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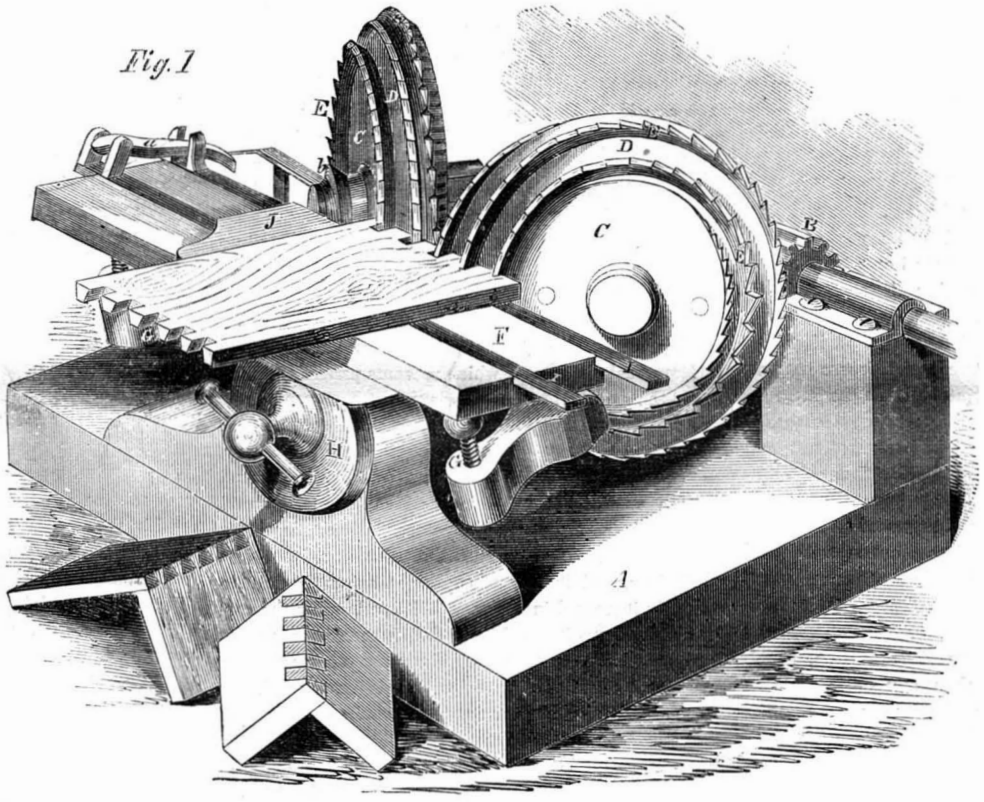
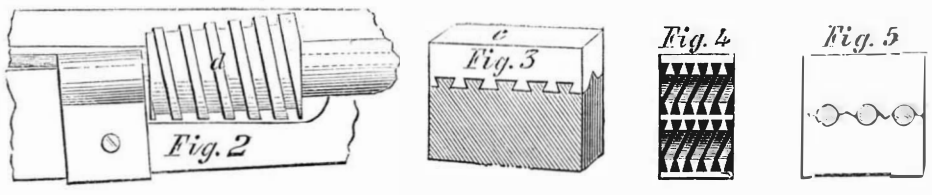
IMPROVED DOVETAIL AND TENON CUTTER.

The number of boxes which are badly put together, for the want of some such machine as we illustrate, to make a good joint at the sides, is enormous, and were that its only use the machine we are about to describe would be a great acquisition, but it is useful for cutting dovetails and tenons at any angle and in any material.

Fig. 1 is a perspective view of the invention for which a patent has been applied for. The inventor is W. A. McDonald, of Mott Haven, N. Y. It rests on a bed, A, and can be operated from a shaft, B, by hand or other power, according to the size of the machine. The cutters are two wheels with an angular periphery, D, on which a spiral saw, E, which runs like the thread of a screw around and on the periphery, is placed. In large machines this saw can be inserted in a spiral groove cut in the wheel, and in small ones it can form part of the wheel itself. The wheels C are adjustable so as to vary the angles at which they stand in relation to the bench F, and also to cut a narrower or wider tenon in order that the fit may be tight or loose as desired. The bench is capable of being elevated or depressed at the back so as to allow the stuff to meet the cutters at the desired angles by the screws, G, and the whole table can be elevated and tilted by the screw H. On the bench, F, there there are two bars, I, on which the stuff to be cut is placed, and a guide, J, is secured to them, against which one side of the stuff is pressed, so as to keep it true to the saw.





MACDONALD'S DOVETAIL AND TENON CUTTER.

The operation is as follows:—The guide is brought in front of the saws and the stuff placed up against it, a slight motion is then given to the stuff by the hand, and the bar, *a*, on the bars, I, catches in a screw, *b*, of the same pitch as the cutters, and which carries the stuff forward a sufficient distance for the teeth of the saw to take hold, and start the tenon at any point desired. The bar is then relieved, and the cutters, by their spiral form, continue to feed to themselves as well as cut. One wheel C, cuts one side of the tenon and the other the opsite side. Specimens of its work are illustrated lying around the machine, and will be seen it is capable of cutting all those joints at any angle or bevel. Two extra heads are provided with the machine to cut the dovetail in another piece of stuff, for the tenon to rest in, and they are of course are capable of the same adjustment as the tenon cutters. The saws in the latter heads are inclined to the periphery, D, those seen in our illustration being at right angles to it.

Fig. 2 represents a cutter patented by the same inventor February 15, 1859, for the purpose of jointing together any material, such as wood, metal, bone or other substance, as in Fig. 3, which shows a piece of metal, *c*, joined to another piece of any material which may either be cut to fit it or only the one cut and the other cast on to it. Fig. 5 shows its application as a tap for joining metal that has been cracked or broken, it is driven through the crack and some other metal is cast or screwed in the dovetail spiral which it leaves around the hole it has made in the metal. Fig. 4 is a cross section of such a crack. The tool itself is simply a dovetail screw *d*, with cutting teeth made on the outside of the screw, which cut in a peculiar manner, as it commences with the narrowest part of the cut and gradually deepens and widens with the cut and makes the dovetail as it proceeds.

The inventor of this simple and valuable machine, which is capable of such varied application, will be happy to furnish any further information upon being addressed as above.

GREAT HEAT.

The California papers give the following items concerning the recent "heated term."

In Sacramento the thermometer for ten days rarely fell below 100°, and often reached 106°.

The heat at Timbuctoo, Yuba county, caused the thermometer to rise to 121° on the 22d of June.

At Ophir, the thermometer stood at 114° in the shade for three consecutive hours; at Gold Hill, it was 116°; at Main Bar, on the American river, 120°; at Mountain Springs, 110°. The mercury rose about 10° higher than the above figures, when the thermometer was placed in a frame building.

The hottest weather ever known in the State, says the Shasta *Courier*, has been experienced during the past week. In some places, in brick buildings, the mercury rose to 118°.

The heat has never been more oppressive at Mariposa, says the *Gazette*, than during the past two days. The thermometer has ranged in the middle of the week from 110° to 118°. Some of the interior towns must have been fairly baked at noon. At Shasta, which is in the latitude of New York, the thermometer ranged (on the 27th), from 108° to 118°—so the dispatches say; and at Oreville, Sonoro Columbia, Nevada, Auburn, Marysville, and elsewhere, the same extraordinary heat was manifested. But worst of all was the visitation inflicted upon the town of Shasta Barbara. A terrible sirocco swept over that place, which caused everybody to run within doors and shut themselves up in houses. Cattle were killed, water became more than blood warm, fruit withered and fell from trees' branches as if roasted, grain dried up, and, in fact, everything of a perishable nature died as if before the blast of a furnace.

San Francisco has escaped and the weather, taken all in all, has been delightful. It is called unusually hot there if it gets as high as 80°. The sea breezes afford a pleasant relief, and such a thing as a sun-stroke never was heard of.

The heat in Paris, during the last week of June, and the first three weeks of July, has not, according to the meteorological registers of the Observatory in that city, been equaled since 1793. Its long continuance is something almost unparelleled. To have the thermometer above 90° for 12 days in succession, seems to have astonished the gay Parisians. Many sudden deaths have been caused by the heat. For a week or two the divisionary and regimental drills of the garrison of Paris were entirely suspended. The English papers report that the maximum temperature in the shade has been the highest of the last 60 years—namely 89°. Of late years, the summer months of June, July, and August, appear to have had an increasing temperature.

INSTANTANEOUS PHOTOGRAPHS.—It is said that Mr. Skaife, of England, has invented a photographic apparatus that can be carried in the hand, and which, working by means of a trigger, can be used with ease and certainty. He calls his instrument the "Pistol Camera."

BESSEMER AND GUN-METAL.

[From "Once a Week."]

Many of the readers of this periodical may not be familiar with the more prominent principles of iron and steel manufacture, and as they are an important part of great-gun manufacture, I will therefore name them as briefly as possible.

Pure iron like pure gold is homogeneous, but unlike gold it is rarely pure. If gold be kept in a melted condition a sufficiently long time, all extraneous matters may be burnt away, but if iron be kept in a hot state too long it will be burnt away itself. Pure iron appears to be ductile, but pure iron will not melt. To form cast-iron, a quantity of carbon must be mixed with the pure iron, If the quantity of carbon be less in amount, steel is the result.

The ancient method of making steel was to cover up bars of iron with charcoal powder, and to keep them in a red-heated condition for a fortnight or so. When taken out the iron was found covered with blisters arising from gases constituting some of the impurities of the iron. Consequently, the purer the iron the less it would be blistered. To turn the blistered steel to use, it was shorn to pieces, and the pieces piled on each other, heated to a welding temperature—*i. e.*, surface melted—and forged under the hammer. When drawn out into bars it was called "single sheer steel." To improve it, it was cut up again and re-piled, welded, drawn into bars, and so called "double sheer steel." But these processes left the metal full of specks, flaws, and imperfect welds, with scaly particles, rendering it unfit for delicate cutting-tools.

In those days die-sinkers and others paid as much as three or four guineas per pound for a steel brought from India, called "wootz," which came in little half-round lumps, shaped as the bottom of a crucible, and weighing from two to three pounds. This was, in fact, the metal from which Indian sword-blades and other weapons were forged, and it was really natural steel cast by workmen sitting on their haunches and urging their fire by right and left-hand circular bellows.

In process of time it was discovered that, if instead of welding up the shorn blistered steel, it was put into a crucible, it could be melted into a homogeneous mass without flaw or speck, and then forged into a malleable bar. This was called "cast steel," but it was a long time before people would be persuaded that cast steel would be other than brittle, like cast-iron. But as time went on, die-sinkers found that what was called, "Huntsman's steel," sold at about four guineas a hundred weight, was quite as good as wootz at four guineas a pound, and wootz was thenceforward kept at home in India for the sword-blade making.

English steel was made from Swedish iron, simply because it was a purer iron than any other, and was manufactured by charcoal, and not by coke. But neither steel nor iron could be manufactuerd in large masses, save by the process of welding together small portions—ever an imperfect process at best in the modes used; and so the prices ranged from eighty pounds per tun, for the highest qualities, to thirty pounds per tun for the lowest—carriage springs—till the advent of railroads, when, with an enormously increased demand, the price went gradually down to twenty for manufactured springs, all specified to be of Swedish steel—all Sweden and Russia to boot not being competent to furnish the supply; English iron being in fact resorted to, to manufacture an inferior article.

One man finally solved for us the problem, how to produce both iron and steel in homogeneous masses of any required bulk. This man was Henry Bessemer, one of that not numerous inventive race by dint of whose brains England is not as China, but is ever progressive—a race ever seeking to develop the true meaning of what has been called the "primal curse," not "sweat of the brow," but rather sweat of the brain within the brow, wherein to seek redemption from all painful drudgery by converting it into healthy exercise. From sugar-refining to iron-making, yet with the bent of his mind—doubtless French Huguenot by derivation—ever leaning rather to chemistry than to mechanism, there are few things of the future that Henry Bessemer has not tried at, as witness the patent list, that record of pretended rewards for genius, wherein his name appears no less than sixty-seven times, beginning in March 1838, and ending in December 1858, ranging over many subjects, such as printing, railroad-brakes glass, bronze, powder, paints and colors, atmospheric propulsion, steam-vessels, locomotives, sugar, varnishes, kilns, furnaces, ornamenting surfaces, guns and projectiles, waterproof fabrics, screw propellers, iron and steel railway wheels, beams and girders, treating coal, &c. Twenty-one patents were taken previous to the alteration of the law, for England only, exclusive of Irish and Scottish, and probably three thousand pounds were extracted from the inventor's pockets for fees. The patents he has taken since the alteration of the law indicates the fact that the cost of patents is not less than before, but considerably greater; the restriction in title being so great that five patents for three years, at £30 each, are required instead of one at £100 for fourteen years; the five patents, if extended to fourteen years, costing about £160 each, or £800 instead of £350, if English, Scotch, and Irish be included in both cases. Many of these latter patents probably did not go beyond "protection," being, in truth taken to prevent others from obtaining patents for every variety of article that could be made out of the improved iron and steel to the detriment of the real inventor.

Thus he went on, ever working through good report and ill report, falling often from a height where success seemed attained, not from false calculations, but from some adverse and before-undiscovered fact in nature, most valuable to us to know, but not tending at the time to replenish the inventor's purse.

At the British Association of 1857, Mr. Bessemer read a paper, wherein he described his process of iron-making. The ordinary process is, first, to run it from the ore into pigs by one heat. 'Secondly, to re-heat it and "puddle" it, *i. e.*, stir it about in a melted condition with iron rods moved by men's arms till it becomes stringy and tough, and gets rid of some extraneous matter. Thirdly, to beat it by hammer into a mass, called technically a "bloom." Fourthy, to rollt his bloom into a bar or bars, making the commonest iron. Fifthly, to cut the bar into short lengths, and pile them up. Sixthly, to re-heat this pile and forge it into another bloom; and, seventhly, to re-roll it into a bar or bars. If, during the process of heating, the oxygen of the atmosphere gets access to the surfaces, scale is formed, which prevents perfect adhesion under the hammer, and the metal is not homogeneous.

Mr. Bessemer simplifies all this. When the metal is melted in the great furnace is is run out into a huge clay crucible, practically a colander, by reason of several openings in the bottom, through which the metal would run were it not impeded by a strong blast of air under great pressure, which is forced through all the interstices of the iron, and instead of cooling it, raises the heat to a greatly increased intensity. This burns away the carbon, which constitutes the chief difference between cast iron and malleable iron, and also some other matters; and when the metal is poured out, it is pure iron, if the process is carried on long enough, or if stopped at an earlier period so as to leave some carbon in it, it is pure steel: in both cases malleable. Thus one heat serves to make a malleable ingot, which is only limited in size by the size of the crucible, which may contain two tuns; and, as many crucible may be used and poured out together, there is no reason why a homogeneous lump of fifty or more tuns should not be produced, either of iron or steel, which may be dealt with by the hammer, or by rolls, or both.

In rolling thin sheets of metal in the ordinary manner, the size is limited by the difficulty of retaining the heat. By another arrangement of Mr. Bessemer, this difficulty may be obviated. Hollow rolls are used, through which a stream of water pours, and on the surface of which jets of water play. Between these rolls, which are placed horizontally, and form a tank or channel when they approach each other, the molten metal is poured, and thus a sheet of any desired width or thickness may may be formed, and only limited in length by the supply which the crucible are capable of keeping up. The ore goes into the furnace a crude stone, and comes out of the rolls a sheet of tough metal. Iron-making is thus rendered as simple as the paper-making processes, where the rags go in at one end of the train of apparatus, and come out at the other perfect paper.

At Baxter House, St. Pancras, this new process of melting was first exhibited to the public, and excited an equal amount of wonder and incredulity. On one occasion, a sort of Welsh St. Thomas, iron-doubting, sneered as he saw the metal poured, and asked: "Do you call that malleable iron?" The inventor went into a shed, brought out a carpenter's axe while the metal was still red, and cut three notches in the angle, just as might be done at the angle of a square foot of timber. The silent answer struck St. Thomas dumb.

Still the inventor had much to learn. The iron hissing, boiling, and bubbling in its clay colander, was poured out in its ebullient state like so much champagne; and as it cooled was filled with innumerable air-cells; and the apparent want of success filled the mouths of fools and scoffers with matter for exultation. Far and wide the whole affair was considered a failure; natheless that men of logical mind knew to the contrary. But the resolute inventor stuck to his work, he had sounded the depth of his invention, but he had not explored many of its ramifications. Two years behold him again before the world with the verification of his theories and of his earlier practice: the causes of failure unfolded. His next paper was read at the Institution of Civil Engineers; and those who know the critical acumen of that strong-brained body of men, and were present at the reception of Mr. Bessemer, and beheld the enthusiasm spontaneously kindled, as important truths were enunciated, and sample after sample was exhibited, opening new capabilities to those anti-Chinese sons of eternal progress, are not likely to forget it. No actor at a successful *debut*, no writer of a successful play, was ever more warmly greeted. A small cannon, a railway axle, a three-ply cable, twisted up of cold iron, one-and-a-half inch diameter, steel bars and rods of all shapes, a large circular saw, boiler-plates of perfect surface and great width, and, lastly, ribbons of iron as thin as paper, were exhibited. A small cylinder was shown of cast metal in a perfect condition, and another cylinder was shown which had been doubled up flat under the hammer, without exhibiting the smallest crack at the sharp bends, but the tensile strength was shown to be nearly twenty-four per cent greater than that of the most costly iron made in England.

A thin sheet of iron, reticulated and pierced with holes, almost like a lady's veil, was produced, and stated to be a skin left on one of the crucibles after pouring out the metal. "Is that malleable iron?" asked one of the audience. The inventor simply folded it, and double-folded it, and laid it again on the table in answer.

Representative men of the iron-master mold were present, some of whom denied that there was anything novel in the process, and others asserted that it was too costly to be of any use. Others inquired why it was that Mr. Bessemer chanced to be successful now, having failed of commercial success at the outset.

"I expended £7,000," said one, "and lost forty per cent of iron in the process."

"I," replied Mr. Bessemer, "sometimes lost a hundred per cent, but I persevered. I found that experimenting with heavier charges of metal gave a decided improvement, and I found that all ores were not equally suited to my process. Blaenavon pig at £9. 10*s*., was not so good as Swedish pig, nor as the red hematite of Cumberland, of which class of ores nearly a million tuns are raised annually, yielding upwards of sixty per cent of metal."

"The process melted down the lining of our furnaces," said another.

"So it did mine," replied Bessemer, "till I established myself as a steel manufacturer at Sheffield, and got to use the Sheffield road-drift. In short when I began my experiments, I was an amateur iron-master, and two years of consecutive work have converted me into a practical man."

Most engineers present felt that they were in the presence of a benefactor, who had immeasurably enlarged the sphere of their operations, whether in bridges, rails, locomotives, or ships. It was the triumph of a simple-minded man, earnest of purpose, and frank of nature, with nothing to conceal, but with the instinct of unsealing every mystery of nature so far as he could, and giving it to man's uses. And, verily, that man had toiled and ranged through matter for twenty years, and at last gave to the world a process of which the results are incalculable—homogeneous iron and steel without limit as to size.

Upon projectiles and projectile weapons these results must have an enormous effect; the process of welding iron together for barrels of small arms and for great

guns may now be dispensed with. A short, thick, hollow cylinder being cast, may be at once rolled out direct between rollers into a musket or rifle barrel of any desired form; and great guns may be cast hollow, and put under the operation of a tilt or steam hammer, if needed, to consolidate the metal. And these malleable iron guns can be procured at one-third the cost of the ordinary cast-iron guns; and what is very important, the malleable steel is even cheaper in cost than malleable iron. The class of guns described in the last number, to be borne on wheels without horses, might be produced with little labor and cost, ve y rapidly to any amount.

With regard to monster guns, they may be regarded as useful only for two purposes—to mount on forts for defense, and to place in vessels. They are not otherwise transportable weapons of offense. This question is yet in embryo; but if armored ships are to obtain, this question must obtain also. For shot that are to pierce armored vessels, it is quite clear that the Bessemer malleable steel will prove a most important material, as it can easily be tempered to any required hardness to act as a punch, and can be more easily manufactured than the wrought iron shot that have replaced fragile cast-iron.

Before constructing monster guns we have yet to settle the question of the form, proportion and weight of the shot we are to use for given distances with a given destructive power. This ascertained, there will be no difficulty in the construction of the gun itself. But it should be a gun so proportionably heavy as to be absolutely without recoil; so long as to expend expansively the minimum amount of powder required to obtain the longest possible range; so dense in the material as not to fracture; and so solid as not to spring and temporarily enlarge its diameter with the explosion. A maximum-sized gun of this kind would probably weigh 100 tuns, and if used for forts would require machinery to move it and aim it. If used on vessels it would be placed fore and aft with only a vertical movement, and the vessel itself would serve as a stock to it, lateral movement being given by the screw and rudder. Fitted to an armored vessel, with the bows thoroughly protected, such a gun would be able to batter down everything in the shape of a stone wall at such a distance as to render being hit from the fort almost an infinitesimal chance. It would be like shooting at the edge of the east wind.

Long-range rifles, it may be remembered, were more than a match for the fort-mounted artillery at Bomarsund and in the Crimea, killing off the artillerymen. This will become more and more the rule as guns are improved. Monster guns are not calculated to pick off skirmishers, and it therefore becomes needful to protect their gunners. With the large embrasures of the ordinary kind which would be required for monster guns, the risk to the gunners would be much increased. It therefore is well to inquire whether there is any reason why the gun should not be closely covered in. With the ordinary mode of mounting on trunnions this seems scarcely practicable. But it would be very practicable to mount the gun on a sphere or ball working in a socket and capable of radiating in any direction. If the radius of the gun were only required to be small, as in a moving vessel, the ball might be placed at the muzzle, and in such case little sound or vibration, and *no smoke whatever should come into the vessel*, and no damage could be done to the gun save by shot striking exactly in the muzzle. This is so perfectly practical an arrangement, that nothing but the fact of a ship's sides being too weak to sustain the recoil of guns so attached ought to keep it out of use. Our sailors are too precious a commodity to have them wasted in working muzzle-loading guns at open ports. The steam ram now constructing is perfectly adapted to this arrangment, and a properly-constructed gun should be free from recoil. Even in our present state of knowledge, muzzle-loading guns must be regarded as things of the past, matching with "Brown Bess," and other tower antiquities. Into the details of construction it is not desirable to enter; and although the improvements indicated give these advantages chiefly to nations with manufacturers widely spread and of a high order, still the State should ever have in reserve a stock of improvements to meet emergencies; not making them common till required by the presence of adverse circumstances. The State should "keep a hold of the actual, knit the new securely to it, and give to them both conjointly a fresh direction." The astonishment created by the results of the Armstrong gun is simply a proof how much the progressive actual is overlooked by the many, while the special individual by time and thought turns it to account; and then it is assumed we can go no further, not heeding the words of the philosopher poet—

Men my brothers! Men the workers! ever making something new;
That which they have done but earnest, of the things that they shall do."

