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Fig. 1

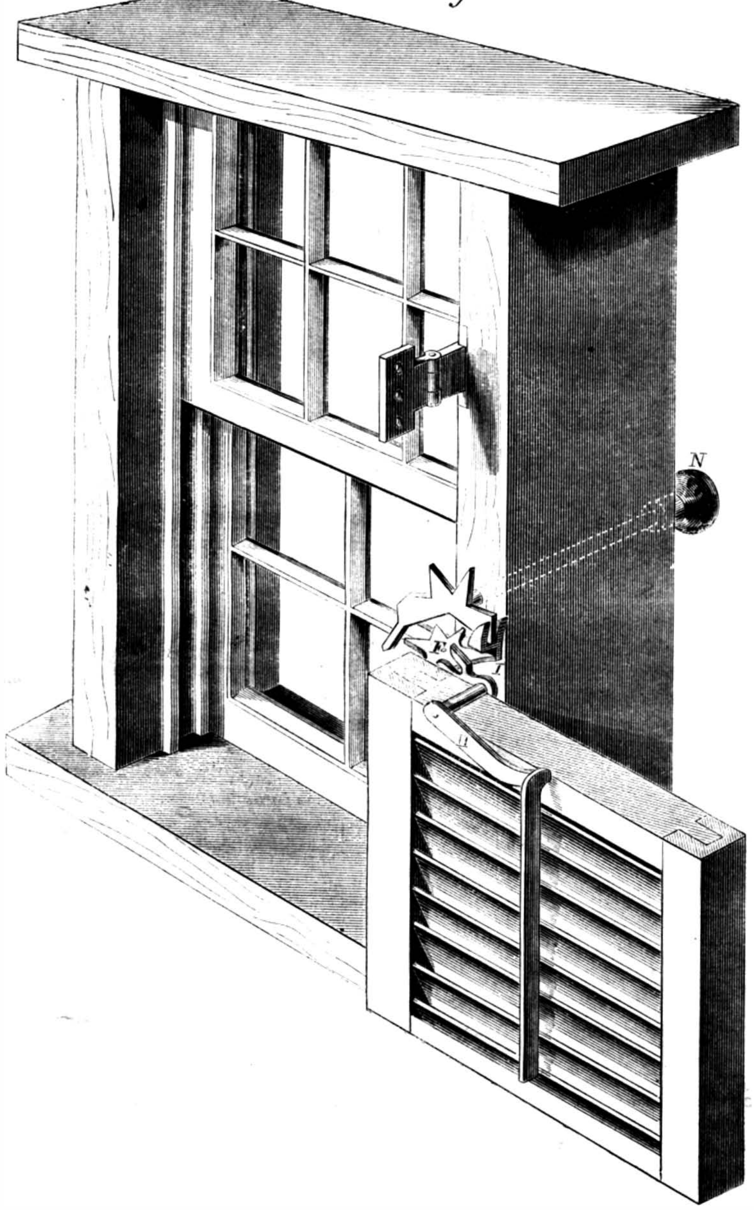
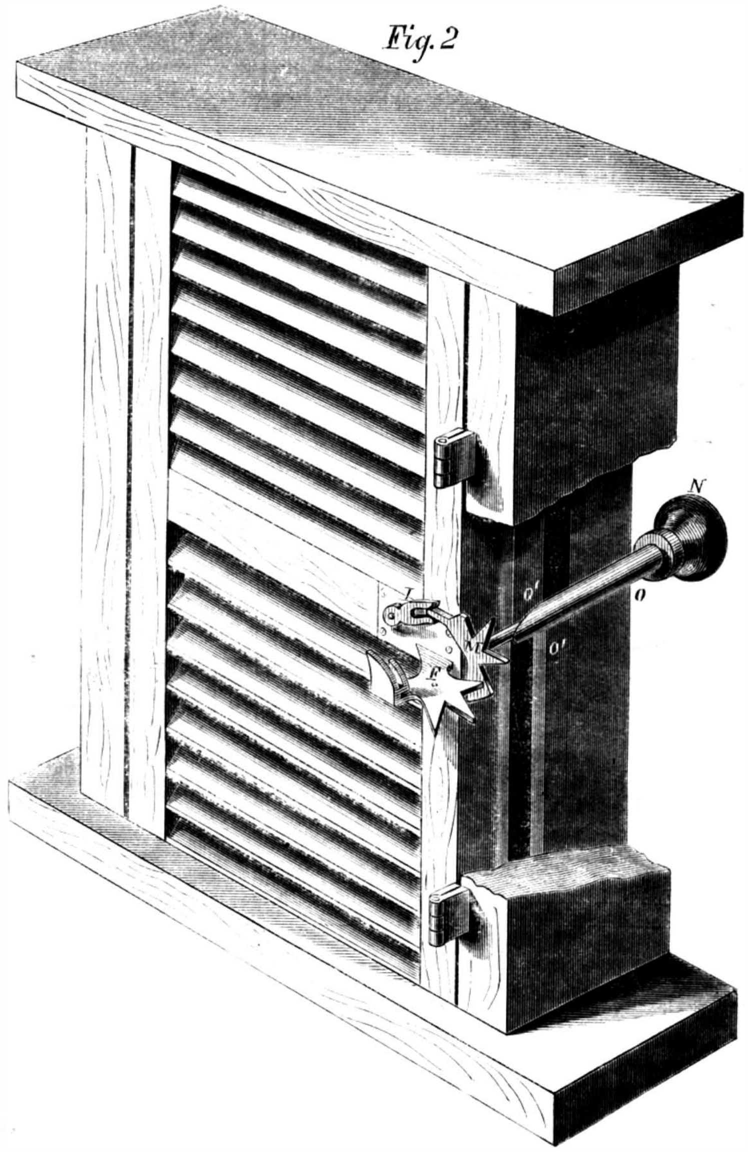


Fig. 2



HOUSE'S MODE OF OPERATING WINDOW BLINDS.

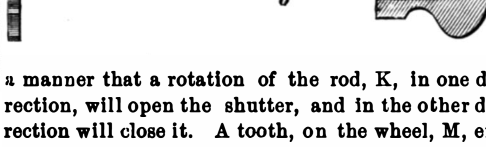
The want of a simple and effective contrivance for operating external window-shutters, without opening the windows, or exposing the person, or the interior of the room, to the weather, is universally felt.

The accompanying engravings represent an ingenious device for this purpose, recently invented by Mr. Edward P. House, of Washington, D. C.

Fig. 1 is a perspective view of a window, representing the shutter open, and a portion of it removed, to expose the operating mechanism. Fig. 2 represents the shutter closed, and a portion of the window-frame removed. Fig. 3 is a plan of the operating shaft, partly in section.

A knob, N, on the inside of the frame, is furnished with a screw thread on the end of a sleeve, O, so as to turn independently upon the said sleeve, but imparting an endwise motion thereto when drawn out or thrust in. On the end of the sleeve, O, within the frame, are flanges, *o' o'*, which fit in grooves in the upper and lower sash, so as to release either, or both the sashes, or secure them at any desired hight. A rod, K, extends completely through the window-frame, and fits a square socket in the knob, N, so that the knob may have longitudinal play independently of the rod, but will impart rotation thereto when turned. On the outer end of the rod, K, is secured a toothed wheel, M, which gears with a cogged segment, F, on the outside of the shutter, in such

Fig. 3



a manner that a rotation of the rod, K, in one direction, will open the shutter, and in the other direction will close it. A tooth, on the wheel, M, engaging behind a tooth on the segment, F, holds the shutter in either position, and prevents it being moved from the outside.

The plate, F, and the wheel, M (the only portions of the device exposed to the weather), can be covered or placed within the framework of the window, and inside the shutter, if desirable, to secure it from the weather. By the partial rotation of the wheel, M, one of the bent arms or cogs comes in contact with a forked arm, I, attached to the lever, H, so as to open or close the slats without interfering with the shutter, or raising the sash—a convenience not obtained in any other device patented. The neck of the knob, N, passes into a square recess, O', in the window-casing, to give it a neat finish, assist in locking the shutter, open or closed, and prevent its being operated from the outside. It will thus be seen that the operations of opening, shutting and locking the shutters, fastening the sash, and opening or closing the slats, are all performed by means of a single knob within the house, which can be used to hang the curtains on, and is in itself an ornament. All styles of patent hinges, sash-fastenings, bolts, locks, clasps, &c., now used about a window, except the common butt hinge are dispensed with. This improved device is all that is required to operate shutters, &c., and it can be furnished at about the same cost as those in common use.

This improvement can be readily attached to windows of houses already built, as well as to new ones. The patent for this invention was procured through the Scientific American Patent Agency, on May 26, 1863, by Edward P. House Further information can be had by addressing William T. House, agent, Box 1,004, Washington, D. C.

DISCOVERIES AND INVENTIONS ABROAD.

New Jeweller's Alloy.—A patent for a new metallic alloy has been taken out in England by A. L Woolf, of Birmingham. It is composed of 90 parts of copper, 5 of aluminum and 2 of gold ; all by weight. It is stated that, in making this alloy, the metals are simply placed in a crucible, and when fused, they immediately combine and form the composition, which is malleable, ductile, and can scarcely be distinguished from gold by its color.

New Composition for Matches.—J. W. Hjerpe, W. Holmgrew and A. V. Sanstedt, of Stockholm, Sweden, have patented a match composition, consisting of chlorate of potash, 5 parts ; bichromate of potash, 3 parts ; oxide of lead, 1 part. These ingredients are ground together in a solution of gum arabic, to form a paste ; and the splints, previously prepared with sulphur, are dipt into it and dried. They will not ignite unless rubbed upon a rough surface of emery or ground glass. The object of this composition is to dispense with the use of phosphorus in making matches.

India-rubber Shirt Collars.—Linen, cotton, paper and steel collars are now made ; and to these vulcanized India-rubber collars have been added, by W. J. Smith, of Sale, England, who has taken out a patent for them as a new article of manufacture. He states that suitable patterns may be painted or printed on the collars, either before or after they are cut from the sheet ; and they may be made white, or colored, or embossed. Cuffs and wristbands may also be made of the same material.

Glass Tiles.—A patent has been taken out by G F. Blumberg, of London, for making glass tiles (shingles), which may be employed for roofing, or for paving, in a similar manner to thin marble slab flooring. Iron molds of the size desired for the tiles are used, and the molten glass is poured into these and pressed ; then removed and annealed. These glass tiles, or slabs, may be formed of any size and shape.

New English Naval Gun—Several powerful muzzle-loading guns for the navy are about to be constructed at Woolwich. The interior or tube, is to be made of a solid block of steel, which is to be bored out, and over this a heavy solid forging of wrought-iron is to be shrunk. The steel tubes for these guns will be tempered in oil, as it has been found that steel so tempered is more tough and enduring than that tempered in water.

Railway-wheels.—A new method of making railway-wheels to insure greater safety in case of the fracture of the tire, has been introduced by E. B. Wilson, of London. Two steel disks of the desired size are first prepared, by casting them in molds. These disks are afterwards placed in suitable dies, and compressed, to give them the desired form, and to raise an annular rim around the circumference, on one side, each rim being V-shaped. The tire for the wheel has corresponding annular grooves, formed inside of it, so as to fit accurately over the rims of the two disks : thus holding them firmly together. The space between the two disks is filled with india-rubber, cork, or any other deadening material. We have lately seen some splendid imported English tires, stamped out of solid Blænavon iron. They are stated to be more durable than welded tires.

Railway Signals.—A peculiar railway signal, invented by Edward Funnel, of Brighton, England, has been in successful operation at the junction on the London, Brighton, and South Coast Railway for the past year. It consists of a hollow cast-iron pillar, fixed near the left-hand side of the rail, on the top of which is a dial-plate about four feet in diameter, divided to mark the time of ten minutes on the lower half of the dial—five red spots on the right indicating danger, and five green spots on the left indicating caution ; besides which it has an indicator hand which moves from left to right, and *vice versa*. On the upper portion of the dial is a fixed lens, through which the different colors for night and fog signals are shown by the aid of a gas lamp. Mechanism is secured on the top of the pillar, behind the dial, consisting of clock work, and a quadrant-shaped disk, on which are fixed the red and green glasses. The working of the apparatus is as follows :—The first wheel of a train of cars depresses a lever placed inside of the left-hand rail, and moves the indicator through a rod, replacing the red light, for the danger signal ; which remains locked until the last carriage has passed. The pendulum then vibrates for ten minutes, and the hand or indicator gradually returns to its former position, upon which the red light disappears, and is succeeded by the green light signal, at the end of five minutes. Ten minutes after the train has passed, the green light disappears, and the white signal of safety is shown, which remains until another train passes. These are automatic time-signals, and may be set for ten, fifteen, or twenty minutes, between the times of passing trains. If gas-light were laid along railway tracks, such signal posts might be arranged one mile apart, thus providing a series of illuminated signals along the whole route.

Composite Soap Patents.

The following constitute the substance of two patents granted for composite soaps :—Patent for soap granted to W. L. Dawson, of Lynchburgh, Va., on April 9, 1861 :—strong potash lye, 75 pounds ; tallow, 75 pounds ; cocoa-nut oil, 25 pounds. Boil until the compound is saponified in the usual manner.

To make 30 pounds of the new composition, take 2 gallons of boiling soft water in a kettle, add half a pound of sal soda, 2 ounces of borax, 2 tablespoonfuls of spirits of turpentine, and 1 teaspoonful of linseed oil. Stir this mixture until the borax and soda are dissolved : then add 15 pounds of the above soap made from lye, tallow and cocoa-nut oil ; and continue the boiling with stirring for fifteen minutes, until the whole is incorporated and dissolved. Now add 2 ounces of the spirits of hartshorn, and stir. It may be scented with any essential oil, or odor, and colored, if desired : then run off and molded into cakes fit for toilet use. It is a good soap for chapped hands, and is free from any disagreeable odor.

Patent for soap, granted to Henry Warren, Goshen, Ind., on Sept. 3, 1861, called "Warren's compound chemical soap," 2 gallons of water; when boiling, add 8 pounds of Brown's opodeldoc, shaved fine, three-quarters of an ounce of alcohol, half an ounce of spirits of turpentine, half an ounce of ammonia, 2 ounces of sal-soda, 2 ounces of borax, 1 ounce of spermaceti ; boil until all is dissolved ; color red, with Chinese vermillion ; blue, with ultramarine. This makes 24 pounds of soap. Pour it out into frames and it becomes solid in three weeks. Brown's opodeldoc is an article of common manufacture.

Safety Valves for Boilers.

At a coroner's inquest lately held at Bilston, England, upon the bodies of five persons who had lost their lives by the explosion of a boiler, Mr. T. Holcroft—an engineer—suggested that it would add to the safety of steam-boilers, especially where more than one is employed, if in addition to the usual safety-valve, one of larger dimensions was placed on the steam pipe, with a screw or weight upon it, convenient to the engineer to ease the pressure of steam during any stoppage of the engine. A great number of explosions occur just when engines are started after a limited stoppage ; because in such cases, they rapidly accumulate an extra pressure of steam owing to the intense heat of the fires under them.

Commerce of New York.

During the six months from the 1st of January last, the total of our exports from this city to foreign ports was $87,793,180 ; greater by more than twenty-five millions, than it was in 1861 for the same period, and twenty-eight millions more than in 1862. So that in spite of the war our industrial products for export have actually increased in value and amount, so far as the business of this port is an indication of its increase. We have also during the fiscal year ending June 30th last, parted with $52,-000,000 in specie and bullion, against $20,000,000 in 1862 ; and yet its price has rapidly declined to a comparatively low figure, and it is estimated that we have actually among us, in the banks and in vate hands, more than five hundred millions, w on the resumption of specie payments will come sight and enter into circulation.

Two-thirds of the increase is derived from the mestic produce of the Atlantic States. The t value of imported goods for the year ending J 30th, is $180,000,000. The total value of expo domestic produce for the year being $186,722,000.

The Magnesium Light.

The metal magnesium burns with a most brilliant white light ; and, could it be obtained in sufficient quantities, at a low cost, it might, for many purposes, be substituted for the calcium light. The following on this subject is from the *Photographic News* (London) :—

"We have, on several occasions, drawn attention to the metal magnesium, and have expressed a hope that some day it could be obtained in sufficient quantity, and at a sufficiently low price to render it available for the uses of the photographer. The wonderfully brilliant light which is produced by its combustion, the absolute innocuousness of the evolved products, and the ease with which the light can be obtained at any time, with no more trouble than is required to light a candle, all tend to show that the perfection of artificial photographic light would result from the burning of this metal in a properly arranged lamp. Many attempts have been made, with varying degrees of success, to introduce an artificial light sufficiently powerful to enable photographs to be taken by its means at night, or in dark caverns, where no photography would otherwise be possible ; and, in many cases, fair success has been met with. The light evolved by all such pyrotechnic mixtures is, however, very feeble, as compared with sunlight, unless an inordinate amount of material be employed ; and, in this case, the fumes evolved are difficult to remove readily from the place where the light is produced ; but unless they are perfectly removed their poisonous character makes them very dangerous. The magnesium light would be superior in both these respects. A thin wire simply held between the fingers, can be lit as easily as a piece of paper, and burns like a candle ; producing a light which is, according to Bunsen's estimate, only about thirteen times less intense than actual sunlight. No injurious fume is evolved during the combustion. A light white smoke is seen rising from the metallic flame ; but this is nothing but magnesia, and is quite harmless. Moreover, the greater portion of the magnesia remains behind, as a friable solid, retaining somewhat the shape of the original wire.

We believe an arrangement of lamp for the magnesium light has already been devised. A spool of wire is gradually unwound, the end being pushed horizontally into the flame of a spirit lamp, where it ignites and continues to burn as long as it is fed with wire. It is in this feeding that the great difficulty has resided. Although it has long been well known—thanks to the labors of Deville and Caron—that magnesium could be procured even easier and at a less price than aluminum, by a slight and obvious modification of the apparatus used to prepare the latter metal, no one cared about risking the necessary outlay requisite to procure the metal in large quantities, when there was a doubt as to whether there would ever be sufficient demand to make the manufacture pay. In the *Comptes Rendus* for Feb. 23, 1857, Messrs. Deville and Caron give a detailed paper on the preparation of magnesium, in which they say that it can be prepared by the process employed for aluminum, which, however, must be slightly modified, as magnesium is lighter than the scoria from which it is produced. A mixture of chloride of magnesium, chloride of sodium, and fluoride of calcium is made, and finely powdered. Sodium, in fragments, is then added and intimately mixed with the chlorides, and the whole is thrown, by means of a little iron spatula, into a red-hot earthen crucible, which is then closed with its cover. In a short time the reaction takes place. When all noise has ceased, the crucible is uncovered, and the mixture is stirred with an iron rod until the globules of magnesium are distinctly seen. The crucible is then allowed to cool, and when the saline mass is ready to solidify, it is again stirred with the iron rod, which collects the separate lumps of magnesium into one mass. The metal is then distilled in a current of hydrogen, and then fused in a flux composed of chloride of magnesium, chloride of sodium, and fluoride of calcium. The latter is added to increase the fusibility of the bath.

"Messrs. Deville and Caron still worked at the subject, and more recently gave an improved process for the preparation of the metal, in which they recommend the omission of the alkaline chloride, and only use chloride of magnesium mixed with fluoride of calcium for the reduction by sodium, although they state that good results were also obtained by using a mixture of chlorides of magnesium and sodium. They give improved methods of separating the metal from the flux, and for melting and casting it into an ingot. Respecting the properties of magnesium, they describe it as a silver white metal melting at about the same temperature as zinc, and like it boiling and distilling at a higher temperature. Like zinc it also takes fire and burns at a temperature a little above its melting point. The density of magnesium is 1.75. In the crude state it is brittle, but by distillation it is rendered pure and ductile."

NEW BOOKS AND PUBLICATIONS.

THE ATLANTIC MONTHLY. Published by Ticknor & Fields, Boston, Mass.

The August number of this valuable magazine is before us, and contains a varied table of contents, which, as usual, fully sustains the high position it has achieved in the world of letters. The leading article, "An American in the House of Lords," is written in a pleasant chatty vein, which does not appal the reader at the outset so much as its title would lead him to expect. "The writings of Theodore Winthrop" receive commendation at the hands of some generous critic; and "Wet Weather Work," by Donald E. Mitchell, with several poems, comprise the volume.

SIGHTS A-FOOT. By Wilkie Collins. Published by F. A. Brady, 24 Ann street, New York.

Those who have read the thrilling tales by this English author re-published in this country, will at once seize this book and peruse it with the expectation of finding the vivid and powerful descriptive talent which he possesses fully carried out. They will not be disappointed: and at this season of the year the pictures of country life and rural scenes generally, afford the means of whiling away many a pleasant hour beneath some shady tree.

