SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XXI.---No. 1. [NEW SERIES.] NEW YORK, JULY 3, 1869. $3 per Annum [IN ADVANCE.

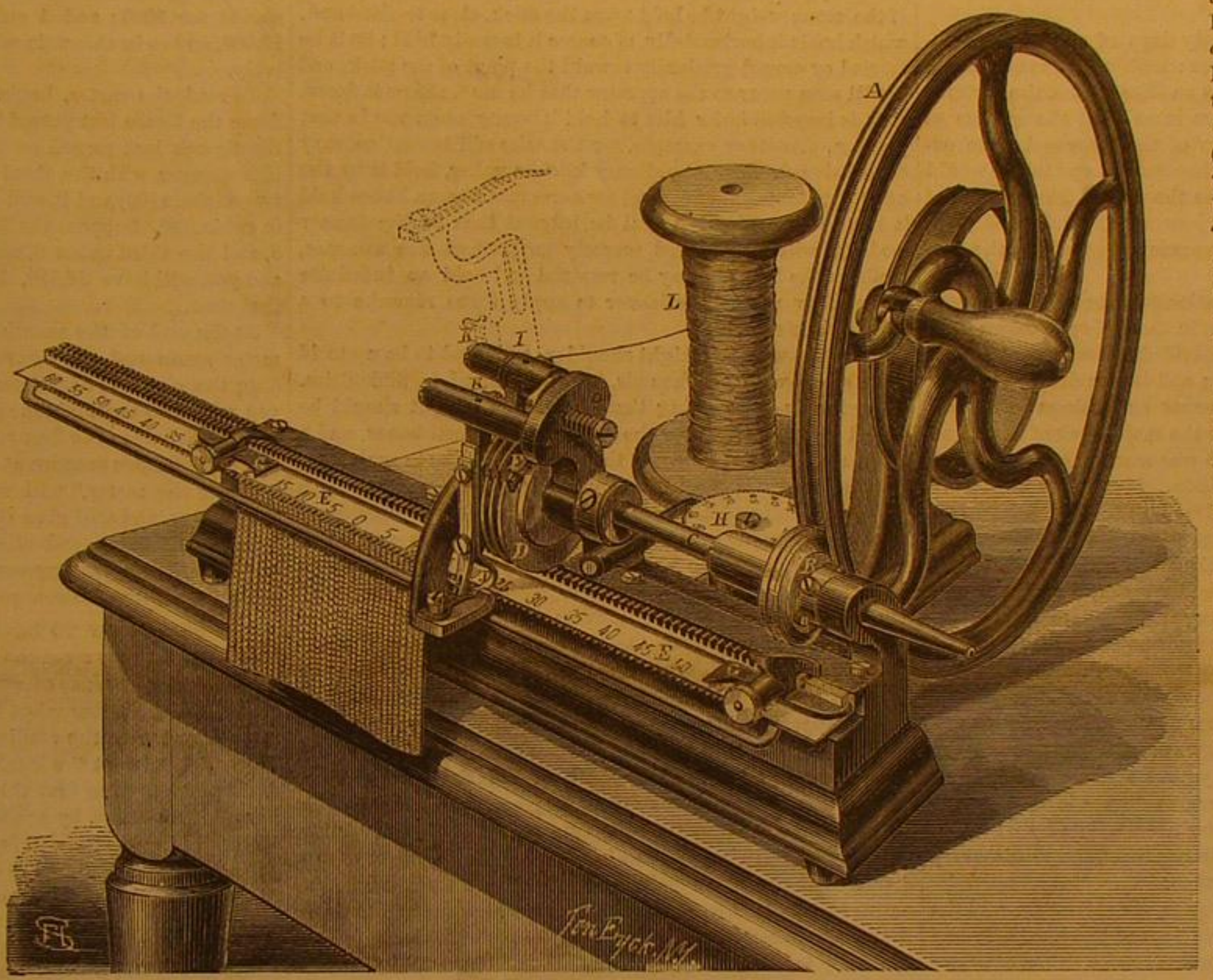
A One-needle Family Knitter.

The exceedingly simple machine, illustrated below, will be examined with interest by all, and especially those accustomed to the complicated machines heretofore presented. Its prominent features are its fewness of parts and the superiority of its work, not without reason thought to be destined to revolutionize all previous methods for producing knitted goods. Most of our subscribers will remember our illustration of the original patent some twenty months since, which attracted considerable attention from its simplicity, and was copied from our pages into several European journals; but the company owning the patents, having been steadily improving their first machines, and having secured new patent, the machine differs essentially from the original device.

As a type of American ingenuity for American homes, a complete knitting machine, with but 27 pieces employed in its entire construction, will be, perhaps, as appropriate an illustration as could grace the first page of our new volume.

This simple, cheap, but substantial machine by means of a single eye-pointed needle, in connection with a looping hook, and work-supporting comb traversing (automatically, or at the design of the operator) in front of the needle, certainly produces the handsomest work we have ever seen from machinery or hand, in which opinion we are sustained by competent experts, as well as by the medals unanimously awarded it at the Paris Exposition, the last American Institute Fair in this city, and, indeed, wherever it has been in competition.

The driving wheel, A, adapted by its crank for hand, or by a band wheel and treadle, as in a sewing machine, for foot power, as desired, drives the friction pulley, B, on the shaft, C, and, by it, the grooved cam-disk, D. This latter ingenious device for operating the comb, E, backward and forward before the needle, consists of a small double grooved disk engaging in the toothed rack of the comb, and, as seen in the cut, has a section of its periphery movable and pivoted at one end. This arrangement causes the comb to advance one tooth each revolution of the disk, according as the section is swung to the right or left by the small dog, F, placed under the movable end of the swinging segment—and which dog is automatically operated by its striking against the indexes, G, as either arrive at the cam-disk, D—thus instantly reversing the direction of the rack. It will at once be seen that this short, movable portion of the periphery of the disk, causes, by its pitch, a comparatively quick advance of the comb—the complement of its grooved circumference holding the comb perfectly immovable the remainder of the revolution while the loop is being formed—thus rendering the stitch *certain*, without that liability of "dropped" stiches, which has, heretofore, prevented the general adoption of domestic knitting machines.



THE HINKLEY KNITTING MACHINE.

Another great advantage of this invention consists in supporting the work from the teeth of a steel comb, E, avoiding the complications and accidents to which knitting machines with from seventy-five to one hundred and twenty-five needles, are necessarily subject, although with these the generality produce but a straight circular tube, susceptible of no change or variation, save by stopping the machine and inserting or removing needles each time it is desired to vary the diameter even a single stitch.

The indexes, G, which are instantly moved any number of stitches desired, beside reversing the action of the comb, point to the number on the comb, give, at a glance, the stitches in width of the work in hand, while the counter, H, which is pushed forward one tooth each time the comb traverses across, presents the rows of stitches in length that the work has progressed—thus entirely saving the old drudgery of counting each stitch, necessitated in hand work or other knitting machines, and reducing the labor of knitting a stocking or other article, to the simple method of changing the indexes, whenever the counter, H, has enumerated a certain number of stitches in length. Centered immediately above the disk, D, is the needle bar, I, which carries the needle and receives its reciprocating motion from a crank pin on the disk working through it in a slot, and also the looping hook, J, operated by means of a cam-slot cut in the disk immediately about the crank pin, which slot receives a pin projecting from the looper shank, J. The needle bar is easily turned up, as shown by the dotted elevation of the same, for threading, etc., and when so reversed, as it can be, without breaking the yarn, the work in progress cannot be disturbed by the interference of a child, or others, during the absence of the operator. The tension screw, K, is seen on the side of the needle bar. With the needle disconnected from the work, and the grooves of the segment of the cam-disk, D, in line with the remainder of the grooves, preventing lateral motion of the comb, the machine is transformed into a "self-spooler" by setting the bobbin, L, on the spindle end of the shaft, C—projecting for that purpose—which rapidly winds its yarn from the swifts without interfering with the progress of the work on the comb, entirely obviating the use of a spooling machine and bobbin stand.

The above describes all of the various parts. The needle bar, I, receiving its motion from the crank pin in its slotted arm, advances with each revolution of the disk, D, and the needle, passing through the stitch immediately in front, under the tooth of the comb, removes that loop from its tooth, the revolution of the cam slot brings the looper-hook forward in season to take up a new loop from the eye of the needle, and, on its backward movement, deposits it on the tooth which held its predecessor. Now, the disk-cam, D, which has held the comb stationary while the new loop has been formed, reaches the gaining or cam part of its circumference, causing the comb to traverse one tooth for the repetition of the stitch forming. It is seen that upon the arrival of that part of the comb on which is stationed either index, that they strike the dog, F, instantly reversing the direction of the comb. The work hangs from the teeth of the comb in front of the machine in the plain view of the operator, and, unlike all other knitting machines, uses no weights to drag down the work, the use of the small wire rod, under the comb teeth, obviating their necessity.

It is easily apparent that by the use of a traversing comb of any length, straight, curved, or circular, that one needle can perform the work previously requiring as many needles as the comb has teeth, that the "widening" and "narrowing" is adjusted stitch by stitch, or as many as desirable, instantly, by sliding the indexes along the comb—that it "sets up" its own work, not requiring the loops to be "cast on" by hand—that the stitch is the same as that taken by hand from one needle to another—that each edge will be a "selvedge" like cloth, no matter how irregular in outline, and that the top of the work, as, for instance, a stocking, will not be a raw edge, but "finished," as it comes from the machine. Many other advantages over the most expensive "knitters," may be enumerated. For instance, it is evident that the work and all the machinery are in full view of the operator, and readily understood by a child—that the knitter can be run by hand or foot, like the sewing machine—that any size yarn or cord can be used—that, by reason of its small friction gear and the large driver, it is almost noiseless, while an extremely high speed can be reached, which, with the rapidity of "widening" and "narrowing," places this machine in the front rank of "fast" knitters, and that the tension governing the size of loop is altered in a second.

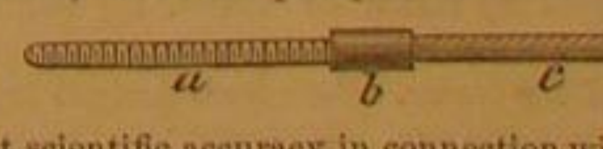
It also knits the buttonholes to use an Irishism), in a garment; knits in different colors or sizes of yarn without tying together; knits any fabric from an afghan to a pair of gloves; knits a stocking complete with a "hand heel" (which stockings do not require the toes and heels to be knit in by hand, but will knit them "double" if desired); and produces work equal to hand-knit in every respect, not liable to return to a uniform tubular shape after the first washing.

These machines are now being manufactured by the "Hinkley Knitting Machine Company," under the United States patents. The patents obtained in Great Britain, Belgium, France, New Brunswick, etc., are for sale.

Parties desiring agencies, territory, machines, or other information, will address the New York office of the "Hinkley Knitting Machine Company," No. 176 Broadway, New York city.

Determinations of Free Oxygen.

At a meeting of the Manchester Literary and Philosophical Society, Mr. Peter Hart described his method of making rapid determinations of free oxygen. The apparatus required consists, in addition to an ordinary pneumatic trough, of two tubes, each ½ inch in diameter and 16 inches long, closed at one end. One of the tubes is graduated into 50ths of a cubic inch, and the other is coated internally with phosphorus. This is effected by dropping into the tube a few pieces of phosphorus; it is then to be closed by a sound cork, and the phosphorus (melted by immersing the tube in hot water) may be spread in a thin coating over the interior by turning it round as it cools. On cooling, the cork is to be withdrawn, the tube filled with water, and a piece of india-rubber tube tied securely over the mouth. This completes the apparatus. The *modus operandi* is as follows: Both tubes are filled with water, and allowed to remain in the trough, a portion of the air to be examined is passed into the measuring tube, which is now allowed to remain for five minutes in the trough to allow it to attain the same temperature as the water. It is lifted until the water is at the same level within and without, and may then be closed by the finger, and withdrawn from the trough. The volume is easily noted. This done, it is connected by the india-rubber joint with the phosphorus tube; into which the air is allowed to flow. The whole may now be placed for half an hour in the trough, when the gas may be poured back into the measuring tube, the level once more taken, and the volume read off in the same way as before. The loss is oxygen. In the cut, *a* is the measuring tube, *b* the india-rubber junction, and *c* the phosphorus tube. No claim is made



for strict scientific accuracy in connection with this apparatus; its sole merit consists in its offering an easy and rapid means of approximately determining the free oxygen in an atmosphere. In the working of sulphuric acid chambers it has been found extremely valuable, and possibly may be found so for other technical inquiries.—*Mechanics' Magazine.*

AN exposition of textile fabrics is to be held at Cincinnati, commencing August 3d and closing on the 7th. It is to be under the auspices of the Woolen Manufacturers' Association of the Northwest.

Applied Mechanics in Relation to Natural Power.

The last of the course of "Cantor Lectures" on "Applied Mechanics" was delivered by John Anderson, Esq., C.E., Superintendent of Machinery to the War Department, before the Society of Arts on Monday evening. In the earlier ages of the world, said Mr. Anderson, when man as yet accomplished his ends by the exercise of his own physical powers, every fresh insight into the application of natural power must have appeared a wonderful discovery. Circular motions—those simple contrivances for receiving and distributing power, the revolving spindle and wheel, were wonderful discoveries, and they had exercised a far higher effect on our country than many with more sounding titles.

Passing on to consider the mode of reckoning power or force, the lecturer said all force was reckoned by units, one pound moving through a space of one foot being equal to a unit of work; or one pound lifted 100 feet to one hundred units. The convenience of this mode of measurement could not be over estimated. By it the force developed in a railway train, the wind or water lifted from a well, could all be measured and reduced to units of work. For practical measurement a larger unit was, however, necessary, and this was called horse power. A horse would pull 150 pounds through 220 feet in a minute, and this amount of work was equal to 33,000 units. A man's power, as reckoned in the government works, was only about one tenth of that of a horse, being about 15 pounds, or 3,300 units. Natural power could only be partially taken hold of and applied by man, and the quantity thus taken hold of varied.

It has been supposed in the early days of applied mechanics that man could increase power: nothing, however, could have been a greater mistake. As an illustration, the lecturer stated that when Mr. W. Fairbairn introduced the system of taking motion from the periphery of the fly wheel of an engine, men at once said he would lose power, and that it would be far better to have taken it from the axle. The success of Mr. Fairbairn's experiment had, however, been long demonstrated, and nobody would now question the truth of the system he adopted.

Man's first efforts in the application of natural power were lost in antiquity; they were made in Central or Western Asia ere yet the Aryan race had been divided and dispersed to people remoter regions of the world; and it was deeply interesting to note that names of implements and things belonging to peace and industry belonged to the main stock of the Aryan language, while those relating to war were introduced by the different branches after their division. Many ages must have lapsed before man had penetrated far into the secrets of natural power. It seemed a modern age which was adorned quite comparatively by the names of Euclid and Archimedes; yet it was long after this that we found so simple a contrivance introduced as a machine for raising water. Great, however, as was the contrast between the condition of applied mechanics in their days and ours, the contrast might be still greater between that of the present and succeeding ages.

All natural power is derived from the sun, the only exception being that of the great tidal wave that rolls round the world. Heat and force are synonymous terms. The heat required to raise one pound of water one degree is equal to 772 units of work. This fact gave engineers a data by which to measure the achievements of their machines, and its discovery had caused them great dissatisfaction.

Passing on to consider water power, Mr. Anderson said the circulation of water was due to the heat of the sun. It had been calculated that thirteen thousand cubic miles of water were evaporated every year a d carried back again. Part of this, man was able to arrest and apply in its downward course, but all the power yielded was derived from the water, and not from any contrivance which man used in connection with it; and although the subject of water power had been comparatively exhausted he could not as yet utilize more than 75 per cent of the power of the water. This, however, was a great result as compared with that afforded by the steam engine, from which only about 10 per cent was obtained. It was very important that this should be remembered, for of late years it had become the custom to disparage water power to the advantage of the steam engine. The great discovery of modern times in connection with water power was a method adopted in Switzerland of using, so to speak, the ghost of the water—carrying to a distance of 4, 5, and 6 miles the power of the water without taking the water itself. This was effected by a most ingenious contrivance. At the water and by its power a large pulley was whisked round at the rate of sixty miles per hour. A small steel wire cord, not thicker than a pencil, was carried from this to wherever the mill was erected, over valleys, and sometimes miles from the water, and along it the power passed to the place where it was wanted.

A great improvement in connection with this invention had been the application to the pulley of a gutta-percha groove, which prevented the steel cord from slipping. Describing the power developed by steam or heated air engines, the lecturer showed that the nature of the power was precisely the same as that of the water. Both were derived from that great source of power, the sun. With wind and water power it was the present power of the sun, but with coal it was different. That was developed 'ong ages ago and carefully stored up in the bowels of the earth, a rich patrimony of the present age. The supply of wind and water power was unbounded, and would last while "the sun and moon endured;" that of coal was limited, and it was the special province of the engineer to husband and preserve it.

Having considered at some length the progress made in the employment of natural power by the use of steam and air engines, the lecturer concluded by asking his hearers not to be discouraged in their attempts at further improvement because so much might appear to have been done, but still to persevere, and to believe that every fresh invention only cleared the ground for further discovery.—*London Building News.*

How to Select a Saddle Horse.

R. H. Dyer, a well-known English veterinary surgeon—gives the following directions about saddle horses:

"It has been asserted that an oblique shoulder is indispensable in a riding horse, and anything approaching to straightness is considered objectionable. These remarks may be well received, but they do not convey all that is necessary to know. It may be asked how or in what manner, speaking mechanically of course, an oblique shoulder is superior to a straight one. In order to explain this fully and satisfactorily, the reader's attention must be directed for a moment to a steelyard—a contrivance made of iron, which is capable of testing the weight of hay, straw, and other commodities. The small weight, used as a balancing power, is placed at some given point, so as to indicate the value of that which is weighed. If placed at the extreme point of the "yard" it will exert as much influence, although weighing but four ounces, as 56 pounds of hay or other matter would at the other end. This weight becomes less and less as it approaches the opposite end of the steelyard, so that when placed at one end it, as it were, weighs nothing, and when placed at the opposite end it will be found equal to 56 pounds in weight. The same may be shown by placing a stone (14-lb.) weight upon a walking stick. If the stone weight be held upon the stick, close to the hand, which holds it horizontally, of course it is easily held; let it be carried or moved gradually toward the point of the stick, and it will soon occur to the operator that he must throw it down, as it is impossible for him to hold it many moments in that position. Another example, for the sake of illustration, may be mentioned. Take an ordinary kitchen poker, hold it by the knob (horizontally, of course) for some minutes, and then hold it in the center, and it will be learned that in the former mode it will be retained scarcely more than five minutes, while in the latter it may be retained and held an indefinite time. Now we will endeavor to apply these remarks to a horse and his rider.

"A horse with a straight shoulder, supposed to be up to 14 or 15 stone with fox hounds, is often placed in difficulties. For example—presuming that the rider's weight should be placed immediately over the hindermost dorsal bones, and a portion of the lumbar bones, that weight will be in such a position as to admit of all his movements to be carried on with ease to himself and his rider; but if the rider is compelled to sit close to the neck, as he would have to do upon a straight shouldered horse, then his weight would materially interfere with the motion of the front limbs. There would be a corresponding influence upon his movements that we found in the position of the weight of the steelyard. Doubtless, 14 stone placed near to the neck will have as much influence as 18 or 20 stone has when placed in the center of the back, and this will be apparent in ordinary motion. How much more then, will it be apparent in leaping? If we take this for granted, we may readily believe how difficult it is for an animal to carry a fourteen-stone man over a large fence. Unless his hind quarters are proportionably strong, he is likely to fail in carrying him safely over the jump. Again, if a horse with a defective or straight shoulder is ridden down a steep hill, the entire weight is thrown upon the front limbs and neck, which must, of necessity, impede their action, in addition to which the rider is rendered uncomfortable and occasionally subject to falls. Further, in taking a deep drop, if the animal is overweighted at the shoulders, he generally drops upon his knees, or falls altogether in coming to the ground, unless the rider has the power of keeping himself well back, which he cannot possibly do in the same manner he would if he were sitting in a proper position, with sufficient obliquity of shoulder. It is generally believed if a horse possesses strong hind quarters it is a compensation for a defective forehand. This is an error. A horse has propelling power, so to speak, in the front as well as in the hindmost limbs. I do not say that a powerful hind quarter will not, in some measure, make up for deficiency before, but not to the extent imagined by some persons. It may be accepted as truth that every quarter of an inch nearer to the cervical vertebra a rider is obliged to sit is an insuperable objection. The only way to get over this difficulty as regards the position of the rider is to have recourse to the obsolete crupper. Although it is old-fashioned, it tends to prove that our forefathers had good and sufficient reasons for using it. Many other illustrations might be adduced to prove the truth of these observations were it necessary. This reminds me of a conversation which took place sometime since with an eminent horse painter. He showed me his portfolios of celebrated horses, and in speaking of a straight-shouldered animal, he employed the hackneyed phrase, "the scapula has not room to play." I interrogated him as to his meaning, but he could afford no explanation. After explaining to him my views pretty much in the same language as I have used here, he acknowledged it was novel to him, and, looking at it mechanically, it must be correct.

Whatever may be of service in preventing the ravages committed by the *Dermestes lardarius* on preserved specimens in entomological or other collections of natural history is deserving of attention. A correspondent who has had considerable experience of the destructive powers of that beetle, says that camphor and corrosive sublimate are only partial detergents, and that carbolic acid acts perfectly. He advises the application of the carbolic as follows: "Place the crystals of carbolic acid throughout the cabinets, and the evaporation of the crystals will keep them thoroughly saturated with carbolic acid gas and kill all living insects therein."

FACTS ABOUT GAS FOR THE PEOPLE.

HOW TO READ THE METER.

There is no valid reason why consumers of gas should not be able to read the meter for themselves, and know exactly the amount of gas that is consumed. The meter is placed in every dwelling, giving equal privilege to the consumer as well as the gas company, to learn by its self-registering index the amount of gas consumed. If this knowledge was general, it would remove silly prejudice, that great "bone of contention" between those who pay for the gas and those who receive the pay, for it is a faithful arbiter and gives no favor to one more than another.

The meters (both wet and dry) in ordinary use will be found to have three indexes, the hand on the first or right hand index moves to the right as the figures read, and each index begins at a cipher (0) at the top and reads, 1 to 2 to 3 and so to the cipher again, which is 10. When the hand on the right index has moved to 1 it indicates that 100 cubic feet of gas have been used or passed the meter; when it points to 5 it means 500 feet, and after completing the circuit at (0) it is 1000 feet. Each of the indexes are ten-fold multipliers of the one preceding. Single figures are used for want of room, but the multiplier is generally placed above the index; thus the right hand is "one thousand," the next to the left or middle index is "ten thousand," and the last or left hand index is "one hundred thousand." Therefore on the first or right hand index, 1 on the dial stands for 100; in the middle index 1 stands for 1000; and 1 on the left hand index stands for 10,000, and so in this ratio with the succeeding figures respectively.

To read the meter, begin with the left index and write down the figure last passed by the pointer; then write down the figures last passed on the second index, and proceed in like manner with the third or right hand index. Now add two ciphers (00) and it will give the amount of gas registered in cubic feet. Suppose the first index was 2, the second index 5, and the third index 6, making 256, now add two ciphers and you will have 25,600, being the amount of gas used at that time.

At the end of the month (or at any other time) read the meter again and the figures will read—say 26,500 after adding the ciphers; now deduct the first sum from the last and you will have the difference 900, which indicates the number of feet used since the first reading.

A few minutes practice at reading meters, generally called "taking the meter," will make any one quite familiar with the matter, and will give the gas consumer a wonderful degree of satisfaction, and often bring about a much better feeling toward the gas company who supply the gas. Among other things it will show you

HOW TO DETECT ESCAPING GAS.

If your gas bills seem too high, or you have the evidence of escaping gas by sense of smell, but not positively so; take a reading of the meter when no burners are in use, and after an hour or so repeat the reading, and if gas is escaping it will be shown. To detect the locality of the leak is often a more difficult matter. The first thing is to see that no burners have been left turned on by accident, which is often the case where the cock has no *stop*, and is caused by the cock being turned partially round again so as to open the vent. Imperfect stop cocks are for this reason dangerous, and should be at once removed.

The next thing to do in order to detect a leak is to try the joints of the gas fittings. The sense of smell will frequently be sufficient by bringing the face near the suspected joint; a lighted taper or match held near the joint is a more certain plan. If gas is escaping it will take fire at the leak, or if too little to burn steadily it will momentarily catch and extinguish in little puffs.

Sometimes the gas escapes from the joints or imperfect piping between the ceiling and floor, or behind the walls or casings.

If beneath the floor the sense of smell will generally detect the section of the floor under which the leak is; as it escapes owing to its levity upwards through the crevices of the floor, and penetrates the carpet if there be one. If bracket or side burners are used, and the escaping gas is behind the walls or casings, the crevices in the casings, or the opening where the pipe enters the room, will let the escaping gas enter the room sufficiently at these points to indicate somewhat nearly the location of the leak.

In such cases the proper way is *never* to apply a light to the crevices or casings, but to turn off the gas at the meter and send for a gasfitter, otherwise an explosion may occur involving serious consequences. In ordinary leaks of gas fixtures and pipes, whether at the joints or at the attachment of the burner, the fitting or burner should be unscrewed and white lead or common bar soap rubbed in the threads, and then screwed home again. This can often be done without any aid from a gas fitter.—*American Gas Light Journal.*

Simple Method of Ascertaining Death.—Dr. Carrière, of St. Jean du Gard, in reply to the offer of the Marquis d'Orches, of a premium of twenty thousand francs, for a practical method of determining death, furnished the following, which he says he has practiced for forty years: Place the hand with the fingers closely pressed one against the other, close to a lighted lamp or candle; if alive, the tissues will be observed to be of a transparent, of a rosy hue, and the capillary circulation of life in full play; if, on the contrary, the hand of a dead person be placed in the same relation to light, none of the phenomena are observed—we see but a hand as of marble, without circulation, without life.—*Jour. de Méd. et de Chirurg.*

SKILL, INVENTION, AND PROPERTY IN PATENTS AND BOOKS.

By Horace Greeley.

Capital is the unconsumed and unwasted remainder of the fruits or proceeds of industry. He who spends as fast as he earns accumulates no capital: the first man who ever produced or fashioned any substance for use beyond his instant need was the first capitalist.

The material wealth which has been amassed by mankind throughout thousands of years is of incalculable amount and value. Apart from that held by individuals, the churches and other public edifices, canals, roads, railways, bridges, literature, paintings, sculpture, etc., though their cost was enormous, are worth far more than that. Immense is our indebtedness to the genius, industry, and thrift, of past ages for the wealth they have bequeathed us, and signal our obligation to transmit these blessings, not merely unimpaired but enhanced, to those who will come after us.

And, however great our obligation to the departed for the palpable, material wealth they bequeathed us, they have laid us under still greater obligation by their magnificent legacy of experience and skill. Having this, we might in time, were they all swept away, recreate most of our worldly possessions; deprived of it, we could scarcely, and with great difficulty, preserve our bare lives. The teeming millions of China are constantly near the brink of starvation, which many of them daily overpass; less, I apprehend, because of the density of their population than of the rudeness and inefficiency of their labor-saving devices. On the other hand, so prodigious has been the progress of invention in Europe that the steam engines of Great Britain alone have been estimated as equivalent in force, if not in productive capacity, to six hundred millions of men. Cheap beyond comparison as is the labor of Eastern Asia, the machinery of Great Britain competes with it in its own markets, rivals it, undersells its products at the very doors of the producers, divests them of employment, and dooms them to die of famine. In my early boyhood, Chinese cotton fabrics known as nankins, etc., were extensively worn, even by the poor, in New England; but that trade was destroyed by British and American power-looms nearly half a century ago; and now the peasanty of China and India are largely clad in the products of those looms. Cotton grown in India is extensively shipped to England, there spun and woven, returned in the shape of fabrics to India, and there worn all but exclusively by those among whom it was grown, who would gladly have spun and woven it for sixpence sterling per day's work, yet who paid the cost of two journeys around the Cape of Good Hope, that of the British manufacture, the interest on its value during its long absence, and the profits of several mercantile transfers, and yet were supplied with it in the market of India at lower cash prices than her own looms could afford.

Those countries only which cherish and delight in labor-saving devices have added aught of moment to the world's inestimable aggregate thereof. Europe could not now afford for a billion of dollars to lose the inventions and improvements in machinery for which she is indebted to America, and the great mass of which, in all human probability, would never have been, had the policy of buying from Europe every article of manufacture, which marked and fitted the era of our colonial dependence, been persevered in to this day.

Our oldest manufactures are naturally our cheapest and best. Europe cannot rival our axes, adzes, and other edge tools; nor can she surpass, either in quality or cheapness, the spades and shovels extensively made by one Massachusetts family throughout the last fifty years. Cut nails are an American idea; and no other nation yet makes them so cheaply or half so abundantly. We have begun, after many years trying, to make wrought nails also by machinery, and will naturally keep the lead in this department also. I have heard that the screw auger, whereby the cost of boring holes in timbers was reduced more than half, is a Connecticut invention, and never patented, though its value to mechanics defies computation. The planing machine, the innumerable reapers and mowers, the sewing machine, and ever so many kindred trophies of Yankee genius for invention, have enriched not our country only but the civilized world. And as the cotton gin would surely not have been invented had not the cotton culture preceded and required it, so the arts, in the prosecution of which other American inventions were called into being, had to be previously known and practiced among us, or the world must have waited indefinitely for the triumphs they incited. We are, I rejoice to learn, on the eve of a similar stride in the production of all forms of wrought or malleable iron, through a Pennsylvania invention whereby the expensive process known as puddling is to be superseded or immensely reduced in cost: and a thousand other beneficent applications of inventive genius to the cheapening of processes, the increase of products, are on the point of practical realization. No man can truthfully suggest an article which, having formerly been wholly imported, has since, through protection, been so naturalized on our soil that it is now produced here nearly to the extent of satisfying our own wants, yet which now costs our people more than it did when we procured it from abroad. And the area whereon such achievements are possible is by no means fully occupied. We shall yet make our own crockery and finer kinds of pottery, which we still mainly import, and shall grow as well as manufacture the silks for which we are still mainly indebted to the insects of China and the looms of France, we having in California a more genial climate for the silk-worm than Europe or Asia can boast; while we are already reeling and spinning, on American machinery invented for the purpose, vast quantities of raw silk imported in an imperfect or damaged condition (answering to the "swingle-tow" of flax) which all the ingenuity and patient industry of "the Flowery Land" had given up as hopelessly intractable and worthless. So shall we continue, under a beneficent policy of encouragement and support, to develop new and larger possibilities of industrial achievement, and, in expanding and diversifying our own national industry, benignantly stimulate, and ultimately renovate, that of all mankind.

The rights of those who create intellectual property are less clearly defined—perhaps less capable of unerring definition—than those of the producers or transformers of material substances; yet they seem to me not less real, beneficent, and defensible. Let us suppose that four brothers commence responsible life with equal patrimonies, equal capacity, and like habits of industry, temperance, and frugality. Twenty years afterward, one of them, who has devoted his energies to farming, has a fine estate, a commodious dwelling, a handsome herd of cattle, a good collection of implements, a library, and all the material elements of independence and comfort. A second has addresed himself to the construction of locomotives, and has done as well thereby as his farming brother. A third has given himself up to the study of mechanics and engineering, and has, after many disappointments, perfected a new steam engine, whereby the power required to move a train or boat of so many tuns at a given rate per hour is reduced at least twenty-five per cent. The fourth has addicted himself to literature, art, and poetry, and has produced a book which one hundred thousand of our people annually read, deriving pleasure and instruction therefrom which they would rather pay him for than forego. I ask why this inventor, and this author, have not as fairly earned, and are not as justly entitled to the price that others prefer to give rather than forego the advantage or pleasure derived from their products, as are their brethren, the farmer and the locomotive-builder, to a like remuneration for the use of *their* products? If, as Thiers forcibly says, "The indestructible foundation of the right of property is labor," then, surely, the right of property in Elias Howe to that combination of the needle with the shuttle which gave practical existence and value to the sewing machine, of Alfred Tennyson to "The Princess," "Maud," "In Memoriam," and "The Lotus Eaters," is as perfect as any right of property can be. For the craftsman merely fashions, adapts, or r ecasts materials coexistent with the earth, and which may be regarded as in some sense once the common property of mankind; while the inventor, the poet, builds into the void space, makes chaos luminous, and adds potentially, and, as it were, by original creation, to the enduring wealth of mankind. I cannot perceive how or why his right of property in his product is not at least as perfect and pervading as that of the maker of a locomotive, the grower of grain.

I have considered what has been urged in favor of a restriction of this right of property to the material thing wrought upon—to the particular locomotive built by the inventor, the author's manuscript copy of his poem—and it seems to me palpably absurd. For what the inventor has labored twenty years to perfect is not the single, particular locomotive on which he expended his handiwork, but *all* locomotives to be thereafter built—his efforts were incited and upheld by a desire to make *all* locomotives henceforth less costly or more efficient. This he has achieved, or nothing; herein he has succeeded, or not at all. Once completed, the machine whereon he labored so long may accidentally take fire and burn to ashes, yet no one, surely, would thence infer that his labor had been in vain.

I do not regret that foreign authors are extensively read here; I do not deny that some of them are eminently deserving of their American popularity; but I protest against the legislation, or lack of legislation, on the part of our rulers, whereby foreign works are habitually—nay, necessarily—proffered cheaper to our people than those of our own authors. This is unjust to both alike—to those whom it deprives of readers, and those whom it gives more than their fair proportion of readers, but denies compensation for their work. Walter Scott barely escaped dying a bankrupt, when one cent per volume from his American readers would have saved him from pecuniary embarrassment, smoothed his downhill of life, and perhaps enabled him to live longer and write more and better. I wish we had rendered him naked justice.

