alternate thread, and arranging those that remain in alternation, so that the sections of cutting thread following one another shall successively cut and give shape to opposite sides of the thread in the nut or the bolt which is being threaded or tapped, substantially as described.

**81,163.—PORTABLE COOKING STOVE.**—Oliver B. Hale, Malone, N. Y.

I claim, 1st, A portable stove, whose sides are composed entirely of distinct sections, E, fitted to slide in vertical grooves, formed in the opposite sides of posts, D, substantially as herein shown and described, for the purpose specified.

2d, A stove provided with the vertical grooved ways or guides, D, and with boilers or vessels, F, arranged to slide in the said ways, to be brought into or moved out of contact with the fire, substantially as and for the purpose described.

3d, The combination, with the sections, of the springs, G, and guide rods, H, substantially as and for the purpose described.

4th, The sections, E, provided with the pins or hooks, b, for suspending a boiler or other similar apparatus over the fire, substantially as and for the purpose described.

5th, Perforating the sections, E, at or near their upper edges, so that when said sections are shoved down for the attachment of a cooking vessel, the draft of air will be directed through the fire, or above the fire, when the

sections are fully up to their places, substantially as herein described and represented.

6th, The combination with a stove, arranged as described, of the ash-door, B, substantially as and for the purpose described.

**81,164.—METHOD OF REMOVING TIN AND OTHER COATINGS FROM SHEET METAL.**—R. H. Harmon and D. B. Sturdevant, Clifton Springs, N. Y.

I claim the process of removing coatings from sheet metal or other materials, by combining the latter in a closed retort, and subjecting it to a current of hot air, as herein set forth.

2d, Imparting to the basket containing the scraps a jarring or vibrating action, for the purpose of liberating the melted material, as herein set forth.

Also, constructing the basket holding the scraps with an open or grated bottom, and with perforated sides, in the manner and for the purpose specified.

**81,165.—BOLT FOR PRISON DOORS.**—Benjamin F. Haugh, Indianapolis, Ind.

I claim, 1st, The doors, B and E, hinged hasp, L, bolts, v, and bar, w, in combination with compartment, F, all arranged as and for the purpose set forth.

2d, The hasp, H, and hooks, O, for securing the door, D, in combination with compartment, F, arranged as and for the purpose set forth.

**81,166.—COMBINED FORK, SHOVEL, AND HOE.**—J. A. Heald, Columbus, Miss.

I claim the tubular handle, A, the hookshank, B, and the washer, E, when the same are constructed, arranged and combined, substantially as shown and described for the purpose set forth.

**81,167.—STEAM SAFETY VALVE.**—Henry W. Hewett, New York City.

I claim, 1st, The arrangement of the steam ports, b, in the center or thereabouts of the valve seat, whether said seat be a concave or convex cone, or both combined, substantially as set forth.

2d, The arrangement of the double seat, n, n, on the same plane, one on either side of the ports, b, substantially as shown and described.

3d, The arrangement of an annular cavity or groove, centrally or nearly so, in the face of the valve, and of greater width than that of the ports, b, in the seat, so as to span said ports, substantially as and for the purposes set forth.

4th, The arrangement of the case, f, f, in combination with the spring, e, valve, C, collar, D, and locking cap, G, substantially as shown and described for the purpose set forth.

**81,168.—DIRECT-ACTING ENGINE.**—William D. Hooker, San Francisco, Cal.

I claim, 1st, The auxiliary ports, m, m', together with the main ports, l, l', in combination with the main valve, f, piston, c, and auxiliary valve, q, of a direct-acting engine, constructed substantially as described.

2d, The arrangement of the auxiliary valve, q, ports, p, p' and n, n', in combination with the main valve, f, and piston, c, of a direct-acting engine, constructed substantially as described.

3d, The combination with the main valve, f, supply ports, l, l', exhaust ports, j, j', auxiliary valve, q, and ports, p, p', the small ports, l, l' and k, k' substantially as herein described.

**81,169.—COFFEE POT.**—N. Hotz, Greenpoint, N. Y. Antedated August 5, 1868.

I claim the condenser, C, within the chamber, B, having its one end open to the boiler, A, and its other open to the atmosphere, by an orifice in the side of said condenser substantially as and for the purpose specified.

**81,170.—MACHINE FOR FINISHING CLOTH.**—George C. Howard, Philadelphia, Pa.

I claim, 1st, The combination of the cylinders, V, v, placed on opposite sides of the rests, x, and handle, Z, arranged and operating substantially as described.

2d, The combination of the rolls, B, b, shaft, F, and rolls, D, d, with lever, J, racks, G, pinions, H, and friction, I, the rolls, B, b, turning the shaft, F, and through it, or the roll of material, E, also turning the rolls, D, d, substantially as described.

3d, The combination of the shaft, F, provided with points, N, N, the thread ed and notch, m, with the catch, K, and sleeve, Z, substantially as described.

4th, A stop motion with the clutches, S, S, and curved arms, Q, Q, in combination with the clutch, R, bar, O, slotted arms, P, P, pins, K, K, and guides, f, f, substantially as described.

**81,171.—SCREW-DRIVER AND COUNTERSINK.**—Peter N. Jacobus, Flatbrookville, N. J.

I claim, 1st, A screw-driver, provided with sliding jaws, so operating that as they reach in any work, they converge, and grasp the head of the screw firmly, and as they are slid out again, they diverge and release it.

2d, The combination of the part, A, having the fixed ring, R, the sliding ring, S, the movable jaws, J, J, and the metallic piece, B, substantially as described.

**81,172.—COMPOUND FOR PRESERVING WOOD.**—Bartholomew A. Jaeger, Bowers Station, Pa.

I claim a composition for preserving wood, consisting of the ingredients herein set forth.

**81,173.—SHOVEL PLOW.**—A. Jennings, West Cairo, Ohio.

I claim the plow, provided with the side projection, a, and with the upright guard, b, on which the fingers, c, are secured, substantially as herein shown and described.

**81,174.—WASH BOILER.**—F. Judson, Castleton, N. Y.

I claim the combination of the steam chamber, B, with its top, a, slides, b, tubes, D, and grate bars, E, with wash boiler, A, provided with the shoulders, F, rack, C, and supports, G, in the manner and for the purposes herein described.

**81,175.—CARRIAGE WHEEL.**—George Kenny, Nashua, N. H.

I claim, 1st, The metallic flange ring or casing, B, provided with sockets, E, E, and screw threads on the inside of its inner end, when used in combination with the spokes, C, C, which are provided with a tenon on their ends, fitting into the mortises on the hub, A, and its shoulder resting on the outside periphery of the hub, substantially as and for the purposes set forth.

2d, The combination of the spokes and felloe by tenon, when said tenon consists of two members, H, H', substantially as described and for the purpose set forth.

**81,176.—MODE OF ATTACHING MICA TO STOVE PLATES.**—John H. Keyser, New York City.

I claim providing for securing transparent plates over openings made through stove plates or door, by means of a self-fastening frame, substantially as described.

**81,177.—COMBINED PLANTER AND CULTIVATOR.**—George W. Kinzer, Linden Station, Ohio.

I claim, 1st, The combination of the plow, Y, beam, Y, and standard, Y', hinged at z, substantially as described.

2d, The combination of the distributing apparatus, G, H, I, with the valve, a, arm, J, sliding bar, L, and cam wheel, b, substantially as described.

3d, The combination of the markers, T, T', with the springs, u, u', the shaft, T', gearing, t, t', and spur, e, substantially as described.

4th, The combination of the slide, Q, with the gearing, r, r', foot rest, r'', and plow standards, f, f', substantially as described.

**81,178.—SASH FASTENER.**—F. Kramer, St. Louis, Mo.

I claim, 1st, The face plate, B, provided with metallic tongues, b, for the purpose of holding and guiding the sashes, when applied to the window frame, A, as and for the purpose set forth.

2d, In combination with the face plate, B, and its tongues, b, the pivot, b', for securing and locking the sashes, substantially as set forth.

**81,179.—SASH HOLDER.**—Daniel P. Lacey, Orfordville, Wis., assignor to Robert R. Ball.

I claim the combination of the widened point, B', notches or depressions, A, pivoted bolt or tumbler, B, lock bolt, C, and springs, E, all arranged and employed substantially as and for the purpose set forth.

**81,180.—FLOOD GATE.**—J. Leatherman, Napoleon, Ohio.

I claim, 1st, An improved flood gate, formed by the combination of the posts, A, auxiliary posts, B, cross bars, C, inclined bars, D, and hanging bars, E, with each other, substantially as herein shown and described, and for the purpose set forth.

2d, The inclined bars, d, upon which the hanging bars, E, move up and down with the rise and fall of the water, substantially as herein shown and described and for the purpose set forth.

**81,181.—MEDICINE FOR FEVER AND AGUE.**—A. V. Lee, Clayton, Ala.

I claim a medical compound, composed of the above mentioned ingredients in about the proportions named, substantially as and for the purposes set forth.

**81,182.—TOOL HOLDER.**—William J. Linton, Detroit, Mich.

I claim, 1st, The combination with the stock, A, of the jaws, P and E, when the jaw, P, is provided with the longitudinal opening, e, extending entirely through it, and communicating with the hole, f, in the stock, A, all substantially as herein shown and described for the purpose specified.

2d, The spring lever, b, pivoted in a slot in the screw handle, C, and adapted for operation as herein set forth.

**81,183.—TOOL HOLDER.**—William J. Linton, Detroit, Mich.

I claim, 1st, The bracket, A, provided with the slot, b, in the front, and having the shoulder, f, in combination with the slotted holder, C, constructed and pivoted thereto, substantially as and for the purpose described.

2d, The combination of the tool holder, as above described, with the tool-slide of a planing machine, substantially as and for the purpose described.

**81,184.—WINDOW VENTILATOR.**—R. H. Long, Cincinnati, Ohio, assignor to himself and R. T. Trail, New York City.

I claim, 1st, The side grooves, C, applied to a sash frame surrounding a single pane of glass, in combination with the movable supplementary frame, F, substantially as described for the purpose specified.

2d, The shaft, H, applied to the supplementary sash frame, F, substantially as described for the purpose specified.

**81,185.—PROCESS OF PRESERVING ANIMAL SUBSTANCES.**—Orazio Lugo, New York City, assignor to David Lyman, Ross C. Brown, and Mason C. Weld.

I claim, 1st, Introducing phenol, or any of its equivalents, into the system of a living animal or animals until death takes place, for the purpose substantially as herein specified.

2d, Introducing or diffusing phenol, or any of its equivalents, into the system of a living animal or animals just before bleeding or killing the said animals, for the purpose substantially as herein specified.

3d, The within-described method of introducing phenol (carbolic acid) or its homologues, into the system of living animals, or the purpose substantially as herein described.

**81,186.—TEA AND COFFEE POT.**—E. B. Manning, Middletown, Conn.

I claim a tea or coffee pot constructed with a hard metal or iron body, the inner side coated with porcelain, or similar material, and the outer with soft metal after the lining has been baked, substantially in the manner herein set forth.

**81,187.—CUTTER ATTACHMENT FOR PLOWS.**—T. E. Marable (assignor to himself and S. A. Plummer), Petersburg, Va.

I claim, 1st, The cutter, F, when constructed and arranged, in connection with a plow, so as to scrape the surface of the ground in front of the mold-board and the whole width of the furrow, cutting the weeds, grass

therefrom, and casting them out of the way of the plow, on the side opposite to the mold board.

2d, The combination of the plow, B, beam, A, cutter, F, shank, G, and box-strap, H, substantially as described.

**81,188.—SHOVEL PLOW.**—B. F. McCollister, California, Mo.

I claim the combination of the double-pointed shovel plow, B, with the standard, A, plate, C, having lugs, e, e, block, D, bolts, E, E, and screw nuts, e, e, substantially as and for the purpose above set forth.

**81,189.—SHOVEL PLOW.**—J. Meyer, Bloom township, Ohio.

I claim the upright center bar, A, provided with the notched cross bar, L, in combination with the springs, d, d, and the lugs, e, e, substantially as and for the purpose herein set forth.

**81,190.—ARTICLE OF FOOD FOR THE SICK.**—A. Meyerberck, Frankfurt-on-the-Maine, Prussia, assignor to Alfred Mellor and H. N. Ritchey, Philadelphia, Pa.

I claim the employment or use of the serum of beaver's blood, as a constituent in the production of a nutritive sirup for the sick and delicate, substantially as described.

**81,191.—SEWING MACHINE.**—Nicholas Meyers, (assignor to E. L. Chamberlayne, and E. C. Pomeroy), Buffalo, N. Y.

I claim, 1st, The plate, k, provided with the wedge-shaped and inclined part, k', in combination with the pivoted triangular-shaped piece, l, and the plate, m, the latter being provided with the triangular-shaped slot, m', and the feed plate, o, operating together to produce the feed motion, substantially as described.

2d, The shaft, A, in combination with the vibrating arm, l, the connecting rod, e', and the carrier, b, bearing upon one side the shuttle, and upon the other side the feeding mechanism, substantially as described.

**81,192.—CAR BRAKE.**—G. L. Miller, De Witt, N. Y.

I claim, 1st, The construction and arrangement of the central bar, G, having the rack, H, and lugs, e, pivoted levers, E, connected to the brakes, C, by the links, b, b, the adjustable pinion, I, and friction wheels, J, K, as herein described and for the purpose specified.

2d, The spring rack bar, G, when provided with the central lugs, e, in combination with the pivoted levers, E and brakes, C, as herein described for the purpose specified.

3d, The pinion, I, upon the shaft, f, when each shaft is hung in bearings adjusted vertically by the bar, i, and lever, M, and when provided with the friction wheel, J, engaging with the wheel K upon the axle, L, of the tender as herein described for the purpose specified.

**81,193.—STUMP JOINT FOR CARRIAGES.**—F. B. Morse, New Haven, Conn.

I claim a stump joint, consisting of the two parts, A and B, hinged together by a connection, C, pivoted to each of the parts, forming the meeting ends of the joint, of irregular form, the one corresponding to the other, so as to operate substantially in the manner specified.

**81,194.—ADJUSTABLE CAR STEP.**—William Neumann, St. Louis, Mo.

I claim the car step, B, when constructed so as to be convertible at pleasure into a step or guard, substantially as herein described and set forth.

Also, the construction of the step, B, riser, b, sliding rods, a, and platform, A, when arranged as and for the purpose herein set forth and described.

**81,195.—FRICTION BRAKE FOR SEWING MACHINES.**—Daniel Newton, Southington, Conn.

I claim the loosely-enclosed cylinder, C, of suitable material, within the trough, B, the latter being securely held to plate, A, and is adjustable by means of screws and slots, the whole arranged and applied substantially as described, and for the purpose set forth.

**81,196.—GATE.**—William E. Nichols, Baldwin, Mo.

I claim, 1st, The combination with the gate, A, provided with the arm, D, of the latch rod, B, and cords, I, and K, suspended as described, for opening and closing the same, substantially as and for the purpose set forth.

2d, The combination with the cords, I and K, of the cords, O and N, suspended as described, for opening and closing the gate, the same, substantially, as and for the purpose described.

**81,197.—COAL STOVE.**—B. Oertly and Xavier Fendrich, Washington, D. C.

We claim a stove, made in whole or in part of an iron or other metal framework, coated or embedded in a composition or mass of suitable glass and mineral matter that will be fire-proof, substantially as and for the purpose set forth.

**81,198.—APPARATUS FOR THE MANUFACTURE OF ILLUMINATING GAS.**—F. W. Ofeldt and A. W. Almquist, (assignors to themselves and Thomas Fitzsimmons, New York City.)

We claim, 1st, The upright conical or spherical reservoir, A, the reservoir, B, and the cooler, J, arranged substantially as described, for the purposes set forth.

2d, The tube, E, the valve rod, F, and the float valve, H, in combination with the reservoir, A, and reservoir, B, arranged and operating substantially as and for the purposes specified.

3d, The method, herein shown and described, of uniting and securing together the retort and reservoir by the flanges, C, C, and swing bolts, d, d, as set forth.

4th, The method of oxygenating the gas, or the drums, O and P, revolving in the large drum or case, M, constructed and operating substantially as shown and described.

5th, The method of securing the gasometer to the head and bottom by grooves and rings, substantially as described.

6th, The method of securing the gasometer against the force of the gas, by means of hoops, C, suspended by cords, as shown and described.

7th, The safety pipe, V, with its valve, d, constructed and operating substantially as and for the purposes described, in combination with the gasometer, as shown and described.

8th, An arrangement of means for supplying air for oxygenating gas by the expansive action of the gas, substantially as and for the purpose described.

**81,199.—PREPARING PAPER FOR THE MANUFACTURE OF FLOOR COVERINGS, BELTING, WINDOW SHADES, AND THE LIKE.**—Joseph J. Ott, Washington, D. C.

I claim, as an article of manufacture, the combination of two or more sheets of paper, when prepared by passing through a solution of acid, and connected together by puncturing with a toothed roller, substantially as herein described for use as carpeting, belting, and other purposes as set forth.

**81,200.—MACHINE FOR CUTTING SOAP INTO SLABS.**—George T. Palmer, Brooklyn, N. Y., and Philo P. Bush, New Haven, Conn.

We claim, 1st, The open-bottomed frame, A, made in such manner that it may be passed entirely over a mass of soap, substantially as and for the purposes herein shown and described.

2d, The reciprocating carrier frame, C, when made separate from the cutting-wire frame, N, for the purpose shown and described.

3d, The combination and arrangement, in relation to each other, of the carrier frame, C, and removable cutting-wire frame, N, substantially as and for the purpose set forth.

4th, The horizontally-moving, open-bottomed, or inverted U-shaped barrier frame, B, for the purpose herein shown and described, said frame moving independently of and disconnected from frames, C and N.

5th, The open-bottomed or inverted U-shaped cutting-wire frame, D, for the purpose of cutting masses of soap, said frame being independent of and disconnected from frames, C and N.

6th, The combination and arrangement, in relation to each other, of the carrier frame, C, and removable cutting-wire frame, D, substantially as and for the purpose shown and set forth.

7th, The windlass, F, arranged across the end of the frame of the machine, for the purpose shown and described.

8th, The removable or shifting braces, M, M, or their equivalents, for the purpose herein shown and set forth.

9th, Operating the butter-wire frames of a soap-cutting machine with chains and pulleys, and such suitable gearing and means of propulsion as may be required therefor, substantially as herein shown and set forth.

10th, A soap-cutting machine, composed of frame, A, independent vertically moving cutting-frame, N, and independent horizontally-moving cutting-frame, D, when combined with suitable gear or means for operating the cutting-frames, substantially as herein described.

**81,201.—SPINDLE STEP.**—Samuel L. Pattee, Northbridge, Mass.

I claim a spindle step, having the upper oil chamber, g, partly covered by a flange, which encircles the spindle, the lower oil chamber, c, the passage, d, at the bottom of the spindle socket, and axial therewith the passage, i, f, extending from the chamber, c, to the edge of the beveled base of the socket, and passages, h, extending from the upper to the lower chamber, the whole constructed and arranged substantially as described.

**81,202.—CORN HARVESTER.**—Samuel Patton, Chatsworth, Ill.

I claim, 1st, The rollers, m, m', arranged, as described, out of contact with each other, and provided with longitudinal ribs, n, all operating in the manner and for the purpose specified.

2d, The curved projecting horns, p, p', upon the front of the frame, b, arranged in relation with the wheels, n, n, and rollers, m, m, for the purpose of preventing the accumulation of refuse matter beneath said wheels, and for finishing bearings for the forward ends of the rollers, m, m, as herein shown and described.

**81,203.—SEAL LOCK.**—O. S. Pease, Zenia, Ohio.

I claim a lock which will be secured by means of one or more cartridges when inserted through the casing, A, and tumbler, d, and which can be unlocked only by the explosion of the cartridges, in the manner substantially as described.

**81,204.—SEAL LOCK.**—O. S. Pease, Zenia, Ohio.

I claim the escutcheon or guard, B, in combination with lock, A, when both are so constructed and arranged that they can be bolted together with cartridges, employed substantially as and for the purpose described.

**81,205.—FRUIT BASKET.**—E. F. Percival and N. S. True, Hammon, N. J.

We claim, as an article of manufacture, a fruit basket, or other hollow wooden ware, when the slats or staves composing the same are connected at the top with a continuous band, forming both inside and outside hoop, the whole constructed substantially as herein set forth.

**81,206.—BEE HIVE.**—J. F. Pool, Monroe, Wis.

I claim the hive, constructed with walls a, a', hinged bottom C, ventilating holes, B, B', B'', and opening or entrance, D, all arranged substantially as and for the purpose set forth.

**81,207.—SASH SUPPORTER.**—William Randall, May, Wis.

I claim, 1st, The upright, h, pulley, i, cord, j, and weight, c, in combination with the upper sash, B, and part, o, of the window frame, all constructed and operating together substantially as shown and described, and for the purpose set forth.

2d, The slotted tubular upright, b, cord, a, arm, l, rod, d, and weight, e, substantially as shown and described, in combination with the lower sash, A, and part, n, of the window frame, as and for the purpose set forth.

**81,208.—HARVESTER RAKE.**—Amos Rank, Salem, Ohio.

I claim, 1st, The combination, in a harvester, substantially as set forth, of an endless discharging apron, with a wheel on a vertically-vibratable arm, for the purpose specified.

2d, The combination, in a harvester, substantially as set forth, of an endless discharging apron and a propelling wheel, on a vibratable arm, with devices operated by the driver for raising or lowering the wheel to stop or start the discharging apron.



81,200.—GATE LATCH.—Peter Rasar and D. J. Mayes, Illinois. We claim a gate fastening, composed of the latch, b, and double spring, c, constructed and arranged relatively to each other and the rest of the gate, substantially as and for the purpose specified.

81,201.—SHEEP SHEARING MACHINE.—Hiram A. Reid, Beaver Dam, Wis. I claim the arrangement of the wheel, f, slotted rod, k, cutting wheel, v, plunger, m, slotted bar, n, and hooked plate, q, all operating as described, whereby a rotary motion is imparted to the wheel, v, and a prehensile movement given to the hooked teeth, r, as herein described, for the purpose specified.

81,211.—APPARATUS FOR HEATING AND VENTILATING RAILROAD CARS.—E. L. Roberts, New York City. I claim, 1st, The combination, with railroad cars, of the exhaust tubes, f, provided with valves, arranged substantially as and for the purpose described. 2d, The combination, with the supply tubes, a, of the steam or air heater, g, and heating fan, h, and the pipe connecting the heater to the heating tube, substantially as and for the purpose described.

81,212.—STEAM GENERATOR.—Robert E. Rogers, Philadelphia, Pa. I claim, 1st, The boiler, composed of separate elongated sections or staves, connected at bottom for the interpassage of water, and at top for the interpassage of steam, one or more of such sections being provided with circulation tubes on the side next the fire, each being set on end, and all the sections being arranged around a common fire so as to form the fire chamber or furnace flue, substantially as shown and described.

81,213.—CARD GRINDER.—B. S. Roy (assignor to himself and H. S. Morse), Lowell, Mass. I claim the endless chain, a, and wheels, b and c, and the radial shaft, g, gears, g and h, and the connecting link, f, combined with the shaft, d, and the grinding wheel, e, and all arranged to operate substantially as and for the purpose set forth.

81,214.—BREWING ALE, PORTER, ETC.—F. M. Ruschhaupt, New York, and Gustavus Barthelemy, Williamsburg, N. Y. We claim the use of bran of wheat, bran of oats, or bran of rye, together with meal of kiln-dried Indian corn, and with a certain amount of malt, either alone or with the addition of the herein named and specified phosphates, for the purpose set forth and herein fully specified.

81,215.—HARVESTER.—I. S. Russell, New Market, Md., and H. R. Russell, Woodbury, N. J. We claim, 1st, The coupling plate, D, formed with a twist, so as to assume a vertical position where attached to the axle of the wheel, and an outward inclination at its hinge pin connection with the machine, substantially as and for the purpose set forth.

81,216.—WAGON.—Samuel Seitz and L. D. Arnold, Melmore, Ohio. We claim, 1st, The springs, F, in combination with the side boards, C, and end boards, E, substantially as herein shown and described and for the purpose set forth.

81,217.—RUNNING GEAR FOR WAGONS.—C. M. Sexton, Aurora, Ill. I claim the combination and arrangement of the divided axle, C, double guide, h, rods, i, braces, k, and slotted plates, L, substantially as herein set forth.

81,218.—SASH PULLEY.—A. P. Seymour, Jr., Hecla Works, and W. R. Goodrich, Whitestown, N. Y., assignors to Hecla Works Company. We claim, 1st, The construction of the cheeks, B, B, with projections, locking in a dovetailed manner, within or through the face plate, A, and secured by a rivet, c, holding the said cheeks together by the pins or ears, at their outer edge, substantially as shown and described.

81,219.—SEWING-MACHINE MOTOR.—Elisha Shiver, Columbia, S. C. I claim, 1st, A sewing-machine motor when constructed with the double springs and shafts, a and a', gearing, drums, and brake, n, and adapted to be placed under the ordinary sewing machine, substantially as and for the purpose set forth.

81,220.—TRELIS FOR PROPAGATING BEES.—Andrew Simons, Fairfield, Iowa. I claim the protecting of bees during winter by means of a cloth or other textile covering, substantially as herein shown and described, rendering other protection, as housing, placing in cellars, wrapping hives with straw, etc., unnecessary.

81,221.—HARVESTER.—E. W. Skinner, Madison, Wis. I claim, 1st, The plate, A, provided with the projections or flanges for attaching the parts to, and otherwise constructed as shown and described.

81,222.—STEAM-BOILER FURNACE.—Sidney Smith, Worcester, Mass. I claim, 1st, A fire chamber, with walls of perforated blocks, with perforated sheet-metal jackets behind and blocks, and said blocks and jackets secured between plates, substantially as shown and described, so that the fire chamber may be set up and its parts secured before the construction of the incasing wall.

81,223.—REGISTERING FAKE RECEIVER.—W. G. Smoot (assignor to himself and Antonio Pelletier), Washington, D. C. I claim, 1st, The registering apparatus, consisting of the stationary dial, B, with the index, E, operated by the tilting tube, G, and the rotating dial wheel, H, all constructed and arranged to operate substantially as described.

81,224.—MAKING NUTS.—J. H. Sternbergh, Reading, Pa. I claim, 1st, The combination of the weighted lever, or levers, P, W, with cross head, H, H, crowder, L, and cam, n, on shaft, B, for the purpose of throwing the finished nut or washer out of the die box at the time and in the manner specified.

81,225.—STEAM GENERATOR.—James Sutcliffe, East Boston, Mass. I claim the combination of the bridge wall, B, hollow discs, C, C, pipes, c, c, drum, D, boiler, A, pipes, b, b, and a, all constructed, arranged, and operating as herein set forth.

81,226.—PIANO LOCK.—John Thielemann, Newark, N. J. I claim the hook block, C, C', connected together by a lug and stud, and provided with cam, e, e', in combination with a stud, d, substantially as and for the purpose described.

81,227.—CARRIAGE.—Smith Titcom, Amesbury, Mass. I claim, 1st, The construction of a carriage body with fixed and movable seat slides, the movable slides having a carriage top attached thereto, and combined as described, so that the carriage and the same seat or seats may be used with or without the top.

81,228.—WEATHER STRIP.—E. S. Torry, New York City. I claim, as an article of manufacture, the construction of a weather strip on one side of which is inserted, in a dovetail groove, c, a piece of india-rubber, or other elastic material, as described, and on the other side of which is inserted a straight strip of india-rubber, or other elastic material, b, as and for the purpose herein set forth.

81,229.—CEMENTING AND STRENGTHENING BOXES FOR PACKING LARD AND OTHER SUBSTANCES.—C. L. Tucker, Chicago, Ill. I claim, 1st, Filling the score openings of angular boxes with cement, substantially as and for the purpose specified.

81,230.—POTATO DIGGER.—B. D. Vanderveer and D. Riddel, Freehold, N. J. We claim, 1st, In combination with a plow or plowshare of any construction, when used for the purpose described, the shaker, J, J, and the vine cleaners or bars, k, k, arranged substantially as described for the purposes specified.

crank shaft, all arranged to operate substantially as herein shown and described.

81,231.—SUBMARINE LANTERN.—M. Vander Weide, St. Petersburg, Russia, assignor to C. M. Clay. I claim the submarine lantern having the semicircular channels, B, C, formed concentrically in the body of the cylinder, the former being closed at the top and opening into the cylinder at the bottom, and the latter closed at the bottom and opening into the cylinder at the top, all chambers communicating respectively, with the supply and exhaust tubes, F, G, upon each side of the burner, as herein described for the purpose specified.

81,232.—APPARATUS FOR THE MANUFACTURE OF ILLUMINATING GAS.—P. H. Vander Weyde, M. D., (assignor to Alfred Phillips and John MacDougall), New York City. I claim, 1st, The rotating carbonizer, consisting in a revolving disk or disk, operating in connection with shaft or pulleys and chain, as herein described and for the purposes specified.

81,233.—COMPOSITION FOR CLEANING AND RENOVATING BRICK WALLS.—W. R. Walters, Lock Haven, Pa. I claim the combination of the ingredients, above mentioned and described, and the application of the same to brick buildings, using for that purpose the aerosol compound, and in other substantially the same, and which will produce the intended effect.

81,234.—HORSE HAY RAKE.—C. W. Warner, New Haven, Vt. I claim, in combination with the lever, H, carriage frame, A, and revolving rake, C, the bolt, F, link, K, and lever, L, or their equivalents, to operate substantially as and for the purpose set forth.

81,235.—JACK FOR KNITTING NEEDLE.—Horace J. Wickham (assignor to himself and Milton Keeney Manchester, Conn. I claim a knitting-needle jack, constructed with an inclined rebate, d, and slot, e, as and for the purposes set forth.

81,236.—DRUM EVAPORATOR.—David Wolf, Easton, Kansas. I claim a safety boiler, as constructed, when the same is provided with two or more pans or troughs for holding water, so arranged as to be drawn out, one at a time, from the drum or boiler, whereby the treble function of tempering the atmosphere in the room, arresting the sparks, and regulating the draft is accomplished, substantially as and for the purposes set forth.

81,237.—COMPOSITION FOR TANNING.—Ira Wood, Woodstock, Vt. I claim a tanning liquid, made from the leaves of the oak and the maple, or of the willow, or of the three combined, or by the addition of the leaves of the beech, in about equal proportions, when combined with alum, Glauber's salt, and nitric acid, in about the proportions specified, for the purpose and in the manner set forth.

81,238.—APPARATUS FOR CARBURETING.—Henry Woodward, London, England. I claim, 1st, The arrangement, in a cylindrical carburizing vessel, of a partition dividing said vessel into an upper and lower chamber, in combination with concentric perforated bridges or diaphragms in the upper chamber, as and for the purposes set forth.

81,239.—ROTARY STEAM ENGINE.—John Woody, Mount Vernon, Ind. I claim the arrangement of the ingress steam pipes, E, E, exhaust pipes, F, F, abutments, I, I, and casing, B, B, substantially as described.

81,240.—WAGON COUPLING.—James M. Wynn, Scipio, Ind. I claim the coupling device, a, a, e, e, b, f, g, all substantially as and for the purpose set forth.

81,241.—HARVESTER.—George W. N. Yost, Corry, Pa. I claim the two cases, A and A', combined with the main axle, G, when the axle is put transversely through the middle of the cases, so that the body may be easily balanced, and the axle bolt is put through the cases, parallel with the main axle, midway between the middle and hind end, and also combined with the support bolt, I, when the support bolt is put through the cases parallel with the main axle, midway between the main axle and the fore end.

81,242.—NOZZLE FOR PIPE.—Francis S. Babbitt, Taunton, Mass. I claim an improved hose-pipe nozzle, consisting of the body, A, the hollow screw plug, B, the milled nut, D, and the check nut, L, the whole being constructed and made to operate together, substantially as above set forth.

81,243.—AIR-TIGHT CAN.—Christian Barry, Philadelphia, Pa. I claim a cylindrical can, having ends flaring from the direct line of the body, and the lid or cover for the top or bottom of which is swaged or depressed and bent at the edge so as to overlap the flaring end of the can, to which it is secured substantially in the manner herein described and represented.

81,244.—FELTING MACHINE.—W. J. Benedict and John Wylie, South Norwalk, Conn. I claim, in combination with a felt-making and napping machine, the combination of the reciprocating steam-box, L, the light or loop of cloth, H, roller, K, and adjustable plate, M, substantially as described, for the purpose specified.

81,245.—WATER ELEVATOR.—Silas R. Boardman, Fort Wayne, Ind. I claim the bucket, A, the bottom valve, a, the tilting rod, d, the stop, a, the disk, B, in combination with the cylinder, C, the same being constructed in the manner and for the purpose substantially as set forth and described.

81,246.—ATTACHING WIRE TO BRIM OF HATS.—C. F. Bosworth, Milford, Conn. I claim attaching the wire to hat-brims by a continuous or direct line of stitches parallel with the wire, the said stitches alternately crossing the wire, so as to secure the wire to the brim, substantially in the manner specified.

81,247.—MACHINE FOR UNSHARING HIDES.—Elias Brock and Judson Smith, Ellenville, N. Y., assignors to Judson Smith. We claim, 1st, The mechanism of the feed of an unsharing machine that the said feed may move in the same direction with or in an opposite direction from the movement of the knife cylinder, at the will of the operator, substantially as herein shown and described, and for the purpose set forth.

81,248.—MECHANICAL MOVEMENT.—Arthur W. Browne, Brooklyn, and William F. Goodwin, East New York, N. Y. I claim, 1st, The combination of the series of pulleys, G, with their circles of internal cords, c, external pulleys, k, and intermediate pulleys, i, and j, and arm, l, substantially as shown and described.

81,249.—CLOTHES DRYER.—Manly T. Campbell, Lima, Pa. I claim the hinged legs, E, applied to the racks, C, D, of the main stand, A, in the manner described, and held in supporting position by the bolts, F, or their equivalent, for the purpose set forth.

81,250.—SHOE BUTTONE.—Edward Card, North Providence, R. I. I claim the use of a jointed arm, D, furnished with hook, s, and presser, b, operating substantially as described.

81,251.—LINK FOR ENDLESS CHAIN FOR HORSE POWERS.—Joseph Casho (assignor to Casho & Company), Newark, Del. I claim, 1st, The combination of the grooved and slotted plank with ribbed journal bearing brackets, geared links, and through bolts, all arranged as set forth for joint operation.

81,252.—FELTING MACHINE.—A. Cattaneo, Newark, N. J. I claim a felting apparatus, formed of two ranges of rollers, arranged in pairs, and driven by the worm pinions and gears, as represented, in combination with the frame, g, carrying the upper range of rollers, to which frame

and rollers a reciprocating motion is given in the manner and for the purpose specified.

81,253.—PAPER FILE.—Wm. R. Clough, Cambridge, Mass. I claim, 1st, Combining, with the cap, C, the two links, E, E', and D, D', with the base, A, B, arranged and operating substantially as described, and for the purpose set forth.

81,254.—WATER WHEEL.—C. S. Corsett, Middleville, Mich. I claim the wheel, A, composed of sections, C and D, when the upper and lower surfaces of the same are concave and convex in form, and the whole is constructed and arranged substantially as described, and for the purposes specified.

81,255.—DEVICE FOR APPLYING CLOTH PATCHES TO PAPER COLLARS.—John P. Courtney and Charles Redmayne, Brooklyn, N. Y. We claim, 1st, The receptacle, a, for paste, formed with a perforated bottom, of the size and shape required, for pasting the surface of the collar for the cloth lining or patch, substantially as set forth.

81,256.—HOISTING APPARATUS.—William W. Crapster, Mechanicsburg, Pa. I claim, 1st, The combination of the drum, D, shaft, B, clutch or dog, E, rod, F, and lever, G, for attaching the drum to the shaft, and detaching it therefrom, substantially as shown and described.

81,257.—HOSE PIPE NOZZLE.—James A. Cushman, Seneca Falls, N. Y. I claim the overlapping segments, E, operated through the medium of the pins, F, fixed radial slots, I, in the parts, C, and the curved movable slots, K, in the section, H, whereby, as the nozzle is contracted and expanded, the overlapping segments form a continuous metallic ring, as herein shown and described, for the purpose specified.

81,258.—CURTAIN FIXTURE.—Jacob David, New York City. I claim the within described method of hanging and operating a curtain, by securing the same to its roller at or about the middle of its length, said roller being fastened to the window frame at the middle thereof, and the curtain being operated substantially as set forth.

81,259.—UMBRELLA.—Anthony G. Davis, Watertown, Conn. I claim the cap, a, constructed as explained, in combination with runner A, substantially as and for the purpose described.

81,260.—BIT STOCK.—S. W. Davis, Wilmington, Del. I claim the combination of the shank, D, and spring, e, coiled thereon, the movable sleeve, C, pawl, a, and projection, b, in a bitstock, H, G, all substantially as shown and described, and for the purpose set forth.

81,261.—COVER FOR CHAMBERS AND OTHER VESSELS.—John S. Davidson and Nicholas Lorton, Cranberry, N. J. We claim that cover, by means of canvas or india rubber, when stretched over a hoop as herein described, the whole being arranged as and for the purpose above set forth.

81,262.—BUSTLE ATTACHMENT FOR SKIRTS.—Robert Bleloch Duncan, West Roxbury, Mass. I claim a bustle frame or hoop skirt supporter, constructed and adapted to be used as and for the purposes set forth.

81,263.—FRAME FOR STRETCHING DRAWERS.—Job Dyson, New Britain, Conn. I claim a board or frame for stretching drawers, constructed substantially as described, with its hinge, a, arranged in direction of the width of the boards, A, at their upper or body ends, and they shaped on their edges, b, c, to conform to the profile of the leg, and provided with a stretcher, B, at their opposite ends, substantially as specified.

81,264.—LATHE DOG.—William Emmett, Paterson, N. J., assignor to himself and S. E. Horton, Windsor Locks, Conn. I claim the combination and arrangement of the dog frame, B, having angular sides, D, pinion shank, E, and groove, O, the set screw, C, sliding frame, F, consisting of plates, G, H, with inclined sides, I, and or projection, J, extension arms, M, and lug, N, and operating substantially as and for the purpose described.

81,265.—ANIMAL TRAP.—Samuel F. Estell, Richmond, Ind. I claim, 1st, The lever, as formed by the end of latch, e, extending beneath platform, B, by which the platform is raised by the action of gate, P, substantially as specified.

81,266.—SELF-ADJUSTING CURB FOR HYDRANTS.—John A. Finnegan, Charlestown, Mass. I claim a curb, made with a flange, and arranged relatively to the pipe or well, substantially as and for the purpose specified.

81,267.—CIRCULAR SAW.—John F. Folmer (assignor to himself and A. J. Kelly), Philadelphia, Pa. I claim a circular saw, the blade of which is composed of any desired number of straight sides, the continuation of each of which forms the back of one tooth, the front of the latter being parallel, or nearly so, with the back, as set forth for the purpose specified.

81,268.—RAT TRAP.—M. D. Fowler, Vincennes, Ind. I claim the arrangement herein shown and described, with relation to the catch arm, E, and lever catch, F, of the crank shaft, M, connection, N, angular lifting lever, O, all arranged within the trap, A, G, H, to operate as set forth, for the purpose specified.

81,269.—SKATE.—Charles Gooch, Cincinnati, Ohio. Antedated August 8, 1868. I claim the sliding toe-clamp, C, sliding heel-clamp, M, fixed heel-clamp, I, screw rod, G, and thumb nut, K, all constructed as described, whereby said clamps are adapted to bear only upon the sole and heel of the boot or shoe, without touching the uppers, as herein shown and described.

81,270.—CONNECTION FOR WOODEN RODS.—Adam Good, Jr., and Simon Srouse, Titusville, Pa. We claim a combination with the union joint, A, the socketed connection, consisting of the tapering tube, B, the tongue, C, with its enlargements, and the adjusting screw, D, all substantially as shown and described.

81,271.—MECHANICAL MOVEMENT.—William F. Goodwin, East New York, N. Y. I claim, 1st, The drum, F, with its ratchet, B, and pawl, c, in combination with two or more of the series of pulleys, G, all substantially as shown and described.

81,272.—MOP HEAD AND WRINGER.—Christopher Gullman, Poughkeepsie, N. Y. I claim, 1st, The combination of the hinged jaws, B, D, convex block, C, handle, A, and sleeve, b, as shown and described.

81,273.—WASHING MACHINE.—Wilhelm Hoeft, Fountain City, Wis. I claim, 1st, The combination of the pivoted frames, E, beaters, F, connecting rods, G, and double cranks, c', formed upon the driving shaft, C, with each other and with the tub, H, when arranged so that the double beaters approach and leave each other, substantially as herein shown and described and for the purpose set forth.

81,274.—POWER WINDLASS FOR MAKING CASKS.—Edward Hume and Britain Holmes, Buffalo, N. Y. We claim the combination of the driving pulley, E, provided with a friction clutch, the screw shaft, D', worm, D, worm wheel, C, clutch, H, and windlass drum, B, operating in the manner and for the purpose described.

81,275.—PEG-FEED STOP FOR PEGGING MACHINERY.—S. A. Holt, and C. H. Williams, Hudson, Mass. We claim the lever, c', or its equivalent, for actuating the pawl, a, substantially as described, and for the purpose set forth.

81,276.—ELEVATOR.—Erwin T. Hope, Philadelphia, Pa. I claim, 1st, The combination, with the telescopic tubes, of a carriage, H, and ways, K, substantially as and for the purpose described.

81,277.—APPARATUS FOR PRINTING PHOTOGRAPHS.—A. S. Kay, Huntington, Ind. I claim the leaves, D, E, slider, G, case, A, roller, B, any suitable clamps, i, f, all substantially as described, when contributing to form an apparatus for printing photographic pictures, all as set forth.

81,278.—VAGINA INJECTOR.—G. W. King, Saratoga Springs, N. Y. I claim, 1st, An improved vagina injector, formed by the combination of the bowl or cup, A, and tube, B, said parts being constructed and arranged substantially as herein shown and described, and for the purpose set forth.

81,279.—EXTENSION LADDER.—M. M. Knowles, Elmira, N. Y. I claim the combination of ladders, A and B, a adjustable brace, D, F, and pin, J, all constructed and arranged substantially as described, and for the purpose specified.

81,280.—CURTAIN FIXTURE.—J. D. Legg, Long Eddy, N. Y. I claim the coil spring, J, enclosed concentrically within the cylindrical boxes, G, and attached to the shafts or axes, i, and the periphery of the boxes, G, in combination with the pawls, e, ratchets, dx, and curtain, A, all being arranged substantially in the manner as and for the purpose set forth.

81,281.—BUSTLE.—Jason B. Loomis, Chelsea, Mass. I claim my arrangement of bow springs, b, connected as described, with



the bow spring, e, the hook, f, or its equivalent, and the adjusting strap, g, the whole being applied to a waistband, as set forth.  
Also, the combination and arrangement of the shield or abutment, k, with the buckle made and provided with the spring, e, as set forth.

**81,382.—EASY CHAIR.**—Dumont Mareau, Hubbardstown, Mass.

I claim the springs, E, arranged as described, in combination with the seat, A, rails, C, links, F, and hooks, G, substantially as set forth for the purpose specified.

**81,383.—BREACH-LOADING FIRE-ARM.**—John Merlett (assignor to himself and John Smalley), Board Brook, N. J. Antedated August 7, 1868.

I claim, 1st, The laterally swinging chambered breech piece, C, attached to the barrel by the semicircular joint, e, and arranged in relation with the spring, A, substantially as and for the purpose herein set forth.  
2d, The sliding plate or anvil, e, arranged in relation with the joint, e, substantially as and for the purpose specified.

**81,384.—BRICK MACHINE.**—Anthony Nulsen, Eugene Hanelson, and Albert Wagner, Cincinnati, Ohio, assignors to A. Nulsen & Co. We claim the relative arrangement of the endless carrier, A, hopper, G, case, F, rolls, B C D E, and throat, H, constructed to operate as described.

**81,385.—BELT-TIGHTENER.**—Samuel Patton, Chatsworth, Ill.

I claim, 1st, The arrangement of the drums, D D', in connection with the belt, C, and pulley, B B', in such a manner that the drums press the belt directly against the surface of the pulleys, substantially as described.  
2d, The combination and arrangement of the belt, C, drums, D D', pulleys, B B', spring bearings, E E', and adjusting screws, or their equivalent, F F', substantially as shown and described.

**81,386.—MORTISING MACHINE.**—Joseph A. Peabody, Philadelphia, Pa.

I claim the regulators, composed of rings, R, and R', plates, P and P', with slots, S S', bolts, b b', and screws, C, and C', substantially in the manner and for the purpose specified.

**81,387.—STOCK PUMP.**—Anderson H. Piland, and Andrew H. Turner, Indianapolis, Ind.

We claim, 1st, The foundation framework, consisting of the elements, A B C F G, constructed and arranged substantially as and for the purpose set forth.

2d, The hinged platform, E E', supported on the timbers, J, and by the braces, K L M, strutting from the sliding post, D, and attached to the post, F, by the straps, I I', as set forth, in combination with lever, N, eduction pipe, V, and pump, all arranged and operating substantially as and for the purpose set forth.

3d, The cone-shaped piston, T, packed as described, in combination with the valve chamber and valve, X, and eduction pipe, V, attached to the vibrating platform, all arranged and operating substantially as set forth.

**81,388.—GRAIN SEPARATOR.**—J. F. Pool, Monroe, Wis.

I claim, 1st, The spouts, i, placed, one on each side of the frame, A, and emptying into the conductors, O O, substantially as and for the purposes herein set forth.

2d, The box, b, placed under the slide, g, so that when said slide is removed, the grain seed will drop into the same, substantially as herein set forth.

3d, The adjustable and movable screens, d, when constructed as described, and operating as and for the purposes herein set forth.

4th, The cross screen, m, placed between the series of screens c c and screens d d, substantially as herein set forth.

**81,389.—HOISTING MACHINES.**—George H. Reynolds, New York city, assignor to himself and Cornelius H. Delamater, same place.

I claim, 1st, In a system of hoisting machines, providing for emphyse, by the employment of the feather, a, or its equivalent, in combination with the V-shaft, friction gear wheels, B' C', substantially as and for the purposes herein set forth.

2d, In combination with the shaft, C, and friction wheels, B' C', the movable box, M, links, m, and eccentric pins, O, mounted relatively to the shaft, F, and handle, p, so that the pins, o, shall come nearly on their dead points when the friction wheels, B' C', are properly connected, as and for the purposes herein set forth.

3d, Connecting the shaft, C, and the winding drum, E, in a hoisting machine by the peculiarly constructed and arranged parts, C3 C4 and E3 E4, as and for the purposes herein set forth.

4th, The bearings, m, for supporting the drum, E, and its connections, independently of the concentric shaft, it, as and for the purposes herein set forth.

5th, The bearings, H H', constructed and arranged to serve relatively to the shafts, B C, and their several connections, so as to support the frame, A, and aid in preventing any spring or displacement of the parts under the strains and vibrations to which they are subjected, as herein set forth.

**81,390.—BREACH-LOADING FIRE-ARM.**—C. B. Richards, Hartford, Conn.

I claim so shaping and connecting the breech plug, a, and a yielding hooked extractor, that the free end of the extractor will be locked to the breech plug by the relative movement of the two in the act of retraction, substantially as and for the purpose hereinbefore set forth.

**81,391.—MACHINE FOR MANUFACTURING FUSES.**—Thomas Richards, Medford, Mass., assignor to Edward D. Manning, same place.

I claim the hollow shaft, M, having open slots, s, at its upper end, in combination with the ring, t, substantially as described for the purpose herein set forth.

**81,392.—CORKSCREW.**—Charles L. Ridgway, Boston, Mass.

I claim the stud or fulcrum, E, provided with the notch, N, working in combination with the shoulder, E, substantially as described, and for the purpose set forth.

**81,393.—CLAMP FOR HOLDING LEATHER.**—Alvah Rittenhouse, Philadelphia, Pa.

I claim the arrangement of the jaws, J and J', hinge, H, and lever, L, substantially in the manner and for the purpose specified.

**81,394.—FEATHER RENOVATORS.**—Hiram H. Robbins, Lynn, Mass.

I claim the above-described device for restoring feathers, consisting of the two cylinders, A and B, constructed and arranged as described, in combination with the steam conduits, f f', and the parts, g g', &c., such conduits and parts being regulated by the tubular valve, h, and the whole operating in manner and for the purpose as before explained.

**81,395.—SHINGLE MACHINES.**—L. C. Robinson, Shepardsville, Mass.

I claim, 1st, The combination, with the shaft, C, of the laterally moving shaft, b, having its saws hinged, as described, and operated by the feed rod, c, through the medium of the bell crank, d, and connecting rod, d', substantially as and for the purpose specified.

2d, The cut off saw, D, in combination with the sliding mandrel, spring, f, ratchet bar, f', and pawl, f', operating in the manner described, with relation to the hinged saws, a a', as and for the purpose specified.

**81,396.—FRUIT JAR.**—F. Rohrbacher and F. Horman, Philadelphia, Pa.

We claim a jar, having, at the inside of the neck, inclined recesses, b, and vertical recesses, c, open at the top, and above the said recesses a flanged projection, the upper edge of which is an unbroken circle, in combination with a cap, B, rubber ring, i, and lugs, a, arranged as specified.

**81,397.—RAILROAD CAR VENTILATOR.**—William M. Russell and D. E. Holmes, Cincinnati, Ohio.

We claim the deflector, D E, when the same is provided with projecting pins, e e', in combination with the angular base, b, and shaft, c, and the whole is so constructed and arranged as to operate substantially as described and for the purpose specified.

**81,398.—CLAMPS.**—William Sailer, Philadelphia, Pa.

I claim a clamp, consisting of a bar, a, upon which are projections, b d, serrated at their edges, and lugs, i f, the said clamp being adapted for use in connection with a wedge, y, substantially as described.

Also, the clamp, A, consisting of a bar, a, upon which are lugs, f f', and projections, b b', serrated at their inner edges, the said lugs and projections being arranged as and for the purpose specified.

**81,399.—ELEVATOR.**—George Scott, Louisville, Ky.

I claim, 1st, The combination of the wheel, G, rope, f, axle, Q, wheels, Q', and P, and the clutch, O, substantially as and for the purpose specified.

2d, The pulley, E, when constructed with a double beveled groove, and used in combination with a rope, b, fixed at both ends, and operating substantially as described.

3d, The arrangement of the rope, f, fixed at both ends, at B B', the platform, F, the pulleys, E D and C, the latter being placed in a balance weight, M, substantially as described.

4th, The arrangement of the rope, f, passing through bulls' eyes in the platform, F, substantially as and for the purpose set forth.

**81,400.—FASTENER FOR BUTTONS, STUDS, &c.**—Thomas S. Sewick, Oswego, Ill.

I claim an auxiliary attachment for securing buttons and studs, consisting of an elastic loop passing through or noiled to the fabric near to the button hole or eyelet, all substantially as described.

**81,401.—MACHINE FOR TURNING BOOT LEGS.**—Jacob Shearman, Fayetteville, Pa.

I claim, 1st, The cylinder, E, table, B C C, wheels, e, racks, d d', rod, f, hooks, g, shaft, a, and crank, j, all arranged and operating substantially as and for the purpose shown and described.

2d, The racks, b, and ring, i, substantially as described, in combination with the necessary mechanism, all as set forth.

**81,402.—MACHINE FOR OBTAINING MOTIVE POWER.**—Robert Rude, Union Street Borough, England.

I claim the cranks, working in pairs, one within the other, in opposite directions, for imparting rocking motion to weighted beams, having no fixed axis of motion, but so constructed that the crank pins move in slots in the said beams, substantially as above described.

**81,403.—ICE CUTTER.**—Franz G. Siemens, Winona, Minn.

I claim, 1st, The reciprocating frame, D, having the series of pickers, a a', arranged to operate substantially as described.

2d, In combination with the ice cutting frame, D, the follower, L, arranged and operated substantially as described, for feeding the ice to the pickers as it is cut.

3d, The combined ice cutter and refrigerator, when constructed and arranged for use as shown and described.

**81,404.—OYSTER DREDGE.**—Thomas P. Sink, Fairton, N. J.

I claim the construction of an oyster dredge with an adjustable rake, as herein described and for the purpose set forth.

Also, the device or bucket, or its equivalent, in combination with an oyster dredge, for the purpose of setting and keeping a dredge rake to the proper pitch, as herein described, and for the purpose set forth.

**81,405.—FAUCET.**—David C. Smith, Salem, N. J.

I claim the washer or seal, b, in combination with the elastic packing, C, and the screw cut cylinder, a, in combination with the elastic packing, being constructed and arranged to operate together, when applied to the wooden vessel, substantially as and for the purpose specified.

**81,406.—PIANO-FORTE.**—Theodore Steinway, New York city.

I claim, 1st, A metallic action frame for piano-fortes, said frame being secured to the wrest plank, and composed of metallic hangers or standards, A, and described.

2d, The flanged traverses, B, constructed substantially as and for the purpose set forth.

3d, The intermediate plates, C, provided with holes to receive the flanged traverses, B, substantially as and for the purpose set forth.

4th, The adjusting screw, F, provided with a square end, n, and jam nut, o, to secure the same with the hangers or standards, A, substantially as and for the purpose set forth.

5th, The segmental or spherical ends, p, of the hangers, fitting into corresponding steps, and operating in combination with the screws, F, substantially as and for the purposes herein set forth.

**81,407.—HORSESHOE.**—Chas. O. Stevens, Auburn, Me.

I claim the top piece, u, and rear piece, v, joined by the pivot, G, secured to the hoof by means of the screw cross bar, e, substantially as herein set forth and for the purposes herein mentioned.

**81,408.—FASTENING HANDLES TO AXES, PICKS, ETC.**—James Stewart, St. Cloud, Minn.

I claim the metal tongue, G, constructed as described, and provided with a circular projection, l, on its lower end, and one or more bolts, a, on its upper end, when used for the purpose of fastening handles to tools, substantially as herein set forth.

**81,409.—ENGINE LATHE.**—Squire Teal, Rochester, N. Y.

I claim, 1st, The combination of the adjustable bracket, H, the pattern plate attached thereto, and the jointed guide bar, B, with the tool holder, when arranged and operating as described.

2d, The combination of the sleeve, r, set screw, v, a d set screw, w, with the tool holder, in the manner described, for the purpose of permitting or prohibiting to the tool holder, as may be found necessary, independent transverse movement.

3d, Arranging the bracket which supports the pattern on the tailstock of the machine, and connecting the foot holder with the pattern by a jointed guide bar, in the manner substantially as herein described.

**81,410.—CLOTHES LINE SUPPORTER.**—Francis W. Tilton and Moses C. Swift, New Bedford, Mass.

We claim, 1st, The tubular slotted stand, A, with the hooked notches, h, therein, substantially as and for the purposes described.

2d, In combination with the stand, A, the pole, E, with the rod, G, and hook, F, arranged substantially as and for the purposes set forth.

**81,411.—STRAP HOLDING DEVICE.**—John Way, Waterbury, Conn.

I claim a holding device composed of a double acting cam or eccentric bellows, in combination with a suitable bearing surface, the whole operating substantially in the manner described, for the purpose set forth.

**81,412.—CLOTHES HOOK AND LINE HOLDER COMBINED.**—Theophilus Weaver, Harrisburg, Pa.

I claim the combination of the hook, S, lever, L, and the posts, a b a' b', substantially as described and for the purpose set forth.

**81,413.—BRICK MACHINE.**—Darius Wellington, Boston, Mass.

I claim in combination with the follower (which intermittently feeds forward the series of molds), and with the rotating pulverizing blades, d, and feed screw, k (which break up the clay and force it into the molds), the scraper bar, t', the throat piece, u, and the "doctor," y, each arranged to operate substantially as set forth.

Also, in combination with the reducing and feeding mill, b, and with the mold feeding mechanism, the solidifying plunger, v, and expelling plunger, w, when arranged to operate substantially as described.

Also, the arrangement of the bevel gear, f, at the bottom of the pulverizing and mold filling mill, b, to be driven by a pinion, g, on the driving shaft, just above the bed, a, substantially as described.

Also, the arrangement of the crank and cam wheel, s, connecting rod, r, slides, q, lever, d, and slide plates, a', for driving the follower o, and plungers v w, substantially as described.

**81,414.—MACHINE FOR SEPARATING STONES FROM CLAY.**—Darius Wellington, Boston, Mass.

I claim, in a clay mill, the arrangement of the parts, substantially as herein described; that is to say, arranging the delivery gate, d, beyond the shaft, b, and these in relation to the incline, e, so that the blades on said shaft shall cause a movement of the mass of clay over the grate and under the incline e, by which movement the clay is forced through the grate, and the stones moved forward thereon, and into the pocket, h, which pocket is provided with movable bars, a, or their equivalents.

**81,415.—LATHES FOR TURNING BALLS.**—J. Burns West, Geneseo, N. Y., assignor to Samuel Finley.

I claim, 1st, The swing rest, constructed and arranged as described, for the purpose of rounding one end and the sides of the block from which the ball is cut, by a single traverse of the tool across the axis of the mandrel, as set forth.

2d, The combination, with the swing rest, of the fixed notched tool holders, and swinging locking clamps, O, all these parts being constructed and operating as described, so as to hold the tool either horizontally or at an angle, as set forth.

3d, The combination with the swinging rest and locking clamps, of the twist arranged, as described, for joint opposition.

4th, The combination of the perforated chuck and mandrel with the pushing rod sliding through them, and with the vibrating hammer to knock out the finished balls, these parts being constructed, arranged, and operating as described.

5th, The combination, as described, with the chuck supporting the block from which the ball is to be cut, of only of the swinging rest, which carries the tool across the axis of the mandrel, as set forth.

6th, The method, herein described, of finishing a portion of the ball somewhat greater than its hemisphere, by a tool swinging transversely across the axis of rotation of the ball, (which is sustained at one end only), and then inserting the finished end in a perforated concave chuck, and completing the remainder of the sphere by a repetition of the former swinging movement of the tool.

7th, The combination, as described, with the chuck and swing rest, of the marking spring, O', constructed and arranged as set forth.

**81,416.—TURNING LOGS IN SAW MILL.**—George Willett, Richburg, N. Y.

I claim the described arrangement of the wheels, E E, relatively with the head blocks, operating in connection with the cant hook to turn the log, as herein shown and described.

**81,417.—CRANE.**—C. Williams, New York city.

I claim, 1st, The clamping brake, arranged with reference to the crane, and the lifting rope thereof, substantially as and for the purpose specified.

2d, The crane, constructed with the swinging post, E, in combination with the standard, B, of the crane, substantially as and for the purpose specified.

3d, The detachable foot piece, L, in combination with the base, A, of the crane, substantially as and for the purpose specified.

4th, The pawl, K, arranged in relation with the notched collar of the turning standard, B, substantially as and for the purpose specified.

5th, The collar, B', and the base, A, in combination with the turning standard, B, and the base, A, substantially as and for the purpose specified.

**81,418.—BUCKLE.**—H. C. Wissel (assignor to himself and H. F. Shryock), Indiana, Pa.

I claim a buckle, composed of a plate, a, provided with loops, b b, and a tongue, B, all constructed and arranged to operate in the manner substantially as and for the purpose set forth.

**81,419.—HOOP SKIRT AND BUSTLE COMBINED.**—Alexander K. Young, Boston, Mass.

I claim the arrangement of the hoop bustle on the outside of the main skirt, and with the ends of the hoops of the bustle connected with the hoops of the skirt, as set forth.

Also, the combination of an expansive hoop bustle as described, with a hoop skirt, it being arranged on the outside of and fixed to the hoops of the said skirt, substantially as set forth.

## REISSUES.

**65,563.—AX.**—Dated July 9, 1867; reissue 3,083.—Thomas Bakewell, and John Lippincott, Pittsburg, Pa., assignors of Daniel W. Colburn, Laomi, Ill.

We claim, 1st, Making that part of the edge of an ax which lies forward of the broadest part of the bit of a semi-circular shape, or of a shape nearly so, substantially as and for the purposes hereinbefore set forth.

2d, Containing the cutting edge of an ax around the swell of the bit on both ends of the ax, substantially as and for the purposes above set forth.

3d, Making an ax with a pole of gradually increasing width from the eye towards the bit, when combined with a bit having a curved cutting edge extending around and back of its broadest part, on both ends of the pole, so that the bit may be reversible, and that the handle may be inserted at either end of the eye.

**59,192.—HARVESTER PITMEN.**—Dated October 30, 1866; reissue 3,094.—Division C.—J. W. D. Lockport, N. Y.

I claim the combination of the bolt, H, ratchet nut, e, and pawl, p, with the conical or spherical wrist, m, and socket, n, or their equivalents, for the purpose set forth.

**61,735.—MATERIAL FOR VARIOUS STRUCTURES.**—Dated December 26, 1865; reissue 3,095.—Division A.—John K. Mayo, New York city, for himself, and Andre Cushing and George B. Cushing, St. John, New Brunswick, assignors of John K. Mayo.

I claim a compound scale board, consisting of a plurality of thin sheets, scales, or layers of wood, connected together with the grain in divergent directions, as a material for manufactures, and for the formation, lining, or covering of land or marine structures.

**51,735.—MATERIAL TO BE USED IN CONSTRUCTING BRIDGES, ARCHES, DAMS, TUNNELS, AND OTHER WORKS IN CIVIL ENGINEERING.**—Dated December 26, 1865; reissue 3,096.—Division B.—John K. Mayo, New York city, for himself, and Andre Cushing and George B. Cushing, St. John, New Brunswick, assignors of John K. Mayo.

I claim the employment or use of the compound scale board hereinbefore described, in the formation of the specified or analogous structures in civil engineering.

**51,735.—CONSTRUCTION OF SHIPS, BOATS, BUOYS, AND OTHER NAUTICAL AND MARINE STRUCTURES.**—Dated December 26, 1865; reissue 3,097.—Division C.—John K. Mayo, New York city, for himself, and Andre Cushing and George B. Cushing, St. John, New Brunswick, assignors of John K. Mayo.

I claim the employment or use of the compound scale board hereinbefore described, in the formation of the specified or analogous nautical structures.

**51,735.—CONSTRUCTION AND FINISHING OF HOUSES AND OTHER BUILDINGS.**—Dated December 26, 1865; reissue 3,098.—Division D.—John K. Mayo, New York city, for himself, and Andre Cushing and George B. Cushing, St. John, New Brunswick, assignors of John K. Mayo.

I claim the employment or use of the compound scale board hereinbefore described, in the construction and finishing of houses and other buildings, or parts thereof.

**51,735.—HOUSE DECORATIONS, FURNITURE, FITTINGS, AND THE LIKE.**—Dated Dec. 26, 1865; reissue 3,099.—Division E.—John K. Mayo, New York city, for himself, and Andre Cushing and George B. Cushing, St. John, New Brunswick, assignors of John K. Mayo.

I claim the employment or use of the compound scale board hereinbefore described, in the formation of the specified or analogous articles or articles of house decoration, fitting, and furnishing.

described, in the formation of the specified or analogous structures or articles of house decoration, fitting, and furnishing.

**51,735.—CONSTRUCTION OF BOXES, TRUNKS, BUCKETS, BARRELS, AND OTHER CONTAINING VESSELS.**—Dated Dec. 26, 1865; reissue 3,099.—Division F.—John K. Mayo, New York city, for himself, and Andre Cushing and George B. Cushing, St. John, New Brunswick, assignors of John K. Mayo.

I claim the employment or use of the compound scale board hereinbefore described, in the formation of the specified or analogous receptacles or parts thereof.

**51,735.—PIPES, TUBES, FUNNELS, FAUCETS, ETC.**—Dated Dec. 26, 1865; reissue 3,099.—Division G.—John K. Mayo, New York city, for himself, and Andre Cushing and George B. Cushing, St. John, New Brunswick, assignors of John K. Mayo.

I claim a conductor or vessel made of thin scale boards or laminæ of wood cemented together, with the grain crossed or diversified, substantially as and for the purpose herein set forth.

**51,735.—CONSTRUCTION OF CARRIAGES, CARS, COACHES, AND OTHER VEHICLES.**—Dated Dec. 26, 1865; reissue 3,099.—Division H.—John K. Mayo, New York city, for himself, and Andre Cushing and George B. Cushing, St. John, New Brunswick, assignors of John K. Mayo.

I claim the employment or use of the compound scale board hereinbefore described, in the formation of the specified or analogous articles and structures.

**75,070.—HARVESTER.**—Dated March 3, 1868; reissue 3,093.—Wm. H. Stevenson, Auburn, N. Y.

I claim, 1st, The combination with a dish driving spur wheel, D, of a spur pinion, E, bevel wheel, H, and bevel pinion, I, which will admit of the arrangement of the crank shaft, J, substantially as and for the purposes specified.

2d, The arrangement of the gear wheels, D E H I, the wheel, E, running loosely on a shaft, F, and being provided with a clutch face, f, and slipping lever, G, substantially as described.

3d, The adjustable shifter holder and guide, G, constructed in one piece, and attached to the main or draft frame by bolts passing through one or more slots in the shifting plate, G2, whereby the shifter fork may be adjusted to the groove in the spur wheel, substantially as described.

4th, The combination of the adjusting lever, T, linked connection, L, and curved guide, S, the latter working edwise in a guide box, K, on the frame, with the drag bar, P, substantially in the manner shown and described.

## DESIGN.

**3,160.—SLEIGH BELL.**—Ezra G. Cone, East Hampton, Conn.

## EXTENSION NOTICES.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., July 22, 1868.

William Porter, of Williamsburg, N. Y., having petitioned for an extension of the patent granted to him on the 21st day of October, 1854, for an improvement in "Securing Lamps to Lanterns," it is ordered that said petition be heard at this office on the 19th day of October next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., July 29, 1868.

Clara B. Snow, of Independence, Iowa, executrix of the estate of Harvey Snow, deceased, having petitioned for an extension of the patent granted to the said Harvey Snow the 21st day of November, 1854, for an improvement in "Presser-bar for Planing Machines," it is ordered that said petition be heard at this office on the 24th day of November next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.



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## Improved Vertical Trip Hammer.

The old fashioned lever trip hammer, the use of which is beyond the memory of the "oldest inhabitant," is being superseded by direct stroke hammers, occupying far less space and performing their work much more satisfactorily. It is well known that the ordinary trip does not deliver a square blow except on a thin piece of work, and that its variation of stroke is confined, mainly, to a diminution in the number per minute, rather than to the amount of force exerted; so that for light work a light hammer must be used, and *vice versa*. The steam hammer is the master-piece of improved dead stroke hammers for heavy work, but it is expensive and not applicable to general work. Between this and the old style trip hammer there are several other devices which, sharing in the advantages of the great steam hammer, possess all the merits of the trip with some marked superiorities. The one shown in the accompanying engravings depends for the force of the blow wholly upon gravitation—the weight of the hammer—yet it may be so governed as to strike a much lighter blow than its total weight would deliver.

The hammer and actuating machinery is mounted upon a suitable upright frame of wood, or iron, the hammer-head being hollow, as seen plainly in the section, Fig. 2, and traversing in upright slides, by means of a crank and pitman. The drop, an internal arrangement of the hammer head, is shown in Fig. 2. Two bars, pivoted at A, extend up through the cap of the hammer-head, as at B, and are held together by spiral or other springs, C, until forced apart by the rise of the hammer bringing the projections in contact with the V-shaped releaser, D, Fig. 1, which spreads the bars and releases the cross head or snug, E, Fig. 2, which is attached to the piston rod, F. This cross-head engages with the bars or levers by means of projections seen plainly in Fig. 2. The height from which the hammer falls, and, in a measure, the weight of the blow, are governed by the height of the releaser, which may be elevated or depressed by the lever, G; rod, H, and handle, I.

Further, to govern the force of the blow, one side of the hammer has inclines against which two spring clamps, J, operated by a handle, bear with any degree of pressure desirable, and they may be regulated by hand or foot as may be most convenient. From the foregoing description the action of this hammer may be easily understood.

Attached to the hammer-frame is a device for "upsetting" a shaft or heavy bar of iron, K, which is suspended by a wire rope or chain running over a sheave and around a grooved wheel, L, the groove of which runs out at the side on one part of its periphery, allowing the bar to drop upon an anvil fixed underneath; the wheel end of the chain being secured to the center of the groove of wheel, L, insuring the return of the chain or rope and the raising of the bar to be worked. The hammer and anvil dies are placed at an angle for convenience in operating the trip and regulator.

Patented through the Scientific American Patent Agency, August 27, 1867, by Joseph Tandler, Grand Rapids, Mich., who offers state rights for sale.

BETTER waste oil than wear journals; yet wasting of oil is unnecessary if common sense guides its use.

## COPPER AND BRASS WORKING.—THE ANSONIA WORKS

The degree of proficiency attained in working of metals seems fitly chosen to serve as a criterion in determining the grade of advancement in civilization of any age or nation. Favored by some such fortuitous circumstance as the burning of the forests, the existence and mode of reducing the more fusible metals would be revealed to the dullest comprehension, and it is evident that no great amount of skill or ingenuity would then be requisite to enable the savage to fashion a few trinkets or the rudest implements. Metallur-

is little doubt that wherever mentioned throughout the Scriptures, copper rather than brass is meant. Although the Latin word *as* is commonly translated brass, it is stated that of all the specimens of ancient objects made from this material yet found, analyses have failed to discover a trace of zinc, the composition being nearly uniformly copper and tin. The employment of this alloy by the Romans was very general, coins, vases, culinary utensils, ornaments, arms, furniture, and musical instruments all being formed from it, while great attention was given to investigating the properties and studying the best combining proportions of the alloying metals.

The alloys of copper in variety and industrial value, are perhaps the most interesting of any that are worked. The term brass is of somewhat broad significance, including nearly all the alloys of copper; but in its most common acceptation and for the generality of purposes, the alloy bearing the name consists of two parts copper to one of zinc, but the proportions of these ingredients used in the arts are exceedingly various, being altered to suit color and other properties to the purpose for which the alloy is intended. Doubling the amount of spelter to copper, we obtain a gold colored brass, variously designated as Dutch Gold, Prince's Metal, Tombac, and Pinchbeck, the latter alloy having been made historical because coins made from it were forced upon the American Colonies as a circulating medium, thereby raising the righteous indignation of the Revolutionary Fathers, and forming one of the grievances demanding redress from the Mother Country.