TIGER SLAYER. By Gustave Aimard. Published by F. A. Brady, 24 Ann street, New York.

Those who find romantic sketches of field life and sports interesting, will be repaid by a perusal of this work.

PORTRAIT MONTHLY OF THE "NEW YORK ILLUSTRATED NEWS." Published by T. B. Leggett & Co., 90 Beekman street, New York.

In such stirring times as we now live, when reputations are made in a few hours, and those who were celebrated win additional laurels, every person is anxious to have some idea of the forms and features of their heroes. The "Portrait Monthly of the New York *Illustrated News*" contains a great many portraits of generals and others, who have been prominently before the public of late; and from our acquaintance with some of the originals, we readily recognize their well-known features. The monthly is neatly bound in paper, and has a portrait of Washington on the cover, which sufficiently attests the character of the publication.

Remarkably Fast Time.

We learn that the steamship *Columbia*, on her last trip from New Orleans to New York, made the run in the very short time of five days and twenty-one hours. We have not the proper data at hand, but believe this is the best time yet made between the two cities. The *Columbia* has long been known as a fast ship; and unless some of our steamships look to their laurels, she will take her place as the swiftest

To this may be appended the recent performance of the British steamer *City of New York*, which is said to have made her last voyage across the Atlantic in eight days and 23 hours. The latest and best time, however, has been achieved by the Cunard mail steamer *Scotia;* which arrived at this port on the evening of the 27th ult., in the short space of eight days, from Queenstown, Ireland. The *Scotia* sailed from Liverpool on the 18th, and Queenstown on the evening of the 19th; and she would have been in one day sooner, as we learn from one of the passengers; but was detained by a dense fog when off Cape St. George—on the west coast of Newfoundland.

Launch of the "Onondaga."

The iron-clad battery *Onondaga* was launched from the Continental Works, at Greenpoint, L. I., at half-past eight o'clock on the morning of the 29th inst. The *Onondaga* is known in naval circles as the "Quintard battery," so called from the gentleman who contracted for her, Mr. George W. Quintard, proprietor of the Morgan Iron Works. She is 230 feet long, 52 feet wide, and will have two turrets on the *Monitor* pattern, with the exception that a part of the turret is composed of heavy plates, instead of consecutive layers of thin ones, as in all the other *Monitors*. The *Onondaga* is also peculiar in her side armor, which consists of heavy single plates 4½ inches thick, faced with timber 13 inches thick, which is in turn covered with an iron plate 1 inch thick. The deck is laid with plating amounting to two inches in thickness; and the rest of the vessel is very similar in general arrangement to others of the same class. The propelling power is two pair of horizontal back-acting engines, each driving a screw under the quarter. The *Onondaga* has no overhang forward and but little aft, and it is thought will prove a good sea boat. The vessel was launched very successfully, going down the ways with great rapidity, and running far out into the river. The turrets are not yet placed on board, but are ready for erection. The rest of the machinery is all on board.

French and English Photographers.

The editor of the *Photographic News* (London), alluding to the impressions produced upon his mind on a recent visit to an Exhibition of Photography in Paris, says:—

"In comparing the photography of Paris with that of London, we are not struck with any superiority in the former over the latter, except in one particular. The best French photographers do not excel in any respect the best English photographers; we are not sure that we saw anything in Paris, which of their kind equalled the whole plate vignettes of Mr. T. R. Williams; but in universality of excellence, Paris takes precedence of London. There are more good photographers—a greater number whose works are uniformly excellent, than there are in our own metropolis. We are now speaking of portraiture: in landscape and some other departments, we have no hesitation in claiming the palm for English photographers. Indeed, we have good reason, nationally, to be satisfied with our position in the present exhibition. There are not more than half-a-dozen English exhibitors, but the very highest position in several departments is unquestionably occupied by Englishmen. The best landscapes exhibited are by Mr. Maxwell Lyte: the best instantaneous pictures, by Colonel Stuart Wortley; the best reproductions by Mr. Bingham; the best composition picture—perhaps the best picture of any kind in the exposition, by Mr. Robinson. Nothing can exceed the beauty of some of the instantaneous transparencies of Messrs. Ferrier and Soulier; but they are produced by English lenses, and some of the instantaneous street scenes on paper by other photographers, are not comparable with those of Wilson, England, or Blanchard.

"But in every department of portraiture there are fewer bad pictures in the Exhibition than are found amongst the productions of some of our own professional photographers. Some of the first portraitists, as we have observed, do not exhibit."

MORTALITY IN ENGLAND.—In the ten years, 1851–60, the annual mortality in the districts comprising the chief towns was 34.57 per 1,000 living; in the districts comprising small towns and country parishes, 19.77; in all England, 22.24. The deaths of males averaged 23.18 per 1,000 living; of females, only 21.34.

MISCELLANEOUS SUMMARY.

WE learn that Mr. D. L. Miller, Jr., of Philadelphia, is loading a cargo of crude petroleum, in bulk, for Liverpool, which is the first ever carried in that way. The vessel is fitted up with an exclusive view to carrying oil in bulk (of which it is expected she will take 50,000 gallons), and provided with twelve immense iron tanks, most of which are divided into two compartments, the lower of which may be filled and secured first. The barrels of oil are emptied directly in the tanks, and when unloaded it is pumped out. Of course the peculiar construction of the vessel unfits her for any other than the petroleum trade, and necessitates her returning from Liverpool in ballast, for which the tanks are partly filled water. We understand that in case this experiment proves successful, it is the intention to build other and larger vessels, on the same plan; but the fact that they cannot carry return freight will, in our judgment, render them unprofitable.

THE RIGHT OF TRADESMEN TO TEST MONEY.—An action was lately tried in one of the London courts, to recover damages sustained in consequence of defendant having broken a half-sovereign while testing it. Plaintiff stated that he went to defendant's shop to buy some plants, and he handed a half-sovereign to defendant, who put it between his teeth, and deliberately broke it in half. He gave the pieces back to plaintiff, remarking that it was bad. Plaintiff, however, was convinced that it was good, and he had it properly tested by a chemist, who said it was perfectly good. The pieces were then again offered to the defendant, who refused to accept them, and told plaintiff he could try the question, if he were so minded. The judge said the defendant had acted most unjustifiably: a tradesman must apply sure and gentle tests to the coin of the realm. A verdict was given the plaintiff, for 10s. damages and costs.

A SMART CANADIAN VILLAGE.—The village of Hastings is situated on the River Trent, a few miles from Rice Lake, C. W. Three years ago there were some dozen houses in it; now there are over one thousand inhabitants, two four-story factories—one cotton and one woolen; two large saw mills, grist mill and tannery, and ten stores; altogether, it is quite a thriving village. The cotton factory is called the Trent Valley Mills; it has 30 looms, and turns out about 8,000 yards of grey cotton per week. The same firm have a small factory, where they knit gentlemen's underclothing, vests and pants.

POPULATION AND TAXATION.—A parliamentary return, just published, shows that in 1801–2 the population of Great Britain was 10,500,956, and the gross revenue £35,218,525, or £3. 7s. per head. In 1761–2 the population was 23,128,518, and the revenue £61,360,749, or £2. 13s. per head. In Ireland, the population in 1801–2 was 5,216,331, and the revenue £2,919,217, or 11s. 2d. per head; in 1871–2 the population had only increased to 5,798,967, while the revenue had sprung up to £6,792,606, or £1. 3s. 5d. per head.

PROPERTY RECOVERED FROM THE SCENE OF THE RIOTS.—Large quantities of goods of all kinds are found by the police in low tenement houses up town, where they were stored by the rioters. Also, large numbers of "innocent" persons appear who have miraculously found great amounts of jewelry, and who have had tables, chairs, sofas, and other fragile articles, thrust unwillingly upon them by the ruffians; these they have restored to the police authorities, who in turn call for the owners to appear, prove property, and take them away.

CREAM FOR CONSUMPTIVE PATIENTS.—The *Medical Reporter* says that a consumptive patient, now under treatment, is taking cream, with better effect than was experienced under the cod-liver oil, previously tried. Our advice is for all who have, or think they have, consumption, to adopt a cream diet. Eat the pure, sweet cream, abundantly, as much of it as the stomach will digest well, and we doubt not that it will prove quite as effectual as the purest cod-liver oil that can be bought.

M. ASRAVAIS, Professor of Geology at Strasbourg, has obtained a new metal from the mineral waters of Alsace. It is yellow like gold, but is soft as lead. It has been introduced among the Paris jewelers.

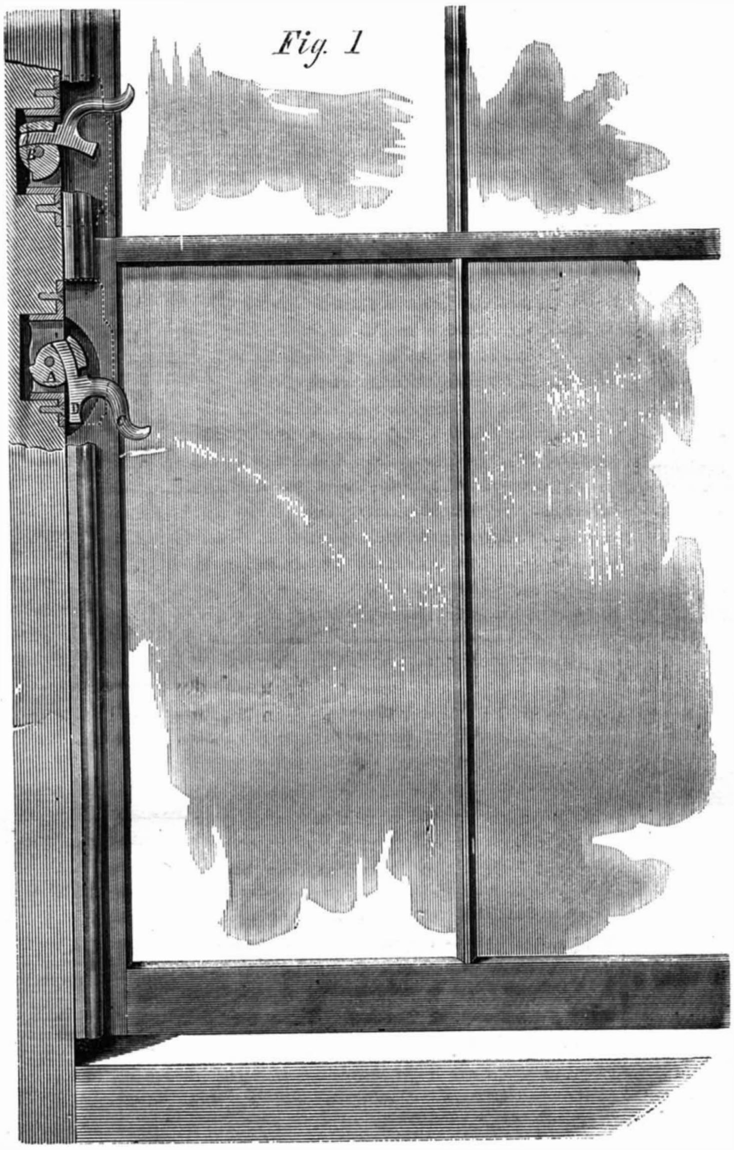
Improved Window-sash Supporter.

So many devices for supporting window-sashes have been brought before the public, that it seemed to be almost an impossibility to produce anything new in that line; and yet in the accompanying engravings we have the representation of one which is both novel and useful. It consists of a small cast-metal box, having an eccentric section-roller, and lever-catch; the roller being set in the run or jamb of the sash, and operated by the lever to lock the window in the desired position.

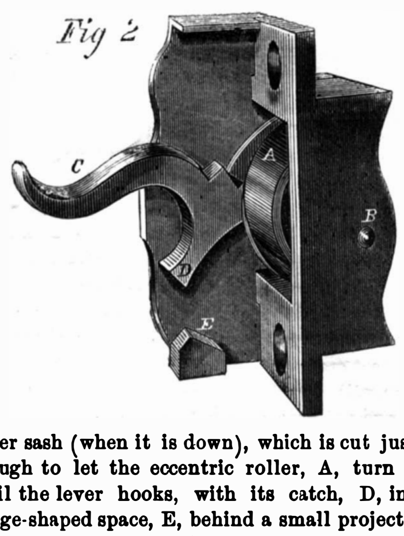
Fig. 1 is a front view of a window, showing a sash supporter in section, secured to the case for the upper sash; and another is shown secured in the case for the lower sash. A description of one will suffice for both; and a perspective view—nearly full size—is given of the supporter in Fig. 2.

The small box of the sash-supporter is let into the case, in the jamb of the case, and fastened with screws, as shown in Fig. 1. A is its small section eccentric roller, secured on the pivot, B, and C is its adjustable lever-handle, passing into a slot in the edge of the roller. This lever has a catch, D, upon it, which is pushed into the wedge-shaped space, E, in the face-plate of the box, and serves to lock the sash in the position desired, by preventing the eccentric roller from being turned.

When the lower sash is down, the lever, C, is turned down, so as to bring its catch, D, into the wedge space, E, which prevents the roller from moving, and the window is locked, as shown by the lower sash in Fig. 1. When it is desired to raise the window, the lever, C, is slightly pushed into its slot, thus relieving the eccentric roller; the sash is then raised, the roller, turning as it is elevated, and the window is held in any position, by the bearing against the sash-edge. The upper sash is operated in a manner similar to the lower one; and the window is locked securely, so that it cannot be opened from the outside even when the upper sash is left partly down; thus securing ventilation, while the window is locked. No notches are required in the style of the sash; and any man who can use a mallet and chisel, can put it on a window. It is only necessary to make a mortice in the left jamb of the window-case, for the upper sash, about three inches above; and one for the lower sash about three inches below the meeting rail; the flanges of the sash-supporter are then let in flush with the face of the jamb. About one-fourth of an inch is cut out of the window-strip, so as to fit over the face-plate; and a half-circle notch is made in the style of the lower sash (when it is down), which is cut just deep enough to let the eccentric roller, A, turn down, until the lever hooks, with its catch, D, into the wedge-shaped space, E, behind a small projection on the face plate. The sash is now fitted, and the window complete.



M'LEAN'S WINDOW-SASH SUPPORTER.



The patent for this sash-supporter was issued on April 21, 1863. For further information respecting it address Messrs. McLean and Campbell, No. 112 Wood street, Pittsburgh, Pa.

CAUSES OF ANIMAL HEAT.

The following extracts on a most interesting subject, are from a lecture delivered before the Royal College of Surgeons, England, by George Gulliver, F. R. S:—

"Soon after the discovery of oxygen by Priestley, in 1774, the very time of Hewson's death, just a century after the publication at Oxford of Mayow's tract, and seventeen years subsequent to the discovery of carbonic acid by the eminent Dr. Black, a consistent, or at least plausible, theory was formed on the subject. Black observed that carbonic acid is produced during respiration and combustion; and the chemical theory of the cause of animal heat made rapid progress. In short, that respiration was essentially a combustion of carbon, which combined in the lungs with oxygen, and formed carbonic acid, and at the same time produced animal heat, was the prevailing doctrine—indeed, the exclusive one on the subject. And no wonder, seeing that this conclusion was supported on the Continent by such eminent authorities as Lavoisier and Laplace, and in Britain by Black and Crawford. Recently, even Liebig, like some old writers, seems to maintain the same view, when he attributes animal heat to the burning of the carbonaceous part of the food, especially fatty matter, in the lungs.

"But a host of experiments and observations, in our day and before, show that the blood in the lungs cannot be the center or furnace for the production of all the animal heat; whatever may be the importance of the blood as a carrier of support and fuel for the combustion and other chemical changes concerned in the production of that heat. Mr. Hunter, Sir Benjamin Brodie, and Mr. Cæsar Hawkins, have given conclusive evidence, that respiration in the human subject may be preternaturally slow or imperfect, while the body is acquiring and maintaining a preternatural heat; and it is well known to practical surgeons, that the limb in which the artery has been tied for the cure of aneurism, may be for a while hotter than the other limb, which is still receiving its usual supply of arterial blood. That arterial blood is warmer by one or two degrees than venous blood, has been clearly established by Dr. Davy. He has proved that blood acquires heat in passing through the lungs—in other words, that the blood of the left ventricle is hotter than the blood of the right ventricle in the living body; the difference of temperature being from 1° to 1°.5 of a degree: a like difference existing between the blood of the veins and arteries, though somewhat diminishing as their distance from the heart increases. He has further shown that venous blood, agitated in a bottle with oxygen, acquires an increased heat of about 1°, and this, by combining with the oxygen, without the production, or at least evolution, of any carbonic acid. Hence, he infers that animal heat is caused by the fixation and condensation of oxygen in the blood: by its conversion from venous to arterial blood in the lungs: and by combination of this oxygen in its course through the body, in connection with secretion and other changes.

"Ludwig and Spiess found the temperature of the saliva, which flows when the nerves of the submaxillary gland are galvanized, 1° 8′ higher than the blood of the carotid artery of the same side; and they conclude that the work of secretion produces a notable increase of temperature, with a diminution in the formation of carbonic acid: the venous blood of the gland being almost as red as arterial blood. Nay, further, we have well-attested cases of an actual rise of temperature in the human body, unconnected with putrefaction, during the first hours after death; and, therefore, quite independently of the immediate agency of the nervous and respiratory functions. Dr. Bennett Dowler, of New Orleans, has reported cases of this kind in bodies dead from cholera, yellow fever, and sun-stroke; and though Dr. Davy, in his excellent work on 'Diseases of the Army,' has some doubts about these results, they have been confirmed, as far as regards cholera subjects, by M. Doyère, in Paris. But now, within our own immediate knowledge, thanks to the interesting experiments conducted by Dr. Sclater and Mr. Bartlett, we have the great female python at the Zoölogical Gardens, producing and maintaining a great increase of temperature during the act of incubation; and this, without taking any sort of food for upwards of a month. It would be curious to know how Professor Liebig would attempt to reconcile these unquestionable facts with his theory. Certain it is that here there has been no food or fuel put into the reservoir of the stomach, to be burned up for heat in the lungs, during this remarkable elevation and maintenance of temperature in the body. In short, animal heat is certainly produced elsewhere than in the lungs, whatever heat may be generated there, and however important they may be as receptacles for the elaboration of materials, to be distributed to initiate or assist in the chemical processes for the production and maintenance of that heat throughout the body.

"Sir Benjamin Brodie has made experiments which furnish proof that the nervous system is necessary to the production of heat. He removed the brains of several dogs and rabbits, and after having duly secured the arteries of the neck, and maintained the action of the heart thereafter for two or three hours, the bodies were found to cool even faster than the bodies of other animals killed at the commencement of the experiment, and laid in the same room for comparison. Yet the blood of these decapitated animals, thus made to breathe artificially, underwent the usual changes, just as in a living animal. The dark venous blood acquired the florid arterial hue in its passage through the lungs; as usual, too, oxygen was absorbed and carbonic acid evolved. Allowing for all possible errors in the observations and calculations, here was sufficient experimental proof that the then universal doctrine of all animal heat being produced in the lungs, must be abandoned. That specious and beautiful theory, so beloved by its authors, so long and fondly admired and cherished by those who had embraced it, had to be discarded. And so the conclusion becomes irresistible, that animal heat—whatever share the oxidation of the blood in the lungs may have in its production there, and some share it would appear to possess—must be generated elsewhere in the body. This is just what all the best subsequent and independent observations have peremptorily proved. Indeed, with these observations—and especially the experimental researches of Dr. Davy, which attribute the generation of a large share of animal heat, and different chemical processes in other parts of the body besides the lungs, to the consumption or agency of oxygen—Sir Benjamin Brodie's experimental results have always appeared to be in concord. Chemical changes, therefore, so far as they are dependant on the organic functions, in vertebrate animals, are under the presidency of the nervous system, or at least some part of that system."

THE MANUFACTURE OF CHEESE.

We were lately informed by a very intelligent farmer of northern New York, that the manufacture of cheese, when properly conducted, was a very profitable business; "but," he added, "there's more bad cheese than bad butter made, and there's more than enough of that." For some years past large quantities of the best American cheese have found a ready sale in Great Britain; in some sections of which cheese is used to a great extent as an article of daily food by both rich and poor. We have been credibly informed that almost all the best American cheese is exported—the inferior qualities being kept for home use. A few remarks on the subject will not be unprofitable at present, as this is the season when most of our farmers set about making cheese.

