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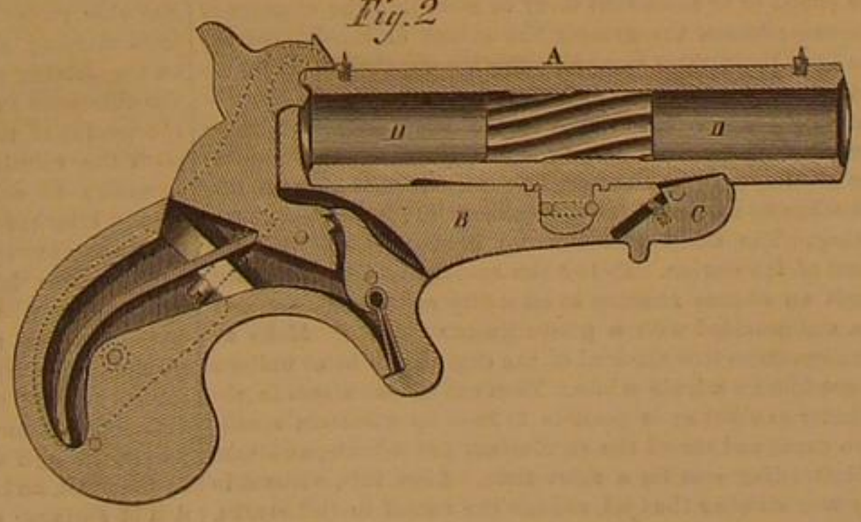
Patent Copper Cartridge Revolving Derringer.

The pistol represented in the accompanying engravings is a cartridge Derringer, loading with the ordinary copper shell cartridge, and discharging a ball weighing half an ounce, or of the same size and weight as a carbine ball. Fig. 1 represents a side view of the pistol, and fig. 2 a longitudinal section of it.

The leading ideas in this pistol are the mode of loading the cartridges, and the mode of expelling the shell of the cartridge after firing. In cartridge Derringers of the usual construction, the barrel, after firing, is opened at the breech, then the cartridge shell is extracted by a cartridge extracter, operated mechanically, after which the new cartridge is inserted into the breech, and the barrel is closed. In the new pistol here represented all this is changed; the barrel, A, is pivoted to the lock frame, B, at the exact center of its length, and is retained in the line of fire by a catch, C, of peculiar construction and arrangement. Each end of the barrel is chambered out, as at D, to receive a cartridge. (See sectional drawing.) When the pistol has been fired, the breech is not opened, nor is the empty shell extracted before loading (although it may be if desired); but the empty shell is left in the breech, while the new cartridge is inserted, ball foremost, into the muzzle, after which the barrel is turned half round on its pivot, so as to place the new cartridge in front of the hammer, while the empty shell is brought to the muzzle. Then the pistol is cocked and fired; whereupon the discharge expels the empty cartridge shell from the muzzle, in advance of the ball. By this system of loading and firing, the number of operations required are less than in any pistol hitherto produced; and, as a natural consequence, the pistol can be loaded and fired more rapidly than any other single barreled fire-arm, and more rapidly than any revolver, if more than six shots are to be made at a time. Experience has proved that at least twenty shots per minute can be readily fired; while the number can be increased to thirty or more per minute, by practice. The pistol can, also, be readily carried in the pocket. The advantages claimed are, that it is conveniently carried in the pocket, being less bulky than the ordinary pocket revolver; it carries a half ounce ball, or if desired, it will discharge two balls at a shot, thus firing an ounce of lead at a discharge; it can be loaded and fired from twenty to forty times per minute; its penetration is greater than that of any pistol of the class which has ever been produced; is superior in style or form, finish and workmanship, to any pistol of its class; is extremely simple in its construction, and can be manufactured at a low cost; may be kept in the pocket, or under a pillow, without danger of going off accidentally, as the loaded shell may be retained at the muzzle until the pistol is to be fired, when it is transferred to the breech while the pistol is being cocked. The simplicity of operation of the new pistol is so great, and its efficiency so marked as to render it peculiarly adapted for naval warfare.

Fig. 1

Fig. 2



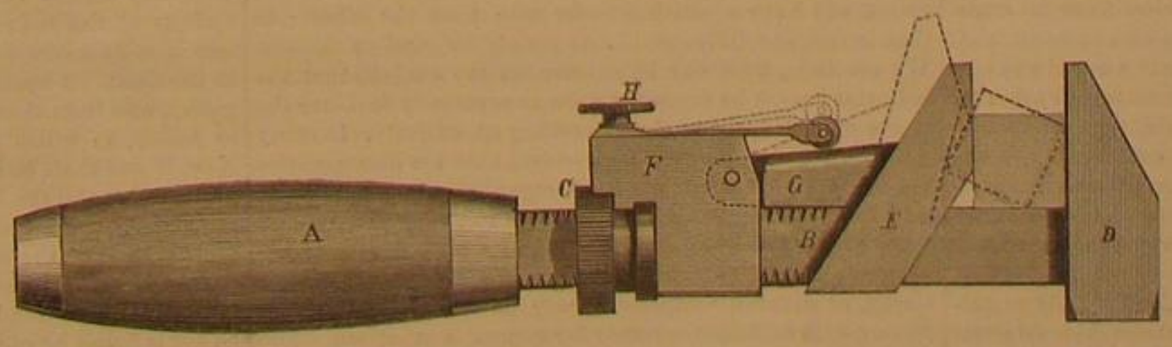
The pistol embodies may novel features, which are covered by several patents, full information respecting which may be had from E. S. Renwick, 34 Beach street, New York, who may be addressed for the purchase of the entire right, or for an exclusive license to manufacture under the patents.

Improved Screw Wrench.

No hand implement used by mechanics has a greater number of applications than the screw, or monkey wrench. It is almost indispensable in the machine shop and the engine room, and of the greatest service otherwheres. The necessity, however, of removing it from the nut or bolt head at every partial revolution and again replacing it, renders it a less perfect instrument than it otherwise would be. To avoid this annoyance and waste of time is the object of the invention herewith illustrated.

The handle, A, shank, B, nut, C, and jaw, D, are of the usual construction. The jaw, E, however, instead of encompassing the shank and being thereby compelled to move along upon it, is hinged to the saddle, F, by an arm, G, and its base is slotted to embrace the sides of the shank and slide along upon it, being held in place by a spring and roller fixed to the saddle by a set screw, H.

By this device the jaw, E, is thrown up from the nut, when it is being unscrewed, by simply turning the wrench on the nut as a center, by which the jaw is lifted from the shank, as shown by the dotted lines. When the wrench is turned in the contrary direction the jaw is actuated by the spring and moves back to take a firm hold on the nut. Thus, using the nut or bolt head as a center, the necessity of removing the wrench at each turn is avoided. It is evident the same arrangement is applicable to the pipe wrench. Every mechanic who uses the screw wrench in his business must see the superiority of one that can be used either for screwing or unscrewing without the trouble of removing and replacing the implement several times at each revolution over those in ordinary use. Patented June 30, 1868. Address, for the whole right or for rights to manufacture, Bradshaw & Lyon, Delphi, Ind.



THE PERRY & GODDARD "DOUBLE HEADER," OR "PERPETUAL REVOLVER."

BRADSHAW & LYON'S SPRING-JAW WRENCH.

THE taxes in England, for 1868, amount to £68,000,000.

ELECTRO-DEPOSITION OF IRON.

Means whereby the electro-deposition of iron could be accomplished have long been sought, although with but very partial success. Some recent experiments by M. Klein, St. Petersburg, as given in a letter by him to M. Jacobi, of Paris, having met with a larger measure of success than has hitherto been obtained, are worthy of attention. M. Klein has produced by electro-deposition casts, as follows:—1st, a tablet of iron, 150 centimeters square, and 2 millimeters thick; 2d, of several medals; 3d, of a medallion composed of thirty-four cameos, and 13 centimeters in diameter; 4th, of a page of movable type stereotyped in iron, 84 centimeters square, and the block of a drawing, guillocheed with the most delicate strokes, both destined for the typographic press. The first plate and the first medals prepared by him, present on the reverse sides, sundry porosities and cavities, penetrating even in some places the entire thickness of the deposit. He attributes these cavities to bubbles of gas, but he has recently been able to avoid them. His starting point was the known process of covering engraved copper plates with a coating of steel, which is quite successful in a bath composed of the chlorides of ammonium and iron, to which he added a minimum quantity of glycerin. Nevertheless, all who have attempted coating with steel must have observed, when endeavoring to give greater thickness to a very thin and brilliant layer of steel, that the surface cracks, and the deposit detaches itself from the cathode in very brittle spangles. Other baths, composed in a uniform manner, and capable of being employed under the same conditions, must therefore be used. They may be classed under two categories, comprising baths composed of sulphate of iron, and sulphate or chloride of ammonium. The first bath consisted of a solution of the double salt sulphate of iron and sulphate of ammonium; the second was composed of an admixture of the concentrated solutions of each of these two salts, in the proportions of their equivalents; the third bath, which distinguished itself meritoriously from the others, was obtained by taking a solution of sulphate of iron, precipitating the iron by carbonate of ammonium, and dissolving the precipitate in sulphuric acid, thus avoiding all excess of acid. For the preparation of the baths in the second category, he either mixed solutions of chloride of ammonium and sulphate of iron in the proportions of their equivalents, or dissolved in a solution of sulphate of iron, at a temperature of about 15° Reaumur, as much chloride of ammonium as it would take. All these baths were as highly concentrated and as neutral as possible. For an anode, plates of sheet iron were used, presenting a surface nearly eight times as large as that of the copper cathode. Upon the employment for decomposition of one of Daniel's cells, there were formed upon all the cathodes, in the course of twenty-four hours, irregular deposits full of cracks, which, on the slightest attempt to remove them, broke into a thousand pieces.

A continuation of the experiments, for several days, produced no better results, the solution not improving by use, as is often the case with copper solutions used in electrotyping. An employment of a weaker battery improved the results, but still left much to be desired. An examination of the bath showed an increasing acid reaction, owing to the deposition of iron upon the cathode more rapidly than it was dissolved from the anode. To augment the solubility of the anode, a plate of copper was plunged in the bath, and combined with the iron.

The result of this combination was most surprising; not only did the baths in the first category become re-neutralized in a few hours, but the deposits became much smoother, their color a dull gray, and adhered perfectly to the cathode without forming bubbles, or cracking in any part. Their surfaces remained quite smooth during the first twenty-four hours, after which there began to form, in several places, the characteristic cavities, corresponding, so to speak, with those mam-

miliary bubbles so often seen in the electro-deposition of copper. By reducing the energy of the current, either by reducing the strength of the solution or increasing the resistance in the solid parts of the circuit, so as to render the evolution of gas imperceptible, the formation of these bubbles ceased entirely. M. Klein found the strength of the solution should vary with the material of which the cathode was made. In all cases the cathode was required to be perfectly clean and smooth.

Galvanic iron, when first taken out of the bath, is as hard as cast steel, and very brittle, but when annealed at a temperture of dull redness, it loses much of its harshness and hardness; when further annealed to red heat, it is malleable, and may be engraved as easily as soft steel.

When made under favorable conditions, and annealed uniformly, and with the proper precautions, electro-deposits are not subject to twist, bend, or blister. There is no contraction, but, on the contrary, an almost imperceptible dilatation; this is of importance where the complete similarity of blocks is required, as their dimensions should receive no sensible alteration on being annealed. The specific gravity of this iron before and after annealing, has not been yet determined.

It appears that galvanic iron has no permanent magnetism, but will receive magnetism like soft steel.

ON THE DURABILITY OF METALS.

At a recent meeting of the institution of Civil Engineers, London, a paper was read on the durability of materials, by Mr. Edwin Clark, C. E., in which was the following:

The durability of metals, like that of organized substances, depended, mainly, on the resistance they offered to combination with oxygen; and thus their decay might also be regarded as a slow combustion. But their durability further depended on the character of the oxides formed on their surface. Iron exposed to moisture was soon coated with rust, in the form of hydrated peroxides; and as these oxides did not adhere to the surface, additional flakes constantly formed and fell away, until the whole mass was destroyed. Wrought iron in a pure, dry atmosphere suffered, practically speaking, no deterioration in any lapse of time. It was extremely durable in distilled water free from air; but it was slowly oxidized in a moist atmosphere, and with fatal rapidity in air or water containing free acids or other corrosive agents. It was, however, efficiently protected from such agents by paint, which adhered to clean iron with great tenacity. It was also a fact, not hitherto satisfactorily accounted for, that oxidation was to a great extent arrested by vibration. The painting of wrought iron girders and roofs, more especially in the neighborhood of smoky towns, was a precaution of the utmost importance. Every care should be taken to expose the iron as freely as possibly to the air, to leave no hollows where water could collect, to avoid the contact of damp earth, and especially of vegetation, and to throw the material in the form of heavy bars rather than thin plates. Painting was more economically performed, and was more effectual, when constantly attended to, than under the vicious practice of laying on three or four coats and then leaving the work for years, till the paint all peeled off, with a layer of rust attached to it. The Britannia bridge furnished a striking illustration of the value of this system. The maintenance had been effected by two or three men, constantly on the work, who attended to the slightest symptom of local discoloration. As a consequence, the author did not hesitate to express his firm belief, that the total loss from rust of the 10,540 tuns of which the tubes consisted, did not in twenty years amount to a single pound weight.

Cast iron when exposed to the action of sea water slowly decomposes, the iron being dissolved, leaving behind a graphite or plumbago. The action was, however, superficial, and very slow. It could be preserved by painting, where accessible for that purpose, and by any protection which prevented continual renewing of the surrounding medium, as when enclosed by brickwork or masonry. In fresh water it suffered no such deterioration, and under ordinary circumstances its durability in a pure atmosphere appeared unlimited. In the case of zinc, although the bright metal oxidized even more rapidly than iron, yet the oxide adhered with such tenacity to the metal, that it afforded an efficient protection against the continuation of the process. To this property the metal owed its great durability. More especially as its oxide was insoluble in water. In the presence of any solvent of the oxide, this metal was so speedily destroyed as to be practically useless, unless protected by paint. The destruction of zinc in smoky districts was, however, principally due to galvanic action. A similar action produced the rusting away at the base of iron railings, when fixed in stonework, as was usually the case, by being run in with lead. The contact of copper with the iron plates of a vessel was also a source of great danger and there were numberless other instances in which the contact of metals of different conducting powers was equally destructive. In all such cases the use of paint furnished, at any rate, a temporary remedy.

It was difficult to over-estimate the value of the introduction of the process of coating iron plates with zinc, by simply cleaning and immersing them in the molten metal. All that had been said on the subject of zinc applied equally to galvanized iron, as it was called. In a clear atmosphere its great durability, its stiffness, its freedom from expansion, and its economy, were all qualities of the highest value; while on the other hand, without constant painting, it was wholly unfitted for the atmosphere of smoky towns, or manufactories, or even stations where it was exposed to the fumes from locomotives. Both the corrosive and galvanic actions, which in such cases were so destructive, did not cease with the destruction of the zinc, which was soon effected, but continued also to act, with fatal effect, upon the iron itself, as might be seen in many railway stations and sheds near manufacturing towns. The corrosive tendency in zinc and iron obliged the use of the less oxidizable metals copper and lead. Lead slowly absorbed oxygen and carbonic acid in moist air. It was acted upon by certain waters, and was occasionally riddled with holes by the larva of an insect; and its expansion and contraction required to be carefully allowed for in its use. Its ductility rendered it a valuable material. Copper might, however, in many instances, be used with great advantage in its stead.

The action of sea water on copper was so important, that it was particularly alluded to. The object of covering a vessel with copper was solely to prevent the adhesion of barnacles and other molluscs. This property was not due to the poisonous quality of its salts, as was sometimes asserted, nor was copper used on account of its durable qualities; on the contrary, its value depends on its slow destruction. The chloride of copper formed beneath the attachment of the barnacle being a soluble salt, the creature no sooner effected a lodgement than it was at once set free by the solution of the salt; while the salts which were formed on zinc or iron being insoluble, the plate was rather protected than otherwise by the tenacious parasite. Hence the difficulty of divising an efficient paint for iron ships; for while, on the one hand, it must be slowly soluble in water to prevent this adhesion, it must on the other hand, be sufficiently insoluble to be durable.

Ordinary oil paint was the most efficient material for protecting either metals or wood from the effects of moisture and air, but all oils, resins, and gums exposed to air, and especially to the light of the sun, oxidized and burnt away with more or less rapidity, leaving a powdery residue behind. As a preservative of paint against the heat of the sun and light, attention was directed to the virtue of a coating of silicious sand, dredged on the paint while wet. The durability of matter was a subject of the highest philosophical interest. The universal law on this planet appeared to be, that no form should be permanent. Never ceasing destruction and re-construction were characteristic, within the range of the atmosphere, of everything that existed, whether as regarded organic life or inorganic matter; and it was probable that even the atmosphere itself was subject to the same decree.

THE BEST MODES OF TESTING THE POWER AND ECONOMY OF STEAM ENGINES.

BY CHARLES E. EMERY, LATE OF THE U. S NAVY AND U. S. STEAM EXPANSION EXPERIMENTS.

Read before the Polytechnic branch of the American Institute, Oct. 22, 1868.

(*Continued from page* 308.)

The Richard's, or "parallel motion" indicator, is undoubtedly a great improvement upon the old style; but using one of the best of the first named instruments, made by Elliott Brothers, of London, and carefully adjusted so as to move freely, but without shake in the joints, we have found inaccuracies in the diagrams of from ten to twenty-five per cent. The results were so remarkable and unexpected, that we propose to point out ready means whereby anybody may repeat the experiment. As has been previously explained, the weight and friction of the moving parts of the indicator cause the pencil to be somewhat tardy in recording the changes of pressure; hence, the greater the extent or rapidity of the changes, the greater should be the discrepancies. If an engine be working full stroke, the steam and exhaust lines of the diagram will change so little that there will be time for the piston of the indicator to adjust itself to the pressure; the contrary will be the case, however, when the steam line is broken by expansion, or the exhaust line by extreme cushioning. The discrepancies would increase, also, with the speed of the engine. To test the amount of the variations, select an engine running at least fifty revolutions per minute, and provided with a good adjustable cut-off. Make arrangements so that the load of the engine will be as uniform as possible for a little while. Then cut off the steam in the cylinder as short as is possible to keep up a certain speed; then count and record the revolutions per minute, and take indicator diagrams for a short time. After this, without in any way altering the load, change the cut-off to full stroke, as nearly as possible, and adjust the throttle so that the engine will make exactly the same speed as before, and again take indicator diagrams. The operations may be repeated several times, to allow for inequalities in the load. The indicator diagrams, taken under such circumstances, though of different shapes, should of course show the same mean pressure, for the engine was developing the same power in all cases. In practice, however, the cards taken with a short cut-off will have a much greater area than the others; so that, in fact, the difference can be readily detected by the eye. We conclude, from our experience on the subject, that the indicator cannot be depended upon to accurately measure the power of high speed engines, working expansively. In many cases, in practice, we suppose however that the discrepancies are so small that they may be disregarded. In marine practice, for instance, the paddle engines run very slowly, and screw engines do not generally work at a high degree of expansion; and, in general, the power of all engines running slowly, or with little expansion, may be measured by the indicator with sufficient accuracy for general comparison. The difficulty occurs in cases like the locomotive or stationary engines working very expansively, at a speed of from fifty to two hundred revolutions per minute. In these cases, the indicator should be depended upon only in comparative tests where the engines run at about the same speed, with about the same pressure of steam and degree of expansion. The stiffer the spring of the indicator, the lighter the moving parts; and the smaller the range of the motion, the smaller will be the variations. Gooch's locomotive indicator seems to fulfill these requisites the best of any yet designed. The indicator is often applied to both steam and pump cylinders of pumping engines, when the difference in the power thus obtained shows the friction of the machinery.

The measurement of the power in the steam cylinder, by the indicator, is defective, also, because it takes no account of the friction of the engine. If all engines of the same power worked with substantially the same friction, this consideration would be of little or no consequence. But a multiplicity of parts, awkward proportions, improper fittings, weak framing, etc., may cause some engines to have far greater friction than others. Again, questions as to the proper size and speed of an engine are influenced by friction. For instance, if a large engine is more economical than a small one, will not the gain be balanced by increased friction? The only way of settling these questions is by measuring the net power of the engine or that which is available for useful work. This can be done by the dynamometer. This instrument is made in many different forms The friction dynamometer consists substantially of half clamps or boxes fitted to a revolving shaft, and kept from turning therewith by a lever held in position by weights, and a spring balance. When in use, the clamps are tightened, until they create sufficient friction to absorb the power; the weights are then adjusted, till they nearly balance. The amount of weight, the tension of the spring, and the speed of the shaft, are then noted, when the power transmitted through the shaft may be easily calculated; for the force of the weight and spring is multiplied by the lever in proportion to its length, divided by the radius of the shaft, and this multiplied by the velocity of the bearing surface in feet, per minute, gives the foot pounds. This form of dynamometer is little used, because it absorbs instead of transmitting the power. Beside, it is difficult, on a large scale, to maintain a constant friction for any length of time.

The dynamometers of greatest practical value transmit, and at the same time indicate the power, without in any way interfering with the regular duty of the engine. For instance, if the power be transmitted by means of a belt, and we can in any way measure the tension of the two parts, their difference represents a force, moving with a given velocity, which may easily be reduced to units of power.

A dynamometer on this principle has been used abroad, which was re-invented by Horatio Allen, Esq., President of the Novelty Iron Works, in this city, and by him applied to the engines used in the United States Steam Expansion Experiments. In this case the driving and driven shaft were separate, but lay in the same horizontal line. Near the contiguous ends large wheels were placed, with a V-groove in the circumference of each. An endless rope passed in both directions, over the top of one wheel, then under side pulleys, over the top of the other wheel. The side pulleys were below the center of the large wheels, and were of such size that the four parts of the rope leading to them hung vertically. These pulleys ran in bearings, free to slide vertically, and were connected to platforms carrying adjustable weights. The motion of the wheel, on the engine shaft, turned the other shaft in the opposite direction by means of the rope, but tended, at the same time, to lift one side pulley. The opposite side pulley was weighted sufficiently to keep the rope from slipping, and weights and a small spring were adjusted on the driving side to balance the lifting force. Then half the difference in weight, on the two side wheels, equaled the tension of the cord, or the driving force, which, together with the velocity of the cord, furnished the only elements necessary to calculate the power. This instrument had means attached to automatically record the strain on the cord, and answered its purpose very perfectly and satisfactorily. It was, however, too expensive and cumbersome for every day use. Three beveled wheels, on the above principle, have been used as a governor, and would doubtless make a good dynamometer also.

Steel springs, properly arranged, form, we believe, the best dynamometer for practical use. As commonly constructed, a pulley, through which the power is transmitted, is made loose on the shaft, and then is driven from it through the intervention of springs; or one shaft is driven from another in the same manner. It is necessary, then, in order to calculate the power, to ascertain the tension of the springs and their velocity where the force is applied. Neer's dynamometer, on this principle, may be taken as a type of its kind, and has given general satisfaction. The instrument must be attached in two places—one part to the driving shaft, and the other to the pulley or shaft to be driven; and the latter must not receive any motion except what is transmitted through the springs of the instrument. Secured to the instrument are two or more coiled steel springs, lying in the same direction as the shaft. A chain passes through each spring, around a pulley, and from thence to a circular hub on the other shaft or pulley, to which hub the end of each chain is secured. Now, if one shaft be moved, it tightens the chains and compresses the springs sufficiently to overcome the resistance, and put the driving shaft or pulley in motion. The longitudinal motion of the springs moves a hand on a suitable dial, which is graduated so as to show the horse power when the shaft makes one hundred revolutions per minute. The exact power is found by counting the speed of the shaft, and correcting the reading accordingly. The minor details of construction can best be explained by the manufacturers. The accuracy of an instrument of this kind can easily be tested by weighing the springs, measuring the distance from the center at which they act, and correcting the dials accordingly.

A good dynamometer is the only instrument that can be depended upon to accurately measure the useful work which

an engine is capable of performing; still the best instruments of this kind have many disadvantages for every day practical use.

In the first place, especially when great power is to be measured, the dynamometer must needs be a large, heavy, and expensive measuring machine, rather than an instrument; consequently, but few can afford to purchase it The dynamometers, at present in the market, are sold chiefly to establishments that rent rooms with power, where a small machine can be shifted about the building in the night, and attached so as next day to indicate the power used by any one of the tenants.

The steam indicator, on the contrary, is neat and compact, and can easily be applied to nearly every kind of steam engine. Its use has, therefore, become so general, that it is acknowledged throughout the world as the standard measure of the power of the steam engine. We have shown the instrument defective, still we cannot point out another, fit in every respect to take its place. We do say that the dynamometer should always be used to measure the power; but we acknowledge that, in a majority of cases, it is impracticable to apply it. Then, as we have proposed two methods of investigation, one for careful scientific experiment, and the other for practical and tolerably accurate comparison, we conclude that the first would always require the use of the dynamometer, and the latter whenever it is practicable to employ it. Generally, however, until a new instrument is perfected, we must use the indicator alone in ordinary practical trials. It should only be trusted, however, under the circumstances, and subject to the precautions we have before expressed.

(To be continued.)

VELOCITY OF NERVE FORCE.

The *Journal of Mental Science* contains an interesting article on the velocity of nerve force, comprising a description of the methods which have been employed to determine it. It says:

"The nerve current which transmits sensations to the brain, and the orders of the will to the extremities of the body, requires a certain time to travel in. Impressions coming from without are not perceived at the instant they are produced, they travel along the nerves at the rate of 20 to 30 meters (21·87 to 32 81 yards) in a second, which is the same as that of the carrier pigeon, of a hurricane, or of a locomotive engine at its quickest, but very much less than that of a cannon ball. For instance, we can only be conscious of an injury to one of our feet about one-twentieth of a second after it has actually occurred, and the commands of the will proceed equally slowly from the center to the peripheries of the nervous system. In the human body the time thus occupied is unimportant, but let us take the case of a whale, where the telegraphic network of the nervous system is far more extensive. A boat attacks the whale, and a harpoon is driven into its tail. The impression thus produced has to travel over some forty yards before reaching the headquarters of the will; a second is thus lost. How long a time is then required for reflection? That must depend upon circumstances; but at any rate it is certain that the will has need of some definite amount of time for its decision. The order to capsize the boat is dispatched to the tail, but another second must elapse before the telegram reaches its destination, and in the time thus employed the whaling boat has pulled off and escaped the danger.

"Several methods have been devised by physiologists for measuring the velocity with which nerve force travels. Thus, a physician of the middle ages, mentioned by Haller, fancied that this might be calculated by comparing the supposed diameter of the nerve tubes with that of the aorta, as he supposed the velocities of the blood and 'animal spirits' to be in the inverse ratio of the vessels containing them, from which data he calculated that nervous influence travels 600 times more quickly than light.

"Haller's own mode of procedure was scarcely more rational. He counted the greatest number of letters he could articulate in a given time, which he found to be 1,500 per minute. Now, the letter *r* requires, according to him, ten successive contractions of the muscle which makes the tongue vibrate, whence he concluded that this muscle can contract and relax 15,000 times, that is, can move 30,000 times in one minute. From the brain to the muscle the distance is one decimeter; if, therefore, the nerve force passes over that space 30,000 times in a minute, it must travel at the rate of three kilometers per minute, or fifty meters per second. We need not point out that this process is a mere series of mistakes, but it is strange that the result should happen to be so near the truth.

"No attempt was made until 1830 to study this question in a satisfactory manner, when one of the most distinguished of modern observers, M. Helmholtz, undertook its investigation. He at first employed Pouillet's 'chronoscope,' a machine in which a galvanic current of very short duration makes a magnetic needle deviate, the duration of the current being measured by the amount of deviation; by this means as short a time as some thousandths of a second can be measured. M. Helmholtz fixes one end of a muscle from the leg of a frog, and attaches the other to a small lever which forms part of a galvanic circuit, so that at the moment of contraction the circuit is broken and the time registered by the chronoscope. The current is first sent directly through the muscle, and then through a given length of nerve which has been left adherent: the difference in time between the two cases gives the velocity of the nerve force, which, by this process, is found to be 26 meters (85 feet 4 inches) in a second.

"In a second method, also, employed by M. Helmholtz, the lever raised by the contraction of the muscle has a point which traces a line upon a sheet of blackened paper, which is kept moving from the moment of excitation, and the curve produced by the movement of the lever registers all the phenomena of the muscular contraction. This apparatus, called the 'myograph,' gives the velocity of nerve force as equal to 27 meters (88 feet 7 inches) per second; several modifications of the instrument by different physiologists have given very closely agreeing results, and have also shown that the velocity is diminished by sending an electric current through the nerve, or by a low temperature.

"Experiments with the same object have been made upon man in the following manner: An electric current is suddenly applied to the skin, the moment of application being registered by the turning cylinder of a chronoscope, and as soon as the person experimented on perceives the slight prick produced by the current, he touches an electric lever by which a second mark is made upon the cylinder. The interval between the two, which can be thus measured, is made up of the following elements, viz., transmission of the impression to the brain, the mental process there gone through, the transmission of the voluntary impulse to the fingers, and the consequent muscular contraction. But if this experiment be performed on two different parts of the body, as for instance, at the groin and at the great toe, all the other elements of the delay will remain the same except the time occupied by the transmission of the impression upward, and the velocity of nerve in man can be thence calculated. M. Hirsch, the director of the Neufchatel Observatory, was the first person to make these experiments, in 1861, and from them he concluded that nerve force in man passes over 34 meters (111 ft. 6 in.) in a second. Dr. Schelske has repeated the same experiments, and deduces from them a slightly less velocity, 29½ meters (96 ft. 9 in.) per second. By similar means it has been shown that the rate of transmission through the spinal cord is the same as through the nerve trunks, and that a reflex action requires from one tenth to one thirtieth of a second more than the mere direct conduction of excitement to the muscles.

"The time required for certain cerebral operations has been measured by Dr. De Jaager in the following manner: it was preconcerted that the person on whom the experiment was made should touch the lever with his right hand when he received an electric shock on the right side, and with the left hand when he received a shock on that side. The interval between the shock and the signal was found to be 0·20 of a second when the subject of the experiment had been told beforehand on which side the shock would be given, and 0·27 of a second when he had not been told; 0·07 had therefore been employed in reflection.

"M. Hirsch, again, has found that on an average two tenths of a second must elapse before an observer can mark by a signal his perception of a sudden noise or flash of light, and MM Donders and De Jaager have varied their experiments thus—one of them pronounced a syllable, the other repeated it as soon as heard; when the syllable had been agreed upon beforehand, there was an average delay of two tenths of a second; when it had not been so agreed upon, of three tenths of a second. These are, however, only average results, and subject to considerable individual variations, of which the 'personal equation' of different observers of a transit is an example well known to astronomers."

