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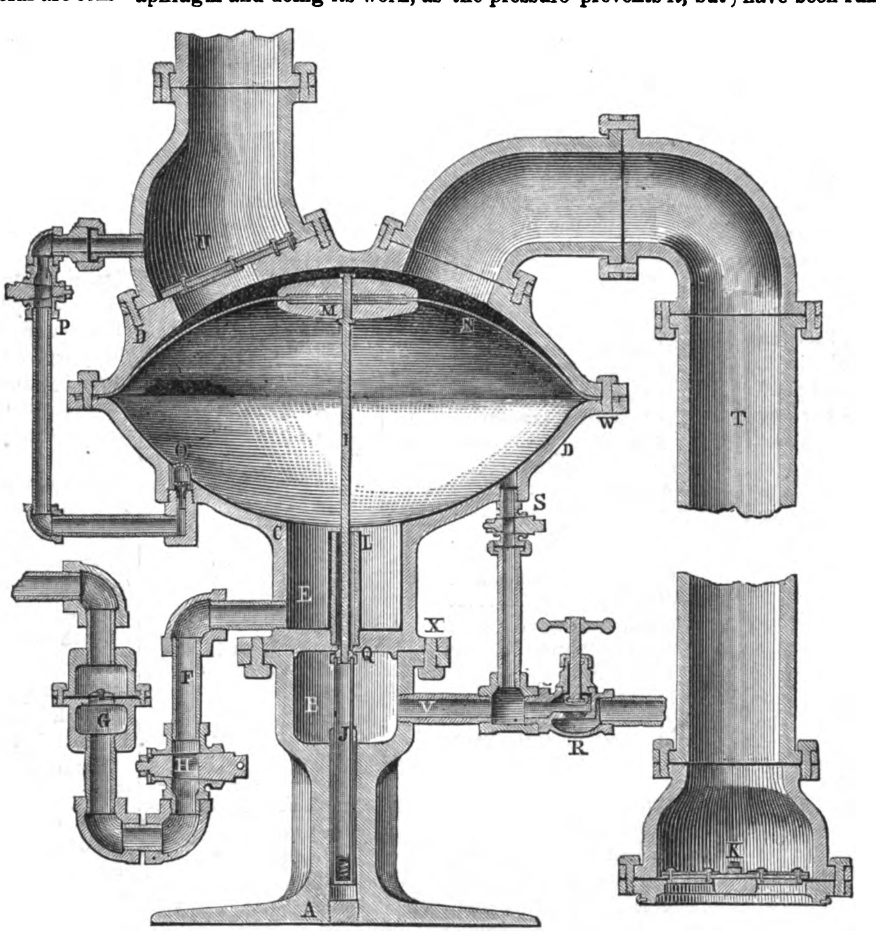
Improved Pumping and Blast Engine.

The object of the inventor, in designing this pump, was to obtain the simplest and most efficient device for the purpose. It is well known that steam pumps in general are complete steam engines, having all the parts usually found in them. It will be seen by the engraving that this has no working parts that require packing, no metallic surfaces in contact, and that the details are limited in number; in fact, the only part moving is a cotton duck diaphragm, which has no friction whatever, and is simply a floating wall between the water to be lifted and the steam which lifts it. It follows from these facts, that the resistance to be overcome before the work is done, is reduced to nothing, hence no lubrication is required, and the total effect of the steam is applied directly to the water itself, the diaphragm aforesaid being the only object intervening.

The annexed engraving shows a vertical section through the center of the pump, of which A is the base or standard, and D D are hemispherical castings of iron with flanged edges, united by bolts, W. Intervening between said flanges, and stretching across said hemispheres, is a rubber-coated duck diaphragm, N, of sufficient diameter to allow it to float to the extreme upper and lower walls of the hemispherical disks, D D. The lower half of the hemispherical disk is coated with vulcanized rubber, thus preventing the too rapid cooling of the steam chamber. C is the wall of the hot well; U is outlet water-pipe with valve opening outward; T is inlet water pipe, provided with valve, K, opening inward; O is the injecting nozzle, provided with a valve opening inward. This injecting nozzle is connected by a small pipe, P, with outlet pipe, U. V is a steam pipe from boiler, provided with cock, R, and leading to steam chest, B, and also to starting cock, S. J is a tubular valve, with its seat at Q, and is provided at the bottom of its tube with a light coiled spring, as shown. I is a valve stem clasping diaphragm disks, M, and having a button or nut on its lower end, playing loosely in valve tube, J, for the purpose of operating valve, J, by opening and closing it alternately at its seat, Q. E is a well for the collection of condensed steam; L is a pipe to conduct live steam from steam chamber, B, through the hot well to lower hemisphere; F is a pipe for the escape of condensed steam, with outlet cock, H, to limit the amount of escape, and has also a valve at G, opening outward.

The pump is operated by opening the cocks, R and S, which let steam into the body of it. The air contained therein is driven out through the pipe, F, when the cock, S, is closed. As soon as the steam in the pump is reduced to the pressure of the atmosphere, a jet of water will be thrown into the pump through the nozzle, O, which is supplied from the feed pipe, P. The steam is thus condensed, a vacuum is formed below the diaphragm, and it comes down immediately, followed by the water, which rushes in through the main suction pipe. In the act of descending, the valve stem, I, attached to the diaphragm, strikes a spring at the bottom of the valve tube, J, and opens it at its seat, Q, which allows the live steam to enter the body of the pump directly under the diaphragm, and lifting the same, precisely as a piston would do, ejects the water, which entered at its down stroke. The injection water, of course, does not enter while the steam is under the diaphragm and doing its work, as the pressure prevents it, but so soon as it is expanded, and the pressure reduced, the steam is condensed as before the diaphragm descends, and the pump acts automatically. The number of strokes per minute varies from five to ten, and the hight to which the water is elevated depends upon the pressure of steam employed.



SHAW & JUSTICE PUMPING AND BLAST ENGINE.

It will be seen that it takes steam only one way, and that steam is condensed, showing a very marked advantage over pumps that take steam both ways, and exhaust it into the atmosphere or throw it away at every stroke. These pumps have been running for several months at the manufacturer's works, feeding boilers, and doing other work. They are said to have drawn water the full limit of distance allowed for atmospheric pressure, and through very many angles and crooked passages; the performance leaves nothing to be desired. They are economical in fuel, act with great regularity, and require no attention after once starting. From their simplicity, cheapness, and efficiency, they must appeal to manufacturers in general. State Rights for sale on reasonable terms.

Patented by Thomas Shaw, Dec. 15, 1868, and manufactured by Philip S. Justice at 17th and Coates streets, Philadelphia. Offices—14 North 5th st., Philadelphia, and 42 Cliff st., New York.

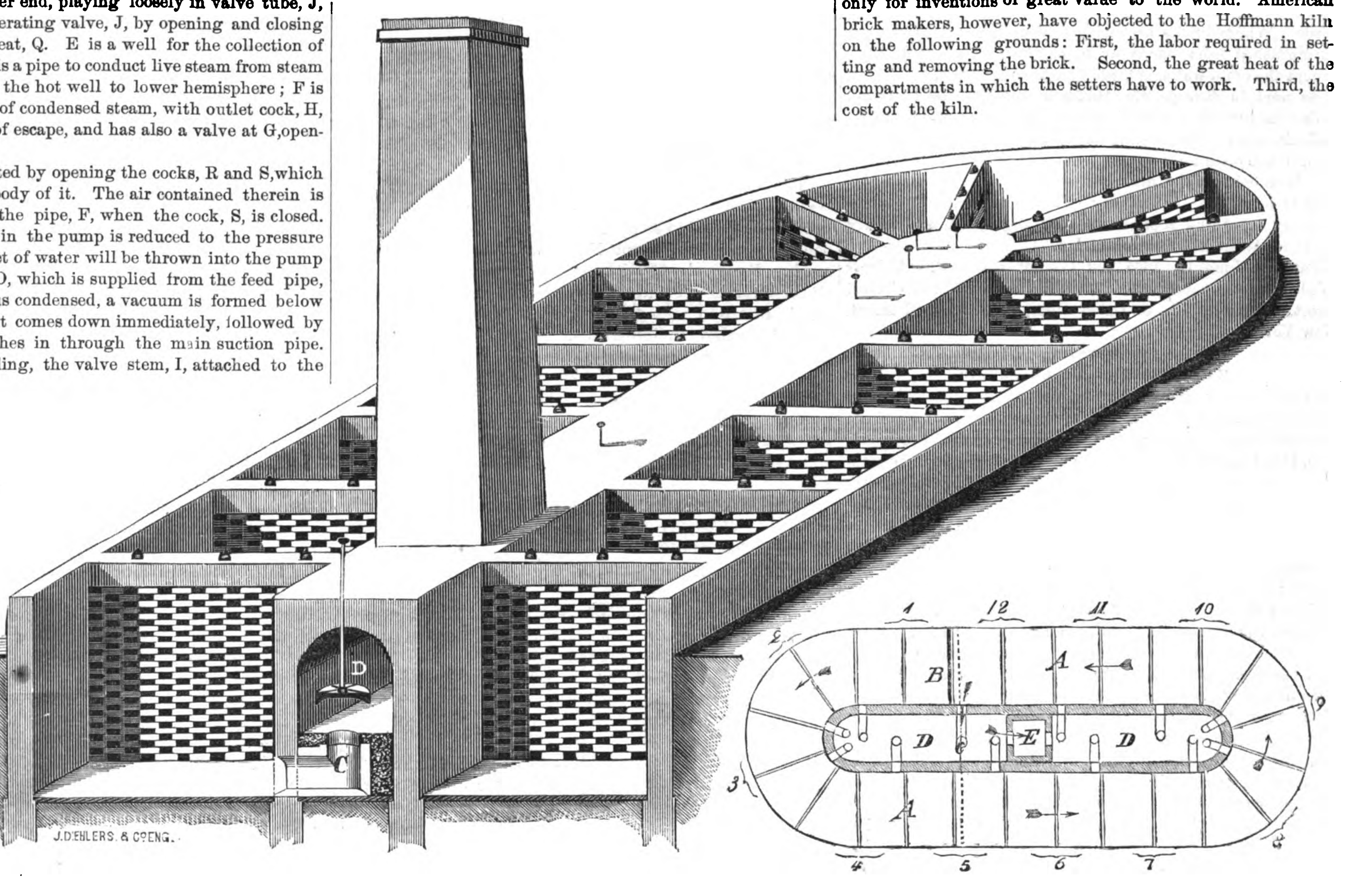
Improved Brick Kiln.