The principal substances in milk are the fatty butter parts—milk-sugar and casein. The latter is really the cheesy part; but cheese of the best quality likewise contains a considerable portion of the butter, and some milk-sugar. The cheesy portion of milk is separated from the liquid by coagulation—a chemical operation, which is performed to-day as it was hundreds of years ago. The mode of producing this result was undoubtedly an accidental discovery. It consists in stuffing the stomach of a sucking calf, an unweaned lamb, or a kid, with salt, and suspending it in a dry situation for several months. This prepared stomach, called the *rennet*, when steeped in water, produces a decoction which possesses the power of thickening milk—decomposing it, and separating the casein from the liquid or whey. The most convenient way to prepare the rennet for use is to place the stomach in a stone-ware jar with two handsful of salt; pour about three quarts of cold water over it, and allow the whole to stand for five days; then strain and put it into bottles. A tablespoonful will coagulate about 30 gallons of milk.

The milk of which cheese is made, is heated to about 90° Fah. To every 30 gallons, a tablespoonful of the rennet is added and stirred. In from fifteen to sixty minutes the milk becomes coagulated—the casein separating in a thick mass. The rennet possesses the chemical property of producing lactic acid, by acting upon the sugar in the milk. The acid unites with the soda in the milk, which holds the casein in solution; when the casein, which is insoluble, separates, forming the curd.

The quality of cheese depends chiefly upon the milk of which it is made; the best containing a considerable portion of the constituents of butter. The Stilton cheese of England, and the Brie cheese of France, have a world-wide reputation; and are made from fresh sweet milk, mixed with cream, skimmed from milk of the preceding evening. The Cheshire, double-Gloucester, Cheddar, Wiltshire and Dunlop cheese of Great Britain is made of sweet unskimmed milk; as is also the best Holland and American cheese. It is frequently made from milk obtained at two separate times, though it is believed that the best cheese is made from that procured at one milking; as it is supposed that cream, which becomes separated from cold milk after standing several hours, cannot be intimately mixed with the milk again; and that much of it will be removed with the whey. This is a very important consideration for those engaged in the production of cheese.

Skim milk yields nearly as much cheese as sweet milk, as it contains all the casein. The Dutch, the Leyden, and the hard cheese of Essex and Sussex counties, in England, are made of milk thrice skimmed. They are excellent for sharpening the teeth, and would try the temper of a good American axe.

In making cheese, a thermometer should always be used to test the heat of the milk, which should never be raised above 95° Fah., otherwise the curd will be hard and tough. If the milk is cold—much below 90° Fah.—the curd will be too soft, and difficult to free from the whey. Perhaps the best and safest way to heat the milk is in a tin vessel, placed in a cauldron of water heated to 95°, to which temperature the milk should be raised before the rennet is added. Whenever the milk is fully coagulated, the whey should be strained from it. In Cheshire—famous for its cheese—great attention is paid to the removal of the whey: which is done very slowly, and with slight pressure until the curd is pretty hard; the latter is then cut fine in a machine, and prepared for the press. The curd of the celebrated Stilton cheese is not cut at all; it is pressed very gently till all the whey drains out, so as to retain all the butter in it. In Belgium, a rich cheese is made by adding half an ounce of butter and the yolk of an egg to every pound of cut curd. About an ounce of the best salt is mixed with every two pounds of the cut curd, which is then placed in a cloth, secured in the cheese-hoop, and submitted to pressure. The quality of cheese depends on having all the whey pressed out; to do which it is turned upside-down several times, and allowed to remain in the press until no more whey can be got out of it. Cheese when taken from the press should be rubbed over the entire surface with good butter, and placed in a cool, airy room, upon a smooth, flat stone, or polished slab of marble, if possible. It requires to be examined and turned, daily, for some weeks afterwards, and occasionally rubbed with butter. Annatto is frequently employed to color the outside of cheese, but this is a practice which ought to be condemned. Cheese of an inferior quality may be inoculated to some extent with the flavor of any rich cheese, by introducing a small portion of the latter into the interior of the former with a common cheese scoop. Old cheese sells in England at several cents per pound higher than new cheese. It acquires by age that peculiarly sharp pungent taste so pleasing to the palate of the Britisher.

Railway Curves.

The following communication has been addressed to one of the London papers, by Mr. William Bridges Adams, the distinguished practical engineer and writer on mechanical subjects:—

On railway curves it is a practice to elevate the outer rail above the inner one, with a view to balance the centrifugal force by gravitation,—a practice that obtained on the highway curves in the old coaching days of high speeds, and which still obtains in the sharp curves of the amphitheater, where both horse and rider lean over towards the center at an angle corresponding to the speed.

But in the old coaching days the wheels on either side were enabled to vary their speed to suit the length of the curves they described, and the inner wheels made fewer revolutions than the outer. So, also, it will be found in the amphitheater that the inner legs of the horse make shorter strides than the outer. Otherwise the animal would be driven against the barrier—his leaning inwards notwithstanding.

On a railway, wheels proper, *i. e.*, revolving independently of each other on the same axle, are not used, but there is a contrivance intended to produce a compensation, The periphery of each wheel is coned, or has a varying diameter, largest internally, and smallest externally. Theory says that the centrifugal force tends to drive the wheels against the outer rail, and so bring the larger diameters into action thereon, and the smaller diameters into action on the inner rail, thus producing compensation and curvilinear movement.

But theories are not sound when they do not take into account all the data which may affect them. If the play or width between the rails, *i. e.*, the gages, be not wide enough for endlong movement of the axle, this conic compensation is defeated. And, if the axle be so fixed in a long carriage or engine that, while going round a curve, it cannot point to the center of that curve, the compensation will be imperfect. The actual condition on almost every curved line, whether the proposed curves of the engineer, or the multiplicity of short and sudden curvatures and variations of rail surface induced by wear or imperfect workmanship—the actual condition involves both the defects—wrong position of the axle, and wrong diameter of the wheel.

The result is that the wheels become, not rollers, but sledges; and induce that grinding vibration which physicians object to for their nervous patients, and the existence of which is ignored frequently by those said to be experts.

The proof—centrifugal force and inward gravitation are nicely calculated and balanced by engineers to determine the exact elevation of the outer rail above the inner due to each curve. Theoretically, the weight of the engine leaning inwards should tend to grind the inner rail, but the exact opposite is the constant fact. The inner edge of the outer rail is ground away and polished, even when on a curve of 600 feet radius; the outer rail is elevated 6 inches—equal to an incline of one in nine.

The mechanical reason for this is that the inner wheels, running in diameters too large for the path of the inner rail, are acting with an outward thrust that wholly overpowers the gravitation inwards: that very gravitation tending to increase the bite or adhesion of the inner wheels, and to force the lighter loaded outer wheels to "skid," and slip against the outer rail with a force tending to burst the fastenings by the flange action. If, under these circumstances, there be a yielding or sinking of the inner rail, the adhesion of the inner leading wheel will be lessened, and the flange force of the outer wheel will be increased, tending to throw the engine off internally. If, on the contrary, there be a yielding or sinking of the outer rail, the flange force will be weakened, and the adhesive force of the inner wheel will tend to throw the engine off externally.

Other things being equal, the greater the length of the wheel base compared with its breadth, the steadier the engine will run on straight lines; but the greater will be the risk of its getting off the rails on curves, unless provision be made to keep the axles true to the curve centers, and to adjust the diameters of the wheels to the respective lengths of the rails.

Such provision is not made—is scarcely thought of being made—and as a general rule would be thought a heresy, would be objected to, and yet herein lies the whole of that "mystery" so frequently adverted to, as the solution not to be comprehended, when railway accidents occur, by engines getting off the line.

All railway practice is full of the proof. Why do rails glisten? Why do the treads of wheels work into deep hollows? Why are wheel flanges cut to the sharpness of knife-blades? All this is proof positive of sliding friction, and not of rolling.

And now to the proof negative. A resident railway engineer applied to four engines running on a line of sharp curves and steep gradients, four classes of tires of different qualities, varying in price from £72 per tun to £25 per tun, representing thereby their various degrees of durability. To three of the engines the wheels were applied on the usual mode with the best tires. To the other engine, working under far more unfavorable circumstances, the lowest class tires were applied, so that the wheels obtained compensation in curves. The result was that the inferior tires exhibited about two-and-a-half times the durability of the best. And, as action and reaction between tire and wheel must be equal, the saving on the rails must have been proportionate to the saving in tires, *i. e.*, the seven years' duration grew into seventeen, so far as that engine was concerned.

So much for the pecuniary advantage in wear. Yet this pecuniary advantage represented also a corresponding element of safety. Possibly, this practical fact, still only a portion of what is needed, may, in process of time, and by the help of accidents, grow up into recognition; and, like the grain of mustard seed in the parable, become multiplied till that source of railway accidents disappears.

Correspondence

The Barometer as an Indicator of the Weather.

MESSRS. EDITORS:—Dr. Comstock, in his "System of Natural Philosophy, designed for the use of Schools and Academies," says:—

"The following indications of the barometer with respect to the weather, may be depended on as correct, being tested by the observations of the author:—

"1. In calm weather, when the wind, clouds, or sun, indicate approaching rain, the mercury in the barometer is low.

"2. In serene, fine, settled weather, the mercury is high, and often remains so for days.

"3. Before great winds, and during their continuance, from whatever quarter they come, the mercury sinks lowest, and especially if they come from the south.

"4. During the coldest, clear days, when a gentle wind from the north or west prevails, the mercury stands highest.

"V. After great storms, when the mercury has been lowest, it rises most rapidly.

"It often requires considerable time for the mercury to gain its wonted elevation after a storm; and, on the contrary, it sometimes rains without the usual corresponding change in its altitude.

"7. In general, whether there are any appearances of change in the horizon or not, we may prognosticate rain whenever the mercury sinks during fine weather.

"8. When it rains with the mercury high, we may be sure that it will soon be fair."

I also find an article copied from *Chambers' Journal*, as follows:—

"Many private persons consult the barometer, and even set it daily, and are surprised to find that they cannot rely on its indications; especially on those of the unscientific wheel barometer, with a face like an underdone clock. The fault, however, is not with the instrument, but with those who use it improperly; 'th' ap'aratus,' as Salem Scudder observes, 'can't lie.' A few words on the practical use of the weather-glass may be found useful. It is an invaluable fact, and too often overlooked, that the state of the air does not show the present, but coming weather; and that the longer the interval between the barometric signs of change and the change itself, the longer and more strongly will the altered weather prevail; so, the more violent an impending storm, the longer warning does it give of its approach. Indications of approaching change of weather are shown less by the height of the barometer, than by its rising or falling. Thus, though the barometer begins to rise considerably before the conclusion of a gale, and foretells an improvement in the weather, the mercury may still stand low. Nevertheless, a steady hight of more than 3 inches is mostly indicative of fine weather and moderate wind. Either steadiness, or gradual rising of the mercury, indicates settled weather; and continued steadiness, with dryness, foretells very fine weather, lasting some time. A rapid rise of the barometer indicates unsettled weather; a gradual fall of one-hundredth of an inch per hour, indicates a gradual change in the weather, and moderate rising of the wind; several successive falls, to the amount of one-tenth of an inch, indicate a storm eventually, but not a sudden one; and a gale if the fall continues. These storms are not dangerous, as they can be long foretold; but a sudden fall of one-tenth of an inch betokens the quick approach of a dangerous tempest. Alternate rising and sinking (oscillation) indicates unsettled and threatening weather."

The above quotations are about fair samples of the rules laid down by the scientific as guides for the unscientific, in using the barometer as an indicator of the weather.

If the above rules are based on scientific principles, why is it that during the protracted dry weather at the end of last spring, and commencement of the present summer, the barometer ranged generally low? and why is it, since the present wet spell of weather commenced, and during its continuance, so far, the barometer has ranged higher? If—as Dr. Comstock says:—In serene, fine, settled weather, the mercury is high, and remains so for days; and that during the coldest clear days, when a gentle wind from the north or west prevails, the mercury stands highest; and if, as *Chambers' Journal* says:—"Th' ap'aratus can't lie;" and a steady hight of more than 30 inches is indicative of fine weather—why is it that the barometer rose on the 4th of February last to 30.95 inches—the highest for several years—with a cloudy atmosphere; and on the 5th, a north-east snow-storm commenced, barometer 30.87 inches; and on the 21st of the same month a violent storm commenced, the barometer being at 30.70 inches: which has been reported as defeating the plans of General Burnside at Fredericksburg; and that most of the storms during last winter and spring commenced with a heavy atmosphere—or, the barometer considerably above 30 inches?

It is very important in this day of science, of improvement, and of general knowledge, that a set of rules, based on scientific principles that can be relied on, be laid down for the use of the learner; more especially is it important that a set of rules not based on these principles should not go out to the world, to be taught in our schools and colleges! Can you or your readers furnish such rules? D. P.

Salem, N. J.

Compressed Air as a Motive Power in Street Railways.

MESSRS. EDITORS:—The peculiar need of the underground railway in London has recently occasioned some discussion in a Committee on Art and Science, of which D. K. Clark and John Braithwaite are members. As it is difficult to ventilate the tunnel in which the railway is laid, steam and the gases from fires are inadmissible. Mr. Clark suggested that either water heated at stations to so high a temperature as to give off steam of sufficient pressure on the way, or compressed air, might answer the purpose.

Mr. Braithwaite thought that compressed air would do well; referring to its use in the Mont Cenis tunnel, and to the experiments of Arthur Porsey, about 1848, as confirming this view. As Messrs. Clark and Braithwaite are engineers of high authority, and probably well informed as to the results of experiments on compressed air by Porsey, Von Rathen, and others in London, their recommendation entitles this motive agent to the consideration of those who seek an agreeable motor for open streets, and doubt that steam will be entirely satisfactory.

As a speculation for inventors and engineers, an attempt to introduce compressed air, or to refine steam, is not eligible unless new elements of the invention, of great efficacy, can be patented; or equivalent arrangements of another kind can be obtained. The object of this note is to inquire what new elements may be available; and what encouragement there may be to perfect the old parts of the invention.

I know of two new inventions of details which I think will contribute to such superiority as may make it profitable to produce a street motor. But to make the undertaking as promising as it should be, all the new improvements should be combined, and the engineering talent of the nation be united to perfect and utilize them; and there should also be ample capital. How such union can be effected is the question not settled. I do not believe it can be done by bargaining beforehand about the value of plans, or improvements, or engineering services; the only practicable way, it seems to me, is for each to contribute to a common stock his improvements, counsel, money, or whatever else he has to spare; and to keep a record of all contributions; and when there is profit, to appoint judges to divide it according to merit. The record, and the machinery that has proved successful, and all other considerations bearing on the case, would enable the judges to divide more justly than interested parties could bargain about untried inventions.

Were the invention new, and patentable as a whole, such an uncertain way might be at once rejected by all concerned. But it is old, and there is little hazard of pecuniary loss in contributing whatever new ideas may arise pertaining to it. Under such circumstances it may be practicable to form—first, a union of those who can add to the invention; second, if they can produce promising plans, to bring into the union engineers whose abilities will perfect the construction, and whose names will attract capital.

If there be no profitable result from conferences among inventors who have new ideas on this subject, there is not likely to be loss; and there may be scientific interest. On this moderate ground I would request communications on the subject to myself personally.

The problem, as I understand it, is to produce a motor on wheels, that can do all the work in streets, and make no dust or offensive exhalation. Such a motor will bring in smooth iron pavements and sidewalks; and no dirt will be made by vehicles or motors. If this problem can be solved, or if engineers unanimously recommend the plans proposed as likely to solve it, it may be expected that capital will be provided.

J. K. FISHER, 80 Broadway, Room 5.

[We think the day of self-propelling vehicles for common use in our streets very far distant; but the necessity of some substitute for horse power on our city railroads is immediate and urgent. If there are those who conceive that confined, or compressed air is an efficient agent in street-car propulsion, let them build a car and put it in operation; and the failure or success of the scheme will soon be apparent to every one. "Put it to the touch, and win or lose it all;" that is the only way. Resolutions, and meetings, and unions, are of no earthly utility. Build the car; obtain permission from the city authorities to run it for a day, or a week; and let the public ride for the usual fare. If it is liked, the car will be crowded; if disliked, all the powers on earth cannot make it popular or successful. It is time some energetic action was taken in this matter. Only show railroad companies that they can make money by the change, and horses will soon be discharged and mechanical means substituted on city railroads. Half a dozen fortunes lie in this thing for any one who goes at it with a will.—EDS.

Heating of Propeller Shafts.

MESSRS. EDITORS:—Most of the steam propellers in the navy, have cranks forged solid in the shafts which are subject at times to heat, and cut or tear the crank-pins, leaving them rough and slightly oval: which makes them still more liable to heat, when the engines are driven at full speed, than if the pins were round and smooth. The heating of these bearings is one of the obstacles to obtaining a high speed in this class of vessels for more than three or four hours at a time. And supposing that any plan for turning these bearings while in their places will be acceptable to practical engineers, I send you the following:—Cut a slightly dove-tailed keyway through both brasses (or an old pair), parallel with the axis: and with the upper edge of one, and the lower edge of the other, opposite and corresponding to a line through the center of the connecting rod. Into these keyways fit two pieces of steel, leaving them just flush with the brass; knock them out, file to a cutting edge (rather blunt, that it may not chatter), temper, and grind to the shape you want the pin. Now place one or more thicknesses of paper under it, sufficient to raise the cutting edge a trifle above the brass. Disconnect the piston from the crosshead of the engine whose pin you design turning; and by running the other engine slow, with care in setting up the brasses, and using plenty of oil, a round and smooth-bearing will be secured. A groove must be cut in front of the tool, to allow the chips to work out. If the brasses are not worn out, fill up the keyway with Babbit metal, or like composition, and use them again. Our naval vessels are not as fast as they should be. The boilers make plenty of steam, and the engines have more power than we dare to use, because we cannot keep the bearings cool. Hot bearings are sure attendants on what would be considered a moderate speed.

A. D.

U. S. S. S. *Narragansett*, June 30, 1863.

Vulcanized Rubber Enduring Temperatures.

MESSRS. EDITORS :—Your correspondence and comments on the destruction of vulcanized rubber, at temperatures a little above that of boiling water, are valuable; especially in relation to the selection of means for conveying steam under certain circumstances. Steam at a pressure as high as 40 pounds, may be carried through ordinary hose of vulcanized rubber for a long (probably an indefinite) period; but if a pressure as high as 100 pounds above the atmosphere is applied, the hose soon fails. In the experiments on steam brakes, on the New York and New Haven Railroad, a few years ago, several sets—the last of which were thick, and extra carefully vulcanized—were successively tried, for conveying steam from one car to another, throughout a train; but all burst after only about two or three weeks use. All the links which I examined appeared darkened and crisped—in short burned by the steam on their interior surfaces.

The pressure used on the locomotive, was never more than 120 pounds per square inch above atmosphere, which gives a temperature of about 350° Fah.; and the hose burst several times, at points quite distant from the locomotive, and where no heat from friction, or any other source other than the steam, could have reached it.

In a discussion at the Polytechnic Association one evening, we deduced from this and numerous other facts which chanced to be within the knowledge of the members, that ordinary vulcanized rubber might be relied on to endure up to 60 pounds pressure; which is equal to a temperature of about 311° Fah. This is considerably higher than the limit fixed by you in your last issue.

In very many cases—especially in preparing temporary and movable apparatus—it would be a matter of importance if the safe temperature could be fixed higher than this; or even if it could be satisfactorily settled at this point.

New York, July, 1863.

The Extreme Test of Endurance in Guns.

MESSRS. EDITORS :—You copy into your issue of July 25, on page 54, current volume, an item in which an attempt is made to cover the comparative failure of the 13-inch battering gun, made at Providence, R. I., by the assertion that it had been "subjected to the most severe powder test ever applied to any gun in this country, if not in any country." The ordinary tests of wrought iron, steel and bronze guns, both in this country and Europe, is far greater, proportionately, than that applied to the Providence gun; and in reference to cast-iron guns, the assertion is about as wide of the mark. It must be borne in mind that the new navy 13-inch and 10-inch "battering guns," are cast upon patterns of nearly the same exterior dimensions, respectively, as the 15-inch and 11-inch navy shell guns. The charge of the 15-inch gun, therefore, in the new 13-inch gun, and behind a 13-inch ball, would be but an ordinary test of the new piece. The 10-inch battering gun has been fired with a solid shot and a sufficient charge to shatter in pieces an iron target 10 inches thick; while the first 15-inch navy shell gun was proved by three rounds of 50 pounds, and twenty-five of 35 pounds, of powder, showing no injury whatever from the proof. A solid cast-iron gun, made at the Fort Pitt Works, seven years ago, was fired over twenty-four hundred rounds without bursting. The trials of guns of the 8 inch and 11-inch hollow-cast Columbiads, and the 9 inch and 11-inch navy shell guns, were each fired one thousand rounds, and with comparatively little injury to the bore. In view of these facts, that gun, which burst at the 178th round, with a maximum charge of 50 pounds of powder—by no means enormous, taking into consideration the massive character of the piece—was not tested beyond precedent.