Locomotive Engines.

Engineering says that although locomotive engineers are plain, practical "bodies," as would be said of them north of the border—and "muckle bodies" some of them are, too—they have nevertheless so idealized the locomotive engine that it has become with them a mechanical Apollo, and they would no sooner listen to any proposal to give it new forms than would the genius of sculpture, or its chosen disciples, to transform the *chef d'œuvre* of the Belvidere gallery into the traditional tripedal aboriginal of Manx, or, in other words, the three-legged *quocunque jeceris stabit* of the Isle of Man. The marine engineer may cut and carve his engines in a hundred ways, standing them on their heads or their heels, or lying them on their backs or their bellies (!), for they are neither fish, flesh, nor fowl, or, as sailors would say, "hog, dog, nor devil," but animated masses of ironmongry, and nothing better. But the locomotive engine is a horse of another color, and more than half of all the locomotive engineers in the world would, we are sure, were they to open their hearts, pronounce their favorite—rolling as it must, because it cannot fly—a heaven pacing Pegasus, and they would dwell upon his "points," albeit that he has neither mane nor tail, with the affection of a jockey caressing the favorite for the two thousand guineas.

Now, without exactly translating this iron horse into a gelding, it is requisite that he should be materially altered. Good looking as he may be, he is nevertheless the greatest beast that paweth the valley, and his pawing is really more than the valley can withstand. In plain English, the locomotive of 1868 is a monster which all good engineers should unite to destroy. He is the stalking horse of railway bankruptcy, the gaunt steed of railway ruin. It is time he was off to the knackers, and his carcass sold for what it will fetch in gun metal (precious little) and old iron. There are several counts of the indictment against this beast. But chiefly he will perform his plunging, racing, backing, gibbing, and shying only upon an iron railway. And of his sextupedal or octupedal hoofs there is generally one pair on which from ten to fourteen tuns of his carcass are supported. With these he will often "let out" in a manner to grind fire from the rails beneath him. Harnessed at his best, the train of traps at his heels has nowhere a wheel loaded to more than three or four tuns—the latter very, very seldom indeed, although the load is doubtless growing with the force of bad example. Now, to draw the line somewhere, no railway ought ever to be strained with a load of more than four tuns to a wheel. We can remember the locomotive shortly after he was foaled, and when, as a colt, he beat the devil's tattoo with his little wheels—heels we mean—weighing not more than five tuns on the hind pair; and he was a four-footed locomotive then, and not a six or eight footed nondescript as now. Bless his little boiler! He could, as he was then, ride on the footplate of the hard-mouthed stallions that tear over the rails now, and *they* would never feel it, although the racecourse, 'yclept "permanent way," might. But he has grown altogether too big, and he must either have more legs put under him or else be knocked on the head. There is a main pair of legs to every engine, through which it must exert all its strength on a pull. For a strong pull all the legs must pull together, and all must keep exact step with each other. This can only be secured by means of certain harness known as coupling rods, but when more than six legs at most are coupled, there is fretting and chafing. What with the difference in shoeing, and in the weight on each pair of legs, there is a constant tendency to get out of step, which only the coupling rods can restrain. When the beast has eight, ten, or twelve legs, as some of them have, coupling rods may be carried altogether too far. The weight is well distributed, no doubt—say to four, or at most, five tuns on a hoof—but the coupling rods do almost more harm than good, and in turning Tattenham Corner, or, in other words, a sharp curve, the off heels are playing mischief with everything on that side. The fact is, very long bellied horses, of the breed we are now dealing with, will never ride well in the ring. Dropping the metaphor, eight, ten, or twelve-coupled engines, having, therefore, necessarily long wheel bases, tear the way to pieces and themselves too.

And yet larger engines than almost any now in use are required to work heavy goods traffic with economy—say forty-five to eighty trucks, in a train on reasonably good lines. We see no solution of the problem of fifty-tun or sixty-tun engines, except in double bogies, like an American passenger carriage, each having its own pair of cylinders and working gear, but fed from a single long boiler with the firebox at the middle. This plan unites all the advantages of a single engine with those of twin engines, and avoids the disadvantages of both. Many of the American passenger carriages have each two six-wheel bogies, some of them two eight-wheel bogies. The sixteen-wheel carriage need not yet be repeated in the locomotive, but the twelve wheels, in two independent groups, may be and should be as soon as possible.

The system of engine building which requires a permanent way twice as strong as is necessary for the paying load, including wagons, to be drawn, is, on its face, wholly wrong, and nothing but habit and an almost pagan veneration for the outward form of the locomotive as George Stephenson left it, can account for the long continuance of a practice so palpably vicious. With properly constructed engines the permanent way need not be made nearly so strong as now, or, if the present strength were retained, the wear and tear, upon the plainest principles of action and reaction, would be very sensibly diminished.

The Phenomena of Supersaturation.

For a very long period the phenomena of supersaturation in saline solutions have perplexed chemists. Mr. Charles Tomlinson, F. R. S., has been experimenting and theorizing upon the subject, and has communicated to the Royal Society his conclusions and the grounds upon which they are based. We have only room to give the conclusions which, if substantiated, are important and interesting to chemists.

The conclusions arrived at by Mr. Tomlinson are: (1) That a number of hydrated salts form supersaturated solutions and remain so even at low temperatures simply from the absence of a nucleus to start the crystallization. (2) That a nucleus is a body that has a stronger adhesion for the salt than for the water which holds the salt in solution, a state of things brought about by the absence of chemical purity. (3) That three or four salts form supersaturated solutions which in cooling down deposit a modified salt or one of a lower degree of hydration than the normal salts. (4) That this modified salt is formed first by the deposit, in small quantity, of the anhydrous salt, which entering into solution, forms a dense lower stratum containing less water than the rest of the solution, in which lower stratum the modified salt is formed. (5) That salts of a low degree of hydration form supersaturated solutions, which on reduction of temperature, or by the action of a nucleus, deposit the excess of salt that held the solutions supersaturated, leaving them merely saturated.

Test of a Fire-proof Building in Chicago.

A test of a fire-proof building erected specially to prove the relative merits of wooden beams and floors covered with a preparation for rendering wood fire-proof, and iron beams and brick arches, was made in Chicago on the 26th October. The upper floor of the building was composed in part of iron and brick, and in part of the prepared wood. Wood was heaped up below and set on fire. The fire was allowed to continue 35 minutes, when it was, with much trouble, extinguished with an engine. The test was very severe, but the wooden flooring stood it very well. Several merchants, insurance men, and others were present, and expressed themselves highly satisfied. The comparative cost of wood thus prepared is only about one third that of iron and brick, hitherto used in fire-proof structures, and should future tests confirm the results of the one we have described, it will no doubt take the place of the more costly material to a great extent.

IN Durham, Maine, there is a family of six brothers, aged respectively, 80, 77, 75, 70, 66 and 64 years. The father of these brothers lived to the age of 80 years, and their mother 99 years.

Improvement in Steam Engine Valves.

The object of the improvement, shown in detail in the accompanying engravings, is to furnish a self-acting main valve to a steam engine or steam pump, actuated only by the pressure of the steam, the inlet valve alone being operated by the machinery of the engine; and to give absolute control of the inlet of steam, so that the engine, or pump, shall work equally well at high or low rates of speed and at differing pressures.

The inventor says the simplicity of the whole valve arrangement should recommend it, as it is a plain slide valve; any packing may be used on the valve piston and cylinder, and the cylinder may be constructed to suit the purpose; the valve piston is not subject to blowing, as steam is freely admitted from the steam chest on each side, except at the moment of action.

Fig. 1 is a longitudinal section of the valves, steam chest, and valve seat; Fig. 2 is a similar section of the same, leaving out the valve seat; the sections being taken in line with the steam passages on either side of the center of the main valve. Fig. 3 is an end view of the main valve cylinder, showing the means of seating it and adjusting it to the valve face of the steam cylinder. Fig. 4 is the rocker arrangement for moving the inlet and main valves.

A is the valve face, or seat, of a cylinder of common three-port construction; B, the steam chest; C, the valve cylinder bolted to the steam chest in such a manner as to allow shifting toward the main valve face; D is a stuffing box for the valve rod; E is the main valve bearing on the valve seat, A, of the main cylinder; F is a valve plate seated on the valve face, E, and held in position by the steam chest; G is the inlet valve worked by the main piston by the rocker, Fig. 4. The main valve, or piston, has its packing so fitted as to allow for its permitting the valve to always be seated on its face, as seen at H, Fig. 1, in combination with the arrangement for moving the entire valve cylinder, as in Fig. 3. The rocker, Fig. 4, consists of a quadrant, arm, and pins pivoted to the stud, I; the arm, J, pivoted also to the same center, has its other end connected to the piston rod, K. The bracket holding the center pin or stud of the rocker shaft is bolted to the frame of the engine.

Fig. 1

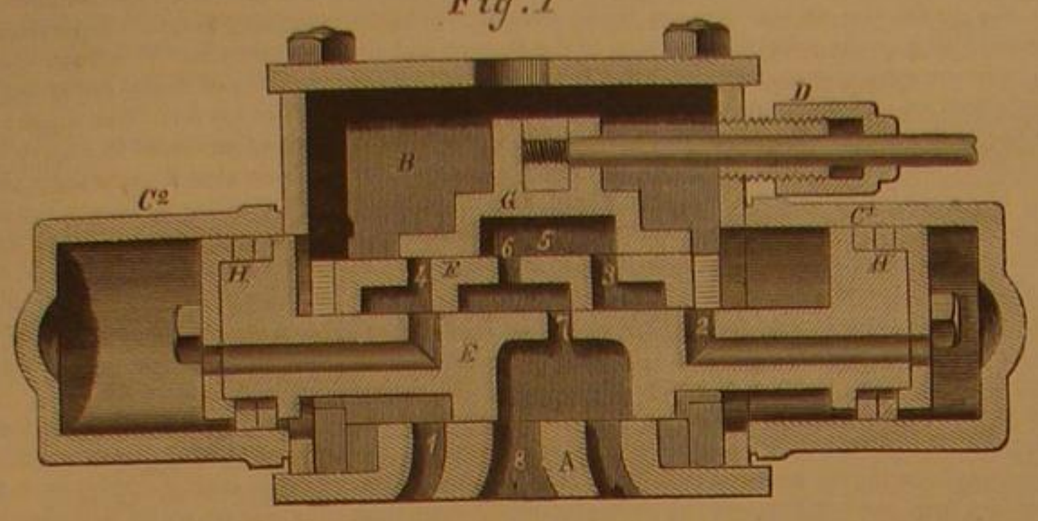
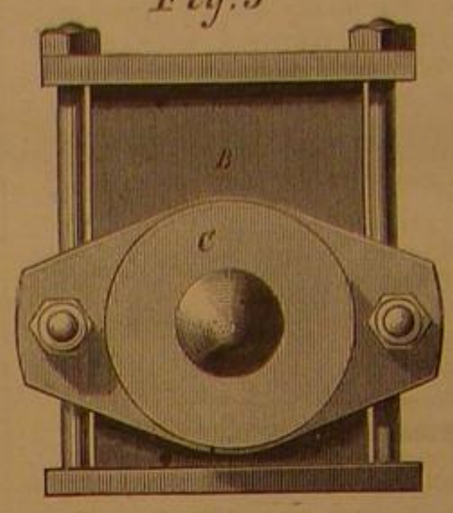


Fig. 3



THE REICHMANN'S PATENT VALVE FOR THE STEAM ENGINE.

Fig. 2

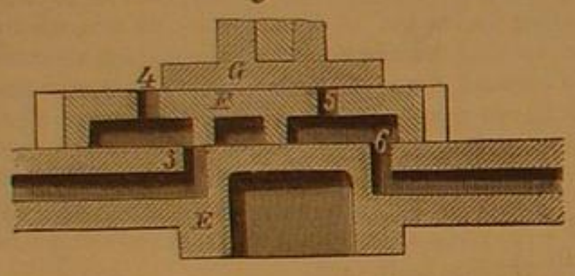
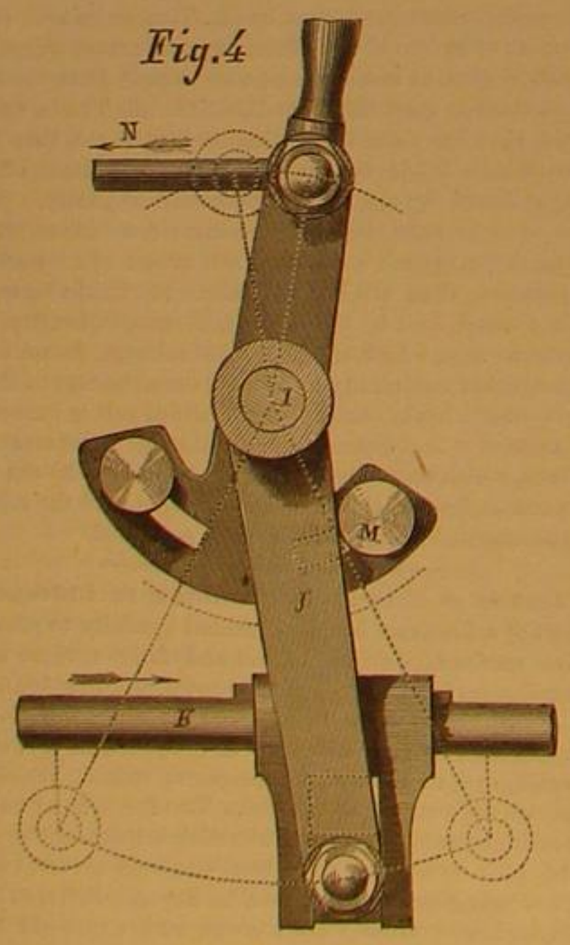


Fig. 4



The parts being thus described, it only remains to note their operation. Steam is admitted, as usual, through the opening, Fig. 1, and it enters the steam port, 1, and the port, 2, into the chamber, C1, of the valve cylinder, and also port, 3, Fig. 2, into chamber, C2, in consequence of which the main valve will remain in position; but, steam entering port, 1, the main piston will be moved in the direction of the arrow in Fig. 4, and on reaching the proper point will move the pin, M, and the rocker arm, and with it the valve rod in the direction indicated by the arrow, N, and dotted lines. This will close the exhaust port, 3, Fig. 1, and steam port, 4, Fig. 2, and open the corresponding ports, in consequence of which steam will exhaust out of chamber, C2, and from 4, into 5, and from that into 6 and 7, and thence to the main exhaust, 8.

Steam will enter into 5 (Fig. 2), into 6 to chamber, C1, in consequence of which the piston and valve will move in the direction from C2 to C1.

By a careful examination of the sections it will be seen that the arrangement of the combined valves is such that the motion of the main valve, caused by the inlet of the steam, will be governed by the force of the steam, whether the pressure be high or low, or the motion rapid or slow. In short, the device is a balanced slide valve, governed in its action simply and only by the force of the steam admitted to the steam chest. By making the inlet valve in the form seen in Fig. 2, the valve is considerably simplified, the ports, 4, 3, and 6, Fig. 1, being rendered superfluous.

Patented through the Scientific American Patent Agency Feb. 18, 1868, by Joseph Reichmann, who may be addressed for the purchase of the whole or a portion of the right, at P. O. box 1,408, Dubuque, Iowa.

Archeology-Discoveries in Tennessee.

Dr. Joseph Jones, of Nashville, Tenn., has been making extensive researches among the artificial mounds of Tennessee, and has been rewarded by a large number of interesting and important discoveries. Excavations made during the war at Chattanooga, Knoxville, Murfreesboro, and Nashville, brought to light many curious remains which were taken away by northern soldiers. Enough was revealed, however, to show that these relics were of a remarkable character and that they would repay a systematic examination. Dr. Jones has latterly been prosecuting his researches with great zeal, and has succeeded in securing a very large and valuable collection of relics. The result of his labors were made the subject of an interesting lecture by Dr. Jones to the citizens of Nashville on the evening of Oct. 21st, an abstract of which we copy from the *Nashville Press*:

"The Doctor gave an account of his researches into a large mound in Giles county. Here, in the center of the pyramid, he discovered the remains of a great chief buried with numerous relics, and around him the skeletons of some of his subjects. Drifting into the sides of the artificial mounds, ashes, bits of pottery, and bones of both human beings and animals were found, mixed up in one incongruous conglomeration, often with beautiful specimens of vases and shell ornaments. Specimens of the burned crust of these mounds, beneath the present soil, were exhibited. Two large stone idols were shown, carved out of a dark iron colored rock, the largest some thirteen inches in hight, and the other perhaps four inches less in stature. One represented a female, and has the hair gathered up behind under a diminutive sort of a waterfall, while in the longer specimens, that of a male, the hair was represented twisted into a sort of cue, not unlike the style of our forefathers in the revolutionary times.

"The lecturer, to please the lady hearers, gave a short description of the *tout ensemble* of one of the female mound builders. With hair gathered in a graceful knot behind ears pierced and filled with huge rings of shell or bone, nose likewise ornamented with an enormous balancing weight, she must have been an enchanting creature. Two copper crosses were exhibited, together with three vases, the outsides of which were divided into the three regular compartments, having three crosses and three crowns, symbolic, the Doctor claimed, of the Christian religion, the Trinity, and the Virgin Mary. The signs of the Catholic religion, he stated, were wonderfully prominent in a great many of the relics thus far brought to light. On the great mound near Franklin, two hundred and thirty feet in diameter, evidently stood a gigantic temple of the sun. Religious symbols were plentiful there.

"Two remarkable vases were exhumed, one not unlike a child's foot, with the opening at the heel, and the other surmounted with a carved head with a helmet, having a remarkable resemblance to that of a Spanish cavalier. The speaker inferred from this that the extinct people were not unfamiliar with the haughty râce whose conquests in Mexico and Peru read almost like romance of the wildest character. Here he found, too, the skeleton of a child, the face of which was covered with a curious shell bearing occult hieroglyphics, among which could be distinguished perfect triangles. This mound was graced with the stump of a tree, which, when cut down twenty years ago, could not have been less than two centuries old.

"An idol exhumed from the mouth of Lick Branch, Nashville, was also displayed, and a small female effigy in white clay, with the marks of the cross upon the shoulders. The Doctor everywhere found traces that the aborigines of this country may have come in contact with civilized nations long before the discovery of America by Columbus.

"He gave a short sketch of some of the explorations of the Scandinavians, Danes, and Icelanders, and the colonies they founded in the New World. But to these fearless navigators could not be ascribed the knowledge the mound builders of Tennessee had of the cross and the symbols of religion. It was rather to be referred to a late period, when the early Catholic missions were founded upon the shores of the New World some three hundred years ago. In 1564 the Catholic sovereign of Spain was attacked with a terrible religious zeal, and he sent one Francisco, with a large body of co-workers, to convert and evangelize the Indians.—They planted themselves at St. Augustine, on the shores of Florida, and for twenty-five years the missionary was very successful. He founded a great many missions, and partially Christianized a great many of the savages. Delegates were sent to the parent society of St. Augustine and to the convent of St. Helena. The Spaniards appear to have encouraged marriages between the young people of their own race and those of the Indians, and to have lived with them on terms of greatest intimacy.

"The mound builders of Tennessee, the Doctor thought, must certainly have belonged to the great Natchez tribe, who coming from the South, spread themselves throughout the valley of the Mississippi and its larger branches. When in the hight of their empire, they probably number 500,000. The lecturer thought it extremely curious, the mixture of Christianity and idolatry found among those people. While the great fundamental principles of the true religion were so familiar to them, they worshipped stone effigies and adored the sun, they were probably guilty of human sacrifices. The Doctor exhibited a great number of implements of warfare, such as stone axes, arrow heads, knives, spears, etc. Also, culinary utensils, mortars used in grinding Indian corn, and paint. The lecture was listened to throughout with the greatest interest, but time fails us for more than a passing sketch of its riches."

Polishing Wheels for Dental and Other Small Steel Instruments.

A correspondent of the *Dental Cosmos* describes a method of making polishing wheels for small steel instruments as follows:

"Take a piece of sole leather of a size suitable for the desired wheel, make a hole through the center and attach it to the lathe in the same manner as a corundum or cotton-polishing wheel; then with a sharp chisel turn it down to the size desired; coat the face of it with glue, and apply as much coarse emery as the glue can be made to take; put it aside to dry, and you have polishing wheel No. 1. Make another in the same way, only using flour of emery instead of the coarse, for No. 2. Form a third wheel in the same manner, but instead of the glue and emery, apply crocus with water, for No. 3. The wheels I use are about an inch and a half in diameter, but may be of any size convenient to the lathe, and by fastening several of these together with common shoe pegs will give any thickness desired.

"The labor of polishing is diminished by turning little grooves into the face of my wheel before applying the emery.

"An excellent wheel for carrying the pumice, in polishing vulcanite can be formed by fastening together two of these leather wheels with brass screws (common wood screws), between which are three or four thicknesses of woolen cloth cut somewhat larger than the leathers. This woolen cloth carries the pumice better than anything I have yet found. When it becomes worn down to the leather, it can be removed by taking out the screws, and new cloth substituted. The leather keeps the wheel stiff and firm, and, as the cloth becomes worn down, will not scratch the plate, even though it should touch it."

Castor Oil for Leather.

A correspondent in our last number recommends the use of castor oil for harness. The Wisconsin *Farmer* says: "We notice in our exchanges numerous recipes for making shoe leather water proof, most of them compounds, involving considerable trouble in preparation and more or less expense, and none of them half so good as the simple article castor oil, which can be bought at the drug stores for twenty-five or fifty cents a pint, according to your locality. Apply it to the boot when dry, and soak it by the fire till the leather is saturated. Treat the soles in the same way, being careful to dry in well so that they will not grease the carpets. We once treated a pair of calf boots in this way, and a few days after we walked five miles in saturated snow and water from six to ten inches deep at every step, and came out with feet perfectly dry. Castor oil will keep the leather soft, pliable, and black, though not glossy, and quite impervious to water."

THE BLOOD OF PLANTS.

Plants like animals depend for subsistence and growth upon external matter. Animals, havingthe power of locomotion, can go to their food. Not so with plants; the food must come to them. Animals are possessed of a mouth for the comminution of food and a stomach to digest it. Plants on the contrary, have neither, and their food is taken entirely unmodified by the performance on their part of the operations of mastication or digestion. We say food is taken, for food cannot properly be said to be taken until it has passed into the circulatory system. Stop up the vessels that convey the digested food of an animal into the blood, and the animal would die of hunger though the stomach were crammed. The mouth is a mill which grinds; the stomach and other organs of digestion form a chemical laboratory which dissolves and converts all food into a fluid capable of becoming blood by the absorption of oxygen. It gets its supply of oxygen from the lungs during its first arterial trip, and the blood thus formed is drawn upon by the tissues to supply waste.

Plants are nourished also directly from their sap which we have by analogy called their blood; and though they have no mouths or stomachs to digest their food they can no more take undigested food into their circulation than can animals. The food must be comminuted and dissolved before it can become a constituent of plant blood. As an illustration of this fact let us experiment with a plant requiring, to form its tissues, silica, lime, magnesia, phosphoric acid,carbon, etc. Take the most thrifty specimen you can find, and place about its roots lumps of limestone, flints, soapstone, gypsum, charcoal and potash. Of course you will not be surprised to see it droop and die in a short time. But subject now these same substances to the action of heat and cold until the earthy matters are pulverized, mix them mechanically, pour upon them the fluid that is to plants what the gastric juice is to animals, and if the proper proportions are observed your plant will shoot at once into vigorous growth.

Nature provides for all this. She heats and freezes and grinds rocks into powder, enriches the mass by droppings of animals; pours water over beds of mineral salts and leaches it through the soil thus manufactured. The substances are now soluble and the plant sucks in the nutritious fluid prepared for it through its roots directly into its blood. This blood must, however, be aerated, that is, it must come into contact with the air. This is accomplished by the leaves of the plant which both inhale and exhale, as do the lungs of an animal, only there is no mechanical action required to bring the air into contact with the plant's lungs as are they are situated upon the outside,their work being supplemented by the twigs and roots which also have an absorbent power and help to supply the plant with the necessary oxygen. A large part of the carbon which constitutes the great bulk of the solid portions of plants is also obtained through the leaves in the form of carbonic acid, which is a chemical compound of six parts by weight of carbon with sixteen of oxygen.

Now let us look a little into the manner in which circulation takes place in plants. Cut a piece of grapevine as thick as your thumb straight across the grain. Do the same with a piece of hickory, and compare the two sections. You will perceive a striking difference in the internal structure of the two woods. The hickory is made up of concentric rings of woody fiber, the grapevine is full of small holes scattered all over the surface of the section. There are no signs of growth by successive layers in the vine section. The hickory has a thick bark, the grape vine has none, if we may except a thin cuticle scarcely thicker than paper. The difference in the two sections are characteristic of the two great divisions of plants—Exogens, those which grow by successive layers upon the outside, like the hickory; and Endogens, those which grow throughout their entire structure, like the grapevine. If we examine more closely the section of the hickory we can see that between each grain is a layer of spongy tissue. The minute holes seen in either the hickory or the vine, are the severed veins of the plant through which the blood flows. They cannot be perhaps called arteries, for as a plant has no organ corresponding to the heart of an animal, no division can be made of these vessels into arterial and venous systems, as in the circulatory system of animals.

Let us trace the course of the circulation of the sap through these vessels. If we cut off the stem of a young tree close to the root and place it in a solution of certain dyes innocuous to the plant, the coloring matter will pass into its circulation. After a little we shall find it has ascended to a considerable hight; a little longer and it can be detected in the leaves. The motion most obvious, then, is an ascending one, but this motion could not continue unless there was either a return flow somewhere, or an outlet for the ascended sap. There are both. The leaves reduce the volume of the sap greatly by evaporation of the aqueous portions, and the modified remainder returns through the bark to the roots of the plant, and there receiving an accession of newly absorbed food, travels over the same route again; supplying in its entire passage the material of growth to the plant.

The heart is a force pump which, in the animal economy, gives the primary and controlling impulse to the blood. Plants being destitute of a heart, the force which gives impulse to their blood, is an interesting subject of inquiry. The law of capillary attraction has been supposed to account for it, but it is not sufficient to account for all the phenomena of sap circulation. It is probable that another law of attraction by which membranes force fluids to pass through them with great force, comes into play here. We refer to what the learned call *exosmose* and *endosmose*, for want of any simpler terms. If a piece of bladder be tied tightly over the mouth of an empty bottle, and the whole immersed in a proper fluid, the fluid will pass through the bladder with such force as finally to burst the bladder from the internal pressure thus generated. The fluid passes through the bladder by virtue of a peculiar force not yet thoroughly understood, to which we have just referred. If the bottle were filled with the same fluid, the bladder tied over it, and then laid on its side so that the fluid should come in contact with the membrane, the fluid would be passed out through it, leaving a partial vacuum in the bottle. The evidence of the vaccum would be the depression of the bladder by the external pressure of the atmosphere, which, if the membrane were not too strong, would burst it inwards. The terms *endosmose* and *exosmose* are merely relative, and express the opposite directions in which this force acts. The same force has much to do with the circulation of the blood in animals, as well as plants.

The power exerted by this force is very great, and the circulation, especially in vines having small stems at the root and very large tops loaded with dense foliage, is very rapid. We once experimented with a flowering vine in our garden, which running up over an outbuilding must have covered with dense foliage a space of at least one hundred square feet. The main stem near the root was not more than three eights of an inch in diameter. When this plant was drooping for water, watering it at the root would revive it in twenty seconds. In that short space the water was absorbed by the roots into the circulation, and carried to the remotest twigs and leaves as was shown by their changing from a drooping to an erect position.

We have thus shown that the method by which plants are nourished is strikingly similar to the way in which plants are supplied with nutriment. A proper application of the analogies we have pointed out, and their relation to the growth of seeds or fruit, is the basis of all intelligent horti culture and agriculture.

PROPOSED METHOD OF SINKING THE PIERS FOR THE ST. LOUIS BRIDGE.

Extract From Report on Illinois and St. Louis Bridge. By JAS. B. EADS, C.E.

A number of designs and estimates were made by me to determine the most practicable, economical,and reliable method of constructing the parts of the channel piers below low-water mark. These designs and estimates included the use of cast-iron cylinders, of diameters varying in the different plans from three to fifteen feet, which were to be sunk to the rock and filled with concrete. The danger of scour, and the difficulty of binding these cylinders together beneath the surface of the sand, so as to insure stability under the strains produced by the thrust of the arches, induced me to increase their diameters in subsequent designs, until they became so great that wrought iron was substituted, and finally two cylinders, each of a diameter equal to the width of the pier, were tried with smaller ones about them, to complete the entire dimensions of the foundation. The same difficulty of binding these together in a manner to insure safety to the superincumbent masonry, in the event of deep scour, as well as to give promise of any great durability, still remained.

Cast-iron cylinders may be used with great advantage in forming subaqueous foundations in situations where there is no scour, but the dangers to be guarded against in this location would render them, I think, less reliable and more expensive than other methods.

My experience of the effects of fresh water upon wrought and cast iron, submerged for many years in the Mississippi, assures me that the latter can be relied upon as almost indestructible, but that wrought iron will oxidize or rust out so rapidly that in twenty years the strength of a bolt an inch and a half would probably be reduced one-half. To bind these cylinders together, beneath the sand, would greatly increase the cost of adopting them, and to use wrought iron to secure them above the sand would fail to insure durability. To undertake to do it with cast iron would be more expensive, and the slighest unequal settlement of the different ones composing the mass would be likely to fracture a material so brittle. To sink these cylinders either by the pneumatic process, or by any of the methods known, to the requisite depth, would be exceedingly expensive. The great quantity of iron required in them, and the fact that they must be filled with masonry, would render a foundation of the necessary dimensions, if composed of them, much more expensive than if made of stone alone.

Having arrived at this point in the solution of the most important problem connected with the design and erection of your bridge, I determined to construct the base of the pier entirely of solid masonry, within a water-tight floating coffer-dam, whose sides should be extended above water from time to time, as it sunk deeper and deeper, with its increasing burden of stone and cement.