As bricks are ordinarily burned there is great loss of heat from two sources: First, during the burning, the smoke and gases of combustion pass off at a very high temperature, and are wasted. Second, after burning, all the heat the bricks contain is lost. This two-fold loss of heat is avoided in the Hoffmann system of kiln, herewith illustrated.

First, the heated gases and smoke from the burning bricks are made to pass through the green bricks, so that they are approximately burned before any fire is directly applied to them.

Second, the heat of the bricks, after burning, is utilized in heating the air for the fires, so that the fuel is consumed in air already hot. By this means a perfect combustion is obtained, as is proved by the entire absence of smoke, even when bituminous coal is used.

The Hoffmann kiln is extensively used in Europe, chiefly in Germany and England; and at the Paris Exposition, 1867, its inventor received the distinction of the "*Grand Prix*," which was awarded in but 64 instances, and only for inventions of great value to the world. American brick makers, however, have objected to the Hoffmann kiln on the following grounds: First, the labor required in setting and removing the brick. Second, the great heat of the compartments in which the setters have to work. Third, the cost of the kiln.



WEDEKIND & DUEBERG'S IMPROVED BRICK KILN.

Parties who are interested in its introduction here, claim that these objections are not well founded. However, Mr. Hoffmann's American agents have wisely determined on removing all possible ground of objection, rather than to rely on explanations to demonstrate the truth of the above statement. We present our readers with a cut showing the arrangement of the Hoffmann kiln in its Americanized form, which, with the following explanation, will, we think, be readily understood.

A long rectangular smoke chamber, D, communicating with a stack, is made either above or below ground. A gallery, open at top, is made all round this smoke chamber. This gallery is divided by means of cross walls into twelve compartments, each of which communicates with the smoke chamber by means of a separate flue. Each flue is provided with a damper. Other cross walls divide the compartments into sections. The cross walls, made of fire brick, are perforated, so as to allow a free draft from one section or compartment to the next, and are made double, with a space in the interior. These spaces are the fireplaces. At the top the cross walls are solid, except where vertical holes are made, called the feeding holes, for putting in fuel. The feeding holes are closed at top by means of closely-fitting iron covers. The fuel may be wood, coal, or peat—whatever is cheapest, and in case of coal, it may be in the form of dust.

The manner of using the kiln is as follows: Five or six compartments are filled with green bricks, say 7, 8, 9, 10, 11, 12, numbering them in order like the hours on a clock face. On top of the bricks are two platting courses and a layer of clay or sand, forming a tight covering. At the perforated wall separating compartment 12 from 1, there is a temporary partition called the "cut-off." This may be either of sheet iron or wood, as no fire comes near it. But iron is preferred, it being less easily broken. The flue of No. 12 compartment is open—all the others are closed. The cross wall between 6 and 7 is partially removed, and in setting the bricks in 7, arches are turned as in an ordinary kiln. Fires being lighted in these arches, the draft passes in the direction of the arrows through all the mass of bricks to the open flue. After about twenty-four hours, the first cross wall will be hot enough to ignite fuel. Fuel is then supplied through the feed holes in this wall; and as soon as the second cross wall is hot enough to ignite fuel, the burner commences to fire at these holes, and so on, the firing advancing as fast as the cross walls, one after another, get hot.

When five or six cross walls have fire in them, the firing at the arches is stopped; then one cross wall after another is left without fuel, so that only five or six sets of fires are burning at a time. While this is going on, setters are putting bricks into compartments, 1, 2, 3, etc., and when the gases escaping through the open flue are hot enough to be of any value in drying green bricks, the cut-off is advanced one compartment, No. 1 damper is opened, and No. 12 damper closed.

The interval of time between opening two consecutive dampers is usually twenty-four hours, and as the compartments are calculated to hold each one day's manufacture, say 20,000 bricks, it is plain that there are added to the burning mass of bricks each day, just one day's production of the yard. This goes on till all the compartments are full. By that time the bricks first fired are cool, and ready to be taken out. The compartment left empty by removing these is immediately refilled with green bricks, and the work of setting and drawing each day continues as long as bricks can be made. Where bricks are made in winter, the fires are not extinguished from one year to another. The whole kiln, except the cross walls, is made of common bricks.

As used in Europe, the Hoffmann kiln is closed at top. This construction causes the setting under the arches to be difficult, and the first cost of the kiln is considerably greater than in the open top form.

It is stated that the first cost of the open top Hoffmann kiln is less than that of any other form of kiln of equal capacity; that the repairs are very slight, and are easily made while the kiln is in operation.

Patented June 13, 1865, and December 15,1869. Address Wedekind & Dueberg, No. 53, 55, and 57 North Calvert street, Baltimore, Md., or Caleb Huse, No. 17 Broad street, New York.

The Wonders of California.

While the novelties of climate, the strange and wonderful variety of surface and form in nature, the combination of the beautiful and the anomalous, the fascinating and the repulsive, that California everywhere presents, arouse every enthusiasm and excite every interest, it is to the student of science that she seems the most original and proves the most engaging. He finds here not only revolutions in forms and facts, but revolutions in theory, and sees that he must begin anew to observe and recreate the science of the world's history. There are evidences of glaciers that surpassed those of Switzerland; there are proofs of volcanic revolutions that utterly changed the form of the Continent, and the nature of vegetable, animal, and human life upon it; where these mountains now rise were once grand rivers; out of their depths have been dug the bones of a gigantic race that lived farther back in the ages than human life was ever before known, or perhaps suspected by the most audacious theorists; the State has diluvial deposits fifteen hundred feet deep, and granitic mountains twelve to fifteen thousand feet high, and others of lava and slate and metamorphic rock of nearly equal hight; silent craters are open upon many of her highest peaks; where Switzerland has one mountain thirteen thousand feet high, California has a hundred; she has a waterfall fifteen times as high as Niagara; she has lakes so thin that a sheet of paper will sink in their waters; others so voracious that they will consume a man, body, boots, and breeches, within thirty days; she has inexhaustible mines of gold, quicksilver, and copper; she keeps a miniature hell in blast as warning to the wicked sons of men; she has dreary deserts with poisonous waters, where life faints; she has plains and valleys that will grow more wheat and vegetables than any other equal space in the whole nation; in short, her nature is as boundless in its fecundity and variety as it is strange and startling in its forms; while her men are the most enterprising and audacious; her women the most self-reliant and the most richly dressed; and her children the stoutest, sturdiest and the sauciest of any in all the known world!—*Samuel Bowles.*

ON COMPOSITIONS FOR FRICTION MATCHES WITHOUT PHOSPHORUS.

In treating of this subject in the *Polytechnic Journal*, Vol. XC., page 369, Mr. Wladimir Tettel adopts, as a measure for judging of the quality of the various compositions, the proportion of oxygen contained in them to that of the other ingredients. In not taking into account the mucilage and gum, which are used for thickening, as well as the substances retarding combustion, they being chemically inert, the following proportions have been found for the here annexed compositions:

ORDINARY PHOSPHORUS COMPOSITION.		Parts in weight.	
I. Phosphorus	3·1	14·538	contain oxygen 1452 or 10 p. c.
Minium	36·365		
Nitric acid (50 p. c. in weight)	15·27		

	Parts in weight.	Atomic weights.	Contain oxygen in per cents.
II. Chlorate of potassa	4	122	38
Sulphur	1	16	
Bichromate of potassa	0·4	149	
III. *a.* Chlorate of potassa	2	122	38·4
Charcoal	1	6	
or *b.* Chlorate of potassa	1	122	34·8
Sulphur	1	16	
IV. Chlorate of potassa	11	122	37·5
Marcasite	1·5	60	
Binoxide of manganese	1	43	
V. Chlorate of potassa	7	122	36
Nitrate of lead	2	170	
Bichromate of potassa	2	149	
Sulphur	1	16	
VI. Chlorate of potassa	3	122	34·75
Golden sulphuret of antimony	0·25	209	
VII. Chlorate of potassa	8	122	20
Nitrate of lead	3	170	
Sulphuret of antimony	8	153	
Bichromate of potassa	0·5	149	

In regard to composition No. I., the small amount of oxygen contained therein is explained by the presence of phosphorus, which, even without coming in contact with compounds yielding oxygen, will catch fire at a small increase of temperature. The other compositions which contain no phosphorus, require a four or five times larger amount of oxygen, and though this is the case, inflammation only ensues, in correlation of them with rough surfaces, adapted for the purpose.