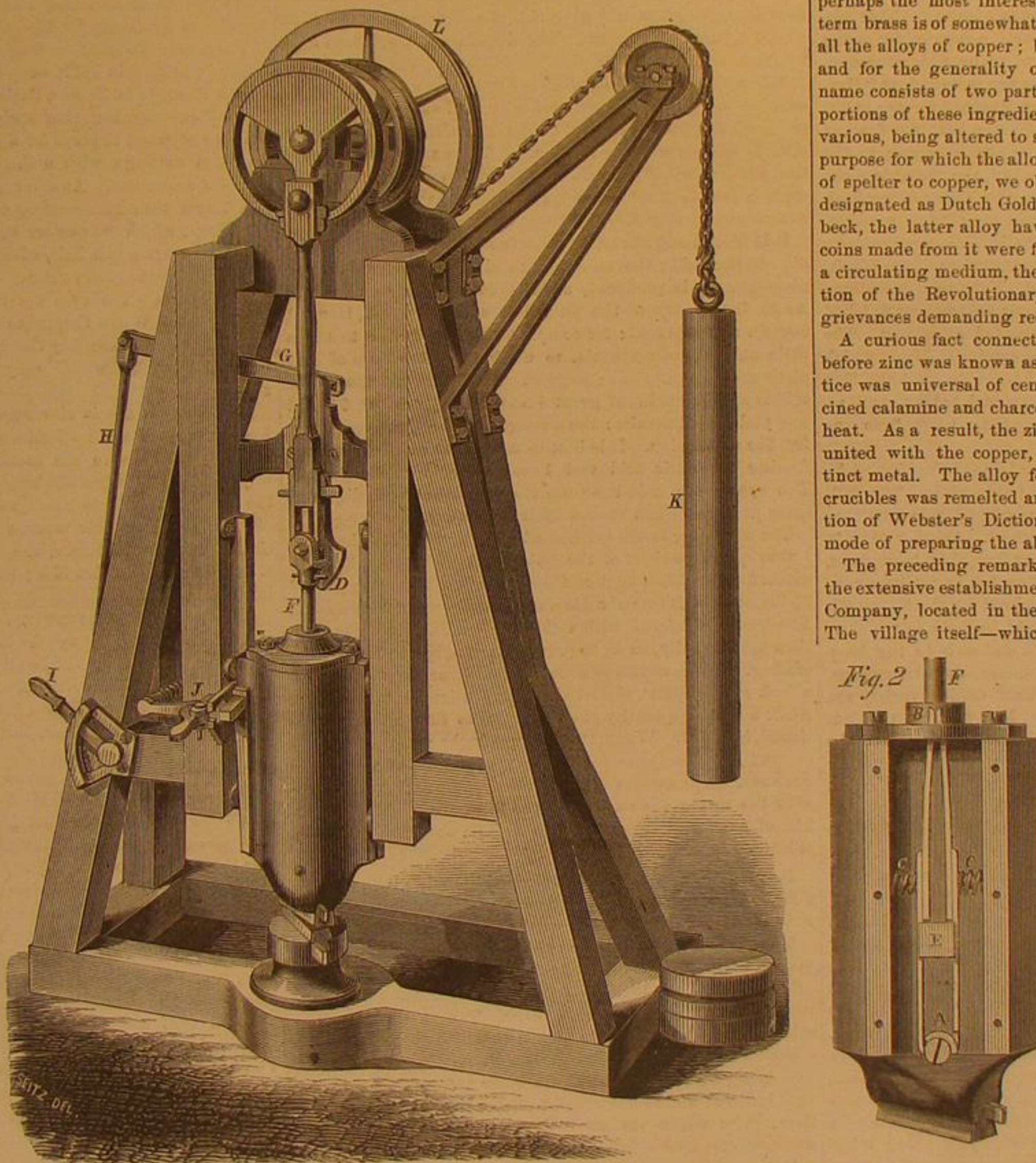
A curious fact connected with making brass is that long before zinc was known as such, in its metallic form, the practice was universal of cementing granulated copper with calcined calamine and charcoal, in crucibles exposed to a bright heat. As a result, the zinc was liberated from its oxide and united with the copper, without becoming visible as a distinct metal. The alloy found in lumps at the bottom of the crucibles was remelted and finally cast. Even the latest edition of Webster's Dictionary recognizes only this primitive mode of preparing the alloy.

The preceding remarks were occasioned by a late visit to the extensive establishment of the Ansonia Brass and Battery Company, located in the thriving village of Ansonia, Conn. The village itself—which has now become the center of a large manufacturing interest, and is one of the most important towns in the famous Naugatuck valley—is indebted for not only its name but its very existence to the late Anson G. Phelps, of the firm of Phelps, Dodge & Co., of New York. Twenty-five years ago, this gentleman perceiving the value of water power which might be made available at this spot, selected the locality as the site for what has since developed into the various manufacturing establishments, all conducted under the name above mentioned. The products of the several mills are so well known throughout the country, that a brief note of the processes of manufacturing may prove of interest.

The shops of the company, four in number, as also five

other factories scattered through the village, are driven by water power drawn from the Naugatuck river, at a point one mile north of the town of Seymour, and brought by a canal one and one-eighth miles long, under a head or fall of thirty-two and one-half feet, with a permanent power of fifteen feet drawn under a thirty-inch head. The copper-rolling mill, as the first built of the company's shops, is worthy of first notice. Previous to the war, most of the pig copper used in the mill was brought from South America, but now little is derived from this source, as the metal can be obtained at better advantage from the Lake Superior mines, immediately being smelted at the Baltimore or Cleveland works. The ingots, or plates, on receipt are remelted, refined, and, for convenience, run into plates of uniform size and quality. The rolling of these plates, after a second heating, into long thin sheets; the annealing of the latter to restore somewhat their malleability; immersion in dilute vitriol to remove the black oxide and restore the characteristic pale-red tint of the bright metal; squaring and cutting into required sizes ready for shipment, are all processes too simple to be specifically described.

The brass mill is the most important establishment of the company's, and its several departments will admit of a somewhat fuller description. Lake Superior copper in ingots from the smelting works, as before, and blocks of spelter are



TANDLER'S DRAWING AND UPSETTING POWER HAMMER.

gical knowledge among the lowest races generally is confined to an acquaintance with the precious metals, which are made by them to subserve many of the uses for which iron is employed by civilized nations. The more difficult of fusion is the native ore, the greater the talent required for bringing it into subjection; and the skill which can take iron—itsself entirely too refractory to be fused as easily as silver and gold, or even if brought to the metallic state by the intense heat of the furnace, could never be wrought with the same ease as the more malleable metals—and make it many hundred fold more precious, weight for weight, than the so-called precious ores, indicates in itself the high grade of progress of the present age.

A knowledge of the properties and value of alloys is evidence of a considerable advancement in the arts of life. Gold, silver, and copper, hardened by combination with tin, constituted the material from which were formed the principal weapons, tools, and metallic manufactures of the early ages, and of the half civilizations of modern times. To the alloy brass is popularly accorded a far greater antiquity than by right it is entitled to. The material is frequently spoken of in our English Bible, even Job mentioning it in the succinct treatise on metallurgy, given in the xxviii. chapter of that book; but the reference is here evidently to copper; and there



melted together in black lead crucibles and run into plates; these must be annealed and pickled before rolling into strips, in which form, after a part of the hardness imparted to the sheets during the process of rolling is removed, they are sent to market or used in various ways in other parts of the establishments. The mill has the capacity for turning out six thousand pounds of rolled brass daily. The first branch of manufacture which would be likely to engage the visitor's interest, is the mode of making brass tubing. The strips prepared as just stated, are brought from the rolling mill; one end shaped into tube form is placed in the die and the whole strip is forced through the same, whereby a circular, elliptical, star-shaped, or other form of tube results. Several such tubes being placed on a rack, the joint of each is cleaned, a charge of borax and solder placed in it and set by running the whole number simultaneously through a furnace. The oxide raised by the fire is now removed and the tubes are ready for shipment. The number of purposes to which the manufactures of this department are required in every-day use, is much larger than one would suppose; stair rods in a great variety of designs, rails for sliding doors to run upon, lightning rods, are but a few of the multitudinous uses which a little reflection will suggest.

The manufacture of brass kettles by machinery is a branch of industry carried on only at this establishment and by a Waterbury firm. The old English mode of making these culinary indispensables, was by the laborious one of continuously and vigorously hammering upon a sheet of metal until by degrees the required shape was assumed. This process of battering was operated by this company for many years, and furnished the distinctive name by which the company is still called. The plan now in use is known as "Hayden's patent," a patent having been granted for the same, bearing date December 15, 1851. Square blanks of sheet brass are cut into circles of a diameter corresponding to the size of kettle required. After annealing, the metallic disks are brought in contact with cast iron chucks revolving horizontally with great velocity. A small steel friction roller, resembling a button, is then brought in close contiguity to the metal, and, running along the outer surface of the blank, spins it out to the shape of the mold. Four such operations are commonly required before the kettle assumes its finished form, the metal requiring to be annealed after each. The course of the roller is marked by the concentric rings which are found upon most of the brass kettles in market. The processes of wiring, fixing on the ears and bales are all required to make the kettle complete. Sizes range from one half to thirty-two gallons capacity.

Manufacturing burners for kerosene lamps is conducted on a large scale in one department of this shop. The well known "sun burner" is made exclusively by this company, who are the sole proprietors of the patent. Another room in the same building is devoted to making hoopskirt trimmings, apparently a very insignificant industry, but in reality a very thriving one. The pieces are stamped out by the thousands from sheets of copper, tinned, and sold in bulk to the skirt manufacturers for fastening the tapes and web to the hoop springs. Harp-hangers for kerosene lamps, clock trimmings, and copper burrs and rivets in almost endless variety are other products of this department. For making the last named, wire is fed into a machine, which cuts it off the proper length, and heads it by two blows. The demand for these articles comes principally from belt, hose, and harness makers. Copper bottoms for kettles, wash basins, and boilers, are stamped out from sheets; annealed and pickled; they are washed on the concave side, first with maricate of zinc, then by a solution of lead and tin; when dried they are ready for the tinner.

In the wire drawing mill, coils of rough imported English wire are drawn by power through dies of varying diameter until reduced to sizes required by the trade. Each drawing necessitates a separate annealing and pickling. The wire is coated with flour or lime to prevent wear on the dies as also to preserve it from oxidation when ready for market. A large amount of wire is called for to supply the pin machines in the neighboring towns of Waterbury and Birmingham, but by far the largest demand the company now have comes from the West, where it is used in enormous quantities for making fences. One of the uses of wire just being introduced, is for making shoe pegs, a Boston notion. The wire for this purpose is made oval or three cornered and a half turn given to the pegs prevents them from drawing out of the boot sole.

Clock-making, one of Connecticut's most important industries, is vigorously carried on in Ansonia. The movement and case departments occupy now the same building, pending the construction of a new shop which, on its completion, will be monopolized by the former business. Space would fail to describe the processes of converting the rough stock into attractive and substantial cases, or making the intricate mechanism constituting what is known as the movement, and finally, fitting together the completed whole, ready for a long life of useful service. The shops of this and other companies in the village are open to visitors, and no more instructive summer tour can be undertaken than a trip through the Naugatuck river valley, with a short sojourn at the villages of Birmingham, Ansonia, Waterbury, and Seymour.

#### MANUFACTURE OF INDIGO CARMINE.

A recipe for a green color for confectioners' use, published in No. 10, current volume, has called forth inquiry as to the nature of indigo carmine, and its method of manufacture. The following description will be found a complete answer to these inquiries:

In the first place, the choice of the indigo on which to op-

erate is not without importance. Its price is generally in proportion to the quantity of pure indigotine which it contains, and it is most advantageous to employ the finest qualities, in order to avoid, in manufacturing a fine quality of indigo carmine, a number of purifications, washings, etc., which soon become costly operations. The manufacturer must not allow himself to be entirely guided by the external appearance of the indigo, the best qualities of which are porous, light, clear, etc., but he should ascertain by one of the known methods the quantity of pure indigotine it contains.

Indigo carmine consists of a perfectly uniform paste of a fine copper color, without any granulations. Spread upon a sheet of glass, and viewed by transparency, it should give a pure blue color with a slight tint of violet.

In the manufacture of indigo carmine, the first operation is the pulverization of the indigo. The author places some 10 lbs. at a time in a wooden drum, properly closed, and in which have been previously placed three cannon balls of 6 lbs. weight each. This drum is fixed to a wooden case, which catches any of the powder that may happen to escape during the pulverization. The drum is turned on its axis by means of a handle, and in about three hours the above quantity is completely pulverized. It is then withdrawn, and passed through a silken sieve containing 100 threads to the square inch. Whatever remains on the sieve is put aside, and replaced in the drum in a future operation.

The powder thus obtained must be completely dried, otherwise, when placed in contact with the sulphuric acid in the next operation, it would give rise to a degree of heat which would injure the product. The desiccation is operated at a temperature of 60° to 70° C.

When the pulverized indigo is dry and has cooled, its dissolution in the acid is proceeded with, and as this part of the process determines the result of the manufacture, it is impossible to operate with too much care. The author recommends that small quantities should be operated on at a time, for the work is thus facilitated, and if an accident happens the loss is comparatively slight.

It is best to add the acid to the indigo, rather than the indigo to the acid; the temperature rises less high, less sulphurous acid is produced, and dissolution is more complete. As to the quality of the sulphuric acid employed, it must contain no nitric acid; for complete safety it is best to add a little sulphate of ammonia, to neutralize the effects of any nitric acid that might be present. The concentration of the acid is another point of great importance. Acid at 66° did not yield good results; the stronger the acid, the more perfect the dissolution. It is best to use a mixture of 4½ parts of fuming sulphuric acid and 1 part of acid at 66° Baumé. The weaker the acid the more violet will be the indigo carmine produced when viewed by transparency.

The following is the method adopted by Herr Roesler:

One pound weight of the pulverized indigo is placed in earthenware dishes kept cool by water, and upon it is poured 2½ lbs. of the mixture of acids above quoted, previously cooled. The mass is stirred with a thick glass rod, slowly at first, then more rapidly, so as to prevent the indigo from agglomerating. In the course of about half an hour the whole forms a dark smooth paste, almost black; it is stirred rather slowly, while a second quantity of acid, equal to that already mentioned, is added. When the mixture froths considerably and evolves much sulphurous acid gas, it is a bad sign; on the contrary, the operation may be considered successful when, after the mixture is completed, the thick foam of little bubbles of gas forms upon the surface while the mass gradually thickens.

It is true that this manner of dissolving indigo is somewhat slow, since one workman can scarcely operate upon a hundred-weight per diem, but the results are always good.

The operation is not yet complete, however; the transformation of the indigo into sulphindigotic acid is not entirely effected, and if the process is immediately continued at this point, a bad result can alone ensue. The earthenware vessels must now be covered to protect them from dust, and their contents allowed to remain in this state for about a fortnight, care being taken to stir up the mixture now and then during that interval, and to warm the vessels a little on the last few days. The whole product is thus transformed into a thick mass, covered by a thinner or more liquid layer.

The next operation is that of precipitation. The contents of five of the earthenware vessels are emptied into a large vat and 237½ pints of pure cold water are added, and then, gradually, a concentrated solution of common salt (1:17 sp. gr.), until the whole of the coloring matter is precipitated. The author formerly used carbonate of soda instead of salt, but the cost is greater and loss of time ensues on account of the violent effervescence.

By the use of common salt a large amount of hydrochloric acid is generated, which attacks the ordinary suspended filters hitherto used. The filtration is therefore effected in cases provided with false bottoms pierced with holes, over which the well-soaked filtering material lies. The first portions which pass must be passed again through the apparatus until the liquid filters clear. The clear solution which filters through is of a blackish green tint. When salt has been used, the clear liquid is afterwards evaporated to crystallize; when chloride of potassium is used, instead of salt, sulphindigotate of potassa is obtained, but this product is not so soluble as the soda compound, and is therefore less esteemed.

When the filtration is finished, the filter is doubled upon itself, and the product submitted to a careful pressure. The cakes of indigo carmine thus obtained are fit for certain purposes; but when it is desirable to furnish a product capable of giving very pure tints, this first yield must be submitted to a few more operations.

The precipitate yielded by 5 pounds of indigo, is mixed

with 210 pints of boiling water, and 5 pounds of monohydrated sulphuric acid are added, while the whole is well stirred with large wooden spatulas.

Although this quantity of acid is not sufficient to dissolve all the product, it is enough to bring it to a very fine state of division, and to keep in solution all the impurities during the subsequent precipitation. The latter is then operated with 5 pounds of a solution of soda at 90°, and an equal quantity of common salt for every 2 pounds of indigo. The mixture is carefully stirred, allowed to cool, and filtered on cloths about two square yards in size, stretched on wooden supports. The mother water has a dirty green tint. The filtered product is washed until the water which passes has a clear blue tint.

With impure qualities of indigo it is advantageous to repeat the latter operation to obtain a perfectly pure product.

The indigo carmine collected on linen filters is pressed, and finally a little glycerin is added to preserve a proper degree of moisture in the mass.

One pound of indigo yields about ten pounds of indigo carmine.

#### Do Animals Think or Reason?

The theory that animals think and reason, and their mental manifestations differ from those of mankind only in degree, has found a new advocate in Ernest Menzies. Here are some of the stories which he narrates to establish the claims of fleas, fishes, and bugs. He also claims for these inferior creatures the affections of parental love, and an emotional nature, capable of gratitude for kind treatment.

There were industrious fleas before our time. Baron Walckenaer (who died in 1852), saw with his own eyes, for sixpence, in the Place de la Bourse, Paris, four learned fleas perform the manual exercise, standing upright on their hind legs, with a splinter of wood to serve for a pike. Two other fleas dragged a golden carriage, with a third flea holding a whip on the box for coachman. Another pair dragged a cannon. The flea horses were harnessed by a golden chain fastened to their hind legs, which was never taken off. They had lived this way two years and a half, without any mortality among them when Walckenaer saw them. They took their meals on their keeper's arm. Their feats were performed on a plate of polished glass. When they were sulky and refused to work, the man, instead of whipping them, held a bit of lighted charcoal over their backs, which very soon brought them to their senses.

But of what use is cleverness without a heart? The flea has strong maternal affections. She lays her eggs in the crannies of floors, in the bedding of animals, and on babies' night clothes. When the helpless, transparent larvae appear, the mother flea feeds them, as the dove does its young, by discharging into their mouths the contents of her stomach. Grudge her not, therefore, one small drop of blood. For you it is nothing but a flea bite; for her it is the life of her beloved offspring.

While pleading, however, for the flea, we cannot do as much for the bug, though he is gifted with fuller developed intelligence. An inquisitive gentleman, wishing to know how the bug became aware of human presence, tried the following experiment: He got into a bed suspended from the ceiling, without any tester, in the middle of an unfurnished room. He then placed on the floor a bug, which, guided probably by smell, pondered the means of reaching the bed. After deep reflection, it climbed up the wall, traveled straight across the ceiling to the spot immediately over the bed, and then dropped plump on the observer's nose. Was this, or was it not an act of intelligence?

The Fish belongs to the great Flathead family. The same sort of platitude which you see in his person doubtless extends to the whole of his character. You have met him somewhere in human shape—one of those pale-faced wishy-washy gentlemen, whose passions have extinguished all heart and feeling. You often find them in diplomatic regions, and can't tell whether they are fish or flesh. But if their mental powers are less developed, their term of existence is more extended. They gain in longevity what they lose in warmth of temperament.

Nevertheless, the skill with which the stickle-back constructs his nest is now a matter of natural history. Other fishes display an address which we acquire only by long and constant practice. One fellow, with a muzzle prolonged into a narrow tube (which he uses as a popgun), prowls about the banks of tidal rivers. On spying a fly on the water weeds, he slyly swims up until he gets within five or six feet of it. He then shoots it with water from his proboscis, never failing to bring down his game. A Governor of the Hospital at Batavia, doubting the fact, though attested by credible witnesses, procured some of these fish to witness their pranks. He stuck a fly on a pin at the end of a stick, and placed it so as to attract their notice. To his great delight, they shot it with their water guns, for which he rewarded them with a treat of insects.

The pike has proved himself not only intelligent, but even capable—disbelieving it who will—of gratitude.

"While living at Durham," says Dr. Warwick, "I took a walk one evening at Lord Stamford's park. On reaching a pond in which fish were kept ready for use, I observed a fine pike of some six pounds weight. At my approach he darted away like an arrow. In his hurry he knocked his head against an iron hook fixed in a post in the water, fracturing his skull and injuring the optic nerve on one side of his head. He appeared to suffer terrible pain; he plunged into the mud, floundered hither and thither, and at last leaping out of the water, fell on the bank. On examination, a portion of the brain was seen protruding through the fractured skull.

This I carefully restored to its place, making use of a small silver toothpick to raise the splinters of broken bone.



The fish remained quiet during the operation; when it was over he plunged into the pond. At first his sufferings appeared to be relieved, but in the course of a few minutes he began rushing right and left, until he again leaped out of the water.

"I called the keeper, and with his assistance applied a bandage to the fracture. That done, we restored him to the pond and left him to his fate. Next morning, as soon as I reached the water's edge, the pike swam to meet me quite close to the bank, and laid his head upon my feet. I thought this an extraordinary proceeding. Without further delay I examined the wound, and found it was healing nicely. I then strolled for some time by the side of the pond. The fish swam after me, following my steps and turning as I turned.

"The following day I brought a few young friends with me to see the fish. He came toward me as before. Little by little he became so tame as to come to my whistle, and eat out of my hand. With other persons, on the contrary, he continued as shy and wild as ever."

### Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

#### Concentration, Transmission, and Transportation of Motive Power.

MESSRS. EDITORS:—In the late work of John Bourne, entitled "Recent Improvements in the Steam Engine," in speaking of researches in thermo-dynamics, made by Joule, he says: "It has long been known that heat may be made to produce power, and that power may be made to produce heat. But Mr. Joule has shown by elaborate experiments that the heat produced by friction is the mechanical equivalent of the power expended in maintaining friction; and that the power represented by the descent of a pound weight through 772 feet, or 772 pounds through one foot, would, if expended in friction, produce as much heat as would raise the temperature of a pound of water one degree Fahrenheit. If we had a perfect engine for extracting the power from heat, we ought to be able to recover from the heat generated by friction the exact amount of power expended in generating the heat. But in the best existing steam engines it is found that only about one tenth of the value of the heat it obtained as power, the residue being wholly wasted; so that if a steam engine were employed to generate heat by friction, only one tenth of the power would be obtained that would have to be consumed in the production and maintenance of the friction. The steam engine, indeed, has now been found to be a very wasteful machine; and the cause of the waste is traceable to the fact that it deals with extremes of temperature but little removed from one another, instead of with extremes of temperature as far removed from one another as possible."

In view of the facts that such a waste is as far as can be foreseen an inevitable concomitant of the use of steam as a motor, and that as the coal supplies in different parts of the world must eventually fail, and also that the time is not far distant, comparatively speaking, when in many locations the price of coal must advance so as to increase the expense of steam, why steam is the only motor except water power which is to any great extent available becomes a pertinent inquiry.

Although future discoveries may yet render electricity available as a motor, there is no immediate prospect of its becoming so. Heated air is gradually coming more into use for light service, but with this there must be always more or less loss of heat, from the same causes which occasion loss in steam production. There remains the strength of animals; yet with these as motors of machinery, no economy over steam can be obtained. For although a pound of meat, or butter, or honey, or a bushel of corn, will be converted into power with far less waste in the animal economy than similar quantities of coal can be in the furnace of a steam boiler, the preparation of the animal fuel, the conversion of carbon and hydrogen into butter or corn, is an expensive process, and so increases its cost, that, even with a loss of nine tenths, coal could more than compete with it, even though the cost of the latter should far exceed what it is at present.

As all the forms of motion may be traced back to the sun, the great prime mover of our system, it seems singular that the power it is constantly generating should not be employed directly as a motor without having recourse to power stored up in coal beds or wood. This power is constantly raising immense volumes of water to enormous heights, which in their descent would, if utilized, drive a million times more machinery than the world will ever require; but the unequal distribution and irregular precipitation of the water from the clouds, and the level surfaces of many localities, are practical difficulties which obstruct a more general use of water power as a motor.

It is not intended in this communication to place before the public a method for the direct utilization of the sun's heat, which can be said to be free from practical difficulties. It is freely confessed that there are many obstacles to success. But to leave altogether out of consideration a mechanical possibility, because of its attendant difficulties, is, to say the least, not a philosophical method of thought.

Let us see what is the essential nature of these difficulties, and appreciate them to their fullest extent. Suppose it were proposed to utilize the heat of the sun by the expansion of solids, and a method of doing this were required, it might be done as follows: An inclined plane or railroad, having placed thereon a heavily loaded car, with pawls attached, playing in ratchets by the sides of the rails, so that it should be prevented from descent; also, having a long bar of iron or other metal fixed to the lower end of the car with a mov-

able joint, so that the lower extremity of the bar should lie upon a central ratchet lying parallel to and between the rails, would operate thus: The long bar would expand by the heat of the sun, and, being prevented by the central ratchet from downward motion, would push the car up the inclined plane. The side panels and ratchets would hold it there, so that upon subsequent cooling the bar would be drawn up, and, taking a new hold upon the central ratchet, would, when heated again, push up the car. In this way, step by step, through successive days and nights, the car would be lifted to the top of the inclined plane, precisely as a tin roof sometimes crawls out of its place by contraction and expansion. An enormous weight might thus be elevated, which, in its descent, could be made to supply power for mechanical work; but here comes in the practical difficulty. It will have taken days to have thus stored up the force, which, though it might be enormous, would be so concentrated that, to apply it, great multiplication of its motion would be necessary. This would lead to complication of parts, and loss from friction. This description has only been introduced to illustrate the fact that the direct application of the sun's heat to motion can only be practically made by great concentration, through a long period, of the force generated by it, and that the chief practical difficulty lies in the distribution of the force to work after it has been so concentrated.

The inclined planes do not need to be artificial. Nature has provided for that; and the sun, as we have seen, is constantly putting vast weights of water upon their summits. It would be difficult to find a place where power is required in large measure that has not a range of hills within two hundred miles of it, where powerful wheels might be placed. But how transmit the power, or how transport it? This is the question to which the age demands an answer, and to the solution of which mechanical genius should be at once applied. Some suggestions upon the means of so doing must be reserved for a future occasion.

#### A Patent in 1655.

MESSRS. EDITORS:—In the records of the Colony of Massachusetts Bay I find the following passage relating to a patent granted to Joseph Jencks, Sen., for an engine for the more speedy cutting of grass:

"In ans<sup>r</sup> to the motion of Joseph Jencks, Sen., it is ordered that Joseph Jencks, Sen., and his assigns only, shall have liberty granted to them to make that engine the said Jencks hath proposed to this Court, for the more speedy cutting of grass, for seven Yeares, and that no inhabitant, or other person w<sup>h</sup>in this Jurisdiction, during that time shall make or use any of that kind of engine w<sup>h</sup>out license first obtained from the said Joseph Jencks, on the penalty of five pounds for every such engine so made or used, to be recovered at any Court in this jurisdiction by the said Joseph Jencks, Sen., or his assigns."

Can you inform me what sort of engines were made in those days?

H. B. HARRISON.

[In "those days" all machines driven by any power except hand labor were called engines. The engine referred to, invented by Joseph Jencks, Senior, mentioned in the colonial records from which the above extract is taken, was one of a series of inventions made by him for the making of scythes and other edged tools with greater speed and perfection than had previously been accomplished. It was not an engine directly applicable to cutting grass, as the quaint language of the record might seem to imply. It was merely a machine, driven by water power, to manufacture scythes upon a new principle of construction, which gave greater length and thinness to the blade, the requisite strength being given to it by welding a rib of iron to the back of it, now done by rolling instead of welding. This was a great improvement upon the short, thick, and clumsy English scythes used at that period. Although many improvements have since been made in modes of manufacturing scythes, no radical change in their form has taken place.

Joseph Jencks, Senior, was one of the most skilled mechanics and inventors of his time. He was the first founder of brass and iron on the Western Continent. In 1652 he was employed by the Colonial Government, to make dies for the silver coins issued to supply the deficiency of specie which at that time embarrassed financial operations. The issue consisted of shillings, for which there were at least sixteen different dies, sixpences, threepences, and twopences. The coins were of very fine metal, but they were worth by weight two pence less in the shilling than the English coin. Mr. Jencks was the maker of the first fire engine ever used in America, anticipating their use in France nearly fifty years.—Eds.

#### How to Become an Engineer.

MESSRS. EDITORS:—I am not a machinist, but am a natural mechanic—can do a good job at nearly anything with a little instruction. I wish to learn to be a marine engineer (a good one—I mean a competent one). How had I better commence? Is it necessary to learn the machinist business; or had I better try to get a job helping about some marine engine? (I have put up engines—stationary—and run them with good success.) What books had I better commence studying on engineering? I have been a reader of the SCIENTIFIC AMERICAN for sixteen years; it has benefited me very much in a mechanical way. Please give me a little advice to commence with.

C. C. R.

Avon, Ill.

"Line upon line, precept upon precept," seems as necessary a rule now as in the time of Solomon. We have published our advice on these matters repeatedly, have replied by mail to many such letters, and not a week passes that we are not called upon personally for our opinion on these subjects. Our advice is always founded on our personal experience as a

practical mechanic and on observation, and cannot be more valuable than that of any intelligent mechanic.

There is no royal road to success in mechanics; there are no books published which will make a "natural mechanic" a practical mechanic, and the sooner our young men appreciate the fact the better for their welfare and the credit of the noble army of wealth producers. To be a marine engineer one should understand every part and piece of the engine and all its connections. He should be competent to do or direct in case of accident or repair. How can he best acquire that knowledge? Evidently by practice, and practice must begin in the shop. Jobbing about a marine or any other engine never made an engineer—it may enable one to run an engine when everything goes right. But an engineer—a good one, a competent one—such as our correspondent evidently desires to be, must begin at the beginning, go into the shop and work. In his leisure hours study "Bourne's Hand Book," "Russell's Steam and Steam Navigation," "Main and Brown on the Marine Engine," and other authorities. Still, books are but an aid, an accompaniment to his daily labor and daily experience, and in no case to take the place of that labor or that experience. To ascend a ladder one must begin at the first rung, however much his natural taste may enable him to see through the ladder.—Eds.

#### To Find the Number of Teeth in the Gears Used on the Spindle and the Leading Screw.

MESSRS. EDITORS:—I send a copy of my rules for screw cutting on engine lathes:

RULE. Take the number of threads in any convenient distance on the leading screw, for the number of teeth on the gear on the spindle, and the number of threads in the same distance on the screw to be cut, for the number of teeth on the gear on the leading screw.

EXAMPLE. The leading screw of a lathe being 5 threads to the inch, required the gears to cut 8 threads.

In 4 inches of the leading screw there are 20 threads which gear put on the spindle, and in 4 inches on the screw to be cut there are 32 threads, which gear put on the leading screw. But suppose you have no 32 tooth gear; take some other distance, say 6 inches, and the gears required will have 30 and 48 teeth. So any distance may be taken.

Again, suppose the leading screw to be 4 threads to the inch; required the gears for cutting 6 threads.

In eight inches of the leading screw there are 32 threads, and in 8 inches of a 6 thread screw there are 48 threads; then 32 and 48 are the gears wanted.

In cutting the same number of threads as the leading screw, the gears should both have the same number of teeth, no matter what that number is.

From the foregoing it will be seen that any gears, having the same ratio to each other as the number of threads given and required, may be used with the same result.

The pitch of a screw is the distance gained, in the direction of its axis, by one revolution of the screw, and is usually expressed by a fraction.

The denominator of the fraction denoting the pitch of a screw, is the number of threads in the number of inches denoted by the numerator.

EXAMPLES. 1-5th of an inch pitch is 5 threads in 1 inch; 3-16ths of an inch pitch is 16 threads in 3 inches; 1-5-8ths pitch is (1-5-8ths = 13-8ths) 8 threads in 13 inches; 11-30ths of an inch pitch is 30 threads in 11 inches; 15-24ths pitch is 22 threads in 15 inches.

In the last two cases suppose the leading screw to be 5 threads to the inch; required the gears.

In 11 inches of the leading screw there are 55 threads, and in 11 inches of the screw to be cut there are 30 threads. Put 55 gear on the spindle, and 30 gear on the leading screw. Again, in 15 inches of the leading screw there are 75 threads, and in 15 inches of the screw to be cut there are 22 threads; but suppose there is no 22 gear at hand, or if it is at hand it is too small to be driven without crowding; double the numbers already found, and use 150 gear on the spindle, and 44 on the leading screw.

#### TO FIND THE PITCH OF A SCREW.

Lay a rule on the screw, in the direction of its axis, and note where the threads correspond with the inch marks on the rule; make the number of threads the denominator and the number of inches the numerator of a fraction, which fraction will denote the pitch in its lowest terms. If the fraction be an improper one reduce it to a mixed number. If the fraction is a proper one the number of threads to the inch may be found by dividing the denominator by the numerator.

EXAMPLES. 3-16ths pitch is (16÷3=5-1-3) 5-1-3 threads to the inch. 11-30ths of an inch pitch is (30÷11=2-8-11) 2-8-11ths to the inch.

In counting a square thread screw be careful to count a thread and a space also.

In two or three thread screws the pitch should be taken at twice and three times, and the number of threads at one half or one third that of a single thread screw.

Intermediate gears are used only to transmit motion, and the number of their teeth does not affect their work, but it sometimes happens that the pitch of the screw to be cut, is so much greater or less than that of the leading screw, that one gear is too large or the other too small. In that case the speed of the leading screw may be increased or reduced by two gears fixed together on the same stud, one being half the size of the other.

EXAMPLE. The leading screw being twelve threads per inch, required the gears for cutting 2 threads per inch.

Take the number of threads in 10 inches, which will be 20 and 120 on the spindle and 20 on the leading screw, but so small a gear on the leading screw will crowd and drive hard. So double the number of teeth on the small gear, and put 40



on the leading screw, and use two intermediate gears on the same stud, one with double the number of teeth of the other, and let the gear on the spindle work into the smaller one and the gear on the leading screw work into the larger one, and the required speed will be obtained.

Left hand screws gain in the opposite direction from right hand screws, and one more or one less intermediate gear is used to give the proper motion.

In cutting large screws much time is saved by using a half nut which may be raised off the screw while the carriage is moved by hand. When the screw to be cut is the same pitch as the leading screw or one half or one fourth of the same, the lathe may be kept running ahead all the time. But when the pitch is different, if the lathe be stopped at the end of each cut, and the carriage moved back by hand, a certain number of inches the nut will gear into the screw all right.

EXAMPLES. The leading screw being 4 threads per inch, to cut 3 1-3d threads, the carriage may be moved, 3, 6, 9, or 12 inches. 2 1-2 threads, 2, 4, 6, or 8 inches.

Milton, Mass.

E. S. CHAPPELL.

### Do Water-Wheels Run Faster in the Night than in the Day?

MESSRS. EDITORS:—There seems to be a very general belief among those who have charge of mills, that the water wheel runs with more force at night than during the day time. This idea is regarded by many as a superstition; but I am inclined to think that there are valid reasons for believing that it has a foundation in fact. The wheel is put in motion by the gravity of the water. Gravity results from a mutual attraction of particles for each other—a law which no one will dispute prevails through the solar system. At noon, the attraction of the sun would have the effect to counteract the attraction of the earth, and lessen the gravity of the water; while at midnight the attraction of the sun combines with that of the earth to increase the gravity of the water. If this theory be true, the effect should be most marked at the new of the moon, when the attraction of the sun and moon tends to counteract that of the earth during the day time, and to combine with it at night. Under these circumstances the gravity of the water, and the dynamic force exerted by the wheel must be greater at night than in the day time? How could it be otherwise?

New York city.

F. G. FOWLER.

[The "general belief" (in which we have never shared) may be easily demonstrated as to its truth or falsity, and therefore does not require argument. But the theory of our correspondent as to the cause of the fact (if the fact exists) does not seem to be entirely satisfactory. The combined influence of sun and moon is only sufficient to produce the rise in the ocean known as the tide; and even allowing for its extreme height on shores the peculiar conformation of which concentrates, so to speak, the force otherwise spread over a large surface, yet the total rise is hardly to be appreciated when considered with reference to the bulk of the earth. It was announced some time ago, as a remarkable fact (?), that a tide of one third of an inch had been detected in Lake Erie. If on so large a body of water only one third of an inch rise takes place, how much would the tide (combined attraction of sun and moon) of a mill pond affect the running of a water wheel?—EDS.]

### Plan for Index Plates.

MESSRS. EDITORS:—Since my last communication to your paper (on page 101, current volume), I have worked out the following combinations for an index plate. Holes drilled:

77	95	115	129	141	275	372	468
79	96	116	130	142	280	384	480
82	102	118	132	143	300	396	492
86	104	119	133	145	312	408	504
89	106	121	134	146	324	420	
91	107	122	135	147	336	432	
94	109	125	137	149	348	444	
95	110	127	139	150	360	456	

In this plan there are only sixty circles of holes, with a total of 12,629 holes to be drilled.

Any gear below 151 teeth can be cut on it; also, the following, because

132 is a factor of	456,	174 "	348,	210 "	420,	246 "	492,
135 "	495,	180 "	360,	216 "	432,	252 "	504,
136 "	504,	182 "	364,	218 "	436,	254 "	
138 "	522,	186 "	372,	222 "	444,	258 "	
144 "	528,	192 "	384,	224 "	448,	264 "	
146 "	532,	194 "	388,	226 "	452,	266 "	
148 "	536,	196 "	392,	228 "	456,	268 "	
150 "	540,	198 "	396,	230 "	460,	270 "	

which will allow 186 different changes of gear to be cut between 6 and 504 teeth, inclusive.

Kalamazoo, Mich.

E. H. H.

MESSRS. EDITORS:—I see, page 83, that P. H. Vander Weyde asserts that the sticking qualities of glue seem improved by the addition of Paris white. I concede that it adds to its appearance and weight but nothing more. The combination is a mechanical one, and is just the same as so much foreign matter in a state of minute division which is anything else but desirable in a good article of glue. If a microscopic examination is made of a joint made by a mixture of glue and Paris white and afterward torn apart, it will be found that each grain, so to speak, is enclosed in a separate cell formed by the glue. These sacs occur in minute division and separate the glue wherever they occur. This being the case, it certainly cannot be beneficial to add Paris white more than to increase the weight and add to its appearance.

Frankfort, Ky.

MARCUS JONES.

MESSRS. EDITORS: What is the size and capacity of the largest water-wheel in the United States?

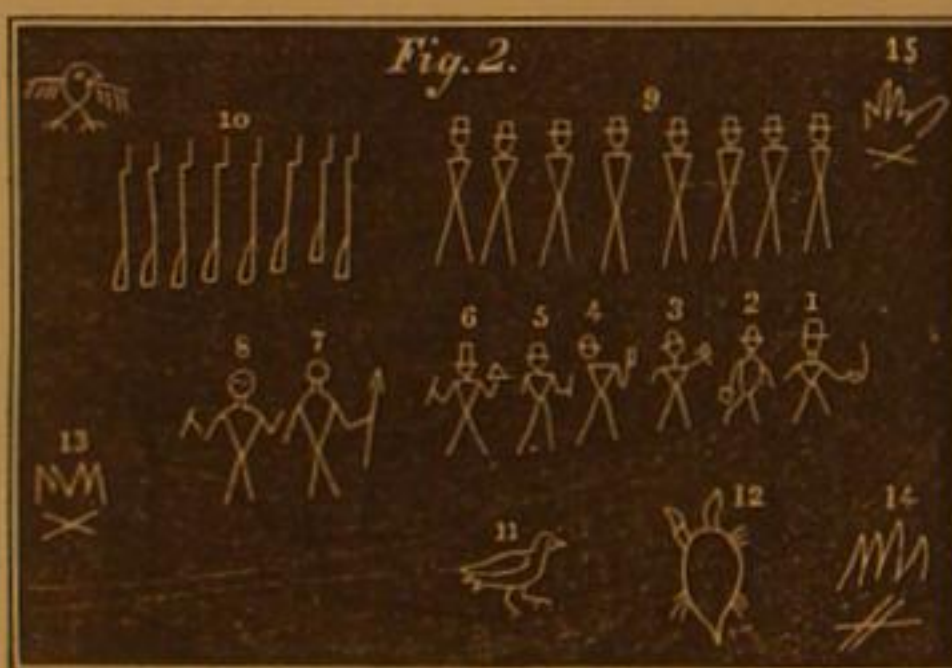
For three years, St. Louis has been at work in an artesian well, seeking for water, as we quite recently mentioned. A few days ago the boring was ordered to cease, at the depth of three-quarters of a mile.

### THE WRITTEN LANGUAGES OF SAVAGES.

In our last issue we published an article on the "Arts and Manufactures of Savages," being a synopsis of two of a series of lectures delivered by Sir John Lubbock, Bt., F. R. S., before the Royal Institution. In the same series he has attempted to show the crude ideas of written language entertained by uncivilized man, using as illustrations copies of the written language of North American Indians. Three of

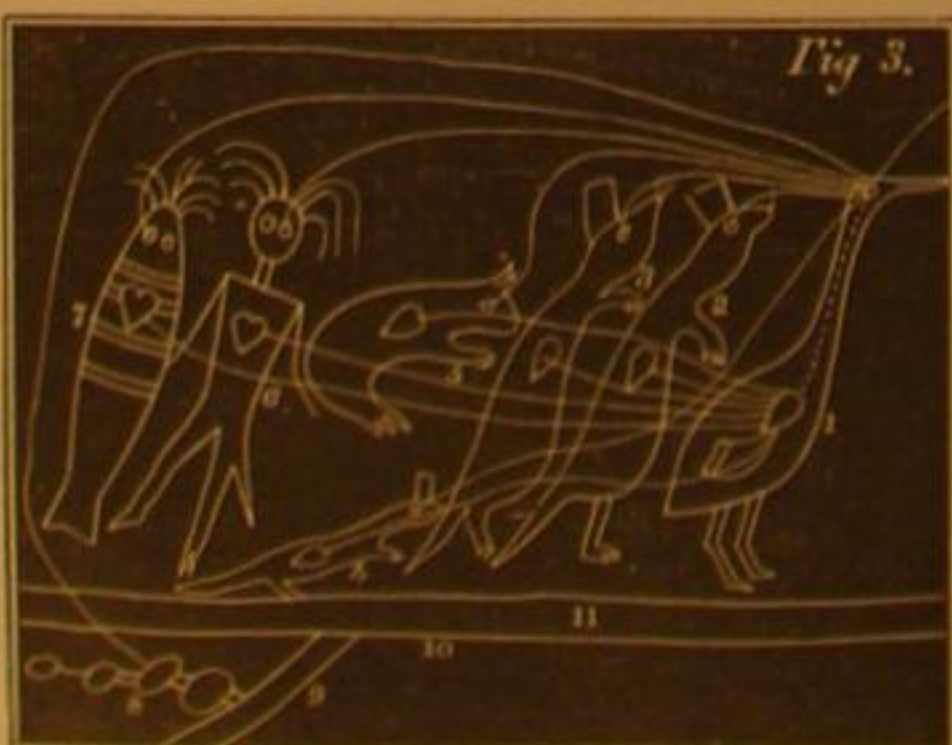


these we reproduce from a notice of his lectures as published in the *Engineer*. It will be seen that the attempts of savages to produce a representation of ideas by visible signs are similar to those made by the children of educated and enlightened parents—merely natural symbols, or rather pictorial representations. By neither can the connection between the parts of a sentence be discovered without the exercise of experienced judgment or of a lively imagination, and either may go astray unless guided by practice and a knowledge of the habits of thought of the writer. It is evident that pictorial writing could be useful mainly in the statement of bald facts, as only visible or otherwise well known objects



could be depicted, and thus any system of philosophy dependent on its transmission by visible signs, as written characters, was impossible to the nations or tribes who did not possess either an alphabetical system or one of arbitrary characters to which meanings commonly accepted are attached.

Yet it would seem that the fact that the Aztecs of Mexico, the Inca race of Peru, and the Chinese, all had, and have, only a pictorial language; that the ancient Assyrians and Egyptians used pictorial or hieroglyphic signs to denote ideas, and yet each and all attained to a high degree of



civilization, and developed systems of social and moral philosophy, would militate strongly against the assumption that an alphabetical or arbitrary language is necessary either to the production and transmission of any system of philosophy involving abstract ideas or against a high degree of cultivation by means of picture writing. But it must be considered, as an offset to this view of the subject, that a knowledge of the mysteries of ancient philosophy were obtained mainly by personal acquaintance with their ceremonies and transmitted orally by the aid of symbols.

All writing probably was originally of a representative or pictorial character. We presented this view of the case with

diagrams on pages 266 and 353, Vol. XV. *SCIENTIFIC AMERICAN*, in relation to the probable original form of the Arabic numerals, and according to Sir William Jones the elaborate written system of the Chinese is to this day but a system of picture writings, abstract ideas being conveyed by symbols derived from crude representations of visible objects.

Fig. 1 of the diagrams represents an Indian census roll or roster of a band entitled to annuities from the United States Government. Some of the figures in the compartments are easily recognizable as No. 5, a catfish, the six strokes denoting the number of individuals in the family. No. 8 is the beaver family of three persons; number 9, the sun; 13 the eagle; and here we see the popular and traditional "spread eagle," still seen on our coins and coats of arms. No. 14 is a snake; 22, a buffalo; 34, an ax; 35, a "medicine man," or priest, etc.

According to Schoolcraft, a party of explorers, with two Indian guides, saw one morning, as they were about to start, a leaning pole stuck up in the direction they were going, holding at the top a piece of birch bark covered with the drawings shown in Fig. 2. No. 1 represents the officer in command of a squad of United States soldiers. He carries a sword to denote his rank. No. 2 is the secretary, holding a book. No. 3 is the geologist and mineralogist of the party, carrying a hammer. Nos. 4 and 5 are attachés. No. 6 is the interpreter. No. 9, eight infantry soldiers, their muskets shown in No. 10. No. 15 denotes that they had a separate fire and constituted a separate mess. Nos. 7 and 8 are two Chippewa guides. It will be noticed that the whites are all represented with hats; the Chippewas have none. The hawk with spread wings shows the party to be on a journey, and Nos. 11 and 12 are a prairie hen and turtle, the proceeds of the previous day's chase.

One of the best specimens of Indian pictorial writing is shown in Fig. 7, which represents an Indian petition to the President of the United States, and is thus described by Schoolcraft: "No. 1 is the totem of the chief, called Oschabawis, who headed the party, who is seen to be of the *Adji-jauk*, or Crane clan. To the eye of the bird standing for this chief the eyes of all the other totemic animals are directed, as denoted by lines, to symbolize union of views. The heart of each animal is also connected by lines with the heart of the Crane chief, to denote unity of feeling and purpose. If these symbols are successful they denote that the whole party see and feel alike—that they are one. No. 2 is a warrior, called *Wai-mit-tig-oash*, of the totem of the Marten. The name signifies literally "He of the Wooden Vessel," which is the common designation of a Frenchman, and is supposed to have reference to the first appearance of a ship in the waters of the St. Lawrence. No. 3, *O-ga-ma-ga-zig*, is also a warrior of the Marten clan. The name means literally "Sky Chief." No. 4 represents a third warrior of the Marten clan. The name of *Muk-o-mis-ud-ains* is a species of a small land tortoise. No. 5, *O-mush-kose*, or the Little Elk, of the Bear totem. No. 6, *Penai-see*, or the Little Bird, of the totem of the *Neban-a-baig*, or Man Fisher. This clan represents a myth of the Chippewas, who believe in the existence of a class of animals in the Upper Lakes, called *Neban-a-baig*, partaking of the double natures of a man and a fish, a notion which, except as to the sex, has its analogies in the superstitions of Western Europe, respecting a mermaid. No. 7, *Nova-je-uun*, or the "Strong Stream," is a warrior, of the *O-was-se-ung*, or Catfish totem. Beside the union of eye to eye, and heart to heart, above depicted, *Osh-ca-ba-wis* as represented by his totem of the Crane, has a line drawn from his eye forward, to denote the course of his journey, and another line drawn backwards to the series of small rice lakes, No. 8, the grant of which constitutes the object of the journey. The long parallel lines, No. 10, represent Lake Superior, and the small parallel lines, No. 9, a path leading from some central point on its southern shores to the villages and interior lakes, No. 8, at which place the Indians propose, if this plan be sanctioned, to commence cultivation and the arts of civilized life. The entire object is thus symbolized in a manner which is very clear to the tribes.

### Saponification under Pressure.

We condense from *Engineering* the following description of the method generally used in England for the separation of Stearic and Oleic acids:

"Fatty matters, whether of vegetable or animal origin, are always found combined intimately with glycerin, and may be regarded as stearates or oleates of glycerin. Many processes are employed to separate the stearic from the oleic acids, all of which have for their object the destruction of the combination of stearate or oleate of glycerin, so that the liberation of the stearic acids may be insured. These acids are solid at moderate temperatures, are hard, white, crystalline, and odorless, and are employed in the manufacture of candles. Oleic acid is used also in the fabrication of soap, and in the cleansing of wool previous to its being spun into yarn. The most general method followed in England for separating these combinations consists of a treatment with sulphuric acid, followed by distillation. The fatty matters are placed in contact with concentrated sulphuric acid, and form combinations of sulpho-stearic, sulpho-oleic, and sulpho-glycerine acids. These all increase in bulk when in boiling water and decompose, but the glycerin and carbon remain interspersed in the mass, and it is necessary to complete the first operation by distilling these carbonic and fatty matters remaining in the distilling apparatus, so that the fatty acids may be volatilized and carried away for condensation in the refrigerator. This process is advantageous because the production of solid fatty acids is considerable, as much as sixty-five per cent of solid matter being sometimes obtained, but the stearic acid produced by this process melts at a lower temperature than that obtained by saponification; and the oleic acid, more



readily decomposed, undergoes in this treatment such alterations as to render its employment in the manufacture of hard soap very difficult. It is suitable enough, however, as an ingredient in soft soap with a potassa base, a soap much used in Belgium and Holland, which explains the favor which the distillation process enjoys in those countries. Saponification by lime is, however, generally more employed. The process of decomposition with water under a high pressure and temperature is beginning to find favor in places where sulphuric acid is costly, but certainly the former method is in use in most manufactories. It is the most simple of all, as well as the oldest, and it gives undoubtedly the best results, although it is the most costly. Six operations are necessary to convert the tallow into fatty acids.

1. The formation of the soap of lime.
2. Its extraction from the vat.
3. The decomposition of the soap of lime by sulphuric acid.
4. The washing with acidulated water.
5. Washing with pure water.
6. Crystallization.

Then follow, by different means, the separation of the solid from the liquid acids, by means of hydraulic pressure. Until latterly, the saponification of lime has been effected in large wooden vats, in which the melted tallow was mixed with lime, in the proportion of 14 of lime to 100 of tallow. Boiling was necessary for six or seven hours, and it was indispensable, for the success of the operation, that the mass should be kept constantly in agitation by stirring. This process, besides being tedious to the workmen, long and very difficult to carry out properly, required a considerable quantity of steam; and, in spite of all care, saponification was always incomplete, especially in those places where the current of steam had not properly penetrated.

To obviate these imperfections an apparatus has been devised working under a mean pressure of forty-five pounds, in which the saponification by lime is worked economically without manual labor, with a reduced proportion of ten or eleven per cent of lime, in place of fourteen per cent, and without a large consumption of steam.

The process is effected in a fixed temperature of 130°, instead of that of 100°, which it is impossible to exceed in an open vat, is always chemically complete, and the separation of the oleic acid is easily effected by hydraulic pressure.

This apparatus is working at the present time in eighteen different manufactories on the Continent, and is in course of construction at twenty other establishments. The tallow is melted in a sheet iron basin, and the lime is prepared in an adjacent vessel. These vessels are provided with large taps, and the bases are inclined to facilitate the flowing out of the liquid. In each is placed a steam injector to heat the mass. Both basins are of exact size, and so determine the proportionate quantities of matter under treatment. The melted tallow and lime flow into an upright chamber, and thence forced up a pipe by hydraulic pressure into the saponifier, which forms a large boiler of sheet iron, working up to seventy-five pounds pressure per inch, and placed vertically, resting on four feet, which lift the lower end about three feet three inches from the ground. This apparatus is provided at the upper part with valves, gages, taps, etc. On one side are placed cocks at different levels, in order that samples may be drawn off from time to time. On the lower end are placed the steam injectors, and so constructed that the closing of valves on the inside prevent any of the melted contents of the boiler from flowing into them. A large cock for drawing off is provided, and a pipe carries the calcareous soap into the decomposing chamber. The mingled tallow and lime are discharged from their respective vessels into the chamber, whence they are forced up a pipe into the boiler; there, two or three jets of steam, according to the size of the apparatus, are discharged into the boiler by tweezers, and all communications to or from it are closed. The steam in penetrating into the boiler heats the liquid mass, and the saponification becomes perfect without any assistance from workmen. From time to time it is advisable to test the progress by drawing samples from the taps, and after five or six hours the pressure in the boiler and the steam generator having become equal, the process is complete.

The water saturated with glycerin is then drawn off by the taps at the bottom of the boiler, and the calcareous soap is taken into the decomposition chamber, where the sulphuric acid combining with the lime, forms a sulphate of lime, and liberates the fatty acids. The mass leaves the boiler at a pressure of about sixty pounds, and on reaching the open air the fat contained separate breaks up and falls down in powder, the more readily and completely the smaller the quantity operated on at a time. The soap being instantly decomposed, the fatty acids are not exposed to a long contact with the sulphuric acid, and are then neither attacked nor destroyed. To prevent the soap being thrown in its ebullition beyond the decomposing vat, the pipe in communication with the boiler is turned upwards at the end, and discharges the soap against a cone of sheet iron upon which it bursts and breaks and falls down again into the decomposing vat below.

Not only does this system of treatment produce fatty acids, whiter and bolder, but the saponification being always complete, there is a larger production of oily matter from the solid residuum when submitted to hydraulic pressure, amounting to fifty per cent, whereas by other methods only forty-seven per cent can be obtained. In the next consideration of cost, the expense of lime, of sulphuric acid, of coal, and of hand labor, a saving of thirty-five per cent, is made on the cost of the old method.

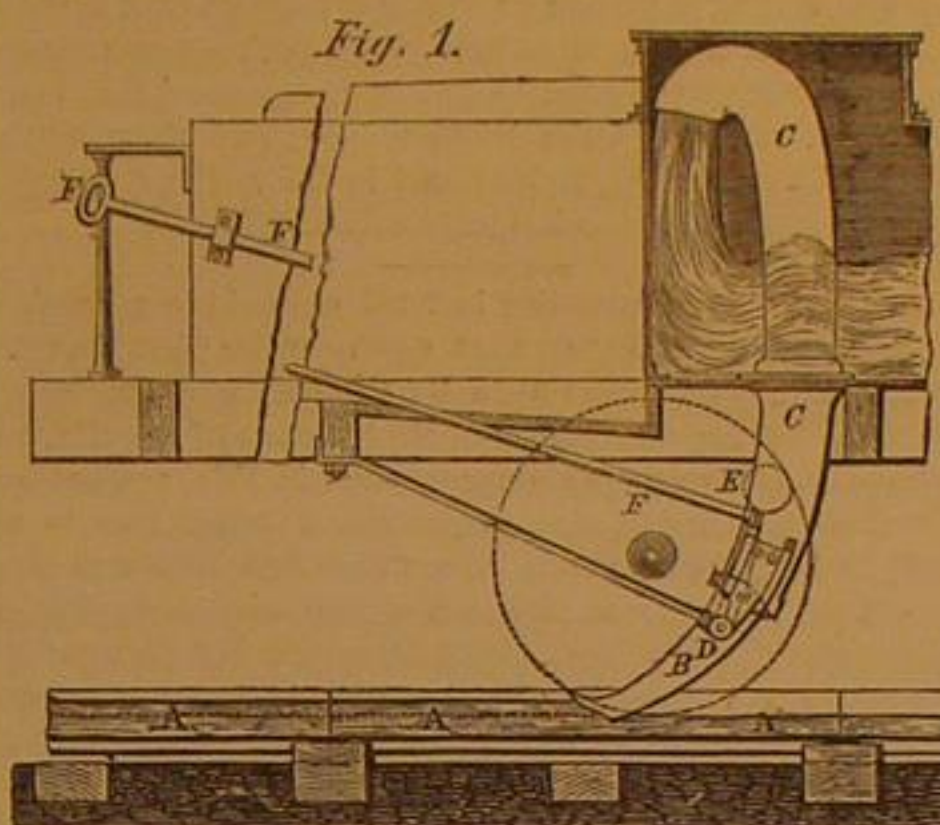
A HAMBURG inventor is making paper from tobacco stems, to be used as cigar wrappers in place of the more costly leaves, and the application is said to be quite satisfactory.

#### RECENT IMPROVEMENTS IN THE STEAM ENGINE FEEDING SCOOP FOR LOCOMOTIVES.

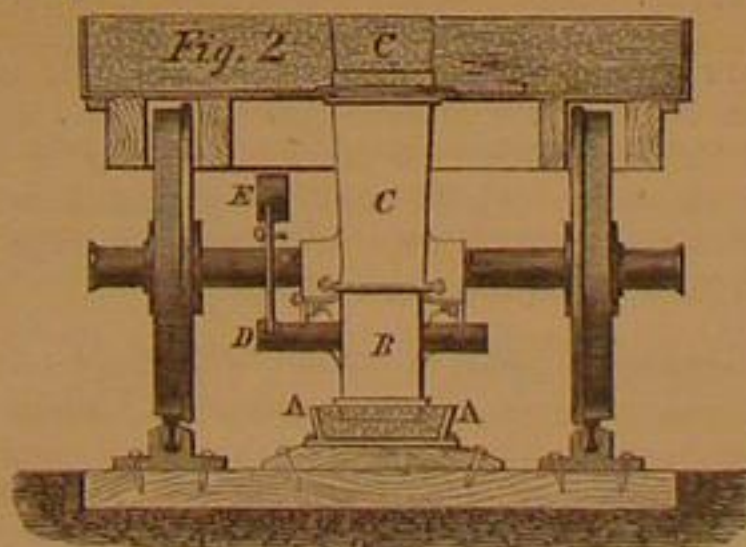
The name of John Bourne has become so well known to mechanical engineers through his former works, that the simple announcement of another treatise from his pen is sufficient to secure its favorable reception. The little work entitled, "Recent Improvements in the Steam Engine" which has just been issued from the press of J. B. Lippincott & Co., Philadelphia, is a supplement to the Catechism of the Steam Engine, and contains the most recent improvements both in construction and practice as well as the most novel applications of steam power as a motor, together with accounts of the latest improvements in steam, air, and gas engines as shown in the Paris Exposition of 1867. It is profusely illustrated, and should be read by all interested in the progress of the arts.

As a specimen we extract the following description of the feeding scoop for locomotives as now used in England for supplying water to them while running, and have also reproduced the engravings by which the device is illustrated.

"This apparatus, represented in Figs. 1 and 2, consists of an open trough of water, lying longitudinally between the rails at about the rail level, and a dip-pipe or scoop attached to the bottom of the tender, with its lower end curved forward and dipping into the water of the trough, so as to scoop up the water and deliver it into the tender tank while running along.



"The water trough, A, Figs. 1 and 2, of cast iron, 18 inches wide at top by 6 inches deep, is laid upon the sleepers between the rails at such a level that when full of water the surface of the water is 2 inches above the level of the rails. The scoop, B, for raising the water from the trough, is of brass, with an orifice 10 inches wide, by 2 inches high; when lowered for dipping into the trough, its bottom edge is just level with the rails and immersed 2 inches in the water. The water entering the scoop, B, is forced up the delivery pipe, C, which discharges it into the tender tank, being turned over at the top so as to prevent the water from splashing over. The scoop is carried on a transverse center bearing, D, and when not in use is tilted up by the balance weight, E, clear of the ground. For dipping into the water trough it is depressed by means of the handle, F, from the footplate, which requires to be held by the engine-man as long as the scoop has to be kept down.



The upper end of the scoop, B, is shaped to the form of a circular arc, as is also the bottom of the delivery pipe, C, so that the scoop forms a continuous prolongation to the pipe when in the position for raising water. The limit to which the scoop is depressed by the handle, F, is adjusted accurately by set screws, which act as a stop and prevent the bottom edge of the scoop being depressed below the fixed working level. The set screws also afford the means of adjusting the scoop to the same level when the brasses and tires of the tender have become reduced by wear, causing the level of the tender itself to be lowered. The orifice of the scoop is made with its edges beveled off sharp, to diminish the splashing; and the top edge is carried forward 2 or 3 inches and turned up with the same object.

"The water trough, A, is cast in lengths of about 6 ft., so as to rest upon each alternate sleeper, and is fixed to the sleepers, the height being adjusted by means of wood packing. The ends of each length are formed with a shallow groove, in which is inserted a strip of round vulcanized India-rubber, to make a flexible and water-tight joint, the metal not being in contact; this meets all the disturbances arising from expansion, settlement of road, and vibration caused by the passage of trains. The length of trough now laid on the Chester and Holyhead Railway near Conway is 441 yards on the level; and at each end the rails are laid at a gradient of 1 in 100 for a further length of 16 yards, the road being raised for that purpose, so that the summit of the incline is 6 inches higher than the level portion: the trough is tapered off in depth to a bare plate, so that the same thickness of wood

packing serves for fixing it throughout the entire length. The portion of the line where the trough is fixed is a curve of 1-mile radius, and the outer rail is canted 1 inch above the inner, the wood packing being made taper for fixing the trough horizontal; but the cant does not interfere with the efficient action of the scoop on the tender, since it amounts to only  $\frac{1}{4}$  inch on the 10-inch width of scoop. At each extremity of the water trough is an overflow pipe, limiting the height of water in the trough.

"The trough contains 5-inch depth of water, and the scoop dips 2 inches into the water, leaving a clearance of 3 inches at the bottom of the trough for any deposit of ashes or stones. The trough is so constructed as to present no obstruction to be caught by any loose couplings or drag-chains that may be hanging from the trains passing over it; and experiments have been tried with a bunch of hook chains and screw couplings hanging down behind the tender and dragged along the trough without any damage occurring.

"As to any difficulty from ice, a thorough trial has been afforded by severe winters; and by means of a small ice plough, which was run through the trough by hand each morning, the coating of ice was removed from the surface of the water, and no more was formed afterward excepting a film so thin that it was removed by the scoop itself in passing through the trough without being felt at all. It has indeed been shown, that the continuance of this action with the succession of trains in ordinary working would be sufficient in this climate to prevent the formation of any ice thicker than could be readily and safely removed by the passage of the scoop alone, even during the severest seasons.

"The principle of action of this apparatus consists in taking advantage of the height to which water rises in a tube, when a given velocity is imparted to it on entering the bottom of the tube; the converse operation being carried out in this case, the water being stationary and the tube moving through it at the given velocity. The theoretical height, without allowing for friction, etc., is that from which a heavy body has to fall in order to acquire the same velocity as that with which the water enters the tube. Hence, since a velocity of 32 feet per second is acquired by falling through 16 feet, a velocity of 32 feet per second, or 22 miles per hour, would raise the water 16 feet; and other velocities being proportionate to the square root of the height, a velocity of 30 miles per hour would raise the water 30 feet very nearly (a convenient number for reference), and 15 miles per hour would raise the water  $7\frac{1}{2}$  feet—half the velocity giving one quarter the height. In the present apparatus the height that the water is lifted is  $7\frac{1}{2}$  feet from the level in the trough to the top of the delivery pipe in the tender, which requires theoretically a velocity of 15 miles per hour; and this is confirmed by the results of experiments with the apparatus: for at a speed of 15 miles per hour the water is picked up from the trough by the scoop and raised to the top of the delivery pipe, and is maintained at that height while running through the trough, without being discharged into the tender.

The theoretical maximum quantity of water that the apparatus is capable of lifting is the cubic content of the channel scooped out of the water by the mouth of the scoop in passing through the entire length of the trough; this measures 10 inches width by 2 inches depth below the surface of the water in the trough, and 441 yards length—amounting to 1,148 gallons or 5 tons of water. The maximum result in raising water with the apparatus is found to be at a speed of about 35 miles per hour, when the quantity raised amounts to as much as the above theoretical total; so that, in order to allow for the percentage of loss that must unavoidably take place, it is requisite to measure the effective area of the scoop at nearly the outside of the metal, which is  $\frac{1}{4}$  inch thick and feather-edged outward, making the orifice slightly bell-mouthed and measuring at the outside  $10\frac{1}{4}$  inches by  $2\frac{1}{4}$  inches; this gives 1,356 gallons for the extreme theoretical quantity. By experiment it appears that the variation in the quantity of water delivered is very slight at any speed above 22 miles per hour, at which nearly the full delivery is obtained; the greater velocity with which the water enters at the higher speeds being counterbalanced by the reduction in the total time of action while the scoop is traversing the fixed length of the trough. It also appears that at any speed above that which is sufficient to discharge the water freely from the top of the delivery pipe, all the water displaced by the scoop is practically picked up and delivered into the tender. In these experiments the water level was maintained the same in the trough each time by keeping it supplied up to the overflow orifice at each end; and the scoop was lowered to the same level each time by means of the set screws, the height of the tender itself being maintained practically the same in each case.

The construction of this apparatus was pressed upon Mr. Ramsbottom by the accelerated working of the Irish mail, the arrangements connected with which made it necessary that the train should run from Chester to Holyhead (a distance of 84 $\frac{1}{2}$  miles) in two hours. A supply of 2,400 gallons of water is found to be required for this journey in stormy weather, and it became necessary, therefore, either very much to enlarge the tender tanks, or to introduce an arrangement under which the tender could take up water while running. The latter expedient was preferred, and it has now been matured and utilized with complete success.

IN Dayton, Ohio, recently, a little girl named Foley swallowed a glass button, which passed into the lungs and would not be dislodged. Dr. Reeves, as a last resort, cut a hole in the child's throat, holding it open by instruments, and on the third day after the incision, the child, in a fit of violent coughing, ejected the button through the aperture, and is now doing well.



## Pyrometers.

In our issue of August 5th, we referred to the instruments for indicating high temperatures, made by Wedgewood and Daniel. There are however others of American and English make, in extensive use, depending in their construction, on the difference of expansion of various metals under heat, which answer well for lower temperatures, and are less expensive. Mr. Gauntlett has long supplied the Blast Furnaces in England, with an instrument having a brass stem about four feet long inclosing a steel rod; this gives good satisfaction in biscuit manufacturing, oil refining, wire annealing, and similar operations, where the temperature is under 800 degrees. Above this figure and especially if continued for a length of time in a red heat, the brass tube is liable to be injured. To indicate the increased temperature now used in blast furnaces, Mr. Gauntlett has introduced an instrument the stem of which is composed of tubes of refractory clay, enclosed in an iron stem about three feet long, this is more durable in a temperature of 1,000 or 1,200 degrees, and is highly spoken of. The Agent for them is Edward Brown, 311 Walnut St., Philadelphia.

## Effect of the Galvanic Current upon the Tenacity of Wire.

Mr. James Wylde has made public the results of some experiments which are of great importance to telegraphic science. He says that he found, some years since, that when intense currents were passed through the best copper wire, in only one direction, its tenacity was gradually destroyed, so that it could finally be crushed to pieces by the fingers. This loss of tenacity occurred first and in a greater degree at the negative pole. An examination with a microscope revealed at the broken surface a complete molecular change, a crystalline structure having taken the place of the fibrous. He states that, having entered upon some extended experiments in connection with submarine explosions by means of the voltaic current, he was frequently annoyed by the breaking of one of the wires, and in all cases found the structure at the broken part crystalline. From these facts he infers that intense currents passed through submarine cables must eventually deteriorate them, and counsels their avoidance. The frequent reversal of the current, in regard to direction, lessens or entirely prevents the molecular change in the wire.

## Neutralization of Magnetic Influences.

M. Arson has sent to the French Academy of Sciences a second paper on his system of neutralizing magnetic influences on board iron ships, and recommended experiments to be made on the iron advice-boats now constructing in the French harbors. As these boats are being built by sections, nothing would be easier than to introduce plates of copper between them, and to use brass rivets, whereby the magnetic forces, neutralizing each other, would cease to exercise any action on the needle. M. Treves wrote to say that he had communicated to the Minister of Marine a new plan for the construction of the mariner's compass. The binnacle is to be of thick copper, and under each rose a thick horizontal plate of the same metal is to be placed, M. Treves having ascertained that copper exercises an influence on the needle by deadening its oscillations.

## The Case of Dawson v. the Bricklayers' Union.

While we greatly regret the unsettled state of the differences that unfortunately exist between the trades unions, and those who believe these organizations either unnecessary, or injurious to the interests of all parties concerned, we trust that the legal controversies that have grown out of them will result in a definite understanding of the exact legal status of these combinations.

The case of Henry B. Dawson, against the Bricklayers' Union in Westchester Co., the initiatory proceedings of which were noticed on page 3 of the current volume of the SCIENTIFIC AMERICAN, has finally resulted in a verdict adverse to the defendants. The complaint charged a conspiracy against the defendants, in that they prevented the son of the plaintiff from obtaining employment. We understand that an appeal from the verdict rendered will be made, and it yet remains to be seen what will ultimately come of it. The case is an important one, and its progress will be watched with interest by employers and employes throughout the entire country. Meanwhile it will not be surprising if the success so far gained by the plaintiff in this case should encourage further litigation, but as the case can not be said to have terminated, it would be wiser, we think, to await its final result.

"THE SCIENTIFIC AMERICAN.—This journal is certainly one of great value. We have read it with interest for twenty years, and it is among the first papers inquired for by our children when the time for its weekly visit arrives. It is full of important suggestions and scientific facts; and we think it has done more to elevate and stimulate thought among the laboring classes, than any other journal published in this country or Europe. Many years ago we received a suggestion from its pages, which was worth to us pecuniarily several thousand dollars. It is probable others can make a similar statement. We are led to make these observations in justice to an excellent journal."

We extract the above notice from the *Boston Journal of Chemistry*, one of our most valuable exchanges, edited by Dr. James R. Nichols.