Piers of smaller dimensions have been constructed in a similar manner, and placed upon foundations favorable to their permanent reception. When sand or mud has been interposed, and its removal rendered necessary, the sides of the floating vessel have been extended downward below its bottom, to form a chamber or kind of diving-bell beneath the masonry. Through the masonry, tubes were provided by which workmen and materials could descendinto the chamber; and through these tubes, air was forced to expel the water from the chamber, and enable the workmen to remove the sand or mud beneath the pier. These tubes required to have two or more air-locks or valves in them, that were closed behind the workmen or materials in their passage, to prevent the escapment of the compressed air in the chamber. This, of course, retarded the rapid progress of the work. To facilitate the excavation of the deposit an extra tube was introduced in the middle of the pier, and extended to the level of of the bottom of the air chamber. The water stood within this tube at the level of the surface of the river, and through it an endless chain, carrying scoops or excavators, was made to rotate around a pulley at the bottom of the tube, and another at the top, in this way the sand was rapidly exavated without permitting the escapement of air from the chamber, and without passing the deposit up through the air-locks. The workmen in the chamber were enabled to shovel it to the bottom of the tube, where it was taken by the excavator, and discharged in vessels above.

The gradual descent of the pier was managed by screws, supported upon false works, erected around and over the site of the pier. As the sand was removed below, the pier was allowed to settle by slacking the screws, as it was only partially water-borne. When it had passed through a considerable depth of sand, the friction of the latter upon the sides of the pier held it to such a degree as to take all the strain off the screws, and when it moved downward, it was sometimes so suddenly that the supports were strained severely.

The shortness of the season in which each one of the piers for this bridge must be put in position, because of the floods of summer and the ice of winter, and the great amount of deposit to be removed, renders the pneumatic process just described too slow for this case, as well as too expensive. For the safety of the workmen beneath the pier, it is absolutely necessary to regulate its descent by screws or similar means, and to do this with piers of such magnitude would not be advisable.

The removal of the sand will be accomplished by sinking an elliptical-shaped caisson or curb of plate-iron through the deposit to the rock. The caisson will be open at the top and bottom, and will be strongly braced on the inside with heavy angle irons placed horizontally around it. It will be larger at the bottom than top, to facilitate its passage through the sand and relieve it of the friction. The caisson will be suspended by false works erected around the site of the pier, and will be regulated in its descent by screws supported on the false works. As it is lowered into the sand, that which is inclosed by it will be excavated by steam machinery, until the caisson is finally sunk to the rock. It is not intended at any time to remove the water within the caisson, but only the sand it encloses; the object of the caisson being only to exclude the sand outside of it until that which it incloses has been removed, the rock leveled off with concrete, the floating coffer-dam placed in position within the caisson, and the pier so far built up in the latter as to sink it down to the concrete bed prepared for it.

The bottom of the coffer-dam will be formed of squared timbers, thoroughly caulked, and will be about two feet in thickness. Its sides will also be of timber,and so constructed as to admit of being disengaged from the bottom when the latter has reached the bed formed to receive it, The interior of the coffer-dam will be larger than the pier, and the latter will be constructed with certain cavities in it to be filled with masonry after the pier reaches the bottom, so that the weight of the pier will bear such proportion to the displacement of water as to insure the top of the masonry being kept but little below the surface of the river while the pier is being built within it. This will enable the side of the vessel to be thoroughly braced against the pier, so as to resist the pressure of the water.

It is known that timber is indistructible when completely submerged in fresh water. Piles placed in the Rhine by the Romans, nearly 2,000 years ago, have been found to be entirely sound when removed within the present century. There are many other similar instances on record establishing the fact of its durability, whilst the soundness of the timber found in the bogs of Ireland and elsewhere indicates that it is unlimited by time.

When the bed rock has been prepared to receive the pier, the coffer-dam will be floated within the caisson, and will be guided by the latter as it descends with its load. It will be understood that the pier is completely water-borne by the coffer-dam until the quantity of masonry in it has become so great as to cause the dam to touch the bed on which its bottom, with the pier, is to rest permanently. When the pier has been completed above water, the dam is permitted to fill, and its sides will then be disengaged from the bottom and removed, to be used in putting down the next pier. The caisson for the smaller pier can be withdrawn and used for the other one; and the larger one may possibly be saved also.

As before stated, the floating coffer-dam is not an untried experiment, but has been frequently used to place piers in position where the bed rock or other substratum was favorable for their reception. The caisson has also been frequently used to exclude the sand or mud, and enable that within it to be removed sufficiently to facilitate the driving of piles to a greater depth and in firmer soil than would be otherwise practicable.

The estimates made for the cost of this work prove that it will be much less expensive than any other method yet devised; while the superiority of the foundations thus made will be beyond all question.

A Good Family Paper.

One of the best family papers published south of this city is the New Jersey *Enterprise*, Burlington, N. J. Among its many good features, is its Scientific Department, to make up which it draws largely from the stores of information presented weekly in the SCIENTIFIC AMERICAN, and shows its honesty by giving us credit for the same.

POWER and force, pressure and weight, are too often used as interchangable terms, if not as synonyms. Power implies force, but not always force, power; weight is pressure in one certain direction but pressure may act in an opposite direction.

THE OBSERVATIONS OF THE GREAT SOLAR ECLIPSE. WHAT HAS COME OF THEM.

Few expeditions for scientific research have ever been more carefully organized than those sent to observe the recent solar eclipse. The results are important as they confirm previous theories in regard to the nature of the luminous matter which surrounds the sun, and the frequent changes observable in its appearance. The remarkable protuberances pictured by the camera and tested by the spectroscope are no longer mysterious.

A self-luminous object is determinable with the greatest ease by the spectroscope. The sun has by this means been determined to be self-luminous. The peculiar parti-colored streak which indicates this, had been noticed in the solar spectrum previously to the occurence of the eclipse. The absence of the dark lines in the spectrum, fixed the nature of the luminous matter so far as to show it to be gaseous. Photography has shown us the irregular forms of the masses of gaseous matter as they float about and are upheaved. The prominences are now attributed to a sort of condensation going on among the vapors and gases formed by the intense heat of the sun. The heat which exists upon the surface of the sun is intense beyond all human conception, and doubtless those substances which are to all artificial means within our reach so refractory that they cannot even be fused would be vaporized by it.

So science goes on prying deeper into the mysteries of nature its powers gradually enlarging only to discover that the field is infinite.

A Remarkable Case—Artificial Replacement of Lower Jaw and Tongue, and Restoration of Articulation.

In an article entitled "Progress of Dentistry," published on page 233, current volume of the SCIENTIFIC AMERICAN, we called attention to the fact that the art of dentistry was no longer confined to plugging, extraction, and restoration of teeth; but that restoration of portions of the jaw, facial bones, etc., was now often accomplished by the resources of dental art. An extraordinary confirmation of the statement we then made has occurred in the practice of Dr. George H. Perrine, a dentist of this city, a full description of which he has communicated to the *Medical Gazette*.

A gentleman aged forty eight, of a bilious nervous temperament, had, several years previously to his calling upon Dr. Perrine, submitted to an operation for a disease of the lower jaw bone, which extended to and involved the left lateral portion of the tongue. Upon examination, a large portion of the left side of the tongue was found to be removed. The breath was offensive and the saliva ropy. The surface of the tongue where a portion had been cut away had healed imperfectly, and a generally unhealthy state of the gums and soft parts of the mouth prevailed. As might be expected, the health of the patient had suffered, and he seemed anxious and worn.

The morbid condition of the mouth having been corrected by proper treatment, casts were taken, from which and previous examinations the following state of things was found to exist:

The entire alveolar process between the first bicuspid and the wisdom tooth had been removed, together with a part of the body of the bone; and a large portion of the tongue had also been amputated. The action of the muscles upon the remaining portion had drawn it back, so that speech was nearly impossible, and deglutition difficult. Nature had made some feeble attempts at restoration, but so far as could be determined the cavity left by the removal of the process had been only very partially filled by a semi-cartilaginous tissue. It was decided to repair this extended damage by a single denture, made of hard and soft rubber; the vulcanized rubber to sustain the artificial teeth and form a basis for the attachment of the soft rubber, with which it was designed to reconstruct the tongue.

The hard rubber portion filled the cavity in the jaw, and passing around and resting against the inside of the remaining alveolar process, to the right side, rested upon the gums and formed a support for the artificial teeth to be supplied on that side; the portion fitting into the cavity on the left also forming a support for the artificial teeth on that side. A piece of soft rubber was molded into the shape of the part of the tongue which had been cut away, and from its borders on the right, a thin rubber membrane was extended, forming a sack which could be slipped over and closely fitted to the remaining portion of the tongue, like a glove finger. To the posterior lower border of this portion a ligament of soft rubber was attached, extended and also attached to the arch or plate of hard rubber above described, so that it drew equally in all directions, and covered the soft parts beneath the tongue. Finally, the hard rubber plate was attached by clasps to the dens sapientis and the first bicuspid on the left, and the second molar and first bicuspid on the right.

This denture far more than exceeded the most sanguine expectations. The patient was enabled to speak with ease, and masticate almost any kind of food. The distortion of his face previous to its introduction was remedied, and his general health much improved.

Chilian Agricultural Exhibition.

The Executive Committee of this exhibition has issued the following notice:

"As the exhibition will certainly open on the 1st of April 1869, it is deemed very essential that all contributions of machinery be sent in time, to place and try them before the day of opening. To this end all the contributors should notify the committee at the earliest possible date, of the character of their proposed contribution or contributions, and as near as may be, the number of superficial feet they will require for their exhibition. This notice may be sent to the nearest Consul, to the Chilian Minister at Washington, or to the *Comision Nacional de Agriculture, Santiago, Chili, S. A., Via. Panama.* The Government will also allow to all contributors of articles, $40 00, Chilian gold, for payment of the expenses of passage to the country, of each person deemed necessary by the contributor, to properly work or exhibit his contribution; a large allowance towards the payment of the freight on such articles, as well as their importation free of duties; and will provide the labor necessary to remove them from the vessel, and to assist the artisan sent with them to place them in the position destined for them in the Exhibition, as well as for their exhibition."

The recent South American earthquakes have not extended their ravages to Chili and it is hoped that they will not retard contributions to the Exhibition. Manufacturers who desire to secure a South American trade ought surely to be represented.

Registration of Earth Currents at Greenwich.

In a darkened room, says the *Telegrapher*, in the meteorological department of the Royal Observatory at Greenwich, the Astronomer Royal fixed, some two or three years ago, a sensitive little galvanometer, with reflecting mirror, to register earth currents by photography. One end of the wire of this galvanometer is connected with the earth, and the other end with a telegraphic wire, which, after running several miles along a neighboring railway, is again connected with the earth. Now, currents of electricity are constantly running to and fro in the earth, and sometimes these currents enter the telegraph wires; also, when they are strong enough, they overpower the ordinary working batteries, and send unreadable messages on their own account. Such disturbances sometimes stop for a time all messages and news, and, on one exceptional occasion, caused a panic on the stock exchange, by delaying news of importance. Being a source of great occasional loss to the telegraph companies, the endeavor of electricians has always been to neutralize and get rid of the currents as soon as possible. The object of the apparatus in Mr. Glaisher's department at Greenwich is, on the contrary, to watch and examine all the movements of these earth currents. From the description already given it will readily be seen that, as currents from the earth flow through the wire erected from Greenwich Observatory, the needle of the galvanometer shows the direction, and approximately the strength of the current. On the little magnetic needle a mirror is mounted, and a ray of light from a steady flame, after falling upon the mirror, is reflected upon a sheet of photograph paper. Hence, as the needle moves, the ray of light moves to and fro upon the paper. This sheet of sensitized paper is fixed round a cylinder of ebonite, which, by clockwork, makes one revolution every twenty-four hours. At the end of the twenty four hours the paper is taken off the cylinder and a fresh sheet substituted, the record on the first is then developed in the usual way, and a zig-zag dark line, passing across it from end to end, shows the movements of the galvanometer needle and spot of light during the past twenty-four hours.

Death of an Eminent Mechanic.

The English papers announce the recent death of Thomas Cooke, of York, who was the most celebrated manufacturer of astronomical instruments in Great Britain, and was beside a man of large scientific attainments. An early acquaintance with, and love for mathematics led Mr. Cooke to the study of optics, and his success as an optician is due to this combination. After commencing the construction of object glasses, he was soon dissatisfied with the method of hand polishing, and in his perfected arrangements the hand is scarcely called into play. The introduction of steam power, as arranged by him, not only insured perfect accuracy of figure, but it has enabled a number of object glasses to be made which seems almost fabulous, if we compare it with what was formerly considered the maximum rate of manufacture. At the time of his death a 25-inch telescope, a triumph of skill, required only a few touches to make it complete; and we believe that other glasses, varying from ten to fifteen inches, are also in hand.

Mr. Cooke was a Fellow of the Royal Astronomical Society. It is certain that, had he lived, the rewards for which scientific men generally care would have been bestowed upon him, although with his modesty and retiring disposition he would never have expected them.

A New Voltaic Combination.

The *Telegrapher* says a new voltaic combination of great power has just been exhibited to some of the learned societies of England. It is the invention of Messrs. De La Rue and Hugo Muller, and has been designed for Mr. Gassiott. The elements consist of small cylinders of pure zinc and chloride of silver. The latter is cast upon a thin silver wire, which forms the conductor. The exciting liquid is merely a dilute solution of common salt.

In the battery shown the cylinders were only three inches long, and about the size of a goose quill, arranged in two ounce phials cut down to two-thirds of their length, but a series of ten such couples decomposed water with great rapidity By the chemical action taking place in the cell, the chloride of silver is reduced and chloride of zinc formed. The action proceeds so long as any chloride remains, for the reduced silver adheres to the wire as a spongy mass, which allows the liquid to permeate to any unreduced chloride.

The first cost of such a battery will be considerable, but as the only loss will be a little zinc, it will be very economical in working. Mr. Gassiott, it is said, is having a battery of one thousand pairs constructed, of which, no doubt, the scientific world will, in good time, here of and learn much.

The German Arctic Expedition.

European papers announce the unexpected return of the *Germania* and the failure in one aspect of the expedition. While unsuccessful in their attempts to penetrate to an open polar sea, or to make the coast of Greenland, on account of the solid masses of ice which they found in their way, they reached, however, the highest degree of northern latitude ever attained by any ship, namely, 81° 5', their longitude being at the time 16° east. They sighted the coast of Greenland several times, but were never able to reach it. The expedition has made important corrections in previous charts, and has secured some other not unimportant results. The interest manifested by scientific men and by shipowners in the matter of arctic exploration renders it not improbable that the experiment will be repeated.

Editorial Summary.

THE first line of electric telegraph in British India was built in 1851–52. Little progress was made during the two succeeding years, but in 1855 an aggregate length of 3,255 miles was in working order. When the mutiny broke out in 1857, there were 4,162 miles of serviceable wires provided with sixty-two signal offices in the hands of the Government. At the close of 1867 India was furnished with 13,390 miles of telegraph lines, and 172 signal stations. The whole system is in the hands of the Government; but between 1855 and 1861 eight railway companies had licenses to construct lines of telegraph.

A SCIENTIFIC discovery is reported from Turin, where Professor Casturani, the celebrated oculist, has found a way of killing animals by forcing air into their eyes a few seconds, and almost without causing them pain. Experiments were recently made at the Royal Veterinary School, and it is said that they have fully proved the truth of the professor's invention. Within the space of a few minutes four rabbits, three dogs, and a goat were killed in this manner. The most remarkable fact is that the operation leaves absolutely no outward trace.

NATURAL MATCH SCRATCHER.—A correspondent residing in New Jersey sends us a piece of the skin of a blue shark, very common on the Jersey coast, which he says he has used for a long time to ignite matches. It has the appearance and feeling of very fine sand paper, and possesses the rare advantage that, when the surface gets filled up with phosphorus and sulphur, it can be washed out; beside it is not at all affected by damp weather. Let us have a supply of shark skin match scratchers.

THE first vessel ever built in Scotland carrying guns working on a turntable in a fixed tower is now in process of construction at the Govan Yard, Glasgow. She is to be called the Hotspur, and is intended to be an iron ram, her length being 235 feet, and her breadth of beam 50 feet. Her armor plating along her broadsides will be 11 inches in thickness, with a backing of teak of 10 inches, and the usual iron plating. The tunnage will be 2,637 tuns.

ESPARTO grass is rapidly growing in use for making paper It is stated that a large proportion of British paper is now made from it. The London *Times* is printed on paper made of this material, as is also the fine thin paper on which the circular conveying this information is printed. Already fifty thousand tuns are annually exported from Spain and Portugal to England, at a cost of about $35 a tun.

ADVERTISING.—A correspondent who has been one of our most steady advertisers writes to us that the initial letter had been dropped for a few weeks, and adds: "Though a small matter, it is rather vexatious to have letters so addressed; *but at the same time it illustrates the value of the* SCIENTIFIC AMERICAN *as an advertising medium.*"

THE New York Young Men's Christian Association are building a magnificent edifice on the corner of Fourth avenue and Twenty-third street, which is to cost $300,000. The corner stone was recently laid with appropriate ceremonies.

IT is said that the oldest wooden building in Boston is situated in Dock Square, opposite the west end of Faneuil Hall. It was erected in 1709, is framed of oak timber, and in its early days was the "Sun Tavern."

BELTS to run smoothly should have a certain amount of elasticity. A perfectly unyielding belt will not embrace the face of the pulley. For this reason leather belts should be kept soft by occasional oiling.

THE ELECTION has taken place. Gen. U. S. Grant is chosen President for four years from March 4th, 1869, and Schuyler Colfax is chosen Vice-President. "Let us have Peace."

A VALUABLE box of machinery has been recovered by divers from a depth of sixty feet, near the Portsmouth, Va., Navy Yard, after three unsuccessful attempts.

THE Ivy Paper Mill still in operation in Delaware Co., Pa., was erected in 1773. It manufactured paper used by Benjamin Franklin in the days of "Poor Richard."

A VESSEL is said to be building in this city, for the China trade, larger than any other in the world except the Great Eastern. She is to be called the *America*.

BRANDY has been made by a Swedish chemist from the common reindeer moss.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

Manufacturing has been brisk in Maine during the last three months as the following returns from a single revenue district will show. The sales of cotton goods by the mills at Lewiston, in the quarter ending September 30th last, amounted to $1,142,679, divided as follows: Androscoggin $343,508; Bates $251,726; Continental $103,997; Franklin $29,169; Hill $289,523; Lewiston $124,756. The sales of woolen goods in the revenue district, including mills in Lewiston, Wilton, Webster, and Turner, amounted to about $700,000. The sales of shoes in the District reached $302,665, to which must be added the product of manufacturers who have made no returns, about $60,000. A. C. Dennison & Co., of Mechanic Falls, sold $90,000 worth of paper in the quarter. The aggregate sales of manufactured goods in the District for the three months of July, August, and September, were nearly $3,000,000.

A single sewing machine factory in New York turns out 1,800 machines per week. This being totally inadequate to supply the demand the company propose to shortly double their works.

The Morgan, Etna, and Neptune Iron Work, at New York, have been recently consolidated. They now employ about 800 hands, only half the full working force.

The largest casting ever made in Indiana was turned out at the foundery of Greenleaf & Co., in Indianapolis, a few days ago. It was a blowing cylinder for the Lafayette Iron Works, was eleven feet long, and weighed 16,000 pounds. The firm have recently begun work in their new buildings, and this cylinder was one of the products of their first "melt" of 22,000 pounds, which was run in two hours.

An establishment at St. Louis, Mo., has turned out during the past year a quarter of a million well buckets. It also makes four hundred nail kegs per day.

The aggregate weight of the seven bells in the chime of Cornell University is 5,858 pounds. They were molded, cast, transported 28 miles, and set up within a period of eighteen days.

Australia is going largely into the meat-preserving business. Several patents for improved methods of keeping meats have been recently taken out, and the export trade is largely increasing.

The Boston and Maine Railroad have been indicted by the Grand Jury of Rockingham Co., N. H., for carelessly killing Hiram Wetherill, at Plaistow, on the 18th of February last.

The Grand Trunk Railway have ordered from the Portland, Me., Rolling Mills, 1,000 tuns of rails to be delivered and laid the present season.

The weavers in the Richmond cotton mill, at Newport, R. I., have struck and the mill is stopped.

The zinc mine at Potosi, Mo., is now producing 1,400 pounds of pure zinc daily.

The Black and Baltic seas will be united by rail before January 1869.

The largest flax mills in this country are located at Passaic, New Jersey.

Recent American and Foreign Patents.

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

RAILROAD CAR BRAKE.—Stephen Randall, Centerville, R. I.—This invention relates to a new railroad car brake, which is so arranged that the engineer of a train can have full control over all the brakes, so as to be able to apply all brakes and to stop the whole train by operating one lever on the engine or tender; at the same time the brakes on all the cars can be separately acted upon by means of levers on their platforms or near their ends. The device will operate satisfactorily while the cars move in either direction.

WOODEN BOXES.—M. Fitzgibbon, New York city.—This invention consists in a material composed of a strip of paper having on each side, firmly glued to it, a thin strip or sheet of wood; by which construction the material is made strong, elastic, and impervious to water.

COMBINED CULTIVATOR, PLOW, HARROW, AND ROLLER.—Sterling C. Thornton, Macomb, Texas.—The object of this invention is to combine and arrange a cultivator, plow, harrow, and roller, with draft wheels, axle, draft pole, and an adjustable supporting frame, in such a manner that the several parts can be used together or independently, in a more convenient manner than heretofore, and so as to save time, expense, and labor. Beside the general purpose of the invention, there are several improvements designed to effect specific purposes, such as the adjusting of the plows and the draft pole, and the clearing of the harrow.

FOLDING CHAIR.—E. W. Vaill, Worcester, Mass.—This invention is an improvement upon the chair patented by David Howarth, April 16, 1867, No. 63,897, and consists in attaching to his chair a flexible back and an upholstered seat, and in a slightly different arrangement of the short legs and seat, whereby a more beautiful and salable chair is produced than that heretofore manufactured under said patent.

HORSE HAY FORK.—W. M. Gillan, Mount Parnell, Pa.—In this invention the lower end of the fork is provided with two opening and shutting blades, which are capable of being locked in position or unlocked, by means of a novel and very simple, strong, and durable device at the upper end of the fork.

COMPOSITION.—Geo. W. Spots, Jacksonville, Ill.—This invention has for its object to furnish a substance for preventing the ravages of curculio and other insects destructive to fruit trees, vines, and vegetables. To this end, the invention consists in a compound, formed in a simple manner, of ingredients which are cheap and abundant in every part of the country.

CLOCK MOVEMENT.—Michael Tromly, Mount Vernon, Ill.—This invention consists, first, in a novel apparatus whereby the use of the winged fly wheel for regulating the striking movement is dispensed with; and, secondly, in an improvement upon the escapement apparatus, whereby a smoother and easier action is obtained than in the clock movement heretofore in use.

CHURN.—E. P. Russell, Manlius, N. Y.—This invention relates to a new and improved churn of that class which have an up and-down or a reciprocating dash.

HORSE HOE.—Don Carlos Matteson and T. P. Williamson, Stockton, Cal.—This invention relates to a new and improved horse hoe designed for cultivating crops grown in hills or drills, by loosening up the earth and cutting weeds below the surface of the same.

COMBINED SEED SOWER AND HARROW.—W. E. Phelps, Elmwood, Ill.—This invention relates to a new and improved combined seed sower and harrow, whereby seed may be sown and harrowed in or covered with earth simultaneously or at one operation.

CARPET STRETCHER.—S. Stevenson, Dansville, N. Y.—This invention relates to a new and improved device to facilitate the stretching of carpets and the tacking of the same to the floor, and admit of the work being done by a single person without any trouble or difficulty whatever.

RECEPTACLE FOR WATCH KEYS AND OTHER ARTICLES.—M. Z. Crane, New York city.—This invention relates to a new box for retaining different kinds and sizes of watch keys or watch crystals, or other articles, and consists of a stationary circular or polygonal box, divided by radial partitions into a series of compartments, and provided with a rotating cover which has an aperture as large as one of the compartments.

BURRING MACHINE.—John Nichols, Paterson, N. J.—The object of this invention is to construct a machine for burring wool, which will not tear nor injure the wool, and which will operate with great rapidity and effectiveness. The invention consists chiefly of a toothed grooved cylinder, which is constructed of a toothed triangular band wound around a cylindrical roller. The invention also consists of a fixed finger bar for removing the burrs from the cylinder, and in the use of a revolving reel for rapidly liberating the burrs from the cylinder.

GUIDE BLOCK FOR WINDOW SASH CORDS.—Alfred Bickwell, South Reading (Greenwood P. O.), Mass.—This invention has for its object to furnish an improved anti-friction grooved guide block for window sash cords, which shall be simple in construction, inexpensive in manufacture, and effective in operation, and which is designed to take the place of the ordinary guide pulleys.

ENGRAVING MACHINE.—J. C. Guerrant and B. J. Field, Leaksville, N. C.—This invention relates to improvements on the engraving machine patented Dec. 18th, 1866, No. 60,506, and Nov. 5th, 1867, No. 70,553. It also consists in improvements in the construction and arrangement of several material parts of the said machine, and in the addition thereto of an improved apparatus to facilitate and control the operation of the graving tools; whereby the field of usefulness of the said machine is materially extended, and whereby also the care and skill required to operate the said machine is materially lessened.

RAILROAD CARS.—E. T. Ligon, Demopolis, Ala.—This invention relates to a new and useful improvement in the construction of railroad cars, and has for its object, first, the prevention of accidents now caused by the cars being thrown from the track, and also to avoid the danger to which passengers are now exposed in getting in and out of cars as well as to avoid the danger attending the breaking of axles which not unfrequently occurs.

PLOW.—Levi Fosdick, Tiskilwa, Ill.—This invention relates to a new and improved plan of that class which are more especially designed for breaking up new ground, and are commonly termed "breaking plows."

FIREPLACE.—John Erwin, Sr., Princeton, Ind.—This invention relates to an improvement in the fireplace and chimney dwellings, and other buildings, whereby the fire is supplied with air from beneath the fire grate or hearth.

INVALID CHAIR.—L. M. Whitman, Sterling, Ill.—This invention relates to chairs which are made convertable into various forms, and so constructed that the position of the occupant may be changed at will, and the chair be made to work or not as may be desired.

COOK STOVE.—Harvey Brown, Harlem, N. Y.—This invention relates to a new and improved cook stove, and has for its object simplicity of construction, facility in adjusting the several parts together and taking them apart, the obtaining of an oven of large capacity in proportion to the dimensions of the stove, economy in fuel, the preservation of the fire chamber from heat, and general adaptability for household use.

MACHINE FOR PASTING AND TRIMMING WALL PAPER.—Warren H. Guthrie, Brooklyn, N. Y.—This invention relates to a new and improved method of constructing machines for pasting and trimming wall paper or paper hangings, whereby the same are automatic in their operation, and whereby much time and labor are saved in hanging wall papers. It consists of two feed rollers, the under of which said rollers rotates in a paste box which distributes paste upon the paper while the same is passing through the rollers; and it consists, also, of a circular knife or cutter, rotating on the shaft of the upper roller driven at any desired speed by gearing from the lower roller, by means of which the edge of the paper is trimmed while the same is passing through the rollers.

STRAW CUTTER.—Julius Ambrun, Leavenworth city, Kansas.—This invention consists in the arrangement and use of reciprocating cutters, and in a new mechanism for operating them, and also in a new device for feeding the straw, and in a new manner of transmitting motion to such driving mechanism.

MANGER.—Wilbur F. Stanley, Cazenovia, N. Y.—This invention has for its object to furnish an improved manger for cattle, which shall be constructed and arranged that each animal may eat by itself, and can lie down and get up easily, which shall prevent the animals from reaching after and taking the feed from each other, and which shall be perfectly easy, safe, and secure.

PREPARING ROSIN SIZE.—Thos. Gray, London, Eng.—This invention consists in preparing rosin size, by first bleaching the rosin in a solution of warm water and salt of soda, or the alkaline salt, and mixing the same with a solution of chloride of sodium, by which a size especially adapted for use in paper-making is provided.

FOLDING CHAIR.—Geo. McAleer, Worcester, Mass.—This invention has for its object the construction of a simple and strong chair, which can be folded into an exceedingly compact form for convenience in packing and transportation, and which, when open, shall be ornamental in appearance and adapted for use in the parlor.

MILK CAN.—O. J. Nutting, Warwick, N. Y.—The present invention relates to a new and useful improvement in milk cans, which are so constructed with double walls, the outer wall of which being perforated at or near its top so as to admit a current of fresh air or water to pass freely around the outside of the inner can which contains the milk, and thus keep the same cool and sweet.

DRYING APPARATUS FOR CLOTH AND OTHER SUBSTANCES.—Andrew Chambers, Providence, R. I.—This invention consists in a series of two or more cylinders parallel to each other on a suitable frame, having for their covering wire cloth or other similar material and a series of guiding rollers for carrying the articles to be dried around the same, while a series of rotating fans within the said cylinders are made to force a continuous blast of air outwardly through the meshes of the said covering material and also through the article being conveyed around the same.

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 advertisemets at $1 00 a line, under the head of "Business and Personal."

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

C. E. S., of Ill.—Postage stamps are cut by machinery. The precise composition of the gum used we do not know.

R. C., of N. Y.—Is common soft rubber affected by crude and rectified petroleum? Ans. The benzines and naphthas contained in petroleum dissolve rubber. Any substance which contains these substances will affect it in proportion to the amount they contain.

J. B., Jr., of Ohio.—The planet Jupiter is now visible in the east immediately after sunset. That is what you probably ask about. If it is that planet a glass of small power will enable you to detect his moons which will determine the matter fully. It takes a pretty good glass to show the rings of Saturn, and a powerful one to show his satellites.

G. B., of Mass.—Good malleable iron can be brazed. Your failure is owing either to defects in the iron or your process. The reason that steel appears to file harder when hot, than when cold is probably owing to the effect of the heat upon the file and the clogging of the teeth by the heated metal.

S. S., of Va.—We think the foul smell and taste in the water from your spring is not attributable to the pipe or the planking, we of course cannot explain the fact at this distance, but we advise you to open the spring, and instead of closing it tightly place over it a covering of loose stones and earth.

J. B., of Pa.—"Will a six inch horseshoe magnet attract a four ounce weight, at a distance of four inches if the weight is suspended from a pivot twelve inches above it." Ans. Yes. "Will the attraction be stronger if the weight is itself a magnet." Ans. Yes. Such magnets can be obtained of Dexter & Nellegar, Albany, N. Y. We cannot give the probable cost.

A. J., of N. Y.—We cannot see any advantage in providing mail reception boxes on our street lamp posts for newspapers, pamphlets, etc., as the orifice would have to be so large that the hand could be easily inserted. A better plan would be the extension of the system of sub-post stations now in use for the convenience of the people in our principal cities.