As to the abolition of the Patent system, which has of late been influentially advocated, I shall be more easily reconciled to it when I learn that it is to be swiftly followed by a repudiation of *all* rights of property whatever—or, more strictly, of all legal guaranties and defenses of such rights. Whenever the laws of my country shall refuse to protect the inventor, they should, in simple consistency, bid the land-owner, the bondholder, the merchant, "Take care of yourself, and of all that you call your own." Assuredly, no man's right to the wild lands conceded to his ancestor by a European monarch who never saw, and knew not how, even to bound them accurately, can be better than that of Eli Whitney was to his cotton gin, or that of Daguerre to photography. When these shall be successfully denied, be sure that *no* rights of property can be secure.

"Then, why not make patents and copyright absolute and perpetual?" is often asked. I answer, there are *no* absolute rights of property. The land you bought of the Government yesterday may be taken from you for the bed of some highway or railroad to-morrow, and you have no redress. *All* rights of property are held subordinate to the dictates of National well-being; and the Government will batter down or burn to ashes your house, if it shall have become (through no fault on your part) a harbor or defense of public enemies, and make you no compensation therefor. I only insist that intellectual property shall be recognized by law as standing on a common foundation with other property and equally accorded the protection of the State and the respect of all who hold property no robbery, but justly entitled to deference and support from the wise and the good.

Rules for Bathing.

1. Baths should not be taken within at least one hour before eating, nor within two hours after; and not within two hours before, and three hours after, is still better.

The reason for this is, that in bathing, the blood is brought to the surface in large quantities and circulates freely in the capillaries of the skin, being drawn away from internal organs and generally diffused through the whole body, and the more freely this external circulation and warmth is kept up, the more refreshing and invigorating the bath becomes, and the greater the benefit derived from it; whereas, when the stomach has recently been supplied with food, the blood is diverted from the external circulation to the digestive organs to supply the secretions and juices necessary to carry on the digestive process.

From these facts, it will be evident that if food be taken into the stomach too soon after a bath the blood is directed to the stomach before a full reaction has taken place, thus interfering with its beneficial effects; while on the other hand, if the bath be taken too soon after a meal, the blood is diverted from the digestive organs before digestion is completed, and thus a very important function of the body is interfered with.

In cases of active congestion or inflammation, in fevers, or in severe pain and distress, it may be necessary to make water applications irrespective of this rule.

2. The head and face should be thoroughly bathed at the commencement of every bath. This will prevent the rushing of blood to the head and ward off unpleasant sensations.

3. A bath should never be taken when the body is exhausted, or too greatly fatigued by exercise, as a person in such a condition would not be likely to secure the proper reaction and warmth. Moderate exercise before a bath is usually beneficial, as it accelerates the circulation and secures a comfortable degree of warmth, which is always desirable before taking a bath. There is no danger from taking a general bath while in a perspiration, providing no fatigue accompanies it; for the sitz and foot baths, however, it is better that the body be warm, but not perspiring.

4. All general baths should be taken briskly, and the bather himself, if able, should rub vigorously that he may quicken his circulation and respiration, and thus secure the warmth and glowing reaction that is so essential after every bath; this should be observed not only while in the bath but in rubbing dry after it.

5. For drying the body after a general bath, a strong linen or cotton sheet is much better than towels; this should be for an adult at least two yards square, so as to envelop the whole body like a cloak, and with it he should be rubbed or rub himself till thoroughly dry—by using the sheet for wiping, the body is protected from the air, the escape of heat is prevented, and there is much less liability to feel chilly afterward—towels will suffice, however, for all local applications.

6. At the completion of the bath, the bather should immediately dress, and, if able, exercise in the open air, or engage in some active employment. If not able to exercise, it is well to cover up warm in bed for an hour or so, and sleep, if possible.

7. Very nervous persons or those whose digestion is much impaired, or circulation is imperfect and feeble, or temperature is below the normal standard, should be careful not to use cold water to any great extent in bathing; it may have a temporary beneficial effect, but in the end their sufferings will be likely to be increased.

8. Feeble invalids, consumptives, persons subject to hemorrhage of the lungs or the stomach, those who have just passed the crisis in fevers or other acute diseases, those suffering from profuse discharges, such as suppurations, diarrhea, cholera, etc., and also females during the menstrual period should avoid the use of cold water, as well as the excessive use of it in any form.

9. Always use a thermometer to determine the temperature of baths for invalids.

10. An invalid should not bathe in a room with the temperature below 70°, and for most persons 80° or 85° would be better, provided there is good ventilation.—*E. P. Miller, M. D.*

Substitute for Copper in the Daniells Battery.

Few persons, in experimenting upon voltaic combinations, ever consider economy in their construction, and experiments which tend to cheapen their first cost should be made public.

An expensive part of the Daniells battery is the copper plate, the cost of which can be reduced two thirds, in the following manner:

Procure sheets of the ordinary sheet tin of commerce, brighten and plunge into a very weak copper plating solution, in connection with a voltaic battery of very low quantity. In fifteen to eighteen hours a tenacious film of copper will have been deposited upon the tin, and the plate can then be bent in shape suitable for a Daniells battery.—*Telegraph.*

Copal Varnish, according to Professor Böttger's prescription, should be made by first dissolving one part, by weight, of camphor, in twelve parts of ether; when the camphor is dissolved, four parts of the best copal resin, previously reduced to an impalpable powder, are added to the ethereal camphor solution, placed in a well-stoppered bottle. As soon as the copal appears to be partly dissolved, and has become swollen, four parts of strong alcohol, or methylated spirits, and ¼ part of oil of turpentine is added, and, after shaking the mixture, and letting it stand for a few hours longer, a thoroughly good copal varnish is obtained.

ROCKWELL'S OVERDRAW AND COMPRESSION BIT.

Anything that tends to render the horse more docile, or what is still more important, tends to instruct the public in common sense and humane treatment of that noble animal is worthy the consideration of all intelligent men. The inventor of the improvement we are about to describe, A. H. Rockwell, Harpersville, Broome Co., N. Y., is well known to the public through his work on horse training and personal skill in instructing the horse. The improvement is designed to take the place of the Yankee bridle with its double ring bit, patented by the same inventor December 4, 1866; the double ring bit was patented November 12, 1867, and the further improvements described in this sketch are now pending.

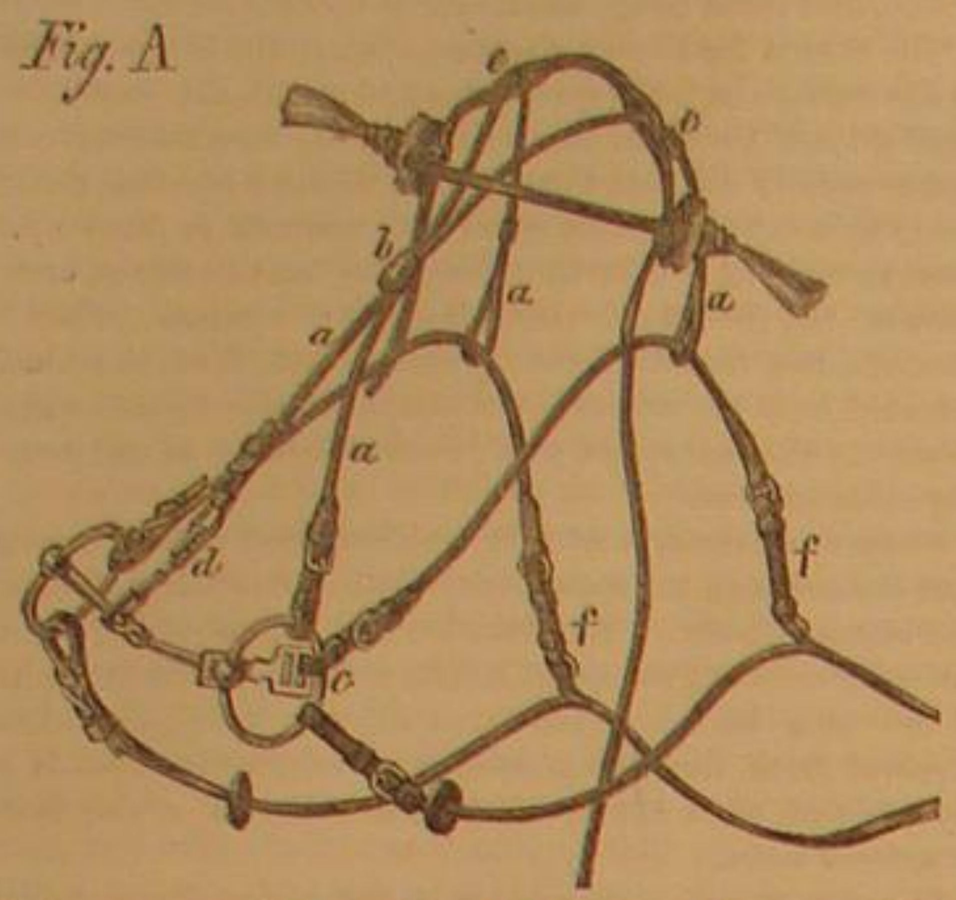


Fig. A

It is considered by the inventor to be a greater advance on the Yankee bridle than that was over the ordinary bridle in breaking and instructing the horse.

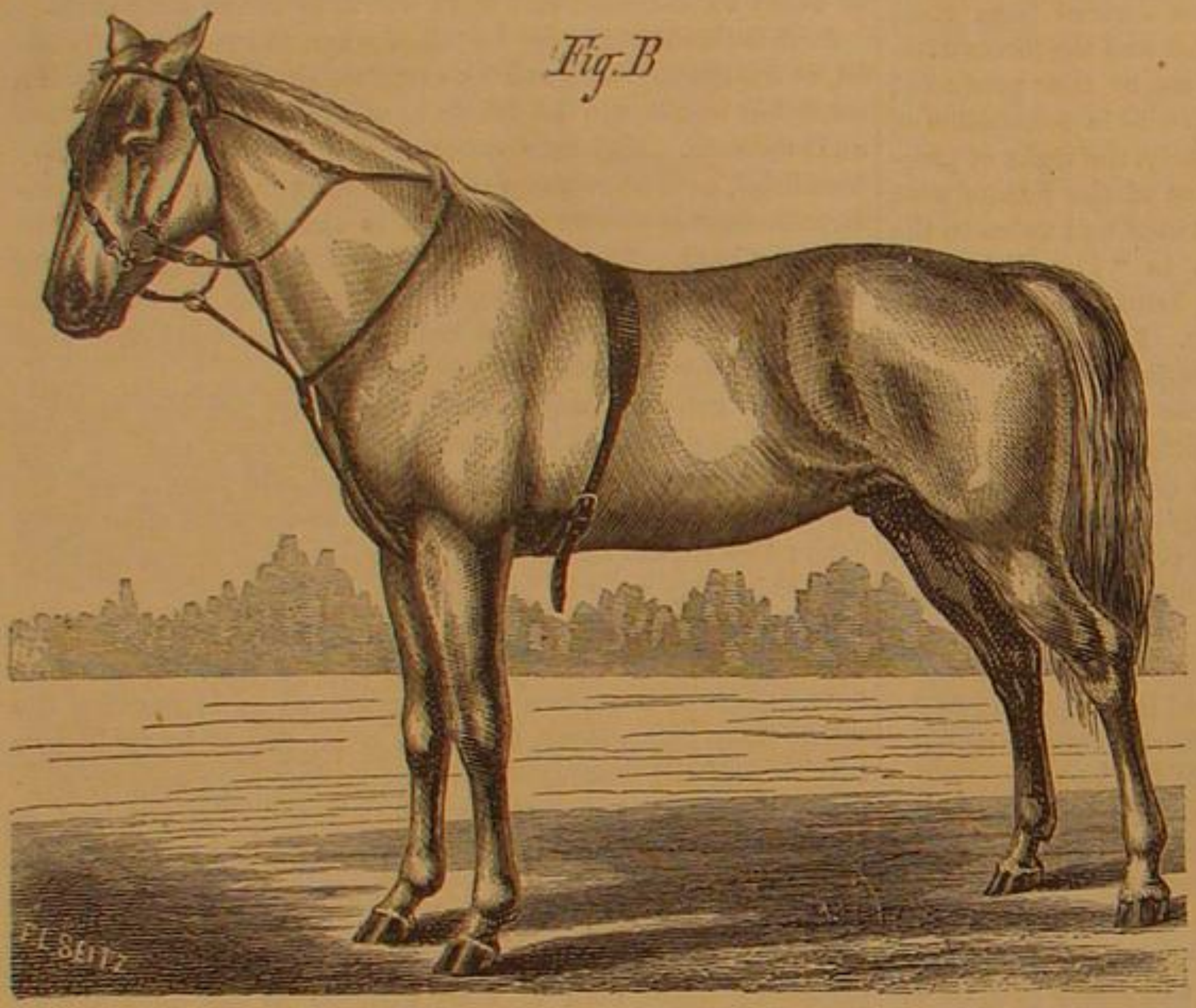


Fig. B


Fig. C

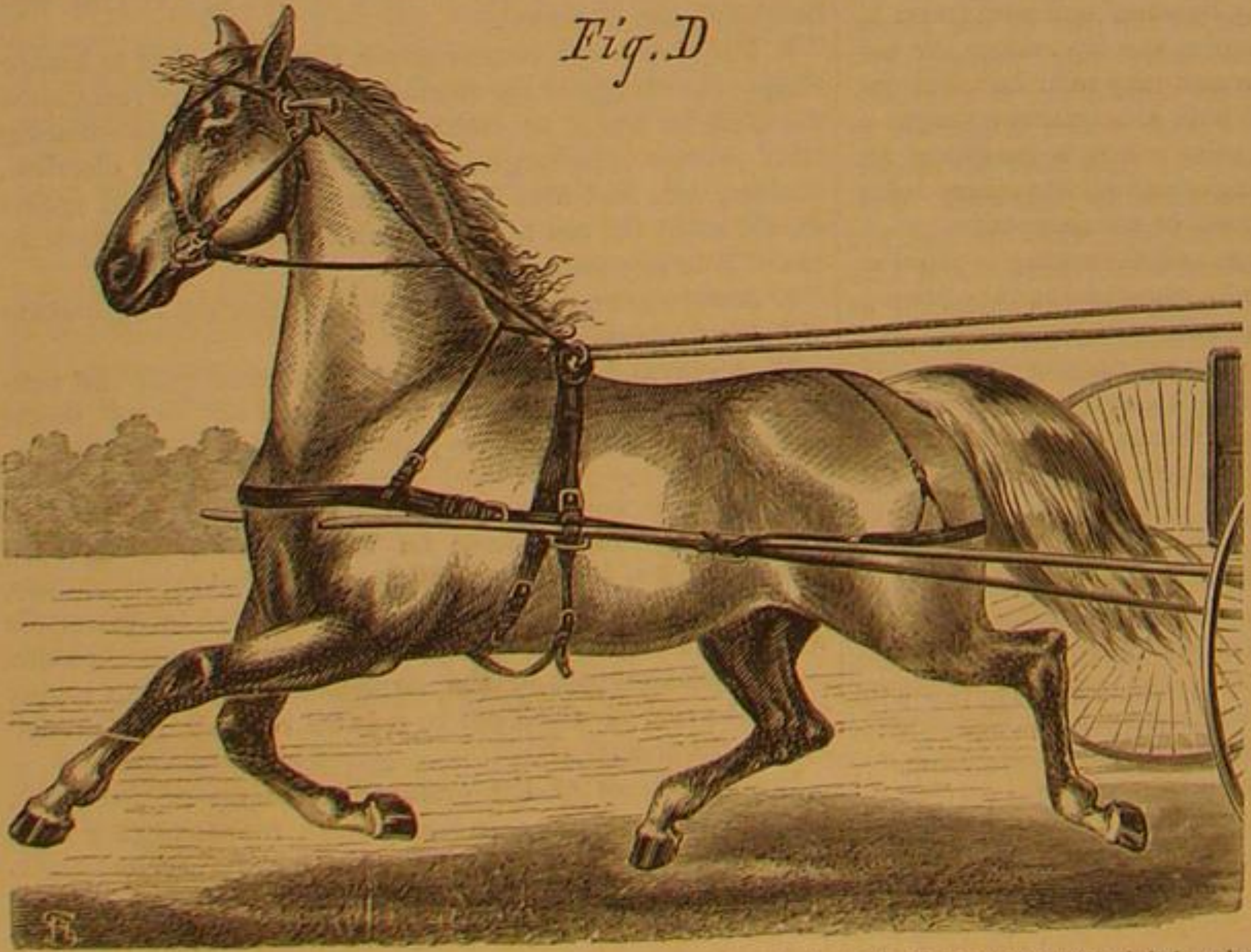


Fig. D

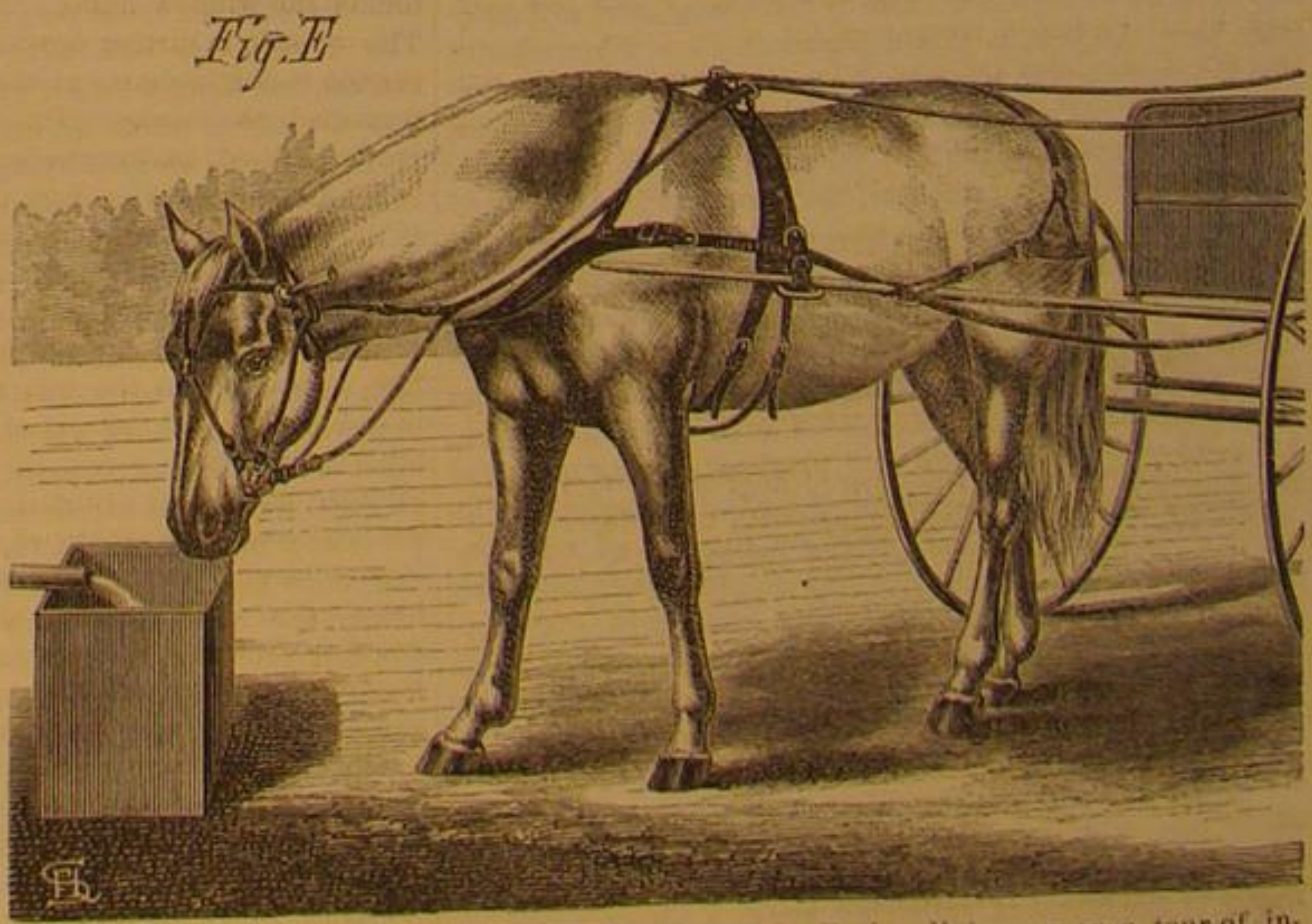


Fig. E

The principle of this improvement will be understood by reference to Fig. A. The mode of applying the bridle and bit to the training of horses will be understood by referring to the other engravings and their explanations.

Fig. A represents a skeleton bridle, with the improvements attached. The chief advantage which this bridle has over other bridles known is owing to the remarkable results which follow the application of the overdraw and compression bit in their various uses.

The overdraw is formed of two round straps, with a buckle and billet as represented by *a a* at the left of the figure, terminating in the two loops at the other ends, *a a*, at the right of the figure. Each of the straps, when buckled, to be two feet and two inches in length. A tight sliding loop, *b*, connects the straps. This loop should be stitched between the two straps so as to work snugly. A sliding knob is snugly attached to each strap, above the loop. The compression bit is a joint bit in the usual form, except that it is double jointed, with the two sliding bars, *c* and *d*. The figure represents two modes of attaching these sliding bars, which are hereafter explained.

The bridle is formed of a crown piece and throat latch of one piece of leather, lined over the head with patent leather. Two loops are placed on top of the crown piece, three inches apart, *e e*; the fore piece to be of the usual length; rosettes may be added to suit fancy; throat latch of usual length; the loops of the overdraw and the knobs are put through the loops on the crown piece, from front to back, the rest of the overdraw coming down over the face and being attached to the bit. It is attached in various ways, according to the end desired to be attained; but for the ordinary purposes of a riding or driving bridle, it is buckled to the ring of the bit. The remainder of the bridle consists of an ordinary driving line buckled to the ring of the bit, and an ordinary check rein, buckled to the ring of the bit and the sliding bar jointly (see *c*), passing through the loop of the overdraw, *a*, as through a gag runner; on the driving line, two inches farther back than the length of the check-rein, there is fastened a strap about four inches in length when doubled (*f f*) arranged the same as the flat part of a check-rein, capable of being adjusted, which strap is connected with a ring on the end of the check-rein.

For a Saddle Horse.—This is put on as just described, with the addition of a martingale when the horse carries his head too high and his nose out too much. The illustration, figure B, exhibits a horse bridled ready for mounting, and figure C shows the horse mounted and lines drawn up. These two illustrations have the overdraw buckled to the sliding bars, as shown by the letter *d*, Fig. A. This is proper where the horse pulls too hard or refuses to rein; but ordinarily it should be attached as shownby Figs. D and E.

For a Driving Horse.—There is no change from the bridle as applied to a saddle horse (when an open bridle is desired), except in the mode of attaching the check-rein to the driving line, as the adjustable knobs on the overdraw hold the bit in the mouth and avoid the necessity for a check piece.

The driving line being usually rounded, a strap is made to lap around—drawn so tightly that it cannot slip—at the place where the check-rein is attached to the main driving line, as heretofore described. The overdraw may be attached to a common driving bridle if desired. In this case, the knobs will not be necessary, as the cheek piece answers the purpose for which they are intended. The advantages are manifold. While sitting in a carriage, the driver may, by drawing up the lines, have all the benefits of a check in adding style (see Fig. D) without any of its cruelty, as he can, by letting up on the lines while the animal is traveling, entirely relieve him from its pressure. He can also water the horse at a trough (see Fig. E) without removing from his seat. The horse's back is not galled, he travels freer, rests better when not in motion, mounts a hill much easier, and is held up descending a hill with more security; his head is kept up while standing, if desired, by fastening the lines to the whip, dashboard, or a hook in the buggy-top. Horses driven with this overdraw and bit will travel more miles in a day and last longer than by the use of any other contrivance known. If the horse is a hard puller, the overdraw is attached to the sliding bars independent of the bit rings, as in Figs. B and C. This creates a pressure upon the cheek which soon causes him to be more pliable. If he is a side-reiner, attach the end of the overdraw on the side toward which he turns his head to the detached sliding bar, leaving the other attached to the ring, exactly as shown in Fig. A. By sliding the front loop on the overdraw, up or down, the effectiveness of these appliances, is increased or lessened when operating upon the sliding bar detached from the check-rein and bit ring. If a horse carries his head lower than his mate, and it is wished to cause him to raise it, the overdraw is applied to the common bridle, in lieu of the usual gag runner; if a trotting horse throws his head down while speeding, use the overdraw, and check high. If the driver wishes to drive without a check-rein, and wants the advantage of the compression bit, he makes what is called a half-overdraw, by fastening a short overdraw to the head piece, instead of passing it through the loops; then, by sliding the front loop up or down, he can regulate its force. Governing the mouth is the main thing. This attachment will do it by the use of a reasonable degree of judgment. We have room to explain here only a small portion of the benefits to be derived from the use of these improvements. A careful study of their applications will, by a fair exercise of patience and common sense, prove invaluable to those interested in the improvement and instruction of the horse.

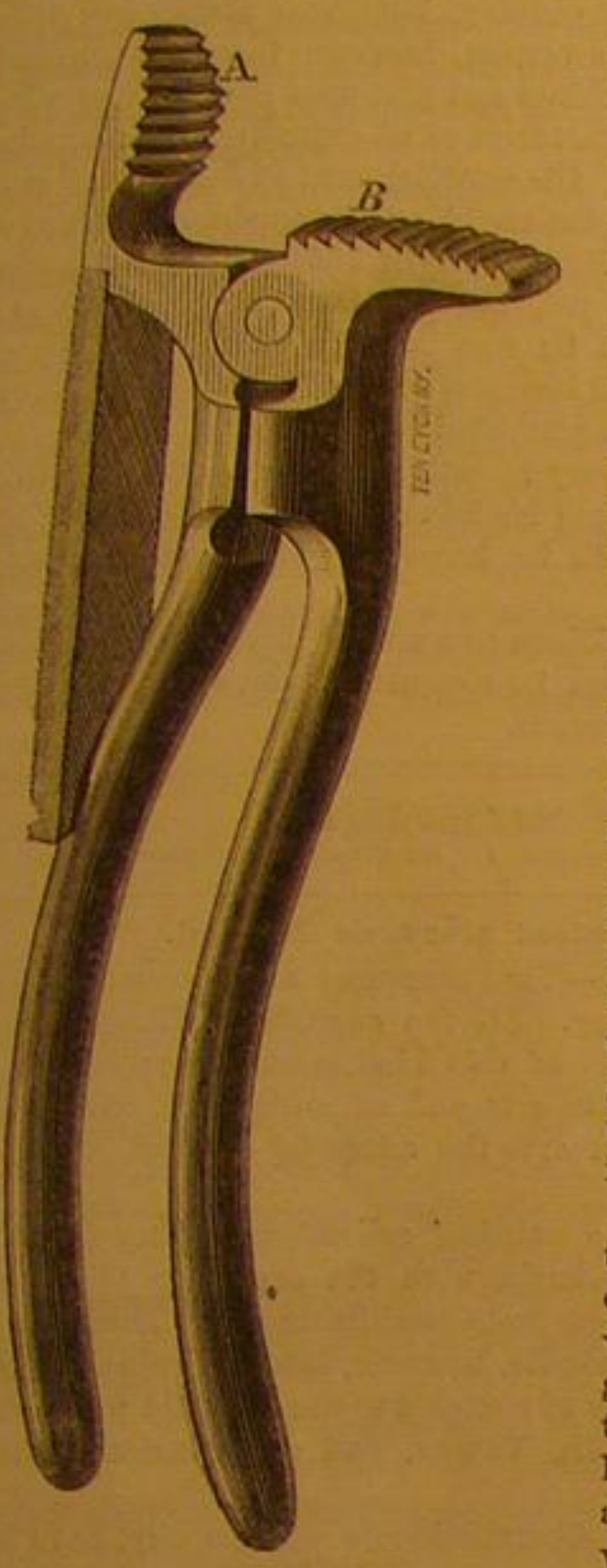
Patents for additional improvements are now pending through this office. Mr. Rockwell is now on a tour of instruction in the New England States, but orders addressed to him, at Harpersville, N. Y., as above, will receive attention.

We learn that a considerable quantity of land near Fond du Lac, Wisconsin, has been devoted this year to the cultivation of the sugar beet, and that a company is in process of formation to engage in the manufacture of beet sugar in that town.

An enterprising Chinese firm has established a publishing house and type foundery at Shanghai.

IMPROVED HORSESHOE CLINCHER.

In clinching the nails in ordinary horse shoeing four tools are commonly used; viz., a pair of nippers to cut the nail to the proper length for a good clinch, a rasp, an iron to hold the nail from being driven back, and a hammer by which the nail is bent over and clinched. Most horses will endure the hammering upon the bottom of the foot in inserting the nail, but are uneasy and at times fractious from the greater or less pain suffered when the side of the hoof is struck in clinching.



A method which should obviate this trouble particularly in shoeing unquiet horses, mules, and colts, has long been desired by blacksmiths and others, who have come to the rational conclusion, that any unnecessary pain inflicted upon the horse is to cause in him fear and mistrust, and foster any germs of mischief that naturally exist in his disposition.

The inventor of the horseshoe clincher, of which we this week give an engraving, is confident that the instrument he has devised exactly meets the want, we have alluded to. It is a combined nippers, rasp and clincher, all of which parts are shown in the engraving, and the use of which will be obvious without description, except the jaws, A and B, used for clinching. In use, after the nail has been driven by a hammer in the ordinary way, the jaw, A, is placed upon the head of the nail, and the other jaw is brought up to engage with the end of the nail remote from the head, when a few motions of the handle which works the jaw, B, quietly and securely clinches the nail without any pain to the horse or inconvenience to the smith.

This tool will be likely to not only attract the attention of farmers, but those who in traveling across our western plains and other out of the way places, frequently find it necessary to have at hand the means of fastening a shoe or replacing a lost one.

Patented through the Scientific American Patent Agency, June 8, 1869, by Nicholas Repp, whom address for information at Waterloo, Iowa.

ADJUSTABLE SPIRIT LEVEL PLUMB AND INCLINOMETER.

This instrument, invented by L. L. Davis, takes the place of the old-fashioned spirit level and plumb, which has been used by all classes of mechanics for many years. The advantage of this level and plumb is in the accuracy and simplicity by which it works, having a graduated scale showing the different angles, being conveniently and neatly arranged for getting elevation of any hight, the graduated scale show-

ing the exact elevation or number of degrees per foot, simply by turning the center or bubble case with the pointer attached, the bubble glass being well and substantially protected, not liable to breakage or derangement as is the case with the ordinary levels; and in case the bubble glass should become out of true or out of line with the base of the level it can be accurately adjusted again by the screw at either end of the bubble case, which screws, in connection with beveled studs, also act as stops. If the bubble case should accidentally be broken, the bubble case and ring can be readily removed by taking off the graduated dial; first, turn out the three small screws which hold it in place, the ring can then be detached from the bubble case by removing the screw which holds the two together, and the bubble case will then be exposed.

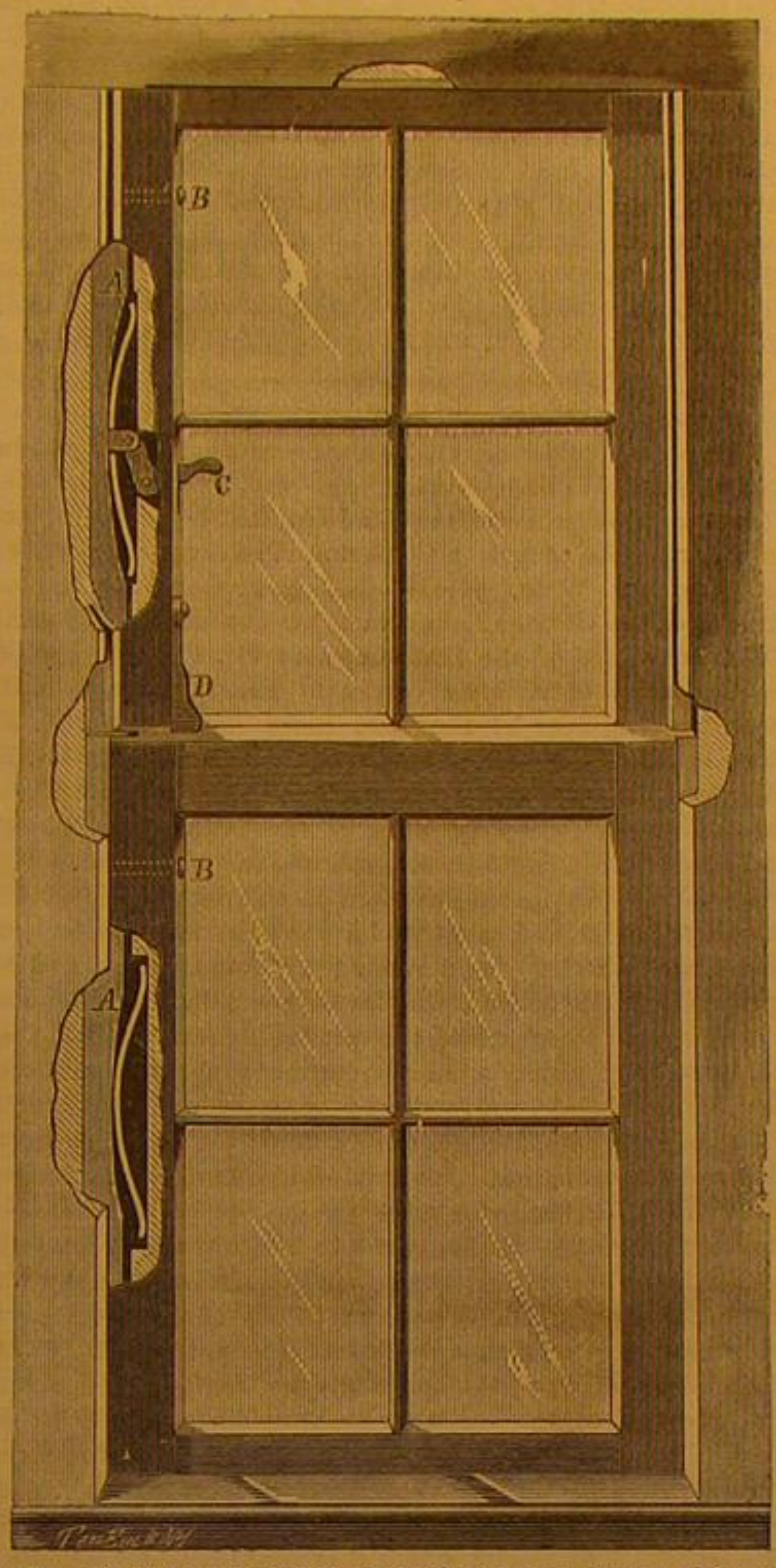
These levels are of the best material and workmanship, and are thoroughly adjusted and tested in every respect. They have been pronounced to be perfectly accurate, and are offered to the public with the assurance that they meet the wants of all classes of mechanics.