It is stated that the Conecuh and Pensacola rivers are literally jammed for a distance of 200 miles with saw logs belonging to the Pensacola Lumber Co. They are destined to be sawed at Molino.

## Editorial Summary.

A NEW ENGLAND paper speaks of a flourishing establishment at Middletown, Conn., engaged in the manufacture of silver plated ware, calling special attention to the fact that the business was begun four years ago in a small room, and with one machine, while seventy-five men are now required to produce the goods which the market demands. The success of this concern, and its quick growth into a large business is not a rare event. Beekman street, in this city, is the home of hardware dealers, for example; and many of the most extensive and attractive stores devoted to the sale of hardware sundries on the street, are the metropolitan sales-rooms of gigantic manufacturing concerns that commenced like this one quoted by the New England paper, "in a small room, with one machine." The history of some of the heaviest hardware manufacturers of New Britain, Middletown, Bridgeport, Waterbury, and Norwalk, Conn., would be an exceedingly interesting and attractive one.

ONE of the most industrious streams in the country, is the Quinebaug, which starts for the Atlantic from Massachusetts, via Norwich, Conn. Before it is fairly on its way, it is pressed into service at Southbridge and obliged to turn the wheels of at least a dozen factories, most of them cotton, and extensive. After that it hurries southerly through eastern Connecticut, turning a wheel at almost every furlong of the way, and setting in motion hundreds of thousands of spindles. At Norwich it is obliged to take on its back a dozen propellers, and some of the most magnificent steamers that run to New York, and carry them to the Sound; and there, setting them afloat on the sea, it indulges in the rest and quietude which its eventful career has fully earned.

CINCINNATI has heretofore insisted on making a break in the railroads centering at that city in order that travelers through might be levied upon by the hackmen and hotels. The result has been disastrous to the interests of the city, and the papers are urging an improvement in this respect, and an endeavor is made, also, to procure a direct line to the south, by bridging the Ohio from Cincinnati across to Newport. The navigational interests of that section oppose the bridge, as it is feared that it will injure the navigation of a river which is at present none too reliable in the matter of floating facilities.

AMERICAN ART has suffered a serious loss in the death of Charles Loring Elliot, of Albany, the most eminent portrait painter which this country has ever produced. He began life as a clerk in a country store, but his innate love for art conquered his business faculties, and he soon applied himself to portrait painting, and achieved a deserved fame. His first sitters in this city were Mr. and Mrs. Cornelius Vanderbilt, for whose portraits he received fifty dollars each. His last ten pictures brought him seven hundred and fifty dollars each. We are glad to learn that he leaves his family well provided for.

A CURIOUS case of spontaneous combustion took place recently at Gaines, Michigan. Some cotton saturated in linseed oil that had been used as a dressing for a barn, was removed and thrown aside, when in a few hours it commenced burning spontaneously. Cotton or woolen covered with oil which oxidizes rapidly when distributed thinly over a great extent of surface has often been the source of disastrous conflagrations.

CAPTAIN STEVENS ROGERS who is said to have taken the first steamship over the Atlantic that ever crossed it, died recently at his residence at New London. Among his personal effects is a magnificent gold snuff box presented to him by the Emperor of Russia in honor of his success in the first experiment in transatlantic steam navigation.

THE propeller *Congress*, of Detroit, after fully testing the invention, has adopted and just commenced running with petroleum for fuel. The cost is half the cost of wood; while the oil to do the work of forty cords of wood can be carried in the space of four cords, leaving the space occupied by thirty-six cords for freight.

THE ties of the Chicago & Quincy railroad are all kyanized by immersion, for thirty hours, in carbolic acid, at 245°. They are, when so prepared, as black as charcoal, and believed to be practically indestructible.

THE number of threshing machines in the country is about 225,000, and they save five per cent more of the grain than the flail. There is a total to the credit of the machines of about 10,000,000 bushels annually.

FORGE VILLAGE, Mass., makes 1000 pounds of horse shoe nails daily, and the factory gains a profit of 1600 a month, which is at once returned to the works by increasing their capacity to the demands of their rapidly growing business.

ALLEGHENY, Pa., has a flowing salt well on one of its streets and though much of the water runs to waste, the owners make one hundred barrels of salt daily. They intend, soon, to work up the whole of the product of the well.

DETROIT is using a new invention for keeping the water in the boilers of steam fire engines in such condition that steam can be generated and the engine working in two minutes. The fuel used is coke, and the expense seven cents a day.

PITTSBURG is examining, with much satisfaction, a machine for undermining coal. The local papers say that it works easily, cheaply, steadily, saves coal, does not strike, and can go by steam, horse, or man power.

## MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Mayo lode (Colorado), west of the Coin lode, is at present yielding silver ore that assays \$935 to the ton.

The shaft on the celebrated Cornet lode is now sixty-five feet in depth, carrying three feet of pay ore.

The bar mining below Idaho has been seriously interfered with by the high water which is now subsiding.

The owners of the Equator lode, Colorado, have commenced shipping ore to Newark, N. J., for reduction on account of the limited facilities for shipment to Cheyenne.

The shaft in the Awaunda lode, Leavenworth Mountain, is now fourteen feet deep. The vein is four feet wide carrying a very fine gangue thoroughly interspersed with mineral.

RAILROAD BRIDGE BURNED.—The Chicago and Northwestern railroad bridge at Sterling, Ill., 800 feet in length, was burned on 21st Aug. It will shortly be replaced.

PROSPERITY OF OUR RAILROADS.—The gross earnings of the principal railroads of the country for July of this year, exceed those of the same month of 1867 by about nine per cent.

SILVER IN THE ARTS.—It is estimated that one hundred thousand ounces of silver is daily consumed throughout the world, in the manufacture of silverware, watches, jewelry, photographs, and in the other manufactures and arts.

PERSEVERENCE AND INDUSTRY OF AMERICAN WORKMEN.—Several mill operators at Lewiston, Maine, are building houses in their spare hours. Working in the mills nearly twelve hours per day they manage to secure a little time before the bell rings and after they come out at night, which they devote to building operations. A short time ago one of these persevering men was seen shingling after eleven o'clock at night, and the next morning was at work almost before light.

## Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more important American and foreign patents.

GRAIN SCREEN.—J. H. H. Wiseheart, Shawneetown, Ill.—The object of this invention is to furnish a cheap and simple apparatus whereby grain may be thoroughly cleaned and separated from dirt, sticks, chaff, dwarfed kernels, etc., in an expeditious and convenient manner.

COMPOSITION FOR GRINDING MARBLE.—J. C. McAfee, West Alexander, Pa.—The manner of applying the sheets or plates of my improved composition to planes or polishing tools is represented by a longitudinal vertical section of such plane or tool, having a detachable shoe or sole formed of the composition.

STEAM GOVERNOR.—Thomas Alsop, Elkhart, Ill.—The object of this invention is to construct a steam governor, with its parts so arranged and operating, that if the belt slips, or an accident happens to the machinery, the governor will cut off the steam and stop the engine, in addition to properly performing its functions as a steam regulator at other times.

WARMING ATTACHMENT FOR STOVES.—John Fahrney, Boonsborough, Md.—This invention consists of an attachable and detachable horizontal iron rim which is to be used in connection with upright cylindrical stoves, for the purpose of supporting dishes, etc., around the stove, to be warmed by the heat radiated from its body.

LOW-WATER INDICATOR.—T. G. Eiswald and James Barbour, Providence, R. I.—The object of this invention is, so to construct a low-water indicator that the fusible plug, when melted, shall not be blown into the whistle, but shall be forced in another direction, so as to prevent the possibility of its obstructing or interfering with the operation of the alarm apparatus.

MILKING STOOL.—O. H. Earl, Hermon, N. Y.—This invention consists in a clamping device, arranged to be closed and maintained in a closed condition, by the weight of the milker, in a sitting position on the stool, whereby the long hairs of the tail, being placed between the clamping jaws by the milker, before sitting down, will be clamped and held until he rises, when the jaws will separate and release the tail.

LET-OFF MOTION FOR LOOMS.—Benj. F. Carter, Manville, R. I.—This invention relates to improvements in let-off mechanism for looms, designed to provide means whereby the warp yarns shall be held rigidly against the action of the lay, while beating up, as is found to be highly necessary in weaving heavy goods, and, at the same time, permit the tension of the yarn to effect the delivery of the same after the lay has beaten up the web.

PLANE.—George Buckel, Detroit, Mich.—The object of this invention is to provide a plane so arranged that the thickness of the cut may be regulated, either in a positive manner, or by the pressure of the hand, and that the bit may be raised out of contact with the board being operated on when it is being moved back.

MACHINE FOR FORMING RAISED PANELS.—F. D. Green, Williamsport, Pa.—This invention has for its object to furnish an improved machine for forming raised panels, so as to raise and finish a panel at one operation.

TRACE FASTENING.—Thaddeus Peck, Stratford, Conn.—This invention has for its object to furnish an improved device for securing traces to whiffletrees which shall be simple in construction, allowing the traces to be easily and quickly attached and detached, and holding them securely in place.

CHURN.—C. N. White, Batesville, Miss.—This invention has for its object to furnish an improved churn, simple in construction, easily operated, in which waste in churning and the ingress of dust, or other impurities, are effectually guarded against, and which will bring the butter in a very short time.

SAWING MACHINE.—Peter S. Beldier, South Easton, Pa.—This invention consists of an arrangement of means for feeding an adjustable circular carriage. Also, an arrangement of means for automatically stopping the feed when the cuts have been sawed through. Also, an arrangement of means for automatically varying the feed.

PLATFORM SPRINGS FOR VEHICLES.—Chas. D. Sutton, Tarrytown, N. Y.—This invention has for its object to furnish improved platform springs for vehicles, which shall be stronger, more durable, no heavier, and no more expensive than the ordinary platform springs, and which will allow the draft to be attached lower down than it can be with the ordinary springs.

OPERATING BELT SAWS.—George Thompson, Nashua, N. H.—The object of this invention is to provide a means of operating belt saws, whereby the curve of the saw at the point of its operation on the wood may be varied to cut staves, lagging (so called), and other work of a curved character for which it may be applicable. It consists of a belt saw steadiad by a number of adjustable small pulleys and running on a main pulley, which is driven by a driving belt which is so arranged upon several other pulleys as to hug the main driving pulley for half of its circumference, and by its friction against the same transmit motion to it.

WAGON BRAKE.—F. D. Ladenberger, Glenbeulah, Wis.—The object of this invention is to provide an effective wagon brake, which is operated in a simple and convenient manner.

AUTOMATIC FLY BRUSH.—B. F. Day, East Freedom, Pa.—This invention is a machine for actuating pestle brushes with a horizontal reciprocating motion, the motive power being furnished by a spring and train of wheel work. It is designed to be placed upon a table during meals, or at the side of a sick bed, to produce a gentle current of air and drive away flies, mosquitoes, and other annoying insects in the air.

AUTOMATIC LIQUID METER.—Charles H. Riggs, Warwick, N. Y.—This invention consists of a combination of floats and siphons arranged within a chamber to operate automatically in moving the registering mechanism as the water passes through the meter.

COUPLING FOR VEHICLES.—Chas. W. Greter, Three Rivers, Mich.—The object of this invention is to accomplish the abrupt or sharp turning of the front wheels of vehicles without jointing the coupling or reach pole of the same.



**HORSE COLLAR FASTENING.**—W. A. Sharp and J. A. Shannon, Tama City, Iowa.—This invention relates to a new and improved method of constructing the collars of horse harness whereby many advantages over the ordinary method are secured.

**SECTIONAL STEAM BOILERS.**—Charles Bean, East Douglas, Mass.—This invention relates to a new and improved plan for constructing steam boilers whereby they are rendered more durable and more effective as steam generators than those of ordinary construction.

**MACHINE FOR MAKING GINGER SNAPS.**—Daniel M. Holmes, Williamsburgh, N. Y.—This invention has for its object to furnish a simple, convenient, and effective machine by means of which ginger and other snaps may be made from soft dough rapidly, conveniently, and accurately.

**PIPE CUTTER.**—John Peace, Camden, N. J.—This invention has for its object to furnish an improved tool for cutting off pipe, which shall be simple in construction and durable, and which will cut off the pipe quicker and better than the pipe cutters now in common use; cutting away the metal, and not leaving a burr upon either the outside or inside of the pipe.

**CAR HEATER.**—W. S. McNeill and O. S. Caldwell, Jr., Springfield, Mass.—The object of this invention is to construct a heater for heating or warming railroad cars by heated air that the air shall be purified before it is heated and discharge into the car and properly distributed therein, and so that fuel shall be economized and proper provision made for protecting the passengers and car from injury from fire in case of accident.

**HAND DRILL.**—Alfred Wirsching, Brooklyn, E. D., N. Y.—This invention relates to a new and improved drill, which is designed to supersede the ordinary bow drill, now generally used for fine or small work, by watch-makers, etc.

**HORSE RAKE.**—A. H. Robbins, Copenhagen, N. Y.—This invention relates to certain new and useful improvements on the ordinary wooden-toothed revolving horse rake; and it consists in a peculiar construction of the same, whereby the operator may control and operate the machine with the greatest facility, and the latter connected to a sulky or cart if desired, so that the driver or operator may ride if he prefers to do so.

**GRAIN AND GRASS HARVESTER.**—Amos Smith, Vienna Cross Roads, Ohio.—This invention relates to certain new and useful improvements in grain and grass harvesters, and it consists, first, in a novel and improved construction and arrangement of the driving gear; second, in a peculiar manner of applying the draft pole; third, in a novel manner of attaching or applying the finger bar to the machine; fourth, in a peculiar application of a lever for raising the finger bar; fifth, in a novel construction of the guards or fingers.

**SOIL PULVERIZER.**—Cornelius Berninger, Mier, Ill.—This invention relates to a new and improved device for pulverizing the soil, and it consists in a novel combination of a rotary toothed pulverizer, and a harrow fitted in a swinging or suspended frame, and attached to a mounted frame, all arranged in such a way as to admit of the soil being pulverized in an expeditious and perfect manner.

**CORN-SHELLING MACHINE.**—Geo. F. Johnson, Marshall, Iowa.—This invention consists in a rotary wheel provided with a central opening in which are provided a series of hooked shellers, having rages which press upon the cob to prevent the shellers from scraping the cob too deeply, the said shellers being provided with radial stocks, which slide on corresponding grooves in the rotary wheel, and surrounded by a spring which constantly bears them towards the center of the said rotary wheel. A set of feeding rollers is also provided for grasping the cob after a portion of corn on one end of the ear has been shelled off, and drawing it through the sheller, the whole being actuated from a hand crank.

**LOCKING DEVICE FOR LOOSE PULLEYS.**—William J. Linton, Detroit, Mich.—The object of this invention is to provide a simple and effective locking device, to be used in machinery, when pulleys or other wheels are required to run loose or fast on a shaft for locking or unlocking them.

**JOINERS' PLANES.**—F. Smith, and I. Carpenter, Lancaster, Pa.—This invention relates to improvements in joiners' planes, whereby it is designed to render the stocks less liable to warp, to regulate the weight of the same, to provide for a more perfect delivery of the shaving, adjusting the same to be used as a single or double plane, and adjusting the mouth so as to govern the width of the same, for the passage of the shaving.

**SAW-SET.**—W. B. Weaver, Reading Center, N. Y.—This invention relates to a new and improved saw set, and it consists in a peculiar construction of the same whereby it may be readily adapted for setting the teeth of large and small saws, and also adapted for other purposes or uses than setting saws.

**PUMP.**—Jehyleman Skaw, Bridgeport, Conn.—This invention consists in placing the ordinary lift pumps within a cylinder, provided at its lower end with a holding valve; the piston rods of the two pumps being connected by ends or chains passing over a pulley, and all arranged in such a manner that the device is made to operate as a force pump, and elevate water or other fluid to any desired height, according to the amount of power applied to operate it.

**CAR BRAKE.**—S. W. Y. Schimonsky, Cheyenne, Dakota Ter.—This invention relates to a new and improved brake for railway cars and consists in a novel construction of the same, whereby the principle of the wedge is applied to the shoes, and the brake rendered self-acting and entirely self-locking. The object of the invention is to obtain a brake which will be efficient in its action, strong, and not liable to get out of repair, and which may be applied with a very slight effort or expenditure of power.

**LAMP WICK.**—Wilhelm August Gensch, New York City.—This invention relates to a new lamp wick, which is composed of animal and vegetable fibre, fitted together so as to be more effective and useful than those now generally made.

**MACHINE FOR CUTTING MITER JOINTS.**—Frank A. Howard, Belfast, Me.—The object of this invention is to accomplish the cutting and fitting of miter joints for moldings, picture frames, and the like, in a perfect and expeditious manner. It consists in a sliding V-shaped cutter, composed of two shear edges and an adjustable V-shaped rest plate, together with other devices perfecting the whole.

**CAN HOLDER.**—M. M. Shurr, Delaware, Ohio.—This invention consists in the combination of expanding staves with a hollow box and staff sliding thereon, together with other devices perfecting the whole. It is used for holding cans to be soldered, and is designed as an improvement upon a machine for the same purpose patented by Henry P. Dennis (No. 45,183).

**PERMUTATION LOCK.**—T. J. Sullivan, Albany, N. Y.—This invention relates to improvements for setting the combination of any lock having indented wheels, actuated by a knob bearing a graduated circle exterior to the lock, but is designed more particularly to improve a lock previously patented by the same inventor. The invention consists in attaching circular springs to the disks containing the combination wheels, said springs being each provided with a detent pin for detaining the combination wheels at any desired point, by fitting into the indentures of the same, together with other devices relating to and perfecting the whole.

**SEWING MACHINE.**—Robert Barclay, Buffalo, N. Y.—This invention relates to a new and improved sewing machine, and it consists in a novel feed mechanism and a take-up movement for the thread, whereby simplicity, economy in construction, and durability of the working parts are obtained.

**FIRE GRATE.**—G. H. McElevay, Newcastle, Pa.—The object of this invention is to construct and arrange a fire grate and the plates and fixtures connected therewith, that the fuel shall receive a supply of oxygen from the back and ends as well as from the front and underside of the grate, and so that the heat generated shall be utilized instead of being passed directly to the chimney from the throat of the grate, as is ordinarily done.

**WATER WHEEL.**—P. H. Watt, Sandy Hill, N. Y.—This invention relates to a new and improved water wheel of that class which is secured on a vertical shaft and rotate in a horizontal plane at the lower end of a cylindrical case under the chutes or water guides.

**CAR COUPLING.**—Leonard Monzert, New York City.—This invention relates to a new car coupling, of that class in which two jaws are employed for holding the connecting link, and consists in the application of a ring, which is fitted around the coupling box, and which, by being turned, serves to lock the jaws together, or to release them, to allow their opening, as may be desired.

**WEAVING MACHINE.**—Adolph Wagner, New York City.—This invention relates to a new machine for weaving hoopskirts and other fabric of suitable tubular or irregular shape, but is more particularly intended for the manufacture of petticoats and hoopskirts. The invention consists principally in the use of a circular machine in which the fabric is woven around a block suspended between the warp carriers and the track of the shuttles, said block being up and down as well as lat-rally adjustable, so that it may always be adjusted centrally between the shuttles; however irregular its shape may be.

**SHUT MACHINE.**—Henry Stanley, St. Johnsbury, Vt.—This invention consists of an arrangement of fan-blades within cases which are curved around the fans in the form of scrolls, into one of which the grain to be cleaned is admitted through the air passage to the fans, and from which it is forced by the blast of air around the scroll (the sides of which are perforated), to the mouth into a spout communicating with the next fan chamber, and in like manner forced from there to the mouth of the scroll, when it encounters another blast of air from another fan which is designed to separate the chaff.

**MACHINE FOR ROLLING SAW LOGS.**—Elihu Tarrant, Muskegon, Mich.—This invention has for its object to furnish an improved device for turning or rolling logs upon the carriage of circular or other saw mills, which shall be simple in construction, effective in operation, and conveniently operated.

**FIRE ESCAPE.**—Thomas Thompson, Jr., New York City.—This invention has for its object to furnish an improved fire escape for permanent attachment to the outer sides of buildings, which shall be so constructed and arranged, that it may be conveniently lowered when required for use, and raised again out of the way when not required for use.

**VULCANITE RUBBER BILLIARD BALLS.**—For many years, indeed, since the game of billiards became popular, there has been a demand for a substitute for the ivory of which billiard balls are made. The game seems to demand a certain weight, a fixed diameter, and a degree of elasticity to the balls; qualities difficult to combine in their necessary proportions in any manufactured material. But Mr. W. H. Lippincott, of Pittsburgh, Pa., claims by a patent obtained through the Scientific American Patent Agency, May 13, 1868, to have succeeded in obviating these difficulties, and in producing a ball superior in some respects and equal in others, to those made from solid ivory. He says: "Although a number of attempts have been made to construct billiard balls of vulcanized rubber, none have succeeded in overcoming the difficulties of thoroughly vulcanizing them. Balls vulcanized by single layers in square blocks, when turned, will be only one-half the required weight, and are liable to be porous. By my process all the qualities of elasticity, density, weight, etc., are obtained, and the balls will last for years; cheaper in first cost, smooth as ivory, and not liable to chip, crack, or get out of truth. These balls are susceptible also of a high polish, and can receive any color desired." The inventor forms first a ball of say one inch diameter and vulcanizes it, then increases the size by successive vulcanizations until the desired thickness is attained. The constant expense for the renewing of the stock of billiard balls amounting for each table to \$32 for eight sets per year, makes this invention worthy of attention.

## Answers to Correspondents.

**CORRESPONDENTS** who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

**SPECIAL NOTE.**—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1.00 a line, under the head of "Business and Personal."

All reference to back numbers should be by volume and page.

**A. M. C., of Mo.**—Is there any depth in the ocean to which an iron weight or bar would not sink. Ans. No.

**E. B., of Pa.**—Wire can only be properly coated with gutta-percha by machinery. For any small work, it may be coated by hand, softening the gutta-percha by immersing in water heated to 200° Fah.

**S. H., of N. J.**—The contraction and expansion of the spindle by heat and cold is sufficient to account for the fact you describe. We can supply some back numbers but not all; the rates are the same.

**R. C., of Mass.**—The pressure upon a closely fitted steam valve not covering any ports is as the area of the valve and the pressure of the steam. When it covers ports it is the same minus the back pressure from the cylinder.

**H. A. S., of Mo.**—Owing to the variety of circumstances under which stones and bricks are used in building no general rule can be given for computing the strength of structures. Each case must be worked by itself. Mahan's Civil Engineering gives all the necessary tables and data.

**J. H. W., of Mass.**—Sheet iron plates are galvanized by first cleaning the sheets with dilute sulphuric acid, hammering, and scrubbing with emery and sand. The plates are then immersed in a bath of melted zinc covered with sal-ammoniac. Galvanized iron plates are simply iron coated with zinc. There are several other processes of manufacturing it.

**H. A. S., of Me.**—"Would coal tar on a roof injure the rain water caught from the roof when used for domestic purposes?" If the roof has been newly coated the taste will be perceived for a time, but it is in no sense unhealthy.

**T. H., of W. Va.**—This correspondent states that his steam boiler, fed with good, pure well water, after lying unused for a time, shows honey-combed holes filled with a "substance resembling black lead," and that his boiler leaks badly. He asks if an acid is present an alkali like soda or lime will neutralize it and prevent its deleterious effects. Either, we think, will do the business. It is evident that the water he uses is unfit for boiler purposes. Better procure water from a purer source.

**W. M. G., of Vt.**—This correspondent has a plan for setting off the divisions of a gear to be cut on an engine which seems to be novel, but the description sent is too obscure to be valuable. We advise him to insert an illustration of his device in our columns if he desires to introduce it to the trade.

**E. H. H., of Mich.**—sends a plan for a gear cutting engine which has been in use for many years, and is not popular among machinists. His plan presents no novel features and its publication does not seem advisable.

**C. B., of Iowa,** proposes to build a five-horse power boiler thus: The shell a cylinder 12 feet long and 24 inches diameter with one flue 14 inches diameter, shell and flue to be connected at the ends with heavy cast iron rings 24 inches external and 12 inches internal diameter, to fit shell and flue, they are to be attached to the ring with tapped bolts instead of rivets. Set the boiler at an angle of about 30 degrees making one end a steam chamber, the products for combustion to circulate all around the shell below the water line and return through the flue its whole length to the chimney. The feed water pipe to run down through the flue—coiled if desired—and enter into the lower end at the bottom with check valve. "Do you think such a cheaply constructed boiler would be safe?" The plan is neither new nor safe. Similar boilers have exploded some months ago, one in Williamsburg, L. I., which we noticed at the time.

**J. P. J., of Mass.**—Paper of the proper sort is a good material for cleaning the face of a mirror or window glass, but the use of ordinary newspaper is not to be recommended. Much of the paper used for printing the common daily and weekly journals is manufactured from straw, which contains a large proportion of silica or flint, and the process of grinding, pulping, etc., is not sufficient to eliminate this substance. Consequently a glass often rubbed with newspapers exhibits in time a congeries of scratches, less pleasant to behold than dust or fly-specks, as flint will scratch glass, if it cannot cut it as the diamond.

**B. J. P., of N. Y.**—The business information you desire we cannot give, neither are we acquainted with the composition of "Zopless" cement. We believe it has not yet been made public. Ammonia dissolves

copper when exposed to the air. As long as it is thus exposed it has a splendid blue color, when not so exposed it becomes colorless. The copper in the former case is an oxide in solution, in the latter it is a dioxide. The process of making the solution of metallic copper being slow, the same solution may be more rapidly obtained by using the hydrated oxide. The statement that this solution will dissolve lignin has the sanction of good authority. Linseed oil is oxidized by heating it with litharge. Nitro-benzole is made by slowly adding benzole to fuming nitric acid gently heated; upon the addition of water the nitro-benzole separates in the form of a heavy yellow oil.

**B. F. L., of Pa.**—It is probable that you can obtain the work of Dr. Beaumont referred to in the article, of Lea & Blanchard of Philadelphia.

## Business and Personal.

The charge for insertion under this head is one dollar a line.

For State and County rights to the best and cheapest sorghum stripper now in use, address C. P. Hale, Calhoun, Ky. Agents wanted.

Half the profits of a cotton gin that will add twenty per cent to the value of the lint, given to the manufacturers. Jas. S. Carnall, Lockhart, Texas.

Wm. G. Vermilye, 6 Park Place, New York, gives special attention to the manufacture of india-rubber articles for inventions.

Siccobast, that dryer for linseed oil, made in Boston by Mr. Asahel Wheeler, which so astonishes everybody who knows about paints—what is it? What does it impart to the oil? Simply causes oil to attract oxygen from the air and dry with the pigment upon the surface.

Metallic cartridge machine makers send circulars to J. V. Meigs, postoffice box 1031, Lowell, Mass.

Broughton's lubricators, for suet or oil, have none of the objectionable features which pertain, more or less, to all others. Manufactured by Broughton & Moore, 41 Center st., New York. Their gage cocks and oil cups are the best.

If you want to buy a factory with water power, read advertisement in another column.

Wanted—samples and price of native sumac. Address D. Miles, 95 Water st., Boston, Mass.

Pratt Brothers, publishers and printers, 37 Cornhill, Boston, will negotiate with writers for the publication of popular manuscripts, provided the authors will guarantee the sale of one-half the first edition.

Metal-edge card and show-bill manufacturers will please address H. C. Small, box 2169, Portland, Me. State whether the article is patented, and where the machines can be purchased.

A paying investment.—We are offering County and State rights. Also, manufactured goods of newly invented and patented household articles of great merit, at very low prices. On receipt of \$1.75 we box and ship the above, nine articles, with directions and terms. Agents wanted every where. Send for samples. Marsh & Co., 33 Maiden Lane, N. Y.

Wickersham's American oil feeder, combining principles of the siphon capillary attraction, and filtration; saves 50 per cent in oiling journals; perfectly reliable; always under control. J. B. Wickersham & Son, 143 South Front st., Philadelphia, Pa.

Those prepared to manufacture the beam steelyard please address H. Marsanville, Akron, Ohio.

Machines for boring, turning, and slotting pulleys, mill gearing, and turbine water wheels, ten feet diameter and under,—about half the cost and does double the work of a lathe of same swing. Gear cutters of new and improved pattern, to cut gears 8 ft. diameter and under, and all kinds of machinists' tools. Send for circular to L. W. Pond, 98 Liberty st., New York.

For descriptive circular of the best grate bar in use, address Hutchinson & Laurence, No. 8 Dey st., New York.

Peck's patent drop press. Milo Peck & Co., New Haven, Ct.

Parties about to buy steam boilers should examine Root's wrought iron sectional safety boiler at 95 and 97 Liberty st., New York. See advertisement.

Spring-bed bottom—unequalled for simplicity, cheapness, and durability. Manufacturers wanted as agents. Address S. C. Jennings, Wautoma, Wis.

Moss' improved compound oil for use in the manufacture of woolen goods, and the greasing, carding, cleansing, and spinning of all kinds of wool is the greatest invention known. Address Moss & Lindsey, New Richmond, Ohio.

N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

For sale—just finished—an 18x43 Wright engine. Address Merriek & Sons, Philadelphia, Pa.

For sale—the whole or a part of a paper mill, all new machinery. For particulars address L. A. Beardsley, Fredericksburg, Va.

For sale—the patent right, in Great Britain, for perforated saws. The manufacture of these saws is now firmly established in the United States, and they are rapidly taking the place of all solid saws. Apply to J. E. Emerson, Trenton, N. J.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct.

Wanted—a second-hand steam hammer. Norway Manufacturing Company, Wheeling, W. Va.

## NEW PUBLICATIONS.

**HANDBOOK OF THE STARS, for School and Home Use.** By W. J. Rolfe and J. A. Gillett. Boston: Crosby & Ainsworth. New York: Felt & Dillingham, successors to O. S. Felt.

The study of astronomy is of all others most calculated to enlarge and elevate the mind. Descriptive astronomy is particularly adapted to interest youth, and can be pursued advantageously without a previous knowledge of the higher mathematics. The little work before us is designed to aid the school and family in this important study, and seems well adapted to the purpose. It has maps of the constellations, including all the stars down to the fourth magnitude, with a table of all the constellations visible during each month, and full instructions as to their location, their history and mythology. The book is printed and bound in superior style. An additional attraction is its description of the spectroscope and its use in the study of the heavenly bodies.

## THE WORKSHOP.

We are in receipt of the seventh number of "The Workshop," containing besides its usual amount of useful and artistic designs, some very entertaining and instructive remarks upon the subject of antique vessels, and a valuable article on the "Employment of Calcareous Tufa for the Production of a Fine, Artificial Marble."



### Device for Regulating the Flow of Water to Pulp Engines.

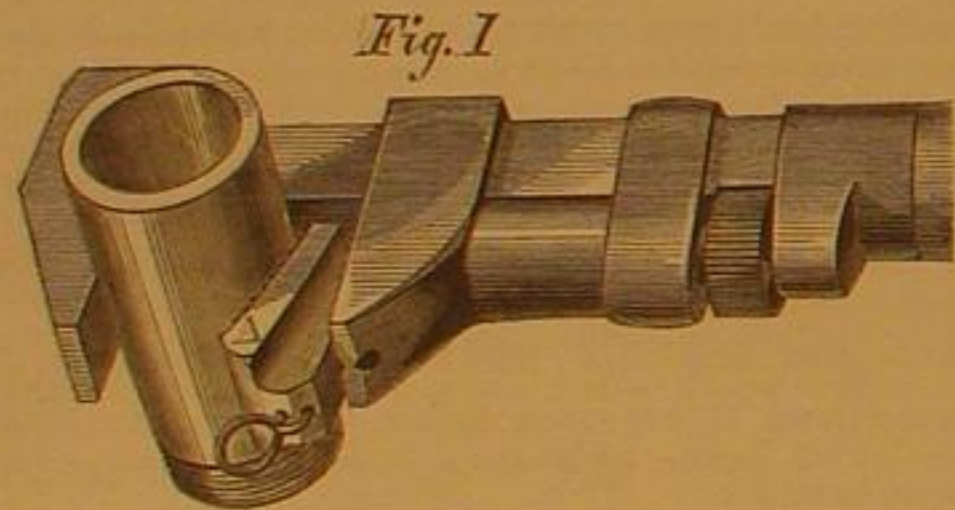
Annoyance and waste of stock is sometimes caused in paper making by the overflow of the engine tank, or by the insufficient supply of water. The design of the improvement herewith illustrated, is to prevent the occurrence of these difficulties by furnishing an automatic feed for the water by means of which the supply shall be regulated and governed by the level in the tank.

A, is the usual tank, shown empty in the engraving. B, is the supply pipe, by which the water is led to the regulator, C, from which leads the delivery pipe, D, that conducts the water to the tank, A. The interior of the regulator, C, is shown in the section Fig. 2. It will be seen that the water is admitted from a proper head, in the direction of the arrow at B, to a chamber, the walls of which extend across the regulator, and are pierced at top and bottom by apertures forming valve seats in which fit downward opening valves secured to a rod, E, to the lower end of which is attached a suitable float, F, sustained on the surface of water in a reservoir, G; the level of the water in the reservoir being kept at the height of that in the tank by means of a connecting pipe, H. A drip pipe, I, leads any surplusage of water from the regulator, C, to the reservoir, G, and a lever, J, Fig. 2, may be attached to the top of the regulator, C, to open the valves by hand, if at any time it may be deemed necessary.

From the foregoing the operation of the device may be readily understood without further explanation. It was patented through the Scientific American Patent Agency, by David Hunter, North Bennington, Vt., to whom all communications relative to the device should be addressed.

### FARIES' PATENT SUPPLEMENTAL JAW FOR SCREW WRENCHES.

The object of this device is to provide a handy auxiliary jaw for the common screw or monkey wrench, by which the



ordinary wrench may be used for screwing up bolts by gripping their cylindrical surfaces or for piping purposes instead of the gas-piper's tongs. Its value as applied to these uses is apparent at a glance.



The supplemental jaw, A, seen plain in Fig. 2, is a wedge-shaped block slightly curved on face and back, the face being corrugated or toothed to give a better hold on the work, the serrations being so inclined that the greater the strain exerted in operation the more determined and positive the hold of the jaw on the work. A ring is fastened in the supplementary jaw by which it may be linked to the movable jaw of the wrench or suspended to the wrist of the operator if working on elevated places or in pits or excavations. In consequence of the slight curve given the auxiliary jaw, the points of bearing on the pipe, shaft, and the jaw of the wrench are directly in line with the force exerted, so that there is no transverse or wrenching strain tending to injure the wrench. It can be applied to or used with any ordinary wrench.

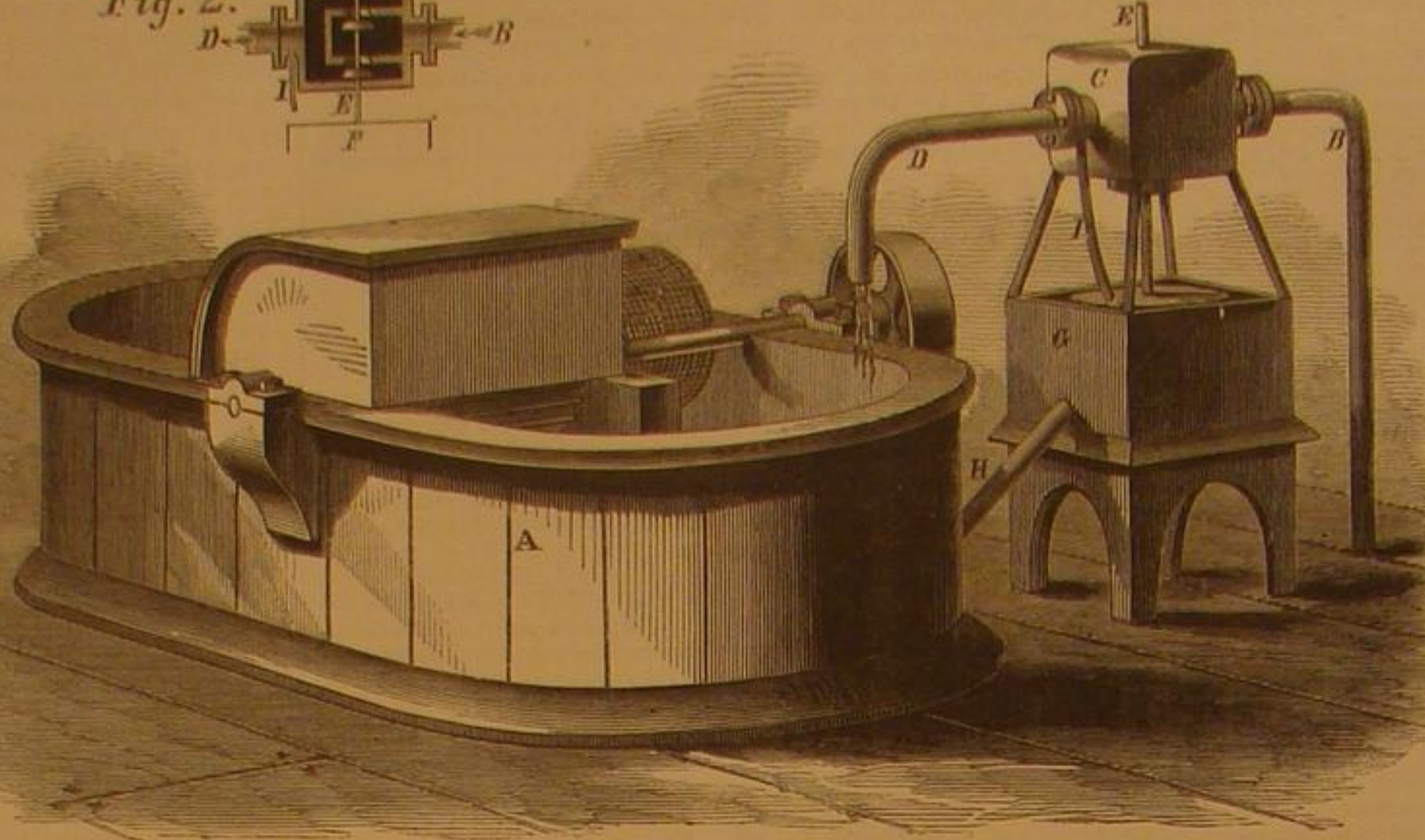
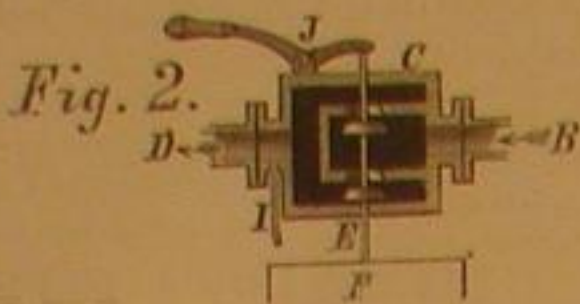
Patented June 23, 1868, by Robert Faries, who may be addressed for territorial and manufacturing rights, or the device itself, at Decatur, Ill.

### Erie Water Works.

The people of the thriving city of Erie, Pa., have been for years dependent for their supply of water on local wells, aided by an inefficient system of supply furnished by a limited and unreliable congeries of pipes fed by springs of small capacity. But it is soon to be supplied from the pure waters of Lake Erie, than which no better water for drinking, lavatory, or manufacturing purposes is in use. The plan, under the superintendence of H. P. M. Birkenbine, a well known Philadelphia engineer, is to erect on the shore of the lake an engine house and stand-pipe, the latter of sufficient height to provide a head capable of supplying the most elevated portions of the city.

The Erie Dispatch says: "The stand-pipe rises 234 feet above the level of the water, and stands on a rock 14 feet high, making the pipe 220 feet high; it is five feet in diameter, and is made of boiler iron 3-16ths of an inch thick at the top and

7-16ths of an inch at the bottom; it weighs 42 tons. This is to be surmounted by an ornamental spire of bright metal fifteen feet high. This is the highest pipe on the continent, and probably in the world. It was raised in a very novel manner, the invention of the contractor, and is well worthy of a patent. It was done very much as the Irishman proposed to build a chimney, 'hold one brick up and put another under it.' It was done by commencing with the top section and adding the lower sections in their regular succession, hoisting the pipe as each section was added, by means of derrick and pulleys.

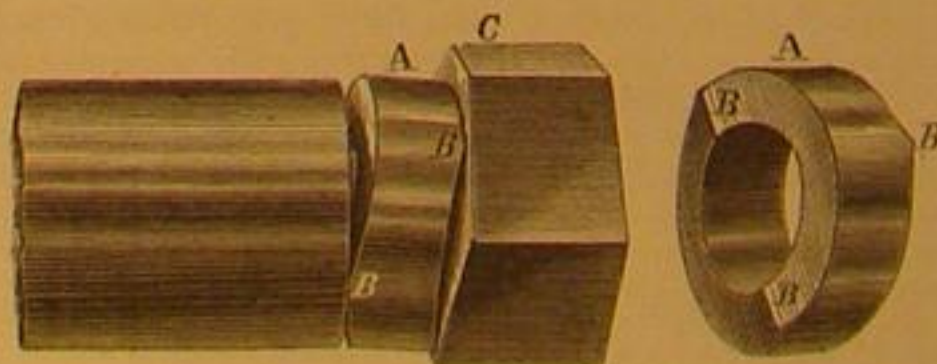


### HUNTER'S PAPER ENGINE WATER FEEDER.

"Around this pipe is to be built a tower 9 feet 6 inches from wall to wall, and 190 feet high from the rock, surmounted by a balcony five feet wide. The balcony is reached by a spiral stairway of 250 steps. The stairway and pipe will fill the entire space in the tower. The tower will be of stone 22 feet, and the remainder of brick. The engines are of the Cornish pattern. Their cylinders are upright, and are 60 inches in diameter and 10 feet stroke. The cylinders themselves are of immense weight. The pistons work directly in connection with the pump rods. This connection is made in the lower or middle story. The pumps are in the basement story, placed directly under the engines. They are 21 inches in diameter and 10 feet stroke, and are capable of pumping 2,000,000 gallons each in 17 hours. Adjoining the engine house is the boiler house, which is 50 by 60 feet and one story high, made of brick. In this will be eight boilers, 30 feet long and 42 inches in diameter, with two 14-inch flues. They rest on brick and stone work, built up from the solid rock. Each boiler will be independent of the others, so the stopping of one will not affect the others. The fire will not be under the boilers, as is commonly the case, but will be in front of them, in combination chambers. The smoke stack is to be 100 feet high."

### BOARDMAN'S DEVICE FOR FACING NUTS.

The accompanying engraving is a perspective view of a convenient little device for turning or facing nuts. It consists in providing a loose ring, A, with two rounded projections, B, on either side and at right angles with each other. This ring is placed on the screw-arbor between its shoulder and the nut, C, to be turned, and adapts itself to the irregular shape of the nut's rough surface, making an equal pressure on its opposite sides directly endwise with the arbor, and perfectly true with the thread. The engraving shows the ordinary style of arbor at one end, and the improved arbor and ring on the other.



The style of arbor now in use is shouldered down below the bottom of the thread, to allow the nut to be faced to screw up to its shoulder, and when the highest point of the nut strikes on one side of shoulder, and is screwed up hard enough to turn or face up the nut, the arbor will spring and the nut will cramp over on the few remaining threads of the arbor, and be faced out of truth. This improved arbor gives a thread bearing to the nut its entire length, and is not weakened by having the thread turned off, but is left full size of outside of thread. This invention was patented April 21, 1868, by Byron Boardman, of Norwich, Conn., and assigned to himself and Frank Douglas of the same place. For further information, or the patent rings, address Frank Douglas, Norwich, Conn.

### Carbolic Acid a Cure for Snake Bites.

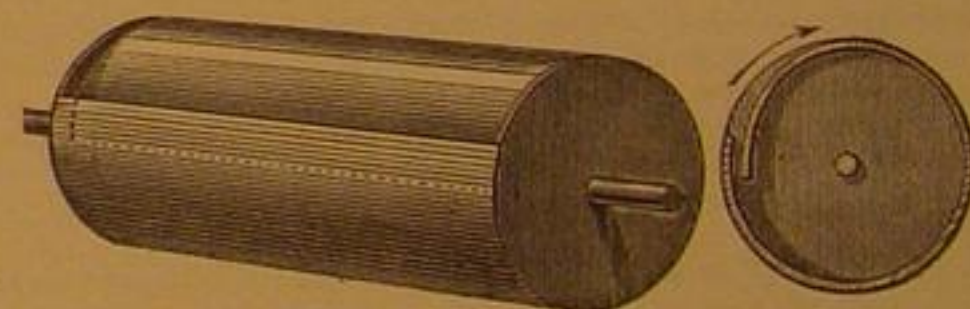
The following extract from a letter written by John W. Hood, M. D., from Australia, gives the results of the application of carbolic acid to the cure of bites of poisonous snakes:

"An unfortunate experiment, resulting in the death of the principal performer, as to the efficacy of a so-called antidote for snake bites, took place here some few weeks since, and of which I send you a report. The cure of persons bitten by the venomous snakes of Victoria has long been a favorite subject for experiments among the medical profession here. I, living in a city, have not the opportunity of meeting with

any human subjects to experimentalize upon, and have to rest contented with quadrupeds—most of which suffer death. However, I have long entertained the opinion that carbolic acid, taken internally and used as a caustic to the wound, would be found to be beneficial, and, perhaps, a specific cure. That I am right, to a certain extent, is proved by the fact that a friend of mine, a medical man living at War-ranambool, Dr. Boyd, successfully treated two cases of snake bite with carbolic acid. I am not aware of more particulars than that the first case was a young lad bitten by a tiger-snake, the most venomous these colonies produce, and Dr. Boyd, six hours after the boy was bitten, administered ten drops of pure acid, in brandy and water, every few minutes. He writes: 'The effect was magical—from a pallid countenance, slow pulse, and semi-comatose condition, the patient rallied to a bright expression, ruddy glow, and quick pulse, and the recovery, though slow, was continuous and certain.'

### IMPROVED TUMBLING BARREL AND COAL SIFTER.

The tumbling barrel is a very efficient means of cleaning small castings from sand, and brightening and polishing small metal work of all descriptions more effectually and much cheaper than can be done by hand. It is a cylinder suspended on an axle and having an aperture for the reception of the work to be cleaned, which may be closed and secured when the barrel is charged. For large work and where the tumbling barrel is kept nearly constantly in operation, it is built quite heavy, the staves being strong ribbed iron castings and the heads made to correspond, the whole bolted firmly together; but for light work an ordinary barrel or wooden



cask is used, or a square cornered box of wood is swung on journals and rotated. But all of them must have a door or trap which has to be secured so that none of the contents can escape while the barrel is performing its revolutions. Evidently there are objections to the ordinary tumbling barrel or rattling box, as time is required to open and close the aperture, and, as it is generally situated midway between the heads and the barrel is usually cylindrical, it is not easy to deliver the contents.

We present herewith a plan which we consider an improvement on the ordinary tumbling barrel. This one is always closed, and yet always open. Instead of being a cylinder it is in cross section a scroll, as seen. So long as the barrel rotates in the direction of the arrow its contents will remain inside, but if stopped and turned in the other direction until the aperture comes underneath, the contents are readily discharged. One advantage of this plan is that the opening extends the whole length of the cylinder and the contents drop at once from the whole of the interior. Facility of charging is another advantage, and the projection inside, of one edge of the casing over the other, makes a fall for effectually rattling and mixing the contents. The inner edge should pass the outer only sufficiently to prevent the escape of the contents.

As a coal and ashes sifter, flour and meal bolt, for sifting molding sand, etc., this device is equally well adapted, a wire screen or bolting cloth taking the place of the solid covering used in the tumbling barrel. It may be constructed of any material, wood or iron, boiler or cast, and still preserve its form and its advantages.

We do not claim to have originated this device, but received it from an enterprising mechanic, Mr. Boynton, formerly of Hartford, Conn. We believe there is no patent on its application, and we deem it worthy the attention of foundry men, hardware manufacturers, and others.

AN Ohloan has invented a car brake which acts directly on the axle, instead of the wheel. It is asserted that it will, by a quarter turn of the brakeman's wheel, bring a car to dead-lock, and that a train can be stopped instantly, though that, of course, would destroy the train.



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## THE INCREASE OF DISEASE AMONG DOMESTIC ANIMALS.

A very cursory examination of agricultural statistics and reports of different organizations relative to the diseases of domestic animals, brings prominently to view the fact that these diseases are on the increase. The causes which engender this augmentation of disease are an interesting and important subject of study. Some light may be thrown upon it by a consideration of the origin and progress of human diseases, with which the diseases of animals are in many cases identical, and in other instances bear so strong a resemblance that the principles of general pathology may be considered as equally applicable to both.

The medical faculty are generally agreed that, in the human race, diseases originate largely from the artificial habits of civilized society, which, although many of them really conduce to health, as cleanliness, the absence of the peculiar privations attending savage life, etc., are attended with practices contrary to the laws of health.

The congregation of people in large cities, high seasoned food, artificial stimulants, sedentary habits, etc., are fruitful causes of disease. Among the very poor inhabitants of large towns, the want of proper ventilation, light, and food, adds to the catalogue of "ills which flesh is heir to."

If we examine the mode of feeding, stabling, and breeding cattle, we shall find some of the same causes of disease in their improper management. Dark, ill-ventilated stables; too stimulating and concentrated diet; the crowding of animals in large herds and pens, are counter-types of the causes of human disease. These causes are well recognized among breeders, and we shall therefore not dwell upon them. Our object is to call attention to a fact which has its analogue in the culture of vegetables. The diseases which have from time to time made such havoc with the potato, the hop, and other plants largely cultivated, have been ascribed to over-cultivation. Not that over-cultivation is the direct cause of disease, but that the constitutions of the plants in question have become so weakened by it that they have thus been rendered susceptible to causes which otherwise would be resisted.

The practice of breeding stock in order to develop particular qualities, is, we believe, fraught with danger beyond a certain point. It is all very well to have horses that can trot in 2:30; hens that lay but will not set; sheep that will furnish a large fleece of a desired quality, or cows that yield thirty pounds of milk per diem, if these qualities can be obtained without the risk of initiating diseases that rage indiscriminately among, and ravage our flocks and herds, destroying alike good and bad. We do not believe that this result of the inter-breeding, so much in vogue among our most celebrated breeders, has attracted sufficient attention, or that the constitutional peculiarities and idiosyncracies of highly bred animals have been sufficiently observed. Now that the attention of the world is attracted to the epidemics and contagions that are making such havoc, raising the price of food and rendering people suspicious of its effect upon the health of mankind, this point demands immediate and thorough investigation.

## THE SANITARY CONDITION OF WORKSHOPS AND MANUFACTORIES.

A foolishly incorrect idea is generally prevalent that confinement inside a manufactory of any kind is detrimental to health, whether it be a machine shop, foundry, one of the hundred-and-one establishments for metal working, for wood working, or the cotton or woolen factory. Few manufacturing employments are necessarily unhealthy, and the confinement itself we do not believe to be either unhealthy or irksome. To be sure, there are some departments of the work,

perhaps, in each, which are not entirely pleasant, and, possibly, which, if long followed, might prove detrimental to bodily health; but, on the whole, mechanical pursuits are not more unhealthy than mercantile, or strictly out-door employments. It may be unpleasant to polish, day by day, at an emery wheel, to attend a gig saw, to manage a picker or set of cards in a cotton mill; but even in these extreme cases we believe much has been done to reduce the annoyance and mitigate the evil, if any existed.

On a visit, a few days ago, to South Norwalk, Conn., we spent an hour in the shops of the Norwalk Iron Works. Beautifully and pleasantly situated on a salt water estuary, close to Long Island Sound, the welcome breezes coursed through the many windows, making a cool retreat on one of the hottest days of the season. The buildings are pierced with windows, more than are necessary for light, but intended also for ventilation. Along the walls of the machine shops are the vise benches, next a single row, on each side, of lathes, planers, drills, shaping machines, etc., leaving the whole center free, encumbered with nothing more than piles of work in progress. The consequence is, clean, clear, well ventilated and well lighted rooms, giving the advantage of free, unobstructed locomotion, permitting the ingress of the cool salt breezes, tempered by the warm sun outside, whose too fervid rays could not reach the toilers inside the buildings. Toilers, did we say? Pleasant is their toil with such inducements to comfortable work. It is no wonder, that, as Mr. Earle, the manager, says, his men choose to spend their Sundays during the hot season of this summer in the shop, rather than at their homes, conducting religious exercises on their "own hook," combining comfort with moral and religious instruction.

Here are employed not only the brawn—the muscle and sinew—of the locality, but no small modicum of the brain, the intellect of Norwalk. We could not help but notice, in conversing with the "hands," the aptness of apprehension, the promptness of reply, the independence of thought, and the general physical and mental health of these enviable American citizens. They were as well "booked up" and "posted" on the news of the day, and on the

"Great thoughts that move mankind."

as those who make the news and those thoughts their specialty. Indeed our columns bear witness, in their published communications, that our mechanics are frequently not only as close thinkers, but as deep and earnest investigators as those who work only with the pen. These workmen, employing their shop hours in the production of pumps, use their leisure in improving their minds, and acquainting themselves with the state of local and national politics. Individually they exercise a large power. Could they do it if herded and crowded together in an ill-ventilated shop from whence they would go exhausted to a supper and bed? And could they properly and intelligently do their work if they returned in the morning to a close, unventilated shop? Decidedly not. A clean, airy workshop is an advantage to employer, employee, and the public generally.

A late visit to the works of one of the largest cotton corporations in Lowell, Mass.,—the Boot—served but to confirm us in the idea that the provision of clean, airy, and comfortable rooms is peculiarly profitable to the proprietors. Clear heads and cheerful minds conduce not less to intelligent labor than to bodily comfort, and acting on this idea, the managers of these vast establishments have wisely applied the proper means to this end.

## PAPER COLLARS.

Some querulous person once wrote to a public journal that the pleasure of the tourist was all but spoiled now-a-days, by the prevalence of paper collars. At first this complaint seems ridiculous, but the gentleman had traveled some, and doubtless spoke from what he had seen. If you open the window of your hotel and look down into the court, dirty paper collars, torn and worn paper collars, collars new but burst at the button holes, collars in all states and conditions, meet your first glance. If you take the wings of the express train and the depths of the White Hills pierce, you are certain to meet with paper collars in the most quiet and retired nooks. They bestrew the landscape far and wide, they are encountered, trodden under foot of man at picnics, people drop them behind sofas in waiting rooms, leave them in company with worn out toothbrushes, as legacies to waiters, denude themselves of paper collars as crabs do their shells; so that they are found floating about the world, waifs and strays from the wardrobe, the most useless of all rubbish with but one exception—the hoopskirt.

The quantities manufactured every year will astonish those who have never given the matter a thought. So very general is the use of them, that large factories and many hands are employed the year round upon them. We lately visited such a workshop in Springfield, Mass., and brought away a few statistics in relation to the trade which will give, so far as figures can, an approximate idea of the extent of a novel branch of industry.

Of course the first thing is to get the paper. This is made specially for the purpose, of a peculiar stock and color, and is furnished in sheets about eighteen by thirty inches, as near as we could estimate by the eye alone. These are piled one upon the other in varying quantities, from 100 upwards, and placed under a machine which is really nothing but a press. A die, or knife, above, the exact shape the collars are to have when cut out, is forced through the sheets, and stamps a collar complete out of every one. This merely shapes the outside. The button hole patches, which are made of cloth, are now applied. This is a simple process apparently, but it is the work of a very ingenious machine and a pretty girl conjointly. The machine does its part, which is simply to

stamp out oval patches from a sheet of gummed cloth led over the machine like paper in lithographing, and the pretty girl does hers by feeding the collars in continually, so that each one is ready for the machine to operate on. When the patches are put on, the collars are much stronger, and not so liable to tear out at the holes. These are subsequently punched at another machine, through the co-operation of another pretty girl. In fact, the whole operation of manufacturing paper collars is a series of ingenious and effective machinery attended by pretty girls.

After these processes are gone through with, the collar is folded, also on a machine; and then rolled, to give it a sharp edge and make it lie close to the neck.

One of the most curious processes, however, is the embossing, or that which gives the linen finish. Paper collars now-a-days look exactly like linen, and the process, which is secret, through which they are put, infallibly produces the desired result.

These details will give an idea of the mere hand-work connected with the trade, a very inadequate one, however, as all details do. It is necessary to walk through the factory, visit different rooms, and see stacks of the finished product before one can realize what an immense trade there is in what seems a trivial affair.

Messrs. Ray and Taylor, our informants, stated that they made last year 16,000,000, and beside them there are some thirty or forty other makers. One would suppose a large force would be required to supply those left in hotels alone.

Those who are looking forward to the good time, when woman shall be man's equal in the market of labor, would think that a long step had been taken toward that end, if they could have seen these Yankee girls at work in this factory. They sat at their work apparently contented, certainly clean and intelligent looking, earning a fair rate of wages, say from six dollars to eight dollars per week of ten hours. This at noiseless, unfatiguing work, except as regards monotony, and in a room where there was plenty of light and air, with enough manual labor to keep the blood from stagnating, and the brain from getting stupid. These places are at a premium, for Mr. Ray informed us that he could get an entire new set of hands if he chose, in twenty-four hours.

The lace patterns of paper collars and cuffs for ladies wear, are chiefly made abroad; and the delicate tissue of the thinner parts is given simply by color, while the flowers are embossed by pressure between dies.

One cannot fail to be struck by the economic results derived from a division of labor. Here is an article which requires large capital, a heavy force of employés, and extensive workshops, many operations, and yet sells for a cent and one half each, that is, ten in a box at fifteen cents per box. Countless thousands of collars have to be manufactured before a satisfactory dividend can be made; and this calculation we offer to the statistician.

## IRON RAILS ON COMMON WAGON ROADS.

American wagon roads are proverbially bad during a large portion of the year. In spring, while the frost is coming out of the ground and until they are settled by the vernal rains, they are for heavy loads well nigh impassable. Nothing is more common at that season than the spectacle of a wagon sunk to the hub in some slough of despond, with its attendant driver up to his knees in mud, vainly endeavoring, by the aid of some fence rail borrowed for the occasion, to pry it out, at the same time shouting in terms far from elegant to his bedraggled and exhausted team. In the fall the rains having first changed the consistency of the earth into mortar, the frost consolidates the ruts formed by the wheels, so that there is scarcely any choice between the state of the roads at that season and the spring mud. During the summer any heavy rain breaks up the highways into gulleys, and also approximates them to the delectable state which they assume at the close of winter.

There is no work done by the people that is more remunerative than the repair of public roads and none that is more grudgingly performed. The prevalent custom among the agricultural population is to work out the road tax annually levied, and this work is too often a mere sham, the time being allowed by the path-masters while no corresponding amount of labor has been performed.

Some years since when the plank-road experiment had proved a failure in this country, a good deal of discussion took place in regard to the permanent improvement of roads, and among other things it was suggested that iron rails upon which the wheels of ordinary wagons might run would prove the best means of effecting the desired object. Horse railroads were then in their infancy. The experience which has been gained since that time has proved their durability. The expense of construction and repairs has been shown to be even less than that of a first-class McAdam road, while the wear upon vehicles and horses is less.

The proposition to construct common roads upon this plan is favorably viewed in England. The London Times recently published a communication strongly advocating its adoption upon the entire road system throughout the Kingdom, and demonstrated its entire practicability for all sorts of soils, including bogs and mucky deposits. It also shows that to lay such roads throughout the Kingdom would cost only one-half as much as the steam railways now in operation in that country. It advocates the adoption of locomotive engines of a particular type, but we think that for public highways this is generally impracticable. What we want in America is that our principal highways should be in good condition at all seasons for vehicles drawn by horses, and this result can doubtless be secured by a railway differing in no important particular from those in use in the streets of the large cities.



in the United States. We believe such roads would prove remunerative, and at once be viewed with favor in many localities as a substitute for the plank roads which have so generally proved a disappointment.

#### WHITE GUNPOWDER.

White Gunpowder is again receiving attention; a result no doubt attributable to the failure of most of the explosive compounds, to supersede ordinary gunpowder for fire arms. For blasting, some of these compounds have been shown to be of great value; but their adaption to this purpose on account of the suddenness and violence of their explosions, renders them unfit for use either in large or small fire-arms. It is a settled principle in gunnery that an explosive agent should not burn instantaneously in a gun, to act most efficiently as a projectile agent; and in proportion to the size of the gun in which ordinary gunpowder is to be used, its method of manufacture is modified to insure its burning with sufficient tardiness to impart its force to the ball as uniformly as possible until it leaves the mouth of the gun.

In the manufacture of all these substances except the white gunpowder, there is more or less danger. Taking this fact into consideration, if the white gunpowder can be shown to act with equal or greater efficiency, to be as cheap or cheaper than the black, and not injurious by its chemical action to the mechanism of fire-arms, it ought to be adopted without hesitation. Has this been satisfactorily proved? We think not; yet we are far from believing that it cannot be. That it is well adapted to small arms is quite possible, but that it is equally fit for heavy artillery is we think open to question. Having ourselves made and experimented with this powder, we believe it to be, notwithstanding the statements published in regard to it, much quicker in its combustion than the artillery powders manufactured in this country. Having said this we are prepared to admit that it seems possible to so modify its composition as to make it sufficiently slow, but at the same time we think its explosive force would be weakened, so that it would be little if any superior to common artillery powder. But if equal to the latter in energy that is enough to establish its value, provided it can be made without danger and cheaper than black gunpowder.

That this can be done will be evident from its composition, and the mode of making it. It consists of Chlorate of Potash, 48 parts; Yellow Prussiate of Potash, 29 parts; Finest Leaf Sugar, 23 parts. The yellow prussiate should be dried in an iron ladle until it is as white as the chlorate of potash. All the materials should be separately pulverized. If the same mortar or mill is used for each, it should be cleaned after each substance is ground. The materials are then mixed by sifting them over and again to insure uniformity. All trituration in mixing should be avoided. Made in this manner there is not the slightest danger. It should not be rammed hard but pressed down solid by the ramrod. Only a little more than half as much will be required for a charge as of the ordinary powder. Although it should cost somewhat more in the first instance by weight than black gunpowder, when compared in regard to efficiency it would be cheaper than any powder in market; but on account of its not being granulated, it should be used in cartridges. These cartridges can be made, by persons of ordinary ingenuity, of paper or gut, and will obviate the difficulty which would be otherwise experienced in obtaining equal charges in the ordinary manner from a flask, arising from the non-granulation of the powder. An ordinary flask would not be adapted to carry it, as its mouth is so narrow that it would be difficult to get the powder in or out.

#### EXAMINERS TO BE EXAMINED.

Commissioner Foote contemplates making a thorough examination of the qualifications of the Examiners in his office, and to weed out all inefficient officers. There are about 40 persons to whom the higher duty of examining into the merits of inventions is intrusted, and all who are found deficient in qualifications are to be discharged. The Examiners receive higher salaries than those performing clerical duties, the policy being to excite a laudable ambition in the latter class. The Commissioner intends, also, to give the latter the preference in a competitive examination for the places of such Examiners as may fall short of the standard of qualifications.

That is good; and we have no doubt, if the examination is properly made, the Commissioner will find among the really good men some dunces who might be better employed in other business. We hope this examination will be extended throughout the whole official force, and if there are any Examiners or employés who are interested in the success of patent agencies or attorneys either at Washington or elsewhere they should be discharged. There is already a strong suspicion that some clerks are unfaithful to their trusts.

#### THE BOWERY EXPLOSION.—THE ENGINEER'S DEFENCE.

The explosion of the boiler of one of the metropolitan steam fire engines, at a fire on the Bowery, New York city, is still fresh in the recollection of our readers. It will be remembered, also, that the engineer, Mr. Patrick W. Hand, who was severely injured by the explosion, was censured by the coroner's jury and the daily press. He has lately published a certificate of his abilities as an engineer and a demand for a more thorough investigation into the causes of the explosion, with a view to his vindication, signed by a number of practical mechanics. We think Mr. Hand's proposition for an investigation by a committee of engineers should receive consideration, as his reputation as a mechanic cannot but be greatly injured by the imputation of incapacity conveyed by the strictures of which he has been the object.

#### OUR PLANET—ITS PAST AND FUTURE.

The above is the title of a very interesting little volume published by William Denton, Boston. It is a series of eight lectures on geology, in the popular style now so much in vogue, and is well calculated to bring science down to the level of the masses. These lectures seem to do this very successfully. They abound in vivid description, and are as far as may be, freed from the technical character of more extended works. The following extract, intended to show that the resources of modern civilization will prove sufficient for the future necessities of mankind, is a good specimen of the style of the work:

"As long as the world exists, then, we may be assured that man's ingenuity will keep pace with his necessities, and the human race march on to the goal that lies before them."

"Man is an important part of Nature; and his importance increases hourly. At first a helpless log, he floated on the stream, but now stems the current, or boldly directs it."

"If the land-surface of the globe should not increase naturally in the future, as we have anticipated, man's agency would, without doubt, bring it to pass, as is evident from what he has already accomplished."

"In Lincolnshire, England, four hundred thousand acres of fever-and-ague-breeding swamp land have been transformed into fields of wheat, barley, and oats, and excellent meadows. In the Netherlands, lands lying still lower than the fens of Lincolnshire, and apparently much more hopelessly doomed, have been reclaimed, and become among the most productive. It has been calculated that nearly nine hundred thousand acres have been gained there by diking and draining. The province of Zealand consists of islands washed by the sea on their western coasts, and separated by the many channels through which the Schelde and some other rivers find their way to the ocean. In the twelfth century, these islands were much smaller and more numerous than at present. They have been gradually enlarged, and, in several instances, at last connected by the extension of their system of dikes. Walcheren is formed of ten islets united into one. At the middle of the fifteenth century, Goeree and Overflakkee consisted of separate islands, containing altogether about ten thousand acres. By means of above sixty successive advances of the dikes, they have been brought to compose a single island, whose area is not less than sixty thousand acres."

"A few years ago, an English gentleman purchased for a trifling sum a small island which was covered by the sea every flood-tide, but left dry at the ebb. He enclosed it with a bank of earth thirty feet wide at the bottom, and seven feet high and four feet wide at the top, with a slope on the outside having two feet horizontal to one perpendicular. This wall, about two miles and a half long, encircled the island, except a gap about seventy feet wide, through which the tide flowed in and out. Earth was at first used to close the gap; but the sea swept it away as fast as it was thrown in. Piles were then driven in a double row, and clay rammed in between them. This succeeded, and the little island was drained. In time, excellent crops were raised upon it, a house and barn built, and nearly three hundred acres of land, by the energy of one man, won from the sea."

"The draining of Lake Haarlem is one of the best examples that we possess of man's disposition and power to change water-surfaces into dry land; and is at the same time a prophecy of what will be done in the future, when the earth shall be as densely populated over its whole extent as it is now in Holland."

"Here was a lake fifteen miles long, and seven broad in its greatest width. What fine farms we might have here," said an enterprising Hollander, "if this lake were only drained!"—"Yes; but it lies below the sea-level, and it would be impossible to drain it."—"Then we must pump it dry."—"Pump it dry! Who ever heard of such an absurdity?" But pump it dry they did. For this purpose, three large steam-engines were employed, each pumping a million tons of water in twenty-five and a half hours. They commenced pumping in May, 1848; and laid it dry in July, 1852. Where the boats sailed and the fishes swam are now comfortable cottages, fertile fields, and a population of five thousand thriving citizens. In the same country it is now proposed to drain the Zuyder Zee, which covers two thousand square miles. The time will come when the land under Lake Erie will be of more value than the water within it; and, when that time comes, man will say to the waters, "March!" and they will go, leaving the land for man's occupancy. Its greatest depth is but two hundred and seventy feet, and its drainage would be an easy matter. In like manner, the lands of Lakes Michigan and Superior will be needed, demanded, and obtained, and the sea be made to give up a large portion of its shallow shores to supply man's constantly-increasing demand for room."

The remarks of the author upon the climatic changes that have occurred within the historic period, and the remains of man in connection with those of extinct animals, are interesting and instructive. Although we cannot endorse all the inferences and opinions contained in the book, we believe it to be a meritorious contribution to popular scientific literature.

#### INTERESTING BORING AND MINING EXPERIMENTS.

A large number of gentlemen interested in mining and quarrying recently assembled at the lime quarries at Wrexham, Wales, to witness some interesting experiments with Haupt's Improved Rock Drill. This machine was originally an American invention, but during the last year it has been much improved and rendered more practical and effective. The machine in its present form, is very compact, weighing only 150 lbs. It is operated by one man. All the working parts are made of hardened steel, in order to bear the severe

work which it is designed to perform. It has a simple frame, with four adjustable legs, weighing about 90 lbs. The entire machine and frame can be easily moved by two men. The machine gives the same motions which are given to the hand drill, and is self-adjusting to all differences in hardness of rocks. The motive power in the experiments above alluded to, was steam, for which compressed air may be substituted upon occasion. The machine is capable of making from 400 to 500 strokes per minute, the force of the stroke being estimated at 200 lbs. It requires a force of two horse power to drive it. The machine was operated upon this occasion by means of steam brought through a flexible tube from a locomotive in the quarry. The rock drilled was a seam of the hardest limestone. The first experiment was with a one and five-eighth inch drill, with a jet of water flowing into the bore to carry off the dust and keep it cool. The machine was put to its full speed, and in somewhat less than two and a half minutes, the tool penetrated sixteen inches. A drill of one and three-eighth inches was then set to work in the same hole, when an average rate of five inches per minute was attained. A hole thirty-two inches in depth was thus drilled in less than ten minutes, including stoppages. Subsequent experiments showed that this machine was equally adapted to horizontal, vertical, or angular drilling, and that irregularities of surface did not interfere with its adjustment.

These experiments were followed by some experiments with dynamite. Our readers are aware that nitro glycerin is formed by the action of nitric acid upon glycerin. Dynamite is nitro glycerin absorbed by silicious earth, and in appearance resembles very closely coarse, brown sugar. Its properties are merely those of nitro glycerin, modified by the silicious substance, so that the dangers which attend the use of the former, are entirely obviated, while the strength of the explosion, when brought about by proper agents is augmented.