W. B. ADAMS.

NEW YORK WATER.

A few years ago the water with which Boston is supplied became quite fœtid, acquired a fishy taste, and formed a subject for much anxiety to the people of that city. In the subsequent year, the water in the city of Albany, N. Y., was affected in a similar manner; and now the "Croton," of this city, seems to have caught the infection. It has not yet acquired the exact fishy taste of the Cochituate fountains; but as it has been growing gradually worse for the past two weeks, it may yet arrive at that stage of deterioration if something is not immediately done to discover and arrest the evil. The reports of the scientific committees which were appointed to investigate the water evils in Boston and Albany attributed them to minute animalculæ and the decay of vegetable matter, brought about by a deficient supply of water in dry seasons, whereby the ponds be came, in a measure, stagnant by the very limited quantity that was permitted to flow into the distributing reservoirs. The impure water in New York this season cannot be ascribed to such causes, because there has been no drouth; the supply of water has been abundant, and the season has not been unfavorable. The taste of the water is similar to that retained in a "moss-covered bucket" for several days, and the odor is very like that of marsh gas, thus affording some evidence that there has been an overflow of marsh lands into Croton Lake.

It has been stated that Dr. Chilton and some others have analyzed the Croton, without finding anything of a deleterious character in it. This may be true. The waters of the Dismal Swamp, although of a berry-brown color, are stated to be very healthy and very pleasant. The first quality may belong to the Croton, but not the last. That's certain.

ON HARDENING STEEL.

There are few things of which it is more difficult to understand the *rationale* than hardening steel; or why the same operation of heating red-hot and plunging into a cold fluid, which hardens steel, should soften copper.

Some persons will explain everything whether they understand it or not, and for this also have they found, in their own imagination, perfectly satisfactory answer, and cut the difficulty by saying steel is condensed by the operation; but, unfortunately for their theory, the reverse is the fact, and instead of being condensed, it is expanded by hardening, as any one may soon satisfy himself by taking a piece of steel as it leaves the forge or anvil, and fitting it exactly into a gage, or between two fixed points, and then hardening it; it will then be found that the steel will not now go into the gage or between the fixed points. Or let him rivet together a piece of steel to a piece of iron, filing the ends of both even, so that they may be exactly the same length, then heat them to a proper heat to harden the steel, and plunge them into water; he will find the expansive force of the steel has nearly torn the rivets out, and that it extends beyond the iron at both ends, any article may be taken with steel on one surface and iron on the other—such as a joiner's plane iron in the forged state—flat on both surfaces, and hardened; and the expansion of the steel will cause that side to be convex, and the iron side concave; how this is to be got flat again will be explained afterwards.

All steel expands in hardening, but that expands most which is most highly converted, and in direct proportion to the amount of carbon it received in that process. No other general rule can be given for the treating of steel for hardening than this, and it should in all cases be heated as regularly as possible to the lowest temperature at which that particular kind of steel will harden, and as little as possible beyond it, remembering that the more highly converted the steel is, the lower the temperature at which it will harden; and that a small article, such as a penknife-blade, will harden at a lower temperature than a more bulky one made of the same steel, because the small article is more suddenly cooled. The hardening of the very bulky articles, such as the face of an anvil, cannot be affected in the same way as smaller articles, by plunging them into water; for the length of time required in cooling will be almost certain to leave the middle of the face soft, where it is of the most consequence that it should be hard. Where the anvil-forge is worked by water-power, they possess the best means in hardening them, which is this:—The anvil, properly heated, should be placed in a water-tank face upwards, under a chute connected with the mill-dam; the chute drawn, and a heavy and continuous stream of water let fall from a height of ten or twelve feet upon the anvil-face, which effectually hardens the surface.

A red-hot anvil plunged into water would for a time, be surrounded by an atmosphere of steam, which would prevent its direct contact with the cold water, whereby its cooling would be retarded too much to harden the face; and hence the advantage of a continuous stream of cold water. Hence, also, the necessity of moving about in the water even articles of a pound or two in weight, to remove them away from the stream as it is generated upon their surfaces and thus promote more rapid cooling.

It is a good plan to harden hammer-faces, where there is a tub and water tap conveniently near, by plunging the red-hot hammer, held with the face upwards, into the water, so that a stream from the tap may fall upon its face. The face of hammers and anvils is ground after being hardened, but should never be tempered.—*Orr's Industrial Arts.*

DURATION OF LIFE AMONG THE JEWS.

According to the observations of M. Gatters, the duration of life among the Jews is considerably longer than with Christians; even in infancy, the mortality of the former is relatively less than among the latter. From his calculations, it results that the average length of life is, for Israelites, 46·5 years; for Germans, 26·7; for the Croats, 20·2; for the Austrians, 27·5. Gatters attributes the superiority on the part of the Jews, in different climates, entirely to the influence of race, and suggests the advantage of paying attention to the ethnographic element in the etiology of diseases. It is very probable that the cause of the greater longevity of Jews over Christians does not depend wholly on race, as Gatters thinks, but especially, if not entirely, on the fact that the Jews are more wealthy than Christians, and that their hygiene is superior to that of the latter.

EXPERIMENTS ON THE OLD ATLANTIC CABLE.—The Buffalo *Republic* says three pieces of the Atlantic cable, which were purchased by Messrs. Tiffany & Co., of New York, have been laid across the Mississippi, at St. Louis, in order to put that office in connection with the eastern lines. The first cable worked very well for about three weeks, the second about thirteen hours, and the third, which was laid on Saturday evening, gave out on Sunday night. On Thursday the second cable was under-run by experienced electricians, but no flaw was discovered—nothing perceptible to account for the cessation of the working capacity of the cable. The last cable was put to a good test, having been entirely submerged for over two hours before being laid. The first cable was examined from St. Louis to near the Illinois shore, where the cable having been imbedded in the sand gave way. Up to the place of parting there was nothing perceptible that could lead to the discoverery of the existing trouble. The third cable also furnishes no evidence whereby the cause of the difficulty can be detected.

IRON RAILROAD CAR.—An iron car, built according to the patent of Dr. La Mothe, was exhibited for a few days last week at the New York and Erie Railroad station, Jersey City. It is one of the handsomest cars we have ever examined, and we have no doubt but the proprietors of the road for which it was built (Boston and Lowell) will feel highly pleased with its appearance. Its sides are of double plates, with a space between, and the seams are branded with narrow strips, riveted on in such a manner as to form panels. It is fire-proof, and lighter than a wooden car of the same size.

C. A. Schultz has a new and economical steam-engine on exhibition at the Neptune Iron-works, foot of Eighth-street, East river, in this city. The novelty of this engine is so great that we shall shortly give an illustration and description of it in the SCIENTIFIC AMERICAN

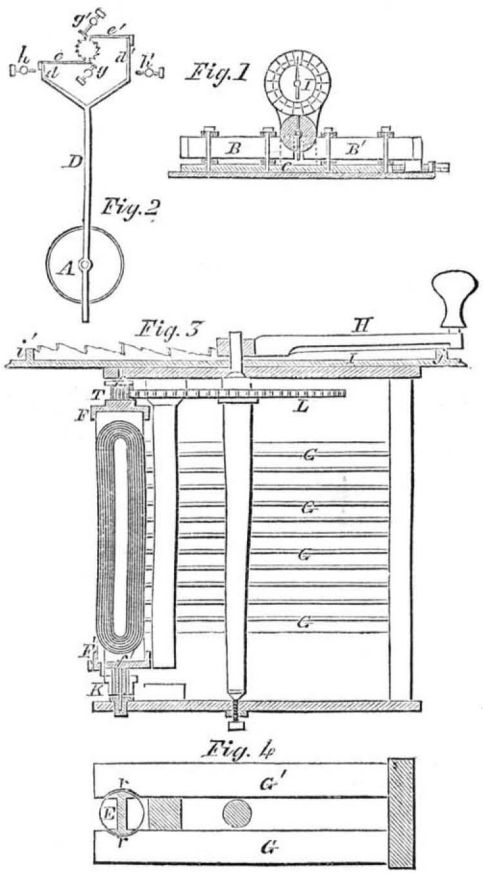
THE MAGNETO-ELECTRIC DISK TELEGRAPH.

[Translated for the Scientific American.]

Messrs. Siemens & Halske are the proprietors of a large manufactory of telegraphic instruments in Berlin, Prussia, and the instrument which we are about to describe is rendered prominent by its compactness, and by its surety and rapidity of operation, whereby it is particularly adapted for railroads. Three hundred of these instruments are already in use on the different railroad lines in Bavaria alone.

The construction of this instrument will be easily understood by the aid of the accompanying engravings, in which Fig. 1 represents a transverse vertical section of this instrument; Fig. 2 is an enlarged view of the coil and its appendages for the purpose of moving the index; Fig. 3 is a sectional plan of the electro-magnetic coil which produces the opposing currents necessary to propel the index; and Fig. 4 is a transverse vertical section of the same.

The poles of an electro-magnet, A, which is reversible in its integument, are placed between the opposite poles of two steel magnets, B B′. These steel magnets are arranged on a carriage, C, and they are adjusted so that both exert an attraction of equal power on the electro-magnet, which takes the place of the armature. To the reverssble electro-magnet, an arm, D, is screwed, from which two prongs, *d d′*, extend, that are furnished with spring hooks, *e e′*. These hooks engage with the teeth of a small ratchet-wheel, *f*, which is turned for one tooth by each backward or forward motion of the lever, D.



The hooks, *e e′*, are furnished with projections extending beyond the wheel, and bent down, which strike against screws, *g g′*, whenever the motion of the arm, by coming in contact with the set-screws, *h h′*, has arrived on its extreme point. By these means, the progress of the wheel beyond the required distance is prevented.

The axle of the ratchet-wheel, *f*, bears the index.

If, now, a current passes through the coil of the electro-magnet, its poles are attracted by one and repelled by the other of the electro-magnets, and the wheel, *f*, is turned for one tooth. If, now, a current passes through in the opposite direction, the attraction and repulsion is reversed, and the second motion of the wheel is effected, and so on.

The opposing currents of equal intensity necessary to propel the index are produced by a magnetic-inductor, which is represented separately in Figs. 3 and 4, and the construction of which differs considerably from those now in use.

This inductor consists of an iron cylinder, E, provided with a groove of about 7-16 of the diameter in depth, and 2-3 of the diameter in width, and extending in a longitudinal direction all round the cylinder, as clearly shown in Fig. 3. This groove is filled up with braided copper-wire, in such a manner that the cylindrical form of the iron, E, is restored.

Secured to the ends of this cylinder are the boxes, F F′, with the pivots, *f f′*, which latter form the jouruals for the cylinder, E.

Said cylinder rotates between the poles of a number of small steel magnets, G G′, placed in pairs, one above and at a short distance from the other, as clearly shown in Fig. 4.

Said steel magnets are formed of magnetic steel rods, and segmental recesses, *r*, are cut out of their front ends, exactly opposite to the cylinder, E, and nearly filled up by the same, and their rear ends are united by horse-shoe-shaped rods of soft iron. From this, it will be seen that the cylinder, E, forms the common armature for the several steel magnets, G G′, and if said cylinder is rotated, the magnetism in the inner flat iron core is reversed for every half revolution; and, whenever this takes place, a current is produced, the intenseness of which is in direct ratio with the quantity of magnetism confined in said core. The successive currents run alternately in one and in the other direction, and their magnetic value is exactly alike.

The cylinder, E, is rotated by means of a cog-wheel, L, which goes into a pinion, T. A crank, H, is mounted on the arbor of the cog-wheel, L, and said crank rotates on the face of the dial-plate, I, which is marked with the letters and figures of the telegraph. The handle of this crank can be depressed by a slight exertion of the hand, and a nose secured to its under side catches into recesses, *i i′*, on the edge of the dial-plate, whereby the wheel, L, and the cylinder, E, is arrested.

The ends of the helix of the cylinder, E, communicate with one end of the helix of the appertaining telegraphing instrument (the other end of this helix communicates with the line wire), and with the earth.

The indexes of the telegraphs thus inserted on two stations rotate, therefore, with every half revolution of the cylinder, E, for one tooth.

When the cylinder, E, is at rest, a contact, K, closes the circuit of the helix on this cylinder; so that the arriving current cannot pass through it before said contact is removed.

The advantages of this inductor over others now in use, are:—

First, That it gives only two currents in opposite directions, and of perfectly equal intensity, for every revolution of the cylinder; whereas, all the inductors as now used, produce four separate currents—one in removing one of the iron poles from one of the magnet-poles; a second one in the same direction when the iron approaches the opposite pole of the magnet; a third in the opposite direction, by removing the iron from this pole; and a fourth in the same direction of the third current, when the iron approaches the first pole of the magnet.

Second, The inertia of the rotary cylinder is only about 1-20 of that of similar cylinders used in the usual manner. For this reason, it is easy to effect the rotation by hand, as described, or by a running-gear, without any extra power, if it is preferred to use a series of keys for arresting the same.

Third, Instead of two large magnets, an indefinite number of small magnets can be employed. And, as the power of steel magnets is as the square root of their weights, a much more intensive current is obtained with an equal weight of steel by using the above-described inductor. From this it will be seen that not only a great amount of steel is saved, but the intensity of the current can be increased at pleasure, and at a comparatively small expense.—*Dingler's Polytechnic Journal.*

LACASSAGNE & THIERS' DRY GALVANIC BATTERY.

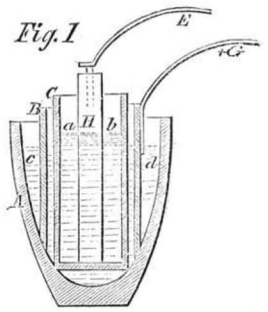
[Translated for the Scientific American.]

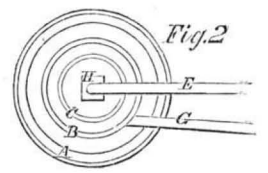
This battery is, for itself, or in combination with other elements, a powerful source of electricity. One part of the elements is employed to produce a metal which not only covers the cost of the battery, but which contains another advantage arising from the decomposition of the substances used for charging the battery.

A vertical central section of this apparatus is represented in Fig. 1, and Fig. 2 is a plan of the same.

The battery consists of a vessel, A, of fire-proof clay. Into this vessel an iron cylinder, B, is placed, which is open on both ends, and to which a conducting-wire, G, is attached. In the interior of this cylinder, there is a diaphragm, C, of clay, which receives a rod, H, of gold, platina or charcoal, to which the other conducting-wire, E, is attached.

The exciting medium consists of common salt, which is placed into the outer vessel, and chloride of aluminium or chloride of manganese; free of water, which is put into the inner diaphragm of clay. This battery is heated in a common stove to a red heat. The chloride of soda excites the positive metal, B; the chloride of aluminium the negative element, H. If both the salts are red-hot, and if the conducting-wires are now united, an electric current is produced, which turns a piece of soft iron, inserted between the currents, into a powerful electro-magnet.





The metal, B, is eaten up by the corrosive power of the common salt, and the chloride of aluminium is decomposed into chlorine (which escapes) and into aluminium, which collects on the bottom of the diaphragm, C. It is obvious that a number of such batteries may be united and a current may be formed of sufficient power for any practical purpose, and, at the same time, a quantity of aluminium is obtained. In order to effect the positive element more rapidly, a small amount of nitrate of potash or chlorate of potash may be added to the chloride of soda.—*Armangeud's Genié Industriel.*

MILK WHICH DOES NOT YIELD BUTTER, AND THE MEANS TO REMEDY IT.

M. Deneubourg addresses those who are chiefly interested in cases in which there is no disease of the mammary gland nor loss of milk, but a want of oleaginous matters in the fluid. In the causes of this deficiency of butter-making quality, he concludes that there are two principal ones, viz.: idiosyncrasy and alimentation; but there is another which cannot be so easily defined, and which occurs in animals that are well kept, and whose milk has been previously rich in butter. It is to these that the remedy is principally directed. The remedy consists in giving the animal two ounces of the sulphuret of antimony, with three ounces of coriander seeds, powdered and well mixed. This is to be given as a soft bolus, and followed by a draught composed of half a pint of vinegar, a pint of water, and a handful of common salt, for three successive mornings, on an empty stomach.

The remedy, according to the author, rarely fails, and the milk produced some days after its exhibition is found to be richer in cream. The first churning yields a larger quantity of butter, but the second and the third are still more satisfactory in their results.

A letter from a farmer states that he had fourteen cows in full milk, from which he obtained very little butter, and that of a bad quality. Guided by the statements of M. Deneubourg, which had appeared in the *Annales Veterinaries*, he had separately tested the milk of his cows, and found that that the bad quality of it was owing to one cow only, and that the milk of the others yielded good and abundant butter. It was, therefore, clearly established that the loss he had so long sustained was to be attributed to this cow only. He at once administered the remedy recommended by M. Deneubourg, which effected a cure.—*Veterinarian.*

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

We conclude this week the extracts from the proceedings of this association, held at Springfield, Mass. This was the Thirteenth Annual Meeting. It was held for six days, and adjourned on the evening of the 9th inst., to meet on the first of August, next year, at Newport, R. I.:—

NEW SURVEYING INSTRUMENT.

Mr. J. E. Hilgard, of the Coast Survey, read a paper by Mr. John Oakes, of New York, on a self-recording instrument to measure the sun's altitude without an artificial horizon. The instrument is a hollow hemisphere, silvered and iodized, hung on gimbles; and the sun's light is admitted through a hole in an equatorial plane, for one minute, and the center of the image of the sun thus formed taken as the true center at the end of 30 seconds. Practically tested by the Messrs. Blunts, of New York, it has proved itself capable of giving quite accurate results. The iodized coating need not be renewed oftener than once in five or six weeks.

MAGNETIZING LOCOMOTIVE-WHEELS.

Lieutenant W. P. Blake read a short paper by Mr. E. W. Serrell upon "Experiments in the magnetizing of Locomotive-wheels." The lower segment of the driving-wheels having been surrounded by a helix of copper wire, upon passing a current through the wire the friction on the rail was so increased that, when 19 lbs. of steam would make the wheel slip, unmagnetized, it required 35 lbs., magnetized; when it required 50 lbs., unmagnetized, it required 88 lbs., magnetized. The value of this invention consists in giving greater tractive power to lighter engines than those now employed. We shall have more to say on this subject in our next number.

EXPLOSION IN STEAM-BOILERS.

Mr. Hyatt, of New York, presented an able but practical paper on "The Explosion of Steam-boilers." He showed how rapidly the pressure of steam in boilers was doubled according to the following formula:—

212	degs. of heat,	15	pounds to	square inch.
251	"	30	"	"
294	"	60	"	"
342	"	120	"	"
398	"	240	"	"
464	"	480	"	"
868	"	960	"	"

This carries iron to a red heat, and, of course, softens it. The temperature rises often with great rapidity. If the water becomes low, or if it is let in suddenly, steam of high tension is generated, acting against weakened boilers. This, he had no doubt, was the true cause of the explosion of boilers.

Professor Henry said that the amount of latent and sensible heat in steam was the same, according to the law discovered by Dalton. This would lead to most terrible results when water was allowed to become low in boilers. He coincided with the view presented.

Professor Silliman said that he had never had the subject so vividly brought to his mind as at the present moment by the remark of Professor Henry. It was, he had no doubt, the true and only cause of all explosions. People resorted to other subterfuges, but this, he was satisfied, was the cause. The relations between latent and sensible heat were such that it was like kindling another fire in the boiler above the one already kindled. Other gentlemen coincided with the opinions advanced.

[In this table of pressures and temperatures, the last column should have been placed first. As it stands, it is liable to make an erroneous impression upon the minds of the uninitiated. The temperature in a boiler rises positively with the pressures, but steam may be heated to a very high temperature, and yet not exert a high pressure. The remarks of Professor Henry, as reported, does not seem to explain the nature of the heat of steam clearly; but that, we believe, is not his fault, as he understands the subject thoroughly. A pound of steam, at a pressure of 15 lbs to the square inch, and at a temperature of 212°, contains as much heat as a pound of steam at 251°, and a pressure of 30 lbs. on the square inch. High pressure steam is just low pressure steam compressed into a smaller space, and has its latent converted into sensible heat.—EDS.

CAUSES OF CHANGES IN THE EARTH'S TEMPERATURE.

Professor Peirce showed that geologists are mistaken in supposing that the heat of the earth is derived from the interior of the earth. He demonstrated that it would require a million million years to produce a change of 1·20 of a degree of heat at the earth's surface. He proceeded to show that the heat could not come from the celestial spaces, neither from the formation of continents; it must come from the sun. But, to assume that hypothesis, in looking at the past history of the earth, it would of necessity involve a change of temperature in the sun itself. He was not ready to take that alternative, but he could see no other.

THE NATIVITY OF INDIAN CORN.

Dr. J. H. Gibbon read a paper on this subject. In commencing, he stated some facts as to maize being found at the present day in Asia and Africa. It grows, he said, in mountainous regions in China, in the latitude of 30°. The natives pay little attention to its culture, and it is of inferior quality. Dr. Livingstone had boiled green maize presented to him in Africa by negroes who had never seen a white man before. They often roast it and use butter upon it. The ancient Egyptians were great eaters of bread, and he thought they used Indian corn to a great extent. The speaker dwelt at some length upon the "manna of the desert," which the Israelites used when under the leadership of Moses, and argued that Indian corn was the very article. The fact that kernels of some grain had been used in olden time in Asia and Africa as a unitary weight, he considered proof of the antiquity of corn in those countries.

[Dr. Gibbon must be an antiquary of the highest sagacity; and, as the "manna" in the desert fell every night, and twice as much on the fifth as the last day of each week, he may be able to inform the Farmers' Club of the American Institute how to raise Indian corn by this short-cut process.—EDS.

METEOROLOGY.