Address all orders to J. W. Storrs & Co., 252 Broadway, New York city.

IMPROVEMENT IN WINDOW SASHES.

Our engraving illustrates a very simple device designed to take the place of weights, cords, and pulleys, for window sashes.

The right side of the sash is tongued to fit into a rebate in the frame. On the left hand side a rebate is cut into both the frame and sash in which plays an adjustable tongue, A. This adjustable tongue, also plays on a horizontal pin, B, inserted in the sash so that it slides up and down with the sash.



The adjustable tongue is pressed outward by an elliptical spring as shown in the engraving where a portion of the sash is broken away to afford a view of this portion of the device. The lateral thrust of the adjustable tongue caused by the action at the spring generates sufficient friction to hold the sash in any position. The adjustable tongue is slightly concave at the point where it comes in contact with the spring to give the latter free action, and the sash has a recess which keeps the spring in its proper relative position to the other parts.

When the sash is to be removed, the pin, B, is withdrawn when the adjustable tongue may be seized and withdrawn by sliding the bottom sash to the top, or the top sash to the bottom of the window frame. The sash may then be taken out. The top sash is further provided with a permanent tongue at the top which is shown at the point where a portion of the frame is broken away. This tongue and all the others being properly fitted, answer the purposes of weather strips.

When the sashes are very large and the spring is required to be more than ordinarily strong, an angular thumb-piece, C, is pivoted to the sash, which when depressed takes off a portion of the power of the spring, and thus lessening the friction to any extent required, leaves only the weight of the sash to be overcome in raising it. On small windows this attachment is needless.

There are several advantages which this method possesses over those hitherto employed for raising and lowering sashes. It is not liable to the annoyances frequently caused by the breaking of cords where weights are used. No additional strips are used to exclude currents of cold air; and much less trouble is experienced in removing a sash for cleaning or other purposes. The sash cannot drop suddenly, remaining firmly suspended at any hight to which it is elevated. A sash lock, D, of the simple button form shown in the engraving, or nearly any other form applicable to sashes in general may be used.

Patented May 25, 1868. For further information address Gross, Yingling, & Co., Tiffin, Ohio.

Bridging the Connecticut.

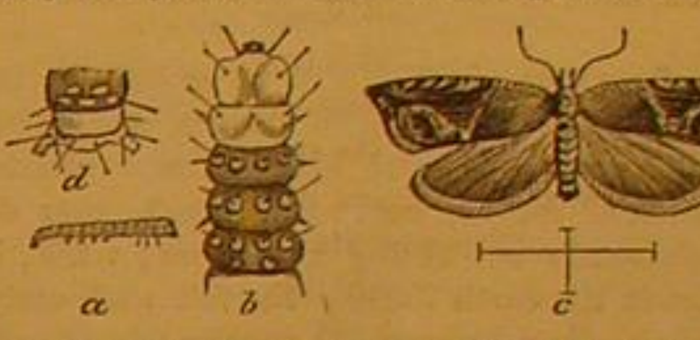
The Board of Engineers, consisting of General C. B. Stuart General George B. McClellan, and General Q. A. Gillmore, appointed to select a plan for a bridge across the Connecticut River at Middletown, for the "Air-line" railroad between New York and Boston, and to designate the point at which it shall be built, recently met at the office of the Chief Engineer of the Air Line, No. 64 Broadway. The session was not a public one. The Board occupied the entire day in examining and discussing plans for the proposed bridge, and adjourned without taking final action, in order to visit the workshops where structures of the kind are made, and to examine some of the large iron draws now in use.

The bridge is to be of wrought iron, and will be 1,248 feet long, with a draw of two openings of 160 feet each. The whole draw is to be 303 feet long, and is to open and shut in one minute and thirty seconds. The track is to be about 42 feet above ordinary water mark. The hight of the truss is to be 20 feet. The bridge is to have a strength equal to two tuns to the running foot, beside its own weight, and is to be capable of sustaining a train of locomotives passing over it at the rate of sixty miles an hour. It will be the strongest bridge on the continent. The name of the new railroad of which this bridge is a part, is the New Haven, Middletown, and Willimantic Railroad, which together with the New York and New Haven Railroad, and the Boston, Hartford, and Erie Railroad which it connects, will constitute what is known as the "Air-line" Railroad, running in a pretty straight line from this city to Boston. By this route a distance of nearly thirty miles will be saved and the time of transit will be shortened by an hour and a quarter. The road will be opened within a year; the bridge is to be completed in eight or nine months.

About forty different plans for the proposed bridge have been submitted to the board of Engineers, and of these eight or nine have been found to be worthy of serious consideration. The result of the deliberations of the Board will soon be made public.

Strawberry Worms.

For nearly two years, we have been acquainted with a little



greenish leaf-roller, shown above,—the strawberry leaf-roller (*Anchylopera fragariæ*, N. Sp.)—measuring about one third of an inch, which in certain parts of North Illinois and Indiana, has been ruining the strawberry fields in a most wholesale manner; and which also occurs in Canada. It crumples and folds the leaves, feeding on their pulpy substance, and causing them to appear dry and seared, and most usually lines the inside of the fold with silk. There are two broods of this leaf-roller during the year, and the worms of the first brood, which appear during the month of June, change to the pupa state within the rolled-up leaf, and become minute reddish brown moths during the fore part of July. After pairing in the usual manner, the females deposit their eggs on the plants, from which eggs in due time, hatches a second brood of worms. These last come to their growth toward the end of September, and, changing to pupæ, pass the winter in that state.

Mr. W. E. Lukens, of Sterling, Whiteside Co., Ill., remarks: "Where these insects are thick I would never think of raising strawberries. It is strange I have not noticed any of them work upon this side the river; while on the south side for a mile up and down they are ruining the crops of berries. Removing the plants does not take with them the moth or the eggs, so far as has been observed. A gentleman by the name of Kimball, at Prophetstown, had his crop a few years ago entirely destroyed by this insect, though it amounted in all to two or three acres. I hear of a great many men in other places having their crops burnt up with the sun, and have no doubt that it was this leaf roller, and not the sun, that was the real author of the damage As for myself, I have on this account entirely quit the business of growing strawberries."

The only modes of fighting this new and very destructive foe of the strawberry—which however seems to be confined to northerly regions—are, 1st, to plough up either in the spring or in the fall, such patches as are badly infested by it, by which means the pupæ will probably be destroyed; and 2d, not to procure any plants from an infested region, so as to run the risk of introducing the plague upon your own farm

The strawberry false worm (*Emphytus maculatus*, Norton) is a worm quite different in appearance and belonging to the order of four-winged flies (*Hymenoptera*), and not to that of the scaly-winged moths and butterflies (*Lepidoptera*), as does the preceding species. It is a soft, dirty-yellow 22-footed worm, that feeds externally on the leaf of the strawberry, and is illustrated in all its stages in the above figure.

The parent flies may be seen hanging to and flying around strawberry vines about the beginning of May. They are dull and inactive in the cool of the morning and evening, and at these hours are seldom noticed. They are of a pitchy black color with two rows of large transverse, dull whitish spots upon the abdomen. The female, with the saw-like instrument peculiar to the insects of the great family (*Tenthred* *inidæ*), to which she belongs, deposits her eggs, by a most curious and interesting process, in the stems of the plant, clinging the while to the hairy substance with which these stems are covered. The eggs are white, opaque, and 0·03 of an inch long, and may be readily perceived upon splitting the stalk, though the outside orifice at which they were introduced is scarcely visible. They soon increase somewhat in bulk, causing a swelling of the stalk, and hatch in two weeks—more or less according to the temperature—and from the middle of May to the beginning of June the worms attract attention by the innumerable small holes which they make in the leaves. The colors of these worms are dirty yellow and gray green, and when not feeding, they rest on the under side of the leaf, curled up in a spiral manner, the tail occupying the center, and fall to the ground at the slightest disturbance. After changing their skin four times they become full grown, when they measure about ⅘ of an inch.

At this season they descend into the ground, and form a very weak cocoon of earth, the inside being made smooth by a sort of gum. In this they soon change to pupæ, from which are produced a second brood of flies by the end of June and beginning of July. Under the influence of July weather, the whole progress of egg-depositing, etc., is rapidly repeated, and the second brood of worms descend into the earth, during the fore part of August, and form their cocoons, in which they remain in the caterpillar state, through the fall, winter, and early spring months, until the middle of April following, when they become pupæ and flies again as related. This fly has received the name of *Emphytus maculatus* by Norton, in allusion, doubtless, to the whitish transverse lines on the abdomen.

With the facts here given, it will be no difficult matter for any one interested to make war in his own way. The worm's habit of falling to the ground enables us to destroy them with a solution of cresylic acid soap, or any other decoction, without necessarily sprinkling the vines; while, knowing that they are in the earth during the fall and early spring, when there is no fruit, the ground may be stirred and poultry turned in to good advantage.—*Entomologist.*

Association for the Advancement of Science and Art—The Bathometer.

The regular meeting of the Association for the Advancement of Science and Art was held at room No. 18, Cooper Institute, New York.

Dr. S. I. Prime, the chairman, said that the Association had been in existence now several years, and had a membership of 200 or 300 members. It had done much toward increasing the general knowledge on scientific subjects, and to quicken the pursuit of scientific truth. The lectures of Dr. Lemercier and Agassiz had been delivered under the auspices of the Society. He earnestly invited all strangers who were present to join the Association. Dr. Prime spoke in terms of eulogy of the successful efforts of American inventors, and introduced Mr. Sidney E. Morse, formerly editor of the New York *Observer*, and his son, G. Livingston Morse. The latter exhibited and explained their bathometer, or apparatus for measuring the greatest depths of the ocean without the use of a line, and, it is claimed, in less than a tenth part of the time required when a line is used. The instrument admits of a combination in one sounding of three or more distinct methods of ascertaining and measuring these depths. The discovery of the Messrs. Morse was that of the means of making a buoy which will retain its buoyancy under the enormous pressure of the deep sea. They took a hollow glass sphere between three and four inches in diameter, the glass only a tenth of an inch thick, and the sphere so light that it floated in water with half its bulk above the surface, and subjecting this fragile body in the cistern of an hydraulic press to a pressure of seven tuns on the square inch, which is the pressure at the depth of about 30,000 feet in the ocean, they found that the sphere was neither chrushed or permeated by the liquid. A tin or wooden tube, four inches or more in diameter and of any required length, is filled with these glass spheres and ballasted so that it will float upright in the water. An elongated sinker also of any required length and weight, is then suspended from the bottom of the tube, and so attached there that it becomes detached when the weight touches, or if desired, when it is 100 feet, or any required distance from the bottom, leaving the tube with its spheres to ascend to the surface. As this instrument moves with uniform velocity both in its descent and ascent, the time of its disappearence from the surface indicates the depth to which it has descended. But the inventors do not confine themselves to this mode of determining the depth. They inclose in their tube, and send down and bring back with it their proper bathometer, which is simply a bottle of water with a bag of mercury and water suspended from its neck, the water in the bottle being connected with the mercury in the bag by a glass tube, of very fine bore, passing from the bottom of the bag through an India-rubber stopper in the neck of the bottle into its interior. When this bottle and bag are placed at the bottom of the sea, the pressure of the external water, communicated through the bag and through the mercury in the bag and glass tube to the water in the bottle, compresses that water, and mercury is forced from the bag into the bottle to supply the void caused by the compression. The amount of the mercury; forced into the bottle is the measure of the compression of the water, and the compression of the water is the measure of the hight of the compressing column, *i. e.*, of the depth of the sea. To facilitate the measuring of the mercury, there is inserted in the bottle opposite the neck, a graduated tube of even bore closed at its outer end, so that on inverting the bottle the mercury falls into this meter-tube, and the hight of the mercury indicates the depth to which the bottle has descended.

All attempts to measure the deep sea with a line and sinker attached as in ordinary soundings, have proved failures, and scientific men of the highest reputation, who have devoted much time to the investigation of the problem, have pronounced it impossible ever to send and recover a line with a sinker from the greatest depths of the ocean. Even in moderate depths the measurement by a line is very uncertain and unreliable in consequence of the effect of currents, and of the drifting of the boat from which the soundings are made. The bathometer of the Messrs. Morse, it is asserted, will descend to, and return from, the greatest depths with certainty, and with a rapidity which hardly admits of a limit. In a recent experiment the instrument rose from the bottom at the rate of twenty feet in a second, or of a mile in less than four minutes and a half. They believe that a sounding in 2,000 fathoms water will ultimately be made easily in less than fifteen minutes. The time occupied in a sounding of this depth by those employed by the United States Government in sounding between Ireland and Newfoundland, preparatory to lying the Atlantic cable, was ordinarily six or seven hours.

American Society of Civil Engineers.

This society held its annual meeting on the 16th ult., at its rooms, No. 63 William street.

Among those present were Mr. John B. Jervis, the oldest engineer in the country; Colonel J. W. Adams, engineer of the Brooklyn Water Works; Mr. E. S. Chesbrough, constructor of the Chicago Lake and River Tunnels; Mr. Thomas Fuller, architect of the State Capitol; Mr. Thomas Prosser, representative of Krupp's Works in Prussia; Mr. John A. Roebling, engineer of the East River Bridge; Mr. R. N. Browne, chief engineer of the Lake Shore Railroad; Mr. S. Whipple, the well-known constructor of iron bridges; General G. S. Greene, chief engineer of the Croton Department, and Israel Smith, engineer of the New Jersey Railroad.

Hon. J. W. McAlpine, President of the Society, called the meeting to order, and said that he was glad to be able to report that the Society is increasing both in numbers and respectability. He spoke of the importance of an exchange of ideas between members of the profession, and hoped that hereafter more papers would be presented for the consideration of the Society. A fund was being formed for the publication of such papers as might be deemed worthy of preservation and dissemination. He then introduced to the Society Mr. John B. Jervis, who gave an outline of the course of studies requisite for the engineer, in which the importance of a knowledge of mathematics and mechanical philosophy was especially dwelt upon. The careful study of structures erected by eminent engineers and of the special purposes they were intended to serve was inculcated. Mr. Jervis also spoke of the necessity of the engineer making his structure stable, especially when exposed to such deteriorative influences as surf and running water. Whether iron, stone, or wood must be used, would be determined by the relative cost of these articles and the facility with which they could be obtained. Railways now offered the largest amount of work for engineers; but as the country increased in population, structures of greater and still greater extent and difficulty of construction would be required. There appeared to be no stopping place for the engineer. He referred to the present defective condition of our railways, which he attributed to engineers being employed simply to lay out the line of the road, and to the details being supplied by mechanics. A great deal had been said about steel rails. There are, however, other and more important improvements to be considered. How is it that the great New York Central, that makes sufficient profit to pay dividends of eighty per cent, does not raise its road bed above the flood? It was disgraceful that this road should be compelled to stop its traffic occasionally because its road bed was under water.

Mr. Thomas C. Clark then read a paper on "The Strength of Iron Bridges and the Minimum Weight they should be required to support," and suggested that a committee should be appointed to investigate and report on the matter.

Mr. Martin Cor read an interesting paper on "The Construction of Bridge Foundations."

Mr. J. M. Clarke followed in a paper on laying out railway turnouts by the simple inspection of tables prepared for the purpose.

Mr. Arthur Beckwith read a paper on the composition of ancient cements.

The meeting soon afterward adjourned.

Death of a well-known Inventor.

We regret to notice the death of Joseph Dixon, of Jersey City, one of the most ingenious men of our time. Mr. Dixon was born in Marblehead, Mass., January 19, 1799. He made a machine to cut files before he attained his majority, learned the printer's trade, afterward that of wood engraving, then lithography, and afterward studied medicine, and in that connection became interested in chemistry, becoming finally one of the most accomplished and comprehensive chemists in the country. He was a thorough optician, and had no equal in his knowledge of photography. He took up the experiments of Daguerre in 1839, and was probably the first person to take a portrait by the camera. He showed Prof. Morse how to take portraits by means of a reflector, so that the subjects should not appear reversed. Morse tried to get the plan patented in Europe. Mr. Dixon built the first locomotive, with wooden wheels, but with the same double crank now used. He originated the process of photo-lithography, and published it years before it was believed to be useful. By his process of transferring, the old bank notes were easily counterfeited, and it was to guard against the abuse of his own process that he brought out the system of printing in colors on the bills, and had the method patented, but never received any benefit from the patent, all the banks having used it without pay. He perfected the system of making collodion for the photographers, and assisted Mr. Harrison in getting a true system for grinding the lenses for camera tubes.

He is said to have originated the well-known Babbitt antifriction metal, and to have been the father of the steel melting business in this country, but these claims rest upon a doubtful basis. It is certain, however, that he originated a vast number of machines and processes; but he was widely known among manufacturers as an extensive manufacturer of plumbago crucibles. His establishment at Jersey City is the largest of its kind in the world, and its productions received a medal at the Paris Exposition in 1867. He was singularly self-reliant, and was untiring in all that he undertook to do. For many years past he was intently engaged in the construction of a musical instrument that he called the "orchestrion," which he was permitted to see perfected.

Mr. Dixon had a very retentive memory, and during his leisure hours had stored his mind with a vast amount of practical knowledge which he knew how to impart in an attractive manner.

We recognise Mr. Dixon as a steady friend of the SCIENTIFIC AMERICAN from its commencement, and an occasional contributor to its columns.

Correspondence.

The Editors are no responsible for the Opinions expressed by their Correspondents.

Botanical Gardens Needed.

MESSRS. EDITORS:—That museums are successful institutions no one will deny. All the capitals of Europe possess public establishments of this kind, containing collections of natural history, of fine arts, and of antiquities, which are of great value and interest to the scientific student, the artist, and the architect.

In this country the existing collections belong to private societies or to individuals, with the exception of some few attached to colleges or State establishments. The most considerable of these dwindle, however, into insignificance when compared in richness of contents to the splendid museums of London, Paris, Berlin, Vienna, and other cities of the old world.

The Central Park Commissioners of this city, have lately determined to erect a museum at the Park complementary to the nucleus of a menagerie which exists there already. I approve of the plan, although I doubt if the amount of money to be expended will enable them to make many acquisitions of really intrinsic value, beyond the purchase of a class of objects (such as attracted the curiosity of the gaping multitude at Barnum's), which will really teach them nothing.

Now, Messrs. Editors, I take the liberty of making a suggestion: Would it not be better that the money to be expended for a museum in this city, which may be the laughing stock of foreigners, should be employed in the construction of a model botanical garden, with accessory green and hot houses, and an aquarium large enough for the cultivation of the giant water lilly, the *Victoria Regina*?

Scarcely a city in Europe of five thousand inhabitants, is without a botanical garden which is the pride of its inhabitants. In such a garden the young physician learns to know the living plants which produce the roots, barks, seeds, and flowers which he prescribes in various shapes to his patients; the druggist studies how to recognize the genuine from the counterfeit among the vegetable substances in which he deals; the horticulturist and the gardener are taught how to graft, how to bud, and how to produce variation and hybridation among the choicer varieties of plants; the agriculturist chooses for himself among many varieties of produce, such as are really the most prolific, without having to depend upon buncombe advertisements.

The student also here finds recreation of the healthiest sort in the study of botany, which is one of the most attractive branches of natural science, and the ladies can stroll and loiter with delight amid parterres of highly-scented plants, and may teach their children not to handle or to trifle with such vegetable species as are labeled "dangerous," "acrid," "poisonous," "stinging," "fœtid," etc.

A botanical garden is the grand *rendezvous* of innocence and taste, and it is more agreeable to gaze on beds of pretty flowers nodding their heads to every passing breeze, than to watch the evolutions of lascivious apes, to see boa constrictors devouring their innocent living prey, to learn how to eat from hungry lions, tigers, or hyenas, or to breathe the effluvia always attendant on captive animals.

The suggestion I here make is not simply destined for New York, but ought to be acted on in every city throughout the land. America ought to rank foremost as regards her horticultural, pomological, and agricultural productions.

Competition and rivalry between cities at the public shows would soon bring about the desired result, and lead to a taste for pursuits conducive to health of mind and of body.

With a good scientific gardener as a manager, such an establishment would soon be not only self-supporting, but ought to realize a large income by sales, which would allow of further extensions and of new acquisitions. Seeds and plants of all kinds can be obtained from botanical gardens in Europe for kindred establishments at a nominal cost, and exchanges are always freely and liberally made by them.

Should you think, Messrs. Editors, the subject of sufficient interest for further elucidation, I should be very happy to furnish the SCIENTIFIC AMERICAN with a sketch of the best plan of laying out and organizing a botanical garden, as has been done in some of the European cities. BOTANICUS.

New York city.

[We concur with our correspondent in the importance of establishing at the Central Park a first-class botanical garden, and we have no doubt that in the progress of time such will be the result, but we cannot concur in the suggestion that a zoological garden should not also be established. All the chief European cities have both, and we expect that New York will some day be favored with something like the *Jardin des Plantes*, of Paris, which not only combines horticulture and zoology, but has also valuable museums of botany, geology, and anatomy, and a school where the natural sciences are taught with a high degree of perfection. With regard to a plan for a garden our correspondent had better see the Central Park Commissioners.

Information Wanted.

MESSRS. EDITORS:—An immense number of intelligent persons in our country are now directing their attention to the production of valuable inventions; some for fame, but, it is reasonably to be supposed, the large majority for profit. Now what is wanted to know, especially by the latter class, is, What is needed? Inventors often waste much valuable time at churns and washing machines, who might produce a much-needed, valuable improvement.

Will you, Messrs. Editors, say what is called for urgently, and will your many readers, professional men, mechanics, or "any other man," do the same through the SCIENTIFIC AMERICAN? E. G. B.

Washington, D. C.

[This subject opens up a very broad field of inquiry, and affects almost every branch of our growing industries. We cannot specify any one article that is especially needed, but it is safe to say that more economical machines and processes are wanted in almost every department of manufacturing. The high price of labor at the present time renders it necessary that this labor should be supplemented by improved machines and processes to enable our manufacturers to produce articles more cheaply than is possible at the present time. The field for improvement is usually more general than specific, but with a view to meet the inquiry of our correspondent, we invite suggestions from others. Our columns are always open to make known the wants of manufacturers in the direction indicated.—EDS.

The Poppy in Texas.

MESSRS. EDITORS:—The frequent mention of the poppy in the recent numbers of your paper, and of the possibility of its successful cultivation in America, reminds me of the acres of this flower that I have seen growing wild in Texas. In portions of Texas, at this season of the year, you will see whole acres covered with the white poppy in bloom, standing as thick as you ever saw wheat growing in a wheat field. About West Liberty, Columbus, and other towns, it grows spontaneously on every uncultivated spot. I was informed that very good opium had been made from this wild white poppy in Texas. If any one wishes to cultivate the poppy for opium, or the *Palma Christi* for castor oil, Western Texas is the country for him to go to find the proper soil and to buy land cheap. JAMES BYARS.

Covington, Tenn.

CORNISH PUMPING ENGINES.

BY H. P. M. BIRKINBINE, ENGINEER.

The American character for independent thinking and acting is illustrated in the variety of pumping engines used in the water works throughout the country; their being no particular form or style that may be said to have precedence or that may be considered as the best, so far as any peculiar form of apparatus would indicate.

In England the Cornish engine is the one almost universally adopted where any considerable amount of water is to be raised, either for supplying towns or draining mines.

In this country there are but five cities where they are used exclusively; namely, Erie and Easton, Pa.; Louisville, Ky.; Cleveland, O.; and Jersey City, N. J.; there are also a few used in draining mines. We have several large pumping engines in use, which may be considered as modifications of the Cornish engine.

The Philadelphia Water Works have four Cornish engines (two overhead beam and two Bull engines) in use, and a side-lever Cornish engine is now in course of construction. The city has also in operation six engines of other form, and has contracted for two more (not Cornish).

Chicago has just completed two large pumping engines of another form.

St. Louis is having four new engines constructed, for the low lift two Bull Cornish, but for the high lift, where the most work is to be done, two engines of different construction.

Buffalo, N. Y., has two Bull Cornish engines, but the last engine placed in the works was of a different form, and it is now proposed to materially alter the Cornish engine.

From the above it is evident that in this country the Cornish engine is not a favorite; many of those constructed being failures. The Union Canal Company have one in use in connection with several high-pressure fly-wheel engines, in pumping water to supply the Summit level of their canal, which has been found to work so unsatisfactorily that it is never used when the work can possibly be done with the other engines.

At the zinc mines, near Bethlehem, Pa., there is one Cornish and several other engines used in draining the mines, and this company, whose engineer has had a large and successful experience in constructing Cornish engines, is now having a powerful engine built, which is not of this class.

This is in direct opposition to the usage of England; therefore, either English engineers adhere to the Cornish engine from prejudice—it being old, and they know of no better—while we have progressed and found other and improved forms, or the construction and management of Cornish engines is not generally understood by the mechanics and engineers of this country.

The exhaustive works of Wickstead and Pole fully describe the construction and operation of these engines, and demonstrate theoretically, and by the actual working of engines in operation, that there is no other form which gives as high duty; that is, raises as much water with a given amount of coal.

The records of the running of a large number of these engines in Great Britain, extending through a long period of time, show that they work with surprising economy. Those running in this country, which are properly constructed and placed where their management is understood, give very favorable results.

Some of the patented pumps have duties claimed for them greater than the Cornish engine accomplishes, but as this claim is made by those pecuniarly interested in their success, and as it cannot be sustained, either by a theoretical examination of the patented peculiarities or by the actual working of the machines, we may be excused from entering into a discussion of their merits.

Engineers acquainted with pumping machinery generally accord to the Cornish engine superiority of duty, and theory and practice both demonstrate that no other form of engine can be worked so economically.

The question then occurs, "Why are they not more generally recommended and used in this country, and why do those who are experienced often adopt other forms when new engines are required?"

It is impossible to give the reasons which have led to the difference in practice between American and English engineers. In some instances (which we believe are but few) the royalties which patentees of pumps receive have undoubtedly influenced those having the selection of engines. Ignorance and want of experience is probably another cause, as is also the difficulty in finding machinists skilled in designing and constructing Cornish engines. Another reason may arise from the impatience which is characteristic of Americans, who are sometimes unwilling to wait until a substantial pumping engine can be built and set up—considering time as the most important element, and frequently neglecting efficiency and durability.

The first cost may also be used as an objection to these engines. We have so much to do in developing the immense resources of the country and comparatively so little capital to do it with, and labor is so high and dear, that this difficulty meets engineers at every undertaking. The above may be some of the reasons why Cornish engines are not more generally used.

In the water works of Philadelphia, there is a number of different forms of pumping engines in use, which may be considered as fair specimens, the following comparisons of the average work for the past five years may form a basis of the relative merits of the different forms of engines. These accounts have been kept uniformly and represent the total amount of coal and other supplies purchased as well as all amounts paid for labor, repairs, etc.

Philadelphia receives its supply of water from six different pumping stations,

1st, FAIRMOUNT. The pumps at this station are driven by water power.

2d, SCHUYLKILL WORKS have four pumping engines. One overhead beam Cornish engine; one bell-crank condensing engine with fly wheel, steam cylinder vertical, pump double acting, nearly horizontal. One overhead beam condensing engine with fly-weeel, steam cylinder vertical, double-acting pump (vertical) placed directly under steam cylinder connected to piston through lower cylinder head. An engine similar to this has been removed and a side lever Cornish engine is being erected to take its place.

3d, DELAWARE WORKS have two pumping engines one overhead beam condensing engine with fly wheel, steam cylinder vertical, pump double-acting, horizontal, connected to piston, (which is connected through lower cylinder head) by bell crank and connecting rods, and one high pressure engine, steam cylinder horizontal, connected to horizontal pump (double-acting) by vertical beam.

4th, TWENTY-FOURTH WARD WORKS have two Cornish Bull engines. New works are being constructed for the district now supplied by these engines, where pumping engines of a different kind are to be used.

5th, GERMANTOWN WORKS.—These have two high pressure engines, steam cylinder and double-acting pumps, horizontal, connected through fly wheel shaft by cranks placed at dead points.

6th, ROXBOROUGH WORKS.—These are just completed and contain a large overhead beam Cornish engine.

There is quite a variety of forms of boilers in use at the different works, in one of them four kinds; they may all be considered as of fair average efficiency.

The works are generally in good repair, except the Twenty-fourth Ward Works, there being no reservoir for this district and the engines are driven much beyond their safe-working speed, and, as a consequence, are rarely if ever in good condition.

The average duty for the past five years in foot-pounds (that is pounds of water raised one foot high with a pound of anthracite coal), is Schuylkill Works, 396,961 foot-pounds; Delaware Works, 210,570 foot-pounds; Twenty-fourth Ward Works, 470,092 foot-pounds; Germantown Works, 214,728 foot-pounds.

At the Schuylkill Works more than one half of the work is done by the Cornish engine. When the Twenty-fourth Ward Works are in good condition; the average monthly duty has frequently been over 550,000 foot-pounds. The average cost of raising one million gallons one foot high, for the past five years, is at Schuylkill Works, 15·21 cents; Delaware Works, 24·80 cents; Twenty-fourth Ward Works, 9·72 cents; Germantown Works, 21·50 cents.

This includes salaries of engineers and firemen, coal, oil, tallow, gas or oil for lighting, packing, small stores, repairs, etc.

By making a calculation from this basis of the cost of raising an average of five million gallons per day, one hundred and fifty feet high, the relative value of the different forms of pumping engines will be made more apparent, thus: Schuylkill Works, $41,637·37 per annum; Delaware Works, $67,890·00 per annum; Twenty-fourth Ward Works, $26,608·50 per annum; Germantown Works, $58,856·25 per annum.

If all the water raised at the Schuylkill Works was pumped by the Cornish engine, it would show economy even greater than the Twenty-fourth Ward Works, and were it not for the large amount of repairs required by the Cornish engines at the Twenty-fourth Ward Works, they would exhibit more comparative economy than they do.

From the above it is evident that the Cornish engine is the most economical. An experience of nearly seven years as chief engineer of the Philadelphia Water Works, and an extensive connection with other water works, has satisfied the writer that where any considerable amount of water is to be raised the Cornish engine is not only the most economical in all items of running expenses, but also the most reliable, and that no other form of engine should be recommended.

Fossil Gums or Copals.

Professor W. H. Gunning contributes to the *Philadelphia Coachmaker's Journal* an article on the above subject. He says: "Amber and copal are so entirely of the past that Nature, it would seem, has forgotten how to make them. They come down to us from out of the by-gone ages, although no place has been found for them on the page of the geologist. Commerce has made them known to the world; and science has at last interpreted their origin.

"Every one has seen gum bleeding from a cherry-tree. This gum is a hydro-carbon, inodorous and soluble in water. Imagine the gum, hard as the wood that bleeds it, soluble only in alcohol, and that only when oxidized, and you have amber or copal. In some olden time, trees long extinct—the *Pinus succinifer*—were standing on the shores of the Baltic. Another species, with a more formidable name—the *Elæocarpus copalifer*—was growing over the desert of Africa and in South America. If now we approach the Baltic, and dig down to the old tree-bearing soil, we find clumps of amber gum bled from the *succinifer*. Specimens are found now and then on our continent, at Cape Sable and Gay Head. Gum from the *copalifer* is called copal. Copal does not differ essentially from amber. It is more abundant and more accessible. The beginning was far back in the golden age of Africa, before the wind and the sand had made a desolation of her great plain. How impenetrable the gloom and mystery which veil this land of the sun! Here is a desert, parched and blasted, the same to-day as when the caravans tracked it, with the stars for chart and compass, in the days of the Pharaohs. Men have thought of it as a primal blight, a brand of some great curse on the new-created world. And yet that plain, so desolate now, was covered once with a majestic forest. The trees have perished, and their sap alone remains to tell that they were. Under a burning sun these trees were bleeding gum: insects came to sip it, lit, mired; the nectar flowed around them and entombed them; the trees perished, but time has wrought their blood into gems, and here are the insects to-day embalmed in their crystal tombs forever. A hundred thousand deaths could not disturb even the dust upon their wings.

"Our fathers used to puzzle over these insects in amber. The amber itself was a mystery, and then the insect—how did it ever get there. We no longer wonder how the insect got there, but how long it has been there. Negroes find the copal down even eighty feet in the desert sand. We infer that in places the soil from which the copal tree grew was buried under eighty feet of sand and clay. We have no data by which we can fix the time demanded for such a change, but we know enough to assure us that it must be reckoned in thousands of years. The revolutions of nature, from forest to desert, are never achieved in a day.

"In general the greatness of a change is a measure of the time. In general, we say. Where man comes in as a disturbing force, desolation or abundance follows quickly in his path. The plains of Babylonia, so fertile in the days of the great Babylon, the borders of Lake Galilee, so beautiful when the Saviour was wont to seek them, are now desolate.

"The crimes of men "have dried up realms to deserts." Nature has done the same, but she is never a swift architect of ruin. To have wrought the extinction of a race of trees from Africa, and buried the soil which bore them under eighty feet of sand, must have required many ages. The fly or moth, which looks as if it had just lit in its crystal coffin, may have been there a hundred thousand years. We are very sure it was there, just as you see it to-day, long before there was any man upon the earth.