J. E. F., of Ohio.—"I have been informed that by attaching a galvanic battery to steam boilers the scale formed by using hard water, can be entirely removed. I learn from reliable parties that in a week's time boilers which have been scaled to a great extent have been freed from scale effectually by passing a current of electricity through. I would be pleased to hear your opinion on the subject." Opinions are useless unless based on sufficient data. This we lack on the above subject. That a galvanic current may prevent the deposition of scale does not appear impossible, but that a deposition already formed can be removed by the same agency seems to demand something more than assertion to subsubstantiate it. Will our correspondent give us the circumstances of the cases to which he refers and the *modus operandi?*

J. H. R., of Ind.—"Will you tell me the best, simple way of putting a polish on small, uneven steel articles?" Nothing better than the tumbling barrel; the articles being placed in the barrel with dry saw dust, plumbago, fine emery and bits of wash leather or chamois skin.

W. W. B., of Conn.—"Will you be so kind as to inform me the process of tinning malleable iron?" The usual process, as employed in tinning tacks and rivets is to cleanse the articles from grease and other impurities by a bath of diluted muriatic acid, then dry them in sawdust and place them in a bath of the melted metal. Remove them with a skimmer and throw them against a sheet iron shield to clean the superfluous metal from them, after which, when cool, they may be finished in a tumbling barrel.

B. P. S., of Pa.—Paint skins boiled with linseed oil and having, while hot, a quantity of sand and lime stirred in until the requisite thickness is obtained, makes a durable cement for leaky roofs.

NEW PUBLICATIONS.

THE AMERICAN BUILDER.

We have received the first number of the above-named journal, devoted to the interests of architecture. It is well printed and well edited, and is altogether a very creditable journal. It is published by J. C. Adams, box 1,250, Chicago, Ill. Terms $3 per annum. We wish the *Builder* success.

D. Van Nostrand, the well-known publisher, 192 Broadway, proposes to issue on the first of January next, an Engineering Magazine to consist of selected matter from the engineering publications of Europe and America. Each number will contain from 80 to 90 pages. Price $5 per annum.

Business and Personal.

The charge for insertion under this head is one dollar a line. If the Notices exceed four lines, an extra charge will be made.

Improvement in Safety Valves.

Nothing is of greater importance to any man using steam than a good reliable safety valve on his boiler; and yet, although this is generally admitted, it is but too well known how many appalling accidents have occurred from the absence of this most necessary appliance. We present, herewith, an illustrated description of the "Metropolitan Double Seated Lock Safety Valve," which, from all we can learn, is superior to anything of the kind now before the public. The highest authorities in the country indorse and recommend it; and, recently, the Secretary of the Treasury instructed Mr. Joseph Cragg, Inspector of Steamboats, to examine and test it. As will be seen from that part of the report of the latter gentleman to Mr. McCulloch, which we quote, this valve is much more reliable, and more desirable for owners of steam boilers to have than any other. Mr. Cragg says:

"In the ordinary safety valve of 3 inches diameter, raised ¼ of an inch, there are 2·262 square inches of space for the escape of steam. In the Metropolitan Double Seated Valve of the same diameter, raised ¼ of an inch, there are 3·634 square inches of space, being an addition of 1·372 square inches, nearly 61 per cent over the ordinary valve.

"The ordinary value would require a weight of 70 lbs., the Metropolitan Double Seated Valve 15 lbs.

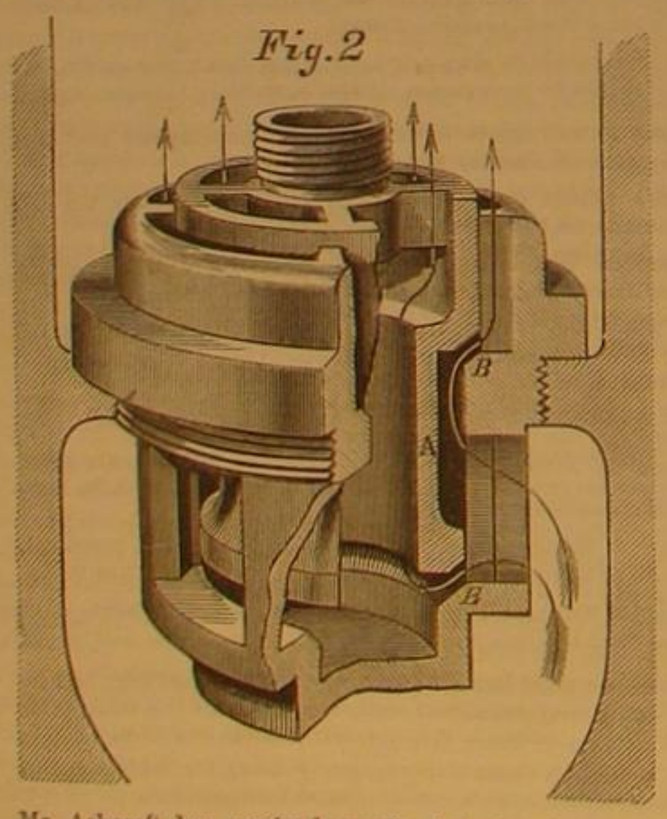
"If direct weights are used, the ordinary valve of three inches diameter, carrying steam of 100 lbs. per square inch, would require a weight of 706·86 lbs., the Metropolitan Double Seated Valve 150 lbs., being a saving in weight of 556·86 lbs., or 78 per cent.

"After a careful examination and test of the Metropolitan Double Seated Valve, I am of the opinion that it is superior to any of the valves approved by the Commission of April, 1867; that by its introduction many of the objections to Lock Safety Valves now before the public would be overcome; and that it would add to the safety of boilers on board of steam vessels."

Mr. George Morris, the Supervising Inspector of the third District, also highly approves of it, as will be seen from the following extract from his letter to Mr. John Ashcroft:

"I have made a complete examination of the Metropolitan Double Seated Valve, and I am pleased to say that it more than possesses all the merit necessary to meet the requirements of our rules governing the use of lock safety valves, and shall apprise the several local boards of this district of my approval of its use."

Fig. 2

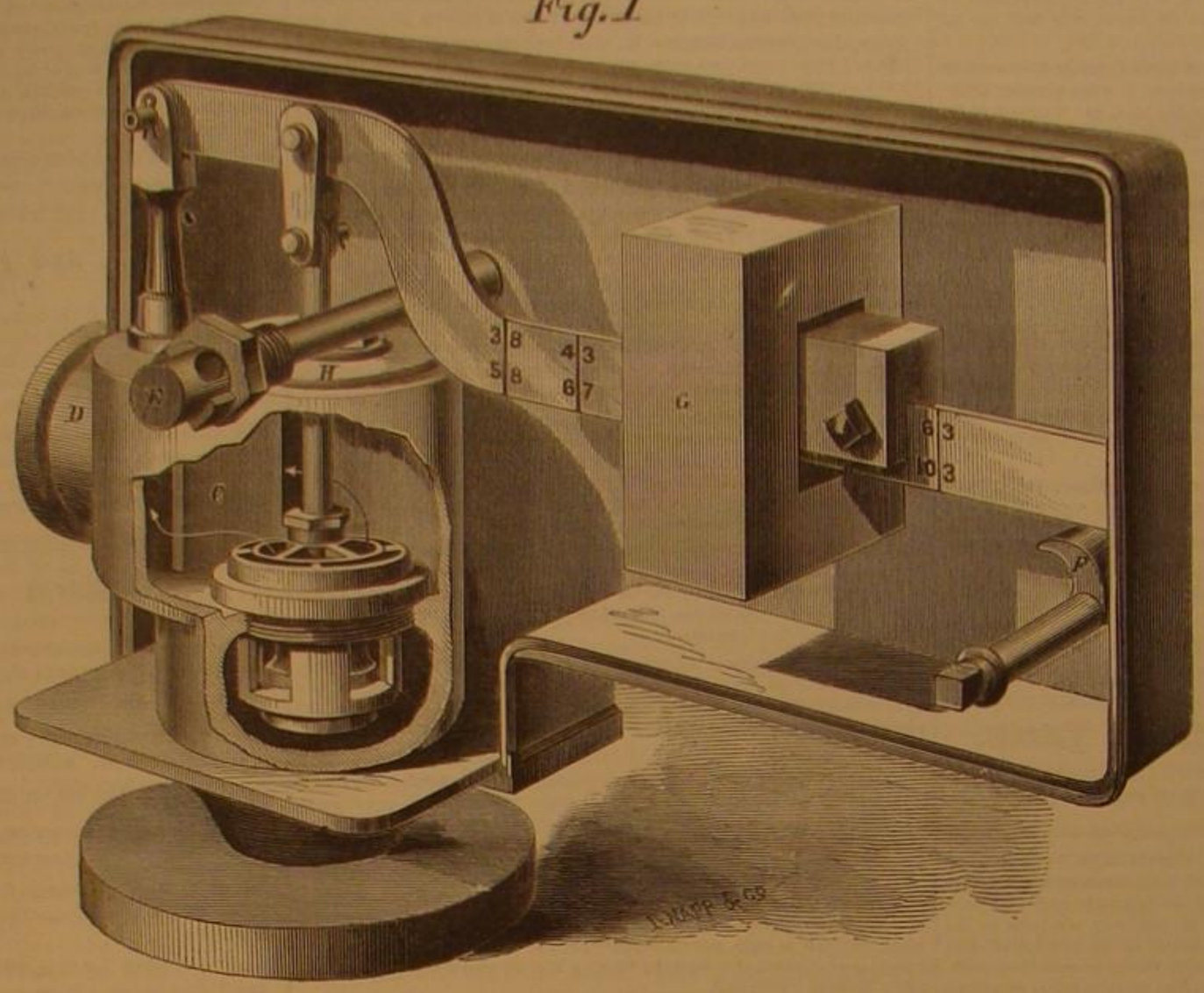


Mr. Ashcroft has received equally flattering letters from Mr. William Bradford, Supervising Inspector of the second District, Mr. E. J. Wilber, Inspector-in-Chief of Steam Boilers, State of New York, and other prominent engineers.

It will be observed that this valve has a capacity for the escape of steam but little less than twice that of the ordinary single disk valve, and that the weight required is but one fifth of that necessary for the latter; consequently, a much smaller one can be used, which makes a great saving in the cost. It is light, simple, and durable, and will, we think, at once commend itself to every engineer. If so desired, it can be locked up and weighted for any specified pressure; and the moment that is reached the valve is lifted from its seats, and the boiler instantly relieved of all undue pressure; carelessness, inattention, or incompetency, on the part of the engineer, being thus in a great measure provided against. This subject is now attracting a good deal of attention, especially in this State and New Jersey. The public in these States are forcibly reminded of the need of greater protection by the recent wise and necessary enactments of their legislatures, which require an approved lock-up valve to be placed on every steam boiler. We will proceed to describe the operation of the Ashcroft Valve:

Fig. 1 is a perspective view of the valve and its parts, with one side of the case removed, and a portion of the covering of the valve seats broken away, to show the internal construction. Fig. 2 is an enlarged view of the valve and its seats. The main peculiarities of this valve are in its having a double seat, and offering a much freer egress to the steam than the

Fig. 1



DOUBLE SEATED LOCK SAFETY VALVE.

single disk valve. By reference more particularly to Fig. 2, these peculiarities will be noticed. The valve itself is hollow, and has an annular space between the two seats, into which, as well as into its central cavity, the steam may pass. The shell that incloses it, and forms its seats, has radial projections, between which are spaces serving as passages for the escaping steam. Fig. 2 shows the valve lifted from its seat, the arrows showing the direction taken by the escaping steam. A is the valve, and B the seats.

Fig. 1 shows a guard plate, C, placed in front of the escape pipe, D, to prevent tampering with the valve. E is a bolt securing the halves of the case together, and having a hole through it for the reception of the staple of the lock. F is a cam for lifting the lever and the weight, G. The cap, H, over the valve, serves as a guide to the valve stem, and prevents the steam from escaping into the lock box. With these references to the engravings, the construction and action of the valve are plain to every engineer.

Patented March 10, 1868. All communications should be addressed to John Ashcroft, 50 and 52 John street, New York city, Superintendent and Treasurer of the Metropolitan Lock Valve Company.

Relics of the Middle Ages.

In digging out the foundations for some new buildings in the Place de la Bastille, situated at the entrance of the Rue Saint Antoine, some interesting discoveries have been made. Massive blocks of solid masonry have been come upon, which, no doubt, belonged to the ancient fortress that stood on this site, the first stone of which was laid by Hugues Ambriot, prévôt of Paris, on the 22d of April, 1370. Originally the Bastille Saint Antoine had but two towers, but two others were soon afterwards added; and the edifice was still further enlarged in the reigns of Charles VI. and Henry II. This bastile, which was raised for the purpose of protecting the capital from the attacks of the Bourguignons and the English, afterward served the purpose of a state prison. Henry IV. deposited there for safety the royal treasure; and Sully tells us, in his "Memoirs," that about the year 1610 the King had stowed away in the vaults of the building £15,878,000 in coin, beside £10,000,000 put aside as a saving fund. Some passages, steps and cells almost perfect, have been met with; and among other remains of past ages a rifled cannon has turned up, which shows that the boasted invention of modern times is not new, but dates some five hundred years back. The progress of the excavations, which are constantly bringing some interesting object to light, is watched with great curiosity by the Parisians, who daily surround the place in large numbers.

Motion is a constant quantity. The sum of all the motions throughout the universe is always the same.

Fire-proof Bronze Color for Copper and Brass.

A German journal gives the following method for imparting a fire-proof bronze color to copper and brass. We cannot speak from any personal test as to the value of the method, but have generally found such formulas, coming from German sources to be correct. Should any of our readers try the method we should be glad to learn the result:

"One sixteenth of an ounce of crystallized verdigris, and the same quantity of finely powdered muriate of ammonia, are to be dissolved in five-sixths of a pint of rain water, the solution left standing, covered, for three to four hours, and then one and a half pints more water poured into it. The copper vessel, which must be perfectly clean is now to be held over a charcoal fire until it is equally heated throughout, and becomes uniformly tarnished. The copper is now to be rubbed over with the mixture and then carefully dried.

"After five or six repetitions of this treatment, the copper receives a brass color; after from six to ten repetitions it acquires a fine yellow. If the copper is now to be changed from yellow to brown, it must no more be wetted while hot; if, however, it be desired to have it very pale brown the process must be repeated twenty or twenty-five times. When the desired color is attained, the copper is to be laid in clean water, taking care to clean it or dry it rapidly after taking it out. This must be done carefully. The copper is then held over a weak charcoal fire, when the bronze becomes permanent and fireproof. To give a fireproof brown bronze color to brass, the following is the process:

"Three thirty-seconds of an ounce of crystallized verdigris and the same quantity of sal ammoniac are mixed with five sixths of a pint of rain water, and left to stand from two to three hours. The brass is then to be rubbed over with it from two to three minutes, when it becomes green. One pint and a quarter of rain water is now to be added to the solution. The metal is now held over a charcoal fire, which must not be too strong, until it acquires a copper color. It is then again wetted, and left to dry by evaporation. When it has been treated in this manner four or five times, it becomes olive colored. The heat may now be somewhat increased, but it is necessary to be very careful that the metal does not become too hot. When it has been treated nine or ten times in this manner, it becomes brown. As long as any greenish places are to be seen, however, this treatment must be continued, in many cases twenty to twenty-five times before the required color is obtained.

"If, however, the metal be strong, the materials are to be dissolved in hot rain water, and the metal rubbed with it immediately until it acquires a fine dark green color; it is then to be held over a strong charcoal fire, by which means it acquires a fine brown color after ten to twelve repetitions of the treatment. It is necessary to be careful that the metal is equally heated throughout. If spots appear they must be bitten out during the work and polished with brickdust."

Wood Gas.

A correspondent of the *Engineer*, London, makes the following statement and inquiry. If the assertion of the writer is correct it is important, and worthy of further experiment by manufacturers and persons residing in sections of our country where wood is plenty and coal for illuminating purposes scarce:

"I reside in the country, and manufacture coal gas for my use—say for fifty lights, and being fond of experiment I tried oak timber instead of coal in the iron retort. I found that gas was produced very rapidly, at least ten times faster than from coal. It was passed through the lime purifier, thence to the gasholder. On burning this gas I found the flame very blue, though strong, and producing an atmosphere not bearable for any great length of time. On opening the retort I discovered that the oak had become very first-rate charcoal, and of three times the value of the timber made use of. It is therefore quite clear that good gas can be produced from timber, and if properly purified, its use in country districts where coal is dear would be of very great importance, and I may say of benefit also. But the question is, how can it be purified to give good illuminating light, and not leave injurious results after use?

"I think it likely that some of your numerous readers may be able to answer the question. It is one well worthy of consideration, as important in many respects. I shall feel greatly obliged by information on the subject."

A Geological map of France is to be prepared at the expense of the Government. The map is intended to comprise the minutest details relating to the geological formations of the Empire.

Scientific American.

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VOL. XIX., No. 21...[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, WEDNESDAY, NOVEMBER 18, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

"LET US HAVE PEACE."

Let not the reader imagine as his eye catches the above heading, that the SCIENTIFIC AMERICAN is about to depart from its time-honored course of neutrality in politics. During the past months of scramble and partizan jostle, we have been silent although not uninterested spectators of the contest. During the months that will intervene between the election and the inauguration of General Grant, there will, in all probability, be more or less of unprofitable recrimination, between the victorious and the vanquished, upon which we shall also look silently yet regretfully.

The spirit of our institutions demands that the results of a popular election should be accepted as cordially and gracefully by the defeated party, as though the winning candidate were unanimously chosen. It is only by the adoption of such a course, that a popular government is rendered tolerable. It is only by such a course that it can hope for permanency and prosperity. We feel ourselves justified, then, in putting forth a plea to our countrymen, North and South, East and West, to join in the attempt to restore now the old feeling of brotherhood that once formed the most beautiful element in American citizenship.

The signs of the times encourage us to believe, that the dangerous rule of extremists will be rejected by the people. No matter to what party they belong, their counsels are to shunned. Although many of our Southern people may regard the election of General Grant as a misfortune, we greatly mistake if events do not prove it a blessing. We have grossly erred in our estimate of the man, and have greatly misinterpreted the motives which governed him at the time of General Lee's surrender, and still govern him, if he does not mean when he says, "Let us have Peace," peace, not for one section only, but for all sections; and we believe further, that if the extremists of the dominant party seek to use him as a pliant tool to force the adoption of an oppressive policy, rather than one of justice and magnanimity, they will be disappointed.

We believe the surest way to the proper political reconstruction of the South, is the reconstruction of her industries. Possibly some of these cannot be restored; if not, others can be substituted. There are plenty of capitalists, who, once convinced that the situation is accepted, and that the shape affairs have assumed is regarded by the people of the South as inevitable, would not only be willing, but anxious to aid in developing the vast resources of that bruised, but, by no means, utterly destroyed section. People of the South, you owe it to yourselves, to show that you can be as energetic in peace, as you were brave in war. Cultivate your lands. Induce Northern capital to come to your help, by discouraging lawlessness, and by securing the peaceful possession of property. Let us bury the past, and look forward with courage and hope to the future; a future big with blessings and prosperity if you will; prosperity and strength such as in your palmiest days you never realized in the past. We speak what we do know, when we assure you that the masses at the North will never consent to see you systematically oppressed, and that they eagerly hope for the coming time, when, with resuscitated vitality, your industries shall shoot into a vigorous growth, and you shall be richer, more peaceful, happier, than you ever could have been under the old dispensation.

But we do not plead with the South alone. We exhort all sections to put aside feelings of self-interest, and to work together for peace; peace from party bickerings, from sectional wranglings; peace, not merely in name, but in verity.

When we consider the possibilities of development possessed by our common country, when we picture to ourselves the results of another half-century of peace with the rest of the world, and absence of internal dissention, we feel as though we could not too strongly entreat our fellow-citizens to consider whether it is not far better to submit to temporary wrongs, until such time as they may be peacefully righted, rather than in the heat of passion to endanger the safety of the entire nation.

A spirit of moderation cultivated by such considerations, mutual concessions, rather than arbitrary and unyielding demand, on the part of those portions of our common country, whose interests may sometimes appear to conflict, will secure the united prosperity of all. The absorbing questions to which the thinking minds of the country ought to be directed, are those of political economy. The vitality of the country is so great, that the wounds received in the late disastrous contest will soon close, if they are not irritated by the revival of old issues.

We implore all sections, then, to strike hands and join in an effort to advance the interests of the entire conntry. Do this, and our fertile valleys shall blossom; our streams blend their music with the hum of machinery; our lakes, rivers, and railroads be laden with commerce, and present business tagnation give place to universal and healthy activity.

SOME SUGGESTIONS ON THE BURNING OF COAL.

The season when closed windows and doors and glowing coal fires have superseded well-aired apartments has arrived, and as the price of fuel has increased, any methods of preventing the waste of so necessary and valuable a commodity must be useful. We give, therefore, a few brief suggestions, drawn from experience, in regard to the care of ranges, heaters, cooking and parlor stoves, and grates.

It is a false economy to be chary of the use of kindling for anthracite fires. Charcoal is probably the best kindler, but is not always to be obtained, and then, is costly. In this and other cities, kindling wood, of pine, sawed short—five or six inches in length—and split fine, is sold in convenient little bundles, one or two of which is sufficient to start an anthracite fire for any household purpose. It may be obtained also in barrels or boxes, or in quantity. In the country these conveniencies do not exist, but every householder prepares his own kindling. One great mistake in its preparation is in not cutting it short enough, or splitting it fine enough. More heat can be obtained by using fine than coarse kindling. This preparation is to the stove, what mastication is to the stomach, an assistant to combustion or digestion, in this case convertible terms.

After the kindling is lighted, it should be allowed to burn until it is all enveloped in a light blaze and portions have become live coals before a particle of coal is put on. If the coal is heaped upon the unignited wood the process of combustion is delayed by choking, and much of the carbon that would otherwise produce heat is carried off in the form of dense smoke or is deposited or held as carbonic acid gas, the greatest enemy to inflammability. Most persons have seen this when an apparently well-kindled fire has been extinguished and had to be re-made.

The coal put on the kindlings should be new coal, not the screenings of a former fire; and it should be carefully spread in a thin layer. The practice of filling the fire-pot or furnace will materially delay the process of combustion. In such cases we have seen an hour elapse before a bed of incandescent coal could be formed sufficient to broil a steak or a fish, or to emit any sensible heat, while with a decent draft a good coal fire, with judicious management, may be obtained in fifteen minutes.

Where a fire is kept all night, or for days and weeks together, as is now so frequently the case with base burning stoves, and even the common cylinder stove, the first thing to do in the morning is to put on fresh coal, without disturbing that in the stove, open the draft and the damper, and do no raking until the new coal is well ignited. Then the ashes may be rattled down until sparks drop through the grate. Soon as these are seen the raking should cease. Never poke a coal fire—anthracite—at the top. This rule, as military men say, is "general."

But a greater fault than any other and a very common one is choking a fire by piling on a grate or filling up a stove with coal when the fire is low. In all cases the coal should be added in moderate, even small, quantities, and it should be placed or spread evenly. In some cases it is well to deposit the lumps piece by piece by hand. When dumped on in masses the coal wastes rapidly without giving out heat, a large proportion of the carbon escaping up the chimney in the form of visible soot or as thick smoke. No anthracite fire should ever be allowed to emit a visible smoke. The gases in the form of a bluish flame carry off enough of the heat producing products. It would be well if all this could be retained and consumed; but we almost despair that this will ever be an accomplished fact.

Drafts and dampers are too frequently used without intelligent reference to their respective offices. Many leave the stove doors open, and close the chimney damper. The effect is, to be sure, to retard combustion, but at the same time the gases evolved, finding no escape by the natural draft, are forced out into the room, poisoning the atmosphere and rendering the apartments unhealthy, inducing languor and headache. If the chimney damper is closed, or the passage to the chimney, the door or aperture above the fire should also be closed, while the draft at the bottom of the fire, or under the grate, may be opened; for if the gases escape through this opening, they will have been neutralized by passing through the fire.

In open grates the draft is frequently found to be insufficient. This is because too large a portion of the fire is exposed. A sheet of boiler plate covering a portion of the grate bottom will in many cases improve the draft, reduce the consumption of coal, and, at the same time, increase the available heat.

Some persons, especially inexperienced help, do not know how to distinguish between unconsumed or coked coal and valueless clinkers, as the former may be coated with white ashes. It may be accepted as a general truth that in a grate, or stove furnace, or fire box, the clinkers, being of a semi-metallic nature, sink and the unconsumed coal be left on the top. We have found it to be economical to gather the top lumps by hand before disturbing the mass. Thus, most of the unconsumed portions will be recovered, and can be used again. In many cases this will prevent the necessity of sifting the ashes and picking out the scoria.

In sifting it is a good practice to drench the ashes in the sieve with water. Much that would otherwise be rejected will be found to be pure coal, the water washing off the coating of ashes, and exposing the "black diamonds," which are frequently in fine particles. These savings are valuable to be used when the requirements of cooking or of particularly sharp airs do not demand a brisk fire. Even the ashes that escape through the sifter, when made into a mortar with water, are serviceable. They may be used advantageously in preserving the fire in a grate, and it is surprising how much of what might be otherwise condemned as waste can be made thus to yield available heat.

Coal should be kept under cover, exposed neither to the sun, the rain, or the frost. Insensible combustion and waste by the action of the elements rapidly diminish the heat producing qualities of even the hardest anthracite coal. By some this possible waste is estimated as high as fifty per cent. This may be an exaggerated estimate, but that it is considerable the observation and experience of twenty years warrant us in confidently affirming. Even the fine dust left in the coal bin is valuable. Mixed into a mortar, as we advise with the ashes, it gives out an intense heat, greater than that of lump coal because of the more readiness with which the oxygen of the atmosphere can permeate the mass; and here we may give a few words of advice. Small sized coal is more economical than large coal, especially for household purposes, if the grate is adapted to the size, for the reason just stated. To prove this let one take a lump of anthracite as large as a man's fist, "all alive," and crack it so as to expose the interior, it will be found to be entirely black inside and undisturbed by the heat.

These practical suggestions and facts, unaccompanied by scientific reasons are submitted for the consideration of our readers. We might have given the philosophy of combustion as applied to anthracite coal, but preferred to make a few simple statements, leaving our readers to trace the truths back to their source. We are confident, however, that an observance of these rules will result in a valuable saving of coal.

THE PROPOSED DARIEN SHIP CANAL.

One of the most important meetings held in this city for years, took place on the 20th October, the object being to initiate measures for furthering the project of a ship canal across the isthmus of Darien. It was attended by a large number of gentlemen prominent in the great enterprises of the age. Peter Cooper was appointed chairman and the Hon. A. F. Conklin secretary. Among those who took a prominent part in the proceedings were the Hon. Wm. H. Seward, Secretary of State of the United States, and the Hon. Wm. M. Evarts, Attorney General. An estimate of the cost of the canal was made as being $100,000,000. A committee to obtain subscriptions was appointed, consisting of Messrs. Wm. T. Coleman, Marshall O. Roberts, C. K. Garrison, William B. Duncan, and Richard Schell. Surveys of the proposed route were submitted by several eminent engineers, and an assurance of the final success seemed to prevail in the minds of all the gentlemen present.

Mr. Seward addressed the meeting, setting forth the advantages that must accrue to the commerce of the world, and the United States especially, from the completion of this great work. We have room for only the following extract from his able address:

"Commerce can no longer afford to use the circuitous and perilous navigation around the Capes. It must and will have shorter channels of transport, and of these there can be but two—the one across the Isthmus of Suez, the other across the Isthmus of Darien. A canal across the Isthmus of Suez already approaches its completion. If that channel is to secure the patronage of universal commerce, it will be fully enlarged and completely adapted to the interests of modern commerce. In that case the commerce of even the Atlantic American coast, from the St. Lawrence to Cape Horn, will be turned eastward across the Atlantic and through the Mediterranean and the Red Seas and the Indian Ocean to India and China. It would be a reproach to American enterprise and statesmanship to suppose that we are thus to become tributaries to ancient and effete Egypt, when by piercing the Isthmus of Darien we can bring the trade of even the Mediterranean and of the European Atlantic coasts through a channel of our own, so palpably indicated by nature that all the world has accepted it as feasible and necessary."

Truly this is an age of great enterprises, and civilization marches onward with gigantic strides.

AN IMPORTANT MOVEMENT.

The recent International Workingmen's Congress held in Brussels was an important movement, and deserves careful attention and consideration. Diversity of opinion as to its effects upon the interests of labor is to be expected. The adverse action of the French and Prussian Governments, having for their purpose the defeat of the movement, will, as all such action must, react upon the working classes in those countries, and tend to foster a spirit of discontent and to stimulate emigration.

For ourselves we can see how such an association could be made the instrument of good, but the history of similar movements does not encourage the hope that much good is to be expected from the action taken. The fact that in this congress the policy of maintaining large standing armies by any government, as opposed to the interests of labor, was discussed, shows the tendency of all such organizations to run into politics, and thus defeat any good that might otherwise be derived from them.

The question of strikes seemed to be one which such an assemblage might have discussed satisfactorily and intelligently; but we are sorry to say that any reports that have reached us fail to show that the real gist of the question was comprehended. The most diverse opinions prevailed, some regarding strikes as an unmitigated evil, others esteeming them an unqualified blessing, while a minority seemed to think them only admissible in extreme cases. On the whole, we fail to see that any result commensurate with the importance of the movement has been derived from the International Congress.

INVENTORS AND THE PATENT OFFICE.

The excitement incident to a Presidential Election always deranges trade and paralyzes business in a greater or less degree. It seems even to be a bar to the progress of science and an obstacle in the development of genius. The decrease in the business of the Patent Office for the last few weeks indicates this effect. The election of Grant and Colfax to the two highest offices in the gift of the people, insures peace, and we trust, harmony and prosperity to the whole country. Inventors and the men of genius will, we trust, receive their share of the good things hoped for by others under a new administration.

Inventors, as a class, have been greatly prospered during the past few years, and the demand for good improvement in all departments of manufacture is constantly increasing. The condition of the Patent Office under the new Commissioner is favorable for early examination of cases, and we advise those who contemplate applying for patents and are prepared, to have their business proceeded with and not to defer it. In the same reverse degree as the days shorten, evenings lengthen, and cold strengthens—all favorable to working out inventions—the hours of work at the Patent Office decrease, and before next spring it is likely that the office will be overcrowded with cases, and examinations greatly delayed.

Such has been the workings of the Patent Office in past years. We believe Commissioner Foote will try to guard against a recurrence of such a condition of affairs, but the difficulty of obtaining competent assistants may render it beyond his ability to keep the work of the office up. All persons who are prepared should not delay in making application if they wish careful examination and early decision. A more favorable time will not occur.