Professor Henry read a most interesting paper on this subject. He stated that there were 350 observers in the United States, who made their observations daily. The moving power in meteorology was the sun. It was originally supposed that the currents of air flowed from the equator to the poles; but that could not be true. On account of the convergence of the meridians, there was not room at the poles for the air. There were middle systems or intermediate currents of air; but these points were not fully established. There were exceptions in the general action which could be determined in their general bearings only by long observation. The cause of the fitful disturbance of the atmosphere was owing to the conversion of water into vapor. During a single shower, an amount of water fell upon the Smithsonian Institute building equal to 20,000 horse-power an hour; or the heat necessary to evaporate it would be equal to that necessary for working an engine of 20,000 horse-power per hour. Another cause of disturbance was the motion of the earth itself upon its axis. He had been assured by Mr. Wise, the balloonist, that, out of 200 ascensions, he had always been able to move east whenever reaching an upper strata of air. He (Prof. H.) therefore did not think it impossible that an aerial voyage could be made to Europe. Success would greatly depend upon the ability to make the balloon air-tight. If he kept in the upper strata, he might succeed, although it was not certain there was not a reverse current in mid-ocean. In the lower strata, there were irregularities which must be avoided. The balloon he considered as an important means of meteorological observation; by it, electrical phenomena and the formation of clouds could be observed. The reason why the English meteorologists had failed to make any satisfactory observations was because they lived on the western side of a great continent, with no opportunity to make observations west of them; while we lived on the eastern side of a great continent, with telegraph lines extending inland thousands of miles. The formation of hail, the sudden gusts, tornadoes, and other phenomena, were explained in a clear manner, which was listened to with intense interest.

STOCKINGS KNIT BY MACHINERY.—We published in our last volume an illustration of Aiken's Hosiery Knitting Machine, designed for manufacturing purposes and to be driven by power. Since then he has arranged the machine for family use, and is prepared to furnish them as will be seen by reference to Mr. Aiken's card on the advertising page. The machine is an excellent one and is made to be operated by a treadle, like the sewing machine, and is a valuable adjunct to every large family in our land.

AMERICAN PAPER-HANGINGS.

The beautiful green color on wall-paper is produced by a pigment containing arsenic, and we have, in former volumes, directed attention to cases of sickness said to be caused by the volatilization of this poison from the paper. It has been as strongly denied, on the one hand, that arsenic volatilized from the paper as it has been asserted, on the other, that it did; both parties claiming to have made experiments to test the question. This subject has very recently been brought before the public again by Mr. R. Medlock, of London, who states that he has recently analyzed three specimens of green-colored paper, and dust swept from the carpet of a room in which it was used, and in this dust he found a considerable quantity of the poison, thus showing that, whether it was exhaled from the paper or brushed from it, the fact was evident that it was in the room, and floated in its atmosphere, and that was sufficient. He therefore recommends the public to avoid purchasing wall-paper colored with arsenic-green.

On this subject, Dr. Hall, in his *Journal of Health*, for this month, says:—"If green paper, under any circumstances, poisons the human system, it is better to lay it down as a broad fact for practical purposes, that green paper ought not to be put on the walls of rooms. If the paper is well glazed, comparatively little injury may result, for then there is less furz to fly about the room."

We hope our manufacturers of wall-paper will attend to this matter. In the meantime, we assure the public that green colors of a perfectly harmless character can be used on paper, and they must not, therefore, be excited to reject the use of all paper containing this color.

PERFORMANCES OF LOCOMOTIVES.

The New Orleans *Delta* gives the following account of the performances of two Philadelphia locomotives on the New Orleans, Jackson and Great Northern Railroad:—

"The locomotive 'Black Prince,' built by R. Norris & Son, Philadelphia, ran in the month of June 3,328 miles, burning 25 cords of wood, making 133·12 miles to a cord, carrying three passenger-cars and one baggage-car. Charles Barnum acted as engineer and John Snyder as fireman.

The locomotive 'Mazeppa,' built by M. W. Baldwin & Co., ran for the same month, 2,730 miles, burning 27 cords of wood, making 101·08 miles to a cord, carrying three passenger and two baggage-cars. The above wood includes firing up, switching and regular mileage. The length of the road is 206 miles: it has 35 stops each way. The engineer was Henry Frink, the fireman Patrick Murter.

We will also remark, that on one trip of the 'Black Prince' (a trial trip), the consumption of wood was 2½ cords, making 412 miles, including switching, stopping, and firing up at each end of the road, and with a train of two passenger-cars and one baggage-car—being 164·08 miles to a cord of wood."

OUR CANALS AND RAILROADS.

In *Hunt's Merchants' Magazine*, for this month, there is an able article on the above subject, by Hon. B. Brockway, of Pulaski, N. Y. He seems to view this question in the same light as we have done ourselves, and he presents similar ideas to those which we put forth on pages 253 and 299, Vol. XIII., SCIENTIFIC AMERICAN. During the present year there has been a great reduction in the amount of tolls received on the Erie Canal; but this is not good evidence of its trade being absorbed by railroads, because all kinds of traffic between the East and West has been less this year than the last, thus far. If, however, we take a series of years, such as from 1854 to 1859, we find that the traffic on the canal has greatly decreased in the aggregate, while that of railroads has increased; so we may safely conclude that the latter system of public conveyance is absorbing the trade of the former. This appears to be the case, according to Mr. Brockway, as, in 1854, no less than 4,165,862 tuns were carried on the New York canals, and only 3,665,192 tuns in 1858. According to his views, *our canals* are moving down an inclined plane, and are yearly becoming deeper involved in debt, so that the people may yet be called upon to pay the principal as well as the interest. Unless our canals be galvanized into prosperity by the application of steam-power in towage, they must ultimately go down before the competition of railroads. It is only a question of time.

INTERESTING CORRESPONDENCE.

THE PEOPLES' COLLEGE.

MESSRS. EDITORS:—The anniversary meeting of the Trustees of the People's College was held at this place yesterday, and was a very pleasant affair. In sending you an account of it I will give a brief history of the institution.

About thirteen or fourteen years ago, the idea of a People's College originated with several members (in western New York) of an organization called "The Mechanics' Mutual Protection"—an order which had most noble objects in view, and which did considerable good in its day, but is now extinct. The names of its originators I need not give in this communication; although several of them have since then arisen to to distinguished positions and are now men of *mark*. After much labor and trouble it was reserved for the Hon. Charles Cook, of Havanna, Schuyler county, N. Y., to give the project a fixed and practical impulse, and he may justly be called its founder. It was chartered by the Legislature in 1853, and its objects found a responsive sympathy in his heart, as he had commenced active life as a laboring man, and gradually ascended the ladder of affluence and public reputation, until he has reached a most distinguished and deserved position in society. On September 2, 1858, the foundation-stone of the edifice was laid amid a large concourse of people, and with very imposing ceremonies; and the main building has now reached its fourth story. Mr. Cook is erecting this structure, which will cost $175,000, and he has also given a farm worth $30,000 for industrial purposes, which is one of the main objects of the college. This is a good beginning, and affords evidence, that the institution is destined to be one of the best and most comprehensive in our country. Its main objects are to qualify young men for the efficient discharge of the practical duties of life, and to provide the means for elevating the working men to that position in our republic which they deserve to occupy, but which they do not at present. The exercises of the students are to be arranged so as to educate them theoretically and practically for following the callings which they desire to pursue, as mechanics, farmers, &c. Geology, botany, mechanics, chemistry, engineering, agriculture, &c., together with the classics, are to be taught. Workshops are to be erected for teaching practical mechanism, and students who are too poor to pay for their education can labor in connection with the college to defray their expenses.

The anniversary ceremonies, yesterday, were conducted in the open air. A procession of about 3,000 persons was formed in the village, and escorted to the grounds, near the college, by the Cook Guards. On reaching the grounds, the Hon. Charles Cook, in the absence of the Chairman of the Board of Trustees, was called to the chair, and prayer was offered by the Rev. Mr. Hunt, of Ithaca. This was followed by a most eloquent address by the Rev. Asa D. Smith, D. D. of your city. From beginning to end it was listened to with the most profound attention, and every heart seemed to bound with impulses in unison with the ideas of the speaker. His address was full of sympathy for the mechanical and agricultural classes; and he urged, as the foundation of true greatness, in all who were to receive an education here, the study of the scriptures.

The president of the college, Dr. Brown, afterwards stated, in the form of a report, that about fifty men had been kept at work upon the building for the past eleven months, and that $30,000 had already been expended upon it. He said that he had already received 200 applications from young men in various parts of the country who were waiting to avail themselves of the privileges of the college, and he asked for $20,000 from Schuyler county to endow a professorship. The audienee gave a unanimous response to the effect that this would be done. It is to be hoped that the several chairs in this college will all be endowed soon, and that it will go on prospering and to prosper. No other college in the world is founded on the same principles, nor is there one which has such thoroughly useful objects in view. It has a lofty mission to fulfill; and those who have labored to promote its interests deserve the lasting gratitude of all good men.

The trustees of the college now consist of the Governor and Lieut.-governor of the State, the Speaker of the House of Assembly, the Superintendent of Public Instruction, and the president of the college, who are, by the charter, made ex-officio members of the Board; also Horace Greeley, New York; Daniel S. Dickinson, Broome; Washington Hunt, Niagara: T. C. Peters, Genesee; D. C. McCallum, New York; A. I. Winkoop, and W. H. Banks, Chemung; C. J. Chatfield, John Magee, and Constant Cook, Steuben; S, Robertson, Tompkins; George J. Pumpelly, David Rees, Tioga; Charles Lee, John Rose, Yates; T. R. Morgan, Broome; E. C. Frost, Charles Cook, W. T. Lawrence, and Joseph Carson, Schuyler; Thurlow Weed, Albany; Asa D. Smith, D. D., New York.

Havanna, N. Y., August 11, 1859.

QUALITIES OF BELTING FOR MACHINERY.

MESSRS. EDITORS:—As the columns of the SCIENTIFIC AMERICAN have furnished much valuable information on the subject of belting, permit me to add my testimony as to the relative durability of different kinds of belts, and thereby, perhaps, save some of your readers from spending their money for that which profiteth nothing.

Having had the management, for several years, of one of the best steam saw and grist-mills in the South, I have had an opportunity to try almost every variety of belting. I am running, with other machinery, a circular saw, of 48 inches diameter, which is cutting upwards of 2,000,000 feet of yellow pine per annum. It is driven from a center-shaft by a 10-inch four-ply belt of vulcanized rubber. The center-shaft is driven by a four-ply belt of the same material, 12 inches wide. The last-named belt was injured by oil, through the carelessness of the engineer; and having heard gutta-percha belting recommended as possessing every good quality of rubber, with the addition of being oil-proof, I substituted gutta-percha in lieu of the 12-inch rubber one; but with very poor success, for it cracked so badly that in less than a month it was a total failure. The injured rubber belt, which had been used constantly for 18 months, was again set to work, and has now run in all 22 months, and is yet good for six months more. The gutta-percha belting, under a light tension and slow motion, might give satisfaction; but it will not do in a situation where its qualities are as severely tested as here—this 12-inch belt requiring a tension-pulley of 400 lbs. weight, and a motion of 2,500 feet per minute, and it has to be shifted to work on fast and loose pulleys. Yet, with ordinary care, a vulcanized rubber belt will last, in this situation, three years, running 12 hours per day.

I will now mention a composition belting manufactured by a company who advertised their goods, and "guaranteed" every belt purchased of them. In April last, I ordered a variety of this belting, such as I was needing, the lot costing about $120. In place of the 10-inch belt which drives the saw-mandrel before-mentioned, I put in a composition belt, full one-third thicker and heavier than the rubber belt, which had been used for nearly two years. I found it would do as much work with one-half the tension which the rubber belt required, but the material was so rotten that it was with difficulty I could join the ends to last more than two hours. Finally, I succeeded in making a joint which was stronger than any other part of the belt, and then it parted in a new place; so that the belt was entirely used up in two days' running. I wrote to the treasurer of the company, requesting him to order the belt returned, and send me a better article or refund the money; but no notice was taken of my letter. The adhesion of the composition is so imperfect that you can press the edges of an eight-inch belt together, and form a tube through which a cat can pass pass from one end to the other. And this explains the "pliable" nature of the belting.

I have replaced the old rubber belt again. A leather belt of the best quality will last only about six months in this situation. The canvas in the composition belt is of a poor quality, or else the composition rots the canvas. The company's circular states that "the lacings will not tear away, but will retain their hold on the tightest bands," but this is so far from being the case, that one of their belts has given way repeatedly, and that in a situation very favorable for the durability of the belt. It is eight inches wide and 75 feet long, and runs perpendicularly, requiring hardly any tension except its own weight. A vulcanized rubber belt will do service for more years than this "substitute" will days.

The old proverb, "Try what you will, there's nothing like leather," was penned before vulcanized rubber came in vogue for belting and numberless other purposes; yet for crossed-belts, and those running at high speed over small pulleys, the proverb is still good. But for almost every other situation, I prefer belting of rubber. I have in operation some leather belting manufactured by a New York company, which gives perfect satisfaction. Some other, purchased at the same time and place (all warranted to run straight on the pulleys), bears a strong resemblance in its course to that of a snake in the grass, but perhaps not quite so regular in its curves. It is useless to complain of such treatment, for the parties would make it appear that, although the orders, which are accompanied by a check, almost invariably go safely by mail, yet a letter expressing dissatisfaction, or requesting them to make good their promises, is invariably miscarried.

These remarks are intended entirely for the benefit of mill-owners; for, in many cases, steam mills are so badly mismanaged that the proprietors realize little or no profits from them.

C. W. SHEDD.

Addison, Ala., August 16, 1859.

TOOL-HOLDERS FOR LATHES.

The following interesting letter, giving a history of the various improvements which have been made in lathe tool-holders, is from a gentleman well qualified to give a succinct and correct account. It was called forth by our description of Peck's improved tool-holder, which appeared in No. 7. of the present volume.

MESSRS. EDITORS:—In my 26 years' experience and observation in the machine and tool business, there have come under my notice many devices for adjusting tools on gib and other lathes; and from the importance of the subject, I have noted somewhat carefully the progress made.

Among the earliest experimentors (to my recollection) was Mr. O. W. Bailey, of Manchester, N. H., who made the first gib lathe ever built in this country. He constructed his tool rest in two pieces; the top part, carrying the tool-post, was attached to the bower or main part by a hinge-joint, and had cast on the bower side a pendant arm hanging down in the hollow part of the lower piece, and was vibrated forward and back by a screw, giving a rocking motion to the upper surface, and producing any required adjustment to the tool.

Mr. James Brown, of Pawtucket, Mass., built and used for six or seven years, and afterwards patented (in 1852, I think) a tool-holder for gib rests, which consisted simply of a thimble with an internal screw, screwed on the top of a round rest, in the center of which was a common tool-post with a long slot and set-screw. To adjust the tool it was simply necessary to slacken the screw in the tool-post, and turn the thimble up or down, as the case required, to the proper hight, then to tighten the screw on the tool.

Mr. Rollins, of Nashua, N. H., also built and patented (some six years ago) a tool-holder that is very much like Charles Peck's device; as each of them supports the tool upon convex surfaces resting upon corresponding concaves, which is really the main feature in the two adjustments, and is substantially the same thing in principle.

Mr. C. C. Strong, of Nashua, N. H., built and used some tool-holders that were constructed with a segment of a sphere on the under side of the piece supporting the tool, which segment rested in a corresponding surface, and was held in any required position by tightening the tool, it being adjustable in every direction within proper limits.

The next noteworthy inventori n this line was Mr. C. Van Horn, of Springfield, Mass., who patented, several years ago, a tool-holder that was elevated or depressed by means of a screw and inclined-plane, in substantially the same manner as has been in use some 29 years on a lathe now running in the Newark Machine Co.'s machine-shop, in Newark, N. J., the principal difference between the two being in simply reversing the angle of the plane.

Mr. Lincoln, of the Phœnix Foundry, Hartford, Conn., has also in extensive use an adjustable tool-holder, operated by screw and wedge. Messrs. Gay, Silver & Co., of North Chelmsford, Mass., and Wm. Sellers & Co., and our firm, of this city, have long been using for the same purpose a gib rest very much like the old weighted rest, and adjusted by a thumb screw on the

back side, which device has been abandoned more ta facilitate turning larger objects over the rest carriage than for any faults it possessed in its adjustment.

The common ring around a tool-post with steps or notches has been very extensively used, and answers a good purpose, though not perfectly adjustable. But among all the valuable improvements I think there is none so simple and entirely *practicable* as the adjustment which we use, and which was invented by our foreman, J. Q. A. Brown; it is simply two rings or circular inclined-planes, each having a thick and thin edge, with the common tool-post in the center; these rings are made of wrought-iron, case-hardened, and are milled on their outer surfaces so that the workmen can turn them easily with their fingers. By placing the thin edge of one and the thick edge of the other together the upper surface is level, but by placing the two thick edges together, the greatest angle is obtained, and any intermediate angle is obtained to the slightest degree by turning one or both of the rings, as the case may require.

In a recent visit to several European machine-shops I was greatly surprised to find little or no attention paid to the subject in question, though they universally use gib rests. In fact, the English—who are the leaders in tool-building in Europe—are far behind the Americans in practical conveniences about tools and labor-saving machinery, though they do excel in massive and expensive tools, which our people are beginning to appreciate.

As I understand one of the aims of your valuable journal is to diffuse a knowledge of the mechanic arts, with all past and present inventions, I have ventured thus to advance the foregoing remarks, hoping that they may interest many of your readers and "draw out" some other communications on the subject, thus helping forward still greater improvements in the construction of machine tools.

WM. B. BEMENT.

Philadelphia, Pa., August 22, 1859.

RAIN AT DIFFERENT ELEVATIONS.

MESSRS. EDITORS:—There is one remarkable fact connected with the fall of rain, which has never yet received satisfactory explanation. Over any given spot more rain falls at the surface of the earth than above it. Heberdon made some experiments to explain the fact, in the following manner: he fixed a rain-gage on the square part of the roof of Westminster Abbey (away from the western towers, which might have obstructed the clouds), another on the roof of a neighboring house, and a third on the ground, in the garden of the same. The number of inches of rain caught on the Abbey roof was 12, on the house-top, 18, and in the garden, 22. The illustrious French astronomer, Arago, has for many years noticed the fall of rain, at different hights, at the Observatory of Paris, and his results (with which hundreds of others agree) are like those of Herberden. It is well-known that the quantity of rain which falls at the foot of a mountain is considerably larger than that deposited on the summit of it. Many explanations have been offered of this most curious fact, but none to which the scientific have given sanction. My own explanation of the phenomena is that the rain, in falling, condenses vapor in the whole way of its descent to the ground, and must, therefore, convert a greater amount of it into water at the surface of the earth than at any altitude above it.

H. B. LIVINGSTON.

Laurens, N. Y., August 18, 1859.

MINERALS IN SOUTH-EASTERN MISSOURI.

A correspondent—F. Woolford, of Paton, Mo.—who seems to be fully posted in the manufacture of pottery and porcelain, sends us a description of the minerals of the south-eastern portion of his State, which he has evidently explored very thoroughly. He informs us that, in addition to iron, marble is plentiful in Bollinger and the adjoining counties, and cobalt, nickel, bismuth and antimony have been found, with silver in small quantities and in crystals. But more valuable than these are the kaolin or china clay deposits, which are found on the eastern spurs of the Ozark Mountains, about 14 feet below the surface, and is overlaid with a strata of red firable micacious rock, resembling gneiss. In some places it is entirely decomposed, and in others it has the external form of feldspar, and is of good quality, being free from iron and other impurities. It is well adapted to the manufacture of porcelain, iron-stone china, and other wares. There is an extensive mine of pipe or ball clay, free from iron, and which burns very white in the kiln. It will admit of from 20 to 30 per cent. of silex to make a good pottery. There is also an abundance of fine quartz sand, suitable for glass and glazes for the earthenware; and there is a fine clay in the neighborhood which makes excellent fire-bricks, seggurs, glass-pots, and the like. If coal could be found in this region (which, from its granite character, we do not think likely), it would immediately become the Staffordshire of America; but until cheap and easy means are found for the fuel, we are afraid these valuable resources must lie dormant, and not realize the sanguine anticipations of our correspondent.

WEAR OF BOILERS.

MESSRS. EDITORS:—There is one fact in regard to the wear of ordinary flue boilers which I do not remember to have seen in your journal; it is this, the corrosions of the plates exposed to the fire takes place just at the edge of the overlapping sheet, and the space does not exceed an inch in width, and expands around the boiler, to the water line on either side. I have an old boiler which at this point is not thicker than sheet iron, while the remainder of the sheet is almost as good as new; the furrow is as distinct as if cut with a cold chisel. This matter is worth investigating.

T. LEE.

Central College, Ohio, August 20, 1859.

HOW TO FATTEN CHICKENS.

It is hopeless to attempt to fatten chickens while they are at liberty. They must be put in a proper coop; and this, like most other poultry appurtenances, need not be expensive. To fatten twelve fowls, a coop must be three feet long, eighteen inches high, and eighteen inches deep, made entirely of bars. No part of it solid—neither top, side nor bottom. Discretion must be used according to the sizes of the chickens put up. They do not want room; indeed, the closer they are the better—provided they can all stand up at the same time. Care must be taken to put up such as have been accustomed to be together, or they will fight. If one is quarrelsome, it is better to remove it at once; as, like other bad examples, it soon finds imitators. A diseased chicken should not be put up.

The food should be ground oats, and may either be put in a trough or on a flat board running along the front of the coop. It may be mixed with water or milk; the latter is better. It should be well slaked, forming a pulp as loose as can be, provided it does not run off the board. They must be well fed three or four times a day—the first time as soon after daybreak as possible or convenient, and then at intervals of four hours. Each meal should be as much and no more than they can eat up clean. When they have done feeding, the board should be wiped, and some gravel may be spread. It causes them to feed and thrive.

