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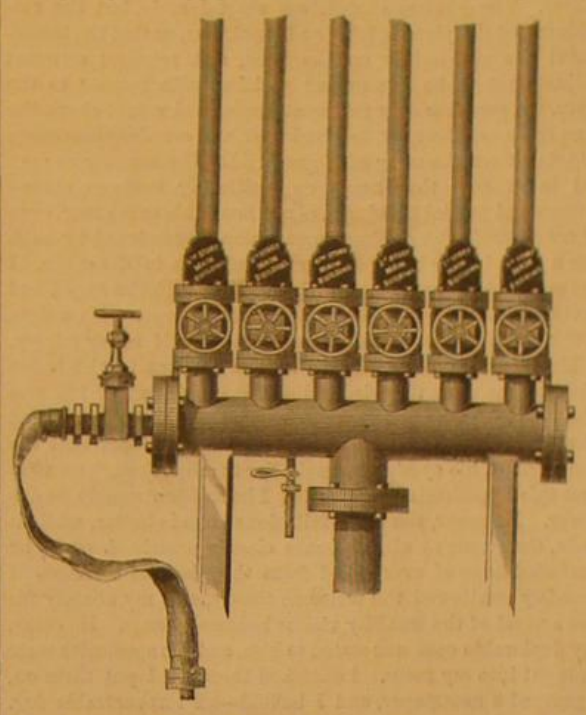
Fire Extinguishing Apparatus.

In a recent number we published an article on the importance of extinguishing fires at their commencement, and we remarked in that article "that a very little water, judiciously employed, will extinguish a fire within five minutes of its ignition."

Since publishing the article above mentioned, our attention has been called to the system of sprinklers, as arranged by Hall Brothers, 36 Chardon street, Boston, which system seems exactly to meet the want spoken of, namely, the instant and judicious supply of water to fires the moment they are discovered. We present, for the benefit of our readers, a description ofthis admirable system.

The accompanying engraving, Fig. 2, represents their "Receiver,"—also shown in the larger engraving—which is placed in the counting room of a building or any other suitable place, where the valves can be got at readily. The large pipe, entering the bottom of the receiver, is to be used where there is a natural head of water. The hose at the left is to be connected with a hose from a force pump or steam fire engine. The pipes at the top are mains leading to each room in the building—each numbered like the room to which it leads—and cut off from the receiver by valves. These mains are watertight until they get to the rooms, where the perforated pipes or "sprinklers" commence; these perforated pipes run across a room, say a line every eight or ten feet. The perforations are small and frequent. Now, if a fire occurs in any room—say room No. 3—the valve of No. 3 leading pipe is turned, and in an instant a fine rain shower of spray fills that room. A few moments of this fine rain will suffice to extinguish almost any fire, and that without flooding or deluging the room with water. As soon as the fire is extinguished, the valve, upon being turned back, will immediately stop the supply of water, and as soon as the pressure



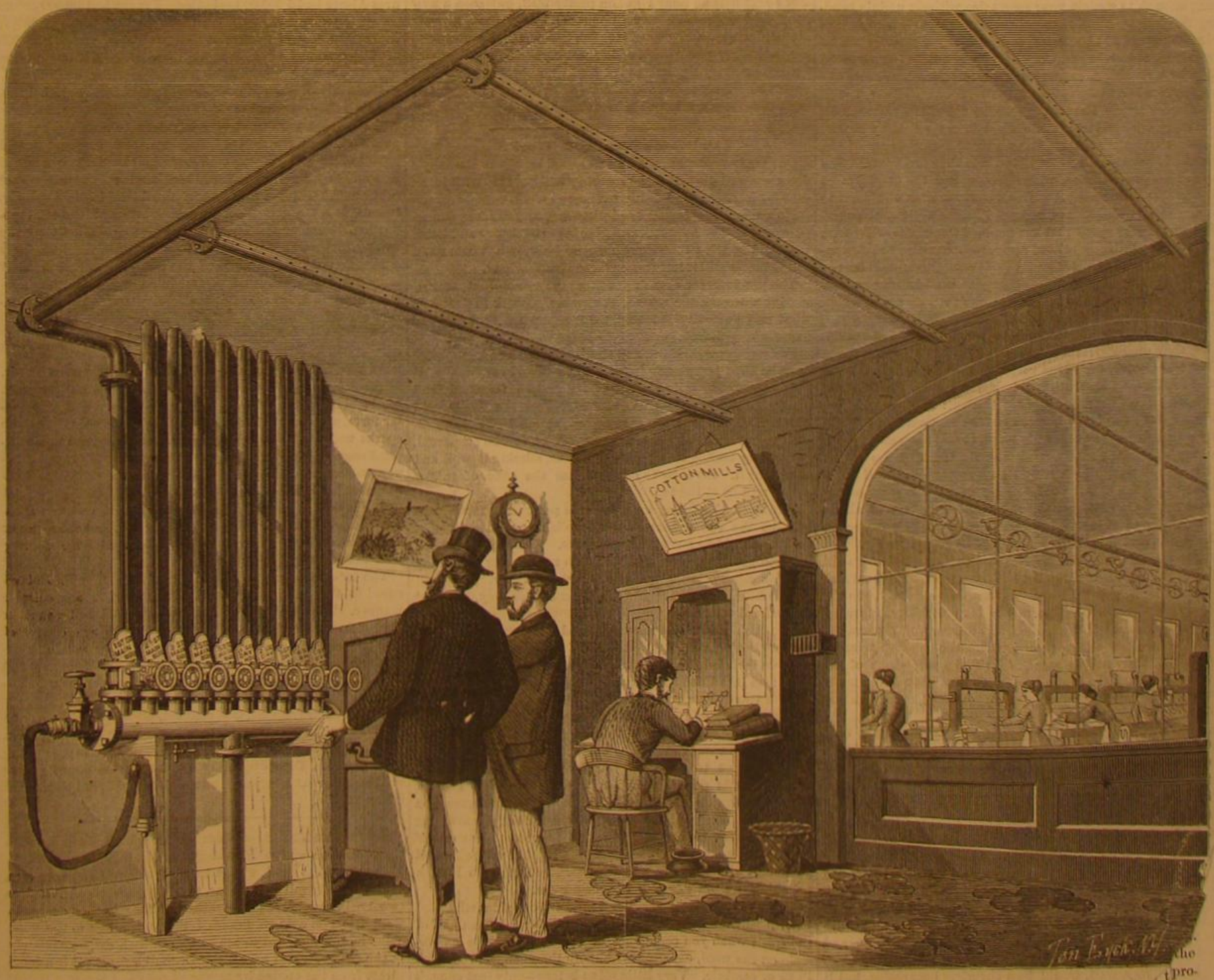
is turned from the receiver, the valve is again opened, and the water remaining in the pipes at once runs out through the small waste cock at the bottom of the receiver.

When a fire takes place, the excitement and confusion always existing is very unfavorable to efficient action, and while men are running amid the smoke with hand hose, portable engines, or extinguishers, the fire generally spreads beyond control. The opening of doors and windows, to get access, admits the air, and supplies the fire with oxygen; but the "sprinklers" are a fixture, always on the spot, and ready for instant action.

Perforated gas pipes have been, for several years, placed in certain portions of cotton and woolen mills, but the great objection to them has been, that in drilling the holes a ragged burr is left upon the inside, upon which are constantly collecting lint, dust, etc., so that, after a time, the hole becomes filled up so much that it cannot be used with any degree of certainty; we have even known of manufacturers, who had this kind of pipe, who were obliged to paste over every hole a piece of fine tissue paper. Messrs. Hall Brothers use a pipe made of galvanized sheet iron, and claim that they have the only machine in the world for making sheet metal pipe in long lengths. The holes are punched out on the sheets before forming them into pipes, thus leaving a clean smooth hole.

Another very important advantage they have is, that with this kind of pipe, it costs but half the sum to pipe a building that it does with the other kind.

In the short time their system has been before the public, they have already piped some of the largest factories and mills in the country, among which are the York Mills, Saco, Me., Fletcher Manufacturing Company, Providence, R. I., Glenham Company's Mills, Glenham, N. Y., Falls Company, Norwich, Conn., Washburn & Co., and Jewett & Pitcher's large planing mills, Boston, etc., etc.



HALL BROTHERS' FIRE EXTINGUISHING APPARATUS.

So highly is this system appreciated that several of our largest and most reliable insurance companies have, we understand, agreed to deduct twenty-five per cent from the insurance premium of extra hazardous risks, such as planing mills, furniture, box factories, etc.

THE LOSS OF MY SPECTACLES.

[Condensed from "All the Year Round."]

I have worn spectacles for nearly twenty years, and they have become to me a necessary of life, secondary only to food and clothing. I can indeed take my walks abroad with unarmed eyes, being fortunately able, without artificial assistance, to discern objects of comparatively large magnitude. But, if I would read even for a short time, my glasses become absolutely indispensable. A few lines, printed in exceptionally bold type, I can perhaps wade through, with the untrustworthy aid of guessing, by holding the paper at a distance from my face, my defect being the reverse of that endured by the shortsighted. But in a few minutes the annoyance of a process, which may be compared to the observation of stars through a fog, not quite dim enough to render them utterly invisible, amounts to physical torture. Hence, as reading constitutes the chief occupation of my life, I rarely lay my spectacles aside, but wear them even when they are not altogether needful. The consciousness of depriving myself of a power which I am accustomed almost perpetually to use, is repugnant to my habits. Satirical friends, who see me not engaged in study, affirm that I look over, not through my spectacles, and thus infer that I wear them through some species of affectation. Blest themselves with strong natural vision, they cannot realize the fact that the consciousness of a diminution of sense is intolerable.

Careless with respect to umbrellas and other articles, I am extremely careful of my spectacles. It is with a sort of nervous instinct that, whenever I am going out, I clap my hand hastily to my waistcoat pockets to ascertain that they are safe. And here let me lament, with w[illegible] placed grief, that the most convenient form of spectacle c[illegible]e has suddenly become obsolete. I refer to the thin, flat sheath, open at both ends, which glided into the waistcoat pocket without occupying any sensible room, and some years ago drove out of fashion the thick unwieldy case, which requires the side pocket of a coat for its abode, and, opening at one end, is closed with a tongue like a pocket book. Oddly enough, the useful innovation has of late disappeared, and the ancient mass of leather is restored to supremacy, without a single claim to public favor. Rarely can one of the closing cases be found long enough to contain your spectacles, without unduly bending the delicate arms of metal that press lightly on the temples; whereas in the neat, flat sheath, any spectacles can be inserted. Nevertheless, this sheath is not to be obtained save by a remarkable stroke of good fortune. To me its disappearance is a source of constant trouble. Disgusted with the clumsy article, I have given up the use of cases altogether, and carry my spectacles unsheathed in my waistcoat pocket. Under these circumstances, the normal transparency of the glasses is occasionally interrupted, and they are brought into a semi-opaque condition, which necessitates the employment of a pocket handkerchief. Now, the restoration of glasses to their proper transparency is by no means a pleasant operation. The foggy speck that has dimmed the center will often, after being skillfully rubbed away, reappear near the circumference, where it is less easily removed. Breathing on the glass, too, though sometimes successful, is a hazardous experiment, inasmuch as you may sometimes produce a mist which you will find yourself unable to dispel.

But whatever inconvenience may attend the use of spectacles, they are so great a blessing to those who require them, that, like health, their true value cannot be ascertained until they are lost. This truth was impressed upon me by bitter experience one Saturday night. At about half past eleven, when I was on my way home, a sudden instinct told me that my spectacles were gone. My hand, thrust successively into all my waistcoat pockets, confirmed the truth of the mysterious revelation, which was still further confirmed by a plunge into the breast pocket of my coat. The sense of my bereavement then began to force itself upon me in all its horror. The lost spectacles were the only pair I possessed in the world, and as all the shops would be very properly closed on the morrow, I should be in a state of semi-blindness till Monday. Moreover, I knew that, from circumstances which need not be narrated, I should be unable to leave home till the Sunday evening, and there was the possibility before me of dying for want of occupation. In a frenzy of desperation I thrust my hands into places where the missing treasure would certainly not be found. I rifled the pockets of my coat tail; I opened a letter case, likewise a book I commonly carried about me, and of course, as I expected, my search was without profit.

After awhile I bethought myself of the possession of a powerful magnifying glass, which I use to distinguish small words in maps, and in pocket dictionaries. And a very serviceable instrument it is when employed on rare occasions. But, as I soon found when I sought its aid to relieve me from my distress, it became, when employed for the purpose of continuous reading, an instrument of torture worthy the invention of an Oriental tyrant. The page before you is broken up into a number of circular lakes, which appear in certain succession—thickly studded, like Lake George in the United States, with islands, every island consisting of [illegible]ressive letters—islands which it is impossible to reduce to one uninterrupted surface. To take a long walk, and while to read Young's Night Thoughts chalked in huge [illegible]s on a wall, would be a cheerless occupation, but it probably be perfect bliss compared to the effort to read a book or a newspaper with one eye armed with a magnifying glass of high power.

My magnifier having proved a disastrous failure, and being cast fiercely on the floor, I was again thrust back into a state of internal contemplation, when it occurred to me that in some drawer or other I had an eye glass, made to be worn on a chain, and expanding, when required, into a spectacle form by means of a pivot. It is an old family treasure, not made for me, and, as it does not exactly suit my sight, I am not in the habit of wearing it. Nevertheless, my forlorn condition forced its image into my memory, and I recollected that on rare occasions I had used it for purposes not merely ornamental. So I rummaged the drawer, and, having found it, was delighted to perceive that it suited my sight much better than I expected. My joy was transient. I was not, indeed, hurled at once into despair, as by the magnifier, but I glided down on an inclined plane to the same undesirable abyss. The glasses themselves are tolerable, but the machinery of the pivot is loose and capricious, so that the instrument sits uncertainly on the nose, and requires constant adjustment to be in a proper position with respect to the eyes. A pen that only marks at haphazard would check the fine frenzy of the most inspired poet, and certainly was never plucked from the wing of Pegasus. In like manner an optical instrument that keeps on oscillating between chiaro-oscuro and partial blindness, is not favorable to reading, even if we set aside the galling inconvenience occasioned by holding a book in one hand, and something else in the other. I did not dash my eye glass to the ground with the fury I had lavished on the magnifier, but I laid it down with a sigh, and, folding my arms, calmly resigned myself to my misery.

Much time had not elapsed when a resident in the house cheered me with the glad tidings that a friend of his was about to call, who wore spectacles, and would no doubt lend them for an hour or so. There was a vague belief that the condition of his eyesight was similar to mine, though on what fact this hypothesis was founded I have been unable to discover. However, the most fallacious hope is better, while it lasts, than none at all, as Dante clearly perceived when he excluded hope of every kind from the place of torment. I greedily swallowed the welcome theory, and my anxiety for the arrival of the wealthy visitor became intense. He came, my deplorable case was stated to him, and the spectacles were brought into my room. I snatched them up, I put them on, I grasped a newspaper, and I beheld—an impenetrable fog. Still, I had suffered too much not to struggle a little with adverse destiny, and I found that by making the paper almost touch the tip of my nose, I could read with tolerable facility. For about half an hour I got on pretty well, but soon a new source of oppression came upon me. As I have already stated, I am naturally long sighted. Now, by the borrowed spectacles, my whole habit of life was reversed; I had become artificially short sighted, and I could not bear my changed condition. I sent down the newspaper and the spectacles with thanks, and relapsed into melancholy.

Polishing Veneered Work.

Our readers who have been interested in Mr. B. Barnaby's discussions of glueing and veneering will peruse with interest his directions for polishing veneered work.

No attempt at scraping, sand papering, or polishing veneered work must be made till the glue is perfectly dry and hard. It should be left twenty-four hours at least, in a warm room and is better still if left two or three times as long.

The processes for French polishing vary somewhat, according the nature of the wood. For common work in deal, the wood may be well sized first, then papered with fine glass paper, and polished.

For mahogany, walnut, and similar porous woods, the pore must be filled by rubbing in, on a roller of old carpet, a mixture of Russian tallow (that is, tallow free from salt) and plaster of Paris, well amalgamated, before the fire in cold weather. Russian tallow may be had, at most oil shops, generally pure enough; but if the presence of salt be suspected, refine it by boiling it in plenty of water, stirring it well and skimming it. Set it by to cool, and use the cake of tallow which will be at the top.

The more this filling up process is persevered in, the less will be the subsequent labor in polishing; quite a bright surface should be got up by this alone. The mixture of tallow and plaster may be darkened with red lead for mahogany or with other coloring matter according to fancy.

This filling is not necessary for boxwood, ebony, or other of the hard woods.

To polish a surface thus prepared, not being hard wood, and not in the lathe, take a ball of cotton wool saturated with methylated French polish; cover it with a fold of linen cloth; on the linen cover put, with the tip of the finger, a drop or two of raw refined linseed oil (not "boiled oil"); get on a good body of varnish by rubbing always one way with circular strokes; be very careful to go over all the ground each time you work round the surface; and do not go over the same spot twice before you have gone over all. The longer this is done the better. Never mind the smears, which, though they look queer, are the very appearance you want at this stage. Having got on a good body, leave your work and take to another piece. It is good to leave it, if convenient, even for a day or two. By the way, shut all doors and windows before you begin. You can't do French polishing in a draft or in a very cold room.

When you resume work, use a mixture of half methylated French polish and half methylated spirit, or less than half of the spirit when you commence, and put now as little as possible on the wool, covering with more than one fold of fine linen or cambric. Very little oil as before—only just enough to prevent the rubber from sticking to the work; go over it lightly, with an easy gentle touch, in circular strokes, all one way. Never mind the smears. When it comes to look something like a good result, which it soon will, you may take out the smears by rubbing up and down with a mere trace of spirit on wool well covered with the linen, but avoid going over the same place twice, and be very light and gentle, or you will remove your polish. Finally rub it well with a clean wash leather (carefully folded, so as to leave no hard crease which will scratch), or an old silk handkerchief, breathing on the work occasionally.

Boxwood, ebony, cocus, etc., may be rapidly polished in the lathe. At first get a body of polish, on and this can be done without using any oil. The work must not be turned around rapidly, but the pulley of the lathe moved slowly by hand; then use your rubber with a drop of oil, and finally, the polish thinned with spirit.

If either on flat or turned work you require a very superior polish, you may remove nearly all the first coat with fine glass paper, and put it on again which will not take long, the pores being all filled. Remember that throughout the oil is only used to prevent the rubber from sticking, and it has to be got out afterwards with the spirit; so never use more than necessary.

In the lathe, when you come to the wash leathers, the work may be driven rapidly. A bit of ebony can be polished in five or six minutes to such a surface that small print can easily read in it as in a mirror. Dont use your rubbers when they get hard and dry, but, nevertheless, stick to an old one as long as you can, and, if you have to put them by, keep them in a tin box tightly covered.

How the Recent War Affects the Iron Works of Alsace and Lorraine.

The annexation of Alsace and Lorraine, says a correspondent of *Engineering*, has imported into the industrial situation of France and of Germany a considerable perplexity, which just now occupies the attention of both countries. Out of 39 blast furnaces producing 281,000 tuns of iron, which Alsace Lorraine worked and, according to the statistics of 1867, 25 blast furnaces producing 205,000 tuns are left to France; and out of 28,500 acres of land producing 641,000 tuns of ore 22,500 acres become German, and represent a production of 500,000 tuns. We may add that the treaty of peace leaves to France 14 iron works, whose production amounts to 127,000 tuns, and 55,000 acres of coal lands, yielding 180,000 tuns of coal annually.

France possessed 6,800,000 cotton spindles, representing per annum 80,000.000 of kilogrammes of thread. In these figures Alsace had 1,600,000 spindles. France had 80,000 looms producing about 55,000,000 kilogrammes of cotton fabrics; the treaty leaves in Alsace 35,000 looms, and 22,000,000 of kilogrammes of fabrics, or more than a third of the total amount. Now after the 1st of September next, according to the treaty of peace, the annexed territories would be subjected to the duties and taxes of Germany, that is to say, they will be struck with imports equivalent to prohibition. Importation from Switzerland, Belgium, and England would have to fill the enormous void made in the consumption of iron and of fabrics. On the other hand this result would cause to the German producers a considerable disadvantage, because it represents a considerable portion of the total production. This subject forms matter for negotiation, since the two countries would have alike to suffer from the immediate application of the provisions of the treaty. It appears as if there must be established a transition state, granting sufficient delay in order that the material interests of the countries should not suffer.

Glynn's Spark Arrester.

An interesting improvement has just been patented by Mr. Michael A. Glynn, of Matanzas, Cuba, being an improvement in globular spark arresters. The spark receiver is of globular form, and placed in relation to the chimney so that the sparks will be discharged therein, while there will be a sufficient opening between the top or discharge end of the chimney and the receiver for the discharge of the smoke and uncondensed steam into the open air.

The invention may be applied to the top of a curved chimney, so as to discharge the sparks laterally; but the same or a similar result, may be produced with a receiver curving over the chimney.

The receiver is placed on the top of the funnel, and secured to the chimney by bands, clamps, or in any suitable manner. To the bottom of the funnel is attached a tube or cinder flue by which the sparks and cinders are conducted into the ash pit, or into a receptacle containing water for extinguishing the sparks. Where the spark arrester is applied to the smoke stack of a steam boat, the sparks may be discharged directly into the water.

By this improvement, it is claimed, all the sparks may be arrested by the receiver, will fall therefrom by their own gravity, and be discharged as above stated, thus preventing damage from fires caused by sparks from locomotives, as well as the great annoyance of cinders on railroad trains and steam vessels.

STEAM CAR BRAKE.—Steinard's steam brake is in use with much success on the Flushing and Northside Railroad, N. Y. On a recent trial, with a train of seven passenger cars, velocity thirty miles an hour, the stoppage was effected in twenty-six seconds; at forty miles per hour, in thirty seconds. Both trials on a down grade of thirty-five feet to the mile. The brake is attached to the bottom of each car, immediately in the center, which necessitates a double floor. It is worked irect from the engine by means of rods and levers. It does ot interfere with the old style of hand brake.

IMPORTANT PATENT DECISION.

In the matter of the application of David Eymon for letters patent for an improvement in machinery for the manufacture of spikes, appealed from the primary examiner, the Commissioner of Patents, Hon. M. D. Leggett, has rendered the following decision:

The invention in this case consists in such a combination of arrangement of the reducing rolls of a rolling mill, a machine for making spikes or bolts, and an intermediate furnace, as will admit of a bar of iron being so manipulated as to retain the heat it has when leaving the reducing rolls until made into spikes or bolts. The object of this arrangement is to save time and material, and to produce a better spike than can be made by permitting the bars of iron to cool after leaving the rolling mill, and then reheat them before going to the spike machine; it being a well known fact that iron deteriorates in quality by cooling and reheating. The applicant does not claim that the spike machine, the furnace, and the roll of the rolling mill have any connecting mechanism, nor that there is any automatic arrangement for transferring the bars of iron from the rolls by way of the furnace to the spike machine. He only claims that they be in such juxtaposition, such relation to each other, and the furnace so constructed, as will admit of the bar of iron being taken from the reducing rolls directly to the spike machine while still at a proper heat for working, and the rear end of the bar being so swung over the furnace as to retain its proper temperature, while the other end is being worked into spikes or bolts, thereby saving the time and waste of cutting into lengths, and the time and deteriorating effect of reheating. The applicant makes two claims:

First. The arrangement, substantially as described, of a furnace in respect to reducing rolls, and a spike or bolt machine.