ADVANTAGE GAINED WITHOUT COST.

Applicants for patents should remember that all patents taken by us are specially noticed in the reading columns of the SCIENTIFIC AMERICAN at the time the claims are officially published. A description of a new invention just patented, in a paper of as large circulation as this, although brief, is often the means of selling a patent, and putting the patentee in possession of a handsome sum of money before he has scarcely received his document from the Patent Office. If no other advantage were gained in applying for patents through the Scientific American Patent Agency, this alone is a good reason why every inventor who wishes to realize, immediately, by the sale of his patent, should do his business through this office.

CAREFULNESS IN THE MANAGEMENT OF FIRE-ARMS.

In this country almost every boy, before arriving at his majority, has opportunities for becoming acquainted with the use of fire-arms. This is proper, as one of the rights of American citizens is that to bear arms, and the republic depends upon her citizen soldiery to repel invasion, or to quell internal troubles. But some plain directions in regard to the proper care of fire-arms, and especially rifles or rifled pistols, seem to be demanded by the increasing use of these arms. We do not allude, in our heading, to absolute carelessness in the handling and use of fire-arms, but simply to the means of keeping them in order for use. Too many words of caution have been wasted, and too many serious and fatal accidents have occurred by the careless handling of guns and pistols, without ending, and possibly without abating this carelessness, for us to hope that anything we may add in the way of caution would be of benefit. If people will not be convinced that a loaded fire-arm is more dangerous to handle than a poker or broomstick, we wash our hands of any blood guiltiness that may accrue from their carelessness, and leave them and their victims to the result of their folly.

But, as it is the fact that our people have already become accustomed to the handling of these instruments, and their use has become general, it may not be amiss to give a few simple and plain directions as to their care. The smooth bore may be used with impunity until it becomes so foul as to clog the passage of the flame from the nipple to the charge. The only difficulty will be this obstruction, except in case the barrel becomes so foul near the breech that a deposit of the unconsumed powder may take fire. We have known two or three such cases, and the result was a bursting of the barrel in one case loaded with ball, and in others with bird shot. In each case the deposition of the unconsumed portions of the charge of powder on the walls of the barrel had been allowed to dry. But the smooth bore can be relied upon much longer when foul than can the rifled barrel, as it affords less chances for a deposition of the unburned powder; still, the generation of moisture produced by the combustion of gunpowder and the failure of burning the whole charge at each explosion will result in a deposition of gunpowder paste on the walls of the tube, which, when moderately dry, is, to all intents and purposes, true gunpowder, and as such will surely explode. Bursting of barrels from this cause is not uncommon, although frequently attributed to some mysterious cause. The cure for this is, first, a proper proportioning of the charge of the powder to the weight and resistance of the shot or of the bullet, and second, the frequent cleansing of the gun tube. All excess of powder beyond that which is consumed at the discharge is worse than waste. This for smooth bore firearms, as fowling pieces, etc.

Now, as to the treating of rifled arms. None are now made except with a "gain twist;" and if a deposition of unburned powder is made, it will be near the muzzle, rather than near the breech. Of course the danger of explosion from this deposition is thus greatly lessened, as the course of the ball, impelled by the combustion of the powder, extends through a longer, although an inappreciable period, than that in the smooth bore. Yet, accidents happen even with these arms. Our experience may have been peculiar, but we believe it correct; and we have noticed the bursting of heavy rifled barrels which could have occurred only by want of care of cleanliness where too large charges of powder were used. The unconsumed powder was deposited in the "lands" or grooves, and remained to be ignited by the first discharge, after it had become sufficiently dry; and here we may remark that the popular idea that gunpowder cannot explode except when perfectly dry, is not borne out by the facts. The intense heat generated in a confined tube, as a gun barrel, bears very little analogy to the heat of a flame in the open air. The spire of flame from the percussion of a common gun cap will project itself with a rapidity and force to be likened to nothing but a stroke of lightning, and will throw its stream of fire in a direct line, from the diminutive lozenge of fulminate, at least twenty-four inches. Such a force, accompanied as it is with intense heat, is sufficient to ignite even more resistant material than damp gunpowder.

Almost all these rifled pieces are now built by firms who have made their construction a study, and calculated, to the minutest fraction of a grain, the amount and quality of the powder necessary to the propulsion of the projectile. Most of them furnish their cartridges so that no mistake may be made between the relations of powder and ball. Yet, even here mistakes may occur, except when the cartridge is inclosed in a metallic case. For instance, the Colt's revolver, so favorably and deservedly appreciated, was formerly, if not now, furnished with paper cartridges, or it might be loaded with open powder and ball. In the latter case, possibly not all of the powder might be placed in the chamber, especially if there was a stiff breeze blowing, or the operator was careless, and in consequence the ball would not be propelled through the barrel. This fact might not be known to the marksman, and he would continue to fire the round, each ball lodging just behind its predecessor, until he had filled his barrel with undischarged bullets. Such a case we knew where a pistol of six inches barrel burst and contained no less than seven bullets wedged one upon the other.

It is evident from these statements that the proper use of fire-arms demands care, not only to prevent accidents, but to make them effective in their legitimate use.

RISE AND FALL OF THE NORTH AMERICAN LAKES.

The theory, put forth some few years since, by Prof. Mather, of West Point, to account for the rise and fall of water in the North American Lakes, it again being discussed. Most of those who write upon the subject seem to coincide with the theory mentioned, but we must dissent from it, and propose to show cause for our dissent.

The waters of Lake Superior rise often from eighteen to twenty-four inches. The rising of the water is sudden and without apparent cause, and the subsidence is the same. The other lakes exhibit similar phenomena to a greater or less degree. No uniformity is observable in the times at which the water rises, hence they are not tidal phenomena. The cause or causes of these occurrences have hitherto eluded investigation. We say, have eluded investigation, because we believe that any of the theories which have been thought by their authors to account for them, will not bear scientific scrutiny. Especially we regard the theory of Prof. Mather as one which has not a leg to stand upon, and as we find this theory circulating not only among popular journals, but those claiming to be scientific we propose to show up its faulty character.

The theory may be thus fairly stated:—The water in any of these lakes, extending over a wide area, the air over their surfaces, is subject to considerable variations in density from different causes; as variations in temperature, hygrometric condition, etc. These changes of density produce differences in pressure upon different parts of the surface, therefore, the water will rise in those portions sustaining the lightest pressure. Thus the lakes are considered as huge barometers which indicate by their rise and fall, variations in the weight of the atmosphere at different locations on their surface.

This is wholly faulty. If the water rises at a distance from the point of greatest pressure, it does so by virtue of pressure transmitted through the mass; but the air is also a fluid of much greater mobility than water, and will, at least, transmit the pressure as quickly over the surface as it can be transmitted beneath it. The pressure being thus transmitted through the air would become equalized upon the surface and under it; how then could this pressure tend to raise the water above its usual level? It could not.

A barometer indicates differences in the weight of the atmosphere, because a portion of the mercurial surface is excluded from the pressure of the atmosphere. This is its essential feature. Open the end of the tube so that air may rest upon the upper end of the column, and the mercury sinks to a common level, and will remain there in spite of all variations in atmospheric density. For these reasons we maintain that the theory cannot be true, and that the rising and subsidence of the waters in the North American lakes yet remain unaccounted for.

IMPROVEMENT IN PAINT.

The hydro-carbonate of lead or white lead, and the oxide of zinc, known as zinc white, are the two principal bases now generally used throughout the civilized world for the manufacture of paints. By their use our houses are preserved from decay and adorned with cheerful colors to gladden the eye. The majority of all articles produced by the industry of mankind depend for preservation, and, to some extent for beauty, upon the protecting and coloring qualities of paint. It ranks next to food, raiment, and shelter, among the necessaries of life, while the labors connected with its numberless applications give daily employment to thousands of people.

We are led to these remarks from an examination lately made by us in the quiet old elm-shaded town of Stratford, Conn., of some of the work done by a young practical painter of that place, by name Frederick Lillingston. He has made a discovery in connection with paints which appears to be of great value and ought, we think, to be made public. It is the result of long study and experience. The improvement consists in taking any of the ordinary paints of market, whether having the lead or zinc base, and subjecting them to a chemical treatment by which their tendency to chalk or to scale off or to change color, is prevented, and an increased body is imparted; the practical result being that the cost of paint is reduced, about 33 per cent, while the painter finds himself supplied with a greatly improved article, reliable and durable in its nature. It flows with more ease than the ordinary paints, has a good body, dries readily with a fine gloss, endures the tests of time and weather, and gives satisfaction under all circumstances. It is well adapted for use in connection with the various pigments: capable of a peculiar transparency, coupled with excellent body, it is well suited for fine effects in graining and other ornamental work. For blind painting it is of unusual value, as it covers well, gives a superior finish, and the color will not run. For the lack of this quality many a painter of blinds loses his labor and is compelled to go over his work.

Any mere trick of adulteration by which the quality of paint is impaired, or its value diminished, should be frowned upon and ignored by all who love honest dealing. On the other hand, any discovery whereby an article of such universal consumption can be really improved in quality, and cheapened in price, is a matter of the first importance, deserving every encouragement.

The Lillingston paint is no new experiment, but has been in actual use for a long time. It qualities have been ascertained by experience. Some of the painting which we examined had been exposed to the weather for three years; but, we found it hard, fresh looking, and entirely free from chalkiness.

THE DEVICES ON OUR COINS AND STAMPS.

Many of the papers have contained notices of the new devices for our postal stamps, almost always accompanied with laudatory remarks. Among these devices are pictures of a mail carrier on horseback, a railroad train, a steamer at sea, a copy of Trumbull's "Signing of the Declaration of Independence," and of his "Burgoyne's Surrender." No doubt all these are very fine specimens of the engraver's art, but we would ask, why attempt to reproduce a large historical picture on a space of seven-eighths of an inch by three-quarters? Are we all to carry microscopes, or is there such a fear of vignettes of heads of patriotic men as to prevent us from using these representations as insignia of our national coins and stamps? It is evident that the devices on our coins and stamps would subserve their purpose better if simple and suggestive than if complex and without significance. No style of stamps can be imagined more appropriate and useful in teaching lessons of patriotism than our old-fashioned postage stamps bearing the effigies of Washington, Jackson, and Franklin. The symbolical bird of the republic, or the national shield, are also appropriate emblems, and we can see no reason why the likenesses of our great statesmen and soldiers should not be employed as decorations to our coins and stamps. "Hero worship" is not to be deprecated if it excites emulation to copy their examples, and reminds us of our duty to the country by keeping alive the memory of the great and good whose lives and public services are a portion of our nation's history. Microscopic copies of the painter's art, which can never approach the original, appear to us to be entirely out of place on our national coins and stamps.

The Consumption of Sugar.

According to the *Trade Journal* the amount of sugar annually consumed by the civilized nations of the earth is truly enormous, and will surprise those not familiar with the extent of that trade. The *Produce Markets Review* has some figures in this connection, from which we learn that Great Britain, including her colonies, and the United States, are the most important consumers, as they use 1,420,000 tuns per annum, or 41·40 lbs. per head. France, Italy, Spain, Belgium, Portugal, and Switzerland use 506,000 lbs. per annum, or 12·34 lbs. per head. The third on the list is the great Teutonic race, but with the great impetus given to its national life, and the much better scope for enterprise and commerce, Germany, with its domestic social life, will soon rise in the sugar scale. The Zollverein, Austria, Holland, the Hanseatic League, and Denmark consume 262,000 tuns per annum, or 7·30 lbs. per head. Last come Russia, Poland, Turkey, and Greece, and the deliveries in these countries amount to only 125,000 tuns, or 3·80 lbs. per head.

The quantity of sugar used in the rich countries depends upon its price, and the low rates of the last few years give an extraordinary stimulus to the deliveries. The sources of supply at present worked are so numerous, the cultivation of sugar can be so indefinitely extended, and even at the late and present low rates is so remunerative, that all possible demands can be met; and, as the wealth of civilized communities increases, we anticipate a progressive increase in the use of sugar. In fact, the figures that we consider so large at present will, if the late rates of progress be maintained, soon be utterly insignificant. In round numbers, the British consumption for 1866 may be estimated at 625,000 tuns. On the scale of New South Wales it would amount to 250,000 tuns per annum. The total consumption of the 313,000,000 souls, from which returns can be obtained, is 1,035,000 tuns per annum, or 15 lbs. per head. On the British scale of consumption it would amount to 6,150,000 tuns; on the New South Wales scale to 12,000,000. The growers of sugar, therefore, need have no fear of extending cultivation too far.

Certain Diseases Common to Men and Animals.

Prof. A. Large, in the introductory lecture delivered by him before the New York College of Veterinary Surgeons, made some interesting remarks upon diseases common to both men animals. The animals, the similarity of whose diseases to those of the human race was considered, are the horse, ox, pig, sheep, and dog. The similarity of the diseases of the horse and ox to those of mankind was observed as early as the time of Aristotle. Beside being liable to the same accidents as wounds, bruises, etc., the lecturer pointed out the fact that they were liable to disease from atmospheric changes, improper food, overwork, and other fruitful causes of disease among men. Among the diseases common to men and animals, he enumerated small-pox, and various other eruptive diseases. He stated that a great many sheep were destroyed by small-pox in England, during the year 1857, and urged that sheep imported to this country should be subjected to quarantine. He believed, contrary to the generally received opinion, that cows are subject to scarlatina, and attributed many cases of sore mouth to the drinking of milk drawn from cows affected by this disease. He asserted that what has lately been considered as the cattle plague was not identical with the cattle plague in Europe, and pointed out marked differences in the manifestations of the plague from the European plague, to sustain his position.

After discussing, to some extent, the subject of hydrophobia, he advised, in cases where people were bitten by dogs, that the animals should be confined rather than killed, as, in case they should not prove to be rabid, the assurance thus obtained would do away with the anxiety that would otherwise be experienced.

The lecturer closed his remarks by urging the importance of establishing veterinary colleges in various parts of the country, as the dissemination of veterinary science is of the highest importance, both from a sanitary and commercial point of view.

Prof. Silliman and the Mines of Colorado.

The correctness of Prof Silliman's statement in regard to the mines of Colorado is disputed. He says: "The veins are, in general, copper veins, the minerals being copper and iron pyrites. In all the veins except the galena and blende (black jack of the miners) the gold is uniformly associated with the iron, never with the copper pyrites. It is found most abundantly in the fine granular varieties, large pyrites crystals being generally destitute of it. The "tenor" or content of the veins in gold averages for second class ores 1 oz. to the tun, and ranges for first class from 3 to 12 oz., averaging 8 oz. to the tun."

The *Weekly Register*, of Central City, Colorado, says that the "statement that the copper ores contain no gold is the very farthest possible from true, as no copper ore in Colorado is so rich in gold as copper pyrites. That ore contains three fourths of all the gold; indeed nearly all the gold is taken from copper ores. His estimate of the total production of Colorado for the year is less than one half what the yield of Clear Creek and Gilpin counties alone will be. In many respects he speaks disparagingly of our county, and especially of the mills and machinery which he found idle, greatly exaggerating facts, but at the same time he fails to charge the transportation of useless machinery here on Eastern people, where it belongs, for it was the managers of companies, who, sitting in their Wall street and Broadway offices, arranged for these failures. In his report he ignores Summit, Lake, Park, and other counties. His trip was quite too short to enable him to take more than a birdseye view of a small portion of the country, and hence it is not wonderful that he should make errors."

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING NOVEMBER 3, 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	$30
On application for Extension of Patent	$50
On granting the Extension	$50
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)	$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.*

83,583.—KNITTING MACHINE.—William H. Abel, Greenville, R. I.

I claim, 1st, The knocking over points, constructed substantially as described, for the purpose specified.

2d, The combination of the separately removable knocking over points, substantially such as described, with the bar, B, having the notched lip, g, clamp, A, and screws, a, or equivalent.

83,584.—KNITTING MACHINE.—William H. Abel, Greenville, R. I. Antedated October 22, 1868.

I claim 1st, The sinkers, c6 and c7, constructed as described, combined with the jacks, c, and operating in combination with the needles, in the manner and for the purpose set forth.

2d, In combination with the jacks, c, which have sinkers, c6 and c7, constructed, combined, and operating as set forth, the springs, g6, arranged to operate as and for the purpose set forth.

3d, The plate, f f, applied to the face of the knocking over bar, in the manner and for the purpose substantially as specified.

4th, The combination of the vertical shaft, 19, operating as set forth, the crank arm, 17, connecting rod, 15, the segment, with its arm, A', cords, 24 pulleys, 27 and 28, and the top bracket, the whole arranged to operate substantially in the manner and for the purpose specified.

5th, The combination of the friction slide and slide box with the parts last above claimed, as and for the purpose set forth.

6th, The lever, M, for operating the presser bar, when provided with a pin or stud, m, and a rotary sliding roller, n, and with a shipping device, substantially as and for the purpose specified.

7th, The combination of all the operative parts herein described, arranged substantially in the manner and for the purpose set forth.

83,585.—BLIND HINGE.—Max Adler (assignor to himself and Henry Breitwieser), Buffalo, N. Y.

I claim the combination of the interposed bearing cushion, k l, with the geared hinge leaves, a d, arranged as described, and operating in the manner and for the purpose specified.

83,586.—DIE AND PUNCH.—T. G. Arnold, New York city. Antedated October 24, 1868.

I claim, 1st, The combination of the die plate, A, series of removable dies, C, and spring die clearer, L, arranged substantially as described.

2d, Also, the combination of the plate, H, series of punch-supporting tubes, K, and punches, E, arranged substantially as described.

83,587.—STEAM ENGINE OIL CUP.—E. H. Ashcroft, Lynn, Mass.

I claim the combination and arrangement of the outer cup, G, inner open mouthed cup, A, stem, B and valve, C, operated in the manner as shown and described and for the purpose set forth.

83,588.—STEAM AND WATER CHECK VALVE.—E. H. Ashcroft, Lynn, Mass.

I claim the construction of the piece, E, and its arrangement in relation to the valve piece, c, piece, C, and union joint piece, D, substantially as shown and described.

83,589.—EXTRACTING SACCHARINE MATTERS FROM MALT.—William Anneuser, St Louis, Mo. Antedated October 28, 1868.

I claim, 1st, The process of forcing a direct current of steam, water, or compressed air into a tight compartment containing the malt, for the purpose of pressing the saccharine juice from the malt.

2d, The application of a suction apparatus to secure a ready issue of the saccharine liquid, either separate or in combination with the device specified in the first claim.

83,590.—MACHINE FOR BLOCKING HATS.—James A. Ball and Peter B. Lawson, Cold Spring, N. Y.

We claim, 1st, The perforated cone, H, having a recessed surface, f, in combination with the hollow chamber mold or former, C, arranged so as to pinch and hold fast the hat body, substantially in the manner set forth.

2d, In combination therewith, the conical ribs, e e e e, applied to and forming part of the horizontal upper surface of the chamber, d, of the box-mold or former, C, substantially in the manner and for the purpose specified.

3d, The combination of the recessed perforated cone, H, flexible covering, I, plate, B, and steam pipes, K and L, with the box mold, C, arranged and operating substantially as specified, so as to force a felt hat body into the said mold, C, by applying the pressure of steam internally.

83,591.—CAR COUPLING.—Robert M. Barthelmess and Charles C. Millar, Savannah, Ga.

We claim the application, within a longitudinal slot, b, through a buffer head, B, of a slotted segmental latch, D, of described construction, guided and kept in place by means of a pin, g, and carved abutment, h, substantially as described, and for the purpose set forth.

83,592.—GATHERING ATTACHMENT FOR SEWING MACHINES.—Walter B. Bartram, Danbury, Conn.

I claim the within described gathering attachment for sewing machines, composed of three elastic blades or plates, B b a, all arranged relatively to each other, as shown and constructed to guide and give the required pressure to the strips of material to be gathered, as described and specified.

83,593.—LIGHTGING GAS.—W. W. Batchelder, New York City

I claim, 1st, The friction fuse or cord, saturated and coated with the ingredients and in the manner herein set forth.

2d, The method of effecting the feed of the fuse by means of two racks or pinions constructed and arranged so as to admit of the passage of the fuse between them, the said pinions being operated by a spindle and endless screw, or equivalent device, substantially as set forth.

3d, The combination with the feed pinions or racks and fuse, and the spindle for operating the racks and effecting the combustion of the fuse, of the hollow standard case, in which the said spindle and racks are supported and enclosed, substantially as and for the purposes set forth.

4th, The combination, with the rotary spindle for operating the feed racks of a thumb piece, mounted upon the spindle, substantially as herein described so as to prevent the retraction of the fuse from between the said racks.

5th, The fuse receptacle, constructed as described, in combination with the gas burner, under the arrangement herein shown and specified.

83,594.—CHECK HOOK.—Alma Bedford, Coldwater, Mich.

I claim a harness check hook, B, provided with a vertical pin, C, and ball, D, all constructed and arranged to operate substantially as herein described.

83,595.—CHURN.—George Beisner, Chicago, Ill.

I claim, 1st, The movable paddles, b b, arranged and operating substantially as set forth.

2d, The spring, d, as and for the purpose set forth.

83,596.—SEWING MACHINE.—Charles P. Benedict, Hoboken, N. J.

I claim, 1st, The slotted lever, B C, having one of its jaws so constructed that it shall always hold and keep the pin, g, on the arm, E, in contact with the other jaw by a spring pressure, substantially as set forth and specified.

2d, The frame, A, and vibrating slotted lever, B C, constructed substantially as described, so that it may be readily attached to a four-motion-feed sewing machine, in co-operative relation with the feeder thereof, substantially as and for the purposes set forth and specified.

3d, The combination with a reciprocating feeder, of the vibrating slotted lever, B C, constructed as described, so that said lever shall always be in contact with the ordinary feed cam of a four-motion-feed sewing machine, without making or breaking contact therewith, substantially as described and set forth.

4th, The supplementary presser foot or spring, b, in combination with a reciprocating feeder, H, and vibrating slotted lever, B C, constructed and operating substantially as described and specified.

83,597.—BLOCK AND DIE FOR FORMING HATS.—Lorenz Bommer, New York city.

I claim making porous hat blocks, molds, and dies, substantially as described, as distinguished from molds made porous by perforations or woven meshes.

83,598.—HORSE HAY FORK.—B. S. Burgan, Congress, Ohio.

I claim the links, I, bow, F, lever, G, and cross bar, C, as arranged to operate in combination with the feet, D, and limbs, A, substantially as and for the purpose described.

83,599.—HARVESTER RAKE.—Charles Thomas Burgess, Brentwood, England. Patented in England, September 8, 1866.

I claim, 1st, The combination, as herein described, of the reel shaft, the rake arms, and the cam for carrying the delivery rake or rakes of the reel or fly by the arm or arms which are inclined to the shaft of the reel, and which are caused to vary their angle to the shaft, substantially as described.

2d, The arrangement of mechanism, herein described, for carrying the delivery rake of the reel or fly, as it is moved back over the platform, not only to move endwise towards the draft side of the machine, but also to turn into a position inclined to the line of the knife, substantially as hereinbefore described.

83,600.—LETTER PACKAGE.—J. W. Burns, Medway, Ohio.

I claim the direction papers, E, when attached as described, by the fastenings, c, or the band, x, and combined with the parts, A B, as and for the purpose set forth.

83,601.—PROPELLER SHAFT.—Wm. Burtis, New York city.

I claim the application of the double counter shafts, C C, with their gear wheels, F, in combination with the gear wheel, E, on the crank shaft, and the gear wheel, D, on the wheel shaft, as herein described.

83,602.—NON-FREEZING HYDRANT.—James E. Carter, Portland, Me.

I claim the improved hydrant, having the gas and water pipes combined and arranged within the shell or stock of the same, from their respective mains upward, as and for the purposes set forth.

83,603.—BLIND HINGE.—Charles B. Clark, Buffalo, N. Y.

I claim the angular socket, g, and pin, n, in combination with the inclines, m m', constructed and operating as described.

83,604.—WATER WHEEL.—Mark J. Colbourn, Karthaus, Pa.

I claim, 1st, The hoods or shields, D, constructed of the form substantially as described, upon the backs of radial floats, m, substantially in the manner and for the purposes described.

2d, The shields, D, constructed with interlocking segments, S, and shoulders l, in combination with the float plates, m, flanches, H, and a locking key, K', substantially as described.

3d, The convolute case, inclosing the water wheel of two sections, C C1, constructed and connected together by the devices, as shown, so as to be detachable, substantially as described.

4th, The combination of the sectional frames, A A', the sectional water wheel case, and the tongue and groove and bolt fastenings, all constructed and arranged substantially in the manner and for the purpose described.

5th, The removable box, d, provided with hooked fastening, d, adapted for use with a standard, C3, substantially as and for the purpose described.

83,605.—ANNEALING PIT FOR ANNEALING CAR WHEELS.—W. J. Cochran, Baltimore, Md., assignor to himself and John Cochrane, Farmingdale, N. J.

I claim, 1st, The cooling or annealing pit, herein described, with a top covering and bottom vent, arranged for the purpose set forth.

2d, The arrangement of the cope ring with the top plate, substantially as described.

3d, The cooling or annealing pit, in combination with the guide strips or their equivalents, arranged and operating substantially as described.

83,606.—NOISELESS BELL PULL.—John F. Cory, New York city.

I claim the carrying of the rubber, D, on the slide, B, attached to the wire, C, leading to the bell, so that it is raised and lowered therewith, substantially as and for the purposes herein set forth.

83,607.—BOILER FLUE BRUSH.—Patrick H. Coyle, Newark, N. J.

I claim a boiler-flue brush, the flexible or brush portion of which is composed of strips or pieces of steel, or other metal, inserted in the hub, substantially as set forth.

Also, the combination of a metallic lined tubular hub or base, with a steel or metallic brush, substantially as set forth.

Also, the combination, with a boiler-flue brush, of removable end pieces or heads, and a removable center rod or handle, substantially as set forth.

83,608.—STEAM GENERATOR.—J. A. Davis, Watertown, N. Y.

I claim the combination of the generator, A, and the water supply reservoir, F, whereby to generate low pressure of steam, and to supply heated water to the boiler, substantially as herein set forth.

83,609.—COFFEE HULLER AND POLISHER.—C. de St. Charles, Jalapa, Mexico.

I claim the combination of the cylinder, A, rubber, b, belt, e, and adjustable stretcher, h, when constructed and operating in the manner herein described.

83,610.—HARVESTER RAKE.—Joseph Dick, Jr., of Oshawa, Ontario, assignor to himself and Eugene Glen, Rochester, N. Y. Patented in Canada, June 26, 1868.

I claim, 1st, The bed plate, B, provided with bearings for the driving and crank wheel shafts and rake pivot, and for the adjustable stops and rake latch, arranged substantially as described.

2d, The latch, f, attached to the rake-carrying arm, and operating in connection with the sector arm, substantially as described.

3d, The latch, f, attached to the rake-carrying arm, and operating in connection with the sector arm, substantially as described.

3d, The adjustable roller arm, in combination with the latch, f, for releasing the same, in the manner set forth.

4th, The pivoted latch lever, l, operating in combination with the sector and rake carrying arms, substantially as described.

5th, The pivoted latch lever, l, provided with the adjustable latch or hook, for the purpose set forth.

6th, The pitman, J, and boxes, I and K, in combination with the adjustable washers or jam nuts, k, arranged and operating substantially as described.

7th, The vibrating rake arm, provided with the heel extension or counter arm, D', in combination with the crank-wheel shaft, arranged and operating in relation thereto, substantially as described.

83,611.—POST AUGER.—John B. Draper, Salem, Ill.

I claim the arrangement of the screw shaft, G, with its wheel, I, and the nut, D, with its wheel, F, and restraining plates, E, operating respectively for the rotation and insertion of the auger, and for its upward withdrawal, substantially as described and represented.

83,612.—CORN MARKER.—J. W. Eardly, Grand Rapids, Mich.

I claim, 1st, The adjustable hinged bars, A A, in combination with the arms a a a a, and slotted arms, b b, arranged and operated substantially in the manner shown and described, for the purpose set forth.

2d, The manner of adjusting the marker, a, fig. 2, substantially as and for the purpose described.

83,613.—WASHING MACHINE.—Dexter Estes, Stockholm, N. Y.

I claim the corrugated roller, A, moving in the curved box, B, by means of the lever, d, pivoted to a projection extending from one side of the box, and furnished with the handle, C.

83,614.—WAGON STAKE.—Amos Fassett, Sterling, Ill. Antedated Oct. 17, 1868.

I claim, 1st, The plate, B, when provided with the flange, b', and the enlargements, e e, projecting below said plate, substantially in the manner and for the purposes herein set forth.

2d, In combination with the above, I claim the side plates, C D, arranged and operating in the manner specified.

83,615.—COMPOUND FOR KILLING INSECTS ON TREES.—H. D. Flower, Chicago, Ill.

I claim the ingredients herein named, compounded and applied substantially as and for the purpose set forth.

83,616.—MANUFACTURE OF PAPER.—Elias T. Ford, Stillwater, N. Y.

1 claim, 1st, The perforated cylinder, A, with the interior suction box, B, both constructed and arranged to operate substantially as herein described.

2d, In combination with the perforated cylinder, A, the suction box, B when constructed and arranged to operate substantially as herein described and for the purpose set forth.

3d, The reservoir, D, with a packing roll, G, or its equivalent, for preventing drip, in combination with the forming cylinder, A, when constructed and arranged to operate substantially as herein described.

4th, In combination with the perforated cylinder, A, and sucking box, B, the slice bars, r r, and blades, H H, when constructed and arranged to operate substantially as herein described and for the purpose set forth.

5th, Providing the forming cylinder, A, and its attachment, as herein described, with a reciprocating movement, for the purpose of interweaving the fiber of the pulp, as set forth.

83,617.—MACHINERY FOR THE MANUFACTURE OF PAPER.—Elias T. Ford, Stillwater, N. Y.

I claim, 1st, In the manufacture of paper, the method of sucking the surplus water from the pulp formed into a sheet on the wire cloth as it passes to the couch roll, substantially as herein described.

2d, The perforated cylinder, B, when constructed and arranged to operate substantially as herein described for the purpose of avoiding the wear of the wire cloth in the manufacture of paper.

3d, The water box, A, perforated cylinder, B, circular plungers, C, concave plungers, J Q, packing plates, I, and packing, Z, when constructed and arranged substantially as herein described and for the purpose set forth.

4th, In combination with the perforated cylinder, B, the sucking box, W, with its plungers, C, when constructed and arranged substantially as herein described.

83,618.—WRENCH.—E. T. Ford, Stillwater, N. Y.