S. D.

Pittsburgh, Pa., July 23, 1863.

The Earth a Magnet.

MESSRS. EDITORS :—Thinking that I could make a machine to illustrate, and perhaps prove the method by which the earth becomes a "magnet," I took a disk of iron, six inches in diameter and one-eighth of an inch thick, to represent the earth, through the center of which I ran a three-eighth inch rod, ten inches long; the disk, six inches across, representing the equatorial diameter; and the rod the polar diameter. I put this rod in a steam lathe, and caused it to revolve with great rapidity, to represent the revolution of the earth on its axis. As I could not conveniently concentrate the rays of the sun upon the disk, I took a heavy bar of iron, made one end red-hot, and held it alongside of the disk within half an inch. In less than two minutes, the instrument became a magnet, and also the mandrel, which was several inches in diameter and a foot long. As the disk revolved, from east to west, the iron rod representing the northern part of the earth, attracted the north pole of the compass, and the other end of the rod repelled it. It would, therefore, seem that the calorific rays of the sun make the earth a magnet. I think this clearly proves and illustrates the matter.

R. T. KNIGHT.

Philadelphia, July 26, 1863.

[The rapid motion of the disk had more to do with the development of magnetism than the calorific rays. A bar of soft iron suspended for a considerable period of time in the direction of the earth's poles will become magnetic.—EDS.

Marvels of Man.

While the gastric juice has a mild, bland, sweetish taste, it possesses the power of digesting the hardest food that can be swallowed. It has no influence whatever on the fibers of the living animal, but at the moment of death, it begins to eat them away with the power of the strongest acid.

There is dust on sea and land—in the valley and on the mountain top—there is dust always and everywhere. The atmosphere is full of it. It penetrates the noisome dungeon, and visits the deepest, darkest caves of the earth. No palace door can shut it out; no drawer is so secret as to escape its presence. Every breath of wind dashes it upon the open eye; which yet is not blinded, because there is a fountain of the blandest fluid in nature incessantly emptying itself under the eyelid, which spreads itself over the surface of the eyeball, at every winking, and washes every atom of dust away. This liquid, so well adapted to the eye itself, has some acridity, which, under certain circumstances, becomes so decided as to be scalding to the skin, and would rot away the eyelids, were it not that along the edges of them there are little oil manufactories, which spread over their surface a coating as impervious to the liquids necessary for keeping the eyeballs washed clean, as the best varnish is impervious to water.

The breath which leaves the lungs has been so perfectly divested of its life-giving properties, that to re breathe it, unmixed with other air, the moment it escapes from the mouth, would cause immediate death by suffocation; while, if it hovered about us, a more or less destructive influence over health would be occasioned. But it is made of a nature so much lighter than the common air, that the moment it escapes the lips and nostrils it ascends to higher regions, above the breathing point, there to be rectified, renovated and sent back again, replete with purity and life. How rapidly it ascends is beautifully exhibited any frosty morning.

But foul and deadly as the expired air is, nature—wisely economical in all her works and ways—turns it to good account in the outward passage through the organs of voice, and makes of it the whisper of love, the soft words of affection, the tender tones of human sympathy, the sweet strains of ravishing music, and the persuasive eloquence of the finished orator.

If a well-made man be extended on the ground, his arms at right angles with his body, a circle, making the naval the center, will just take in the head, the finger ends and the feet. The distance from "toe to toe" is precisely the same as that between the tips of the fingers when the arms are extended. The length of the body is just six times that of the foot; while the distance from the edge of the hair on the forehead to the end of the chin is one-tenth of the length of the whole stature.

Of the sixty-two primary elements known in nature, only eighteen are found in the human body, and of these, seven are metallic. Iron is found in the blood; phosphorus in the brain; limestone in the bile; lime in the bones; dust and ashes in all. Not only these eighteen human elements, but the whole sixty-two, of which the universe is made, have their essential basis in the four substances—oxygen, hydrogen, nitrogen and carbon—representing the more familiar names of fire, water, saltpeter and charcoal. And such is man, the lord of the earth—a spark of fire—a drop of water—a grain of gunpowder—an atom of charcoal!

But, looking at him in another direction, these elements shadow forth the higher qualities of a diviner nature, of an immortal existence. In that spark is the caloric which speaks of irrepressible activity; in that drop is the water which speaks of purity; in that grain is the force by which he subdues all things to himself—makes the wide creation the supplier of his wants, and the servitor of his pleasures; while in that atom of charcoal there is a diamond, which speaks at once of light and purity: of indestructible and resistless progress. There is nothing which outshines it; it is purer than the dew drop. "Moth and rust" corrupt it not; nor can ordinary fires destroy it; while it cuts its way alike through brass, and adamant, and hardest steel. In that light we see an eternal progression towards omniscience; in that purity, the good of divine nature; in that indestructibility an immortal existence; in that progress, a steady ascension towards the home and bosom of God.

Tea Tasting.

Few of our readers are aware that tea-tasting is reduced to a regular profession, one which is as certain death to a man as the continued practice of opium-eating. The success of the tea broker, or taster, depends upon the trained accuracy of his nose and palate, his experience in the wants of the American market, and a keen business tact. If he has these qualities in high cultivation, he may make from twenty to forty thousand dollars per annum while he lives, and die of ulceration of the lungs. He overhauls a cargo of tea, classifies it, and determines the value of each sort. In doing this, he first looks at the color of the leaf, and the general cleanliness of it. He next takes a quantity of the herb in his hand, and breathing his warm breath upon it, he snuffs up the fragrance. In doing this, he draws into his lungs a quantity of irritating and stimulating dust, which is by no means wholesome. Then, sitting down to the table in his office, on which is a long row of little porcelain cups and a pot of hot water, he "draws" the tea and tastes the infusion. In this way, he classifies the different sorts to the minutest shade; makes the different prices, and is then ready to compare his work with the invoice. The skill of these tasters is fairly a marvel, but the effect of the business on their health is ruinous. They grow lean, nervous and consumptive. At the end of a hard day's work, they feel and act as fidgety and cross as if they had the hysterics.

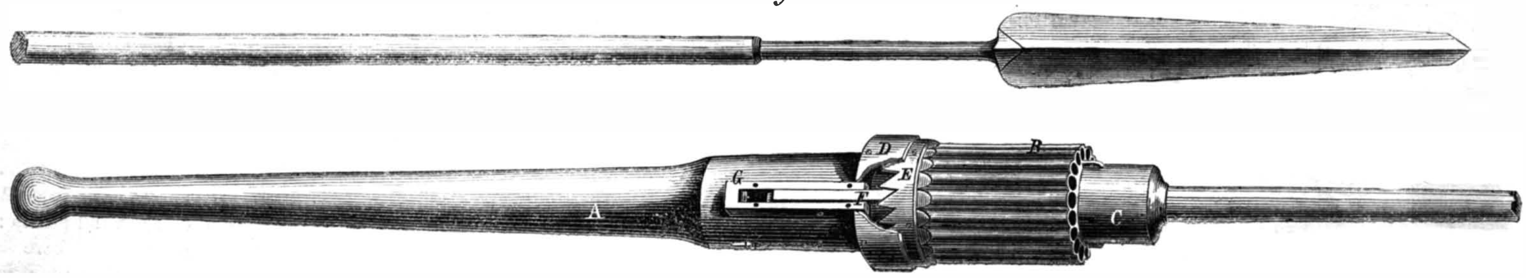
TESTIMONIAL TO CAPTAIN ERICSSON.—A splendid gold model of one of the *Monitor* class of iron-clad batteries has been made and presented to Captain John Ericsson, the designer of the batteries in question. All the machinery is exhibited in perfection. Fourteen pounds of 18-carat gold were used in its construction; and the money was subscribed by various ship-builders in this and other cities. This is certainly a splendid gift, and must be highly appreciated by the receiver.

GROSS CARELESSNESS.—A contemporary says that an elevator in Oswego recently elevated 500 bushels of wheat, but that, instead of remaining in the loft, it all ran out through the discharge-spout from which vessels are loaded; and the accident was not discovered until the next day, when a schooner grounded on the huge pile. There is nothing improbable in this story, but it sounds *rather* tough.

Improved Lance and Pistol.

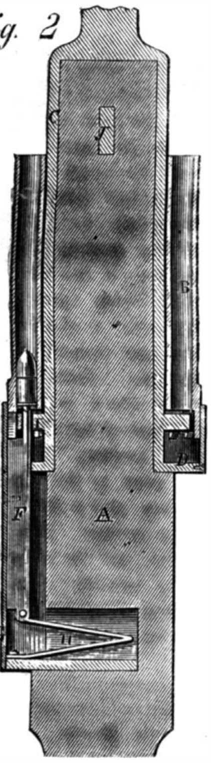
The prosecution of the art of war involves the employment of many different kinds of weapons; and it is hardly necessary to add that the most deadly ones are the most valuable. Neither artillery nor infantry, alone, can be in every instance relied on to terminate a contest successfully; but resort must be had, at times, to all branches of the service, to relieve each other, as well as to bring the battle to a victorious issue. Of late, our cavalry have achieved wonderful deeds; not only daring in their character, but fruitful in their results; crippling, as they have, the enemy, and causing him to abandon expeditions, which, had they been carried out, would have been productive of serious injury to the national cause. In some countries numbers of regiments of lancers and pikemen still exist; and these troops were recently employed by the Mexicans in the war waged against them by the French. At the outbreak of the present rebellion also this weapon, the pike, was urged upon the Confederate Government by several persons who had had experience in its use, and declared it to be a most formidable instrument for offense and defense. If the pike alone is capable of achieving all the success in the hands of determined men that its admirers claim for it, certainly the combined lance and pistol, an engraving

Fig. 1.



CAMPBELL'S COMBINED LANCE AND PISTOL.

Fig. 2



of which is herewith presented, recently invented by Mr. J. C. Campbell, is a still more terrible weapon; containing, as it does, in addition to the lance-head, a pistol which can be fired as many times without re-loading as it has chambers, be the same more or less. It may be safely assumed that if a resolute body of men had been armed with this lance during the prevalence of the late riots, the outlaws would not have presented a threatening front very long; but would have been dispersed in all directions immediately.

The mechanical construction of this weapon will be easily understood by referring to the subjoined description. The handle, A, of the weapon is constructed of wood: while the shaft and lance, which is broken off in the engraving, on account of its length, is finely-finished steel. The handle of the lance has, in addition to the offensive and defensive point, a many-chambered cylinder, B, revolving about the boss, C. This chamber is bored like an ordinary pistol-barrel, and may be rifled if required, as it is intended to be used at close quarters; however, this feature has not been introduced in the model before us at the time of writing. The protective casing, D, at the base of the chamber, has been cut away by our artist, in order to show the internal arrangement of the mechanism for firing the charges; it is very simple. The ratchet teeth, E, (see Fig. 1), engage with, and depress the slide, F, contained in the case or box, G, on the side of the handle; this is also closed with a cover to protect it from the weather. As the barrel is revolved, the teeth force the slide down, and it immediately flies back into the next space of the ratchet teeth, by the force of the spring, H, in the recess at the bottom; on this slide there is a projecting point, I, which strikes the fixed ammunition with which the cylinder, or chamber is filled, and explodes it. This is in brief the whole machinery required. The weapon is very neatly arranged in its several parts—not at all liable to get out of order—and will stand exposure to the weather without derangement. By pressing on the projecting tongues, J, the barrel may be slid off the boss, and loaded in a few seconds; and then replaced as quickly. There is a small hole in the side of the box containing the slide, F, which is fitted with a pin chained to the handle. This being inserted in a hole prevents the lock from working when not required for use. In using this weapon, the soldier holds the lance as he would a musket on the charge; and he is ready to transfix, or to discharge twenty-five or thirty bullets into his adversary, as occasion may require. The base of the handle may be hollowed out, so as to contain ammunition. The weapon has this merit that it is at all times ready for service, and is not subject to more—if as many—casualties than usually falls to the lot of weapons of war, and can be used by either infantry or cavalry. A patent on this invention was obtained on June 30, 1863, through the Scientific American Patent Agency; further information can be had by addressing the inventor, J. C. Campbell, New York City.

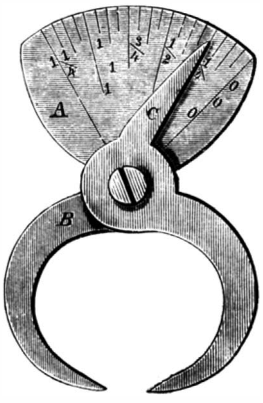
A SENSIBLE PATENT REFERENCE CASE.

On the 8th inst. in the Court of Queen's Bench, Guildhall, London, a peculiar patent case came up for trial before the Lord Chief Justice and a special jury. The parties were Saxby *versus* Stevens. The complaint was for the infringement of a patent system of colored railway signals, combined with points or rail frogs. The points were moved in harmony with the signals, so that when a signal was right, the rail point, to switch on or off, was right, and *vice versa*. The floor of the court was occupied by large models, exhibiting a line of railway, with a junction station, and all the signal lamps, and apparatus or points and levers, to show the operation of the invention. Mr. Bovill, Q. C., opened the case for the plaintiff, and entered into an elaborate explanation of the details of the invention exhibited in the models, and in photographic drawings. After having been thus engaged for an hour and a half, the Lord Chief Justice, who saw that the jury was becoming more and more bewildered, asked if it were necessary to enter into all the details, as he thought it impossible for the jury to remember them.

Mr. Bovill answered, that he had felt this difficulty, but it was the only course left for him; there were the models, and he must go on with the explanation. On he went again for another hour, when the Chief Justice again interposed. Mr. Bovill then stated that it was only after long and laborious study that he was able to understand the invention; still he must do his best, and again he proceeded, when the Chief Justice again interrupting him, said: "Would it not be far better for the parties to refer this case to mechanics, or engineers, or other persons who are familiar with patents." Mr. Bovill said: "It would be infinitely better to do so;" and Mr. Grove, counsel for defendant, acquiesced in this view. The Chief Justice then said that the present mode of trial in such cases, where the jury was not composed of mechanics, was hopeless, and that the decision of such a jury must be like a "toss up," and very unsatisfactory. After consultation with their clients, it was agreed to refer the whole case to Mr. Montague Smith, Q. C., a gentleman well versed in patents and mechanics. This sensible reference was manifestly satisfactory to the jury that had been empanneled to try the case.

TALBOT'S PATENT CALIPERS.

The accompanying engraving is a representation of a well-designed implement, which machinists especially, and mechanics in general, have frequent occasion to use. The calipers are provided with a scale, A, engraved on the projecting portions of one of the legs. This scale as well as the leg, B, to which it is attached, is one piece of steel, and is spaced off, and numbered, to correspond with inches, or parts of an inch, so that the person using the tool may instantly



set his calipers to any desired size, without having recourse to a rule, the arm or pointer, C, enabling him to read the register at a glance. The use of the tool is sufficiently evident in the engraving, without further comment; and we think that all mechanics will agree with us in saying that this is a very convenient form of self-regulating calipers; they may be made on this principle for either inside or outside work. This invention was patented on Jan. 27, 1863. Further information may be had by addressing the patentee, D. C. Talbot, at Worcester, Mass.

Lane's Carriage-jack.—Since publishing the illustration of Lane's patent carriage-jack in a recent number of the Scientific American, we have had one of the articles in constant use. It is certainly one of the most convenient implements which can be introduced in a stable; and we most cheerfully recommend its general adoption. The jack combines lightness with strength; and is easily operated. Any person wishing to purchase a good article is referred to our advertising page for further information.

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THE PRESENT AND FUTURE OF THE COTTON MANUFACTURE.

Those political leaders who instigated and promoted the rebellion, labored under the conviction that their cotton controlled the Governments of Europe; and that as a consequence of its supply being forcibly stopped, war would ensue, for the purpose of breaking the blockade of the cotton ports. All such anticipations, however, have been disappointed. There never has been any interference with the blockade; and what appears to be remarkable to many persons is the determined opposition to all such interference by the leading English cotton manufacturers, and even by the operatives who have lately been subsisting by thousands on charity. To the credit of our Northern cotton manufacturers, be it said that they have not uttered a word of complaint; although many of them have suffered more, financially, than any other class of our producers.

A report to the Boston Board of Trade, on the cotton manufacture of 1862—by Mr. Atkinson—contains much useful information on the condition of this branch of industry. Prior to the war, there were about 4,800,000 spindles in operation in the cotton mills north of the Potomac; now the number running is only about 1,700,000. Several of the Massachusetts spinners had laid in a full supply of cotton for 1861; and by running half time, they were enabled to operate a portion of their machinery until the end of 1862. Thus they realized large profits for their goods. But while the large dividends paid by a few mills have attracted much attention, nothing has been said about the heavy expenses of such as were obliged to stop. The annual expenditure of one corporation owning two mills, running 15,000 spindles, and having a capital of $600,000, has been $49,232 while being stopped, and the expenses of other mills, not running, have been in the same proportion. When it is taken into consideration that about two-thirds of the number of cotton spindles in the country are idle, a tolerable idea of the sacrifices of the cotton manufacturers will be obtained.

It is satisfactory, however, to know, that this large decrease in the operations of our cotton mills, has not caused distress among the operatives. Enlistments in the army, and the great demand for mechanics in the Government workshops, have given employment to the men; while the increased activity of the manufacture of woolen goods, and other branches of business, have given employment to the female operatives. Mr. Atkinson states that, even in Lowell, where the proportional stoppage has been the largest, owing to the cotton mills having generally been devoted to the manufacture of heavy goods, the deposits in the savings banks have largely increased during the past year. The cotton mills which have been most constantly employed, and those which are now running, are chiefly devoted to making light goods, such as printing cloths, &c.

Since the great supply of the Southern staple has been cut off, many descriptions of cotton have appeared in our market, the largest amount imported being 30,000 bales of Surats. All foreign cotton is inferior to American; and only the latter would be employed could it be obtained. There had been an additional duty of ten per cent laid on the Surat cotton; but as coarse grain bags can be made of it, this impost has been removed for two years, to the great advantage of our Western farmers.

The total number of cotton mills in the United States (North and South) is 915, involving a capital of $99,551,000; having 5,035,798 spindles, and 129,458 looms; consuming 403,054,654 pounds of cotton annually, and producing goods valued at $115,137,926. In Ure's "Cotton Manufacture," the cotton statistics of Great Britain for 1860 are as follows:—Number of spindles, 33,099,056; cotton consumed annually, 1,050,895,000 pounds (85 per cent of which was American). The total value of the manufactured goods was $441,664,713—the home consumption being valued at $192,000,000; the balance being exported. It is stated by Mr. Atkinson that the average numbers of yarn spun in America is between 20's and 24's; the average numbers of English yarn is between 40's and 45's.

With respect to the character of cotton suitable for spinning, none equals the American. Surats may be used for coarse numbers, from 14's to 24's, but with an immense waste of the material. From the reports that have been made to the English Cotton Supply Association, upon the examination of the soil and climate of various countries, the Southern States appear to be better adapted for raising cotton than any other part of the earth. Many persons suppose that most of the cotton districts are low, unhealthy coast lands where white people cannot labor. This is a mistake; for the greatest quantities of cotton are cultivated on healthy uplands, and the extent hitherto devoted to its culture, is a mere patch compared with the quantity of virgin land not yet invaded by the cotton hoe. Most of the intelligent cotton manufacturers in England and America believe that, under a system of free labor, cotton will be raised in greater quantities, and at less cost than with slave labor. They are now waiting in hope, expecting that their spindles and looms will not always remain idle, as at present; but trusting that the time is not far distant when the melodious sounds of industry will again be heard in twining and weaving the fleecy products of free labor.

IMPROVING NAVIGABLE RIVERS.