These compositions will not catch fire by rubbing them against smooth surfaces. No. II. is a mass similar to one largely used in Sweden. No. III., *a* and *b*, are the pastes for the so-called English "mennous," of which the first inflames very readily and quietly, while *b* is lighted with a certain noise. No IV. is a recipe indicated by H. Wagner. No. V. is a French one of Canouil, and No. VII. is a composition of F. L. Lutz, in Blaubeuren, of which the inventor himself asserts that it needs to be improved on account of the difficulty with which it is lighted.

From the foregoing table, it appears, that a good and readily inflammable composition for amorphous surfaces ought to contain from 35 to 38 per cent of oxygen, for all the compounds mentioned, except No. I. and No. VII. possess as much. It may also be taken for granted that the recipes for all these pastes were only discovered after continuous trials—that is, that they were improved on until the oxygen had reached the above indicated quantities. From the foregoing the following principles result:

1. The principal ingredient for compositions without phosphorus is chlorate of potassa. The quantity of the same amounts to from 40 to 92 per cent, in most cases, to over 60 per cent of the directly acting ingredients. Compositions which ought to take fire on every surface by striking them against it should contain still more oxygen; such masses, however, then crack and snap too much. It remains still a problem of chemistry to discover a substance by the addition of which the quantity of oxygen is increased without that cracking (explosion) ensues; it may perhaps finally be discovered in some picrate.

2. Aside of the chlorate of potassa, most pastes require still other oxygen generating compounds. Their quantity in the above masses amounts to from 10 to 40 per cent of that of chlorate of potassa, so that the quantity of oxygen yielding substances increases as follows: for

II.	IV.	V.	VII.
83	88	91	58

3. A third ingredient is free or combined sulphur. Its quantity is found to be as much as 25 per cent of that of chlorate of potassa. Except when charcoal is used, sulphur cannot well be dispensed with; it is the properly inflaming body.

In case sulphurets are employed, a certain quantity of native sulphur may always be substituted for them; it is, however, then necessary to add an equivalent percentage of bodies which retard the combustion. The use of native sulphur is always to be preferred; the washing of the metallic sulphides being thereby dispensed with.

4. As admixtures retarding the combustion, and thereby causing a quiet burning, there are used, glass powder, sand, and umber. In using one half a pound of umber, or less, for 4 pounds of chlorate of potassa in mass No. II., cracking still ensues, one and a half pounds, however, will produce a slow and quiet inflammation. Yet it may be mentioned that the quantity of the admixtures cannot be well determined, since it is solely dependent upon the chemical nature of the substances employed in the preparation.

5. The quantity of mucilage and gum for thickening should never be unnecessarily large; it ought only amount to from one third to one half of the total amount of the compounds yielding oxygen. When dried too quickly, the lighting of the matches will be attended with cracking, on account of the fact that the mass will not then present a like density throughout. Beside this, the matches thus dried become of a very interior quality, form the fact that the denser top part leaves a compact, not readily fusible residue, while the inner less dense portions become quicker consumed than the outer portions. Thus, in consequence of the speedy generation of gases, a bursting of the outer already burned crust takes place, which is always attended with spurting, or ejecting of the ignited interior portions.

Modern Methods for Refining Vegetable Oils.

Many systems for refining vegetable or grain oils, have been practiced during the last few years. The best known is the one first preconized by the chemist Thenard. It is as follows: He adds three parts of concentrated sulphuric acid to 200 parts of the crude oil. After stirring for a long while the mixture is left to rest. Four hundred parts of water are then added to get rid of the excess of acid. For this purpose long stirring must be again resorted to, and followed by a new period of rest. The oil is then drawn off and filtered. Thenard's method has been modified in various ways, one of which consists in precipitating the acid by milk of lime.

R. Wagner employs chloride of zinc instead of sulphuric acid; he heats by means of steam, and washes the oil with hot water after defecation.

Mr. Gusher, of Nuremberg, adds $\frac{1}{18}$ of its weight of starch to the oil, and boils the mixture until the starch is carbonized. He then decants and filters.

At the works of "la Villette," in France, oil used to be refined by admixture with pulverized charcoal, but this plan was discontinued on account of the waste of oil occasioned through imbibition of it by the coal, from which it could not be entirely recovered.

Evrard refines oils by means of very weak alkaline solutions.

All the above processes are long and tedious. Mr. C. Michaud, of Honfleur, has discovered a new method of refining oil which will probably eclipse all those in general use at the present day. This method has just been communicated by M. Chevallier to the *Société d'Encouragement*, and we lose no time in submitting it to our readers.

While sulphuric acid is introduced into the oil in minute numerous streamlets, air is blown into the oil so as to produce a great commotion in the liquid and to fill it with air bubbles. The mucilage contained in the crude oil being acted on by the acid soon forms with the air a voluminous layer of scum at the surface, which is skimmed off as it forms. This insufflation of air is repeated several times in succession, and the scums cleared off every time until the oil is clarified.

At this point of the operation it still retains free sulphuric acid. It is now run into a copper vessel, and steam is forced through it until the oil has reached a temperature of 100° Cent. The steam is then allowed to bubble through for half an hour or an hour longer. After the oil has cooled down some 20° or 30° Cent., which may be done artificially, it is run through an ordinary filter.

The oil obtained by this process surpasses in quality and in limpidity any that has been made to this day, and the operation combines the great advantages of speed and economy. Two large refineries have lately been put up on the "Michaud" plan, and the oil produced by them is so pure that the wick of a lamp burning it will not carbonize after many days usage.

Concrete Building in Scotland.

An interesting experiment is being tried on the estate of Carbery, near Edinburgh, Scotland, the property of the Right Hon. Lord Elphinstone. A very promising coal pit having been recently sunk on the estate, his lordship has commenced to provide accommodation for the colliers to be employed at it, and he has determined to build in all sixty houses, twenty of them to be of stone and lime, and forty of concrete, upon the principle patented by Joseph Tall, of London. The concrete buildings are to form a separate village by themselves, and are to occupy a square of about two acres in extent, each tenement having a garden attached. On the south side of the square his lordship proposes to erect a school for the children of the miners and a reading-room for the men themselves. The construction of the village has been begun, and already the walls of a block of four houses—each containing two apartments—are about half built, if that is a correct term to apply to Mr. Tall's process, a brief description of which may not be uninteresting, seeing that this is among the first attempts to employ concrete in the erection of houses in Scotland, though in England and France the process has already been pretty extensively tested. The foundation of the houses is laid at about the usual depth, and is formed of stones welded together by the concrete compound. The foundations in this case are about fifteen inches broad for the front and back walls, and about two feet for the gables. On the foundations being completed, the next operation is to erect upon them the frame or molding machine within which the walls are to be formed. These frames consist of wooden boards eighteen inches deep, faced on the inside with sheet zinc, and bolted to upright posts. The frames are placed on the foundations—the one to form the outside of the front wall and the other to form the face of the inside of wall. In this case the intervening breadth is nine inches for the front and back walls, and eighteen inches for the gables—the additional thickness of the gables being to provide accommodation for fireplaces, chimneys, and wall presses. When once set and carefully plummed, the work of *building*, which can be done equally well by an ordinary laborer as by a regular mason, is commenced. All that has to be done is to take a quantity of whatever sort of building material the district affords and pack it inside the frame, care being taken to keep it from touching the sides of the frame. The concrete, which may be made of a variety of articles, such as gravel, sweepings of brickworks, or coal dross, mixed in certain proportions with Portland cement, and of about the thickness of common mortar, is then poured in, in bucketfulls, upon the stones and down the inside of the frame. The concrete used by Mr. Tall in this contract is composed of seven parts of river gravel, one part of sand, and one part of Portland cement. The houses are being built in blocks of four each. The blocks measure about sixty feet in length by about thirty feet in breadth, with a concrete wall running across the middle to provide accommodation for fireplaces, etc., for the two houses in the middle.