I claim the above described wrench for axle nuts of carriages, the whole constructed and operated substantially as and for the purpose specified.

83,619.—FINGER BAR FOR HARVESTERS.—E. T. Ford, Stillwater, N. Y.

I claim the oval plates, A B, provided with apertures, F and r, in combination with the guard fingers, C, provided with shanks, c, screws, a a, and metal plug, J, all constructed and arranged substantially as described.

83,620.—WINDMILL.—John Frazee, St. Louis, Mo.

I claim, 1st, The vanes, G and G', respectively combined with the frame, B, cam plate, B2, cams, f and f', and fan shafts, E, substantially as and for the purposes set forth.

2d, The governor device, h H h1, acting upon the vanes, G and G', to cause them to turn the frame, B, substantially as and for the purpose set forth.

83,621.—LOOM.—John G. Garretson, Cincinnati, Ohio. Antedated Oct. 22, 1868.

I claim, 1st, The combination of the batten, the finger, b the pendants, d, the cord, f, the pulley, e, and the case, c c, for the purpose of operating the harness, as above described.

2d, The cords, w and x, in combination with the lever, y, and finger, b, for the purpose of operating the pendants, as above described.

3d, The combination of the guide pins, n n n with the hand rail, or batten cap, and with the sliding guides, o o, in the manner and for the purpose above set forth.

4th, The endless cord, a a a, arranged with the batten and its guiding pulleys, in combination with the shuttle working or carrying guides, o o, for the purpose above shown and described.

5th, The combination of the pawl, k, the fly, m, the dog, t, and the lever, h, acting on the rag wheel of the cloth beam, and making a take up motion, as above set forth and described.

83,622.—BELL PULL.—James Garvey and M. H. Kimball, San Francisco, Cal.

We claim the application of the lifting wedge, H, combined with the lug, I, which, being attached to the pull bar, G, operates with it directly on the hammer, E, in the manner herein described and for the purposes before mentioned.

83,623.—BELL PULL.—James Garvey and M. H. Kimball, San Francisco, Cal.

We claim, 1st, The lever, D, as constructed, and the attachment of the wedge-piece, G, thereto.

2d, The attachment of the handle or pull bar, H, directly to the lifting wedge, G.

3d, Connecting the lever, D, and hammer, K, by the spiral spring, P, or its

equivalent, the whole constructed in the manner substantially as herein described and for the purposes as set forth.

83,624.—SEEDING MACHINE.—H. A. Gaston, Stockton, Cal.

I claim, 1st, The rotating fingers, d, when constructed to operate between fixed fingers, f, of a grain-sowing machine, substantially as above described.

2d, The combination and arrangement of the rotating shaft, D, and its fingers, d, with the stationary fingers, f, and the further combination and arrangement of the relief board, H, with the remaining internal machinery of a grain-sowing machine, substantially as above described.

3d, The spur, e', in combination with the slide, C', substantially as above described.

83,625.—MACHINE FOR BENDING ELLIPTIC SPRINGS.—Joseph Gatchell, Rahway, N. J.

I claim, 1st, The combination, substantially as described, of the templet, rolls, bending levers, and weight.

2d, The combination of the series of rolls with the bending levers and templet, arranged substantially as described.

83,626.—SASH SUPPORTER.—H. C. Goodspeed, New York city.

I claim the construction and arrangement of the grooved single pulleys or sheaves, a a, double sheave, b, cords, C C, and spring, D, when applied to a window sash and frame, substantially as described, and for the purpose set forth.

83,627.—HARVESTER.—Martin Hallenbeck, Albany, N. Y., assignor to Alfred Blaker, Newtown, Pa.

I claim, 1st, The arrangement, as described, for joint operation, of the tongue, the driver's seat, and the lifting lever on the foot board, pivoted to the main frame behind the main axle, for the purpose specified.

2d, The arrangement, for joint operation, as described, of the main frame, the down hangers, h hl, the lever, H, the socket, I, and the cutting apparatus.

3d, The combination, as described, with the sickle eye and pitman, of the flanged, slotted guard plate, N, for the purpose specified.

83,628.—CUTTING APPARATUS FOR HARVESTERS.—Martin Hallenbeck, Albany, N. Y., assignor to Alfred Blaker, Newtown, Pa.

I claim, 1st, The combination, with the cutting apparatus of a harvester, of a vertically moving divider and a depressing spring for the purpose set forth.

2d, The combination, substantially as set forth, of a vertically yielding divider, a depressing spring, and a stop to limit the vibration of the divider.

3d, In a harvester cutting apparatus, the construction and arrangement, for joint operation, substantially as set forth, of the finger beam, the guard fingers, and their ledges, e, the brackets, and their ledges, b, with the cutter bar and cutters, for the purposes specified.

83,629.—FURNACE FOR HEATING SOLDERING IRONS.—Warner Hatch, Plainfield, Ill.

I claim, 1st, The combination of the fuel chamber, a, with the throat, d, and slide, m, when applied to a furnace for heating soldering irons, all constructed and arranged as and for the purpose set forth.

2d, The throat, d and slide, m, in combination with the fire box, b, when constructed with a circular partition, o and lid, s, all arranged and operating as and for the purposes set forth.

83,630.—GRAIN SEPARATOR.—Dexter Hathaway, Wyoming, Wis.

I claim, 1st, The two short screens, C and D, as described.

2d, Attaching the spout, G, to the lower edge of the shoe, as specified.

3d, The movable tail board, H, as shown and described.

83,631.—SKATE.—George Haveli, Newark, N. J.

I claim the angular sliding bar, G, encased in the box, F, and provided with clamps, H H, and operated by means of the screw rod, I, substantially as and for the purposes herein set forth.

83,632.—WINDOW SASH AND FRAME.—Orion R. Hight, Dowagiac, Mich.

I claim the arrangement of pin, J K, loosely in stop, G, for the purpose of rigidly fastening the sash when desired, substantially as and for the purposes described.

83,633.—ANIMAL TRAP.—Thomas M. Hill, Richmond, Ind.

I claim the arrangement and combination of the vibrating platform, I, with its levers, J J, the door, B, working in guides, i i, the head block, K, spring, H, connecting rod, G, post, E, and trigger, F, with the box, A, when provided with the hinged lid, C, and opening, D, for the purpose and in the manner substantially as herein set forth and described.

83,634.—SLATE CUTTER.—Hatfield Hopper and John G. Hetzell, Newark, N. J.

We claim, 1st, The combination of fixed knife, B, with beveled cutter, A, when the latter is operated by means of an up and down motion, in the manner substantially as described.

2d, The gages, O O, and the center pin, P, substantially as described and for the purposes named.

3d, The frame, B, hinged at C, carrying the beveled cutter, A, when operated by means of the treadle, E, through the media of the connecting rods, F K, and crank shaft, H, carrying fly wheel, L, all constructed and arranged to operate in the manner and for the purpose substantially as described.

83,635.—BOBBIN.—Horace J. Hubbard, Chicopee, Mass.

I claim the combination, with the bobbin, of the fly catch, consisting of the ring, A, with one or more arms, B, with pins, C, constructed and arranged substantially as herein described, and for the purpose specified.

83,636.—TOOL HOLDER FOR GRINDING.—Aaron P. M. Jeffers, Allegan, Mich.

I claim the construction of a tool holder, with the rock shaft, C, standard, D, set screw, E, rest, E", provided with slots, F and H, thumb nut, G, standard, I, pin, J, bolts, K M and O, rest, L, ratchet, N, jaw, P, ball, R, springs, S, screw, M, and nut, U, or their equivalents, when arranged and operating substantially as and for the purposes herein set forth.

83,637.—COMPOSITION FOR THE SOLES AND HEELS OF BOOTS AND SHOES.—Nathaniel Jenkins, Boston, Mass.

I claim, 1st, A combination of caoutchouc, or india-rubber, and raw hide, in suitable proportions, for the purposes before explained.

2d, The addition, to a compound of caoutchouc and raw hide, of a less expensive and heavier substance or substances, to produce results before described.

83,638.—LOW WATER INDICATOR.—Eliza Joyce, New York city.

I claim the arrangement, in connection with the boiler, of the float, C, and alarm, E, directly connected together by the crank spindle, B, substantially as described, so that the ebullition of the water, when at a determined level in the boiler, will effect the vibration of the float, and the consequent sounding of the alarm as set forth.

83,639.—ROTARY SPADING MACHINE.—Edward H. Kent, Portland, Oregon.

I claim the spade bars, E, moving in slots, O, operated by pawls, H, and lever, L; also, fastening the spade bars, E, when extended outward in the slots, O, of the cylinder, B, by the latches, D, falling in and out behind the collars, G, with the groove, M, on the shaft, N, and the concentric segment I, and bars J, and combination of the various parts, as herein described, and for the purposes set forth.

83,640.—PAPER FASTENER.—Albert J. Kletzker, St. Louis, Mo.

I claim the stand, A, lever, B, followers, C, and perforators, D, when arranged and operated as described and set forth.

83,641.—GANG PLOW.—John D. Kneedler, Collinsville, Ill., assignor to himself and Thomas S. Davis

I claim the frame, A, and vibrating frame, A1, the spring, a1, loop, a2, and treadle, a3, all operated and combined substantially as set forth.

83,642.—ANIMAL TRAP.—John A. Lee, Chattanooga, Tenn.

I claim, 1st, The two concentric drums, A and A' one, stationary and the other rotating by means of a coiled spring upon the upright axis, b, when in combination with the platform, c, spring trigger, o, and bait hooks, a, as and for the purposes set forth.

2d, The combination and arrangement of the glass gate, I, and wire grating, J, and pawl, f, with the lugs, f, upon the outside drum, A, as and for the purposes set forth.

83,643.—MANUFACTURE OF OXIDE OF ZINC FROM SULPHURETTED ORES.—David Lees, Blair county, Pa.

I claim the application of a hot blast, substantially in the manner and by the process above described, to the manufacture of oxide of zinc, whereby the oxide is always formed in an oxidizing atmosphere, and at a temperature sufficiently elevated to decompose all injurious products.

83,644.—BARBER AND DENTAL CHAIR.—Michael Leidecker, and Philip Cron, Rochester, N. Y.

We claim the combined arrangement of the screw, D, nuts, b b, and toggles, c c, for producing the backward and forward adjustment of the chair, and the worm, h, nut, g, and screw, f, for producing the vertical adjustment of the seat, independent of the chair, as herein set forth.

83,645.—WRITING SLATE.—Robert F. Leighton, and Solomon Severy, Melrose, Mass.

We claim the improved manufacture of elastic-frame slate or writing tablet, as made with the india-rubber, or material of the frame, not only molded upon the tablet about its edges, but through holes made through the tablet, and near to such edges, as set forth, such extensions of the rubber through the tablet serving to effectually prevent detachment of the frame from the tablet.

83,646.—STOVE-PIPE THIMBLE.—John L. Little, Atkinson, N. H.

I claim a stove-pipe thimble, composed of cylinder, A, having the inward projections, F, removable collar, C, with rim R, and slot, S, all constructed and operating in the manner and for the purpose described.

83,647.—TRUNK HINGE.—Orrin Luce, Cortland, N. Y.

I claim the construction and arrangement, herein described, of the parts, a b i g g p d e and c, for the purpose set forth.

83,648.—PAPER BAG MACHINE.—George H. Mallary, Poughkeepsie, N. Y., assignor to himself, Alex. L. Van Buren, Herbert Reed, Wm. H. Clark, and John A. Standish. Antedated Oct. 17, 1868.

I claim, 1st, The combination of the moving bed, f, and the rollers, d e, and the folders, h h, actuated substantially as set forth, so that the feeding of the sheet of paper and folding the same are effected at the right time, as set forth.

2d, The rollers, k g' and l l', in combination with the moving bed, f, and the folders, h h, for the purposes and as set forth.

3d, The pasting and creasing mechanism applied on the axis of the roller, o, as and for the purposes set forth.

83,649.—BROILER.—John Mallory, Penn Yan, N. Y.

I claim the gridiron, B, when made as specified, and used in combination with the case, A, substantially as set forth.

Also, the opening of the case, when made as and for the purpose herein specified.

83,650.—DOOR STOP.—William May, Binghampton, N. Y.

I claim the cam, F, and spring, D, in combination with the slide, B, and plate, A, as arranged and shown, for the purpose set forth.

83,651.—STUMP EXTRACTOR.—H. E. Mead, Centerville, Mich.

I claim the combination and arrangement of the capstan head, B, provided with recesses, L, clutch plates, M, and the yoke, O, with the cylinder, E, provided with a journal, F, and clutch, G, sills, A, centre plate, B, standard, C, cross tie, D, sweep, I, evener, J, guide yoke, K, lever, N, and cord, P, when constructed and operating substantially as herein described and for the purposes specified.

83,653.—KNOB LATCH.—W. T. Munger, Branford, assignor to P. Corbin and F. Corbin, New Britain, Conn.

I claim the swinging link, i, jointed to the latch, e, in combination with the projections 2 and 3, and lever arm, h, from the spindle hub, k, substantially as and for the purposes specified.

83,653.—VENTILATING ATTACHMENT FOR ASH SIFTERS.—Henry A. Newhall, Providence, R. I.

I claim, 1st, A funnel to connect the inclosing case of a coal sifting apparatus with a flue, constructed substantially in the manner herein described.

2d, The sifting box, t, provided with pipes, w v, constructed in the manner and for the purpose herein set forth.

83,654.—WRENCH.—Frank L. Oliver, Scarborough, Me.

I claim the improved wrench for carriages, made in the manner and combining the parts herein specified.

83,655.—STEAM GOVERNOR.—E. H. Parker, Bucksport, Me.

I claim a steam governor constructed with fan, G, spindle, a, spiral flange, c, truck, e, or other suitable bearing for the fan upon the flange, pulley, f, or its equivalent device, for imparting motion, and the rod, g, or its equivalent, for connecting the governor with the valve, all arranged substantially as described and shown.

83,656.—HARROW TEETH.—Andrew Patterson, Birmingham, Pa.

I claim an angular iron or steel harrow tooth, made substantially as shown and described.

83,657.—COOKING STOVE.—Henry Pease (assignor to himself and H. W. Seymour), Brockport, N. Y.

I claim, 1st, The arrangement of a firepot, E, concentrically within a circular oven space, B, substantially as shown.

2d, In a central independent firepot, E, suspended concentrically within the circular oven space, the air jacket, i i, induction orifices, k k, and ventilating dampers, p p, communicating externally through the top of the stove, combined and arranged substantially as set forth.

3d, The combination of the revolving false bottom, P, and sweeping arms, s s, arranged as described and operating as herein set forth.

83,658.—SMUT MILL.—C. T. Phillips, Jordan, N. Y.

I claim the arrangement herein described of the scouring cylinder, D d e, annular chamber, h, blast wheels, L l, screen, B R r, chambers J K, conduits, k, and spouts, F G, all operated as shown and for the purpose specified.

83,659.—BUT HINGE.—Benj. C. Pole, Richmond, Va.

I claim the bed plate, A, the spring, B, the hinge plate, C, with the slot, D, the hinged lever, E, rod, I, plate, K, hinge plate, F, all constructed, combined, and operating substantially in the manner and for the purpose herein set forth.

83,660.—MANUFACTURE OF METAL CANS.—John Pollock and Theo. J. Diedrick, Philadelphia, Pa.

We claim, 1st, Table, T, levers, L L1 L2 and L3, plates, P P2, lug, l, standards, S and S', rods, r and r1, springs, s s1 s2 s3 and s4, block, B, and its beveled punches, b, saddle, E, and its hammers, h, cylinder, C, flexible tongue, f, flat bar, F F', arm, a, rod, R, vibrating guide, G, and treadle, D, all arranged, constructed, and operating in the manner and for the purpose set forth.

2d, The combination of the sliding plates, P and P', rods, r and r, and springs, s and s1, with the cylinder, C, and flexible tongue, f, for the purpose of interlocking the tongues, and bringing the edges of the can together, as herein set forth.

83,661.—RAILWAY CAR BRAKE.—Warren Portlock and J. R. Dodds, New London, Iowa.

We claim, 1st, The arrangement of the rod, D2, links, S R g, chain, h h', rocking bar, J, brake bars, N, suitable connections and rod, D1, substantially in the manner and for the purpose described.

2d, The arrangement of the chain or cord, b, and brake shaft, a, in combination with the sliding self-retracting frame, D D, in the manner shown and described.

3d, The rods, D1 D2, arranged on opposite ends of a car, and connected to the brake bars as described and shown, in combination with the right and left arms of the sliding self-retracting frame, D D, substantially as and for the purpose described.

83,662.—RAFT.—David Quinn, Chicago, Ill.

I claim a raft or boat having an interior opening, in combination with a house, box, or cabin over it, whereby wind and waves are excluded from the surface of the water in the opening, and light excluded from the interior of the cabin, substantially as herein set forth.

83,663.—GUTTER IN FOOT PAVEMENTS.—Joseph Read, Philadelphia, Pa.

I claim in combination with the foot pavement of a city or town, the iron drain, C, having the side flanges, c''' c''', and the detachable covering plate, c4, constructed and applied substantially as and for the purposes described.

83,664.—CHURN.—E. P. Russell, Manlius, N. Y.

I claim the link, I, pin, J, adjustable sleeve, f, and loose band d, all constructed and arranged as described, for the purpose specified.

83,665.—SKATE.—R. J. Russell, Moundsville, W. Va.

I claim the combination of the slides, A and B, with the bars, C and E, and the washers, H, and nut, F, substantially as described, the whole constructed and operating as herein set forth and shown.

83,666.—TRAP FOR DESTROYING INSECTS.—Thos. C. Silliman, Chester, Conn. Antedated Oct. 24, 1868.

I claim, 1s, The regulator, substantially as described, to insure silence, and to simplify the mechanical combination and movement.

2d, The flat or elliptical form of the driving shaft, S, to economize power.

3d, The placing of the driving shaft, or the arm or arms for driving the sweep, out of the axial line of the sweep, for the purpose specified.

4th, The sweep, P, to convey the insects to the drowning box, or its substitute.

5th, The arch, A, as located relatively to the sweep, to increase the trapping surface.

6th, The strainer, F, to remove the insects from the liquid.

83,667.—DEVICE FOR UNLOADING HAY.—George Smith, Providence, R. I., assignor to himself and John C. De Lany, Detroit, Mich.

I claim the combination and arrangement of the hook, C, latch, D, cords, E and A, pulley, p, for latch cord, E, sling, a c, and rings, b b, all constructed and operating substantially in the manner described.

83,668.—PIPE MOLDING MACHINE.—William Smith, Allegheny City, Pa.

I claim, 1st, A packer shaft, mounted in bearings on a vertically moving carriage, arranged and operating so as to communicate rotation to the packer shaft during its vertical movements, substantially in the manner described.

2d, The carriage, G, and racks, G3 G4, in combination with the pinions, D1 D2, counter shafts, D C, gear wheel, Dd, pinion, Cc, loose pulleys, C1 C2, clutch, Cd, and driving shaft, Ab, arranged and operating substantially as described and for the purpose set forth.

3d, The pivoted clamps, L2 having friction rollers upon their ends, in combination with the car, K, and flask, B, as set forth.

83,669.—INSTRUMENT FOR ATTACHING BUTTONS TO FABRICS.—Daniel M. Somers, and Walter S. Atwood, Brooklyn, N. Y.

We claim, 1st, The bed piece, A, lever, E, friction roller, F, sliding die plate, C, attached to and operated by sliding piece, H, having an inclined face, and a stationary die plate, B, combined and arranged substantially as herein described, and for the purposes set forth.

2d, The die plates, B and C, so constructed, with removed surfaces, t t' and v v', that they may overlap, and their dies provided with inclined sides, i i' and e e', combined and operated substantially as herein described.

83,670.—POTATO-DIGGER.—John Stewart, Jackson, Mich.

I claim, 1st, The extension of the mold boards, B, by means of the curved bars, or wings, C, when the latter are held and rendered yielding by means of braces, D, constructed and operating substantially as herein set forth.

2d, The triangular frame, E, with its attachments, in connection with plow, A, when constructed, arranged, and operating substantially as and for the purposes specified.

83,671.—MORTISING AND TENONING MACHINE.—Henry D. Stover, New York city.

I claim, 1st, The bed plate, A and A', when so constructed that the cutter heads may be worked back and forth, or to and from the work, substantially as described.

2d, Varying the throw or motion of the chisel in mortising machines, by means of the friction disks, C and C', when arranged substantially as described.

3d, The cutter heads, attached to levers, N and N', in combination with cutter head, x, when constructed and arranged as described, for the purpose set forth.

4th, Mounting a cutter head upon the adjustable lever, N, attached to the sliding bed, L, so that the gains or notches may be readily formed in heavy timbers, substantially as described, and for the purpose set forth.

83,672.—SHEEP SHEARING TABLE.—Joseph T. Styer, Richwood, assignor to himself and Eber Bradley, Whitehouse, Ohio.

I claim the construction of a sheep shearing table, A, provided with folding legs or standards, B, and revolving concave disks, E, when operating substantially as and for the purposes herein set forth.

83,673.—AUTOMATIC CAR COUPLING.—Horace Tarbox, Warwick, R. I.

I claim a car coupling, composed of the box, A, with a shaft, b, and spring, c, which has a lever, d, connected to the slotted coupling pin, with a guide plate, e, when combined with a projecting staple, i, and lever, i, all constructed and operated substantially as described, and for the purpose specified.

83,674.—RAILWAY CAR BRAKE.—Bjarne O. Thompson, Chicago, Ill.

I claim, 1st, The combination and arrangement of the arms, B, when connected to the driving wheels of a locomotive, and to disk, C, thereby giving motion to bevel wheel, D, keyed on the same shaft, C', as the disk, C, when the driving wheels are in motion.

2d, The combination of the vertical brake shaft, S', slotted plate, c, pin, e, shaft, h, pinion or serrated flange, d, pawl, f, spring, g, bevel pinions, E and G, cog wheel, H, shaft, I, projection, P', and chain, L, substantially as and for the purpose set forth.

83,675.—COMBINED CULTIVATOR, PLOW, HARROW, AND ROLLER.—Sterling C. Thornton, Macomb, Texas.

I claim, 1st, The combination and arrangement of the fixed frame, C, movable frame, E, parallel ruler joints, d d d d, lever, G, rod, g, rack, H, and spring catch lever, g', the whole being constructed to operate in the manner and for the purposes set forth.

2d, The joint plates, d d, when constructed in the triangular shape described and shown, and provided with notches, v v, in their under edge, and used in connection with the pin, v1, and series of holes, v2 v2 v2, in the fixed frame, for the purpose of adjusting the depth to which the plows, etc., can work.

3d, The pivot, a, in combination with the lugs, a1 a1, and bolts, e and e', passing through the rear end of the draft pole, the whole being constructed to operate in the manner and for the purpose specified.

4th, The use of the standards, L L, in combination with the springs, l l, and middle beams, J J, for the purposes and operating in the manner described.

5th, The rocking frame, M, when pivoted to the drag bars or arms, R R, as described, and provided with the lever, s, and adjusting bar, r2, by which the whole frame can be raised or depressed at pleasure, in combination with the cleaning device, u u, when made to operate substantially as described.

6th, The described method of attaching the tooth or plow, K, to the frame of the machine, namely: the employment of a bifurcated standard, so constructed as to brace the tooth laterally, and, if necessary, provided also with braces, to brace it longitudinally with the machine, substantially as shown and specified.

83,676.—MACHINE FOR CUTTING MEAT AND OTHER ARTICLES.—Peter Vande Sande (assignor to himself and Stephen Coleman), Rochester, N. Y.

I claim, 1st, The combination of the knives, a a, and clearers, i i, having an angular adjustment, and otherwise arranged as described, and operating in the manner and for the purpose specified.

2d, Constructing the rack, H, in such a manner as to have a degree of flexibility, as herein described.

3d, The arrangement of the divided screw threads, q q, upon the collar, I, in such a manner as to alternate in position when combined with the thread plate, K, in the manner and for the purpose specified.

4th, The combination of the cams, r r, with the screw threads, q q, and thread plate, K, operating in the manner and for the purpose specified.

5th, The arrangement of a series of the collars, I I I, upon the same shaft, and having screw threads of different degrees of coarseness, whereby one may be substituted for another, as described.

6th, The arrangement, as a whole, consisting of knives, a a, rack, H, box, C, thread plate, K, and screw collars, I, operating as described.

83,677.—CORN PLANTER.—James F. Walker, Murrayville, Ill.

I claim, 1st, The construction of the tread of each covering and transporting wheel, E, of three tires or rings, a a' a'', so applied to forked ends, b, of the spokes of the wheel as to leave spaces for the escape of earth, substantially as described and shown.

2d, The lifting lever, F, in combination with the looped lever, c, and scrapers, m, when these parts are constructed and arranged so as to operate as herein described.

3d, The looped lever, c, the longitudinally movable and vibrating lever, F, and the vibrating hopper frame, when these parts are arranged, combined, and constructed, substantially in the manner described.

4th, The levers, H J J, connected to the seed slides, s s', and operated by means of one or two hand levers, G2, substantially as described.

5th, Removable perforated cut off plates, d, applied to hoppers above the seed slides, substantially as described.

6th, While not claiming broadly anti-friction castors, I do claim providing the transverse beam, C, with channeled blocks, P, having supporting wheels, P2, and swiveling standards, P1, applied to said blocks, with anti-friction balls, p', interposed between said blocks and standards, as described.

83,678.—FRUIT CARRIER.—James W. Weston, N. Y. city.

I claim a fruit carrier, formed of a perforated cylinder, fitted with heads that are retained in place by the cords that suspend the carrier horizontally, as and for the purposes set forth.

83,679.—COOKING RANGE.—Stephen Wilks, Chicago, Ill.

I claim the arrangement of the several parts constituting my said range, as above specified and shown.

83,680.—CURTAIN FIXTURE.—William H. Young, and L. Young, Boston, Mass.

We claim the slide, C, constructed as described, and for the purpose specified.

83,681.—FISHING JIG.—Sewall Albee, Wiscasset, Me.

I claim the method of forming the body of the jig of three adjustable parts, substantially as described, and especially the method of adjusting, securing and holding the hook, by means of an adjustable tube or cap, in combination, with a center piece, containing a screw, fitting the cap, and an aperture, for the admission of the stem of the hook, all substantially as above described.

83,682.—STRAW CUTTER.—Julius Ambrun, Leavenworth city, Kansas.

I claim, 1st, The frames, C and D, which hold the two cutters, E and F, respectively, when connected with each other by means of a pinion, b, and racks, operated by a lever, G, substantially as herein shown and described.

2d, The reciprocating frames, C D, carrying the cutters, E F, in combination with the pawl, I, ratchet wheel, g, belt, h, feed wheel, K, and presser wheel, L, all arranged on a straw box, A, substantially as herein shown and described.

83,683.—COMPOSITION FOR THE MANUFACTURE OF SAFETY AND OTHER FRICTION MATCHES.—William Austin, London, England.

I claim 1st, The manufacture of match igniting chemicals and ingredients with anti-hydro matter, so as to render the same, and the igniting surfaces and matches prepared therewith, wet and damp proof.

2d, The manufacture of friction igniting chemicals and ingredients for safety matches and their igniting surfaces, with the anti-hydro matter or compound herein mentioned, and applying the same directly to or upon the natural surface of the materials of boxes, match containers, or match igniters, of metal, china, stone, or earthenware, or other similar materials.

3d, The manufacture of other match igniting chemicals, with the anti-hydro matter or compound herein mentioned, and applying the same to matches.

83,684.—PLANK AND TIMBER DRESSER.—Ezra Bailey, Cincinnati, Ohio, assignor to himself and Joseph Parker, Covington, Ky.

I claim the adjustable hinged rails, C D, jaws, I I', carriage, H, and adjustable heads, J J', herein described, arranged to operate for the purposes set forth.

83,685.—SASH GUIDE BLOCK.—Alfred Bicknell, South Reading, Mass.

I claim the anti-friction grooved guide blocks, A, constructed substantially as herein shown and described, that is to say, with grooves upon their semi-circular upper edges, and with shoulders or notches upon either or both their sides and lower edge, or upon their lower edge only, as and for the purpose set forth.

83,686.—COFFEE POT.—E. Blunt, Jr., New York city, assignor to Henry P. Nichols, trustee.

I claim the combination of the vessels, A and C, double partition, c c', valve and rod, G, and whistle, D, all constructed and operating substantially as herein shown and described.

83,687.—PILE DRIVER.—John A. Borgort, Hudson city, N. J.

I claim the combination and arrangement of a grappling hook, H, pulleys, K and L, with the frame, composed of the uprights, B and C, and base, A, substantially as herein shown and described, and for the purposes set forth.

83,688.—COOKING STOVE.—Harvey Brown, Harlem, N. Y.

I claim, 1st, The cleats, a b, attached respectively to the sides, c c, of the body of the stove and the base, A, for the purpose of securing the body of the stove to its base, substantially as shown and described.

2d, The combination of the hooked cleats, f k, with the lugs, g, and bolts, h, for the purpose of securing together the plates, c c, e e, i i, j j, of the stove, substantially as set forth.

3d, The pins, d, or their equivalents, in combination with the cleats, a b, arranged substantially as and for the purpose specified.

4th, The oven, placed upon the top of the stove, consisting of elevated rack, E, covered with the closed box, F, whereby the article to be cooked is raised above the stove, to receive the heat from the plate, D, and that radiated from the top of the box, in about equal proportions, as herein shown and described.

5th, The combination with the upper flaring or inclined plates, i i j j, of the stove, with the upright plates, c c e e, of the lower part of the same, when used in connection with the rack, E, and cover, F, substantially as and for the purpose set forth.

83,689.—GRATE BAR FOR FURNACES.—William Colborne, Cambridge, Bristol, Great Britain, assignor to himself and J. T. Griffin, New York city.

I claim a fire bar, constructed with vertical side ribs, A A, having raised ledges, a a, in combination with the depressed web, B, and oblique opening, c, substantially as and for the purpose set forth.

83,690.—MACHINE FOR DRYING CLOTH.—Andrew Chambers, Providence, R. I.

I claim the arrangement of the perforated cylinders, B B, geared as described, independent fans, C C, guide rollers, L L1 L2 L3 L4, feed and take up rolls, M N, presser roll, O', shaft, H, and belts, G I K, all operating as described for the purpose specified.

83,691.—PUMP.—Thomas Chambers, St. Louis, Mo.

I claim a large forcing cylinder, A or B, a vacuum or air cylinder, D or E, and a small forcing cylinder, F I, when combined substantially in the manner and for the purpose set forth.