Second. The combination of the furnace with its movable roof.

The examiner objects to the first claim, for the reasons that the distance of the reducing rolls from the spike machine is not stated, and that no mechanism is shown for conducting the nail rod to the spike machine or to the furnace, and refuses to examine the case upon its merits until applicant strikes out the first claim and all that relates to it. From this decision of the examiner, the applicant appeals to the Commissioner in person, under rule 44.

The substance of the examiner's objection seems to be that the different machines that enter into the combination or arrangement claimed in the first clause, and described in the body of the specification, have no connecting mechanism, and no automatic arrangement for conducting the bar of iron from the reducing rolls through the furnace to the spike machine. If there had been shown some machinery for doing this, and also such connection of the reducing rolls, spike machine, and furnace as to show that they all worked together by the same power in producing the improved result, I judge that the examiner's decision would have been different, and the patent granted. The question presented, then, is whether such an arrangement or combination as the applicant describes, even if new, and producing a new and useful effect in the manufacture, is a patentable combination.

The object of the patent law is to stimulate the inventive genius of men and induce the discovery of new and improved articles of manufacture, and new and improved modes of producing s ch articles, so that better articles may be made at the same expense, or the same article at less expense.

In the case in hand it is claimed that the applicant makes better spikes at less expense than could be produced by any means known before his invention. Hence, if this is true, he is one of the men that the patent laws were designed to reward. It is not, however, of unfrequent occurrence that the law falls short of doing all that the lawmakers intended.

In this case the examiner was evidently of the opinion that the law was not sufficiently comprehensive to include the invention described. Section twenty-four of the patent law provides: "That any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new or useful improvement thereof . . . may obtain a patent therefor."

If the alleged invention is all that the applicant claims for it, it is certainly an improvement in the art of manufacturing spikes, and as such would be entitled to a patent. But the question raised between the examiner and the applicant in this case is as to whether the invention is of such a character as to be entitled to a patent as either a combination or arrangement.

I must confess that I am not entirely satisfied with the practice of granting patents on the "*arrangement*" of machinery.

A patent may be granted for an improvement in a useful art, an improvement in a machine, or an improvement in a manufactured article; but I find no law for granting a patent on the arrangement of different machines in reference to each other, unless it be done incidentally under a claim for an improvement in the art of manufacturing some article.

The courts have construed the work "machine," as used in the statute, to embrace not only single organizations of mechanical powers, but all such combinations of single machines as are essential to the production of certain and unitary results But I know of no case where they have con strued the statute to cover "arrangements," except in cases where they have held the word "arrangement" to be synonymous with "combination," hence I regard "*combination*" as the better word, and think the use of "*arrangement*" in its stead, in patent claims, should be discouraged.

Does the applicant's arrangement of the reducing rolls, the furnace, and the fuel rolls of the spike machine in reference to each other amount to a legitimate combination, so as to bring it under the term "machine" as used in the statute?

"A patent may be for a new combination of *machines* to produce certain effects, and this whether the machines constituting the combination be new or old."—(*Barrett* vs. *Hall*, 1 *Roff*, 235.)

"But in such case the patent being for the combination only, it is no infringement of the patent to use any of the machines separately if the whole combination be not used, for in such case the thing patented is not the separate machine, *but the combination of machines*. Where a patent is for a new combination of existing machinery or machines, and does not specify any improvement or invention except the combination, unless that combination is substantially violated, the patentee is not entitled to any remedy, although parts of the machinery are used by another, because the patent, by its terms, stands upon the combination only. In such case, proof that the machines, or any part of their structure, existed before, forms no objection to the patent, unless the combination has existed before, for the reason that the invention is limited to the combination." (*Ibid*, 318.)

The preceding extracts from decisions rendered by Judge Story, clearly show that he recognized the validity of combinations made of existing machines.

Such combinations, when formed, are, in view of the result attained, themselves machines, and thus come under the statutes. The term "machine" includes every mechanical device or combination of mechanical powers or devices to perform some function and produce a certain effect or result. —(*Corning* vs. *Burden*, 15 *Howard*.) "The word *machine* in the statute includes new combinations as well as new organizations of mechanism, and hence there may be a patent for new combinations of machinery to produce certain effects, whether the machines constituting the combination be new or old."—(*Wintermute* vs. *Redington*, *Laws Digest*, 472, *s*. 25.

"All the parts or devices of the combination claimed must co-act to produce a given result in order to form a legitimate combination."—(*Swift* vs. *Whisen*, 3 *Fish*, 357).

"When a certain particular combination of known mechanical power or principles produces a new and useful effect in a manufacture, that combination becomes the lawful subject of a patent."—(*Warner* vs. *Goodyear*, *App. Cus.*, *Cranch*, *Ch. J. D. C.*, 1846.

"Any new combination which is of substantial advantage in the arts comes within the policy and protection of the patent law."—*Tyler* vs. *Duval*, 1 *Code Rep.*, 31 *Sa.*, 1848).

"A combination to be patentable must effect a new result, or an old result by a new mode of action. There must be novelty either of product or process."—*Botten* vs. *Clayton*, 2 *Whart. Dig.*, 408.

"A new, or improved, or more economical effect, attributable to the changes made in the mode of operation of existing machinery, proves the change has introduced a new mode of operation, which is the subject matter of a patent."—(*Farbush* vs. *Cook*, 2 *Fish*, 672.

"To make a valid claim for a combination it is not necessary that the several elementary parts of the combination should act simultaneously. If these elementary parts are so arranged that the successive action of each contributes to produce some one practical result, which result, when attained, is the product of the simultaneous or successive action of all the elementary parts, viewed as one entire whole, a valid claim for thus combining those elementary parts may be made."—(*Ibid*. 669).

These quotations give correctly, I believe, the current doctrine of the courts on the subject of patentable combinations. A careful reading of them will show the only true method of determining whether or not a given arrangement of different mechanical devices constitutes a valid combination under the patent law. These learned jurists inquire: First. Is the effect or product of the alleged combinations a new effect or a materially better effect, or as good an effect, more economically attained? Second. Do all the separate devices claimed in the combination take part in producing said effect?

If the first question is answered affirmatively, then it is evident that there is in the alleged combination a patentable invention. If both questions can be answered in the affirmative, then the combination is patentable.

If the first question is answered in the negative, then it is a non-patentable arrangement.

If the first question is answered in the affirmative, and the latter in the negative, then the application contains a patentable invention, but not in the manner and form claimed.

Whoever attempts to determine whether or not a machine is patentable by first examining the machine itself is very liable to arrive at false conclusions.

The true method of examination is to first ascertain what is the effect, and second, what produces the effect.

Apply this test to the case in question.

The applicant alleges that he has invented an arrangement of machinery that will produce better spikes and bolts at less expense than could be done by any machinery before known.

If this be true, then he has a patentable invention, for the test of invention is the result attained.

If he can retain the bar of iron at or near the temperature it has when leaving the reducing rolls, until it is worked into spikes, and if this has not been done before, then he can make better spikes. If he can do this without first cutting the bar into "lengths," and then reheating them, then he can make better spikes at less expense. It being determined that he produces a better effect at less expense, it must be the result of new machinery or a new combination of old machinery.

We now turn to his device, and find the same old spike machine as heretofore. We also find the ordinary reducing rolls of a rolling mill. But he has placed his spike machine near the reducing rolls, and right between the spike machine and reducing rolls he has placed a peculiarly constructed furnace, so adjusted as to admit of one end of the bar being heated from the reducing rolls to the spike machine while hot, and the other end of the bar being swung over the furnace to retain its heat until the whole bar is worked into spikes. In this adjustment of these three machines we find the cause of the effect produced.

The specified arrangement of these machines in reference to each other is essential to the effect, and every device or machine in the arrangement acts an important part in producing this effect.

In view of the end to be attained, these three devices—the reducing rollers, the furnace, and the spike machine—become, by the decisions of the courts already quoted, a single machine, and as such is embraced in the statute defining the subject matter for patents.

The fact that the applicant was obliged to construct a new form of furnace for this machine, having a peculiarly shaped and adjustable roof, for which he makes a separate claim, obviates the charge that his combination is a mere mechanical expedient and without invention.

It is further claimed by the examiner that the reducing rolls, the furnace, and the spike machine do not *co-act* in producing the result. It is true, they do not all act upon the same spike at the same moment, but the term "co-act," as used by the courts, does not mean that all the devices in the combination shall absolutely act upon the result at the same instant of time.

It only means that each device shall fill a necessary office, and act a necessary part in producing the result. They may act simultaneously or successively, and in either case it would be co-action. Neither is it necessary that the parts of the combination shall be connected together by operating mechanism. Without such mechanism the effect is complete; hence it is doubtful whether, if such mechanism existed, it could properly be regarded as any part of the combination.

Neither is it necessary that there should be any automatic arrangement for conveying the bar of iron from the reducing rolls through the furnace to the spike machine. The improved effect is complete without such arrangement.

It is barely possible that some automatic process might be devised for this part of the work that would still further lessen the expense. If so, it is a legitimate field for further invention hereafter.

The doctrine that all the parts of a valid combination must necessarily be connected by operating mechanism, and that the product must be transferred from one device to another in the combination by automatic process, is illogical and pernicious.

It is true that such connecting mechanism and automatic arrangement will generally exist, but to say that it is absolutely essential is, I think, fallacious. I am clear in the opinion that the application presents a legitimate combination, and if the same is novel the applicant is entitled to a patent.

I should prefer, however, to see a combination claim substituted for the "arrangement" claim. With this change I see no such defect in the specifications or claims as should excuse the examiner from proceeding to the examination of the case upon its merits.

M. D. LEGGETT, Commissioner.

U. S. Patent Office, September 2, 1871.

The Electric Flash---Its Velocity and Measurement.

A correspondent of the New York *Evening Post* gives the following interesting description of the experiments of Professor Rood and others in the measurement of electrical velocities:

A wheel painted black and carrying a distinct white point on its circumference is provided with some means of giving it a uniform motion of rotation. If the wheel make one revolution in one sixth of a second, the white point will appear as a continuous circle; for any impression produced on the eye remains during one sixth of a second, therefore during one revolution of the wheel all the successive positions on the circumference occupied by the bright point remain impressed on the eye and hence the circle appears unbroken. Now, if a flash of light in the place of the white point should last one sixth of a second, the circle would appear complete; but if it lasted one twelfth or one twenty-fourth of a second, then would the point describe one half or one quarter of the whole circle. Thus, by this simple means—remembering that the smaller the arc of the circle the less the duration of the flash—we can readily measure, from the length of this arc, quite minute portions of time.

If, instead of having one white point on the wheel, we have one hundred or more radial white bands drawn with the space between them equal to their breadth: then, if the wheel makes ten turns in a second, any radial white band will advance into the position previously occupied by an adjoining black band in one thousandth of a second, and if the flash of light lasted one thousandth of a second all the white bands would, during that interval, have advanced into the position of the black bands, and *vice versâ*, and the disk would appear without bands and covered with an uniform gray tint. We can thus readily and accurately measure one thousandth of a second.

With the above apparatus Arago, about the year 1835, first showed that a flash of lightning lasted less than one thousandth of a second, but did not succeed in fixing the minimum limit to its duration. Professor Rood, however was more fortunate; for during the well remembered remarkable display of lightning, 1869, with an apparatus similar to the above (extemporized from a piece of paste board and a shawl pin), he succeeded in measuring one five hundredth of a second as the duration of those vivid and extensive flashes.

It was soon found that the velocity of the revolving disk fell far behind that of the spark of the Leyden jar, for its flash showed the revolving radial bars as absolutely at rest as when the disk was stationary. But Professor Wheatstone, of London, in 1834 substituted for the revolving disk a mirror turning on a horizontal axis, and instead of the white point or bars, he used the image of the spark reflected from the turning mirror. If the spark be instantaneous, then, will it appear in the rotating mirror just as it is seen when reflected from the mirror at rest; but, if the spark last during even an extremely minute fraction of a second, it will appear drawn into a line in the direction in which the mirror turns. Wheatstone thus measured the one-million-one-hundred-and fifty-thousandth of a second, and ascertained that the electricity from a Leyden jar goes over a copper wire at the rate of 288,000 miles in a second, exceeding light itself in velocity.

Professor Rood combined the two methods above given by viewing the appearance of stationary, parallel, and equidistant white and black bands reflected from the revolving mirror while the flash of the Leyden jar illuminated them. He has produced, by this simple combination, an instrument surpassing in minuteness and accuracy of determination all that has gone before; an accomplishment which cannot but reflect much renown upon American science. He has succeeded (with a mirror making three hundred and fifty turns in a second) in measuring accurately forty billionths of a second, and has shown that this is the duration of the flash of a Leyden jar having only eleven square inches of surface and one twenty-fifth of an inch striking distance—an interval of time just sufficient for a ray of light going at the rate of one hundred and ninety thousand miles in a second to travel over forty feet. The flash from a jar having one hundred and fourteen square inches of surface lasted four times as long as that of the smaller jar. Thus, for the range of electric flashes, we have measures from the one five hundredth to the forty billionth of a second.

ON the eastern slope of Clark mountain, Nevada, near its summit, there is a perpendicular cliff two hundred and fifty feet high. At about one hundred feet from the base of the cliff on its front are engraven the characters † I L D. The cross and letters are of immense size, being fully sixty feet in hight, and cut into the cliff two and a half feet deep—so that they can be plainly seen at a distance of five miles. This strange workmanship was done, it is supposed, by the Jesuit missionaries, many years ago.

THE AGED PILGRIMS' ASYLUM.

The building of which we this week give an illustration, is being erected on a site adjoining the new Islington workhouse, at Hornsey Rise, England, by the Aged Pilgrims' Friend's Society, and is for an extension of operations now carried on at the society's present asylum, at Camberwell. It is intended for the reception of aged and comparatively destitute members of Christian churches of all denominations.

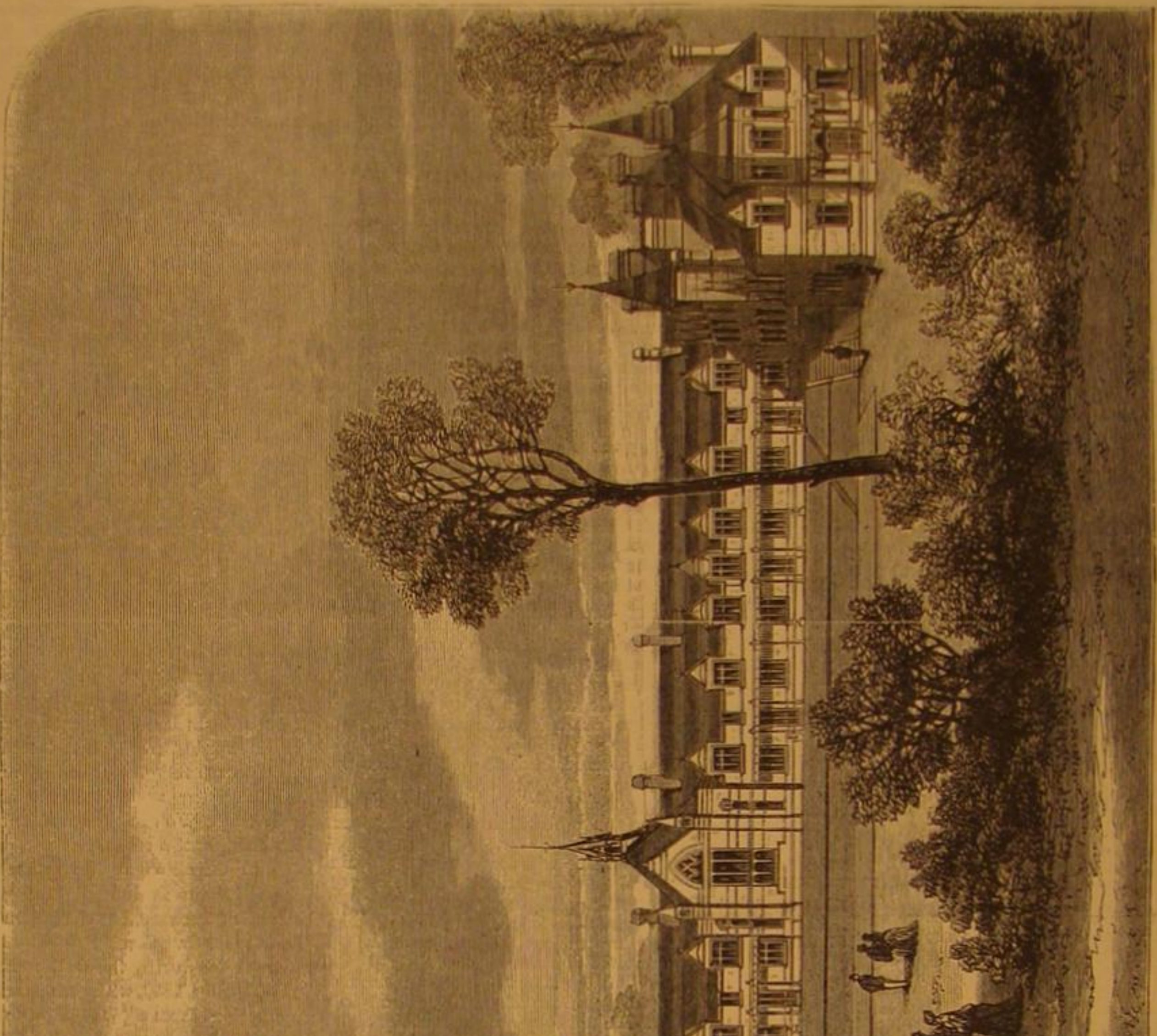
The nature of the site, it being on the side of a hill, suggested the terraces, which materially aid in giving whatever effect the building may have.

The new asylum provides accommodation for eighty pensioners, and has besides a chapel reached by covered ways, warden's and matron's apartments, committee, and other official rooms.

The design combines the corridor and cottage systems, the wings being devoted to the former. All the corridors and staircases are fireproof.

The materials employed are stock bricks, picked for the facings, with a struck joint, and with dressings of Box stone. The annexed block plan shows the general arrangements.

The contract has been taken for erecting this building for £9,345 sterling, by Messrs. Hill & Sons, of Islington, by whom the works are being carried out, under the personal superintendence of the architect, Mr. F. Boreham.



THE AGED PILGRIMS' HOME, HORNSEY RISE, ENGLAND

Queer and Vicious Fish.

Among the vast multitudes of living beings which inhabit the waters of the globe, there are things beautiful, things ludicrous, and things horrible and fearful, beyond the power of pen to describe. Among the latter class may be included the scorpion fish, which, upon the authority of Dr. Francis Day, is so much feared and dreaded, that fishermen will cut the meshes of their nets, and lose their entire catch, rather than risk a wound from it. The fish inflicts its injuries by its dorsal fin, which is serrated, and until this is broken by means of a club or stick, no one acquainted with the character of the fish will venture to touch it with the hand. Another fish, called the crocodile fish, also inflicts frightful wounds with its spines. A fish is said to infest the mouth of the Amazon, which, although scarcely larger than the minnow of our fresh water streamlets, is so ferocious in its attacks upon the human body that it is dreaded even more than the crocodiles. The name of this little fish fiend is "candirou," and when it seizes hold of the flesh, which it never fails to do when occasion offers, it holds on with such a tenacity that it cannot be removed without tearing out a mouthful of flesh. Another fish of South American rivers is the "payara," which carries in its lower jaw two fangs, by which it cuts a gash as smoothly as could be done by a razor. The "caribe" is the vampire of South American streams. It scents blood so keenly, that the least scratch on the person of the bather invites its fierce attacks. It has sharp triangular teeth of great power, and, though no larger than the perch, is an object of dread to all who know [illegible] character.

[illegible] great things are done little by little. Atoms make [illegible]ds. The greatest fortunes consist of farthings. Life is [illegible]e up of moments.

Insect Destroyer.

Samuel Creighton, of Lithopolis, Ohio, has invented an improved trap for removing bugs and other insects from potato vines, which shall be simple in construction, effective in operation, and convenient in use; and it consists in the trap constructed as herein described. The back plate of the trap has the lower end bent or curved into semi-cylindrical form, so as to form, in connection with the side plates, a pocket to receive the bugs. The side plates are attached to the side edges of the plate, and are made wide at their lower ends, and taper to a point at their upper ends. The upper parts of the side plates are bent outward. In the lower part of one of the side plates is formed an opening, closed by a slide, for convenience in pouring out the bugs. To the upper end of the plate is attached a handle for convenience in holding the trap when in use. Another handle may be attached to the upper part of the rear side of the plate for convenience in carrying the trap. In using the trap it is placed at one side of the hill or hills of plants, with its top or upper end more or less inclined, according to the size of the plants. In this position the lower branches of the plants will overhang the forward edge of the back plate, and the flanges of the sides will embrace the second and third sides of the hill, leaving the fourth side exposed. The operator then holds the trap with one hand, and with a light, flat, and broad broom he strikes the exposed side of the plants, knocking the bugs into the trap. The bugs, as they are knocked into the trap' slide down the plates into the pocket. In the case of active bugs that might escape from the trap, water may be placed in the pocket into which they fall as they slide down the plates. In this case the opening should not be made in the lower part of the side plate.

Galvanic Action.

Although no two persons are constituted precisely alike, and that which produces a certain effect on one will produce a very different result on another, yet there are doubtless general laws which govern all actions of the animal organism. To appreciate and understand these laws is the difficulty. For instance, what will be the effect of two metals in one tooth? Cases come under my observation frequently where this state of things exists, but with very different testimony from the patients as to the effects—some complaining of a persistent metallic or coppery taste, and uneasy sensations in the tooth, while others appreciate no effect whatever. Not long since a lady called to have an examination of her teeth. They had nearly all been filled—some with gold, some with amalgam fillings, some with both. In one tooth I found two large amalgam fillings, and two smaller gold ones; no one of the fillings, however, in contact with another. They had all been in over twelve years, and the tooth was in a good state of preservation. This patient complained of a coppery taste in her mouth. Now, this was either the result of galvanic action, or caused by the secretions of the mouth acting on the amalgam fillings. If the latter hypothesis be correct, will not the digestive fluids be necessarily vitiated, and will not this ultimately impair the health?

But again. We see patients in the possession of excellent health whose teeth were filled with amalgam twenty years ago.

Can galvanic action be modified by temperament or condition? Or is there any galvanic action where the two metals do not touch each other? Or, if they do touch, will there be sufficient galvanic action in any case to produce unpleasant results?

My use of amalgam is limited to two classes of cases—where the tooth is too poor in substance or vitality to warrant a gold filling, or where the patient is too poor to pay for gold.

Latterly I have been experimenting with Guillois' cement as a substitute for amalgam in teeth which are too frail to bear the mechanical force required to insert a gold filling, and so far am pleased with the results. Where there is much vitality in the tooth, its non-conducting properties make it more desirable than amalgam. In some special cases which I have under observation, it has withstood the friction of mastication beyond my most sanguine expectations

A single remark, in closing, upon these cases of galvanic action, of which we hear. I apprehend the unpleasant taste ascribed to this cause is not unfrequently chargeable to an unhealthy saliva and want of cleanliness, and that the galvanic action would cease if these conditions were corrected. —*A. M. Hills, in Dental Cosmos.*

EVERY boiler should have its own safety valve.

Long's Patent Knock-down Chairs.

Our engraving illustrates a practical yet simple and very useful improvement in the class of chairs mentioned in the above heading, which greatly facilitates the packing, economizes space in transportation, and consequently saves expense for freight, cartage, etc., while, at the same time, nothing in convenience, stability, or durability in service, is sacrificed.