"A race of trees perished from the earth, and left no wood or bark to tell that they lived, no seed or scion to perpetuate their kind, but their sap, their spirit—a mere aroma which exhaled from their wounds—this remains, a thing of beauty, while everything that was earthly has crumbled to dust."

GOOD WHOLESOME BREAD.—Professor Stohmann advises to mix to $\frac{3}{4}$ parts of rye meal, $\frac{1}{4}$ part of bean, or pea meal, and 2 per cent, by weight, of the mixture, of ordinary common salt. It appears that bread thus made is of excellent quality, taking its constituents into consideration, and easily digestible

Improvement in Hoisting Apparatus.

This invention is an improvement on the common hoisting machine by which it is rendered self-sustaining, beside having the advantages over contrivances of this nature heretofore made of being free from extra friction while hoisting, and still under control of the check line when lowering. This is accomplished in the following manner reference being made to the drawings, Figs. 1 and 2.

A, represents a suitable frame of wood to which the other parts of the machine are fastened. B represents fixed bearings in which are pivoted the levers, C, carrying the hoisting drum, D, and pinion shaft, E; these levers being so placed in the fixed bearings, B, that a portion of the load sustained by the drum, D, shall act upon the brake, I. F is the large gear attached to the drum. G is a pinion meshing into F. H is the rope wheel on the periphery of which is the brake flange as usual. I is an iron brake shoe bolted to the frame, A, which is extended for the purpose.

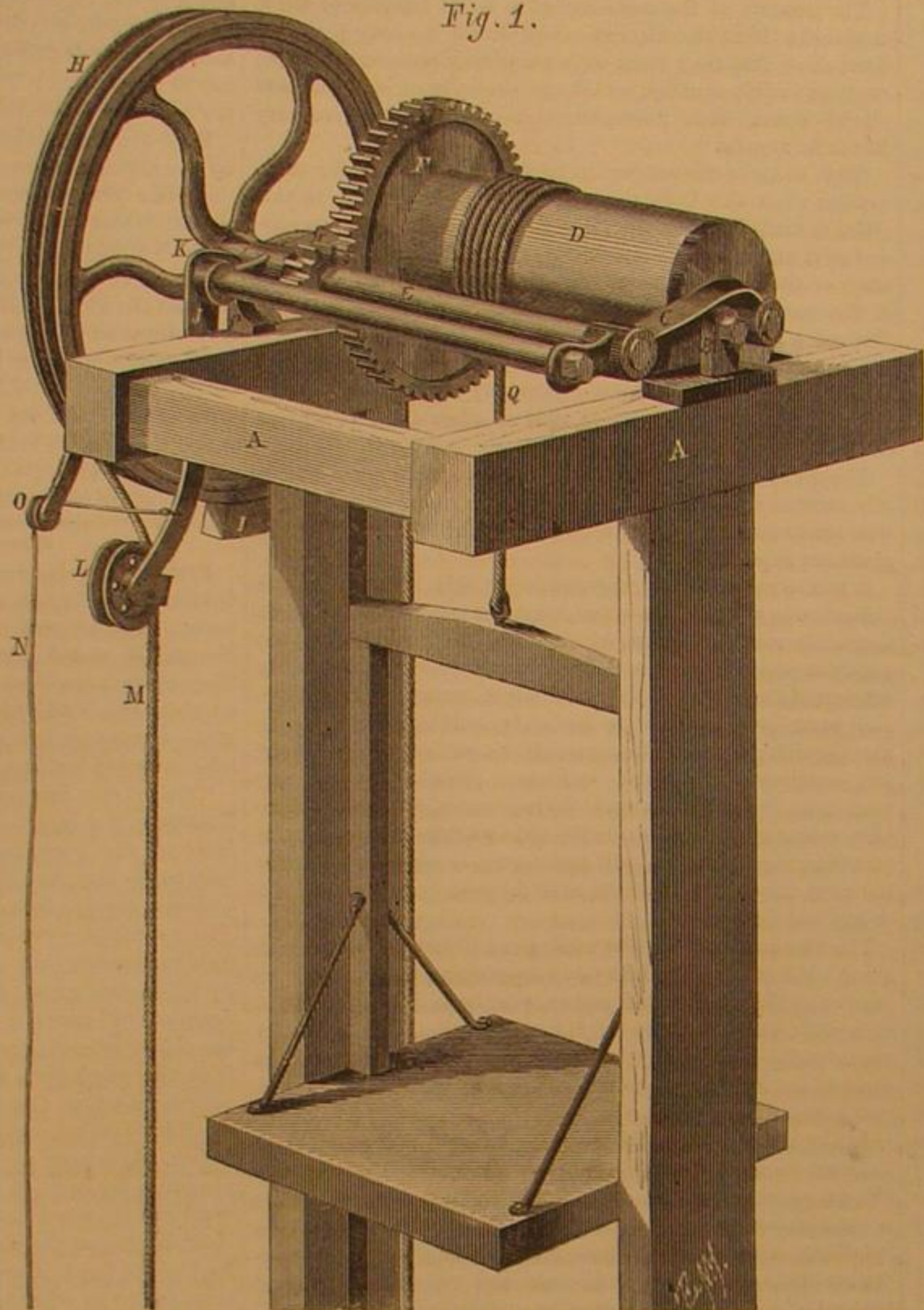
This shoe is provided with a good friction surface, by being faced with rawhide or leather. J is an L-shaped lever pivoted at K, to the suspending lever, C, and carrying at its longer end a rope pulley, L. M is the endless rope passing from the wheel, H, at an angle over the pulley, L; N is the check line leading from the lever, J, over a small pulley at O; P is the fulcrum to the lever, J; Q is the draft rope.

In operation a load being suspended from Q, the act of hoisting by the rope, M, will cause a lateral motion of the same toward the lever, J, which, bearing upon the fulcrum, O, will raise the wheel, H, from contact with the brake surface on I, allowing the load to be lifted until the pull ceases, when it is instantly held in place. To lower, the check line is pulled so as to free the brake flange wholly, or in part as desired.

This machine is now tested in practice and found to answer the ends sought. It is a valuable improvement, since it furnishes a more safe and convenient arrangement in the laborious process of hoisting, permits the use of a platform when required, loading or unloading at any floor, and for power hoists, provides at once for the slipping off, stretching or breaking of belt.

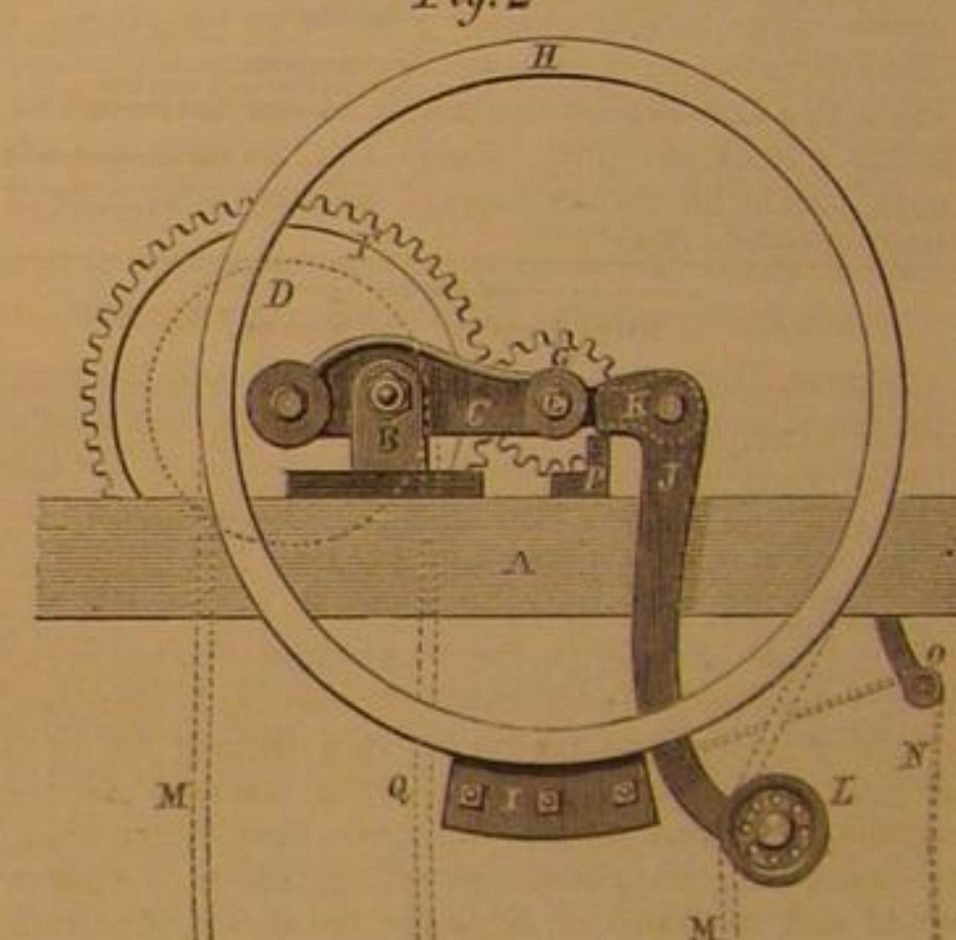
For State rights to manufacture (except N. E.), or for further particulars, address F. P. Canfield, 71 Sudbury street, Boston, Mass.

Fig. 1.



CANFIELDS, IMPROVED PATENT ELEVATOR.

Fig. 2



Beet-root Sugar in California.

The *Mining and Scientific Press* says, the question of producing beet-root sugar in this State is gradually increasing in interest, and we are pleased to note that an important experiment has been made by Mr Justus Beplar, of San Mateo county, to ascertain definitely the capacities of the soil and climate of California for this valuable product. Mr. Beplar has produced a sample of sugar pronounced to be equal to the best brands of imported cane sugar. It is well granulated, pure, and presents a thoroughly marketable appearance. This experiment is considered one of much importance and significance. Some idea of the value to which this interest may attain on this coast may be inferred from the fact that the sales of sugar by our local refineries for the quarter ending March 31, amounted to an aggregate value of $748,598; or within a fraction of three millions a year. It is now pretty well settled that the Sacramento beet-root sugar factory will go into operation during the current year, and the company will be prepared to purchase all the beets which may be produced in the present season. There can be little doubt that within a few years beet-root sugar will form an important item in the already long list of California productions.

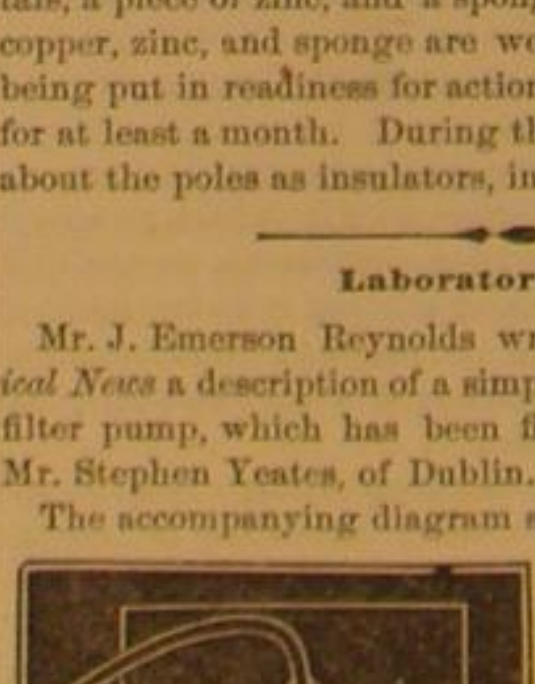
Signal Drill--Field Telegraphs.

At the recent examination of the West Point graduating class, one of the most interesting features of the occasion was, what is called a signal and telegraph drill—signaling by means of flags, and building a field telegraph. Although very few persons, but those immediately concerned in the drill, were able to comprehend much about the thing, it attracted considerable attention, and was looked upon with a great deal of interest by the officers of the post. The signaling was probably the most attractive feature of the whole affair. A certain number of the second class were detailed with the flags, which were of the ordinary size, nailed to poles about four leet long. Several of the signalers went up to the hights of Fort Putnam, and across the river, and signaled to others on the parade ground, with the flags, and for several minutes orders were communicated from point to point, and conversations held by the aid of the simple movements made by the moving of the flags. The orders were communicated and repeated with a rapidity which was actually astonishing. The building of the field telegraph, which was done by the first class, was also a great feature of the drill. Lines were run from Fort Putnam down in the direction of Cozzens' West Hotel and back to the post, and messages were sent over the wires without the slightest hindrance, although on the plains the lines were laid at the rate of three miles an hour. The batteries that were used in the drill differ very much from the ordinary batteries common to most telegraph companies, one of their principal advantages over the ordinary kind being the impunity with which they can be thrown into and carried in the wagons. Everybody who knows anything about telegraphing is aware that ordinary batteries, after being tossed about over a rough road for a short time, refuse to work; but all the rough usage which the batteries received during the drill that day, appeared in nowise to impair their efficiency. They consist simply of a peculiar apparatus to be attached to the wires, and contain sulphate of copper in crystals, a piece of zinc, and a sponge. When they are used, the copper, zinc, and sponge are wetted, and, it is said, after once being put in readiness for action, that they will work steadily for at least a month. During the drill, hard-rubber was used about the poles as insulators, instead of glass.

Laboratory Pump.

Mr. J. Emerson Reynolds writes to the editor of the *Chemical News* a description of a simple form of a Bunsen's valuable filter pump, which has been fitted up in his laboratory by Mr. Stephen Yeates, of Dublin.

The accompanying diagram shows the essential parts of the pump. A is a tube of tin, about eight inches long, and of nearly one inch internal diameter; within three inches of one end, the tube, B, is soldered. The diameter of this tube should be about three eighths of an inch. The end of the wide tube most distant from B is now contracted so as to form a portion of a cone, and D then soldered in. A small tube, C, is now selected, one extremity of which enters, but must not at all close, the cone formed by the junction of A and D; and at this point its orifice is contracted so as not not to exceed one eighth of an inch in diameter. It is then soldered, as shown, into the upper end of A. The whole arrangement is fitted to a board by the straps, S S.



The tube, C, is connected with the vessel to be exhausted of air. B is the delivery pipe for water, obtained from a cistern or from the street main; the supply should admit of regulation by means of a stop-cock placed in the course of B. In order to obtain the maximum exhaustion with the pump, the length of D should be about thirty-three feet, but a fall of twenty feet I find to be more than sufficient for ordinary water. As this form of Bunsen's pump can be constructed by any intelligent plumber for a few shillings, no chemist need be deterred, either on account of expense or trouble, from fitting his laboratory with the new apparatus.

I have had the pump in operation in my laboratory for about two months, and gladly bear testimony to the great practical value of Professor Bunsen's admirable arrangement.

The First Iron Founders in St. Louis.

The proximity of St. Louis to the vast ore-yielding fields of Missouri so closely identifies it with the iron interest as to make anything connected with the subject of special importance to the city; and it is not a matter at all surprising that the citizens watch with the deepest interest any enterprise looking to the development of the great wealth garnered up by nature in those immense storehouses of iron ore, the Iron Mountain and Pilot Knob. With this idea we propose, says the St. Louis *Republican*, to give some few notes on the history of iron founding in St. Louis.

The history of founding iron in St. Louis dates back far as as 1824, though it was then done in a rude way. In the year 1817 a man named Louis Newell landed in St. Louis, then, as many know, a small village compared with its present proportions. Newell commenced the business of blacksmithing, giving special attention to the making of edge tools. His fame soon spread abroad as a great ax-maker. At this time St. Louis was an important center of the fur trade of the West; the demand for wolf traps, beaver traps, and squaw axes was very considerable, and Newell soon made a specialty of the manufacture of these implements, the production of a good quality of which brought him at once wealth and a wider fame. About that time, too, the old French cart began to be superseded by the Yankee wagon, all the cast-iron hub boxes for which had to be brought from Pittsburgh, as indeed all other iron castings.

Then it was that the idea of founding first entered the brain of the first St. Louis founder. Newell saw that if he could make the hub boxes he could make a wagon out and-out, thus saving a heavy expense in their manufacture and adding greater facility to their production; a desideratum much to be desired by the farmers and settlers around St. Louis. So Newell went to racking his brain for a plan to overcome the inconvenience of having to import wagon boxes.

He was not a practical iron founder; but his genius and indomitable courage made up for the want. Having completed a pattern, he went to work with a common blacksmith's forge to make wagon boxes; he melted his iron and molded them with the most perfect success. This was the first melting of iron west of the Mississippi river. For four years Newell proceeded with this slow process to turn out boxes for the wagons he made.

In 1828, Mr. Samuel Gaty—then a mere boy—left his home in Kentucky, and pitched his tent in St. Louis. In connection with two other men, named Richards and Martin, he rented a piece of ground from Colonel Martin Thomas, and put up a small foundery on what is now the corner of Second and Cherry streets, and the trio went to work. Young Gaty had all the capital ($250), and acted as molder and financier; Richards was furnace man and Martin pattern maker. Under this arrangement matters progressed satisfactorily, and they made money. Colonel Thomas, looking upon Richards as *the* man of the concern, and seeing the profit in the business, made overtures to buy out Gaty's interest; and the latter looking a little deeper into matters than the Colonel could see, sold out to him. The sequel proved the sagacity of Gaty, for the two men, Richards and Martin, without business management, and being given to dissipation, soon let the concern run down. Colonel Thomas then declared he had bought out the wrong man. Gaty went back to Louisville.

Ether Spray is used successfully in Lyons, France, to render painless the operation of uprooting hair, when necessary, in cases of cutaneous disease.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York.
☞ "The New York News Company," 8 Spruce street.
☞ Messrs. Sampson, Low, Son & Marston, Booksellers, Crown Building, 188 Fleet street, London, are the Agents to receive European subscriptions. Orders sent to them will be promptly attended to.
☞ A. Asher & Co., 20 Unter den Linden, Berlin, are Agents for the German States.
☞ Tubner & Co., 60 Paternoster Row, London, are also Agents to receive subscriptions.

VOL. XXI., No. 1...[NEW SERIES.]....*Twenty-fourth Year.*

NEW YORK, SATURDAY, JULY 3, 1869.

Contents:

(Illustrated articles are marked with an asterisk.)

PROPERTY IN PATENTS AND COPYRIGHTS.

Horace Greeley, the veteran editor of the *Tribune*, is publishing in that journal a series of interesting articles upon Political Economy, which are designed to set forth the value of protection to American industry. The third article of the series is devoted to the discussion of Capital, Skill, Invention, and Intellectual Property, some extracts from which we reprint in this number of the SCIENTIFIC AMERICAN. Mr. Greeley discusses, with his usual clearness and force, the influence of labor-saving machinery upon the civilization and progress of the world, and shows the immense value and benefits which have resulted from inventions, contributing, at the same time, his protest against the efforts of those who would seek to abolish, or disparage, the system of protecting the property right of inventors and authors to their discoveries and works. The discussion of this subject by Mr. Greeley is timely, especially when viewed in connection with the recent effort in the British Commons, to secure the abolishment of the Patent System of Great Britain.

In reference to the rights of authors, we have never had but one opinion. We have, as we think, very justly arraigned the Canadian Government for its persistent refusal to allow patents to American inventors, and we consider it no less unjust, on the part of our Government, to deny to foreign authors the right to copyright their books, and we trust that this illiberal policy, which serves only to enrich a few large publishers at the expense of the brain-workers of Europe will soon give way to a sense of justice too long withheld.

CHEAP IRON FENCES.

Among the numberless uses to which iron is put, the manufacture of railings and fences for courtyards has attained very large proportions. Such fences are rapidly superseding all others for inclosing public parks and courtyards of first-class buildings in large cities.

There remains, however, a want for an iron fence of a much cheaper character, suitable for farms. The rate at which we are cutting and exporting timber in this country and the consequent increase in the price of lumber, render the supply of fencing material, very expensive to farmers in many parts of the country.

Where fencing timber is scarce and farms are stony, farmers manage to "kill two birds with one stone," by removing the stones which cumber their lands, and building with them a wall about their fields; but there are many large tracts of fertile land, without either stone or timber. Such is the character of our western prairie land. The time is coming when these lands must be cut up into small farms, and the cultivation of grain must be replaced in great measure by stock raising. When this time arrives, fences will be needed. It is safe to say that even now a large market would be found for a cheap and efficient iron fence, which could be built for about the same cost that a board fence now entails, while its durability would be greater, and its need for repair less.

Upon lands where neither stone nor timber can be obtained hedges have been tried, but there are many objections to them. It is a matter of difficulty to get them started into vigorous growth; they require more attention and labor when grown, to prevent spreading and unsightliness, than will keep either a stone or board fence in good repair; they are likely to be winter-killed, and they exhaust and occupy a considerable proportion of land.

An attempt was made a few years since to meet the want by wire fences, but unless the wires were woven into mutually supporting meshes, making the fence too expensive, they could not relied upon to restrain anything but the larger cattle of the farm; and even these soon learned that the wires could be easily broken. Wire fence for farms has for the most part gone the way of plank-roads to return no more, unless some inventor shall make the phœnix rise from its ashes in a form much better adapted for real service than it existed before its demise.

Another class of inventions which have had better although not complete success is that of portable wooden fences. Some of these were really meritorious, as they required a much less quantity of lumber than the old style of fence, while the labor consumed in their construction was scarcely more. They were, however, though lighter and more graceful, not so strong as the fences they were designed to supersede, and thus they failed to fully meet the requirements of the case.

Now it seems to us, that it would require no great amount of genius to adapt the principle of corrugation of sheet metals, in combination with the angle iron now regularly manufactured and sold, to the production of a fence so light that it should be sufficiently cheap for farm use, and yet so strong and durable as to outlast any timber fence of equal cost.

Fences of this kind, painted with coal tar, would resist oxidation for a long time, and there is no doubt that they could be made sufficiently rigid and inelastic to restrain sheep, pigs, etc., which the old wire fence was incompetent to do.

ARCHITECTURAL ENGINEERING.

The sister arts of engineering and architecture are commonly considered as being distinct, and in one sense they are distinct; but there is a class of building which, while it gives scope to all skill in design which the finished architect possesses, also involves considerable knowledge of civil and mechanical engineering.

We allude to the designing of buildings, and works for manufacturing purposes. In many kinds of manufacturing, long established and systematized, there exists a regular method of building so far as interior arrangement is concerned, never modified except in unimportant details. The exteriors of such buildings vary greatly in the degree of beauty and appropriateness of their designs; but a large number are totally destitute of either, being simply stiff and ungraceful masses of masonry, which if not without form, are certainly destitute of comeliness. Others would be good designs were it not for their inappropriateness.

But it is not of exterior designs that we were about to speak. There is a field in which the highest success can only be reached by uniting the special requisites of skill in mechanical and civil engineering with the skill of the architect. In many industrial establishments strict adherence to one type of building is neither requisite nor desirable. Circumstances connected with the location, the materials available for the erection of buildings, the character of the site, and other particulars not necessary to be enumerated, must, in some cases, and may, in any case, render more or less change necessary.

As an illustration of this fact, we have in mind a case, where a large industrial building, requiring very heavy walls to support the machinery, was erected on the side of a clay hill. The work was about two thirds completed when it was found that the building and its foundations were gradually but surely sliding down hill. Of course, nothing was left but to tear down, and either begin over again upon a better foundation, or change the site of the building. Here was a grave error committed by an architect, of no mean reputation, simply by not taking into proper account the effect likely to be produced upon the clay basis by such a great weight as was necessary.

Our readers will doubtless recall some instances of terrible disasters arising from want of proper strength in manufacturing buildings, of which the fall of the Pemberton Mill, at Lawrence, Mass., was a most notable and lamentable example. We have, in our observations of different industrial works, often wondered that more such disasters did not befall, rather than so few. It is common to meet with errors in building arising from obvious ignorance of the practical working of machines, and their effects upon buildings in which they are placed, together with a total disregard of the effect likely to be produced by rhythmic movements and their attendant vibrations. We have seen power printing presses placed in positions, on top floors, where the ultimate destruction of a building, by their effects, would only be a work of time; and drop presses placed upon foundations so weak that they could not, by any possibility, be expected, by an expert, to remain *in situ* more than a week at the outside.

We believe that there is now, and has been for some time, a requirement for a special profession of architectural engineering.

Because a man can build handsome churches, design a splendid front for a bank building, or erect an elegant villa, it does not follow that he is competent to build or superintend the building of a grist mill, or even a saw mill.

To properly design and complete works of the latter character requires a knowledge of the machinery to be used, the nature of the work they are designed to perform, the points of the structure likely to be subjected to strain, and knowledge of the resources whereby such points may be adequately strengthened.

We are aware that there there are some architects who have devoted themselves to this speciality, and have acquired skill in it, but they are too few to meet the requirements of the public, and, consequently, much of the work, which only such experts can properly perform, goes into the hands of men who, however skillful in other departments, are certainly incompetent to win enviable fame in this.

DEATH OF A DISTINGUISHED EDITOR

Henry J. Raymond, the editor of the New York *Times*, died suddenly at his residence, in this city, on the morning of June 18th, in his 50th year. Mr. Raymond began life a poor boy, and, by his indefatigable purpose to achieve success, he secured a liberal education at the University of Vermont, graduating with honor in 1840. Upon quitting college he at once came to this city, and began the study of law, and maintained himself by teaching. Mr. Raymond early evinced a strong tendency to journalism, and attracted the attention of Horace Greeley, who invited him to a position on the *Tribune*, then in its infancy. Of the value of Mr. Raymond's services, Mr. Greeley thus speaks in his recently published work entitled the "Recollections of a Busy Life:"

I had not much for him to do till the *Tribune* was started; then I had enough; and I never found another person, barely of age and just from his studies, who evinced so signal and such versatile ability in journalism as he did. Abler and stronger men I may have met; a cleverer, readier, more generally efficient journalist, I never saw. He remained with me nearly eight years, if my memory serves me, and is the only assistant with whom I ever felt required to remonstrate for doing more work than any human brain and frame could be expected to endure. His salary was, of course, gradually increased from time to time; but his services were more valuable in proportion to their cost than those of any one else who ever aided me on the *Tribune*.

Mr. Raymond became well known as a public man, having held several prominent positions, but his abilities were best known as a journalist. In company with Mr. George Jones as publisher, he started the New York *Times* in 1851, and has since displayed great tact and ability as the editor-in-chief of that able journal. Mr. Raymond was seized with an apoplectic fit, and died a victim to his untiring industry. He was a generous-hearted man, and will be mourned sincerely by a host of chosen and intimate friends and associates, who were best able to appreciate his many excellent qualities.

THE CLAIMS OF GENIUS.

There is a peculiar cant current among artists and the crowd of hangers-on which are always to be found frequenting the haunts of artists, about the claims of genius upon the public. Artists, they say, are not and cannot be men of business. They live on a higher plane than butchers, and grocers, and haberdashers. Artists' pursuits are ennobling in their nature. They call off the mind from the groveling details of business. The true artist lives for his art, and ought not to look upon it as a mere means of obtaining a livelihood. That would immediately degrade art to a mere catchpenny business.

The obvious deduction from all this is, that the baker and butcher who refuse to trust the artist, with his last week's bill unpaid, are cruel in their heartless unrecognition of genius. The world owes such men a living because their mere existence in it is a boon to mankind whether they work like other men or not. Now, so far as we are able to discover, the higher plane which sustains this sort of cant is out of sight. Though artists may live upon this plane, we are able to say from knowledge, that they eat the same food and drink sometimes a great deal of the same drink as other people, and so far as the plane of elevation is concerned, as long as plain people fail to see it, it must go for little in the work-a-day world.

The idea of genius which originates all this cant, is that of spontaneous inspiration, coming unsought, after long intervals of idleness. It once prevailed in regard to literary work. The old ideal of literary genius, was that of a man lazy in his work, loose in his habits, yet living above ordinary mortals in a realm of thought, always clear, but at times inspired. The modern newspaper has pretty much done away with these absurd notions of literary genius. It demands and gets the work it needs done on time, and it must be confessed gets it done sufficiently well. Inventive genius has claimed far less of inspiration than art or literature, though it might as reasonably have done so as either of them. In this field, however, the lesson was early learned, that he who demands anything of the world, must not only be recognized as being able at some moment of ecstasy to give something in return, but must at all times actually give *quid pro quo*. It has thus been thoroughly taught that genius in this department means ability to work, evidenced by work done, and it has come to be recognized as not only being ability but *will* to do work.

The old idea of lazy or desultory genius is fast becoming obsolete. That it still clings to the fine arts is a great misfortune. The true genius is always a steady, plodding, ardent worker, for the most part finishing what he begins according to a definite plan conceived before the beginning. Such a genius is always successful, unless some great calamity of sickness, or blindness, or other physical or mental incapacity overtakes him. His success is to be attributed to his industry more than to any other quality, and will, in general, be found proportional to it.

It may be argued that many eminent men, whose names will be long remembered as benefactors to their race, were desultory in their habits and in many cases even dissipated. There may have been exceptional cases of this kind, but that they can be justly adduced as examples of the highest and broadest success we deny. Success is something more than the securing a name which will descend to posterity; something more, even, than conferring large benefits upon humanity at large. He who confers these benefits should be himself benefited, and the rule has been in the past, and is more than ever now, that he who works persistently at any useful occupation, whether it be high art or low art, literature, or whatever else it may be, will himself be rewarded by something far more substantial than posthumous fame.

A man must not only show himself capable of doing, he must do and keep doing, to be successful. The world is getting too narrow for lazy races or lazy individuals. This continent was once peopled by indolent and barbarous tribes which refused to help in the grand work of civilization. The result is they are crushed beneath its wheels. Their fate will ultimately be the fate of all races who place themselves across the path of advancing improvement.

This world is yet to see the day when idleness will be esteemed a crime, when work will be equally distributed and remunerated, when false distinctions which have prevailed in regard to kinds of work shall be annihilated, and the best shoemaker shall take honors with the best painter or the best physician. In that day, we shall hear no more cant about "higher planes;" man will have attained his level.

TESTING STEAM ENGINES.

Our able cotemporary, *Engineering*, whose editor is himself a Yankee, in an article on "Testing Steam Engines," published in its issue of May 21, makes a statement which will strike the minds of Yankee engineers at large as being rather funny. It says: "Although the ordinary method of expressing the performance of a steam engine by stating the number of pounds of coal per horse power per hour consumed in working it, no doubt possesses some points of practical convenience, yet as a means of comparing accurately the performances of different engines it is absolutely valueless."

We assure our English cotemporary that we have in this country got somewhat further than this. That the above-named method is with us not *an ordinary* method, and that we feel surprised to find that missionary ground still remains in a land that has done so much with steam; that, so to speak, exists on steam.

We in America have got so far that we do not commit the fault of considering "the boiler and engine as one instead of two entirely independent parts," which *Engineering* asserts to be the ordinary method.

It is true we understand that when we use more than the proper amount of fuel to do a given amount of work, and find that the fault is not in the inferior quality of the fuel, we assume there is something wrong, and that the fault lies somewhere between the fuel and the work. Now we have have learned some time since, that there are two distinct vital organs which constitute the animal we are dealing with, and that the disease may be in one of these organs while the other is perfectly sound. But we see outward evidence of organic derangement in the prominent symptoms of morbid appetite. It eats too much, and with engines we do not believe it "better to pay two butchers than one doctor," however well the maxim may apply to the human engine. So we make it put out its tongue, feel its pulse, sound its lungs, and so forth, till a correct diagnosis has been made, and then apply the proper remedy if the disease is in its nature curable.

The remarks in the article to which we have made allusion, serve as an introduction to a description of a method for testing steam engines, based upon the amount of heat which remains utilized in the exhaust steam. It is stated to be the invention of Messrs. Farey and Donkin, well-known English engineers.

This method has for its object the ascertaining of the comparative efficiencies of steam engines, and is worthy of attention, not so much in our opinion for its asserted superiority, but because anything that can add to our present stock of tests serves as a check upon errors in the methods in vogue, and as a new standpoint for investigation.

"The principles upon which the system is founded," says our cotemporary, "may be very simply stated. A steam engine is but a form of heat engine, receiving its supply of heat from the boiler, and converting a greater or less portion of this heat into useful work. The more efficient the engine the greater will be the proportionate amount of heat thus transformed into work, and the less, consequently, will be the proportionate quantity carried off by the exhaust steam. We thus see that we measure the quantity of heat carried off by the waste steam of any engine, during, say, a minute, and divide this quantity by the number of horse power developed by the engine during that minute, we get a certain number or constant which will enable the performance of that engine to be compared accurately with that of any other engine tested in a similar way. The more efficient the engine, the lower, of course, its 'constant' will be, and *vice versâ*.

"We must next consider the means by which the quantity of heat carried off by the exhaust steam can be measured, and we may here remark that nothing could be more simple, and at the same time more accurate, than the apparatus which Messrs. Farey and B. Donkin, Jr., have devised and employed for this purpose. In its simplest and most generally useful form, it consists merely of a wooden trough or box, into which the whole of the water from the hot well is led, this trough having several partitions across it, over and under which the water flows, so as to obtain at last a steady current, which, at one end of the trough, falls over a weir or a "tumbling bay." The hight or head of water above the weir can be readily determined by the ordinary hook gage, and this and the breadth of the weir being known, the quantity of water discharged in a given time can be readily and accurately calculated by the use of Beardmore's Tables, or equivalent formulæ. In practice it would be unnecessary to make these calculations more than once for any given apparatus, it being, of course, more convenient to mark on the gage the discharge per minute corresponding to each given amount of head. To ascertain the temperature at which the condensing water enters the condenser and finally escapes, a good thermometer is, of course, all that is required. The number of degrees that the water is raised in temperature during its passage through the condenser, and the number of pounds of water thus heated during a given time, being known, we can, by merely multiplying these two quantities together, determine the number of pound-degrees of heat or thermal units carried off from the engine during that time by the exhaust steam. Dividing this number of pound-degrees by the number of horse power developed by the engine during the trial, we get the 'constant' already mentioned.