To show the speed at which the process of concrete building can be performed, we may mention that eight ordinary laborers can add eighteen inches per day to all the walls of a block of the dimensions we have specified—in other words, they can fill the frames once per day. The frame is allowed to stand over night, and the first thing the workmen have to do in the morning is to unfasten the bolts and lift it up to the top of the portion built the previous day, bolting it with new tubes or "cores," as before. They then commence to fill in the stones, and, after having finished that work, they pour in the cement, continuing the same operation from day to day. When the frames are lifted in the morning, the work of the previous day is found to be wonderfully hardened even in that short time. When the walls get so far on as to require scaffolding, the "cores," which were originally used to bind the frames, and which were allowed to remain in their places, now come to be of service, acting as receptacles for bolts affixed to the trestles upon which the planking rests. The hollow of the tube is afterwards filled in with cement, and the ends are entirely hid from view by the outside coating which is applied to the concrete. This coating is a compound, consisting of two parts of sand to one of Portland cement, and is applied in the same way as ordinary plaster. It imparts a smooth and finished, but rather dull-looking, appearance to the buildings, which can, however, be very easily relieved by a coat of paint. The flooring of the houses is also to be of concrete, and is to be three inches in depth, the upper portion being of a finer quality than the lower. The fire-places are formed by the introduction of temporary wooden frames in the lower portion of the gable walls, and the vents are constructed by the insertion of tin tubes, which are moved upwards as the walls ascend, leaving a clear space beneath, which requires no further treatment. The windows are fitted in entire, and are securely fastened simply by the concrete taking a firm hold of the framework. It may be mentioned that it is never necessary to apply a plumb line to the walls, the frames being constructed with so much precision that, if care is taken in placing the first layer of concrete, no deflection can possibly take place in the superstructure. No skilled artificers, excepting a solitary carpenter, whose duty it is to fix the window frames and joisting, and the movable frames for the wall presses, fire-places, etc., is required in the construction of houses on this principle.

It is believed that the system has many advantages over either stone or brick buildings. A saving of from 30 to 40 per cent is expected, and the houses are supposed to be even more durable, as well as drier and warmer, than the ordinary class of workmen's dwellings. Mr. Tall took a prize for his patent at the Paris Exhibition in 1867, and has erected a number of cottages in Paris by order of the Emperor. He has more recently been employed in the same work by the Duke of Northumberland.

Diseases of Workers among Lead and Paint.

In the sixth of a series of reports "On the Preventible Diseases of the Industrial Classes," the *British Medical Journal* says: "Owing to the impossibility of keeping paint from coming into contact with the skin while they are at work; owing to the almost universal practice among them of touching their food with unwashed hands, and to the habit of some of them of wearing corduroy, fustian, and other clothes difficult to cleanse, painters absorb large quantities of the hurtful metal, and suffer gravely in consequence. An attack of colic may occur now and again, and the painter will recover; but if he continue to follow his trade, the more serious diseases—paralysis or kidney disease—are almost certain to attack him at last, and to render him, if not entirely unable to work, so weak and prostrated that in mental as well as in physical power, he will be but as the ghost of his former self. It is seldom that such workers are killed in early life; they lose power early, and soon become unable to perform a good day's work, but they drag through their labor for many years, suffering always from general weakness. From the time that lead has contaminated their bodies, their lives are wearisome and joyless. Since lead is so dangerous a metal to work with, it is most desirable that all efforts to substitute other materials should meet with attentive consideration. Different substances have been used instead of lead in the manufacture of paint, and with an encouraging amount of success. Zinc has been employed, and we have had favorable reports of it; the silicate of iron has also been used. The zinc is thinner than other paint, and workmen do not like it on this account, but in all other respects it is, we are told, as useful as leaden paint."

Our medical cotemporary suggests that all workers among lead should, before commencing or resuming work, wash their hands, not once, but many times a day, in a strong decoction of oak bark, the tannin of which would not only harden the skin, but would protect it against the action of lead. The hair of the workmen should be kept short. All painters should, during their work, wear clean cloth caps. All their clothes should be made of materials that can be easily and frequently washed. Their hands should be washed before touching food, and, if stained with paint, should be dipped into a decoction of oak bark. The mouth should be well rinsed with cold water before partaking of food. A weak oak bark decoction should be used as a wash several times a week. The body should be sponged night and morning with cold or tepid water, and the hair thoroughly washed every evening after work. The food should contain a large proportion of fatty substances, and milk should be taken in large quantities.—*London Building News*.

The Wood Screw Manufacture.

It is not easy to grasp, mentally, the extent of a manufacture of one thousand million separate and like pieces of iron goods yearly. Yet a single Birmingham firm now produces rather more than this number of wood screws every year, or, say, 150,000 gross weekly.

Until within about twenty years ago the manufacture of wood screws was carried on with the aid of comparatively primitive machinery. Yet the trade was a large one, and Mr. Nettlefold, of Birmingham, was, perhaps, then—as his firm, Messrs. Nettlefold and Chamberlain, certainly are now—the largest manufacturer of screws in the world. M. Japy, who has large screw-making works in France, took out a patent for screw machinery as early as 1845. The remarkably ingenious machinery now employed both by M. Japy and the eminent Birmingham house already named was invented by T. J. Sloane, of New York, and was first employed by Wm. Angel, of Providence, U. S. Sloan's machinery was worked some twenty years ago in London, and was introduced to our screw manufacturers by Mr. J. Burrows Hyde, of New York, assisted, in some measure, we believe, by a well-known Birmingham gentleman connected with the wire and metal trades. Even in its early stage of working the invention was valued at £20,000, although the English patents were subsequently sold for £12,000, from which £5,000 was finally deducted because of the non-fulfillment of an undertaking into which Mr. Sloan had entered that the English purchaser (Mr. Nettlefold) should visit, inspect, and study Angel's works at Providence, U. S., Mr. Angel afterwards refusing admission to any one. Sloan received a considerably larger sum for a braiding machine, in which the whole extent of his invention was the substitution of springs in place of weights, for maintaining tension upon the strands. The springs enabled the braiding machine to be worked at a speed much beyond what was possible with weights. The proprietors of the great works near Smethwick, Birmingham, are, reasonably no doubt, quite as exclusive, in respect of admitting visitors, as was the original employer of the same machinery, viz., Angel, of Providence—and what a singular association of names! Who, objecting to monopolies, would wonder at this reserve? It is not, in this case, so much the monopoly of patents as of capital. The great Birmingham house buys up and extinguishes every other concern in the trade, and it is now engaged in a notorious arbitration (Nettlefold *vs.* James), in which a certain screw business was valued by the respective arbitrators, on the one side at £14,000, and on the other at £140,000, the umpire deciding in favor of the latter amount. Of this £100,000 have been paid, and the remainder is now waiting a further award, under further arbitration. In all this there is nothing to wonder at when it is considered that wire for screws costs £11 per tun, that the prime cost of finished screws is now hardly £20 per tun, and that they sell for quite £40 per tun. It is not difficult to reckon the annual profit, at £20 a tun, on the manufacture of 100 tuns of screw wire weekly. Nor is it difficult to understand that it is likely to pay the makers to put up a blast furnace, rolling mills, and wire-drawing machinery for making their own wire at first cost, as they are now about to do. Their works already employ a thousand people, and upward of 30,000 cutting tools are ground every day. At one time not less than 60,000 gross of screws were sent weekly from Smethwick to America, the parent country of the wood-screw manufacture. The old price list is still maintained, but qualified by terrific "discounts." The latter are generally 65 per cent from the list prices; and thus, in increasing, as Nettlefold and Chamberlain once did, the discounts by 5 per cent, they really lowered the price of screws by about 15 per cent, and thus snuffed out their competitors, who were making screws at the former scale of prices.

Great numbers of machines, although these machines are of but three kinds, are employed in screw making, the threading machines forming six screw threads a minute, while the turning machines turn ten a minute. The cutting of the slit or slot in the head of the screw is effected by circular saws, of which Messrs Nettlefold and Chamberlain use and wear out 150 gross, or upwards of 20,000 saws weekly, each saw cutting the slots in about 1,000 screws. These saws, of from 90 to 100 teeth, and of but 3 inches in diameter, cost M. Japy, the French manufacturer, about 7 pence each. Mr. Batho, who was for some years the engineering brain of Nettlefold's screw factory, contrived a plan of making these saws at a cost of about ½ pence each. He placed 144 (a gross) of thin circular plates, 3 inches in diameter, upon a mandril, and subjected them, as if they were a single piece of metal, to the action of a series of slotting tools. For saws of 100 teeth he at first employed ten cutters, thus finishing the saws, 144 at a time, by ten complete cuts. He afterwards employed cutting tools adapted to form three teeth, each at a single cut, so that, for 90-tooth saws, but three changes of feed were necessary, 30 teeth being cut, by ten tools, at each adjustment. The line of cut, instead of being parallel with the axis of the mandril to which the saws were fitted, required to be spiral or twisted, to give the proper cutting angle to each tooth of the saws. This was effected by giving to the group of saws the slight necessary axial rotation during the cut, which would correspond to the requisite angle of the cutting edges of the saws. The principle, a simple one, is the same as that adopted in planing the Whitworth shot. Indeed, it is external rifling, as contrasted with the internal rifling adopted, a few years since, for the saw-tooth grooving of the Armstrong guns. It is something to save 20,000 sixpences, or £500 a week, in the mere matter of saws for cutting the slots in screw heads.—*Engineering*.

Transfer Ornamenting.

"There are many different ways of putting on the ornament, some preferring one way, others a different method according to circumstances and individual skill. We shall endeavor to give the most simple and successful method known.