After a fortnight of this treatment, you will have good fat fowls. If, however, there are but four to six to be fattened, they must not have so much room as though there were twelve. Nothing is easier than to allot them the proper space; it is only necessary to have two or three pieces of wood to pass between the bars, and form a partition. This may also serve when fowls are put up at different degrees of fatness. This requires attention, or fowls will not keep fat and healthy. As soon as the fowl is sufficiently fattened it must be killed, otherwise it will still get fat, but it will lose flesh. If fowls are intended for the market, of course they are or may be all fattened at once; but if for home consumption, it is better to put them up at such intervals as will suit the time when they are required for the table. When the time arrives for killing, whether they are meant for market or otherwise, they should be fasted, without food or water, for twelve or fifteen hours. This enables them to be kept some time after being killed, even in hot weather.—*London Cottage Gardener.*

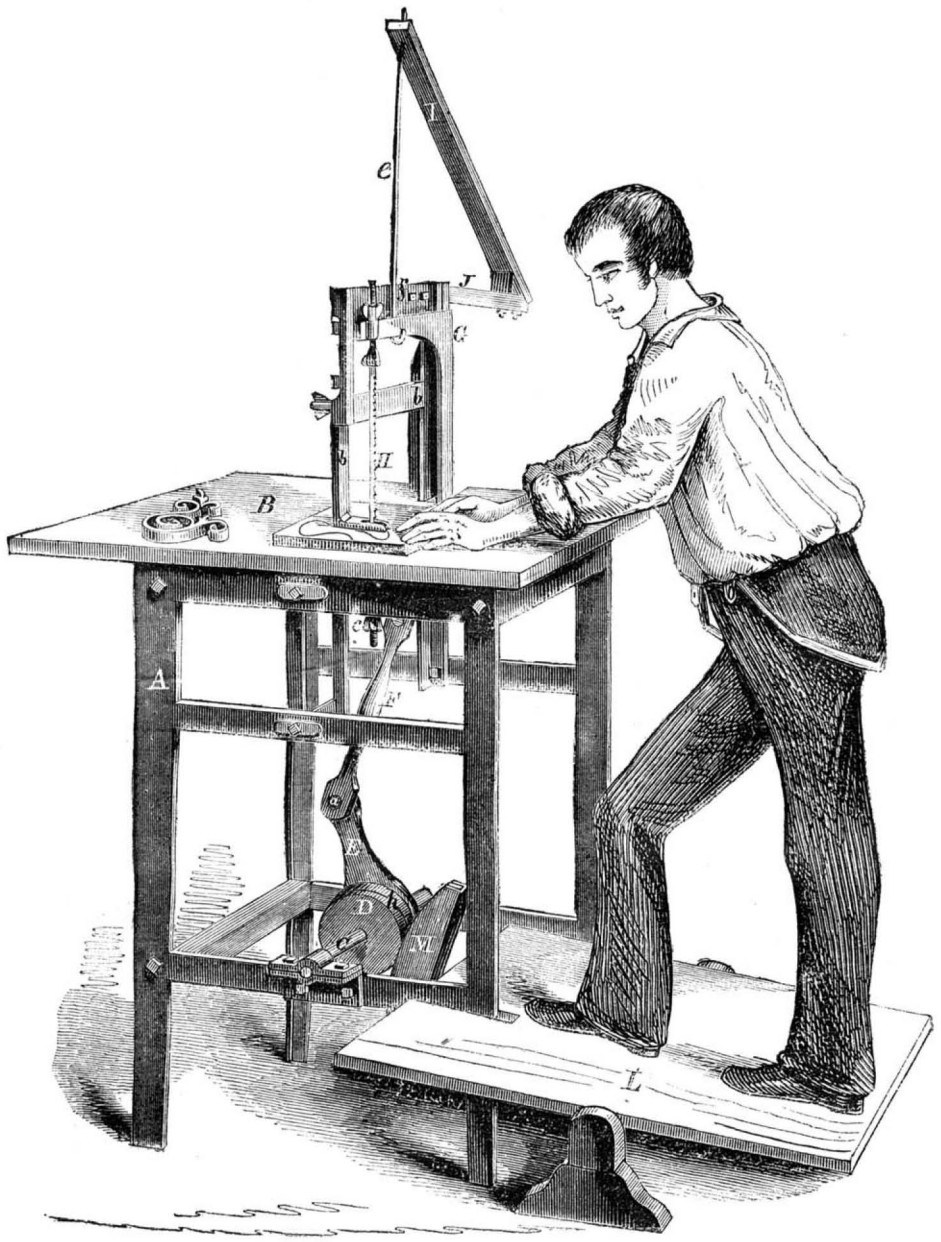
A GOOD SUBSTITUTE.—A correspondent writing from Auburn, Ind., says:—"Your paper is the most welcome visitor in my house, and I expect to do without tobacco and whiskey, and take it in." Good! we are glad to know that our friend is going to practice such remarkable self-denial for the sake of our journal.

A COLUMN OF INTERESTING VARIETIES.

It is announced, for the benefit of those persons who did not get a sight of the comet, that it will again appear before the public, for a few nights, in the autumn of 2147.....The most secure fastening of your chamber-door is a common bolt on the inside; if there is none, lock the door, turn the key so that it can be drawn partly out, and *put the wash-basin under it*, that any attempt to use a jemmy or put in another key will push it out and cause a racket among the crockery, which will be pretty certain to rouse the sleeper and rout the robber.....Barrow, the Chinese traveler, computes that there is more material in the great wall of China than in all the houses of England and Scotland combined..... A short time ago, a lady advertised in the London *Times* for a housekeeper, and received upwards of 2,000 replies, 500 of which came to hand by the first delivery. .....Human hair varies from the 250th to the 600th part of an inch in thickness. The fiber of the coarsest wool is about the 500th, and that of the finest about the 1,500th part of an inch in diameter. Silk-worms' silk is about the 5,000th part of an inch thick; but the spider's line is six times finer, and a single pound of this delicate but strong substance would be sufficient to encompass the globe.....German physiologists affirm that, of 20 deaths of men between 18 and 28 years of age, 10 originate in the waste of the constitution induced by smoking.....A French surgeon has been making experiments upon sores and wounds of persons of frail constitutions, by employing the common hand-bellows to act upon the part for 15 minutes at a time, four times a day. His success is announced, on medical authority, as encouraging.....Sound is always propagated outwards in straight lines, but recoils like a ball when driven against an obstacle which, by its dimensions, is sufficient to intercept the undulation. It will pass with great velocity through glass, and timber, and massive buildings, but is beaten back by mountains and caverns. This reflection of sound produces the beautiful effect of echoes.....The engines of the large ocean steamers make about 200,000 turns in crossing the Atlantic, between Liverpool and New York ....With four weights of respectively 1 lb., 3 lbs., 9 lbs. and 27 lbs., any number of pounds, from 1 to 40, may be weighed.....The annual consumption of coal for gas-making in London is estimated at 840,000 tuns, the product being 7,728,000,000 cubic feet of gas..... Boron was some time since crystallized by Messrs. Wohler and Deville, and the product, in brilliancy and hardness, rivaled the diamond.....The widest span yet made in a timber bridge is believed to be that of the Schuylkill bridge, at Philadelphia, the clear opening of which is 340 feet.....The highest mountain in the world is Mount Everest, in the Himalayas. Its hight is 29,000 feet, or five and a half miles above the sea.....Veins of coal, having caught fire, sometimes burn for years. An anthracite coal vein, under Broad Mountain, Pa., has been burning for 22 years, and there is no prospect of its extinction whilst more coal remains to be consumed. .....The friction of iron journals in brass boxes, with a film of good oil interposed, has been found, in some cases, to be as little as 1-90th of the weight. Ordinarily, it is about 1-30th of the weight; while, if the surfaces are wiped dry from oil, it is about 1-10th.....The power required to drive an 18-inch train of rail rolls, including roughing and finishing, also, one pair of cropping-shears, eight straightening presses, saws, &c., sufficient for making 900 tuns of rails weekly, has been found to be 239-horse power. In this case, the rolls made 85 revolutions per minute.....The population of Rome, at the highest period of its power, has been estimated at 6,800,000. The present population of London is about 2,800,000. The entire population of Paris, including that of all its metropolitan suburbs, is about 1,500,000. That of New York, estimated in the same way, is 1,100,000.....Hydraulic mortar was first made in London, in 1796, from the *septaria* in the Isle of Thanet. Roman cement contains from 30 to 40 per cent. of clay, and hardens in a quarter of an hour. When clayey limestones are calcined, the theory is that the silica unites with the alumina, lime and magnesia, forming a silicate which, when mixed with water, takes up water of crystallization, like plaster of Paris, and becomes as hard as rock.....Huntsman, of Attercliffe, near Sheffield, Eng., was the first, in 1760, to make cast-steel.

IMPROVED SCROLL-SAWING MACHINE.

There are many places where steam-power is not attainable, and, even if it were, it would not be economical to use it, as the work to be done is so small; but yet a machine that could be worked by a man, and, at the same time, give him perfect control over the work, would be of great use in many a small workshop. Such a machine is the subject of our engraving, which is a perspective view, and it is the invention of Edw. Beck, of Allentown, Pa. It is a scroll-sawing machine, operated by the weight of the workman, his hands being perfectly free to guide the work to the saw, and to move it to cause the saw to follow the pattern.



BECK'S SCROLL-SAWING MACHINE.

A is a rectangular frame, having a bed or platform, B, on its upper-face, and C is a shaft which is placed horizontally in the lower part of the frame and has a pulley, D, firmly keyed to it. To one side of this wheel or pulley an arm, E, is attached, the shaft, C, passing though the center of the arm, E. To the upper end of E, a pitman, F, is attached by a pin, *a*, the upper end of the pitman being attached to a saw-frame, G, which is fitted between suitable guides, *b b*. In the frame, G, a saw, H, is secured, and it is strained by nuts, *c*, which are placed on the eyes or sockets, in which the ends of the saw are secured; the saw works through a hole in the bed, B. To the upper end of the saw-frame, G, a spring, I, is attached by a link, *e*. This spring is secured to a band that is attached to an upper cross-piece, *f*, of the guides, *b b*. To the lower part of the frame, A, two horizontal projecting-pieces are attached. At opposite sides of the frame, A, and between these two pieces, a rock-shaft is placed, on which a treadle-platform L, is secured; to the front end of the platform a curved bar, M, is attached, the face or outer side of which forms a part of a circle, of which the rock-shaft is the center. The bar, M, has a strap, *h*, attached to each end of it, and straps are also attached to the pulley, D, and pass around it in opposite directions.

The operation is as follows: the operator stands on the platform, I, and gives it a vibrating movement by inclining his body alternately to either side of the rock-shaft. This movement of the platform gives, through the medium of the bar, M, straps, *h h*, and the wheel, D, a reciprocating, partially-rotating movement to the shaft, C, and arm, E, and the latter, through the medium of the pitman, F, gives a reciprocating movement to the saw, H. The spring, I, serves as an equalizer, and performs a function similar to a fly-wheel.

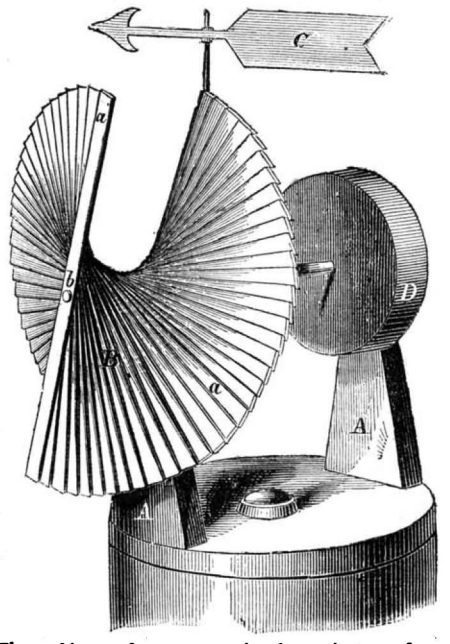
From this description, the simplicity and utility of the machine will be at once perceived; and any further information can be obtained by addressing the inventor, as above. The patent is dated June 8, 1859.

CALIFORNIA COAL.

From published reports in several of our California exchanges we think it cannot be doubted that there are large coal deposits in Sacramento county, and that these are of the utmost consequence to the "Golden State," in regard to obtaining fuel for steam engines, to operate quartz mills, and all other kinds of machinery employed for manufacturing purposes. No State can ever become great in manufactures without a plentiful supply of fuel. A very thick seam of coal, partaking partly of the nature of lignite, is stated to have been lately discovered on the eastern border of Sacramento county; it is of a brown color, highly bituminous, burns with a gentle flame, and is admirably adapted for generating steam and for parlor grates and stoves.

IMPROVED WIND AND WATER WHEEL.

All of us, in our childhood's days, have been eager for a piece of paper, a pair of scissors and a pin, and we all recollect how, when these materials were obtained, the paper was sliced, the corners bent over, the pin pushed through into the end of a stick, and we had a windmill with which we were amused for hours.



The subject of our engraving is an improved toy of this kind. Two standards, A, are provided and a shaft or pin, B, rests on them in suitable bearings, and on the end of this shaft a number of thin slats, *a*, are placed, so as to form a spiral wheel, B. These can be placed to catch as much wind as desired, and in any direction. But as we gradually pay more attention to this invention we discover that it is capable of great utilitarian application and may, by being constructed of pieces or slats, *a*, of a sufficient size, be used either as a water wheel or a wind wheel, and that if it be placed on either a vertical, a horizontal or an inclined shaft, it will give off nearly the whole effective power of the water or wind. It is not liable to get out of repair and can be constructed by any carpenter for a mere trifle, and when more or less power is required or the wheel has to be regulated to the impelling force, the requisite number of slats can be folded together and the wheel reduced in size. For a wind wheel, as we have represented it, it can have a vane C, and a pulley, D on the shaft *b*, to enable the power to be communicated to the machinery.

The inventor is W. H. Benson, of Wetumpka, Ala., and any further information may be had by addressing S. A. Heath & Co., Inventors' Exchange, 37 Park-row, New York. The patent is dated January 25, 1859.

ASPHALT FOUNDATIONS FOR WALLS.—A correspondent of the London *Builder*, highly recommends a layer of asphalt as the foundation for the walls of buildings, in damp situations. It may also be used in place of hydaulic cement, or common mortar for the joints of bricks in walls built underground, as it can withstand a very great pressure without cracking, when it becomes dry, and it prevents damp rising in the walls. By capillery attraction moisture will ascend through the pores of common brick and mortar, but not through asphalt, hence the capability of the latter for walls erected in wet situations. It has been successfully employed in the underground walls of stores built along the docks in New York. It is applied hot by dipping the edges of the brick into it, then laying them up in the wall.

STEAM CANAL-BOATS.—We have received a letter from Mr. L. Hatfield, of Cuyahoga Falls, Ohio, in reference to the steam canal-boat *Enterprise*, noticed in our columns a few weeks since. We stated that it had been built at Akron, but our correspondent informs us that the hull was built at Peninsular, by Mr. Payne, and the engine and all the machinery were planned and made in Mr. Hatfield's machine-shop. The machinery and boiler of this boat only weigh 4,200 lbs., and occupy but a very small space of the stern. It has two propeller wheels, three feet in diameter, which make but little swell in the canal, and we are assured that "it is a complete success."

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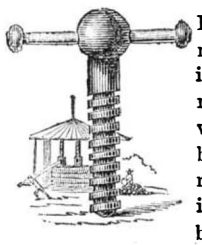
VOL. I., No. 9.....[NEW SERIES.].....*Fifteenth Year.*

NEW YORK, SATURDAY, AUGUST 27, 1859.

WHAT IS SCIENCE?



HIS is a question regarding which many individuals entertain exceedingly incorrect notions, and none more so than several personages who are considered the very embodiment of science. We have arrived at this conclusion from reading the remarks of leading members belonging to the American Association for the Advancement of Science at their late annual convention.

In reply to a resolution (it is not necessary to state here what it was) Professor Henry said:—"The objects of the association have been misunderstood. It is not its object to diffuse knowledge to the public; not to put forth popular information for the people of the city where the meetings are held; but to assist each other—to obtain new views, to criticise, to receive suggestions. We have been called, ironically, a 'mutual admiration association;' but the term is not well taken. *We congratulate ourselves as being those who put forth the noblest truths, never before revealed to man.* We feel that we have a high mission to fulfill—to make discoveries, to put them forth feeling that we are as ministers of nature to men. There is no happiness, no pleasure so great as that of scientific investigation. It is pleasant to impart knowledge to others, but higher than this—next to our holy religion—is scientific investigation: it is to receive light from above. We have come to love science for its own sake. We do not seek to live in the journals of the day, but in the world's history. We are to walk the paths of science, and leave it for others to gather the golden apples which we may scatter by the way."

Professor Pierce said:—"It has been thrown out, as Professor Henry has said, that it is a mutual admiration society—that it is devoting itself to useless objects; but such men would hear no gale in the wind, no murmur in the shell, would behold no power in the sunbeam. Yet, if such men had been present in the council chamber of Time, they would have advised in regard to the formation of the world. Those who say that the pursuits of scientific men are useless, would take the color from the rainbow and incorporate it into calico, or pluck the stars from the sky and make them into pins."

It will scarcely be denied, by almost any person, that the remarks of Professor Henry afford good grounds for bringing the charge to which he refers against the association. We regret this, because his scientific discoveries have been honorable to himself and of benefit to mankind; but we consider him in error in arrogating to the members of the association the rank of scientific high priests. He is also mistaken in his views regarding the *journal literature* of the day—it *is* the world's history. It brings to the public gaze and holds up to public judgment the science as well as the shams of public men, and it is fast becoming the first power of the State. Science is a collection of facts, properly arranged, relating to certain subjects; and scientific discovery consists in an accumulation of new facts. Judged by these standard rules, the majority of the papers read before the association were mere mental speculations, totally unworthy of the name of science. Scientific investigation is a noble pursuit; but when its aims are not understood, the most trifling objects are put in its place, and a dumb idol usurps the throne of the true and the good, and this, we infer, has been done, according to the foregoing quotations. Man is not sent into this world to be a mere dabbler and babbler in scientific curiosities. He must use his powers for the glory of the Supreme Creator, and in doing the most good to his fellow-man. His life must be one of usefulness, or he fails in his "chief end."

In reading the reports of the proceedings of the Scientific Association, we are driven to the conclusion (we would it were otherwise) that it is devoting itself, in a great measure, to useless unscientific objects. The man who can "take the color of the rainbow and incorporate it into calico," does more for the elevation of his race and the dignity of science than is appreciated by the Cambridge professor. By bringing objects of beauty, in form and color, within the reach of all the people, their taste becomes elevated; and in this respect, the calico printer excels all the *savans* that were assembled at Springfield. The "fling" at the most beautiful, ingenious and refined of all the chemical arts, affords good evidence of mis-directed views regarding the objects and aims of science.

A number of the papers read before the association were upon useful subjects, but they should *all* have been of this character; and our object now is to call the attention of men highly gifted by nature and education back from the reveries of speculation to the beautiful realities of true science. It is a waste of mental power and a mis-direction of learning, to enter upon long disquisitions on the tails of comets, the probabilities of the asteroids being pieces of a broken planet, or whether the curious tracks in the Connecticut red sandstone are those of an extinct kangaroo or a goose, &c., &c.; and it is just such questions as these which have occupied most of the attention of the Scientific Association. If Professor Henry expects that any person will ever be able to "gather golden apples" from such trees, his faith must be very strong in the doctrine of improbabilities; we would as soon expect to gather grapes from thorns. It is our opinion, however, considering the utility and value of his own contributions to science, that charity prompted him to make an apology for the shortcomings of others. In doing so, however, we consider that real science has been lowered in its dignity by exalting trifling phantasies to the same position as useful discoveries.

THE ARMSTRONG GUN---FORGING LARGE MASSES OF IRON AND STEEL.

We have received a communication from Mr. Alonzo Hitchcock, of Chicago, Ill., in which he claims to be the inventor of the method of constructing the Armstrong gun. He says:—

"In order to show you that it is not new in principle of construction, I propose to give you my little experience in this class of gun. Some sixteen or eighteen years ago, when Capt. Stockton proposed to forge his big gun of wrought-iron, my attention was particularly called to this subject of welding large masses of iron, not that there was any propect of success in forging this gun as proposed, but from certain well-known practical difficulties it must inevitably prove a failure, as it did. It was very easy to tell how it could *not* be done; but to tell how it *could* be done was strictly a personal question, which I immediately set myself to answer, and really I found so many difficulties in the way that I tried many devices to avoid the necessity of welding such large masses of iron, as for cannon, only one of which I will describe here, which will go to show at least an extraordinary coincidence.

I proposed, then, in order to combine the greatest amount of strength with the least amount of material, to form a tube of suitable dimensions, either of cast-steel or wrought-iron, around which I proposed to shrink a series of heated bands, from end to end, when another tier of bands would be shrunk over the first, so as to break joints, and so on till the desired strength be attained.

Here then we have the Armstrong gun, practically and substantially the same; the only difference being in the *manner* of hooping or banding this tube. Sir William Armstrong uses a continuous band or bar of iron wound on hot from one end to the other, and then back, and thus continued until sufficient strength is acquired. Which of the two plans is the better could only be known by practical test, which I feel no interest in now, as I think now, as then, that there are *some* doubts about the practicability of either invention under extraordinary circumstances not necessary to mention now."

In another part of it he states that he has discovered the problem of forging large masses of wrought-iron, or cast-steel, or both combined, as, for instance, lining the inside of a gun with steel or welding on a steel breech, after the barrel has been bored and rifled. And this he proposes to do in masses of metal from 100 pounds to 20 tuns, without the least possible chance of a flaw or imperfection. He says:—

"I can forge any amount of wrought-iron or steel, as in guns or shafting, into one solid homogeneous mass, when every part and parcel of said mass shall be as perfect as the best hammered iron or steel, and more perfect in its texture and tensile strength than the best rolled iron of commerce, and this can all be done by one man, if necessary. Being able to accomplish all this, I am prepared to make a gun as much superior to the Armstrong gun as the Armstrong gun is superior to the ordinary gun, mine being far superior in strength and durability, lighter, and at least 50 per cent. cheaper!"

The method of constructing guns similar to that for which Sir William Armstrong has received such distinguished honor, has been claimed by several parties, and we think it has been pretty well established that it was invented many years before Mr. Hitchcock devoted his attention to the subject, according to the foregoing statement. The improvements which he claims, however, appear to be new, and if he can accomplish all he purposes, he certainly deserves very high consideration.

A GREAT WATER-POWER IN MARKET.

On another page will be found an advertisement of the Lockport Hydraulic Company, regarding which we will voluntarily make some additional statements. The fall at Lockport, which is about 54 feet, with 32,899 cubic feet passing per minute, is equal to 3,364 nominal horse-power, 25 per cent. of which is deducted, thus leaving a fair margin of 2,500 actual horse-power. The fall is produced at the declivity of the table-land which forms Niagara's cataract, and the water is supplied from the same perennial source—Lake Erie. The city is something of a curiosity, as the Erie Canal passes through it by a lofty flight of water stairs, which have a most imposing appearance. The communication by canal and railroad is most convenient, and the country around is the very garden of New York State, rich in wheat and fruit. With the proposed arrangement of supplying mechanics with buildings and shafting, at moderate rates, Lockport should become a great manufacturing city. It is some years since we visited it, but it was then a smart manufacturing place, having a large cotton-mill, a woolen-mill, and several grist and saw-mills. We do not know how it is supplied with fuel—a most important consideration for manufacturing purposes—but we suppose it obtains an abundant supply of anthracite coal from the East, and bituminous coal and wood from the West.