To show its harmlessness when stored or transported, a quantity of it was placed loosely upon a stone and set on fire by a match; when it slowly burned away, no explosion taking place. A similar quantity being placed in a like position and being fired by means of a fuse having the end placed in the dynamite terminating in a percussion cap, caused an explosion louder than a thirty-two pounder. This experiment was intended to show that without the charge of fulminate of mercury contained in the cap, or its equivalent, an explosion could not be produced. Next, the holes drilled as above, were charged with dynamite, some being tamped with sand, and others with water. The explosions in each case disengaged large masses of rock. The amount thus broken up was estimated as being six times as great as would have been the case with the same weight of gunpowder. One charge of one and a half pounds was placed in a horizontal hole nine feet in length, and, though the tamping was not well done, it was estimated that at least 1,000 tons of rock were detached by the explosion. These experiments, and many others which are constantly taking place, establish the great utility of dynamite beyond a doubt, and we believe the day is not far distant when it will supersede all other explosive agents for blasting.

INTERESTING TO RAILROAD TRAVELERS.—Judge Sharswood, of the Supreme Court of Pennsylvania, has decided that the platform of a railway company, at its station or stopping place, is in no sense a public highway, and that there is no dedication to public use. Persons are allowed to walk over it for other purposes than as passengers arriving and departing in the trains, but they have no legal right to do so, and the servants of the company, after requesting them to leave, can remove them by whatever force may be necessary.

#### OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING AUGUST 25, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each caveat.....	\$10
On filing each application for a Patent, except for a design.....	\$15
On issuing each original Patent.....	\$20
On appeal to Commissioner of Patents.....	\$20
On application for Renewal.....	\$20
On application for Extension of Patent.....	\$20
On granting the Extension.....	\$20
On filing a Disclaimer.....	\$10
On filing application for Design (three and a half years).....	\$10
On filing application for Design (seven years).....	\$15
On filing application for Design (fourteen years).....	\$20

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay \$500 on application.

Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.

81,320.—STEAM SAFETY VALVE.—E. G. Allen, Boston, Mass. 1 claim, 1st. The combination of a spring, g. sleeve, d. and stem, c. substantially as and for the purpose specified.

2d. Constructing the let-off pipe with the perforations, s s s, as and for the purpose described.

3d. So arranging a whistle with reference to the safety valve that, at the first escape of the steam from said valve, the whistle will be sounded, and will continue to sound as long as the steam continues to escape, substantially as shown and described.

81,321.—LAMP BURNER.—John Allen, New York city. Ant. dated Aug. 12-1-67.

1 claim the adjustable draft or air regulator, A, arranged, constructed, and operated on the counter-extension screw, B, substantially as described and for the purpose set forth.

81,322.—RAILROAD-CAR HEATER.—Ira R. Amsden, Buffalo, N. Y.

1 claim, 1st. Constructing a furnace car with a furnace or furnaces, C C and surrounding chamber, K, provided with transverse or intermediate partitions, a, a, having suitable apertures, for the passage of air, substantially as shown and for the purpose described.

2d. The combination of the furnace or furnaces, C, space, K, and partitions, a, a, constructed substantially as described, with a receiving chamber, J, and fan blower, I, the whole constituting the furnace car, as herein set forth.

3d. As a whole, the construction of furnaces, C C, surrounding chamber, K,



alternating partitions, a, a receiving chamber, J, fan, I, driven from the axle or gear wheel, and conducting the air, G, F, with flexible connections, H, for distributing the heated air, the whole arranged as described and operating in the manner and for the purpose specified.

81,323.—CAR COUPLING.—T. Arndt, Mt. Joy, Pa., assignor to himself, C. H. Nissler, and I. L. Landis.  
I claim the combination of the pin supporter, E, link holder, C, pin, E, and link, M, all arranged and constructed substantially as described and for the purpose specified.

81,324.—LAMP BRACKET.—Wm. Ascoug, Buffalo, N. Y.  
I claim securing lamps in brackets by means of an upper guarding, C, and connecting rods, d, for attaching to the supporting ring, substantially in the manner and for the purpose set forth.

81,325.—ELEVATOR.—E. H. Ashcroft and J. R. Brown, Boston, Mass., assignors to E. H. Ashcroft.  
We claim, 1st, The shafts, I, having a series of screws or bosses, R, arranged therein, substantially as and for the purpose described.  
2d, In combination with the shafts, I, having the bosses, R, secured thereon, the plates, J, having the semicircular grooves with screw threads cut therein, said parts being arranged for joint operation, substantially as described.

81,326.—STEAM SAFETY VALVE.—John Ashcroft, New York city.  
I claim, 1st, The construction of the valve, M, and its seat, F, with guides, m, and openings, I, as herein set forth.  
2d, The arrangement of the dome, A, case, B, and valve seat, F, as herein set forth.

81,327.—WAGON SPRING.—Calvin Atherton, Wales, Mich.  
I claim the arrangement of the semi-elliptic springs, A and C, in connection with the axle, B, and the running gear of any wagon or carriage, substantially as herein set forth.

81,328.—SKIVING MACHINE.—Robert Barclay, Buffalo, N. Y.  
I claim the cam, P, and lever, H, in combination with the spring arms, S and V, constructed and arranged to operate as and for the purposes set forth.

81,329.—MECHANICAL MOVEMENT.—John S. Barden, Providence, R. I.  
I claim the combination of an external and an internal gear with an eccentric, substantially as set forth.

81,330.—STEAM GENERATOR.—Charles Bean, East Douglas, Mass.  
I claim the construction and combination of the section, formed of the tubes, A, B, and the flues, D, with the apertures, C, substantially as herein shown and described.

81,331.—BELT FASTENER.—G. M. Beardsley, Fenton, Mich.  
Antedated Aug. 7, 1868.  
I claim the adjustable plates, B, turning pin, C, stable key, E, to be fastened to belt, A, all combined and arranged substantially as described and for the purpose set forth.

81,332.—SAWING MACHINE.—Peter S. Beidler, South Easton, Pa.  
I claim, 1st, The combination, with the adjustable carriage, D, of the adjustable feeding apparatus, consisting of the trip catch, b, pendulum bar, g, weighted lever, f, slotted bar, e, connecting rod, c, rock shaft, d, feed shaft and piston, I, and swinging frame, K, arranged as described for the purpose specified.

81,333.—SOIL PULVERIZER.—C. Berninger (assignor to himself, Wm. Friend, and G. L. Valley), Mier III.  
I claim the harrow teeth, d, and toothed cylinder, F, provided with the wheels, G, when said parts are applied or attached to a frame, E, suspended to a mounted frame, A, and all arranged substantially in the manner as and for the purpose set forth.

81,334.—EXCAVATOR.—Hiram Brown, Lowell, Mass.  
I claim the scoops, A, B, with the lips, n, in combination with the arms, G, and rakes, E, when used in connection with the movable carriage, with hangers, S, and wheel, P, ratchet, S, and pawl, o, all constructed and arranged substantially as described and for the purpose specified.

81,335.—PLANE.—Geo. Buckel, Detroit, Mich.  
I claim a plane tool constructed of the parts, A and C, pivoted together, and provided with a spring, E, and set screw, F, substantially as and for the purpose set forth.

81,336.—HARNESS SADDLE.—George H. Buckius (assignor to himself, Cornelius Antman, A. C. Tonner, and P. S. Sowers), Canton, Ohio.  
I claim the crupper piece, I, constructed as herein described, when used in combination with the tree, A, and water hook, C, substantially as and for the purpose specified.

81,337.—FARM GATE.—A. L. Butler, Ripon, Wis.  
I claim, 1st, Making this gate into two sections, substantially as described and the manner in which it folds.  
2d, The bar or lever, J, extending from the gate to either one of the standards of the framework, this lever being pivoted at each end.  
3d, The whole of the device, comprising levers, bell cranks, latch gear, and pinion, substantially as described and for the purpose specified.

81,338.—TOOL FOR TURNING MOLDINGS.—W. W. Carey (assignor to himself and G. W. Harris), Lowell, Mass.  
I claim the adjustable cutter block, e, when arranged as described and for the purpose set forth.

81,339.—SELF-CEMENTING BAND FOR HOLDING BANK NOTES, PAPERS, ETC.—E. W. Carrington, New York city.  
I claim the band here described, as a new article of manufacture, having a body of paper, with the ends made adhesive by rubber cement, so as to serve in the manner and for the purposes herein set forth.

81,340.—CHURN-DASHER.—John S. Carson, Brookhaven, Miss.  
I claim, 1st, A churn dasher, when composed of the plates, A and C, and these plates constitute four wings, as herein described, when these wings are constructed and relatively placed with respect to each other, and are held together, and on the spindle of the churn, by the collar, B, substantially as herein described, for the purpose set forth.  
2d, The above-described dasher, in combination with the hinged cross table, F, when the latter supports the shaft, I, and its appliances, as herein described, for the purpose set forth.

81,341.—CHURN.—John S. Carson, Brookhaven, Miss.  
I claim, 1st, The sectional helix dasher, A, B, when the same is composed of the sections of parts, 1, 2, 3, 4, constructed and relatively arranged as described, for the purpose set forth.  
2d, The sectional helix dasher, A, B, when constructed as described, in combination with the pulley, C, the driving wheel, E, the band or cord, F, and the crank, H, the whole being arranged for conjoint operation, substantially as shown and described, for the purpose set forth.

81,342.—LIFT-OFF MECHANISM FOR LOOM.—Benjamin F. Carter, Manville, R. I.  
I claim, 1st, The combination of the cam block, a, on the wheel, B, with the lever, C, spring actuated rod, D, escapement lever, Y, wheel, n, and whip roll, b, substantially as and for the purpose described.  
2d, The combination of the whip roll, b, lever, C, rod, D, springs, X and J, escapement lever, Y, and wheel, n, substantially as and for the purpose described.  
3d, In combination with the above, the slide, g, formed with a socket for the reception of the head of the set screw, K, substantially as and for the purpose specified.

81,343.—SNOW CLEARER.—Richard Dover Chatterton, Bath, England.  
I claim the combination of the wheel, C, shield, D, and spring scrapers, E, arranged and operating substantially as described.

81,344.—SHUTTLE FOR LOOM.—Augustus D. Clark, Wilkesville, Mass.  
I claim, 1st, The combination and arrangement of the pin, b, plate, f, and bent spring, g, constructed substantially as herein described.  
2d, The bent spring, g, formed as shown, for the purpose of actuating both the spindle head and the pin, b, substantially as herein specified.

81,345.—MILK CAN.—Alonzo P. Cook (assignor to himself and Sylvanus B. Cook), Collins Center, N. Y.  
I claim, 1st, The removable bottom, C, having a flange, e, in combination with the packing ring, d, follower, E, adjustable or as bar, F, and set screw, H, all parts being constructed, arranged, and operating substantially as herein described.  
2d, Making the sides of a metallic receptacle for milk or other fluid beveled or flaring near its lower end, in combination with the removable bottom, C, substantially as herein described.

81,346.—TREADLE ATTACHMENT FOR SEWING MACHINE.—John Crandell, Chicopee, Mass., assignor to Lamb Knitting Machine Manufacturing Company. Antedated August 7, 1868.  
I claim a treadle attachment, consisting of the piece, B, and cap, A, hinged thereto, spring, d, the socket formed in A and B, and the ball, m, formed upon the connecting rod, c, or upon the crank, G, the whole arranged and operating substantially as described.

81,347.—LOOM.—George Crompton, Worcester, Mass.  
I claim, in combination with the upright hooked jacks, the angular lifter, depressor, or even lever or levers, connected to the actuating slide rod by means of the gear rack fixed to the slide rod, and the segment gear on the lever, substantially as described.

81,348.—ATTACHING GUN-BARRELS TO STOCKS.—Nathan R. Davis, Freetown, Mass.  
I claim the combination and arrangement of the tongue and clamp screw with the tenon socket of the stock of the lock case, such being to operate with the tenon or tenons of the barrel or barrels, as specified.  
Also, the combination of the inclined plane with the tongue and the clamp screw, arranged with respect to and combined with the socket for receiving the tenon or tenons of the barrel or barrels, as described.

81,349.—AUTOMATIC FLY BRUSH.—B. F. Day, East Freedom, Pa.  
I claim the rods, b, carrying brushes, d, when pivoted at one end eccentrically to the wheel, a, which are adapted to be rotated automatically, said rods working in guides, g, and substantially as herein shown and described, whereby both horizontal and vertical reciprocating motion is imparted to the brush carriers, as set forth.

81,350.—BRICK WALL.—John M. Deitz, Berne, N. Y., assignor to himself, C. T. Bush, and Sanford & Sisson.  
I claim, in the construction of walls composed of brick and concrete, the combination and arrangement of the bricks, B, B, and H, H, concrete, C, steel-chains, P, P, braces, b, b, cleats, W, W, and a, and guide board, D, substantially as and for the purposes herein set forth.

81,351.—BOILER FLUE CLEANER.—George R. Dobbins, Lowell, Mass.  
I claim the arrangement of the spreader, c, due end, e, pipe, a, flange, b, and rib, e, when constructed as herein set forth.

81,352.—MILKING STOOL.—Otha Earl, Hermon, N. Y.  
I claim the combination, with a milking stool, of a tail-clamping attachment, arranged to be actuated by the weight of the milker, substantially as and for the purpose described.

81,353.—FANNING MACHINE.—George F. Evans (assignor to himself and George P. Riley), Chelsea, Mass.  
I claim the fan, D, operating as described, in combination with arm, h, connecting rod, e, pinion wheel, I, crank pin, t, large wheel, K, pinion, S, barrel wheel, m, spring, d, fan wheel, I, W, thumb-screw, b, and crank, a, for winding, all arranged and operating in combination with each other, substantially as described, and for the purpose set forth.

81,354.—WATCH CHAIN HOOK.—Charles Faas, North Attleboro, Mass.  
I claim, 1st, The eye, A, in combination with the swiveling hook, a, the sliding band, b, and the springs, b', b', as and for the purpose set forth.  
2d, The divided link, c, in combination with the band, b, substantially as described.

81,355.—THRILL COUPLING.—Reuben Fink, and Jacob B. Horshock, Lancaster, Pa.  
We claim, 1st, The combination of the binged pieces, A, B, arranged and entering into longitudinal relation of the bed plate, substantially in the manner and for the purpose specified.  
2d, In combination with the piece, A, binged at a, to the notched piece, B, the bed plate, c, when prolonged and furnished with a slot, H, and coil-d springs, D, arranged and operating substantially in the manner and for the purpose specified.

81,356.—SAWING MACHINE.—John Frey, Osnaburg, and John M. Eichholtz, Canton, Ohio.  
We claim the driving shaft, S, T, composed of the tube, S, with journal, s, and shaft, T, with collar, t, when used in combination with the driving pulley, P, of a sawing machine, said pulley being maintained in its relative position to the machine by means of arms, Y, Y, the extended ends of which form the boxes of the driving pulley, P, substantially as and for the purpose specified.

81,357.—MACHINE FOR DRAWING AND SPINNING COTTON.—Jim B. Fuller, Norwich, Conn., assignor to himself, James P. Upham, and Edwin T. Rice.  
I claim, 1st, The bearing, d, or its equivalent, constructed as described, so that by turning it in different positions the roller, D, may be adjusted to the length of cotton being drawn, substantially as and for the purpose specified.  
2d, The saddle, the back part of which is cut out, as described, so that in moving the back roller forward or back, the position of the saddle strap and weight or spring is not altered, substantially as and for the purpose set forth.  
3d, In a drawing or spinning frame, where two top rollers rest on only one bottom roller and where the latter is drawn partially around the said bottom roller, D, in the middle top roller, C, constructed and operated as shown and described, in combination with the roller D and C, and bearing, d, substantially as and for the purpose specified.  
4th, The rollers, C, C', D, and the bearing, d, combined and arranged substantially as and for the purpose set forth.  
5th, The rollers, B', C, D, in combination with the saddle, a, substantially as and for the purpose herein specified.

81,358.—EXPANDING BOTTOM FOR BEDS, SEATS, ETC.—Eli K. Gagnon, Ottawa, Ill.  
I claim the construction of a cot, bed, or seat, with a flexible bar, D, in combination with legs, A, B, stretchers, C, C', supports, e, e, bolts, G, G, and friction rollers, I, I, the bottom of the cot being of canvas or other suitable material, and secured by means of cords, fastened to the edges with rods, h, h, and stretchers, C, C', substantially in the manner and for the purposes described.

81,359.—LAMP WICK.—Wilhelm August Gensch, New York city.  
I claim the lamp wick composed of animal and vegetable fiber, and steeped in the solution composed of the ingredients herein set forth in the manner and for the purpose specified.

81,360.—BASS-BURNING STOVE.—Isaac H. Gildersleeve, Whitewater, Wis.  
I claim, 1st, A stove, consisting of base, A, outer shell, B, inner shell, C, pot, K, magazine, L, grate, M, and pipes, N, N, substantially as described.  
2d, Grate, M, when made with air spaces for air to pass through, for the purpose of consuming the gases from the coal, and to keep the grate from burning out, substantially as described.  
3d, Grate M, with a serrated rim, substantially as described.

81,361.—MACHINE FOR CUTTING PANELS.—F. D. Green, (assignor to himself and George Zimmer & Co.), Williamsport, Pa.  
I claim the combination of the frame, B, C, constructed and operated substantially as herein shown and described, in connection with the cutter head, A, as and for the purpose set forth.

81,362.—HEATER RANGE.—William A. Greene, Troy, N. Y.  
I claim, 1st, The removable contracting or dividing plate, H, lined with fire brick or asbestos, and combined with the boiler-hole top plate, C, fire-box, G, and exit flues, J, E, J, E, therefrom, all in manner substantially as shown, and fully described hereinafore, for the purposes specified.  
2d, The combination of the fire-box, G, boiler-hole top plate, C, the damper, X, the contracting plate, H, and the stationary fire-grate, X, which forms a fixed support for the foot or bottom part of said plate, H, all in manner substantially as shown, and described herein, for the purposes specified.  
3d, In combination with a boiler hole, q, of top plate, C, the curve, c, in the upper part of a removable contracting plate, constructed so as to fit or correspond with the said boiler hole, substantially as set forth herein.  
4th, The relative arrangement of the deflecting plates, I, I, in the boiler-hole flues, n, when employed in combination with the removable contracting plate, B, with its curved recess, c, boiler-hole top plate, C, fire-box, G, and flues, J, J, in manner substantially as herein set forth.  
5th, The deflecting cover plate, L, when constructed with closed sides and open ends, and so constructed so that the air may be carried toward the front, and combined with the direct flue, F, and oven plate, M, substantially as herein shown and described.

81,363.—COUPLING FOR VEHICLES.—Charles W. Greter, Three Rivers, Mich.  
I claim, 1st, A coupling device for vehicles, constructed and arranged, substantially as described and for the purposes set forth.  
2d, The curved plate, m, with notch, l, braces, j, j, with curved slot, E, thereon, and rollers, n, n, with notches, p, p, substantially as described, when constructed the prominent features of a vehicle coupling, all as set forth.

81,364.—MACHINE FOR BLOCKING HATS.—William C. Griswold, Brooklyn, N. Y., Augustus Pellase, Newark, N. J., and Albert H. Hook, New York city.  
We claim, 1st, An expandable block, in combination with the brim plates, b and b', constructed, arranged, and operating substantially as herein specified.  
2d, The combination of the band ring, r, holding plates, b, b', and expandable block, substantially as and for the purposes herein specified.

81,365.—MACHINE FOR BENDING WOOD.—John S. Hall, Jeffersonville, Ind.  
I claim the flexible strap, provided with sockets, C and D, in combination with the mold or former, F, constructed and arranged to operate as set forth.

81,366.—ATTACHING SOLES TO BOOTS AND SHOES.—Francis n. Hawks, St. Louis, Mo.  
I claim the new application and use of screws, together with washers or eyelets, as herein described, for the purpose of attaching water proof half soles and heel taps to boots and shoes.

81,367.—WIRE STRETCHER FOR FENCE.—William B. Hayden, Columbus, Ohio.  
I claim, 1st, A hooked ratchet bar, C, constructed with teeth, b, l, and a hook, m, in combination with a hooked sliding pawl, said parts being adapted to operate substantially in the manner and for the purposes described.  
2d, A hooked ratchet bar, C, and a hooked sliding pawl adapted for receiving a lever, G, for effecting the tightening and loosening of wire in fences and vine frames, substantially as described.

81,368.—GATE FOR WATER WHEEL.—James L. Helmer, Rome, N. Y.  
I claim the movable part, C, of the guide, in combination with the arms, C2 and C3.

81,369.—FEATHER RENOVATOR.—Charles E. Hendrick, Chicopee, Mass.  
I claim the annular chambers, P, P, in combination with the valves, O, O, m, n, and conveyer, F, provided with branches, I, I, drier, E, and feast or box, B, when constructed, arranged, and operated substantially in the manner shown and described, for the purpose set forth.

81,370.—LAMP.—Joseph E. Hendricks, Waterbury, Conn., assignor to Brown & Brothers.  
I claim the sustaining and clamping springs, f, adapted to support the base of the chimney being drawn, substantially as and for the purpose specified.

81,371.—COMBINED POTATO PLANTER AND CULTIVATOR.—Charles F. Hoffman, New Orleans, La.  
I claim, 1st, The eccentric, T, when provided with the wire fingers or caps, d, and otherwise constructed, as described, in combination with the box, U, and the feeding trough, V, when these several parts are arranged and operated substantially as described, for the purpose set forth.  
2d, The cutting box, M, when provided with a knife, N, that is constructed and operates substantially as described for the purpose set forth.  
3d, The eccentric, T, in combination with the trough, V, the cutting box, M, and the knife, N, when these several parts are constructed and arranged with respect to each other, and operate substantially as herein described for the purpose set forth.  
4th, The eccentric, T, the cutting box, M, and the knife, N, in combination with the plows, G, G', G'', and the plowing "shoes," H, when these several parts are constructed, arranged, and conjointly operate substantially in the manner and for the purpose herein set forth.

81,372.—CHURN DASHER AND LID.—Samuel P. Hopkins, Port Deposit, Md.  
I claim, 1st, The star dasher, constructed and arranged substantially in the manner as herein described, for the purpose specified.  
2d, The double lid or covers, D, E, for dasher churns when constructed in the manner herein described.  
3d, The combination of the star dasher and double cover, as and for the purposes set forth.

81,373.—MACHINE FOR MITERING.—Frank A. Howard, Bel-  
fast, Me.  
I claim, 1st, The movable V-shaped cutters, E, affixed to plates, G, in combination with the morticed rest plate, I, operated in the manner described, for the purpose specified.  
2d, The cutters, E, E, affixed to plates, G, G, which are hinged together at H, and provided with rods, n, passing through arched slots, m, in the vertically adjustable holder, U, whereby the said cutters are adjusted to the desired ad-

gle and there retained, substantially as described, for the purpose specified.  
3d, Adjusting the plate, I, and the cutters, E, E, simultaneously, by means of the screw shaft, Q, f, nuts, e, I, shaft, M, beveled gears, N, O, L, W, substantially as herein described, for the purpose specified.

81,374.—BALE FASTENER.—William M. Irvine, Montgomery, Ala.  
I claim reinforcing one end of the plate, and confining the ends of the strap or band, in the manner herein set forth and shown.

81,375.—CORN SHELLER.—George F. Johnson, Marshall, Iowa.  
I claim, 1st, The radially expanding shellers, provided with the curved plates, e, e, and e', in combination with the wheel, C, and spring, D, substantially as and for the purpose set forth.  
2d, The arrangement, with relation to the drawing rollers, E, E, and shelling wheel, C, having the toothed rim, C1, of the drive shaft, S, main wheel, F, pinion, G, and connecting gear rim, as herein shown and described, upon the frame, A, B, for the purpose specified.

81,376.—GUIDE FOR SCROLL SAW.—L. A. Johnson, New York city.  
I claim the grooved guide-roller, D, fitted in the pressure clamp, A, to receive the saw, E, substantially in the manner as and for the purpose set forth.

81,377.—SAD IRON HEATER.—S. M. Johnson, Lockport, N. Y.  
I claim, 1st, The valve, I, m, arranged with the burner, F, and hollow rod, G, substantially in the manner and for the purpose set forth.  
2d, The burner, F, consisting of the tube, x, provided with slots, s, s, and radiating wire, o, in combination with the vaporizing chamber, e, arranged as and for the purpose specified.  
3d, The radial corrugations, u, u, arranged with the burner, F, substantially as shown and described.

81,378.—BUTTON BOOT.—Joseph L. Joyce, New Haven, Ct.  
I claim cutting or dividing the fly at or near the ankle-joint line, substantially in the manner and for the purpose herein set forth.

81,379.—TREADLE FOR SEWING MACHINE.—Carl Kihn, New York city.  
I claim a sewing machine treadle, composed of a plate, A, of roughened glass, supported in and elevated above the frame, B, carrying a standard, D, or its equivalent, and the open clutches, C, the whole being constructed, applied, and operating substantially in the manner and for the purpose set forth.

81,380.—DIE FOR MAKING CLEVIS BLANKS.—Jacob Kritch, Cleveland, Ohio.  
I claim the dies as herein described for the purpose set forth.

81,381.—JOINERS' CLAMP.—Jacob Kuneman, Canton, Ohio.  
I claim the joiners' clamp, composed of a clamp lever, A, with pawl, a, ratchet bar, B, with ratchet teeth, b, and clamping head block, F, and bar C, D, with holes, c, c, connecting bolts, k, k, and clamping head block, e, when said ratchet bar, B, is pivoted to the lever, A, between the bar, O, D, and the ratchet, a, and the whole clamp is so arranged as to fold up in the form shown and described, as and for the purpose herein specified.

81,382.—WAGON BRAKE.—F. D. Ladenberger, Glenbeulah, Wis.  
I claim, 1st, The combination, in a wagon brake, of the cross bar, A, loose away bar, B, connected by any suitable rods, I, I, and kept back to the extent of their play by a spring, e, of any suitable form or arrangement, with brake shoes, j, j, suspended by straps or links, k, k, connected with the axle tree or rods, n, all arranged to operate as brakes by being connected with the double tree, m, by the plates, a, and b, all substantially as shown and described.  
2d, The combination in a wagon brake of the concave iron, l, on the away bar, B, with the friction roller, n, the slotted plate, B, slotted tongue, and doubletree bolt, all arranged to take the draft strain proportionately when the away bar and cross bar are drawn forward to the extent of their forward movement, all substantially as herein shown and described.

81,383.—BRIDGE GUARD OR BARRIER.—John Lehmann, Brown Point, Ind.  
I claim the combination of cog segment, A, ratchets, B, B, pinions, C, C, racks, D, D, pawls, L, and catch levers, M, all arranged and operating substantially as herein set forth, for the purpose of operating a bridge barrier.

81,384.—DEVICE FOR LOCKING LOOSE PULLEYS.—Wm. J. Linton, Detroit, Mich.  
I claim the improved locking device herein described, consisting of the sleeve, sliding pin, stationary pin, spring, and stud, all arranged substantially as set forth.

81,385.—DERRICK.—Chas. S. Lockwood, Newburg, N. Y.  
I claim the counter-weight to balance the bucket on a derrick, in the way as shown and described and for the purpose as specified.

81,386.—FILTER.—Wm. C. Long and Harvey A. Lowmsbery, Lockport, N. Y.  
We claim the arrangement, in connection with the galvanized iron filter, A, of the diaphragms, a, a, dividing the packing chamber, and the ribs, g, g, strengthening the water chamber, the whole operating in the manner and for the purpose specified.

81,387.—PERAMBULATOR.—Charles Lyne, Padstow, England.  
I claim the arrangement of the axle, A, cross piece, C, P, bolt, b, plate, P, rod, B, guides, G, G', and springs, S, S', in the manner and for the purpose set forth and described.

81,388.—STEELYARD.—H. Maranville, Akron, Ohio.  
I claim the loop or head, C, spring, b, as arranged, in combination with the vokes, G, D, and beam, a, for the purpose and in the manner set forth.

81,389.—FIREPLACE.—G. H. McElevy, Newcastle, Pa.  
I claim, 1st, The described arrangement of the air heating chambers, G, H, I, and their connecting flues, the supply flue, P, the fire and smoke flue, J, and the exposed grate, E, as herein described, for the purpose specified.  
2d, The arrangement of the slide damper, m, and damp, r, K, with relation to the air heating flues, G, H, I, whereby the products of combustion are either directed to the flue, J, between the chamber, G, and the grate, or over the chamber, G, between the same and the chamber, H, or over the chamber, I, or over the chamber, G, and downward around the chamber, I, as herein described, for the purpose specified.

81,390.—BAIL EAR FOR PAIRS.—Wm. J. McLea, Leroy, N. Y., assignor to himself and Frank Ladd.  
I claim attaching bail ears to pails and other vessels by means of the tips, d, d', in the manner set forth.

81,391.—COUPLING BELT.—Thomas McMullin (assignor to himself and Miles Wendenhall), Osgood, Ind.  
I claim the combination of the eccentric rollers, a, furnished with V-shaped grooves, b, with the plates, A, A', and prongs, c, when arranged and operating as and for the purpose set forth.

81,392.—RAILROAD CAR HEATER.—W. S. McNeil and O. S. Cadwell, Jr., Springfield, Mass.  
We claim, 1st, The described arrangement of the case, H, fire box, A, combustion chamber, D, hot air chambers, E, J, fire opening, B, pipes, K, L, m, perforated pipe, F, screen, d, water chamber, z, air purifying chamber, X, and air supply tube and double funnel, W, F, as herein described, for the purpose specified.  
2d, The hot-air pipe, L, n, and the cap, o, in combination with the perforated pipe, F, and hot-air chambers, J, E, as herein described, for the purpose specified.  
3d, The arrangement of the air purifying chamber, X, lined with absorbent material, and containing the curved deflectors, with relation to the water chamber, z, air supply pipe, W, and hot-air chamber, E, whereby the motion of the car displaces the water through the perforated bottom of the air chamber, and saturates the absorbent material for the collection of dust and cinders, as herein shown and described.

81,393.—MECHANICAL MOVEMENT.—Daniel S. Merritt, Mount Morris, Mich.  
I claim the combination and arrangement of the four levers, D, the pinion C and H, and the levers, J, when attached to any suitable frame, A, and constructed and operating substantially as and for the purposes set forth.

81,394.—TRACK BUCKLE.—Charles H. Miller, Buffalo, N. Y.  
I claim the binged pressure cam, F, constructed and operating as specified.

81,395.—BRIDLE BIT.—Charles H. Miller, Buffalo, N. Y.  
I claim the bar or mouth piece, A, and slotted lever guides, B, when constructed, and the latter cast distended, to permit the insertion of the bar, A, and tongue, m, in the manner described.

81,396.—HOSE NOZZLE.—John B. Mitchell (assignor to himself and Perez B. Barnham), Portland, Me.  
I claim, 1st, A hose nozzle having the adjustable tube, B, ring, A, arms, b, and ring, I, arranged to operate as and for the purposes described.  
2d, In combination with the above, the belt, d, as and for the purposes set forth.

81,397.—CAR COUPLING.—Leonard Monzert, New York city.  
I claim the pivoted ring, C, arranged in relation to the jaws, B, B, provided with concentric depressions, d, all operating as set forth, whereby the ring is swung back over the depressions, to permit the opening of the jaws, and swung forward to securely lock and hold them in place, as herein described and shown.

81,398.—SURPLUS HONEY BOX IN BEE-HIVE.—Hiram Moon and Dewitt C. Tarner, Red Creek, N. Y. Antedated August 21, 1868.  
We claim 1st, The adjustable honey-case, C, when constructed as and for the purpose set forth.  
2d, The case, C, in combination with adjustable box, B, and hive, A, when constructed substantially as described.

81,399.—KNIFE AND FORK HANDLE.—Charles A. Moore, Westbrook, Conn.  
I claim the making of knife and fork handles in sections or pieces, substantially as herein specified, and for the objects set forth.

81,400.—SAWING MACHINE.—M. P. Noel, St. Cloud, Minn.  
I claim, 1st, The oscillating log-holding frame, F, when pivoted to the oscillating saw guide ram, E, controlled by the lever, b, and hook, h, whereby the holding dogs, g, clamp the log upon each side of the saw log-holding frame, and saw guide frame, all constructed, arranged, and operating as herein shown and described.  
2d, The log frame, H, operated in the transverse guides, a, by the lever, C, only, whereby the log is set to the saw by one movement of the lever, as herein set forth.

81,401.—CONFECTION.—Dudley L. Page, Lowell, Mass.  
I claim a new and improved combination maple chocolate cream, as herein described, using for that purpose the sugar and ingredients or composition of matter, as a new article of confection, substantially as and for the purpose specified.

81,402.—PIPE CUTTER.—John Peace, Camden, N. J.  
I claim the improved pipe cutter herein described, consisting of the threaded handle, C, tubular holder, B, having the female screw threads, k, k, cylinders, A, and D, and set screw, F, all constructed, arranged and operating as described.



**81,403.—THREE FASTENER.**—Thaddeus Peck, Stratford, Ct. The key, C, whose blank is formed with projections, c<sub>2</sub>, when adapted to be fitted into recesses formed in the ends of the shaft, and prevented from turning therein by means of the staple, D, passed transversely through said recess, and resting in notches formed in the sides of the shaft, c<sub>1</sub>, all as herein shown and described, for the purpose specified.

**81,404.—APPARATUS FOR FEEDING SCREW BLANKS.**—Elijah S. Pierce, Hartford, Conn. I claim the combination of the roller, C, and belt, D, with the hopper and trough, A, B, when constructed and arranged substantially as herein described.

**81,405.—BRICK MOLD SAFETY GUARD.**—Benjamin Porter (assignor to himself, John George, Thomas E. Lusk, Alfred E. Vandercook, and Oscar Vandercook), Jackson, Mich. I claim the spring, D, when provided with hinge joints, H, and braces, E, which latter move in the recesses, G, of the plate, C, all operating and arranged substantially as described and for the purposes set forth.

**81,406.—BRIDGE.**—Andrew J. Post, Hudson City, N. Y. I claim in combination with a wrought iron strut, the employment of end pieces of cast iron, fitted into and between the parts of the wrought iron, and receiving a through bolt through both the wrought and cast-iron parts, all substantially in the manner and for the purposes herein set forth.

**81,407.—MORTISING MACHINE.**—John Richards, Cincinnati, Ohio. I claim, 1st, The right and left threaded screw, m, and fixed and movable nuts, k and l, when used to operate the chisel bar of a mortising-machine, as herein set forth and described.

2d, The shaft, p, and bevel gears, n' and n, when used in combination with the ram or carrier, a, and as a means of rotating the reverse threaded screw, m, substantially as specified and shown.

3d, The shaft, p, and bevel gears, n' and n, for rotating the screw, m, as specified and shown.

4th, The belt, q, and pulley, r, when used in combination with the ram or carrier, a, and as a means of operating the reverse threaded screw, m, for feeding the chisel bar down, substantially as set forth and shown.

5th, The friction clutch, consisting of the plate, o, pulley, r, in combination with the reverse threaded screw, m, and carrier, a, for producing a graduated feed of the chisel bar, b, for the purposes and in the manner shown.

6th, The weight, u, and belt, t, when arranged to operate as a graduated resistance to the rotation of the screw, m, as a means of returning the chisel bar to its up stroke, arranged and operating as herein described.

7th, The screw, W, when formed with a compound or right and left hand thread, and used as a means of adjusting the table bracket, M, arranged and operating as set forth and specified.

**81,408.—LIQUID METER.**—Charles H. Riggs, Warwick, N. Y. Antedated August 17, 1868. I claim, 1st, An automatic liquid meter, having its receiving pipe, C, opened and closed by the buoyancy and weight of a float, I, the said float being controlled in its action by the floats, G and H, and the whole in combination with the siphon, F, all substantially as shown and described, and for the purpose set forth.

2d, The receiving cylinder, D, substantially as shown and described, in combination with the meter tank, B, floats, I, G and H, the siphon, F, and F, as and for the purpose set forth.

3d, The springs, m and l, or other equivalent device, substantially as shown and described, in combination with the float, I, pins, e and n, and levers, k and g, all as and for the purpose set forth.

4th, The levers, q and h, operated by the float, I, substantially as shown and described, in combination with the gear, p, pipe, C, and tank, B, and siphon, F, all arranged as shown and described, and for the purpose set forth.

5th, The ratchet, f, and pawl, u, substantially as shown and described, or the equivalent thereof, for the purpose of operating the registering dial, J, of a meter, when in combination with the float, I, rod, i, meter tank, B, and floats, G and H, all as set forth.

6th, The registering dial, J, substantially as shown and described, in combination with the siphon, F, floats, I, G and H, and meter tank, B, as and for the purpose set forth.

**81,409.—HORSE RAKE.**—A. H. Robins, Copenhagen, N. Y. I claim the bars, O, attached to the handle shafts, M, M, and provided with oblong slots, g, through which screws, h, pass into the shafts, K, K, for the purpose of admitting of the proper operation of the stop, e, as set forth.

2d, The connecting rods, Q, Q, connecting the rakes to the cart, and the handles of the rods, Q, Q, arms, B, B, shafts, S, and lever, T, all arranged substantially in the manner as and for the purpose set forth.

**81,410.—PLASTER SOWER.**—Henry Rodas, Clarence Center, N. Y. I claim the arrangement, in connection with the intermediate brush, G, of the litter, E, provided with the spiral loops, e, e', situated above and the raised ridge, h, h, of the discharge openings situated below said brush, the whole operating in the manner and for the purpose specified.

Also, the blinged arm, D, with holding band, p, and elevating toggle, r, and serving, with gear, b, to give motion to the parts in the hopper, as set forth.

**81,411.—CAR BRAKE.**—Franklin Root, Boston, Mass. I claim, 1st, The arrangement of the lever brakes, B and C, pins, m and n, and sheaves, E, substantially as and for the purpose specified.

2d, The combination of the sliding inclined plane, D, with lever brakes, B and C, clamping sheaves upon an axle, when constructed substantially as described and for the purpose specified.

3d, The lever clutch brakes, C and B, with removable shoes, when each shoe clamps one-half the circumference of a sheave, in combination with sheaves having V-shaped grooves into which the shoes fit, when constructed substantially as and for the purpose specified.

**81,412.—SUNSHADE FOR HORSES.**—Sarah Ruth, Philadelphia, Pa. I claim the canopy, A, and the supporting frame, B and C, the said parts being constructed, applied, and operated substantially as and for the purpose set forth and described.

**81,413.—SAW.**—David Sattler, Milford, Ohio. I claim the peculiar arrangement and combination of the knife teeth, D, F, planing teeth, B, B, gear tooth, C, and clearing tooth, E, on the saw blade, A, when the several parts are constructed and arranged substantially as and for the purpose herein specified.

**81,414.—CAR BRAKE.**—S. W. Y. Schimonsky, Cheyenne, Dakota Territory. I claim the brake shoes, G, rigidly attached to the frame, D, sliding through the wheels, E, upon the guides, F, and attached to the lever, I, all operating as described, whereby the shoes, G, are alternately wedged upon each side of the wheel, between the same and the guide, F, as the lever is operated in either direction, as herein shown and described.

**81,415.—HAND STAMP.**—A. Selkirk (assignor to J. Gibson, Jr.), Albany, N. Y. I claim, 1st, The loaded plunger, B, with its slot, e, set screw, d, the dovetail, c, or T-shaped terminus of the plunger, B, in combination with the type blocks, h, h, with their recesses, s, s, or their equivalents, substantially for the purpose set forth and described.

2d, The socket, b, or its equivalent, and the handle, c, in combination with the outer cylinder, A, for the purposes set forth and described.

3d, In combination, the cylinder, A, with its prismatic type end, the loaded plunger, B, as described, the elastic spring, f, the perforating type, h, handle socket, b, or its equivalent, and the handle, c, all in combination, substantially for the purpose set forth.

**81,416.—HORSE COLLAR FASTENING.**—W. A. Sharp and J. A. Shannon, Tama City, Iowa. We claim the described construction of the metallic sockets, d, secured to the ends, B, C, of the collar, and provided respectively with the longitudinally beveled recess, c, and tenon, f, arranged as described for the purpose specified.

**81,417.—PUMP.**—J. Shaw, Bridgeport, Conn. I claim the two lifting pumps, C, C<sub>2</sub>, and within the external case, A, provided with a valve, C, at its bottom and all constructed and arranged to operate in the manner substantially as and for the purpose herein set forth.

**81,418.—SAWING MACHINE.**—Pius Lee Shepler, Whitehouse, Ohio. I claim, 1st, The combination of the drums, M, shaft, G, spool, I, chain, J, and carriage, K, all arranged to operate as herein described and shown.

2d, The rest, Z, when provided with a slot, B, and operated by means of the curved and bent lever, C, all as and for the purpose described and shown.

**81,419.—DIE FOR MAKING SQUARE-HEADED BOLTS.**—Wm. Scheldt, Philadelphia, Pa. I claim the narrow ledge, e, at the bottom of the die, in combination with the side walls thereof and the plunger, as and for the purpose herein described.

**81,420.—DEVICE FOR SOLDERING CANS.**—M. M. Shur, Delaware, Ohio. I claim, 1st, The arms, B, having slots, i, and pivoted within the slots, d, and the pins, a, fixed to the slots, b, all constructed, arranged, and operating as and for the purpose set forth.

2d, In combination with the plates, A, and arms, B, bearing pins, i, the cage slots, k, and as and for the purpose specified.

3d, In combination with the parts, D, C, G, the collar, H, when provided with inclined surfaces, m, and the loose handle, K, having pins, h, all constructed and operating as and for the purpose specified.

**81,421.—MEAT CUTTER.**—F. G. Siemens, Winona, Minn. I claim, 1st, The meat cutting machine, consisting of the frame, A, B, with the tables, C, D, the reciprocating frame, h, with the series of knives attached thereto, and the rotating chopping block, K, operated, by the shaft, G, the rock shaft, q, and pawls, t and w, all constructed and arranged to operate substantially as herein described.

2d, The chopping block, K, consisting of a series of pieces set endwise and bound together with a band, q, and set screws, p, and provided with the removable curb, M, constructed and arranged as described.

3d, The arrangement of the tables, C, D, in combination with the meat-cutting apparatus, when constructed as herein set forth.

**81,422.—SPRING-BED BOTTOM.**—P. Sisson, Brant, N. Y. I claim supporting the slat, A, on the ends of the inclined spring levers, B, B, when arranged substantially in the manner and for the purpose set forth.

**81,423.—HARVESTER.**—Amos Smith, Vienna Cross Roads, O. I claim the arrangement of the bars, K, L, at the junction of which the outer bar is pivoted, upon the outer end of the axle of the machine and the bearing of the shaft, respectively, when said bars are adjustable as described, and the bar, K, provided with the pivot, i, of the lever, O, and the slot-standard, P, for raising the outer end of the outer bar, all constructed, arranged, and operating substantially as set forth.

**81,424.—LIFTING JACK.**—Charles A. Smith, New York City. I claim the combination of the lever, H, ratchet wheel, D, cogged wheel, K, slide, B, ratchet bar, C, with safety wheel, F, and brake or safety band, I, all herein set forth.

**81,425.—PLANE.**—F. Smith and I. Carpenter, Lancaster, Pa. We claim, 1st, The adjustable cap, provided with the guard in front of the set screw, e, substantially as and for the purpose described.

2d, The set screws, d<sub>2</sub>, in the lugs, a<sub>1</sub>, arranged to clamp upon the adjustable bridge, C, as herein shown and described for the purpose specified.

**81,426.—HOP VINE TRELLIS.**—Youngs W. Smith, Bristol, N. Y. I claim the improved hop trellis, formed of the elevated parallel supporting wires, a, a, and standards, A, A, in combination with stakes, B, B, and diagonal net work of twine, alternating from row to row, and stake to stake, over the intermediate supporting wires, a, a, arranged substantially as set forth.

**81,427.—BREAD CUTTER.**—J. D. Soles, Lynn township, Ill. I claim the combination of the arch standard, A, its guide plate, B, and flange, i, and bed plate, m, the gear, E, the guide, F, the spring, S, the lever and knife, C and D, all as and for the purposes described.

**81,428.—SMUT MACHINE.**—Henry Stanley, St. Johnsbury, Vt. I claim the grain cleaning machine, composed of one or a series of perforated scroll cases, surrounding one or more taps, the spouts, E, G, and the fan, I, arranged substantially as and for the purpose described.

**81,429.—FAN FOR SEWING MACHINES.**—James H. Stone, Washington, D. C. I claim operating the rotary fan to a sewing machine directly from the driving shaft, A, through the medium of the beveled gearing, B, F, as described for the purpose specified.

**81,430.—PERMUTATION LOCK.**—T. J. Sullivan, Albany, N. Y. I claim the tumblers, constructed as described, of the perforated annular plate, a, grooved disk, b, and divided annular spring, b, having the pin, i, all arranged and operated as described for the purpose specified.

**81,431.—SPRING FOR VEHICLES.**—Charles D. Sutton, Tarrytown, N. Y. I claim an improved platform spring formed by the combination of the cross springs, C, constructed substantially as described, and forming a flat support for the fifth wheel, with the side springs, B, and shackles, D, as and for the purpose set forth.

**81,432.—MACHINE FOR TURNING LOGS IN SAW MILLS.**—Esau Tarrant, Muskegon, Mich. I claim, 1st, The toothed bar, C, pivoted at its lower end between the blocks E, E, adapted to slide in vertical grooves formed in the posts D, whereby the said bar, C, is rendered vertically movable and capable of adjustment to suit logs of different sizes, substantially as herein set forth and shown.

2d, The combination with, and arrangement with relation to, the bar, C, of the cord or chain, F, pulley, C, shaft, J, drum, I, friction pulleys, K, L, and adjustable shaft, M, all as set forth and shown.

3d, The arrangement of the pivoted brake, R, connection, S, and pivoted bridge tree, O (in which is formed the outer bearing for shaft, M), substantially as herein shown and described, whereby the pulley, L, is removed from contact with pulley, K, and the brake brought into contact with the latter, and vice versa, substantially as herein set forth.

4th, The arrangement of the cam and shaft, P, Q, and weighted arm, T, with relation to the connected brake and bridge tree, to operate as and for the purpose described.

**81,433.—STEAM GENERATOR.**—Ed. Taylor, Tecumseh, Mich. I claim the arrangement of the suspended counterbalanced boiler, B, within the fire box or chamber, A, and the elevated tank or reservoir, I, substantially as and for the purpose set forth.

**81,434.—BELT SAW.**—George Thompson, Nashua, N. H. I claim the arrangement, substantially as herein shown and described, of the pulleys, A, each adjustable independently of the others, with relation to the pulley, A, and saw, as set forth.

**81,435.—SHINGLE BOLT MACHINE.**—Thomas Thompson, Buffalo, N. Y. I claim, 1st, The arrangement of the rack bars, H, pinions, G', friction wheels, I and J, and shifting rod and lever, K, K', with the counterbalanced swinging frame, C, as a means of raising and lowering the same, as set forth.

2d, The step lever, M, and pivot arm, M, in combination with the stationary table, provided with a slit in one side for the passage of the saw, arranged and operating in the manner, for the purpose described.

**81,436.—FIRE ESCAPE.**—T. Thompson, Jr., New York City. I claim the ladder, D, constructed substantially as herein shown and described, that is to say, with two side bars at each side, to which the flanged ends of the broad steps are pivoted, in combination with the balcony, B, permanently attached to the outer wall of the building, in the manner and for the purpose set forth.

**81,437.—BURIAL CASE.**—Franz Vester, Newark, N. J. I claim the application of the tube, C, and ladder, H, to a burial case or coffin, substantially as and for the purposes described and set forth.

Also, in combination with the tube, C, and ladder, H, the cord, K, and bell, I, for the purposes substantially as set forth and described.

**81,438.—LOOM FOR CIRCULAR WEAVING.**—Adolph Wagner, (assignor to Samuel Beinstein), New York City. I claim, 1st, A circular weaving machine, in which the core or block, H, is vertically as well as horizontally adjustable, substantially as described, so that tubular, as well as irregular shaped fabric may be produced, as set forth.

2d, The device herein shown and described, for imparting reciprocating motion, in opposite directions, to the two sets of carriers, E or E', which compose a group, said device consisting of the pin, p, cam on the drum, B, and pinion, m, in combination with the toothed carrier stems, substantially as and for the purpose herein shown and described.

3d, The carriers, E, E', when arranged in combination with the upright bars, I, and sliding blocks, o, o, being divided in the middle, as set forth, to allow the passage of the warp threads, as specified.

4th, The carriers, E, E', when provided with diverging horizontal arms, substantially as set forth, for the purpose of distributing the warp threads, and of allowing the grouping of the carriers between the pinions, e, e, as herein shown and described.

5th, The carriers, E or E', when arranged and operating as described, the shuttles, L, L, when made as described, and the up and down as well as horizontally adjustable block, H, all in combination with each other and with the rotary drum, B, and all made and operating substantially as herein shown and described.

6th, The sliding pins, p, in combination with the carrier stems, substantially as and for the purpose shown and described.

**81,439.—CURB FOR WATER WHEEL.**—P. H. Wait, Sandy Hill, N. Y. I claim, 1st, The portion, F, of the curb, constructed as described, of the top and bottom plates, g, g', the latter provided with a pentagon flange, h, forming a portion of the case, A, the side and end bars, i, j, adapted to receive the gate, D, and door, G, all arranged as described, for the purpose specified.

2d, The curved gate, D, constructed as described, with a flange, f, adapted to work against the vertical central bar, d, in the frame, E, said frame being provided with the ledges, c, c, out of line with each other, as herein described, for the purpose specified.

**81,440.—QUILTING FRAME.**—Daniel F. Wallace, Ripley, Ohio. I claim a quilting frame, constructed with rests, DD, movable posts, a, a, rollers, E, E, and nuts, b, b, b, combined and arranged for the use and purpose as specified and herein set forth.

**81,441.—VESSEL FOR HOLDING PETROLEUM AND OTHER LIQUIDS.**—Elisha Waters, Troy, N. Y. I claim a closed cylindrical tank-like or barrel-shaped vessel, formed essentially or mainly from paper pulp, paper in sheets, or paper or straw board, of any suitable quality, and supported internally by disks or hoops at the ends, or an extended wooden shell, substantially as described herein.

Also, a closed cylindrical tank-like or barrel-shaped vessel, formed essentially or mainly from paper pulp, paper in sheets, or paper or straw board, with or without internal end hoops, or an inner wooden shell, substantially as described, in combination with an exterior protecting case formed of wooden staves and heading, and fitted or secured to the paper vessel, substantially as set forth, so that the paper vessel shall not turn within the wooden case, and yet shall be free or separable therefrom along the joints of the staves.

**81,442.—SAW SET.**—W. B. Weaver, Reading Centre, N. Y. I claim the combination of the leather packing, l, and adjustable plate, E, with the jaws, A, as herein described, for the purpose specified.

**81,443.—MECHANISM FOR OPERATING FIVE WIRES IN LOOMS.**—William Weld, Manchester, England (assignor to Elias S. Higgins), New York City. I claim, 1st, Wire motions, where the head of the wire only is guided during insertion and withdrawal, and the point is supported and transferred from the point of withdrawal to the point of insertion by a trough or bar, d, oscillating on a fulcrum or joint, substantially as hereinbefore described.

2d, The combination of wires, with heads of the shape shown in figs. 4 and 4a, with an oscillating grooved trough, d, substantially as hereinbefore described.

3d, The spring pieces, d<sub>3</sub>, or their equivalents, in combination with the oscillating grooved trough, d, substantially in the manner described.

4th, The slide, b, provided with a projection, b<sub>3</sub> for pushing directly against the head of the wire, when combined with an oscillating trough, substantially as hereinbefore described.

5th, The combination and arrangement of the mechanism of the wire motion shown in figs. 1, 2, 3, 4, and 4a, and hereinbefore described.

**81,444.—RAILROAD GATE.**—David S. Weiss, Brecknock township, assignor to himself, Jacob H. Bingham, and Joseph W. Goshert, Durioch, Pa. I claim the combined arrangement of my notched rocker, T, adjoining the rail, pivoted bar, L, rocker shaft, B, and lever, t; also the crank arm, c, connecting rod, D, stirrup bracket, E, and gate, F, G, H, all arranged and operated substantially in the manner and for the purpose specified.

**81,445.—CHURN.**—C. N. White (assignor to himself, W. S. Hais, and T. F. Roland), Bayville, Mass. I claim, 1st, The combination of the dash plates, E, block, F, plate, G, and cover, H, with each other, and with the churn body, D, said parts being constructed and arranged substantially as herein shown and described and for the purpose set forth.

2d, In combination with the above, and with the frame, A, B, C, the fixed centre, J, and crank, L, all arranged and operating substantially as and for the purpose set forth.

**81,446.—COUGH MIXTURE.**—Samuel R. Whitlow, Rosefield, Ill. I claim the compound cough mixture, prepared and compounded, and to be used substantially as described.

**81,447.—BAIL MAKING MACHINE.**—Henry C. Wilder, Ashby, Mass. Antedated August 13, 1868. I claim, 1st, The spring supports, R, R, so arranged with formers, V, V', and vibrating arms, X, X', or their equivalents, as to receive the pressure of the wire at the ends of the bail wood, while being bent, as described, and for the purpose specified.

2d, The vibrating shaft, J, the lever, g, and the hardened steel die, F, with the guide thereto, combined and operating as described, and for the purpose set forth.

3d, The opening tunnel, H, so arranged with other necessary parts as to guide the bail wire through the bail wood, in combination with the stationary slotted tunnel, B, constructed substantially as described, and for the purpose set forth.

4th, The arrangement and combination of the bent lever, B, with the pivot,

r, the spring, x, the spring ton, C, the incline, t, the adjustable gage, s, and the set screw, b, constructed and operating substantially as described, and for the purpose set forth.

5th, The arrangement and combination of the spur gears, P, P', the washer and screw, n, n', the connections, A, A, the eye, r, the spring, W, and the ratchet wheel, Q, constructed and operating substantially as and for the purpose set forth.

6th, The arrangement and combination of the shaft, D, D, the gears, m, n, the pins, J, J, or their equivalent, with the lever, z, and vibrating shaft, J, operating substantially as and for the purpose set forth.

7th, The arrangement and combination of the lever, g, the spring, p, the arms, c, l, the spring, h, the shaft, J, and the spring, W, operating substantially as and for the purpose set forth.

8th, The arrangement and combination of the adjustable cutter plate, D, the hardened steel ring, G, the hardened steel cutter, d, the lever, C, C, the pin, E, and the spring, K, operating substantially as and for the purpose set forth.

9th, The arrangement and combination of the crank, z, the grooved rolls, O, O', the pivoted lever, Z, or its equivalent, and the adjusting screw, L, operating substantially as and for the purpose set forth.

10th, The plate having thereon the guide, y, and the incline, s, in combination with the vibrating shaft, J, having the steel die, F, thereon, operating as and for the purpose set forth.

11th, The construction, combination, and arrangement of all the parts, substantially as described, and for the purpose specified.

**81,448.—GRAIN SEPARATOR.**—Miles D. Williams, Lawton, Mich. I claim, 1st, The upper screens, L, provided with the laws, M, in connection with the shoe, B, screen case, A, bolt, C, and nut, D, operating in the manner described and for the purposes specified.

2d, The combination of the above-named parts with the grain separator, constructed and arranged substantially as and for the purpose set forth.

**81,449.—LUBRICATING HUBS AND AXLES.**—Thomas Wilson, Gaston, England. I claim, 1st, The cam nut, v, when arranged to operate substantially as described and set forth.

2d, The oil receptacle, j, in combination with the conductors, n, n, substantially as and for the purpose described.

3d, The pistons, l, l, with their valves, m, m, when operated upon by a cam nut, v, substantially as herein described and set forth.

4th, The sand guard, g, and waste box, t, in combination with the box, c, and bearing, p, when arranged substantially as described and set forth.

5th, The arrangement and combination of the oil receiver, j, pistons, l, with their valves, m, m, conductors, n, n, box, c, with its nuts, d, and e, bearing, p, with spiral groove, q, waste box, t, sand guard, g, shell, f, and f', and hub, a, all when arranged substantially as described and for the purposes fully set forth.

**81,450.—WATCHMAKER'S DRILL.**—Alois Wirsching (assignor to himself and Albert Wild), Brooklyn, N. Y. I claim the drill shaft, B, fitted within the tube, A, in connection with the spring, E, arranged or applied as shown, or in an equivalent way, and the string, F, attached to a drum or pulley on the drill shaft, all constructed to operate in the manner substantially as and for the purpose set forth.

**81,451.—PUMP PISTON.**—John Wood, Franklin, Pa. I claim the movable sections, A, B, C, the packing, F, the ball valve, V, and ribs, e, arranged as herein described, for the purpose specified.

**81,452.—FIFTH WHEEL FOR CARRIAGES.**—Edmund Yeiser, Sheridan, Pa. I claim the perch plate, B, as constructed, in combination with pin, g, guides, C, C, axle, D, bar, A', and supports, H, H, arranged substantially as set forth.

**81,453.—LET-OFF MECHANISM FOR LOOMS.**—Charles H. Young, River Point, E. I. I claim the combination of the wheel, D, with the escapement, J, arranged so that the projections, c, o, on the arms shall move clear of the projections, r, on the wheel, D, when extra strain is thrown upon the warp, substantially as herein described and for the purpose set forth.

**81,454.—CASTER FOR SEWING MACHINE.**—Levi O. Allen, Gardner, Me. I claim the combination of the pivoted legs, A, A, with slots, c and c, in combination with the link, F, slotted clutch, G, and lever, D, substantially in the manner as herein shown and for the purpose specified.

**81,455.—GOVERNOR FOR STEAM ENGINE.**—Thomas Alsop, Elkhart, Ill. I claim, 1st, The arrangement of the independent rod, J, resting upon the rod or stem, b, and having its upper end held against rod, I, by means of a lever, L, or its equivalent, whereby the ingress of steam is controlled or arrested, substantially as herein set forth.

2d, The combination of the parts, C, C', clutch, m, n', and rods I and J, substantially as described.

3d, The weighted lever, L, or its equivalent, in combination with the valve stem, b, and steam governor apparatus, in such a way that, when the motion of the bell shaft is retarded, as compared with that of the governor balls, the weight will be dropped, and the cut-off valve thereby closed, substantially as described.

**81,456.—MODE OF ATTACHING SPRINGS TO MILL SPINDLES.**—Thomas Alsop, Elkhart City, Ill. I claim the combination of the case, E, pinion, D, shaft, A, and spring, m, with its outer end attached to the case, E, and the inner end attached to the spindle by the sleeve, e, arranged substantially as described, and for the purpose specified.

**81,457.—BOOTS AND SHOES.**—Robert Andrews, Milwaukee, Wis. Antedated August 7, 1868. I claim the method of making boots and shoes water proof, by putting the hair side or grained surfaces of two pieces of leather together, and putting between them some lubricating material, to prevent abrasion and injury from attrition, as herein described, using, for the purpose of lubrication, any material composed by me, or any oil substance which will produce the intended effect, and using any and all kinds of leather which may be used to make boots and shoes made of any and all kinds of skins.

**81,458.—CORN SHELLER.**—Daniel Bacon, Brewster, Ind. I claim the lever, f, plunger, d, teeth, b, b, springs, a, a, a, platform, A, constructed and operated substantially as shown and described, for the purposes set forth.

**81,459.—BUTTER TUB.**—A. R. Bailey, Elmore, Vt. I claim in combination with a butter tub having the usual cover, and provided with angular grooves, b, b, on the inner side, near the top, the additional interior cover, B, having journals, a, a, for fitting into the grooves, b, b, as and for the purposes specified.

**81,460.—WASH BOILER.**—Alex. R. Ball and Wm. M. Phelps, Marshall, Mich. We claim, 1st, The inclined false bottom, B, in combination with a wash boiler, substantially as and for the purpose specified.

2d, Providing said inclined false bottom, B, with side flanges, C, or other equivalent means for reversing its incline, when employed in combination with a wash boiler, substantially in the manner and for the use set forth.

**81,461.—ENGRAVERS' PLATE.**—Thos. Bardon, Brooklyn, N. Y. I claim an engraving surface formed of type metal, or its equivalent, fused upon the surface of a hard metal plate, such as brass or steel, for the purposes and substantially as set forth.

**81,462.—STEAM MACHINE FOR EXTRACTING STUMPS.**—Alfred B. Beaumont, Austerlitz, Mich. I claim, 1st, The combination and arrangement with the derrick, A, A, mounted upon wheels, B, B, of the steam engine, D, E, G, with stack, I, and the reservoir, Z, the whole being in portable form, whereby the machine may be moved over a stump, and the steam applied for extracting it, as herein set forth.

2d, The combination and arrangement of the connecting rods, I, I, jointed ends, J, J, pawls, h, h, with the ratchet wheel, I, whereby the forward turning of the ratchet is produced at both strokes, in the manner and for the purpose specified.

3d, The combination with the pawls, h, h, of the cam plate, y, having cams, j, j, rods, K, K, and lever, L, for throwing said pawls out of gear, as herein set forth.

4th, The arrangement of the wire ropes, s, s, passing through the slots, t, t, and retained by a rod passing through the loop, as set forth.

5th, The arrangement of the brake, Q, connecting cord or rod, R, and lever, S, with the brake wheel, B, as herein described.

6th, The combination and arrangement with the wheels, B, B, of the wing or sustaining bars, C, C, and the rope or chains, c, c, pulleys, a, b, and holding device, z, as herein set forth.

7th, The arrangement as a whole, consisting of the derrick, A, steam engine, D, E, G, connecting rods, I, I, arms, J, J, with pawls, h, h, ratchet wheel, I, roller, N, with wire cords or chains, s, s, and adjusting wheels, B, B, all as herein set forth.

**81,463.—BOOT TREE AND STRETCHER.**—Jacob Bechtel, Roxbury, Pa. I claim, 1st, A boot tree when made in two parts, one of which is provided with blocks and rollers worked by a screw, for the purpose of pressing them outward, substantially as and for the purposes herein set forth.

2d, The last, C, constructed as described, in two parts, adjusted by screws, and provided with a tongue fitting into a slot on the lower end of the front part of the boot tree, substantially as and for the purposes herein set forth.

**81,464.—TOOL FOR CUTTING HOLES IN CLOTH OR LEATHER FOR BUCKLE TONGUES.**—Alma Bedford, Coldwater, Mich. I claim a tool for cutting holes in leather or cloth, to receive buckle tongues, consisting of the cutting tool, J, and locking device, G, constructed and arranged to operate substantially as herein described.

**81,465.—ROTARY PUNCH.**—Alma Bedford, Coldwater, Mich. I claim a rotary punch, having attached to its upper jaw, E, by means of a set screw, B, an adjustable plate, A, rotating parallel with it, provided with a removable series of punches, C, and having its lower jaw, F, provided with a removable wooden or other bed, D, all constructed and arranged substantially as herein described.

**81,466.—GUIDE FOR SEWING MACHINE.**—Charles Benedict, and O. R. Fyler, Wolfville, Conn. We claim the gage, constructed with a curved groove, and flanged face, substantially as herein described.

**81,467.—LEVER JACK.**—Jacob Bernheisel, Sr., Green Park, Ill. I claim the coiled spring, H, the slide, K, and the curved oval slot, D, in which the pivot, U, of the lever, C, works, when arranged, constructed, and operating as herein described, and for the purpose set forth.

**81,468.—RAILWAY STOCK CAR.**—George R. Blanchard, Baltimore, Md. I claim, 1st, A car for the transportation of animals and other kinds of freight upon railroads, convertible from a double to a single deck or platform car, and vice versa, by means of a sawing or drawing deck or platform, attached to the sides of said car, substantially as shown and described.

2d, The removable section, D<sub>2</sub>, which occupies the central position between the sections, A, A, A<sub>2</sub>, substantially as shown and described.

3d, The arrangement of devices, substantially as shown and described, for receiving and carrying the central portion of the deck when not in position for use.

4th, The arrangement of the beams, and their rests or supports, with refer-



ence to the platforms or sections of the upper deck, and the framework of the car, substantially as shown and described.

**81,469.—HAME.**—Thomas G. Brooks, Oneida, Ill.  
I claim the hame, A, when provided with a notched plate, b, in combination with the slotted spring, D, constructed as described, for the purpose of attaching the hames together by means of the ring, B, substantially as and for the purposes herein set forth.

**81,470.—WINDLASS.**—N. B. Brown, Antwerp, N. Y. Antedated August 17, 1868.  
I claim, 1st, The brake, J, in combination with a ratchet wheel, E, and clutch, Z, the several parts being constructed and operated substantially as and for the purposes specified.  
2d, The arrangement of the shaft, R, wheel, E, and crank, F, with the clutch, G, pawl, K, and brake, J, when the various parts are constructed and operated as and for the purposes herein fully set forth.

**81,471.—SKEIN HOLDER.**—Thomas F. Brown, Jr., Concord, N. H.  
I claim the combination of the plates, A, B, slitted and notched, as described, with their connections and operative spring, arranged and applied to them substantially as specified, the whole being for the purpose as explained.

**81,472.—HARVESTER.**—Thomas S. Brown, Poughkeepsie, N. Y.  
I claim, 1st, The shipping lever, provided with a cam or eccentric slot and notch, to receive the pin on the sliding fork, when constructed and operating substantially as set forth.  
2d, The combination of the slotted and notched lever with the spiral spring and the sliding fork, when constructed and operating substantially as set forth.  
3d, The combination of the slotted and notched lever with the spiral spring, the sliding fork, and the wheel having a grooved and ratcheted hub, when constructed and operating substantially as set forth.

**81,473.—HARVESTER RAKE.**—Thomas S. Brown, Poughkeepsie, N. Y.  
I claim, 1st, A swinging gear frame or box mounted upon and vibrating horizontally about the vertical rake and reel shaft, substantially as described.  
2d, The horizontal driving shaft mounted in a swinging gear frame, whose axis of vibration is the vertical rake shaft.  
3d, The combination of a swinging gear frame with its gearing and a double jointed tumbling shaft, by the use of which the usual extensible tumbling shaft is dispensed with, substantially as described.  
4th, The vertically adjustable switch lever for the purpose described.  
5th, The adjustable switch lever, in combination with an adjustable hook or spur on the revolving rake arm or rake head, for actuating said switch lever, as described.  
6th, A movable switch lever, in combination with means for removing said lever out of the way of the actuating hooks or spurs on the rake arms or rake head.  
7th, Operating the switch lever by means of a spring or equivalent device, and a hand or foot lever, within reach of the driver or his seat on the machine, so that said switch lever may be made to engage the hooks or spurs on the rake arms or not, at pleasure.  
8th, The combination of the switch lever, spring, or weighted lever, and foot or hand lever, substantially as described.  
9th, Actuating the adjustable hook or spur to the iron roller cheek or elbow, so that an adjustment of the angle of the rake arm relative thereto will not disturb the relation of said hook to the switch lever.  
10th, The arrangement of the pulley, R, over which the cord for actuating the switch lever passes, in the same or nearly the same plane with the joints which connect the platform with the machine.  
11th, Giving to the switch lever an inclination backward from its shaft, substantially as described, so that in case of a backward movement of the rake arms, the hooks or spurs thereon will press said lever downward, and pass over it without injury thereto.  
12th, The foot lever, provided with the stops or shoulders and spring, operating substantially as and for the purpose described.

**81,474.—CURB FOR WATER WHEEL.**—James B. Dryson and John H. Hartuff, Newcastle, Pa.  
We claim the curved plates, F, F', loosely attached to the ends of the gates, E, E', and sliding on the chutes, B, B', all operating substantially as and for the purposes herein set forth.

**81,475.—MACHINE FOR SAWING LATH.**—William G. Bulgin, Vienna, N. J.  
I claim the arrangement of the two sets of bevel gear, k, m, and n, placed centrally in the machine, to be operated by the hand lever, G, for reversing the motion of the log carriage, and moving it forward and back, alternately, at a different rate of speed, substantially as and for the purposes herein set forth.

**81,476.—CUTTING PRINTERS' LEADS.**—John W. H. Cheney, Hartford, Conn.  
I claim the arrangement of the hand cutter, F, and the parts by which it is operated, with the stationary cutter, a, bed, C, and adjustable gages, D and E, when constructed as described and for the purpose specified.

**81,477.—TRUNK LID SUPPORTER.**—Philip Cohen, Chicago, Ill.  
I claim, 1st, Stud, B, spring, F, hook arm, G, all operating substantially as described and set forth.  
2d, Quadrant bar, A, provided with perforations, 2, when operating in connection with case, D, substantially as set forth and shown.

**81,478.—CONSTRUCTION OF CARTRIDGE SHELLS.**—James F. Cranston, Springfield, Mass., assignor to "The American Trading Company."  
I claim forming the flange, p, on the inside of the shell, by means of the dies, E and F, at the same operation in which the shell tapered, substantially as shown.

**81,479.—SUPPORTER FOR STOCKINGS.**—Elizabeth L. Daniels, Boston, Mass.  
I claim the combination of a stocking and diaper supporter, in the manner and for the purposes herein described, when the same consists of the band, A, supports, D, B and C, and buckles, e, substantially as and for the purpose set forth.

**81,480.—CAST CUT.**—George P. Darrow (assignor to James L. Haven and Company), Cincinnati, Ohio.  
I claim a cast screw nut, whose threads are interrupted at the parting seam, as set forth.

**81,481.—BLACKING BRUSH.**—Clark D. Day, Chatham, Conn.  
I claim the combination of the smaller brush, a, fitting into the socket, b, with the scrap, c, and set screw, d.

**81,482.—SHOULDER BRACE AND SUSPENDER COMBINED.**—Alice M. Eaton, Boston, Mass.  
I claim the within described shoulder brace and suspender, consisting of the waistband, B, with its buckle, elastic straps, A, and C, and those, e, e' and g, g', with their buckles and button holes, the whole combined, arranged, and operating substantially as and for the purpose set forth.

**81,483.—LOW WATER INDICATOR.**—Theodor G. Eiswald and James Barbour, Providence, R. I., assignors to T. G. Eiswald.  
We claim, 1st, The arrangement of the cup, E, fusible plug, P, tube or stem B, and openings or side pieces, e, e', or their equivalents, when constructed to operate in the manner described.  
2d, The arrangement of the above-described apparatus within the hollow globe, cylinder, or expanded pipe, A, substantially as shown and described.