These chairs are especially adapted to localities where the cost of transportation is large, either by rail or water.

The front legs and rounds are put together and packed in the manufactory, as shown in Fig. 1.

Fig. 2 shows the method of packing the backs for shipment.

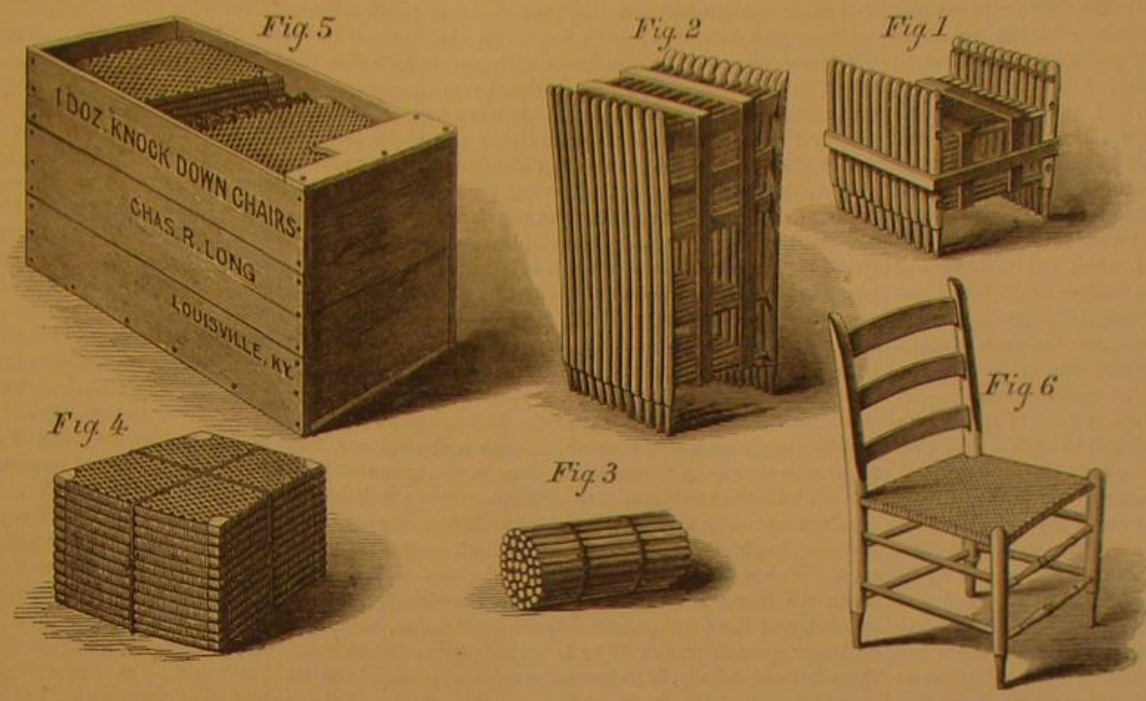
Fig. 3 represents the bundle of side rounds as packed for shipping.

Fig. 4 represents the seats, also packed for transportation, there being, in each bundle, pieces for one dozen chairs when set up as shown in Fig. 6.

The representations referred to show the method of packing in bundles.

Fig. 5 shows the compact manner in which one dozen chairs are packed in a box.

The improvement on chairs in this particular is the main point sought for by the patentee, while all of the advantages of a good, comfortable and durable chair are preserved for the use of the public, within the reach of all classes. This improved chair, by reason of its construction, can be shipped in the knock-down state by the dozen, boxed or in bundles, thereby, it is claimed, creating a saving of 300 per cent, in rate of freight, over chairs constructed in the ordinary way, as the seats are made detachable from the frame of the chair. In case of their wearing out, they can be readily detached and seated at small cost, and at a mere nominal cost of transportation. If the frame of the chair should get broken or made useless from any cause, the seat, if uninjured, can be easily detached and applied to another frame of the same manufacturer, causing economy in the general application and specific construction of this class over any other in the market. These chairs, in the knock-down state, can be easily put together by any unskilled person.



LONG & BROTHER'S DOUBLE BOTTOM RATTAN AND SPLIT SEAT KNOCK-DOWN CHAIRS.

In putting the chair together two long rounds are selected, and the two front posts are partially driven together, taking care to have the gains that are cut into the posts for the seats opposite or facing each other, and also to have the front post properly matched, with the two holes for the side rounds turned in the same direction. After partially driving the front of the chair together, the seat is inserted (the front part of which is the widest), into the gains that are cut into the posts; then the front of the chair is fully driven together. The front of the chair is then laid down on a solid bench, the side holes upward; then four short rounds, two for each side, are driven into the remaining holes of the front post, after which the chair is ready in its two parts (the back being already driven up), to be completely put together. The back of the chair is then laid down, holes upward, on a solid bench, and the front part which has been put together is connected to the back of the chair by driving the projecting ends of the side rounds into the holes of the back posts, commencing with the bottom round, guiding, at the same time, the upper rounds into the upper holes, and also the back part of the seat into the gains that are cut into the back posts, after which the chair is forced completely together, all of its parts making a perfect fit. The chair is then laid down on its side, and the seat fastened, by the use of screws, through the holes in the sides of the posts, forcing them full up, after which the heads of the screws are covered by filling with putty, colored to suit the finish or color of the chair.

Patented through the Scientific American Patent Agency, December 13, 1870, by Long Brothers, whom address for further information, 78 Main street, Louisville, Ky.

Dumping Car.

Solomon Rousculp, of Thornville, and Isaac B. Shambaugh, of Scio, Ohio, have invented an improved dumping car for use in ballasting railways, from which, by simply turning a shaft, and thereby opening hinged doors in the bottom, the load of gravel or other material may be discharged, the same shaft and connected mechanism being used for closing the bottom, and thus putting the car in position to receive another load. The invention consists in an arrangement of parts for performing this function.

The bottom is preferably partly hopper shaped or descending toward the center for facilitating the delivery of the load as near the center of the road as possible; but it has a level portion at the center, consisting of two boards hinged to the bottom of the descending part, so as to open downward and close upward, the said boards meeting together at the center of the car when closed. These boards are connected at the upper sides at each end or thereabout, by chains, to a chain or cord, attached to a pulley, on a shaft, extending along the center of the car from end to end, and supported in suitable bearings above it, so as to close the boards when turned in one direction; and the boards have also a cord attached to the lower side and extending around the outer edge of the car up to the said shaft, and attached to pulleys thereon, so as to wind up and draw the boards down when the other cords or chains are unwound, and to unwind and allow the boards to be closed when the shaft is turned in the direction to wind up the chains. For turning the shaft forward and backward, the pulleys are connected, by a cord or belt, to a vertical shaft, similar to a brake shaft, with a hand wheel at one side of the car, which being turned one way will open the bottom, and the other way will close it. This shaft is provided with ratchets and pawls, arranged to hold it from turning either way, by which the opening may be kept entirely closed or partially so, as may be preferred, for dumping the whole load at once, or allowing it to discharge gradually while the car is moving along. The shaft is turned by a hand crank applied to the ends or by any other competent means.

FARRELL'S IMPROVED LAMP WICK.

Lamp wicks are usually made either flat or round, and of a length to reach the oil or hydrocarbon liquid in the reservoir. Much of the wick is always wasted, because its length must always be sufficient to reach from the wick tube to the fluid when at the lowest level to which it is to be burned.

With coal oils, and other limpid hydrocarbon liquids, it is not necessary to have the wick itself extend down to the liquid, or be prolonged by a stationary wick of the same size as itself.

A capillary cord, extending from the lower end of the wick into the burning fluid, will supply enough of the fluid to the wick for the purposes of combustion.

The wick illustrated can be made much more cheaply than other wicks, because of the saving of the fibrous material.

The entire wick can be used as long as the body of the wick will extend from the end of the wick tube to the wick raising device in the burner, and the supply of the fluid, being through the capillary cords, will be uniform.

The engraving is an elevation of the improved wick, the upper part being either flat or circular, and the capillary cords, extending from the lower end of the wick, downward, as shown.

The inventor prefers to use two capillary cords, with a flat wick.

Patented, May 23, 1871, by John Farrell, who may be addressed for factory or State rights for manufacturing, at Post Office Box No. 110, Brooklyn, N. Y.

A REMARKABLE group of conical stone monuments, made of smooth and apparently hewn stones cemented together, and evidently the work of skilled builders, has been found near Death Valley, in Southern California. There are probably one hundred in all.

Improved Photo-Lithographic Process.

In the first place, a solution is prepared of bichromate of potash (chemically pure), one part, water, twenty parts; and upon this a carbon tissue is allowed to swim for a couple of minutes. It is dried in an airtight box, containing fused chloride of calcium, within the space of twenty-four hours, and may be preserved many weeks without losing its sensitiveness.

The negative should be absolutely clear and transparent in the lines, and otherwise as opaque as possible. The development is conducted, after brief exposure, with an ordinary iron developer, and the negative subsequently intensified with bichloride of mercury and sulphide of ammonium in the usual manner. The margin of the negative is covered with Indian ink, or with a paper mask fastened upon the reverse side of the plate. In this way the development of the picture is much improved, the pigment paper extending well beyond the unsolarized margin. The exposure varies from three quarters to one minute in the sun, and from four to ten minutes in diffused light.

For the development of the picture, an exceedingly smooth lithographic stone is employed, together with a sheet of fine filter paper, a squeegee, a dish of rain water, and a supply of hot water.

The print is first dipped into cold water, the air bubbles dissipated, and then placed face downwards on the stone. Without losing time, the filter paper is at once placed upon the tissue, and rubbed over well with the squeegee, a new supply of paper being subsequently applied in the same way, until the tissue is half dry. After waiting two or three minutes, the stone is put in a sloping position into a dish, and warm water allowed to flow over the whole surface; and under this treatment the unsolarized portions of the pigment paper begin to swell visibly under the paper in a very short time. The application of warm water is continued until the paper backing begins to leave the stone, and as soon as there is not much resistance to the operation one may proceed to draw it off. Upon the stone is seen a dark mass of black gelatine, which disappears as the washing goes on, until a sharply defined image is the result. Upon the picture itself the water must never be poured, but only allowed to stream over the surface, as the lines are easily injured, and for this reason the warm water is applied from the edge of the stone.

When the image stands out clear and free, the stone is immersed in cold water until it has become cool, which necessitates an interval of some minutes. It is then leaned against a wall, and allowed to dry spontaneously, when lines which, in a moist state, were soft and hazy, become sharp and defined.

The dry picture is now covered with a solution of gum, as in the case of an ordinary lithographic impression, and, after drying, again moistened, and the lithographic ink repeatedly applied. The stone may then be rolled up and printed from in the ordinary press.

GEORGE'S CLAMP PEN HOLDER.

The engravings accompanying this notice, illustrate Mr. A M. George's clamp penholder, manufactured at 137 Elm street, New York, and patented through the Scientific American Patent Agency, January 24, 1871.

The pen is held by a piece of swaged or stamped metal, so joined to the wood that the connection forms a spring which, when the piece is released from a clamping ring, throws the former away from the wood. When the ring is slid down upon the spring piece, the latter is forced toward the wood, and a pen placed under it is very firmly held, while, at the same time, there is an elasticity in the parts approximating to the agreeable elasticity of the quill pen.

The holder fits all sizes of pens, is durable, and has the further advantage that a pen is easily removed from it when worn out, not binding and sticking from rust, as in many other forms of holders.

Extensive arrangements for the manufacture of this penholder have been made, and a fair trade in them has already commenced. The article is one which will doubtless become popular, especially as it combines cheapness with great utility.

Two interesting agricultural enterprises are in progress—one the cultivation of oranges in California, and the other the establishment of an olive grove on St. John's River in Florida. For California it is claimed that fully twenty-five out of the fifty counties in the State are admirably adapted to the production of oranges.

Correspondence.

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

Another Marine Disaster from Criminal Neglect.—Had the Lodona a Governor?

To the Editor of the Scientific American:

"And all the firemen were ordered below to keep the fires up!"

It is probable that but few, even among readers of accredited general intelligence, have been properly impressed with the significance of the above words extracted from the plain report of the mess boy, Lewis Wolf, saved from the wreck of the steamer *Lodona;* yet those words afford positive proof that the ill fated *Lodona*—like steamers in the American service generally—was not as well prepared as she might have been for the dangers of the sea. These steamers are tossed and pitched about in a gale, and, at every lift of the screw propeller or paddle wheel from the water, its resistance being nearly all removed, away bounds the ponderous engine, and the steam after it, wasting at the perilous moment its invaluable power. A marine boiler is calculated to supply steam to drive the engine at a given speed and perform a given amount of labor, but when the resistance of that labor is suddenly removed, the engine must, when not supplied with automatic means of regulation, naturally increase its speed, which often reaches, under such circumstances, to two or three times its normal rate, exhausting the boiler so rapidly of its steam that at such times extraordinary exertions are made (but too often in vain) in feeding up to maintain a supply of power; and it is in such a case that "all the firemen are ordered below to keep the fires up." It is hardly to be supposed that a steamer would be sent to sea, without a supply of engine power to move her qui e equal to that of any gale; hence, if her engines, when in a rough sea, could but economize the steam so that every ounce of its force would be properly applied when most required, the ship would, when heading off a lee shore, at least keep her distance, or at worst, with the aid of an anchor, insure her safety; or, in other words, if the mechanical appliances to her engines were so complete as to prevent a waste of her steam power (when, by reason of pitching and tossing in a rough sea, the propeller becomes alternately more or less bare of resistance) and store it up at every lift of the screw for a more than average push as the latter becomes immersed, the ship could ride out the most terrific gale with safety.

A Cunard steamer can stem the most violent of gales with safety to the ship and machinery, and maintain at least one half her usual speed; had not many years' experience shown this, the last trip westwardly of the *Cuba*, during which a tornado headed her off for some hours, would have solved the problem.

But the Cunarders, like all foreign steamers, have their engines fitted with "marine governors," which prevent a gale from seriously affecting the machinery that drives them, and in no condition of foul sea or weather is it requisite to order "all the firemen below to keep the fires up," but on the contrary, no steam being wasted, when the propeller is pitched out of the water and becomes temporarily almost a useless appendage, fuel is saved, and generally at such times some of the furnace doors are opened, but always a full head of steam is maintained.

When but few steamships crossed the Atlantic, and before the introduction of marine governors, it was quite common for them to waste so much steam in contending with westerly gales as to make it necessary to call at Halifax for an extra supply of coals to enable them to reach New York. But with the great number of steamers now making their much more regular passages between Europe and America, such a case is rarely heard of, and when it is, the cause may be readily suspected.

In the SCIENTIFIC AMERICAN of July 19, 1856, is illustrated the first invention of the author of the marine governor, Mr. Thomas Silver, and its use was there strongly advocated. It had then been in successful operation on the Collins steamer *Atlantic*, whose popular commander, Captain West, never failed to speak in praise of its performance. Since that date it has become considered abroad an essential portion of a sea going engine, but through false notions of economy, or the perfect recklessness in regard to safety, with which characteristic our people are liberally accredited, its advantages seem to be little appreciated among American steamships. It is common with steamers not fitted with efficient marine governors, when in severe weather, to "lay to" and "weather out the gale." As an example of this resort, many will remember the report of Rear Admiral Poor, of the United States flagship *Severn*, when in a gale near Key West, in which he says: "The engines raced to such an extent, and the propeller struck the water so forcibly, that there was great danger of giving way, and the ship was hauled to under canvas." We hardly need say that the flagship *Severn* or any other steamer in want of proper appliances to meet such contingencies is liable to founder and go down, or, having to encounter a gale off the lee shore, run all the dangers of total destruction with many unfortunates besides the *Lodona*.

If a steamboat boiler explodes, and spreads death and maiming among scores of human victims, although an invisible flaw may have led to the disaster, a murderous criminality is charged upon those whose duty it was to have prevented the calamity. But when a steamer at sea becomes overpowered by the elements for want of a simple addition to her machinery, by which the powers that were allotted to her in her construction could be maintained in the worst of weather, the world must be content with the report of her sad fate, together with those on board, frequently embellished with a poetic description of how the noble ship behaved to the last plank above water. As before stated, all foreign sea going steam vessels are fitted with governors, and I will venture to state that an engineer who failed to keep the instrument in a proper condition would be promptly discharged.

If the *Lodona* were furnished with a governor, the ordering of "all the firemen below to keep up the fires" supplies sufficient evidence of the disorder of her machinery.

ENGINEER.

Boiler Explosions.

To the Editor of the Scientific American:

It is an established maxim, that the best judge of any science or art, is a person who has made that science or art his particular study. Therefore has the world looked to the practical engineer for an explanation of the causes of the frequent steam boiler explosions. But the recent examination of the so-called experts shows that the world (and, no doubt, the experts also) has been deceived. The examination would show that the mechanical portion of an engine is more studied by engineers than the chemical phenomena produced by the agents they are employing. They all agree that a steam boiler may be exploded; but, what is the combination of facts to produce this effect, is a question. Fortunately (without intending it, perhaps), language has pointed to the difficulty: "Explosion; the act of driving out anything with noise and violence." "Burst; to break suddenly." The bursting of a boiler, then, would seem to imply the sudden breaking of a segment of the boiler, escape of steam and boiling water, scalding of fireman and engineer, and those who carelessly placed themselves in the range of danger. While the explosion of a boiler, as we too well know, involves not only the lives of the careless, and very often ignorant, engineer, but also the lives of all entrusted to his care. We are too apt to say we know the nature of a body, when we know several of the uses to which it may be applied, and the consequences of such application, in greater or lesser quantities, simply or in combination; but to know the nature of a body, is to know the original materials of its constitution, and the mode of their combination; and those materials should be known in their primitive, or most simple state, and the knowledge of the combination should include all the intermediate changes, in all their details, from the primitive elements. Therefore, the engineer should not only study thoroughly his machinery, but also chemistry—at least, so far as it relates to those bodies which he is obliged to use. A committee of men thus educated would not be long in investigating and giving the true cause of steam boiler explosions.

We are gravely told, in some of our school books on natural philosophy, that experiments were made by a committee of the Franklin Institute of Philadelphia, at the suggestion and expense of the United States Treasury Department, showing that the generation of hydrogen gas, in steam boilers, however high their heat may be, never takes place: "After many trials, with the express design of forming hydrogen in a steam boiler, if possible, they never produced a trace of this gas, from the decomposition of water." Again: "Even if the gas in question were formed in overheated boilers, no damage could accrue from its presence, since hydrogen never explodes without being mixed with oxygen or common air, neither of which ever exists in a steam boiler when in use; besides, were these two gases in the steam boiler, ready for explosion, still no danger would exist, since they never take fire except from contact with flame. Hence, all danger from hydrogen in the boiler exists only in the imagination." We are told by some chemists (from the laboratory), that the spheroidal state of the water is the cause of the explosion; but we know that the spheroidal state of the water cannot exist unless the boiler be overheated; and if there be a sufficiency of water, and a safety valve, the boiler cannot be overheated; therefore, with a sufficiency of water in the boiler, and safety valve, we cannot have the spheroidal state of the water, nor an explosion of the boiler.

Let us now see what is the effect of an insufficiency of water in a boiler which is well heated: The flame, or heat, passing through a flue, or under a surface of a boiler not covered by water, soon causes it to become red hot; the steam necessarily comes in contact with this red hot iron. "Iron decomposes steam at all temperatures, from a dull red to a white heat, appropriating its oxygen." In this way it would take but a short time (according to the surface exposed) to convert the greater portion of the steam into its elements, hydrogen, which remains free in the boiler, and oxygen, which the heated iron appropriates to itself, forming oxide of iron. While the machinery is not in motion, or the steam not escaping freely, the hydrogen fills the upper portion of the boiler, and does not come in contact with the red hot iron, nor its oxide; but, any cause which may produce an expansion or disturbance of the gas, so as to bring it into contact with the "oxide of iron heated to the same temperature as will decompose steam," the gases will immediately become chemically combined, producing a most intense heat ("the most intense heat that can be produced is caused by the combustion of hydrogen gas"), and causing an explosion, at the same time the "oxide of iron will be reduced to its metallic state."—("Turner's Chemistry," 1846, by Rodgers, page 333.) The simple experiment of burning a mixture of the gases in what is termed an hydrogen gun, or experimenting with the eudiometer in a basin of water, will satisfy any scientific engineer, not only as to the cause of steam boiler explosions, but how they may be remedied.

JOHN LYNCH, M. D.,
Professor in South Carolina University.

Darwinism.

To the Editor of the Scientific American.

I have noticed going the rounds of the press, an article on "a new and hitherto unanswered objection to the theory of Darwin." The substance of it is an effort to prove that the most vigorous plants (I believe the writer does not speak of animals) are the least prolific, and the least able to propagate their kind; and the writer instances the fact that gardeners have the greatest difficulty in obtaining seed from their finest varieties, in fact, that these highly cultivated varieties show very little disposition to produce seed at all.

Now it strikes me that the ground for this objection is not well taken, and not only this, but it appears to me that the argument, instead of being a strong one against the theory of natural selection, is really only another confirmation of its truth.

For, the writer is evidently in error in calling such plants as he refers to, vigorous. They may be the most monstrous, or the oddest, or the most brilliant and varied in color, and may be the most pleasing to the genus *homo*, but these qualities are by no means signs of vigor. In fact, I should think them quite the reverse. Monstrosity is not strength, oddity is not power. Daniel Lambert, who was the heaviest man of whom we have any record, was not the most vigorous and healthy of his race. Yet I have *no* doubt that if there were another race of beings standing in the same relation to us as a gardener does to his plants, they would pick on precisely such monsters as choice specimens, and would neglect the ordinary members of our species, who are the really vigorous and powerful ones—the ones who get their own in the battle of life, and spread out and occupy the earth. That is, supposing they selected us as the horticulturist does his plants, for oddity or eccentricity. If we were selected for use, as a farmer raises his corn, I suppose the most vigorous would be selected. The farmer selects his corn and grain not by its oddity, but by its vigor; and I never hear him complain of a difficulty in getting seed from his corn or pumpkins.

In the course of natural selection, in the struggle for life with increasing numbers of its own and of other species, true vigor in a plant is pre-eminently required, and in such a contest what chance would the "vigorous" (or rather the most deformed) plants of the horticulturist have? Brought to the crucial test of vigor, they would be overcome and exterminated, unless in a few generations they rose to their naturally vigorous state, which advance the gardener would term a degeneration into the wild or uncultivated state.

I think the writer's fault is, that he regards those plants as the most vigorous which are the most vigorous in supplying man's whims; in other words, the most vigorous in becoming man's slave. This is docility and pliability, not vigor. We must take the plant's own view of it. Being an organized being, it is, like all other such, selfish, and looks entirely to its own comfort and interests, and does nothing whatever for any other being, except what the other takes perforce. As the most vigorous plant is that which is hardiest and most prolific, tenacious of its own life, and powerful in continuing its species, I think it may be found that these plants which have been the least cultivated will be found to be the most vigorous; such as the thistle, the innumerable class called weeds, the blackberry, etc. All of these are hardy in the extreme, difficult to exterminate, and grow under conditions which would be fatal to the gardener's pets.

The positions taken by Mr. Darwin have not yet been successfully assailed, for the reason that his conclusions are not the result of mere theorizing, but have been forced upon him by observation of nature's stubborn facts, to the collection and study of which he has devoted his life.