"First let it be understood, that all pictures that show the colors complete, are only suitable for white or very light-colored brown; those that are covered with a white grounding, gold, metal, or silverleaf, can be used on any color, light or dark. After getting the work ready for ornamenting, give the picture a smooth, thin coat of some quick-drying copal varnish, thinned with turpentine (other preparations are used of which we will speak hereafter), being careful not to go beyond the outline of the design. Allow it to dry until it has a good tack, and put it on the work in its proper place. Roll it smooth with an india-rubber roller, or smooth it with a paper-folder, until every part adheres well. (For very large pieces, it is well to lay them, after they have the right tack, between two sheets of damp blotting-paper. It will stretch the paper and make a smooth transfer). Now wet the paper, smoothing it down at the same time, until it has absorbed all the water possible, leave it about a minute and pull off the paper carefully. Should any parts of the design still adhere to the paper, press it down again, wet-rub it until it separates easily.

"After having removed the paper press the design on well and wash and dry it off. Should any blisters appear, prick them with a pin and press down. In a few hours the design may be varnished, which will increase the brilliancy of the colors.

"An improved method has been invented by Mr. Charles Palm, of this city, which saves time and works with more certainty. The design is coated with a 'transfer cement' of his own manufacture, without regard to outline, transferred as usual, and the traces of the cement around the design washed off, with the detergent (also his own invention), which will remove every particle of cement without injuring the colors or gold in the least. A few drops poured on a sponge or chamois skin are sufficient.

"For fine ornaments, having many fine lines and touches, it is necessary to use these preparations to make a neat job."—*Painters' Magazine*.

Proportions of Belts to Drive a Given Horse Power.

We give by permission of the author, Mr. F. W. Bacon, 84 John street, New York, a rule for proportioning belts to carry a given power, taken from a "Treatise on the Steam Engine Indicator," shortly to be published by D. Van Nostrand. It will answer several queries we have now in hand relative to the same subject.

Rule.—Multiply the horse power required to be transmitted through the belt by 36,000. Divide the product by the number of feet, or parts of a foot the belt is to run per minute; divide the quotient by the number of feet or parts of a foot in length of that part of the belt in contact with the smaller pulley; divide this last quotient by 6, and the result will be the width of the belt in inches.

The same work contains the following formula for a steam joint cement never before published in this country but long used in France, and said to be unexcelled by any other known:

"Take white lead ground in oil, a sufficient quantity. Add dry red lead enough to make a stiff putty. Put the mass in a mortar or on a block of iron or smooth stone, and pound it till it becomes soft; continue to add red lead, and pound until the mass will no longer become softer by pounding nor stick to the fingers. At this time it should be of sufficient tenacity to stretch out three or four inches, when pulled, without parting. The more protracted the pounding the softer, finer, and more tenacious the cement becomes. Interpose this putty between the flanges of steam pipe joints, taking care to put a thin grummet of packing or wicking around the diameter of the bore, to keep the cement from squeezing through when the flanges are screwed together. It is indestructible by steam or water and makes the best joint known to the engineer."

It will be seen that elbow grease is an ingredient in the above recipe that it will not do to stint.

A good cement is made by mixing clean cast-iron borings with water. If properly rammed, steam may be put on immediately. The addition of corrosive substances only serves to destroy the cement and parts joined with it.

THE heat emitted from the sun in a year is equal to that which would be produced by the combustion of a layer of coal seventeen miles in thickness.

MOULE'S PATENT EARTH CLOSET.—EARTH versus WATER FOR CLOSETS.

Our readers having read the article on "Earth Closets," published on page 313, Vol. XX. of the SCIENTIFIC AMERICAN, will be prepared to duly appreciate the value of the invention we this week present to their consideration.

In that article we called attention to the enormous waste attendant upon the present general system of sewerage in large cities, to the contamination of waters by the discharge of sewage into them, to the danger to the public, arising from the saturation of soil with fœcal matter in the immediate vicinity of dwellings, to the intolerable nuisance arising from water closets on shipboard, and to the complete remedy for all these evils afforded in the earth closet if properly constructed.

In the light of the facts set forth in the article referred to, and also referring to an article entitled "Hidden Generators of Disease," published in another column of the present issue, let us examine the construction of the celebrated Moule earth closet, which forms the subject of the present article.

Fig. 1

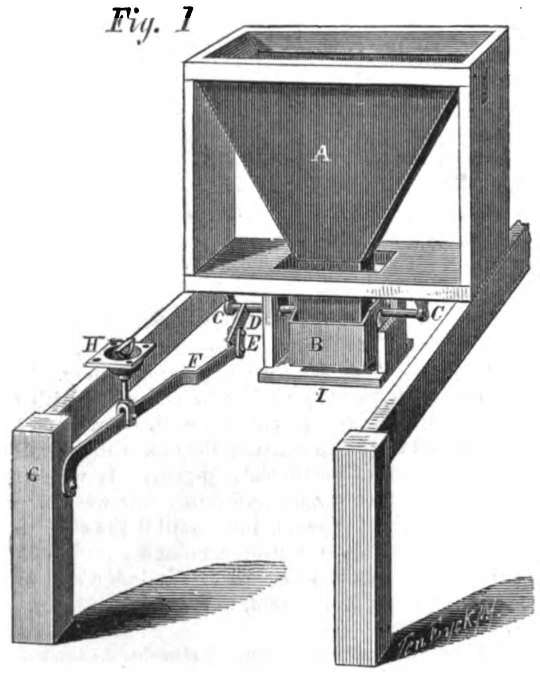


Fig. 1 is a perspective view of the uprights, bearers, and frame employed to support the seat, earth reservoir, and chucker, showing the lower portion of the earth reservoir with the chucker and levers attached to it. A represents the lower part of the earth reservoir, which is of hopper form, and may have placed at its top, a high rectangular box as large as convenience may dictate, with a tightly closing top lid. B is the "chucker" attached to a rod playing loosely in bearings, C. An arm, D, projecting at right angles from the chucker rod is pivoted to short bars, E, pivoted to the long bar, F, which is pivoted to the upright, G. This bar is operated by a handle, H, which, when raised, operates through the connections described, to rotate the chucker, B, and throw the bottom of it forward. The lower part of the "chucker" is open, a platform, I, serving to stop the fall of the earth when the chucker hangs vertically, as shown in the engraving.

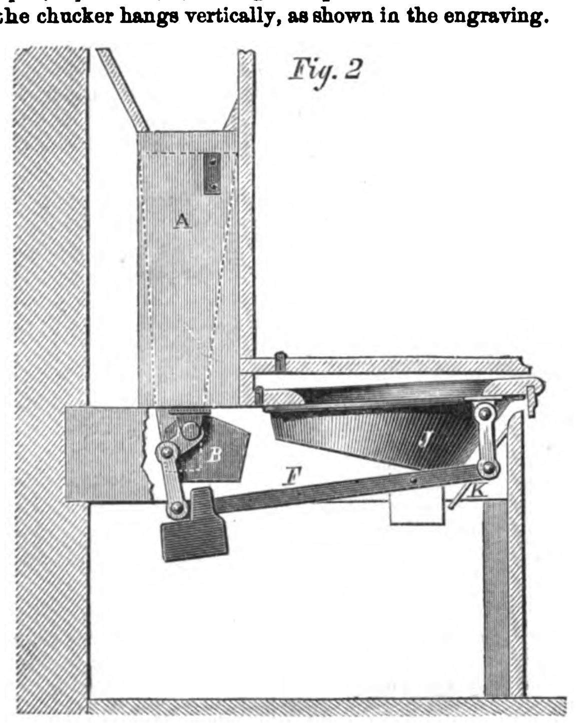


Fig. 2 shows the completed closet in vertical section, the bar being actuated by a spring seat instead of the handle, H, as shown in Fig. 1. In this case the chucker, B, is so formed that the flow of earth from A is cut off when the closet is not in use; and, when the weight of the body is thrown upon the seat it is thrown into the vertical position to receive a charge of earth. Upon rising, the spring of the seat elevates the forward end of the bar or lever, F, and tilts the chucker suddenly forward into the position shown in the engraving, again cutting off the passage from A, and precipitating the charge of earth contained in B upon the fœcal matter deposited. An earthenware pan, J, with open bottom, conducts the urine into the receptacle below, or it may be dispensed with by using an apron, K, of slate or other suitable material.

It will be seen that we have here a simple practical and effective apparatus, generally applicable in town or country, which may be used in the form of a commode for sick rooms or sleeping apartments, is capable of being elegantly finished, and equally adapted to use on shipboard as in dwellings on land.

Various reservoirs to receive the deposits may be employed —a pail, or a drawer, or a tank, as circumstances may dictate. Anthracite coal ashes are nearly equal to earth in their deodorizing effects, although the dust, in filling the earth reservoir, is an objection. This objection may be obviated by the admixture in the ashes of a very small quantity of damp earth.