"All, then, that is necessary to test an engine on Messrs. Farey and Donkin's system, is a wooden box with a tumbling bay, a good thermometer, and indicators for determining the power developed. It is by no means necessary that the trial should be a lengthened one, for it will be found that as long as a constant pressure of steam is maintained, and the engine is employed to do a uniform amount of work, the amount of heat carried off by the condensing water will also remain constant from hour to hour, and there is, therefore, no reason why the experiment should be extended for an inconvenient time. This is a very important point in favor of the system of testing of which we are speaking, as in all mills or factories an engine can be kept doing tolerably uniform work for a couple of hours or so without inconvenience, whereas, if the trial had to be extended over a lengthened period (as would be essential if the quantity of water evaporated by the boilers and the amount of coal consumed were obtained in the ordinary way) much inconvenience and expense would be in most cases incurred.

"We must now speak of another important point connected with this system of testing engines. Mr. Farey and Mr. B. Donkin, Jr., have found, from experiments, that the 'constant' of any given engine does not vary to any practical extent with moderate variations of power; and thus when the 'constant' has once been obtained, the power developed at any given time by an engine fitted with the apparatus we have described, can be ascertained very closely without the use of the indicator. For instance, let us suppose that it has been ascertained that the 'constant' of any given engine is 480, or in other words, that the exhaust steam of that engine carries off 480 pound-degrees of heat per minute for every indicated horse power. Then if, on observing the apparatus, it was found that 14,400 units of heat were passing away per minute, the engine would then be developing $\frac{14400}{480} = 30$ horse power, or if 16,800 units were being given off per minute, $\frac{16800}{480} = 35$ horse-power would be developed, and so on. We thus see that the apparatus affords a very ready means of estimating the power requisite to drive various machines, shafting, etc., and we are inclined to believe that if it was generally applied to these purposes some curious revelations would be the result.

"In cases where it is desired to maintain a continuous registration of the work done by an engine, Messrs. Farey and Donkin employ the simple arrangement of photographic apparatus described and illustrated in the letter from Mr. Farey to which we have already referred. According to this plan, two rays of light from a gas burner—the one passing through a hole in a screen carried by a float, and the other through a break in the mercurial column of a thermometer—are, after traversing lenses, made to fall upon a sheet of sensitized paper carried by a slowly revolving drum, which derives its motion from the engine. Each ray of course traces a line upon the sensitized paper, and by the distance of these lines above or below a fixed datum line traced by a third ray of light, the quantity and temperature of the water passing over the weir at any given time are registered. Applied in this way, the apparatus is calculated to do good service to large mill owners and water-works companies who desire to obtain a continuous record of the performances of their engines.

"We have spoken of this system of testing as applied to stationary condensing engines only; but it is also applicable to high-pressure engines, and, under certain circumstances, to marine engines."

Improved Photographic Paper.

The *British Journal of Photography* publishes the following by W. H. Davis: "My method for preparing the surface—for I believe it will do for many other surfaces than paper—is the following for direct printing: Take from four to six grains of gelatine, soak it in an ounce of water for an hour, then melt it gently over a fire, hot plate, or water bath, using a clean earthen pipkin. When fully dissolved, add to it, while yet warm, and stirring it gently during the mixing, from four to six drachms of a solution of white lac in methylated spirit, if for white or pale surfaces; but orange lac will do if the surface be of a darker color. This is made in the proportion of six ounces of spirit to one ounce of lac, and digesting it till fully dissolved. The mixture of the gelatine and gum lac in spirits produces a creamy-looking emulsion, to which is added four grains of chloride of sodium, or a like equivalent of chlorides of ammonium or barium, and, when fully dissolved, filter through fine muslin into a clean pipkin, and it is ready for use.

"I generally apply the solution warm with a flat camel's hair brush, crossing it till it lies evenly. When the paper is dry it is ready for sensitizing, which may be either done by flotation on the ordinary printing bath, or by brushing on the silver solution. I prefer to use the ammonia-nitrate solution brushed on; but there are specimens by both methods before you. I use forty grains of silver to the ounce of water. Some of the ammonia-nitrate prints contain also a large proportion of citrate of silver in addition to the usual ammonia-nitrate.

"As you will see, the tones of many of the untoned prints are quite as fine in color as are those toned with gold, and I attribute this entirely to the variations in the salting and in the strength of the size and lac solution, and to the minute variation of the silver bath by the addition of various salts in the course of sensitizing.

"The question will probably be asked—Will this method allow of printing by development? I can only say that I believe it will. There is nothing in the materials to prevent it; but I have not had time to go into that branch of the matter."

Misadventure in Experiment---Professor Silliman.

The true nobility of character and calm heroism evinced by Professor Bunsen, while suffering from the effects of the late distressing accident—an account of which we recently published—must have excited feelings of admiration for the *man*, apart from the high respect justly due to him as an eminent scientist. Many similar instances could be given of other men distinguished in the walks of science, one of which, happily unattended by serious damage, is thus related of Professor Silliman by the Worcester *Spy*: "In one of his lectures, Mr. Silliman was explaining the properties of hydrogen, and was proceeding to illustrate its combustible properties by an experiment. After stating that, on a lighted candle being applied to it, it would burn quietly with a bluish flame, he raised by its knob a glass receiver which he supposed was filled with the gas and applied the candle. There was a violent explosion; the glass flew in splinters about the lecture room; the ladies present screamed with terror, and the students rose from their seats, startled by the shock, and uncertain whether some of the other powerful agents in the laboratory might not be called into destructive activity in a moment. The cool bearing of the venerable professor as he stood in an easy attitude, still holding the knob of the jar in his hand, quieted the apprehensions of the audience, and, as soon as the commotion began to subside, the clear, even tones of his voice were heard saying: 'This illustrates something that I was going to speak of by-and-by. A little oxygen was accidentally mixed with the hydrogen, and caused the explosion. It has burned my hand a little; but that is no matter. We will now try an other jar, which I presume we shall find pure.'"

Practical Application of Sensitive Flames.

An apparatus has been invented by Barrett for making practical use of sensitive flames. It consists of two perpendicular copper rods, one of which, on its upper end, holds a metallic ribbon, which is composed of thin leaves of gold, silver, or platinum, welded together. Such a ribbon expands unequally under the influence of heat; it bends toward one side, and, in doing so, comes in contact with a fine platinum wire attached to a galvanic battery. As soon as the poles of the battery are closed, a bell begins to ring. The working of the apparatus is as follows:

"A sensitive flame is lighted, about ten inches from the metallic ribbon. This burns quietly so long as there is no noise, but a shrill whistle, or any unusual disturbance, will cause it to diminish one half in length, and to spread out wide in the middle, like the wings of a bird. It thus heats the metallic ribbon, which expands unequally, and occasions the contact of the poles of the battery, which rings a bell."

Such a light as this in a banking house would betray to the watchman the noise of robbery, and the inventor proposes to use it as a species of burglar alarm. As sound can be transmitted in water four times as rapidly as in the air, it is also suggested to employ this method on shipboard to make known the approach of a vessel in time of a fog.

There is probably the germ of curious applications of sensitive flames in Barrett's invention, and it would not be surprising to hear of its use in war, to warn a sentinel of the approach of the enemy, or of its application to a new species of telegraphy.

A New Decorative Material.

The slowness of painting operations in buildings, the obstruction caused by workmen, and the disagreeable smell from fresh paint, are great inconveniences inherent to the present mode of painting and decorating. To remedy this, M. Jean Marie Lasché, of No. 23, Boulevard de Strasbourg, Paris, has just patented an invention, the object of which is chiefly to dispense with painting operations in the house or room to be decorated and to prepare the painting at a factory or shop, so that it can be applied to walls or other surfaces by ordinary hangers or layers, without giving rise to disagreeable smells. The invention consists in producing the painting upon tin foil. M. Lasché takes thin tin foil, which possesses great flexibility, and spreads it upon glass, taking care to damp the glass in order to facilitate the spreading and retention of the foil. The foil thus spread constitutes a very smooth surface, on which the inventor paints or colors in oil, either plain or ornamental, as on walls or wainscots. It is allowed to dry, and is then varnished. This portable painting, when removed from the glass with its lining of tin, is ready to be applied in a house or otherwise. This new covering or hanging is wound on rollers like paper hangings, but it differs from them, inasmuch as the coloring or painting is on tin and in oil; the back or tin lining constitutes a waterproof surfrce, and the tin, owing to its great flexibility, can be adapted to the configuration of all moldings or irregularities. Before applying the tin hanging or covering, a waterproof mixture is spread on the wall or surface to be decorated, and the hanging is then cut and applied, being made to follow the irregularities of the moldings and ornaments. This tin covering may also replace gilding, the gold being applied on the tin foil with the ordinary preparation. It is dried and cut, and after having had a waterproof mixture spread on the ornaments or surface to be decorated, the pieces of tin gilding are applied to them. The advantage of this tin gilding over ordinary gilding on metals is that it does not oxidize, while ordinary gilding on metals soon becomes spotted or tarnished. This invention thus constitutes, as it were, a new process of decorative painting, which dispenses with all labor at the place of application, except simple hanging or laying. We have by us some samples of this new material, which are exceedingly appropriate and effective.—*Mechanics' Magazine.*

THE PRESENT STATUS OF MEDICAL SCIENCE.

The present status of medical science presents some singular aspects. While the majority of the people, perhaps, retain their faith in drugs, the doctors—at least, those of the allopathic school—are daily losing faith in them, and relying more upon good nursing, proper dietetic regimen, and rest, for the cure of disease.

Homeopathy, with its infinitesimal doses, has greater faith in its drugs; but, whether this faith arises from the really greater success in the use of the remedies than is attained by the allopathic system, or whether that success is falsely attributed to the effect of drugs, given in so small quantities that their influence upon disease is imperceptible, and therefore, harmless, is a question, we believe, not fully decided. And it cannot be decided so long as many professed homeopathists do not conform to the practice they profess, and persist in substituting the allopathic dose for the homeopathic one.

There are quacks in all kinds of medical practice, quacks admitted into full communion, and of good standing. In the allopathic practice, the strictly honest physicians, who always give the remedies they pretend to give, who eschew bread pills, and give the real old-fashioned "kill or cure" dose, are the men of inferior talent and small reputation; secretly laughed at by the knowing ones, and publicly praised in consultations. "The treatment has been perfectly correct ma'am," says the wisehead, whom the weaker brother has called in to reassure the anxious mother, who has had some misgivings as to whether her old family doctor was not possibly treating her sick child erroneously. "The treatment has been perfectly correct. The constitution of your child has been admirably prepared to receive the benefit of a course of tonics which I shall now recommend." "What tonics?" timidly asks the weaker brother of the man of great repute. "A little wine and plenty of beef tea are the best for children, with perhaps a little, a very little, of any other simple tonic remedy," says that oracle as he steps into his carriage, endeavoring to save, at once, the child and his own standing as a "regular."

"Talk about the inefficiency of homeopathic remedies," says the practitioner of that school. "See, ma'am, I will place one of these little pellets of stibium upon the tongue of your Spanish greyhound, and presently he shall be literally as sick as a dog." Now, stibium, worthy reader, is antimony, and this metal and its salts are deadly poisons. The stomach revolts against a very small quantity of it, and it is never used in the allopathic practice except in minute doses. This experiment, often performed to convince people of the power of homeopathic remedies, is convincing to people who know nothing of the nature of the drug.

We believe homeopathy is doing a good work, and that it will ultimately teach the world the utter powerlessness of drugs to cure diseases, but its practice is not free from quacks, who are, so to speak, "neither fish nor fowl," neither allopathists nor homeopathists, but simply eclectics, doctoring as they think best for the good of the patient; that is, in nine cases out of ten, not doctoring at all, but humbugging patients into the belief that they are doctored. This class of eclectics are the most successful physicians in all kinds of practice.

What is disease is a question never yet satisfactorily answered. The allopathists affirm that the homeopathists treat only symptoms. But what do the former know of disease except symptoms? Can they point out the subtle cause of smallpox? show how it operates in the blood, and taints the entire system? Can they give you the origin of Bright's disease, or throw a single obstacle in the way of its progress? Can they show the primary cause of tubercular deposit, or explain the mysterious nature of the scrofulous diathesis? Yet these are the men who claim, *par excellence*, to treat causes and not symptoms.

The following statement in the *Radical*, for June, is not exaggerated. "No branch of science is in a more unstable and chaotic state than the science of medicine. Earnest young men graduate from the medical schools, and then throw up the profession with the frank avowal that they do not understand how an honest man can be a physician. Grave professors close their learned lectures with the *naive* confession, that, although these are the accepted theories of to-day, a few years will undoubtedly sweep them all into the waste-basket of posterity. Undoubtedly they will; and with them will go what Egyptian pyramids of pills and powders! what rivers and seas of wine bitters and cherry pectorals, of pain killers and panaceas of every conceivable sort, that have brought wealth to their venders, and woe to humanity! Every day marks the birth of some new, and the burial of some old, nostrum—more worthless, even, than ephemeral—while temperance, cleanliness, and exercise—the world-old healers of humanity—lose not one jot nor tittle of their ancient virtues, though the world comes to a knowledge of, and adherence to them by slow and painful steps. It certainly has not learned that temperance means the intelligent use of all that is good, and the rejection of all that is evil; that cleanliness includes purity of person, purity of surroundings, purity of soul; and that exercise, in its true sense, means a full and perfect development of the body in harmony with all the laws thereof."

Says the *London Quarterly Review*: "The acknowledgment seems to become daily wider spread, that 'the man is greater than his maladies;' that his general condition is of more importance than his local ailments; that disease is a change in him, rather than in some part of him; and that no treatment can be of real service which sacrifices the greater to the lesser."

This is what Dr. Wisehead reasoned to himself, when he spoke to Weaker Brother, M.D., about the wine and beef tea, shrewdly covering up his wisdom by the "little tonic remedy," lest he should risk his standing with the "County Medical Society," and thus deprive himself of the opportunity of another consultation.

The *London Quarterly* further remarks: "It may be easily seen that a prime moving spur to a great deal of the practice, from which our medical guides are now drawing back, was a certain awful 'idol of the market place,' called Inflammation. With fiery limbs spread aloft, wielding weapons labeled Tumor, Rubor, Calor, Dolor, Effusion, Suppuration, Fibrinous Exudation, Phlegmon, Fever, etc., it has made all fall down before it: and the more it has been sacrificed to the fiercer it has seemed. It has been a veritable Kalee. Of late, men of science have been picking at the skin of this hideous object of faith, and have seen reason to pronounce some of its weapons of offense mere wind-bags and tinsel. Though they cannot say but that there is a sort of life in it, yet its destructiveness consists mainly in the pitfalls encountered by those running away from the Bogy. Laying aside metaphor, it would seem that inflammation consists in the phenomena of a lower degree of life. The process of nutritive growth in the various tissues of the body is arrested at an incomplete stage. For example, what should have been the intricate meshes of skin, elastic sensitive muscle, or mysterious gland, gets no further than being a thickish liquid, which can assume no comely form, can only multiply itself, and appear in the shape of mucus or pus. This is suppuration. Again, the swelling (*tumor*) of inflamed parts is a loss of one of the vital properties of the small blood vessels, elasticity. Spur them up to more life, and the swelling vanishes. And so on.

"What is now principally feared by the shrewder class is, not so much inflammation, as the panic which it causes. They almost prefer that those who have to deal with it should shut their eyes than open them and act upon their fright. A fashionable physician, who is also a learned physiologist and acute observer, was summoned to a case of rheumatic fever of some days' duration. In the consultation, he pointed out that there was extensive inflammation of the heart, to the extreme terror of the family doctor. 'Oh dear, dear! what will you think of me? How can I forgive myself for so neglecting my poor friend's case?' 'Pray do not be distressed,' was the comforting answer, 'it is just as well you did not find out the pericarditis; you might, perhaps, have treated it.'"

On the whole, we do not think the prospects of the drug trade, for a brisk business, during the latter half of the twentieth century, are altogether flattering. Before the expiration of that period, man will, perhaps, not have practically learned that diseases may be warded off by a clean, temperate life; but he will, at least, have learned that diseases, once acquired, cannot be cured by cathartics, emetics, or any of the other "ics," and, throwing himself upon nature, will give her the best chance to work he can, and thus secure the only possible chance he has for recovery.

We would not, in these remarks, be understood to reflect anything upon the noble art of surgery, whose influence upon the sister science of medicine has been most salutary. It is the use of nauseous, poisonous, and powerful drugs, not tonic in their action, that we deprecate, believing that not one patient in a hundred needs them, while many a life has been lost through their administration.

HELL GATE.—We perceive with pleasure that our townsman, Mr. Samuel Lewis, monopolizes a considerable portion of the current number of the SCIENTIFIC AMERICAN by a two-page illustration of his admirable submarine drilling apparatus. The pictures and descriptive text are very fine, and reflect great credit upon the conductors of the SCIENTIFIC AMERICAN. Foreign patents for this truly splendid invention have been procured by Munn & Co., patent solicitors, and the inventor is now prepared to clear Hell Gate, or either side of it, or any other important obstructed channel, with the least possible delay. As we have before said in these columns, if the rocks lying between the Sound and East river are ever removed it will be by this magnificent mechanism, the speedy use of which nothing but the most disreputable coalitions can prevent.—*The Brooklyn Argus.*

THE Portland *Argus* says, Walter Brown has brought home a new paper boat, of the Waters' patent, from a model of his own. This boat is 31½ feet long, 12 inches wide, and weighs but 22 pounds. The lightest wooden boat ever built of similar dimensions weighed 41 pounds. The most singular part of the matter is that the boat is more than four times stronger than one of wood. All of it, save where the sculler sits, is gas-tight, so that in the event of a race sufficient gas may be taken into it to reduce its weight to 8 pounds. The displacement of water by such a craft will be very much less than that of a wooden boat, and the same exertion will propel it proportionately faster. Its strength is also a great advantage.

AN IMPROVED BATTERY.—We have recorded so many improvements (as they are all called) in galvanic batteries, that the number and variety becomes bewildering. The last we meet with is that suggested by Böttger, who proposes to substitute metallic antimony for carbon. An amalgamated zinc plate is immersed in a strong solution of common salt and sulphate of magnesia. The antimony, like the carbon, is placed in a porous pot, but the liquid used is dilute sulphuric acid. A combination of this arrangement is said to give a stronger and more lasting current than a cell of Daniel's battery.—*Mechanic's Magazine.*

NEW PUBLICATIONS.

A PRACTICAL TREATISE ON THE MANUFACTURE OF PORTLAND CEMENT. By Henry Reid, C. E., to which is added a Translation of M. A. Lipowitz's Work, describing a New Method adopted in Germany, of Manufacturing that Cement. By W. F. Reid. Philadelphia: Henry Carey Baird, 406 Walnut street. 8vo. Price, by mail, free of postage, $7·00.

The large and increasing use of Portland cement not only renders a work of this kind necessary to manufacturers and dealers, but to architects, engineers, builders, contractors on public works, and whoever desires a valuable work of reference upon this important article of trade, its composition, different modes of manufacture, its uses, methods of application etc., etc. A prejudice which has existed in certain quarters against the use of this cement is gradually giving way before the light of experience, and, as a consequence, its manufacture and use are likely to assume in the future much larger proportions than has hitherto been the case. The work begins with the A, B, C of the subject. The selection of a site for a manufactory, giving proportions of the materials required, and full details and descriptions, with plates illustrating the apparatus, distribution of help, processes, etc. These subjects occupy eleven chapters. The author then treats of the importance of rigid testing, and gives the different methods in vogue, with the advantages and disadvantages pertaining to each. This chapter is an excellent and valuable portion of the work for architects and engineers, but is followed by one upon experiments determining the constructive value of Portland cement and its uses, which alone contains information worth the price of the work. Several other chapters follow upon the mode of using the cement, its application to marine architecture and its suitability for concrete building; and then Mr. H. Reid closes his part of the work by an interesting and well-prepared essay on the improvement of roads, streets, etc., by the agency of this material. Then follows the translation of Lipowitz's work, by W. F. Reid, which completes the volume. We have nothing but commendation for this book, except that it lacks an index. Publishers should recollect that a large class of readers use their works not as text-books for study, but as books of reference for casual information, and that to such a table of contents, however copious, can never take the place of a well-prepared index.

A TREATISE ON THE TEETH OF WHEELS, Demonstrating the Best Forms which can be given to them for the purposes of Machinery, such as Mill Work and Clock Work. Translated from the French of M. Camus, by John Isaac Hawkins. Third Edition. Philadelphia: Henry Carey Baird, 406 Walnut street.

While finished mechanical engineers are perhaps fully aware of the great importance of proper shape in the teeth of wheels, their practice in this regard is, in many cases, but little better than that of less accomplished men. This is evidenced by the imperfections met with in toothed wheels almost universally. If gears will only run together with tolerable smoothness, and without too much noise, the average perfection is reached, and further considerations are too often neglected. But poorly formed gears may, although they cost less in the first instance, soon absorb an amount of power in friction which would more than purchase good ones at double the price of inferior ones. We would not be understood as saying that so wide a departure from good practice as we have described is the rule, but it is certain that more or less departure from accurate proportions is looked upon with toleration, even by those who are capable of judging correctly, would they take the trouble, of the evil effects of such a departure. There are few manufacturing establishments where such errors of form cannot be detected in the wear and clashing of badly-constructed toothed wheels. The work before us is that of a man celebrated for his learning and a recipient of the highest academic honors, both in his own and other countries. A rigid reasoner, he assumes nothing, but leads his reader on step by step to each conclusion through an admirable course of mathematical demonstration. To read the book will require some acquaintance with mathematics and patience on the part of the reader, not accustomed to following readily a train of mathematical reasoning; but the importance of the conclusions finally reached will repay such readers for the trouble taken. To those well versed in mathematical methods and language, the work presents no difficulties, and is recommended as being probably the most complete and exhaustive treatise upon the subject extant.

ON MECHANICAL SAWS. By S. W. Worssam, Jr. Illustrated with eighteen large folding Plates. Philadelphia: Henry Carey Baird, 406 Walnut street.

This is an essay on saws actuated by steam power, reprinted from the "Transactions of the Society of Engineers for 1867." Three divisions are made of the subject, namely: Reciprocating, or mill saws; rotary, or circular saws; endless ribbon, or band saws. The treatise embraces the origin of mill saws and their introduction into this country; various forms of saw teeth; sharpening and setting mill saws and cross cuts, mill saw vise, gages, files, saw sets, etc., statistics of mill saws, saw-sharpening machines, attachment of saws to swing frames, with various addenda. The treatise is eminently practical, and offers no difficulties to any mechanic. It will prove useful to all who are connected with the manufacture or the use of saws.

HOW TO BATHE. A Family Guide for the Use of Water in Preserving Health and Treating Disease. By E. P. Miller, M. D., author of "Vital Force; How Wasted and How Preserved," etc. Published for the author. New York: American News Company. Boston: Lee & Shepard.

We have found this little work entertaining and instructive. It contains descriptions of some forty or more kinds of general and local bathing, with other information of a popular character in regard to properties of water, its solvent power, how to purify it, and many other matters respecting this wonderful fluid. As a specimen of the general character of the book, we have reproduced in another column rules for ordinary bathing, extracted from the book, which will be found interesting and useful. The world has begun to learn that cleanliness is only another name for health, and that disease and dirt always keep company.

INVESTIGATIONS OF FORMULÆ FOR THE STRENGTH OF THE IRON PARTS OF STEAM MACHINERY. By J. D. Van Buren, Jr., C. E., late of the Engineers, U. S. Navy. New York: D. Van Nostrand, 23 Murray street and 27 Warren street.

This book has lain upon our table for some days, but as yet we have not found time to give that attention which would enable us to speak of it as it properly deserves. It is written in the abstruse style of mathematical investigations, and was probably designed for those well posted in the mathematical treatment of such subjects. The formulæ seem chiefly founded upon the experiments of Fairbairn, Rankine, Mosely, Mahan, and other engineers of note, great care being taken in securing accuracy of the data, from which the formulæ are deduced.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

1,535.—DEVICE FOR SECURING CORKS IN BOTTLES.—W. M. Littell, Newark, N. J. May 18, 1869.

1,546.—SHOES FOR HORSES AND OTHER ANIMALS.—David Roberge, New York city. May 19, 1869.

1,558.—CORD TIGHTENERS FOR CURTAIN FIXTURES.—C. C. Parker, Brooklyn, N. Y. May 19, 1869.

1,568.—DISTILLATION OF SPIRITUOUS LIQUORS, AND IN APPARATUS TO BE EMPLOYED THEREFOR.—George Johnson, San Francisco, Cal. May 20, 1869.

1,529.—PROCESS FOR OBTAINING GELATINE, ETC., FROM ANIMAL SUBSTANCES.—D. K. Tuttle, Orazio Lugo, W. J. Hooper, and Theodore Hooper, Baltimore, Md. May 19, 1869.

1,567.—BOAT-DETACHING APPARATUS.—Jas. Foster, Jr., Noah Hand, and Charles Sloan, Camden, N. J. May 20, 1869.

1,577.—MACHINE FOR WORKING METALS.—Charles Bowen, Sherbrooke, Canada. May 21, 1869.

1,585.—HORSESHOE NAILS AND NAIL MACHINERY.—John S. Griffing, New Haven, Conn. May 22, 1869.

1,586.—MACHINERY FOR CASTING IRON.—J. A. Burden, Troy, N. Y. May 22, 1869.

1,593.—ICE HOUSES AND REFRIGERATORS.—E. D. Brainard, Albany, N. Y. May 24, 1869.

1,595.—MACHINERY FOR THE MANUFACTURE OF BRUSHES.—A. M. White, Thompsonville, Conn. May 22, 1869.

1,603.—IMITATION, WOOD, IVORY, STONE, ETC.—David Blake, Albany, N.Y. May 25, 1869.

1,612.—TOOLS FOR CUTTING GLASS, ETC.(Joseph Beales, W. T. Davis, and A. De Wolf, Greenfield, Mass. May 26, 1869.

1,647.—MACHINERY FOR MANUFACTURING BOLTS AND NUTS.—O. C. Burdict, Providence, R. I. May 28, 1869.

1,682.—MECHANISM FOR PROPELLING BY MUSCULAR POWER.—W. S. Hall, Quincy, Mass. May 31, 1869.

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 correspondents by mail.

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

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

W. B., of Ky.—We do not think the process you suggest of transferring pencil drawings can be accomplished. There is no solvent that will dissolve wood without decomposing it. A pulp may be made of woody tissue by mechanical means, which is used in the manufacture of paper. The idea of making moldings of saw dust by pressure and combination with some cementing material is not new. If in the distillation of water, the weight of the condensed distillate and the residue of saline and organic matter left in the still do not equal the weight of the water experimented with, the fact argues only your inexperience, or the imperfection of the apparatus employed. The substance which you describe as resembling graphite, is the product of attrition between the two metallic surfaces. It is not graphite. Graphite is one of the forms in which carbon exists. As generally found, however, it contains more or less carbonate of iron. Bone or horn is easily dissolved by steam under high pressure. In the ordinary manufacture of handles, etc., such as you describe, these materials are only softened by hot water or steam, and shaped while hot by pressure in molds. When cold they harden again and retain the form of the mold.

J. H. T., of Ill.—To find the loss in the delivery of a water pipe caused by friction, the following rule is given: Multiply the weight of fluid discharged in a given time, by the product of the length of the pipe, the circumference of the cross section of the bore, and the square of the velocity of the flow, all expressed in similar units of measurement divide this product by 32·1808 times the area of the cross section of the bore, and multiply the quotient by 0·0035. This will give an expression, in pounds of water prevented from flowing by friction during the time of the experiment. We have not the data for answering your second query, and doubt if it has ever been made the subject of experiment.

C. C., of N. Y.—Steel springs can be either tinned or zinced. Zincing a steel spring by immersing it in melted zinc, you will draw the temper of the spring, but the melting point of tin being considerably lower, tinning by the usual method will not be likely to injure the temper unless you heat the tin beyond the melting point. The temperature of zinc at the melting point is too high to give a proper spring temper. By the use of a battery we think you might coat springs with zinc without injuring the temper. You could not restore the temper of a spring if lost after zincing by any process known to us.

A. B., of Mass.—The liquid blacking used by manufacturers for rubber goods is applied before the goods are vulcanized, and passes through the process with the rubber. We learn that it can not be made available for common use. We are, however, informed that black japan varnish tempered with a little boiled linseed oil may be used for restoring the surface on manufactured goods when it has become dimmed or abraded and that the varnish is perfectly harmless in its effects upon the material.

H. P., of N. Y.—You may make quite an effective filter by binding several thicknesses of flannel over the nozzle of your water faucet; but for a permanent filter, we would advise you to purchase some one of the numerous filters kept for sale. You must either do this or clean out the tank. The latter is best, as the accumulation of organic matter you describe must eventually prove detrimental to health.

H. B., of N. Y.—You can temper small springs in large quantities, by first hardening them in water in the usual manner of hardening steel, then placing as many as convenient in a vessel containing oil. Heat the oil containing the springs until it takes fire from the top, then set off the vessel and let it cool. The springs when cooled will be found to have the proper temper.

E. R., of Vt.—The strain of iron in a mold depends primarily upon the principles which govern the pressure of liquids, and partly from the fact that, at the time the metal is about to assume the crystalline form, an expansion takes place analogous to that which takes place in water in cooling from 39° Fah. to 32° Fah.

C. B., of Iowa.—The assignee of an original patent has no right, under an extended term of the patent, in the absence of a specific agreement to that effect. It is the intention of the law to allow the extention of a patent, only for the benefit of the patentee or his heirs.

R. G. W., of———The temperature for incubation is 104° Fah.

Recent American and Foreign Patents.

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

CHROMO-LITHOGRAPHIC POWER PRESS.—August Hoen, Baltimore, Md.—This invention comprises several valuable improvements in the chromo press, among which are a new method of applying the pressure, a new device for inking and damping, and a new apparatus for registering.

PAPER ENVELOPES.—G. P. Hachenberg, Hudson, N. Y.—This invention relates to a new and improved method of forming envelopes for letters and for official and professional inclosures as well as for paper packages or parcels; and it consists in a fold formed on one or more of the edges of the envelope in such a manner that the fold so made may be readily torn off, and the envelope thereby be opened.

MILKING STOOL.—E. W. Hopkins, Oneonta, N. Y.—This invention relates to improvements in milking stools, designed to provide a simple and efficient means for securing the cow's tail while milking; also an improved arrangement of pail-holding attachment.

FLOUR COOLER.—Abraham Staffer and Peter Staffer, Salt Creek, Ind.—This invention relates to an improvement in machines for cooling flour in the process of manufacturing the same, whereby the operation is more thoroughly and speedily performed than by the old method.

WHEEL HUBS.—H. V. Belding, Oppenheim, N. Y.—The object of this invention is to provide certain improvements in the construction of hubs for wagon wheels, calculated to reduce the friction, facilitate oiling, and to economize in the cost of construction.

CONVEYOR "FLIGHT."—John M. Lemon, Polk City, Iowa.—This invention relates to a new and useful improvement in machinery for moving or conveying flour or grain in a horizontal direction in mills or warehouses.

BOLT AND NUT-THREADING MACHINES.—John Killefer, West Richfield, Ohio.—This invention consists in an improved arrangement of the bolt-threading dies and die holders to facilitate the changing of the dies for bolts of different sizes. Also, an improved arrangement of the vise for holding the bolts or rods to be threaded. Also, an improved arrangement of means for throwing the dies out of action when the bolts have been threaded the right length, and for throwing them into action again when a fresh blank has been supplied. Also, an improved arrangement for operating the nut-threading device from the bolt-threading operating mechanism; and, also, an improved arrangement for gearing and ungearing the nut-threading spindle.

SPITTOON FOOTSTOOL.—Charles Marcher, New York city.—This invention relates to new and useful improvements in foot-stools, whereby they are made to inclose and secure a spittoon.

OVENS.—D. A. Kennedy, Beloit, Wis.—This invention relates to improvements in ovens, designed to provide an improved arrangement of the means for operating rotary tables within the said oven. Also, an arrangement of means for maintaining a supply of aqueous vapor in the oven while baking; and also a means for imparting aromatic flavors to the bread while baking.

EARTH CLOSETS AND COMMODES.—Henry Moule, Fordington, England, and Henry John Girdlestone, London, England.—This invention relates to improvements in apparatus to be used in closets and commodes, in which dry and powdered earths (consisting of clay in a dry, unburned, or burnt state or loam) lime, peat, and other dry vegetable matters in powder, but more especially dry earths are employed for deodorizing the fresh excrementitious matters by covering or dusting them over with such powders and dry earths.

STEAM BOILERS.—James Eaton, Bridgeport, Ill.—This invention consists in providing a steam chamber within the shell of the boiler, in a manner to be completely enveloped by the water, and an elevated water chamber communicating with the water space, to be so arranged that the boiler may be kept full of water at all times, the water being maintained at such a hight in the said elevated chamber that no change of position, such as is likely to occur to the boiler, will cause any part of the fire surface or steam chamber to become increased, and provided with means for conveying the steam to the said chamber.

PUNCHES.—John Wright, Middleport, Ohio.—This invention consists in an arrangement of right-and-left threaded operating screw for effecting a quick movement of the punch. It consists in an improved arrangement of ratchet mechanism for operating the screw in either direction. It also consists in certain improvements in the method of connecting the punch to the sliding nut by which motion is imparted to the punch.

SELF-FEEDING AND SELF-ROTATING DRILL.—Samuel Lewis, Williamsburgh, N. Y.—This invention has for its especial object the lifting, rotating, and freeing a drill by as nearly one motion and device as is practicable, but which, having in view the large variety of work in the quarry, under water, for coal oil wells, stamp mill movements, etc., shall be applicable to a wider range of uses by a simpler series of means, than anything heretofore produced for such purposes.