Almost all great cities have been founded on the shores of seas, lakes, or rivers, because these are the natural highways and avenues of commerce. Railways have provided increased facilities for internal communication and travel; but they can never entirely supersede water channels for traffic. In the management of railways, constant care must be exercised to maintain them in proper condition, or they soon become unfit for their intended purposes. Many navigable rivers require the same attention as railways; but the importance of this fact does not seem to be generally appreciated. Not long since, a convention was held at Chicago, Ill.—which was attended by a number of our merchants—for the ostensible purpose of devising measures to connect New York city with the Great West, by a through line of ship navigation. It was proposed to construct a ship canal round Niagara Falls, through which vessels could pass down to Lake Ontario; thence up the Oswego river, through Oneida Lake, into the Erie Canal, and down the Hudson to the sea, without breaking cargo. The project is a grand one, and not impracticable; but those who attended the convention from New York, would have displayed more consistency of action, had they first instituted measures to improve the Hudson river: the navigation of which has been so much interrupted during the present season. Sufficient water flows in this noble stream to float a steamer of 3,000 tuns burden, from the city of Troy to the ocean; and yet the channel is so obstructed for a few miles below Albany, that steamboats and barges get aground daily, and navigation is interrupted for considerable periods of time. A few weeks since we were delayed below Albany for seven hours, on one of the night boats; and a whole fleet of canal boats and larger vessels suffered a similar detention. We have received a recent report by the State Engineer and Surveyor—Mr. W. B. Taylor—which contains some very useful information on the removal of the obstructions from the river. It seems that the earlier attempts to improve the navigation of the Hudson were directed by incompetent engineers, whose efforts were more injurious than beneficial. The best mode of improving the river, set forth in this report, is by Mr. S. N. Payne—an experienced river engineer—and is based upon the system so successfully carried out in the case of the river Clyde, Scotland, which is a mere streamlet compared with the Hudson. Fifty years ago, the Clyde was only navigable to the city of Glasgow, by vessels not exceeding 100 tuns burden. Now, steamships of 3,000 tuns burden may be seen at the quays there, and it has become the third greatest shipping port in Great Britain. This great result has been achieved by engineering ability, and commercial enterprise. The care of the Clyde is vested in a Board called the "River Trust." They employ a first-rate engineer, whose sole business is to improve the river, and keep it in order; and sufficient funds are raised for this purpose by a moderate tax on shipping. This engineer holds his appointment independent of political considerations; and is never removed while he performs his duties faithfully.

The method of improving the Clyde is simple and effectual. It consists substantially in employing powerful dredging-machines to excavate the river bed; and the current is contracted, and made to scour the channel by low walls erected on either side. With respect to the engineering of the Clyde, Mr. Payne states that "it confirms the opinion that the Hudson may be improved to almost any extent," and he calculates that the cost need not much exceed $100,000 for removing the present obstructions—extending for three miles—to its navigation. Four dredging machines are constantly employed on the Clyde, within a distance of twenty miles; and the side-walls or jetties, are kept as carefully repaired as the track of a railway. Such engineering measures should also be employed for improving and maintaining the navigation of the Hudson, and other similar rivers in the United States. The most sensible way of advancing the interests of cities, villages, towns, and sections of country, is by the development and cultivation of natural resources, and local advantages.

ECONOMICAL ADVANTAGES OF SYSTEM.

Persons who have noticed how work is carried on in many of our large machine-shops, cannot but wonder why it is that no established system and routine is laid down to be observed by the workmen. The advantages of such a plan are too obvious to require any comment; and it is, as we have remarked, incredible how many things are left to take care of themselves, that should have been regularly classified, and arranged with reference to the demands of the work. Let us take, for instance, the item of mandrels, as they are called here; or arbors, as they are better known in some other parts. These valuable, and indeed indispensable aids to machine work in too many instances have no more care or attention bestowed upon them than if they were scrap-iron. They are often made of iron, instead of steel, and are cut, hacked, battered, and ground in the centers, by careless workmen, until they are utterly useless. A good mandrel costs too much money to be subjected to such usage, and this is but a small part of the evil; for where such bad practices prevail there are not likely to be good workmen, and no shop can create or maintain a reputation where such carelessness is permitted. The loss pecuniarily is to be considered also; for where there are no regulations as to mandrels or other tools, any workman makes one as he requires it, and throws it down on the floor when he is done, from whence it is perhaps snatched the next moment and used for battering some other mandrel, into, or out of a pulley.

Such folly and wastefulness as this must and should receive the severest condemnation of every right-thinking person. System, as applied to the use of mandrels, is not the only place where it might be adopted with good results. Let us take the matter of measurement, for instance. In too many workshops the only reliance for proper fitting work is placed on an old, illegible, greasy, shaky-jointed, smooth-ended, wooden two-foot rule; which is about as useful for measuring purposes as so many inches of a broomstick. With this valuable aid, the old-fogy workman gravely takes a pair of callipers, and turns up a shaft from it to the size of "four inches."

Another individual bores out a wheel to "fit" it by *his* wooden rule; and the consequence is that, between them, about a sixteenth of an inch of daylight passes through the wheel when the shaft goes in, or else there is a similar quantity of iron to be forced through the bore of the wheel in excess of the proper measurement. These are not instances created for the sake of maintaining our assertion that some system is required, but are cases of too frequent occurrence, as every one familiar with the routine of a machine-shop can testify. What is true in the case of lathe-work is also correct as regards every other transaction, where fitting depends upon actual measurement. The steel scale is an excellent substitute for the box-wood rule, and should be more generally employed by workmen; but none of these can compare in value with a set of standard gages; such as are used in the Novelty Iron Works in this city, and other large and smaller machine works throughout the country. These gages, we believe, are made on the Whitworth standard, and for sizes of 3 inches are divided into sixteenths, while beyond that they are only graduated to eighths of an inch. These gages can be made so that one end can be used in turning a shaft, while the other end is flattened like a fish-tail, and reduced to exactly the dimensions of the calliper ends. Thus a shaft turned by one end, and a hole bored so as to fit the opposite part, will cause both wheel and shaft to fit each other beautifully, without loss of time. This is so much better than the old-fashioned way of using callipers for the purpose, that the two are not to be spoken of in the same breath.

Every part of the machine business can be made the subject of a general and thorough reform. There are numbers of establishments in which wooden chucks, mandrels, bolts, washers, old files, stray hammers, lathe-tools, and every conceivable thing are scattered under the benches, lying on window-sills, and trodden under foot generally. What a spectacle of slovenliness and disorder such a place presents! And what a commentary it is upon the character of those in charge. The pecuniary loss sustained by such a state of things is enormous, and might be dispensed with by having everything in its proper place, and a regular and recognized system of procedure for all, so that work would not be spoiled by carelessness. One of the many advantages would also be soon apparent in encouraging a better class of workmen, and result in good to the whole trade generally.

ICE.

It is not unpleasant at this season of the year to revert to the Polar seas, and the icebergs which slowly circle and drift therein, impelled by the resistless force of the tides. Viewed from this distance, the imagination lends them a charm which a nearer approach, or sudden contact in a vessel, would rudely dispel. If—instead of breeding fogs by drifting down into warmer latitudes, or creating terror in the heart of the mariner as he sees one of them in the grey dawn slowly bearing down upon his becalmed ship—in the place of these perils some enterprising person should boldly make fast to one of them, and tow it down off our harbor, he would find himself the possessor of a handsome sum of money though in a somewhat awkward form; for all ice, whether from salt or fresh water, is fresh, or sufficiently so for use. The value of the ice trade in this country is something important, considering the nature of the article, and the universality with which it has been adopted. Indeed from being at one time a luxury which only the rich could afford to use, it has taken place as an actual necessity; and the procurement of it, in winter, gives employment to a large amount of capital, and a great number of individuals. Of old, the nations of the world who were celebrated for their luxurious tastes, cooled their beverages with frozen snow obtained from the peaks of the mountain ranges running through their several territories; and even to this day, in some of the South American States, the scantily-clad Indians or mestizoes, bear to the homes of the wealthy the frozen snows of the mountains. Of course this is a laborious process, and the refrigerant itself of necessity must soon waste away. With us the case is different, and in our cities the canvas-covered carts, richly freighted with the huge blue blocks, go from house to house to deliver their burden, and are eagerly welcomed. For many centuries the annual frost and snow has covered the earth, and acres of water, changed by the subtle chemistry of nature into sparkling ice, have melted again upon the approach of warmer suns, and no one seemed to have conceived the importance of storing it up for use during the sultry portion of the year. At length, Mr. Frederick Tudor, of Boston, conceived the idea that ice might be made a source of profit; and in 1805 he shipped a cargo of it to Martinique. The ice was cut from the lakes with axes, and shipped at once. As in nearly every commercial enterprise, where the field is novel and untried, and experience has not suggested the proper method of procedure, the venture proved a failure, as did also several succeeding ones, until the war put an end to all trade whatsoever. Mr. Tudor was not, however, disheartened; and with an energy and determination sufficiently remarkable, considering the nature of the case, immediately resumed the business in 1823; and at length, extending his shipments to the West Indies, found his scheme successful. Of course, so long as it was a losing business, mercantile men kindly permitted him to enjoy the field undisturbed; but so soon as it was clearly shown to offer profitable employment for capital, a number of disinterested persons gave it immediate attention. Up to 1832, Mr. Tudor was alone in the ice trade; but he then began to ship to Calcutta in addition to other ports.

Such was the rise of the ice trade in this country as compiled from good authority. The progress of it may be noted in the fact that while in 1832 the amount shipped was but 4,352 tuns, cut from Fresh Pond; in 1854, it had increased to 154,540 tuns. The annual domestic consumption of ice since then is stated to be 70,000 tuns in New England, and in New York nearly 285,000 tuns. It is said that all of this vast quantity is obtained from lakes along the water-course of the Hudson river. The large cities in the Northern and Western part of the State also lay up vast quantities in addition to these enormous amounts, and tuns untold are sent abroad to various parts of the globe. The price, of course varies with the supply; the demand is unlimited. The average price is stated to be, in good seasons, at from $2 to $6 per tun for shipping; and for families, by the season—May to October—$5; at the rate of 9 pounds per day; 15 pounds are served for $8, and 24 pounds for $12. The pounds of the iceman are, however, an algebraic expression, or unknown quantity; and the general supposition is that they deliver at the weight with which they started from their depots, without making any allowance for loss by waste. Out of three weeks that we, as a matter of curiosity, weighed ice that was delivered and paid for as 100 pounds per week, we obtained upon an average 65 pounds. During the present year the price of this necessary has been greatly enhanced by the avarice of the companies who monopolize the trade, and they are doubtless making money rapidly.

THE FIELD FOR LABOR.

Recent observation in several parts of the Eastern States has convinced us that the condition of the laboring population in the rural districts is immeasurably superior to the lot of the same class in the city. And this, on many accounts; not the least of which is the material benefit, pecuniary and physical, to be derived from the fresh air, wholesome food, and healthy surroundings of the country. Any one who has ever observed the tenement houses in cities—the manner in which the laboring population herd together—the stale vegetables which they are obliged, from motives of economy, to purchase—the influence of dram shops, and the countless incentives to vice and misery which exist on every hand, cannot but wish that a large proportion of the poorer classes in great cities would transfer themselves and families to the open fields, pure air and simple living of the country. At this juncture, especially when the calls of war have so materially diminished the surplus of labor, when the harvest, ready for the sickle, nods its head impatiently for the reaper to come and gather it in, an opportunity is presented to the poorer classes of crowded towns to settle themselves permanently where they can hope to become forehanded in a reasonable time. The advantages which a cheap rent, a small plot of land wherein to grow vegetables, and other features of rural life present to mechanics, as well as the more common laborers, are not to be slighted; and the manufacturers in towns throughout the Northern States can employ a vastly greater number of hands than they can at present obtain.

If the laboring population would avail themselves of this privilege, we should have a continually changing class, which would result beneficially to us, and to them; for the new men would not be imbued with the vices of the old, and those who went forth from the city would soon lose their false ideas of the division of wealth, in healthy and remunerative employment.

THE LENOX PLATE-GLASS COMPANY.

The rough plate-glass works at Lenox Furnace, Berkshire county, Mass., are the only ones of that class in the country. We recently paid a visit to this factory, which was idle at the time, in order to prosecute needful repairs to the furnaces, and introduce some improvements deemed necessary. We found a large stock of fine plate-glass, from one-fourth of an inch in thickness up to an inch and more; and some ten or twelve feet in length, by three or four feet in width: in fact sheets of the largest size are produced here with ease. The process of making the plates is quite simple, all the machinery necessary for the purpose being comprised in a large cast-iron bed, planed true on the face, provided with raised edges at the sides, on which a large cast-iron roller runs; the roller is about 16 inches in diameter. The fluid glass is poured on the table, the roller pushed over its surface, and the plate is then done. There are several furnaces in the works, for annealing or baking the plate to render it less brittle, which are very extensive. The furnaces are all heated with wood.

The crucibles or pots in which the glass is melted, are made on the premises, from clay, which being brought from Germany, is quite costly. One pot holds about 450 pounds of glass, and will last about four weeks. The fine quality of the Lenox plate-plass is due chiefly to the excellent sand found in the neighborhood, which is a species of disintegrated quartz rock common throughout Massachusetts. This is pulverized and sifted, and is of a beautiful white and glistening appearance. The company have had considerable difficulty in making a market for their goods; as wholesale dealers in the cities were not disposed to purchase of them. They succeeded, however, in creating a reputation for their glass among small dealers, which they soon increased to an extended business acquaintance; and they are now doing very well. It is designed to introduce machinery, for grinding and polishing the glass, so as to produce the finest qualities of window and mirror glasses; but this has not yet been accomplished for the want of adequate machinery. It is the intention of the company, however, to prosecute the idea at an early day: so soon as the necessary preparations can be made. There is no reason why an article equal to the best French plate-glass cannot be made in this country, by the introduction of adequate means for polishing and finishing.

THE INTERNATIONAL STEAM FIRE-ENGINE TRIAL.

The report of the Committee on the steam fire-engine trials—noticed in our issue, last week—has been made; and the prizes have been awarded. In the large class engines, the first prize of £250, was awarded to Messrs. Merryweather & Son; second prize of £100, to Messrs. Shand & Mason. For the small class engines, the first prize of £250 was given to Messrs. Shand & Mason; second of £100 to Messrs. W. Lee & Co.—for the "Alexandra"—American engine.

The weight of the engine which gained the first prize was 2 tuns, 18 cwt.; that of the one which gained the second prize, 2 tuns, 28 lbs. The American engine, which competed—the "Victoria"—belonging to J. Butt & Co.—weighed 2 tuns, 14 cwt.; W. Robert's engine weighed 1 tun 19 cwt.; Easton, Amos & Son's, 2 tuns 18 cwt., 84 lbs. This engine did very well in one trial; but injured its furnace so much as to be thrown out for those which followed. The large engines had four trials; two of which con sisted in delivering 1,000 gallons of water into a tank at a distance of 67 feet, with hose inclined at an angle of 27 degrees to the horizon. The water in the boiler was cold, and each engine was to commence work on attaining a steam pressure of 100 lbs. on the square inch. Merryweather's engine got steam up in 10 minutes, 25 seconds; and tank filled in 9 minutes 42 seconds. Steam was up in Easton & Amos's machine in 13 minutes 14 seconds; tank filled in 6 minutes, 16 seconds. In Shand & Mason's, steam was up in 10 minutes 51 seconds; time of filling tank 12 minutes, 19 seconds. Time of raising steam in Butt & Co's. (Victoria), 16 minutes, 30 seconds; time of filling tank, 6 minutes, 48 seconds. In Robert's engine steam was up in 11 minutes, 40 seconds; time of filling tank 20 minutes, 24 seconds Shand & Mason's engine was stopped for two minutes, owing to the suction being choked. In the second trial, the engines all started with steam up, and the tank was filled as follows: Shand & Mason's in 3 minutes; Butt & Co's, in 3 minutes 3 seconds; Merryweather's in 3 minutes 7 seconds. The other two engines did not fill the tank. The third trial of the large engines was to test their capacity of delivering water. It was to continue two hours for each engine, unless a tank of 16,000 gallons was filled sooner. Each engine was to begin with cold water, and commence at any pressure the owners might choose. The water was drawn from a depth of 19 feet below the cylinders, and was forced through 440 feet of hose. This was the most severe test of all. Messrs. Merryweather's engine delivered 16,086 gallons, in 1 hour 24 minutes 55 seconds, and was the only engine that completed the task. The nozzle used was 1½-inch in diameter. After working 46 minutes, the cylinder cover of the "Victoria"—Butt & Co's engine—burst, but while working it delivered 8,280 gallons into the tank. The "Manhattan" entered upon this trial, but after working a short period the fly-wheel cracked. The account which we gave last week of the large engines playing vertically was substantially correct. Shand & Mason's threw a jet 180 feet high, out of a 1⅝-inch nozzle; Merryweather's, a jet of the same hight out of a 1⅝ inch nozzle; Robert's a hight of 150 feet from a ⅞-inch nozzle. The American engine was not in good order for this trial.

Only three engines of the small class competed; namely Messrs. Shand & Mason's, Merryweather's, and Lee & Co's. (Alexandra). The trials were similar to those of the large engines, the most important of which was in delivering water during the third trial into a large tank, each engine working one hour—the length of hose being 420 feet, running up an incline. Shand & Mason's delivered 8,142 gallons in the hour; Lee & Co., 4,278 gallons, and Merryweather's 4,885 gallons. Shand & Mason's far surpassed the other two engines. Wm. Robert's engine, which competed in the large class, did fully as well as any of its antagonists, in proportion to its size. The English engines are provided with blowers, in raising steam, at first; the American engines depend on the natural draft. The foregoing is condensed, chiefly from an abstract of the official report.

In the trial between the three large engines, in filling the 16,000 gallon tank, the "Victoria" commenced favorably, discharging more water than the other two; and, had its cylinder-head not failed, it would probably have been the victor.

The London *Mechanics Magazine*, comments dispassionately on the subject; and in alluding to what the *Times* published says:—"No one considers the *Times* newspaper as an authority on scientific subjects. Their report of this trial contains a sneering criticism on American fire-brigades and engines, which at once exhibits the good taste, and scientific and general information of the writer, in a light which shows that the *Times*, has yet to learn, not only a smattering of mechanical knowledge, but also the art of treating strangers with courtesy. International competitions afford a bad mark for newspaper insolence."

It would appear, from an advertisement in the London *Mechanics Magazine*, that our steam fire-engine builders, who are represented in England by W. Lee & Co., have challenged the English winners of the first prizes to a separate trial, declaring it as their opinion that their (the American) engines can beat, not only Merryweather's, but the best machine ever made by Shand & Mason, the parties to whom the first prize was awarded. The firm of W. Lee & Co., are willing to make the entrance fee from a nominal sum up to £200 ($1,000), if desired. The conceited tone of the London *Times*, upon the subject of the recent trials, is disgusting to all lovers of fair play; and we are glad to observe that portions of the English press who are familiar with the subject on which they write attribute our *fiasco* to circumstances wholly beyond the exhibitors control. In the case of the "Manhattan," it is to be regretted that she attempted to play at all. It would have been far better to retire from the contest, without taking part in it, than to make a show of doing nothing.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list:—

Printing Machine.—The object of this invention is to obtain a portable device which may be held in the hand and operated with the greatest facility for printing direct upon paper or other suitable material. To this end the invention consists in the employment of a combination type, that is to say, a type composed of several sections, arranged and combined in such a manner that any one of the sections may be used separately, and certain parts used combined, in order to form the different letters of the alphabet. The invention also consists in the employment of finger pieces or keys, arranged in a novel way with levers, for the purpose of operating the several parts of the type, and also in a certain means employed for causing the type to traverse or move, so that proper spaces may be allowed between the impressions, and the type allowed to adjust itself properly at the termination of each line for the printing of a succeeding one. The invention further consists in a means employed for moving or feeding the paper along at the termination of each line as it is printed. Benjamin Livermore, of Hartland, Vt., is the inventor of this machine.

Mold for Casting Tires.—This invention consists in fitting a mold for casting tires, rings, or bands of steel or iron, or other metal, with a metal core so constructed as to be capable of contraction automatically, as required, to permit the natural contraction of the casting in cooling, and in so constructing such core that it may be loosened in the casting by the force applied, to lift it to withdraw it therefrom. It also consists in so constructing the gates of the mold, both those for pouring and those for the escape of air, open to the core, or so that the core constitutes one side of each gate, by which means the metal left in the gates is prevented from interfering with the contraction of the casting. It further consists in providing for an overflow from the pouring gates at a level lower than the mouths of the air gates, for the purpose of preventing the metal in the pouring gates from cutting into the core, and of permitting the cover or cope of the mold to be drawn without difficulty. William Brooke, deceased, lately of Jersey City, N. J., was the inventor of this improvement. Further particulars of this invention may be obtained from Jane Brooke, administratrix, Jersey City.