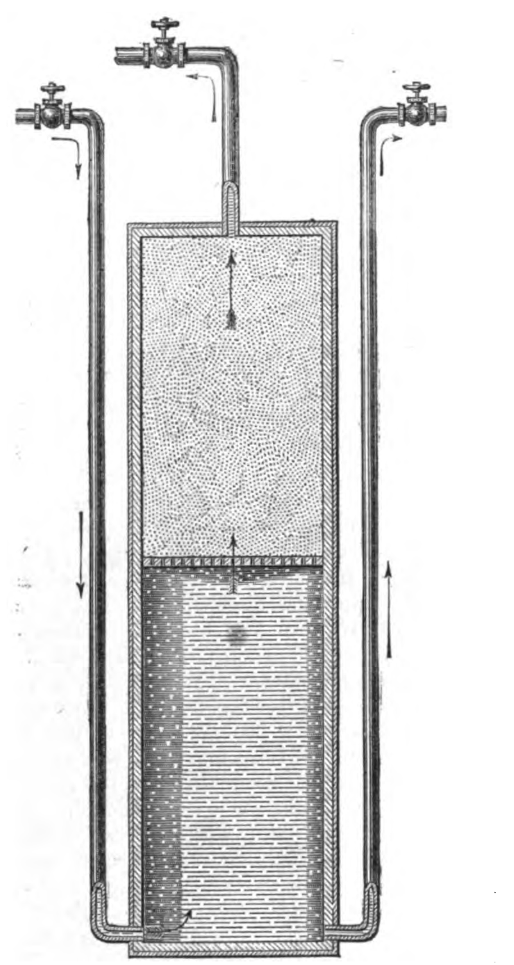
The removal of the mixed earth and fœcal deposits is unattended with any discomfort not attending the carrying out of ashes from a stove, and the compost produced forms one of the best fertilizers known.

We can see no obstacle to the general adoption of these closets, and among the more intelligent thinking people it is already being considerably patronized. The greatest obstacle it will encounter is prejudice, the great enemy of progress, but we are confident that any such prejudice must be eventually overcome by the irresistible logic of facts. The use the improved earth closet will at once receive in sick rooms, from which it will eliminate one of the greatest annoyances, will open the eyes of the public to its more extended advantages.

The patent on this invention was granted to Rev. Henry Moule and Henry John Girdlestone, residents of England, through the Scientific American Patent Agency, on the 15th June, 1869. A company has been formed in this country under title of "The Earth Closet Company," for the manufacture and sale of the article on an extensive scale. Their advertisement may be found on the back page of this paper.

IMPROVED WATER FILTER AND COOLER.

This combined filter and cooler is based on natural principles, and consists of a tube made of boiler iron and lined inside with a thick coat of cement; it is closed at both ends and placed upright in the ground from ten to fifteen feet below the surface. This depth is the proper or natural cooler; for at a depth of fifteen feet there will in most localities be found a temperature of from 50° to 55°. The water with which most cities are supplied indicates in midsummer a temperature of 60° to 80°, and in many cases after heavy rains it often gets so muddy as to be unfit even for washing purposes.



A perfect and also natural filtering is obtained by the tube being divided into two compartments by a middle bottom made of terra cotta, which is perforated with little holes like a sieve; the upper part is filled with sand, charcoal, or any filtering material.

The water is led in near the lower bottom of the tube through a pipe attached to a main or other supply pipe, and has to rise upward through the little holes and sand, and comes out clear at the top through pipes to the draw. By this operation the coarser particles of mud and fibrous substances will settle to the bottom before they reach the sand, and in order to clean out the mud when it should become necessary (which the inventor states is not oftener than once in two or three years) a second outlet is provided right opposite the supply and carried to the surface by a piece of pipe, which when opened will readily wash out the whole. Hydrants may be connected with such an apparatus and so constructed that by turning a crank one way the clear water may be drawn, and by turning the other way the common water will be obtained.

It has been adopted in Philadelphia at the public drinking fountain at the Ledger Building, and in many private dwellings in and around the city. In cities situated on the Ohio, Missouri, and Mississippi, where the water is most generally muddy, the application of this invention must prove especially beneficial.

The water that passes this filter placed 15 feet in the ground during the whole year scarcely varies from the temperature of 54°, is perfectly clear, and is also much improved in taste. The inventor claims that there is no trouble with it, that it cannot get out of order, that the water is cool enough for drinking without any ice and is of coarse healthy.

Patented December 12, 1865. For further information and for the sale of State rights, address the inventor, Louis Scharp, Spring Mill, Montgomery Co., Pa.

IMPROVEMENT IN THE LUBRICATING OF CROSS HEADS.

The self-lubricating cross head which is presented to our readers in the accompanying engravings, has been, we are informed, in use for months, and has demonstrated the economy of its use on locomotives. It is equally applicable to all engines using a cross head, be they vertical or horizontal. Its saving of oil and the positive distribution to the whole surface requiring oil, allowing none to be wasted, are the ends accomplished.

An expert will see its construction at a glance, nevertheless we will describe it in general terms for the benefit of the general reader.

Fig. 1

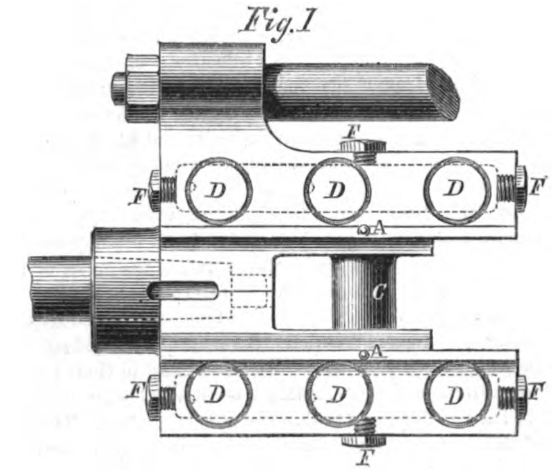
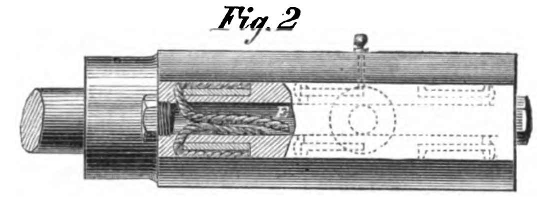


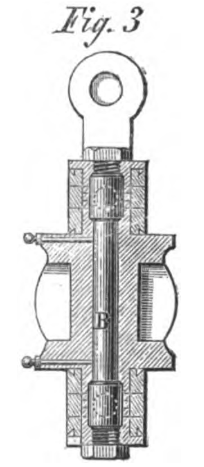
Fig. 1 shows the external appearance of this cross head, the wings of which are cored out to form reservoirs for oil which is supplied as wanted through the oil cups, A. The reservoirs thus formed are connected by a passage, B, through the wrist, C, Figs. 1 and 3. In filling, the air is permitted to escape through vent plugs provided for the purpose. In the faces of the slides, or wings, are formed circular recesses into which disks, D, Fig. 1, of anti-friction material are inserted, having dovetail or other formed grooves in their faces suitable for retaining gaskets of absorbent material, which passes through openings into the oil reservoir. These gaskets are so arranged that a portion of their saturated surfaces will bear against the faces of the guides on which the cross head plays, thus keeping them covered, but not overcharged with oil. The portion of the gasket which lies in the oil reservoir is shown at E, Fig. 2.

Fig. 2



To insure the lubrication of the upper flanges, wicks may be carried up from the reservoirs through holes in the slides and grooves in the faces of the flanges, terminating in holes for the support of the wicks. The oil will flow naturally to lubricate the lower flanges. Holes may also be perforated in the wrist so as to lead oil out from the passage, B, Fig. 3, so that it may be kept lubricated also.

Fig. 3



The reservoirs and passages may be readily cleaned by removing the plugs, F, Fig 1, provided for that purpose. Thus constant, thorough, but not profuse and wasteful lubrication is attained for all the bearing surfaces, the flow of oil being easily controlled by the size of the wick and its quality

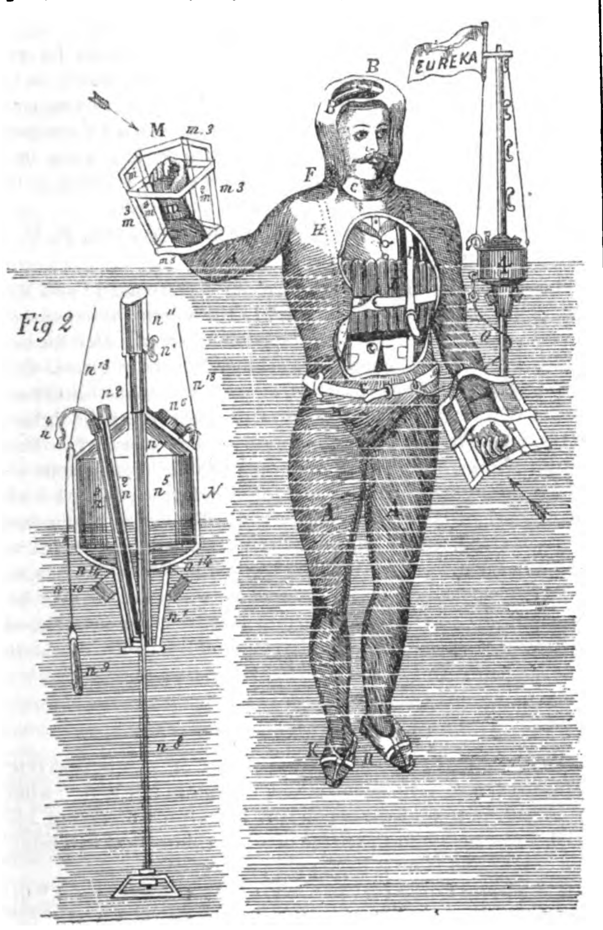
The inventor informs us, that by a proper adjustment of the parts of this device a locomotive has been able to run 2,000 miles, and being then examined found to be in perfect working order, having received during the whole time no oil, except what was at first provided. The merits of the invention are obvious.