83,692.—POST DRIVER.—Angelos McClara, Whitney's Point, N. Y.

I claim the combination of the secondary sliding tongue, m, with the ram, C B F, and wagon, A, as and for the purpose set forth.

83,693.—BOW IRON FOR CARRIAGES.—A. W. Clark and Geo. W. Marble, Charlestown, N. H.

We claim the bow iron, C, constructed as described, with holding points or clasps, for attachment to the bows of a baby cab or other carriage, substantially as and for the purpose herein set forth.

83,694.—TOBACCO DRYER.—Samuel T. Cotterill (assignor to Cotterill, Fenner, and Company), Dayton, Ohio.

I claim, 1st, The drying chamber, consisting of the frame, C, having cleats, E, and an open end, D, provided with slops, L, in combination with the nest or series of gravitating trays, F, for the purpose of allowing the withdrawal of said trays, in the manner described for the purpose specified.

2d, The combination, with the upwardly flaring trunk, B, and drying chamber, C, arranged as described, of the series of branch pipes or groose necks, K K, having downwardly projecting nozzles, for the purpose of distributing the blast of air forced through said drying chamber, as set forth.

3d, The arrangement, substantially as described, of the flaring trunk, B, drying chamber, C, removable and porous-bottomed trays, F G, blast pipe, H, and goose necks, K, for the object stated.

83,695.—RECEIPTACLE FOR WATCH KEYS AND OTHER ARTICLES.—M. Z. Crane, New York city.

I claim the cover, D, provided with an aperture, b, of the same size as one of the compartments in the stationary box, A, and adapted to be rotated around the fixed pin, C, whose enlarged head is marked or numbered to correspond with the number of compartments in the box, all arranged and operating as described, for the purpose specified.

83,696.—VELOCIPEDE.—C. N. Cutter, Worcester, Mass.

I claim, 1st, The combination with a frame, A, cross piece, I, and crank shaft, B, of the elbow connections, G H, or either, and right angle levers, K L, or either, substantially as and for the purpose set forth.

2d, The combination with the crank shaft of a velocipede, and main frame thereof, of one or more sets of elbow connections, G, connected to a right angle lever, K, by means of a swing piece, M, substantially as and for the purpose set forth.

83,697.—SASH SUPPORTER.—Addison Davis, Boston, Mass.

I claim the window sash fastener, consisting of a spring lever, e, having at its top a wedge-shaped bolt, formed and applied as shown, so as to perform the double function of locking the sash securely in position, and also of wedging or pressing back the sash against the bead, d, the lever having a slide rod or other provision for releasing the bolt, substantially as set forth.

83,698.—GANG PLOW.—Jasper N. Davison and Naaman Spencer, Jr., Buffalo, Ill.

We claim, 1st, The combination of the plows, the beams, the adjustable platform, the lever, E, and the tongue, so arranged that the tongue shall be flexible when the plows are at work, and only stiff when used to carry the plows above the ground, the depth of the cut being independently regulated, substantially in the manner set forth.

2d, The combination of the plows, the beams, the platform, and axle, with the braces, N, and sliding seat, E, arranged to operate substantially as and for the purpose set forth.

83,699.—SPIKE WITH SCREW THREADS.—Alpheus C. Dunn and Issac L. Dunn, New York city, assignors to Philip Dunn and James Yates, Trenton, N. J.

We claim the construction of the bolt, to conform to the form shown, and in the manner described.

83,700.—RAILROAD SIGNAL BOX.—John Durand (assignor to Perkins, Livingston, and Post), Cincinnati, Ohio.

I claim the railroad signal box arrangement, consisting of the portable case, provided with a flag on a jointed and folding staff, and with pockets containing torpedoes, substantially as described and represented.

83,701.—FIRE PLACE.—John Ervin, Sen., Princeton, Ind.

I claim the flues, H and J, with the orifices, l m i k and o, arranged substantially as and for the purposes described.

83,702.—BEER COOLER.—James Fallows (assignor to himself and John Edward Insley), Philadelphia, Pa.

I claim a portable cooler, consisting of a vessel, C D, filled with pebbles coarse gravel stones, or their equivalents, in combination with an ice-holding case, A B, the same being constructed and arranged to operate together, substantially as and for the purpose described.

83,703.—PLOW.—Levi Fosdick (assignor to David Reigel), Tiskilwa, Ill.

I claim the securing of the rods, G, to the handle, B, by means of bolts, b, and stirrups, H, substantially as shown and described.

83,704.—HAND STAMP.—L. H. Gano, New York city.

I claim, 1st, The combination of the revolving stamp head, B, with ink pad c', and ratchet, k, substantially as and for the purpose set forth.

2d, Disclaiming the use of an ink ribbon in a postal and canceling stamp, an apparatus for automatically inking the die, substantially as described.

3d, The conical stem valve, d, provided with the spiral spring, e, when said stem is applied to the fountain of self-inking stamp, and used in combination with the perforated pad, c', as and for the purpose set forth.

4th, The standards, a, in combination with arms, h, and springs, h", in the manner and for the purpose described.

5th, The pad holder, c, provided with the cam ears, c" c", in combination with recessed standards, a, and thumb screw, a", in the manner and for the purpose described.

83,705.—HORSE HAY FORK.—Wm. M. Gillan, Mount Parnell, Pa.

I claim the center bar, A, side rods, D D', levers, C C', arm, E, with the notch, e, and blades, B B', all in combination, and arranged as and for the purposes set forth.

83,706.—GAS REGULATOR.—Henry Giroud, Paris, France.

I claim, 1st, The method herein described of regulating the flow of gas, by the employment, in combination with a regulator or regulating apparatus and valves, of a return pipe in which the pressure of the gas supplied to the burner or burners, in excess of combustion, acts upon said regulator so as to control the flow of gas therefrom, in the manner shown and set forth.

2d, The improved regulating or equilibrium valves or regulators herein described, arranged and operating as shown and set forth.

83,707.—PREPARING RESIN SIZE FOR USE IN PAPER MAKING.—Thomas Gray, London, England. Patented in France June 30, 1868.

I claim, 1st, The improved process for making size, by first bleaching the rosin in a solution of warm water and salt of soda, or other alkaline salt, and mixing the same with a solution of chloride of sodium, under the conditions substantially as and for the purpose specified.

2d, Size prepared by the herein described process as a new article of manufacture, substantially as and for the purpose specified.

83,708.—ENGRAVING MACHINE.—John C. Guerrant and Benton J. Field, Leaksville, N. C.

We claim, 1st, The combination with the graving tool of an adjustable presser, substantially as and for the purpose described.

2d, The stock, C5, of the graving tool, provided with a pulley, C6, for communicating rotary motion thereto, substantially as and for the purpose described.

3d, The disk, F2, provided with the recess and set screw, F14, for tightening the belt, F13, substantially as and for the purpose described.

4th, The combination with the slotted holder, G6, and the slotted disk, F5, of the chuck, G7, provided with the shank, G12, substantially as and for the purpose described.

5th, The combination with the holder, G6, of the toothed rack, and the pinion, G8, on the shank of the chuck, or the equivalent thereof, substantially as and for the purpose described.

6th, The chuck, G7, adjustable in a horizontal plane coincident with the vertical axis of the graver support, substantially as and for the purpose described.

7th, The chuck, G7, provided with means for giving it a rotary motion on its own axis, while it is adjusted in the horizontal plane of the vertical support of the graving tool, substantially as and for the purpose described.

8th, The combination with the weighted graver supporting frame, of the yoke, H, and treadle, H5, suitably connected thereto, substantially as and for the purpose described.

9th, The combination with the presser support, C, of the screwed rod, D, and the rod, D3, adjustably connected to the said end, D, substantially as and for the purpose described.

10th, The combination with the rod, D3, of the rollers, L9 and L10, and the frame, L6, or its equivalent, for actuating the said rollers, substantially as and for the purpose described.

11th, The combination with the staff, B, of the slide, L1, provided with a vertical guide connected to the staff, substantially as and for the purpose described.

12th, The combination with a staff, B, of a vertically adjustable rest, I2, substantially as and for the purpose described.

13th, The combination with the staff, B, of a counterpoised frame, I4, substantially as and for the purpose described.

14th, The combination with the staff, B, and adjustable rest, I2, of the adjustable gage, for producing wave lines, substantially as and for the purpose described.

15th, The combination with the staff, B, and slide, L1, of the edjustable gage, O, substantially as and for the purpose described.

16th, The combination with the staff, B, and adjustable rest, I2, of the gage P, substantially as and for the purpose described.

17th, The combination with the staff, B, and adjustable rest, I2, of the mechanism substantially as described, for producing circles and ellipses, as and for the purpose specified.

18th, The combination with a ring, R5, of the ring, R6, yoke, R6, and crank shaft, R12, connected to the screw, R17, by a universal joint, substantially as and for the purpose described.

19th, The combination with the crank shaft, R12, of the rings, R8 and R9, slotted plate, R12, shaft, R13, and pinions, R15 and R16, substantially as and for the purpose described.

20th, The mechanism for actuating the staff, for producing circles, arranged for adjustment in a horizontal plane, substantially as and for the purpose described.

21st, The combination with the rings, R5 and R16, of the spring snap, R20, substantially as and for the purpose described.

22d, The combination with the crank shaft, R12, and yoke, R6, of the adjustable slotted plate, R12, and rings, R8 and R9, for effecting the adjustment of the ring, R16, substantially as and for the purpose described.

23d, The combination of the adjustable copy holding plate with adjustable pointer, and with the graving tool, substantially as and for the purpose described.

24th, The pointer, F3, provided with the presser gage, E4, substantially as and for the purpose described.

25th, The arrangement of the pointer support, for adjusting it axially, with reference to the staff, B, and vertically, substantially as and for the purpose described.

83,709.—MACHINE FOR TRIMMING WALL PAPER.—W. H. Guthrie, Brooklyn, N. Y. Antedated Oct. 24, 1868.

I claim, 1st, An automatic machine for pasting and trimming wall paper, substantially as shown and described.

2d, A circular rotating cutter, a1, in combination with the rollers, A and B, substantially as shown and described and for the purposes set forth.

3d, The pasting roller, B, in combination with the roller, A, and paste cup, C, substantially as shown and described and for the purposes set forth.

4th, The lifting lid, D, in combination with the frame, M, substantially as shown and described.

5th, The roller, e', in combination with the binding roller, R, and frame, M, and rollers, A and B, substantially as shown and described and for the purpose set forth.

83,710.—ATTACHING HANDLES TO PICKS.—P. J. Hogan, Cincinnati, Ohio.

I claim the combination of the handle, A, rectangular eye, B, screw stem, b, ferrule nut, E e', socket, F, pick head, D, and notches, c and f, all constructed, arranged, and employed in the manner and for the purposes described.

83,711.—LAMP.—Thomas A. Hunter and John Blewitt, New York city.

We claim, 1st, The fountain, a, provided with the plug, b, in the bottom, for filling, in combination with the cylinder, c, that is tightly attached at its upper end to the fountain, a, and provided with a foraminous bottom, as and for the purposes specified.

2d, The fountain, a, formed with a depression in its upper surface for receiving the collar of the burner, as and for the purposes specified.

3d, The handle, formed so as to set upon the bracket, b, and support the lamp, or be removable therefrom, as set forth.

83,712.—MACHINE FOR FORMING SHEET-METAL PANS.—S. H. Kennedy, Hydetown, Pa.

I claim, 1st, In combination with the bed plate, A, the detachable end former, a', arranged to operate in connection with the forming-surfaces, c' c', upon the bending bar, substantially as and for the purposes set forth.

2d, In the construction of the bending bar, B, the described arrangement of the forming surfaces, c" c', one or more, as may be required, to operate in connection with the detachable end former, a', upon the bed plate, substantially as and for the purposes set forth.

3d, The general arrangement and combination of the bed plate, A, provided with its detachable end former, a', the bending bar, B, with its channels, d d, and forming surfaces, c' c', skeleton clamp bars C C', and bending lever, D, all arranged to co-operate substantially in the manner and for the purposes set forth.

83,713.—CHAIR SEAT.—H. C. Knowlton, Gardner, Mass.

I claim the arrangement of the bearing faces of the seat frame and each of the confining bars at an acute angle with the upper surface of the seat frame in combination with the arrangement of each of the clamping screws, so as to incline upward at an obtuse angle with the said bearing faces, the screw hole in the confining bar being made so as to admit of the upward movement of the bar while it may be in the act of being forced against the bottoming to confine it to the frame, the same serving to effect not only the fixation of the bottoming to the frame, but the straining or tightening of the said bottoming, and the setting of it up so as to be flush or even with or in its proper position with respect to the upper surface of the seat frame.

83,714.—PHOTOGRAPHIC REST.—Charles Ernest Kruger, New York city.

I claim, 1st, The combination of the foot part, or its equivalent, with the main body of a photographic rest, in the manner as described and for the purpose set forth.

2d, The head part of a photographic rest, consisting of jointed pieces, or their equivalents, in connection with the movable rod of the rest, as herein fully described and for the purpose set forth.

83,715.—CAR COUPLING.—J. K. Landis, Palmyra, Pa.

I claim, 1st, The pin, e, and the rock shaft, f, in combination with the swinging plate, h, all being applied to operate substantially in the manner and for the purpose set forth.

2d, The link, C, constructed as shown, and secured to the drawhead by a screw bolt, D, occupying slots, a, in the drawhead, as and for the purpose set forth.

83,716.—STEAM ENGINE SLIDE VALVE.—E. B. Latch, General Wayne, Pa., assignor to himself and Edmund Lincoln, Cleveland, Ohio.

I claim, 1st, The combination of the valve, E, plate, F, and intervening springs or elastic packing with the packing plate, G, the whole being constructed and arranged substantially as herein set forth.

2d, The thin metal strip, J, adapted to the valve, E, and plate, F, substantially as specified.

83,717.—RAILWAY CAR.—E. T. Ligon, Demopolis, Ala.

I claim the body of a railroad car, having its bottom extended down between the truck, as described, and provided at its bottom side with V-shaped metallic stringers, a, as herein set forth, for the purpose specified.

83,718.—APPARATUS FOR ROLLING METALS.—Robert Marsden, Sheffield, England. Patented in England, March 13, 1865.

I claim the mode described of combining the two shafts by means of the toothed wheels, and rollers, and counter shafts, connected by loops or rods, substantially as specified.

83,719.—HORSE HOE.—Don Carlos Matteson and T. P. Williamson, Stockton, Cal.

We claim the combination of the reversible double-edged cutter, D, the pivoted bars, C C, and adjustable braces, E, with a beam, A, substantially as described.

83,720.—FOLDING CHAIR.—Geo. McAleer (assignor to E. W. Vaill), Worcester, Mass.

I claim a chair, composed essentially of the crossed pivoted legs, A A B B, seat, C, rod, E, connected to the seat, as described, and bearing in slots or sockets, e e, in the legs, B B, back, G, straps, J J, round, H, slat, s, and cross bar, o, the whole being constructed to operate in the manner and for the purpose substantially as set forth.

83,721.—APPARATUS FOR UNLOADING STONE.—J. B. Moore and E. G. Moore, McDonough, N. Y.

We claim the movable platform, A, so attached to a wagon or sled that it may tilt from either side, in combination with frame, F, tackle, C, and windlass, D, all constructed, arranged, and operated, substantially as and for the purpose described.

83,722.—CAR WHEEL.—Gustavus Natrop, New York city.

I claim a compound wheel, in which the wooden and metallic portions are interlocked and bound together, substantially as described.

83,723.—MACHINE FOR BURRING WOOL.—John Nichols, Paterson, N. J.

I claim a burring machine, consisting of the combination with each other of the drum, E, having the toothed triangular band, F, of the notched blade, I, rotating reel, G, and brush, H, all made and operating as herein shown and described.

83,724.—MILK CAN.—O. J. Nutting, Warwick, N. Y.

I claim the described construction of the milk can, consisting of the body, A, provided at top and bottom with internal grooves, b a, for receiving the edges of the top, C, and bottom, the latter being supported by the bruise hoop, B, secured within the body, below the bottom, as herein shown and described.

83,725.—HOISTING APPARATUS.—C. R. Otis and N. P. Otis, Yonkers, N. Y.

We claim the combination, with the hoisting drum, of screws operated through pulleys, by a belt or band coupling the same, said screws gearing with worm wheels arranged at opposite ends of the drum, and connected with the latter by interposed spring and ratchet attachments, or either, substantially as specified.

83,726.—STONE DRAG.—G. N. Palmer, Greene, N. Y.

I claim a low sled, having a boat or body, B, secured to the rear ends of the runners, A A, as described, so that the body, B, may be lifted at the front end for discharging the load by the arrangement of mechanism, constructed and operated substantially in the manner as and for the purposes herein set forth.

83,727.—COMBINED SEEDER AND HARROW.—W. E. Phelps, Elmwood, Ill.

I claim the arrangement, upon the frame, A, of the adjustable harrow, I, and the seed boxes, H H, all operated in the manner described for the purpose specified.

83,728.—RAILWAY CAR BRAKE.—Stephen Randall, Centerville, R. I.

I claim the combination of the grooved eccentric, F', with the sleeve, F, shoulder, G, and brake chain or chains, as herein described, for the purpose specified.

83,729.—WATCH.—G. W. Reed, Brooklyn, N. Y., assignor to himself, Reuben S. Middleton, and Henry Rothfelder.

I claim a winding pin, applied at the arbor of the spring barrel, in combination with the double ratchets, acting in opposite directions, as and for the purposes set forth.

83,730.—APPARATUS FOR CARBURETING AIR.—Joseph Richard (assignor to himself and G. W. Baker), New York city. Antedated Oct. 28, 1868.

I claim, 1st, The arrangement and combination of the inclined shelves, e el e2 e3, and absorbing sheets, i i1 i2 i3, the upper edges of which dip into the troughs, d d1 d2 d3, substantially as and for the purpose described.

2d, The vertically adjustable rods, g g', in combination with the shelves, e el e2 e3, absorbing sheets, i i1 i2 i3, and troughs, d d1 d2 d3, constructed and operating substantially as and for the purpose set forth.

3d, The vertically-adjustable rod, g, in combination with the sheets, i i2, and troughs, d d2, substantially as and for the purpose described.

83,731.—PASSENGER RAILWAY CAR.—E. Y. Robbins, Cincinnati, Ohio.

I claim, 1st, The body of a passenger railway car, made of wrought iron, steel, or other metal, the different parts or sheets being riveted or otherwise firmly fastened together, the whole forming one continuous shell, or a cylindrical or approximately equivalent shape, the shape itself being such, together with the thickness of the metal, as to give the requisite strength and stiffness without the necessity of a general frame work or bars and rods, or hoops, etc.

2d, The yielding platform, X, constructed and employed as and for the purposes herein specified.

3d, The hollow annular ribs, F, extending completely around the interior of the cylindrical shell, in the manner and for the purposes specified.

83,732.—CHURN.—A. Schlingman, D. Glander, and J. Campbell, West Alexandria, Ohio.

We claim the churn dashers, I I, consisting of rollers constructed substantially as herein described and pivoted in a frame, as and for the purposes herein set forth.

83,733.—RECOVERING WASTE ALKALIES FROM STOCK AND OTHER FIBERS.—Carl Dietrich Julius Seutz, Bury, England, assignor to himself and Charles Edmund Bailliere, New York city.

I claim, 1st, The general system or mode of treating waste liquors resulting from the preparation of bamboo, cane, esparto grass, alfa, straw, or other similar fibrous substances, as and for the purposes herein set forth.

2d, The system or mode of mixing the concentrated waste liquors with a certain proportion of soda (caustic soda, soda ash, recovered ash, or sulphate of soda,) and with quicklime, in the manner herein set forth.

83,734.—PIANOFORTE TUNING KEY.—N. B. Sherwood (assignor to himself and W. H. Willson), New York city.

I claim a tuning key, so constructed that the wrench may be applied directly to the pipe, or through the medium of the worm wheel and endless screw, and provided with an adjustable base, substantially as shown and described.

83,735.—DROPPING PLATFORM FOR HARVESTERS.—Andrew H. Shreffler, Joliet, Ill.

I claim, 1st, The combination of the stop, b, with the tilting floor, a, arranged, operating, and constructed substantially as and for the purposes set forth.

2d, The use of the spring, l, to start the dropping device back past the center, after letting go of the lever, e, substantially as described.

3d, The combination of the platform, a, slotted extension, b c, curved slotted plates, d, spring, l, and lever, e, arranged in rear of the finger bar, and operating substantially as described.

4th, The circular slotted plate, d, for the purpose of regulating the stop, b, substantially as and for the purposes set forth.

83,736.—MACHINE FOR SERRATING SICKLE SECTIONS.—Alvan A. Simonds and George F. Simonds, Fitchburg, assignors to The Simonds Manufacturing Company, West Fitchburg, Mass.

We claim the arrangement, with the anvil block, b, upon which the sickle section or blank is supported and clamped, of the two cutter carriages, at an angle to each other corresponding to the angle of the cutting edges of the blank, each carriage having a feed movement imparted to it, and carrying a cutter having blow giving movements imparted to it, in such manner that the two edges of the blank may be simultaneously or alternately serrated, without movement of the blank, the mechanism being arranged to operate substantially as described.

83,737.—COMPOUND FOR DESTROYING INSECTS ON TREES, PLANTS, ETC.—George W. Spots, Jacksonville, Ill.

I claim the composition, substantially as and for the purpose above set forth.

83,738.—MANGER.—Wilbur F. Stanley, Cazenovia, N. Y.

I claim the suspended pivoted neck bars, D, constructed, arranged, and operating substantially in the manner herein shown and described and for the purposes set forth.

83,739.—PISTON VALVE.—M. C. Stebbins, Springfield, Mass.

I claim the combination and arrangement of the piston, D, having the beveled seat or chamber, m', therein, the disk, m, having the chambered projection, d, thereon, with its spring, s, and the bar, a', with the projection, n, thereon, operating within said chambered projection, d, the whole constituting an improved piston valve, and constructed and operating substantially as herein described and set forth.

83,740.—FISHING APPARATUS.—John Stetson, West Harwich, Mass.

I claim the combination of the clamp, thumb screw, guard pin, pivot joint, hand rest, or their equivalents, with the pulley.

83,741.—CARPET STRETCHER.—S. Stevenson, Dansville, N. Y.

I claim, 1st, The head piece, B, having the toothed plate, C, attached and provided with the rack bars, E E, in combination with the pawls, F F, on the framing of the device, all arranged substantially as and for the purpose set forth.

2d, Providing the head piece, B, with a series of holes, e, with or without the clamps, f, for the purpose of facilitating the tacking down of the carpet, as described.

3d, The bar, G, when constructed to be used in combination with the racks, E, pawls, F, and perforated head piece, B, as herein described, for the purpose specified.

83,742.—BINDER FOR SEWING MACHINE.—William M. Stoddard, San Francisco, Cal.

I claim the two pieces, A B, shaped, bent, and otherwise constructed and arranged, substantially in the manner and for the purposes described.

83,743.—MACHINE FOR FULLING AND FELTING HAT BODIES.—William Mont Storm, New York city, and George H. Eonis, Hudson county, N. J.

We claim, 1st, The apron or aprons of netting or sheet rubber, one or both, so arranged that, while moving in contact with the body to be felted, they shall be alternately stretched and relaxed, by means substantially as described, and for the purpose specified.

2d, The hollow double shelled form, E, its outer shell perforated, and its inner shell whole, mounted and operating substantially in the manner and for the purpose described.

3d, In combination with the above, the water cock, c, and conduit standard, d, arranged and operating substantially in the manner and for the purpose described.

4th, In combination with the perforated form, E, the external sprinkler, Q, arranged and operating substantially in the manner and for the purpose described.

5th, The rolls, G G1 G2, mounted upon movable standards, so that they shall be adjustable in position relative to the form, E, substantially as and for the purpose set forth.

6th, In combination with the above, the supplemental roll or rolls, p, located and operating substantially in the manner and for the purpose described.

7th, The latching bar, K, in combination with the swinging standard, d, for the purpose set forth.

83,744.—FOLDING CHAIR.—E. W. Vaill, Worcester, Mass.

I claim, 1st, The improvement in the Howarth chair, consisting essentially in placing the legs, B B, outside of the legs, A A, and pivoting them to the sides of the seat frame, which is provided at its rear end with pins, adapted to slide in grooves in the legs, A A, in closing the chair, substantially as shown and described.

2d, A chair, constructed of the legs, A A B B, pivoted upon short pins or bolts, e e, the stuffed upholstered seat, C, jointed to the legs, B B, by means of short pivots, c c, behind the front edge of the seat, and connected with the legs, A A, by a pin working in a slot or groove, the upholstered back, D, and the flexible arm, O O, the whole being constructed and operating substantially as and for the purpose above set forth.

83,745.—MACHINE FOR MAKING NUTS.—Samuel Vanstone, Providence, R I.

I claim, 1st, The combination of the clamping jaws, D D', pressing jaws, K K, and punches, E E, with the plunger plate, A', and bed plate, B, all constructed and arranged substantially as described.

2d, In combination with the subject matter of the foregoing clause of claim, the jaws, I, studs, G1, and punches, G, arranged substantially as described.

3d, Also, in combination with the bed plate, B, plunger plate, A', and jaws, I I and K K, the tapering studs, N N, arranged and operating substantially as set forth.

83,746.—INVALID CHAIR.—L. M. Whitman (assigner to himself and A. B. Enderton), Sterling, Ill.

I claim, 1st, The combination of the pivoted slotted bar J, cord L, pulleys d n, rocker, E, shaft and crank-wheels, H, and the standards, T U, with the back, A, seat, B, front, C, and foot-piece, D, substantially as described, for the purpose specified.

2d, In combination with an invalid's chair, the adjustable stands T and U arranged substantially as shown and described for the purpose set forth.

3d, In combination with an invalid's chair and the stands, T and U, the track, W, substantially as and for the purposes set forth.

83,747.—MANUFACTURE OF DOUBLE-WALL ICE PITCHERS.—Dennis C. Wilcox, Meridian, assignor to Meriden Britannia Company West Meriden, Conn.

I claim electrotyping the upper end or unprotected surface of a glazed-coated or enameled vessel, substantially as and for the purpose described.

83,748.—CHARGING GASES WITH VAPORS OF HYDROCARBON-LIQUID.—Cyrus M. Williams (assignor to Henri L. Stuart), New York city.

I claim, 1st, A gas-holder, in which is suspended or retained any suitable absorbent or capillary material, saturated with hydrocarbon-liquid, through which air or gases are passed for carbureting.

2d, I claim a carbureting-chamber, placed in the gas-holder tank, arranged to receive and distribute hydrocarbon-liquid, through which air and gases are forced, for the purpose set forth.

83,749.—SELF-LOADING HAY-CART.—Isaiah M. Williams (assigned to himself and Harvey Smith), Blanchester, Ohio.

I claim, 1st, A self-loading hay or grain cart, capable of being depressed for raking and loading, and elevated for conveying, when provided with the ground-wheels, D D', on bent axel, C, and driving-wheels, E E', for operating the board, M N O, or equivalent shifting-mechanism, substantially as herein explained.

2d, The shifting-board, M N O, arranged and operated substantially as set forth.

3d, The arrangement of depressible bed, A, bent axle, C, lever, G, and cross-piece, I, for the purposes designated.

4th, The provision of one or more severing-knives, R, or their equivalent, beneath the figure, B.

83,750.—SEWING-MACHINE.—William C. Wilmarth and C. N. Farr (assignors to B. W. Lacy), Philadelphia, Pa.

We claim, 1st, The combination of the plate, E, its thread-carrier, f, lever P, needle, b, and an adjustable plate, S, the whole being arranged and operating substantially as and for the purpose specified.

2d, The vibrating-needle arm, I, with its needle, b, in combination with the plate, J, and its projection and opening for the passage of the needle, when the said plate is adjustable diagonally on the arm, C, as and for the purpose described.

83,751.—CASTING HOLLOW WARE.—John Ziegler, Dayton, Ohio.

I claim, 1st, The sprue-pattern herein described, constructed with wings, e e e, and downward projections, D D D, so arranged as to correspond in position with the feet of the vessel to be cast, as and for the purposes stated.

2d, The process of casting hollow ware, by introducing the metal through the part or parts of the mold which are to form the feet of the vessel, substantially as and for the purposes set forth.

83,752.—ICE ELEVATOR.—Ruben S. Zilar, Cincinnati, Ohio.

I claim, 1st, An ice elevator, consisting of the frame, A A' a, B b, adjusting devices, D F V W w, toothed wheels, J J, T t, endless chain, N, hooks, R, notched bar, U u u', and inclined plane, E G g H, having one or more flexible upper sections, E E', for the purpose specified.

2d, In combination with the wheels, J T, inclined plane, E, endless chain, N, and hooks, R, the spring bar, X, for the purposes set forth.

83,753.—TREATING AND STORING GRAIN.—Charles Alden, Newburg, N. Y.

I claim the chamber, A, adapted to be closed, and provided with false bottom, a, side walls, b, columns, c, and supply and exhaust pipes, e f, when said bottom, side walls, and column are perforated, and communicate with each other, whereby the contents of the chamber are not exposed to the ordinary action of the atmosphere, but adapted to be subjected to a forced current of hot or cold air, substantially as described.

83,754.—FLEECING CRADLE.—J. K. Alwood, near Dalta, O.

I claim, 1st, The arms, H, lugs, h, and springs, I, constructed and operating substantially as and for the purposes described.

2d, A table for sheep shearing purposes, having pedestal, A, shaft, B, cradle, E, plate, C, arms, H, lugs, C and h, nuts, d, and springs, I, constructed and arranged substantially as specified.

83,755.—MEDICAL COMPOUND.—Sterling Bass, M. D., Savannah, Ga.

I claim the specific for cure of chills, made up of the ingredients or medicines herein named, or their equivalents, in or about the proportions specified.

83,756.—SKATE FASTENING.—Edward Brady, Philadelphia, Pa.

I claim a heel piece of metal, or other hard substance, surrounded at one end by a similar thin plate, which may be enlarged to the size of and to be fastened by screws, &c., to the heel of a boot, having a hollow cylinder sunk into the heel, containing any common spring, operating against a cap covering a stud hole to prevent dirt, &c., from entering the cylinder, and thus to enable the stud of a skate to be adjusted to the heel of a boot, without the stud hole in the cylinder being obstructed by dirt, &c., substantially as set forth.

83,757.—CURRY COMB.—Charles B. Bristol, New Haven, Conn.

I claim, as an article of manufacture, a curry comb, in which the bar, C teeth, a, and shank, B, are formed in one and the same piece, and united to the plate, D, the whole constructed substantially in the manner herein set forth.