AN IMPORTANT WORD TO SUBSCRIBERS.—Had we not changed the time of the commencement of our annual volume, the present issue would, in the ordinary course of things, have been "No. 51, Vol. XIV," and next week's number would have closed the volume. A large number of our old subscribers remitted their subscriptions in June and July, so as to commence with the "New Series." We find, however, on examination of our books, that there are about 4,000 subscribers who did not renew their subscriptions and whose terms therefore expire with the next number; and as it is our invariable rule to discontinue the paper at the expiration of the subscription, we urge our friends to renew theirs without delay. We trust also that they will endeavor to induce some of their neighbors to join with them in the formation of a club, as to clubs of 20 persons the paper is sent for $1·40 each, while to clubs of 10 the subscription price is only $1·50 each. These exceedingly liberal terms, for a yearly volume of 832 pages, replete with valuable information and illustrated by about 600 original engravings, render the SCIENTIFIC AMERICAN indisputably the cheapest and best journal of its class in the world. This is the concurrent testimony of the press and the reading public of the country, and it will be our determination to maintain its high character. Friends! do not forget to renew your subscriptions promptly, and thus preserve the first volume of the "New Series" unbroken.

THE FATHERS OF PHILOSOPHY.—IX.

THEOPHRASTUS.

The impetus which had been given by Aristotle to the classification and orderly study of nature and natural productions, was continued by his friend Theophrastus, or the divine speaker, a name conferred upon him because of his melodious voice and elegant pronunciation. His great work was on the history of plants, and one genus of our own tropical shrubs is named after him (by Linnœus) the *Theophrasta Americana*. This history of plants was the first work on botany, written with scientific precision, and in it the plants are classified, first, according to their modes of generation; secondly, their localities; thirdly, their size, as trees, shrubs and herbs; and lastly, according to their uses. He mentions the sexes of plants, and, as he had a botanic garden of his own, all his information concerning Grecian plants is still correct, but there are many faults in the descriptions of the foreign ones, and as he probably derived his information upon them from illiterate soldiers in Alexander's army, this is not to be wondered at. In another work he informed the world of the times of sowing the various productions of the vegetable kingdom, the method of preparing the soil for them, the manuring of the ground, and the best manures for the different varieties. Both of these works, although written more than 2,000 years ago, are still valuable to the botanist, and an edition was published as late as 1813, at Oxford, England. A German edition was published more recently at Altona.

He was born about 371 B. C., at Eresus, in the island of Lesbos, and went to Athens while young, to acquire knowledge, and there, while studying under Plato, formed the friendship of Aristotle, and succeeded the latter in the Lyceum, where he had an audience of 2,000 scholars, from all parts of Greece, who were drawn together by his marvelous oratory.

He died B. C. 285, and it is said that the whole population of that learned city followed his remains to the grave, and sincerely mourned the loss of so great a man.

We now pass to the last of our present list, namely to

EPICURUS.

This philosopher wisely taught that the end of all knowledge was to increase the happiness of man, and that knowledge which had not this effect was not worth either the time or trouble of acquiring. He contended that man ought to increase his pleasures and diminish his pains, as much as possible, and to speak vulgarly, he "went the whole animal" for being happy. In physical science he taught that all atoms had an innate and natural tendency to move downwards vertically and obliquely, and these atoms, which were once diffused through space, obeying this law, had come together and formed the world and all the varied phenomena which it presents; it is called "the doctrine of the fortuituous concourse of atoms." This, of course, is manifestly wrong as we know that the same forces which brought the atoms together would have separated them again, because the forces according to him were always acting in such a way as to produce motion and not, as is true, converging to a center, which produces cohesion.

He was born in 341 B. C., on the island of Samos, but, as his father was an Athenian, he was a citizen of the Grecian city. In his 32d year he established a school at Mitylene, but he remained there only a short time and then went to Lampsacus, where he taught for four years and then returned to Athens (which he had visited in his youth) and established the sect that bears his name. He lived with his pupils in a pleasant garden; their mode of life was frugal and simple, and when he died he left the garden and house to his successor, in order that it might be for the use of his followers so long as the sect existed. His death occurred in his 72d year, 270 B. C.

We have now finished this series of articles on the Fathers of Philosophy, and will conclude with a brief summary of the moral which we should like to be drawn from the study of these great men's lives, namely that physical investigation is one of the highest and most enjoyable pursuits in which the human mind can be engaged, provided that it tends to the well-being and information of the community. This was the stand-point of the ancient philosophers; some modern ones in their folly think the idea very wrong, and that knowledge should really edify nobody except those who need no edification. These great men, through whose lives we have been strolling, made all nature and the pursuit of its secrets subservient to morals; they were what we call heathens, and had not the light that we possess, but were all sincere, and endeavoring by the light they had to get the precious jewel of truth; we have seen how successful they were in many instances, and how they treasured each truth as they acquired it. They all lived pure and good lives and so made a lasting moral impression upon a corrupt and somewhat licentious age. Indirectly we owe all our knowledge to them, as they first started systematic inquiry, and Thales may be said to be the founder of our commerce, since all navigation is based on the problem he discovered. They were Grand old fellows, and stand like lighthouses of truth in the ocean of historic darkness and error.

WESTERN RAILROADS.

In speaking of the prospects of western railroads, the Chicago *Democrat* remarks that the water routes will take the grain as the cheapest means of transportation; and the agricultural community of debtors must go through the disagreeable process of paying two bushels of wheat for a debt one bushel was to cancel when it was incurred. The railroad system of the West, built upon grain at two dollars per bushel, has now reached a point where its most severe trials commence. The business created by building roads has subsided, and affairs along their lines have been restored to their wonted quiet. Most of the roads have suspended dividends, while a large class have repudiated stocks and bonds alike. By economy pushed so far as to suspend necessary repairs, many roads have paid interest upon their mortgage bonds. Whether the majority can do this for the next year is still a matter of doubt. The whole country is richer in crops than ever was known, but there underlies the whole a mass of debts contracted upon the inflated scale of 1856 and 1857, which requires all the skill of the debtors to manage.

NEW INVENTIONS

IMPROVEMENT IN SCALES.—F. M. Strong and Thos. Ross, of Brandon, Vt., have invented an improvement in weighing-scales of the kind known as the "Union scales," or a combination of platform and counter-scales, the object of which is to obviate the inaccuracy hitherto attending the combination of the two forms of scales by having a certain independent relation between them, and also by having the larger platform so connected with the levers beneath it as to obviate the undue friction hitherto attending the casual movement or displacement of the larger platform. The invention is assigned to John and F. E. Howe, of same place.

PERCUSSION PELLETS.—Jacob Rupertus, of Philadelphia, Pa., has invented an improvement in the construction of percussion pellets for fire-arms, which consists in employing, to enclose the detonating compound, a spherical metal capsule. This kind of capsule affords the same protection to the detonating compound as the cylindrical shell, and possesses the advantage of never failing to be presented to the vent in a proper manner, as is so often the case with the cylindrical pellet, owing to its liability to be turned sideways within the priming-magazine. One-half of this invention is assigned to John Krider & Co., of same place.

SAWING-MACHINE.—This invention relates to that class of sawing-machines which are designed for sawing square stuff direct from the log or timber, and which employ circular saws whose cutting planes are at right angles to each other. The invention consists in having the counter or saw-frame placed within the outer reciprotating frame in such a way as to admit of a vertical adjustment of the former, so that the saws may be adjusted and fed to their work with the greatest facility. There is also a peculiar arrangement of means for operating the saws and giving the log an oblique movement, so that the log may be adjusted to the saws in a manner to prevent all unnecessary friction during the operation of the machine. It is the invention of B. Fulghum, of Richmond, Ind.

IMPROVED METHOD OF SUPPLYING FURNACES WITH HOT AIR.—This inventor arranges a series of flat pipes with two chambers, one at each end of the pipes, so that the pipes radiate from the center like the spokes of a wheel. These chambers are filled with steam from any source, which circulates through the pipes, and so presents a large amount of heating surface in a small space. The air is drawn through the spaces between these pipes by a fan and pipes, and can be conveyed to any place or chamber it may be desired to heat. This excellent contrivance is the invention of Calvin Fletcher, of Cincinnati, Ohio, and he has assigned it to A. C. Fletcher, of the same place. An English patent has been obtained for this invention.

STEAM-GENERATOR.—The fire-box of this generator is surrounded by a water-space, and from the tops of the fire-box and bottom of the water-space tubes descend into the fire-box, their lower ends being closed and the upper ends being open into the water-space, so that they are continually filled with water. Inside these tubes smaller ones are placed, which are open at both ends, and run nearly to the bottom of the containing-tubes and into the steam-space, above the water in the space surrounding the fire-box. By these means steam is very rapidly generated and quickly passed up the inside tubes, without coming again in contact with the water, thus saving fuel and giving much drier steam. The inventor is Mellen Battel, of Albany, N. Y.

MANUFACTURE OF WHITE LEAD.—D. R. Erdmann, of Philadelphia, Pa., has invented an improved apparatus for cleaning and washing white lead, in which it is introduced into a cylinder that rotates in a vat containing water, and both ends of which cylinder are closed by means of a double layer of wire netting with a piece of flannel between them, so that nothing but the very finest particles of pure white lead can escape from the cylinder. The vat is so arranged, by means of a tube which is carried nearly all the way round on the inside of the vat, and near to its top, and from which a number of branches extend down near to the bottom of the same, that the water contained therein is always saturated with a fresh supply of atmospheric air, and that the carbonic acid introduced with the air into the ate greatly facilitates the purifying process.

STONE-DRESSING MACHINE.—In this invention a reciprocating carriage is used, with trip-hammers or picks, arranged and operated so that stones may be very expeditiously dressed and faced by very simple means and by any convenient power. The inventor is H. Chauncy, of Perry, Ga.

PAPER-BAG MACHINE.—This invention consists, firstly, in a novel mode of combining and arranging a system of creasing and lapping mechanism for forming the bottom lap or seam of the bag, whereby the loss of the strips of paper usually cut off to make the bottom seam or lap of the bag is prevented; secondly, it consists in the forming of a lap in the manufacture of a paper bag or bag of other material, by the combination of a creasing-blade with two rolling surfaces without the aid of any stationary edges or other contrivances; and, thirdly, it consists in a certain mode of applying the revolving upper shaft, in combination with the creaser and the apparatus for feeding the bags, to the action of the creaser and lapper shaft. The inventor is F. Wolle, of Philadelphia, Pa., and the patent is re-issued this week.

AGRICULTURAL FAIRS FOR 1859.

UNITED STATES FAIR.

Exhibition	Chicago	September 12—17.

STATE FAIRS.

Alabama	Montgomery	November 15—18.
Canada West	Kingston	September 27—30.
California	Sacramento	September 27. Oct. 6.
Georgia	Atlanta	October 24—28.
Illinois	Freeport	September 5—9.
Indiana	New Albany	September 26—30.
Iowa	Oskaloosa	September 27—30.
Kentucky	Lexington	September 13—17.
Maine	Augusta	September 13—17.
Maryland	Frederick City	October 25—28.
Michigan	Detroit	October 4—7.
Missouri	St. Louis	September 26. Oct. 1.
New Hampshire	Dover	October 5—7.
New Jersey	Elizabeth	September 13—16.
New York	Albany	October 4—7.
Ohio	Zanesville	September 20—23.
Pennsylvania	Philadelphia	September 27—30.
Tennessee	Nashville	October 5—7.
Vermont	Burlington	September 13—16.
Wisconsin	Milwaukie	September 26—30.

A DARING FEAT.—Blondin, the celebrated rope-walker, who has passed over the Niagara river so many times of late on a rope stretched from shore to shore, achieved, on the 17th, the wonderful feat of crossing with a man on his back. We did not suppose that two such fools existed on this hemisphere. The idea of such a thing is enough to congeal one's blood.

FOREIGN SUMMARY—METALS AND MARKETS.

An American—Wm. H. Ward, of Auburn, N. Y., the inventor of the bullet-machinery described on page 36, Vol. XII., SCIENTIFIC AMERICAN—has been exhibiting a new system of naval signals before the British Admiralty Board. He has been highly complimented for the completeness of the invention, and it is believed that it will be adopted for the British navy.

The ship-building business in England is very active at present, both in the government and private dock-yards.

The Cunard Company have sold their line of iron propellers, which had been employed for carrying heavy freight between England and America, to the Spanish government. They are to be replaced by vessels of a larger class. This company also intends to add another large ship, called the *Scotia*, to their mail line. It will be made of iron, and of greater capacity than the *Persia*. It is not yet decided whether it shall be propelled by a screw or paddle-wheels. It is to be desired that the screw may be adopted, in order to test its qualities fairly in a first-class ship. Hitherto, all screw steamers have been furnished with engines of much less power in proportion to their tunnage than paddle-wheel steamers.

A colossal statue of Hugh Miller, the stone-mason, geologist and editor, is about to be erected in his native place, Cromarty, Scotland. A new statue of John Hunter, the celebrated surgeon and anatomist, is also proposed to be erected in London. These are honorable memorials to the memory of scientific men.

A meeting of scientific gentlemen was lately held at North Woolwich, for the purpose of discussing the merits of india-rubber as an insulating substance for telegraph cables. Mr. West stated that a telegraph-wire insulated with india-rubber had been in use across the harbor of Portsmouth since 1846, and that its insulation was still perfect. It was also stated that gutta-percha was a failure for telegraph-wires on land and in the sea; that it was not such a good material as india-rubber for insulation, but it was easier to apply it to the wires.

There was a great trial at Ipswich, July 6, with Fowler's steam plow and Smith's steam cultivator. The former plows up the soil in furrows, according to the common method; the latter smashes up the soil, and is a "rotary." It is drawn by a windlass, worked by a band attached to the driving-wheel of a small, high-pressure portable engine. Its cost, with ropes and all the apparatus, is only about $1,050. It was generally admitted that steam-plowing was becoming a necessity, just as much as reaping by machinery.

Towing by small steamers has just been introduced on the Leeds and Liverpool Canal, four steam-tugs being employed for this purpose. Each boat is 60 feet long, 8 feet beam, has a tubular boiler, engines of 12 horse-power, and a screw-propeller driven at the rate of 180 revolutions per minute. These boats are solely employed for towing on the canal, and they do the work for 25 per cent. less than has been charged for horse-haulage.

PRICES OF FOREIGN METALS, AUGUST 4.

	£	s.	d.
Iron, English Bar and Bolt:—			
In London, per tun.	7	0	0
In Wales	6	0	0
In Liverpool	6	10	0
Staffordshire Bars	8	0	0
Sheet, single	9	10	0
Double	11	0	0
Hoop	9	0	0
Rod, round	8	0	0
Nail Rod, square	9	0	0
Shipping Iron :—			
Staffordshire Bars	8	0	0
Sheet, single	9	10	0
Double	11	0	0
Hoop	9	0	0
Rod, round	8	0	0
Nail Rod, square	9	0	0
Iron, Rails, in Wales, cash	6	5	0
Do. 6 months	6	10	0
In Staffordshire	7	0	0
Railway Chairs, in Wales	4	5	0
In Clyde	4	5	0
Pig No. 1, in Clyde	2	15	6
3-5ths No. 1 and 2-5ths No. 3	2	15	0
No. 1, in Wales	—	—	—
No. 1, in Tyne and Tees	—	—	—
Do. Forge	—	—	—
Staffordshire Forge Pig (all mine), at the works, L. W., nom	3	15	0
Welsh Forge Pig	—	—	—
Acadian Pig, Charcoal	8	15	0
Scotch Pig, No. 1, in London	8	10	0
Iron, Swedish, Indian Mosher's, per tun	18	0	0
Russian C C N D	17	0	0
Steel, Swedish Keg, nom	20	10	0
Do. Rolled	19	10	0
Faggot	21	0	0
Spelter, on the spot	21	0	0
To arrive	21	10	0
Zinc, in sheets	28	10	0
Copper, Tile, 14 to 28 lbs	102	10	0
Tough Cake	102	10	0
Sheathing & Bolts, per lb	—	—	11⅛
Sheet	—	—	11⅛
Bottoms	—	—	12
Old	—	—	10
Yellow Metal	—	—	9½
Burra-Burra, per tun	—	—	—
Russian	—	—	—
Lead, British Pig	22	15	0
Spanish	22	10	0
W. B., at Newcastle	—	—	—
Sheet	23	10	0
Tin, English Block, nom	138	0	0
Bar	139	0	0
Refined	145	0	0
Foreign Banca	146	0	0
Straits	143	0	0
Tin Plates, Charcoal, IC, per box	1	13	0
Do. IX	1	19	0
Coke, IC	1	5	6
Do. IX	1	11	6
Do. at Newport, 1s. per box less	—	—	—
Do. at Liverpool, 6d, per box less	—	—	—
Canada, Plates, p'r t'n	13	0	0
Quicksilver, per bottle	7	6	6

New York Markets.

COAL.—Foreign cannel, $9; Anthracite, from $4.50, $4.75, to $5

CORDAGE.—Manilla, 8½c. a 8¾c. per lb.

COTTON.—The sales were more favorable this week, still the prices have somewhat fluctuated. Good ordinary Upland, Florida and Mobile, 9½c.; Texas, 10c.; Middling fair from $13¼c. to 14c.

COPPER.—There has been a considerable advance in the prices of this metal. Lake Superior ingots at 23c. per lb. for cash; sheathing, 26c.

FLOUR.—There has been a slight upward tendency of prices. Southern flour has been buoyant, but on the whole, between one day and another, the market may be set down as fluctuating. Genesee brands, $5.25 a $8; Ohio choice, $5.50 a $7.75; common brands from $4.15 up to $6.

HEMP.—American undressed, $140 a $150; dressed from $190 a $210. Jute, $95 a $90. Italian scarce. Russian clean, $210 a $215. Manilla 6½c. a 6¾c. per lb.

INDIA-RUBBER.—Para, fine, 57½c. a 60c. per lb.; East India, 37c.

INDIGO.—Bengal, $1 a $1.65 per lb.; Manilla, good to prime, 55c. a $1.10; Guatemala, $1.05 a $1.25.

IRON.—Anthracite pig, $23 a $24 per tun; Scotch, $24 to $24.50; Swedish bar, ordinary sizes, $38 a $90; English refined, $53 a $54.50; English common, $43 a $45. Russian sheet, first quality, 11¾c. a 12c. per lb.; English, single, double and treble, 8¾c. a 4½c.

LEAD.—Galena, $5.80 per 100 lbs.; German and English refined, $5.70; bar, sheet and pipe, from 6¾c. to 7c.

LEATHER.—Oak slaughter, light, 35c. a 37c. per lb.; Oak, heavy, 32c a 35c.; Oak, crop, 40c. a 42c.; Hemlock, middle, 25½c. a 26½c. Hemlock, light, 25c. a 25½c., Hemlock, heavy, 23½c. a 24½c; Patent enameled, 16c. a 17c. per foot, light. Sheep, morocco finish, $7.50 a $8.50 per dozen. Calf-skins, oak, 62c. a 65c.; Hemlock, 60c. a 65c; Belting, oak, 32c. a 34c.; Hemlock, 28c. a 31c.

NAILS.—Cut are quiet but steady at 3c. a 3¾c. per lb. American clinch sell in lots, as wanted, at 5c. a 6c.; wrought foreign, 3c. a 3½c., American horseshoe, 14½c.

OILS.—Linseed, city made, 60c. per gallon; whale, bleached spring, 54c. a 56c.; sperm, crude, $1.22 a $1.27; sperm, unbleached spring, $ 135; lard oil, No. 1 winter, 85c. a 90c.; extra refined rosin, 30c. a 40c.; machinery, 59c. a 100c.; camphene, 45c. a 47c.; coal, refined, from $1.12 a $1.50.

RESIN.—Common, $1.77½ per 310 lbs. bbl.; No. 2, &c., $1.80 a $2.12½; No. 1, per 280 lbs. bbl., $2.25 a $3, white, $3.25 a $4.50; pale, $4.50 a $6.25.

SPELTER.—5½c. per lb.

STEEL.—English cast, 14c. a 16c. per lb.; German, 7c. a 10c.; American spring, 5c. a 5½c.; American blister, 4½c. a 5½c.

TALLOW.—American prime, 10¾c, to 11c., per lb.

TIN.—Banca, 33c. a 34½c.; Straits, 32c. ; plates, $7.50 a $9.83½ per box.

TURPENTINE,—Crude, $3.62½ per 280 lbs.; spirits, turpentine, 44½c. per gallon.

ZINC.—Sheets, 7½ a 7¾ per lb.

The foregoing rates indicate the state of the New York markets up to Aug. 18.

There has been a slight decline in cotton; also, in tin. But it is believed the prices of both will yet rise somewhat higher. Great efforts are now being made in England to increase the cultivation of cotton in Africa, so as to obtain it at lower prices than have ruled in the market for several years. The demand for cotton is greater than the supply, and this would be increased were the prices lowered. When it is remembered that the prices of cotton are not over one-half what they were half a century ago, the improvements in its cultivation since then must have been neither "few nor far between."

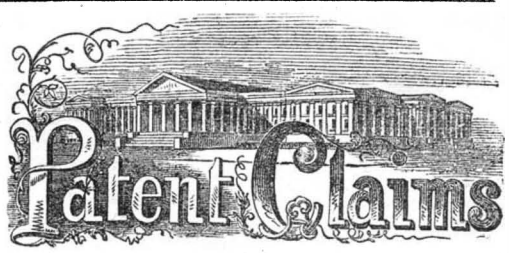
The market for most qualities of wool is very quiet. The holders are not anxious to sell at present prices, and much caution is exercised in buying, thus showing a want of confidence in the existing state of things. Fine Saxony fleeces sells at 56c. to 60c. per lb., American merino at 35c., 40c. and 45c; California fine at 25c. to 30c., unwashed, and common South American, 10c. to 13c., unwashed.

The peaches are a small crop this season, but some very beautiful lots of Jerseys have sold at $1 to $1.25 per basket, and Delawares at $1.50 and $2. The peach crop has been growing smaller every season for some years past; and where this tree once flourished in several counties in New Jersey, it is now almost extinct.