Patented through Scientific American Patent Agency, January 26, 1869, by J. H. Congdon, who may be addressed for Territorial rights, etc., at Omaha, Nebraska.

THE London *Times*, for many years, has made an offer of £50,000 for a cheap substitute for paper, equal in all respects to the paper manufactured from linen rags, yet the check for the money has never been drawn.

PATENT LIFE-SAVING APPARATUS.

Various as have been the devices employed to save life at sea in cases of ordinary shipwreck or sudden collision of vessels, there seems to have been only one thing considered in the large majority of them. To enable the body to float for any length of time in the water is, of course, the first requisite for any such device. A task of so easy a nature as this would scarcely merit much notice, except upon humanitarian considerations. It certainly would not rank among the grand mechanical achievements which win immortality for their originators. Nothing can be more simple. A person has merely to attach to the body, by lashings or otherwise, a sufficient quantity of some material considerably lighter than water, and which is incapable of absorbing water and sinking, and the thing is done. So effective is this simple means, that perhaps it would be safe to say that not one in a thousand people thus provided would drown at sea, were it not for loss of strength consequent upon long exposure to cold, thirst, and starvation. These are the terrible enemies which conquer, the waves only supplementing their cruel work.



The life-saving apparatus of Captain Stoner puts weapons in the hands of its possessor to fight all these enemies for days together. This apparatus was exhibited to the press of this city and a large and select party of ladies and gentlemen, invited to witness the experiments on the evening of July 1st. The steamer *Sunnyside* was chartered for the occasion, starting from Pier 39, North River, about 4 P. M. After a short but pleasant cruise up the Hudson, the steamer turned and conveyed the party out into the bay, stopping nearly opposite Fort Hamilton.

After a collation had been served, Captain John Stoner, the inventor of the apparatus, made a short address, explaining that the apparatus to be exhibited comprised two distinct devices—a life-boat, so constructed that it is impossible by any accident to capsize it, or sink it, and a life-saving apparatus, to be attached to the person, whereby the body would not only be floated in an erect position, so that the head would be at some distance above the water, but a person shipwrecked would also be thoroughly protected from cold and wet, provided with food and drink, enabled to sleep, if desired, in calm weather, and to signal approaching vessels by : ight or by day.

The life-boat was first exhibited. It is a strongly built boat, with air cylinders placed under the seats to give it buoyancy sufficient to float its complement of people, even when filled with water. The most prominent, and the original feature of this boat, is the method of ballasting it so that it cannot be capsized. It is a modification of the system of ship ballasting, for which, as also the life-saving apparatus, patents were obtained for the United States, February 4, 1868, and subsequently throughout the European countries, through the Scientific American Patent Agency.

The modification of the lever and weight, applied to ballast the life-boat, will be understood from the following description. A lever about twelve feet in length, pivoted at the middle point of the keel of the boat, has a weight fixed to the end opposite the pivot. A small rope being attached to this end, operated by a winch, pawl, ratchet, and brake, serves to swing this lever back, and bring it up to the level of the forward segment of the keel, in which position it forms a part of the after half of the keel itself. This is its proper position in calm weather or when the boat is under sail, with a moderately fair wind. If the wind is on the beam, and blowing strongly, the lever is let down as much as necessary to meet the emergency. When, finally, the lever reaches the vertical position, the center of gravity is brought so low, hat no wind can capsize the boat. This was amply proved by the experiments. A large party of gentlemen, of whom the writer was one, entered the boat, and failed to capsize it by all the means within reach, all standing on the windward side of the boat, and finally filling it with water, when it still resisted all their efforts.

The boat has a mast and sail provided, and its model is such as to make it a fine sailer.

The life-saving apparatus attached to the person is shown in the accompanying engraving.

A is a rubber suit, made in one piece, the lower parts or feet being made thicker than the other parts, and in the same manner that rubber shoes are now made. The suit, *A*, is made large enough to be put on over the ordinary clothing of the wearer, his shoes only being removed. The only openings in the suit, *A*, are at the upper end or head, and at the wrists, for the exposure of the face and hands of the wearer. The openings at the wrists are provided with cuffs or bands, made in a piece with the suit, to confine the edges of the openings closely around the wrists of the wearer, to prevent the entrance of water. To the under side of the edge of that part of the upper or top opening that comes upon the wearer's head, is secured an elastic band, *B*, which is made tubular in form, and which passes under the chin of the wearer, beneath the chin-flap, *C*. To the inner edge of the under side of the upper opening is attached an open elastic band, *D*, formed by connecting two elastic tubes longitudinally with an elastic membrane, so as to leave a space or channel between the two tubular edges of said band. The band *D*, is buckled over the head of the wearer, and is prevented from slipping forward by an auxiliary band, *E*, attached to it, and which passes around the back of the head of the wearer.

The elastic tubular band, *B*, is then sprung into place beneath the chin of the wearer, passing also beneath the chinflap, *C*, in such a way as to lie in the space or channel between the tubular edges of the elastic band, *D*. The slack of the upper opening is gathered into a roll, and placed in the hollow between the jaws and neck of the wearer, where it is confined and secured by a strap, *F*, secured in proper position to the outer side of the suit, which is buckled around the neck of the wearer.

The flap, *C*, projects forward beneath the chin of the wearer, and is intended to protect his mouth and nose from the splash of the water. The upper or top opening of the suit is made so large that the wearer can conveniently insert his body through it. The suit is secured to the body of the wearer by the strap, *G*, secured to the rear part of the suit, and buckled around his body.

The suit is still further supported by straps or suspenders, *H*, secured to the lower part of the body of said suit, and passing over the shoulders of the wearer, as shown in cut, *I* is a cork jacket, made of suitable material; it may be smooth or flat upon the inside and corrugated upon the outside. The jacket, *I*, is worn beneath the rubber suit, *A*, is buckled around the waist of the wearer, and is prevented from slipping down by shoulder straps, *J*, passing over the shoulders of the wearer. When not in use it can be folded into a very small bulk. K are metal shoes or weights, fitting upon the feet, the greater part of the weight (about five pounds) being collected upon the instep. The shoes *K*, are made in two parts, hinged to each other at the heel for convenience in putting them on, and secured to each other by a strap *k'*, buckled around the said shoes, and around the feet of the wearer. The forward parts of the shoes or weights are kept from slipping or working upon each other by projections formed upon the edge of one part and entering holes or cavities in the other part, padded upon their inner sides and edges, to prevent them from chafing the wearer, and galvanized or wholly covered with rubber, to prevent the corrosive action of the water. *M* is the propelling or swimming device, in which m^2 is a bar or handle, to be grasped in the hand of the wearer, and to the ends of which are attached bars m^2. m^3 is a wire framework, hinged or pivoted to the bars, m^2. The entire framework, m^2, m^3, is covered with rubber, as shown in the drawings. When the hand with the device, *M*, attached to it, is moved through the water in one direction, the wings fold down, so as to encounter less resistance from the water; but when moved through the water in the other direction, the wings expand into a horizontal position, beyond which they are prevented from passing by the straps m^4 and m^5. The strap m^4, passes beneath the hand or wrist, and its ends are attached to the under side of the upper end of the middle part of the device *M*, and which buckles around the arm of the wearer, to secure the upper part of said device to the arm. The outer ends of the straps, m^5, are attached to the outer edges of the upper parts of the wings, and their inner ends are secured to the strap, m^6, near the point at which it is to be buckled. Or, if desired, the straps, m^5, may be made in one piece, passing beneath the arm, and having its ends secured to the outer edges of the said wings. *L* is a cord or strap attached to the upper part of the device, *M*, and to the sleeve of the suit, *A*, so that the said device, when detached from the hand and allowed to float upon the water cannot float away and be lost.

A prolonged experiment was made with the apparatus, Capt. Stoner, and one of the Trustees of the Life Saving and Ship Ballasting Co., each putting on a suit of it and leaping into the water. While there, these gentlemen seemed very much at their ease. Eating, drinking, smoking, and even reading the news from papers taken from the floating magazine, shown in elevation at 4, in the engraving, and in section at Fig. 2. Each of these operations, performed under circumstances hitherto considered as incompatible with bodily comfort, received hearty applause from the party assembled on board the steamer, and when finally the steamer left the experimenters to their fate, so that in the dusk of evening they could scarcely be discovered in the distance, and they made known their position by crimson lights and rockets, and the life-boat, *Eureka*, rigged her masts and sails, picked them up and brought them safely on board, the party gave vent to their enthusiasm by giving three hearty cheers to the gallant captain and his comrade, repeated with redoubled vigor when upon stripping off the rubber suits it was seen that their clothing was perfectly dry and their shirt fronts unsoiled.

Every one expressed themselves as being entirely satisfied with the results of the experiments, and if it is ever our fate to be shipwrecked, we hope to rob the disaster of much of its terror through the protection afforded by this apparatus.

BUELL'S VELOCIPEDE SPRING.