PLOWS.—S. T. Godfrey, Scaville, N. J.—This invention has for its object to improve the construction of plows so as to make them better adapted for plowing sedge, sea-weed, and other similar substances.

TABLE LEAF SUPPORT.—C. P. Wing, Lyonsville, Ill.—This invention has for its object to furnish a simple, convenient and secure support for table leaves which shall be so constructed that it may be operated to secure or release the leaves, without its being necessary to stoop and reach under the leaves to operate the support.

WASHING MACHINE.—F. L. Wickham, Pavilion, Ill.—This invention has for its object to furnish an improved washing machine which shall be simple in construction, effective in operation, and easily operted, doing its work quickly and well.

BACKS FOR BRUSHES, HAND MIRRORS, ETC.—W. U. Dudley, Port Richmond, N. Y.—This invention has for its object to improve the construction of brushes, so that the brush may be wet without injuring the veneering or cover of its back, and so that the body of the brush may be removed when worn out and replaced with a new one.

ANIMAL TRAP.—Henry Pattison, Duck Creek, Ill.—This invention has for its object to furnish an improved animal trap, simple in construction and effective in operation; catching and caging the animals in such a way as not to alarm the animals still uncaught, and which shall also be self-setting.

CORN PLANTER.—Geo. H. Wood, Cambridge City, Ind.—This invention has for its object to furnish a simple, convenient, and accurate corn planter which shall be so constructed and arranged as to plant the corn at uniform distances apart, without the gaining or losing of space, which is unavoidable when the planter is operated by wheels rolling upon the ground.

PLOW.—Josiah Long, Leavenworth, Ind.—This invention has for its object to furnish an improved plow which shall be so constructed as to more thoroughly turn and pulverize the soil than plows constructed in the ordinary manner, while at the same time it may be adjusted to turn a narrow or wide furrow according to the character of the soil to be plowed.

HAY LOADER.—F. W. Harlow, Hannibal, Mo.—This invention consists in a rake of curved teeth of steel wire, suspended from the axle of a two-wheel carriage, to be attached to and drawn by the side of the wagon to be loaded; also of a broad elevator supported on the same carriage and operated thereby, which takes the hay from the said rake, carrying it up and delivering it into a trough wherein a transverse carrier works also, supported on and operated by the said wheels, and which conveys the hay over the rack to be loaded.

ANIMAL TRAP.—A. C. Flanders, Owatonna, Minn.—This invention relates to that class of animal traps provided with a slip noose and operated by a spring arm. The present improvement consists in the peculiar construction and arrangement of the spring arm, noose, catch, and bait hook, whereby the parts operate in a peculiar manner and with several important advantages over traps of this class heretofore brought into public use.

HAY AND MANURE FORK.—L. D. Pitcher, Pitcherville, Ill.—This invention relates to a new manner of connecting the tines to the handle of a manure and hay fork, for the purpose of producing a substantial fastening, so that the fork will be adapted for loading and transporting loose hay and straw as securely as if the same was in bundles. The invention consists chiefly in the application of a cross bar with dovetail mortises adapted to receive the inverted V-shaped sheet metal tines, and also in a new manner of attaching the crosshead to the flattened back ends of the tines by means of screws and by the ends of the bow.

BAG FASTENER.—Samuel P. Parmly, New Orleans, La.—This invention relates to a novel and convenient device for closing bags of all kinds, and consists in the combination with a knotted string of a novel star-shaped plate for fastening the same to the bag, and of a peculiarly bent wire, which is held to the bag by the said star-shaped plate, and which is to secure the outer end of the knotted string.

FILLING FOR THE WALLS OF SAFES, ETC.—Geo. H. Ireland, Somerville, Mass.—This invention relates to a new filling for walls of safes or other burglar-proof structures, and consists of a novel combination of tubes, plates and spring bars, all arranged so as to make the same almost absolutely burglar-proof. The tubes are set close together, so that they will turn, when an attempt to perforate them should be made, and the rods or bars in them are made so that their fractured ends will close together when they shall have been successfully drilled.

COFFEE AND TEA POT.—Gregor Heiss and Martin Schmidt, Houston, Texas.—This invention relates to a new apparatus for producing extracts from coffee, tea, and other substances, and for straining the same, and it consists of a novel construction of the interior devices by which the substance to be treated is at first thoroughly stirred in the boiling water, and then properly strained, so that a pure and wholesome extract may be produced.

ADJUSTABLE-CENTER SQUARE.—M. J. Trowbridge, Cazenovia, N. Y.—This invention relates to a new center square which is to be used for laying out patterns for toothed wheels, or for other purposes, and which is so arranged that the squaring pins will be held steady in any desired position. The vention consists in the peculiar arrangement of the braces for holding the reversible tongue and the squaring pins.

WATER ELEVATOR.—G. W. Dickerson, Prairieton, Ind.—This invention has for its object to furnish an improved water elevator, which shall be so constructed and arranged that the bucket may be at all times completely under the control of the crank, which shall be simple in construction, not liable to get out of order, and conveniently operated.

VELOCIPEDE.—Fisher A. Spofford and Matthew G. Raffington, Columbus Ohio.—This invention relates to a new driving mechanism for velocipedes, and has for its object to provide greater leverage, and, consequently, greater power than could heretofore be obtained. The invention consists in the application of toothed segments, which are connected with one single lever in such manner that they will simultaneously be oscillated in opposite directions, so that the one swinging backward will impart motion by means of pinion and ratchet pawl to the driving axle.

MILK COOLER.—J. C. Sherwood, West Cornwall, Conn.—This invention lates to a new apparatus for cooling the milk as it comes from the cow, preparatory to filling the same into cans. The present invention has for its object to spread the liquid in a thin layer, while it passes over the cooling surface, so as to obtain quick and reliable action; and it consists in the application of an inclined cooling plate provided with a series of perforated transversely-projecting plates, by which the milk, as it passes through their apertures, during its downward passage on the cooling plate, is spread, so as to move in a thin sheet over the said plate, and will, consequently, have each particle thoroughly cooled.

STEAM GENERATOR.—H. Whittingham, New York city.—This invention relates to a new sectional steam generator, which is so constructed that it will provide a very large heating surface, so as to produce steam with great rapidity, and with a considerable saving of fuel. The invention consists in forming a boiler of sections of horizontal tubes connected by vertical tubes, the horizontal tubes containing smoke flues, so that the water in them will be heated from the outer as well as inner side. The invention consists, also, in forming narrow projecting strips on the sides of the vertical tubes of each section, whereby, when a number of sections are put side by side, transverse partitions are formed, to confine the products of combustion in certain desired channels.

VELOCIPEDE.—John C. Wirtz, New York city.—This invention relates to a new three-wheeled velocipede, which is especially adapted for ladies' use, and which is so constructed that the motion of the feet, by which the vehicle is propelled, cannot be perceived, and so that the driving mechanism is all concealed and protected from dust and rain. The invention consists in the general combination of a protecting shield which has the appearance of a wagon body, with the driving mechanism, which is set in motion by an oscillating footboard, said footboard being concealed by the protecting shield, so that the motion of the feet cannot be perceived. The invention also consists in arranging a convenient steering apparatus, on the front end of the reach, and in covering the same by means of a hood, so that it will be protected from the inclemencies of the weather.

MASON'S SAND SCREEN.—Charles Lockwood, Haverstraw, N. Y.—This invention has for its object to furnish an improved mason's screen, which shall be stronger, more durable, simpler in construction, more effective in use, and which can, at the same time, be manufactured at less cost than the screens constructed in the ordinary manner.

HEAD-REST ATTACHMENT FOR CHURCH PEWS.—John H. Weeden, Waterbury, Conn.—This invention has for its object to furnish an improved device for attachment to church pews, to support the head of the worshipper when inclined, and which shall be so constructed and arranged that it may be conveniently detached from the pew when no longer required for use.

COMBINED CHILD'S CHAIR AND CARRIAGE.—James Lee, New York city.—This invention has for its object to furnish a combined chair and carriage, designed especially for use in the nursery as a toy, but which may be made larger for street use if desired, and which from the various transformations of which it is capable, will prove an unfailing source of amusement to its possessor.

REVOLVING DOUGH MIXER.—Thomas Holmes, Williamsburgh, N. Y.—This invention has for its object to furnish an improved machine for wetting the flour, or mixing or forming the dough, which shall be simple in construction and effective in operation, and at the same time easily operated.

SAW GUMMER.—Abraham Staffer and Peter Staffer, Salt Creek, Ind.—This invention relates to a new and useful improvement in machines for gumming saws, whereby the saw may be gummed without removing the same from the frame.

CULTIVATOR.—I. A. Benedict, West Springfield, Pa.—This invention relates to improvements in cultivating implements for working between the rows of corn, or other plants; and has for its object to provide a cultivator that will work the ground as much as possible between the rows without throwing it on to the plants, especially when small. It consists of a common shovel plow with broad low wings or side plates attached to each side.

VISE.—Otis Dean, Richmond, Va.—The object of this invention is to provide certain improvements in bench vises, calculated to facilitate adjusting them to any required position, and also to adapt the pins and feeding screw to be employed as a part of a drilling press.

HORSE POWER.—Wm. Lauver, Peru Mills, Pa.—The object of this invention is to obtain, at the same time, the maximum of compactness and speed.

GUANO DISTRIBUTOR.—J. D. Coxwell, Gibson, Ga.—The object of this invention is to provide for public use, a light, simple, and convenient hand machine for sowing or distributing guano, or other pulverized fertilizers.

GRAIN SIEVE.—Lorin D. Carpenter, Buffalo Grove, Iowa.—This invention consists in an arrangement of perforated angle plates of thin sheet metal and plain strips, traversing the said plates, and also in an improved arrangement for operating the sieves.

EXTENSION TABLE.—Floyd Hamblin, Madrid Springs, N.Y.—This invention consists in the application to an ordinary table having a permanent top and leaves hinged to each side thereof, of other leaves hinged to legs arranged to slide in and out under the first-mentioned leaves, and to be supported in the same horizontal plane therewith by circular braces when all the leaves are spread.

GUN CARRIAGE.—J. R. Kelso, Freedom, Mo.—This invention consists in a carriage swiveled at each end upon supports, arranged in ways or on tracks crossing each other at right angles, in such a manner that the said supports are moved forward or back in their separate ways, and that the gun may be turned to any required direction.

BRICK TRUCK.—John M. Mayer, Rondout, N. Y.—The object of this invention is to provide a three-wheeled truck for moving the molded bricks while in a soft state, capable at all times of maintaining the load in a level condition to prevent the substance of the bricks from flowing and becoming thicker on the lower sides, as they will do when not kept in a level position.

SEEDER.—Robert B. Tunstall, Norfolk, Va.—This invention consists in the arrangement upon a vehicle resembling a common wheelbarrow, without a box, of a seeding wheel having numerous seeding chambers, radiating from the center, and having adjustable openings at the periphery for discharging the seed, which is rotated by gearing with the axle of the supporting wheel, which is made heavy and forms the drill or groove for the seed. A chain and roller are applied for covering and passing the seed.

Facts for the Ladies.

I have used my Wheeler & Wilson over fifteen years. It has done the sewing for two families, and numerous benevolent purposes, without one cent of repairs. I had no personal instructions, but simply followed the printed directions. MRS. R. E HALE.
Coldwater, Mich.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per line will be charged.

Scientific Books to order. Macdonald & Co.,37 Park Row,N.Y.

Engine and horizontal tubular boiler for sale—15 to 25-horse, now at work at 80 Greenwich st., New York.

Patents and patent articles sold, manufactured,and introduced. National Patent Exchange, Buffalo, N. Y.

Patentees, manufacturers, and venders of water wheels, mill furnishing goods,etc.,who wish their wares noticed in a forthcoming book, on Mills and Milling,will please communicate with Henry Carey Baird, Industrial Publisher, 406 Walnut st., Philadelphia. N. B.—No charge will be made for notice—none inserted unless approved by the editor. Baird's New Catalogue of Industrial Books, June 1, 1869, 72 pages, sent free to any address.

Rolling-mill blanks wanted—3-8, 7-16, 1-2, and 9-16-in. rounds, cut to 1-ft. lengths. Address Box 6,721 New York Postoffice.

See advertisement of Doty Manufacturing Co.'s Punching and Shearing machinery on last page.

Wanted—A pattern maker, with good reference. Address box 75, Ephrata, Lancaster county, Pa.

Wanted—A thorough practical machinist, familiar with the details of first-class work, and qualified to take general oversight of its execution. The right man will find a permanent situation in a well established concern,desirably located. Address with full particulars,Postoffice Box 4,499, New York city.

Wanted—Enterprising men, with large and small capital, to introduce and sell a money-making patented article. Sample and circular sent postpaid for 35c. Address Tusch & Co., 37 Park Row, Room 29, N. Y.

Steam engine, Harrison boiler, rotary pump, wrought iron steam and water pipes, much below cost, by G. Leverich, Mechanical Engineer, 80 Broadway, New York, room 46.

Superintendent wanted in a well-established machinery business, who can buy an interest. Liberal Salary to a thoroughly competent man. None other need apply. Address "Iron Works," Care Joy, Coe & Co., Tribune Buildings, New York.

Builders of bridges, railway cars, and other woodworkers will notice Steptoe, McFarlan & Co.'s advertisement, inside.

An engineer,about leaving for Europe (where he has first-class business friends), to negotiate a very valuable patent, is desirous of receiving one or two similar commissions. 1st-class firms only treated with References A 1. For particulars address H. M., Postoffice Box 6,New York.

A small,useful patent for sale. Address A.Storm,Matteawan,N.Y.

Leschot's Patent Diamond-pointed Steam Drills save, on the average, fifty per cent of the cost of rock drilling. Manufactured only by Severance & Holt, 16 Wall st., New York.

For Sale—A Patent valuable to manufacturers of farm machinery. Will sell low, or trade for lands. Send address to H. S., Box 651, Cincinnati Postoffice, Ohio.

Peck's patent drop press. For circulars, address the sole manufacturers, Milo Peck & Co., New Haven, Ct.

New Machine for Grinding Tools,etc., great saving of files and labor by their use. Address American Twist Drill Co., Woonsocket, R. I.

Gear-cutting engines—new patterns—cut every number up to 127, and 26 in. diam., made by A. H. Saunders, Nashua, N. H.

Cider Mills for sale, and rights to manufacture. Address H. Sells, Vienna, Ont., or Shaw & Wells, Buffalo, N. Y.

Scientific American—Old and scarce volumes, numbers, and entire sets of the Scientific American for sale. Address Theo. Tusch, Box 448, or Room 29, No. 37, Park Row, New York city.

State Rights for sale of a new and valuable improvement on the velocipede, in successful operation. L. H. Soule, Binghamton, N. Y

Glynn's Anti-incrustator for steam boilers—the only reliable preventive. Prevents foaming and does not attack the metals of the boiler Liberal terms to agents. M. A. Glynn & Co., 735 Broadway, New York.

For the best hammer and sledge handles, made of carefully-selected, well-seasoned, second-growth hickory, address Hoopes, Bro. & Darlington, West Chester Spoke Works, West Chester, Pa.

Tempered steel spiral springs made to order. John Chatillon, 91 and 93 Cliff st., New York.

A. A. Fesquet, practical and analytical chemist. Construction of chemical works, etc., 323 Walnut st., Philadelphia.

The Tanite Emery Wheel—see advertisement on inside page.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Machinists, boiler makers, tinners, and workers of sheet metals read advertisement of Parker's Power Presses.

Winans' boiler powder, 11 Wall st., N. Y., removes Incrustations without injury or foaming 12 years in use. Beware of imitations.

APPLICATIONS FOR EXTENSION OF PATENTS.

SEWING MACHINE CASES.—F. A. Ross, of New York city, for himself, and as assignee of William H. Marshall, of his interest in the extended term, has applied for an extension of the above patent. Day of hearing August 16, 1869.

GRASS HARVESTER.—James Haines, of Pekin, Ill., administrator of the estate of Jonathan Haines, deceased, has petitioned for the extension of the above patent. Day of hearing, August 16, 1869.

BANK LOCK.—Joshua H. Butterworth, Dover, N. J., has applied for an extension of the above patent. Day of hearing August 23, 1869.

MACHINERY FOR FOLDING AND MEASURING CLOTH.—J.D.Elliott,Leicester, Mass., has petitioned for an extension of the above patent. Day of hearing August 23, 1869.

METHOD OF OPERATING RECIPROCATING SAWS.—Ozias S. Woodcock, of Paris, Ill., has petitioned for the extension of the above patent. Day of hearing August 23, 1869.

KNITTING MACHINE.—Clark Tompkins, of Troy, N. Y., and John Johnson, of Boston, Mass., has petitioned for an extension of the above patent. Day of hearing, August 30, 1869.

Official List of Patents.

Issued by the United States Patent Office.

FOR THE WEEK ENDING JUNE 15, 1869.

Reported Officially for the Scientific American.

SCHEDULE OF PATENT OFFICE FEES:

On each caveat	$10
On filing each application for a Patent (seventeen years)	$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 an application for Design (three and a half years)	$10
On an application for Design (seven years)	$15
On an 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.

For copy of Claim of any Patent issued within 30 years $1
A sketch from the model or drawing, relating to such portion of a machine as the Claim covers, from $1
upward, but usually at the price above-named.
The full Specification of any patent issued since Nov. 20, 1866, at which time the Patent Office commenced printing them ....$1·25
Official Copies of Drawings of any patent issued since 1836, we can supply at a reasonable cost, the price depending upon the amount of labor involved and the number of views.
Full information, as to price of drawings, in each case, may be had by addressing
MUNN & CO.,
Patent Solicitors, No. 37 *Park Row, New York.*

91,197.—NUT LOCK.—S. C. Adams, Buffalo, N. Y.
91,198.—CHECK-BOOK CLIP.—A. B. Auer, Chicago, Ill.
91,199.—VISE.—Noyes Baldwin, Buffalo, N. Y.
91,200.—SLIDE BLOCK FOR MULEY SAW MILLS.—A. P. Barlow, Kalamazoo, Mich.
91,201.—COMPOUND TOOL FOR REAMING AND SQUARING PIPES.—Wm. Barry, Chicago, Ill.
91,202.—GRAIN BINDER.—C. L. Beamer, Cambria, N. Y.
91,203.—BEEHIVE.—Henry Berix, Petersburgh, Ohio.
91,204.—WAGON WHEEL.—C. W. Bierbach, Milwaukee, Wis.
91,205.—INJECTOR.—A. J. Blakslee and G. C. Williams, Du Quoin, Ill.
91,206.—COTTON SEED PLANTER.—A. W. Brian, Ouachita county, Ark.
91,207.—LET-OFF MECHANISM FOR LOOMS.—L. C. Briggs and Albert Howard, Boston, Mass.
91,208.—LAMP BURNER.—A. W. Browne (assignor to Mary A. Van Alen), Brooklyn, N. Y.
91,209.—TINSMITHS' MACHINE.—Bradford Buckland (assignor to S. Stow Manufacturing Co.), Plantsville, Conn.
91,210.—CIDER MILL.—C. L. Carter, Union City, Ind.
91,211.—FEED PUMP FOR LOCOMOTIVE ENGINES.—Plumer Cheswell, Manchester, N. H.
91,212.—CULTIVATOR.—B. M. Close, West Camden, N. Y.
91,213.—CARBURETER.—W. H. Covel, New York city.
91,214.—KNITTING MACHINE.—Thomas Crane, Fort Atkinson, Wis.
91,215.—KNITTING MACHINE AND KNITTED FABRIC.—Thos. Crane, Fort Atkinson, Wis.
91,216.—COMPOSITION TO BE USED IN THE MANUFACTURE OF PAINTS, CEMENTS, HARD AND SOFT RUBBER, AND THE LIKE.—Ferdinand Dickenson, Jr. (assignor to himself and J. E. Coleman), Hartford, Conn. Antedated June 4, 1869.
91,217.—THEATER CHAIR.—Wm. Dixon, Boston, Mass.
91,218.—COMPOSITION TO DESTOY THE APPETITE FOR TOBACCO.—Edward Douglass, Gorham, Me.
91,219.—MACHINE FOR FINISHING LEATHER, PAPER, ETC.—Peter Farrell, Albany, N. Y.
91,220.—PAPER FOR THE MANUFACTURE OF PAPER BAGS.—W. E. Farrell, Philadelphia, Pa. Antedated June 4, 1869.
91,221.—PADDLE WHEEL.—A. C. Fletcher, New York city.
91,222.—DOOR SPRING.—O. V. Flora (assignor to A. Balding and J. C. Moore), Madison, Ind.
91,223.—COMPOSITION CEMENT FOR SETTING SLATES, MAKING GUTTERS, ETC.—John Fullager and Miles Byrne, New York city.
91,224.—STEAM ENGINE.—Wm. Fuzzard, Chelsea, Mass.
91,225.—BUNG CUTTER.—A. J. Gibson (assignor to W. C. Davis and J. W. Garrison), Cincinnati, Ohio. Antedated June 8, 1869.
91,226.—OAR.—R. E. Gleason (assignor to himself and E. W. Parkhurst), Libertyville, Ill.
91,227.—HOUSEHOLD IMPLEMENT.—Aaron Guinzburg, Boston, Mass.
91,228.—MODE OF ATTACHING HUBS TO AXLES.—John Gunn, Salem township, Ill.
91,229.—FEEDING DEVICE FOR MACHINES FOR COMBING COTTON, ETC.—C. F. Hadley, Chicopee, Mass., and Elisha Johnson, Wethersfield, Conn.
91,230.—WHIFFLETREE HOOK.—J. A. Hammon, Franconia, Minn.
91,231.—STOVE DRUM.—W. P. Hepburn and William Reiner, Clarinda, Iowa.
91,232.—SETTEE.—Sullivan Hill (assignor to himself and E. A. Hill), Spencer, Mass.
91,233.—CHECKER MEN.—J. W. Hyatt, Jr., Albany, N. Y.
91,234.—DOMINO.—J. W. Hyatt, Jr., Albany, N. Y.
91,235.—MANUFACTURE OF DOMINOS.—J. W. Hyatt, Jr., Albany, N. Y.
91,236.—MACHINE FOR LOADING LOCOMOTIVE TENDERS.—J. N. Jackson, Brookhaven, Miss.
91,237.—HORSESHOE CALKS.—Joseph Jorey, North Manchester, Conn.
91,238.—MACHINE FOR PEELING FRUIT.—Charles Lehman, Hartford, Conn.
91,239.—HOT-AIR ENGINE.—Wilhelm Lehmann, Nuremberg, Germany, assignor to himself and Stehn & Wulfing, New York city.
91,240.—APPARATUS FOR PERFORATING PAPER FOR TELEGRAPHING.—George Little, Hudson City, N. J., assignor to himself and Marshall Lefferts, N. Y. city.
91,241.—APPARATUS FOR PERFORATING PAPER FOR AUTOMATIC TRANSMITTERS.—George Little, Hudson City, N. J., assignor to Marshall Lefferts, New York city, and Marshall Lefferts, assignor to himself and George Little.
91,242.—HAY LOADER.—A. W. Lozier, New York city.
91,243.—HAY RAKER AND LOADER.—A. W. Lozier, New York city.
91,244.—CABINET BEDSTEAD.—S. C. Maine, Boston, Mass.
91,245.—STOVE DAMPER.—H. Mallory, Milwaukee, Wis.
91,246.—HARVESTER.—J. P. Manny, Rockford, Ill.
91,247.—STEAM GENERATOR.—Carlile Mason, Chicago, Ill.
91,248.—MACHINE FOR MANUFACTURING METAL CANS.—John Mays and E. W. Bliss, Brooklyn, N. Y.
91,249.—CARTRIDGE BOX.—J. R. McGinnis, Washington, D.C. Antedated June 2, 1869.
91,250.—PISTON PACKING.—Andrew McMullin, Paterson, N. J.
91,251.—MECHANICAL MOVEMENT.—Henry Merriman, Bloomington, Ill.
91,252.—APPARATUS FOR BENDING TIRES.—John Metzgar, Rancho Gap, Pa.
91,253.—ICE VELOCIPEDE.—G. H. Miller and John Jageler, Binghamton, N. Y.
91,254.—STEAM GENERATOR.—R. B. Mitchell, Chicago, Ill.
91,255.—STEAM GENERATOR.—D. M. Nichols, New York city.
91,256.—FRUIT PICKER.—Thomas Nutting, Georgiaville, R. I.
91,257.—THRASHING MACHINE.—Geo. Oerlein, Utica, Minn.
91,258.—HAMES STRAP.—George Paddington and W. F. Crew, Waubeck, Iowa.
91,259.—BED BOTTOM.—Thomas Payne (assignor to Walter Wilkins and A. D. Plumb), Grand Rapids, Mich.
91,260.—MAGAZINE COOKING STOVE.—J. S. Perry, Albany, N. Y.
91,261.—SAFETY ATTACHMENT FOR BREASTPINS.—Charles F. Pierce, Providence, R. I.
91,262.—GRAIN SIEVE.—Peter Plamandon and N. A. Maher, Atchison, Kansas.
91,263.—LAMP.—George Pugh, Cleveland, Ohio.
91,264.—MACHINE FOR MEASURING AND WINDING CLOTH, ETC.—J. E. Race and Hiram Whitney, Chicago, Ill.
91,265.—UTERINE SUPPORTER.—J. S. Rankin, Pittsburgh, Pa.
91,266.—BEEHIVE.—E. B. Redfield, White's Corners, and E.C Hubbard, Water Valley, N. Y.
91,267.—MACHINE FOR MAKING LEAD SHAVINGS.—Joseph Repetti, Philadelphia, Pa.
91,268.—PAPER FILE.—A. S. Richards, Montgomery county Md.
91,269.—CUTTER HEAD.—Charles Richards and Willard Curtiss, Cleveland, Ohio.
91,270.—GRAIN SEPARATOR.—Henry Richmann, Cincinnati, Ohio.
91,271.—PROCESS FOR RECUTTING FILES.—Xiste Robert Worcester, Mass.
91,272.—SYRINGE FOR DESTROYING COTTON-PLANT WORMS.—Antonia Robira, Galveston, Texas.
91,273.—MEAT CHOPPER.—M. E. Russel, China, Me.
91,274.—COFFEE POT.—Silas T. Savage, Greenbush, N. Y., assignor to himself and J. S. Perry, executor and trustee.
91,275.—COOKING STOVE.—A. C. Schwanke, La Prairie,Ill.
91,276.—PERCUSSION CAP HOLDER.—F. J. Seymour,and O. N. Perkins, Meriden, Conn.
91,277.—PAGING MACHINE.—C. L. Sholes, Milwaukee, Wis. Antedated June 4, 1869.
91,278.—METALLIC CARTRIDGE.—Dexter Smith, Springfield, Mass.
91,279.—PORTABLE FURNACE FOR SHRINKING ON AND REMOVING TIRES.—W. Bell Smith, Charleston, S. C.
91,280.—THILL COUPLING.—W. C. Spalding and C. P. Southwell, Watertown, Wis.
91,281.—MACHINE FOR ROUNDING UP BOOT AND SHOE SOLES.—E. M. Stevens, Chelsea, Mass.
91,282.—GRAIN BINDER.—Ole O. Storle, Norway, assignor to himself, J. G. Flint, Jr., and Mary M. Mason, Milwaukee, Wis.
91,283.—HOISTING APPARATUS.—Henry D. Stover, New York city. Antedated June 2, 1869.
91,284.—MILLSTONE PICK.—H. P. Straub, Cincinnati, Ohio.
91,285.—CORDER FOR SEWING MACHINES.—J. B. Sulgrove, Indianapolis, Ind.
91,286.—INSTRUMENT FOR PARING HORSES' HOOFS.—John Temple, Van Buren, Ohio.
91,287.—FIREPLACE HEATER.—J. M. Thatcher, Bergen, N. J.
91,288.—MACHINE FOR MAKING METALLIC NUTS.—A. S. Upson, Unionville, Conn.
91,289.—MODE OF CONSTRUCTING HOUSES.—Fred. Walton, Staines, England. Patented in England, Dec. 11, 1868.
91,290.—JAW FOR BOOMS.—Isaac Webster (assignor to Jas. F. Moses), Bucksport, Me.
91,291.—PIPE COUPLING.—F. R. Wegman (assignor to himself and F. C. Hydel) Hartford, Conn.
91,292.—GUIDE FOR SEWING MACHINE.—G. W. Wells, Washington, D. C.
91,293.—MACHINE FOR CUTTING RASPS.—J. B. West, Geneseo, N. Y.
91,294.—STEAM GENERATOR.—I. N. Wilfong, Philadelphia, Pa.
91,295.—HANGING MILLSTONES.—A. W. Winall, Cincinnati, Ohio.
91,296.—COMPOUND FOR CLEANING AND SCOURING WOOD, METAL, ETC.—F. M. Woodbury (assignor to himself and J. P. Bonnell), New York city. Antedated June 8, 1869.
91,297.—AUTOMATIC FAN.—David Aaron, San Francisco, Cal.
91,298.—MODE OF PREPARING RENNET FOR USE IN MAKING CHEESE.—L. B. Arnold, Lansing, N. Y.
91,299.—FIREPLACE.—Thomas F. Baker, Cincinnati, Ohio.
91,300.—SWIMMING APPARATUS.—Frederick Barnett, Paris, France.
91,301.—HEATING DRUM.—S. M. Bayard, Ionia, Mich.
91,302.—CARRIAGE HUB.—H. V. Belding, Oppenheim, N. Y.
91,303.—CULTIVATOR.—I. A. Benedict, West Springfield, Pa.
91,304.—APPARATUS FOR EXTINGUISHING FIRES.—J. F. Boynton, Syracuse, N. Y.
91,305.—LOOM FOR WEAVING HATS.—Peter Brooks (assignor to himself, and C. O. Crosby), New Haven, Conn.
91,306.—TIRE COOLER.—T. S. Brown, Boston, Mass., and Geo. W. Gou'd, Camden, Me. Antedated June 9, 1869.
91,307.—GRAIN SIEVE.—Loren D. Carpenter, Buffalo Grove, Iowa.
91,308.—FASTENING FOR HAND-REIN.—L. C. Chase, Boston, Mass.
91,309.—VISE AND DRILL COMBINED.—Otis Dean, Richmond, Va.
91,310.—IRON FENCE.—D. I. DeGroat, Newburg, N. Y.
91,311.—WATER ELEVATOR.—G. W. Dickerson, Prairieton, Ind.
91,312.—TOOL FOR HOLDING DIAMONDS FOR DRESSING STONE.—John Dickinson, Bay Ridge, N. Y.
91,313.—MODE OF TREATING THE SPENT OXIDE OF IRON USED FOR PURIFYING GAS.—S. R. Divine, New York city.
91,314.—BACK FOR BRUSHES.—W. U. Dudley, Port Richmond, N. Y.
91,315.—HARVESTER RAKE.—J. C. Durborow, Ellicott's City, Md.
91,316.—STEAM GENERATOR.—Jas. Eaton, Bridgeport, Ill.
91,317.—HOE AND RAKE.—Augustin Ellis and Oliver Albertson, Salem, Ind.
91,318.—SEWING MACHINE.—M. J. Ferren (assignor to himself and W. J. Battles), Stoneham, Mass.
91,319.—PIPE COUPLING.—J. J. Fifield, East Boston, Mass.
91,320.—TEA AND COFFE POT.—J. H. Finch, Rochester, N. Y.
91,321.—BEEHIVE.—J. E. Finley, Enon, Ohio.
91,322.—VELOCIPEDE.—D. P. Flint, Nueces county, Texas.
91,323.—VELOCIPEDE.—D. P. Flint, Nueces county, Texas.
91,324.—MANUFACTURE OF IRON AND STEEL.—J. Lee Floyd, Philadelphia, Pa.
91,325.—LAMP.—Jim B. Fuller, Norwich, Conn.
91,326.—SASH-CORD FASTENIMG.—J. J. Gabel, Lebanon, Pa.
91,327.—MECHANISM FOR DRIVING SEWING MACHINES.—Caroline Garcin and U. Adam, Colmar, France.
91,328.—PLOW.—S. T. Godfrey, Seaville, N. J.
91,329.—ASH SIFTER.—B. J. Greely, Boston, Mass.
91,330.—FRUIT STAND.—Arthur Greenman, East Kendall, N. Y.
91,331.—ENVELOPE.—G. P. Hachenberg, Hudson, N.Y.
91,332.—EXTENSION TABLE.—Floyd Hamblin, Madrid Springs, N. Y.
91,333.—COFFEE AND TEA POT.—Gregor Heiss and Martin Schmidt, Houston, Texas.
91,334.—DIAPER.—J. C. Hempel, Baltimore, Md.
91,335.—REVOLVING DOUGH MIXER.—Thomas Holmes, Williamsburgh, N. Y.
91,336.—MILKING STOOL.—E. W. Hopkins, Oneota, N. Y.
91,337.—STEAM-ENGINE STOP-VALVE.—W. H. Howland, San Francisco, Cal.
91,338.—WATER WHEEL.—Rodney Hunt (assignor to himself J. B. Waite, and D. B. Flint), Orange, Mass.
91,339.—MANUFACTURE OF RAILWAY RAILS.—J. S. Hunter, Lowellville, Ohio.
91,340.—LINE HOLDER.—C. S. Hutchins, Canton, Conn.
91,341.—METHOD OF MAKING SOLID COLLODION.—J. W. Hyatt, Jr., Albany, N. Y., and I. S. Hyatt, Rockford, Ill.
91,342.—BURGLAR-PROOF SAFE.—George H. Ireland, Somerville, Mass.
91,343.—HOMINY-MILL BURR.—Andrew P. Jackson, Memphis, Ind.
91,344.—FIELD FENCE.—D. W. Keefer, Leechburg, Pa.
91,345.—GUN CARRIAGE.—J. R. Kelso (assignor to himself and Ernest Quast), Freedom, Mo.
91,346.—APPARATUS FOR DETACHING HORSES FROM CARRIAGES.—Solomon Kepner (assignor to J. E. Meister, and J. F. Evans), Pottstown, Pa.
91,347.—HARVESTER.—John Kershaw, Kent, Ohio.
91,348.—MACHINE FOR THREADING BOLTS AND NUTS.—John Killeter, West Richfield, Ohio.
91,349.—BOTTLE STOPPER.—F. Kutscher, New Haven, Conn.
91,350.—CHILD'S CHAIR AND CARRIAGE.—James Lee, New York city.
91,351.—CONVEYER-"FLIGHT."—John M. Lemon, Polk City, Iowa.
91,352.—ROCK DRILL.—Samuel Lewis, Williamsburgh, N. Y.
91,353.—SAND SCREEN.—Charles Lockwood, Haverstraw, N. Y.
91,354.—PLOW.—Josiah Long, Leavenworth, Ind

91,355.—Wool Table.—Jesse Mallette, Catharine, N. Y.