Car Brake.—This invention relates to an improvement in operating the ordinary hand brakes, and consists in a novel and simple arrangement of parts, whereby all the brakes of a train of cars may be operated simultaneously, and by a single manipulation on the part of the attendant. In carrying out this invention a friction wheel is employed for turning a shaft, which winds up a continuous chain, the latter being connected with the brake-rods in such a manner as to apply the brakes to the wheels, the brakes at the same time being capable of being operated by hand in the usual way, when necessary or required. The friction wheel is constructed and arranged in a novel way so as to preserve the car wheel which rotates it from injury by wear, and at the same time prevent the brakes or any of their parts being injured by any undue strain or tension. This invention is by J. D. Myers, of South Bend, Ind.

Revolving Fire arm.—This invention, by W. C. Ellis and J. N. White, of Springfield, Mass., relates to revolving fire-arms to be loaded at the front of the cylinder with metallic cartridges carrying their own priming. To permit such cartridges to be inserted into the chambers in front, they are made without the laterally projecting flanges commonly provided, but have flanges projecting in a rearward direction, or parallel with the bores of the chambers, to contain the fulminate priming. This invention consists in a certain construction and arrangement of the openings provided in the rear ends of the chambers of the cylinder for the entrance of the nose of the hammer to strike the cartridges, and in a suitable arrangement of the hammer, in combination with such openings, whereby the hammer is caused to strike upon the interiors of the flanges of the cartridges, and the said flanges are supported against the blow of the hammers by the bores of the chambers, without requiring any forward projections at the bottoms of the latter, thereby simplifying the construction of the cylinder.

Steam Boiler.—This invention consists in the arrangement of two segmental reservoirs, with or without heating tubes, attached to the sides of the steamspace of a flue or tubular boiler, and extending throughout its whole length, in combination with an annular flue surrounding the shell of the boiler, and surrounded by a water jacket in such a manner that the smoke and sparks are perfectly consumed while passing from the furnace in front to the smoke-box in the rear of the boiler, and at the same time the fire in passing through said annular flue acts on the water in the boiler and in the segmental reservoirs in the inside, and on the water contained in the water jacket on the outside, and the heat emanating from the fuel is used to the best possible advantage. The invention consists further in the arrangement of a narrow strip of brick work on the top of the shell between the open ends of the segmental reservoirs, in combination with a cast-iron plate on the interior of the water jacket, and under its highest part, in such a manner that the steam spaces of the boiler and of the water jacket are fully protected against the direct action of the fire. A patent for this invention has been granted to A. S. Harris, of Galena, Ill.

Lamp Burner.—This invention relates to a new and useful improvement in lamp burners which are provided with draught chimneys and a hinged cone or deflector, suc as may be seen in many coal-oil burners. These hinged cones or deflectors are very convenient as they admit of the wick-tube of the burner being readily exposed for trimming and lighting. The objection to them hitherto has been the want of a proper stop or support, to prevent the cone and chimney falling too far back when turned over. The chimney, which is attached to the cone and moves with it, is quite heavy, and is liable, in the ordinary hinged cone, to break the hinge when the former is turned over or off from the burner. The object of the invention is to obviate this difficulty, and to this end the invention consists in attaching a rod or wire to the cone or burner, in such a manner that a stop will be obtained which will serve to hold the cone and chimney in a proper inclined position, and at the same time serve as a thorough protection to the hinge of the cone, so that the latter cannot become broken or injured by the throwing back of the cone or chimney. A patent for this invention has been obtained by J. J. Marcy, of Meriden, Conn.

PRESERVING FRUIT.—To make good currant jelly, take a pound of sugar to a pint of juice; boil the juice by itself, twenty minutes, in a brass kettle; skim it, and boil the sugar, also by itself, for five minutes, afterwards mix the juice and sugar, and boil five minutes or more, until the sirup appears to thicken slightly. All fruits are better preserved by pouring boiling sugar upon them, and letting it stand a few days, and then reboiling it, than by cooking all in one mass.

A NOVEL STATUE.—One of the largest pieces of Pennsylvania anthracite that ever reached Boston is now shown there in the form of a life-size American Indian. It was taken from a coal vein 9 feet thick, and cut into its present shape by a common miner. It is said to show real talent on the part of the rough sculptor, presenting the appearance of solid cast iron.

THE total amount of land under flax cultivation in Ireland, amounts to 147,957 acres.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JULY 21, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

39,266.—Dry Gas Meter.—David Alcorn, New York City:
I claim, first, Making the port openings of the valve seat, C, substantially in the enlarged and curved form set forth and described, for the purposes specified.
Second, I claim casting or constructing the valve seat, C, and its hollow projection or elongation, c6, together in one solid piece, substantially as described and set forth, for the purposes specified.
Third, I also claim arranging the channel, F, in an oblique position in relation to the valve and to the inlet tube, E, as described and set forth, for the purposes specified.

39,267.—Removable Charge Chamber for Explosive Shells.—Francis Alger, Boston, Mass.:
I claim the use of a tube or pouch, of india-rubber cloth, or of other flexible material, containing gunpowder and attached to a fuse, so as to form, together with the fuse, one apparatus, which may be inserted into or removed from a projectile at a single operation.

39,268.—Machinery for dressing Heading for Cooper Ware.—Edmund Greenlee, Summerhill, Pa.:
I claim the device for clamping and holding the heading while being dressed, when used in connection with the face plate or wheel, as above specified.

39,269.—Railroad Switch.—Nathan Ames, Saugus Center, Mass.:
I claim, first, The director, E, constructed substantially as set forth and for the purpose described.
Second, The beveled friction roller, G, or its equivalent, in combination with the spring, I, and beveled director, E, substantially as set forth and for the purpose described.

39,270.—Breech-loading Fire-arm.—George R. Bacon, Providence, R. I.:
I claim the combination with the cartridge-block, D, and its link connection, E, of the compound groove, c d or c d d', in the said block, and the stationary pin, e, in the frame substantially as and for the purpose herein specified.

[This invention relates to what is known as the Burnside fire-arm, with the improvement of I. Hartshorn, patented March 31, 1863. In this arm the cartridge block is connected with the frame by a link, and to bring the said block from the position for firing to the position for loading, and *vice versa*, two movements are necessary, viz., a movement of the block and link together on the pin which connects the link with the frame, and a movement of the block alone upon the pin which connects it with the link. No means have been heretofore provided for guiding the breech-block in the above-mentioned movements, and some practice and dexterity have consequently been required to manipulate it properly, for bringing it to the requisite positions for loading and firing; and the soldier, in the excitement of battle, might sometimes fail to load and fire with that celerity which might be insured by some means of guiding the block. This invention consists in providing in one side of the block a compound curved groove, which receives the point of a stationary pin that projects inwardly from the contiguous side of the frame of the arm, for the purpose of so guiding the block, that it is not possible to manipulate it otherwise than in a proper manner.]

39,271.—Filter and Cooler.—John S. Brooks, Rochester, N. Y.:
I claim a combined filter and cooler, having two separate reservoirs for the filtered water, substantially as shown and for the purposes specified.
I also claim in combination with the two reservoirs, the pipe, D, serving as a supply to the upper reservoir, and as a passage for air to and from the lower reservoir, as and for the purposes shown and specified.

39,272.—Shingle Machine.—A. H. Clark, Fond du Lac, Wis.:
I claim, first, The dog, G, attached to or formed with the slide bar, F, in combination with the spring, H, screw, c, and frame, D, all being arranged and applied to the rotating plate, B, to operate as and for the purpose herein set forth.
Second, Operating the dog, G, through the medium of the stationary curved bar, N, pendant pin, e, of frame, D, and the spring, O, all arranged substantially as herein described.
Third, The rotary planers, Q, when used in combination with the bed, L, for the purpose herein set forth.

[This invention relates to an improved shingle machine, of that class in which a revolving bolt plate is used in connection with a circular saw. The invention consists in a novel manner of dogging the shingle bolt, and using in connection with the dogging mechanism, a rotary planer.]

39,273.—Washing Machine.—John Clark, Sharon, Pa.:
I claim the sweep, the face of which is composed of a number of yielding blocks so arranged as to adjust themselves to every part of the clothes to be washed; and, also the double apron and slats as herein before described.

39,274.—Cask.—John Connolly, Boston, Mass.:
I claim a metallic head for casks, barrels, kegs, &c., formed with an elevated rim or cap, a, and a flange, d, provided with a screw, e, on its inner surface, and all constructed and arranged as shown, so as to be capable of being applied in the manner substantially as set forth.

[This invention relates to a new and useful improvement in the construction of casks, barrels, kegs, &c., and is applicable to either metal or wooden articles above named. The invention consists in the employment or use of a metal head, provided with an internal screw, which works on a male screw on the cask, barrel, or keg, and so constructed and arranged that many advantages are obtained over casks, barrels, &c., constructed in the ordinary manner.]

39,275.—Machine for compressing Carriage Wheels.—George Cook, New Haven, Conn.:
I claim the arrangement described, of the ring, F, screws, H, and bracket, I, when the same are combined in the manner and for the purpose as herein substantially set forth.

39,276.—Cultivator.—Tully R. Cormick, Cap-Au-Gris, Mo.:
I claim, first, The combination of the plow shanks, and handles, G G, draught chains, L L, universal joints, M, connecting rod, H, and adjusting nuts, h, constructed, arranged and operating substantially as and for the purposes set forth.
Second, The combination of the elevating levers, I I, draught chains, J J, and hinged plow-shanks, F F, constructed, arranged and operating substantially as and for the purposes specified.

[By means of this invention every share of the cultivator is placed under the independent control of the driver, and the machine is adapted for turning or backing with perfect freedom, and without danger of straining any part.]

39,277.—Looking Glass and Match-holder.—D. Cumming, Jr., New York City:
I claim a new article of manufacture, consisting of the combination of a looking glass with a match holder and friction surface, constructed substantially as herein set forth.

39,278.—Valve Gear for Steam Engines.—Edward N. Dickerson, New York City:
I claim the combination of an auxiliary steam cylinder and piston, with the vibrating rock shaft of a large steam engine, so arranged that the piston of the auxiliary engine will, at the pleasure of the engine driver, vibrate the rock shaft of the large engine, and thus open and close the main valves which it works, substantially as described.

39,279.—Washing Machine.—William M. Doty, New York City:
I claim the derrick, A, with the board, b, in combination with the oscillating presser, B, and adjustable hand lever, C, constructed and operating in the manner and for the purpose substantially as shown and described.
I also claim the arrangement of the adjustable hand lever, C, with friction rollers, g, in combination with the oscillating presser, B, and slots, h, constructed and operating as and for the purpose set forth.

[The object of this invention is an improvement in that class of washing machines, which consist of some device that can readily be combined with or used in an ordinary wash-tub, and which allow of effecting the operation of washing clothes by the simple motion of a lever or handle.]

39,280.—Lock.—Henry H. Elwell, South Norwalk, Conn.:
I claim the connecting of the inner end of the latch-bolt, C, to the lever, E, by means of pin, f, in combination with the sliding or adjustable bearing, F, arranged as shown, or in an equivalent way, to operate as and for the purpose herein set forth.

[This invention relates to an improvement in that class of locks which are provided with reversible latch-bolts, to enable them to be applied to either a right or left hand door.]

39,281.—Caliper.—Charles A. Fairfield, Springfield, Mass.:
I claim the combination of the half nuts, 1 1, with the taper screw, 3, when constructed, operating and applied substantially in the manner and for the purpose herein fully set forth.

39,282.—Chain Shot.—George P. Ganster, New York City:
I claim, first, The shell cast with a cavity in the center, apertures in the sides, and a square pivot on the butt end of the shot, substantially as described and for the purposes set forth.
Second, The combination of the chain and sub-balls constructed and arranged as above described.

39,283.—Floor for Stalls.—Zebulon G. Garlick, Otsego, N. Y.:
I claim providing animal stalls with a secondary floor, formed in part of a movable grate, which is constructed of longitudinal bars, secured together at each end with interstices between them, and attached to the other part of the floor by hinges; so as to operate in the manner and for the purposes specified.

[This invention consists in providing the stall with a secondary floor, which is raised a little above the stall floor proper, and supported in such a manner as to leave an open space between the two floors for the urine which the animal discharges, and which passes freely through grated work of the secondary floor, to run off, whereby the animal is kept clean, dry, and comfortable.]

39,284.—Hollow Auger.—Ransom Gaylord, Seymour, Conn. Ante-dated April 26, 1862:
I claim as an improved article of manufacture, a hollow auger composed of a hollow shank, A, grooved guide plate, B, cutter heads, C, with dove-tailed plates, a, pins, b, eccentric slotted disk, D, and nut, E, as herein shown and described.

[This invention consists in the arrangement of a rotary disk with eccentric slots acting upon pins inserted into the backs of the sliding cutter heads, and with a suitable jam nut, in such a manner that by turning said plate all the cutter heads are forced out or drawn in simultaneously, and to equal distances from the center, and that the cutters can be adjusted to various sizes by a simple, cheap, and easy contrivance.]

39,285.—Pack Saddle.—Joseph Gosker & A. Degenhart, Cincinnati, Ohio:
We claim, first, Supporting the packs or burdens of a pack saddle off from the sides of the animal by means of the bows, a a, constructed and arranged substantially in the manner herein specified and shown.
Second, In combination with the pack saddle, A, we claim the arrangement of the breeching strap, k, diagonal straps, l l, and auxiliary strap, m, substantially as and for the purpose described.
Third, We claim the arrangement of the breast-strap, g, and the straps or stays, h h, in combination with the pack saddle, A, substantially as shown and described.

39,286.—Mowing Machine.—John P. Greeley & Levi W. Buxton, Nashua, N. H.:
We claim as our invention, the said improved mowing machine, so constructed as not only to have its axle, A, and its cutter bar, F, connected by means of a vibratory frame, D, arranged with respect to and applied to them, and serving to support the cutter operating mechanism substantially as described, but also to have combined with the cutter bar frame and axle, a lever, H, a chain, I, a pulley, g, and a windless or wheel, i, and mechanism for operating or rotating such wheel, and retaining it in position, the whole being substantially as herein-before specified.

39,287.—Machine for making Nails for Horse Shoes.—William C. Grimes, Philadelphia, Pa.:
I claim, first, The forging or forming of nails, or other metallic articles, by the compound and combined action of a pair of rolls and a swage or hammer, and an anvil, or their equivalents, operating alternately upon the material to form the nail or other article, as herein-before described.
Second, I claim in combination, a pair of rolls having a contour suited to give the required form to the opposite sides of the article; with a hammer and an anvil, the faces of which are the counterpart of the required form of the other opposite sides or edges of the nail or other article, as before specified.
Third, I claim the mode of effecting the periodic suspension of the action of the hammer, by means of the lever, J', the bar, Q, arm, R', cam, S, and spring, r, or their equivalents, constructed substantially as herein described, and operating as and for the purpose set forth.
Fourth, I claim the feeding rolls, U V, having a rotary and a reciprocating movement, in combination with the operative rolls, E and F, as herein before described, and for the purpose set forth.
Fifth, I claim the clutch, substantially as described, in combination with the adjustable stop, X', bent lever, P', and cam, T', or their equivalents, as described and for the purpose set forth.
Sixth, I claim the shear-bars, K and L, or their equivalents, when operated by cams as, M N and P, on separate shafts that revolve with unequal speed, as herein before described, and for the purpose set forth.

39,288.—Bung Cutter.—Charles W. Harris, Pittsburgh, Pa.:
I claim, first, Placing the knives or cutters in grooves in the body of the tool, at the angle required to be given to the sides of the bungs, substantially as described.
Second, Attaching the knives or cutters to the sleeve, either by toggle joint, or link, or by a pivot, working in a slotted pivot-hole, so as to allow the cutters to spread in their descent through the wood, without varying the angle of deflection from the axis of the tool.
Third, The use of a loose center pin in the axis or center of the tool, pressed downwards by a strong spiral spring, for the purpose of centering the tool, holding the bung while it is being cut, and delivering the tool from the wood after the operation is finished, substantially as described.

39,289.—Steam Boiler.—R. S. Harris, Galena, Ill.:
I claim, first, The annular flue, D, and water-jacket, E, in combination with a tubular or flue boiler, A, constructed and operating as and for the purpose herein shown and described.
Second, The segmental reservoirs, C, cast-iron plate, F, and brick-work, G, in combination with the annular flue, D, boiler, A, and water jacket, E, all constructed and operating in the manner and for the purpose substantially as specified.

39,290.—Dove-tailing Machine.—Elander Heath, San Francisco, Cal.:
I claim, first, The arrangement of the adjustable inclined bench, with its sliding carriage, spring gages, and gage strips.
Second, The use of the swinging face-end with its adjustable screws.
Third, The arrangement of the swinging face-end in combination with the spring gages and gage strips, all attached to the sliding carriage.

39,291.—Receptacle for Dead Bodies.—Thomas Holmes, Washington, D. C.:
I claim the elastic receptacle with funnel-shaped top, handles at the sides, deodorizing tube and grooved block as herein described, for the purpose of preserving and more easily transporting dead bodies.

39,292.—Governor Valve.—Truckson S. La France, Elmira, N. Y.:
I claim, first, Making the ports in the valve seats of different sizes, when the same are arranged in the manner and for the purpose set forth.
Second, The adjustable screw center piece, M, constructed, arranged, and operating substantially as described.
Third, Perforating the diaphragm plate, r, for the purpose stated.

39,293.—Boot Form.—L. N. Leland, Grafton, Mass.:
I claim the plate, C, provided with the tubular projection, d, and screws, g g, in connection with the plate, B, provided with the projections, f f, when the above parts are used in combination with a boot-clamp formed of a screw, D, and jaws, E E', all arranged to operate in connection with a boot form, as and for the purpose herein set forth.

[This invention relates to an improvement in the metal fixtures pertaining to the clamp and screw of a boot-form, whereby the clamp is rendered capable of being adjusted so as to draw, or act upon the leather at different angles, as occasion may require.]

39,294.—Device for Cutting Welts.—L. N. Leland, Grafton, Mass.:
I claim the cylinder, A, provided with a series of circular cutters, C, in combination with a cylinder, D, having a series of V-shaped grooves, a, made circumferentially in it to receive the edges of the cutters, substantially as and for the purpose set forth.

[This invention consists in the employment or use of a cylinder provided with a series of cutters placed at equal distances apart, and in using in connection therewith a grooved cylinder arranged to operate conjointly with the cylinder of cutters, so as to cut in a perfect manner the leather which is passed between the grooved cylinder and cutters.]

39,295.—Snap Hook.—D. W. Lewis, Janesville, Wis.:
I claim a harness snap hook constructed with a longitudinally divided shank, or neck, which is compressible, to unlock the pivoted section, and also capable of being opened by a circular slide motion.

39,296.—Device for Hand Printing.—Benjamin Livermore, Hartland, Vt.:
I claim, first, The combination type, I, formed of a series of parts, 1 1' 2 2' 3 3', arranged substantially as shown, so as to be capable of being operated singly, or any two or more of them simultaneously for the purpose specified.
Second, The arrangement of the levers, H, arms, K, levers, t, and keys or finger-pieces, L, substantially as shown, for operating the parts of the type.
Third, The plate, B, rack bar, C, and lever, D, the latter being provided with the pawls, E F, provided respectively with prongs or arms, h' i', for the purpose of feeding or moving the type across the paper, as set forth.
Fourth, Connecting the arms, K, with the lever, D, of plate, B, through the medium of the bar or arm, J; for the purpose of moving the type across the paper simultaneously with the giving of the impression, or just before the impression is given as set forth.
Fifth, The two pawls, P Q, arranged as shown in connection with the ratchet, b', and the lever, D, of the plate, B; for moving the paper, c, as set forth.

39,297.—Wheel Vehicle.—G. S. Manning, Springfield, Ill.:
I claim the springs, C, composed of two principal parts, a c, connected together by a link, b, and secured to the axles, B, and to the vehicle in the manner substantially as herein set forth.

[This invention relates to an improvement in the springs of wheel vehicles, the mode of applying them, &c., whereby it is believed that several advantages are obtained over the old or ordinary springs.]

39,298.—Bread Cutting Machine.—Rinehart P. March, Norristown, Pa.:
I claim, first, The combination of the gate, G, with knife, H, and adjustable gage, I, the adjustable elastic box, C and the follower, K, all constructed, arranged and operated as set forth.
Second, The combination of the brake, N, and rod, R, with the lever, J, and follower, K K, or their equivalents, for the purpose specified.

[The subject of this invention is a machine by which bread, vegetables, or other articles may be rapidly sliced up to any required thickness, the material being fed up to a gage by an automatic device which acts only at the instant the knife reaches the upper point of its stroke, ready for the next descent.]

39,299.—Hat Block.—Jacob H. Masker, Newark, N. J.:
I claim a hat block made in sections, said sections being united to each other by a wedge or dove-tail formed tongue and groove, the tongue being in line with the base of the block, the tongue and groove terminating before reaching the crown, substantially as shown and described.