**81,484.—COAL STOVE.**—John Fahney, Boonsborough, Md.  
I claim, 1st, An attachable and detachable rim, B, when used in connection with base, burning or reservoir, stoves, substantially as and for the purpose specified.  
2d, The sliding plates, C, C', when employed in combination with the rim, B, for the purpose described.

**81,485.—MAGNETIC TELEGRAPH.**—Moses G. Farmer, Salem, Mass.  
I claim the arrangement and combination of the rheostat-receiving magnet, and two-point key, or their equivalents, substantially as described.

**81,486.—COMPOSITION FOR CURING CORNS, BUNIONS, ETC.**—A. J. Ferguson, Sharon, Pa.  
I claim the within described process of treating corns and bunions, consisting, first, in bathing the corn or bunion with muriatic acid, and then applying the compound, prepared as herein specified.

**81,487.—LOOM FOR WEAVING PILE FABRIC.**—Levi Ferguson, Lowell, Mass.  
I claim, 1st, The combination of the steady box, I, with the lever catch H, and the auxiliary carriage or wire transferer, G, provided with mechanism for operating it, substantially as described.  
Also, the combination of the steady finger, L, (provided with mechanism for operating it as described), with the withdrawing carriage, E, its abutment, K, and the transferer, G.  
Also, the combination of the withdrawing carriage, E, the heel plate transferer, G, the lever, M, and its notched plate, N, such being for supporting and transferring the wire, in manner as specified.  
Also, the combination of the auxiliary carriage, W, and its cam, x, with the lever, M, the words, a, d, or their equivalents, in one or more languages, when used on any stove or heater, or on any appendage thereof, in connection with fuel size representation, a, b, or c, or their equivalent fuel size representation, as and for the purpose set forth and described.

**81,488.—VACUUM APPARATUS.**—Theophilus Fravel, Westville, Ind.  
I claim, 1st, The construction of the cape, H, and the manner of fastening it to the door or cover of the apparatus, substantially as shown and described.  
2d, The construction and arrangement of the pit, A, seat, D, door, G, with its aperture for the neck, and exhaust aperture, I, all substantially as shown and described.

**81,489.—DRAWING FIBROUS SUBSTANCES.**—Jim B. Fuller, Norwich, Conn., assignor to himself, James P. Upham, and E. T. Rice.  
I claim the roller, C, the band, d, and drawing rollers, E, F, adjusted and arranged substantially as described, and for the purpose specified.

**81,490.—FUEL SIZE INDICATOR.**—J. Gibson, Jr., Albany, N. Y.  
I claim, 1st, The size representations, a, a', of fuel, fac-similes in form and size, or outline size representations, b, b', or measurement size representation, c, or any fuel size representations equivalent thereto, cast solid with or attached to any stove, heater, furnace, or the like, or cast with or attached to any part or appendage of such stove or heater, as and for the purpose set forth and described.  
2d, The fuel size representations or indications, a, b, or c, or their equivalents, attached permanently to any stove or heater, or when made detachable, either with or without the words, d, d', or their equivalents, as and for the purpose set forth and described.  
3d, The words, d, d', or their equivalents, in one or more languages, when used on any stove or heater, or on any appendage thereof, in connection with fuel size representation, a, b, or c, or their equivalent fuel size representation, as and for the purpose set forth and described.

**81,491.—AUTOMATIC TOY.**—Wm. F. Goodwin, East New York, N. Y.  
I claim, 1st, In the construction of the leg of a toy, adapted to imitate the movements of the natural leg, the attachment of the bar, B, to the lower end of the bar, B', and to the foot, at a point in advance of the point of

attachment of bar, B, to said foot, substantially as and for the purpose shown and described.

**81,492.—HOT AIR FURNACE.**—C. B. Gregory, Beverly, N. J.  
I claim, 1st, The arrangement of the fireplace, chamber, H, with its tubes, p, chamber, x', and the flue, E, as and for the purpose specified.  
2d, Perforated plates, arranged above the sides of a fire pot, so that their lower edges may be raised from contact with the fire pot, for the purpose set forth.

**81,493.—WINDOW SASH.**—Henry Goss, Tiffin, Ohio.  
I claim the tongue, C, spring, D, set screw, g, bar, h, and pins, J, J', arranged in combination with the sash, B, to operate as set forth.

**81,494.—WATER ELEVATOR.**—Jos. Gruet, Kendallville, Ind.  
I claim the water elevator described, consisting of curb, A, shifting shaft, B, with bar and pins, b, loose spools, C, C', with gear wheels, d, and cylinder, c, having the face wheels, c', standard, D, adjustable shaft, f, d, with gear wheel, d', lever, E, clevis, H, and spring, h, with wheel, h', the whole being combined, arranged, and operated in the manner and for the purposes set forth.

**81,495.—PREPARING OILS.**—Stuart Gwynn, New York city, assignor to S. M. Clark, Washington, D. C.  
I claim oils prepared and purified in the manner which I have herein set forth.

**81,496.—APPARATUS FOR THE PURIFICATION OF OILS.**—Stuart Gwynn, New York city, and S. M. Clark (assignors to S. M. Clark), Washington, D. C.  
We claim, 1st, The within described combination and arrangement, in successively lower planes, of an oxidizing tank, A, provided with a detachable stirring shaft, H, and diffusing sieve, P, a neutralizing tank, B, with sieve, P', at top, and steam or hot air pipes, K, within the same, a steaming tank, C, containing suitable steam-jet pipes, K, and an evaporating tank or vessel, D, the whole being adapted and made to operate for the refinement of oils, as has been herein set forth.  
2d, In combination with the tanks, A, B, C, and D, of our apparatus, outer vertical glass indicating tubes, S, communicating with the bottoms of said tanks, and operating as herein described.  
3d, The within described combination of inclined or cam surfaces and suitable notches, formed upon a revolving sieve, P, with pins supporting the same, when arranged and operating to lift and drop the sieve in its revolutions, substantially as herein set forth.

**81,497.—BOX OPENER.**—H. H. Hall, Tioga, Pa.  
I claim the lever or stock, A, hooks, b, and J, spring, e, and wedge, d, all combined, constructed, and arranged substantially in the manner and for the purpose set forth.

**81,498.—PAN-FOLDING MACHINE.**—William Hamilton, Philadelphia, Pa.  
I claim the hinged folding plate, with grooved edges, or its equivalent, the metal projections or their slides and ends, or their equivalent, and the application of the rollers and movable slides, as substantially set forth herein, by the combined action of which the operator is enabled to fold a pan or box at one motion, and of any required form or size.  
Also, the prepared machine sheet, E, E', fig. 5, as described, and for the uses and purposes herein set forth.

**81,499.—CAR SPRING.**—G. W. Harris and George Elliott, Aurora, Ind.  
We claim, 1st, A spring composed of one or more leaves, which taper from mid length endward, and the upturned margins of which, likewise, taper endward.  
2d, A spring, composed of a series of nested leaves, A, B, C, which, with their upturned margins, taper in length endward, and are secured by means of a central band or strap, substantially as set forth.  
3d, The pack of flanged tapering and leaved leaves, A, B, C, in combination with the stepped strap, E, e' 1 2 3, bolt, F, and nut, G, substantially as and for the purpose set forth.

**81,500.—CHUCK.**—Benjamin Haviland, Hudson, N. Y.  
I claim, 1st, The general construction and arrangement of the several parts, which, taken together, constitute the chuck herein described, whereby the same may serve as a screw-cutting die or a universal chuck, all as set forth.  
2d, Rotating the cam plate, c, c', and retaining it in position by means of the rack plate, detent, a, and stub, e, substantially in the manner specified.

**81,501.—GATE.**—H. A. Henderson, Avoca, N. Y.  
I claim the adjustable pulley, b, running in the slot, c, and on the rail, E, in combination with the movable pulley, a, on the gate post, for the purpose of allowing the gate to be slid backward and forward as well when raised as when in its proper position, substantially as herein set forth and described.

**81,502.—CORN PLANTER.**—A. E. Herrington and J. D. Richards, Big Prairie, Ind.  
We claim, 1st, The combination of the collars, M, on the axle, B, with the shields, F, provided with openings and slides, which latter are operated by levers, B', all arranged and operating substantially as described and for the purposes set forth.  
2d, The combination of the lever, A, and arms, F, F', with the vibrating bars, G, and teeth, D', arranged to operate substantially as and for the purposes set forth.  
3d, In combination with the above, the lever, T, hinged at U, and provided with standard, V, to operate the frame, C, substantially as and for the purpose set forth.

**81,503.—CRIMPING CLAMP.**—Lucian Hill, West Brookfield, Mass., assignor to Lawson Hill, North Brookfield, Mass.  
I claim, 1st, The combination, with the jaw part, C, spindle, A, and nut, a, of the spiral spring, substantially as and for the purposes set forth.  
2d, The combination, with the jaw part, C, screw spindle, A, and hinged jaws, B, B', of the spiral spring, I, and nut, a, substantially as and for the purposes set forth.  
3d, The combination, with the jaw part, C, and nut, a, of the hinged jaws, B, B', substantially as and for the purposes set forth.

**81,504.—DEVICE FOR HOLDING SPOOLS OF THREAD.**—L. F. Hobbs, Quincy, Mass.  
I claim a spool holder formed of wire and provided with the axle, holder, b, thread guide, c, retaining pin, a, and socket or eye, d, the whole arranged and operating substantially as herein set forth.

**81,505.—MACHINE FOR MAKING GINGER SNAPS, ETC.**—D. M. Holmes, Williamsburgh, N. Y.  
I claim, 1st, The combination of the follower, C, cross bar, E, and screws, F, with the dough box, A, frame, B, and driving shaft, I, substantially as herein shown and described, and for the purpose set forth.  
2d, The knife frame, S, adapted to slide in dovetail grooves formed in the bottom of the dough box, A, upon each side of the perforations, whereby the knives, R, are adapted to be fastened upon the under side of said frame, and work in contact with the perforations, as herein described for the purpose specified.  
3d, Operating the sliding knife frame, S, from the shaft, M, by means of the cam wheel, T, and gear wheels, V and X, substantially as herein shown and described and for the purpose set forth.  
4th, The combination and arrangement of the gear wheels, L, J, N, O, K, and sliding clutch, Q, with other parts, and with the shafts, M and I, for the purpose of operating the follower, C, substantially as herein shown and described.

**81,506.—BUICK MACHINE.**—William H. Hovey, Springfield, Mass.  
I claim, 1st, The rolls, A and B, of different diameters, and in combination with the scrapers, J, J', and the vibrating table, having a reciprocating rectilinear motion, with or without the curved plate, C, when operating substantially as described.  
2d, In combination with a table, having a reciprocating rectilinear motion, as described, a gate, L, for preventing the return of the molded brick into the machine, and for depositing the same upon the carrying board, b, substantially as specified.  
3d, The combination and arrangement of the mold bed, P', and vibrating table, having a reciprocating rectilinear motion, rolls, A and B, scrapers, J, and J', and plate, C, plunger, R, and tracks, F, and the gate, L, the whole arranged and operating substantially as described.

**81,507.—MANUFACTURE OF WHIPS FROM INDIA-RUBBER.**—Livershall, Hull, Charlestown, Mass.  
I claim the whip stock or body as composed not only of cloth covered with a vulcanizable composition, and rolled up as set forth, but of a retainer or retaining covering of thread, either braided or wound thereon, for the purpose of supporting the roll during the process of vulcanizing it by heat.  
Also, a whip as composed of the stock or body so made, and one or more coverings of thread, or leather, or other suitable material or materials, either wound, braided, or otherwise properly fixed on such body.

**81,508.—BITTERS.**—A. T. Hyde, Rochester, Minn.  
I claim the within described compound for medicinal bitters, as and for the purposes herein set forth.

**81,509.—CHEESE PRESS.**—Silas Y. Ives, Meriden, Conn.  
I claim, 1st, The arrangement of the two platens, M and E, combined with the drums, G, and bands, L, so as to operate, by the descent of the platens, substantially as specified.  
2d, In combination with the above, the drum, M, operating as described.  
3d, In combination with the subject-matter of the first claim, the bands, S, and drum, T, arranged so as to operate substantially as specified.

**81,510.—ABDOMINAL SUPPORTER.**—A. F. Jennings, Sherman, N. Y.  
I claim, 1st, The combination of the interposed elastic band, C, and the check strap, D, with the body belt, A, and pad, E, arranged and operating in manner and for the purposes herein set forth.  
2d, The formation of the pad with the central elevation, c, raised rim, d, and intermediate annular depression, f, in the manner and for the purpose specified.

**81,511.—BRICK MACHINE.**—Philip H. Kells, Adrian, Mich.  
I claim, 1st, The angular wrought iron rings, K, K', in combination with the mold wheel, I, and followers, H, substantially as and for the purpose described.  
2d, The provision, in the bed plate, B, of the openings, b, b', and wedge-shaped center-piece, b', substantially as and for the purpose specified.  
3d, The adjustable columns, A, A', constructed and arranged as described, in combination with the bed plate, B, and pug mill, C, substantially as and for the purpose set forth.

**81,512.—HORSE SHOE.**—Albert E. Kroger, Norwalk, Conn.  
I claim the arrangement and attachment of the hollow calks to the shoe, by means of the studs, D, and mortises, or their equivalent, in the manner substantially as and for the purpose described.

**81,513.—FENCE.**—Abraham Lapham, Farmington, Mich.  
I claim the portable fence, consisting of the bars, B and D, pivoted together near their top, the bars, B, provided with cross bars, A, the ends of which are beveled, and the bars, D, provided with the bars, E, similarly beveled, all constructed, arranged, and operating as herein described.

**81,514.—WINDING FRAME FOR CARDING ENGINE.**—William Leach, and Joseph Leach, New Harmony, Ind.  
We claim the smooth rod or roller, A, provided with movable flanges, B, B', in combination with a series of drums, D, D', above, and another series of drums, C, C', below the same, all constructed as described, and operating substantially as and for the purposes herein set forth.

**81,515.—CHALK-HOLDER FOR BILLIARD-TABLE.**—Andrew M. Leonard and Belmont Perkins, Ann Arbor, Mich.  
We claim the construction of a box, B, provided with a hinged bottom, C, and chain, L, in connection with circular box, D, lever, E, fulcrum screw, F, spring, G, and key, I, when arranged and operating substantially as and for the purposes herein set forth.

**81,516.—SHOE.**—James S. Lester, and Perrin H. Cardwell, Knoxville, Tenn.  
We claim the front piece, A, and side pieces, B and C, formed in the manner described, for the purpose of forming a shoe, substantially as and for the purposes herein set forth.

**81,517.—HORSE HAY FORK.**—Charles E. Lins, Ashland, Pa.  
I claim, 1st, The combination, with the movable jaw, D, of the slide, G, connecting rod, F, and latch, H, arranged and operating in the manner and for the purpose set forth.  
2d, The combined arrangement of the stock, A, rigid and hinged jaws, C, D, brace, E, rod or brace, F, slide, G, and latch, H, all substantially as described, for the purposes specified.

**81,518.—CHURN.**—Deloss L. Main, Brooklyn, Mich.  
I claim the combination of the churn, A, dasher shaft, B, perforated wings, D, crank, E, bearing, F, standard, G, driving wheel, H, pinion, I, crank wheel, J, connecting rod, K, and hand crank, L, when constructed, arranged and operating substantially as and for the purposes herein set forth.

**81,519.—CREAM SAVER.**—S. E. Mallett, Corry, Pa.  
I claim the cream saver, A, constructed and operating substantially as and for the purposes herein described, with or without openings, o.

**81,520.—COMPOSITION FOR GRINDING AND POLISHING MARBLE AND OTHER SUBSTANCES.**—J. C. McAfee, West Alexander, Pa.  
I claim the composition above described, substantially as and for the purpose set forth.

**81,521.—FARM GATE.**—William McGuire, Chess Springs, Pa.  
I claim the piling, D, provided with the slot, E, in combination with the bolt or pivot, f, and nut, f', substantially as and for the purpose herein specified.

**81,522.—STONE CUTTING MACHINE.**—David H. Merriam, Fitchburg, Mass.  
I claim the cutter cylinder provided with cutters and apertures, and supplied with water or steam, for dressing stone or other material, substantially as described.

**81,523.—LATHE CHUCK.**—Joseph S. Moody, Saco, Me. Antedated July 23, 1868.  
I claim, 1st, The gear hub, A, and gear, B, having the set screw, E, to play in a groove, F, to operate as herein set forth, and for the described purposes.  
2d, The arrangement of the scales, 8, 10, 12, on the face plate, as and for the purposes set forth.  
3d, The combination with the center shaft or gear hub, A, when operated as herein set forth, the knob, D, or its equivalent, as and for the purposes specified.  
4th, The combination and arrangement of a universal chuck with a chuck for eccentricity, when constructed substantially as shown and described.

**81,524.—GAS BURNER.**—George Mooney, Providence, R. I., assignor to himself, James Shaw, Jr., and Job Arnold.  
I claim, 1st, In an argand gas burner, a beveled tip, drilled or punched at right angles with its face, substantially as described.  
2d, The combination of the base, A, provided with shoulders, A', and adjustable check, G, C, with or without the grooves, U, C, C', with the surface, B, and stop screw, B', constructed and arranged to operate substantially as herein shown and described, for the purpose set forth.  
3d, A chimney holder for an argand gas burner, with the peculiar construction of the outer edge, with the modifications thereof as described, for the purposes specified.

**81,525.—SAW.**—George B. Montgomery, Winslow, Ind.  
I claim the combination of the teeth, a, b, c, the tooth, c, being shorter than the teeth, a and b, and formed with the peculiar curved point, and all the different formed teeth being alternately arranged as herein shown and described.

**81,526.—GRINDING MILL.**—John A. Montgomery, Crawford, N. J. Antedated Aug. 15, 1868.  
I claim a grinding mill consisting of the shell, A, and runner, K, provided with shafts, H and M, pinions, E and F, and crank, G, for the purpose of imparting to said runner a reciprocating rotary motion, as shown and described.

**81,527.—THRILL COUPLING.**—Eli M. Morrison and James K. Ross, Noblesville, Ind.  
We claim the eccentrically shaped thrill iron, E, in combination with the carriage clip, A, rubber packing, C, and bolt, D, constructed as described, and operating substantially as and for the purposes herein set forth.

**81,528.—MANUFACTURE OF SHEET IRON.**—Edward B. Nock (assignor to O. B. Perdue, Chas. F. Matthews, and John Long), Cleveland, Ohio.  
I claim the application of tin to the surface of the iron, by either of the methods herein described, substantially as and for the purpose set forth.

**81,529.—REVERSIBLE KNOB LATCH.**—W. A. C. Oaks (assignor to W. M. Griscom), Reading, Pa.  
I claim, 1st, The follower, E, or its arms, c, c', constructed substantially as described, in combination with the steps, e, on the yoke projections, f, f', or their equivalents, arranged in such manner that the back movement of the latch bolt is effected for a given distance only by the follower, and so restricted by the gear of the follower with the threads cut in the yoke, to prevent the bolt from being moved further back by direct application of force to it, essentially as herein set forth.  
2d, So constructing the follower arms and bolt or yoke, against which they act to draw back the bolt, as that when the latter is pushed back beyond its unlatching position, as described, and the follower slightly further turned, said arm or arms are disengaged from gear with the bolt or its yoke, to allow of the protrusion of the bolt sufficiently beyond the front edge of the case to admit of its reversal, substantially as specified.

**81,530.—TOOL EXTRACTOR FOR WELLS.**—Thomas M. Patterson, Tarr Farm, Pa.  
I claim the within described apparatus for grappling tools, consisting substantially of the hollow die or screw socket, a, in combination with the iron poles, c, c', when said die socket and poles are provided with and connected by means of left-hand screw threads, or threads cut in an opposite direction from the threads upon the tools, substantially as and for the purpose herein set forth.

**81,531.—FLOOR CLAMP.**—George B. Perkins, Utica, N. Y.  
I claim a clamp for laying matched boards, consisting of the lever, A, dog, B, groove, C, and brace, E, all constructed to operate substantially as described.

**81,532.—WELL CURBING.**—C. W. Perry, Providence, R. I.  
I claim in the construction of wells, the combination and arrangement of a series of tubes or cases, sliding within each other, capable of extension and contraction, when applied in the manner and for the purposes specified.

**81,533.—HERNIA PAD.**—William Pomeroy, Brooklyn, N. Y. Antedated Aug. 15, 1868.  
I claim the spring plate, B, hinged to the plate, C, and the milled eccentric D, working against the shoulder, E, combined with the pad, A, constructed and operating substantially as herein described.

**81,534.—CULINARY VESSEL.**—H. Poole, Richmond, Ind.  
I claim the steamer, A, divided into compartments by one or more partitions, in which the boiler is separate from the cooking chambers, and the steam is admitted to the latter with pleasure, as set forth.

**81,535.—WATER WHEEL.**—Frederick Post, Plano, Ill.  
I claim, 1st, The combination of the major wheel, B, and the minor wheel, F, constructed and operating substantially as and for the purposes specified.  
2d, The sleeve, U, in combination with the wheels, B and F, substantially as and for the purposes specified.

**81,536.—SPRING.**—Henry A. V. Post, Cincinnati, Ohio.  
I claim, 1st, The pair of folded and interlapped plates, A and B, having the prolonged inner limbs, a' and b', constructed, arranged, and adapted to operate as set forth.  
2d, The pair of folded and interlapped plates, A, B, adapted to both slide upon and mutually support each other in the described combination with one or more pairs of stationary outer plates, G, H.

**81,537.—BELT LACER.**—Joseph K. Priest and William Earl, Jr., Nashua, N. H.  
We claim the combination of the movable jaw, k, with the crossed-lever punch, A.  
Also, the combination and arrangement of the hook, m, with the crossed-lever punch, A.  
Also, the arrangement of the hook so as to extend from the piercer.  
Also, the combination and arrangement of the rotary knife, a, with the crossed-lever punch.

**81,538.—SHIELD FOR CARRIAGE CURTAIN BUTTONHOLES.**—W. G. Queal, Otego, N. Y.  
I claim the above-described combination of shields, A and B, with flexible or metallic back, attached to the buttonholes of carriage curtains, for their preservation, and for security of fastening, in the manner and for the purpose as substantially set forth and described.

**81,539.—ROTATING FAN.**—James H. Reynerson, Pleasant Plain, Iowa.  
I claim, 1st, The combination of the spring, D, and thumb-screw running through the piece, O, as described.  
2d, The arrangement of the support, B, between the main spring, C, and driving wheel, and the general construction of the whole machine, for the uses and purposes described.

**81,540.—WOODEN PAVEMENT.**—William D. Richardson, Springfield, Ill.  
I claim a wooden pavement, constructed of transverse-arching beams, either whole, or the parts of which break joints, and which support the shouldered blocks of described shape, the interstices being filled with concrete, which concrete rests upon the transverse beams, all substantially as described and for the purposes set forth.

**81,541.—HAY FORK.**—George M. Robinson, New Wilmington, Pa.  
I claim the ring, F, formed on the upper end of the slotted center bar, B, in combination with the handle, H, constructed as described, by the side bar, D, being extended and bent over, substantially as herein set forth.



- 81,542.—OIL OR SUEET CUP.—Robert Ross, Bethlehem, Pa.  
I claim an oilcup, constructed and operating as herein set forth.
- 81,543.—STEAM GENERATOR.—J. Q. A. Sargent, Manchester, N. H.  
I claim a boiler, constructed and arranged substantially as herein set forth.
- 81,544.—MODE OF CONNECTING THE DRAFT LEVER TO HORSE-POWER MACHINES.—Henry Shaw, New Orleans, La.  
I claim the springs, d, e, in combination with the lever, B, when the latter is pivoted to the driving wheel, A, and the several parts arranged, constructed, a, d, conjointly and operating as herein described, for the purpose set forth.
- 81,545.—CARRIAGE WHEEL.—Jacob T. Shimer, Easton, Pa.  
I claim the combination of the wrought-iron spokes, B, threaded at each end, with the cast-iron hub, A, having screw thread perforations, and the wooden rim, C, angular plates, e, and screws, d, all arranged together in the manner set forth.
- 81,546.—SPIKE MACHINE.—William Hamilton Schoenberger, Cincinnati, Ohio.  
I claim, 1st, The herein described series of dies, a', cutters, a, b, and headers, k, all arranged, r-atively to the other parts of the machine, substantially as shown, and adapted to make more than one spike at each operation from a single bar or rod.  
2d, The arrangement, in the cutter head, B, of the head block, K, headers, k, and cutters, b, substantially in the manner set forth.  
3d, The arrangement of the sliding block, U, links, w, w', head, V, ejecting rods, x, x', lever, W, and cam, X, as described.
- 81,547.—GRAIN DRILL.—Jacob H. Shreiner, Camp Hill, Pa.  
I claim the combination and arrangement of the boot, A, with the contractor, R, and distributor, C, when said distributor is sustained in position, substantially as shown and described.
- 81,548.—SEED PLANTER.—T. H. Smith, Clyde, N. Y.  
I claim, 1st, The combination of frame, A, wheels, B, gear wheels, H, I, hand wheel, K, wheel, M, shaft, M', wheels, M2, M3, and markers, P, P', all arranged and operating substantially as and for the purpose set forth.  
2d, The seed boxes, -1, C, in combination with the slides, N', N', and cams, constructed, d, arranged, and operating as described.  
3d, The regulating hand-wheel, K, and wheel, M, in combination with the shaft, M, wheels, M2, M3, and markers, P, P', arranged and operating in the manner and for the purpose explained.
- 81,549.—SNOW SHOVEL.—John P. Spangle, Canandaigua, as-  
signor to himself and Chauncey Spear, Hopewell, N. Y.  
I claim a snow shovel composed of the blade, A, provided with the up-  
turned rear end, a, and marginal beads, at x2, the handle, B, nail, C, and bracket, D, substantially as described for the purposes set forth.
- 81,550.—TIRE BENDER.—T. M. Stansbury, and A. F. Stansbury, Canton, Ill.  
We claim the arrangement herein described and shown of the devices, viz, the posts, d, rollers, e, and c, lever, b, spring, i, segment ratchet bar, k, and frame, a, for the use and purposes herein set forth.
- 81,551.—CAR COUPLING.—Harvey B. Steele, Winsted, Conn.  
I claim the construction of the bumper, A, with its spiral spring, G, head-  
block, F, with its dog, D, and the dog, E, with its spring, H, all arranged, combined, and operating the square end link, B, as herein described and for the purpose set forth.
- 81,552.—HALTER.—Christian Adolph Steinbruecke, Louis-  
ville, Ill.  
I claim, 1st, The buckle, constructed with a plate extending across from one side bar to the other, and forming a portion of the metallic joint, sub-  
stantially as shown and described.  
2d, The metallic joints, constructed as described, and as shown in Fig. 2, in combination with the leather straps composing portions of the halter.  
3d, The metallic brace, G, constructed substantially as shown and de-  
scribed.
- 81,553.—BREAST STRAP SLIDE.—Charles H. Stevens and  
and Wilson Garrison, Syracuse, N. Y.  
We claim the combination of the form, b, inclined ribs, a, and loops, d, with the detachable pin, c, as herein shown, and for the purpose set forth.
- 81,554.—MOLD FOR CASTING SLEIGH-SHOES.—Charles Shore  
Montano, Iowa, assignor to himself and Levi Helges.  
I claim the flask or metallic mold for casting sleigh-shoes, constructed and  
arranged as shown and described.
- 81,555.—POST-HOLE BORER.—Alfred F. Summers, Peoria,  
Ill., assignor to himself, Chauncey Nye, and Thomas A. Slack.  
I claim, 1st, The adjusting slide, B, B', and the standards, b, b', b', the universal  
axis, C, containing the spherical joint, D, the screw, E, the universal joint, e,  
and the means, c, w, w', H, as described, arranged and operating, in com-  
bination with a carriage and auger, substantially in the manner and for the  
purposes as herein set forth.  
2d, The auger, E, F, and adjustable concave plate, G, in combination with  
the universal joint, e, and screw, D, as described and operating substantially  
in the manner and for the purposes set forth.  
3d, The carriage, A, as described, in combination with the auger, E, F, and  
its operating devices, substantially in the manner and for the purpose set  
forth.
- 81,556.—WASH BOILER.—J. B. Sweetland and Silas T. Fenn,  
Pontiac, Mich.  
We claim the combination of the double bottom, B, pipe, C, spouts, D, D',  
side pipe, E, braces, a, a', and rack, F, all constructed as described, and op-  
erating substantially as and for the purposes herein set forth.
- 81,557.—GATE FOR TURBINE WATER-WHEEL.—Leonard S.  
Sweet and James Graham, Vassar, Mich.  
We claim a gate, having a cylinder, B, and guide for water wheels, having gate, E,  
guide, G, guide plate, A, slots, G, guide pins, D, lugs, c, c', c', ratchet, H, cog-  
wheel, K, and shafts, L and B, constructed, arranged, and operating sub-  
stantially as specified.
- 81,558.—FARM GATE.—Lovel F. Tanner, Milan, Ind.  
I claim, 1st, The combination of the removable locking-pin, H, with the  
thrusting braces or struts, E, E', studs, G, and gate, A, B, C, substantially as  
and for the purposes specified.  
2d, The arrangement, substantially as described, of the eyes, I, I' perforat-  
ed rod, J, J', staples, k, k', and pin, L, for the object explained.
- 81,559.—LETTER FILE.—A. E. Taylor, New Britain, Conn.  
I claim the combination of the bent metal plates, A, B, plate, B, being pro-  
vided with a ratchet slot, d, on each side, and plate, A, provided with a  
catch, c, for said slot and ratchet, all operating as set forth.
- 81,560.—BRICK PRESS.—Alfred A. Torpey, Chicago, Ill.  
I claim the employment or use of the cams, D, E and F, pallets, i, slide bar,  
Q, arms, J, and P, rock shaft, N, when combined with plates, J, connecting  
rod, a, L, and box, K, substantially as and for the purposes set forth.
- 81,561.—CUPOLA AND BLAST FURNACE.—Charles Truesdale  
assignor to himself and William Resor & Co., Cincinnati, Ohio.  
I claim, 1st, A cupola or blast furnace, having its blast formed by a multi-  
tudinous number of tuyeres at different levels, and of small individual area,  
and adapted to deliver a diminished blast upward in the series, substantially  
as herein described, for the purposes set forth.  
2d, A cupola or blast furnace, whose tuyeres and fire brick-lining are sup-  
ported upon an iron back or casing composed of staves or sections, F, sub-  
stantially as set forth.  
3d, The mode of fastening the tuyeres upon the inner surface of the air-  
chamber by means of a dove-tail or its equivalent.  
4th, A tuyere, whose inner or discharging end projects beyond the opening  
which regulates the amount of blast discharged through the same, for the  
purpose set forth.  
5th, A tuyere, whose regulating throat or more contracted portion is pro-  
tected by a prol-ogation, which inclines more or less downward to the in-  
terior of the cupola or furnace, substantially as and for the purpose stated.  
6th, The slotted tuyere, K, so arranged as to discharge a greater volume  
below than above, for the purpose set forth.
- 81,562.—MACHINE FOR PICKING AND CLEANING PEANUTS.—  
James C. Underwood, Sagry Court-House, Va.  
I claim a machine having a cylinder, B, provided with rows of teeth, c, c', c',  
e, in combination with the fan, G, apron, L and M, and cap, N, substantially  
in the manner and for the purpose as herein described.
- 81,563.—CASTING CHAINS.—C. C. E. Van Alstine, New Ha-  
ven, Conn.  
I claim the herein described process for casting metallic chains, by the em-  
ployment of a four part flask, A, B, C, D, with mold boards E, F, G, H, upon  
which the pattern is arranged, in the manner specified.
- 81,564.—COMPOSITION FOR PAVEMENT.—Edouard Wenger  
assignor to himself and Joseph Martindale, Richmond, Ind.  
I claim, 1st, Compositing an asphaltic composition with the materials  
above described, in the manner and with the proportions set forth.  
2d, Laying the same on a foundation of gravel and lime.
- 81,565.—PUMP PISTON.—J. D. Westcott, Watertown, Pa.  
I claim the hollow piston head, C, enclosing the induction opening, b, in all  
positions, and the cup-shaped stops, B, B', acting in connection therewith, the  
whole arranged as described, and operating in the manner and for the pur-  
pose specified.
- 81,566.—STEAM GENERATOR.—S. Lloyd Wiegand (assignor to  
Walter J. Budd), Philadelphia, Pa. Antedated August 13, 1868.  
I claim, 1st, A steam generator, constructed with double tubes in several  
sections, when the steam and water connections thereof are both applied to  
the upper vessel or tank C.  
2d, The arrangement of the sections, so constructed that the tubes will con-  
stantly intersect and intersect the currents of flame and gas passing to the flue,  
in combination with the furnace, A, and a chamber below the lower ends of  
the tubes.  
3d, The furnace, either entirely or partially projecting beyond the steam  
generator, in combination with the chamber below the tubes B,  
the perforated pipes, with circular depressions around the tubes, in  
combination with the tubes and tank C.  
4th, A steam generator, constructed substantially as shown and described,  
in combination with a furnace, having the regulable apparatus for admit-  
ting and heating air above the fuel, and with the chamber below the tubes,  
substantially as shown and described.  
5th, The hand-hole plate, constructed substantially as described.
- 81,567.—GRAIN SCREEN.—J. H. H. Wischart, Shawnee-  
town, Ill.  
I claim, 1st, The arrangement of the sieve, L, with the hopper, C, conveyer,  
D, and screen, B, substantially as described.  
2d, The arrangement of the hopper, C, sieve, L, screw conveyer D, screen,  
B, incline, J, and spouts, K and F, substantially as described.
- 81,568.—CAR BRAKE.—T. C. Woods, Marion county, Ky.  
I claim the brakes, D, constructed as described, when connected by the  
bar, L, and held in place by the bolt, F, and spring, W, and when operated  
substantially as and for the purpose set forth.
- 81,569.—HARVESTER.—George W. N. Yost (assignor to Corry  
Machine Company, Corry, Pa.)  
I claim the support bolt, I, when used to fasten together the cases, A  
and A', forming the body, and also to support the gougeon box of the bevel

plow shaft, N, within the body, as described, for grass and grain cutting  
machines.

81,570.—POTATO SLICER.—Charles B. King, Gallatin, Tenn.  
I claim the frame, E, when the same is provided with a knife, F,  
and cage plate, G, and is used in combination with the table, H, and the  
whole is so constructed and arranged as to operate substantially as de-  
scribed.

81,571.—PLOW.—Alexander Vail, Henry, Ill.  
I claim, 1st, The beam, C, supporting the plow, D, and rigidly secured to  
the axle, A, in combination with the driver's seat, S, the hinged bounds, E, E',  
and tongue, F, substantially as and for the purpose herein set forth.  
2d, The slide, K, arranged as and for the purpose herein set forth.  
3d, The hinged bounds, E, E', in combination with a plow suspended from  
a beam rigidly secured to the axle, substantially as described.  
4th, The combination of the beam, C, plow, D, hinged bounds, E, E', tongue,  
F, lever, I, axle, A, and driver's seat, S, substantially as and for the purpose  
described.

## REISSUES.

- 61,796.—PLOW.—Dated February 5, 1867; reissue, 3,094.—  
James C. Bethea, Blakely, Ga.  
I claim, 1st, The post, A, having in combination, the front flange, F, and pro-  
jection, B, or any equivalent of this projection, which sustains, in front of the  
vertical part of the post next below it, the holding-down mechanism of the  
beam.
- 2d, Making the connection of the plow-beam to the post, A, having the  
front flange, F, by the stirrup, D, and wedge, E, or equivalents of these  
two parts, the stirrup of which surrounds the beam and a portion of the  
metal below it, and has directly in rear of the lower end a portion of the  
post.
- 3d, The post, A, having the front flange, F, and projection, B, or any equiv-  
alent of this projection, which together with the beam, is surrounded by the  
stirrup, D, and drawn together by the wedge, E, or equivalents of this stir-  
rup and wedge, which hold the beam to the post, as these parts do, without  
weakening either one.
- 4th, The post, A, having the front flange, F, and the front and rear pro-  
jections, B, B', or any equivalent of the front projection, which, together with  
the beam, is surrounded by the stirrup, D, and drawn together by the wedge,  
E, or equivalents of this stirrup and wedge, which hold the beam to the post  
in front, while the beam is so held to the rear flange as to prevent the paral-  
lelism of the land side of the beam and post being varied.
- 5th, The combination of the post, A, having the front flange, F, and pro-  
jection, B, and the stirrup, D, wedge, E, and land-side, G, with its cutting-edge,  
or an equivalent combination of parts.
- 6th, The post, A, having the front and rear flanges, F, F', and projections, B, B',  
and the beam, C, connected to the projections with the stirrups, D, D', and  
the wedges, E, E', or equivalents of these parts, for changing the plow from a  
right to a left-hand turning one.
- 7th, The combination of the reversible land-side, G, with the post, A, hav-  
ing the flanges, F, F'.
- 16,887.—MARKING SLATES.—Dated February 24, 1857; reis-  
sue 3,095.—Henry W. Holly, Brooklyn, N. Y., assignee of John W. Hoard,  
Providence, R. I.  
I claim, 1st, The use of liquid silic in the preparation or manufacture of  
artificial slates, tablets, blackboards, and other like articles for marking or  
writing upon.
- 2d, The combination of an oxide as a drying, anti-delluquescent, and color-  
ing substance, with liquid quartz or silic, as a menstruum in the manufac-  
ture of artificial slates, substantially as specified.
- 3d, An artificial slate or tablet formed by spreading liquid quartz or silic,  
either separate or mixed with other materials, on a suitable surface or body,  
of card or sheet form, and, prior to being dried, calendering or rolling the  
same under pressure, essentially as herein set forth.
- 72,041.—PROCESS FOR REFINING AND CONVERTING CAST  
IRON INTO CAST STEEL, AND OTHER COMBINATIONS OF IRON AND CARBON.  
—Dated Dec. 10, 1867; reissue 3,096.—Emile Martin and Pierre E. Martin,  
Paris, France.  
We claim the process substantially as herein described, for decarbonizing  
cast iron, in combination with the process of recharging the molten metal  
with the recarbonizing or "deoxygenating" material, substantially as and  
for the purpose specified.
- 63,847.—CULTIVATOR TEETH.—Dated April 9, 1867; reissue  
3,097.—Don Carlos Matteson and Truman P. Williamson, Stockton, Cal.  
We claim, 1st, The double pointed adjustable bit, A, attached to the be-  
veled foot of the curved standard, C, substantially as and for the purpose  
specified.
- 2d, The oblong blade or share, D, in combination with the bit, A, substan-  
tially as described, for the purpose specified.
- 61,762.—PLOW.—Dated Feb. 5, 1867; reissue 3,098.—M.  
Richards and J. Vandergrift, Princeton, Ill.  
We claim, 1st, Broadly, the beam, C, pivoted to the brace, B, and arranged to  
turn substantially as and for the purpose herein specified.
- 2d, The combination of the beam, C, support and brace, B, landside, A, and  
moldboard, A', as set forth.
- 3d, The arm, D, in combination with the beam, C, plugs, h, clamp, F, and  
moldboard, A', as described and set forth.
- 67,174.—WATER WHEEL.—Dated July 30, 1867; reissue 3,099.  
—Robert Danbar, Buffalo, N. Y.  
I claim, 1st, A passage or communication formed between the chambers,  
M and N, outside of the hydrostatic chamber, G, substantially as and for the  
purpose set forth.
- 2d, The rim, F, connected with and extending downwardly from the plate  
K, on a circle of less diameter than the hub of the wheel, so as to form, in  
combination with the plate, K, and stationary disk E, the lesser annular  
chamber, G, and in combination with the hub, the larger annular chamber,  
J, for the purpose and substantially as described.
- 67,298.—RUBBER FABRIC.—Dated July 30, 1867; reissue 3,100.  
—John Haskins, Boston, Mass.  
I claim the within described article of perforated rubber as an article of  
manufacture the same being used as and for the purpose set forth.
- 36,150.—CIRCULAR SAW MILL.—Dated Aug. 12, 1862; reissue  
3,101.—George Place and Charles Place, New York city, assignees of Clark  
L. Hayes and Martin Newman.  
We claim, 1st, In a machine for edging and shitting lumber, where the saw  
or saws are made adjustable on the mandrel, the combination of said saw or  
saws with feed rollers, constructed and arranged to operate in the manner  
and for the purpose specified.
- 2d, The construction of the saw mandrel and hub, which moves upon it, as  
described.
- 68,598.—STEAM GENERATOR.—Dated Sept. 10, 1867; ante-  
dated July 19, 1867; reissue 3,102.—Division B.—Henry L. Stuart, New York  
city, assignee of John F. Boynton, Syracuse, N. Y.  
I claim, 1st, The perforated tube, B, within the boiler, or its equivalent, for  
equalizing the temperature of the steam in the boiler, substantially as de-  
scribed.
- 2d, In combination with a steam boiler, the automatic heater and feeder,  
when constructed, arranged, and operating substantially as described.

## DESIGNS.

- 3,161 to 3,163.—FLOOR OILCLOTH.—Chas. T. Meyer, Bergen,  
N. J., assignor to Edward C. Sampson, New York city. Three patents.
- 3,164.—BASE OF A STOVE.—T. J. Hodgkins, Jr., Peekskill, N. Y.
- 3,165 and 3,166.—CARPET PATTERN.—Levi G. Malkin, New  
York city, assignor to Hartford Carpet Company, Hartford, Conn. Two  
patents.
- 3,167 and 3,168.—TOP PLATE FOR WATCHES.—Eugene Pau-  
lus, Philadelphia, Pa. Two patents.
- 3,169.—GROUP OF STATUARY.—John Rogers, New York city.
- 3,170.—PRINTING TYPE.—Edwin C. Ruthven (assignor to  
Mackeller, Smith & Jordan), Philadelphia, Pa.
- 3,171.—MATCH BOX.—Rodney L. Smith, Wolcottville, Conn.
- 3,172 to 3,183.—CARPET PATTERN.—Henry G. Thompson,  
New York city, assignor to Hartford Carpet Company, Hartford, Conn.  
Twelve patents.
- 3,184.—TRADE MARK.—Wm. H. Winslow and Erving Wins-  
low, Boston, Mass.
- 3,185.—POCKET SUN DIAL.—D. W. Wright, New York city.

## EXTENSION NOTICES.

- U. S. PATENT OFFICE,  
WASHINGTON, D. C., Aug. 15, 1868.  
Charles Farham, of Philadelphia, Pa., having petitioned for an extension  
of the patent granted him on the 21st day of November, 1854, and reissued on  
the 3d day of November, 1863, for an improvement in "Sewing Machines," it  
is ordered that said petition be heard at this office on the 2d day of Novem-  
ber, next. Any person may oppose this extension. Objections, depositions,  
and other papers, should be filed in this office twenty days before the day of  
hearing. (11) ELISHA FOOTE, Commissioner of Patents.
- U. S. PATENT OFFICE,  
WASHINGTON, D. C., Aug. 20, 1868.  
George W. Lee, of Winchester, Ohio, having petitioned for an extension  
of the patent granted him on the 21st day of November, 1854, for an improve-  
ment in "Seed Planters," it is ordered that said petition be heard at this  
office on the 9th day of November next. Any person may oppose this exten-  
sion. Objections, depositions, and other papers, should be filed in this office  
twenty days before the day of hearing. (11) ELISHA FOOTE, Commissioner of Patents.
- U. S. PATENT OFFICE,  
WASHINGTON, D. C., Aug. 12, 1868.  
Eliza Mascher, of Philadelphia, Pa., administratrix of the estate of John F.  
Mascher, deceased, having petitioned for an extension of the patent granted  
the said John F. Mascher the 8th day of March, 1859, for an improvement in  
"Daguerreotype Cases" (this application having been authorized by act of  
Congress, approved July 7, 1860), it is ordered that the said petition be heard

at this office on the 2d day of November next. Any person may oppose this  
extension. Objections, depositions, and other papers should be filed in this  
office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., Aug. 21, 1868.

Whitten E. Kidd, of New York city, having petitioned for an extension of  
the patent granted him on the 28th day of November, 1851, and reissued the  
18th day of January, 1857, for an improvement in "Molds for Pressing Bon-  
net Fronts," it is ordered that the said petition be heard at this office on the  
9th day of November next. Any person may oppose this extension. Objec-  
tions, depositions, and other papers should be filed in this office twenty days  
before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., Aug. 3, 1868.

Daniel G. Ambler and Halsted H. Hoeg, of Jacksonville, Fla., administra-  
tors of the estate of Daniel C. Ambler, deceased, having petitioned for an  
extension of the patent granted to the said Daniel C. Ambler on the 7th day  
of November, 1854, for an improvement in "Sewing Machines," it is ordered  
that said petition be heard at this office on the 2d day of November next.  
Any person may oppose this extension. Objections, depositions, and other  
papers should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., Aug. 21, 1868.

T. J. W. Robertson, of Washington, D. C., having petitioned for an exten-  
sion of the patent granted him on the 28th day of November, 1854, for an im-  
provement in "Sewing Machines," it is ordered that the said petition be  
heard at this office on the 9th day of November next. Any person may op-  
pose this extension. Objections, depositions, and other papers should be  
filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., Aug. 21, 1868.

James H. Whitney, of Brooklyn, N. Y., administrator of the estate of The-  
odore E. Weed, deceased, having petitioned for an extension of the patent  
granted the said Theodore E. Weed on the 23rd day of November, 1851, for  
an improvement in "Sewing Machines," it is ordered that the said petition  
be heard at this office on the 9th day of November next. Any person may  
oppose this extension. Objections, depositions, and other papers should be  
filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., July 22, 1868.

William Porter, of Williamsburg, N. Y., having petitioned for an exten-  
sion of the patent granted to him on the 24th day of October, 1854, for an im-  
provement in "Securing Lamps to Lanterns," it is ordered that said petition  
be heard at this office on the 19th day of October next. Any person may op-  
pose this extension. Objections, depositions, and other papers, should be  
filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., July 29, 1868.

Clara B. Snow, of Independence, Iowa, executrix of the estate of Harvey  
Snow, deceased, having petitioned for an extension of the patent granted to  
the said Harvey Snow the 21st day of November, 1854, for an improvement in  
"Presser-bar for Planing Machines," it is ordered that said petition be heard  
at this office on the 2d day of November next. Any person may oppose this  
extension. Objections, depositions, and other papers should be filed in this  
office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., August 3, 1868.

Chesley Jarnagin, of Bean's Station, Tenn., having petitioned for an exten-  
sion of the patent granted him on the 31st day of October, 1854, for an im-  
provement in "Seats for Wagons," it is ordered that said petition be heard  
at this office on the 19th day of October next. Any person may oppose this  
extension. Objections, depositions, and other papers should be filed in this  
office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., Aug. 5, 1868.

George Miller, of Providence, R. I., having petitioned for an extension of  
the patent granted to him on the 7th day of November, 1854, for an improve-  
ment in "Leather Banding for Machinery," it is ordered that said petition be  
heard at this office on the 29th day of October next. Any person may op-  
pose this extension. Objections, depositions, and other papers, should be  
filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., Aug. 11, 1868.

George Crompton, of Worcester, Mass., having petitioned for an extension  
of the patent granted to him on the 14th day of November 1854, for an im-  
provement in "Looms for Weaving Figured Fabrics," it is ordered that said  
petition be heard at this office on the 26th day of October next. Any person  
may oppose this extension. Objections, depositions, and other papers, should  
be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., Aug. 12, 1868.

John Cram, of Boston, Mass., having petitioned for an extension of the  
patent granted him on the 25th day of November, 1854, for an improvement  
in "Towel Stand or Clothes Horse," it is ordered that said petition be heard  
at this office on the 9th day of November next. Any person may oppose this  
extension. Objections, depositions, and other papers, should be filed in this  
office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,  
WASHINGTON, D. C., Aug. 15, 1868.

Jacob Swartz, of Philadelphia, Pa., having petitioned for an extension of  
the patent granted him on the 14th day of November, 1854, reissued on the  
5th day of June, 1860, and again reissued in three divisions, numbered 1,313,  
1,314, and 1,315, on the 3d day of June, 1862, for an improvement in "Harvest-  
ers," it is ordered that this petition be heard at this office on the 2d day of  
November next. Any person may oppose this extension. Objections, depo-  
sitions, and other papers, should be filed at this office twenty days before the  
day of hearing.

ELISHA FOOTE, Commissioner of Patents.

Inventions Patented in England by Americans.  
(Compiled from the "Journal of the Commissioners of Patents.")

## PROVISIONAL PROTECTION FOR SIX MONTHS.

- 2,220.—HEATING RAILWAY CARRIAGES.—Willard B. Farwell, New York  
city. July 14, 1868.
- 2,221.—TOOL OR CHISEL FOR MORTISING MACHINES.—Otis Adams and James  
Hatch, San Francisco, Cal. July 15, 1868.
- 2,242.—HAY AND STRAW CUTTER.—George S. Fisher, Buffalo N. Y. July  
16, 1868.
- 2,244.—LINKS OR COUPLINGS FOR HARNESS, ETC.—Geo. S. Fisher, Buffalo  
N. Y. July 16, 1868.
- 2,250.—SHUTTLE.—Thomas Hatch, Lawrence, Mass. July 18, 1868.
- 2,258.—PROPELLING MACHINERY FOR CANAL BOATS AND OTHER VESSELS.—  
Frederick R. Rice, New York city. July 18, 1868.
- 2,257.—TRENCHING MACHINES FOR PICKING OR PREPARING COTTON, ETC.—  
Robert Wilde and Charles Schofield, Philadelphia, Pa. July 24, 1868.
- 2,243.—BINDING FOR SKIRTS.—Thomas de Forest, Birmingham, Eng. Au-  
gust 1, 1868.



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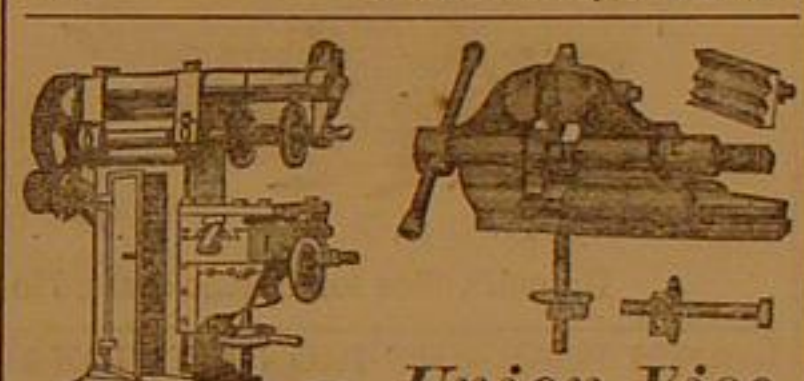
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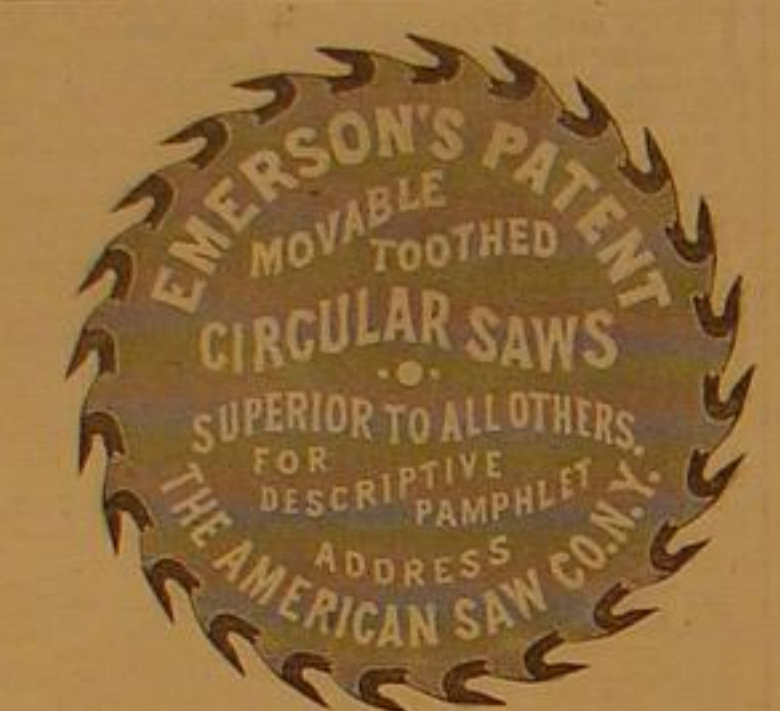
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Vol. XIX.—No. 12.  
(NEW SERIES.)

NEW YORK, SEPTEMBER 16, 1868.

\$3 per Annum.  
(IN ADVANCE.)

## Improved Portable Stump Extractor.

The engraving presents a longitudinal vertical section of a stump extractor, which being mounted on wheels, may be readily moved from place to place, and yet which remains firmly fixed in place, without blocking, while in use. The lower portion of the frame is V-shaped; the open ends of the V at the rear. This portion is supported on braced uprights, forming bolsters that rest on the two axles. Rising above this bed is a very strong, thoroughly braced superstructure, which receives the immediate strain of the lifting chain. This chain is attached at one end to a hook, A, and descending receives in its bight the hook sheave, B, from whence it passes over the fixed sheave, C, to an iron drum, D, the surface of which is formed with depressions to receive the links of the chain. This form of construction of the drum, with the fact that the chain passes around about two thirds of its circumference, proves sufficient to hold the chain without slipping under the heaviest strain, and permits it to pass freely to the ground over the pulley, E.

In operation, if the stump is not too large, or too firmly held, the drum may be rotated by means of one or two cranks, F, which give motion to a pinion the teeth of which mesh with those of the large gear on the drum, D. To hold the strain thus obtained the pinion shaft carries a ratchet with the teeth of which a pawl engages.

When, however, some power greater than manual is required, a rope is led from the circumference of the small drum, G, under a pulley, H, to the yoke or whiffletree of a pair of oxen or horses. A handle, I, with clutch attached, serves to throw the pinion and drum, G, in or out of gear. The power exerted by either of these methods is immense; the most obdurate stump, however firmly held in the soil, must yield to it. The machine is applicable also to lifting and conveying heavy stones and other weighty bodies.

Patented through the Scientific American Patent agency, by C. C. Manuel, North Troy, Vt.

For particulars concerning the patent address O. N. Elkins, North Troy, Vt.

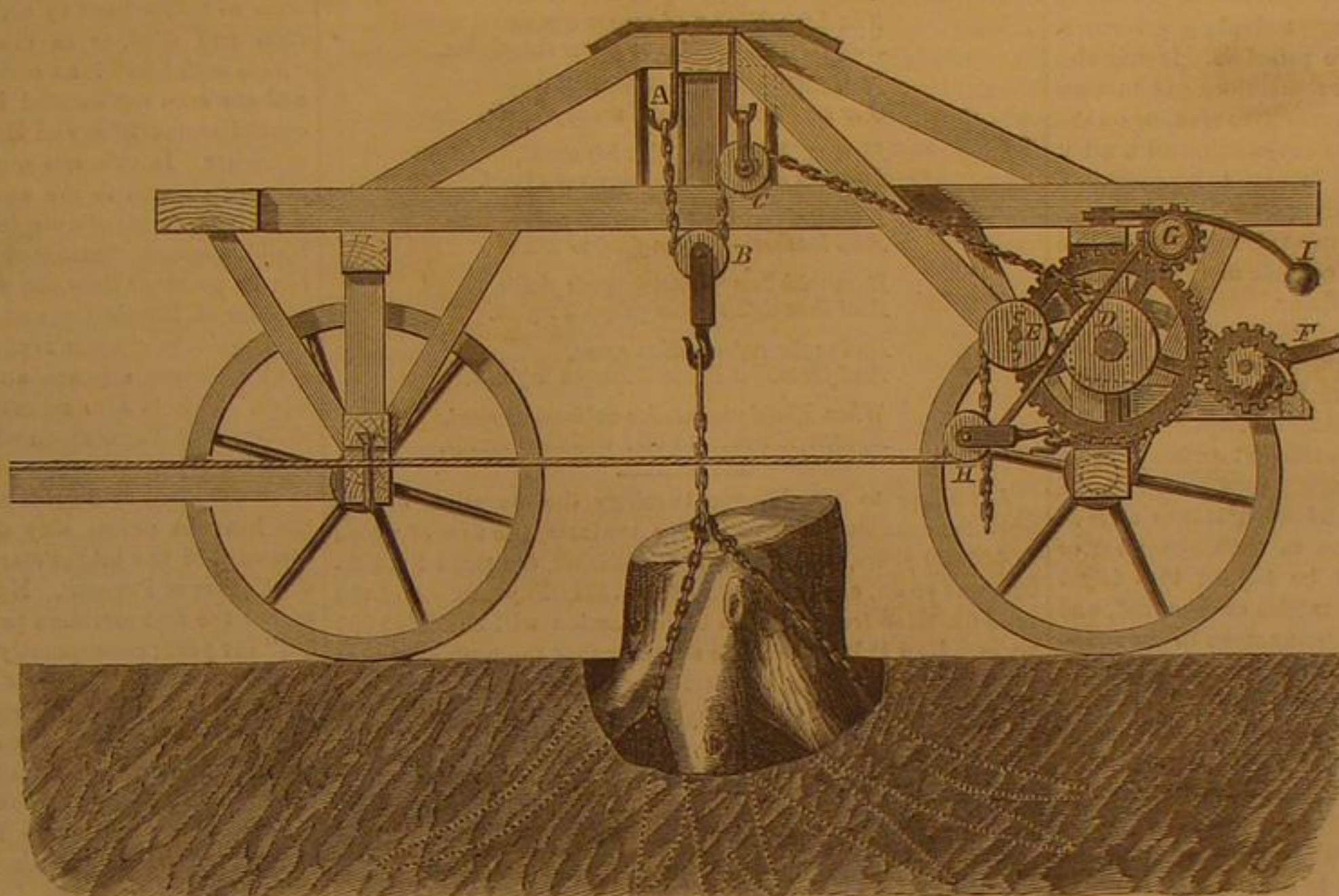
## The Chicago River Tunnel.

Work on this tunnel is rapidly progressing, and there is little doubt that this great thoroughfare may be opened in the early spring. The obstructions are to be removed from the river by December 1. From 800 to 400 men are employed on the work, and the whole is pushed forward to completion as rapidly as possible. Six hundred and sixty-five feet of the arching are already finished, leaving 265 feet still to be built. The east excavation is now 80 feet inside the river bed. On the west side the excavations are within 25 feet of the river. The general plan of the tunnel is already known. Single passages, for horse and foot separately, are built to the water's edge, where the passage is doubled for the carriage way, extending 220 feet, one side for going east, and the other side for going west, thus preventing any danger of collision. The footpath is six feet above the carriage road, in the middle of the tunnel. When all the arches are completed the top is to be covered with masonry, making all level; over this will be a coating of government asphaltum, poured on hot, and thus running into and filling all the seams, and forming a water-tight sheeting; over this, again, large, heavy flag stones, of the usual white stone are to be laid, and the joints filled with asphaltum. Then the water is allowed to flow over all. Between each course of brick in the arches is a half inch of cement. Beneath the center of the passage-way, under foot, is a sewer 120 feet long—over 100 feet of which is now built—leading to a well in the center of the tunnel bottom, into which all water accumulating in the tunnel flows, and is pumped up by a powerful engine to the surface and back to the river. The cost of the tunnel for material and labor is about \$8,000 per week. The original contract was \$328,500, but the actual cost will be not less than \$500,000.

## Carbonization of Wood.

M. Gillot, in his memoir to the French Academy of Sciences on this subject, says, the only condition essential for the

production of good charcoal is, that the operation shall proceed slowly. The decomposition of wood commences at about the boiling point of water. During the decomposition the production of carbonic acid causes a development of heat in the retort greater than that out of it, when the heat applied approaches 300°C. Too rapid an increase of internal heat gives rise to the formation of tar and gaseous products diminishing in a corresponding degree the useful accessory products, as well as the yield of charcoal. The condensed products contain the largest proportion of acetic acid (about 28 per cent.)



MANUEL'S PATENT STUMP PULLING MACHINE.

when the temperature of the oven is 218°C. In this way a given amount of wood will yield about two-thirds in weight of charcoal, and 7 or 8 per cent of acetic acid.

## WOODSIDE'S PATENT SELF-SETTING ANIMAL TRAP.

The destruction of vermin seems to be a necessary condition of human comfort; and although the process appears, at times,

will suffice to explain its employment for other purposes. It is, in fact, an adaptation of the guillotine, the broad, decapitating knife being replaced by two blades intended for piercing the necks of the animals. It is fixed for rats, on a bench or table, in front of which stands a tub or bucket of water to receive the victims.

The lower part of the frame has an opening sufficiently large to admit the head of a rat, and over it is a slide or cross-head, A, having fixed to it two knives, B, guided through suitable slots, in the head piece, C. The crosshead is attached by means of a pitman to a crank, D, on a horizontal shaft at the top of the frame, on which is coiled a line suspending a weight, E, the falling of which allows the crosshead to fall when the rat releases the catch holding the shaft, and also raises it again instantly, thus resetting the trap.

On the horizontal shaft is a cam or single-toothed ratchet, F, the point of which engages with a snug on an upright sliding bar, pivoted at its lower end to a crank, to the shaft of which is secured a bait hook, G, inside the trap. A guard of wire net, or other material, prevents the rat from reaching the bait, except through the opening, on the side, C, under the knives. When the bait is tampered with, the snug on the upright sliding rod is disengaged from the catch of the cam, F, allowing the shaft to revolve and the crosshead, with attached knives, to fall. The snug on the upright sliding rod also engages with a projection on the rear of a pivoted hook, H, and, when disengaged, partially revolves the hook, throwing its long arm under the cam, F, which, as it swiftly revolves, throws the hook, H, back into place and resets the trap by raising again the upright sliding rod.

The operation can be readily understood from the above description. The weight, E, brings the knife block down with great rapidity, and it is so rapidly raised again, that, as the inventor states, the blood of the rat does not have time to stain the knives and deter others from taking the place of the victim, who rolls over into the bucket of water. The handle, I, is for winding up the weight.

This device was patented through the Scientific American Patent Agency, April 28, 1868, by Wm. J. Woodside, who may be addressed at Zanesville, Ohio.

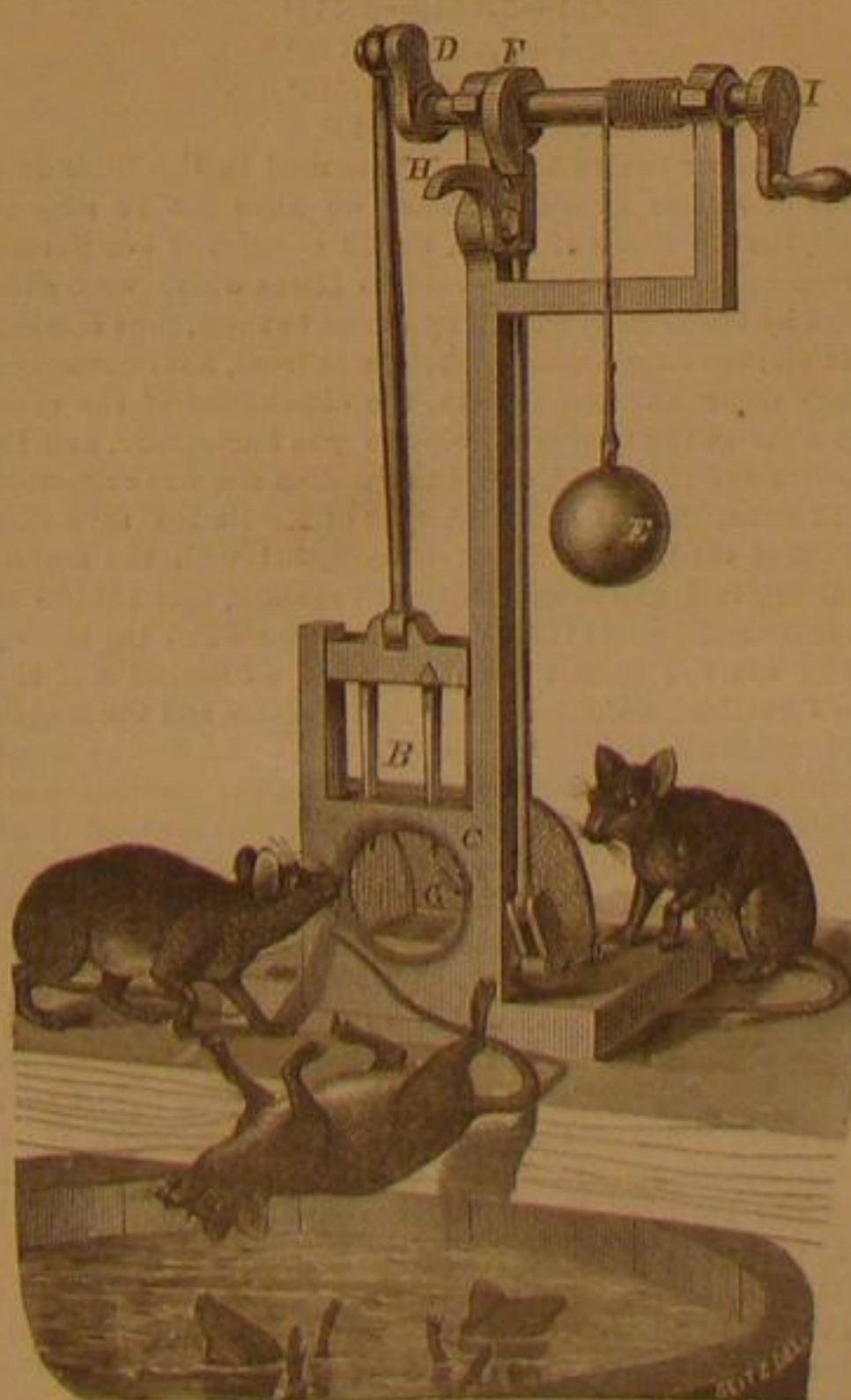
## Machine for Recording Votes.

The Post thus describes the new vote-recording machine which, we are informed, is to be used in the Assembly Chamber at Albany:

"By means of the machine which is to be put up in the Assembly Chamber the members will vote simultaneously. There is a dial like a large face of a clock to indicate the yeas, and another to indicate the nays. These dials contain the numbers of all the members, and each pulls a knob, communicating by a wire, as the bells do in a hotel, with the dial; his number flies out as he pulls, and he sees that his vote is recorded. If he desires to change his vote he does so by a request to the clerk.

"By turning a little crank the hand on the dial is made to point out the number of votes that have been cast both for and against the bill; and by another simple process the names of those voting both in the affirmative and negative are printed for the use of the clerk on a slip of paper. The whole process of taking the vote, recording it, and printing the name does not require more than half a minute. In that way over a hundred bills can be passed in an hour."

It is computed that this machine will be a great saving to the State in shortening the sessions of the Legislature. Certainly it will save the clerk's lungs.



to be cruel, yet it is difficult to see how it can be avoided. The engraving presents a view of a self-setting trap, intended as a trap for catching wild animals as well as our domestic vermin. The description of the engraving, as applicable to rats,

RUSKIN, the eminent art author of England, who has lately turned his attention to political economy, in a recent letter urges the purchase of all the railroads in England by the Government. He argues that private persons should not be permitted to own the railroads of a nation; that all means of public transit should be provided at public expense; that neither railroads nor canals should ever pay dividends to anybody, but should pay their working expenses and no more, and that the whole work of carrying persons or goods should be done as the carriage of letters is now done.



## MANUFACTURE OF CAST STEEL AND HOMOGENEOUS IRON.

In treating puddled steel, raw steel, and puddled iron, for the production of cast steel and homogeneous iron, the material to be treated has usually been (at great expense) balled and shingled to clear it from the cinder, and subsequently generally rolled into bars, cut up in pieces, and remelted. According to an invention recently patented by Mr. John Gjers, of Middlesborough, when crude iron or refined iron is caused through the action of iron cinder or other additional matter to boil and to come to nature, the material is transferred under treatment from the puddling even before the process of balling. By remelting or keeping fluid the material, it is caused to separate from the cinder and to attain a uniform quality ready to run into ingots. Thus Mr. Gjers melts crude pig iron, or refined iron, or recarbonized puddled iron, and works it in the usual way in a puddling furnace, and causes it through the action of rich pure iron cinder or other additional matter commonly used when making puddled steel—such for instance as manganese and salt—to boil and to come to nature in the manner adopted for making puddled steel or puddled iron. At or before the stage called top boil, just before the metal begins to thicken and to come to nature, but before the stage when it is fit or ready for balling up, the material under treatment is tapped with as much of the cinder as cannot at this period of the process be separated. It is transferred into a receptacle, in a reverberatory furnace on Siemens' regenerative principle. It may also be run on to the open hearth of a reverberatory gas furnace which may be either on Siemens' regenerative plan, or on the blowpipe plan in which gas is used in conjunction with a hot blast. The essential feature of the furnace to be employed is that it should be capable of producing a temperature sufficiently high to melt steel or homogeneous iron, and it is also important that the flame should be capable of regulation to either an oxidizing or a carbonizing flame.

Here, in the reverberatory furnace, Mr. Gjers allows the transferred metal in a fluid state to remain at rest for a length of time, exposed to a neutral or to a carbonizing or an oxidizing heat, according as the crude steel metal requires more or less decarbonizing; the heat being sufficient to keep it perfectly fluid until the metal has thoroughly separated from the cinder, which will float on the top, and until it has arrived at the requisite point of carbonization to form the steel or homogeneous iron which may now be tapped into ingot molds. Or the cinder may first be tapped or removed, and other flux (such as oxides of iron and manganese in the shape of pure ores of those metals) may if necessary be added to assist in decarbonizing and to protect the metal. To the metal may be added a certain quantity of either wrought or crude iron, of the shape of spiegel iron or other matter (manganiferous) so as to arrive at the point of carbonization and temper desired.