91,356.—Spittoon Footstool.—Charles Marcher, New York city.

91,3'7.—Cooking Stove.—Geo. Mayer, Cincinnati, Ohio.

91,358.—Brick Truck.—John Mayer, Rondout, N. Y.

91,259.—Permutation Lock.—John H. Morse (assignor to himself and Henry W. Wells), Peoria, Ill. Antedated May 28, 1869.

91,360.—Churn.—J. L. Nettleton (assignor to himself and F. Caffray), West Cheshire, Conn.

91,361.—Cotton-bale Tie.—T. Campbell Oakman, Paterson, N. J.

91,362.—Bag Fastener.—S. P. Parmly, New Orleans, La.

91,?63.—Animal Trap.—Henry Pattison, Duck Creek, Ill.

91,364.—Mosaic Covering for Floors.—Shadrach H. Pearce, Boston, Mass.

91,365.—Apparatus for Destroying Worms on Cotton Plants.—M. Perl, Houston, Texas. Antedated June 9, 1869.

91,366.—Railroad Car Duster.—Lawrence M. Platt, Chicago, Ill.

91,367.—Fork Blank.—J. C. Richardson, Ilion, N. Y.

91,3'8.—Valve and Opening for Steam Engines.—F. Rochow, New York city.

91,369.—Cabinet Hook.—J. B. Sargent, New Haven, Conn.

91,370.—Machine for Rounding Whalebone for Corsets.—James A. Sevey, Boston, Mass.

91,371.—Fur Collar.—R. M. Seldis (assignor to Myer Stern), New York city.

91,372.—Milk Cooler. — J. C. Sherwood, West Cornwall, Conn.

91,373.—Mode of Purifying and Deodorizing Sewage, etc.—William Cameron Sillar, Matheran, Sydenham Hill, Robert George Sillar, 7 Cintra Park, Upper Norwood, and George William Wigner, Grove Lane, Camberwell, Great Britain.

91,374.—Liquid Meter.—J. Plumer Smith, Cleveland, Ohio.

91,375.—Fireproof Ceiling. — Samuel P. Snead, Louisville, Ky.

91,376.—Automatic Gas Regulator for Blow Pipes.—Joseph H. Snow, Providence, R. I.

91,377.—Compounds Containing Xyloidine.—Daniel Spill, Paradise Terrace, Hackney, England.

91,378.—Mode of Protecting Insulated Telegraph Wires.—Daniel Spill, Paradise Terrace, Hackney, England.

91,379.—Velocipede.—Fisher A. Spofford and Matthew G. Raffington, Columbus, Ohio.

91,380.—Saw Gummer.—Abraham Staffer and Peter Staffer, Salt Creek, Ind.

91,381.—Flour Cooler.—Abraham Staffer and Peter Staffer, Salt Creek, Ind.

91,382.—Muff.—Myer Stern and R. M. Seldis, New York city.

91,383.—Steam Plow.—Linus Stewart, San Francisco, Cal.

91,384.—Sawdust Feeder for Furnaces.—Samuel Sykes (assignor to himself and Michael Gorland), Chippeway Falls, Wis.

91,385.—Center Square. — M. J. Trowbridge, Cazenovia, N. Y.

91,386.—Seeder.—Robert B. Tunstall, Norfolk, Va.

91,387.—Post Auger.—A. Vaughan, Chicago, Ill.

91,388.—Attachment of Main Springs to Watch Barrels, etc.—Arthur Wadsworth, Newark, N. J. Antedated December 15, 1868.

91,389.—Head-rest for Church Pews.—John H. Weeden (assignor to himself and L. G. Arnold) Waterbury, Conn.

91,390.—Trace Buckle.—Jacob Welker, Attica, N. Y.

91,391.—Rolling Tobacco. — John Wettstein, Lynchburg, Va.

91,392.—Carpet Stretcher and Nailer.—Elonzo S. Wheeler, Westport, Conn.

91,393.—Mode of Protecting Insulated Telegraph Wires.—Edward Orange Wildman Whitehouse, Stoke, Newington, England.

91,394.—Knob Latch. — Andrew F. Whitting, Greenville, Conn.

91,395.—Steam Generator.—H. Whittingham, New York city.

91,396.—Washing Machine.—Flavius L. Wickham, Pavilion, Ill.

91,397.—Table-leaf Support.—Charlas P. Wing, Lyonsville, Ill.

91,498.—Velocipede.—John C. Wirtz, New York city.

91,399.—Corn Planter.—George H. Wood, Cambridge City, Ind.

91,400.—Punch.—John Wright (assignor to himself and J. W. Wells), Middleport, Ohio.

91,401.—Harvester Rake.—Abram Adams, Boston Station, Ky.

91,402.—Apparatus for Tanning Hides.—Henry W. Adams, Philadelphia, Pa.

91,403.—Device for Carrying Lumber from the Saw in Circular Saw Mills.—John H. Adams, Martinsville, Ind.

91,404.—Railway Car Brake.—Arthur M. Allen, New York city.

91,405.—Necktie.—John Bachelder, Norwich, Conn.

91,406.—Fastening for Necktie.—John Bachelder, Norwich, Conn.

91,407.—Process of Cleaning Cotton and Woolen Wastes from Oils, Grease, etc.—Haydn M. Baker, Washington, D. C.

91,408.—Process for Cleaning Plate Printers' Cloths, etc.—Haydn M. Baker, Washington, D. C.

91,409.—Cabinet for Dressing Bureau.—Wm. E. Beames, New York city.

91,410.—Machine for Carving and Ornamenting Woodwork.—Myron T. Boult, Battle Creek, Mich.

91,411.—Fire Extinguisher.—J. F. Boynton, Syracuse, N. Y.

91,412.—Grain Separator.—Abram Burkholder, Cornelius Burkholder, and Henry K. Burkholder, Clear Spring, Pa.

91,413.—Safety Valve.—Charles Burley, Cincinnati, Ohio.

91,414.—Gluing Hopper.—James W. Campbell and William J. Miller, New York city.

91,415.—Potato Digger.—Horace Carrier, Kirtland, Ohio.

91,416.—Telegraph Wire.—Alanson Cary (assignor to the American Compound Telegraph Wire Company) New York city.

91,417.—Machine for Making Compound Telegraph Wire.—Alanson Cary (assignor to the American Compound Telegraph Wire Company), New York city.

91,418.—Hoop Skirt.—John F. Chase, Augusta, Me.

91,419.—Cartridge Box.—Felix Chillingworth, Springfield, Mass.

91,420.—Corn-stalk Cutter.—Milton Clark, Oakley, Ill.

91,421.—Breech-loading Firearm.—Loughlin Conroy, New York city.

91,422.—Curtain Fixture.—Henry T. Cooper (assignor to himself and Wm. Pitman), New York city.

91,423.—Apparatus for Making Light from Hydrocarbon Liquids.—E. Hall Covell, New York city.

91,424.—Railway Car Axle.—Daniel M. Cummings, Enfield, N. H., assignor to himself, Francis H. Wells, and Salmon R. Godfrey.

91,425.—Harness Tug.—J. S. H. Dickinson, Jackson, Pa.

91,426.—Mold for Casting Solder.—John Fanning, Brooklyn, N. Y., assignor to Thomas Otis Le Roy and Co., New York city.

91,427.—Animal Trap.—A. C. Flanders, Owatonna, Minn.

91,428.—Saw Handle.—Joseph Flint, Rochester, N. Y.

91,429.—Match-boxing Machine.—Nelson B. Forest, Auburn, N. Y.

91,430.—Turbine Water Wheel.—Theodore M. Fuller, Hainesville, N. J.

91,431.—Harness-operating Mechanism for Looms.—John F. Gebhart, New Albany, Ind.

91,432.—Device for Raising and Kneading Bread.—A. G. Good, Reading, Pa.

91,433.—Laundry Heater.—Charles H. Goss, Troy, N. Y.

91,434.—Guano Distributor.—John D. Coxwell, Gibson, Ga.

91,435.—Mode of Attaching Rubber Tires to Wheels.—J. Ashton Greene, Brooklyn, N. Y.

91,436.—Hot-air Furnace.—Daniel Gusweiler (assignor to himself and Jacob Hoffner) Cincinnati, Ohio.

91,437.—Miniature Rink. — Cordelia C. Hall, Saratoga Springs, N. Y.

91,438.—Velocipede.—C. A. Harper, New York city.

91,439.—Skirt Board and Ironing Table.—L. M. Harvey, Albany, N. Y. Antedated June 4, 1869.

91,440.—Apparatus for Shoveling Grain.—T. D. Hawley, Detroit, Mich.

91,441.—Cornice for Curtains.—Charles Washington Hill, New York city.

91,442.—Cartridge Case Charger.—A. C. Hobbs, Bridgeport, Conn.

91,443.—Extension Slide for Gas Fixtures.—John Horton, New York city.

91,444.—Corn Harvester.—William B. Hubbard, Arrington Depot, Va.

91,445.—Plow.—Leavitt Hunt, Weathersfield, Vt.

91,446.—Oil for Curriers' Use.—J. B. Kendall, Boston, assignor, to himself and J. O. Safford, Salem, Mass.

91,447.—Apparatus for Distilling Hydrocarbons.—J. J. Johnston, Allegheny City, assignor to John T. Tyler, A. R. Hurst, Henry M. Myers, and David M. Armor, Pittsburgh, Pa. Antedated June 12, 1869.

91,448.—Apparatus for Distilling Hydrocarbon Oils.—J. J. Johnston, Allegheny City, assignor to John T. Tyler, A. R. Hurst, Henry M. Myers, and David M. Armor, Pittsburgh, Pa. Antedated June 10, 1869.

91,449.—Method of Making Carpenters' Squares.—H. K. Jones, Kensington, Conn.

91,450.—Sadiron Heater.—A. J. Kennedy, St. Louis, Mo.

91,451.—Oven.—D. A. Kennedy, Beloit, Wis., assignor to himself, Wm. Wadsworth, and E. D. Murray.

91,452.—Nail Extractor.—Wm. Knaus, Otterville, Mo.

91,453.—Combination of Rocker, Sled, and Swing.—Geo. Knell, Moorestown, N. J. Antedated June 8, 1869.

91,454.—Churn Dasher.—Gottleib Lange, East Saginaw, Mich.

91,455.—Roofing Paint.—C. W. Langworthy, Bergen, N. J.

91,456.—Horse-Power.—Wm. Lauver, Peru Mills, Pa.

91,457.—Wind Wheel.—T. S. Lines, Newcastle, Ind.

91,458.—Fabric from Fibrous Sheets and Hard Rubber.—R. O. Lowrey, Salem, N. Y.

91,459.—Fire Extinguisher.—S. C. Maine, Boston, Mass.

91,460.—Skate.—M. W. Marshall, Hudson, Mich.

91,461.—Sawing Machine.—Wm. Martin, Bay City, Mich., assignor to himself and H. B. Everett, Washington, D. C.

91,462.—Horse Fetter.—A. P. Mason (assignor to himself and Zalmon Hanford), Gowanda, N. Y.

91,463.—Bridle Bit.—A. P. Mason (assignor to himself and Zalmon Hanford), Gowanda, N. Y.

91,464.—Coulter Cleaner.—A. B. Mattoon, Auburn, N. Y.

91,465.—Sash Fastener.—W. W. Maughlin, Baltimore, Md.

91,466.—Manufacture of White Lead.—F. F. Mayer, New York city.

91,467.—Churn Power.—David McCurdy, Ottawa, Ohio.

91,468.—Rotary Steam Engine.—Thomas McEwen, Chicago, Ill.

91,469.—Rocking Chair.—A. K. McMurray, Utica, N. Y.

91,470.—Revolving Show Case.—O. H. Melendy, Delhi, Iowa.

91,471.—Corn Plow.—A. D. Michener and J. W. Steigmeyer, Attica, Ohio.

91,472.—Plow.—W. D. Miller, Enon, Ohio.

91,473.—Postal-currency Envelope.—Fisk Mills, Washington, D. C., assignor to himself, M. P. Norton, Troy, N. Y., and G. H. Penfield, Hartford, Conn.

91,474.—Deodorizing Apparatus for Water Closets.—Henry Moule, Fordington, and Henry John Girdlestone, London, England.

91,475.—Construction of Hot-water Boilers. — Anton Müller, Brooklyn, N. Y.

91,476.—Machine for Making Rubber Hose, etc.—John Murphy and A. H. Hook, New York city.

91,477.—Method of Coating Hinges with Tin.—H. M. Myers, Allegheny City, Pa.

91,478.—Machine for Refitting Conical Valves.—Isaiah Nutt, New York city.

91,479.—Combined Latch and Lock.—Anton Ochsner, New Haven, Conn.

91,480.—Manufacture of Paper.—John Pickles, Wigan, England.

91,481.—Milk Cooler.—M. F. Potter, Kaneville, Ill.

91,482.—Harvester.—Geo. Pye, Boston, Mass.

91,483.—Hopper Cock.—Peter Regitz, Chicago, Ill.

91,484.—Sewing Machine Work Plate.—George Rehfuss, (assignor to the American Buttonhole Over-seaming & Sewing Machine Co.), Philadelphia, Pa.

91,485.—Evaporating Apparatus.—Dexter Reynolds, Albany, N. Y.

91,486.—Method of Constructing Piles for Forming Axles, etc.—Percival Roberts, Philadelphia, Pa.

91,487.—Potato Digger.—James Roberts, White Pigeon, Mich.

91,488.—Boat Detaching Apparatus.—William S. Ryerson, (assignor to himself, Amos L. Tripp, and Charles Chambers), New York city.

91,489.—Corn Planter.—H. C. Shafer, Petersburg, Ind.

91,490.—Sash Holder.—Christian Sholl, Mount Joy, Pa.

91,491.—Ash Sifter.—De Witt Stevens, Newark, N. J.

91,492.—Beehive.—Solomon Stevens, Terre Coupee, Ind.

91,493.—Smelting Furnace. — Charles H. Swain, Brooklyn, N. Y.

91,494.—Potato and Corn Planter.—A. J. Taylor, Manchester, Ind.

91,495.—Baling Press.—H. H. Tift, Mystic, Conn.

91,496.—Gas Stove.—L. Trowbridge and W. H. Trowbridge, New York city.

91,497.—Reversible Cultivator.—Seth G. Tufts, Maineville, Ohio.

91,498.—Machine for Making Covered Cord.—John Turner, Norwich, Conn.

91,499.—Apparatus for Making Gas from Hydrocarbons.—John T. Tyler, Pittsburgh, and James J. Johnston, Allegheny City, assignors to J. T. Tyler, A. R. Hurst, H. M. Myers, and D. M. Armor, Pittsburgh, Pa. Antedated June 12, 1869.

91,500.—Whiffletree.—Alexander Vail, Henry, Ill.

91,501.—Harvester.—W. J. Wallis and W. E. Huttmann, Chicago, Ill.

91,502.—Wine and Cider Press.—Joseph Weizenecker, St. Louis, Mo.

91,503.—Process for Making Augers and Boring Bits.—Cornelius Whitehouse, Bridgetown, near Cannock, England.

91,504.—Process of Tanning Hides.—H. L. Wilcox, Percival, Iowa.

91,505.—Butchers' Steel.—J. R. Wood (assignor to C. G. Taft, Jr.), Providence, R. I.

REISSUES.

14,517.—Grain Separator.—Dated March 25, 1856; reissue 3,502.—C. Aultman, Mansfield, Ohio, assignee, by mesne assignments, of Cyrus Roberts and John Cox.

70,885.—Fanning Mill, Grain and Seed Separator.—Dated Nov. 12, 1867; reissue 3,503. Division A.—Harrison Ogborn, Richmond, Ind.

70,885.—Fanning Mill.—Dated Nov. 12, 1867; reissue 3,504. Division B.—Harrison Ogborn, Richmond, assignor to Ellis Michael, Laporte, Ind.

87,968.—Composition for Welding Iron and Steel.—Dated March 16, 1869; reissue 3,505.—J. B. Rand, Concord, N. H.

35,842.—Apparatus for Recovering Gold and Silver from Waste Solutions.—Dated July 8, 186 ; reissue No. 1,652, dated April 5, 1864; reissue No. 3,506.—The Shaw & Wilcox Co., Bridgeport, Conn., assignees, by mesne assignments, of Jehyleman Shaw.

72,697.—Gasoline Head Light.—Dated Dec. 24, 1867; reissue No. 3,507.—The American Railway Gas Light Co., New York city, assignees, by mesne assignments, of J. B. Terry.

38,001.—Lamp for Locomotive Head Lights.—Dated March 24, 1863; reissue No. 3,508.—James Radley, Alexander McAllister, and R. S. Aikman, New York city, assignees, by mesne assignments, of Peter Budenbach.

DESIGNS.

3,537.—Trade Mark.—P. M. Consuegra, New York city.

3,538.—Lantern.—G. H. Deuell, Brooklyn, N. Y.

3,539.—Trade Mark.—J. I. Livingston, Pittsburgh, Pa.

3,540 to 3,547.—Carpet Pattern.—E. J. Ney, Middlesex county, assignor to the Lowell Manufacturing Co., Lowell, Mass. Eight Patents.

3,548.—Fireplace Heater.—Philip Rollhaus, Port Chester, N. Y.

3,549.—Stove.—J. R. Rose and E. L. Calely (assignors to Cox, Whiteman & Cox), Philadelphia, Pa. Antedated May 25, 1869.

3,550 and 3,551.—Stove.—I. N. Ross, Holden, Mass., assignor to Earle Stove Co. Two Patents.

3,552 and 3,553.—Cook's Stove.—I. N. Ross, Holden, Mass., assignor to Earle Stove Co. Two Patents.

3,554.—Stove.—Garrettson Smith and Henry Brown (assignors to Sharp & Thomson), Philadelphia, Pa. Antedated May 25, 1869.

EXTENSIONS.

Miter Machine.—G. W. La Baw, Jersey City, N. J.—Letters Patent No. 12,956, dated May 29, 1855; reissue No. 3,445, dated May 18, 1869.

Machine for Punching Metal.—Geo. Fowler, Seymour, Conn., and Sophronia and Maltby Fowler, Wallingford, Conn., administrators of De Grasse Fowler, deceased.—Letters Patent No. 12,723, dated April 17, 1855. Act of Cangress approved March 3, 1869.

Faucet.—E. A. Sterry, Norwich, Conn.—Letters Patent No. 13,047, dated June 12, 1855.

Subscribers—who wish to have their volumes bound, can send them to this office. The charge for binding is $1.50 per volume. The amount should be remitted in advance, and the volumes will be sent as soon as they are bound.

Advertisements.

Back Page..............................$1·00 *a line.*
Inside Page..............................75 *cents a line.*
Engravings may head advertisements at the same rate per line, by measurement, as the letter-press.

KNEE-SPRUNG HORSES PERMANENTLY cured without cost or trouble. W. T. BAKER, Sentinel Office, Waterford, N. Y.

THE NOVELTY IRON WORKS— Foot E. 12th st., and 77 and 83 Liberty st., New York, Manufacture the most approved Stationary Steam Engine, with Variable Cut-off, now in use.

VINEGAR FABRICATION.—Prof. H. Dussance, Chemist, is ready to furnish the most recent European methods to manufacture vinegar by the slow and quick processes. Address New Lebanon, N. Y. 1*

FOR SALE at a Bargain, entire, or by State Rights. Pat. No. 90,855, for an Improved Toothpick. An article for the Million. Samples furnished. Address THOS. RICHARDSON, 17 N. 8th st., Philadelphia.

RENEW!! RENEW!! The Phrenological Journal and Scientific American sent to one address for $5. Address S. R. Wells, 389 Broadway, New York.

ECONOMY! SPEED! SAFETY! Have your old Fuel-wasting Steam Engines altered, and made as Economical as the best by using Davis' Balance Piston Valves. Send for circular.
D. P. DAVIS, 263½ Broadway, New York.

Steam Boilers.

ECONOMY OF FUEL, Dry Steam, Rapid Circulation of Water, Accessibility for Cleaning, and Safety from Destructive Explosion.
BABCOCK, WILCOX & CO.,
1 tf eow 44 Cortlandt st., New York.

FOR SALE, ENTIRE— My Patent for the American Reading Card, the only practical device for reading in Railway Cars, etc., and for the universal dissemination of special and condensed advertisements. Sample circular, etc., by mail, 10c.
B. SNYDER, Jamesburg, N. J.

FOR SALE.— Sanders' Patent Mitering Machine, Illustrated in the Scientific American of Oct 7, 1868. The Best Machine of the kind in use. Also, State and County Rights and Licenses for sale. Address or apply to
JOHN J. SANDERS, Jr., 257 Hudson st., New York.

TODD & RAFFERTY, Manufacturers and DEALERS IN MACHINERY. Works, Paterson, N. J.; Warerooms, 10 Barclay st., N. Y. Boilers, Steam Pumps, Machinists' Tools. Also, Flax, Hemp, Rope, and Oakum Machinery, Snow's and Judson's Governors, Wright's pat. Variable Cut-off & other engines.

Pat. Water-proof Paper roofing, Siding, Ceiling, Carpeting, Water Pipes,
ETC. C. J. FAY & SONS, Camden, N. J.

A JUBILEE NUMBER—SEE PHRENOLOGICAL JOURNAL. July ready. Motley, Morse, Auber; Portraits, Characters, Biographies. Music, with words. "Hail Columbia," "Star Spangled Banner," "My Country 'tis of Thee," "Red, White, and Blue." An oration—Courtship and Marriage. What can I do best? How Rothschild lived. Organs of the brain, with illustrations. Only 30c. or $3 a year. Newsmen have it. Address S. R. WELLS, 389 Broadway, New York. The Phrenological Journal and Scientific American a year for $5.

COCHRANE'S
Low-water Steam Port.
Patented in Europe and America.
This Port occupies one cubic foot of space and can be attached to any steam boiler in thirty minutes. Warranted to give notice of low water in all cases when it exists, whether the boiler is foaming or not. The Port opens and allows the escape of steam whenever low-water mark is reached and closes immediately when water is supplied. Manufactured by
J. C. COCHRANE, Rochester, N. Y.

HARTFORD
Steam Boiler
INSPECTION & INSURANCE CO.

CAPITAL..............................$500,000.

ISSUES POLICIES OF INSURANCE, after a careful inspection of the Boilers, covering all loss or damage to

Boilers, Buildings, and Machinery,
—ARISING FROM—
STEAM BOILER EXPLOSIONS.

The business of the Company includes all kinds of

STEAM BOILERS,
STATIONARY, MARINE, AND LOCOMOTIVE.

Full information concerning the plan of the Company's operations can be obtained at the
HOME OFFICE, in Hartford, Conn.
Or at any Agency.
J. M. ALLEN, President.
C. M. POND, Vice President.
T. H. BABCOCK, Secretary.

BOARD OF DIRECTORS:

J. M. Allen	President.
Lucius J. Hendee	President Ætna Fire Ins. Co.
F. W. Cheney	Ass't Treas. Cheney Bro's Silk Mfg. Co.
John A. Butler	Pres. Conn. River Banking Co.
Charles M. Beach	of Beach & Co.
Daniel Phillips	of Adams Express Co.
G. M. Bartholomew	Pres't American Nat'l Bank.
R. W. H. Jarvis	Pres't Colt's Fire-Arms Mfg. Co.
E. M. Reed	Sup't Hartford & N. Haven Railroad.
C. M. Pond	Treas. Hartford & N. Haven Railroad.
T. O. Enders	Sec. Ætna Life Ins. Co.
Leverett Brainard	of Case, Lockwood & Co.
Geo. Crompton	Crompton Loom Works, Worcester.
D. L. Harris	Pres't Conn. River R. R., Springfield.
Earl P. Mason	Pres't Prov. & Wor. R. R., Providence.
Hon. E. D. Morgan	U. S. Senator, New York.

New York Office, **106 Broadway.**
THOS. S. CUNNINGHAM, Agent.
R. K. McMURRAY, Inspector.

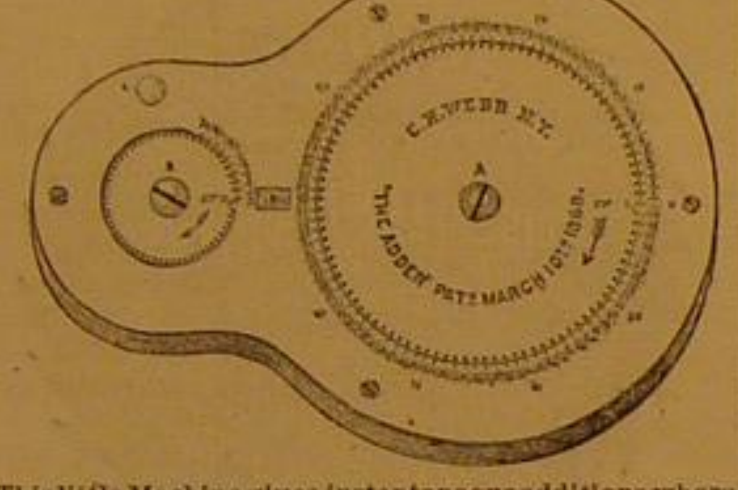
MODELS, PATTERNS, EXPERIMENTAL, and other machinery, Models for the Patent Office, built to order by HOLSKE MACHINE CO., Nos. 528, 530, and 532 Water st., near Jefferson. Refer to Scientific American office. 14 tf

BAIRD'S BOOKS For Practical Men.
LIST NO. 3.

Camus' Practical Treatise on the Teeth of Wheels demonstrate the best forms for the purposes of machinery, such as mill work and clock work. 40 plates 8vo..........$3.
Chapman's Treatise on Rope Making...$1 50.
Campin's Practical Treatise on Mechanical Engineering, with 29 plates and 100 wood engravings. 8vo..........$6.
Campin's Practice of Hand Turning in Wood, Ivory, Shell, etc. Illustrated 12mo..........$3.
Capron de Dole and Dussauce's Blues and Carmines of Indigo. 12mo..........$2 50.
Carey's Harmony of Interests, Agricultural, Manufacturing, and Commercial. 8vo, cloth....$1 50.
Carey's Manual of Social Science. 12mo. $2 25.
Carey's Miscellaneous Works. 8vo....$4 50.
Carey's Past, Present, and Future. 8vo...$2 50.
Carey's Principles of Social Science. 3 vols., 8vo..........$10.
Carey's Slave Trade, Domestic and Foreign. 12mo..........$1 50.
Carey's Way to Outdo England without Fighting Her. 8vo, paper..........$1.
Clough's Contractor's Manual and Builder's Price Book. 24mo..........75c.
Colburn's Gas Works of London..........75c.
Colburn's Locomotive Engine. 12mo...$1 25.
Colburn & Maw's Water Works of London. Illustrated 8vo..........$4.

☞ The above or any of my Books sent by mail, free of postage, at the publication prices. My new revised and enlarged Catalogue of Practical and Scientific Books, 72 pp. 8vo, now ready, complete to June 1, 1869, will be sent, free of postage, to any one who will favor me with his address.
HENRY CAREY BAIRD,
Industrial Publisher,
406 Walnut st., Philadelphia, Pa.

WEBB'S ADDER.
Only Practical Adding Machine in the World.



This little Machine gives instantaneous additions where numbers are called off. It carries up the columns of a ledger account, two at a time, with mechanical accuracy. It has the indorsement of all who have seen or used it. New testimonials will be published next week.

"Wonderful triumph of inventive genius."—Schuyler Colfax. "It discovered an error in my books of ten years' standing, of $1000."—F. F. Thompson, President National Currency Bank, No. 2 Wall street. "Of special value in lumber yards, as it can be used as well in wet weather as dry, and never fails in its tallies."—R. H. & L. Taylor, Jr., Pine and Hardwood Lumber Dealers, 62 Tenth Avenue.

The Machine is guaranteed to do everything claimed for it. Price, $6, $8, and $10. To those likely to keep a Machine in constant use, the $8 or $10 Machine is recommended. Sent by mail on receipt of price and postage (75 cents), or by express, C.O.D., at the customer's expense. To remit saves return-money charge. Send Money Order, Registered Letter, or Draft. For circulars, etc., inclose stamp. State and County Rights for sale.
WEBB ADDING MACHINE CO.
E. P. DUTTON & CO., Selling Agents
713 Broadway, New York.

WE INVITE
Special Attention
To the following, and shall be glad to furnish Cuts and Circulars of Wood-working Machinery and Machinists' Tools of our own manufacture.
STEPTOE, McFARLAN & CO.,
Cincinnati, Ohio.

Toledo, Ohio, May 3, 1869.
Messrs. Steptoe, McFarlan & Co.:
Gentlemen: You ask us how the new Planer works which was manufactured at your establishment. We would say that it has been used but a short time, and it has given us great satisfaction. We have eight men handling the timber, and they cannot supply the machine and keep the timber out of the way. It planes very smooth and even on one side and one edge each operation, making a perfectly square piece in passing twice through the machine. The timber we dressed was 8x14 inches, of various lengths—from 20 to 30 feet. We take off the timber guides in a few minutes; we then have the most powerful surfacer (as we believe) that was ever made. On one occasion we took off 1¼ in., from a board 24 in. wide, at a single cut. You may refer to us for further information. Respectfully yours, etc.,
R. W. SMITH & CO.
Of the Smith Bridge Co., Toledo, Ohio.

SHINGLE AND HEADING MACHINE— Law's Patent. The simplest and best in use. Shingle Heading and Stave Jointers, Stave Cutters, Equalizers Heading Turners, Planers, etc. Address
16 tf TREVOR & CO., Lockport, N. Y.

For Machinists' Tools,
OF SUPERIOR QUALITY, WITH ALL Modern Improvements. Also, Improved Nut and Bolt Machinery. Address R. A. BELDEN & CO.,
18 tf New Haven, Conn.

PORTABLE STEAM ENGINES, COMBINING the maximum of efficiency, durability and economy, with the minimum of weight and price. They are widely and favorably known, more than 900 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address
4 tf J. C. HOADLEY & CO. Lawrence, Mass

R. BALL & CO., Worcester, Mass., Manufacturers of Woodworth's, Daniel's, and Dimension Planers; Molding, Matching, Tenoning, Mortising Shaping, and Boring Machines; Scroll Saws, Re-Sawing Hand Boring, Wood Turning Lathes and a variety of other Machines for Working Wood. Also, the best Patent Door, Hub, and Rail Car Mortising Machines in the world. ☞ Send for our Illustrated Catalogue.
RICHARD BALL. E. P. HALSTED.
18 tf

STEAM HAMMERS, TURN-TABLES, and Foundery Cranes. Address
14 tf GREENLEAF & CO., Indianapolis, Ind.

LATHE CHUCKS—HORTON'S PATENT —from 4 to 36 inches. Also for car wheels. Address E. HORTON & SON, Windsor Locks, Conn.
17 tf

WROUGHT-Iron Pipe for Steam, Gas, and Water; Brass Globe Valves and Stop Cocks, Iron Fittings, etc. JOHN ASHCROFT, 50 John St., N. Y.
16 tf

$3000 SALARY. Address U.S. Piano Co N.Y
10 52

BOILER FELTING SAVES TWENTY-five per cent of Fuel. JOHN ASHCROFT,
16 tf 50 John st. New York.

FOR STEAM ENGINES, BOILERS, SAW Mills, Cotton Gins, address the ALBERTSON AND DOUGLASS MACHINE CO., New London, Conn. 14 tf

WANTED—AGENTS—To sell the AMERICAN KNITTING MACHINE. Price $25. The simplest, cheapest, and best Knitting Machine ever invented. Will knit 20,000 stitches per minute. Liberal inducements to Agents. Address AMERICAN KNITTING MACHINE CO., Boston, Mass., or St. Louis Mo. 16 12

PRACTICAL, Substantial, Durable, Cheap. Warranted as represented. Hand Slitting Saw Machine; self-feeding; thousands in use; one man with ease rip board 3 in. thick, 13 ft. inch plank, 1 minute. Wm. H. Hoag, Manf'r, 214 Pearl st., N.Y. P.O. Box 4245. Agts wanted.
22 10

CAMDEN
Tool and Tube Works,
Camden, N. J. Manufacturers of Wrought Iron Tube, Brass Work and Fittings, and all the most improved TOOLS for Screwing, Cutting, and Fitting Pipe. Screwing Machines for Pipe, of five different sizes. Pipe Tongs, Common and Adjustable; Pipe Cutters, Pipe Vises, Taps, Reamers, Drills, Screwing Stocks, and Solid Dies. Peace's Patent Screwing Stocks, with dies. No. 1 Screws ¼, ⅜, ½, ¾ Pipe. Price complete, $10. No. 2 Screws, 1, 1¼, 1½, 2 Pipe, $20. No. 3 both screws and cuts off, 2½, 3, 3½, 4, $65.
21 tf

BENT, GOODNOW & CO., Boston, Mass., Agents for the sale of Patents. FOR SALE—A variety of very valuable "Rights." Send stamp for THE PATENT STAR, Containing descriptions of each. 12 tf

CATALOGUES SENT FREE.
MATHEMATICAL INSTRUMENTS, 112 pages.
OPTICAL INSTRUMENTS, 72 pages.
MAGIC LANTERNS and STEREOPTICONS, 100pp.
PHILOSOPHICAL INSTRUMENTS, 84 pages.
JAMES W. QUEEN & CO.,
12 tt 924 Chestnut st., Philadelphia, Pa.