39,300.—Photographic Album.—John D. Mets, Dubuque, Iowa:
I claim, first, As an improved mode of binding photograph albums, uniting the leaves thereof to perforated plates which are hinged, or jointed together substantially as described.
Second, A photograph album constructed with a hinged back made up of a succession of plates hinged together, substantially as described.
Third, Uniting the book of leaves to the cover thereof, by means substantially as described.
Fourth, A combination of hinged plates united together and adapted to receive and hold the thick leaves, A A', and to form a hinge binding, substantially as described.

39,301.—Chimney for Lamps.—Henry W. Millar, Utica, N. Y.:
I claim as an improved article of manufacture a lamp-chimney, constructed of glass and mica, in the manner substantially as herein shown and described.

[This invention consists in constructing the chimney in two separate parts, one of glass and the other of mica, and having the upper part fitted on the lower part, in such a manner that it may be readily removed so as to render the wick accessible for trimming and lighting; the upper part of the chimney being of mica, and the lower part of glass, whereby the chimney is prevented from being broken by unequal expansion, as is the case with the ordinary chimneys, which are constructed entirely of glass, and the chimney at the same time in consequence of being constructed wholly of transparent materials not obstructing any of the rays of light emitted from the flame as the combined glass and metal chimneys.]

39,302.—Signal Lantern.—Joseph J. Miner, Buffalo, N. Y.:
I claim the opaque shade, D, made movable, so that it may be raised or lowered as desired (with or without the reflector, E), in combination with transparent colored shades, for the purposes and substantially as set forth.

39,303.—Car Seat Lock.—R. B. More, Cincinnati, Ohio :
I claim the spring latch, D, applied to the arm, B, of the car-seat back, in combination with the nosing, F, on the bracket, E, the former being provided with a recess, d, and strike or beveled surface, e, and all arranged substantially as and for the purpose specified.

[The object of this invention is to obtain a simple means for locking the backs of the seats of cars so that the backs cannot be turned over from one side of the seat to the other by the passengers.]

39,304.—Hair Restorative.—John Moye, Medina, N. Y. Ante-dated Nov. 1, 1862 :
I claim the within described compound or composition made of castor oil, alcohol, tincture of lobelia, tincture of blood-root, laudanum, citronella, bergamot, oil of cloves and cinnamon, in the proportions herein set forth.

[The nature of this invention will be readily understood from the claim. All the ingredients are perfectly innoxious to the skin, and the compound is said to have a good effect.]

39,305.—Mop Head.—E. D. Murphy, Claremont, N. H.:
I claim a mop head, having in combination a frame, A, with socket, a, screw, C, with semi-circular foot, g, fitting in a semi-spherical step, h, in follower, B, which is provided with points, e, and a cross bar, b, with points, c, all as shown and described.

[This invention consists in a mop-head, provided with points in the cross bar of the head and in the follower, and with a screw for operating the follower, said screw being made to step with its semi-circular foot into a semi-spherical socket, in such a manner that it allows the follower to adjust itself if more rag is on one side than on the other.]

39,306.—Railroad Car Brakes.—David Myers, South Bend, Ind.:
I claim, first, The friction wheel, constructed of a ring, m, and a plurality of disks, l, fitted on a shaft, G, substantially as shown, in connection with the levers, u r, pulleys, t q, and cord, L, arranged to operate substantially as and for the purpose herein set forth.
Second, The combination, on the baggage or first car, of the fixed pulley, t, and the pulley, q, in the swing pendant, r, the latter being connected to the lever, b, by a rod, s, and all arranged to operate in connection with the chain, L, as and for the purpose set forth.
Third, The triangular lever, M, applied to the rear cars and provided with the pulleys, a′ b′ c′, and arranged in connection with the chain, L, to operate as and for the purpose specified.

39,307.—Washing Machine.—Joseph Oaster, Amboy, Ill.:
I claim the combination with the self-adjusting cylindrical rubber, C, herein described, the removable and adjustable slats, B, of the concave, substantially in the manner and for the purpose set forth.

39,308.—Door Spring.—W. T. Root, Geneva, N. Y. Ante-dated March 7, 1863 :
I claim the combination with the parts, A B, of the case, provided with the notches and teeth, i k, of the coiled spring, l, or equivalent, and adjusting screw, n, for the purpose of adjusting the main spring to greater or less degrees of resistance, and for holding the said parts of the case together, arranged and operating substantially as herein described.
I also claim the double stops, s s, situated respectively on opposite sides of the drum, and forming a part of the support or bearing of the same, in combination with the spur, r, for the purpose of preventing the band from being drawn through, and for adapting the device to both right and left-hand doors, as herein specified.
I also claim the special construction, arrangement, and combination of the whole device, consisting essentially of the case, A B, main-spring, I, band, E, spur and stops, r s, side spring, l, and adjusting screw, n, substantially as herein set forth.

39,309.—Rice-cleaner.—C. E. Rowan, Brooklyn, N. Y. :
I claim, first, The screen, h, applied around the base of the cylinder, d, and below the case, f, for the purpose set forth, in combination with the pins projecting from the cylinder, d, that agitate the rice while in contact with said screen, as specified.
Second, I claim the polisher, m, upon the same shaft, a, as the cleaner cylinder, d, and acting to clean and polish the rice by contact with the wire gauze and stones, p p, as and for the purposes specified.
Third, I claim the arrangement of the winnowing blower, s, on the shaft, b, as shown, in combination with the polisher, m, and cleaning cylinder, d, as specified.

39,310.—Railroad Car Spring.—Clement Russell, Massillon, Ohio :
I claim the rubber cylinder, E, in combination with the disks, A A′ and B B′, and radial elliptical springs, C, when these several parts are constructed and arranged substantially as and for the purpose specified.

39,311.—Teaching the Art of Swimming.—Socrates Scholfield, Norwich, Conn. :
I claim the use of floats for the purpose specified, so constructed and arranged as to gradually exert less and less sustaining force upon the wearer, and become detached automatically while he is making the proper motions in the act of swimming.
Also, the use of a float, the buoyancy of which is gradually destroyed by the ingress of water, substantially as described.

39,312.—Giffard Injector.—William Sellers, Philadelphia, Pa. :
First, I claim the outer framing or case of the injector when it is constructed substantially as described, so as to maintain all the working parts of the instrument in their relative positions to each other, and to admit of changing any of these parts without affecting the remainder.
Second, providing the water supplying pipe of the instrument with a check valve, and the described priming arrangement, or its equivalent, the whole operating substantially in the manner and for the purpose specified.

39,313.—Giffard Injector.—William Sellers, Philadelphia, Pa. :
I claim, first, The use of the compressible stationary packing between the steam and water chamber, when arranged substantially in the manner and for the purpose set forth.
Second, The use of the adjusting nut, when so constructed as to permit the steam, which operates the injector, to pass through it.
Third, The employment of compressible metallic packing below the steam chamber, in combination with packing of elastic material above the steamchamber, with the perforated nut intervening, substantially in the manner and for the purpose described.

39,314.—Railroad Car Spring.—Richard Vose, New York City :
I claim securing one end of a curbed spring, composed of one or more C-shaped plates, to a bed plate, whilst the opposite end of the same is received into a pocket, in a curved, over-arching bearer, E, or lever, G, which is connected with a bearing block, F, or an arm, K, substantially in the manner herein set forth.
When a C-shaped metallic spring, composed of one or more plates, is arranged and combined with a bearing block, F, or arm, K, and a curved over-arching bearer, or lever, as described,
I also claim combining an auxiliary spring therewith, substantially as herein set forth.

39,315.—Machine for polishing Turned Articles.—Warren Wadleigh, Sanbornton Bridge, N. H. :
I claim the endless polishing belt, E, in connection with the rollers, N O N O′, arranged to operate substantially as and for the purpose herein set forth.
I further claim the guides, Q Q Q′, in combination with the polishing belt, E, and rollers, N O N O′, for the purpose specified.

[This invention relates to a machine for polishing or smoothing wooden articles which have been turned in lathes, or made cylindrical by other means. The invention consists in the employment of an endless belt, leaving its outer surface covered with emery or other suitable polishi g material, in connection with feed rollers and guides, all arranged so a to effect the desired end.]

39,316.—Mold for casting Tires.—Jane Brooke, Jersey City, N. J., administratrix of William Brooke, deceased, late of New York City :
I claim, first, Fitting a mold for casting tires, rings, or bands of steel, or iron, or other metal, with a metal core, which is so constructed as to be capable of contracting, automatically, as required, to permit the natural contraction of the casting in cooling, substantially as herein specified.
Second, So constructing the metallic core that it may be loosened in the casting, by the force applied to lift and withdraw it from the casting, substantially as herein described.
Third, The arrangement of the pouring gates and air gates of the mold, between the core and the body of the mold, so that one side of each gate is formed by the surface of the core, substantially as and for the purpose herein specified.
Fourth, Providing an overflow from the pouring gates at a level lower than the mouths of the air gates, substantially as and for the purpose herein specified.

39,317.—Machine for grinding and polishing Cutlery.—James Dodge, Waterford, N. Y., assignor to Dodge & Blake, Cohoes, N. Y. :
I claim the employment, in grinding or polishing machinery of whatsoever construction, and in combination with the bed plate thereof, whether the same be stationary, revolving or vibratory, of an elastic or yielding substance, so applied between the matrix, bed or support, and the articles to be ground or polished, that when the latter are brought in contact with the stone or polishing wheel, they shall be pressed against it with a yielding pressure, substantially in the manner hereinbefore described.
I also claim the combination with the matrix bed, or other equivalent device, for supporting the articles to be ground or polished, of a clamp to hold the said articles in place, as described, such clamp being actuated so as to expose the whole surface of the articles to the action of the grindstone or polishing wheel, substantially in the manner hereinbefore set forth.
In combination with the clamp, operating substantially as hereinbefore described, I further claim the employment of a grooved grindstone or polishing wheel, or of two grindstones or polishing wheel, having an intermediate space, to allow that position of the clamp which projects from above the surface of the article to be ground or polished to sink below the surface of the grindstone or polishing wheels substantially as herein described.

39,318.—Revolving Fire-arm.—Willard C. Ellis and J. N. White (assignors to Henry Reynolds), Springfield, Mass. :
We claim the construction of the openings, b b, in the chambers of the cylinder, and arrangement of the hammer in combination with such openings, substantially as herein set forth, whereby the hammer is enabled to strike upon the interiors of the flanges of cartridges, of such character as herein specified.

39,319.—Window-shade Hangings.—E. T. Higham (assignor to himself and D. Higham), Philadelphia, Pa. :
I claim the roller, B, hung to a cord, E, passing over a pulley, F, and to a cord, G, passing over a pulley, F′, the cord, H, united to the said cords, E and G, and connected to an eye, K, or its equivalent, and the endless cord, L, passing through the said eye, K, and round a pulley, M, on the roller, B, the whole being arranged for joint action, as and for the purpose herein set forth.

39,320.—Lamp Burner.—J. J. Marcy (assignor to Edward Miller), Meriden, Conn. :
I claim the combination with the hinge, C, of the rigid curved rod, F, fixed to the cone, B, projecting downward through the shell, A, between the hinge and the wick tube, and provided with a bent end, b, which, coming in contact with the under side of the said shell, operates by a tensional strain upon the rod, F, to limit the turning of the chimney, all as herein described.

39,321.—Hot-air Engine.—Henry Messer, Roxbury, Mass., assignor to himself and C. G. Dunscomb, Boston, Mass. :
I claim the combination of a pump or pumps with a chamber in the piston of a hot-air engine, and with an outlet pipe from said chamber directly into the hot-air reservoir, when so arranged as to pass all of the compressed cool air into and through said chamber, for the specified purpose.
I claim constructing the pipes which connect the valve chambers with the exterior of the engine, and which incase the valve stems and prevent leakage into the valve chambers, of a diameter equal to or in excess of that of the valves, for the specified purpose.

39,322.—Clasp for Corsets.—T. A. Nelson (assignor to himself and Shelton & Osborn Manufacturing Company), Birmingham, Conn. :
I claim the employment, in combination with two strips or edges, which can be sprung, as described, of perforated plates, c d e, attached to either of said strips and studs, 1, 2, 3, operating in conjunction with said perforated plates, substantially as and for the purposes described.

39,323.—Saw-set.—Oliver Newton (assignor to William Nash), Watertown, N. Y. :
I claim a saw-set composed of a frame, A, having a straight portion, a, an oblique portion, b, a handle, B, at one end, and two projections, c c′, and also composed of a handle, C, lever, D, gage, I, spring, g, set screws, E F, and dies, G H, all arranged substantially as set forth.

[The object of this invention is to obtain a saw-set of simple construction, which may be adapted for setting the teeth of either large or smallsaws, and at the same time have a powerful purchase, so as to be capable of being readily operated, and enable even unskillful hands to set a saw in a perfect manner.]

39,324.—Horse Power.—Stuart Perry, Newport, N. Y., assignor to C. H. A. Carter, New York City :
I claim, first, The power-transmitting wheel, H, having a changing or moving surface for the chain to work upon, substantially as and for the purpose described.
I also claim making the forks, f, of a socket form for fitting onto and holding the spokes of the sprocket wheel, substantially as described.
I also claim the chain or sprocket wheel, composed of the central flanged hubs, the notched spokes, and the sockets, for the purpose of readily taking down the horse-power for transportation or for storage, and quickly setting it up again, substantially as described.
I also claim in combination with the sprocket wheel and the chain pulley a case-hardened or cemented chain, for the purpose of preventing undue cutting or wearing of the chain sprocket wheel and pulley, substantially as described.
I also claim the arrangement of the spring pulley, G, and hinged arm, g, for taking up the slack of the chain, substantially as described.
I also claim the pulleys, i i, for preventing the twisting of the chain, substantially as described.
I also claim, in combination with the main chain pulley, H, the guiding, directing, and holding pulleys, Q Q, substantially as and for the purpose described.

39,325.—Horse-power.—Stuart Perry, Newport, N. Y., assignor to C. H. A. Carter, New York City :
I claim, first, In combination with an endless chain horse-power, the encompassing or encircling of two or more wheels, shafts, or drums by said chain for the purpose of communicating the power of the animal or animals, through the chain, to said wheels, shafts, or drums, substantially as described.
I also claim the arrangement by which one or more friction wheels, shafts, or drums, are interposed between two or more wheels, shafts, or drums that are enwrapped or encircled by an endless chain, or its equivalent, for the purpose of lessening the friction of their axles, whether the force of the endless chain is transmitted by the friction of contact, or by toothed wheels, substantially as described.
I also claim the fork with rollers inserted for the purpose of making a changing bearing for the chain therein, substantially as described.

39,326.—Lathe.—S. W. Putnam and J. Q. Wright (assignors to the Putnam Machine Company), Fitchburg, Mass. :
We claim operating the disk, C, for throwing the side feed in or out of action, by means of the swivel or "union jointed" nut, d, in the manner substantially as set forth.
Second, Forcing the wheel, M, into or out of contact with the disk, N, for throwing the cross feed in or out of action, by means of the hand wheel, O, in the manner substantially as set forth.
Third, The hollow shaft, a, for transmitting power from the driving wheel, B, to the wheel, M, for operating the cross-feed, arranged and operating substantially as specified.

39,327.—Preserve Jar.—P. W. Reid, Birmingham, Pa., assignor to James S. and Thos. B. Atterbury, and J. Reddick, Pittsburgh, Pa. :
I claim, first, The cylindro-conical stopper, in combination with a depressed handle, g, and lugs, i i, constructed in such a manner, with reference to the mouth of a jar, that I combine with a screw pressure and fastening a wedge bearing, substantially as described.
Second, Constructing a cylindro-conical stopper with an annular recess formed in its conical or beveled sides, in combination with a rubber packing ring, r, substantially as herein described.
Third, I claim constructing the mouth of a jar with tapering grooves, a a, spaces, b b, reduced neck, B, and rounded or beveled shoulder, e, in combination with a cylindro-conical stopper, and a rubber packing ring, r, applied to the beveled edge thereof, so as to bear upon the rounded shoulder, e, and to form a tight joint, substantially as herein described.
Fourth, A cylindro-conical stopper with lugs, i i, and a depressed handle, g, constructed substantially as and for the purposes herein described.

39,328.—Apparatus for making Ruffling.—Thomas Robjohn (assignor to E. C. Wooster), New York City :
I claim, first, The combination of the two pairs of intermittently-rotating fluting rollers, D d, and D′ d′, and a presser, E, applied and operating substantially as herein described, in combination with said rollers, for the purpose herein set forth.
Second, The employment, in combination with the guide, J, for conducting the strip of muslin or other fabric to the fluting roller, of a starching roller, K, and a presser roller, L, applied and operating substantially as herein specified.
Third, The employment of a thread-conductor, m, applied subsatntially as herein specified, in combination with the fluting rollers, D d D′ d′, and presser, E, for the purpose herein set forth.
Fourth, The combination of the gas burner, W, chimney, U, and extremities, C* c*, of fluting roller shafts, C c, substantially as shown and described.

[The double-ruffling or frilling which this mechanism is intended to make, is composed of a single strip of muslin or other fabric, and fluted in such a manner as to present ruffles or frills at both edges, but has the flutes folded and flattened along the center of the strip in the form of plaits, which are to be secured by one or more rows of stitching. The invention consists in a novel system of fluting rollers, and a folding device, operatingin combination therewith, for producing the ruffles or frills at the edges of the strip, and the plaits along the center thereof. It also consists in the employment of a starching apparatus applied in combination with the said fluting rollers and folding device to apply starch to one side of the central portion of the strip to enable the plaits to better retain their folded condition. It also consists in certain means of delivering a thread to one surface of the plaits, in such manner that it may be caused by the starch to adhere to the plaits, and hold them together until they can be secured by stitching. And it further consists in a certain mode of heating the fluting rollers by a flame of gas.]

39,329.—Raking Attachment to Harvesters.—Isaac S. and H. R. Russell, New Market, Md., and J. J. D. Bristol, Detroit, Mich., assignors to Isaac S. and H. R. Russell, New Market, Md. :
I claim, first, Giving to the rake a motion nearly parallel with the platform in its delivery passage over it, and also a motion in a curve, both upward and backward in its return stroke, by means of the cranks and arms, G d1 d2 g2, eccentric, n, pitman, m, connecting rods, g3, and G2, all of which are unslotted.
Second, The interposition of the thrusting eccentric, n, or its equivalent, for giving to the rake an oscillating motion for the purpose described.
Third, The articulated rake-head, or hinged teeth, so applied to the rake handle and to the intermediate controlling bar, k, or its equivalent, that the teeth will preserve a position nearly or quite perpendicular to the platform.
Fourth, The combination with a rake which sweeps the platform of the flexible reel ribs supported at or near both ends by flexible radial arms, one set of which are affixed to the reel shaft, and the other set affixed to a circularly-adjustable hub, substantially as and for the purposes set forth.
Fifth, The serrated spirally ribbed reel in combination with a rake which sweeps the platform, substantially as described.
Sixth, Making the axis of the oscillating frame, F, a medium through which motion is communicated from the driving wheel shaft to the rake disk, B, being the bearing for said frame, substantially as described.

39,330.—Wood-saw Frame.—H. F. Shaw, West Roxbury, Mass., assignor to himself and C. H. Page :
I claim, first, Combining with the three parts, A B and C, of a common wood-saw frame, a revolving pressure-bar, D, provided with a nut, i, and screw, h, or their equivalents, substantially as described and for the object specified.
Second, The thimble, E, provided with lateral flanges, f f, tenon, g, and mortise, k, to operate in combination with the ends of the frame, A and B, the bar, D, and its appendage, substantially as and for the purposes described.

39,331.—Soda-water Fountain.—S. R. Sylvester, Washington, D. C. :
I claim, first, The direct discharge of the solution from a single reservoir by means of a spring pump into the drinking glass.
Second, The pump arranged with a spring or air chamber, or spring and air chamber and valve, and for the purpose set forth.
Third, The combination of the single reservoir, pipes, spring, pump, and discharging pipe, substantially as set forth.

RE-ISSUE.

1,513.—Apple-paring Machine.—J. H. Lockey and W. M. Howland (assignees of Horatio Keyes), Leominster, Mass. Patented Dec. 16, 1856 :
I claim, first, Giving the knife a circular movement around the fork, G, and apple or other article thereon, substantially in the manner and for the purposes shown and described.
Second, The combination of the wheel or turn-table, K, cam, O, and shank, M, of the knife head, P, constructed and operating in the manner and for the purpose substantially as herein set forth.