However, let his work stand upon its merits, and let every objection that can be offered be boldly made and fairly discussed.

ANDREW VAN BIBBER.

Cincinnati, Ohio.

Railroad Car Springs.

To the Editor of the Scientific American:

It has occurred to me that our railroad mechanics have in most cases overlooked the proper manner of applying springs te the trucks of cars and engines. The usual application is to place the center of the half elliptic spring so that the concussion acts on the center. This should be reversed, so that the center or heavy part of the spring should be uppermost, and the point down or towards the axle.

While at the Boston and Albany shops, in East Albany, a few weeks since, I observed some locomotives with springs arranged as they should be. I was told that these engines seldom came to the shop for repairs. To me the reason is obviously owing to the arrangement of the spring. There is nothing that tells more on a locomotive than the arrangement of the spring.

The proprietors of sleeping cars multiply the number of springs on their six wheel trucks to make easy riding cars. Now a six wheeled truck is just adapted to the theory I advocate, and two half elliptics on each side could be so adjusted that much cumbersome dead weight and machinery could be dispensed with, and the cars be made to ride infinitely more comfortable.

The new crystal cabs, lately introduced in New York, are pronounced a failure by many persons. The fault is in the arrangement of the spring, namely, the center of the half elliptic rests on the axle and the points attached to the body. I would suggest a remedy in this case, namely, place a cross spring under the back end of the body, and connect the joints to the back ends of the parallel spring. This could be easily done, and make a success, otherwise they may prove a failure for carrying single persons or light loads.

G.

Cincinnati, Ohio.

The Bois d'arc, or Osage Orange.

To the Editor of the Scientific American:

It may be interesting to note that the Bois d'arc mentioned by your Texan correspondent in your paper of Sept. 2d, as being a lumber of great value, is the Osage Orange, which for the last twenty years has been used as a hedge plant with constantly increasing favor. It grows well on the Western prairies, either in hedge or grove, and is now to be met with from six to ten inches in diameter. It seems to be subject to no disease, and is proof against all insects. The young plants in the hedge row sometimes winter kill, but the roots still survive and put forth vigorous shoots in the ensuing season. Nothing else has met with such universal favor in the West for a live fence, and in time it will be as prevalent there as the hawthorn is in England. Although the fruit matures in northern Illinois, the seed is still brought from Texas for the general supply. The wood is undoubtedly very indestructible, and it might be well to cultivate it also as a forest tree.

Ottowa, Ill. J. D. CATON.

The Science of Milk.

To the Editor of the Scientific American:

The editor of the London *Milk Journal* boasts of his chemical knowledge, and of his intention to do all in his power to have his subscribers supplied with pure milk. Yet in the August number of his journal he warns his readers not to put milk into their tea, lest the tannin of the tea unite with the albumen of the milk, and form leather.

If the milk with which he is supplied contains albumen, it must be badly Simpsoned (the London term for watering); if it does, the editor had better turn his attention to leather making. The chemist who can convert albumen into leather will certainly be able to reduce the price of that useful article if he cannot that of milk. E. S. S.

[For the Scientific American.]

ON THE PSYCHIC FORCE.

The report of the well known English chemist, William Crookes, F.R.S., editor of the *Quarterly Journal of Science*, etc., concerning some feats of David D. Home which he witnessed, and which were republished in the SCIENTIFIC AMERICAN of August 12th, have most forcibly called to my attention the usefulness of witnessing first class performances in the art called sleight of hand, or, in foreign languages, *léger-de-main, prestodigitation*, etc. The few feats there described are by no means more mysterious than those performed by Herrman, Robert Heller, Anderson, Harts, and others; the only difference is that the latter gentlemen only claim to be magicians, jugglers, ventriloquists, etc., in short, that they use concealed but natural means to accomplish apparently wonderful feats; while Mr. Home, not satisfied with this, takes advantage of the modern form of superstition, which believes in mediums, influenced by spirits of deceased persons or some other supernatural influences.

It is well known that for several years past Home has succeeded in deceiving, in this way, the rich classes in Europe, among which he finds the double advantage that they pay well and are incompetent judges in regard to such matters, as their education, if they have obtained any, is merely literary, they being total strangers to the domain of physics, in which the most fruitful resources are found for accomplishing apparently wonderful feats and practicing deceptions on the unwary and ignorant in these matters. It is also known that Mr. Home recently did not stand the scrutinizing conditions imposed by the Academy of Sciences of St. Petersburg, which he had requested to investigate his performances, but suddenly left the city on the eve of his exhibition; he probably remembered the fate of Dr. Deslon, a pupil of Mesmer in Paris, who some eighty years ago was interviewed by a committee of the French Academy, among which was our great American philosopher, Benjamin Franklin, and which committee declared the whole thing a deception and delusion.

Now Mr. Home has succeeded in finding a victim among the men of science, Mr. Crookes, who, evidently being no expert in this matter, perhaps never having seen performances of this kind, was easily deceived. But the most astonishing fact is, that not being satisfied that he had seen some tricks of *léger-de-main* and ventriloquism which *he* could not readily explain, he rushes into print with a new theory about the existence of a new force, which he calls "Psychic force," and which most absurdly he supposes to be under the private control of this individual Home.

As a partial excuse for Mr. Crookes' course in this matter, it must be acknowledged that he followed only the old orthodox method of the physicists, who, in order to explain the phenomena of oxidation and combustion, invented the "Phlogiston," and later, a caloric fluid. Newton even believed in a luminous fluid, while the majority of the present day still adhere to the absurd hypothesis of an electric fluid. Physiologists of the old school still believe in vital force, and very few have even abandoned the unnecessary hypothesis of an imponderable ether filling the whole universe. The acceptance of a new fluid or force, or even a mere name, is indeed the easiest way to give a *pseudo* explanation, and to cut short all further inquiry concerning new phenomena of which we do not at once understand the relations to the known laws of nature. It is a curious fact in regard to the constitution of some human minds that they are often satisfied with a mere word; and when, for instance, told that the cause of earthquakes, boiler explosions, or table tipping, is electricity, they acquiesce, and imagine they know all about it; and of course those who know least of electricity are the best satisfied with this supposed explanation; Mr. Crookes, knowing at least so much of electricity as to be satisfied that this would not do to explain Home's performances, invents a new force, or rather a mere word, "psychic."

No doubt but Mr. Crookes knows about this imaginary force absolutely nothing, and if he attempts to investigate its laws, as every one is able to do in regard to electric, magnetic, and other forces, it will disappear as the "fabric of a vision." Any special force or power claimed to be under personal control of any individual is not only spurious but totally imaginary. Mr. Crookes, in attempting to supplant the superstitious belief in mediums, one of which Mr. Home claims to be, by a new supernatural force, is instrumental in encouraging another form of the popular superstition, which causes the easy success of the so called mediums.

In regard to the experimental investigations of the new force, the playing and the motions of an accordion inside a kind of wire cage, I only remark that the imitation of the sound of an accordion is a very favorite performance of ventriloquists, who place, for this purpose, a very little contrivance in their mouths, and calling the attention of the audience to the supposed source of the sound, easily deceive them in regard to the place from which the sound proceeds, as is the case with all ventriloquism. The wire cage serves to hide incidental means of support, or motion of bodies placed inside, chiefly if placed under a table. A spring balance may be made to indicate an increased weight, by having a small electromagnet hidden inside, which by the simple contact of a metallic point, in the wooden lever, is brought into metallic connection with a hidden battery. There are, however, other means, which only can be divined when an expert in this line sees the actual performance; as in a mere description, the essential part which gives the key to the whole is usually left out, not being noticed by the reporter of the facts.

The experiments described by Mr. Crookes are a mere trifle if compared with the feats many have witnessed by first class jugglers, or prestodigitators, as they rather call themselves. So I saw Herrman, in the New York Academy of Music, not only imitate the accordion with his mouth, and the different voices of singing birds, as the canary, the nightingale, the lark, etc., but even cause these sounds apparently to proceed from the upper part of the hall, as if a lark was flying around. Some other feats of the same performer were, to those not initiated in the resources of *léger-de-main*, much more wonderful than those described by Mr. Crookes, and if he had seen them, he would, in order to be consistent, have to invent half a dozen other new forces, or rather, new names, which in reality, in his case, amounts to the same thing.

I bless my stars that my parents and tutors considered the witnessing of such performances as one of the best means to cultivate the acuteness of perception by the senses, of young persons, and a powerful antidote against future deceptions, and consequent superstition. They even provided me with a few books on natural magic, and a box with apparatus to perform tricks, and I am satisfied that some of my success in experimenting, manipulating, and investigating subjects pertaining to the physical sciences is due to this training, which at the same time has enabled me to expose many of the performances of so called mediums, for instance, the Davenport Brothers, which, in fact, were very course deceptions, even inferior in subtlety to Mr. Home's experiments.

P. H. VANDER WEYDE.

New York city, Sept. 13, 1871.

FAIR OF THE AMERICAN INSTITUTE.

A visit to this fair four days after its opening revealed the fact that only about two thirds of the articles to be shown were yet on the ground. The exhibit now made comprises various collections from stores in the city, and though pleasingly arranged, contains very little that is new or of much interest.

The machinery department is as yet very incomplete, but is daily receiving accession.

A pertinent question which we deem it proper to repeat is asked by exhibitors and others. Why do the managers not provide a suitable entrance on Second avenue? A large proportion of the visitors to the fair find that line the most direct route from the Brooklyn ferries to the Rink where the fair is held, but if they take it, they are obliged to walk around the block, or through a dismal cluttered array of rubbish to an open uncovered window to purchase tickets before entering the building. In the evening this becomes so disagreeable that people in general prefer to pay an extra car to bring them in connection with the Third avenue railway.

We were told that a suitable well lighted entrance on Second avenue would have been provided, had it not been for the settled opposition of one of the managers, who is largely interested in the Third avenue road. If the managers are controlled by personal interests, and are running their fair to line their own pockets, the public would like to know it.

Wringing Machine for Knit Tubular Goods.

This invention relates to improvements in machinery for wringing tubular knit or woven goods. It consists in a spreading device of novel construction to be used, in connection with a roller wringing machine, whether having one or more sets of rollers for expressing the water from the goods, to untwist and spread out the goods as they are fed or drawn in between the rollers. A long frame supports two pairs of expressing rollers, and one set of three rollers, also guiding plates for passing the goods through to wring out the water as they come from the washing machine. These tubular goods are frequently in long pieces, which become twisted in the washing, and have to be untwisted and spread out by hand as they are drawn along into the machine, or they will enter between the rollers in folds, knots, and lumps, which materially interfere with the well doing of the work. The untwisting and spreading device provided in this machine saves the expense and labor of an attendant. It is a broad plate, of zinc or other suitable material, with an oval end and and the yoke shaped guide rod at the front, which extends in advance of the first set of rollers nearly to the front of the table, while it extends the other way between the first set of rollers and nearly to the second set, and it is provided with a rib around the edges to prevent cutting the goods. In front of the first set it is provided with rollers—one on the upper and the other on the lower side—with inclines leading from the surface to the sides of the said rollers most distant from the plate. These rollers act against the expressing rollers, to prevent the dividing plate from being drawn through the latter while drawing the fabric in, the said fabric being opened at one end as it is presented to the spreader, and drawn along over it, one side passing over the upper side of the plate and the roller on the upper side, while the other passes under the plate and the lower roller. It is claimed that this improved attachment for wringing machines will untwist, spread open, and adjust the goods as well or better than it could be done by the hand of a person constantly attending for the purpose, thus saving a considerable item of expense. The construction of the spreader may be varied, of course, within certain limits without departing from the spirit of the invention. The inventor does not, therefore, limit himself to the precise construction described. The wringing machine may, of course, have one or more sets of rollers, according to the extent it is desired to express the water; but the application of the spreader will be the same. Mr. Whitley Denton, of Amsterdam, N. Y., is the inventor of this useful improvement.

Boiler Tenders.

Mr. A. P. Otis, of Holyoke, Mass., has remarked that boiler tenders, in the intervals of their work, frequently occupy their time in reading, and regrets that their attention is generally devoted to dime novels and other pernicious literature. He sends us a suggestion that employers would find it to their interest to provide mental food that would inform the men of the nature and qualities of steam, boilers, and engines, and flatteringly mentions the SCIENTIFIC AMERICAN as a periodical replete with information that would improve the minds, increase the knowledge, and elevate the tastes of a class of men who have much leisure time on their hands.

M. Constant Say.

M. Say, who died recently at the age of 55 years, has long been an eminent representative of French commercial enterprise. He was a sugar refiner of Paris, and his works, near the Boulevard de la Gare, were the most extensive in France, and capable of producing 200 tuns of refined sugar per day. He was highly respected for his public and private character; and his home, on the Place Vendôme, was well known to all Parisians and visitors to Paris. He suffered largely by the insensate pillage and destruction by the communists; and this may have brought to a premature end his energetic and useful life.

JOHNS' ASBESTOS ROOFING.—We would refer our readers to the advertisement of H. W. Johns, published in another column, in which he draws the attention of the public to his asbestos preparations for roofing, mending roofs, clothing boilers and steam pipes, etc. Mr. Johns has a large establishment for manufacturing, and is doing an extensive business in their sale. The roofing is a flexible, tenacious texture, which is not only claimed to shed water perfectly, but never to crack or crawl by variations in temperature during the change of seasons. A specimen of the roofing material which now lies on our table is in appearance an excellent preparation, and there is no doubt that it is a good article for the purposes for which it is recommended. In a pamphlet which the advertiser has printed for general circulation are the names of a large number of persons who have given the articles a practical test.

ENORMOUS FALL OF GRANITE.—At the Mount Sorrel quarry, England, a large blast of gunpowder was recently fired, attended with very remarkable results. The cliff, which may be seen from the Midland Railway between Barrow and Leicester standing boldly up 100 ft. in hight, and many hundreds of yards in length, was pierced about 40ft. from the ground by a deep bore hole, and 450lbs. of powder secured therein. When the blast was fired the whole face of the rock came away together, with scarcely any other sound than the crushing of the rock in its fall. The quantity thrown down is estimated at 20,000 tons, and is by far the largest weight of stone ever before moved by one blast at these granite quarries.

AN editor who doesn't know much about farming suggests that, for garden making, a cast iron back with a hinge in it would be an improvement on the spinal column now in use. —*Exchange.*

That editor ought to have a patent.

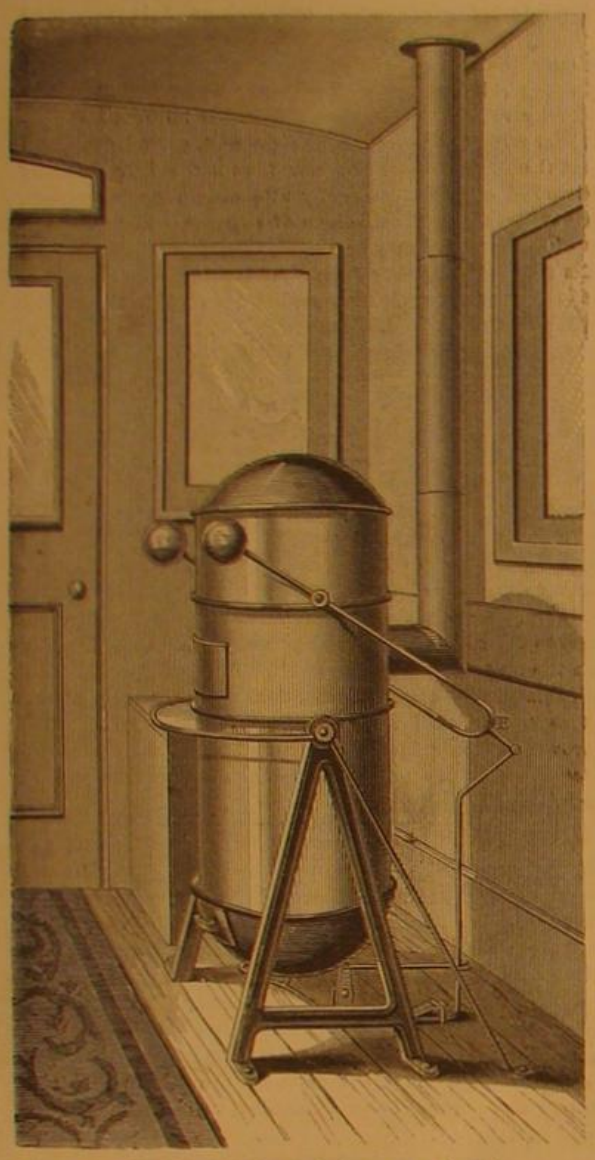
THE eruption of Mount Vesuvius, which has been more or less continuous during the past six months, and which has lately increased considerably in violence, is causing great apprehension as to the safety of the Italian observatory of Vesuvius. The lava has already partially submerged the hill of the Canteroni, on which the observatory stands; and the immediate erection of a strong dyke of scoria, so as to divert the stream of lava, is urgently asked for.

IF we would have powerful minds, we must think.

EVENS' SAFETY STOVE FOR RAILWAY CARS.

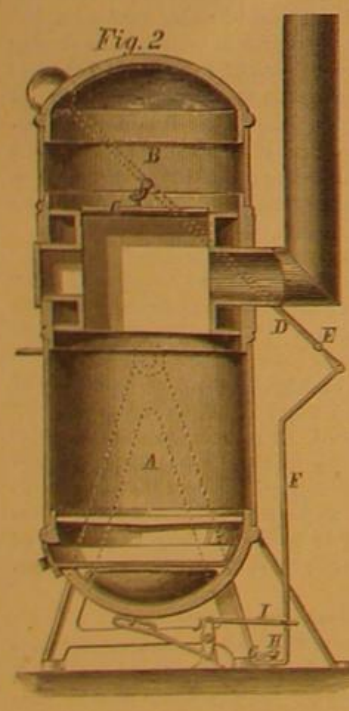
The awful catastrophes which have occurred by collisions, etc., on railways, during the last ten years, might have been robbed of half their terrors through the use of a device like that which we illustrate herewith. Humanity shrinks from the contemplation of maimed and disabled sufferers put to the torture of a slow death by fire, and we will not recall the fearful and heartrending spectacles, the accounts of which, every winter, thrill the entire civilized world with horror. It is pleasant to consider an invention calculated to prevent such catastrophes.

The attachment of a simple device which will at once extinguish the fires in railway stoves, is the feature of this invention, which is simple in its details.



The bottom of the stove is made heavy, so that it possesses great stability under ordinary circumstances; but the body of the stove is hung in a frame, on trunnions, so that when suddenly tilted, a tripping device opens a chamber above the fire box, discharging, upon the fuel, chemicals which at once extinguish the fire, the operation and construction of the parts being as described below.

Fig. 2



The stove is shown complete in perspective in Fig. 1, and a section is also given in Fig. 2, which shows a view of the interior.

A is the fire box. B is the chamber above the fire box and combustion chamber, where the chemicals are stored, these chemicals being any substance or mixture of substances found best adapted to the end in view.

The chamber, B, is separated from the fire box by two trap doors, C, connected by a short link and staple to the common shafts of weighted tilting bars, D, in such a way that when the balls on the bars, D, descend, the doors, C, will open, and the contents of the chamber, B, be discharged into the fire box.

The bars, D, are joined as shown at E, and there pivoted to a bent bar, F, which bar is recurved as shown at G, the recurved end forming a spring hook, being placed under a pin, H, and the bar being connected by a straight rod, I, to a pivoted lever, J, the lower end of which lever is connected by a link to the bottom of the stove.

It will be seen that the tilting of the stove would, by the weight of the heavy bottom, pull or push this hook out from under the pin. When this occurs, as would always be the case in a collision, the balls on the tilting bars, D, will fall, and, opening the chamber, B, at once extinguish the fire. This invention was patented through the Scientific American Patent Agency, July 18, 1871, by Julien T. Evens, assignor to himself, William H. Meyer, and Adolph Rederer, all of St. Louis, Mo., who are the present proprietors under the firm name of Evens, Meyer & Rederer, and from whom, or from Dr. G. W. Evens, General Agent, Independence, Mo., further information may be obtained.

Railroad Cars.

A correspondent who signs himself "Traveling Public" calls attention to the obvious incapability of railroad cars to sustain a collision, and the destruction of cars and passengers whenever an accident occurs. But he also sees an era of narrow gage roads approaching, and with it large reductions of the dead weight and consequently of the stability of railroad vehicles of all kinds. He suggests that directors of narrow gage roads should invite inventors to furnish plans for cars for such roads, designed especially for strength, that passengers may have some sense of the safety of the vehicle in which they travel; and, further, that iron is the material that combines the *minimum* of weight with the *maximum* of strength, and that a framework of iron pipes with a paneling or filling in of corrugated iron would probably fulfil all requirements.

SINCLAIR'S MILL PICK HOLDER.

This is one of those simple practical inventions that at once commend themselves to all practical minds. It seems a great improvement over the old form of pick holder.

Fig. 1

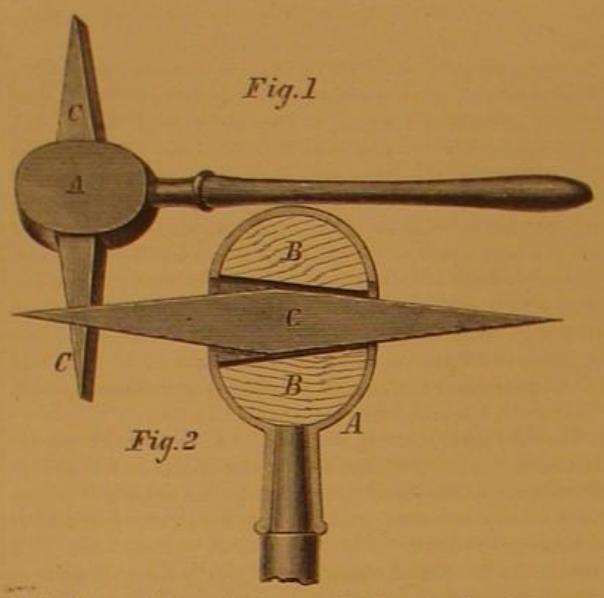


Fig. 2

A hollow cylinder, A, having both ends closed, is made slightly ovoid, the longer axis being in the direction of the handle. On one side of the shell of this cylinder is cast a suitable socket for the reception of the handle, and midway on the circumference, between the socket and the point opposite, are formed slots, for the reception of the pick, C, as shown, the upper one being smaller than the lower one, to correspond to the taper of the pick.

Before the pick is inserted, two semicircular blocks of wood, B, are put in through the lower slot. The blocks being left free to move, their inner straight faces accommodate themselves to the taper of the pick when the latter is inserted, and thus hold picks of various taper securely and firmly.

Patented through the Scientific American Patent Agency, Sept. 5, 1871, by James P. Sinclair, of Mottville, N. Y., whom address for further information.

BUTLER'S ADJUSTABLE WINDOW SASH.

The general advantages of a reversible window sash were set forth in a recent article in this journal. They may be recapitulated, however, in this connection.

In the first place they can be readily cleaned on both sides, while the person cleaning them stands on the floor of the apartment to which they belong, a very great convenience, and one that will be appreciated by all good housekeepers. The labor of cleaning is thus greatly lessened, and the exposure of the person to cold winds, while sitting upon window sills, is wholly obviated.

Second, broken glass may be replaced without taking out the sash, thus saving time and trouble. The sash may also be repainted whenever it is required, without removing it from the window frame.