$20 a Day to Male and
Female Agents to introduce the BUCKEYE $20 SHUTTLE SEWING MACHINES. Stitch alike on both sides, and is the only LICENSED SHUTTLE MACHINE in the market sold for less than $40. All others are infringements, and the seller and user are liable to prosecution and imprisonment. Full particulars free. Address
W. A. HENDERSON & CO.,
18 13 Cleveland, Ohio.

STOCKS, DIES, AND SCREW PLATES, Horton's and other Chucks. JOHN ASHCROFT, 50 John st., New York. 16 tf

POWER LOOMS. Improved Drop Box.
Spooling, Winding, Beaming, Dyeing, and Sizing Machines Self-Acting, Wool-Scouring Machines, Hydra Extractors Also, Shafting, Pulleys, and Self-Oiling Adjusable Hangers, manuf'd by THOS. WOOD, 2106 Wood st., Philad'a, Pa
15 13* tf

WOODBURY'S PATENT
Planing and Matching
and Molding Machines, Gray & Wood's Planers, Self-oiling Saw Arbors, and other wood working machinery.
S. A. WOODS, { 91 Liberty street, N. Y.;
Send for Circulars. { 67 Sudbury street, Boston.
19 tf

ASHCROFT'S LOW-WATER DETECTOR will insure your Boiler against explosion. JOHN ASHCROFT, 50 John st., New York. 16 tf

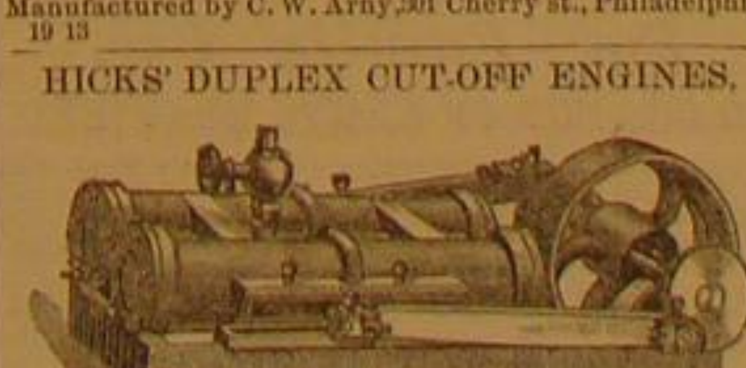
THE
Tanite Emery Wheel.
THIS WHEEL CUTS FAST AND DOES not glaze, gum, heat or smell. For circulars address
THE TANITE CO.,
Stroudsburg, Monroe Co., Pa.
General Agents:—Hart Manufacturing Co., 243 Pearl st., New York. Post & Goddard, 117 Liberty st., New York. Bloomfield, Myers & Co., 11 Dey st., New York. Charles M. Ghriskey, 508 Commerce st., Philadelphia. American Twist Drill Co., Woonsocket, R. I. Thomas Flint & CO., 29 Federal st., Boston.

SPECIAL NOTICE.—Every Tanite Emery Wheel is carefully tested, before being sent from the factory, at a speed about double that at which it is guaranteed to run. Customers can rely, with confidence, on the safety as well as upon the cutting properties of these wheels.
21 tf

WANTED—AGENTS—$75 to $200 per month, everywhere, male and female, to introduce the GENUINE IMPROVED COMMONSENSE FAMILY SEWING MACHINE. This Machine will stitch, hem, fell, tuck, quilt, cord, bind, braid, and embroider in a most superior manner. Price only $18. Fully warranted for five years. We will pay $1000 for any machine that will sew a stronger, more beautiful, or more elastic seam than ours. It makes the "Elastic Lock Stitch." Every second stitch can be cut and still the cloth cannot be pulled apart without tearing it. We pay Agents from $75 to $200 per month and expenses, or a commission from which twice that amount can be made. Address SECOMB & CO.,
Pittsburgh, Pa., Boston, Mass., or St. Louis, Mo.
CAUTION.—Do not be imposed upon by other parties palming off worthless cast-iron machines, under the same name, or otherwise. Ours is the only genuine and really practical cheap machine manufactured. 16 12

Oak Tanned Belting
Manufactured by C. W. Arny, 301 Cherry st., Philadelphia.
19 13

HICKS' DUPLEX CUT-OFF ENGINES.



CUT OFF AT ANY DESIRED POINT; exhaust perfectly free during whole stroke. Unequaled for correctness of principles, economy in operation, and perfection of Workmanship. 20-Horse Power $750. THE HICKS MANUFACTURING CO.,
1 os 1 is tf 85 Liberty st., New York.

Sault's Patent
FRICTIONLESS LOCOMOTIVE VALVES, easily applied; require no changes.
12 tf M. & T. SAULT COMPANY, New Haven, Conn.

WROUGHT IRON
Beams and Girders.
THE Union Iron Mills, Pittsburgh, Pa. The attention of Engineers and Architects is called to our improved Wrought-iron Beams and Girders (patented), in which the compound welds between the stem and flanges, which have proved so objectionable in the old mode of manufacturing, are entirely avoided, we are prepared to furnish all sizes at terms as favorable as can be obtained elsewhere. For descriptive lithograph address the Union Iron Mills, Pittsburgh, Pa. 21 tf

THE ABOVE CUT REPRESENTS OUR patent circular saw with movable or inserted teeth, for which we claim the following advantages over all others:—
The shanks of our saw teeth are elastic, and exert a uniform distension in the sockets. The stability of the plate is in no way affected by inserting new sets of teeth.
Each tooth may be independently adjusted to the cutting line.
No rivets, keys, or other objectionable appliances are employed in connection with the teeth; they are as simple in construction as a nut for a bolt, and as easily applied.
In short all the difficulties heretofore experienced in the use of movable teeth for saws, are fully met and obviated by this invention.
The Subscribers manufacture the "W. G. Tuttle's Patent Cross Cut Saws," J. H. Tuttle's Patent Double Hook Tooth Saws;" also, Cast steel Circular and Long Saws. Single and Double Cylinder and other Power and Hand Printing Machinery.
☞ Our Illustrated Catalogues sent free to all, who will please address us.
R. HOE & CO., Manufacturers,
26 tf 29 and 31 Gold st., New York.

Power Hammers.
HOTCHKISS' PAT. Air Spring Hammers;
W. H. WATER'S PAT. Drop Hammers.
These SUPERIOR TOOLS made by
CHARLES MERRILL & SONS, 556 Grand st., New York.
3 tf

Bridesburg Manf'g Co.,
OFFICE No. 65 NORTH FRONT STREET,
PHILADELPHIA, PA.,
Manufacture all kinds of Cotton and Woolen Machinery including their new
SELF-ACTING MULES AND LOOMS,
Of the most approved style. Plans drawn and estimates furnished for factories of any size. Shafting and mill gearing made to order. 13 tf

PATENT IMPROVED BAND-SAW MAchines manufactured and sold by FIRST & PRYIBIL, 175 & 177 Hester st., N. Y. city. We also offer Band-Saw Blades, imported and domestic, of the best qualities at reduced prices. Send for Circular and Price List.
22 26*

WOODWORTH PLANERS a SPECIALTY —From new patterns of the most approved style and workmanship. Wood-working Machinery generally. Nos. 24 and 26 Central, corner Union street, Worcester, Mass. Warerooms, 42 Cortlandt street, New York.
16 tf WITHERBY, RUGG & RICHARDSON.

BUERK'S WATCHMAN'S TIME DETECTOR.—Important for all large Corporations and Manufacturing concerns—capable of controlling with the utmost accuracy the motion of a watchman or patrolman, as the same reaches different stations of his beat. Send for a Circular. J. E. BUERK,
P. O. Box 1,057, Boston, Mass.
N. B.—This detector is covered by two U. S. patents. Parties using or selling these instruments without authority from me will be dealt with according to law. 14 13*tf

WOOD WORKING MACHINES.
Smith's Improved Woodworth Planer & Matcher, Sash and Door, Molding, Mortising, and Tenoning Machines, Scroll Saws, Saw Mills, etc., at reduced prices. Address CHARLES H. SMITH, 135 North 3d st., Philadelphia, Pa.
14 13

WOODWORTH PLANERS—Iron Frames 18 to 24 inches wide. $125 to $150.
1 tf b S. C. HILLS. 12 Platt st., New York.

Molding Machinery.
THE MOST VALUABLE MACHINE FOR Planing Irregular and Straight Work in all branches of Wood-Working, is the Combination Molding and Planing Machine Co.'s "Variety Molding and Planing Machine." Our improved guards make it safe to operate; our combination collars save one hundred per cent; and for planing, molding, and cutting irregular forms, our Machine is unsurpassed. The right to make and vend these Machines is owned solely by us, and we will defend Purchasers in case litigation is forced upon them by any parties pretending to own Patents on any part of our Variety Machine. COMBINATION MOLDING AND PLANING MACHINE CO., 424 East 23d st., or Postoffice Box 3230 New York City. Silas M. Hamilton, Baltimore Samuel Leggert, New York. 19 tfeow

PLATINUM. H. M. RAYNOR. 57 Bond st., N. Y.
19 6eow*tf

AMERICAN TINNED SHEET IRON. Coating uniformly over the entire sheet, by an entirely new and patented process. All sizes and gages on hand and made to order.
H. W. BUTTERWORTH & SON,
25 eow tf 29 and 31 Haydock st., Philadelphia, Pa.

MERRICK & SONS, Southwark Foundery,
430 Washington Ave., Philadelphia, Pa.,

MANUFACTURE NASMYTH & DAVY STEAM HAMMERS,
CORNISH PUMPING, BLAST, HORIZONTAL, VERTICAL, AND OSCILLATING ENGINES.

Gas Machinery of all descriptions.
Sugar Refineries fitted up complete, with all modern apparatus.
New York office, 62 Broadway.
11 eowtf

MASON'S PAT'T FRICTION CLUTCHES are Manufactured by Volney W. Mason & Co., Providence, R. I. Agents, R. BROOKS & CO., 123 Ave. D, New York; TAPLIN, RICE & CO., Akron, Ohio 16 tfeow

Independent Steam
BOILER SUPPLY,
OR
Feed Pump,
RELIABLE FOR HOT OR COLD WATER.
Circulars sent free. COPE & CO.,
No. 118 East 2d st., Cincinnati, Ohio
23 eowtf

Advertisements.

Advertisements will be admitted on this page at the rate of $1.00 per line. Engravings may head advertisements at the same rate per line, by measurement, as the letter-press.

Ball, Black & Co.,

565 and 567 BROADWAY,

MANUFACTURERS OF

ENGLISH STERLING

Silver Ware.

THE FACILITIES OF BALL, BLACK & CO. FOR MANUFACTURING, ENABLE THEM TO OFFER A LARGER VARIETY OF PATTERNS, AND AT LOWER PRICES THAN ANY OTHER HOUSE IN THE TRADE.

16 ostf

J. F. WERNER, Model Maker & Machinist, 62 Center st. Particular attention given to Working Models, Experimental Machinery, Gear Cutting, etc.

PARTIES WHO CAN FURNISH MAchinery for manufacturing Sewing Machines, and tools requisite in this line, are requested to send their offers to the address, SEWING MACHINE, Care of Post-office Box 5,310, New York.

Closing Out Sale.

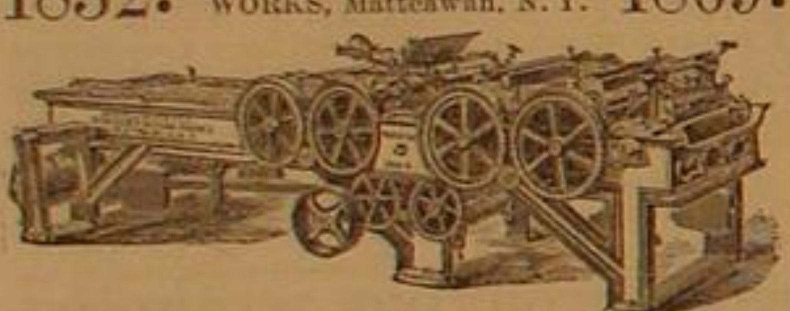
SAWS.—A Stock of Circular, Mill, Muley-Mill, Butting, and Cross-cut Saws, Billet Webs, Saw Mandrels, and Evart's Patent Shingle Machines, of the celebrated manufacture of Wm. Marriott & Co., for sale at less than manufacturer's prices. Stock all first-class, thoroughly warranted.
JAMES SEABORN, 49 Center st., Cleveland, Ohio.

THE WOODWARD STEAM-PUMP MANUFACTURING COMPANY, Manufacturers of the Woodward Pat. Improved Safety Steam Pump and Fire Engine, Steam, Water, and Gas Fittings of all kinds. Also, Dealers in Wrought-iron Pipe, Boiler Tubes, etc. Hotels, Churches, Factories, & Public Buildings, Heated by Steam, Low Pressure. Woodward Building, 76 and 78 Center st., cor. of Worth st. (formerly of 77 Beekman st.), N.Y. All parties are hereby cautioned against infringing the Pat. Right of the above Pump. G. M. WOODWARD, Pres't.

LAMB KNITTING MACHINE

THE BEST IS THE CHEAPEST—4,000 sold this year. Agents wanted everywhere. Send for sample stocking that no other machine can do. Address LAMB KNITTING MACHINE M'F'G CO., Chicopee Falls, Mass.

1832. SCHENCK MACHINE WORKS, Matteawan, N. Y. 1869.



The Improved "Schenck" Woodworth Planer, with Patented improvements. Circular and Vertical Re-Sawing Machines, with feed quickly changed to Self-centering. Also, Siding Saws, with the same feed, and new adjusting arrangements. Patent applied for. Send for circulars. JOHN B. SCHENCK & SON.

PUNCHING
AND
Shearing
MACHINERY.

POWER PUNCHING AND SHEARING Machines, from $200 to $850. Hand Punching and Shearing Machines, from $60 to $200. Power Shearing Machines, from $200 to $450. Hand Shearing Machines, from $100 to $150. Also, a variety of Punching Machines, from $40 up. We make a specialty of Punching and Shearing Machinery. No other establishment can offer so large a variety of kinds and sizes to choose from. Every machine warranted fully up to our catalogue representation. For free catalogue, with cuts, or further information, address
DOTY MANUFACTURING CO.,
Janesville, Wis.

WM. D. ANDREWS & BROTHER,
414 Water st., New York, Manufacture
Patent Smoke-burning & Superheating Boilers that are safe. DRAINAGE and WRECKING PUMPS, to pass large bodies of Water, Sand, and Gravel. HOISTING MACHINES, Friction Grooved and, Noiseless, or with Gearing. OSCILLATING ENGINES from half to two hundred and fifty-horse power. All of these Machines are Light, Compact, Durable, and Economical. 1 tfos

Root's Wrought Iron Sectional
Safety Boiler.

OVER 100 SOLD—TESTED TO 300 lbs., no large sheet-iron shell to explode. Economical and Durable. All sizes on hand. Also, Steam Engines, Steam Pumps, etc. Send for Pamphlets and Price Lists.
JOHN B. ROOT,
15 13os 95 and 97 Liberty st., New York.

WATER WHEELS—Warren's Turbine is the best made, the most economical, durable, and cheapest wheel in the market. A. WARREN, Agent American Water Wheel Co.,
25 13os 31 Exchange st., Boston, Mass.

IRON STEAMERS, HULLS, & LIGHTERS. Estimates & Specifications furnished on application. HENRY J. DAVISON, 77 Liberty st., New York, Agent for Pusey, Jones & Co. 21 tf

IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven, Conn. 5 tf os

It is not generally known that Genuine Waltham Watches are sold in New York at lower prices than in any other part of the country. We send single Watches by Express to any place, however remote, at the reduced prices, and we give the purchaser the privilege of examining the Watch before paying. Silver Hunting Watches, $18; Gold Hunting Watches, $70. Every Watch warranted by a special Certificate. Our descriptive Price List gives full information in regard to the different kinds and our manner of sending them by Express. We send it to any one, post paid, on application. When you write, please state in what Paper you saw this notice. Address in full, HOWARD & CO., Jewelers and Silversmiths, No. 619 Broadway, New York.

NESTER'S COMBINED CARPENTER'S Tool saves one fourth the labor at Weather Boarding. Inquire of the Trade. Send stamp for circular to 27 Park Row, New York. 25 ostf eow

N. F. BURNHAM'S
NEW TURBINE
Water Wheel

IS acknowledged to be the simplest in construction, most durable, and efficient Turbine known. For Illustrated and Descriptive Pamphlet address N. F. BURNHAM, York, Pa.
17 10* eowos

BUY BARBER'S BIT BRACE. 25 4os*

KIDDER'S PASTILES—A Sure Relief for Asthma. STOWELL & CO., Charlestown, Mass.
25 10*os

W. ZINSSER & CO., 197 William st., N.Y., Manuf'rs of Varnishes, Lackers, White Shellac, Sealing Wax, Cements, etc., & dealers in Manf'd Articles.

ONE WRIGHT'S Pat. Cut-off Engine, 60-Horse Power, nearly new, in fine order, for sale cheap. Inquire of HALL & WHITTEMORE, Havana, or J. H. Fountain & Co., Elmira, N. Y.
26 2*os

SCHLENKER'S PATENT
BOLT CUTTER
NEW INVENTION. ADDRESS,
HOWARD IRON WORKS, BUFFALO, N.Y.
291 sos

Lucius W. Pond,

MANUFACTURER OF
MACHINISTS' TOOLS,

NEW AND IMPROVED PATTERNS OF Lathes, Planers, Drills, Milling Machines, Boring Mills, Slotting Machines, Gear and Bolt Cutters, and Punching and Shearing Machines. Dealer in
IRON & WOOD-WORKING MACHINERY.
Works at Worcester, Mass. Office, 98 Liberty st., N. Y.
26 tf os S. N. HARTWELL, General Agent.

Reynolds'
Turbine Water Wheels.

No Complex, Duplex, or Triplex complications. All such are costly, perishable, easily clogged, inaccessible. Mill Gearing, Shafting, and Pulleys. Send for Illustrated Pamphlet.
GEORGE TALLCOT,
96 Liberty st., New York.
15 tf *o

WIRE ROPE.
Manufactured by
JOHN A. ROEBLING,
Trenton N. J.

FOR Inclined Planes, Standing Ship Rigging, Bridges, Ferries, Stays or Guys on Derricks & Cranes, Tiller Ropes, Sash Cords of Copper and Iron, Lightning Conductors of Copper. Special attention given to hoisting rope of all kinds for Mines and Elevators. Apply for circular, giving price and other information.
os 14tf

INCREASE TWIST DRILLS, FLUTED HAND REAMERS, exact to Whitworth's Gage, and Beach's Patent Self-centering Chuck, manufactured by Morse Twist Drill and Machine Co., New Bedford, Mass.
1 ostf

London.........................48 Cannon street.
H. KOHNSTAMM,
Manufacturer of
ULTRAMARINE,
And Importer of English, French, and German Colors, Paints, and Artists' Materials, Bronzes, and Metals. No. 3 Tryon Row, New York, opposite City Hall. 16 13os*

PRATT'S
ASTRAL OIL
For Family Use.
NO CHANGE OF LAMPS REQUIRED.

A perfectly safe Illuminating Oil—Strictly Pure—No Mixture, No Chemicals—Will not Explode—Fire Test 145 degrees (being 35 degrees higher than is required by U. S. Government)—Unequaled for Brilliancy and Economy—Packed in the celebrated Guaranty Pat. Cans. Ask for Pratt's "Astral," the safest and best Illuminating Oil. TRY IT. Agents wanted in every town. At wholesale and retail by the Proprietors,
OIL HOUSE OF CHARLES PRATT,
(Established in 1770.)
Manufacturers, Packers, and Dealers in strictly First-Class Oils,
Box 3050. 108 Fulton st., New York.
Send for circulars, with testimonials and price lists.

B. F. STURTEVANT'S
NEW PATENT IMPROVED
FAN
PRESSURE BLOWERS
MANUFACTORY & SALESROOM
72 SUDBURY ST. BOSTON.

THE GENUINE
Coes Screw Wrenches,
WITH A. G. COES' PATENT LOCK FERRULE,
Manufactured by
A. G. COES & CO.,
Successors to L. & A. G. Coes,
Worcester, Mass.
24 ostf ESTABLISHED IN 1839.

PATENT SOLID EMERY WHEELS, Specially adapted to Grinding Saws, Mills, and Edge Tools. Solid Wheels for Brass Work, warranted not to Glaze. Also, Patent Emery Oil and Slip Stones, the best article in use for Planer Knives, Carpenters' Tools, and for Finishing Down Iron Work. NORTHAMPTON EMERY WHEEL CO., Leeds, Mass. 18 tf os

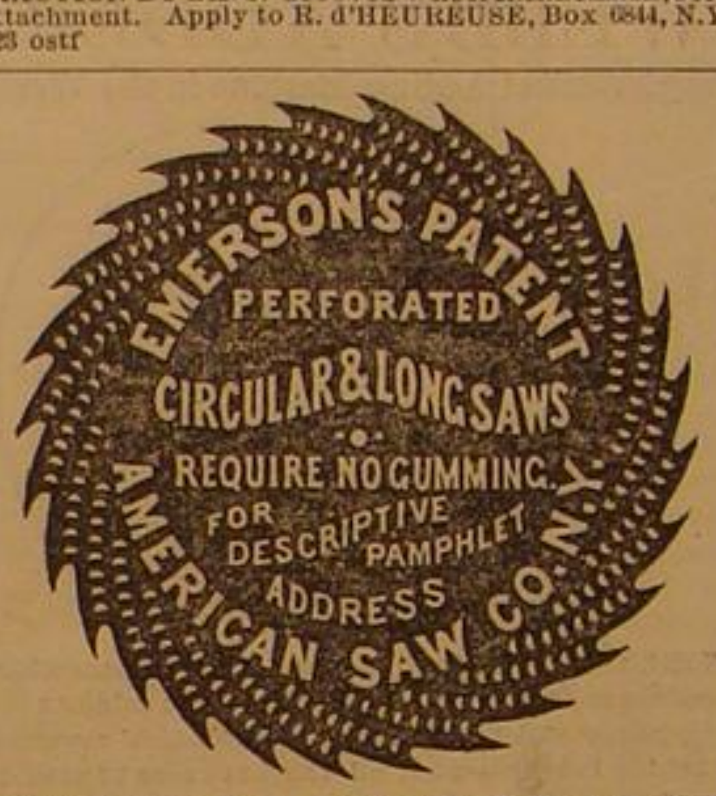
For Sale,

A BEAM STEAM ENGINE, with Cylinder 24 in. diam. by 48 in. stroke, with 2 vacuum pumps, 20 in. diam. by 24 in. stroke, and 2 water pumps, 8 in. diam. by 24 in. stroke. The Engine is a very good and substantial one, built by the Novelty Iron Works, and is now working in a Sugar Refinery, where it can be seen. It can be used both as a high or low-pressure engine, and is suitable for any Mill or Factory. For particulars address A. & F. BROWN 57, 59 and 61 Lewis st., New York.
18 ostf

MECHANICAL DESIGNERS ENGRAVERS ON WOOD.
KNAPP & CO.,
8 and 10 John St., N. Y.

FREE.—Our New Catalogue of Improved STENCIL DIES. More than $200 A MONTH is being made with them S. M. SPENCER & CO., Brattleboro Vt.
5 52os

PATENT AIR TREATMENT, immensely benefits Malting, Brewing, Distilling, Winemaking, Baking, the Conserving of fruit, all curing, fermentation, etc. Pamphlets free. RIGHTS FOR SALE. Also, for PERFECT GOLD EXTRACTION BY ZINC. Grooved Wheel R.R. BRAKE, Cord Attachment. Apply to R. d'HEUREUSE, Box 6844, N.Y.
23 ostf



Factory, Trenton, N. J.. ..Office, No. 2 Jacob st., N. Y
Branch Office for Pacific Coast, No. 606 Front st., San Francisco, Cal. 17 os 10* tf

THE ROSS MILL IMPROVED AND REmodeled—the best Mill in the World. To be seen at No. 9 Spruce st., New York. HENRY JACKSON,
26 4* Consulting Engineer. Send for circular.

Charles W. Copeland,
Superintending and Consulting Engineer,
NOS. 64 AND 66 BROADWAY, NEW YORK.
PLANS AND ESTIMATES PREPARED FOR STEAM ENGINES, PUMPING AND MINING MACHINERY.
Steamboats, Engines, and Boilers For Sale.

PORTABLE SAW MILLS, Patent Ground Cylinder Saws, Self-feeding Boxboard, Shingle, and Stave Machines. Send for price list. Address E. C. STRANGE, Taunton, Mass.
26 2*

VELOCIPEDIOLOGY—The Tale of a Traveler—A Curious Book for Curious People. 400 pages, bound in cloth, and gilt. Sew your buttons on fast before sending for the book, inclosing postage stamp, addressed to the publishers, T. W. EVANS & CO., 41 South 8th st., Philadelphia.

To Electro-Platers.

BATTERIES, CHEMICALS, AND MATERIALS, in sets or single, with books of instruction, manufactured and sold by THOMAS HALL, Manufacturing Electrician, 19 Bromfield street, Boston, Mass. Illustrated catalogue sent free on application. 26 8

PARTNER WANTED.—The Advertiser, Proprietor of one of the Largest Machine Shops and Foundery in the Southern States, now doing a good business, wishes to sell an interest to some party thoroughly competent to take charge. No one need apply who cannot control $10,000, and bring the best testimonials as to character and ability. Apply HUTCHINSON, LAURENCE & CO.,
25 3 38 Courtlandt st., New York.

STEAM AND WATER GAGES, STEAM Whistles, Gage Cocks, and Engineers' Supplies.
16 tf JOHN ASHCROFT, 50 John St., New York.

H. BOARDMAN, Lancaster, Pa.—Superior Patent Cork-cutting Machinery, Hard-laid Twine, Cord, and Rope Machinery, with Pat. Stop & Condenser
24 tf

TO INVENTORS of articles in the Hardware line, and in metals generally—all such manufactured by JOS. BALDWIN & CO., 204 Market st., Newark, N. J
19 12*

$100 TO $250 Per Month Guaranteed—Sure Pay.—Salaries paid weekly to Agents everywhere, selling our pat. everlasting white wire clothes line. Call at or write for particulars to the GIRARD WIRE MILLS, 261 North 3d st., Philadelphia, Pa. 24 4*

HINKLEY KNITTING MACHINE.—The Wonder of the Age.—With single eye-pointed needle. Simple, Cheap, Reliable for Family Use. Agents Wanted everywhere to introduce them. Address HINKLEY KNITTING MACHINE CO., Bath Maine.

WANTED—ACTIVE MEN TO SELL PURINGTON'S Patent Alarm Drawer. Great inducements to good business men. Address
24 13 A. S. TURNER, Willimantic, Conn.

MANUFACTURERS' AGENCY FOR THE Sale of Patents, Rights, and Patented Articles, in the New England States. Address
24 4 C. A. GRIFFIN, Hartford, Conn.

ROBERT McCALVEY, Manufacturer of HOISTING MACHINES AND DUMB WAITERS. 602 Cherry st., Philadelphia, Pa.

Philadelphia Advertisements.

Philadelphia Advertising Patrons, who prefer it, can have their orders forwarded through T. V. Carpenter, resident Agent, 1506 Poplar st.

The Harrison Boiler.

THIS IS THE ONLY REALLY SAFE BOILER in the market, and can now be furnished at a *GREATLY REDUCED COST*. Boilers of any size ready for delivery. For circulars, plans, etc., apply to
HARRISON BOILER WORKS,
Philadelphia, Pa.; J. B. Hyde, Agent, 119 Broadway, New York; or, to JOHN A. COLEMAN, Agent, 36 Kilby st., Boston, Mass. 19 tf os

Surveying Instruments

DRAWING INSTRUMENTS, Drawing Materials, etc., etc. Transits, Levels, Surveyor's Compasses, a full assortment of Chesterman's Metallic and Steel Tape Measures. A priced and Illustrated Catalogue sent free on application. WM. Y. McALLISTER,
23 6os 728 Chestnut st., Philadelphia.

SAWS. EVERY DESCRIPTION Guaranteed under a forfeiture of $1000, to cut the most lumber with the least expense

Henry Disston & Son,

PHILADELPHIA. Special attention paid to our new style Circular, Belt, Cross-cut, Mill, and Hack Saws. Orders received from England, Ireland, and the Continent.
22 13os

Drawing Materials.

WHATMAN'S PAPERS.—White and Yellow Roll Drawing Paper, 40 and 54 inches wide. Tracing Muslin, Tracing Paper. Muslin-backed Drawing Paper, 40 and 54 inches wide. Winsor & Newton's Colors India Ink. Faber's Drawing Pencils, etc., etc. Priced Catalogues sent free. JAS. W. QUEEN & CO.,
19 ostf 924 Chestnut st., Philadelphia.

WATER WHEELS.—Valentine's Turbines are superior to all other wheels. Satisfaction guaranteed. VALENTINE & CO., Ft. Edward, N. Y.

4 1-2, 6 1-2, & 8 1-2-ft. Planers; 10-in. stroke shapers; 6, 7, and 8-ft. engine lathes, 18-in. swing; screw machines, etc., m'f'd by Twiss, Pratt & Hayes, New Haven, Ct.

SILICATE OF SODA, IN ITS VARIOUS forms, manufactured as a specialty, by Philadelphia Quartz Co., 783 South 2d st., Philadelphia, Pa. 25 13

RICHARDSON, MERIAM & CO., Manufacturers of the latest improved Patent Daniels' and Woodworth Planing Machines, Matching, Sash and molding, Tenoning, Mortising, Boring, Shaping Vertical and Circular Re-sawing Machines, Saw Mills, Saw Arbors, Scroll Saws, Railway, Cut-off, and Rip-saw Machines, Spoke and Wood Turning Lathes, and various other kinds of Wood-working Machinery. Catalogues and price lists sent on application. Manufactory, Worcester, Mass. Warehouse, 107 Liberty st., New York. 17 tf

McNab & Harlin,

MANUFACTURERS OF BRASS COCKS, Wrought Iron Pipe and Fittings for Steam, Water and Gas.
GETTY'S PATENT PROVING PUMP AND GAGE.
GETTY'S PATENT PIPE CUTTER.
Send for Illustrated Catalogue or price list.
18 13 86 John st., New York.

Artisans and Builder's

ORNAMENTAL IRON AND BRONZE WORKS.—Cast and Wrought-Iron Railing, Iron Stairs, Window Guards, Garden and Cemetery Adornments of every description, New and Improved Stable Furniture, etc., etc.
SPARKS, STILLMAN, DOWDELL & CO.,
Foundery 2028 N. Tenth st. Wareroom 807 Chestnut st Philadelphia. 18 13*

HAIR AND WOOL FELT for sale by the square foot, or boilers covered by contract. HENRY J. DAVISON, 77 Liberty st., New York.
18 tf

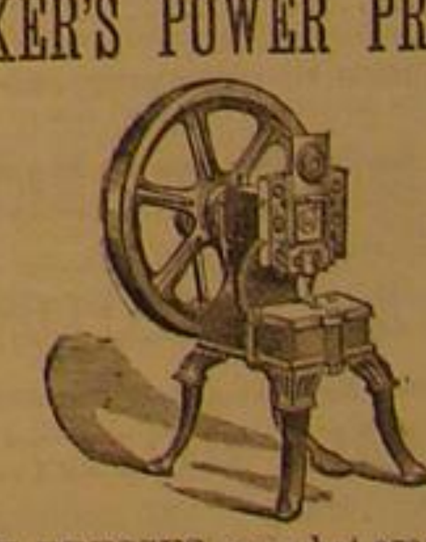
PAPER BAG Machines For Sale. Address
4 26* B. S. BINNEY, 64 Kilby st., Boston.

AMERICAN TURBINE WATER WHEEL. Stout, Mills & Temple's Patents.
This celebrated iron-cased wheel is MORE DURABLE AND ECONOMICAL than any other, and is WARRANTED to give satisfaction in every case, OR MONEY REFUNDED. For illustrated circular address
FULTON MANUFACTURING CO.,
15 26 Fulton, N. Y.

Excelsior Lubricator.

PATENTED AUG. 25th, 1868.—For Cylinders of Engines. A very Superior and Durable article manufactured by B. E. LEHMAN, Lehigh Valley Brass Works, Bethlehem, Pa.
Descriptive circular and price list sent on application
13 tf

PARKER'S POWER PRESSES.



THESE PRESSES are what are universally known as the "Fowler Press," improved, and are *without a rival* as regards strength and durability, combined with delicacy of adjustment of the Punch. We have just received

A GOLD MEDAL

From the New Hampshire Art and Mechanics' Association, it being the FIRST PREMIUM awarded on Presses, and was given us over
STILES' POWER PRESS.

Notice is hereby given that ALL PRESSES having an Eccentric Disk on the Crank Shaft, are direct infringements of our Patent, April 13, 1858, reissued Feb. 9th, 1869, and all parties are hereby cautioned against buying or using said Presses without our permission.
PARKER BROTHERS, 11 26*
West Meriden, Conn.

NOTICE IS HEREBY GIVEN, that all persons purchasing our Presses will be protected against all suits that may be brought by PARKER BROS. under the patent of John A. Bailey, for rolling taper blanks; said patent having been bought up and reissued since we commenced suit against them, in the vain hope of defeating our rights. Trial will be had in April, when our Counsel assures us, our patent will be triumphantly sustained. Meantime all parties are hereby cautioned against purchasing or using the Parker Press, having an eccentric disk on the crank shaft for the purpose of adjusting the punch. Our Presses have been exhibited at, and received the highest Prizes from, all the FIRST-CLASS FAIRS in the country during the last five years.
N. C. STILES.
Middletown, Conn.
19 tf