As far as possible the process is regulated, so that the transference from the puddling furnace may be made at such a period of the coming to nature, as will enable the metal after having been made thoroughly fluid and remained so sufficiently long to decarbonize in the reverberatory furnace, to be obtained without addition of malleable iron or ore at the degree of carbonization desired. If the proper precautions are taken to boil and to work the iron well in a suitable cinder in the puddling furnace, it will generally be pure enough for steel. At the last stage of fluidity, while it is yet fluid enough to run, and just when it is about to congeal or come to nature, it still contains about two per cent too much carbon. By transferring and exposing it, for three or four hours, in the reverberatory furnace in a liquid state to a neutral or slightly oxidizing flame under a cover of oxidizing cinder, this excess of carbon gradually works off; and when it is worked down to the point desired (which may be ascertained by testing samples), it is tapped into ingots. To temper and improve the steel or homogeneous iron, in most cases, before tapping the metal, a small proportion of manganese in some of its combinations is added.

It has been found beneficial to let the metal decarbonize to an extent slightly below the desired degree of carbonization of the steel or homogeneous iron, and then to improve and recarbonize the metal by adding a small proportion of spiegel iron, amounting to about 1 per cent of the whole. The carbon may, in some cases, be partly reduced by the addition of wrought iron, or, it may be, other malleable iron in any form containing less carbon than the desired steel. In practice, it has been found advantageous for this purpose to make use of scrap bars, blooms, or balls in a heated state, which are gradually introduced and melted with the fluid metal tapped from the puddling furnace. In some cases, cast steel or homogeneous iron is made by using ordinary puddle balls in combination with the fluid metal tapped from the puddling furnace, for which purpose it is found convenient to partially tap or transfer the contents of the puddling furnace just before the metal comes to nature, and to allow one half, less or more, of its contents to run into the reverberatory melting furnace. The rest may be allowed to continue working in the puddling furnace until it has thoroughly come to nature, and has become malleable, and the cinder has dropped, when it may be transferred either by shovels or in lumps and added to the fluid metal, previously tapped from the puddling furnace, on to the hearth of the reverberatory melting furnace.

The whole of the metal thus mixed, after being thoroughly fluid and brought to the desired point of carbonization in the reverberatory steel melting furnace, may then be run into ingots. Or four or more puddling furnaces may be employed to one melting furnace, and the entire contents of one or several of the puddling furnaces may be transferred before the period of coming to nature, while yet fluid, and

the contents of the remaining furnaces may be transferred after the contents have got into nature; the entire contents of the whole of the puddling furnaces may then be melted together in the steel melting furnace. Or the crude steel metal tapped from the puddling furnace, at the period named, may, particularly when it is desired to treat it in crucibles, be run into molds as flat cakes, which, being broken in pieces, may be remelted in crucibles (or in the reverberatory furnace), in conjunction with malleable iron or with iron ore, to form steel.—*The Mechanics' Magazine.*

## Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

For the Scientific American.

## VERSIFICATION BY AN ANTIQUARIAN OF THE HINDOO COSMOGENY OF THE TEN AVATARAS,

THEY BEING THE SACRED BOOKS AND TRADITIONS OF THE HINDOOS.

*The Fish denotes the fatal day  
When Earth beneath the waters lay.*

*The Bull's the emblem of the God  
Who raised again the mighty clod.*

*The amphibious Reptile marks the time  
When it began the shores to climb.*

*The Lion King and savage trains  
Now roam the woods or graze the plains.*

*Next little Man begins his reign  
O'er earth and sky and watery main.*

*Ram with ax then takes his stand,  
Fells the thick forest—clears the land.*

*Ram with plow turns up the soil,  
And teaches men for food to toil.*

*Ram with bow 'gainst tyrants fights,  
And thus defends the people's rights.*

*Budha for reformation came,  
And formed a sect well known to fame.*

*When Kalki mounts his milk-white steed,  
Heaven, Earth, and all! will then recede.*

According to the Hindoo theology the duration of the universe consists of ten periods or Avatara, the first of which is 432,000 years, the second is  $2 \times 432,000$ , the third  $3 \times 432,000$ , and so on, and the tenth of  $10 \times 432,000$  years. And the total duration from creation to destruction will be 23,760,000 years. Now it is not a little singular that the number 432 is considered in the East as a sacred or mystic number, and was so regarded by the ancient Chaldeans, Egyptians, and others. Again, if we add together the numbers 1, 2, 3, and 4, the sum will be 10 (or the ten avatara). Again, the earth has four magnetic poles, which revolve around the pole of the earth, approximately in the following periods: the first in  $1 \times 432$  years; the second in  $2 \times 432,864$  years; the third in  $3 \times 432$ , or 1,296 years; and the fourth in  $4 \times 432$ , or 1,728 years. The least common multiple of these numbers is 5,184, which multiplied by the half of ten, gives 25,920 years, which is very nearly the period that it takes the pole of the earth to revolve around the pole of the ecliptic, which gives rise to the precession of the equinoxes. Hence we may infer that the ancients were acquainted with these grand phenomena. I will now offer the following suggestions as to why the number 432 and its multiples and sub-multiples were considered sacred by the ancients. The following table will exhibit in part my explanation:

$$\begin{aligned} 432 &= 3 \times 144 = 3 \times 12^2 \\ 864 &= 6 \times 144 = 6 \times 12^2 \\ 1296 &= 9 \times 144 = 9 \times 12^2 \\ 1728 &= 12 \times 144 = 12^3 \end{aligned}$$

The number twelve is everywhere used in the Bible as a sacred or mystic number. Hence we have the 12 sons of Jacob, the 12 tribes of Israel, the 12 apostles of our Savior, the ten commandments delivered to Moses which were completed by the Lord by adding two more to them, thus making 12 in all; showing a completeness, a fullness, not represented by any other number. Again, the dimensions of the most holy altar in the temple of Solomon was four-square, and its measure was  $12 \times 12 \times 4$ . And the molten sea was supported by 12 oxen. The seventh chapter of Revelation says that 144,000 of the tribes of Israel were sealed with the seal of the living God, and in the fourteenth chapter, that 144,000 of the redeemed praised God before the 4 beasts and the elders, and in the twenty-first chapter we find a description of the New Jerusalem, which is 4 square, has 12 gates, and the length and breadth and the height thereof are all equal, and he found the measure to be 12,000 furlongs. Then the contents must be cube of 12,000, or 1,728,000,000,000. These analogies tend to show why the ancients regarded the number 432 as sacred. Again, the sacred tradition and prophecies of every race and nation were doubtless dictated by extacies long before the art of writing was invented. Is it to be supposed that their prophecies and visions were lost? By no means. They mapped them in the skies, among those fixed and unchangeable stars which glitter in the heavens above—a record that never changes and will last until time shall be no more. If we cast our eyes to the heavens we will see there illustrated the foregoing beautiful lines. Who cannot see the universal deluge when the earth was beneath the waters, in the water bearer who is pouring out a flood in which the fish do swim and the ship (Noah's Ark) is tossed by its tumultuous waves. These constellations are plainly mapped out. Again, the reptile crawling on the dry land is nothing more than the serpent that tempted Eve, and is represented in the heavens by a great serpent which is pursuing a woman to devour her. In the ancient charts she is represented with a child in her

arms and is flying into the wilderness. Is this not mother Eve, and is it not typical of the flight of the Virgin into Egypt, which is also strikingly told in the twelfth chapter of Revelation? Then follows the animal kingdom, which is also mentioned in our Bible, and they are represented in the heavens by the constellations of the lion, the bear, the bull, the goat, the horse, the dog, the sheep, the dove, the raven, the swan, the eagle, the wolf, etc. At length Man appears the master of creation. This is precisely in accord with our Bible. And it was for this reason that the ancients represented a man as surrounded by the 12 signs of the zodiac, each sign corresponding to one of his members. We see this figure printed in our common almanacs, which is probably older than the pyramids of Egypt, and as ancient as theology itself. Then Ram appears—"He fells the forest, tills the ground." (Ram is a Hindoo god, and his name is often found in ancient history as an affix or a suffix to proper names, as Ram-ises, Semi Ramis, etc.) This is doubtless an emblem of Cain. He too is represented in the heavens by the constellation of husbandman or Bootes, who is a cultivator of the vine. He is represented as holding a club, emblematic of his wicked disposition, for we are told that he slew his brother Abel. Abel is also represented in the heavens by the constellation of Auriga, who holds a kid in his arms. The position of these two constellation in the heavenly sphere are so nearly opposite each other that it is presumable that they were so mapped out to show how different in character were Cain and Abel, or in other words, good and evil. Then "Ram with bow" is an emblem of both Nimrod and Sampson, and are seen represented in the heavens by those beautiful constellations Orion and Hercules. Then Budha appears as a redeemer. Is this not another name for our Savior, who is also represented in the ancient charts of the heavens by a child in the arms of a virgin. And lastly, in the grand drama, Kalki appears, "mounted on his milk white steed." This can be no other than the white horse mentioned in the sixth chapter of Revelation, and called "Death on the pale horse." And again, in chapter xix., where the heavens are opened and a white horse appears, and his rider is called Faithful and True. This is also represented in the heavens by the constellation of Pegasus, on which Perseus rode to the rescue of the princess Cassiopeia, who was chained to a rock and about to be devoured by a great sea dragon. The first meridian of the heavens passes only 6 min. 26 sec., or  $1^\circ 38' 30''$  to the eastward of the bright star Algeneb, one of the stars forming the Square of Pegasus. Now the precession of the equinoxes carries the first meridian to the eastward at the rate of about  $50\frac{1}{2}''$  per year; consequently Algeneb must have been on that meridian about 117 years ago. The square city spoken of in Revelation is beautifully represented by the square of Pegasus. The first meridian has already entered that city, and is gradually advancing towards the citadel, the heart of Pegasus, which it will reach in about a thousand years. At the same time that it pierces the heart of Pegasus it will also pass through his rider, and then we may quote the prophecy of the ancient avatara:

"When Kalki mounts his milk-white steed,  
Heaven, Earth, and all! will then recede."

Do we not see this illustrated before our eyes. Never has mankind made so much progress as during the last one hundred years (or since the first meridian entered into the square city). Faithful and True is preparing the white horse—he has already one foot in the stirrup—he will soon mount his milk-white steed. Kalki is beating the call to arms and knocking at the door of our hearts to rouse us to action. The city of the New Jerusalem is being adorned for the marriage with the brightest jewels of the minds and intellects of men. Her gates are standing ajar, and we can even now catch a glimpse into the glorious city whose fame is described in every sacred book ever written, and whose fair proportions are seen in the heavens represented by the Square of Pegasus. Thus we see that our Bible, the ancient Avatara, and the stars agree. And why should they not? Truth is one and universal. And I feel sure that if we could read the internal sense of all sacred books we would find them to agree perfectly. It is man alone who perverts them.

W. P. BUCKNER.

## Center of Gravity in a Revolving Vertical Wheel.

MESSRS. EDITORS:—On behalf of the members of this Institute, I take the liberty of asking you to say, through your able columns, whether the enclosed theory regarding a vertical wheel in motion is true; and if it is true whether it has now been introduced for the first time, as Mr. McCarroll of this city professes himself to be the discoverer of it.

O. J. SWIGGLES,  
President Buffalo Mechanics' Institute.

The theory and its attempted demonstration are given as follows, by Mr. James O'Riordan in a communication to some newspaper, the name of which our correspondent has withheld.

We have no recollection of seeing this theory before, but in a paragraph attached to the slip containing the communication of Mr. O'Riordan, we find a statement that it was formerly submitted to us, and a charge that we treated the subject in a way that seemed to show want of appreciation of its merits. There is no doubt that we should have dismissed the subject as unworthy serious discussion, had it come to us in the way of ordinary correspondence. We would do so now had it come from a private source, as we deem it of no practical value, and we exceedingly dislike to clutter our pages with purely theoretical discussion. We will however for this once make an exception in favor of this communication, and endeavor to show the entire fallacy of the doctrine, as therein set forth.

MATTHEWAN, Aug. 25, 1868.

In reply to your query of the wheel, viz., "Whether the weight of a vertical wheel, when in motion, rests on the same point as when it is at rest." It does not. The point on which the weight rests—the center of gravity—recedes from the center and approaches nearer to the periphery of the wheel.



ascending half of the wheel, and the greater the velocity the nearer it approaches to it, but can never reach to or beyond it.

*Proof.* When the wheel is at rest, and of uniform density, by the laws of gravitation each particle of which it is composed is of equal weight. Then equilibrium is produced—the center of gravity coincides with the center of the wheel—and on all sides there are equal momenta.

Now let us see whether such is the case when the wheel is in motion. It is evident that as the wheel revolves each particle has a tendency, owing to centrifugal force, to fly off in tangents to the circles they describe. This eventually would occur were it not for the attractions of cohesion and gravitation; the former keeping the mass or particles of matter together, and the latter drawing them towards the earth, and consequently giving them weight.

Again, as each particle revolves in succession from the lower to the upper point of the periphery, or through the ascending half of the wheel, they lose a portion of their weight equal to the centrifugal force given to them in opposition to gravitation. Each particle having a tendency to fly off in opposition to gravitation at one hundred and seventy-nine different angles, which undoubtedly causes them to be relatively lighter than when at rest. While on the contrary, as the particles revolve from top to bottom, or through the descending half, they have, in addition to their original weight (given by gravitation) when at rest, the centrifugal force given by the motion of the wheel, which proves clearly that the descending portion of the wheel is actually heavier than the ascending half. So what the ascending half has lost by motion, the descending half has gained to the same amount. And so to preserve the laws of mechanics—equilibrium and momenta—the center of gravity must part from the center of the wheel and approach the descending, the heavier periphery leaving a number of its particles to the lighter side to compensate for what it lost by centrifugal force.

As I have said, the greater the velocity the further the center of gravity departs from the center of the wheel, for the greater the centrifugal force the greater the difference between the weights of the ascending and descending parts of the wheel, and consequently the nearer it must approach the heavier periphery to equalize this difference and to produce equilibrium. But as the wheel is retarded, or the velocity ceases, the center of gravity approaches nearer and nearer, till finally it coincides with the center of the wheel, the motion ceases; then the wheel is at rest, and I will rest too.

[Yours truly  
JAMES O'RIOURDAN.

This so-called proof is open to criticism, upon use of terms as well as incorrect reasoning; but as we wish to discuss this matter in a spirit of candor, and to avoid anything that should seem like ridicule, we shall confine ourselves entirely to the point at issue.

The *reductio ad absurdum* is a method of reasoning that has been considered of great service in mathematical investigation, and is equally valuable in the determination of mechanical principles. If, then, the theory that the center of gravity in a vertical revolving wheel is moved from the center of revolution towards the descending half of the wheel, conflicts with established facts, the theory itself must be erroneous, or the facts are no longer to be considered as facts. Nothing in mechanics, however, has been more surely established than the facts with which this theory conflicts, and as facts are dearer to us than any theory, however plausible, we are perforce compelled to deny the truth of the proposition in question.

By this theory one side of a vertical wheel, when revolving, is always heavier than the other side, provided the wheel be balanced when at rest. This being admitted, of course the centre of gravity is always outside the center of revolution; and as long as the wheel revolves in one direction, it is always on the same side of the center of revolution. Like causes always produce like effects. The shifting of the center of gravity, outside the center of revolution, will, when a wheel is at rest, cause it to turn, provided the increased weight of one side, aided by the diminished weight of the other side, is sufficient to overcome the friction of its bearings. If this is constantly kept up, the wheel will constantly turn with increasing velocity, until it reaches the maximum velocity that can result from the given loading of one side. This occurs upon the common overshot water-wheel, the motion of which is kept up by constantly keeping the center of gravity outside the center of revolution upon one side in the continuous application of a weight of water to, and the discharging it from, that side. In a heavy wheel a slight change of the center of gravity to one side of the center of revolution is sufficient to turn it if nicely balanced. We were once employed to balance cylinders weighing 300 pounds each, intended to revolve 1,200 times per minute. With this speed the balancing had to be performed with the utmost nicety, and the bearings were so constructed for the purpose of accuracy, that the friction was the slightest possible. A difference of two ounces between the sides of these cylinders was sufficient to render them useless, and in balancing the weight of a tenpenny nail would set one of them in motion. Now these nicely balanced cylinders, according to the above theory, ought to have been perpetual motions. The weight of a nail would turn them, and it would be difficult to conceive of a shifting of the center of gravity so slight that it would make a less difference in weight upon one side of a wheel weighing 300 pounds than the weight of a single tenpenny nail. These cylinders, when set in motion, after being thus balanced, ought to have continued revolving for ever when the belts were run off; but they did not, they always ceased moving as soon as their momentum had been exhausted by friction. The geniuses who have heretofore expended their time and money upon the problem of a perpetual motion, have—if this theory be correct—been altogether on the wrong track. Instead of attempting to throw wheels constantly out of balance, they should have endeavored to balance them perfectly. We might, as the lawyers say, rest here, but we will discuss the matter somewhat further, lest we should again be accused of not fully appreciating the merits of the case.

The error in the so-called proof of the theory, so positively asserted, lies in the assumption that the centrifugal force acts in opposition to the earth's attraction on the ascending side of the wheel and co-operates with it upon the descending side. It is true, as Mr. O'Riordan affirms, that the centrifugal force is opposed by two forces, the attractions of gravitation and cohesion; but the attraction of gravitation which thus assists cohesion is the gravitation of the particles of the wheel towards its own center of gravity, and not the earth's attraction upon those particles. The earth's attraction upon the differ-

ent parts of the wheel is the same except the difference which results from variations in their distances from the earth's center, which may be left out of consideration as it does not affect the present question; and until motion should be increased so that the wheel would be thrown to pieces, it would not affect the motion of any of the parts, its entire force being concentrated upon the bearings and neutralized thereby. Thus it gives equal weight to both sides of the wheel, provided the sides are symmetrical and homogeneous, and as it is an established principle in physics that a force acts upon any body without regard to its being at rest or in motion, the earth's attraction would not affect the center of gravity in the mass, which does not depend upon the earth's attraction at any time or in any condition. The center of gravity in a mass is the point around which all the parts of the mass will, in any position, balance themselves, and its position would be the same were there no earth, or sun, or planets, and the vertical revolving wheel had the infinitude of space all to itself. It is true that the application of the earth's attraction, is the experimental test for determining the position of the center of gravity in a mass, but it is no less true that the position of the center of gravity is entirely independent of the influence of any external attraction.—Eds.

#### Solar Heat—Ericsson's Solar Engine.

MESSRS. EDITORS:—Your correspondent, "A," erroneously supposes that the subject of solar heat, as a mechanical motor, has not attracted due attention. Captain Ericsson at the centennial celebration of the University of Lund, in Sweden, last spring, forwarded to that ancient institution essays relating to the sun, showing that perfect uniformity of the rotation of the earth, is incompatible with solar influence and that solar heat may be so employed as to furnish an infinite amount of motive power for practical purposes. As the first part of the essay does not bear directly on the subject under consideration, I will pass over its contents merely observing that the philosophical faculty of the Swedish University at the centennial celebration alluded to, conferred on Captain Ericsson the degree of Honorary Doctor of Philosophy. Before presenting to the readers of the SCIENTIFIC AMERICAN a translation of the latter part of the essay, it will be proper to state that I have witnessed the operation of one of Ericsson's solar engines, to be actuated by atmospheric air heated by the direct intervention of concentrated solar heat. Your mechanical readers will be surprised on hearing that the working piston of the model engine makes upward of 300 strokes per minute.

The simplicity and moderate cost of the means devised to concentrate the solar heat are such that no practical difficulties present themselves to prevent the construction of solar engines of any desirable power. Much might be expected from the versatility of the constructor and his extraordinary mechanical resource; yet, the facility with which the radiant heat of the sun may be collected and concentrated from acres of surface, by the means contrived, will alike surprise and interest the mechanical and commercial community.

The following translation of the essential part of Captain Ericsson's communication to the philosophical faculty of Lund, cannot fail to interest your readers:

"I have, of late years, spent much time and considerable means on experiments to ascertain if the radiating heat of the sun can be concentrated in such a manner as to render it available for the production of motive power.

"Sir John Herschel's and Mr. Pouillet's experiments relating to the radiating heat of the sun, although interesting, are not satisfactory as they only deal with low temperatures, showing how much ice may be melted, or what elevation of temperature of water under the boiling point may be effected in a given time on a given surface. The purpose of my investigations and experiments, on the other hand, has been to ascertain what amount of heat can be developed at the high temperature obtained by concentrating the solar rays, viz., bringing their power to bear on a reduced surface, and to devise the most efficient means for effecting such a concentration of the radiating heat. Apart from these preparatory experiments, I have also, at the commencement of the present year, constructed three different motors which I term *Solar Engines*. One of these is actuated by steam formed by the concentration of the heat of the solar rays, while the other two are actuated by the expansive force of atmospheric air heated directly by concentrated radiant heat. Time will not permit, nor is it my purpose on the present occasion, to present a description of these solar engines or the means adopted for concentrating the radiant heat in order to obtain the necessary high temperature. I will therefore limit my essay to the consideration of the essential part of the subject, viz., the motive force itself. With regard to this, I have briefly to state that my experiments show that, at the high temperature requisite for steam engines and caloric engines, the heating power of the sun on a surface 10 feet square will, although in itself too feeble, evaporate, on an average, 489 cubic inches of water in the hour, by means of my mechanical contrivance for effecting the necessary concentration. The importance of this result cannot be overestimated when we reflect that such an amount of evaporation demonstrates the presence of sufficient heat to develop a force capable of lifting 35,000 pounds one foot high in a minute, thus exceeding one horse power. As an incontrovertible evidence of the capability of the sun to develop a great amount of heat at high temperatures, this result is probably of greater importance than any other physical truth practically established.

"The mean distance from the center of the sun to the earth being 214.44 times greater than the radius of the former, it will be found by squaring this sum, that one superficial foot of the sun's surface must heat 45,984 superficial feet of the earth. In other words, the sun on an equal sur-

face throws off 45,984 times more heat than the earth receives. We are therefore enabled, on the strength of the practical result now positively established, to infer, that an area of 10 feet square on the sun's surface develops heat enough to actuate a steam engine, not a *theoretical* one with its small consumption, but a real steam engine of 45,984 horse power, demanding a consumption of more than 100,000 pounds of coal every hour. But this estimate, based on the evaporation effected by the concentrated radiant heat, is far below the actual development of heat by the sun. Fully one half of the heat conveyed by the solar rays is lost during their passage through the atmosphere and through the apparatus by which the temperature is elevated to the necessary high degree. The actual development of heat, on the supposed 10 feet square of the surface of the sun, will therefore equal the amount of heat generated by the consumption of 200,000 pounds of coal per hour. The mind cannot conceive the intensity which must accompany such an inordinate consumption in so small a space. Still less can we form an idea of the nature of the combustibles or their sufficiency, when such an intense heat is perpetually kept up on the entire surface of a globe the diameter of which is more than a hundred times greater than that of the earth. But it is not my intention on this occasion to lay before the philosophical faculty my speculations regarding the properties of this wonderful orb; I have only designed to discuss the question as to the sufficiency of the radiant heat notwithstanding the enormous distance, and the use we can make of it as a mechanical motor. The result of my experiments, as already stated, having established the fact that without an inconvenient extension of the mechanism which I have devised for concentrating the radiant heat, sufficient power can be obtained for practical purposes, it will now be proper to point out what amount of mechanical power may be obtained by occupying a Swedish square mile with solar engines. Assume that one half of the area is set aside for necessary roads, houses, etc., an available area would remain of 18,000 x 36,000—648,000,000 superficial feet on which the radiant heat might be concentrated. My several experiments having shown that the concentration of the solar heat on 100 square feet of surface is more than sufficient to develop a horse power, it follows that 64,800 engines, each of 100 horse power, may be kept in motion by the radiant heat of the sun on a Swedish square mile.

"Archimedes enthusiastically exclaimed that his favorite device, the lever, had power enough to heave the earth out of its path. It may be more truly said, that the concentration of the radiant heat of the sun furnishes sufficient force to stop the earth in its course.

"I cannot omit adverting to the insignificance of the dynamic energy which the entire exhaustion of our coal fields would produce, compared with the incalculable amount of force at our command, if we avail ourselves of the concentrated heat of the solar rays. Already Englishmen have estimated the near approach of the time when the supply of coal will end, although their mines, so to speak, have just been opened. A couple of thousand years, drops in the ocean of time, will completely exhaust the coal fields of Europe unless, in the meantime, the heat of the sun be employed. It is true, that the solar heat is often prevented from reaching the earth. On the other hand, the skillful engineer knows many ways of laying up a supply when the sky is clear and that great store house is opened where the fuel may be obtained free of cost and transportation. At the same time a great portion of our planet enjoys perpetual sunshine. The field therefore awaiting the application of the solar engine is almost beyond computation, while the source of its power is boundless.

"Enough, I trust, has been said to enable the philosophical faculty to judge of the importance of the subject; but who can foresee what influence an inexhaustible motive power will exercise on civilization and the capability of the earth to supply the wants of our race?"

The foregoing translation is sufficiently explanatory to enable the reader to understand clearly the general features of the subject. I will therefore merely add, that Captain Ericsson is pushing the stupendous scheme with such vigor, that, before the termination of the present season, bread will be prepared from flour ground by the power of his solar engine.

Yours very respectfully,

C. H. DELAMATER.

#### Removing Chuck Cement from Lathe Work.

MESSRS. EDITORS:—I notice one of your correspondents is troubled about removing the "wax" or "lac" from his work, after taking it from the lathe.

With an experience of many years, perhaps I can relieve your correspondent of his trouble by giving him my method. On removing the piece from the lathe, I warm it over a spirit lamp, then tap it with a stiff brush, lightly: the wax will adhere to the brush. By repeating the operation, there is but little left for the alcohol to do. If in a great hurry a few seconds' boiling in alcohol will remove the balance, or it can be put in alcohol, without boiling, a few minutes, while the time is employed on other parts of the watch, when the piece is cleaned with ease. Hoping the above will benefit some of my brother "chips," I remain,

Eufaula, Ala.

S. S. BARNABY.

PROF. GAMGEE has made a report to the effect that one-fifth of the meat eaten in Great Britain, whether beef, mutton, veal, or lamb, is diseased. Prof. Gerlach states that half the meat consumed in Berlin is diseased. How about the United States? The butchers in New York say the demand for beef has largely diminished in consequence of popular doubt upon this point.



## SPECIAL CORRESPONDENCE OF THE SCIENTIFIC AMERICAN.—AFFAIRS AT THE PATENT OFFICE.

WASHINGTON, D. C., Sept. 2, 1868.

You have already announced that Commissioner Foote is hard at work reorganizing the business of the Patent Office. His reform promises to be very thorough. Laziness is a thing not to be tolerated any more, expenses will be cut down to the lowest figure, and the Office be put upon a thorough working basis. The practice of paying forty-eight dollars per thousand for manilla envelopes has been discontinued, and the daubing over of stone columns with cobalt blue is not likely to be repeated at present. The Commissioner has made several changes relative to preparing the annual report, printing specifications, etc., which will greatly reduce the expenses, and advance the true interests of the office.

Among other reforms introduced, is that of examination of examiners, to see if they are qualified for their duties. W. B. Taylor and J. W. Jayne, Examiners, and B. F. James, of the Appeal Board, are appointed to examine applicants for positions in the Office, and hereafter, before any appointment can be made the candidate will be thoroughly examined as to his fitness for the place. He must possess at least some show of qualification or he cannot be appointed. All those now in the Office will have to submit to this examination, and if found unqualified will be discharged. They must have on the wedding garment or they cannot sit at the feast.

The Commissioner intends to raise the standard of principal examiners to that of the judges of our common courts, and means to do away with the practice heretofore in vogue of appointing persons to positions simply because they happen to be related to some M. C. or Senator.

It is not stated whether any examination as to moral qualification is to be made, but it will do the candidates no harm to put to them a few questions from "Watts on the Mind," and the old-fashioned "Westminster Catechism," books too much neglected by officials now-a-days. There is considerable interest felt about this new procedure, and it is already reported that some of the officials with hair erect, are expecting momentarily to be summoned before the new Tribunal. Mr. Taylor, who has had long experience in examining shooting irons, is expected to throw in some sharp shots. Judge James will apply the legal rules, and Mr. Jayne will do his share of the heavy work. The board is really a very able one, and Commissioner Foote has shown wisdom in making the selection. The board will soon organize, and proceed *secundum artem*.

You have, for some time, been aware of the fact that the Examiners have been seriously hampered for room in which to transact their business, and owing to the lack of a little gumption on the part of former Commissioners, no efforts were made to remove the clog. I am happy to say that five rooms in the basement formerly occupied by the Agricultural Department, have been turned over to the Patent Office, and will be occupied by the chemical department under Professor Hedrick and other purposes.

The appointment of Judge Foote to the Commissionership, will do much to break up some mischievous cliques, which have swarmed about the Office like hungry flies—this class of which I am now speaking are really a serious pest, and it wants a high-toned Commissioner to keep them in their proper places, and to teach them that the Patent Office can be managed without their assistance and advice.

The Office will soon be all that inventors have a right to expect; and that their claims will be liberally treated, no one need fear or doubt. Judge Foote is a warm friend to the inventor.

There is a report that Mr. Grinnell, at present an examiner, is to take the place of Gen. Stout, as Chief Clerk, but I think this is somewhat premature. Gen. Stout is now absent, and it is not likely that any change will be made, if at all, until his return.

After a very severe contest the Commissioner has decided to extend the Haywood India Rubber Patent, which is considered to be very valuable. COMMUNE BONUM.

## Chemical and Technical Prizes.

The Société d'Encouragement pour l'Encouragement pour l'Industrie Nationale de Paris has established the following prizes for solving the subjoined questions. The details may be found in the Programme des Prix et Médailles mis en Concours de la Société d'Encouragement, Paris, rue Bonaparte No. 44 (1867).

1. 2,000 francs for an improved method for preparing oxygen on a large scale. (Answer in 1869).
2. 3,000 francs for a technical application of binoxide of hydrogen. (Answer in 1869).
3. 3,000 francs for a cheap method for preparing ozone. (Answer in 1871).
4. 2,000 francs for converting the nitrogen of the atmosphere into a stable form, as nitric acid or ammonia. (Answer in 1869).
5. 2,000 francs for manufacturing cyanides by the aid of atmospheric nitrogen alone. (Answer in 1871).
6. 3,000 francs for manufacturing oil of vitriol without arsenic from pyrites. (Answer in 1870).
7. 1,000 francs for technical application of some common and cheap mineral substance. (Answer in 1869).
8. 1,000 francs for rendering valuable the various residues of manufactories. (Answer in 1869).
9. 1,000 francs for useful applications of the newly discovered metals—thallium, magnesium, indium. (Answer in 1870).
10. 1,000 francs for the same of non-metallic elements, as

silicium, borax, bromine, iodine, selenium, phosphorus. (Answer in 1870).

11. 1,000 francs for the discovery of a new and valuable alloy. (Answer in 1871).
12. 3,000 francs for the preparation of artificial plumbago adapted for lead-pencils. (Answer in 1872).
13. 3,000 francs for producing artificial black compact diamonds. (Answer in 1872).
14. 4,000 francs for discovering a process by which useful organic substances, such as quinia, indigo, alizarine, cane-sugar, etc., may be manufactured. (Answer in 1873).
15. 4,000 francs for discovering a method for the artificial production of fatty acids or waxes. (Answer in 1874).
16. 6,000 francs for a method of manufacturing steel founded on reliable experiments. (Answer in 1873).
17. 5,000 francs for a method which disinfects the refuse matter of gas factories. (Answer in 1869).
18. 1,000 francs for a method which rapidly disinfects and clarifies the water of culverts. (Answer in 1868).
19. 1,500 francs for an ink which does not injure steel pens. (Answer in 1868).
20. 3,000, 1,500, and 500 francs for the application of borax or boracic acid in pottery; for the discovery of new sources of boracic acid in France or her colonies, and for a composition which may replace boracic acid in the glazing of porcelain ware without increasing the cost. (Answer in 1868).
21. 1,000 francs for a practical application of dialysis. (Answer in 1868).
22. 1,000 francs for a practical application of dialysis to gases, such as separation of oxygen from air; distinction of noxious gases in confined spaces; discovering of a diaphragm, by means of which, in rooms lighted by gas and kept ventilated, to prevent explosion, the gas may be permitted to escape while the air is retained (?). (Answer in 1868).
23. 1,000 francs for the best mode of heating and at the same time ventilating rooms. (Answer in 1868).
24. 1,000 francs for a good filter for drinking water. (Answer in 1869).
25. 1,000 francs for a new and ready method by which fresh meat, game, or fish may be preserved at least for thirty days. (Answer in 1868).
26. 6,000 francs for a mode of permanent disinfection of water closets. (Answer in 1871).
27. 1,000 francs for practical introduction of Pasteur's method in the manufacture of vinegar. (Answer in 1868).
28. 2,000 francs for a book on the manufacture of wine, etc. (Answer in 1870).
29. 3,000 francs for the best apparatus to preserve and transport wine in. (Answer in 1870).

## MODERN PENMANSHIP.

We gave last week some illustrations of the pictorial written languages of savages. A natural sequence to the train of thought suggested by that article, is the written language of modern times. In the written language of civilized nations we find arbitrary characters, representing sounds which, in combination, are used to represent things and ideas. The history of these characters contains many matters of interest; but in the present article we wish to confine ourselves to the discussion of the forms of the letters used in modern penmanship, and to show that the observance of these forms entails a large amount of useless labor, which renders the system inadequate to modern business exigencies. We further believe that the conventional forms of which we speak are capable of modification, so as to be equally legible while they could be far more rapidly written. The two great elements which are of vital importance in business penmanship, are rapidity and legibility. We hold that artistic forms have no claims whatever which ought to demand consideration, when they hinder the attainment of the former requisites. The business of job printing owes its prosperity largely to the inefficiency of modern penmanship. The best and most learned men of our age have lamented the waste of time forced upon them by the labor of writing, and have advocated the adoption of a less complicated system of penmanship than the one in universal use.

Many have gone so far as to advocate the general use of phonography. The Hon. Thomas H. Benton said that an early knowledge of phonography would have saved him twenty years of hard labor. An English reviewer, speaking of this subject, says, "We require some means of bringing the operations of the mind and of the hand into closer correspondence." We are, however, of the opinion that there are many objections to the adaptation of the existing systems of shorthand for business purposes. The first and most obvious objection seems to be the necessity for the observance of the orthography of words in ordinary legal and business writing. The most popular systems of shorthand more or less ignore this necessity, and multiply the characters used in writing so that certain sounds expressed in the ordinary way by a combination of characters, are represented by symbols arbitrarily used for that purpose. We are aware that some modifications of these systems have been proposed, which render them more fit for business use than the reporting style, admitted by all authors to be unfit for that purpose. But the substitution of any of these systems for the old one would be too radical a change, and would be attended with obvious difficulties. The reform should commence with the alphabet now used, the aim being to gradually modify the forms of the letters, so as to divest them of the useless turns and flourishes which do not add to legibility, and, regardless of all artistic notions, to simplify their construction as much as possible. This it is quite possible to do, especially with the capitals. Scarcely one of these requires more than two-thirds the number of motions now required, to answer equally well, and to be read by any one who can read ordinary writing. In the

course of time entirely new characters might be substituted, beginning first with the letters least used. The latter should be as simple as those now used in phonography; a single dash or curve, above or below the line upon the paper. Any one at all versed in the shorthand systems now used, will readily understand how the variations in the positions, angles and thickness of such primitive forms, can be multiplied so as to give the requisite number of characters. An alphabet may be made entirely of straight marks, each letter requiring but one motion, and differing from the others only in thickness, length, the angle it makes with the ruling of the paper, and its position above or below the line. Moreover, such an alphabet can be written with perfect legibility, and in much less time than the ordinary characters. But it is not necessary to limit ourselves to straight marks, and it would not be advisable to do so. The object in speaking of it in this connection was to show the entire practicability of eventually obtaining an alphabet, in which each letter should demand only a single motion instead of five or six, as is the case with many now in use.

The progress of the age depends so much upon the pen, that it is wrong to neglect any means that would facilitate the work of authors, editors, and the large class of those who spend their lives in clerical labor. But in this as in all other needed reforms we must make haste slowly, and it is on this account we recommend beginning with the simplification of the alphabet now used, rather than the attempt to at once adopt phonography, as advocated by many of our exchanges.

## An African Rainstorm.

The following extract from the travels of the celebrated African hunter and explorer Mr. Baker, recently published, will give a good idea of the great rapidity with which rainstorms gather in tropical regions, and the enormous volumes of water which often fall in a few hours, filling the previously dry and arid beds of rivers, and causing inundations of proportions entirely unknown in more temperate climes.

"The cool night arrived, and I was lying half asleep upon my bed by the margin of the river, when I fancied I heard a rumbling like distant thunder; I had not heard such a sound for months, but a low, uninterrupted roll appeared to increase in volume, although far distant. Hardly had I raised my head to listen more attentively, when a confusion of voices arose from the Arab's camp, with a sound of many feet, and in a few minutes they rushed into my camp shouting to my men in the darkness, 'The river! The river!'

"We were up in an instant, and my interpreter, Mahomet, in a state of intense confusion, explained that the river was coming down, and that the supposed distant thunder was the roar of approaching water.

"Many of the people were asleep upon the clean sand of the river's bed; these were quickly awakened by the Arabs who rushed down the steep bank to save the skulls of my two hippopotami, that were exposed to dry. Hardly had they descended, when the sound of the river in the darkness beneath, told us that the water had arrived, and the men, dripping with wet, had just sufficient time to drag their heavy burdens up the bank. On the morning of the 24th of June, I stood on the banks of the noble Atbara river at the break of day. The wonder of the desert! yesterday there was a barren sheet of glaring sand, with a fringe of withered bush and trees upon its borders that cut the yellow expanse of the desert. For days we had journeyed along the exhausted bed of the river; all nature, even in nature's poverty, was most poor; no bush could burst a leaf; no tree could throw a shade; crisp gums crackled upon the stems of the mimosas, the sap dried upon the burst bark, sprung with the withering heat of the simoom. In one night there was a mysterious change—wonders of the mighty Nile!—an army of water was hastening to the wasted river; there was no drop of rain, no thunder cloud on the horizon to give hope, all had been dry and sultry; dust and desolation yesterday,—to-day a magnificent stream, some five hundred yards in width, and from fifteen to twenty feet in depth, flowing through the dreary desert! Bamboos and reeds, with trash of all kinds, were hurried along the muddy waters."

## The Late Flood at Baltimore.

The Baltimore Weekly Commercial takes the ground that the late disastrous flood was caused by a storm wholly exceptional in its character, and argues that in the re-occupation of the fine water privileges, where so much damage was sustained, it should be so considered. It says:

"According to the best accounts that have come to us of the visitation in question, and after mature consideration, it seems to be the concurrent testimony that on the day the deluge came, a vast black cloud covered the country all the way from about Laurel and the region north of that point to the Pennsylvania line. A lady staying at the time some twelve miles to the north of the point named, stated that for two or three hours it was so dark, even at the window, as to make sewing difficult. This vast amount of water appears to have been discharged from the clouds almost simultaneously, and near the head waters of the streams so suddenly affected, there having been comparatively but a few drops observed at Elliott's Mills when the water began to rise with such fearful rapidity there. Almost in the nature of a great water spout then, it was one of those unusual visitations—we repeat—such as might never occur again; and therefore, we say, considering all the circumstances, it is but a matter of course that those who have hitherto enjoyed the fine advantages of the streams alluded to, should put their power in requisition once more for business purposes."

Lyons, Michigan, has 100 acres of peppermint under cultivation, and has made this year 1000 pounds of pure oil, and is still at it. The oil is worth \$8 a pound.



TELEGRAPHING WITHOUT WIRES.

The *N. Y. Herald* publishes a long cock-and-bull story from a correspondent at Tonawanda, N. Y., detailing the marvelous discovery of a young man "of modest mien" in that town, of the name of James H. Mower. The invention purports to be an electrical screw or a method of telegraphing without wires. The account states that, after going through secret studies of electricity, chemistry, and all the sciences for three years, during which he encountered difficulties the mere mention of which would occupy two columns of our paper, this modest young man emerges from his obscurity and makes a trial of his invention on Lake Ontario with a pair of the newly-discovered apparatuses. These were each sunk in 25 feet of water, and placed 25 miles apart, in an exact mathematical straight line, extending precisely east and west. The parallel was obtained from the most accurate surveys by a skilled astronomer, because the slightest variation from the true line would have been fatal to success. The precise nature of the apparatus used is not stated; but we are told that, by means of a remarkable electrical machine of his own getting up, "but of too intricate a character to be described here," he generates an immense quantity "of a fluid of astonishing qualities, possessing all the desirable requisites to a quick and thorough decomposition of water."

"On the 10th of July, everything was got in position, the weather being calm and the water smooth. A scow from which to operate was anchored at each end. He then commenced to generate a powerful stream and an immense quantity of the decomposing fluid, which he stood ready to let loose upon the susceptible medium, a hundred radiating agents converging to a common center, all charged with electricity, and which were only waiting for the needed touch to speed the fluid upon its impulsive errand. At seventeen minutes past two o'clock he handled the operating screw and sent the following dispatch:

"J. B. SPEARMAN—  
"Success at last is mine."

JAMES H. MOWER.

"At nineteen minutes past two o'clock, back came the response:

"Mr. MOWER—  
"The world will acknowledge your triumph. J. B. SPEARMAN."

"Two hours were then spent in uninterrupted communication upon matters relating chiefly to the apparatus, its operations and disposition.

"As to the whole evolution of dispatching messages through water, using it as the only medium, without the aid of any wire or insulated conductor, it may be explained thus: The water at the point of contact with the fluid is decomposed in the first drop, when the chemical separation advances to the second globule and there effects a like change, communicating the evolution to the third, and so on in the line of transmission, always in the same stratum of water. Why this line of invariable decomposition is always east and west, Mr. Mower, as I remarked before, will not now disclose.

"It is impossible to overestimate the importance of this discovery—a discovery which will establish a perfect gridiron of ocean telegraphs between our Atlantic coast and Europe on the one hand, and the Pacific coast and China on the other. Obscure islands in the most neglected corners of the earth will be able to hold converse with civilization, and soon receive her quickening breath of industry and art. Every respectable seacoast newspaper can open its own channels of communication at an expense insignificant when compared with the present transatlantic rates. A thousand benefits will accrue to mankind, and it is hoped that, in their full fruition, the name of Mower will not be forgotten, for he has, indeed, electrified the world."

The suggestion of a telegraph without wires is very old. Our modest young man might have saved himself the labor of writing up his silly yarn, and given the pith of his story in much better style, by quoting, as follows, from Addison's article in the *Spectator*, published over 150 years ago:

"Strada, in one of his prolusions, gives an account of a chimerical correspondence between two friends, by the help of a certain loadstone which had such virtue in it, that if it touched two several needles, when one of the needles so touched began to move, the other, though at never so great a distance, moved at the same time, and in the same manner. He tells us that two friends, being each possessed of one of these needles, made a kind of dial plate, inscribing it with the four and twenty letters. They then fixed one of the needles on each of these plates in such a manner that it could move round without impediment. Upon their separating from one another into distant countries, they agreed to withdraw themselves into their closets at a certain hour of the day, and to converse by means of this their invention. Accordingly, when they were some hundred miles asunder, each of them shut himself up in his closet at the time appointed, and immediately cast his eye upon his dial plate. If he had a mind to write anything to his friend, he directed his needle to every letter that formed the words which he had occasion for, making a little pause at the end of every word or sentence, to avoid confusion. The friend in the meanwhile saw his own sympathetic needle moving of itself to every letter which that of his correspondent pointed at. By this means they talked together across a whole continent, and conveyed their thoughts to one another in an instant, over cities or mountains, seas or deserts."

Here is an almost exact description of Brett's needle telegraph as used for twenty years past in England, the essential difference being that, in order to make the two separated needles sympathetic, Mr. Bett is obliged to keep them constantly connected by means of a telegraph wire.

Rules for the Strength of Boilers.

The "Useful Information for Railway Men," written by Mr. W. G. Hamilton, for the Ramapo Wheel and Foundry Company, among many other valuable items of information, gives the following, regarding steam boilers. For the cylindrical parts:

To Find the Working Steam Pressure Due to a given Diameter, Thickness of Plate, and Quality of Joint:—RULE—Multiply thickness of plate in inches by 2, and by the working strength of the longitudinal joint in pounds, per square inch, and divide by the diameter in inches; quotient is working steam-pressure in pounds, per square inch.

To Find Thickness of Plate, Due to a given Diameter, Quality of Joint, and Working Pressure:—Multiply the working pressure in pounds, per square inch, by the diameter in inches, and divide the product by the working strength of the longitudinal joint in pounds, and by 2. The final quotient is the required thickness of plate in inches.

The ultimate or bursting pressure is five times the working pressure.

To Find Working Steam Pressure, Due to a given Diameter of Tie-Rod, and Area of Segment to be guarded by it:—Divide the working strength of the tie-rod in pounds, by the area of the segment in square inches; quotient is working steam pressure in pounds, per square inch.

To Find Thickness of Plates of Stayed Surfaces:—Multiply the square root of the pressure in pounds, per square inch, by the greatest distance between the stays in inches, and by .008; product equals thickness of plate in inches.

To Find Area of Segment, Due to a given Diameter of Tie-Rod and Working Pressure:—Divide the working strength of the tie-rod in pounds, by the working pressure in pounds, per square inch; quotient is area of segment in square inches. Working tensile strength of best iron rods is seven-eighths inch diameter, 8,000 pounds; one inch diameter, 10,000 pounds; one and one-eighth inches diameter, 13,000 pounds. Deduct ten per cent if the rod is reduced by screwing.

To Find Dimensions of Stay Bolts:—Multiply area supported by stay in square inches by pressure of steam in pounds per square inch; the sum divided by 9,000 equals area of stay bolts in square inches, if the stay is thickened out where the screw is cut. If the screw is cut out of the body of the stay, divide by 6,000. Where stays are secured by keys, the stay at the end should be one and a quarter diameter of the body of the stay. Depth of cutter, 1-6 diameter of stay; thickness of cutter, 0-3 diameter of stay.

To Find Working Strength of a Roof-Stay (or Crown Bar) of given Dimensions, fixed in its Place:—Multiply thickness of stay at the center in inches, by the square of its depths at the center in inches, and by 30; divide the product by the length of the span in inches; quotient is working load in tons equally distributed, when stay is fixed in its place.

Staying Locomotive Boilers.—Fire-Box Water Spaces:—Working pressure in pounds, per square inch, being one sixth of bursting pressure; stays, three-quarters inch diameter; copper plates, one-half inch thick; iron do., three-eighths inch thick.

STAY.	PLATE.	STAYS	STAYS
		SIN. APART.	4 IN. APART.
Copper	Copper	107	185
Iron	Copper	169	290
Iron	Copper	130	190
Iron	Iron	185	290

For low pressure boilers, at twenty pounds per square inch flat portions should be stayed at intervals of twelve inches apart.

To Find the Pressure borne by the Roof-Stays (or Crown-Bars) of a Fire-Box:—Multiply span of the roof in inches, by the pitch of the stays in inches, and by the pressure in pounds per square inch, and divide by 2240; the product is the pressure uniformly distributed, borne by each roof-stay, in tons.

Strength of Boiler Plates and Joints:—Working strength of best boiler plates are:

Yorkshire plates, per square inch of entire section.....	11,000
Staffordshire.....	9,000
American.....	14,000
American, ordinary.....	12,000
Cast steel plates.....	15,000

Working Strength of Joint per Square Inch of Entire Section:

	BEST YORKSHIRE.	BEST STAFFORDSHIRE.	BEST AMERICAN.
Seam-welded, joint.....	11,000	9,000	14,500
Double riveted, double welt.....	9,000	7,000	10,500
" " lap joint.....	8,000	6,500	9,750
Lap, welded joint, single welt.....	7,400	6,000	9,000
Double riveted, single welt.....	7,300	6,000	9,000
Single riveted lap.....	6,700	5,400	7,500

The strain per unit of length upon transverse circular joints is only half of that on longitudinal joints; longitudinal seams should therefore be the strongest, and the double-riveted double welt joints should be used for longitudinal joints, and the single-riveted lap joints for circular seams.

Riveting for Boilers.—Table of Dimensions of Rivets, etc., for Steam Boilers:

Thickness of Plate.	Diameter of Rivet.	Length of Rivet from head.	Distance apart of Rivets, Center to Center.	Breadth of lap, single riveting.
1/4 in.	3/16 in.	1 1/4 in.	1 1/4 in.	1 1/4 in.
5/16 in.	7/16 in.	1 3/4 in.	1 3/4 in.	1 3/4 in.
3/8 in.	1/2 in.	2 in.	2 in.	2 in.
7/16 in.	9/16 in.	2 1/4 in.	2 1/4 in.	2 1/4 in.
1/2 in.	5/8 in.	2 3/4 in.	2 3/4 in.	2 3/4 in.
5/8 in.	3/4 in.	3 in.	3 in.	3 in.
3/4 in.	7/8 in.	3 1/4 in.	3 1/4 in.	3 1/4 in.
7/8 in.	1 in.	3 3/4 in.	3 3/4 in.	3 3/4 in.
1 in.	1 1/8 in.	4 in.	4 in.	4 in.

For double-riveted joints, add two thirds of the breadth of lap.

MR. RECHTEN, of Bremen, has been exhibiting the newly patented German whaling gun at New Bedford. The gun is double and very heavy, mounted on trunnions. One barrel is designed for a harpoon and the other for a bomb lance. The harpoon is said to have been thrown a long distance with great accuracy.

THE BESSEMER PROCESS—HOW ITS EARLY DIFFICULTIES WERE OVERCOME.

Before considering the conduct of the Bessemer process, it is necessary to bear in mind, 1st, that the grand value of Bessemer metal over puddled metal, is due to its being produced in a fluid state; 2d, that while cast iron is easily liquefied at a temperature of 3,000°, wrought iron or soft steel can only be kept liquid at a temperature of at least 5,000°, which is quite beyond the convenient and practicable capacities of fuel and furnace material as ordinarily employed.

For nearly a century, the partial decarburization of pig iron has been accomplished by blowing air upon (and in some cases into) a melted mass of it. But the liquidity of the mass was only maintained by contact with an intense coal fire. The combustion of the carbon by the air was so slow and so limited in extent, that the iron was rather chilled than heated by it. This was the "finery" process, and was merely preparatory to puddling; the product was still cast iron.

Some years before Bessemer began his experiments, Mr. William Kelly of Kentucky advanced the finery process by a great stride, but left it still far short of practical steel making. He blew air into the iron just smelted from the ore, and lying in the hearth of a blast furnace, and partially decarburized it, but not without the liquefying agency of the mass of fuel above. He afterwards blew streams of air into melted iron contained in a covered brick vessel or chamber, without fuel. The almost invariable chilling of the iron, after repeated experiments with various forms of apparatus, and extending over several years, led to the suspension of further trial in this direction. The subsequent success of the Bessemer process, however, revived the claims of Mr. Kelly. The precise legal status of the two inventors has not, fortunately for the public as well as for the parties immediately interested, been brought to test, the various interests having been combined.

At this point we are prepared for the inquiry—What is the Bessemer process? If the old finery did not fulfill the theoretical specification, Kelly's certainly did. Here were carbon and silicon in the iron, but all ready to leave it upon the heated appeal of oxygen; here was plentiful oxygen spread over and bubbling through it, and here was the ample heat of three thousand degrees. Still, the reactions were irregular and impracticable.

Just here, Mr. Bessemer introduced a radically new element, that made all the difference between failure and success. To describe his process as the introduction of oxygen into melted iron, is to play Hamlet without the prince. Bessemer's is not strictly a chemical process. The chemical reactions will look out for themselves, but they must have an adequate chance, and this is what Bessemer for the first time gave them, by mechanical means, viz.: the mechanical force of numerous blasts—not sluggish drafts, but roaring blasts of air, blowing the melted iron all into spray, so as to give the oxygen and the carbon hundreds of square feet of surface contact, so that every drop of iron should be enveloped with air. Thus, and thus only, the combustion is so perfect and rapid, and so diffused throughout the whole mass, that the two grand desiderata are attained—1st, the decarburization is effected without the use of other fuel; and 2d, the product is liquid and can be cast into homogeneous masses.

To accomplish these results, Mr. Bessemer developed the radically new machinery and apparatus which, with various extensions and modifications, is everywhere used. It consists principally of the converting vessels mounted on trunnions, and so shaped that the liquid metal can lie quietly in it while the twerees (air admission) and the entrance or mouth of the vessel lie above the metal line, and so that the mouth becomes a chimney and the twerees are brought beneath the metal, when the converter is turned upright. He also, after great trouble, developed a refractory material (chiefly silicious stone), and a mode of lining the converter adequate to the great heat and wear. The general arrangement of casting pit, ladle, ladle and ingot cranes, regulator, and other plan to be hereinafter described, were rapidly developed by Mr. Bessemer. During ten years of his first practice, he advanced the machinery of the new art to a much higher degree of perfection than has yet been attained to in the old processes.

But Mr. Bessemer had no sooner conquered this difficulty than he encountered another and equally serious one. Except when a few of the choicer irons were employed, entire decarburization left the product "red-short," or incapable of malleability at red heat, and therefore utterly useless. To stop the blowing at such a point as should leave in sufficient carbon to cure the red-shortness and constitute a mild steel, was on the whole impracticable, because there is no adequate indication of degrees in decarburization, and the accuracy of blowing through a fixed time, would be impaired by varying heat and other circumstances. Here, then, were the impossibility of definite degrees of decarburization on the one hand, and the spoiling of the product by complete decarburization on the other hand.

In studying Mr. Bessemer's numerous patents and writings, we observe that he clearly understood this difficulty, and approached very near to its solution. Indeed, he rather vaguely described, in several patents, perhaps without seeing the end from the beginning, substantially the remedy afterwards patented by Mr. Robert Mushet.

The indications of complete decarburization by blowing air into melted iron, are as distinct as the time of day on the clock. The flame at the converter mouth suddenly decreases in volume and loses—not its own brightness, but its power of illuminating other things. But the product is valueless. Mr. Bessemer vaguely conceived, and Mr. Mushet definitely specified the finishing touch in the great art—re-carburization. A definite weight (three or seven per centum) of a pig iron, containing not only carbon but manganese (either Franklinitic or



Spiegelisen), is melted and run into the decarburized iron. At this excessive temperature—not less than five thousand degrees—the oxygen and other impurities that make the iron red-hot, come out of it with great commotion, and enter into the carbon and manganese thus added, forming an intense flame and copious slag. A part of the carbon combines with the iron, thus producing steel. All this is the work of a moment, and the thorough reaction is due to the excessive temperature. The oxygen which is removed by the carbon (or chiefly by the manganese), was produced by the oxidation of some of the iron, by the blast of air. This, and the sulphur, and some other impurities, now removed by the manganese, were what made the product red-hot before recarburization. The steel is now cast into ingots, which are malleable at a high heat.

But Mr. Bessemer's troubles did not end here. The product was still uncertain, though often uniform and excellent. Some subtle impurity was still lurking in some obscure corner—now appearing and now retiring. To find it, Mr. Bessemer put every iron and material employed, through a costly and thorough course of chemical analysis, and so discovered phosphorus to be the arch-enemy. And to this day, irons containing above two hundredths of one per centum of phosphorus cannot be employed to advantage. Experiments to remove or neutralize it are in progress, and greater obstacles than this have been overcome. Mr. Bessemer also determined the amounts of other materials—silicium, sulphur, etc.—that affected his process, and with Mr. Mushet's assistance (satisfactorily acknowledged) has presented to the world, not merely a theory, but a perfected process and adequate machinery, for carrying it out. It will thus be observed, that however greatly the public is indebted to Mr. Bessemer's inventive powers, it owes still more to his indomitable pluck.—*Troy Times.*

#### BURYING ALIVE—EXPERIMENTS WITH VESTER'S PATENT BURIAL CASE.

The idea of being buried alive is one that fills the mind with horror, and the accounts which have from time to time appeared in the public prints, describing such occurrences, have always attracted the attention of a sensation-loving public. It may safely be assumed, however, that a very large proportion of the stories of the exhumation of bodies which gave signs of having moved in their coffins, are rehashes from old romances, or have their origin in the awkwardness of those who were intrusted with the interment of the remains: the indications of convulsive efforts to escape death; and other sensational details, being purely imaginative. The chances at this age in a civilized community, observing the decent rites of burial, that living bodies should be interred by mistake, is so small, that it is practically unworthy of consideration. In Germany it has long been the practice in many places to deposit the dead in mortuary houses erected for that purpose, until the commencement of decomposition shall have absolutely proved the death of the bodies deposited in them. Our editorial letter from Strasbourg, page 202, vol. XVII, contains the following description of this practice, as we saw it at Frankfort-on-the-Main, and at Munich:

"In a building at the entrance to the cemetery, the bodies are placed upon iron cots in a recumbent or half-sitting posture, and upon the wrists are fastened rings, which connect with wires and alarm bells hung in the adjoining rooms of the watchman. Each cot is numbered to correspond with the number fastened under the bell, so that in case there should be the slightest motion of the body an instant alarm would summon the watch to the spot. In an adjoining room there is a bed carefully prepared, a bath-tub, electric apparatus, and restorative medicines to be employed in cases of resurrection.

"At the time of my visit I counted the bodies of eight infants, and eight adults, all serenely reposing in a profusion of flowers, and watchmen were sitting in solemn silence awaiting the click of the bell. In Frankfort not a single case of resurrection has yet occurred, but at Munich they had a case many years ago; so they say."

At Wentz, the surgeon, during a course of forty-five years, had only one alarm. It occurred from the body of an old man whose abdomen having subsided from the discharge of a large quantity of fluid, allowed the arms to fall lengthwise beside the body.

There are numerous and generally reliable tests for determining whether death has actually occurred previous to the commencement of decay, which are familiar to most people. Granted that in extremely rare cases, it is possible these should fail, it is difficult to perceive how the device of Mr. Vester is an improvement upon the German method. It consists of an ordinary burial case or coffin with a tube at the head, containing a ladder and a cord to enable the resuscitated individual to return to the upper air, provided he has strength to do it, which we think would in most cases be doubtful.

An experiment with this apparatus was made by the inventor on the 1st instant, at Newark, New Jersey, in the presence of a large number of people, and is thus described in the *New York Tribune*:

"At the hour named the inventor made his appearance and laid himself in the coffin, the lid of which was fastened by four screws, two on each side. This coffin was of the ordinary description, with the exception of a wire screen immediately at its head. The coffin was then ornamented with a cross and a quantity of leaves and white flowers, and the whole—man, coffin, cross, and flowers—lowered by straps into the grave. A large box, rather larger than the customary ones, with a hole two feet square at the head, directly over the coffin screen, was then lowered into the grave. Another box, about two feet in width and seven feet high, was placed in an

upright position, one end fitting exactly into the square hole in the coffin box. The earth was thrown upon the box, around the upright, and all was ready for the test. In the upright box was a flight of stairs, by which the ascent to the "upper crust" was to be made. One curious individual looked down the upright, and, seeing the inventor wiping the perspiration from his brow, asked if it was "warm down there?" He narrowly escaped being put from the grounds by the excited Germans present. About an hour after the "burial," Mr. Vester pulled himself from his coffin by means of ropes attached to the lower portion of the upright, and ascending to the stairs, again appeared upon the earth. He was greeted with kisses and other manifestations of warm approval by a number of his ardent admirers. The exhibition passed off very successfully. Those who witnessed it are divided in opinion as to the utility of the invention. The inventor proposes to place a sort of alarm upon the upright, that the person interred can attract the attention of parties in case assistance is needed, and also intends to place shelves in the upright, within reach of the party buried, on which stimulants may be placed. The invention is claimed to be of inestimable service where parties have been interred while in a trance, as well as to relieve persons of the sorrowful thought that perhaps their friends have been buried alive."

#### MANUFACTURING, MINING, AND RAILROAD ITEMS.

**A FACT OF IMPORTANCE TO TOURISTS.**—At this time, when many persons are about to make a European tour, it may be interesting to learn that so great are the facilities of communication between London and Switzerland, that a traveler leaving Charing Cross Station at 8:30 A.M., can arrive at Geneva on the following morning.

**ILLINOIS AND ST. LOUIS BRIDGE.**—The total cost of the great Illinois and St. Louis Bridge, including structure, land, and approaches, is set down at \$1,500,000. The engineer-in-chief estimates that the work will be completed in 1870, or 1871, and that in the last named year the receipts of the bridge will be \$1,125,250.

**THE CANASTA RAILROAD.**—The Canasta Railroad Company contemplate an extension of their track northwesterly to Greenpoint; thus having two water fronts, and furnishing facilities for travel from East New York to Greenpoint and the upper part of Manhattan Island.

**THE MONRIEFF GUN-CARRIAGE.**—Experiments were conducted last month at Shoburness, for the purpose of testing the Monrieff Gun Carriage, the construction and operation of which were fully described in a late number. The gun mounted was the ordinary 7-inch land service, fired first with 14 lb. powder and 115 lb. shot, and afterward with full battery charge of 22 lb. powder and 115 lb. shot. The result was very successful.

**FRENCH RAILROADS.**—According to official documents, there are at present in working order in France 9,666 miles of railroad, and it is proposed to have 14,669 miles completed before 1878. The cost of construction per mile is estimated at about \$145,000 gold.

**SLEEPING CARS FOR EUROPEAN RAILROADS.**—An American firm has sent an agent to Europe to negotiate with various railroad companies for the introduction of sleeping cars upon their lines. The firm offers to build the carriages and hand them over to the companies on condition of being permitted to collect extra fares, for the accommodation thus furnished, from such travelers as may avail themselves thereof. The adventure will likely prove a success on the long continental lines.

**OUR STREET DEPARTMENT.**—The President of the Citizen's Association charges the Street Commissioner, in a lengthy letter, with expending \$40,000 per annum for blank books and stationery and \$30,000 for repairing roads and avenues contrary to section 38 of the city charter, which provides that no expenditure exceeding \$250 shall be made except in pursuance of contracts. There would seem to be a necessity of mending ways in a metaphorical as well as in a literal sense.

#### Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent new and foreign patents.

**COMBINED SHEARS AND BOLT AND RIVET CUTTER.**—Thomas Smith, California, Mo.—The object of this invention is to furnish a neat and convenient tool for the use of persons who work in sheet metal, blacksmiths.

**SELF-ACTING WAGON BRAKE.**—Thomas Smith, California, Mo.—In this invention the friction blocks are adjustable in order to accommodate them to different wheels, and are directly attached to and supported by the springs of the brake. The apparatus is also made adjustable to horses of different sizes.

**CULTIVATOR.**—D. McNeely and C. J. Cady, Spurgeon, Ind.—This invention has for its object to produce a cultivator which will be convenient and effective for plowing corn, cotton, tobacco, potatoes, and other vegetables, and which can be readily and easily adjusted for shallow or deep plowing, as circumstances may require.

**CHURN.**—J. W. Thompson, Bureau Junction, Ill.—This invention relates to that class of churns in which the dasher has four motions, viz: up, down, right, and left, and consists in effecting such motions by means of a new and greatly simplified device, which can be attached to any churn at a trifling expense, and which is convenient and easy of operation.

**HAY FORK.**—C. S. Ambuster, Woodstown, N. J.—The object of this invention is to provide a neat, cheap, and convenient hay fork, by which the hay can be grasped securely, and firmly held, while being elevated, and can be instantly released when arriving at the place where it is desired to deposit it.

**POTATO DIGGER AND SEPARATOR.**—Wm. Green, Holly, Mich.—In this invention, a new and improved device is employed for separating the vines from the potatoes, whereby the work is more rapidly and effectually accomplished than in other machines, and in connection with this, a new apparatus is used for adjusting the working parts of the machine, and throwing them into or out of gear.

**COMPOSITION FOR ROOFING.**—Benjamin Stephens, Wheeling, W. Va.—This invention is an improved composition of matter for roofing which is of such a nature, that it will prevent the paper from cracking, and will form a fire proof and water-proof covering for the building.

**SELF-FEEDING ROD MACHINE.**—Frank Douglas, Norwich, Conn.—In this invention, the knives which reduce the stick to a round rod, are so arranged that one of them scores directly into the stick, and, at the same time, draws it along and feeds it to the cutter, while the others shave off the corners of the rod and round it to the proper size. A new guide plate is also employed together with a new device for holding the rods when they shall have passed through the guide plate.

**FLOUR BOLT.**—H. N. Shultz, Habbillsville, Md.—The object of this invention is to provide a simple and inexpensive device which can be used in connection with any form of flour bolt, and applied to the old ones now in use, and by which the bolt can be jarred or subjected to a series of sudden shocks during each revolution, so as thereby to be cleansed and kept free from the accumulation of flour. The device is so arranged that it can be readily adjusted to impart any required degree of violence to the shocks, or to allow the bolt to run smoothly, if desired.

**BASE BALL TALLY BOARD.**—Thos. L. Carney, Brownsburg, Ind.—This invention relates to the game of base ball, and consists in an arrangement of pins and in the use of colored balls thereon, and in a slate or other equivalent

marking surface in combination therewith, whereby the game of the contending sides may be accurately kept, as well as that of each individual player.

**MACHINERY FOR TURNING, CROSSING, AND FINISHING BARRELS.**—Saxton J. Arnold and Amos F. Clark, Raymondville, N. Y.—This invention relates to improvements in machinery for turning, crossing, and finishing barrels, and consists of a device for holding the barrel in a convenient position for the performance of these operations.

**SHUTTLES.**—Edward Baggett, Fall River, Mass.—This invention consists in a secondary spring interposed between the spring commonly used, to take the wear off from the shoulder of the spindle, and in constructing the shoulder of the spindle in a form adapted to the application of the said secondary spring.

**RAILROAD CHAIRS.**—Samuel T. Alexander, Pittsburg, Pa.—This invention consists in a bed plate which is to be fastened to the tie, provided with grooves for seating clamping pieces which support the rail and with lugs for preventing the said clamping pieces from being thrown out of the grooves wherein they rest; and also in the said clamping pieces.

**CHECK VALVE FOR PUMPS.**—Wm. R. Malone, Mason, W. Va.—This invention consists in providing a hollow tapered seat having a downward projection for supporting the valve stem, which is provided with jam nuts to regulate the amount of lifting of the valve, which is seated upon the top of the valve seat, the latter is arranged to be fitted into a box or cylinder and secured in the well tube at any desired point.

**STOVE DRUM.**—G. S. Walker, Erie, Pa.—This invention consists of a hollow radiating cylinder or drum made of sheet metal and suitably arranged to be applied to a stove in any desired manner, and having pipe connections for securing and discharging the product of combustion, and provided with an internal apparatus for conveying the said product around and exposing it to the shell of the drum in a manner to extract the heat therefrom.

**ADHESIVE PLASTERS.**—John Lynch, Columbia, S. C.—This invention consists in attaching to the backs of such plasters one or more springs, stays, or flexible rods or bows, which not only prevent the plaster from crumpling or wrinkling, but serve as additional support to the muscles.

**CARRIAGE COUPLING.**—Alfred S. Johnson, Wapuan, Wis.—This invention relates to an improvement in the method of coupling the thills of buggies or the poles of carriages to the shafts.

**PUNCH FOR BELTS AND OTHER PURPOSES.**—David M. Weston, Boston, Mass.—This invention consists of an improved construction of the jaws of a common hand punch, whereby the distance of the hole to be punched from the edge of the material may be readily gaged, and the material disengaged from the punch after the hole has been formed; also, an improved arrangement of the spring for opening the jaws.

**HAND LOOM.**—Edwin Lowe, Burrows, Ind.—This invention consists in connecting to the lay, pawls suitably arranged to give intermittent rotary motion to a tappet shaft, which in turn operates the treadles and picker staves.

**GATE.**—J. H. McKnight, Oakland, Mich.—This invention has for its object to furnish an improved gate, simple in construction, strong, and durable, and which may be conveniently operated to open or close it, without its being necessary to get out of the carriage for that purpose.

**ORGAN PIPE.**—Geo. H. Brock, Huntington, N. Y.—This invention relates to a new manner of constructing organ pipes, and consists in making each pipe of a curved plate, held between two disks. In this manner a more substantial, solid, effectual, and a cheaper pipe is obtained than could ever be produced according to the old plan now in use.

**SEGAR PIPE.**—Henry E. Doster, Bethlehem, Pa.—This invention relates to an improved method of smoking tobacco, whereby all the advantages of a fine segar may be enjoyed without incurring the expense, and whereby the objections to the vulgar pipe are obviated.

**CHURN.**—N. P. Chaney, Potsdam, N. Y.—This invention relates to improvements in churns, the object of which is to provide a churn having beaters provided with air passages to convey the air down into the cream while it is being agitated, and scrapers for scraping the cream off from the underside of the cover, all arranged in such a manner as to scrape it away from around the opening for the shaft, and thereby preventing it from oozing up through the cover around the shaft.

**SLEIGH.**—Lewis A. Spickler, Clear Spring, Ind.—This invention consists in the location of the point of attachment of the shafts with the sleigh behind the front or bent part of the runners and the metal plate, permitting this improved location of the same.

**RAILROAD CAR SEAT.**—F. F. Wagner, Harrisburg, Pa.—This invention consists chiefly in attaching projecting lugs to the axles, by which the swinging arms, holding the chair backs, are secured to the seat frame, said lugs being attached to that side of each axle which is opposite to that from which the arms project, so that if the arms are turned down, the lugs will project from above the axle, and will raise the seat on that side on which such arms are folded down.

**DISTILLING APPARATUS.**—Duby Green, New York city.—This invention relates to a new apparatus for distilling alcohol directly from the mash, and consists in a new construction of the boiling apparatus, which contains six chambers, one above the other, all communicating with each other, and all producing vapors from the mash contained in them; the lowest chambers, which have the weakest mash, receiving the greatest amount of heat, and the highest the least. The invention also consists in the arrangement of a new stirring device, which receives its heat from the vapors that arise from the boiling apparatus, while heretofore direct steam had to be used for that purpose.

**VENTILATING SASH OPENER.**—W. C. Stickney, and James McGee, Steubenville, Ohio.—This invention has for its special object to furnish an improved device for opening and closing ventilating sash doors, or transoms of railroad cars, which shall be simple in construction, easily operated, and which will hold the sash securely in any position to which it may be adjusted.

**CIRCULAR SAW CARRIAGE.**—John Orm, Paducah, Ky.—This invention has for its object to improve the construction of the carriages of circular saw-mills, so as to make them more convenient and effective in operation.

**LIFE AND SURF BOATS.**—John R. Grace, Brooklyn, N. Y.—This invention has for its object to improve the construction of the improved and surf boat, patented by the same inventor, March 6th, 1863, and numbered 27,362, so as to make it more convenient and safer in use.