The invention shown in the accompanying engravings secures the desired reversibility of the sash by means at once simple, ingenious, and effective. At the same time the window sash has nothing unsightly or clumsy attached to it—in fact, it presents, exteriorly, the appearance of an ordinary sash, finished to correspond with the finish of the casement, ornamentally or otherwise, as may be required.

Fig. 1 shows a portion of a window having sashes mounted as hereinafter described.

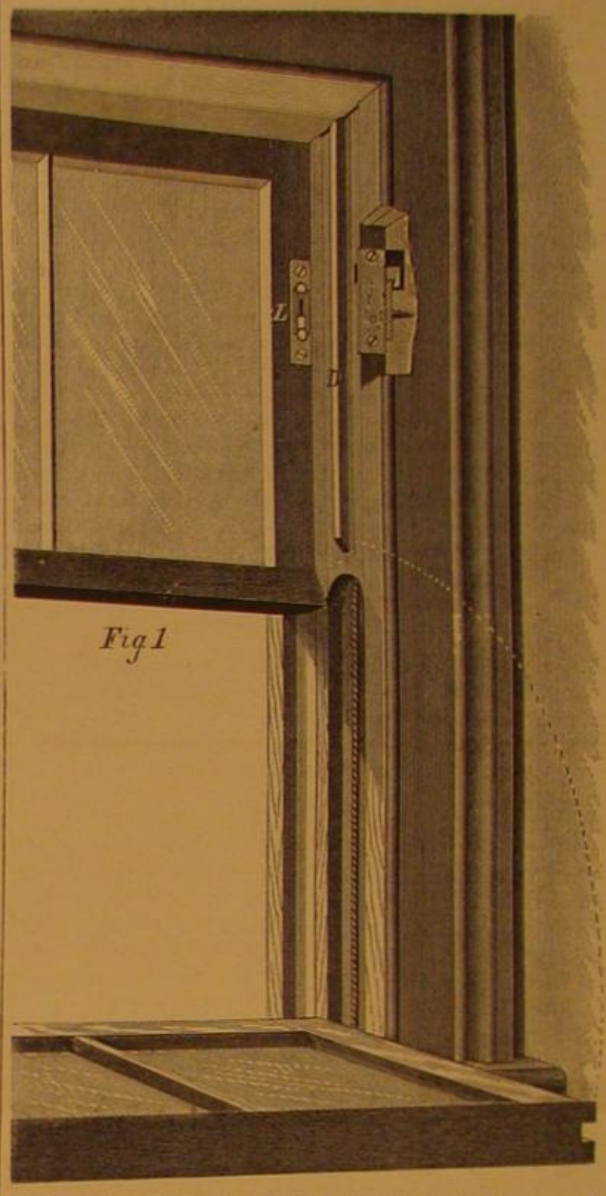
The sashes are usually hung on weights, but the improvement is equally applicable to common sashes having no weights. When weights are used, the cords hereinafter described are run in grooves in the backs of the strips, D, and are attached as shown at A, in Fig. 3, to pieces of metal screwed to the lower corners of the sash. This block of metal is cylindrical, and has formed upon it projections, B and C. The projections abut against a pin, shown in dotted outline, to hold the sash in a horizontal position when turned down. The projection, C, is merely a ledge to receive the pointed end of the strips, D, to avoid a sharp wedge point.

These metal blocks are placed in the groove of the casing, and the sash, being made so narrow that it may be turned forward, as shown in Fig. 1, turns on the blocks, as on pivots.

When the sash is turned up into the vertical position, it slides up and down on the strips, D, Figs. 1 and 2, these strips being so constructed that they may be locked either to the casing or to the sash. In Fig. 1 the strip is shown locked to the casing, in which position the sash is released from it and can then turn freely on the cylindrical blocks, A.

The method of locking the strip, to sash or casing, is shown in Fig. 2, in which E is the jamb of the casing, F the sash, and D the detachable strip rabbeted into the sash, as shown. When the hook, G, is in the position shown, and held there

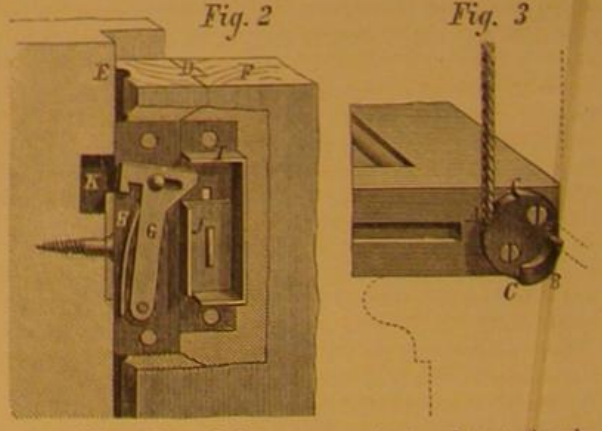
Fig 1



by the spring, H, the detachable strip, D, is locked to the sash, and slides up and down with it, the projection on the hook opposite the spring engaging with the plate, I, on the sash.

When the sliding plate, J, on the sash, is slid upward, it acts upon the inclined under surface of the projection on the hook, causes it to compress the spring, H, and enter the recess, K, in the stile, where the slightest downward movement of the sash hooks it fast, with the strip to which it is pivoted, as shown in Fig. 1. The sash will then slide down on the tongue of the strip D, until it passes it altogether, as shown in Fig. 1, in which figure the strip is shown locked to the sash, as described.

Fig. 2 *Fig. 3*



The sliding plate, J, has a convenient and tasty thumb piece, L, Fig. 1, attached, by which it is actuated.

When the window sash is turned up into the vertical position, slid upward, the thumb piece, L, which drops by its own weight on the descent of the sash, allows the spring, H, to force the hook back, and thus automatically locks the strip, D, to the sash, as described, the strip, D, being raised enough to release the hook, by the action of the cylindrical block, A.

This invention was patented through the Scientific American Patent Agency, August 29, 1871, by Jacob E. Butler, whose present address is 524 Fifth avenue, Brooklyn, N. Y., or Gavit & Butler, 21 Courtland street, New York.

THE largest works in the world for manufacturing paper from wood pulp are said to be located in Philadelphia. The buildings occupy a space of one thousand feet in length and three hundred and fifty feet in width, and cost six hundred thousand dollars.

Scientific American.

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NEW YORK, SATURDAY, SEPTEMBER 23, 1871.

Contents:

(Illustrated articles are marked with an asterisk.)

THE PERILS OF GUN COTTON.

In our edition of September 9th, we laid before our readers the facts of a terrific explosion of gun cotton, at Stowmarket, England, in which some twenty-four persons were killed, and over seventy wounded. As is usual in such calamities, no one of the survivors could give any account of the cause of the ignition, and we are left to wonder and to speculate both as to the origin of such appalling disasters, and as to the means that are necessary to prevent their recurrence.

This material, more powerful than gunpowder, more portable, and, for many purposes, more convenient, was introduced to the world in the year 1846, by Professor Schönbein, and, after creating a nine days' wonder, was dismissed by nearly everybody as an explosive too untrustworthy and dangerous for ordinary use. The Austrian Government, however, caused further experiments and inquiry to be made, and the results were important discoveries as to the nature of the new explosive, and in the mode of its preparation. The Austrian process of Baron von Lenk is performed by winding the cotton in skeins, and then subjecting them to the nitric and sulphuric acids which give the dangerous explosive qualities to the fiber. These skeins are wound, as in spools of thread, to the required sizes for cartridges, etc. The success of Baron von Lenk recalled public attention in England to the matter, and the Royal Society, in the year 1862, revived the inquiry as to the feasibility of manufacturing gun cotton with a reasonable degree of safety. A commission was appointed by the British Government to investigate the whole matter, and, although its labors were brought to a premature end by some unexplained cause, it issued a report to the effect that gun cotton, as made by the Austrian method, was valuable in blasting operations, being superior to gunpowder in explosive force, but not fitted for small arms, as, probably from some peculiarity in its combustion, accurate shooting was not so attainable as with gunpowder; and that confinement in a strong chamber was indispensable to obtain the full force of gun cotton when ignited.

Mr. Abel, chemist to the War Department, Woolwich, England, made long and searching experiments, recorded in the "Transactions of the Royal Society" in 1866–67 and 1869, and from these, and from facts observed by other investigators, it was ascertained that gun cotton was liable to deterioration and decomposition, arising from impurities that could not be eliminated from the raw material; and that the loose fibrous nature of cotton insured the presence of atmospheric air in its substance, a most dangerous characteristic of an explosive material. Mr. Abel, in 1865, directed his attention to overcoming these objections, and produced a gun cotton, pressed into solid cakes, which could be ground into pellets or powder, and his invention had the undoubted advantage of exerting its full power without confinement in any chamber or vessel; and as it was damp throughout the whole process of manufacture, the danger of preparing it was reduced to a *minimum*. Means of producing a gun cotton in a medium state, neither loose fibers nor solid slabs, were devised by Mr. E. C. Prentice, of Stowmarket, England, a member of the firm whose premises and property have just been destroyed, and consisted in twisting the cotton into yarn, weaving cloth, etc., so as to make a textile material of the required density. To get rid of the damaging effect of atmospheric moisture, so deleterious to a rapid absorbent like cotton, paraffin, solutions of gum, gutta-percha, etc., have been used, the gun cotton being steeped therein, and then allowed to dry.

Of the value, in mining and other engineering, as well as in war, of this powerful destructive, many instances might be quoted, among the most prominent of which is the destruction of a solid mass of brick and stone masonry, the walls of a gallery 250 feet long, and 7 feet wide, being part of the old fortifications of Portsmouth, England. This building was demolished by firing 60 pounds of gun cotton, which was loosely hung on nails driven, at one extremity, into the roof. Its value for the construction of torpedoes, the invisible defenders of harbors and ports which are likely to play so important a part in the wars of the future, cannot be overrated; as the quantity of gun cotton required is so much less than that of gunpowder, that the torpedo will be an implement more deadly in power, and more manageable in size.

Such was the terrible agent in the Stowmarket explosion; and this occurrence has brought forward, as usual, a large amount of public comment, of a quality which causes us to wonder that such things do not happen daily, so intense is the ignorance and so vague are the ideas of the public on this and similar most important matters. The *Westfield* boiler did much to give the palm, for silly purposeless talk, to the United States; but England runs us hard, and one of her most prominent scientific journals, the *Engineer*, is not ashamed to hint that the weather has played some important, though as yet unexplained, part in the matter, and states unreservedly, on the subject, that "all accidents have occurred about the month of August." The English "schoolmaster" is probably "abroad" at this time of year; his presence at home is needed by some scientists, and the sooner he can tear himself away from his vacation rambles the better.

The fact that the whole of the gun cotton at Stowmarket was not destroyed is most important, as it will allow a searching analysis of its composition and chemical state, and so aid the enquiry now being prosecuted. The final result of the investigation cannot fail to be of the utmost interest to this country among others. The important railway and other works, now in course of construction all over the United States, consume large quantities of explosive preparations, and the use and handling of these are often left to ignorant and inexperienced men, many of whom are, moreover, from use and habit, reckless in all matters, even of life and death. We hope, therefore, that the utmost light will be thrown on the whole subject, for we are sure that the public will not be satisfied with less.

AMMONIA MOTIVE POWER FOR ORGANS.

There is great want of a simple and portable power for driving the bellows of large organs in our churches and music halls. Water, steam, caloric engines, heavy weights, and lastly, electricity, have been tried, and may succeed on occasions, but practically the exposure, danger from fire, and unwieldy character of the attachment, unless it is the electrical, stands in the way of universal application. The one man power is usually the last resort of musicians, and the man who blows the bellows is often a more important character than the organist himself. The inconvenience of having to send for a man or a boy every time the organist wishes to practice is a serious hindrance to that thorough study of the instrument which ought to be had by all who at empt to play upon it. In the case of the piano, this objection is removed, and there is no limit but fatigue to the amount of practice that can be indulged in. The fact that there is a man or boy around the corner, puffing and blowing, is enough to take away all the inspiration of the performer, and must seriously interfere with the calm frame of mind necessary to the composition of music. We do not know that a caloric engine would be much better, but that can be placed in the cellar. Our advice has been frequently asked in this matter, and in casting about for an answer, we have bethought ourselves of ammoniacal gas as a motive power worthy of careful experimental trial. It is now a good many years since this use of ammonia was proposed, and ammoniacal engines were applied to street cars and to pumps, and still they have not met with general acceptance, and few persons have even heard of them. The trial trip of the omnibus in Paris propelled by liquefied ammonia, confined in cylinders under the seat, was reported as perfectly successful, and a similar result has been arrived at on street cars in New Orleans.

Our knowledge of the force exerted by liquid ammonia at given temperatures is now well fixed, and the cost of liquefaction, the proper metal to employ, and all practical questions ought to have been thoroughly worked out long before this. As ammonia attacks copper and brass, the packing and mounting of the engines would have to be made of iron. The saponification of the ammonia with the lubricating oil is said to be no detriment, but rather to diminish friction. The plan of the company in Paris was to have a large central factory for compressing ammonia gas into iron cylinders, in the same way as water is charged with carbonic acid, and to deliver these receivers to customers in all parts of the city. The cylinder containing the liquid ammonia would be provided with couplings and screws ready to attach it to the stationary piston, and the company's agents would put it in position and remove the exhausted receiver, just as the soda fountain is kept in running order by large dealers. It would only require the opening of a stop cock to set the piston in motion, and it would run as long as the expansive force of the gas was sufficient to propel it. Such an arrangement as this ought to be feasible, and theoretically there would appear to be no difficulty in the way of its universal adoption. It would not only be applicable to organs but to pumps, sewing machines, and a wide range of other work. In addition to the profit which might be supposed to arise from the application of ammonia as a motive power, must not be forgotten the equally valuable property possessed by the gas of producing an intense cold. The employment of ammonia in the artificial production of ice appears to be a fixed fact, and the same company that manufactures the gas for this purpose could also deliver the cylinders to those who wished to employ it as a motive power. Ammonia is now an article of large and economical production. As an incidental product in the manufacture of gas, it can be made cheaply and in unlimited quantities. If the engines could be made so as to avoid leakage—and here is a prominent difficulty—the original supply of gas could be used any number of times, and there would only be the first cost of machinery, of the concentrated aqua ammonia, and of the fuel, to be taken into account.

The solvent properties of liquid ammonia upon various metals have been recently studied by Professor Seely, and some curious results have been obtained. It may be that iron is more or less attacked, so as to render tight joints very difficult to attain. Any leakage of ammonia would be highly objectionable, as the gas is suffocating in its effects upon the lungs, and too much of it would put out the fires. There is no doubt that ammoniacal gas as a motive power is in its infancy, requiring time and continued use, like steam, to develope its advantages. It would be marvellously convenient to have it for propelling small engines, and we trust that the owners of patents covering its use will not rest until they have secured its general introduction.

WHAT CONSTITUTES PATENTABLE NOVELTY?

It appears that some of the Examiners at the Patent Office have not yet been able to get into their heads what are the precise elements or requisites that go to make up a patentable invention, and have made some erroneous rejections.

The Commissioner of Patents, the Hon. M. D. Leggett, in a recent opinion reviewing and revising one of these erroneous decisions, places before the examining officers, and the public in general, some very interesting and instructive information upon the patentable novelty of inventions. The gist of the whole matter is tersely stated by the Commissioner in this one sentence, "*The test of invention is the result attained.*" In other words, if an improved result is produced, or if the public is supplied with a better article, or if the same article is produced in a cheaper, or quicker, or better manner, then patentable novelty exists, even though the devices are old by which the improved results are attained.

We publish the decision in another column. The Commissioner is evidently determined to give a broad and liberal interpretation to the patent laws during his administration, and in this good work he will be cordially seconded by every lover of real progress.

A DEFECT IN MARINE ENGINEERING.

Will any one tell us what other reason than a bigoted conservatism prevents the general use of steam governors on our American Marine?

The importance of this inquiry will be apparent upon the perusal of a letter in another column, entitled "Another Marine Disaster," in which the loss of the *Lodona* is charged to the want of a governor.

The steam marine of nearly the entire world, with the exception of that of this country, uses governors, by which a larger waste in fuel and increased immunity from breakage of machinery are secured, with the still more important advantage, that steam can be kept up during rough weather, and proper control of the vessel maintained.

It requires no great amount of discernment, to understand that in heavy seas, when propeller screws or paddles are constantly either losing entirely their hold upon the water, or so far losing it as to afford but little resistance to the steam in the cylinder, the increase of their motion must result in loss of steam, while their impact must be fearful when again suddenly plunged into the water. And yet in full view of these facts, and in face of the records of experiments which fully demonstrate the great utility of the governors, our engineers refuse to adopt them.

If there is any sound reason for this, it would be interesting, at the present time when the numerous catastrophes occurring to steam water craft are attracting general attention to have the reason publicly stated.

MR. HIGHTON AND THE NEW YORK TIMES.

This country is so much indebted to the New York *Times* for its recent exposure of gigantic frauds in our city government, that we cannot find it in our hearts to criticize that journal very severely when it deserts the realm of politics for that of science, and, to use a homely phrase, "puts its foot in it." The *Times* is an able champion when it arrays itself against corruption in high places, but its strength is wasted in endeavoring to champion the Rev. Mr. H. Highton against the supposed injustice of the British Association, in refusing to allow that gentleman to occupy its time by the reading of a paper before it.

The *Times*, if not versed in the science of electromagnetism, is sufficiently acquainted with the method of procedure adopted by scientific and literary associations to know that proper discrimination, as to the character of papers offered, is absolutely necessary to prevent the acceptance of absurd, and often worse than absurd essays, that would only expose their authors to ridicule, and bring disgrace upon any body of men that should consent to listen to them.

The writer of this article once addressed a paper to the *Times*, which was rejected, not because it was absurd or ridiculous (though it might have been both), but upon other good und satisfactory grounds. Had its author protested that it was the greatest piece of literary work ever produced since the days of Milton, that statement would probably not have

influenced the astute editor, who refused the paper, one particle. Yet, because Mr. Highton now avers that he believes he has made the greatest discovery in electric science that has been given to the world since the days of Volta, the *Times* protests against the suppression of his paper.

It is proper to suppose that there are men in the British Association competent to judge as to the value of Mr. Highton's alleged discovery, and as it has been for some time well known that the gentleman in question was lost in the pursuit of a perpetual motion or its equivalent, and that he stands on about the same footing as another gentleman who has been astounding the world on this side the Atlantic with unproved assertions, the British Association very properly refused to give its countenance to his absurd ideas.

Both Mr. Highton and Mr. Paine are trying to create something out of nothing, and if their assertions mean anything, they mean that they have accomplished this. But though they are loud in asserting, they are so slow and weak to prove anything, that the world, especially the scientific world, has tired of them, and wants to hear no more unbacked statements.

The *Times* seems to have been crammed with a quantity of bombastical statements regarding Mr. Highton's inventions, which are only a distorted account of a statement made by Mr. Highton himself, in a letter to the *Mechanics' Magazine* (London), the statement being made in regard to the Paine engine, instead of Mr. Highton's discovery. Having thus got the facts laughably mixed up, it cordially invites Mr. Highton to come to America—"Land of the free and home of the brave"—here to explain to receptive audiences that "which with scorn was put away" by the great British Association.

In giving this invitation and counsel, the *Times* has forgotten the immortal native born savant, Mr. Paine, who discovered all that Mr. Highton claims to have found out, before the latter gentleman had given up theology for science. If justice be the rule, why are Mr. Paine's claims so carefully neglected? Are we going to be so base as to allow the credit of this sublime discovery to be given to a foreigner, when we have the assertion of a man like Mr. Paine to show that it is American, and only American? The *Times* mistakes the temper of the American public if it supposes the people—the sovereign people—will ever consent to see Mr. Paine's claims ignored

THE STAFF OF LIFE---THE BREADMAKERS OF THE AMERICAN METROPOLIS.

The cities of New York, Brooklyn, and Jersey City, may be said to be practically one. Nearly the whole of the population in the two last named cities earn their bread from business or labor performed in warehouses, manufactories, and mercantile establishments of New York, or, if employed in establishments not located in New York, these, as a general rule, belong to New York proprietors. The combined population of these cities now reaches something over 1,400,000 inhabitants. This vast array of mouths and stomachs demand an amount of food and drink that foots up into something enormous. It consumes daily, at the least calculation, 933,332 lbs., of wheat bread, or about 1,733 barrels of flour per day.

To supply this bread—a portion of which is of course home made—the three cities named have 1,364 professional bakers. It will be seen that the trade is very much cut up, and that many of the bakers must do a very small business indeed. There are, however, a few large establishments. One of these is the aerated bread bakery in West Twentieth street, and another, the bakery of John Hecker, in Rutgers street, which last bakes 300 barrels of flour into bread, and 75 barrels into various kinds of crackers, per week, but has the capacity for double that amount. It also bakes a quantity of Indian corn bread, Graham bread, sweet and sour rye bread, unleavened bread, etc.

By far the greater portion of the bread used is fermented bread made of fine bolted wheat flour, mixed and kneaded by hand, and baked in brick ovens. The aerated bread has the advantage of superior cleanliness, as it is not touched by the hands from the time it is emptied as flour into the mixers till it issues from the ovens as bread. Only good flour can be used in its manufacture, as any mustiness, or deterioration in quality, is apparent in this kind of bread.

In making this bread, the flour is put into strong cast iron globes, with salt and water only. The globes have attached, on the interior, fixed horizontal arms, between which other horizontal arms, attached to a vertical shaft, revolve, working precisely on the principle of the pug mill in brick making. While the mixing is in progress, a quantity of pure carbonic acid gas, made in suitable generators, is allowed to pass into the mixers under immense pressure, where it permeates every portion of the dough. When the mixing is completed, a cock is opened at the bottom of the mixers, out of which the dough is forced with great violence by the pressure of the gas within. As it flows out it is caught in oblong tins, the cock being closed when enough dough has passed into the tin for a loaf. Another tin is then passed under, and the cock opened again, and so on, the operation proceeding with great rapidity till the dough is wholly discharged. The tins are then placed in what is known as a reel oven. This is a large chamber of masonry, in which a huge reel revolves, the arms of the reel supporting pendent shelves upon which the loaves are placed. The reel slowly revolves, each shelf, as its burden of loaves is removed, being again loaded with unbaked loaves, and so on, working continuously as long as desired.

The bread thus made is very sweet and wholesome, but it does not possess the peculiar flavor of fermented bread, which most people have been educated to like. It has, however, its fair share of patronage, and the number of those who use it is on the increase.

Large quantities of ships' bread and crackers of various kinds are manufactured, much of these products being consumed in the city, with the exception of ships' bread.

The Germans consume most of the rye bread made. This is of two kinds. The sweet rye bread is made in the ordinary way of making fermented bread. The sour rye bread is allowed to pass to the acetous fermentation before baking. It generally contains caraway seed.

The unleavened bread of the Jews is simply fine flour and water mixed into a stiff dough, rolled out very thin, cut into circular wafers about the size of a tea plate, and baked.

Indian corn bread is a fermented bread of mixed rye or wheat flour and corn meal; it is quite commonly called Indian bread. Its consumption is comparatively very small.