The coal trade of Pittsburg amounted last year to 54,367,632 bushels, making a total of 2,064,594 tuns. Two-thirds of this amount were exported by boats and railroads to other sections.

The American Horse Nail Company, of Providence, commenced the manufacture of horse and ox shoe nails about six years since, by patent machines, which work with great speed and accuracy, producing from each, with the labor of a man and boy, as many nails as 50 men can make by hand per day. They are formed by pressing the iron into proper shape between dies while at a welding heat.

According to a statement of Mr. E. Howe, the number of sewing-machines sold in this city during the past year, ending April 30, was 37,442. The increase has been over 100 per cent. in the six months ending October, 1858, and it is believed that this increase will be more than doubled during the next twelve months, making the number about 75,000.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING AUGUST 16, 1859.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, 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.

25,083.—G. L. Bailey, of Portland, Me., for Improved Machines for Punching Holes in Leather:

I claim, first, The arrangement and combination of the bed-piece, L, lever, A, and hollow cutter, C, provided with a standard, D, connecting rod, E, and treadle, H, as and for the purpose set forth and described.

Second, I claim the arrangement, as set forth, of the circular adjustable cutter-bed, D, in such a relative position to the cutter, C, as to accomplish the object specified.

25,084.—Wm. T. Barnes, of Buffalo, N. Y., for an Improvement in Sewing Machines:

I claim, first, Working the needles vertically and alternately in the same hole in the bed plate, substantially in the manner and for the purpose set forth.

Second, I claim the arrangement of springs, 5 and 7, wedge, 10, finger, 6, spring, 18, and stop, 20, substantially in the manner specified.

Third, I claim the arrangement of lever, 13, slide, 11, and lever, 12, when said lever, 12, is provided with points, is pivoted to slide, 11, and made to operate substantially in the manner described.

Fourth, I claim the arrangement of the ratchet wheel, a, serrated bar c, and ratchet e, with the spool-rod, and levers, C C', substantially as set forth.

25,085.—Mellen Battel, of Albany, N. Y., for an Improvement in Steam Generators:

I claim the combination with the tubes, C C, extending downward through the tube sheet, or crown of the fire-box or downward into a flue, and upward through the water above the tube sheet, of the inner tubes, D D, applied in the manner described for the purpose set forth.

25,086.—T. D. Berry, of Lowell, Mass., for an Improved Clothes Rack:

I claim the construction of my clothes rack, with divided center, or of two sections, each to consist of center-piece, A, slats, F, braces, H, and circumferential pieces, E, united to each other as described, when these two sections are combined with each other by plates, C, so hinged as to allow the rack to be folded and opened, both vertically and circumferentially, in the manner described, to obtain by this divided center, a rack suitable for use, when folded closely and circumferentially for the purposes set forth.

25,087.—E. Booth, of Troy, N. Y., for an Improvement in Sewing Machines:

I claim, first, The combination of an eye-pointed vibrating lever, and a looper, operating together substantially in the manner and for the purpose set forth.

Second, I claim the vibrating of the eye-pointed lever by a positive motion given to it by the rollers, t t, entirely, and as contradistinguished from the use of a spring of any kind, by which means I ensure its reliable action under its rapid motions as set forth.

25,088.—Maro Bradly, of Dundee, Ill., for an Improvement in Horse-rakes:

I claim the use of the recessed metal bar, b, spurs, E F, rods or shoes, B, elastic bar, I, lever, J, slide-rod, K, and projection, G, the whole being constructed and employed together, in the manner and for the purpose substantially as described.

[This invention relates to an improvement in that class of horse-rakes in which wire teeth are used. The object of this invention is to render such rakes more durable than hitherto constructed, lessen the draft very considerably, and also facilitate the turning and general manipulation of the machine, and at the same time form compact windrows.]

25,089.—J. D. Browne, of Cincinnati, Ohio, for Improved Cabinet Furniture:

I claim the arrangement of the folding ends, C C', as set forth, and the flaps or leaves, E E', hinged on the inside, for the purpose substantially described.

25,090.—Henry Burt, of Newark, N.J., for an Improved Door-fastener:

I claim a permanent door-bolt made with the fastening plate, b, bolt-case, a, and bolt, c, secured and operated as described.

25,091.—Joseph Calef, of Buffalo, N. Y., for an Improvement in the Running Gear of Carriages:

I claim the journal box, E, constructed substantially as described, and combined with the friction rollers, B, or slides, W, for the purposes set forth.

The combination of the axle, A, journal-box, E, friction rollers, B, and equivalents, and hub, D, for the purposes set forth.

The arrangement of the jointed braces L M N, in combination with the running gear of carriages, for the purposes set forth.

25,092.—Wm. S. Carr, of New York City, for an Improved Water Closet:

I claim regulating the action of the cock or valve in water closets by the joint operation of the lever and weight of water in the pan, substantially as specified, whereby the cock or valve is kept open until the weight of water in the pan regulates the closing thereof.

I also claim the construction of the valve, c, with the balancing diaphragm, 12, valve, 10, and spring, 13, as set forth.

25,093.—H. Chauncy, of Perry, Ga., for an Improvement in Machines for Dressing Stone:

I claim the arrangement of the pick or hammer shafts, N N, adjustable shaft, R, and adjustable traverse bar, P, when combined or used in connection with the reciprocating carriage G, and laterally moving, or adjustable bed, U, in the manner and for the purpose set forth.

25,094.—A. H. Clear, of Providence, R. I., for an Improvement in Pipe Connections for Steam Boilers:

I claim making the connections between the injection pipe, or other similarly submerged pipe of a steam vessel, or any other vessel, with the side or exterior of the vessel, by means of a valve box situated within or between the inside and outside planking of the vessel fitted with a valve, capable of being operated by a screw, or its equivalent, by a person on or above the deck of the vessel, substantially as described.

[The liability to bursting or breakage of the injection pipe or pipes or other submerged pipes is an ever-present source of danger on board steam vessels, and in other vessels there are frequently submerged

pipes liable to similar accident in a lesser degree. The object of this invention is to obviate such danger, by providing convenient means of closing such pipes close to the exterior of the vessel: and the nature of the invention consists in making the connection of the pipe with the side or exterior of the vessel by means of a valve-box containing a sliding valve arranged within the planking of the vessel operated by means of a screw, or e uivalent, from the deck of the vessel, by which the external orifice may be closed instantaneously in case of a brake or leak occurring in the pipe, thereby effectually shutting out the water.]

25,095.—J. H. Clifton, of New Castle, Pa., for an Improvement in the Manufacture of Machine Belting:

I claim the process of manufacturing belting for machinery from fibrous materials, substantially as described.

25,096.—J. H. Clifton, of New Castle, Pa., for an Improvement in Belting for Machinery:

I claim, as a new article of manufacture, belting made of fibrous material by the process set forth.

25,097.—E. K. Collins, of Chili, N. Y., for an Improvement in Clover Bolts:

I claim the combination and arrangement of two bolts in clover machines, when said bolts have a counter and upward movement produced in the manner and for the purposes specified.

25,098.—T. S. Cox, of Lafayette, Ind., for an Improvement in the Mole of Drain Plows:

I claim the peculiar shape of the mole, C, by the forward movement of the mole, C, the earth is carried from the bottom of the ditch by means of the terraducts, B, from the point of the mole, D, to the rear of the shank, A, and pressed more densely by the increased earth coming in contact with the convex end of the mole, C, in rear of the shank, A, in such a manner as to make a better arch and more durable than any heretofore made, leaving the bottom of the ditch almost entirely uncompressed, hence I do not claim anything except the invention of the terraducts, B, ending in the convex on the top of the mole, C.

25,099.—John H. Crane, of Charlestown, Mass., for an Improved Carpet-sweeper:

I claim the arrangement of belt, rotating guides and driver pulley, operating in combination with carpet sweepers, essentially as set forth.

25,100.—T. B. DeForest, of New York City, for an Improvement in India-rubber Springs for Railroad Cars, &c.

I claim composing a spring of a series of blocks or segments of a circle of vulcanized India-rubber, placed and held between two parallel plates, or equivalents, substantially as described, but this I only claim when the series of blocks are so arranged and held between the two parallel plates, that their contiguous faces shall not come in contact, under light loads, but shall come into contact and give mutual support as the load increases, substantially as and for the purpose specified.

25,101.—Thos. Dougherty, of Macon, Ga., for an Improvement in Switches for Railroads:

I claim the combination and arrangement of the flat bars, A A, and the stationary end plates, C C, provided with the guide rails, D D, in connection with the rails, G, when constructed and operated substantially as and for the purpose above set forth.

25,102.—Eugene Duchamp, of St. Martinsville, La., for an Improvement in Self-releasing Whiffle-trees:

I claim operating the two rods simultaneously by means of the slotted guards D D, in combination with boxes, G G, and lips, c c, in the manner and for the purposes specified.

[This invention will soon be illustrated in our columns.]

25,103.—Eugene Duchamp, of St. Martinsville, La., for an Improvement in Attaching Thills to Vehicles:

I claim the combination of the swivel coupling boxes, E, having an elliptical slot through their ends, thill-irons having fluked portions, G, and hinged gates, J, or their equivalents, substantially as shown and for the purposes specified.

[An engraving and full description of this invention will be published shortly.]

25,104.—Jacob Edson, of Boston, Mass., for an Improved Carpet-sweeper:

I claim producing the motive power of the machine, by means of a belt of rubber or gutta-percha, interposed and running between the pulley or roller, n, and the surface to be swept or passed over, as set forth.

I also claim arranging the guiding-wheel, i, upon the stationary hollow-shaft or bushing, K, through which the axle of the bush shaft passes, as described and for the purposes specified.

25,105.—Asahel Elmer (assignor to Nathan Elmer, Reuben M. Richard), of Shabbona Grove, Ill., for an Improvement in Mole Plows:

I claim, first, In combination with the adjustable block, B, on the plow-beam, the scoring or leveling-plow, D, in advance of it, substantially as and for the purpose described.

Second, I also claim, in combination with the plow-beam and coulter, the swinging-weighted crane or lever for preventing the careening of the plow, or for recovering its proper position after it has careened, substantially as described.

Third, I also claim the combination of a forked coulter, for cutting a wedge-shaped or tapering slice over the coulter gash, with a pressing or driving device for forcing down said slice, and thus packing the coulter gash, as described.

Fourth, I also claim a mole or former made of a series of conical shaped sections which increase in size or they recede from the coulter, and which are so linked together as that they may move in a horizontal plane, but be comparatively rigid in a vertical plane, substantially as described and represented, and for the purpose set forth.

Fifth, I claim, in combination with the mole, L, the scorer, or shoe, m, on its rear section or end, said scorer forming a groove or channel, in the bottom of the finished drain, for admitting the water into it, the sides of the drain being so closely packed as to prevent the water from entering there, said scorer being constructed and arranged as represented.

25,106.—D. R. Erdmann, of Philadelphia, Pa., for an Improved White Lead Apparatus:

I claim a rotary cylinder, C, arranged with double wire nettings, d, in combination with a vat, A, provided with a tube, F, substantially in the manner and for the purpose specified,

25,107.—Alex. Forot, of Paris, France, for an Improvement in Fabrics:

I claim the manufacture of a new kind of fabric without weaving, composed simply of threads glued upon a base of paper or any suitable kind of material, such fabric being left plain or ornamental, by embossing, or any other process, substantially as described.

25,108.—Benjamin Fulghum, of Richmond, Ind., for an Improved Sawing Machine:

I claim the combination and arrangement of the two frames, B C, placed one within the other, and arranged substantially as described, so as to admit of the saws being adjusted vertically, and also moved horizontally, forward and back, for the purpose set forth.

Second, The arrangement of the shafts, g′ and F, with their respective gearing, f′ p, and the pulley, J, in connection with the two reciprocating frames, B C, whereby the saws are rotated, and at the same time have a reciprocating motion communicated to them.

Third, In combination with two circular saws, d′, w, the inclined ways, e′ e′, of the log carriage, I, for the purpose set forth.

25,109.—H. P. Gengembre, of Alleghany, Pa., for an Improvement in Manufacture of Coal Oils:

I claim the continual progressive and gradual destructive distillation of coal, or other bituminferous substance, for the purpose of obtaining therefrom the different products of distillation by means and with the use of the apparatus described or other equivalent.

25,110.—Chas. Goodyear, of New Haven, Conn., for an Improvement in Manufacture of Porous Rubber Cloth:

I claim, as a new porous manufacture, pervious to air and water repellent, composed of a woven or equivalent fabric, and a thin porous coating of india-rubber or allied gum, substantially as described.

25,111.—Chas. Goodyear, of New Haven, Conn., for an Improvement in India-rubber Fabrics:

I claim the porous and water repellent mannfacture, composed of a bat or fleece of cotton or other fiber and india-rubber, or allied gum, united and rendered porous, substantially as specified.

25,112.—Joseph Grunwald, of New York City, for an Improvement in Clasps for Skeleton Skirts:

I claim the combination of the hoops or springs with the tape, by means of clasps, constructed substantially as described and represented by Figs, 3, 4, and 5, and for the purpose specified.

25,113.—James Hamilton, of New York City, for Improved Cross-cut Sawing Machine:

I claim the manner herein described of arranging the shaft, d, and its gear wheel, f, and bevel gear, r, in connection with the bevel gear, s′, and gear, s, on the shaft, l, so that said shaft, d, can be changed to stand horizontally and give motion to the saw, whether the said saw and the gearing thereof be in a horizontal or vertical position, substantially as specified, thereby adapting one machine to be moved by hand, in felling trees or sawing-up logs, as set forth.

I also claim, in combination with the aforesaid machine for sawing logs, the detachable frame, v, buck, w, and variable lever, x, for holding smaller logs while being sawed for fire-wood, substantially as specified.

25,114.—A. Hammond, of Jacksonville, Ill., for an Improvement in Mole Plows:

I claim the shoe, E, provided with a knife, N, and projection, L, when the same are arranged and operate in the manner and for the purposes herein set forth.

[This is an improvement on the shoe or tooth of the mole or drawing plow, and consists in extending a portion of the tooth out behind the standard, and forming a furrow or groove in the upper surface of it, diminishing, as it reaches the extreme end, for the purpose of closing up the opening left by the standard to prevent the ditch from filling up again. It also consists in forming or affixing, in any suitable way, a pin or angular-shaped knife to the sole of the shoe, to open a place along the bottom of the ditch for allowing the water to pass up into the same and be drained off from below the ditch.]

25,115.—B. S. Healy, of Cohocton, N. Y., for an Improvement in Self-acting Wagon Brakes:

I claim the combination of a forked pole, arranged substantially as described, with the hounds, whereby the pole is free to slide in its forks and operate the brakes without moving the forks backward in the hounds.

In combination with brakes pivoted to a fixed bar, as described, I claim the brake blocks, arranged and connected with the brakes as set forth, whereby the friction of the wheels on the blocks draws the brakes toward, and causes them to press with greater force against the wheels.

25,116.—William M. Henderson, of Baltimore, Md., for an Improvement in Car Seats:

I claim, first, The construction of a railway reclining chair or couch securely attached to the floor of the car, with the whole chair reversible, so as to face either end of the car, substantially as described.

Second, The mode of varying the hight of the back of the chair, by making it in two pieces and suspending the lower portion, substantially as described.

Third, In combination with a chair, reversible as aforesaid, I claim the double-acting foot-board, single-reversing leg-rest, and means for extending it by the action of the arms of the chair, substantially as herein described.

25,117.—Robert Heneage, of Buffalo, N. Y., for an Improved Hose Coupling:

I claim the arrangement of the screw sections, B and C, and packing, K, upon the cone extension, A, as set forth.

25,118.—H. C. Hunt, of Ottumwa, Iowa, for an Improved Vise:

I claim constructing a vise in such a manner that it will self-retain itself upon a table or bench, substantially in the manner set forth.

25,119.—John W. Huntley, of Lane's Creek, N. C., for an Improvement in Cotton Seed-planters:

I claim the vertical rotating toothed shaft, H, in connection with the follower or gatherer, J, placed within the hopper, G, and arranged for joint operation, substantially as and for the purpose set forth.

[The seeds, in this invention, are prevented adhering together by the fine short fibers which are attached to them in a greater or less degree, and which has hitherto rendered the planting of cotton seed by a machine a really difficult and uncertain operation.].

25,120.—Levi S. Ives, of Brooklyn, N. Y., for Improvement in Mill-stone Bushes:

I claim, first, The placing, substantially as set forth, of a cylinder, D, which contains the spindle collar, B, blocks, F, and the adjusting wedges, G, within a cylinder, M, secured within the center of the bedstone, the cylinder, D, being allowed a vertical movement or play within the cylinder, M, to permit of the vertical adjustment of the spindle, and consequently the runner or upper millstone, with but little friction, and keeping all the parts in position so as to prevent their derangement.

Second, The arrangement of the plates, J K L, with the washer, I, and ring, H, or their equivalent, in connection with the projection, d, on the inner side of the cylinder, D, substantially as described, to prevent the casual turning of the blocks with the spindle.

Third, The plate, N, provided with the flanch, O, and the dome-shaped cap, P, provided with the flanch, Q, in connection with the cap, T, and plate, g, the above parts being attached respectively to the cylinder, D, spindle collar, B, and driver, R, to forman air and a dust chamber, substantially as and for the purposes set forth.

25,121.—H. R. Jerome, of Monroeville, Ohio, for an Improvement in Mole Plows:

I claim, first, The arrangement of a beam, carrying a mole plow, with the front and rear standards of the front and rear propelling wheels and with the adjusting device, substantially as and for the purposes set forth.

Second, Providing the coulter with a series of notches and arranging the draught-chain in one or other of said notches, and thus having the draught applied directly to the coulter, substantially as and for the purposes set forth.

Third, The combination of a coulter which is elliptical in form, in its transverse section, with a mold which is conical at its front and rear ends, substantially as and for the purposes set forth.

[This invention is designed for cutting drains under ground. The coulter and mole are sharp at back and front so as to cut both in the back and forward movement, and thus, when the plow comes in contact with a stone or other obstruction, it can be backed and turned out of the way of the same. The frame is self-adjusting, according to the depth at which the coulter is set to cut. The draft chain is attached directly to the coulter and thus the power or pull comes upon the coulter instead of upon the beam, and, consequently, the beam does not act with a leverage strain in the coulter. The whole machine is arranged on wheels and can be adjusted, when desirable, so as to be propelled over the land without going into operation. This is doubtless a good drain plow.]

25,122.—Wm. B. Johns, of the United States Army, for an Improvement in Apparatus for Lighting Gas Burners:

I claim giving the wrench staff the jointed sections, E and F, so that a match inserted in the extreme section may illuminate the burner key while the gas is being turned on, and also serve as a torch to ignite the gas.

25,123.—Thos. J. Jolly, of Olean, Ind., for an Improved Washing Machine:

I claim the described arrangement and combination of the treadle, I, sliding-table, C, and rotary rubber, D, the whole being constructed and operating in the manner and for the purpose set forth.

25,124.—Morris L. Keen, of Roger's Ford, Pa., for Improved Machinery for Manufacturing Artificial Fuel:

I claim, first, The combination and arrangement of the mills, conveyors, mixing and heating cylinders, molding and conveying apparatus, substantially in the manner and for the purpose described.

Second, I also claim the combined use of the molding apparatus, and of the tank or reservoir of water, for the purpose of receiving and molding the heated and plastic material in said tank of water, for cooling the machinery and fuel and for preventing the material from adhering to the machine, substantially as described.

Third, I also claim the combination of the endless apron with the molding apparatus, operating in a tank or reservoir of water substantially in the manner and for the purposes described.

25,125.—Hazard Knowles, of New York City, for an Improvement in Clasps for Fastening Bands on Cotton Bales, &c.:

I claim the method of securing straps by means of a roller, substantially such as described, in combination with the wedge-formed mortise of the sleeve, which receives the strap, substantially as described.

25,126.—S. S. Langdon, of Cleveland, Ohio, for an Improved Churn:

I claim the above described construction and arrangement of rotary churns when the same are provided with the dash frame, K, and chambers, E, and the whole constructed, arranged and operated substantially as set forth.

25,127.—Joel Lee, of Galesburgh, Ill., for Improvement in Mole Plows:

I claim the two swords fitting closely together, the front one attached to the mole near the forward point, the rear sword pivoted near the rear point of mold.

Second, The lever, in combination with the swords for operating or adjusting the front sword and the mold.

25,128.—John Magee, of Lawrence, Mass., for an Improvement in Stoves:

I claim the arrangement of the pot-grate, A, the hot air-chamber, F, the ring-grate, B, the register, G, and the ash-chamber, H, together and with direct descending and base flues, substantially as specified.

25,129.—Joseph P. Markham, of Pennfield, Mich., for Improved Tuyere:

I claim, first, The use of the indented valve, K, in combination with the outlet passages, H, constructed and arranged substantially as herein described, in such manner that, by moving said valve back and forth underneath the outlet, it will admit the wind to or shut it off from said outlet, equally and gradually, on each side of the central tube, I.

Second, I claim the mode of making the loose nozzle, J, independent of the masonry for support, by the use of the tube, I, and its socket, in combination with the ribs, G G G G, and corresponding rebates, substantially as set forth.

25,130.—Rufus Maxwell, of Tucker County, Va., for an Improved Towel Rack:

I claim the construction of racks for endless towels, with a slot, a b, and opening, c, substantially as and for the purpose described.

25,131.—Chas. H. McAleer, of Chambersburgh, Pa., for an Improvement in Binding Apparatus for Harvesters:

I claim the apparatus or elevator for raising and compressing the gavel, constructed and operating in the manner substantially as described.

25,132.—W. Howard Mitchell, of San Francisco, Cal., for Improvement in Rotary Movement:

I claim two or more reversed, self-detaching pawls or catches, working on opposite sides of the periphe y of the ratchet wheel, by being attached to arms working in parallel lines and in the same direction, constructed and operating substantially as and for the purpose specified.

I also claim the combination of the ratchet wheel, R, with the pawls or catches, P and P′, and flanges, E, and the cross-beam, B, with parallel arms, G, substantially for the uses and purposes set forth.

I also claim the combination of the ratchet wheel with the flanged casing or flanges.

25,133.—George J. Montjoy and Joel B. Sawyer, of Houston, Texas, for an Improved Rotary Steam-engine:

We claim the arrangement of the passages in the double elbow piece, E E′, and the reversing cock or valve, F, in combination with the passages in the stationary hollow shaft, D, and its abutment, H, the whole applied in connection with the cylinder and its sliding pistons, to operate substantially as described.