**VELOCIPEDE.**—Andrew Christian, New York city.—This invention has for its object the construction of a velocipede, in such manner that the axle will always be under complete control of the operator, the dead point being readily and completely overcome. The invention consists in so connecting the two operating levers with the connecting rod of the crank, that the dead point of one will readily be overcome by the movement of the other.

**WATER WHEEL.**—Joseph Hathaway, Woodstock, Vt.—This invention relates to a new and improved water wheel, of that class which is attached to a vertical shaft, and works within a cylindrical case, and has an internal discharge.

**CORN PLANTER.**—S. O. Campbell, Leavenworth, Kansas.—This invention relates to a new and improved corn planter, which also, when desired, may be readily converted into a cultivator. The invention consists in a novel construction and arrangement of parts whereby corn may be dropped with great accuracy, and properly deposited in the hills; the kernels or grains being left at the desired distance apart, and the device placed under the complete control of the operator or driver.

**CHURN DASHER.**—A. T. Bleyer, Conception, Mo.—This invention has for its object to furnish an improved churn dasher, which shall be so constructed and arranged as to bring the butter in a very short time, while at the same time it may be used for gathering the butter, and for removing it from the churn.

**CHURN.**—Joseph Watts, Brazil, Ind.—This invention has for its object to furnish an improved churn, which shall be simple in construction, easily operated, and effective in operation; bringing the butter quickly, developing



all the butter that may be in the milk, and separating the butter as fast as it is formed from the milk.

**DENTAL INSTRUMENTS.**—R. T. Fogg, San Paulo, Brazil.—The present invention relates to a new and useful improvement in dental and surgical instruments, which are so constructed with adjustable handles that the dentist or surgeon may carry a number of instruments with him with one set of handles which shall be common to all, thus greatly reducing the weight of metal he would otherwise be obliged to carry.

**BALING PRESS.**—Danglefield Dunn, Lewisport, Ky.—This invention relates to a new and improved baling press, of that class in which toggle levers are employed for operating the platen. The invention consists in a peculiar manner of applying the rope to the toggles by which the latter are operated, and in a novel manner of arranging the platen with the toggles, whereby a compact and powerful baling press is obtained, and one which will admit of being used as a beater press when required.

**STEAM PRESSURE AND FIRE REGULATOR.**—Abraham Kipp, Jr., Sing Sing, N. Y.—This invention relates to a new and improved apparatus or device for regulating the pressure of steam in boilers by automatically controlling the fires thereof; and it consists in a means connected with a damper, and communicating with the steam boiler, whereby an excess of steam pressure in the boiler is reduced by the action of the steam from the boiler upon the mechanism employed in such a manner as to partially close the damper and check the draft of the fire, and when the pressure is below the standard required, the mechanism made to open the damper and thereby increase the draft of the fire.

**HANGING OR SECURING CIRCULAR SAWS TO THEIR SHAFTS.**—William McDonald, Calais, Me.—This invention relates to a new and improved mode of hanging or securing circular saws to their shafts, whereby several advantages are obtained over the present or old mode.

**SOFA BEDSTEAD.**—M. K. Maximilian, New York city.—This invention relates to a new and improved sofa bedstead, and has for its object simplicity of construction, economy in the manufacture, and a general neat appearance of the article.

**CHURN.**—John Fausauer, Wheeling, Iowa.—This invention relates to a new and improved churn of that class which are provided with vertical rotating dashers and it consists in a novel construction of the dash and means for operating the same.

**BROADCAST SEEDING MACHINE.**—Joseph Haas, El Paso, Ill.—This invention relates to a new and improved machine for sowing seed broadcast, and it consists in a peculiar construction and arrangement of parts, whereby seed may be sown broadcast in a perfect manner.

**REAPING AND MOWING MACHINE.**—K. H. C. Preston, Manlius, N. Y.—This invention relates to certain new and useful improvements in reaping and mowing machines, and consists, 1st, in a novel and improved arrangement of driving mechanism, whereby spur gearing of moderate dimensions may be used and arranged in a very compact way. The invention consists, 2d, in a wooden strip or connection interposed between the sickle and the crank, and which drives the same for the purpose of ensuring ease of motion, preventing wear and tear and derangement of the working parts connected therewith. The invention consists, 3d, in a novel and improved means for throwing the sickle driving mechanism in and out of gear. The invention consists, 4th, in an improved pivot for the connecting rod, whereby strength and durability are obtained with ease of motion and diminution of friction. The invention consists, finally, in a novel and improved manner of attaching and adjusting the draft for the purpose of raising and lowering the points of the fingers or guards, as circumstances may require.

**ANIMAL TRAP.**—Alexander Campbell, Oxford, Ind.—This invention consists in a platform suspended centrally in respect of its length, or on a pit, but above the center vertically, so that it will return to its normal position by the action of gravitation, and provided with a latch projecting downward from the center of the platform to hold it in position until the animal, approaching the bait near the center of the platform, steps on a hinged plate connected with the latch, disengaging it, when the weight of the animal causes the end of the platform he is on to swing downward, delivering him into the pit.

**TOOL FOR CUTTING OR SLITTING THIN BOARDS.**—John Langham, Jr., Philadelphia, Pa.—This invention consists of a cutter or knife secured vertically to a hinged holder which is suspended on a sliding stock arranged in ways resting at each end upon suitable supports, which may be secured to a bench so as to maintain the said ways sufficiently above the bench to admit the board to be cut to be passed under the same in front of the cutter, which, being pushed forward by the operator will sever the board. A spring is connected to the stock of the cutter to retract it.

**ASBESTOS FELT.**—H. W. Johns, New York city.—This invention consists of sheeting composed of asbestos and various kinds of felted and pulped matter. It is designed for roofing and sheathing purposes and provides a cheap and indestructible article for the purpose.

**DRAFT EQUALIZING DOUBLE TREE.**—George A. Mosher, Champlain, N. Y.—The object of this invention is to enable two horses of unequal strength or energy to be worked together with the best results.

**ADVERTISING BULLETIN FRAME.**—Wm. P. Brown, Watertown, N. Y.—The object of this invention is to provide a convenient and inexpensive means of publishing a number of business advertisements in the same frame. It consists of a frame constructed with several devices for the convenient insertion or removal of a number of advertisements as the firm styles, nature of business and addresses, and the like, whereby the same can be inserted and displayed permanently in some public place, and so arranged that any one of the said advertisements can be readily removed or substituted by other or different advertisements.

**DOOR LOCK.**—S. A. Green, Lexington, Ind.—This invention consists in the mechanism of a lock for doors. The key hole in the lock case is dispensed with and the lock rendered difficult to open without the key.

**SPOKE TENONING MACHINE.**—Calhoun & Collins, West Lebanon, Pa.—This invention is for the purpose of cutting the tenons of wagon-wheel spokes and consists of a simple and effective combination of mechanism for the purpose.

**LAMP CHIMNEY CLEANER.**—N. A. Vurgason, Brooklyn, N. Y.—The object of this invention is to provide a simple and efficient implement for cleaning the chimneys of kerosene lamps.

**VENTILATED HAT.**—M. S. Watkins, Mansfield, Texas.—This invention relates to a new and improved method of forming hats whereby the same are better ventilated, and conform more perfectly to, and fit more comfortably on the head of the wearer.

**AXE.**—J. W. Hinton and R. W. Green, Bradford, Pa.—The object of this invention is to provide an axe with a separate and removable cutting edge whereby the latter may be readily removed when rendered unfit for further use from wear or other cause and a new cutting edge substituted therefor, thus saving the pole or main body of the axe.

**BELTING, ETC.**—Thomas Standring, Fort Richmond, N. Y.—This invention relates to a new and improved method of constructing belting, or traces, or other straps now made of leather only, or of any one material, whereby the strength of the same is greatly increased.

**CONSTRUCTION OF SHEET-METAL CANS.**—Conrad Seimel, Greenpoint, N. Y.—This invention relates to a new and useful improvement in the construction of sheet-metal cans, designed more especially for holding coal oil or petroleum for export or domestic use. The invention consists in a novel and improved way of constructing the seams of the can whereby great strength is obtained with economy of manufacture.

**RAKING DEVICE FOR HARVESTERS.**—K. H. C. Preston, Manlius, N. Y.—This invention relates to a new and improved raking device for harvesters, and it consists of a platform constructed in the form of the section of a hollow cone, and used in connection therewith a revolving rake and beater, constructed, arranged, and operating in such relation with the platform, whereby the cut grain may be automatically raked from the platform by very simple and economical means.

**DEVICE FOR DESULPHURIZING ORES.**—H. Plummer, Brooklyn, N. Y.—This invention relates to a new and improved device for desulphurizing ores, and it consists in the employment or use of a revolving retort placed in a furnace

and communicating with a flue, all being so arranged that the baser metals contained in gold ores may be oxidized and the gold set free so that the latter may be amalgamated and separated from the foreign substances of the ore.

**CAST IRON PIERS.**—William B. Porter, Plattsmouth, Nebraska.—This invention relates to a new and useful improvement in cast iron piers for bridges, etc., etc., and it consists in casting the same in tubular sections connected together by vertical screw rods strengthened by tubes, the piers being filled with concrete.

**CLOTHES WASHING MACHINE.**—Joseph Osterhout, Rock Island, Ill.—This invention relates to a new and improved clothes-washing machine of that class in which corrugated rollers are employed in connection with an endless band or apron. The object of this invention is to obtain a washing machine of the kind specified which will not injure or tear the clothes and which will at the same time operate in the most efficient manner.

**SULKY PLOW.**—A. R. Stanley and Henry W. Ensign, Shullsburgh, Wis.—This invention relates to a new and improved plow of that class which are commonly termed "sulky plows." The invention consists in a new and improved means for regulating the depth of the penetration of the plow into the earth so that furrows of greater or less depth may be made if desired, and also in a novel manner of attaching the plow to the carriage and the arrangement of the same, whereby said plow may be liberated or thrown out of the ground, whenever necessary, by a very simple manipulation.

**TOOL REVERSING CUTTING MACHINE.**—S. D. Tripp, Lynn, Mass.—This invention relates to a new and improved machine for cutting out pure fabrics or stock, various articles which have curved sides, such, for instance, as the soles of boots and shoes, and it consists in having the stock to which the cutters are attached arranged in such a manner that in the operation of the machine, the cutters may be reversed so that reversed curves may be cut consecutively, and also the position of a cutter changed or reversed at each cut so as to admit of economy in stock, the heel of one sole being at side the or the front portion of the adjoining one.

**WASHING MACHINE.**—Ross and Adamson, Day's Store, Pa.—This invention relates to a new and improved method of constructing washing machines, whereby the clothing to be washed is more conveniently held upon the rubber and is more thoroughly and easily washed. It consists in a jointed clamp or holder attached to the end of an arm by staples so as to form an universal joint, said arm being so connected with a treadle as that the necessary pressure of the clothing upon the rubber in the tub is produced by the foot of the operator pressing upon the same, whereby the washing of clothes is effected without the necessity of the operator putting the hands into the hot water or suds.

**HAME FASTENER.**—John Koch and Daniel Seachrist, Columbianna, O.—This invention is for the purpose of connecting the lower ends of hames and for tightening the same, thus dispensing with the usual buckle and strap, or simple string or thong and supplying instead, a simple, effective, and easily operated device, by means of which harness hames may be drawn upon the collar with the requisite degree of tightness, and fastened securely thereon.

**BORING TOOL.**—James C. Miller, River Point, R. I.—The object of this invention is to provide a simple and effective tool for boring out holes in castings and other iron work. It consists in general terms of a pair of steel cutters or boring plates held in a mortise or rectangular eye in the end of a metal shank and arranged at right angles to the axis of the shank, so that the said boring plates will pass in contact with each other when being set out or in by an adjusting screw.

**GUNPOWDER.**—G. A. Numeyer, Altenburg, Germany.—This invention relates to the improvement in the manufacture of powder for fire-arms and blasting purposes, producing an explosive powder more powerful than the ordinary powder now in use.

**WAGON AXLE.**—G. S. Garth, Mill Hall, Clinton, Pa.—This invention consists of two frictional bands one of which is formed with a dove-tailed annular slot, fitting upon a dove-tailed collar formed on the axle arm at the shoulder of the same. The bands are cast on the axle arm and a reef any suitable antifriction metal as brass composition or babbitt metal.

**ROTARY PUMPS.**—John Poppe, Greenpoint, N. Y.—This invention has for its object to simplify the construction and improve the operation of the improved rotary pump, patented by the same inventor, December 5, 1867 and numbered 71,750.

**HAND MILL.**—Edwin Alsop, New York city.—This invention has for its object to furnish a simple, convenient and effective hand mill which shall be so constructed and arranged that it may be used for grinding coffee, spices, grain, seeds, dye stuffs, oil and water colors, etc., and which shall not be liable to break or get out of order.

**HAND SPRING FRAMES.**—J. W. Burkhart, Cameron, Mo.—This invention consists in an arrangement of the spindle upon a vibrating arm pivoted to the frame of the machine at one end, and borne upon the upper end of a vibrating lever whose lower end is also pivoted to the frame, and is arranged to be adjusted with reference to the spindle arm, so as to elevate or depress the spindle, and for the purpose of tightening the belt; and it also consists in providing a double grooved pulley on an adjustable support, over which the belt from the main driving wheel passes to the multiplying wheels in such a manner that the belt in crossing itself will not wear, and so that it may be adjusted toward or from the driving wheel, also for tightening the first belt.

# NEW PUBLICATIONS.

**ELEMENTS OF NATURAL PHILOSOPHY.** A Book for Beginners, by W. J. Rolfe and J. A. Gillet. Boston: Woodworth, Ainsworth & Co.

The above is the title of a work which, so far as general style of publication and beautiful illustration are concerned, is adapted to the purpose for which it was written. It has, however, important defects. The subject of electricity is not touched upon, notwithstanding its great importance, while the subject of sound, of less practical utility, is extended to considerable length. We notice some errors in definition also; for instance, the common balance is described on page 5 as a bar turning upon a pivot in its center, etc. The accompanying engraving represents it in the same faulty manner. In the appendix the subjects of the origin, transmission, and conservation of force are discussed, which if not intended for the same class of pupils as the rest of the work, would have been better omitted, or the space it occupies used to supply the deficiencies of other parts of the work. If intended for beginners, we submit that it is not a subject fitted for them, even after they have acquired the limited knowledge of physical forces they are likely to obtain from a study of the former portions of the work. Other features of the book, especially its use of the French system of weights and measures, we can commend, and notwithstanding the criticisms we have felt it our duty to make, we think it is perhaps as nearly perfect as most books of a similar character.

**AMERICAN WATCHMAKER AND JEWELER.** By J. Parish Steele. New York: Jesse Haney & Co., 119 Nassau st. Price 25 cents.

This is a convenient pocket manual, one of a series which Mr. Haney is publishing under the title of "Trade Manuals." It contains many receipts, and directions for doing work, the value of which will be better estimated and appreciated by practical watch and clock makers than by us. We commend this little manual to our readers who are interested in the subject on which it treats.

**THE WINE-MAKER'S MANUAL.** By Charles Reemelin, author of the *Vine-Dresser's Manual*. Cincinnati: Robert Clarke & Co., No. 65 West Fourth street.

A small but complete and thoroughly practical work, containing full instructions for the manufacture of all domestic wines, whether from grapes or other fruits; also directions for the manufacture of cider, with full directions how to bottle and keep both wines and cider, how to manufacture imitation champagne, etc. Price \$1.25. Some remarks on the manufacture of cider extracted from this work will be found in a future number.

## Answers to Correspondents.

**CORRESPONDENTS** who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

**SPECIAL NOTE.**—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1.00 a line, under the head of "Business and Personal."

All reference to back numbers should be by volume and page.

**W. L.**—All persons who travel about to sell patent rights must obtain a Revenue License.

**E. H. L., of N. Y.**—When a telegraphic cable is broken earth currents are formed each way from the break. The resistance of the entire cable being known, the resistance of the two portions gives the data for calculating the position of the break. A more minute description than this, or an explanation of the methods for telegraphing in opposite directions over the same wire would necessitate the use of diagrams, and occupy much space.

**T. V. J., of Mass.**—The diamond cuts the glass. No electrical agency is concerned in it so far as has ever yet been shown. Many have believed however that there is a molecular change produced in the glass under the action of the diamond which makes a fissure deeper than the cutting edge of the crystal penetrates. This however has never been proved.

**S. M., of N. J.**—According to Bourne, the superheating surface usually given in marine engines is too large. This accords with our own experience and observation.

**A. J., of Del.**—We believe the first iron vessel ever constructed was a boat of 22 tons burthen, built by John Wilkinson of Broseley in Shropshire, England, to be used on the Severn River in 1787.

**R. T., of Vt.**—The so-called mosaic mixture is made of equal parts of tin, bismuth, and mercury. It is used for various ornamental purposes.

**R. S., of Ill.**—The hemp, (*cannabis Indica*) from which hasheesh is obtained, is supposed by many to be a variety of the common hemp, the properties of the plant being modified by growth in tropical climates.

**A. R. B., of Mo.**—The rails in steam railways have a convex upper surface to adapt them to the shape of the car wheels. The shape of the carwheels is such that in running around curves, the outer wheel runs on a larger circumference, and the inner one on a smaller circumference, thus preventing the wheels which are fixed to the axle from scraping. The wheels are fixed to the axle for convenience in oiling, and also that the oil may be retained over the bearing and thus prevent heating between stations. The latter could not well be done did the wheel turn on the axle. Thus you see your friend is at least partially right, in his statement that the shape of the rail is to be referred primarily to the necessity of keeping oil over the bearings.

## Business and Personal.

The charge for insertion under this head is one dollar a line.

**Asahel Wheeler's siccohash** has peculiar merits not possessed by any other dryer for paints. Its powers are at least three-fold greater. It is perfectly neutral, causes raw linseed oil to dry quicker, harder, and with more gloss than boiled oil, and yet retains its natural elasticity, and resists the forces of the elements much longer.

**Wanted**—a party to furnish checkers from a hard, smooth composition. Address "Checker," care R. H. Bennett, 57 Cedar st.

**Wanted**—address of all parties who furnish patented household small wares to the trade. Box 1901, Boston, Mass.

**For sale**—a new engine, 16x24, just finished. For full description address Albertson & Douglass, New London, Conn.

**Wanted**—a machine for making chalk or fishing lines. Address box 3064, New York Postoffice.

**Cal.**—Broughton's graduating lubricators, oil cups, and gage cocks are to be had of O'Connor Bros., San Francisco, and Gillig, Mott & Co., Sacramento.

**The Ready Roofing Co.**, by mistake, was advertised as being at No. 1, Malden Lane. The correct address is No. 51 Malden Lane.

**Horse hay forks, etc.** Send circular to Wm. Loudon, Fairfield, Iowa.

**S. C. Sumner's pat. stencil frame**, with movable letters, 7 Water st., Boston. A grand thing for marking any name needed on boxes, bbls, etc.

**Peck's patent drop press.** For circulars, address the sole manufacturers, Milo Peck & Co., New Haven, Conn.

**To inventors.**—I will furnish means to patent some useful invention, or will take an interest in a patent, if sufficient inducements are offered. Address, with stamp, J. K. Ross, Nobleville, Ind.

**The toy Boomerang.**—See Advertisement.

**A foreman for a machine shop wanted**,—one who has some experience in the business and can bring good recommendations. Address D. A. Brown & Co., Fisherville, N. H.

**Wanted**—a master mechanic capable of superintending a locomotive and machine shop. One thoroughly accustomed to managing men required. Address box 116 New York postoffice.

**For State and County rights to the best and cheapest sorghum stripper now in use**, address C. P. Hale, Calhoun, Ky. Agents wanted.

**For descriptive circular of the best grate bar in use**, address Hutchinson & Laurence, No. 8 Day st., New York.

**Spring-bed bottom**—unequalled for simplicity, cheapness, and durability. Manufacturers wanted as agents. Address S. C. Jennings, Wantoma, Wis.

**N. C. Stiles' pat. punching and drop presses**, Middletown, Ct.

**For sale**—the whole or a part of a paper mill, all new machinery. For particulars address L. A. Beardsley, Fredericksburg, Va.

**For sale**—the patent right, in Great Britain, for perforated saws. The manufacture of these saws is now firmly established in the United States, and they are rapidly taking the place of all other solid saws. Apply to J. E. Emerson, Trenton, N. J.

**Prang's American chromos for sale** at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

**For breech-loading shot guns**, address C. Parker, Meriden, Ct.

**Wanted**—a second-hand steam hammer. Norway Manufacturing Company, Wheeling, W. Va.

**Winans' anti-incrustation powder**, 11 Wall st., N. Y. 20,000 references. No foaming. No injury. 12 years in use. Imitations plenty.



**Improvement in Method of Holding Lathe Tools.**

The springing of turning and planing tools, when turning out a hole or cutting a deep nut, or on the planer when reaching down to plane a surface much below the face of the work, is a great annoyance to machinists. Sometimes, however slight the chip removed—even in finishing or smoothing—no amount of skill or delicate feeding can prevent the tool from leaving "chatter" marks.

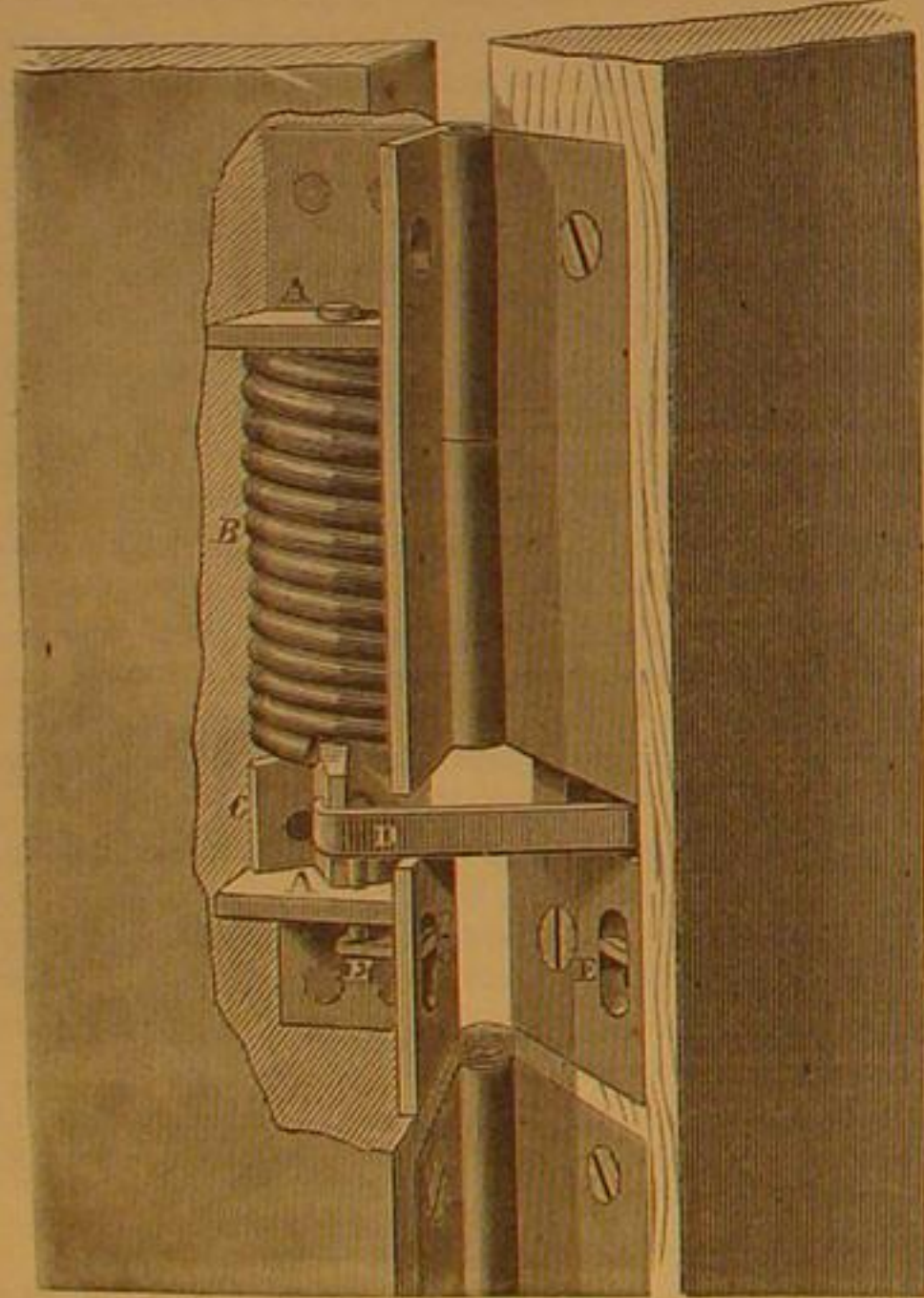
The engravings represent a contrivance designed to remove this difficulty by providing a stay, or, rather, two stays or holders, embracing front and rear, or top and bottom of the tool shank. The holders, A, pass through the slot in the tool post, the lower one being fast to the jaws, B, and the upper one moving freely, held only by a pivot pin moving in slots in the jaw to accommodate itself to the size of the tool shank, and secured on the shank of the tool by the thumb or set screw, C. The tool shown in the holder is an ordinary squaring-up or side tool, and the one shown at D is a common diamond point. In this case the tools, are made from octagonal steel, but the ordinary rectangular tool steel can be equally adapted to the tool holder.

Patented Feb. 25, 1868, by John Baillie, Salem, Ohio. The patentee wishes to dispose of the whole right.

**STIMSON'S PATENT BUTT HINGE DOOR SPRING.**

The closing of doors is one of the neglected duties of careless humanity, causing annoyance and provoking profanity. Some door springs, intended to prevent this annoyance, are neither reliable, permanent, nor certain in their operation. That represented in the engraving appears to be free from these defects.

The spring butt, or the hinge that contains the spring, is cast with two leaves instead of one, as is the ordinary butt hinge, one mortised into the edge and the other into the back of the door. Between these two leaves are two transverse connections, A, which serve as supports to a spiral spring, B, and as bearings for the axles of a corrugated plug passing through its center. This plug has at its bottom several ver-

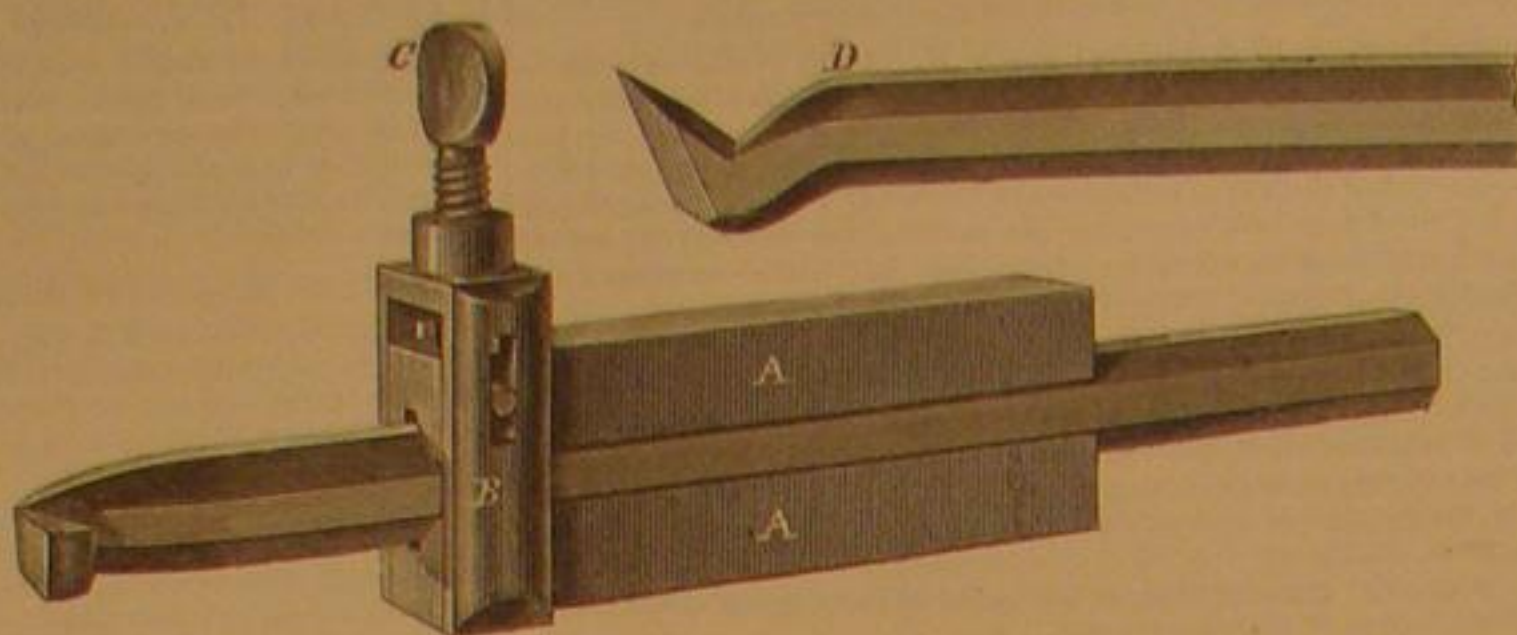


tical flanges, C, upon which the spiral spring rests and against one of which the bottom end of its wire bears. Holes in these flanges by a suitable wrench permit the winding up or turning of the spring to increase its tension. A hooked strap, D, engages with one of the flanges on each spring and connects the two. The operation is to employ the torsion or twisting of the spring rather than its longitudinal elasticity. The effect is to allow the greatest force to its action when the door is nearly closed, just where most door springs fail; they usually exerting their greatest power when the door is wide open, and their least when it is closed. In swinging a door wide open, with this spring the tension on the spring amounts only to one-fourth a revolution, so there is slight danger of its breaking by being overstrained.

If at any time the use of the spring is undesirable and the door is to be free, the slipping up of catches, E, will engage them with the flanges, C, and prevent the rotation of the spring. The strap or connection, D, can then be removed, or one end unhooked and placed in one of the interspaces between the flanges when, while the door may be opened wide, it cannot be closed, being held either at right angles with the wall or half way between, as may be desired. This is a great convenience in hot weather. Patented by Enos Stimson, of Montpelier, Vt., November 19, 1867. The New England Butt Co., Providence, R. I., are manufacturing the improved butts and are prepared to fill orders.

**A BLIND INVENTOR.**

An interesting biography of James Gale has just appeared in England. Mr. Gale "was blind from his youth up." Yet, notwithstanding this apparently insurmountable obstacle to mechanical success, he has achieved even fame by his inventions. Mr. Gale was not educated in a school for the blind, nor by the methods usually adopted with this unfortunate class of youth. Instruction was imparted to him by dictation, a method which, by its evident success in this case, would

**BAILLIE'S PATENT TOOL HOLDER.**

seem to be worthy the attention of instructors. He was thus taught reading, arithmetic (of course substituting the sense of touch for that of sight), and even what would seem more difficult, writing. Few blind people, who have arrived at any distinction, have been educated in any other schools except those specially instituted for the blind; and it is stated that very few indeed of those so educated are able to support themselves by their own labor.

Mr. Gale early showed that the loss of sight would not render him a useless member of society. His senses of hearing and of touch were so remarkably acute as to almost enable him to conceal the fact that he was blind. Indeed, it is related of him, that once, while riding in a carrier's van from Plymouth to Tavistock, the driver lost his way, and was guided by him into the right road by the sense of hearing alone. He has several times acted as a guide to strangers, effectually concealing his blindness until he had reached the end of his journey. More astonishing feats are related of this remarkable man. He has ridden a horse race and won it. He has ridden a blind horse for miles in safety, and has shot pigeons at a match, his aim being guided by his delicate hearing.

In 1864 he singularly enough commenced experiments with gunpowder. In one year he had made the discovery that this substance could be handled and transported in safety when mixed with fine glass, which may or may not have been the hint which led to the subsequent discovery of dynamite. He has since invented an ammunition slide, and a rudder ball cartridge, by which, it is stated, great rapidity in firing can be obtained. Another invention of his is the "fog shell," designed to be projected upon the decks of vessels, and to generate a dense, blinding vapor, which would seriously embarrass them in an engagement. Another invention is what he calls a balloon shell, which is said to clear a space having a diameter of a hundred feet, from all but the most ponderous objects, at a single explosion.

The lesson taught by the life of such a man ought to put to the blush those who so easily succumb to obstacles far less formidable than he has had to encounter. The very nature of his experiments upon a material seemingly so dangerous to one deprived of sight, shows his courage and the strength of his character.

He is a good business man, and a lover of his race. Sympathizing with those who are, like him, destitute of sight, he founded the South Devon and Cornwall Institute, for the blind, which will stand as a monument of a mind that soared above obstacles, and a heart unembittered by the cruelest of all deprivations.

**The Soda Lakes of Mexico.**

The soda lakes of Mexico, from the waters of which crude soda is largely manufactured, are among the natural sources of wealth to that country. The lake of Tescoco, a short distance from the capital of Mexico, and communicating with the city by means of a canal, is one of the greatest natural curiosities of that country. In the center is a barren island, with a hill composed of volcanic rock, and known as El Penon de los Bancos, or rock of the baths, rising from the surface. This desolate spot is famous for the manufacture of crude soda, or tequesquite, a manufacture not more remarkable for its primitive method than its vast resources. The earth of the valley adjoining the lake is impregnated with a species of soda, and Lake Tescoco itself is a concentrated solution of soda. It contains an immense amount of the salts of sodium, chiefly the chloride of sodium and the carbonate of soda. The lake has great surface and small depth, and with a rainy season of four months and a dry season of eight, its range of expansion and contraction is 220 square miles at its maximum to 80 square miles at its minimum. A calculation of the contents of the lake was made in 1851, when the lake was considerably contracted, and the proportion of solid matter was ascertained to be not less than 18 per cent. The Penon soda stills are not numerous, but illustrate the rude principle at work all around the lake. They are simply mounds of accumulated dark, bluish mold, on which large round holes are made here and there. In these holes bags are placed, and in the bag the impregnated, frosty-looking

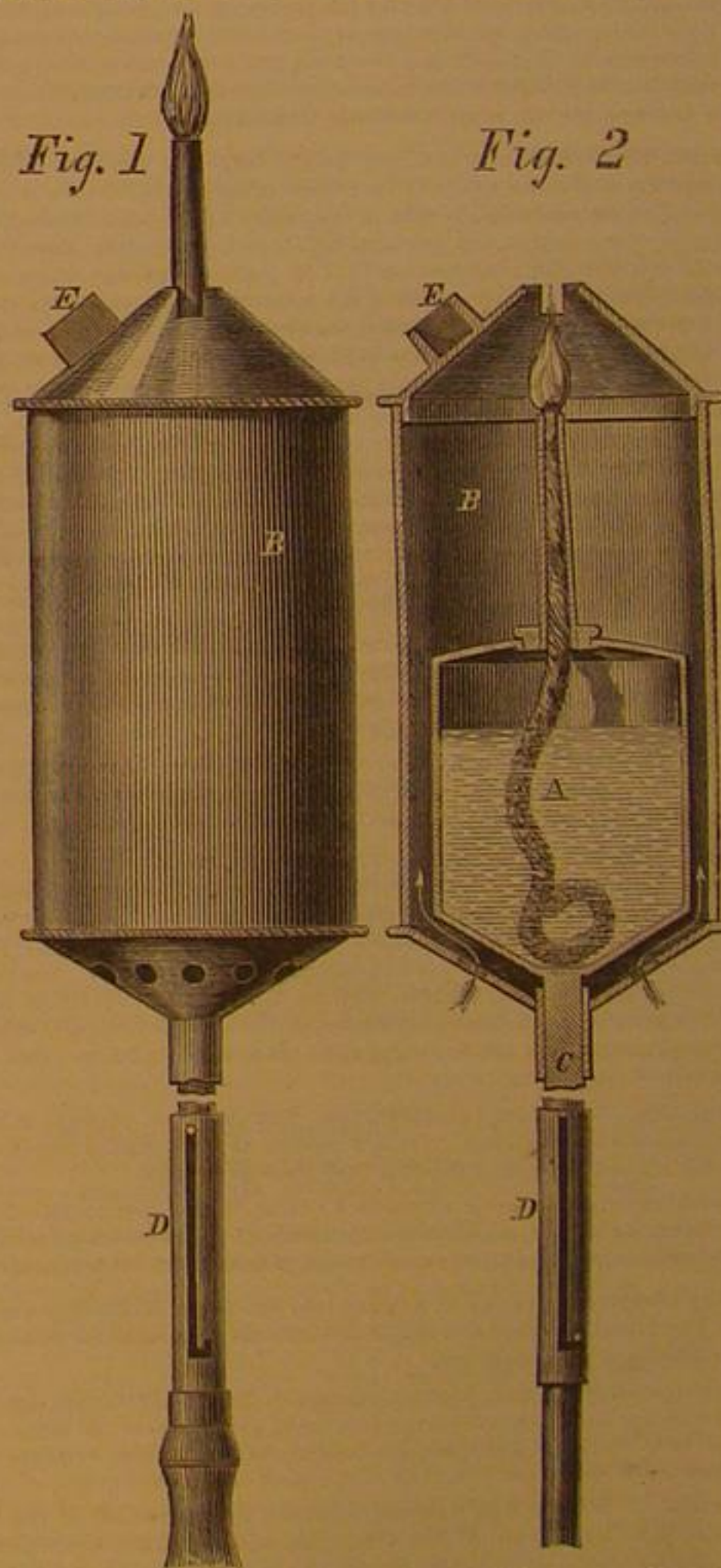
earth found every morning along the lake. Over this earth water is poured, and the liquor which sinks through the dirt, and is drained from the bag, passes into a vessel below. The solution thus caught is evaporated over a fire, and tequesquite is the result. This is the whole process, which is the same that was used in the days of Montezuma. With this primitive system of manufacture, the lake, according to the estimates of the School of Mining in the city of Mexico, produces annually 1,680,000 pounds of crystallized or pure soda, and 3,696,000 pounds of tequesquite or impure soda.

**Styptic Paper.**

The styptic properties of perchloride of iron are well known, but in many cases it is inconvenient to carry about and to apply in case of need. A method of preparing paper with this substance, so that it can be carried safely in the pocket, at the same time preserving the styptic quality has been invented in Paris. The paper is first dipped in a solution made of one pound of gum benzoin of the first quality, one pound of rock alum and four and one-third gallons of water. This mixture is heated in a vessel, carefully tinned inside, up to the boiling point; and the solution is to be kept boiling for four hours, and skimmed from time to time. The water evaporated is to be replaced by the same quantity of fresh water, and, as soon as the solution is cooled, it is to be filtered off. The paper or tissue is then dipped into it, and to be kept there until sufficiently saturated; it is then to be carefully dried. When dry, a solution of the perchloride, in a more or less concentrated state, is applied by a brush or roller. The paper or tissue thus prepared is folded up and preserved from the action of the air by wrapping it in a piece of waterproof taffeta, prepared with the addition of resinous substances, and in this manner it can be preserved any length of time always ready for use. Its application to small wounds will stop the bleeding almost instantly.

**PATENT TORCH FOR LAMP-LIGHTING.**

The object of the device herewith illustrated is to diminish the labor and time of lighting street, hall, or depot lamps, when beyond the reach of the hand, obviating the necessity for the use of a ladder and preventing the extinguishment of the light by gusts of wind. Its construction is simple. The



lamp proper, A, Fig. 2, is contained within a case, B, and is fixed to a rod, C, which forms a portion of the handle, that may be of any length desired. The case is sustained on a metal tube, D, in which the handle, C, slides, the distance of its movement being governed by a slot in the tube and a pin on the handle. The object is to withdraw the flame of the lamp within the case as the operator passes from one lamp to another, to prevent the flame from being blown out. To insure continued combustion the lower part of the case is pierced with holes to admit air, as seen in Fig. 2, which also shows the lamp drawn into the case. The snug, E, is a wrench for opening the gas cocks and a slot across the top of the case is for a similar purpose. From the foregoing description a sufficiently clear idea of the device and its use may be obtained.

Patented through the Scientific American Patent Agency Feb. 4, 1868, by Albert Assman, Rahway, N. J., who will dispose of the whole or partial rights.



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## HIPPOPHAGY.

The *New York Medical Journal*, for August contains a long article which takes strong ground in favor of the introduction of hippophagy among the civilized races of Europe and America. The name, which is probably supposed to confer dignity upon the subject, means the practice of eating horseflesh. The first argument adduced in its favor is the humanity of the practice. The poor old skeletons of horses, which are seen dragging themselves and fish, fruit, or oyster wagons through our suburban streets, and the poor women who painfully labor, early and late, seem to have been specially made to supply each others necessities, and to mutually alleviate each others' woes. The latter by eating, and the former by being eaten, will thus fulfill the end which kind Providence foreordained for them, and which nothing but silly prejudice and religious bigotry have hitherto prevented. It is not pretended that anything but old horses can be afforded for food, and it is only such that it would be humane to eat. It is urged, that in refusing to eat horseflesh, the civilized races are an exception to the rest of mankind. We freely acknowledge that the civilized races do not eat many things that are considered excellent diet in many parts of the world. Rats, dogs, insects, and the bodies of men themselves are to be found upon the well-furnished tables of people in various parts of the globe. Neither are such people so nice in their distinctions about the parts of animals which are fit to be eaten, as their more civilized brethren. They avoid the extraordinary waste of food attendant upon the practice of dressing the bodies of animals in vogue among us. It is with feelings of envy that we read of an African native devouring the warm, raw entrails of recently slaughtered beeves, and we are almost inclined to urge upon the soft-hearted hippophagist who so ably sets forth his views in the *New York Medical Journal*, that it would be a good thing to call the attention of poor women to this cheap (and save for vulgar prejudice) good, wholesome, and even palatable diet.

It is stated that the advent of Christianity put an end to the use of horseflesh as food in ancient Germany, and in other parts of the world, where it had been in use among the pagans for "sacred feasts, and for pagan altars," and that it was the love of Christianity that put a stop to the practice in Iceland. We feel sorry that Christianity, which we have been hitherto disposed to regard as the great regenerating element in this otherwise benighted world, should have so afflicted old horses, depriving them of the blessing of being knocked on the head as soon as their strength began to decline, to reappear upon the tables of the poor in all the different forms of roast, and boiled, and hashed, and warmed over, which it is so delightful and appetizing to think of. It is within the limits of reason to suppose that colts, sometimes deformed from birth, might be killed, at an early period of life, when their flesh would be almost equal to veal, and the suffering poor might then be admitted to the luxury of colts foot jellies, and cutlets. Boiled colt's head seems a good dish for the poor, and the broth would be of service in case of sickness.

The Cossacks eat horse, and even drink the blood of the animal. If they can do this, the custom is, of course to be recommended to the civilized poor, and doubtless a good drink of horse blood would enable many a miserable seamstress to accomplish one shirt per diem more than she could without, and it would certainly be better than the blood of "John Barleycorn," which is now too often indulged in, and is also more expensive.

It is admitted, that its taste is peculiar, and that it is apt to be tough; but then the appetites of the poorer classes are known to be excellent, and their teeth are generally good because they don't eat many sweetmeats. So these objections are of no account.

The horse is subject to glanders, which is communicable to man, and is a most horrible, loathsome, and fatal disease. To this, it is answered, upon the authority of one Rayer, who is said to have experimented upon the meat of horses which had the disease, that it is not communicable after the flesh is boiled. Now what poor woman can be so blinded by prejudice as to refuse horseflesh after that. It reminds us of the old lady who advised her son to always eat his chestnuts "biled," because "biled worms were never known to hurt anybody." Who knows but glanders and poll evil may not yet be discovered by some savant to impart rich and peculiar flavors to the flesh of old horses; or that soup, made from the spavined shinbones of these animals, may not prove a specific for the scrofulous taints engendered by filth and darkness.

Surely the civilized world ought to hail the resumption of hippophagy, and erect monuments to the humane individuals who have been instrumental in reviving the practice. We think it would be well, also, to give some attention to cats and dogs. They are easily raised, and can also be killed at an age when their lives have become a burden, and would no doubt furnish good food for paupers. The Government should immediately provide for the supply of such meat to the prisons and almshouses, and it might not be inexpedient to serve it out in rations to the army and navy; thus lessening the public expenditures and aiding in the payment of the national debt. Let us hope, friends of humanity! A new era is dawning. Let not our prejudices obstruct its advent.

## THE PROGRESS OF CHEMICAL SCIENCE.

Until a very recent period the science of chemistry was made up almost exclusively of facts. The classified results of elaborate and accurate experiments; the relations which exist between the elements of matter and the properties not only of the elements themselves, but of the complex substances formed by their combination; the effects of the physical forces upon combination generalized and reduced to a system, so far as the knowledge of these subjects would admit, constituted the text of the able and numerous treatises that had been written upon the subject. The science has begun to assume a new aspect. The speculative minds have been engaged in framing hypotheses to account for the manifestations of the laws which govern combination. Not content with this they have extended their speculations to the nature of matter itself, and theories which embrace the ultimate form and condition of matter, as well as the forms recognized or recognizable by the senses, are boldly put forth and stoutly maintained.

The objection to such speculations is that no important purpose is subserved by them, while their tendency is to complicate nomenclature and occupy the minds of men with theories which assume to account for facts rather than with investigation and study of facts themselves. It is not sufficient for the establishment of an hypothesis that it accounts for a fact. Because a man might ride in railroad cars from New York to Philadelphia it is not to be inferred that he did ride by that conveyance. There is the possibility that he rode in his carriage or took passage by water. Speculating as to how he made the passage would amount to nothing toward ascertaining the fact, except to guide research into the channel of possibilities.

Now if speculation in physical science were confined simply to indicating the possibilities in the discovery of new facts, we should not say a word against it. That is its true sphere. But when it passes that limit and usurps the place of fact itself it is to be deprecated.

The aim of the modern speculations in the science of chemistry seems to be the demonstration of matter as it exists in its ultimate condition. If this were possible, and a knowledge of matter in that state could be of any service, there would be no objection to them. The old atomic theory never was fully accepted by physicists, and was only accepted at all as an hypothesis, which accounted for certain facts in chemical combination. It was never of any real value, never aided in any important discovery, and we are confident that as it has had its day so the new and more ambitious hypotheses will have theirs. We even doubt that many of these will satisfy the minds of thinkers as well as that did.

The chemist never deals with matter in its ultimate condition. It is with masses that he as well as all others must be content to experiment. The laws which matter obeys in its combinations he may discover, but the essential nature of matter itself is not physical study; it is metaphysical, and it is an *ignis fatuus* that will ever elude pursuit.

The atomical mechanics of Hiarichs, the rational cosmology of Hickok, and the speculations of Sir Benjamin Brodie, are all to be classed in the category of speculative philosophy. They are attempts to get back of matter into a field which the human mind can never explore, and like all such speculations we believe them calculated to obstruct progress rather than to confer any solid benefit upon science.

## NITROUS OXIDE AS AN ANESTHETIC.

The great blessings which have resulted from the use of anesthetics can not be overestimated. Those who have never witnessed a severe surgical operation, unaccompanied by their administration, and also contrasted it with one in which their valuable aid was resorted to, must utterly fail to realize the amount of suffering which has been spared the afflicted by these agents. Previous to their introduction nothing could be more horrible, to one not steeled by long practice, than a capital operation. The most agonizing tears and shrieks were wrung from the stoutest and bravest men, while the vain struggles and cries of children, helpless in the arms of powerful assistants, or strapped to the operating table, rendered

fainting, which often resulted from sheer pain, a blessed relief. Those who are unconversant with the art of surgery, generally suppose that the amputation of a limb is one of the severest of operations. Having read of the bravery of men who could sit and smoke a cigar during an amputation, they fancy that such manifestations as we have described are to be attributed to weakness of resolution, to an enfeebled and shattered nervous system. But every surgeon knows better. There are operations that are as much more terrible than amputation of the leg, as that operation is more terrible than the extraction of a tooth; many of which are only rendered possible by the use of anesthetics. Operations that were once the dread of the surgeon, as well as the patient, in which the deviation of a hair's breadth, in the direction of the knife, might invade vital parts, requiring perfect steadiness, both in the operator and the subject, are now successfully performed, the patient quietly sleeping during the otherwise long minutes of anguish, the very shock of which formerly often caused death.

Notwithstanding all that we have said, the use of anesthetics is attended with some risks, and it is just that the public at large should know this fact and fully appreciate it. More especially is it important, that the different substances used for this purpose, and their peculiar merits and demerits should be well understood.

In the use of chloroform, most of the deaths which have occurred have been in brief and minor operations. As a result of this fact, there seems to be an increased tendency to substitute the protoxide of nitrogen (laughing gas) in such operations. It has the advantage of being more rapid in its action, its effects cease sooner, and no nausea or depression result from it, unless the gas should be improperly prepared. Experiments have satisfactorily shown, however, that this agent cannot be used successfully for long and tedious operations—that its action is very irregular—that neither in its chemical constitution or its physiological action does it much, if at all, resemble the true anesthetics; for, while with them, though every other element may be excluded, carbon must always be present, and the condition of the blood, heart, lungs, and other viscera, after death from it, is dissimilar from the condition after death from them. These objections are quite sufficient, without taking into account the many inconveniences of its preparation, preservation, and transportation, to prevent its ever being employed in the actual practice of surgery. Caution is needed, both in its manufacture and administration, as by carelessness the noxious dutoxide of nitrogen may easily be generated, and if the gas is not properly tested, and its impurities carefully removed, serious results may follow.

Mr. Colton, who is now in London, produces an autograph scroll of twenty-seven thousand persons who have inhaled the gas in America for extraction of teeth and for minor surgical operations, with the most satisfactory results; pain having been annihilated, and the unconsciousness having passed away within one or two minutes, leaving only agreeable recollections. Some of the entries on the scroll are amusingly characteristic. Many of the patients "have had a high old time;" some "would have teeth pulled that way all day long." Here and there comes a bit of poetry, effusive and grateful, but not destined to immortality. Currier entries of "delightful dreams" are abundant. One gentleman, who came six thousand miles, thinks the journey not too long for the result.

It has, notwithstanding, its rivals. The chloride of carbon, the chloride of olefant gas, and the bromide of ethyl have been proved to be safe, pleasant, and efficient anesthetics. Even the common coal gas has been stated to be a useful anesthetic, and one which, in an emergency, might be used to advantage. Though chloroform and ether still remain as much in favor as ever for capital operations, for dentists' use and minor operations the above mentioned anesthetics are becoming quite popular, as substitutes for laughing gas.

## "SMALL POTATOES."

There has been a tendency in all ages, and among a races of men, to attach to certain expressions a pregnant meaning, differing entirely from the literal signification of the phrase, but which, in its figurative or "slang" sense, is exceedingly forcible. The expression, "It will do to tie to," grew out of the practice of fastening horses to small trees in unsettled portions of the country, and it has come to be applied to individuals as expressing all those qualities of honor, truth, and stability, which render men worthy of confidence. In the same way has the expression "small potatoes" come to mean defective morals, want of talent, and general instability of character.

The world is full of grumblers, who declaim against the fickleness of fortune, the favoritism shown in the advancement of men to places of honor and profit, the neglect of merit, and the injustice of Providence. Envious of the so-called good luck of others, instead of setting themselves steadily and persistently to bettering their condition, they cultivate a morbid feeling of disgust at their lot and their work, and become mere time-servers. In other words, they are, and will always remain, small potatoes, of the meanest sort. Grumbling of this kind is one of the principal characteristics of the human small potato. A man may possess mind, education, and other qualifications for high station, but if he does not possess his soul in patience, and do what his hands find to do with his might, biding quietly the time and opportunity for improving his condition, he is small potatoes, notwithstanding. When the basket is shaken—as it is sure to be—no matter how many smaller potatoes may have obscured his merit, it will finally be discovered, and if really great, it will be all the more prized, because it has lain so long unnoticed.



The qualifications for high and responsible positions are as various as the positions themselves; and a man may often possess brilliant talents, and yet lack some apparently minor but all essential endowment or requirement without which a particular place must be forever inaccessible to him. It may be accuracy, it may be a reputation for probity, tried and tested by service in other subordinate but responsible positions, or judgment matured by experience; whatever it is it must be acquired before he can reasonably expect corresponding promotion. If a young man feels that he possesses the necessary ability for success in learned professions, yet lacks the courage to endure the self-denial which is usually to be expected at the outset of a career in any of them, he is small potatoes, and will probably go through life with the feeling that he might have made some noise in the world had not cruel destiny been so unfavorable to his youthful aspirations. So if a young man lacks courage to live within his income, and allows himself to become a slave to debt, he is small potatoes, and the chances are much against his ever being anything else. As a straw at the source of a river may change its current, so a single act at the outset of business life may direct its entire course. Only the greatest minds can reclaim a misdirected life, and secure success in spite of the lost opportunities, and accumulated difficulties resulting from it.

We do not believe that men often fail to reach their proper level; and it is fair to infer, that, when a person is found at mature years occupying a very inferior position, that there was something about him that made him small potatoes. The exceptions to this, if there are any, only prove the rule; and it may be said to be as certain as any principle in business can be, that, in any profession, good ability, close application, and patient courageous effort, during the day of small things, will ultimately be rewarded by success.

#### IMPROVEMENT IN WATER WHEELS.

It is rare that it falls to our lot to notice a patent so simple and so obviously useful that it can be fully described without engravings. In this case, however, we are enabled to do this, as the improvement does not relate to the general structure of water wheels, but only to the prevention of the oxidization of iron wheels, without reference to their form, and also to the reduction of the friction of the water upon the working parts of such wheels. The improvement is the invention of Mr. James P. Collins, of Troy, N. Y., and consists in enameling all portions of any water wheel exposed to the action or force of the water with some suitable material, or combination of materials, thereby giving a smooth and glazed surface, over which the water flows with greatly diminished friction, of course adding proportionally to the efficiency of the wheel. It is obvious, also, that all chemical action of the water must be entirely prevented by such a coating. The patent upon this improvement does not limit the inventor to any particular silicious substance or combination of substances, and he is at liberty to use any materials for the purpose above described that he may find upon experiment to be useful. The inventor does not intend to confine the application of this improvement to the wheels of his own manufacture, but will dispose of rights to manufacturers of water wheels throughout the United States. All applications should be made to J. P. Collins, Troy, N. Y.

#### The New English Ironclad.

The shipwrights at Chatham dockyard, England, commenced laying the blocks and ways for the new armor-clad turret ship *Glatton*. An exchange says, "The drawings and plans received at Chatham dockyard from the Admiralty, show the *Glatton* to be a vessel of 2700 tons burden, with a length of 245 feet, and a breadth of beam of 49 feet. It is, however, in her armor plating that she will surpass in defensive powers every ship yet constructed; it being intended to plate her with armor 12 inches in thickness along her most exposed parts, while on her turrets the *Glatton* will carry armor 14 inches in thickness, laid on a 10-inch backing of teak, with the usual inner "skin" plating. Unlike the *Monarch*—the deck of which is encumbered with a topgallant forecastle—the single turret of the *Glatton* can be directed towards every point of the compass. Her offensive will, at the same time, be on a par with her defensive powers, it being intended to arm her with a couple of 25-ton guns—the most formidable armament yet given to a vessel of war.

#### What Breaks Down Young Men.

It is a commonly received notion that hard study is the unhealthy element of college life. But from tables of the mortality of Harvard University, collected by Professor Pierce from the last triennial catalogue, it is clearly demonstrated that the excess of deaths for the first ten years after graduation is found in that portion of each class inferior in scholarship. Every one who has seen the curriculum knows that where *Rechylin* and political economy injures one, late hours and rum punches use up a dozen; and that the two little fingers are heavier than the loins of Euclid. Dissipation is a swift and sure destroyer, and every young man who follows it is, as the early flower, exposed to untimely frost. Those who have been inveigled in the path of vice are named "Le gion," for they are many—enough to convince every novice that he has no security that he shall escape a similar fate. A few hours of sleep each night, high living, and plenty of "smashes," make war upon every function of the human body. The brains, the heart, the lungs, the liver, the spine, the limbs, the bones, the flesh, every part and faculty, are overtasked, worn, and weakened, by the terrific energy of passion loosed from restraint, until, like a dilapidated mansion, the "earthly house of this tabernacle" falls into ruinous decay. Fast young man, right about!

#### Singular Optical Effect of Certain Sounds.

A correspondent from Michigan writes, that whenever he hears sounds of a certain bell in his neighborhood, he experiences a sensation of flashes of light, or, rather, shadows, which, upon the ceasing of the sounds, give the effect of flashes of light upon the eye. The phenomena are doubtless to be referred to reflex nervous action. The sense of sight is more liable to such reflex effects than any other, often being affected by disturbances in remote organs, as, for instance, the stomach. Instances are on record where sight was so depraved by disordered digestion, that apparitions of people, distant places, etc., were seen by the patient, these symptoms entirely disappearing upon the removal of the disturbing cause.

**JAPANESE PAPER.**—The Japanese manufacture and use paper to as great an extent as perhaps any other nation. There are very few of their industrial operations that do not involve the use of this material. Both for ornamental and useful purposes it seems to be the *sine qua non*. Fans, lanterns, umbrellas, pocket handkerchiefs, cloaks, and windows are made of it. The paper strings and hats lately introduced into this country have been in use for centuries in Japan.

### OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING SEPTEMBER 1, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each caveat.....	\$10
On filing each application for a patent, except for a design.....	\$15
On issuing each original patent.....	\$20
On appeal to Commissioner of Patents.....	\$20
On application for Reissue.....	\$20
On application for Extension of Patent.....	\$20
On granting the Extension.....	\$20
On filing a Disclaimer (three and a half years).....	\$10
On filing application for Design (seven years).....	\$15
On filing application for Design (fourteen years).....	\$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay \$500 on application.

Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.

**81,572.—FLEXIBLE PIPE-JOINT COUPLING.**—Squire Ainsworth, Pittsburg, Pa.

I claim, 1st, A pipe-connection, consisting of a conical recess in the end of one pipe, and a trunnion of a cone at the termination of the end of the other, said pipes being so held together, by a clamp or other means of support, as to permit the rotary movement of one or both of the said pipes without variation from the plane of said movement, all as and for the purpose heretofore described.

2d, In combination with the foregoing, the spring-binged coupling nut, constructed substantially in the manner described, for the purpose specified.

3d, The chain, G, in combination with the spring coupling, C, substantially as and for the purpose set forth.

**81,573.—RAILWAY CHAIR.**—Samuel T. Alexander, Pittsburg, Pa.

I claim a railroad chair, composed of a bed plate, A, and movable clamping pieces, substantially as and for the purpose set forth.

**81,574.—HAND MILL.**—Edwin Alsop, New York city.

I claim the arrangement, herein described, of the vertical shaft, F, removable grinding cone, H, tapering cylinder, I, corrugated vertically on its inside, hopper, J, scraper, L, cylinder K, with discharge orifice, K', wrought-iron frame, A, screw plug, G, shaft, C, fly wheel, B, and bevel gearing, D E, for the purpose set forth.

**81,575.—MACHINE FOR MAKING BARRELS.**—Saxton J. Arnold, and Amos F. Clark (assignors to Saxton J. Arnold), Raymondville, N. Y.

We claim the adjustable flange cone-shaped hubs, C, when provided with the sliding pins, F, and springs, F, in the flange, E, in combination with the cone-shaped pins, G, and screw shaft, A, as herein shown and described.

**81,576.—NON-CORROSIVE VALVE SEAT.**—E. H. Ashcroft, Boston, Mass.

I claim, 1st, An alloy of nickel and copper, in any proportions, as set forth, for the construction of valves or valve seats for steam, etc.

2d, An alloy of gold or silver, in any desired proportions, for the construction of valves or valve seats for steam, for the purpose set forth.

3d, An alloy of aluminum, or aluminum alone, for the construction of valves or valve seats for steam, for the purpose set forth.

**81,577.—MACHINE FOR COVERING CORD.**—John Bachelder, Norwich, Conn.

I claim, 1st, The miter gears, A, a central shaft, C, supports, A1 A2, bobbin gears, D1, covering-cord carriers, F, guide, J, and gears, I L, in combination, a, d operating so that each thread of a strand is covered with finishing material, and the several strands thus covered, twisted; the finishing material being laid in a converse direction to the twist imparted to the respective strands, all substantially as set forth.

2d, The shaft, O, gears, A, A', shaft, C, sleeve, C', and pinions, e, d, stationary support, A1, geared spool-carrying plates, d1, support, A2, rear, D, covering-cord carriers, F, and guide, J, combined and operating substantially as and for the purpose set forth.

3d, In combination with the above, the winding-and-twisting flyer, constructed and operating as described.

**81,578.—SHUTTLE FOR LOOM.**—Edward Baggett, Fall River, Mass.

I claim the combination, with the spring, A, and shoulder, C, of the spindle of the secondary spring, B, noched, slotted, and sliding substantially as and for the purpose described.

**81,579.—MARKING WEATHER-BOARDING.**—Joseph W. Bailey, New Orleans, La.

I claim the marking of weather boards in the manner herein described, during the operation of manufacturing them in the saw mill, or afterwards, during the process of dressing them in the planing machine, as and for the purpose set forth.

**81,580.—WELL TUBE.**—David Baker, Boston, Mass.

I claim, 1st, The double strainer, D, with intervening filtering material, arranged and operating in combination with or in continuation of a well-tube, substantially as and for the purposes set forth.

2d, The point, B, coupling, C, tube, A, and strainer, D, all constructed, arranged, and operating substantially as and for the purposes above set forth.

**81,581.—WELL TUBE.**—David Baker, Boston, Mass.

I claim, 1st, A conical point, F, formed with perpendicular sides, and with shoulders between the apex being formed with one or more drill edges, the sides, a, being elongated more or less, whereby the earth may be forced at right angles from said point in penetrating the ground, all substantially as shown and described.

2d, The combination of the interior perforated tube, A, and the exterior screen, H, when a chamber is formed between said tube and strainer, substantially as and for the purposes set forth.

3d, In combination with the tube, A, and the chamber or space formed between the strainer and tube, arranged and operating substantially as and for the purposes herein set forth.

**81,582.—WELL TUBE.**—David Baker, Boston, Mass.

I claim, 1st, The slide, J, whether placed on the inside or outside of a strainer, in a well tube, so arranged and secured to the point and operating as to leave the woven wire as the only tube near the lower part of the well, substantially as and for the purposes herein set forth.

2d, The combination of slide, J, with strainer, K, well tube, L, and coupling, L, with screw point, M, made and arranged substantially as and for the purposes herein set forth.

**81,583.—MOP WRINGER.**—Myron J. Barcalo, Mount Morris, N. Y.

I claim, 1st, The skeleton frame, B, made up of the hoops, b, b, and standards, c, c1 c2, and having combined therewith the rollers, C D D', and ball or cog, E, the whole being so arranged as to be applied to the inside of an ordinary mop, as herein set forth.

2d, The combination, with the stationary roller, C, of the pressing rollers, D D', mounted upon the rollers, F, arranged as described, and operating in the manner and for the purpose specified.

**81,584.—LANTERN.**—Lewis F. Betts, Chicago, Ill. Antedated August 20, 1868.

I claim, 1st, The spring band, E, for securing the upper end of the globe, substantially as specified.

2d, Constructing a lantern base of two or more sections, D, provided with hinges, F, substantially as and for the purposes set forth.

3d, Securing the flanges and forming the carrying-holes for the guard by means of eyelets at d, substantially as described.

4th, The brackets or ledges, F, for supporting and carrying the guard at a distance from the main portions of the base, substantially as specified.

5th, The rod or ring, J, for strengthening the base and supporting the brackets or ledges without materially obstructing the light, substantially as specified.

6th, The extended guard rods, N, when such extended portion, e, is used for a hook or catch, substantially as described.

7th, The combination and arrangement of the guard, provided with hooks, e, with the brackets, F, substantially as and for the purposes specified.

8th, The spring top, K, in combination with the hooks, e, and bracket, F, for preventing the detachment of the guard, substantially as specified.

9th, The inclines or cans, b, for securing and tightening the lamp, in combination with the pins, c, substantially as specified.

**81,585.—CAN TOP.**—Lewis F. Betts, Chicago, Ill.

I claim, 1st, The inclines or cans, a, when buried or turned down so as to form the cam on the edge of the metal of which the breast or permanent portion of the top is constructed, and operating substantially as specified.

2d, The handle, f, when projecting through the removable top or cover, B, so that its ends will form the lugs or pins, d, substantially as described.

3d, The permanent portion of the top or breast, A, provided with the cams or inclines, a, in combination with the removable portion or cover, B, and lugs or pins, d, substantially as and for the purposes specified.

**81,586.—CHURN DASHER.**—A. T. Bleyley, Conception, Mo.

I claim, as a new article of manufacture, the churn dasher, consisting of the inverted funnel shaped tube, A, B, disc-shaped perforated flange, C, and described, for the purpose specified, and arranged to operate as herein shown and described.

**81,587.—DECOLORIZING TANNIN LIQUID.**—George Bossiere, Paris, France.

I claim, 1st, The use of the herein named substance, for decolorizing tannin juices, substantially in the manner described.

2d, The method of decolorizing tannin, by mixing with it the ingredients herein named, or either of them, in the proportions substantially as specified.

**81,588.—REFRIGERATOR.**—Edwin D. Brainard, Albany, N. Y.

I claim the employment of independent metallic chambers, closely sealed substantially in the manner and for the purposes above described.

**81,589.—CHURN.**—Victor M. K. Branch, Richmond, Va.

I claim, 1st, The combination of the external dasher, B, with the internal dasher, B', when constructed as shown and described, and revolving in opposite directions, as specified, and for the purpose set forth.

2d, The combination of the dasher, B, hollow spindle, D, and pinion, F, with the dasher, B', spindle, C, and pinion, G, all as and for the purpose specified.

**81,590.—APPARATUS FOR CARBURETING AIR AND APPLYING THE SAME.**—Arthur Brin, Paris, France.

I claim, 1st, An apparatus, such as described, the combination, with the fluid reservoir and carbureting chamber, of an interposed feeding vessel, connected with both the reservoir and the carbureting chamber, in the manner described, and communicating with the latter by means of wicking, which supplies the quantity of fluid required to charge the air in said chamber, as set forth.

2d, The combination, with the feeding vessel, and trough formed therein for receiving the liquid from the reservoir, of a series of siphons, of graduated length, and racks, and pinions, and shaft for elevating or lowering said siphons, and thus regulating the flow of the liquid to the carbureter, in the manner shown and specified.

3d, The employment, in connection with an apparatus such as described, of a blow pipe, to which air from the blower, and carbureted air from the carbureting chamber, are supplied, substantially in the manner described and illustrated in fig. 5.

4th, The combination, with a tubular boiler, of two series of nozzles, arranged with relation to each other, and the boiler flues, as represented in fig. 6, the one series communicating with a blower or air supply apparatus, and the other with the gas generating chamber of the carbureting apparatus, substantially as and for the purposes herein set forth.

**81,591.—ORGAN PIPE.**—George H. Brock, Huntington, N. Y.

I claim, 1st, Constructing an organ pipe of a curved plate, A, held between the disk, B, as set forth.

2d, The plate, D, for guiding the wind from the wind chest against the mouth of a curved organ pipe, as specified.

3d, The pendant arrestor, d, arranged in the curved organ pipe, substantially as and for the purpose herein shown and described.

**81,592.—ADVERTISING SHOW-FRAME.**—William P. Brown, Watertown, N. Y.

I claim the bulletin frame, as constructed of the outer frame, A, and inner frame, d, the latter divided by sash strips, a, and provided with panes of glass, and removable backs, B, the frame, A, having moldings and fastening devices, adapted to secure the sash strips, a, all arranged substantially as herein shown and described, for the purposes specified.

**81,593.—SAFETY ATTACHMENT FOR EGG-CARRIER.**—Abner H. Bryant, Wilmington, Del.

I claim the frame, with its cloth bottom arranged and constructed, as shown, as a safety attachment for the suspension egg carrier hereinbefore mentioned.

**81,594.—HAND SPINNING MACHINE.**—J. W. Burkhart, Cameron, Mo.

I claim the combination of the pulley, B, tightening pulley, f, provided with an adjustable support, e, pulley, g, and multiplying wheel, C, and spindle-arm, D, and adjustable support, E, of the same, when constructed and arranged substantially as and for the purpose described.

**81,595.—SPOKE-TENONING MACHINE.**—A. Harvey Calhoun, and George W. Collins, West Lebanon, Pa.

We claim the cutters, I, n, attached to the adjustable straight bars, m, and the curved braces O, all suspended from the upper cross bar, a, of the sash frame, and constructed, arranged, and operating as herein shown and described.

**81,596.—ANIMAL TRAP.**—Alexander Campbell, Oxford, Ind.

I claim the latch, E, and hinged plates, F, having tongues, a, adapted to engage with the centrally pivoted platform, A, and arranged with relation to the notched plate fixed to frame, D, as herein shown and described.

**81,597.—CORN-PLANTER.**—S. O. Campbell, Leavenworth, Kansas.

I claim, 1st, The seed boxes, F F', arranged in combination with the shoes, I, I', slides, K K', frames, L, and springs, M, with the projections, n, on the wheels, substantially in the manner as and for the purpose set forth.

2d, The clutch, composed of the two notched plates, D D', on the axles, C C', and the sliding or adjustable plate, K, provided with the arms, c, and c', and on the axle, C', all arranged substantially as and for the purpose specified.

**81,598.—BASE BALL TALLY-BOARD.**—Thomas L. Canary, Brownsburg, Ind.

I claim, 1st, The use of the wire pins and variously colored balls, as represented at D D' and C, for keeping game in base ball playing, substantially as described.

2d, The use of movable or adjustable pins for keeping a game, and the method of clearing the balls from the pins, substantially as described.

3d, The arrangement of the pins on the board, substantially as and for the purposes set forth.

4th, The slate, or other marking surface, in combination with the pins and ball, substantially as and for the purposes set forth and described.

**81,599.—CHURN.**—N. P. Chaney, Potsdam, N. Y.

I claim the combination, with the tubular beaters D, of the arm, B, provided with the scrapers, b, b, substantially as and for the purpose described.

**81,600.—ROLLING-MILL.**—Joseph L. Chapman, Philadelphia, Pa.

I claim, 1st, The arrangement of three smooth conical rollers, rotating in different planes, and operating in the manner described, to form and feed the wire simultaneously, as specified.