In a recent visit to a large number of bakeries in this city, we found the bakers, as a rule, entirely ignorant of the chemistry of bread making. They follow a routine blindly, yet it is one that is generally successful, or would be, were the best flour generally used by them. So far as we could ascertain, alum, sulphate of copper, etc., said to be used in Europe, for producing white bread from damaged flour, are not used here to any noticeable extent, and the quality of the bread averages as good as could be expected from the quality of flour used, the bulk of which, in the smaller bakeries, is of inferior grade. This opinion is confirmed by Mr. John F. Pinson, the intelligent foreman of Mr. Hecker's bakery, above mentioned, which place was the only one where we found machinery employed for mixing fermented bread. Even here the kneading machines were not used; the noise they make in ordinary use disturbing a religious institution near by, Mr. Hecker ordered them stopped. Machinery is used in all the cracker bakeries, both for mixing and kneading.

The mixing machines consist of a pan with fixed and revolving knives, into which the ferment, flour, water, etc., are placed, and thoroughly incorporated together.

The kneading machines consist, both for bread and crackers, of rollers, through which the dough is passed and repassed, until it is sufficiently kneaded. It is then passed through rollers, which reduce it to a sheet of the proper thickness, and as it passes out from these rollers, it is cut by suitable mechanism into loaves or wafers of the proper size for baking.

In the manufacture of fermented bread there are, so far as we can ascertain, no reel, or rotating ovens employed. The ovens preferred are the tile bottomed brick ovens, which, it is generally agreed, are the best for the purpose.

We have said the quality of the bread averages as good as could be expected from the average grade of flour used. In making this statement we did not take into account the great difference in the cleanliness of different bakeries, some of which we have found to be in a most filthy condition, overrun with mice, and swarming with flies, roaches, and croton bugs. The larger and most respectable establishments are, however, kept in a very clean state, and evident pains is taken to compel cleanly habits on the part of the workmen. Yet it must be impossible to avoid more or less contamination where bread is mixed by hand.

It is bad enough that we eat our bread in the sweat of our brows, but it is by no means pleasant to reflect that it is flavored by the perspiration of filthy workmen. The general introduction of machinery in the manufacture of bread would relieve the public of any anxiety these revelations may engender, but this will not be done till the business is concentrated in larger establishments which can afford the necessary outfit. Such is the tendency at present. During the war of the rebellion, the large establishments, were employed in supplying the United States troops quartered in and about the city, and in making the regular bread of the army ration, for shipment to troops in the field. The smaller establishments multiplied greatly to supply the home demand. Many of these are now scarcely able to live, and their business must inevitably be absorbed by the larger ones.

THE STATE OF THE MANUFACTURING TRADES.

The ingenuity, enterprise, and industry of the inhabitants of New England is proverbial, and these qualities have secured to the Eastern States a very large proportion of all our textile manufactures. Lowell, so long renowned as the Manchester of the United States, has now to look about her to maintain her pre eminence, Fall River having enlarged her boundaries with great rapidity. The population of the latter city has more than doubled in the last ten years, and the mills now erecting will add about 240,000 spindles to her producing capability, and are all to be completed by next April. Further preparation is being made for the building of mills to contain about 140,000 spindles, to be opened later in next year. A large mill for the manufacture of bagging is also being constructed. The Norway Plains Company, of Rochester, N. H., are now manufacturing blankets and flannel at the rate of about 100,000 pairs of the former and 600,000 yards of the latter annually; the company at Gonic in the same State makes flannels exclusively, and can produce 900,000 yards per annum. Mr. Goodall, of Sanford, Me., sends out 200,000 lap robes and horse blankets in a year. Messrs. Shattuck and Smith, of Springvale, Me., are producing 30,000 yards of printed cloth per week. The Pioneer Woolen Mills, Me., the Cocheco Woolen Manufacturing Company, N. H., and many others are in full employ, and show every indication of a prosperous and increasing business.

The leather and shoe trades at New Bedford and North Adams, Mass., at Brownfield, Me., and elsewhere are very busy, although the manufacturers are deploring the loss of their export trade. The paper mills at Springfield and South Holyoke, Mass., at Norway, Me., and at Rochester, N. H., are also well employed. The manilla paper produced by some of these mills has recently improved very much in quality, and the manufacture of wood pulp for paper making is now an important business.

A good idea of the extent of the consumption of some apparently trifling articles may be formed from the fact that awls and needles for shoe pegging machines are being produced by hundreds of thousands, a large firm, the Bay State Needle Company, of Worcester, Mass., being engaged in this particular branch of production. The lumber trade is brisk, and its satellites, the car building shops, are well occupied. The Wheeler and Wilson Sewing Machine Company, at Bridgeport, Conn., are sending away 500 machines a day, a business without precedent in the history of this universally required implement.

In New York, the Oswego Woolen Mills have 300 hands at work, and are paying $7,000 per month wages; and the Fulton works of Messrs. Hoyt, Sprague & Co., in the same line, are equally prosperous.

From other yarts of the Union, accounts are similarly encouraging. The mining operations of the West are progressing at a prodigious rate, and we hear daily of the erection of new furnaces in the iron, lead, and silver works, as well as of rolling mills and converters for wrought iron and steel. The Moline Plow Company, of Illinois, has made and sold 30,000 plows and 7,000 cultivators this season, and the Lehigh rolling mill, now the property of the Allentown Rolling Mill Company, of Pa., has a capacity of 500 tuns iron work per week.

A fair test of the activity of trade and the demand for improved appliances, as well as of sufficient business to justify the further investment of capital, may be found by perusing our list of American and foreign patents for this and the last few weeks. These columns of our paper have been unusually full, and exhibit new inventions in every department of mechanics and manufacturing industry.

Our readers will, no doubt, receive these few facts as evidences of a sound and steadily progressing trade, and will join us in the hope that this healthy condition of our most important interests will continue.

IMPORTANT TRADEMARK DECISION.

Justice Wylie, of the Equity Court of the District of Columbia, has recently rendered an important decision relative to the validity of trademarks. His ruling is to the effect that all trademarks, not enforced for a number of years against infringers, have by such neglect ceased to be the property of their originators, and may be appropriated by others.

The suit was instituted by Joseph Rodgers & Sons, cutlers, of Sheffield, England, *versus* Philip & Solomons, stationers, who have a contract for supplying the Treasury Department at Washington with "Rodgers & Sons" penknives, erasers, etc. The plaintiffs alleged that the defendants had sold cutlery bearing the counterfeit of their—the plaintiffs'—trademark. The defendants gave in answer that they had sold penknives, erasers, etc., bearing the trademark of Rogers & Sons, manufacturers of cutlery in Prussia, which mark is similar to that of Rodgers & Sons, of England, but has been in the American market undisputed for a number of years, having also protection by Royal licence from the Prussian government. The defendants furthermore contended that the plaintiffs cannot maintain suit, as they had not registered their trademark in the United States Patent Office, as provided by act of Congress of July 8, 1870. In consequence of these facts, which were properly substantiated, the Judge ruled that an injunction could not be granted to restrain defendants from the use of the trademark, on the ground that the English firm had, by their neglect for a series of years to enforce such rights as they were possessed of under the trademark law in this country, waived the right to call upon our courts for assistance.

New Preparations of Wheat.

We have received and tried in our own household several articles of food prepared from wheat by the Nutrio Manufacturing Co., corner of 13th and Mt. Vernon streets, and Ridge avenue, Philadelphia Pa., and find them very delicate, palatable, and nutricious. The articles are named "Nutrio," "Nutrina," Nutriette," "Phoda," and "Papoma," and are prepared by a peculiar treatment of the whole wheat, which renders them digestible and retains all the elements of nutrition wasted in the ordinary process of grinding. For infants, invalids, and for nice palates in search of real delicacies, we can recommend these preparations.

The American Diamond Drill Co.

Our readers will find in another column an advertisement of the above company, which sets forth the fact of an entire change in the proprietorship of the diamond drill, formerly owned by Severance & Holt, and states that important improvements have been made, which render it much more efficient than formerly. The company is a working company, purposing to manufacture and sell these drills, and to use them in prospecting mineral lands and quarries, and in the execution of railroad, mining, and engineering rockwork under contract.

THE ATLANTA AGRICULTURAL AND INDUSTRIAL ASSOCIATION announces a "Grand Fair and Exposition," to be held in Oglethorpe Park, Atlanta, on October 16, 17, 18, 19, and 20. The premiums are numerous and valuable, and the list of subjects in which competition is invited consists of all branches of the useful arts. Mr. Samuel A. Echols, of Atlanta, Ga., is the Secretary of the Association.

The Philadelphia *Scientific Journal* says that "Messrs. Geo. P. Rowell & Co., of New York, are so well and extensively known all over this continent, that to name them and explain the nature of their business would be superfluous. No Newspaper Advertising Agency has ever displayed more energy and skill in the transaction of this delicate and tact-requiring business."

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.

Examples for the Ladies.

Mrs. Carrie S. Slater, Newark, N. J., has operated a Wheeler & Wilson Machine 18 years; for the last 13 years on her own account sewing in families, and earned in that time $11,000; married, borne two children, done her own sewing, and attended to other household duties.

Declined.

Communications upon the following subjects have been received and examined by the Editor, but their publication is respectfully declined:

AERIAL NAVIGATION.—.———.
BIRDS' NESTS.—C. C.
EXPLOSIVE PROPERTIES OF WATER.—J. M.
GAS MADE FROM WATER.—J. G. S.
ISAIAH III, ETC.—J. M.
MENSURATION OF SURFACES AND SOLIDS.—R. S. M.
PLUMBAGO.—A. R.
PROPULSION ON CANALS.—C. W. H.
PSYCHIC FORCE.—F. H. S.—J. H. M.
QUADRATURE OF THE CIRCLE, ETC.—C. T.
RAILROAD ACCIDENTS.—J. M. C.
ROTARY MOTION.—J. E. H.
WATER METER.—J. L.
ANSWERS TO CORRESPONDENTS.—C. L. W.—F. C. D.
QUERIES.—J.—M. & L.—W. F. H.

Recent American and Foreign Patents.

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

RAILWAY CAR TRUCK.—John Clark, of London, England.—The object of this invention is to facilitate the traverse of railway carriages around curves, and thus to avoid the irregular and destructive action of the wheels upon the rails and remove the liability of the carriages running off the rails at such parts of the line. To attain these results the end axles of the carriages are caused to incline to the center of the curve of the rails in radial lines, which inclination is effected by allowing the center axle to move endwise with its bearings while a curve is being traversed. The invention consists in a novel mechanism for connecting and changing the relation of the axles.

BLIND SLAT OPERATOR.—Quinten M. Young's, of Utica, N. Y.—This invention relates to improvements in apparatus for operating the slats of window blinds for opening and closing them, and also for fastening them. It consists in a rod mounted in a sleeve having arms pivoted to the lower cross piece of the blind, connected by an arm to the bar, to which the slats are commonly connected, and connected also with a slotted slide arranged in one of the sides of the window frame for actuating the slats by raising or lowering the said bar from the inside without raising the window, said slide being actuated by a bell crank having a handle projecting from the front of the window frame, and having a rack bar and spring catch for holding it in any position.

COMMODE AND WASH STAND COMBINED.—Sampson P. Boone, of Americus, Ga.—A wash stand of any approved kind, has a chamber, opening into it from the front. A case fitted to slide into and out of said stand in the manner of a drawer, and adapted for the support of a vessel, suitable for the uses of commode, and provided with a cover, to be seated upon any suitable packing that will make a tight joint, and a spring is to be employed to hold it down. The vessel is intended to be fitted to the case so that it can be readily taken out for emptying and put back again. When the case is shoved in, its front has the appearance of an ordinary door in the wash stand. The base piece is made to draw out with the case for supporting it when sustaining the weight of the patient.

HEAD REST FOR COFFIN.—John P. Waugh, of South Scriba, N. Y.—A head rest of sheet metal or any other suitable material is made by shaping a plate, of suitable size, with a cavity in the upper side, and extending to one edge for the head of the corpse, and a flange, extending around three sides of the plate and upward from it, for nailing to the inner walls of the coffin. This makes a very simple and cheap head rest, which may be applied to the coffin after the latter has been made.

GUTTER FASTENING.—William L. Rogers, of Rochefort, Mo.—The invention consists in the use of a supporting bracket and saddle, the former being fastened to the building, the latter fitted around the trough or gutter and slipped upon the bracket. The gutter is thereby held without being pierced by nails, screws, or other fastening implements, which often rust through and cause it to drop.

SCAFFOLD.—John Redick, of Butler, Ohio.—This invention relates to a new builder's scaffold, which is so constructed as to be easily taken apart and conveyed from one building to another, put up in a short time, and constructed at a less cost than the ordinary scaffold now in use. The four posts or uprights are on the long sides of the scaffold, connected by braces which are secured by bolts or screws, and placed diagonally and crossing each other as shown. At the ends, the scaffold has braces which fit into grooved edges of the uprights and are fastened by means of pins. The uprights are grooved throughout their lengths and perforated at short intervals, so that the braces can be set higher or lower, as may be desired. For extending the scaffold vertically, the uprights are spliced. Cross bars are held in the uprights by pins at the ends of the scaffold, which do not pass through the bars. By means of vertical rods, the ends of the cross bars are connected with jointed levers which rest on pins across the ends of the scaffold. By swinging down the jointed middle portions of the levers, their ends will be elevated to raise the platform. In this manner they can be elevated by the persons on the platform.

MECHANICAL MOVEMENT.—John J. Kimball, of Naperville, Ill.—The object of this invention is to construct an anti-friction mechanical movement for converting rotary or oscillating into reciprocating motion, or *vice versa*. The invention consists in the application of friction wheels to a reciprocating slide, and in their combination with the crank of a rotary or oscillating shaft.

AXLE BOX.—Sennitt A. Wing and Ianthus G. Johnson, of Greenfield Center, N. Y.—This improved axle box consists in an arrangement of the axle bearing eccentrically in a large center box, which is arranged in the outer or pipe box fitted in the hub of the wheel so that it can be adjusted on its axis to carry the axle bearing forward of the center of motion of the wheel, whereby, it is thought, the gravity of the load will assist the draft.

LOG BINDER.—Walter L. Dean, of Dayton, N. Y.—This invention provides the carriage of a drag saw mill with a binding apparatus, whereby a suitable number of logs or poles can be secured and fed to the saw, to be cut at once. It consists in means for binding logs or poles effectually, whether a single large log or several small ones are being operated upon, as pointed out in the claim, which is for a combination with a movable truck, to which the logs or poles are fastened, a spiked roll, and roll provided with an intermediate chain.

MOUSE TRAP.—Charles A. Hotchkiss, of Bridgeport, Conn.—This is an improved mouse trap, so constructed that the mouse cannot reach the bait, but will spring the trap attempting to reach the bait. It will set itself when the spring loop that carries the catching loop is pulled down. It consists in a bait hook, coil, and catch, constructed and combined with other parts of the trap, so that when a mouse enters the hole, and attempts to reach the bait, it inserts its head in the recess of the coil, and, pushing against the coil, springs the trap, and is caught by the loop before reaching the bait.

ROTARY ICE SHAVER.—A series of devices is employed to rotate knives against which a block of ice is automatically fed, whereby the ice is shaved off and falls through a suitable chute into a glass or suitable receiver. Patented by Clement C. Clawson, of Raleigh, N. C.

RAG CUTTING ENGINE.—Edward Wilkinson, of Paterson, assignor to himself and William O. Davey & Sons, of Jersey City, N. J.—A metal box is fitted in the bed frame of the machine immediately under the cylinder, for holding the case in which the cutters are confined, the sides of said box being slightly wider apart at one end and bottom than at the other end and top, so that the case which is correspondingly fitted, will wedge in tight when shoved in snugly from one end. The cutters are fitted to bars placed in the bottom of case transversely, and having temper screws screwing through them down upon the bottom of the case to raise or lower them. The cutters are also confined between the cross bars which hold them to the work while being adjusted up or down. This arrangement admits of applying a set of cutters and removing them in the most ready manner, so that but little time need be lost, as in the case with the rude apparatus heretofore used, which requires many hours of laborious work to shift and adjust the cutters. Two or more cases and sets of knives will be used, so that when one set gets dull and is taken out, another can be readily put in. If the case be difficult to start when wedged in, a bar and screw may be employed for the purpose, the screw passing through the said bar, which is placed against the end of the box and screwing into case.

FENCE.—Patrick J. Hynes, of Stoughton, Wis.—The object of this invention is to furnish a convenient and durable portable fence for farm and other purposes. The panels of the fence are composed of posts and rails put together with nails or fastened in any substantial manner. These panels rest upon the ground, and the ends of the posts may penetrate the ground, so as to steady the fence if required. The distinguishing feature of this portable fence is the application of cross girders, a short one near the top of the fence, and a long one near the bottom. These girders are gained out on each side. These gains receive the posts, the girders being introduced between the panels. Keys or wedges are driven into the ends of the gains against the posts. Braces are fastened to the upper and the lower girders, and stand at an angle of about forty-five degrees, with their lower ends standing on or penetrating the ground. An iron band incloses the upper ends of the posts and holds the two panels firmly to the girder. Hook stakes are driven into the ground and hook on to the ends of the lower girders. By removing these stakes, the keys and the band of the fence are readily taken up, and may be set down in any other location with very little trouble. In fences of this description rough sawn lumber is used, and the wedges or keys are employed to compensate for difference in thickness of the posts. In passing over uneven ground the posts may be spread at top or bottom by means of wedges, or by cutting the gains in the girders and making the iron band with reference thereto.

WAGON REACH.—Thomas Laux, of Bucyrus, Ohio.—This invention has for its object to furnish an improved wagon reach, so constructed that it may be conveniently lengthened and shortened as required, and which will prevent the reach and hounds from being twisted or strained should one of the wheels drop into a hole or rise in passing over an obstruction. To the rear axle the rear ends of the rear hounds are attached in the ordinary manner. The forward ends of the rear hounds are connected by a metallic plate, attached to their upper sides, and by the forward end of a metallic plate attached to their under sides, thus forming a guide socket to receive the reach. The metallic plate extends back to and is secured in a hole in the axle, or between it and the bolster. The sides of the under plate are turned up, thus forming a channel to receive the reach. The edges of this plate are notched, to receive the ends or points of a catch, which extends across the upper side of the reach, and the ends of which are bent down upon the sides of the reach to enter the notches in the edges of the plate. The catch is secured in place, when adjusted, by a bolt which passes through a longitudinal slot in the plate, and through a hole in the reach, and has a hand nut screwed upon its upper end. By turning up the nut and raising the catch, the reach may be slid along in the channel plate to adjust it longer or shorter, as may be desired. In the forward part of the reach is formed a swiveled joint, which is formed by attaching metallic caps, connected by a swivel bolt to the adjacent ends of the parts of the reach. By this construction, should one of the wheels descend below or rise above the level of the others, the swivel joint in the reach will prevent the reach or hounds from being twisted or strained. In the forward end of the reach is formed a hole to receive the king bolt in the ordinary manner.

CHIMNEY STOP.—Charles H. Earle, of De Pere, Wis.—This invention relates to a new fastening attachment to a chimney stop or plate for holding the same in place so that it will effectually prevent sparks and fire from entering the room through the hole in the chimney. The invention consists in the application of an expansible elliptical spring to the inner side of the plate, which spring is enlarged after the plate is applied to fasten it to the chimney, by aid of a screw bolt passing through the center of the plate which, compressing the spring, elongates it and causes it to bear against the sides of the hole.

CHEESE VAT.—Augustus B. Armstrong, of Dorset, Vt.—This invention has for its object to equalize the heat under the water vat so that the curd will receive an even temperature throughout. The production of cheese from a given quantity of milk will thereby become more profitable on account of greater weight and better quality obtained. The invention consists in the application of mulching plates between the front portion of the furnace and the front part of the water vat, and in the placing of ashes or equivalent material upon such plate; also, in the arrangement of supporting rods or lugs within the water vat for holding the cheese vat, so that the water is higher under its front than in rear, all serving to so spread or equalize the heat, under the cheese vat, as to bring its contents to an uniform temperature throughout.

CHURN POWER.—Levi A. Haight, of Cairo, N. Y.—This invention consists in an arrangement of a foot treadle and hand lever with a crank shaft, and an arrangement of the crank shaft with the walking beam, having the dasher of a churn attached to each end. An operator working the treadle by the foot, whether sitting or standing, may take hold of it to add the power of his hands, and the work may be divided between the members and made less fatiguing to either, while it affords means for applying more power when required than can be done by the hands alone. For working the walking beam to which the churn dashers are attached, a crank is used with a slotted arm hanging from the said walking beam, at the joint wherein it is pivoted, and rigidly connected to it. The crank is provided with an anti-friction roller to work against the walls of the slot to reduce the friction. The whole apparatus is mounted on a platform, constituting a portable machine.

HARNESS SADDLE TREE.—Thomas George Moore, of Albia, Iowa.—This invention relates to a new construction of harness tree, to make it self adjusting to the animal's back, and easily put together. The invention consists in connecting the bridge and jockeys by means of tenons on the former and sockets on the latter, and applying the terrets to the last named sockets, so that they will close the same and help secure the bridge. From each jockey projects a socket or box, open on top and vertically slotted at the end nearest the bridge. Each end of the bridge is T shaped, that is, has projecting pins at both sides. The terrets have their shanks so formed as to fit into those parts of the socket that are not occupied by the bridge. The ends of the bridge are fitted within the sockets, so that its pins will be concealed therein, recesses being provided in the sides of the socket for the reception of the pins. The turrets are then, with their shanks, fitted into the sockets, and cover the same, locking also the pins within their recesses. Screws or pins are employed to lock the terrets. All parts are thus properly united and readily put together. The jockeys can swing on the pivots to be self adjusting, and cannot work loose, as they are firmly held in place by the terrets. The construction of the tree is quite simple. All parts can be cast in the form shown, so that no difficult manipulations are required.

MACHINE FOR TWISTING YARN.—John Henry Jackson, of Putnam, Conn.—The features of this invention are the use of spring thread guides to regulate the yarn as it is fed off the spools, and prevent its too rapid delivery and also to increase the tension of the same, as may be desired. Also the use of a continuous cord, which is passed over pulleys on the spindles in such a manner that they are simultaneously driven all in one direction.

SPIKE MACHINE.—Frederick J. Kimball, of Philadelphia, Pa.—This machine consists of two roller disks or die rolls, the dies being so formed in the perimeters of the disks that both the points and heads of the spikes are perfectly shaped, and the spikes cut off of the proper lengths in a single operation, the rod being fed in lengthwise between the rolls. The rolls are actuated by strong and simple mechanism, which need not be described.

MECHANICAL MOVEMENT.—Edward E. Young, of York, Me.—This invention has for its object to furnish an improved device for varying the rapidity of motion, simple in construction, effective in operation, and easily adjusted. To the main driving shaft is attached a crank wheel, the crank pin of which is attached to a dovetailed slide, which works in a dovetailed groove in the side of the wheel, and which may be held in place when adjusted by a catch, or which may be adjusted and held by a swiveled crank screw working in teeth formed in the said slide. By this construction the crank pin may be moved toward or from the center of the wheel, thus adjusting the length of the crank, and consequently the motion communicated from said crank. To the crank pin is pivoted the end of a connecting rod, the other end of which is pivoted to the end of a working beam. The middle part of the beam is slotted longitudinally, to receive a pin, attached to the standard or frame work, to which the said beam is pivoted. Upon the under side of the beam are formed teeth which mesh into teeth of a small gear wheel, the journals of which work in bearings in the standard or frame. To the projecting end of one of the journals of the small gear wheel is attached a hand crank or screw wheel. In the latter case the wheel is turned by a swiveled crank screw connected with the standard or frame. By this construction, by turning this wheel in one or the other direction, the relative lengths of the two arms of the working beam, and consequently the motion communicated from said beam, may be adjusted at will. To the other or working end of the beam are pivoted the upper ends of two connecting rods, the lower ends of which are pivoted to the outer parts of two bars or plates, riding upon and pivoted to the driven shaft upon opposite sides of a ratchet wheel rigidly attached to said shaft, the lower end of the rods being arranged upon opposite sides of the shaft. To the inner side of the outer part of the plates or bars are pivoted spring pawls, in such positions that their engaging ends may take hold of the teeth of the opposite sides of the ratchet wheel. By this construction the shaft driven will be moved by one of the pawls as the end of the beam moves downward, and moved in the same direction by the other pawl as the said end of the beam moves upward. By this construction the throw of the working end of the beam may be adjusted to give a greater or lesser movement to the driven shaft as may be desired.