[The rotary engine will surely come into use at some future time, to reward the inventors for the time and money they have spent upon it. The present improvement consists in a certain novel arrangement of passages and a reversing cock or valve, in combination with the passages in a stationary hollow shaft and abutment and with a suitable system of pistons, which makes it simple in its construction and enables it to work with very little friction.]

25,134.—Willis G. Murphy, of Seguin, Texas, for an Improvement in Seed-planters:

I claim the arrangement of the beam, A, hopper, C, wheels, D J H and E, seeding-wheel, R and B, helve, 14, plow, T, covers, x, and conductor, V, as described, and for the purposes set forth.

25,135.—Rudolph A. Nathurst and John L. Stewart, of Nashville, Tenn., for an Improved Safety-rein for Bridles:

We claim the connection of the choke-strap with the common or ordinary driving reins, so as to act and serve for both purposes of driving and safety-rein, substantially as described, and this we claim whether it be temporarily or permanently affixed to the bridle or halter, whether a bit is used or not.

25,136.—Cæsar Newmann, of New York City, for an Improved Skeleton Skirt:

I claim the combination of the jointed or hinged hoop supporters, and a series of horizontal hoops, when arranged and operated in the manner described and for the purpose set forth.

25,137.—J. J. Parker, of Marietta, Ohio, for an Improved Steam Slide Valve:

I claim placing the valves loosely on the hollow arms of the side pipe and contracting the supply openings from the valves, substantially in the manner described, for the purpose of employing the pressure of the steam to keep the valves in contact with their seats, as specified.

25,138.—John C. Pedrick, of Washington, D. C., for Improved Ball Furniture Casters:

I claim inserting into a metal cup containing the ball of a caster, a separate anti-friction bearing, f, against which the ball revolves, thereby lessening the friction of the ball in the metal cup or socket, as described.

25,139.—Thos. E. Roberts, of Allamance, N. C., for an Improvement in Trucks for Railroad Cars, &c.:

I claim the construction and arrangement of the concave chilled plates, B, and convex chilled plate, C, with each other in the manner described, and their combination with the self-oiling iction rollers, G O H, for the purposes fully set forth.

25,140.—James H. Roome, of New York City, for an Improvement in Shears:

I claim combining one limb, C D, of a pair of shears, or other similarly operating hand-cutting instrument, with its handle, E, forming part of a separate lever, E G, and combining the said limb and handle with the other limb of the shears by means of an arm, f, attached to the said lever, E G, and operating on the rear portion, D, of the first mentioned limb, a link, F, connecting the said limb with the said lever, and a movable fulcrum connection, g h, between the said lever and the other limb, th e whole operating, substantially as described, to cause the power of the said lever to increase as the shears close.

[One limb of this pair of shears is combined with a handle forming part of a separate lever, and of combining the limb and handle with the other limb of the shears, whereby the leverage exerted by the thumb or hand in cutting is gradually increased as the shears close and a drawing cut is produced.]

25,141.—Wm. N. Rowe, of Sharpsburgh, Md., for an Improvement in Carriage and Wagon Jacks:

I claim the adjustable sliding catch-plate, B, operating as described, in combination with the grease box, F, and jack, as set forth and described.

25,142.—Jacob Rupertus, of Philadelphia, Pa., for an Improved Percussion Pellet for Fire-arms:

I claim the employment, for enclosing the detonating compound, of a metal capsule of spherical form, substantially as described.

25,143.—John Scheeper, of New York City, for an Improvement in Stoves:

I claim the arrangement and combination of the fire-chamber, A, ovens, B C D, and flues, k l l q q n n, substantially as and for the purpose shown and described.

[This invention consists in a peculiar arrangement of a fire-chamber, with ovens and flues, so that the radiation of heat from the stove is in a great measure prevented, and retained to heat the several ovens. It also admits of a very economical use of fuel when used for cooking with vessels directly on the fire, as in frying, boiling, &c.]

25,144.—Henry W. Shipley and Zohar Blair, of Mount Vernon, Ohio, for an Improvement in Portable Iron Husk Grist Mills:

We claim the husk, A, and cup, A′, composed of lower and upper sections, the same being turned and fitted together, as described, and supported upon a frame, C, for the purpose of making the whole portable and complete in itself.

We claim cementing the stone to the interior of the cup, A, which also forms the upper husk, as specified.

We claim the cup, M, constructed and fitted substantially as described, and cementing the stone thereto, so that both will revolve together.

We claim the bridge trees, D and G, in combination with the husk, A, cup, A′, and frame, C, when arranged and operating substantially as set forth.

25,145.—Henry Soggs, of Columbus, Pa., for an Improved Butter Worker:

I claim the tray, d, with convex bottom and ends, set on an inclined plane of rollers, working in combination with the cylinder, a, and ribs, b, for the purpose of working the milk and superfluous matter from the butter, at the same time leaving channels in said butter through which the milk, &c., may escape.

25,146.—David Stoddart, of San Francisco, Cal., for an Improvement in Slide Valves of Steam-engines:

I claim, first, The employment of the elastic plate, D, in combination with a cavity, B, and a balance frame, C, substantially as and for the purpose shown and described.

Second, The combination of an adjusting spring, m, and screw, n, with the elastic plate, D, substantially as and for the purpose shown and described.

[A flexible metallic plate is applied, in ombination with a balance frame, between the back of a slide valve and the back of the steam chest, whereby the valve is relieved of unnecessary pressure and caused to work with very little friction. This is the invention. The valve and the balance frame are constructed of a certain form, and a spring and set screw are so applied, in combination with the flexible plate and balance frame, as to compensate for the wear of the frame, the valve and seat.]

25,147.—William Mont. Storm, of New York City, for an Improved Steam Generator:

I claim the plan or method of conveying water from a closed tank or reservoir to the heating surfaces of a steam generator by capillary attraction, for the objects described.

Second, I claim so constructing and locating the said supply tank that the influence of the heat upon the water contained therein for feed, while elevating its temperature, shall in no case bring it up to the steam-generating or boiling point under the given pressure.

25,148.—Francis M. Strong and Thomas Ross, of Brandon, Vt., for an Improvement in Weighing Scales:

We claim the arrangement of the bars, C D, of the larger platform, B, a shown, to wit, one lever crossing the other at about right angles, so that the knife-edged bearings, b, of the foot-pieces, a, of one lever will be at right angles to those of the other, and the lateral movement of the foot-pieces on the bearings prevented.

We further claim attaching the arms, E E, of the levers, C D, either separately or when connected direct to the beam, G, and having the bar, I, of the scoop or smaller platform, H, rest on knife-edged bearings, k k, on the beam, substantially as and for the purpose set forth.

25,149.—B. F. Sturtevant, of Boston, Mass., for an Improved Blank for Shoe-pegging Machines:

I claim, as a new article of manufacture, a blank or strip of shoe pegs cut around the log, substantially as described.

25,150.—N. G. Thom, of Cincinnati, Ohio, for an Improved Machine for Nicking and Trimming Heads of Screws:

I claim first, A revolving or rotating head, which revolves around a series of spindles or blank holders with an intermittent or interrupted motion, carrying upon it the necessary apparatus and tools for shaving, nicking and trimming, or otherwise finishing the heads of screw blanks.

Second, In combination with the spindles or blank holders, I claim the annular cam, m, having internal and external inclined surfaces, for the purpose of raising the spindle in the nicking process and operating the grippers by acting upon the one rod, b.

Third, In combination with the spindles or blank holders, I claim the rod, d, and spring, e, or its equivalent, when such a spring, or equivalent, is made to act upon the rod at required intervals, to discharge the blank, by being attached to some rotating or reciprocating portion of the machine.

Fourth, I claim the lever, r, and the spring, n, and catch, l, or other mechanical equivalent, which acts upon the machine, for the purpose of arresting one part while it releases another, substantially as described and for the purposes set forth.

Fifth, I claim the arrangement of the spindles and driving shaft in such a manner that, while the spindles containing the blanks to be shaved and trimmed are acted upon by the driving belt, the spindle containing the blank to be nicked is not acted upon, and the necessary tension is given the belt at all points in the revolution of the head without the use of a binder, substantially as described.

Sixth, In combination with the worm-wheel, w, or its equivalent, for giving motion to the cams, I claim the cam, Y, and ool cam, x, when acted upon in such manner that the said cams remain stationary while the head revolves, or nearly so, and the cams revolve while the head is stationary, substantially for the purposes set forth.

Seventh, I claim finishing the heads of screw blanks, by an apparatus, by which the necessary tools for finishing the head are revolved round the spindles or blank holders, whether such blank holders are stationary or otherwise.

25,151.—Andrew Turney, Jr., of Fairfield, Conn., for an Improvement in Laying Submarine Telegraph Cables:

I claim the construction and use of an apparatus consisting of two hollow cylinders, A and B, with longitudinal joints or hinges, and two disks or flanges, E and F, set obliquely to the cylinders, and a guide or regulating disk, G, to be attached to a telegraph cable, while the cable is being submerged, to check the rapidity of the sinking and to afford a constant strain on it in the direction of the vessel which is paying out the cable, to avoid kicks or festoons, when the whole is constructed, arranged and made to produce the result substantially as described.

25,152.—John Wagoner and Abram Severson, of Guilderland Center, N. Y., for an Improved Washing Machine:

We claim mounting the revolving platform, K, and the pulleys and gearing, P Q R, or their equivalents, on the hinged platform, M, and so arranging the whole that, when M is turned up, the driving belt, O′ is slackened, and the whole lies within or by the side of the main frame; and when M is turned down the gravity of the tub, or equivalent vessel, tightens O and causes the several parts to operate without any labor in adjusting.

25,153.—Samuel Wethered, of Baltimore, Md., for an Improvement in Carding-engines:

I claim, first, A card-clothed main cylinder for carding engines, which performs a lateral vibrating movement simultaneously with its revolution, substantially as and for the purposes set forth.

Second, A card-clothed "fancy" or upper cylinder, which is capable of performing a lateral vibration as it revolves, in combination with a laterally vibrating card-clothed main cylinder, substantially as and for the purposes set forth.

25,154.—Julius Wehle, of New York City, for an Improvement in Hat Measures:

I claim, first, The divided handle, in combination with the elastic oval strip, A, for the purpose of contracting the said oval strip, substantially as described.

Second, The scale, D, secured to one of the handles, and passing through an incision of the other handle, in combination with the screw, N, substantially as described, for the purpose set forth.

25,155.—Y. B. Williams, of Freeport, Ill., for an Improved Horse-power Machine:

I claim the arrangement and combination of the circular standard, B, toothed rim, B, ring, C, pinions, D, wheels, E, pinion, e, toothed ring, G, and pinion, H, to operate substantially as and for the purpose specified.

[This invention consists in arranging a series of head-wheels, toothed rings, pinions, shafts and pullies in such a manner that the greatest velocity is obtained with the least amount of power, and that the power may have been transmitted from different places according to the required velocity.]

25,156.—William S. Williams, of New York City, for an Improved Machine for Bundling Kindling Wood:

I claim, first, The feeding clamps, f, and slides, d′, arranged and actuated in substantially the manner and for the purposes set forth.

Second, I claim the combination of the separating and dividing knife, h, with the concave wood carrier, h2, to convey the wood to the bundling apparatus, as specified.

Third, I claim the sliding support, g 1, arranged and acting as set forth, to sustain the kindling wood as fed into the machine, and keep it in place, as described and shown.

Fourth, I claim the curved gatherers, i′, fitted and acting as set forth, to deliver the bundle of wood and gather the next loose wood into a bundle, as specified.

Fifth, I claim the conical gatherers, l and m′, to concentrate and compress the bundle of wood, as described and shown.

Sixth, I claim the stationary plate, k, and segments, 15, in combination with the conical gatherer, l, to sustain the wood while acted upon, as specified.

Seventh, I claim the plunger or press-block, m, acting to bring the ends of the bundle of wood level, as set forth.

Eighth, I claim the vertical moving frame, o, forming the receptacle for the wire, and the guide for the apparatus that wraps said wire around the bundle of wood, as set forth.

Ninth, In combination with the frame, o, I claim the chain, 28, to wrap the wire around the bundle of wood, and the clamp, s′, to hold the wire near the middle part thereof, as described and shown.

Tenth, I claim the circular twisting jaws, 30, moving in dovetails, and acting, when revolved by competent means, to twist the ends of the wires together, in the manner and for the purposes specified.

Eleventh, I claim the arrangement of the sliding and revolving shaft, t, in combination with the twisting jaws, 30, for the purposes set forth.

Twelfth, I claim the spring guides, 25, to keep the wire straight while passed into the machine, in combination with the traveling jaw or clamp, p, and with the shear, 26, as described and shown.

25,157.—John Alexander (assignor to himself and Jas. Ritchie), of Brooklyn, N. Y., for an Improvement in Patterns for Molding:

I claim the employment or use of a "former," C, with a pattern, D, constructed of a plastic substance and formed on or over the "former," C, substantially as described, to produce molds in sand for the casting of hollow ware and other castings of the exact thickness required.

25,158.—Chas. Bradfield (assignor to C. Stewart Bradfield), of Philadelphia, Pa., for an Improvement in Hanging the Bodies of Wheel Vehicles:

I claim, first, Attaching the wheels, C, to the body, A, by means of the arms, e, secured to the traverse bars, d, of the shafts or arbors, b b, which are fitted on the flanches, a, and bearings, c c, of the plates, B, of the body, A, and have springs, D, placed between their flanches, a, and traverse bars, d, substantially as and for the purpose set forth.

Second Attaching the thills, E, to the body, A, by means of the bars, G, fitted in the eyes, g, and secured thereon at the desired hight by set screws, h, substantially as described.

[The wheels of this vehicle are attached to the body in a novel way so that the body can be placed quite low or near the earth, and at the same time wheels of large diameter be employed in connection with spring. The invention also consists in a novel way of attaching the thills to the vehicle, whereby they may be readily adjusted higher or lower to suit the hight of the draft animal between them,]

25,159.—Calvin Fletcher (assignor to Addison C. Fletcher), of Cincinnati, Ohio, for an Improved Apparatus for Supplying Furnaces with Hot Air:

I claim the specific arrangement, as hereinbefore described, of the fan, I, and the steam chambers, A, communicating with the chambers, B C, ogether with the inlet steam-pipe, E, the cold air passages, a, hot air pipes. G l l, and the pipes, F, for the discharge of the water of condensation, for the purposes set forth.

25,160.—Hiram L. Hall (assignor to the Beverly Rubber Company), of Beverly, Mass., for an Improvement in Restoring Waste Vulcanized Rubber:

I claim the restoring of waste vulcanized rubber or gutta-percha by the use of super-heated steam, substantially in the manner and for the purpose described.

25,161.—Miles B. Hand (assignor to himself and Sheldon B. Hand), of Handsboro', Miss., for an Improvement in Cotton Presses:

I claim the combination of the toggles, C C, and screws, E E, when the latter are connected to the driving or power shaft, or to a shaft connected therewith, by means of universal joints, H H, substantially as and for the purpose set forth.

[This improvement is applicable to all presses, and forms a very simple, compact and powerful operating mechanism.]

25,162.—John J. Lehaye, of Reading, Pa., assignor to himself and John Tucker, of Philadelphia, Pa., for an Improved Churn:

I claim the vessel, B, cylinder, C, and reciprocating plunger, E, adapted to and arranged in respect to each other, substantially as set forth, in combination with the devices described, or their equivalents, for enlarging or contracting at pleasure the communication betweeen the said cylinder and vessel, for the purpose specified.

25,163.—Cæsar Neumann, of New York City, assignor to Abraham Prince, of Boston, Mass., for an Improved Machine for Making Hooped Skirts:

I claim the combination of a series of twisting apparatus, with guide rods, for the purpose of forming a hoop skirt, substantially in the manner and for the purposes set forth.

I also claim, in combination with the twisting apparatus, the elevating screw and its appendages, and the mode of operating the same, as described.

I also claim collapsing the guides to form different sized skirts and to deliver the same, as specified.

25,164.—Robert Poole (assignor to himself and G. H. Hunt), of Baltimore, Md., for an Improvement in the "Fifth Wheel" of Fire-engines and other Vehicles:

I claim hanging the pivoted fifth wheel of a steam fire-engine, or other heavy carriage, to a bolster when the latter plays within or over the axle of a vehicle, and is suspended to springs which have their bearings or seats on said axle, substantially in the manner and for the purposes described.

25,165.—E. L. Pratt (assignor to himself and R. B. Fitts), of Philadelphia, Pa., for an Improved Meat Safe:

I claim a new article of manufacture, being a combined arrangement of a cover, A, perforated with small holes at the upper part, d, and a stand, B, also perforated with small holes, f, substantially as and for the purpose specified.

25,166.—John B. Wickersham and Henry Jenkins, of Brooklyn, N. Y., assignors to the New York Wire Railing Company, for an Improvement in Iron Fences:

We claim constructing railways, fences and other articles by metallic bars intersecting each other, and united by a cast-iron ornament or connection, when one or more bars running parallel, or in one direction, pass through between two or more bars running in another direction, substantially as specified.

25,167.—Archilaus Wilson, of New York City, assignor to D. A. Heald, A. L. Wilmarth, C. T. Martin and H. A. Hurlburt, for an Improved Mode of Lighting Gas by Electricity:

I claim combining, with a gas or other burner, metallic points approaching but not coming in contact with each other, substantially as described; but this I only claim in combination with the inductive apparatus, substantially as described, for the purpose of effecting ignition by means of the electric discharge or spark, as specified.

I also claim, combining with a galvanic battery, an inductive apparatus or coil, metallic points and an electro-magnet, for the purposes specified and substantially as specified.

RE-ISSUES.

G. W. Bishup, of New York City, for an Improvement in Breech-loading Ordnance. Patented Sept. 9, 1856:

I claim combining the movable breech-pin with the bore of the cannon by means of movable locking or abutting pieces or segments, substantially such as described, and which, after the breech-pin is inserted, are shifted and made to cross the joint of the breech-pin and bore, to hold the breech-pin against the force of the discharge, as set forth.

Allan Cummings, of New York City, for an Improvement in Ash-sifters. Patented March 8, 1859; reissued Aug. 6, 1859:

I claim the employment of a conical seive, or seive of an equivalent form, in combination with the two receptacles, one for the sifting and the other for the substance sifted, substantially as and for the purpose described.

I also claim the conical deflector for deflecting the substances to be sifted, and concentrating them in combination with the spreader, substantially as described, whether the spreader be itself the seive or employed with the seive below, as described.

I also claim, in combination with the seive, the under conical surface of the deflector for preventing the escape of dust from the apparatus, as described.

And I also claim, in combination, the deflector, the spreader, the conical seive, and the receptacles for the siftings and the substances sifted, substantially as and for the purpose specified.

Ralph J. Falconer, of Washington, D. C., for an Improved Sash-fastener. Patented Aug. 31, 1858:

I claim extending the cap portion, m′, of the catch, m, over and along the front edge of the catch-plate, n, to form a catch-opening, x, flush with the edge of plate, n, so that the window cannot be unfastened without having the point of the hook, a withdrawn entirely clear from the meeting-rail of the upper sash and out of the way of the bars above when the lower sash is raised.

Second, And in combination with the catch, m, hook, a, and plate, e, I claim the check, u′, or equivalent thereof, for the purposes specified.

J. R. Robinson and H. S. Robinson, of Clinton, Mass., for an Improvement in Valve Cocks. Patented Aug. 31, 1858:

I claim, first, The method of constructing valves, valve-cocks and gates, substantially as specified, so that, when the port or ports therein are uncovered, there shall be a straight passage or passages from the induction port or ports in the valve chamber to the eduction port or ports in the same, for the purposes described, whether the valves in such valves, valve-cocks and gates are made in one or more than one piece.

And second, Making the valves in valves, valve-cocks and gates in separate or detached pieces, substantially as and for the purposes described.

Francis Wolle, of Philadelphia, Pa., for an Improvement in Machines for Making Paper Bags. Patented July 6, 1858:

I claim, first, The combination of the creaser, C, and lappers, F G, arranged and operating substantially in the manner and for the purpose described and set forth.

Second, The folding of a lap in the manufacture of a bag of paper, or other material, by means of a creaser blade and two rolling surfaces operating in combination with each other, substantially as described.

Third, The revolving lapper shaft, U, in combination with the creaser, V S, the feed-roller, M, and aprons, u q, substantially as described, the creaser being brought into operation on the lap during the intermission in the motion of the feed-rollers.

Conrad Poppenhusen, of New York City, assignee of L. Otto P. Meyer, of Newtown, Conn., for an Improvement in Treating Caoutchouc and other Vulcanizable Gums. Patented April 4, 1854:

I claim the mode of operation or mode of proceedure, substantially such as described, which said mode of operation consists in the employment of a pliable or flexible envelope, substantially such as described, or the equivalent thereof, applied by pressure to the hard compound of vulcanizable gum, while in the green or plastic state, so as to insure the contact of such covering with the surface of the compound, and while thus covered or protected, subjecting it to the vulcanizing heat, and when vulcanized, stripping off such covering, the whole process being substantially such as specified.

Christian Shunk, of Canton, Ohio, for an Improvement in Refining Iron in the Heat of a Blast Furnace. Patented May 17, 1859:

I claim the employment, immediately before the tapping of the furnace, of an auxiliary tuyere pipe or pipes within the hearth of the common blast furnace, when charged with molten iron, at such an inclination as to cause the blast of air to commingle with the particles of iron and give to the whole mass in the hearth a spiral or rotary motion, substantially as described.

EXTENSION.

Beriah Swift, of Washington, D. C., for an Improvement in Grinding Mills. Patent dated Aug. 16, 1845:

I claim making the grinding teeth of mills, in concentric rows, projecting from the surface of the plates, so that the teeth of one plate shall run in the spaces between the teeth on the other, and vice versa, in combination with the grooves or furrows running towards the periphery of the plates, through which the substances acted upon are carried outwards, whether these furrows be arranged radially according to what is technically termed the eight quarter dress, or in any other manner leading from the inner to the outer range of teeth.

And I also claim, in combination with the teeth arranged as expressed in the above claim, the breaking the teeth on a cylinder or cone, arranged substantially as described and for the purposes specified.

DESIGN.

Garrettson Smith and Henry Brown (assignors to Cox, Whitman & Cox), of Philadelphia, Pa., for Stoves.