[This invention consists in attaching the knife-head to a rotating disk or wheel arranged in such a way that the knife is allowed to pass around the apple or other article to be pared, thereby preventing or obviating the necessity of any backward or retrogade movement of the knife; also in combining the disk or turn table, to which the knife-head is attached, with the shank of said knife-head and with a cam, in such a manner that, by the relative position of the disk and cam toward each other, the position of the knife-head is governed.]

DESIGN.

1,804.—Stoneware Cooking Stove.—Henry Mishler, Mogadore, Ohio.

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On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
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The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

T. W., of N. Y.—Phosphorized ether is made with sulphuric ether and phosphorus. A small piece of phosphorus is placed in a phial, and some ether poured over it. The phial is then well stoppered, and shaken occasionally, until the phosphorus dissolves. This preparation is employed to produce waves of light in chemical experiments, by dropping a piece of loaf sugar in the ether, slightly heated, and blowing gently over it with the breath.

E. B., of Mo.—Any person has a right to use your invention outside of the United States; and although he may have made a large fortune by its use, you have no claim upon him for any portion of the proceeds.

C. W., Jr., of Mass.—A report on the electric light at Dungeness, Scotland, has been made to the House of Commons. It is the only source, so far as we know, from which you can obtain the information you desire respecting it.

J. W. R., of Pa.—Coal ashes contain a small quantity of potash, which is a deliquiescent salt. Having mixed some of it with the hydraulic cement of which the floor of your cellar is made, this may account for the floor becoming very damp during wet weather. Sprinkle equal parts of dry hydraulic cement and clean sand over the floor, when it is damp, and you will probably remedy the evil.

J. G. H., of Mo.—A good Jonval turbine wheel would be the best that you could use on your 35-foot fall, with a regular supply of 10 cubic feet of water per second. When the quantity of water is irregular, the over-shot, or breast-wheel, should be preferred. Several good turbine wheels have been illustrated in the SCIENTIFIC AMERICAN. Communicate with the makers of such wheels about price, &c., and state the purpose to which you desire to apply it.

E. C. P., of Mass.—There is no special work published on spectral analysis, so far as we know. We would prefer silver to aluminum for spoons or any other article of domestic use.

V. B. T., of Iowa.—The flax-dressing machine to which you refer is a good one. Steam evaporators for sirups are perhaps the most safe; because you can regulate the temperature in a manner superior to that of employing fire direct to the pans.

J. R., of Ohio.—You must heat your boxes before applying the Babbitt metal, or it will not adhere.

J. H. B., of Ohio.—Electricity may be generated by water-power, and conducted on wires to as great a distance as if generated by a battery; but you will find it too expensive and troublesome to provide it thus, for use as a motive power two miles distant. In such a case you would require a very large conductor for a very small power.

R. A. R., of N. Y.—There is no truth in the "fact" that a long screw driver is more powerful than a short one. There is no power in a screw driver any more than there is in a potato. The force is supplied by the man using it, and the longer the tool the more chance he has to exert his strength.

S. M. P., of Maine.—Use the scraping tool instead of the sharp, keen-edged one; and you will find that the turning is much better.

L. M., of Conn.—You cannot expect to become a proficient in tempering steel without practice, and an opportunity of observing others skilled in the art.

W. H. T., of N. Y.—The birch oil of Russia which is used in the manufacture of Russia leather, and which is a powerful preservative, is obtained by submitting birch bark to distillation. Such oil might be manufactured in large quantities from the birch bark of our forest trees; and possibly similar oils may be obtained from the bark of others.

H. W., of Ohio.—You must not expect to obtain good molasses from beet root. In France and Germany such molasses is given to pigs; it is nauseous and has a very disagreeable smell.

W. R. C., of Conn.—Good gas for illumination can be made from wood, but it costs more than gas made from coal. In Germany, where coal is high in price, there are twenty different towns in which gas made from wood is used.

J. P. G., of Ill.—Starch is never attacked by insects; it is the gluten of wheat which is so subject to insect depredations. Starch manufacturers have informed us that they have kept starch for several years, and in no case have they ever noticed it depreciate in quality.

H. P. C., of N. J.—The finest qualities of silk are now raised in France, where as much care has been devoted to improving the breed of silk worms, by crossing the varieties, as has been exercised in other countries in improving the breed of sheep, to secure fine wool.

R. F., of Mass.—The armament of the *Monitors* is now said to be one 8-inch Parrott rifle, and the 15-inch gun.

J. M., of Conn.—We do not know the proportions of the freezing mixture. You had better obtain the glauber salts and salt peter and experiment for yourself.

R. P. W., of Ill.—Good cast-iron is easily distinguished by the closeness and smallness of its crystals and its bluish-grey color. Good wrought-iron is tested by bending cold, and applying severe strains of all kinds.

G. S., of N. Y.—No reliance can be placed upon any assertions of the character you mention. We do not admit that class of matter into our columns.

R. F., of Mass.—The most simple method of making the stannate of soda, which is used to such a great extent in Europe by calico printers, is to fuse tin ore with soda.

J. H. W., of Pa.—Rosin oil is not suitable for painting, compared with linseed oil, but you might use it in the painting of outhouses. We advise you to submit your barometer to some philosophical instrument maker in Philadelphia, and not send it to any great distance to have the air removed from the tube.

M. B., of Wis.—Although the lead ores of Great Britain do not contain so much lead as those of America, they contain more silver, and are held to be more profitable to work.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, July 22, to Wednesday, July 29, 1863:—

W. P., of N. Y., $20; J. M. S., of N. J., $16; R. G., of Ind., $20; W. S. J., of Conn., $20; E. E., of N. Y, $20; Z. W., of Cal, $25; J. B., of N. Y., $20; T. J. D., of N. Y., $45; A. C. B., of N. Y., $12; G. W. W., of Pa., $25; A. H. T., of R. I., $16; I. E. P., of Conn., $25; A. H. A., of Ind., $12; G. S. M., of Conn., $10; J. C. L., of Mo., $16; J. E. Van S., of Ky., $10; S. D. E., of Mich., $44; G. H. L.; of Ill., $40; J. C., of Mass., $250; E. W. H, of Ill., $29; E. R. S., of Mass., $16; J. L. K., of N. J., $16; R. McD., of N. J., $20; H. M., of N. Y., $20; C. H. R., of Maine, $20; T. H., of N. Y., $20; A. B. E., of Mass., $100; T. T. H., of N. Y., $20; R. A. T., of N. Y., $16; H. W., of Ohio, $7; S. and W., of Conn., $778; H. F. B., of Ill., $25; C. P. C., of Mass., $25; F. C., of N. Y., $25; C. F., of Ill., $15; M. D., of Ind., $15; A. H., of Ill., $15; K. and L., of Ohio, $29; P. M., of Ill., $25; S. W., of N. Y., $16; W. and C., of N. Y., $16; R. R. B., of N. Y., $25; T. P. R., of Mass., $25; D. R., of N. Y., $20; C. T. D., of N. J., $16; E. A. S., of N. Y., $20; M. R. S., of N. Y., $41; S. B. D., of N. Y., $41; P. E., of N. Y., $16; H. G., of N. Y., $16; M. and B., of N. Y., $41; W. T., of N. Y., $10; B. L. W., of Mass., $28; S. G., of Ill., $16; J. J. K., of Ill., $15; J. C., of R. I., $12; S. and S., of N. Y., $30; J. S. B., of England, $16; D. and H., of Ind, $16; G. F. J., of Iowa, $20; T. J. W., of N. H., $25; S. W. N., of N. Y., $16; A. S., of N. Y., $25; A. A. S., of Mich., $16.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, July 22, to Wednesday, July 29, 1863:—

H. W., of Ohio; A. C. B., of N. Y.; M. & C., of France; J. C., of R. I.; E. P. C., of Mass.; T. J. W., of N. H.; A. S., of N. Y.; P. C., of N. Y.; R. R. B., of N. Y.; P. J., of France; W. T., of N. Y.; M. R. S., of N. Y.; I. E. P., of Conn.; A. H. A., of Ind.; B. L. W., of Mass.; G. W. W., of Pa.; J. E. Van S., of Ky.; S. & S., of N. Y.; T. P. R., of Mass.; E. B. R., of N. J.; M. & B., of N. Y.; R. W., of Mass. (3 cases); J. S. C., of Kansas; H. F. B., of Ill.; G. F. J., of Iowa; K. & L., of Ohio; E. J. F., of Ill.; P. M., of Ill.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

A VALUABLE WORK FOR INVENTORS, PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them—Importance of the Specification—Who are entitled to Patents—What will prevent the Granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the PATENT LAW and PRACTICE, but also to answer a great variety of questions which have been put to them from time to time during their practice of upwards of *seventeen years*, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps.

Address MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, No. 37 Park Row, New York. 9

TALBOT'S PATENT CALIPERS.—ONE-HALF OR THE whole of the Patent Right of Talbot's Improved Calipers for sale. See illustration and description in No. 6 Vol. IX. of the SCIENTIFIC AMERICAN. For further information apply to or address D. C. TALBOT, Worcester, Mass. 1*

RIGHT FOR THE STATE OF NEW YORK FOR SALE.—Improved Automatic Weighing Scale. This scale operates without the use of weights or springs, is compact, simple and cheap, always reliable, never gets out of order, has every advantage of the spring balance without its disadvantages, and can be adapted to every kind of scale now in use, and is superior to any scale now in use. For terms &c., address as soon as possible L. C. CROWELL, 187 Salem street, Boston, Mass. 3 6*

WATER WHEELS.—REYNOLD'S PATENT.—THE best turbine in use; powerful and economical in use of water. Call upon or address us at our office. Works at Oswego. 3 4 TALLCOTT & UNDERHILL, 482 Broadway, New York.

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WAIT'S IMPROVED JONVAL TURBINE WATER-wheel. The best and cheapest wheel in use. Heavy, strong and durable, adapted to all heads, easily set up and never gets out of order. Circulars sent on application. P. H. WAIT, Sandy Hill, N. Y. 5 2*

FAIR OF THE AMERICAN INSTITUTE, 1863.—The Board of Managers of the American Institute hereby give notice that they have rented

THE ACADEMY OF MUSIC,

In Fourteenth street and Irving place, for the month of September, in which to hold this

GREAT NATIONAL EXHIBITION.

The exhibition will be general, embracing MANUFACTURES of all kinds, NEW INVENTIONS, IMPROVEMENTS IN AGRICULTURAL IMPLEMENTS and the MECHANIC ARTS generally, excepting only machinery propelled by steam-power. Premiums, consisting of Gold, Silver, and Bronze Medals, and Diplomas, will be awarded on the decision of competent and impartial judges. Articles for competition for the premiums will be received commencing August 28, 1863, and the Fair will be opened to the public on

WEDNESDAY, SEPTEMBER 2.

Circulars giving full particulars can be had at the rooms of the Institute in the Cooper Union Building.

By order of the Managers,
W. H. BUTLER, Chairman.
WM. S. CARPENTER, Vice-Chairman.
JOHN W. CHAMBERS, Secretary. 2 3eow

FOR WOOD LATHES, SCROLL SAWS, SAW BENCHES and wood-working machinery, address J. A. FAY & CO., or E. C. TAINTER, succeeding partner, Worcester, Mass. 23 & 26—3 & 6 Vol. 9 *

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B. T. BABBITT ON MAKING BREAD, WITH FULL directions on each package of Saleratus, showing how to make the best of bread from materials that farmers always have on hand. Bread made in this manner contains nothing but flour and common salt and water; it has an agreeable taste; keeps much longer than common bread; is more digestible and much less disposed to turn to acid. Common bread, like every thing that has been fermented, ferments again to the great discomfort of many stomachs, and not only so, but acting as a ferment, it communicates to all food in contact with it. The bread being free from all yeasty particles, is more digestible and not so likely to create flatulence or turn acid on weak stomachs as fermented bread is apt to do, and, when of the finest quality, it is beneficial to those who suffer from headache, acidity, flatulence, eructations, a sense of sinking at the pit of the stomach, distension or pains after meals, and to all who are subject to gout or gravel; it is also useful in many affections of the skin; a saving of 25 pounds of flour per barrel is effected by this process. Be sure and get that with B. T. BABBITT'S name on, or you will not get the recipe with sour milk, nor the quality. For sale by store-keepers generally or at the manufactory, Nos. 64 to 74 Washington street, New York. 25 tf

WOOD-WORKING MACHINES.—A FULL SETT for car and sash and door work. Two Woodworth planers 6 rolls, 14 inches. One Gray & Wood planer 16 by 20, one Daniel's planer, one planer and matcher, two molding, two tenoning, and two mortising machines, two scroll saws, one boring machine, two saw tables, one circular saw mill, one "Wicks" re-slitting mill, one cut-off saw, one blind slat machine, belting, &c., all in good order and cheap for cash. Address CHARLES H. SMITH, 135 North Third street, Philadelphia, Pa. 3 4*

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FIBER-CLEANING MACHINE.—THIS VALUABLE machine, the invention of Eduardo J. y Patrullo, and illustrated on page 268, last volume, SCIENTIFIC AMERICAN, is now on exhibition, where the public are invited to examine it, at the establishment of TODD & RAFFERTY, No. 13 Dey street, New York. 2 13

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THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no second-hand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

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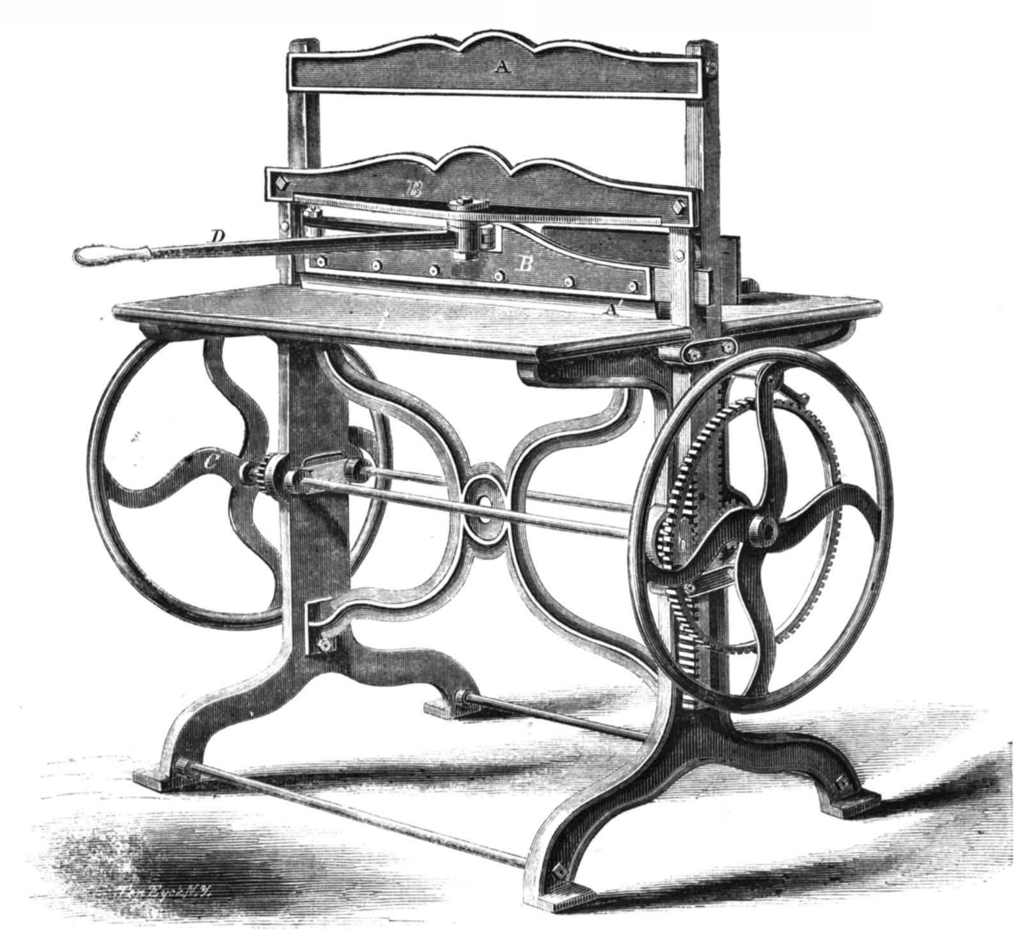
Improved Paper-cutting Machine.

In all job printing offices much inconvenience has long been experienced in the machinery for cutting paper. The machine generally used cuts the paper by a "plow," so constructed that the clamp which holds the paper fast to the table has attached to its head an adjustable knife-blade; this is pushed backwards and forwards on the paper until the task is performed; the knife moving downwards at each stroke. The edges of paper cut in this way are often left rough, and so pressed together that the sheets require careful separation before they can be fed to the printing press.

The machine represented in the engraving published herewith entirely overcomes these objections, and is a valuable tool for bookbinders as well as printers. It is so simple that a minute description is hardly necessary. The paper is placed under a clamp, A, similar in its operation to that of the "plow." The knife, A', is a very long blade, covering the entire length to be cut, held in the frame, B, which moves vertically; and when pressed upon the paper by means of a wheel, C, at the left hand of the operator, is vibrated by his right hand, by a lever, D, in front of the machine.



MONTAGUE'S PAPER-CUTTING MACHINE.

The paper cut in this way is left in the most perfect condition. An adjustable gage on the table is an aid to rapid cutting of books, pamphlets and job work in general. The machine is also more quickly made ready for operation than some others. Machinery for applying greater power than can be obtained by hand can be applied at comparatively little expense. An application for a patent has been filed. Printers, and others interested, will find a specimen machine at E. R. Webb's Printer's Warehouse, 110 Fulton street, New York, which they will do well to examine. Further information can be had by addressing the inventor, Mr. Charles Montague, at Hartford, Conn.

Food for fattening Poultry.—The cheapest and most advantageous food to use for fattening every description of poultry is ground oats. These must not be confounded with oatmeal, or with ordinary ground oats. The whole of the grain is ground to a fine powder; nothing of any kind is taken from it. When properly ground, one bushel of the meal will more effectually fatten poultry than a bushel and a half of any other meal. The greatest point in fattening poultry is to feed at daybreak.

A New Enterprise.

The Menhaden fishery is attracting considerable attention in this vicinity, the present year, in consequence of the almost fabulous profits said to have been realized in the business by parties in other places. Two small vessels recently sailed from this port, and a brig has been added to the fleet. The brig has been fitted in a thorough manner by her agent for doing a heavy stroke of business, with little trouble and in an expeditious manner. She has try-works similar to those of a whaler, except that they are fitted to burn wood. The fish are first boiled in these till they are soft, and then transferred to a powerful set of screw presses, fitted up with novel appliances suited to the work in hand. Among these is an arrangement by which the heavy blocking between the screw and the cheese is so balanced as to be easily swung into and out of position by one man. The vessel carries a number of large tanks, of a united capacity of several hundred barrels, and the oil runs into them through pipes directly from the presses, without bailing. All the spare room in the hold is devoted to empty barrels for the refuse remaining after the oil is pressed out, which is by some means converted into "guano."

The oil is mostly used by curriers, but it is said to have been lately discovered to be superior to linseed oil for paint. About a gallon of oil is obtained from a barrel of fish at this season, and from two to three and-a-half gallons in the fall.—*New Bedford Standard.*

[This may be a new enterprise for fishermen, but it is not to capitalists, who have been at great expense in fitting up large establishments at various points in the Eastern States, with whom the fishermen are thus brought into direct competition.—Eds

Ventilating Hay Mows.

A correspondent (H. Walker), of the *Country Gentleman*, gives the following as his experience with hay mows:—

"Ventilating large bodies of hay is not often practised, and results in mow-heated hay, when it is not thoroughly cured. In the summer of 1861, I filled a bay thirty-four by twenty-two feet, and eighteen feet high; as I supposed, well cured. Soon after it was filled, I had occasion to visit the mow, and found that a large amount of steam or vapor was rising from the hay. I took a hay-knife, and cut two round holes four feet in diameter and five feet deep, which when done had the appearance of an escape-pipe from a steam-boiler. The work of cutting was a good steam bath. The heat subsided in a few days, and the hay came out bright. Last year I constructed a ventilator in the same bay, of four scantling, with rounds two and a half feet long, and fifteen inches apart, and placed it in the center of the bay, over a hole in the floor connecting with the air outside. It is in fact a four-sided ladder. I saw no signs of steam on the mow after it was filled."

A large steam hammer in the works of Messrs. Lazell, Perkins & Co., Bridgewater, Mass., weighs upwards of eleven tuns, and has ten feet stroke; the full force of the blow being 135 tuns. The large lathe in the same establishment will bore and face 30 feet diameter, and turn 37 feet long.

FROM THE STEAM PRESS OF JOHN A. GRAY