PISTON PACKING.—John Clark, Harrisburgh, Pa.—This invention relates to an improvement on the piston packing for which letters patent No. 103,140 were issued same party, bearing date May 17, 1870. In this invention set screws are dispensed with, and spiral springs are employed instead. The springs are placed within recesses formed in the annular wedge, and bear against the follower so that, when the latter is moved inward, the springs force the wedge into the enclosing ring, with the same effect as the set screws of the former invention. The invention also aims at reducing friction by forming ribs on the ring that encloses the annular wedge.

AUGER.—Hiram Pitcher, of Fond du Lac, Wis., assignor to himself and H. & G. O. Trowbridge, of same place.—This invention is an improved combined auger, reamer, and core auger, so constructed and arranged that the two parts may be used together or separately, as may be desired, or as circumstances may require. The shank of the auger works in bearings and guides, and is driven in the ordinary manner. The stem or shank is made with a spiral thread in the ordinary manner. The forward end of the auger is reamed out, or has recesses formed in it to form a spur edge upon its periphery, for a guide to the auger while boring, and to prevent the auger from turning to one side. The spaces between the lips are also filled up with metal, leaving the space, for the chips to pass through, small, to prevent the chips from coming off when the auger is being withdrawn. The metal also provides a seat for the spur cutters, which can thus be placed forward of and quite close to the cutting lips. The reamer is made hollow, and of such a size as to fit upon the auger. The reamer may be driven by a pulley independently of the auger, or it may be so connected with said auger as to be carried with it in its revolution. The hollow cylinder of the reamer is made with any desired number of spur cutters around the inner edge of its forward end, to serve as a guide to the tool when used as a reamer, and to separate the central core from the surrounding wood when used as a core auger. The forward end of the reamer is also provided with any number of cutting lips. The spaces between the lips are filled with metal, to make the spaces for the chips to pass through, small, to form a greater bearing surface upon the periphery of the reamer, and also to form a seat for the cutting spur cutters, which can thus be placed forward of and close to the cutting lips. The spurs are secured in their seats by set screws, so that they may be set to cut forward to any desired distance. The reamer is provided upon its outer surface with a spiral thread in the usual manner. By this construction the inner auger may be used alone or in connection with the outer auger or reamer. The outer auger may be used alone to ream a hole, or as a core auger; or it may be used in connection with the inner auger to ream a hole as it is bored.

POST HOLE DIGGER.—Mr. Edward R. Sumner, of Freeport, Ill., has invented an improved post hole digger, which has many advantages over the old style of tool for this purpose. From the handle of the instrument project arms, to which the blade of the digger is attached. The blade is made of thin elastic metal, in the form of a circular sheet, the edges of which are brought together with an inclined or diagonal joint or opening. The ordinary diggers have a straight or vertical opening, within which roots or other obstructions are apt to enter, on the descent of the digger, and become jammed or lodged in the joint, preventing the proper operation of the tool. By making the joint inclined or diagonal, as in this improvement, this difficulty is overcome, as the obstructions cannot enter the opening, but are cut off or pushed downward by the descent of the blade. The lower portion or cutting edge of the digger blade is provided with a series of diagonal or serrated cutting teeth, having sharpened edges. These teeth, by their pointed and wedge shaped form, easily enter and cut through the soil, also through turf, roots, etc. A digger provided with cutting teeth of the above form will have obvious advantages for working in almost any kind of ground, but especially in thick or tenacious soils, or those containing turf or roots. The usual form of the cutting edge is horizontal or straight, but by the use of serrated teeth, the extent of the cutting surface is much increased, the efficiency of the tool improved, and its operations rendered easier and quicker. The serrated teeth, by their flexibility or elasticity, will bind on the earth contained within the digger, and thus hold the earth securely while the digger and its load are being raised. The arms rise vertically for a short distance above the blade, and then converge into the handle. This vertical rise of the arms affords free opportunity for the blade to sink in the earth and permit the soil or turf to rise above the top of the blade, where the turf or soil will be slightly pressed and held during the removal of the tool with its load from the ground.

EGG BEATER.—Erastus B. Kunkle, of Fort Wayne, Ind., assignor to himself and Emanuel Bostwick, of the same place, has invented a novel egg beating device, the peculiar feature of which is, that by means of self acting valves working in perforated disks, the egg to be beaten is caused to circulate up and down in a direction opposite to that of the disks, which together with a suitable stem constitute a vertically acting dasher.

WATER WHEEL.—David Craik, of Church Mills, N. Y.—The peculiarities of this wheel, which is a turbine, are the arrangement of buckets, the arrangement of the chutes, the mode of opening and closing the chutes, and the combination of the several parts whereby, it is claimed, very superior results are obtained, as verified by practical experiments, in comparison with other wheels of its class.

BRICK MACHINE.—Frank Alsip, of North McGregor, Iowa.—This is a combination of a pug mill of peculiar construction, having force paddles at the bottom of the shaft to force out the mixed and tempered clay into a press, which is automatically operated to form the bricks, with various details of mechanism which cannot be well described in this notice. The machine is constructed on sound principles, and will compare favorably with other inventions in this field.

CANCELING AND SEVERING REVENUE STAMPS.—Patrick Wilkie Brown and Joseph Delarue, of Richmond, Va.—This invention consists of mechanism combining a shaft with arms, and one or more ink rollers operating in connection with an ink plate and a knife, the types being held in a suitable box affixed to the knife, so that one movement cancels the stamp and severs it. The mechanism by which this is accomplished is very ingenious, and the whole forms a compact and convenient implement for the purpose specified.

WAGON BRAKE.—William T. Hamilton, of Luthersburg, Pa.—The prominent feature of this invention is the use of a rack and toothed segment for transmitting the power of the foot lever to the brake shoes. A ratchet and pawl movement with a detaching lever are used to hold the brake to the wheels and release it when desired.

CORN SHAVING MACHINE.—This invention relates to a new machine for shaving green corn, so as to separate from the cobs the grains and juice useful for canning. The invention consists in such an arrangement of parts that the shaving process can be carried on by steam or other powerful agent, and performed thoroughly and with rapidity. The machine is adapted to the wants of large canning establishments, and is evidently a very efficient device. The inventor is Elias Watts, of Keyport, N. J.

CHURN.—A vertical revolving dasher, which throws the cream or milk out against vertical ribs, is made to make several turns in one direction, and then several in the other direction, by means of a rack and pinion movement, the rack being impelled by a pivoted lever, working in a vertical plane. The inventor is Mr. Eli Wilcox, of Hamburg, Iowa.

FERTILIZER DROPPER AND SEED DROPPER.—This is a combination of various well known devices, the method of combining and operating the parts being claimed to secure effective working, and the full purposes for which the invention is designed. It is the invention of Edward P. Hamish, of Felton, Del.

SULKY CULTIVATOR.—Nicholas Whitehall, of Newtown, Ind.—The peculiar feature of this invention is a connection of each of the tooth bars with a foot bar in a novel manner, whereby the operator is enabled to guide the teeth or shovel plows around any obstacle which would otherwise impede its progress, or perhaps break the machine, unless thus guided or stopped. The cultivator is intended for cultivation of corn, but may be used for other crops planted in rows.

DOOR FOR RAILWAY FREIGHT CARS.—Horace L. Clark, of Rahway, N. J.—This is a good practical invention. The doors of grain cars have, commonly, a small opening through them near the bottom for discharging the grain by shoveling. In this operation the grain scatters and flies in all directions, causing waste and inconvenience. The inventor obviates this by attaching a flexible spout of cloth, leather, etc., to the opening in such a way as to permit its being folded and allow the aperture to be closed, the spout being folded into the same plane as that of the door. He also makes use of a system of slides, rods, etc., by which the door may be turned up and supported against the ceiling. Stud pins at the bottom, and guides and pawls at the top, are used to hold the door firmly in position when closed.

MACHINE FOR EXAMINING AND REPACKING CIGARS.—Joseph Levy, of Wolcottville, Conn.—This consists of a box open upon one side, four of the other sides being formed of sliding plates. The fifth plate being placed upon the cigars in a box of which the cover has been removed, the four other plates are slid into the cigar box between its walls and the cigars; the whole is then inverted and the cigar box removed. Then the two side plates being slipped away, the cigars are exposed to examination without disturbing their arrangement. After the inspection, the cigar box is again slipped over the cigars, the machine inverted, and the cigars repacked in precisely the order they were found. This obviates the labor and expense of re-arranging them by hand.

TRANSMITTING MOTION OR MECHANICAL MOVEMENT.—Samuel S. Rembert, of Memphis, Tenn.—A wheel having a zigzag groove cut in its perimeter in such a way that the ends of the angles formed by the adjacent inclined portions of the groove run out at one side of the wheel, leaving openings, engages with a trundle wheel or pinion having four or more teeth, the teeth entering the groove through the breaks, and being acted upon by the inclined surfaces of the groove. Two of the teeth are always meshed into the groove, so that the motion is positive, and the number of revolutions of the pinion may be multiplied more rapidly than can be done by the ordinary system of gearing.

MACHINE FOR ELEVATING HAY OR GRAIN, IN STACKING, OR REMOVING IT FROM A STACK.—Edmund Harrison, of Mountain View, Cal.—A receiver formed of a rope or wire netting of peculiar construction is spread over the rack of the wagon, and this receiver is so constructed that, in connection with a proper derrick, the whole load may be elevated. The construction of the derrick, the peculiar construction of the jointed bars which support the netting, and the receiver formed of the netting and jointed bars, are the claims granted in the patent.

WASHING MACHINE.—William C. Marr, Joseph S. Maughlin, and George A. Davis, of Onawa, Iowa.—This invention relates particularly to an improvement on a washing machine patented by Lull and Bowen, July 21, 1868. Two standards enter a recess or socket in a cleat or block attached to the bottom of the tub, which may be an ordinary wash tub. A large fluted roller revolves in stationary bearings in the lower part of the standards. One journal of the roller projects upon the outer side of its standard, and to its projecting end is attached a gear wheel, into the teeth of which mesh the teeth of a gear wheel pivoted to the upper part of the standard, and to which is attached a crank by which the machine is operated. Small rollers are placed above the large fluted roller. Three or more are used, and their journals revolve in blocks placed in recesses formed in the inner sides of the upper part of the standards. These rollers are held down with proper force upon the clothes by coiled springs. The journal blocks rock to allow the rollers to adjust themselves to the varying thickness of the clothes passing between them and the large fluted roller. The arrangement of the large roller below the small rollers instead of above them leaves a greater available space in the tub for washing the clothes by hand, or for access to them for other reasons; fringes and frills of garments are less liable to be caught or to be torn; the large roller carries up the water to a greater extent; and it also sits lower in the tub than the small rolls in Lull and Bowen's patent.

SHANK AND TOE LASTERS FOR BOOTS AND SHOES.—Charles Leonard Graves, of Osage, Iowa.—This invention consists in a combination of parts forming a simple, easily operated tool, designed for use by workmen in holding and stretching the leather in the desired manner while lasting boots and shoes. A series of levers, all terminating in hooks, except two which have serrated edges, are all arranged in a semicircle, so that the serrated ones are diametrically opposite each other. These levers pass through a plate and are inclined outwardly, so that the longitudinal adjustment of said plate will cause all the levers to swing in or out simultaneously and in radial directions. This movement of the plate is derived from a screw and nut. The implement is used for stretching the toe by applying the hooks to the leather, and then turning the screw so as to contract them, thereby properly drawing the leather over the end of the last. For stretching the shank of the boot, the machine is inclined so that the serrated arms will take hold of the leather, the hooks remaining quite free.

SEWING MACHINE.—Carlos Stebbins, of Pike, N. Y.—This invention consists in an arrangement with the cam plate for working the thread take-up of a device for automatically varying the width of the slot, as the cam plate which is attached to the presser bar varies by the varying thickness of the cloth, for regulating the action of the take up more effectually to meet the requirements of cloth of varying thickness than can be done by the present arrangement. Also, in a novel arrangement of the joint of the vibrating arm for preserving oil and lessening friction. The vibrating needle arm joint consists of round headed bolts, supports therefor, and an inverted concave arm on the end of the needle arm, the said bolts being fitted in sockets adapted for them in the bottom of oil cavities, being inclined either toward each other, or in the opposite direction, so that they cannot draw out of the sockets, which are designed to be under cut so as only to admit the heads or allow them to be taken out by movements in the direction in which they are inclined. This kind of oscillating joint is applicable to other machinery as well as to sewing machines.

WASTE PIPE FOR SINKS.—James L. Oliver, of Boston, Mass.—This invention relates to an improved safety waste pipe for sinks and the like, to prevent the escape being stopped and the overflow resulting therefrom; and it consists in a perforated extension of the waste pipe above the bottom of the sink, and a stopper in the top, which will float off in case the perforations which afford the escape for the water ordinarily become stopped, and open an escape for the water so large as not to be stopped by the small particles likely to stop the smaller holes.

WRENCH.—Hiram M. Smade, of Manistee, Mich.—This invention relates to a new pipe wrench of the kind where the movable jaw is pivoted to a sliding sleeve; and it consists particularly in the mode of fastening the stationary jaws. The handle, main shank, and the stationary jaw holder may be made in one piece, or united from separate sections. The jaw holder is like a hook on the shank with a double in lined inner edge, upon which are secured two fixed jaws, or plates, made of steel or other hard material, with roughened or corrugated inner faces. They rest on shoulders formed on the hook, and meet at their upper ends. A movable sleeve sliding on the stem is operated by a screw, swiveled in a projecting ear of the handle. A movable jaw is pivoted to the upper part of the sleeve. The pivot pin of this jaw may be made in form of a screw, so that said jaw can be clamped fast in any desired position after having once been adjusted for a certain size of pipe. By the arrangement of the jaws shown, the pipe is clamped on three sides, and thus securely held. This is a very compact, and, apparently, efficient tool.

CULTIVATOR.—Jacob S. Fleming, of Island Creek, Ohio.—This invention consists of a coulter formed solid upon the forward end of the center beam of a cultivator by bending the forward end of the beam downward. It is scarcely necessary to add that this refers to cultivators made with rim beams, or having a center beam of iron.

DIAPER PIN.—William H. Hockensmith, of Bridgeport, Conn.—This pin is formed, as certain others have been, from a single wire, but, unlike them, the wire is formed into a long and a short spiral coil, the one forming the elastic and extensible back or body of the pin, the other an eye or socket for reception of the sharp point of the pin proper. Thus a large number of thicknesses of cloth can be secured by this pin, since the back will readily yield outward from the pin proper, and at the same time its tension will be increased so that the point socket or eye will be drawn yet closer against the cloth. And since the coils run in the same direction as the pin proper, when it is desired to disconnect the latter, the extension or drawing out of the coils for the purpose is an easy operation, and no bend being given to the wire, no injury is done to it, such as would cause the back of a pin otherwise formed from wire to quickly break asunder. The form of socket is likewise calculated to protect the pin point better than is the case in other pins, since it entirely surrounds it.

HARROW.—Josee L. Willoughby, of Bowling Green, Ky.—The frame of an ordinary V-shaped harrow is made in the ordinary manner, having harrow teeth, the upper ends or shanks of which pass up through the frame and are secured by nuts. The lower or working parts of the teeth are made with an edge upon their forward sides, the lower part of said edge being inclined to the rearward, so that the said teeth may slide over instead of catching upon the roots or other obstructions they may encounter. To the rear end of the frame is attached a roller, to the convex surface of which are attached teeth, by which the ground, as it is rolled level by the roller, will be loosened and stirred up so as to be left mellow and light. Bars, the ends of which are pivoted to the rear part of the side bars of the frame, are bent upward at right angles, extend upward to a suitable hight above the roller, and are bent inward at right angles so as to be above and parallel with the rear part of the said roller. To the upper or horizontal part of these bars are attached teeth, which project downward along the rear side of the roller so as to clean off any sods or dirt that may adhere to it or to the teeth. Handles, which are pivoted to the opposite sides of the central bar of the harrow frame, pass back through keepers attached, at suitable distances apart, to the upper or horizontal part of the bars supporting the roller journals. By this construction the toothed roller can rise to pass over obstructions without interfering with the operation of the harrow, and by bearing down upon the handles the harrow can be raised from the ground for convenience in turning, and for avoiding stumps and other obstructions.

WATER WHEEL.—Charles M. Miles, of Milford, Del., assignor to himself and Solomon Matthews, of same place.—The water wheel has buckets of suitable shape and arrangement. A guide chute is arranged within the wheel; and a vertically adjustable gate within the chute. The wheel and chute are both divided into two or more stories or sections, one above the other, by means of horizontal partitions. The gate can be lowered to open only one story, or two or more, according to the head of water at disposal, and in each case the chutes and wheel will operate as one perfect apparatus, the upper parts thrown out of action not interfering the least with the lower in action. The same invention is applicable to wheels having the chutes and gates, or either, on the outside.

ARCHED TRUSS FOR BRIDGES.—Peter L. Weimer, of Lebanon, Pa., assignor to himself, J. A. Weimer, and L. E. Weimer, of same place.—This invention is an improvement in bow string bridges. An arch truss has lattice work connecting the arch and the chord. The arch is formed of a series of cast iron flanged segments. A broad plate of boiler or wrought iron is firmly riveted over the top of the segments and to the ends of the chord. Another broad wrought iron plate is secured to the under sides of the segments, and also to the chord, by rivets. The chord is thus firmly connected with the ends of the arch. The chord plate may be broader than the arch plates, and all the plates may be broader in the middle than at the ends. These broad plates (especially the broad chord) allow the bridge or truss to resist lateral pressure, and add materially to the strength of the structure. The lattice slats pass through mortices in the lower flanges of the segments and the lower plate, and are securely riveted or bolted to the segments. The lower ends of these slats pass through mortises in the chord, beneath which they are confined by keys, or in any other suitable manner. The lattice slats are riveted together where they intersect each other. This arched truss is more particularly designed to be employed in bridge building, but is not necessarily confined thereto, as it may be used for various other purposes.

WATER WHEEL.—Alexander C. Lesner, of Fonda, N. Y., assignor to himself and Abram V. Davis, of New York city.—This invention is a new manner of arranging the gates of a turbine water wheel in their annular supports, making them independently adjustable in the supports, and slightly yielding to the varying degrees of pressure by the water. The chutes are set concentric, and have their inner faces so curved that the buckets of the wheel will always be in contact with them, except where the perforations are made for the admission of water. By this arrangement the power of the water is concentrated before admitting it to the buckets. The gates are secured in and between rings which constitute the annular frame of the gates, and are placed around the chutes. A pinion meshes into a toothed portion of the edge of a lower ring, and is used for turning said ring and thereby adjusting the position of the gates in the desired manner. Each gate has projecting tenons at the ends, which enter slotted or grooved sockets provided for their reception in the rings. These sockets are somewhat longer than the tenons, so that the gates will have slight play in the rings. The gates can thus yield to the force of influx of water or change of current, and avoid a considerable amount of friction. More power is thus gained The gates are made L shaped. Their longer arms are curved to fit against the circular circumference of the chutes; the short arms project from the long at an angle of about one hundred and thirty-five degrees, and have their working faces quite straight and smooth, while the backs may be rounded. In this manner the gates, with their projections, serve as actual extensions of the chutes, and permit the use of a narrow chute ring.

PULLEY.—Matthew Ward, of Mount Carmel, Pa.—This invention has for its object to furnish an improved pulley, designed especially for carrying wire ropes upon inclined planes, so constructed that it will begin to revolve as soon as the rope touches it, thus preventing the rope from cutting the wood, as it is liable to do with pulleys made of wood in the ordinary manner. The body of the pulley is made of wood, and in two parts, to receive a gum elastic piece, and to prevent said gum elastic piece from coming in contact with the pulley shaft. The outer edges of the inner sides of the parts are bevelled or rounded off to form the flanges of the pulley. The gum elastic is made in the form of a flat ring, placed between the parts of the pulley, and secured in place by forcing the said parts toward each other, the shoulders of said parts being narrower than the thickness of the ring. The shaft passes through the parts of the pulley. Upon the shaft at one side of the pulley, is formed a collar, and upon it, at the other side of the pulley, is formed a screw thread, upon which is screwed a nut, so that the parts of the pulley may be secured to each other by screwing up the nut. Metallic disks or washers are used, one of which is interposed between the collar and the side of the adjacent part of the pulley, and the other part is interposed between the side of the other part of the pulley and the nut.

WATER WHEEL.—Daniel A. Flummerfelt, of Bridgeville, N. J.—This invention relates to several improvements in the parts used in connection with a turbine water wheel, and in the arrangement of the wheel itself; and has for its object to provide means for more fully utilizing the force of the water than could be done by the appliances hitherto in use. The invention consists chiefly in a new arrangement of the central discharge chamber, which is provided with convex discharge plates, whereby the water is rapidly conducted away so that it cannot clog the wheel. The invention also consists n a new arrangement of certain other parts, as described in the specification, the details being of a character requiring diagrams for the clear exposition.

LIFTING MACHINE.—Francis B. O'Connor, of New York city.—This invention is an improved machine, intended to develop the powers of the human subject. It consists in a small platform of suitable dimensions for the operator to stand on, with two strong India rubber or other springs attached to it, one on or near each of two opposite sides, and made of suitable length, and provided with handles at the upper end, adapted for the operator to expend his strength on the springs by pulling them upward.

MEDICAL COMPOUND.—George W. Chambers, of Talladega, Ala.—An improved medical compound or blood purifier for the cure of debility, enlargement and ulceration of glands, ulcers, eruptions of the skin, syphilitic diseases, affection of the kidneys, etc., consists in a complex mixture of vegetable tinctures with iodide of potassium.

STEAM GENERATOR.—Rus W. Dugan, of Covington, Ky., and Benjamin F. Clark, of Cairo, Ill.—This steam generator consists in a combination of heating coils and a cylinder, calculated to provide a simple and efficient generator, by which steam can be rapidly and economically made, with no danger of explosion, and with but little wear or injury to the parts, the cylinder being placed outside of the furnace, inclosing the coils in which the steam is generated.

PRUNING SHEARS.—William F. Clemmer and George H. Clemmer, of Alexandria, Ohio.—This pruning shears is arranged to bring the fulcrum close to the cutting edge, giving great power to the shears. To effect this, two grooves and a brace plate, arranged in connection with the rivets and blades of the shears, are employed, by which greater strength is gained to meet the increased strain of the greater leverage, and also the cutting edges are made to cut in the proper planes to cut clearly and with greatest effect.