83,758.—PROCESS OF PRESERVING TIMBER FROM DECAY.—Charles Brown, Albemarle county, Va.

I claim preserving or "lapidifying" wood, in the manner and with the materials substantially as described.

83,859.—SUBSTITUTE FOR A BILLIARD TABLE.—Albert G. Buzby, Philadelphia, Pa.

I claim, 1st, A substitute for a billiard table, consisting of cushioned strips, connected together and to the floor, substantially as described, for the purpose specified.

2d, The rounded ends of the strips, in combination with the plates, a, for the purpose specified.

83,760.—BUT HINGE.—James H. Carkeet, Montgomery, Ala.

I claim the double acting but-hinge, constructed and arranged as described.

83,761.—CAR COUPLER.—Samuel K. Christy, Noblesville, Ind.

I claim the combination of the hollow sided draw head, B, with its hook, D, pivoted thereto, when said hook has a rounded end, a, and shoulder, and operates on a spring, E, connected to said shoulder, and in a recess in the side of the draw head, all substantially as shown and described.

83,762.—MODE OF CARRYING KNAPSACKS.—Walter Clifford, Holly Springs, Miss.

I claim a device for carrying knapsacks, composed of the padded shoulder springs, A, back brace, e, belt, B, slides, b b, and thongs, d d, when combined, constructed, and applied as herein shown and described.

83,763.—METHOD OF MANUFACTURING SHOW-CARDS, LABELS, &c.—Andrew James Connell, New York city.

I claim the method, substantially as herein described, of preparing ca[rds]

and paper, and printing or otherwise impressing and fixing thereon prepared aniline colors, substantially as set forth.

83,764.—WASHING MACHINE.—William Cooper, Galesburg, Ill.

I claim the arrangement of the box, A, its bottom ribs, a, the board, C, with ribs, b, shaft c, spring, d, cog, H, segment, E, pitman, I plate F, and balance wheel, G, all constructed and operated as herein set forth.

83,765.—TATTING.—C. O. Crosby, New Haven, Conn.

I claim the herein described tatting, fabricated substantially as set forth, as a new article of manufacture.

83,766.—ROTARY STEAM ENGINE.—Daniel Currie, St. Charles, Mo.

I claim, 1st, The arrangement of the steam chest, E, with the chamber, e1 e2, and the cylinders, A A', as herein set forth.

2d, The arrangement of the cylinders, A A', piston wheels, B B', with their periphery curtailed on one side, as shown at x x', together with the sliding heads, D D1, rods, d d1, links, d2 d3, and beam, D2, all constructed as herein shown and described.

83,767.—MOWER AND REAPER KNIFE SHARPENER.—William B. Deuel, Ithaca, N. Y.

I claim, 1st, The arrangement and application, to the sides of an ordinary grindstone of the plate or plates, C, made with holes or mortises, to receive the pins or hooks, E, for the purposes of holding and adjusting the described mower and reaper knife holder to the face of an ordinary grindstone, substantially as set forth.

2d, The arrangement of the arm or projecting piece, F, with the pins or hooks, E, fitted to two or more of the holes in the plate, C, and adjustable anywhere in the series of holes in the same, and sustaining the bolt, G, in its slot in the arm, and the cutter bar holder, as set forth.

3d, The cutter bar holder, I, when made with the deep and hollowed V-shaped bottom cavity, substantially as set forth.

4th, The bolt, G, when held in place in the arm, F, by the set screw, H, and adjustable for the holder, I, by the set screw, J, and the collar or collars, N, bevel or obliquely, as described.

5th, The clamps, L, so arranged as to hold the cutter bar, M, in the cavity of the holder, I, by the edges of the cutter bar, and on the rear of the knives, thereby leaving the face of the knives free, and open to the stone, as described.

6th, The combination of the plates, C, arm, F, bolt, G, and holder, I, with the frame of an ordinary grindstone, constructed and arranged to operate as set forth.

83,768.—PLOW.—John H. Elwood, Polo, Ill.

I claim the combination of the coulter, D, the rounded shank or rod, D', and rollers attached thereto, substantially as and for the purpose set forth.

83,769.—BRICK MACHINE.—Edward Faron, New York city.

I claim, 1st, The combination and arrangement of the toggle bars, e e' and f, pitman, j, crank and plunger, k, with the mold carriage, H, operating substantially as and for the purposes herein specified.

2d, The head block, N, provided with slots, g, in combination with the plate P, provided with perforations, r r, substantially as and for the purposes herein specified.

3d, The combination of the pusher block, O, lever, V, pin, x, cam, R, shaft, D, and mold carriage, H, arranged and operating substantially as and for the purpose herein specified.

4th, The arm, L', in combination with the mold carriage, H, and plungers, J, substantially as and for the purposes herein specified.

83,770.—WOODEN BOX.—Maurice Fitzgibbons, New York city.

I claim, as an article of manufacture, a box, A, constructed of a material consisting of two sheets of wood, with one sheet of paper between them, the sheets of wood and paper being glued together, substantially as herein described.

83,771.—COMPOUND ADJUSTABLE GARDEN HOE.—Mordecai H Fletcher, Richmond, Ind.

I claim the combination of the arms, b and c, shovels, b' and c', and shank, d, when the latter is made adjustable on arm, b, and the whole is constructed in the manner described, and for the purpose set forth.

83,772.—ELEVATED RAILWAY.—Otto Gsantner, East Orange, N. J.

I claim the carriage, K, fitted to move on the transverse bars, J, provided with hangers, L, and rails, M, when adapted to operate as shown, for shifting the suspended cars from one track to the other, as represented and described.

83,773.—CARRIAGE JACK.—Henry L. Hammond, Providence, R. I.

I claim the flange-plates, C and C', in combination with the levers, E and F, and the standard, A, substantially as described, and for the purposes set forth.

83,774.—ADJUSTABLE GEARING FOR LATHES.—John Humphreys, Chicopee, Mass.

I claim, 1st, The combination of the shaft, A, having the gear, x x, arranged upon it, the shaft, E, with traveller, G, and the rack, L, the parts being arranged and constructed substantially in the manner shown and for the purpose set forth.

2d, In combination with the rest of my device, as herein shown, the arrangement of the lever, O, with gear, P and Q, substantially as here described, and for the purpose set forth.

3d, In combination with the gear, x x and traveller, G, the dial plate or index, W, with the different sizes of gear numbered upon it, substantially as herein described.

83,775.—CLOCK ESCAPEMENT.—William C. Kellum, San Francisco, Cal.

I claim, 1st, The detent lever, D, with the locking screws, e e', the adjusting screw, i, and the screw, m, combined and arranged substantially as and for the purpose described.

2d, In combination with the pallets, a a', and the locking screws or heads, e e' the two parallel and symmetrical sets of escape teeth, E E', arranged and operating substantially as described.

83,776.—CLOCK ESCAPEMENT.—William C. Kellum, San Francisco, Cal.

I claim, 1st, The impulse wheel, D', on the same shaft with the escape wheel, D, and having teeth arranged to give an impulse in a direction the reverse of that given by the wheel, D, substantially as described.

2d, In combination with the impulse and escape wheel, D, and the reverse impulse wheel, D', the double headed screw-detent, substantially as described.

83,777.—MACHINE FOR MILKING COWS.—Thomas H. Lindley Taunton, Mass.

I claim, 1st, The stationary and movable frames, I I, provided with rollers, c c, and connected, by means of cords, or their equivalent, to the lever, N, for the purpose of milking cows, substantially as herein set forth.

2d, The funnel shaped vessels, K K, or their equivalent, in combination with the tube, L, for the purpose of receiving and conducting the milk to the milk pail, substantially as herein set forth.

3d, A cow milker, constructed substantially as described, and adjusted and operating in the manner and by the means herein set forth.

83,778.—WAGON JACK.—Henry W. Long, Council Bluffs, Iowa.

I claim the movable clasp, A, with the hooked fulcra upon said clasp, in combination with the jack for raising weights, the whole arranged as described in the accompanying specification.

83,779.—CHURN.—David Lown, Poughkeepsie, N. Y.

I claim the combination of the cross arms, B B, perforated near their outer ends, with the cup, D, secured under the shoulder on the shaft, A, as and for the purposes set forth.

83,780.—SALTING TROUGH FOR STOCK.—George T. Marshall, Unadilla, Mich.

I claim the inclined board, L, in combination with the trough, A, and foot board, C, upon the lever, B, whereby the cattle are prevented from stepping beyond the foot-board, inside the fulcrum of the lever, B, as herein described for the purpose specified.

83,781.—WAGON BRAKE.—George McKenzie, Zanesville, Ohio.

I claim, 1st, The adjustable connecting parts, c c, in combination with the rack bar, G, and pinion J, of a wagon brake, substantially as described.

2d, The scrapers, O, applied to the brake bar, F, substantially as and for the purposes herein set forth and shown.

3d, The plate, E, provided with guides, a, and secured to the reach, when used in connection with the parts set forth in the first clause of claim, substantially as shown and described, and forming a surface on which the brake bar, F, moves, as set forth.

4th, The casing, H, bolted to the reach, when enclosing the pinion, J, and forming, at the same time, a bearing for the rock shaft, I, and a space in which the rack bar, G, may be moved back and forth, as set forth.

83,782.—WIND ELEVATORS OF GRAIN.—Gerry Morgan, Newport, N. H.

I claim the deflected lip, C, and the wind guide, I, with its regulating pin, E, in combination with the spetture, B, in the elevating tube, A as and for the purposes herein described.

83,783.—COTTON COMPRESS.—Edmund L. Morse, St. Louis, Mo.

I claim the combination of the sector, A, with the vertical screw, E, and its step upon the upper platten, b, thereby counterbalancing in whole or in part, by the thrust of said screw, the upward pressure of the compressed bales, substantially as set forth.

83,784.—BOG CUTTER AND DRAG.—John W. Newton, Geneva, Wis.

I claim, 1st, The cutting blade, A, removably secured to the L-shaped straps, C, attached to the stock, B, and adapted for use either with or without the drag tee h, substantially as and for the purpose herein set forth.

2d, The plate, E, provided with removable teeth, and detachably secured to the hangers depending from stock, B, when used either with or without the cutter, A, for which it can be substituted, substantially as herein described, for the purposes specified.

3d, The L shaped hangers, C, secured to the stock, B, and adapted for the attachment of the toothed bar, E, and cutter, A, either separately or combined, substantially as described.

4th, The combined bog cutter and drag, consisting of the cutter, A, tooth ed bar, I, hangers, C, and a stock, all operating substantially as herein described.

83,785.—POTATO DIGGER AND VINE PULLER.—John W. Newton, Geneva, Wis.

I claim, 1st, The frame, A, handles, D, and draft pole, B, in combination with the teeth, G or B, substantially as and for the purpose described.

2d, The series of curved tapering teeth, G, arranged upon the adjustable plates, F, as described, for the purposes of a potato digger, substantially as described.

83,786.—PROCESS OF RECOVERING THE MATERIALS OF WORN OUT PRINTERS' ROLLERS.—Joseph H. Osgood, Peabody, Mass.

I claim the process for utilizing the ingredients of discarded roller composition, substantially as described and specified.

83,787.—GAG SWIVEL.—Charles B. Payne, Clinton, Ill.

I claim the gag swivel, formed of one piece of metal, and composed of the two bars, a a, and outwardly curved bar, b, with a buckle at one end and with a rivet plate at the other, all substantially as herein set forth.

83,788.—WATCH WINDING CLICK.—Eugene Paulus, Philadelphia, Pa.

I claim, 1st, The improved watch winding click, made in a round shape, cut so as to catch the teeth of the ratchet wheel, and adjusted in a recess of the top plate, to resist, by its full size, the power of the main spring, in the manner substantially as described.

2d, The combination of the winding click, E, bridge, L, spring, M, and pin screw, P, arranged and operating substantially as described.

83,789.—BLIND FASTENER.—William Phelps, Jr., Salem, Mass.

I claim the combination and arrangement of the plates, E and F, with the spring, s, all constructed and applied substantially in the manner and for the purpose specified.

83,790.—RESERVOIR COOKING STOVE.—George H. Phillips, Troy, N. Y.

I claim, 1st, Extending the rear end vertical flues of a cooking stove, upward above the horizontal plane of the boiler hole top plate, A, and the top edge of the rear end plate, C, thereof, which is in the same horizontal plane, by curving or raising upward and backward, above its horizontal plane, the rear end part of the said top plate, thereby extending said flues upward, so as to form, at and above their upper ends, and above the horizontal plane of the stove top, A, hot air or heating chambers, H H H, open at their rear side, in manner substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the upward extension of the rear flues of a cooking stove, over the horizontal plane of the top plate, and the elevation of the rear part of the top plate, whereby hot air chambers, H, are formed, with the shell, F, and boiler, E, substantially as and for the purposes described.

83,791.—MOLDING SCREW.—William Potts, Handsworth, England.

I claim the method of producing molds for casting screws, by first making a plain cylindrical mold, and afterward molding the thread by screwing a pattern screw through the said cylindrical mold, substantially in the manner and by the means herein shown and set forth.

83,792.—SAW SET.—John J. Reichard, Canton, Ill.

I claim a saw set, composed of jaws, a b, anvil, b, punch, f, spring, g, and set screws, c o, constructed and arranged as described, and for the purposes set forth.

83,793.—SAW SET.—John J. Reichard, Canton, Ill.

I claim, as an improvement in a saw set, the adjustable gage, D, with its tenon, E set screw, G, hammers, B and C, when constructed and arranged as described.

83,794.—HORSE HAY FORK.—Elias Rhodes, Jr, Clyde, Ohio.

I claim the lever, B, formed with the shoulder, b, in combination with the central sliding shaft, c, formed with the shoulder, b1, shank or body, A, consisting of two bars, connected together at their upper ends, and supplied with prongs, a' a', passing through shaft, c, and cords, b2, g, and g', all constructed and operated substantially as and for the purpose set forth.

83,795.—STEP LADDER.—Constant S. Rouse, Dowagiac, Mich.

I claim the guide blocks, D D, the pin, H, and rounds, E E, when combined with the platform braces and ladders, as and for the purposes set forth.

83,796.—WATER HEATER.—Hibbard Sabin, Philadelphia, Pa.

I claim the arrangement of chambers or passages, B B', E E', F, and f, in respect to internal and external tubes, b and f, so that the steam shall pass first within and then around the tubes, as described.

83,797.—PICTURE FRAME.—Joseph Theodor Schmitt, Brooklyn, N. Y.

I claim the hollow continuous shell, A, made of glass or other transparent material, and leaving a hollow space, c, for the reception of flowers or other ornaments, substantially as described.

83,798.—COOKING STOVE.—David Stuart, and Lewis Bridge (assignors to Stuart, Peterson & Company), Philadelphia, Pa.

We claim the arrangement of the ovens, D E, fire place, A, plates, h and p, flues, e f j k m, and the damper, x, as herein described.

83,799.—LANTERN.—Nathan Thompson, Brooklyn, E.D., N.Y.

I claim, 1st, The combination of the hinged portion, G' F', with the fixed or stationary portion, G, arranged to connect the middle rim, B, with the head piece, F, substantially as shown and described.

2d, The middle rim, B, formed or provided with a raised interior upper surface or platform, H, and back, I, substantially as and for the purposes herein set forth.

3d, The sectional rim or flange, K, to the lower end of the portion, G', of the guard, peovided with a raised front rim or check, L, to the glass.

83,800.—MITTENS.—George Topping, Chicago, Ill.

I claim cutting the whole of a mitten, back, front, and thumb, out of one and the same piece of material, substantially as described and shown.

83,801.—MUSIC STOOL AND RACK.—A. N. Towne, Chicago, Ill.

I claim the arrangement of the seat, D, in combination with the base or music rack, A, substantially as and for the purpose set forth.

83,802.—CLOCK MOVEMENT.—Michael Tromly, Mount Vernon, Ill.

I claim, 1st, The arrangement of the escapement wheel, D, the pallet, I, with its rollers, i i, oscillating on the rod, P, and connected by the link, H, with the pendulum rod, substantially as shown and described.

2d, The combination of the balance wheel, W, spring, v, rack bar, u', rod, u, pallet, T, and scape wheel, C, when employed to regulate and control the action of a striking apparatus for clocks, substantially as described.

3d, The arrangement of the dogs, x' x', arms, S'' T', rock shafts, X t, stop, S', and pallet, T, substantially as set forth.

83,803.—STREET RAILWAY SWITCH.—William Tuttle, Boston, Mass.

I claim as my invention the combination of the shoe with the car body, by means of the links or rods, a and b, when these links are connected to the said shoe and body in such a manner as to permit of the shoe oscillating or moving laterally as well as vertically, so as to accommodate itself to the surfaces over, on, or against which it may pass, substantially as described.

Also, the combination of the steadying tube, m, with the car body, and the shoe applied thereto, substantially as described.

Also, the arrangement and combination of the inclined planes or chutes, p and q, with the rails, S T T', the flange groove, n, and the deflector, r'.

Also, the combination and arrangement of the inclined plane, o, the groove n, the inclined planes or chutes, p q, the rails, S T T', and the deflector, r'.

83,804.—PAPER BOAT.—P. Shelton Tyler, Boston, Mass.

I claim, 1st, The combination with a paper boat of the sheets or strips, c1 c2, etc., as and for the purpose specified.

2d, In combination with the strips, c1 c2, etc., the pieces, d1 d2, as and for the purpose set forth.

83,805.—SAW SET.—Richard W. Tyler, Wayne, Mich.

I claim, 1st, The pinion G, provided with concentric series of notches in its upper face, when arranged as described with relation to the toothed bar F, and operated simultaneously with the die by means of the adjustable pawl H, applied to lever D, substantially as herein set forth, for the purpose of feeding the saw along automatically and with a regular graduated motion.

2d, The arrangement of the frame A, die B, lever D, adjustable pawl H, pinion, G, and toothed bar F, substantially as herein shown and described.

3d, The adjustable sliding clamps J, consisting of jaws w w', and the hinged slotted block y, arranged as described.

83,806.—COMBINED MOP HEAD AND SCRUBBING BRUSH.—Wm. S. Van Hoesen, Saugerties, N. Y.

I claim the combination of the scrubbing brush A, held by the clamping plate and set screw handle C, mop head D, and lamp E, all constructed substantially as described, and operating as and for the purposes herein set forth.

83,807.—TICKET CASE.—T. Van Kannel, Cincinnati, Ohio.

I claim the card or ticket case A, provided with the projection h, in the slot g, and constructed in the manner as and for the purposes described.

83,808.—RAIN WATER CUT-OFF.—Jacob Van Norman and William Young, Easton, Pa.

We claim the drum A, provided with exit pipes B B', and induction pipe C, in combination with the cut off e, and semicircular plate d, the drum A being provided with holes i i, and one of the plates d, being stained on its outer surface, a different color from the drum, as and for the purpose set forth.

83,809.—BED BOTTOM.—Andrew West, Burlington, Iowa.

I claim the Z-shaped springs D D, braces I I, upright G G, and slats E E, all constructed and arranged substantially as herein set forth.

83,810.—CARRIAGE SPRING.—Wm. F. Whitney, Milton, N. Y.

I claim the combination of the torsion springs B, and their attached arms g, arranged for operation in connection with the body and running gear of a wagon or other vehicle, substantially as described and for the purpose herein set forth.

83,811.—STEAM GENERATOR.—Charles Whittier (assignor to himself and Benj. F. Campbell), Boston, Mass.

I claim, 1st, A bridge piece having water and steam connections with a double shell, in combination with such double shell and water tubes, constructed and arranged substantially as herein described.

2d, The arrangement of the flues with reference to the double shell and bridge piece, substantially as described.

3d, The bridge piece d, when constructed substantially as described and placed in the rear of the fire box, to increase the heating surface of the generator.

83,812.—BOX.—John W. Wilcox, New York city.

I claim, 1st, The supplemental lappets 1, in connection with the lappet D, and strengthened folds h, substantially as described and set forth.

2d, The above in combination with the pocket E, as and for the purposes specified and set forth.

83,813.—RAILWAY RAIL SPLICE.—James Wixted, Port Carbon, Pa.

I claim the steelbar, D, adapted to the rails, and to the splicing bar, B', substantially in the manner and for the purpose herein set forth.

83,814.—COLLAR MACHINE.—J. T. Walker, Albany, N. Y.

I claim, 1st, A collar or cuff die, whose face is inclined downwards from its longitudinal center, or point corresponding with the folding line, substantially as herein specified.

2d, The female die, or its movable bed, constructed to conform to the face of the male die, by being inclined downwards from the folding line, substantially as set forth.

3d, The female or counter die, B2, constructed as described, and arranged upon the bed, A, with one end elevated above the other, presenting an inclined face, substantially as described.

4th, In combination with the slotted follower, C2, the knife, Y, so arranged that it shall indent the collar upon its folding line at each descent of the male die, substantially as and for the purposes set forth.

5th, The slotted folder, Z, in combination with the vertically-reciprocating knife, substantially as herein set forth.

6th, Forming or bending the collar in the line of the fold, as it is cut, in contradistinction to creasing the same, substantially as and for the purposes herein set forth.

7th, A flat guide tube, n, made adjustable to suit the width of the paper, and arranged with the feeding rollers, q and r, for the purposes set forth.

8th, The arrangement of the levers, B and W, and cams, R and A, all constructed as shown, and operating to alternately cause the upward and downward motion of the knife, Y, substantially as shown and described.

9th, A movable collar shaped bed, C2, in combination with the dies, B2 and A2, substantially as and for the purpose set forth.

83,815.—CHURN.—Schuyler S. Case, Marion, N. Y.

I claim, 1st, The false bottom, B, constructed substantially as described, and provided with a valve, f, when used in connection with a plunger, F, also provided with a valve, m, all constructed and arranged to operate substantially as herein set forth and shown.

2d, The removable stock, C, to which the barrel, E, and false bottom, B, are attached, when constructed and arranged as herein shown and described so as to form part of the sides of the churn, A, as set forth, for the purpose specified.

83,816.—MACHINE FOR SPREADING PLASTER, LIME, ETC.—George U. Relyea, Watkins, N. Y.

I claim, 1st, The comb nation, in the same machine, of two independent sets of mechanism for sifting plaster etc., situated end to end, the said sets consisting of revolving sifts, D D', with the inner ends fixed, but the outer ones resting in slide boxes, g g', to throw out of gears, by means of connections, f f G G', and the axle of the driving wheels, and the shaft of the sifters, made in halves, the whole arranged as described, and operating in the manner and for the purpose specified.

2d, The combination, with the perforated sifters, D D', of the angular bars, i i, and division plates, h h, the whole arranged as described, and operating in the manner and for the purpose specified.

REISSUES.

63,240.—MELTING AND SMELTING FURNACE.—Jacob Green, Norristown, Thomas H. Wilson, Hiram Willson, and Charles R. Adams, Philadelphia, Pa., and Samuel Munn, Hackensack, N. J., assignees of Jacob Green. Dated March 26, 1867; reissue 3,177. Division A.

We claim, 1st, A furnace, in which currents of air are introduced above the fire, and a mixture of air and steam is passed upward through the fire, substantially as and for the purpose described.

2d, A furnace, in which the gases produced by the passage of mixed air and steam through, and of the air above, the fire, are maintained under a pressure greater than that of the external air.

3d, A furnace in which the gases are maintained under pressure, and in which openings are arranged at the points to which the heat is to be directed, substantially as and for the purpose described.

4th, The combination, with a furnace, of blast pipes, so arranged above the fuel, as to direct the heated products of combustion to any desired part or parts of the furnace, substantially as set forth.

63,240.—FURNACE FOR TREATING IRON, AND FOR OTHER PURPOSES.—Dated March 26, 1867; reissue 3,178.—Division B.—Jacob Green, Norristown, Thomas H. Wilson, Hiram Willson, and Charles R. Adams, Philadelphia, Pa., and Samuel Munn, Hackensack, N. J., assignees of Jacob Green.

We claim, 1st, The combination in a smelting furnace of pipes through which a mixture of steam and air can be introduced below the fire, and currents of air among the products of combustion, previous to the latter being brought into contact with the ore, for the purpose specified.

2d, A chamber or chambers H, through which the ore is admitted to the furnace, when the said chambers are arranged in respect to the bed and to the fireplace substantially as specified.

3d, The fireplace D, bed F, stack G, inclined passage H, with its openings c c, and reservoir E, all constructed and arranged substantially as and for the purpose set forth.

4th, The combination of the two fireplaces D D, stacks G G, passages H H, beds F F, and the basin E, the whole being constructed and arranged substantially as specified.

62,766.—PLOW.—Dated March 12, 1867; reissue 3,179.—Don Carlos Matteson and Truman P. Williamson, Stockton, Cal.

We claim the curved standard A, with the lug B, and the offsets D and E, substantially as and for the purpose described.

12,395.—MACHINE FOR SLAUGHTERING HOGS.—Dated Feb. 13, 1855, reissue 3,180.—Jefferson Parker, Louisville, Ky.

I claim the combination of the shaft K, elevating fingers d d, scalding vessel A, and scraping bench B, for the purpose set forth.

52,338.—GLASS MOLD.—Dated Jan 30, 1866: reissue 3,281.—Michael Sweeney, James E. Mathews, and Thomas Hartley, Wheeling, W. Va.

We claim, 1st, Molds in which glass is to pressed, made of hot-blast iron, and cast upon metallic chills substantially as shown and described.

2d, Also an enlargement formed around the middle of the mold, in order to obtain the equalization of the heat in the mold while glass is being pressed therein, substantially as set forth.

3d, The manner substantially as above shown of attaching handles to molds for glass.

81,794.—MACHINE FOR SEPARATING ORES.—Dated Sept. 1, 1868; antedated Aug. 5, 1868: reissue 3,182.—Stephen R. Krom, New York city.

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 frame work A, and causing the material to traverse across its narrowest dimensions, substantially as and for the purpose herein set forth.

3d, In combination with a perforated separating bed, and a device for producing intermittent puffs to effect separation of the granular substance on the bed, a rotating or travelling delivery device, arranged to regulate the discharge from the passage which carries off the heavier grades of particles passed through the sifting or separating bed, substantially as specified.

4th, So gearing or operating the device which effects separation by intermittent puffs, and the rotating or traveling device which regulates the discharge of sifted material, as that said devices are made to work at fixed relative velocities to each other during all variations in the general speed of the machine, essentially as and for the purpose or purposes herein set forth.

5th, The roller, L, arranged and operating as represented, relatively to the discharge passage, J, for the purposes herein set forth.

6th, The trip wheel, C, and lever, F G, or their respective equivalents, arranged relatively to the bellows, D, and to the perforated bed, I, and its connections, as and for the purposes herein set forth.

7th, In combination with the perforated bed, I, and with 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 specified.

8th, 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.

9th, 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 H1 H2, or their equivalents, for varying the rate of discharge through the passage, J, all arranged for joint operation, substantially as and for the purposes herein set forth.

10th, 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 inclosing case to protect the working mechanism, all as and for the purposes herein set forth.

DESIGN.

3,213.—GLASS BOTTLE.—John B. Bartlett, New York city.

3,214.—TOBACCO PIPE.—Fred. W. Burrows, New York city.

3,215.—FLOOR OIL CLOTH PATTERN.—Hugh Christie, New York, assignor to D. Powers & Sons, Lansingburg, N. Y.

3,216.—FLOOR OIL CLOTH PATTERN.—Hugh Christie, Morrisania, assignor to William M. Brasher & Company, Brooklyn, N. Y.

3,217.—STAIR OIL CLOTH.—Elihu Dwight, New York city.

3,218.—ORNAMENTS OF A STOVE.—Jeremiah Dwyer (assignor to Detroit Stove Works Company), Detroit, Mich.

3,219.—PENCIL TRADE MARK.—Eberhard Faber, N.Y.city.

3,220.—CARPET PATTERN.—Israel Foster, Philadelphia, Pa.

3,221.—ORNAMENTATION OF GLASS WARE.—Henry C. Fry, Pittsburg, Pa., assignor to himself, Frank Semple, and John D. Reynolds.

3,222.—PLATES OF A COOK'S STOVE.—Luther W. Harwood (assignor to Fuller, Warren & Co.), Harwood, Troy, N. Y.

3,223.—COOK'S STOVE.—Charles S. Lord, and William N. Walker, Otter River, Mass.

3,224.—CLOCK CASE.—George B. Owen, Winste[illegible] C

3,225.—TRADE MARK.—William I. Peake, New York city.

3,226.—SHOVEL-AND-TONGS STAND.—Charles Zeuner (assignor to M. Greenwood & Co.), Cincinnati, Ohio.

3,227.—STOVE.—Conrad Harris, and Paul William Zoiner, Cincinnati, Ohio.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

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2,898.—APPARATUS FOR LIGHTING AND REGULATING THE FLOW OF ILLUMINATING GAS.—Arthur Barbarin, New Orleans, La. Sept. 19, 1868.

2,979.—LAMP AND LANTERN.—John H. Irwin, Chicago, Ill. Sept. 29, 1868.

2,997.—SCISSORS SHARPENER.—G. P. Bergen and C. T. Bainbridge, Brooklyn, N. Y. Sept. 30, 1868.

3,017.—DOOR FRAMES OF FURNACES FOR STEAM GENERATORS.—A. J. Ambler, C. E. Rittenhouse, and R. E. Preston, Washington, D. C. Oct. 1, 1868.

3,031.—MODE OF REVIVING BONE BLACK EXHAUSTED BY MANUFACTURING OPERATIONS.—John Rogers, Brooklyn, N. Y., and L. Reid, New York city. Oct. 3, 1868.

3,063.—KNITTING APPARATUS AND MACHINERY.—Thomas Crane, Fort Atkinson, Wis. Oct. 7, 1868.

3,075.—GAMES.—John M. Fletcher, New York city. Oct. 8, 1868.

3,079.—SAW HANDLE.—C. White Hubbard, Pittsburg, Pa. Oct. 8, 1868.

3,083.—PAPER BOAT.—Frank W. Sargeant and John Tyler, Boston, Mass. Oct. 8, 1868.

3,117.—PROCESS FOR ELECTRO-PLATING WITH NICKEL.—Wm. H. Remington Boston, Mass. Oct. 10, 1868.

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Warren Holden, of Philadelphia, Pa., having petitioned for the extension of the patent granted him on the 1st day of May, 1855, for an improvement in "Boot and Shoe Stretchers," it is ordered that said petition be heard at this office on the 5th day of April 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., Oct. 16, 1868.

Jotham S. Conant, Hackensack, N. J., having petitioned for an extension of the patent granted him on the 16th day of January, 1855, for an improvement in "Sewing Machines," it is ordered that the said petition be heard at this office on the 28th day of December next.

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