2d, The adjustment of the rollers, a, to form rods of different sizes, by means of ball and socket joints at one end, and the set screws and journal boxes at the other end, substantially in the manner shown and set forth.

**81,601.—INTERFERING STRAP FOR HORSES.**—Edwin Chesterman, Boston, Mass.

I claim leather interfering straps, in combination with rubber guards or projections, as herein shown, for the purpose specified.

**81,602.—LOCOMOTIVE SPARK ARRESTER.**—Ira Choate, Exeter, N. H., assignor to himself and Daniel Lee, Boston, Mass.

I claim, 1st, The construction and arrangement of the tube, A, smoke stack, E, cover, D, and air apertures, a a a a, substantially as shown and described.

2d, The coupling, C B, cord or band, d, and guides, e e, substantially as shown and described.

3d, The coupling, C B, constructed as described.

4th, The arrangement of the cord, d, and guides, e e, substantially as described.

**81,603.—VELOCIPED.**—Andrew Christian, New York city.

I claim the operating device of a velocipede, consisting of the bell-crank levers, G H, one having a vertical and the other a horizontal lower end, and of the rods, m, i, and crank, b, all made and operating substantially as herein shown and described.

**81,604.—CLOTH GUIDING ATTACHMENT FOR SEWING MACHINES.**

—Jas. Cline (assignor to John Walls, Eaton, Ohio).

I claim the revolving holder, D, constructed as described, in combination with pin, B, standard, A, and spring, C, as and for the purpose described.

**81,605.—DISTILLING APPARATUS FOR SPIRITS.**—J. C. Cook, Lancaster, Pa.

I claim, 1st, An extra vessel III, with its chamber, A, in combination with the chamber, II, and its perforated bottom, c, and with the chamber, C, with its bottom and extra pipe, k, pipes, i and g, issuing from their respective departments, in the manner shown and specified for the purpose set forth.

2d, In combination with said extra vessel III, with its chambers, A II and C, the still, D, with its pipe, l, sleeve, f, funnel, d, and mouth, and arranged substantially as shown and described.

3d, The chamber, F, when combined with the worm of the condensing vessel and the extra vessel, III, by means of the several pipes, e, f, g and h, substantially arranged in the manner and for the purpose specified.

**81,606.—DRYER.**—Cordell Crane, Boston, Mass.

I claim, as a new article of manufacture, a clothes-drying closet, constructed with doors and pivoted racks, and provided with inlet passages to receive heated air from register pipes, and with outlets for the escape of heated air saturated with moisture, all substantially as and for the purpose described.

**81,607.—SLOTTING AUGER.**—Peter Cunningham, Eckley, Pa.

I claim a method of slotting auger, having rows of gouge or slot holes formed on the edge of the twist, substantially as determined for the purpose set forth.

**81,608.—MACHINE FOR GRINDING METAL ARTICLES.**—J. P. Curries, New Britain, Conn.

I claim, 1st, The arrangement of a series of clamping jaws, a, in the holder, A, substantially as and for the purpose set forth.

2d, The holder, A, made in two parts, one part being fitted into the carriage



C, and retained by the screw spindle, k, while the second part is connected to the first part, so that it can be readily removed, all as and for the purpose described.

3d, The combination, with the holder, A, of the pinman, e, crank motion, d, and screw spindle, k, operating substantially as described.

4th, The sliding wheel, l, the wheel, j, forked arm, i, and screw spindle, k, in combination with the reciprocating holder, A, substantially as described.

81,609.—CHIMNEY COWL.—H. S. Decker, New York city.

I claim the ventilator herein described, having an interior cone inclosed within the exterior walls of the ventilator, so as to provide an annular space between its exterior and the interior of the inclosing shell, which may be extended by a cylindrical attachment to the inner cone, as represented, and the several parts being combined and arranged relatively to each other, and to the passage or pipe for distributing fresh air by the force of the wind upon the cone, substantially as shown and described for the purposes set forth.

81,610.—CIGAR PIPE.—H. E. Doster, Bethlehem, Pa.

I claim a cigar pipe formed of the parts, A B C D and E, arranged substantially as shown and described and for the purposes set forth.

81,611.—GRINDSTONE FRAME.—J. W. Douglas (assignor to W. Douglas and B. Douglas), Middletown, Conn.

I claim, 1st, The adjustable support or standard, H, with tool rest, J, applied to it, substantially as and for the purpose specified.

2d, The providing the shaft, E, with a screw thread, g, having a slot or groove, h, made longitudinally in it, in connection with the washers, Q, Q', furnished with the lips or projections, i, to fit in the slot or groove, h, and the nuts, R, R', on the screw thread, g, all arranged substantially as and for the purpose set forth.

81,612.—BALING PRESS.—D. Dunn (assignor to himself and W. B. Miller), Lewisport, Ky.

I claim the detachable platen, G, in combination with the toggles, C C', and slide, D, all arranged substantially as and for the purpose specified.

81,613.—MACHINE FOR JOINTING STAVES.—L. B. Ecker, Union Bridge, Md.

I claim the combination of the plane, B, arranged in the adjustable gate or frame, L, as described, with the swinging carriage bed, I, and the stops, O, substantially as set forth.

81,614.—CHISEL PRESS.—Jacob Erdle, South Bristol, N. Y.

I claim the arrangement and combination of the screw, D, cross bars, E F, rods, a, a', crank shaft, G, and weighted lever, H, operating substantially as and for the purpose set forth.

81,615.—CHURN.—John Fassauer, Wheeling, Iowa.

I claim the dasher, constructed as described, and consisting of the radial arms, B H C D E', and vertical connecting slats, e, perforated at f, all arranged upon the vertical shaft, B, to operate as herein set forth.

81,616.—HANDLE FOR DENTAL AND SURGICAL INSTRUMENTS.—H. T. Fogg, San Paulo, Brazil.

I claim adjustable handles for dental and other surgical instruments, constructed substantially in the manner and for the purpose herein shown and described.

81,617.—FRICTION CLUTCH.—E. T. Ford, Stillwater, N. Y.

I claim the friction clutch, constructed and arranged with the drive wheels A, A', and being composed of the cone, D, with its corresponding hollow sleeve E, the cam, 3, on its end, and the corresponding cam, 3 D, on the drive hub, C, arresting and relieving the motion or movement of the main axle, B, in its forward and backward motions, in the manner and for the purpose described.

81,618.—WATER-WHEEL.—Thomas H. Fox, Hanover, Va.

I claim, 1st, A vertical penstock, which is provided with lateral passages through its side, and vertical passages through its bottom, adapted for supplying two water wheels, arranged and supported substantially as described.

2d, The arrangement, consisting of the cylindrical penstock, B, frame, A, stay or suspension rods, N, shaft, E, gate, C, wheel, D D', the said being constructed as described, and so combined that the wheel, D D', is suspended on its shaft by the top of the penstock, as shown and described.

3d, The regulator, J, constructed as described, a d arranged upon the bottom, C, of the penstock, in combination with passages, g', a wheel, L L', and a wheel, D D', substantially as described.

4th, A cylindrical penstock, which is constructed with lateral and vertical passages through it, and a chute, G, leading into its upper end, in combination with two water wheels and their regulators, arranged to operate substantially as described.

5th, The upper revolving water-wheel, connected to and supported by the lower water-wheel and vertical shaft, F, said upper wheel being detachable from the lower wheel, substantially as described.

81,619.—GARDEN IMPLEMENT.—Frank Fuller, New York city. Antedated May 5, 1868.

I claim, 1st, A universal garden implement, having one extremity provided with a chisel-shaped, bifurcated, or other pruning-edge or edges, and the other extremity provided with a forked, spoon-shaped, or other digger, dibble, drill, scribe, and flower and fruit gatherer, the whole constructed substantially as described.

2d, Providing said universal garden implement, or any implement of similar construction, or designed for similar uses, with one or more pruning loops, b, arranged between the two extremities of said implement, substantially as described.

3d, Providing a garden implement with a shield or protector for such portion of the hand as may be most liable to be soiled or injured, said shield being constructed of india-rubber, leather, cloth, metal, or any other suitable material.

81,620.—MACHINE FOR MANUFACTURE OF SCREWED BOLTS.—Joseph Galli, San Francisco, Cal.

I claim, 1st, The rigid jaw, B, and movable jaw, C, operated from below, attached perpendicularly to the plate, A, and carrying the screw-plate, a, b, at their outer end, the whole constructed and operated substantially as and for the purpose herein described.

2d, The cutter, F, working close to the sole, together with its operating lever, G, link, d, and arm, H, constructed and operating substantially as described.

81,621.—WAGON AXLE.—G. S. Garth, Mill Hall, Pa.

I claim, 1st, An axle provided with collars, a, b, of anti-friction metal, the latter (b) being cast on to a dove-tailed collar, e, which is formed on or fitted to the axle, as herein shown and described, when the raised portions of the band, b, and collar, e, f, are encircled by a strengthening band, i, d, as set forth for the purpose specified.

2d, The strengthening band, d, encircling the raised portions of the band, b, and shoulder, f, substantially as shown and described for the purpose specified.

81,622.—COTTON PICKER AND CLEANER.—Samuel H. Gilman, Galveston, Texas.

I claim, 1st, The combination of the tapering trunk, having a flat slatted bottom, and segmental caps, J, J', and the combing fan-blades, the extremities of which run at differential speeds, substantially as and for the purpose described.

2d, The pivoted oscillating, tapering, and obliquely set slats, constructed as described of bottom, k, applied so as to present a flat-surfaced grated bottom and inclined chutes, when the slats are in one position, and to present an irregular bottom when the slats are in another position, as shown in red in fig. 5, the said slats being connected to reciprocating bars, all substantially as and for the purpose described.

3d, The combing fan-blades s, s', the extremities of which run with differential speeds, in combination with a trunk or tunnel, which is tapering in form and has its bottom formed of vibrating slats, constructed substantially as and for the purpose described.

81,623.—LIFE BOAT.—John R. Grace, Brooklyn, N. Y.

I claim, 1st, The partitioned cylindrical air chambers, B B, arranged as described forming fixed parts of the bottom, C, and extending below the same to form one or more keels, as herein described for the purpose specified.

2d, The described arrangement of the air chambers, E E, and cylinders, B B, with relation to each other, the walls of the boat, and the bottom, C, as herein described for the purpose specified.

81,624.—DISTILLING APPARATUS FOR SPIRITS.—Duby Green, New York city.

I claim, 1st, The boiler, A, of a still, when subdivided into a series of chambers, one above the other, these chambers being respectively connected with each other by means of the pipes B and C, and provided with slides, e, as set forth.

2d, Connecting the valves, e, that are in the discharge pipes, f, of the boiler, A, all by bottom valves, as described for the purpose specified.

3d, Providing the stirrer with two revolving disks, H H, made as described.

4th, The arrangement and combination of the vessels G T V, which contain the stirrers, H, all made and operating substantially as herein shown and described.

5th, Conveying the vapors from the boiler, A, to the stirring apparatus, so that no steam is required in the latter, as specified.

6th, The deaerator, O, when composed of a series of separate parts or vessels, p q r, each having two compartments, w and x, and all connected with each other by means of pipes, P, all made and operating substantially as herein shown and described.

7th, The arrangement and combination, in one distilling apparatus of the boiler, A, stirring vessel, G T, stirrers, H, rectifiers, J L N, dephlegmator D, and cooler, S, all made and operating substantially as herein shown and described.

81,625.—COMBINED LATCH AND LOCK.—S. A. Green, Lexington, Ind.

I claim the two bolts, C and D, the Y-shaped tumbler-bar, with its projections p and d, the pivot bar, O, springs, E and H, and the arm, F, all constructed and operating substantially as shown and described, in combination with the rack, m, and pinion, k, branches, f and g, all as set forth.

81,626.—BRUSH HOLDER AND MOP HEAD.—Henry P. Gregg, Cincinnati, Ohio.

I claim, 1st, The hook-bolt, E, operated by the thumb nut, F, with the head, A, and spur, G, for the purpose of holding a brush, substantially as described.

2d, The hook-bolt, E, in combination with the bent wire, D, and head, A, for the purpose of holding a mop, as set forth.

3d, Combining a brush holder and mop head of the hook-bolt, E, thumb nut, F, wire, D, spur, G, and head, A, substantially as and for the purpose set forth.

81,627.—SEEDING MACHINE.—Joseph Haas, El Paso, Ill.

I claim, 1st, The placing of the seed box, E, upon the frame, A, behind the wheel, B, when the lower part of said frame is supported by a castor wheel, C, applied to a bar, D, secured to the under side of the frame, A, and all arranged substantially in the manner as and for the purpose set forth.

2d, The arrangement of the lever, J, and spring, K, and the connecting rod, H, substantially as shown and described, for the purpose of disconnecting the rod, H, from the crank pulley, when necessary or desired.

81,628.—HAYSTEK RAKE.—John C. Hall, Monroe, Wis.

I claim, 1st, The rake staff, constructed in two parts, G and H, carrying the rake, and pivoted directly to the reel shaft, K, substantially in the manner and for the purpose set forth.

2d, The jointed arm, N, when its outer end is rigidly fixed to the rake staff H, for the purpose set forth.

81,629.—SAFETY HARNESS SADDLE TREE.—John S. Hall, Pittsburgh, Pa.

I claim the keeper, C, when arranged and operated substantially in the manner and for the purpose described.

81,630.—COMBINATION PADLOCK.—Joseph L. Hall, Cincinnati, Ohio.

I claim, 1st, The combination of a series of rotating tumblers with a rocking lock bolt, operated by the hasp only, and inclosed in a case having no key hole, substantially as described.

2d, The combination of a series of rotating tumblers, C', the rocking lock bolt, D, and the friction lever, E, or its equivalent, all constructed and arranged to operate substantially as described.

81,631.—CORN HUSKER.—John M. Hartnett, Waukegan, assignor to Robert L. Fabian, Lake Forest, Ill.

I claim, 1st, The hopper or chute, h, h', with the metal extension, m, m', as and for the purposes herein specified.

2d, The hinged door, I, with the pendant or fastening, q, as and for the purposes herein specified.

3d, The rods, j, j', of varying size, working together, the combination of iron and wood, and the covering with alternate rings of metal and rubber, and of spurred and plain metal, as herein fully specified and for the purposes set forth.

81,632.—WATER WHEEL.—Joseph Hathaway, Woodstock, Vt.

I claim, 1st, The chutes, C, in combination with the gates, D, pivoted as shown, and connected to the annular plate, E, all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The arrangement of the spindle, H, resting on the bridge tree, I, in connection with the pinion, G, of the wheel shaft, which turns on H, and rests upon a fixed cone, ax, and the part, G', of the wheel shaft, which rests on the fixed spindle, H, all arranged to operate in the manner substantially as and for the purpose set forth.

81,633.—TIRE HEATER.—P. P. Hemstreet (assignor to himself and David Gudtner), Galesburg, Ill.

I claim, 1st, The outer rim, A, bottom, B, lids, Q, chimney, Z, lever, U, rods, S, band, X, bars, N, o, and inner rim, B, all constructed, arranged and combined as described, and for the purpose set forth.

2d, The dampers, D, rods, T and S', and lever, F, with rods, L and H, and rim, C, constructed and arranged as described, and combined with rims, B and A, and bottom, B, substantially as described and for the purpose set forth.

81,634.—RAILWAY SWITCH.—John A. Heyl (assignor to himself, Joseph G. Loring, and John H. Wiggin), Boston, Mass.

I claim the arrangement and combination of the arm, h, the crank, g, its shaft, f, pinion, e, an, the toothed sector, d, with the lever, K, the switch and either or both pairs of connecting rods, A B C D, applied to such lever.

Also, the combination and arrangement of the studs, c, c', and the slotted plate, L, with either or both sets of connecting rods, A B C D, the lever, K, the toothed sector, d, the pinion, e, the shaft, f, the crank, g, and the arm, h, the whole being applied to the switch and the roadbed, substantially as described.

81,635.—AX.—J. W. Hilton and R. W. Green, Bradford, Pa.

We claim as a new article of manufacture a chopping ax, having a removable edge, when the two parts, A and B, composing said ax, are constructed substantially as and for the purpose shown and described, and secured together by removable dowels, d, d', all as set forth.

81,636.—POTATO DIGGER.—Henry P. Hinz, Dunton, Ill.

I claim, 1st, The combination of the shovel, H, the conveyer, N and P, and the screen, Q, arranged to operate substantially as and for the purposes set forth.

2d, The combination of the shovel, and the frames, F F', supporting the conveyer, N, when constructed and arranged in such a manner as to be adjustable vertically, so as to make the shovel run at different depths, as herein specified.

3d, In combination with the said shovel, the arrangement of the arms, G, G', cross bar, J, arm, K, and lever, L, to operate in the manner specified.

4th, The arrangement of the apron, t, below the conveyer and over the chute, R, for the purposes specified.

5th, The arrangement of the chute, R, with the screen, Q, when used in combination with a conveyer, P, above the same, substantially as specified.

6th, In combination with the conveyers, N P, and screen, Q, and its side chute, the arrangement of an elevator, U, so as to operate in the manner set forth.

7th, The arrangement of a tipping platform, Z, below and to the rear of the discharge of the elevator, to operate in the manner described.

8th, Providing the said platform with one or more rollers, to facilitate the removal of the sacks when full, substantially as herein set forth.

81,637.—PROCESS OF MAKING VINEGAR.—S. R. Hoyt, Worthington, Ohio.

I claim making vinegar from cider, beer, sorgho juice, alcoholic and saccharine mixtures by the herein described process for aerifying and clarifying the same, by allowing the fluid or wash to stand upon the pomace, and then filtering or drawing off the same, substantially as set forth.

81,638.—STEAM GENERATOR.—James Howard and Edward Tenney Bonfield, Bedford, England.

We claim, 1st, The construction and arrangement of the vertical tubes, B, and their inner tubes with the horizontal tubes or pipes, C and A, whereby access is gained to the pipes, A, through the feed pipe, as above explained for cleaning the boiler.

2d, The construction of the horizontal pipes, A, arranged with the feed pipe, having covered openings, whereby to gain access to the interior of the boiler, for cleaning out the tubes, as described.

3d, The internal tubes, constructed with lateral openings at bottom, as described, whereby to keep up the circulation of the water in the boiler, and the arrangement of the tubes, as described.

4th, The heating sections, G, for heating the feed water arranged in combination with the larger boiler sections, substantially as and for the purpose described.

81,639.—FOOL FOR LAYING OFF FURROWS FOR MILLSTONE DRESSING.—John C. Hunt and Joseph Temple, Terre Haute, Ind.

We claim, 1st, The combination of the g adapted slide, D, and furrow marking arm, E, with a suitable holder, G, which may be secured to the stone centrally so as to revolve freely as desired, substantially in the manner and for the purpose set forth.

2d, The combination of the adjustable bar, F, with the arm, E, slide, D, and holder, G, substantially in the manner and for the purpose set forth.

3d, In combination with the arm, E, slide, D, and holder, C, the annular plate, A, and cam-plate, B, with the arms, a, and pins, c, all arranged to operate substantially as and for the purpose set forth.

4th, The combination of the plate A, the plate B, provided with eccentric recesses, a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, arranged in the manner and for the purpose set forth.

81,640.—FENCE GATE.—Jasper S. Jewett, Ottawa, Ill.

I claim the oblique rails, f, the top rail, g, the horizontal rails, h, i, the rope or chain, l, the staple, i, and the weight, M, in combination with the post, A, the pulley, K, the casing, N, the spring, O, and the rock shaft, Q, substantially as and for the purpose described in the foregoing specification.

81,641.—FABRIC FOR ROOFING AND OTHER PURPOSES.—Henry W. Johns, New York city.

I claim the combination of asbestos with felted or pulped matter, to form roofing and sheathing sheets, all substantially as described.

81,642.—CARRIAGE COUPLING.—Alfred S. Johnson (assignor to himself and Enock Van Woe), Waupun, Wis.

I claim a small coupling formed of the parts A and B, constructed, arranged and operating substantially as shown and described, for the purpose set forth.

81,643.—APPARATUS FOR CONCENTRATING EXTRACTS.—Thomas W. Johnson, New York city.

I claim the receiver, A, provided with a convex top, B, gutter, C, and cold water pipe, d, in combination with the agitator, F, and heating chamber, E, substantially as and for the purpose set forth.

81,644.—TINNERS' FIRE POT.—Charles W. Johnston.—Neposet, Ill.

I claim the arrangement of the draft tube, B, and the tool holding tubes, D, in a fire pot, constructed and operating substantially in the manner and for the purpose herein set forth.

81,645.—LAMP.—Anson Judson, Brooklyn, N. Y.

I claim, 1st, The combination of the shell, B, of the burner, the ribs, F F', and the screw, G, or its equivalent, substantially as and for the purpose hereinbefore set forth.

2d, The combination of the ratchet shaft, C, wheels, d, and tube, e, substantially as and to the effect hereinbefore set forth.

3d, The combination of the cone, H, shell, B, and adjusting screws, D D', substantially as and to the effect hereinbefore set forth.

4th, The combination of the burner, B, projections, c, c', flange, a, notches, b, b', and right and left inclines f and g, in such a manner that by inserting the projections, c, c' through the notches, b, b', and turning the burner in either direction, said burner may be secured to the lamp cap, substantially as set forth.

5th, The cone or reflector, made of cast iron, with an enameled surface, as hereinbefore set forth.

6th, The formation of the burner, B, in one piece with the wick tube, and in the manner hereinbefore described, by which the wheels for elevating the wick are received into the lower end of the wick tube, and all connection between the fountain and the interior of the burner, except through the length of the wick tube, is cut off, substantially as hereinbefore set forth.

81,646.—MACHINE FOR GRINDING REAPER KNIVES.—Frederick Judson, Castleton, N. Y.

I claim, 1st, The sliding easiase, U, so arranged as to have the slide brought to the grindstone adjustable vertically, substantially as herein set forth and specified.

2d, The stop, F, arranged and connected with plate, O, substantially as above described, and for the purpose specified.

3d, In combination with the above, the bar, Q, guide rods, R R', standard, B, arm, C, screw, H, and set screw, I, the whole arranged and operating substantially as set forth.

4th, A yielding support for the knives, so constructed as to compensate for irregularities in the surface of the knives when passing under the stone, substantially as described.

81,647.—THRESHING MACHINE.—Daniel Kane, Tivoli, Iowa.

I claim, 1st, The combination of two fanning devices with a screening shoe, F, a grain elevating belt, and a straw carrier, said fanning device being arranged in the manner described, so as to operate substantially as and for the purposes specified.

2d, In combination with a threshing drum, an elevating grain belt and a straw carrier, arranged as described, the revolving beater, I, and the tossing and sacking blades, E, all being arranged over tanning devices and a screening shoe, reversibly as described.

3d, The reversible or tilting bottom, N, to the laterally discharging clean grain trough, M, substantially as and for the purposes described.

4th, The arrangement of the pulley, j, with shaft, s, and gearing, i, m, beneath the feeding board, H, so that the cylinder is driven by a belt or other device which runs parallel, or nearly so, with the cylinder, substantially as herein described.

5th, The rolling drums, all at, for the upper part of the straw carrier, applied to studs upon adjustable slides, a, in combination with rotating racks, g', and pawls, v, substantially as and for the purposes described.

6th, Providing for regulating the tension of the grain belt, g, by means of adjustable bearing blocks, i, of drum shaft, R, and bolts, p, said blocks being constructed and applied substantially as described.

81,648.—PUMP.—William H. Keop, Stockton, Cal.

I claim the bail, J, in combination with the ring, i, the valve seat, H, the frame, P, the ring, G, and the valve seat, F, as and for the purpose set forth.

81,649.—STEAM AND FIRE REGULATOR.—Abraham Kipp, Jr., Sing Sing, N. Y.

I claim the slide valve, F, in connection with the elastic disks, D D K, com parts, C C', in chamber, A, arm, E, and beam, M, and the lever, or its equivalent, all arranged to operate in connection with a fire damper, substantially in the manner as and for the purpose set forth.

81,650.—HAMMER FASTENER.—John Koch and David Sechrist, Columbiana, Ohio.

I claim the pawl, D, when its tooth, a, is held against the ratchet bar, C, by means of the coil spring, b, which is protected from injury by being inclosed in a recess in the pawl around the pivot, d, as herein shown and described.

81,651.—HOLD BACK.—Lois Kruse, Sabula, Iowa.

I claim the application, to the tongues of wagons and other vehicles, of the spring latch, arranged as hereinbefore set forth, which will secure the neck yoke in its place, and which may yet be removed when desired.

81,652.—POOL FOR SLITTING BOARDS.—John Langham, Jr., Philadelphia, Pa.

I claim the combination of the sliding stock, C, provided with a center, with the ways, A, and supporting pieces, B, substantially as and for the purpose described.

81,653.—APPARATUS FOR EXTINGUISHING FIRES.—Rufus Leach, Boston, Mass. Antedated August 23, 1868.

I claim, 1st, A placed reservoir, containing and holding a chemical fire extinguishing agent, or materials for readily generating such, when provided with pipes leading to one or more buildings, for the purposes specified.

2d, The application of pipes to connect said reservoir with one or more buildings and the various rooms of buildings, for the purposes set forth.

3d, The auxiliary gas generating retorts, s, one or more, used in connection with the placed reservoir, B, for the purposes specified.

81,654.—PROCESS OF TREATING PETROLEUM TO REMOVE THE MORE VOLATILE PORTIONS.—Robert G. Loftus, Chelsea, assignor to himself and Alonzo Farrar & Co., Boston, Mass.

I claim the separation of the petroleum into fine streams, and causing the same to pass through the atmosphere, so as to enable the latter to vaporize and dissipate the inflammable elements thereof.

81,655.—BORING MACHINE.—Chas. R. Long, Louisville, Ky.

I claim, 1st, The arrangement of the sliding beds, B B, adjusted with relation to the fixed central shaft, b', and its pulley, from opposite ends of the frame, A, by means of the screws, m, constructed to operate as herein described, for the purpose specified.

2d, The staff, p, constructed and operating substantially as shown and described, in combination with the apron, M, of a boring machine, all as and for the purpose set forth.

81,656.—HAND LOOM.—Edwin Lowe, Burrows, Ind.

I claim the arrangement, with relation to the treadles, D, and levers, D', of the tappet shafts, B E, connected by gearing, the pawls, a, a', and rods, C C', connected to the lay, A, all constructed to operate as herein shown and described, for the purpose set forth.

81,657.—ADHESIVE PLASTER.—J. Lynch, Columbia, S. C.

I claim the springs or stays, C, or their equivalents, in combination with an adhesive plaster, substantially as and for the purposes herein shown and described.

2d, Attaching one or more springs or flexible stays, rods, or bars to adhesive plasters, for the purposes described.

81,658.—CULINARY VESSEL.—A. F. Marston, Clinton, La.

I claim the arrangement, within the vessel, A, upon the perforated bottom, B, thereof, of the vessels, C, whose covers, D, are formed with tubes, E, having perforated upper ends, whereby a communication is formed between the said vessels and the removable steamer, G, supported upon its internal lugs, and the steamer having partitions and a perforated bottom, all as herein shown and described for the purpose set forth.

81,659.—SOFA BEDSTEAD.—M. K. Maximilian, New York city.

I claim a sofa bedstead, composed of the two parts, A, B, having their upholstered parts, a, c, connected together by webbing, d, and having arms, C C, constructed as shown, attached to A, and connected to B, when desired, in the manner set forth.

81,660.—CORN PLOW.—Alex. McCreight, Tranquility, Ohio.

I claim, 1st, The drag bars, B B, arranged as described, when operated by means of a fixed and movable attachment, substantially in the manner set forth.

2d, Operating drag bars by means of levers having movable fulcrum, substantially as described.

3d, The drag bars, B B, as described, as in combination with levers, D, and cross bar, C, substantially as and for the purpose set forth.

81,661.—HANGING CIRCULAR SAW.—William McDonald, Callas, Me.

I claim the fixed collar, B, provided with the series of pins, a, adapted to pass through the saw, C, and into the loose collar, D, said saw and collar, D, being clamped firmly to the fixed collar by the screw nut, E, as herein shown and described.

81,662.—GATE.—J. H. McKnight, Oakwood, Mich.

I claim, 1st, The gate, C, formed by the combination of the horizontal bars, c, pivoted connecting bars, c', and c', pivoted diagonal bar, c', and water box, D, with each other and with the gate post, B, said gate, C, being constructed and operated substantially as herein shown and described.

2d, The combination of the levers, F, and cord or chain, G, with the weighted pivoted gate, C, substantially as herein shown and described, and for the purpose set forth.

3d, The weighted catch, J, in combination with the gate, C, post, B, and levers, F, substantially as herein shown and described, and for the purpose set forth.

81,663.—SHELLAC VARNISH.—George S. Meikle, Sterling, Ill.

I claim a varnish formed of gum shellac, combined with the ingredients herein named, and substantially as described.

81,664.—EXPANDING MANDREL OR BORING TOOL.—James C. Miller, River Point, R. I.

I claim, 1st, The combination, in a boring tool, of the boring plates, B B, right and left handed screw, a, and block, b, when operating together within a hole, or in the shaft, A, all substantially as shown and described, and for the purpose set forth.

2d, The screw, D, arranged to operate in combination with the above claimed parts, substantially as herein described.

81,665.—MACHINE FOR MAKING CANDY TOYS, etc.—Thomas Mills and George M. Mills, Philadelphia, Pa.

We claim the die rolls, A A, with the molds disposed thereon as described, and operating in combination with the side rolls, C C, substantially as and for the purpose specified.

Also, in combination with a pair of die rolls, the described system of endless bands, I and N, when arranged and operating in the manner and for the purpose set forth.

81,666.—BRIDGE.—Richard Montgomery and Mary J. Montgomery, New York city.

We claim the combination, substantially as and for the purpose herein set forth, of an intermediate binding plate, D, with the doubly corrugated plates, A, A', forming the double corrugated beams and columns herein described.

Also, in the construction of bridges, roofs, and similar structures, with doubly corrugated beams and columns, the combination of diagonal struts and braces with said beams and columns, by passing the struts or braces between the opposite plates of the beams and columns, substantially in the manner and for the purpose herein set forth.

81,667.—APPARATUS FOR HANDLING STEAMBOAT STAGES.—Ferdinand Moore and George Hastie, Florence, Ind.

We claim the rolling carrier beam, D, provided with the rollers, s, s', fall and tackle, F, wheel, E, windlass, H, hand rope, n, journal, m, pins, a, a', and guides, n, n', or their equivalents, when used in connection with the gates C C, in the manner substantially as described, and for the purpose set forth.

81,668.—STEAM GENERATOR.—William Moses, Buffalo, N. Y.

I claim the auxiliary steam generating vessels, when constructed with contracted shafts, and induction and ejection orifices, and applied to the crown sheet and sides of a boiler, substantially as herein set forth.

81,669.—DRAFT EQUALIZER.—George A. Mosher, Champlain, N. Y.

I claim the slides, D, constructed as described, and provided with a series of holes, b, adapted for the passage of a pin, a, whereby said slides are pivoted to the cross pieces, C, of the centrally pivoted double tree, A, so as to be longitudinally adjustable thereon, as set forth.

81,670.—MANUFACTURE OF GUNPOWDER AND BLASTING POWDER.—Gustav Adolf Nemeyer, Altenburg, Saxe-Altenburg (assignor to August Klein, Leipzig), Germany. Antedated August 23, 1868.

I claim an explosive powder, for blasting and for fire arms, when made of the ingredients and in the manner and proportions herein set forth.

81,671.—FURNACE FOR SMELTING ORES OF GOLD, SILVER, etc.—Eugene W. Nohl (assignor to Charles M. Gray), Chicago, Ill.

I claim, 1st, The construction and arrangement of the smelting chamber, with the cupel and driving flue, for heating the same, substantially as specified.

2d, The opening, K, through the top of the furnace, and above the gas flue or passage, for the purpose of admitting, and mixing with the burning products, atmosphere air to intensify the combustion, and direct the same on the ore bed or table, and into the cupel, substantially as and for the purpose described.

3d, The flues underneath the ore bed or table and the cupel, as and for the purpose described.

81,672.—DOOR BELL.—Oliver B. Oakley and Hiram Rosecrans, San Francisco, Cal.

We claim the hammer bar, G, the cam, F, and the two arms, a and b, together with the knob, I, operating by horizontal or straight pull, either near the bell going or at a distance, substantially as and for the purpose herein described.

81,673.—CIRCULAR SAW MILL.—John Orm, Paducah, Ky.

I claim adjustably connecting one or more of the truck frames, D, to the toothed rack, F, by means of the coupling, G, as herein shown and described for the purpose set forth.

81,674.—WASHING MACHINE.—Joseph Osterhout, Rock Island, Ill.

I claim the holders, J J, secured to the inner sides of the suds box, and applied to the hand or apron, I, substantially as and for the purpose specified.

81,675.—WHIP SOCKET.—Louis J. Parsons (assignor to himself, John K. Linton, and O. K. Linton), New Bedford, Mass.

I claim, 1st, Uniting the edges of a leather whip socket by means of a metal fastening, substantially as and for the purpose described.

2d, The bottom of the whip socket, constructed and united to the tubular portion of the same, substantially as and for the purpose described.

81,676.—BALL ALLEY.—James Dillon Patrick, San Francisco, Cal. Antedated August 23, 1868.

I claim, 1st, The springs, I, I', attached to the spring board, P, the holder, E, in the one through which the balls pass, and the weights, J J, in combination with the cords, substantially as described.

2d, Constructing the ways, C C, so that the balls that roll from the sides of the alley will not come in contact with those that are thrown against the bank or end of the alley, substantially as herein set forth.







34. The combination and arrangement of the friction brakes, I, with the worm shaft, G, and worm wheels, F, F, and eccentric rock shaft, H, and its connections, substantially as described.

35. The hinged partition, L, arranged in the part, B, of the press box, as and for the purpose set forth.

**81,746.—DOOR HOLDER.**—George C. Bunsen, Belleville, Ill.  
I claim the combination and arrangement of the spring dog or lever, H, with the case, F, for operating as a door or window holder, substantially as described.

**81,747.—BEEHIVE.**—Henry Burton, Richview, Ill.  
I claim the hive, B, suspended within, but not in contact with, the base, A, upon legs, M, which support it above the bench, and parts being respectively constructed and arranged in relation to one another substantially as and for the purpose set forth.

**81,748.—JOURNAL BOX.**—Alonso B. Caldwell (assignor to himself and Jacob Pinkerton), Syracuse, N. Y.  
I claim, 1st, The knobs or hooks, h, h, or their equivalent, as a part of the bronze metal frame, B, substantially as described.

2d, The flange, C, on the ends of the arms, b, b, when made and applied in the manner and for the purposes described.

3d, The cast iron shell, A, when cast around the heads of the knobs or hooks h, h, upon the bronze metal frame, B, in the manner and for the purpose as above described.

4th, The shoulders, as, upon the bronze frame, B, in combination with the knobs or hooks, h, h, and holes, a, a, in the cast iron frame, A, when used to hold more securely together and strengthen the bronze metal and cast iron box, in the manner described.

5th, A journal box composed of the bronze metal portion, B, when made with the flanges, f, f, and shoulders, as, combined with the cast iron frame, A, made as aforesaid, with the soft metal portions, m, m, m, filled in, substantially in the manner and for the purposes described.

**81,749.—LAMP.**—James Calkins, New York city.  
I claim, 1st, The divided chamber, consisting of the reservoir, A, and combustion chamber, D, in combination with the duct or coil, C, and water chamber, B, arranged and operating substantially as and for the purposes set forth.

2d, The intervening air-space, G, between the chambers, A and D, as and for the purposes set forth.

**81,750.—DEVICE FOR OPERATING WAGON-BRAKES.**—Dennis W. Carkniff, Lumberville, N. J.  
I claim a sliding lever, ratchet, T, W, spring, and guard, when made and applied in the form and manner, and for the purposes herein described and set forth.

**81,751.—LARD PRESSER AND SAUSAGE STUFFER.**—Joseph B. Cassel, Worcester township, Pa.  
I claim, 1st, The vessel, C, rendered detachable from the base, A, having a detachable spout, D, and adapted for the reception of a perforated casing, E, and of plungers, I or C, the whole being arranged and operating substantially as and for the purpose set forth.

2d, The yoke, G, hinged to the vessel, C, and its spindle, H, and pinion, I, for operating the plunger rod, H', as described.

3d, The combination of the perforated casing, E, and a funnel-shaped ring, hinged to the casing, as and for the purpose set forth.

4th, The plunger, K, attached to the under side of the plunger, I, by a dove-tailed projection, r, or equivalent fastening, for the purpose specified.

**81,752.—EVAPORATOR.**—B. F. Cauffman, Millersburg, Pa.  
I claim the furnace, A, provided with double dampers, c, c, and dampers, e, e, in combination with small side furnaces, D, boiler, F, and pan, H, and the lbs. K, the several parts being constructed, arranged, and used as and for the purpose specified.

3d, The arrangement of the track, d, car, E, and windlass, h, with the grate of the larger furnace, A, with the side furnace, D, when operated and used as and for the purpose set forth.

**81,753.—ROPE MAKING MACHINE.**—Charles Clark, Dayton, Ky.  
I claim the arrangement of the hollow journaled revolving frame, E, gravitating friction bars, H, H', hangers, G, G', and guides, K, K', K', K', W, positively rotated delivery rollers, N, N', for the purpose set forth.

**81,754.—WHIP HANGER.**—Pindar F. Cooley, Pittsfield, Mass.  
I claim, 1st, The notch, n, with the under curviform-surface line, g, substantially as and for the purpose set forth and described.

2d, The rim, A, constructed circular, square, oval, or any other form, provided with the notches, n, n, as described, and the supporting rods, o, o, o, or their equivalents, and all in combination with the swivel, C, as and for the purpose set forth and described.

**81,755.—COMPOUND FOR EMBALMING DEAD BODIES.**—Elliott H. Crane, Burr Oak, Mich.  
I claim the discovery, application, and use of an embalming and mummifying compound for the preservation of the dead, and for taxidermie purposes, as prepared, compounded, and applied, substantially in the manner specified and described.

Also, the application of this compound, in dry powder, to the mouth, throat, and other natural apertures of the subject, substantially as specified and described.

**81,756.—TRAVELLING TRUNK.**—Geert De Bretton, (assignor to himself and Joshua E. Vose), New Orleans, La.  
I claim, 1st, The combination of part, D, with the trunk body proper, when these parts are united, constructed, and arranged so as to be convertible into a system of shelves, substantially as herein described for the purpose set forth.

2d, The above combination in combination with the extra cover, A, when the several parts are united, constructed, and arranged for conjoint operation, substantially as described for the purpose set forth.

3d, The hump, J, and metallic straps, C, when severally constructed as described, in combination with a trunk provided with a part, D, and an extra cover, A, substantially as herein described for the purpose set forth.

**81,757.—AUTOMATIC CRADLE.**—Sylvanus G. Delano, Grand Blanc, Mich.  
I claim, 1st, The adjusting plates, C, in connection with the cradle body, A, and frame, B, substantially as herein described.

2d, The pivoted plate, E, in connection with the vibrating lever, G, when attached and operating substantially as and for the purposes set forth.

3d, The combination of the above named parts with any suitable clock movement, when arranged, constructed, and operating substantially as described, and for the purposes designated.

**81,758.—WHEEL FOR CARRIAGE.**—W. H. De Valin, Sacramento, Cal.  
I claim, 1st, Using the rim or tire to the hub or axle by means of a series of straps or bars of wrought iron, each bent at the middle, where it is attached to the rim, and having its diverging ends extending thence to the hub or axle, to which they are united in the manner set forth.

2d, The combination, with the elongated hub, and the axle upon which it is mounted, of the rim or tire, and a series of wrought iron straps or bars, for steadying and bracing the said rim, and for holding the same to the hub, the whole being arranged in the manner set forth.

**81,759.—COAL MINING APPARATUS.**—George Edmund Don-Ishtorpe, Leeds, England. Patented in England, April 23, 1868.  
I claim the combination, in mining machinery, of the traveling carriage that carries the mining mechanism, with a yielding pressure wheel, which, while pressing the said carriage upon its track and preventing its rise, permits it to be moved forward without relaxing the pressure, the combination being substantially as set forth.

Also, the combination and arrangement of the said traveling carriage, that carries the mining mechanism, with an air cylinder, to apply the pressure required to hold the said carriage upon its track, substantially as above set forth.

**81,760.—COAL MINING APPARATUS.**—George Edmund Don-Ishtorpe, Leeds, England. Patented in England, May 22, 1868.  
I claim the combination, in mining machinery, of a carriage capable of being moved by mechanism slowly along the face of the coal or mineral, a cutting tool, which is supported and guided that a reciprocating to-and-fro motion may be imparted to it by the power of the workman, substantially as herein described.

**81,761.—MACHINE FOR TURNING RODS.**—Frank Douglas, Norwich, Conn.  
I claim, 1st, The arrangement of the inclined cross cutting knife, e, with the knives, e', e', in a tubular cutter head, when constructed and operating substantially as and for the purpose set forth.

2d, The guide, F, when constructed with the openings, m, m, and the notches, n, n, and operating in connection with the lock, o, and the tubular cutter head, substantially as and for the purpose set forth.

3d, The arrangement of the grooved rollers, R, R', at the rear end of the cutter spindle, substantially as described.

**81,762.—REVOLVING FURNACE FOR ROASTING ORES.**—Fredrick Ernst, San Francisco, Cal.  
I claim, 1st, The hearth, D, revolving between the inner and outer walls, B, C, or the furnace, with the circular rack, F, and flange, G, operating in the grooves of the rollers, H, H, substantially as described.

2d, The discharging apparatus, operating traversely across the furnace, above the rotating hearth, and consisting of the scrapers, N, N, attached to the endless chain, N', operated by the wheels, substantially as described.

3d, The construction of the hearth, D, with the circular flange, E, E, so as to retain the ore upon the surface of the hearth, and the stirrer, M, or its equivalent, to turn the ore as the hearth revolves, the whole constructed and operated substantially as described.

4th, The dampers, U, U', and sliding plate, S, arranged to be operated substantially as and for the purposes described.

5th, In revolving furnaces, carrying the ore in one direction on the hearth, while the heat, flame, and gases pass in an opposite direction, substantially as described.

**81,763.—ROTARY STEAM ENGINE.**—Nelson B. Fassett (assignor to himself and William Humphrey), Adrian, Mich.  
I claim, 1st, The two steam backers, E and E', in combination with their respective radial pistons, F and F', constructed and operating in the manner substantially as set forth and described.

2d, The circular disks, J and K, in combination with the radial wings, a, b, e, and d, shaft, T, and rings, I and I', constructed in the manner set forth and described.

3d, The combination of the convex faced bar, f, and concave faced bar, f', for packing against the concave case, B', and rotary piston, B, respectively in the manner set forth and described.

4th, The combination of the slot wheel, L, with the crank arm, K, friction roller, x, and stop wheel, M, constructed in the manner set forth and described.

5th, The steam chamber, m and m' or m'', in combination with rotary piston B, and center piece, G, respectively, as set forth and described.

**81,764.—VISE.**—Isaac Fisher, St. Louis, Mo.  
I claim the combination of the steel flanges, b, b, with jaws, a, a, of a vise, and the soft metal clamps, x, x, substantially as shown and described.

Also, the combination of the rectangular flanges, c, c, with the vise jaws, a, a, by means of the removable blocks, d, d, g, g, substantially in the manner and for the purpose herein set forth.

Also, the arrangement of the pivot connection of the triangular block, J, with the removable block, d, when the said blocks are combined with one of the jaws, a, of my improved vise, substantially as and for the purpose herein set forth.

**81,765.—POTATO DIGGER.**—Elias T. Ford, Stillwater, N. Y.  
I claim, 1st, The dividers, E, E, with the tubes, H, H, shafts, J, J, armed with teeth, Q, Q, arch, T, draft bars, V, V, in connection with lugs, r, r, braces, L, L, the shafts, F, F, hinged to axle, B, with tubes, G, G, the adjustment of the dividers, E, E, varying the line of draft with pole section, B, r, the section, b, b, hinged to centers, d, d, the position of the separating teeth, Q, Q, Q, Q, underneath the dividers, E, E, and the open space, W, between, substantially as described.

2d, The pole section, B, hinged to the lugs, r, r, underneath, and in rear of the axle, H, in combination with the dividers, E, E, the lugs, r, r, to be adjustable in the manner and for the purpose specified.

3d, The vine cutter, o, o, with knives, S, S, plane or sickle edge, as hinged with swivel, U, underneath the pole sections, B, r, substantially as and for the purpose specified.

**81,766.—RECIPROCATING STEAM ENGINE.**—Alexander Caesar, Frederick Franklin, No. 4 Prince's Square, Baywater, England.  
I claim my improved engine, constructed substantially as described, that is, with each cylinder open at one end only to the atmosphere, and with the cranks of the driving shaft and the connecting rods of the pistons of such engines arranged to project from the shaft in the manner herein described.

**81,767.—APPARATUS FOR AMALGAMATING GOLD AND SILVER.**—Willard M. Fuller, Chicago, Ill. Antedated August 23, 1868.  
I claim, 1st, Discharging the tailings of an amalgamator through a conduit or outlet, the mouth of which is immersed in liquid, so that it will close such conduit against the admission of air, and at the same time afford a free and uninterrupted passage for the tailings, substantially as specified.

2d, The steam jacket, D, in combination with the kettle or vessel, C, and shell or case, B, substantially as described.

3d, The shell or case, B, when provided with pipes, E, L, and A, so that it can be operated interchangeably, either by water or by exhausting the air, substantially as specified.

4th, Placing the kettle, C, within an air tight case, B, so as to leave an annular space or flues between them, and connecting such space or flues with a discharge pipe, E, placed below, substantially as specified.

**81,768.—CARRIAGE SHACKLE.**—Wm. F. Gilbert, Derby, Conn.  
I claim the combination of the sleeve or bearing, D, arranged between the cheek, A and B, and secured by the bolt, E, with the head, G, of the tiller iron, the whole constructed so as to be united substantially as herein set forth.

**81,769.—DRILL.**—Frank Glasser, Mystic Bridge, Conn.  
I claim the adjustable lever, attached to the drill stock, as described, and consisting of the pivoted handle, G, screw, E, and drilled arm, D, all operating as set forth.

**81,770.—FLOUR DREDGE.**—E. A. Goodes (assignor to himself E. L. Miller, and W. H. Morford), Philadelphia, Pa.  
I claim the flour dredge, B, C, constructed that its perforations may be entirely closed, or a greater or less number be uncovered, substantially as shown and described for the purpose set forth.

**81,771.—FENCE-POST DRIVER.**—William S. Graves, Oberlin, Ohio.  
I claim segmental stay, D, and slotted rail, E, as arranged, in combination with the ways or guides, b, and frame, C, for the purpose specified.

**81,772.—POTATO DIGGER AND SEPARATOR.**—William Green, Holly, Mich. Antedated Aug. 23, 1868.  
I claim, 1st, Simultaneously adjusting the plow, and putting the apparatus into or out of gear with its driving wheels, by means of the sliding frame, E, E', and axle, D, when operating together for that purpose, substantially as described.

2d, The conveyor, G, in combination with the shovel, E, substantially as and for the purpose set forth.

3d, The use of the two rollers, H, H', for the purpose of detaching and separating the potatoes from the vines, substantially as described.

4th, The combination of the conveyor, G, cords, I, I, and rollers, H, H', substantially as and for the purpose set forth.

**81,773.—MACHINE FOR STRETCHING HAT BODIES.**—W. C. Griswold, Brooklyn, N. Y.  
I claim the combination of the tip stretching mechanism, consisting of the spokes, c', and star, m, with the brim stretching mechanism, consisting of the inclined stationary arms, d', and the expandible or spreading arms, i, all constructed, arranged, and operating substantially as herein specified.

**81,774.—MACHINE FOR POLISHING WOOD.**—Stinson Hagaman, Weisport, Pa.  
I claim the loose screw, i, set screw, j, nut, k, and slide, l, in combination with the shaft, E, and treadle, M, operating substantially as described, and for the purpose specified.

**81,775.—MAKING IRON.**—Alexander Hamar, New York city.  
I claim, 1st, The method, herein described, of introducing steam, superheated steam, or hydrogen, into the boshes of a blast furnace above the ordinary blast twers, for the purpose set forth.

2d, The method, herein described, of introducing steam, superheated steam, or hydrogen, into the stack of a blast furnace, for the purpose set forth.

3d, The method, herein described, of producing iron suitable for conversion into steel by the use of anthracite and a hot blast, in combination with the introduction of hydrogen or superheated steam into the furnace at different elevations.

4th, The combination, substantially as set forth, with a blast furnace, of twers, arranged at different levels in the boshes and stack, for the purpose set forth.

5th, The combination, substantially as set forth, with the furnace, of the jet pipes intruding into the interior of the boshes and stack, as and for the purpose set forth.

**81,776.—PLANING MACHINE.**—S. M. Hamilton, Baltimore, Maryland.  
I claim the vertically moving guide, R, constructed and arranged substantially in the manner and for the purpose shown and described.

**81,777.—HEEL PLATE FOR BOOTS AND SHOES.**—W. E. Hamlin, Jr., Providence, R. I.  
I claim the improved heel plate for boots and shoes, consisting of a plate made in two parts, A and B, constructed and fitted to each other so as to accommodate heels of different sizes, in the way substantially as described.

**81,778.—SUBMERGED ROTARY PUMP.**—D. D. Hardy (assignor to T. H. Foulds), Cincinnati, Ohio.  
I claim a pump, consisting of the case, F, with the pistons, G, inclosed therein, connected by the pipe, C, with the hydrant, B, and operated by the rod, H, all substantially as described.

**81,779.—LOCKING LATCH.**—J. Hardy, 2d, Andover, and B. B. Floyd, Lawrence, Mass.  
We claim a latch provided with the eccentric button, F, when arranged within the door, and operated, and operated by removable key or retained knob, J, substantially in the manner and for the purposes specified.

**81,780.—GRINDING MILL.**—Edward Harrison, New Haven, Conn.  
I claim, 1st, The husk or runner case, A, constructed in one and the same piece, with discharge spout, B, frame, C, connections, D, bearings, E and F, sockets, H, H, substantially as set forth.

2d, Fitting hopper, N, into sockets, H, in the manner described, when said sockets are a part of one of the husks of the mill.

3d, The rocker, P, pivoted to the husk, and so as to be operated by an eccentric or cam, S, on the pulley or shaft, substantially as and for the purpose specified.

4th, A double-faced stove, provided on its edge with a central flange, L, when the surfaces of the said flange bear the relative position to the face of the stone, so as to be set and adjusted, so as to present either face of the stone in the same relative position to the grinding surface of the other stone, substantially as and for the purpose specified.

5th, In combination with the subject-matter of the above fourth clause, the runner plate or bed-stone husk, constructed so as to receive the stone, substantially as and for the purpose specified.

**81,781.—TUBULAR AIR HEATER.**—B. R. Hawley, Normal, Illinois.  
I claim the diaphragm, B3, when perforated at b3, and otherwise arranged, as herein shown and described.

**81,782.—MITER BOX.**—W. H. Herbert, Blissfield, Mich.  
I claim, 1st, The oscillating bar, E, when constructed and operating substantially as and for the purposes herein set forth.

2d, An adjustable miter box, consisting of the two quadrants, D and L, frame, C, set screws, G, M and P, the rods, J, guards, K, saw guides, N, and oscillating bar, H, when arranged and operating substantially as herein described.

**81,783.—DEVICE FOR BINDING LOADS OF HAY UPON WAGONS.**—J. W. Hodges, Plymouth, Ill.  
I claim a combination of the two upright rack bars, B, B, the horizontal beam, C, its pawls, x, x, with the lever, D, its fulcrum, h, with the rack, A, all constructed and operating as herein set forth.

**81,784.—VENTILATOR FOR HAT.**—W. M. Irvine and A. H. Moses, Montgomery, Ala.  
We claim, 1st, A band or ring so constructed and arranged on the inside of a hat that it may be adjusted to different-sized heads, substantially as described.

2d, The band, A, constructed in either one or more parts, and furnished with tubes, e, and a slots, C, and tube, E, all arranged in the manner and for the purposes set forth.

**81,785.—APPARATUS FOR EXTRACTING WORT AND SIMILAR LIQUIDS.**—F. Jacoby, St. Louis, Mo.  
I claim, 1st, The application of a partial vacuum in the sub compartment of a mash tub, to cause the wort to accumulate more quickly, and to cause its extraction more thoroughly out of mash, substantially as set forth.

2d, The combination of the pump, E, its connecting pipe, D, with the concentrating head, C, and the drain pipes, B, and mash tub, A, substantially as and for the purpose set forth.

**81,786.—WHIP HOLDER.**—Albert W. Johnson, New York city.  
I claim, 1st, A holder for whips, etc., composed of jaws, B, in combination with a rest, M, or their respective equivalents, connected together so as to be operated and to operate substantially in the manner described.

2d, The jaws, B, sleeves, E, F, center-shaft, G, spring, O, and rest, M, when all constructed and arranged together for operation substantially as described.

**81,787.—HARNES MAKERS' CLAMP.**—Jesse F. Johnson, Montrovia, Ind.  
I claim, 1st, The guide pulleys, C, attached to the jaws, A, A', substantially as and for the purpose set forth.

2d, The holding bar, E, lever, G, H, e, and elastic strap, I, arranged substantially as and for the purpose set forth.

3d, The channeling tool, L, constructed and applied substantially as set forth.

**81,788.—HARNES.**—W. A. Jordan, New Orleans, La.  
I claim a metallic connecting termination or tip for certain parts of harness, as herein indicated, when the same consists of the self-tapering, angular tapering socket clamp, A, and a projecting loop, B, and is otherwise constructed substantially as herein described for the purpose set forth.

**81,789.—ESCAPEMENT.**—W. C. Kellum, San Francisco, Cal.  
I claim, 1st, The escape wheel, C, having escape teeth either on the side or

rim, and the notched impulse rollers, D and D', above and below, constructed and operating substantially as and for the purpose herein described.

2d, The detent lever, F, having the adjustable double-headed screw, e, e', or its equivalent, locking each tooth of the escape wheel twice at each revolution, either by spring or gravitation, substantially as herein described.

3d, The point, d, on the arm, G, and the point, e, on the roller, D, for unlocking, substantially as herein described.

**81,790.—SEEDING MACHINE.**—G. King and L. T. Shope, Frederick City, Md.  
We claim hinging the lower section of the seed spouts, P, V, to the tubes or spouts, R, M, as and for the purpose specified.

**81,791.—HAY RAKE.**—Watson King, Springfield, Ill.  
I claim, 1st, The rotating of the axle, A, by means of the gearing, C, B and D, herein described, whether spur or beveled, as applied to hay rakes.

2d, The lever, B, C, as shown in fig. 2, as applied to hay rakes.

3d, The collar, F, in combination with the geared lever, B and C, as herein arranged and described.

4th, The tooth, as constructed in fig. 4, in combination with the adjustable brace, L, and nut, M.

5th, The adjustable brace, L, as herein arranged and described.

**81,792.—CAM FOR OPERATING SHUTTLE BOX.**—C. H. Knowlton, Camden, N. J., assignor to Furbush & Gage, Philadelphia, Pa.  
I claim, 1st, In a drop-box loom, the within described system of ratchet wheels, H, and cam or doorways, C, with either smoke-stack, and arranged to be operated and to operate substantially as and for the purpose herein set forth.

2d, The friction clamps, T, in combination with the cams which operate the drop boxes of looms.

**81,793.—BURNING KILN.**—Balthasar Kreischer, New York city.  
I claim, 1st, The arrangement of passages, E, F, controlled by dampers, m, substantially as herein described, for carrying off the gases and products of combustion, through the doorways, C, of the kilns, and openings, e, f, d, controlled by dampers, g and j, communicating with an adjoining kiln or lower flue, D, as required.

2d, The top flues, F, F, in combination with the hollow doorways, C, and connecting tubes or passages, E, essentially as herein described.

3d, The double arch, G, to the kilns, in combination with the openings or tubes, H, and chamber or passages, m, made in the side walls of the whole structure or fire-end of either kiln, and connecting with the grate or fireplace as herein set forth.

4th, The bottom flue, D, arranged below the floor of the kilns, and transversely to them, in combination with the branches running to or from each kiln, in direction of the length thereof, and connecting by suitable openings, H, at their ends or doorways, C, with either smoke-stack, and controlled by suitable dampers, substantially as and for the purposes specified.

**81,794.—MACHINE FOR SEPARATING ORES.**—S. K. Krom, New York city. Antedated Aug. 5, 1868.  
I claim, 1st, Introducing the material upon the bed, I, in a thin stratum, close to the surface of the bed, substantially in the manner and for the purpose herein set forth.

2d, Traversing the material across the perforated bed, I, transversely to the length of the machine, that is to say, extending the bed, I, longitudinally of the length of the framework, A, and causing the material to traverse across its narrowest dimensions, substantially as and for the purpose herein set forth.

3d, The roller, L, arranged and operating as represented relatively to the discharge passage, J, for the purposes herein set forth.

4th, The trip wheel, C, and lever, E, G, or their respective equivalents, arranged to operate the bellows, D, and to the perforated bed, I, and its connections, as and for the purposes herein set forth.

5th, In combination with the perforated bed, I, and with the means for introducing and removing the material as specified, mounting the bellows, D, on a rocking shaft, S, and operating it by an adjustable vibrating motion, substantially as and for the purposes herein set forth.

6th, The gates, N and K, so arranged as to allow the separate or simultaneous changes in the thickness and velocity of the strata on the ore bed, I, substantially as and for the purposes herein set forth.

7th, In combination, the ore bed, I, with its feeding and discharging devices, the adjustable oscillating bellows, D, the trip wheel, C, and its connections, and the means, H, H, H', or their equivalents, for varying the rate of discharge through the passage, S, all arranged for joint operation, substantially as and for the purposes herein set forth.

8th, The within-described arrangement of the operating parts, C, F, and their connections, at the end of the main frame work, A, so that they may operate by a direct connection through the rocking shaft, S, with the bellows, D, and that the closed end of the frame, A, shall form one entire side of an enclosing case to protect the working mechanism, all as and for the purposes herein set forth.

**81,795.—PLANE FOR CUTTING BLIND SLATS.**—Carl Kupfer, (assignor to himself and Kund J. Fleischer), Madison, Wis.  
I claim, 1st, The bit, A, when constructed with sharpened upper and lower edges, 1 and 2, leaving two lips, 3 and 4, said lips to be at right angles with the upper and lower cutting edges, substantially as and for the purposes set forth.

2d, The combination of the bit, A, as described and claimed, with the plane stock, for the use and purposes specified.

**81,796.—HORSE SHOE.**—Benjamin Ladd, Ottumwa, Iowa.  
I claim, 1st, Making the inside face of the clip, where it joins the top face of the shoe, in a line with or even with the outer edge of said top face, substantially as described.

2d, In combination with the clips arranged as above claimed, one or more spurs on the top of the shoe, substantially as described.

3d, The shoe, as above described, provided with nail holes, as a means of fastening it, if the clips, or some of them, get broken off.

**81,797.—CONSTRUCTION OF ARCHES, TUNNELS, &c.**—George T. Lape, Summit, N. Y.  
I claim, 1st, The construction of sections or voussoirs, with horizontal dove-tailed tongues and grooves about their abutting ends, substantially as and for the purpose specified.

2d, In combination with said dove-tailed tongues and grooves, constructing said voussoirs or sections with rebates along their abutting sides, so that they will overlap each other, their joints or points of contact.

3d, The construction of sewers, aqueducts, and canals for bridges, culverts, tunnels, &c., by combining and abutting or securing to each other a series of sections or voussoirs, substantially as and for the purposes herein set forth.

**81,798.—ANIMAL TRAP.**—H. S. Leshar, Galesburg, Ill.  
I claim, 1st, The tilting platform, g, so arranged in combination with the trigger, I, and spring, m, that when the animal presses the platform down, it is released in position to prevent its escape.

2d, The hinged plate, k, so arranged in combination with spring, m, trigger, I, and tilting platform, g, that when the animal seeks escape over the plate, k, the tilting platform will be liberated, thus allowing it to fall to its original position.

**81,799.—SULKY PLOW.**—J. B. Lewis and J. E. Udall, Concord, Ill.  
We claim, 1st, The flanges, G, eccentrics, I, wrist pins, J, and pins, L, when constructed, arranged, and operating substantially as herein described, and for the purposes set forth.

2d, The compound lever, M, when constructed, arranged, and operating substantially as herein described, for the purpose specified.

3d, The combination and arrangement of the above-named parts with the frame, A, axle, B, bolt, H, seat, C, traction wheels, K, plow beam, D, plow, E, and quadrant, N, substantially as and for the purposes specified.

**81,800.—WAGON BODIES.**—Thomas E. Lewis, Pennville, Ind.  
I claim a wagon body constructed and operating substantially in the manner herein described.

**81,801.—WELL TUBE.**—Lorenzo Lovejoy, Malden, Mass.  
I claim the combination, with a well tube, of a series of curved or bent perforated tubes, when constructed, applied, and operating substantially as and for the purpose set forth.

**81,802.—RESERVOIR FOR COOKING STOVE.**—Albert Lyman, Troy, N. Y.  
I claim a metallic reservoir, constructed in the manner described, in combination with sliding covers, all arranged and for the purposes substantially as set forth.

**81,803.—FLOORING CLAMP.**—Donald D. Mackay, Whitestone, N. Y.  
I claim, 1st, The levers, A, pivoted together as at a, and furnished at their lower ends with atoms, c, having spurs, c', substantially as shown and described, for the purpose specified.

2d, The combination of the tripping lever, m, with the pusher block, B, the toggle brace, g, g', and the levers, A, substantially as and for the purpose specified.

3d, The arrangement of the pivots, e, of the pusher block, the slots, d, in the lever, A, and the springs, I, substantially as and for the purpose set forth.

4th, The arrangement of the ring, b, at the upper ends of the levers, A, carrying the pusher block, B, and toggle brace, g, g', substantially as and for the purpose specified.

**81,804.—CHECK VALVE FOR PUMPS.**—William R. Malone, Mason, W. Va.  
I claim the valve seat for check valves provided with the conical form from A to C, and the taper prolongation, D, provided with the opening in the side and with the stem and valve, constructed and arranged substantially as and for the purpose specified.

**81,805.—HINGE.**—Thomas D. McCall and Samuel Bushnell, Walton, N. Y.  
We claim the clamp hinges, a and n, with their joints, a, and the revolving cylinder, o, with its grooves, g, g, when constructed, combined, and arranged in the manner and to operate substantially as described.

**81,806.—PUMP.**—Theodore J. McGowan, Cincinnati, Ohio.  
I claim the "vacuum" chambers, b, b', when cast or otherwise formed upon the valve chest, substantially as herein described for the purpose specified.

**81,807.—CULTIVATOR.**—D. McNeely and C. J. Cady, Spurgeon, Ind.  
We claim, 1st, The combination of the draft beam, A, with plates, J, J, slots and set screws, e, e', and wheel, D, substantially as described.

2d, The arrangement of the beam, A, handles, B, D, wheel, D, plows, E, E, standards, C, C, C', cross beam, L, braces, K, o, o', o', and attachable and detachable rake, F, substantially as shown and described.

**81,808.—MOTH FLY TRAP FOR BEE HIVES.**—James D. Meador, Independence, Mo.  
I claim the tongue door, B, in combination with an illuminating floor, D all arranged and employed as herein described and set forth.

Also, the several parts, A, B, D, and the covered way, c, when constructed and combined as herein shown and described.

**81,809.—HOT AIR FURNACE.**—Martin Metcalf, Grand Rapids, Mich.  
I claim, 1st, The pipes, R, or their equivalents, when arranged with a drum, D, and extending downward as described, and for the purpose specified.

2d, The combination of a case, A, provided with passages, x, and a box, B, provided with a projecting flange, f, and slots, x, with the pipes, R, and the







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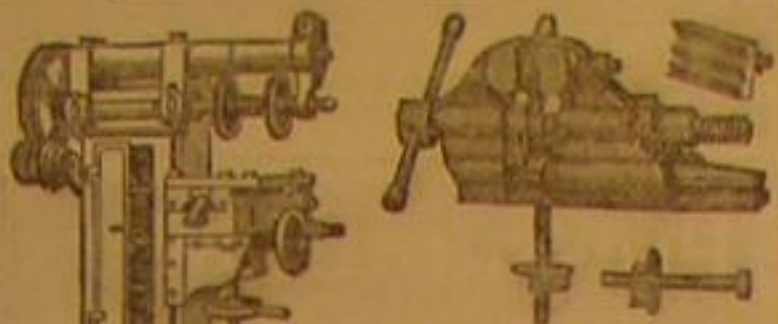
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**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 27, 1868.  
Emeline M. Woodruff (late Emeline M. Steadman), of Elizabeth, N. J., executrix of the estate of Geo. W. Steadman, deceased, having petitioned for an extension of the patent granted to said Geo. W. Steadman the 12th day of December, 1854, and renewed the 25th day of April, 1859, for an improvement in "Sewing Machines," it is ordered that said petition be heard at this office on the 25th day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Sept. 2, 1868.  
Birdsall Holly, of Lockport, N. Y., having petitioned for an extension of the patent granted to him on the 6th day of February, 1855, for an improvement in "Elliptical Rotary Pumps," it is ordered that said petition be heard at this office on the 11th day of January next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 28, 1868.  
Asaph H. Allen, of Boston, Mass., having petitioned for an extension of the patent granted to him on the 5th day of December, 1854, for an improvement in "Saw for Public Buildings," it is ordered that said petition be heard at this office on the 23d day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 31, 1868.  
Jeremiah Stever, of Bristol, Conn., having petitioned for an extension of the patent granted to him on the 12th day of December, 1854, for an improvement in "Machines for Scraping Metals," it is ordered that said petition be heard at this office on the 5th day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 31, 1868.  
John Pepper, of Guilford, N. H., having petitioned for an extension of the patent granted to him on the 5th day of December, 1854, and renewed on the 27th day of October, 1859, for an improvement in "Circular Ketting Machines," it is ordered that said petition be heard at this office on the 23d day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Sept. 4th, 1868.  
Samuel N. Miller, of Dedham, Mass., having petitioned for the extension of the patent granted to him on the 29th day of June, 1852, for an improvement in "Combined Anchor," this application having been authorized by Act of Congress, approved July 20, 1858, it is ordered that said petition be heard at this office on the 23d day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Sept. 14, 1868.  
Cyrenus Wheeler, Jr., of Auburn, N. Y., having petitioned for the extension of a patent granted to him on the 5th day of December, 1854, and renewed Jan. 3, 1859, in seven divisions, numbered 575, 576, 577, 578, 579, 580, and 581, and renewed 575, 576, 577, 578, 579, 580, and 581, and renewed 575, 576, 577, 578, 579, 580, and 581, it is ordered that said petition be heard at this office on the 23d day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
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ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Sept. 14, 1868.  
Cyrenus Wheeler, Jr., of Auburn, N. Y., having petitioned for the extension of a patent granted to him on the 5th day of December, 1854, and renewed Jan. 3, 1859, in seven divisions, numbered 575, 576, 577, 578, 579, 580, and 581, and renewed 575, 576, 577, 578, 579, 580, and 581, and renewed 575, 576, 577, 578, 579, 580, and 581, it is ordered that said petition be heard at this office on the 23d day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
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ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 22, 1868.  
James H. Whitney, of Brooklyn, N. Y., administrator of the estate of Theodore E. Weed, deceased, having petitioned for an extension of the patent granted to said Theodore E. Weed on the 22nd day of November, 1854, for an improvement in "Sewing Machines," it is ordered that said petition be heard at this office on the 9th day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 21, 1868.  
Whitten E. Kidd, of New York City, having petitioned for an extension of the patent granted to him on the 26th day of November, 1854, and renewed the 11th day of January, 1859, for an improvement in "Molds for Pressing Round Fronts," it is ordered that said petition be heard at this office on the 9th day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 3, 1868.  
Daniel G. Ambler and Halsted H. Hoag, of Jacksonville, Fla., administrators of the estate of Daniel C. Ambler, deceased, having petitioned for an extension of the patent granted to said Daniel C. Ambler on the 7th day of November, 1851, for an improvement in "Sewing Machines," it is ordered that said petition be heard at this office on the 2d day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 21, 1868.  
T. J. W. Robertson, of Washington, D. C., having petitioned for an extension of the patent granted to him on the 9th day of November, 1854, for an improvement in "Sewing Machines," it is ordered that said petition be heard at this office on the 9th day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 15, 1868.  
Charles Farham, of Philadelphia, Pa., having petitioned for an extension of the patent granted to him on the 21st day of November, 1854, and renewed on the 30th day of November, 1859, for an improvement in "Sewing Machines," it is ordered that said petition be heard at this office on the 2d day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 20, 1868.  
George W. Lee, of Winchester, Ohio, having petitioned for an extension of the patent granted to him on the 21st day of November, 1854, for an improvement in "Seed Planters," it is ordered that said petition be heard at this office on the 9th day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 12, 1868.  
Eliza Mascher, of Philadelphia, Pa., administratrix of the estate of John F. Mascher, deceased, having petitioned for an extension of the patent granted to said John F. Mascher the 8th day of March, 1857, for an improvement in "Jacquettype Case" (this application having been authorized by act of Congress, approved July 27, 1858), it is ordered that said petition be heard at this office on the 2d day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 12, 1868.  
John Cram, of Boston, Mass., having petitioned for an extension of the patent granted to him on the 25th day of November 1854, for an improvement in "Towel Stand or Clothes Horse," it is ordered that said petition be heard at this office on the 9th day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.  
12 3  
ELISHA FOOTE, Commissioner of Patents.

**U. S. PATENT OFFICE.**  
WASHINGTON, D. C., Aug. 12, 1868.  
Jacob Swartz, of Philadelphia, Pa., having petitioned for an extension of the patent granted to him on the 14th day of November, 1854, and renewed on the 5th day of June, 1859, and again renewed in three divisions, numbered 1,313, 1,314 and 1,315, on the 2d day of June, 1862, for an improvement in "Harvesters," it is ordered that this petition be heard at this office on the 2d day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed at this office twenty days before the day of hearing.  
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