SPECULUM ATTACHMENT.—Jerome D. Bruce, of Newberry, S. C.—This is an improvement in the well known surgical instrument or appliance known as the speculum, for the examination of the uterus or neck of the womb; and consists in an attachment to the speculum of an elastic tube, so arranged that the tube may be distended after the speculum has been inserted into the vagina, thereby distending the parts and greatly facilitating the examination of the uterus. By means of this tube the operator forces, with his mouth or otherwise, air or liquid into the tube, after the speculum has been inserted into the vagina. By thus distending the vagina and the parts connected with the neck of the uterus, the examination of the latter organ is rendered much more perfect and satisfactory than it has been heretofore.

SHAFTS FOR SLEIGHS.—Charles Bock and Daniel Bock, of Drum's, Pa.—The object of this invention is to so construct the shafts or thills of one horse sleighs or "cutters" that they will allow the horse to travel directly forward in the left hand path of the snow track, while the runners of the sleigh run free in the track and the body of the sleigh keeps in its proper position. It consists of shafts, a double crossbar, draft bar, and curved bar, constructed and arranged together to secure the purposes described.

EARTH CABINET.—Wm. H. Bliss, of Newport, R. I.—This invention provides an earth closet or cabinet, claimed to be an improvement upon others which have preceded it, in that it is more convenient in use, cleanly, and effective in preventing any escape of offensive odors. It consists in a combination of various parts—some of which are similar in character to those already in use—with others, the form and use of which are varied the better to secure the desired results.

GRADING AND DITCHING MACHINE.—Joseph W. Fawkes, of Maroa, Ill.—This is an improved apparatus for grading and ditching, of the class in which a common or any approved plow is mounted on a truck frame, on which is arranged a table provided with carriers for taking the earth turned up by the plow and depositing the said earth on a grade or bank or road bed. The invention consists in the arrangement of a carrier, the said carrier being hinged to a rotary wheel or disk, and provided with tripping and resetting apparatus for causing it to be dumped and reset automatically.

COFFEE AND GRAIN CLEANER AND SEPARATOR.—Richard Frisby, of Cleveland, Ohio.—This machine is intended to be used in connection with a hulling or scouring mill to dust and separate the grain, or by itself for separating different grades of coffee and cleaning it of all foreign matter, which is intended to be blown out through a spout and discharge, while any grains blown through the spout will be arrested by a screen, and fall through the spout into a receptacle below. A screen separates all coarse matters, which may be removed by hand. A valve is arranged in the mouth of the air conductor for regulating the draft. The air is blown across the screens, by which a much longer screen can be used than when the air is blown lengthwise of it.

EXTENSION CLOTHES POLE.—James Denton and Whitley Denton, of Amsterdam, N. Y.—To the lower part of a clothes pole is attached a metallic shoe, the opposite ends of which are turned downward, to enable it to take a firm hold upon the ground and prevent it from slipping, however much the clothes line may be swung about by the wind. To the upper end of the lower part is attached a band, which is extended upon one side to form a guide and keeper to receive the upper part of the clothes pole and hold it close to the lower part. To the lower end of the upper part is attached a band, one side of which is extended to form a guide and keeper to receive the lower part and keep the two parts of the pole close together at all times. To lugs formed upon the upper band or keeper are pivoted the ends of a loop or stirrup, through which the upper part of the pole passes, and which catches upon the rack teeth or notches formed upon the outer side of the upper part to support it, however much or little it may be extended. The upper end of the upper part of the clothes pole is notched to receive the clothes line, and to the opposite sides of said notched upper end are attached he lower ends of two spring bars, the upper parts of which are bent inward, and their upper ends are bent outward. By this construction the upper end can be conveniently applied to the clothes line, and when applied will hold the line securely, so that it cannot be blown out, however much it may be blown about by the wind.

MACHINE FOR BENDING WOOD.—Augustus F. Marshall, of Black River, N. Y., has patented a novel machine for bending wood for chairs, etc. It consists in a new arrangement of devices with a former, a metal spring band, and attachments for confining the band to the bar of wood to be bent. The machine is undoubtedly a good one, very strong and compact, and one likely to meet with favor on the part of manufacturers of wooden articles of various kinds.

LOW WATER DETECTOR.—Mr. Gideon B. Massey, of New York, who has devoted much time to the invention of various appliances calculated to insure greater safety in the use of steam, has lately patented an improvement upon his invention for which letters patent were granted August 23, 1870. The nature of the improvement cannot be rendered clear without diagrams, but we can assure our readers that the instrument, as now constructed, is an effective device for the purpose intended, sounding an alarm whistle, as soon as the low water limit is reached. We need not say that we believe these or similar instruments should be placed on every boiler. Our opinions upon this subject are already known to our readers.

BUNG SPOUT.—John Marvin and William T. Hulse, of Port Jefferson, N. Y.—This invention is intended to supersede the primitive leather spouts now generally attached to barrel bungs wherever faucets are not to be used. It consists of a spout pivoted to a forked frame, which has a hook for catching under and a screw, key, or lever for bearing upon the staves. The instrument is applied by passing the hook through the bung hole, making it catch over the edge of the stave, and then turning the screw against the barrel until the packed end of the spout bears firmly against the barrel. The latter can then be turned to discharge through the bung hole. In place of the screw a lever or key may be employed.

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118,777.—BRICK MACHINE.—A. Anderson, Peekskill, N. Y.
118,778.—CASE.—W. Bayley, A. P. Crowell, Wilmington, Del.
118,779.—HEATER.—A. G. Bearup, P. Carraher, Jr., N. Y. city.
118,780.—BLANK, ETC.—H. M. Beecher, Plantsville, Conn.
118,781.—FASTENER.—H. Binder, St. Louis, Mo.
118,782.—SEAT.—J. W. Blakeney, New York city.
118,783.—ELEVATOR.—W. Boswell, Pontiac, Mich.
118,784.—SNOW PLOW.—T. S. Brown, Greenfield, Mich.
118,785.—BELT FASTENING.—G. A. Brown, Reading, Mich.
118,786.—STEAM TRAP.—N. H. Bundy, New York city.
118,787.—ACETATE OF LIME.—C. J. T. Burcey, Black Rock, Conn.
118,788.—ACETIC ACID.—C. J. T. Burcey, Black Rock, Conn.
118,789.—INDICATOR.—W. Butterfield, Madison, Wis.
118,790.—WASHING MITT.—M. Cadwell, Lansing, Mich.
118,791.—ELEVATOR.—F. Calvert, Wabash City, Ind.
118,792.—WHEEL PLOW.—W. J. Connor, Benton, Ill.
118,793.—EXCAVATOR.—J. P. T. Davis, New Trenton, Ind.
118,794.—WHITE LEAD.—W. Davison, Baltimore, Md.
118,795.—EARTH CLOSET.—M. E. Doolittle, Hartford, Conn.
118,796.—SCROLL SAW.—N. T. Edson, New Orleans, La.
118,797.—THRASHER, ETC.—S. Filby, Lewiston, N. Y.
118,798.—PADLOCK.—L. H. Gano, New York city.
118,799.—BOILER.—Azel Gay, Rochester, N. Y.
118,800.—SAW.—G. B. Green, Staffordshire, Eng.
118,801.—HEAD BLOCK.—W. A. Greenleaf, Indianapolis, Ind.
118,802.—SEAT.—A. G. Hawkes, Baltimore, Md.
118,803.—COLLAR.—S. F. Hilton, Providence, R. I.
118,804.—BED BOTTOM.—S. Hobbs, Wilmot, Ohio.
118,805.—BRUSH AND BOX.—H. S. Kerr, Philadelphia, Pa.
118,806.—AUGER.—R. M. Lafferty, E. P. Smith, Three Rivers, Mich.
118,807.—COAL SCUTTLE.—E. Mather, Chicago, Ill.
118,808.—MULE.—P. McGovern, Lawrence, Mass.
118,809.—BOOTJACK, ETC.—J. M. McMaster, Rochester, N. Y.
118,810.—HAY TEDDER.—W. H. Mickle, Utica, N. Y.
118,811.—VENT BUNG.—C. H. Miller, W. Ascough, Buffalo, N. Y.
118,812.—MEDICAL COMPOUND.—D. Nixon, Philadelphia, Pa.
118,813.—SOLUTION.—O. Oldberg, Washington, D. C.
118,814.—SHADE.—J. J. Phares, Whitestown, Ind.
118,815.—WHEEL.—J. Priest, Detroit, Mich.
118,816.—SLATE CUTTER.—W. H. Rayner, Springfield, Mass.
118,817.—STEAM VALVE.—M. C. Rer ell, Clinton, Ark.
118,818.—PLUG HOLDER.—J. Ritchie, Detroit, Mich.
118,819.—PUTTING UP POWDERS.—H. Sawyer, Chelsea, Mass.
118,820.—WHIP SOCKET.—F. Selle, Detroit, Mich.
118,821.—SEED DRILL.—R. B. Sheldon, Canastota, N. Y.
118,822.—BEE HIVE.—W. P. Shortridge, Easton, Mo.
118,823.—EXTRACTING PACKING.—H. N. Smade, Manistee, Mich.
118,824.—COUPLING.—O. L. Smith, J. F. Utton, Providence, R. I.
118,826.—CHURN.—G. Spayd, Alma, Mich.
118,827.—BEE HIVE.—S. D. Stearns, G. Ellsworth, Weston, Ohio.
118,828.—DOOR LOCK.—C. I. Stewart, Baltimore, Md.
118,829.—PRESS.—C. R. Taylor, Iona, Mich.
118,830.—SAFE LOCK.—M. G. Tousley, Mendota, Ill.
118,831.—BOB SLED.—A. H. Walrath, Pamelia, N. Y.
118,832.—FAN.—L. A. Walton, Byhalia, Miss.
118,833.—FENCE.—P. C. Yost, Carthage, Ill.
118,834.—BED.—P. Agger, Cincinnati, Ohio.
118,835.—PRINTING PRESS.—F. L. Bailey, Boston, Mass.
118,836.—COUPLING.—J. D. Barnard, Frostburg, Md.
118,837.—HARVESTER.—O. Billings, Elyria, Ohio.
118,838.—PACKING.—G. F. Blake, Boston, Mass.
118,839.—BOOT HEEL.—M. Bray, Newton, Mass.
118,840.—STEAM ENGINE.—G. W. Briggs, M. H. Densmore, Shickshinny, Pa.
118,841.—WAGON.—J. and M. Broderick, Louisville, Ky.
118,842.—VARNISH.—C. Brumby, Rochester, N. Y.
118,843.—PACKING.—J. Clark, Harrisburgh, Pa.
118,844.—FLOWER STAND.—E. T. Cobb, Conway, Mass.
118,845.—TYING MACHINE.—J. W. Congdon, Marietta, Ohio.
118,846.—TIRE.—W. H. Davis, Lexington, Ind.
118,847.—BENDING TUBES.—H. W. Doe, Springfield, Ohio.
118,848.—PLOW.—J. Duff, Peoria, Ill., G. D. Nourse, St. Louis, Mo.
118,849.—CARTRIDGE LOADER.—G. H. Ferriss, Utica, N. Y.
118,850.—ROOFING.—C. L. Fowler, Baltimore, Md.
118,851.—SHANK.—G. Goodyear, New York city.
118,852.—FLY TRAP.—L. Grim, Fort Branch, Ind.
118,853.—TOY COVERING.—H. C. Grube, New York city.
118,854.—SAD IRON, ETC.—J. K. Gulihur, Montana, Iowa.
118,855.—TOY LOOP.—A. M. Hill, New Haven, Conn.
118,856.—BED.—P. Hill, Millport, N. Y.
118,857.—STEAM ENGINE.—H. T., T. Jennings, London, Eng.
118,858.—FERRULE.—S. E. Jeralds, H. A. Nettleton, E. R. Lawton, West Cheshire, Conn.
118,859.—PUMP.—J. Jonson, Baltimore, Md.
118,860.—OIL CAN.—L. W. Kent, Cleveland, Ohio.
118,861.—STILTS.—L. A. Kimberly, New Haven, Conn.
118,862.—STEELYARD.—H. Kirkwood, Americus, Miss.
118,863.—WATER WHEEL.—D. K. Kraatz, Ephrata, Pa.
118,864.—BENDING WOOD.—E. Lacey, Chicago, Ill.
118,865.—COMPOSITION.—P. B. Laird, St. Johnsbury, Vt.
118,866.—MUFF BOX.—H. Manneck, New York city.
118,867.—LIQUID METER.—H. W. Mather, New York city.
118,868.—HUB CLAMP.—J. McClelland, Geneva, N. Y.
118,869.—AXLE.—N. Mead, Oil City, Pa.
118,870.—FAN, ETC.—H. Mee, Crown Point, Ind.
118,871.—BRUSH.—J. Minetree, Petersburgh, Va.
118,872.—PLASTER.—G. E. Mitchell, Lowell, Mass.
118,873.—CUT OFF.—J. Montfort, Newburgh, N. Y.
118,874.—GRATE.—G. R. Moore, Phila., Pa.
118,875.—REFINING SUGAR.—J. A. Morrell, New York city.
118,876.—FOUNTAIN.—E. B. Myers, Handsborough, Miss.
118,877.—HALTER.—I. P. Osborn, W. A. Bayhan, Wilmington, O
118,878.—TABLE.—P. O'Thayne, New York city.
118,879.—DIE.—E. H. Plant, Plantsville, Conn.
118,880.—DRAIN PIPE.—G. Richardson, Milwaukee, Wis.
118,881.—STRIPPER.—F. Roux, Stryker, Ohio.
118,882.—STEEL.—E. Savage, West Meriden, Conn.
118,883.—SMOKE STACK.—B. F. Smith, New Orleans, La.
118,884.—FURNACE.—B. F. Smith, New Orleans, La.
118,885.—ESCAPE PIPE.—B. F. Smith, New Orleans, La.
118,886.—AIR PISTOL.—G. H. Snow, New Haven, Conn., E. H. Hawley, Kalamazoo, Mich.
118,887.—MILK CAN.—S. Stroock, New York city.
118,888.—FENCE.—R. M. Weider, J. Meals, Carthage, Ill.
118,889.—RICE CLEANER.—J. N. White, New Orleans, La.
118,890.—PLOW.—A. H. Whittick, Clarksville, Ind.
118,891.—WRENCH.—W. S. Wilcox, Hartford, J. A. Wilcox, Rocky Hill, Conn.
118,892.—MATTRESSES, ETC.—E. L. Wright, Sterling, Ill.
118,893.—HORSE POWER.—J. M. Albertson, New London, Ct
118,894.—BEE HIVE.—R. Arnold, Suffolk, Va.
118,895.—POTATO DIGGER, J. B. Baker, Syracuse, N. Y.
118,896.—POT COVER.—W. H. Barker, Windsor, Canada.
118,897.—BAG HOLDER.—O. Barrett, A. D. Brooks, Dartford, Wis
118,898.—JAR.—J. S. Batchelder, Fort Wayne, Ind.
118,899.—CAN.—J. S. Batchelder, Fort Wayne, Ind.
118,900.—BRIDLE BIT.—S. C. Boughton, Waterford, N. Y.
118,901.—BEER, ETC.—H. L. Bowker, Boston, Mass.
118,902.—PANTOGRAPH.—L. F. Bruce, N. J. Wolcott, Springfield, Mass.
118,903.—HYDROCARBONS.—J. K. Caldwell, Philadelphia, Pa
118,904.—CAN.—O. S. Camp, Grand Rapids, Mich.
118,905.—FURNACE.—I. B. B. Case, Toledo, Ohio.
118,906.—SPRING.—H. Chandler, Bennington, Vt.
118,907.—CUTTER HEAD.—M. W. Clark, Worcester, Mass.
118,908.—BED.—W. F. Clark, Mt. Pleasant, Iowa.
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118,995.—BOX.—G. H. Wetjen, New York city.
118,996.—HARVESTER.—W. N. Whiteley, Springfield, Ohio.
118,997.—PIPE WRENCH.—H. Wilson, Tarr Farm, Pa.
118,998.—WASHING MACHINE.—J. C. Wimer, Doylestown, Pa.
118,999.—VISE.—J. A. Younce, G. W. Smith, Hartford, Ind.

REISSUES.

4,545.—BINDER.—G. W. Emerson, Chicago, Ill.—Patent No. 79,500, dated July 7, 1868.

4,546.—GRAIN SEPARATOR.—S. Howes, A. and N. Babcock, and C. Ewell, Silver Creek, N. Y.—Patent No. 23,099, dated Feb. 22, 1859; reissue No. 2,098, dated Oct 21, 1865.

4,547.—INSOLE.—M. A. Johnson, Lowell, Mass.—Patent No. 61,742, dated Feb. 5, 1867.

4,548.—WOOD BENDER.—H. McDonald, Shortsville, N. Y.—Patent No. 31,182, dated Jan. 22, 1861.

4,549.—Division A.—DEPILATING HIDES.—J. E. Siebel, Chicago, Ill.—Patent No. 116,638, dated July 4, 1871.

4,550.—Division B.—PRESERVING WOOD.—J. E. Siebel, Chicago, Ill.—Patent No. 116,638, dated July 4, 1871.

4,551.—HEAD BLOCK.—E. H. Stearns, Erie, Pa.—Patent No. 14,700, dated April 15, 1856; extended seven years.

4,552.—SPOKE TENON, ETC.—J. Deming, Salem, Ohio.—Patent No. 103,187, dated May 17, 1870.

4,553.—WOOD BENDER.—S. Kingsland, Council Bluffs, Iowa. Patent No. 35,983, dated July 22, 1862.

4,554.—FIRE ALARM.—J. O. Fowler, Jr., Hudson, Wis.—Patent No. 35,050, dated April 22, 1862.

4,555.—BUR.—M. Van Auken, Amsterdam, N. Y.—Patent No. 38,997, dated June 23, 1863; antedated Feb. 16, 1863.

DESIGNS.

5,256.—CARPET.—J. H. Bromley, Philadelphia, Pa.
5,257.—MATCH SAFE, ETC.—G. W. Brown, Louisville, Ky.
5,258.—CARPET.—B. Crabtree, Jr., Philadelphia, Pa.
5,259.—SCHOOL DESK.—T. A. Galt and G. S. Tracy, Sterling, Ill.
5,260.—HAME LOOP.—J. Letchworth, Buffalo, N. Y.
5,261.—GLASSWARE.—J. E. Miller, Birmingham, Pa.
5,262.—HOOK.—J. B. Sargent, New Haven, Conn.
5,263.—STOVE.—W. A. Spicer, Providence, R. I.
5,264.—LETTER BOX.—G. F. Topliff, Boston, Mass.
5,265.—GRATE FRONT.—C. Zeuner, Cincinnati, Ohio.
5,266.—BUSTLE.—A. W. Thomas, Philadelphia, Pa.

TRADE-MARKS.

439.—ENGINE OIL.—Harmon, Merrick & Co., Cleveland, Ohio.
440.—INSTRUMENTS.—Heller & Brightly, Philadelphia, Pa.
441.—LEATHER.—G. F. and C. T. Page, Franklin, N. H.

APPLICATIONS FOR EXTENSION OF PATENTS.

MOWING MACHINE.—Ephraim Ball, Canton, Ohio, has petitioned for an extension of the above patent. Day of hearing, November 15, 1871.

DRAWING KNIFE.—Richard N. Watrous, Elmira, N. Y., has petitioned for an extension of the above patent. Day of hearing, November 29, 1871.

HYDRANT.—Washburn Race, Fulton, N. Y., and S. R. C. Mathews, Philadelphia, Pa., have petitioned for an extention of the above patent. Day of hearing, January 10, 1872.

COTTON AND HAY PRESS.—George W. Penniston, North Vernon, Ind. has petitioned for an extension of the above patent. Day of hearing, November 15, 1871.

MACHINE FOR SPREADING LIME AND OTHER FERTILIZERS.—Pierpont Seymour, East Bloomfield, N. Y., has petitioned for an extension of the above patent. Day of hearing, November 15, 1871.

MACHINE FOR THREADING BOLTS.—William Sellers, Philadelphia, Pa., has petitioned for an extension of the above patent. Day of hearing, November 15, 1871.

SHINGLE MACHINE.—Robert Law, Toledo, Ohio, has petitioned for an extension of the above patent. Day of hearing, December 20, 1871.

Value of Extended Patents.

Did patentees realize the fact that their inventions are likely to be more productive of profit during the seven years of extension than the first full term for which their patents were granted, we think more would avail themselves of the extension privilege. Patents granted prior to 1861 may be extended for seven years, for the benefit of the inventor, or of his heirs in case of the decease of the former, by due application to the Patent Office, ninety days before the termination of the patent. The extended time inures to the benefit of the inventor, the assignees under the first term having no rights under the extension, except by special agreement. The Government fee for an extension is $100, and it is necessary that good professional service be obtained to conduct the business before the Patent Office. Full information as to extensions may be had by addressing

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Inventions Patented in England by Americans.

August 22 to August 26, 1871, inclusive.

[Compiled from the Commissioners of Patents' Journal].

BATTERY AND LIQUID.—E. Prevost, V. Barjon, New York city.
BUTTON HOLE AND SEAM.—C. McK. Talcott, Hartford, Conn., residing at City Road, Finsbury, Eng.
CONVERTING GUNS.—H. Berdan, New York city.
FEED WATER HEATER, ETC.—R. Berryman, Hartford, Conn.
FLAX SPREADER.—J. Good, Brooklyn, N. Y.
LEVER.—W. H. Chase, of New York city, residing at 8 Southampton Buildings, London, Eng.
LOOM.—J. Gates, Lowell, Mass.
SKYLIGHT, ETC.—G. Hayes, New York city.
WHEEL FOR TRACTION ENGINES.—A. Campbell, R. Clark, Sacramento, Cal.

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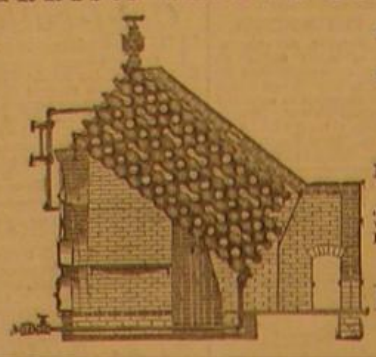

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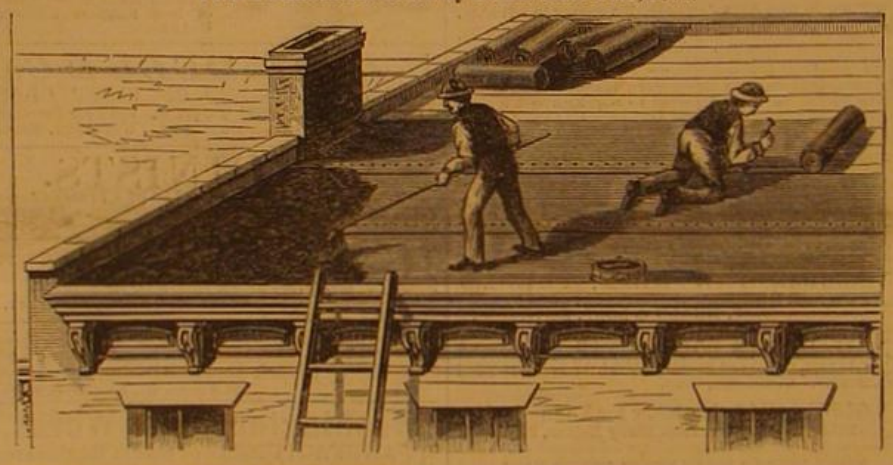

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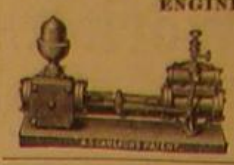

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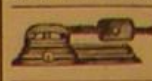

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