Correspondents

J. A., of Conn.—It is very difficult to form an alloy with antimony and copper, and it is not so strong as cast-iron. Tin and antimony form an alloy that is both hard and tough, and with the addition of lead it forms type metal. Antimony does not combine with carbon like iron.

N. H., of Conn.—If you employ dextrine for making Dutch metal adhere to paper, you will find it superior to the white of eggs. Good size made by boiling parchment clippings is superior to dextrine, but is more expensive. A solution of isinglass mixed with whiskey, we think, will answer your purpose better than any other.

S. W., of Cal.—A pump 20 feet in length will not raise water easier than one 10 feet in length from a pit 10 feet deep. If the short pump to which you refer requires more power to work it than the long one placed beside it, you may depend upon it that its buckets are set so as to cause more friction, or else it draws more water.

J. D., of ——.—All vulcanized india-rubber is made under Goodyear's patent. You would have to buy it for making elastic boot heels, but we do not think you could obtain a patent for it, as all waterproof overshoes have heels of this material,

J. Y. H., of Pa.—We cannot well determine as to the exact rights of the parties in the case you mention, without seeing a copy of the deed of assignment. But we will state, in general terms, that if an individual purchases a cider-mill, with right of use in a certain town, he has a right to use it anywhere in that town. He may use it in his own house or in that of his neighbor. He may use it personally, or his neighbor may use it as his representative. The original owner of the patent would, under such circumstances, have no right to demand back pay for the loan to a neighbor, nor could he, at law, recover damages for such continued loanings. If the facts in the case resemble the above the $2 paid was incorrectly demanded; but if the deed expressly limits the use of the machine to the barn or actual premises of the purchaser, then the latter would have no right to use it elsewhere.

S. T., of Mass.—Common mortar used for roofing would be liable to crack; if saturated with oil of sulphur varnish, it may prevent this tendency.

C. G., of Iowa.—Your subscription will expire with No. 20, Vol III., or one year from next November.

H. M., of Ky.—When it is satisfactorily demonstrated by experiments that water-wheels do more work during night than day it will be time enough to seek for the cause of the phenomenon.

T. A. S., of Va.—The stone you send us is a common garnet, and is not of any value.

S. W. G., of N. Y.—There is no work published containing the dyeing recipes to which you refer, and back numbers containing them cannot be obtained.

W. I. L., of N. Y.—We do not understand your views regarding the earth having two revolutions on its axis as presented in your letter, but suppose you mean that its annual revolution round the sun involves an axial motion besides its daily rotation on an axis. If so, your views will not be disputed.

C. H. C., of Ala.—The Babbitt patent is for lining the hard shell of journal boxes with a softer metal; there is no patent on the metal.

W. B., of Minn.—The falling of the mercury in a weather-glass indicates a storm of wind and also rain, but the reason why is not well understood.

C. D. P., of N. Y.—Fine emery is employed for grinding and either calcined tin or calcined sulphate of iron for polishing lenses. Boiled linseed oil containing a drier, such as litharg , is about as good a waterproof varnish as you can employ for waterproofing cotton cloth.

W. K., of Mo.—The furnace of a saw-mill for burning saw-dust, chips, &c., should be lined with the best fire-brick, and made somewhat deeper than one for burning coal. If we were in your place, we would use a grate five feet long and three feet wide, and would feed in the chips on the front end, and push back the red fuel gradually.

E. A. D., of N. Y.—If you take an equal quantity of saturated steam at 250° and superheated steam at 350°, the former will contain the most latent heat, and will therefore require more water to condense it; but if a certain volume of saturated steam at 250° is superheated to 330°, it will certainly require more water to condense it, because the total amount of heat in it is greater. The article to which you refer embraces this idea.

A. C. T., of N. Y.—We can only refer you to our back volumes, where you will find illustrations and descriptions of all kinds of windmills. As to which is the best adapted for your special purpose or location, you must be your own judge.

D. A. J., of Pa.—A square frame with wires stretched across to guide the hand will enable a blind person to write in straight lines, and prevent the letters running into one another by moving the hand continually along a certain wire. There is no machine by which a blind person can write in raised letters. Mr. Chapin, of the Institution for the Blind, in your city, will give you any information concerning apparatus for the blind.

H. D. E., of N. Y.—Three-cornered files are only made small at one end, and that is for doing smaller work than the larger, and also to make the cut easier by commencing narrow, and gradually widening to the end of the file.

E. R. C., of C. W.—If your battery and solution are in good condition, the white metal only requires to be perfectly clean, in order to take on the silver for polishing. We think your articles have not been properly cleaned before you put them into the electro-plating baths.

N. L. O., of Pa.—When you come to this city, you will see how our office is heated and ventilated. It is held to be a very efficient and superior method.

W. C. K., of Texas.—Write to Mr. James Bogardus, Center-street. this city, and he will furnish you with a grinding-mill suitable in every respect for your purpose; but we do not think you can succeed in making pottery without employing a practical man to conduct the business.

L. A. R., of N. Y.—We cannot refer you to any work defining the character of the Virginian cannel coal.

G. V. A., of N. Y.—We have no doubt that Goodwin's wheel is a good one. It has been illustrated and described in our paper.

L. A. B., of N. H.—There is not the slightest chance for a patent on your alleged improvement in devices for producing reciprocating motion in harvesters. The zig-zag wheel has long been known for this purpose.

W. M. H., of Md.—You will find the information you seek (on pumping water) in another column.

S. S., of Mo.—The shining particles in the sand which you have sent us are mica scales. The red chalk is an oxyd of iron. It is of no practical value. Send us a good sketch of your fence, and we will be able to judge of its patentability.

D. R., of N. C.—The paragraph in No. 7, stating that "there are on the earth 1,000,000,000 inhabitants, and that of these 33,333,333 die every year, 7,780 every hour, and 60 every minute," was inserted by the printer to fill up at the last moment before going to press. When too late, we noticed the error in its calculation, but did not deem it of sufficient consequence to correct it.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, Aug. 20, 1859:—

H. W. W., of Cal., $30; E. C., of Mass., $250; E. D., of La., $30; R. S. U., of N. Y., $20; W. H. B., of N. Y., $30; J. C. A., of Ohio, $40; A. H. P., of Mass., $25; W. R. A., of Wis., $32; R. C. F., of N. Y., $10; D. A., of N. Y., $10; S. & M., of N. Y., $30; C. W., of Mo., $25; W. D. J., of N. C., $75; H. R. B., of N. Y., $30; J. K., of N. Y., $25; G. W. B., of Ga., $35; F. S., of Mich., $30; S. F. Van C., of Cal., $20; B. & C., of N. Y., $30; N. W., of Wis., $55; L. H., of N. Y., $25; W. & S., of Vt., $20; J. M. C., of Ky., $30; J. H. R., of Mich., $35; A. C. A., of W. T., $30; H. S. L., of Ill., $25; I. McC. Jr., of Mass., $30; Van H. & A., of Mo., $20; A. T., of Conn., $27; G. C. B., of Ill., $20; C. & B., of Conn., $15; C. C. B., of Ohio, $20; S. & C., of Maine, $30; P. K., of Conn., $30; I. A., of N. J., $40; J. H. F., of Ohio, $25; R. T. C., of Ill., $10; H. W. B. R., of La., $70; H. M., of Va., $25; A. L. C., of N. Y., $25; L. & V., of N. Y., $55; F. C. L., of N. Y., $30; J. N., of Mass., $30; A. L., of Mich., $30; F. & C., of Pa., $30; L. & H., of Ill., $30; W. M., of Maine, $30; B. S. M., of Iowa, $30; H. W. H., of Conn., $100; J. S. L., of Pa., $30; J. S. D., of N. J., $10; W. & C., of Ind., $30; W. M. H., of Vt., $25; W. & F., of Mo., $25; A. L. F., of N. Y., $30; O. C. McC., of Ohio, $30; E. K. B., of Conn., $25; W. C., of Ill., $30; J. W., of S. C., $45; J. & F. E. H., of N. Y., $250; P. B., of N. Y., $55; J. H. L., $55; J. M., of Maine, $25. J. H. G., of Ky., $30, L. & V., of N. Y., £55; C. W. C., of Ill., $26; E. K. B., of N. J., $29.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Aug. 20, 1859:—

N. W., of Wis.; C. & B., of Conn.; A. T., of Conn.; A. H. P., of Mass.; C. W., of Iowa; E. & R., of Mich.; I. C. L., of N. Y.; J. H. F., of Ohio; H. M., of Va.; W. & S., of Vt.; P. B., of L. I.; W. R. A., of Wis.; H. S. L., of Ill.; W. & S., of Vt.; L. H., of N. Y.; W. & F., of Mo.; A. B., of N. Y.; W. D. J., of N. C. (three cases); J. M., of Ill.; J. H. L., of N. Y.; I. W., of Mass.; T. G. G., of Ill.; D. A., of N. Y.; S. & C., of Maine; W. M. H., of Vt.; E. K. B., of Conn.; J. M., of Maine; H. & T., of N. Y.; E. K. B., of N. Y.; A, & B., of N. J.; C. W. C., of Ill., L. & V., of N. Y.; A. L., of Mich.

Literary Notices.

THE EDINBURGH REVIEW. Published by L. Scott & Co., this city.

The present number is the first of a new volume (LI.), and is a sterling issue. It contains 11 able articles, one of which—on "Fossil Footprints"—is full of interest to American geologists.

MANUAL OF HEALTH: a Treatise on the Anatomy of the Human System. Copiously illustrated with colored engravings. This manual is a book which should be found in every household. Graefenberg Company, publishers, No. 32 Park-row, New York. Price by mail (paper covers), 25c.; bound copies, 50c.

History of the Scientific American and Important Information to Patentees.

We have printed a supplementary edition of the SCIENTIFIC AMERICAN, in which there is a history of its rise and progress, with illustrations of the building, externally and internally, showing the spacious rooms in which our immense patent business is conducted, and with life-like representations of the artists, engineers and specification writers at their daily labors. The same paper contains information on the many intricate points arising in patent law and practice, and comprises the best popular treatise on the subject ever published; it should be in the hands of all who are interested either in procuring, managing or using patented inventions. The legal information contained in this paper is the result of FOURTEEN YEARS' experience as patent solicitors, and it cannot be found in any other treatise on patent law. It also contains information in regard to Foreign Patents and Extensions. It is published in octavo form, sixteen pages, and mailed upon receipt of two three-cent stamps. Address MUNN & Co., publishers of the SCIENTIFIC AMERICAN, New York City.

PATENT EXTENSIONS.—ALL PATENTS FOR Inventions, granted by the United States during the year 1845, will expire, by their own limitations during the current year (1859) UNLESS EXTENDED ACCORDING TO LAW. The statute provides for the extension of Patents for an additional term of SEVEN YEARS, the grant being made to the inventor himself, or if deceased, to his heirs and administrator. The EXTENDED TERM enures solely to the benefit of the inventor or his heirs. Assignees or owners of rights under the first term of the Patent have no rights whatever in the extended term. The inventor or his heirs may, however, sell their interests in the Extension prior to the grant thereof, in which case the Extended Patent, when granted, becomes the exclusive property of such purchaser. Applications for Extensions must be made at the Patent Office at least 60 days prior to the extension of the Patent. The undersigned, having had great experience in Patent business, will promptly prepare the various documents and prosecute Extension cases on moderate terms. For further information address
MUNN & CO., Solicitors of Patents,
No. 37 Park-row (Scientific American Office), New York.

KNITTING MACHINES, CIRCULAR AND straight, and machine-knitting needles, of all sizes and gages, on hand and made to order. Address WALTER AIKEN, Franklin, N. H. 7 22t*

PARAGON COAL OIL BURNERS.—TO MANUfacturers of and Dealers in Coal Oils, and Coal Oil Lamps.—The above burners are admitted to be the best in use as to strength, least liability to get out of order, and ease of management; giving a larger blaze than any other burner. Lamps with the above burners, suitable for hand, hall, hanging bracket and side lamps; also, for Railroad Stations, Steamboats and Public Buildings. The best Burning and Lubricating Oils, as well as Lamps, in quantities to suit purchasers, at the lowest market prices. H. COULTER,
8 4t* No. 56 South Second-street, Philadelphia, Pa.

THIRTY-FIRST ANNUAL FAIR OF THE AMERICAN INSTITUTE, in the City of New York.—The Managers announce that the Exhibition will be opened at Palace Garden, in 14th-street, near the 6th-avenue, on September 21, 1859. New Inventions and Improvements in the Mechanic and Industrial Arts, any articles of superior quality and beauty of workmanship, will be received from Sept. 15 to 20. Steam power will be provided to put in operation all kinds of machinery. Premiums will be awarded on the reports of competent and impartial judges. Circulars can be had at the office of the Institute, in the Cooper Institute Building, corner of 8th-street and 4th-avenue. By order of the Managers.
WM. B. LEONARD, Cor. Sec. D. R. JAQUES, Chairman.
JOHN W. CHAMBERS, Rec. Sec: 8 2t*

MACHINERY.—S. C. HILLS, NO. 12 PLATTstreets, New York, dealer in Steam-engines, Boilers, Planers, Lathes, Chucks, Drills, Pumps; Mortising, Tenoning and Sash Machines, Woodworth's and Daniel's Planers, Dick's Punches, Presses and Shears; Cob and Corn Mills; Harrison's Grist Mills; Johnson's Shingle Mills; Belting, Oil, &c. 2 e3w

GRINDSTONES FOR MACHINISTS AND MANUFACTURERS, of every size and grit, for wet or dry grinding.
9 3tom* J. E. MITCHELL, No. 310 York-avenue, Philadelphia.

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5 10 GEO. I. CROSSETT, Assignee.

THE AUBIN VILLAGE GAS WORKS WERE erected last year by gas companies in several States and in Canada. The success attending these works has already led to the erection of one city and one village work this season, has secured three village works for immediate erection, and so nearly secured five more that they may be relied on before August next. For reference apply to the Aubin Company, No. 44 State-street, Albany, N. Y. 1 13

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AMESSIEURS LES INVENTEURS—AVIS IMportant.—Les inventeurs non familiers avec la langue Anglaise, et qui prefereraient nous communiquer leurs inventions en Francais, peuvent nous adresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront recues en confidence.
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TO INVENTORS AND PATENTEES—A. B. ELY, Counsellor-at-Law, Traveler Building, Boston, Mass., will give his personal attention and experience of fifteen years to consultations and trials in all matters relating to the law of patents, interferences, infringements, &c. 1 9*

Zur Beachtung für Erfinder.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu adressiren an

Munn & Co.,
37 Park Row, New-York.

Auf der Office wird deutsch gesprochen.

IMPROVEMENT IN KEY-BOARDS.

Instrumental music forms one of the charms of life, and many an evening is deliciously passed listening to the strains of a piano, which, were it not for that attraction, would be, perchance, worse employed. Indeed, so universal has the love of music become, that it is now regarded as a necessary branch of education in all female colleges and seminaries; and we hope the time will come when we of the rougher sex will find it general in our own schools. Those of us who have acquired this accomplishment know how hard and difficult it was for us to acquire a knowledge of the key-board, and recollect the many weary hours that were spent over the first lessons. But this is no longer the case, as will be seen by reference to our engravings, which represent the invention of H. T. Merrill, of Galena, Ill.

Fig. 2

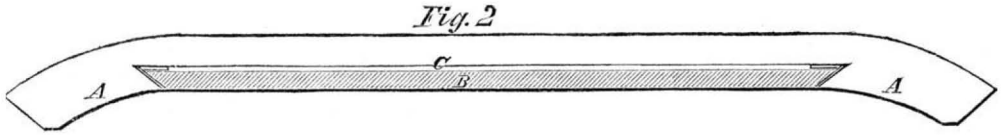
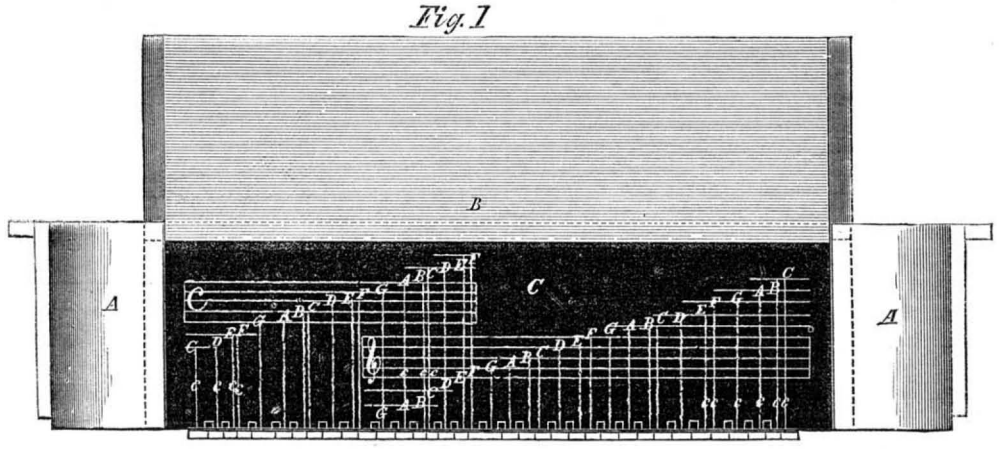


Fig. 1



MERRILL'S IMPROVED KEY-BOARD.

Fig. 1 is a front view of the name-board and adjacent parts of a pianoforte, and Fig. 2 is a horizontal section of the name-board and a top view of the front portion of the case of a pianoforte.

A represents the solid front portion of the case behind the key-board. B is the name-board, upon which the name of the maker of the instrument is ordinarily incribed; this board being of the whole length of the key-board, fitted to slide in dove-tailed grooves, in the part A of the case. C is the "gamut-board," having engraved or otherwise delineated upon it, or faced with paper or other material having engraved, printed or otherwise inscribed upon it, the treble and bass staffs, and such a system of vertical lines, *c c* (Fig. 1), as will point to or meet the keys of the natural notes on the key-board, and having each of such lines indicated on the staff by the proper letter, and being marked upon it, in the proper horizontal spaces between such lines with the letters and signs which will indicate the sharp and flat keys below such spaces, as will be readily understood by reference to Fig. 1, where the keys are represented in black outline. A cavity is left between the name-board and the staff-board, to prevent the latter being chafed by the sliding of the name-board over it.

It will be seen that, with this invention, the piano may be quickly learned, as it is always before the player; and, indeed, any person having first a theoretical knowledge of music can play on a piano which is provided with this invention. It was patented June 14, 1859, and a notice of it was published on page 346 of the last volume of the SCIENTIFIC AMERICAN. The inventor will be happy to furnish any further information, upon being addressed as above.

IMPROVED LUBRICATING DEVICE.

Much oil is wasted in the lubricating of machinery with the present oil-cans, and there are many parts of a machine which place the attendant's life in jeopardy each time he places oil in their bearings, from the number of parts through which his arm has to be passed to get at the desired spot. All this is prevented by the use of the subject of our engraving, which is the invention of Thomas Fildes, of Medina, Pa., and which we will now describe.

Fig. 2

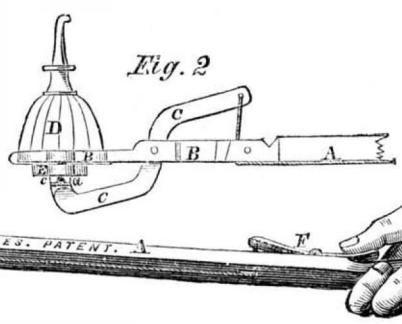


Fig. 1

Fig. 1 is a perspective view, and Fig. 2 is a side elevation. A represents a handle, which may be of wood and of any desired length, and B is a clamp of metal secured to A, and constructed as follows: It is rather more than a semi-circle, which is beveled to conform to the conical shape of the ordinary oil-can, D. About the center of B two small ears project, to which, by screws, *a*, a small bar, E, is attached, when the oil-can has been placed in the clamp, so as to hold the oil-can perfectly secure in the clamp. This bar, E, has an opening in its center, through which a small stop, *c*, on the end of a lever or bar, C, projects, so that it touches the bottom of the can, and the other end of this lever is attached to a cord that passes under a pulley at one end of A, and under another on the handle end to a trigger, F. The device is used as follows: The can is filled with oil and placed in the attendant grasps the handle, A, and places the orifice of the lubricating-can at the desired spot; then, by pressing with his thumbs upon the trigger, he actuates, by the cord, the lever, C, and so presses the end, *c*, against the bottom of the can, compressing the air and forcing the oil out, drop by drop, or in a continuous stream, as may be desired, just as if the thumb were applied to the bottom directly. By the use of this invention tall machinery may be lubricated without a ladder, as the handle can be of any length.

The patent is dated April 12, 1859, and any further information may be obtained from the Inventors' Exchange (S. A. Heath & Co.), 37 Park-row, New York, who will forward the device by express, upon receipt of one dollar.

IRON RAILROAD BRIDGES.

In a letter to the *North American and U. S. Gazette*, M. H. Wilson, resident engineer of the Pennsylvania Railroad, states that he is replacing the wooden bridges of the company, as they become defective, by structures of stone or iron. The spans of the iron bridges range from 40 to 110 feet, and are constructed at the workshops of the company, upon plans designed during the construction of the road, but modified and improved upon by the several engineers who have successively had charge of the road. The iron bridges of spans of less than 40 feet are composed of compound beams from the Phœnix Works, arranged in a very simple and effective manner. "For short spans," he says, "these beams constitute an excellent bridge and are worthy of the attention of engineers generally." We recommend this subject to all the railroad companies in our country.

THE OHIO LIFE AND TRUST CO.—In the month of August, 1857, this old-established company failed, and in the partial development of its condition made at that time, it was evidently a corrupt concern. Public confidence had, previous to that time, been very strong in this company, and not long before this event its stock commanded a premium in Wall-street. Instances have come to our knowledge of persons in humble circumstances who had invested their little all in this stock, the value of which was swept out of their grasp as by the blast of a tornado. The failure of this company, and the rottenness of its condition, coming thus suddenly to public view, was but the first breeze of a financial whirlwind which extended over the whole civilized world. The *Cincinnati Gazette* states that the trustees are about to declare a dividend of ten per cent. to the creditors of this institution. There is no hope, however, that the stockholders will ever get a penny in return for their investment.

STEAM PLOWING.—Fawkes' steam plow is now in the State of Illinois, exhibiting before the Agricultural Society of that State, but it is to be exhibited in this city at the Agricultural Show of the American Institute, to commence on the 21st of September next. This steam plow will be operated on a field near Harlem, and it is expected that a large concourse of farmers will be present to witness the operations.