It is entirely unnecessary for us to dwell upon the importance of good springs for a velocipede destined for use on common highways. On this point our readers have been thoroughly posted. It must be evident also, that on any velocipede the effect of springs will not only add to the pleasure of the rider, but will add to the durability of the machine.

Of the various methods employed in the attachment of springs to velocipedes, we have seen none that can compare with this in graceful appearance, and it seems to be well adapted to secure perfect ease to the rider. It will be seen

that the improvement consists in the employment of four elliptic springs placed upon the uprights arising from the axles of the machine; thus not only relieving the body of the rider from the effect of concussions, but, securing the advantages of the elliptic springs which have rendered them so justly popular for all classes of vehicles.

Patented June 1, 1869, by George C. Buell, New Haven, Conn., whom address for further information.

Correspondence.

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

American Wine Production.

MESSRS. EDITORS:—America still imports nearly all her wine from abroad, while she has all the elements for home production—climate, soil, millions of acres waiting cultivation, and thousands of husbandmen willing to engage in a paying and honest industry. Our ability to produce wine-making grapes in any quantity is beyond doubt, only the profitable manner of manufacturing the wine from the grapes in competition with Europe, is, to a great many, still a doubtful question.

The cause that prevented our wine industry to rise in importance, is simply the great cost of our domestic wine before it finds a market, the cost represented in accumulated losses by improper treatment, and the consequent long storing, which through the interest of capital, evaporation, waste, and storerooms, swallowed up the profits. Our wines, grown on richer and more virgin soils than in Europe, are richer in nitrogenous elements, therefore of stronger ground taste, which in the usual mode, only years of storing could remove so as to give it maturity. Hence our inability to profitably produce, in the prevailing modes of manufacture, wine in large quantities, and hence the comparatively small consumption of home-made wine, which, as a general beverage, would most powerfully counteract the deplorable tendency for strong alcoholic drink.

But this state of things should not continue. The process of wine making may and should be accelerated by judicious means, so as to mature the wine, free it from ground taste, and fit it for shipping in a few months.

Access of air happened to be considered inimical to fermenting beverages, because its contact with the surface of these beverages was observed to cause injury. It was lost sight of that every agency may be applied properly or improperly.

Air, the source of all organism, our fast friend, supporter, and auxiliary, if properly applied, works in a short time all the benefits, which in the present mode of fermentation by air-exclusion, are obtained only uncertainly, under no control, imperfectly, and in long time. The air should be brought in contact with every particle of the fluid alike, by passing through it from below, when it will rapidly oxidize all deleterious, nitrogenous matter, and leave the purified fluid in a proper state of preservation. Ground taste and roughness is dependent on the gluten contained in the fluid ; by oxidizing, elimination of the gluten, the ground taste is removed.

A liquid may be clear and bright, and still retain dissolved gluten (young wine, beer, cider), and is harsh and unpleasant to the taste ; oxidation renders the gluten insoluble and eliminates it.

All this is most profitably and certainly performed during fermentation—the process by which the sugar is converted into alcohol—the whole fermentation is quickened ; in must (or other fruit juice) below 30 per cent sugar requires more than five days after foaming, and at a temperature above 65° to 70° Fah., to finish the fermentation by this patented air treatment. All air required is impelled through a perforated pipe at the bottom of the ferment tub for a few minutes at a time, two or three times a day.

Clarification takes place very rapidly ; two to four weeks after the cessation of fermentation, the wine, cider, etc., are bright and ripe, ready for shipment, and proof against any after fermentation and other wine disease. Acidification, the great bugbear, which, by incorrect knowledge of its principles, was expected to result from access of air, is, in this manner, hardly possible, while the least experienced, as yet, has been unable to spoil the product by air treatment, but invariably improved it.

Slightly moldy, fusty, or otherwise impaired wine (except by acetic acidification) subjected to this treatment, with addition of sugar, and at proper temperature, is restored to soundness. No disease can prevail against properly directed action of air.

By these simple means we are therefore not only able to render ourselves independent abroad for our wines, but stop the constant drain of capital for foreign wines and brandy, while we enormously increase our commonwealth by home production, amounting together to several hundred millions annually, considering the improvement in vineyard lands. Immense tracts of land, hardly suitable for any surface production, do well in vines, that root deeply into perpetual moisture, and, tolerably well attended, yield paying crops for a lifetime.

The product is always in demand, and in proportion with the amount of production, the prices less subject to fluctuation than most other products, while the general adoption of this most natural of the exhilarating beverages would be certain to prove an additional blessing by the moral improvement it is sure to work against intoxication.

The value of American wine production is too enormous to be longer neglected. To make its success sure, the growing of grapes, manufacturing of wine, and dealing in the product ought to be distinctly separate branches, like all other industries as elucidated in your journal of June 8, 1868.

R. D'Heureuse, Patentee of Air Treatment.

New York city.

Preservative Properties of Whitewash.

Messrs. Editors :—I have information that may be of value to some of your subscribers.

Some twenty years since, I caused to be heavily whitewashed with pure lime, the furnace pipe in my cellar; it being exposed to the exhalations arising from tide water, caused me to replenish the sheet iron pipe each season. By whitewashing each year the last one remained good for six years. Gas pipes used under ground have been thus coated at my suggestion and show no oxidation as yet. Last year I tried an experiment with peaches and pears, placed in boxes allowing but little ventilation, thoroughly coated with pure whitewash. They kept seventeen days without showing signs of decay, while those left in the crate all decayed in four days.

No patent has been applied-for, for anything of this kind, and I think fruit growers would be benefited by the information. An experiment would prove quite inexpensive and no harm can possibly occur to the fruit.

Boston, Mass. W. F. Shaw.

What an Advertisement Did.

Messrs. Editors :—It may be of interest to you to learn from a disinterested source the result of a single illustration of a new invention in your valuable journal.

The New York office of the "Hinkley Knitting Machine Company" is next door to my own, and to my positive knowledge there were received over *five hundred* letters and orders within one week after issue of your paper of July 3d.

As the above result was accomplished with no other advertisement, it conclusively shows where inventors can employ their money to the best advantage.

Hamilton E. Towle.

New York city.

[The above testimonial in regard to the value of the Scientific American as a medium to give widespread information respecting anything that appears in its columns, was handed to us by Mr. Towle, the well-known civil and mechanical engineer, 176 Broadway, New York city.

Cleaning Lamps.

Messrs. Editors :—Your correspondent Geo. Buchanan, in No. 24, Vol. XX., of the Scientific American, reviews the various ways proposed by different correspondents for extinguishing lamps, and then gives another plan which, I think, is equally objectionable. I have tried many ways during the last six or seven years, his among the rest, and still practice the way I have long used; that is, to turn the wick down suddenly, low enough to put it out, and then instantly raise it again.

But this communication is intended to call attention to a thing that is too often neglected. So far as I have observed, I have found that nearly half the persons who use lamps do not clean them as often as they should. They seem to think if the outside looks well it matters not how it is inside. This is a great mistake. The inside should be clean as well as the outside. The burnt part of the wick should be taken off every evening before lighting,and the pieces of it and all the oil wiped out from around the tube. If this is not done the danger of an explosion is greatly increased. I believe if lamps were better cleaned in general there would be fewer accidents from their use. Nearly all the explosions are caused by some carelessness. If lamps are worth having they are worth taking care of. Phil. O'Math.

Oak Dale, Mo.

Auroral Earth-rings.

Messrs. Editors :—Professor Loomis' article on Auroras, which you copy in No. 25, last volume of Scientific American reminds me of a phenomenon not in his list, and of which I have never seen the duplicate or description, and I do not know of its having been observed or recorded by others. It happened at Harmar, Ohio, on May 3d, 1843, for I took good care to fix the date in my memory.

There had been a slight auroral exhibition in the evening, but of no unusual sort, until about eight o'clock, when the brightness suddenly increased, and all at once there was an arch or ring spanning the sky from horizon to horizon. It passed a point apparently a little west of the zenith, terminating at the earth a little west of north and a little east of south, though from its almost solid appearance throughout its entire length, and its straight cut, parallel, well-defined edges, it might have been an earth ring as continuous and perfect as a ring of Saturn. It was seemingly a little wider than a full moon and presented much the same color and general appearance of surface. But though in color and solidity resembling the full moon, it had many times more aggregate area of surface ; the light was no greater than that of a full moon, and from being so distributed across the sky, it cast no shadows on the ground. The only thing about it partaking of the usual auroral character was a peculiar trembling, cloudy shadowy something, which seemed to traverse its entire length back and forth alternately, about every three or four seconds—but this seemed to travel on or along the surface only, without disturbing the main body or the edges of the arch or ring. It remained for a considerable time without noticeable change of place or appearance—probably half an hour—and finally faded out. The night was clear with the exception of the previous auroral haziness, and I do not remember seeing the moon that night at all. When the ring developed itself all other auroral signs ceased and were not renewed.

For weeks afterwards I looked in all the papers for some account or explanation of what was one of the most wonderful and beautiful sights I ever beheld—but in vain. Aurora, or ring, who can explain it? W. L. Davis.

Louisville. Ky.

[We witnessed a few years ago a similar auroral ring at Albany, N. Y., although it was not so sharply defined and regular as our correspondent describes. It must have remained as long or longer than the one described by our correspondent, and was very light throughout its entire length from horizon to horizon. Its position was however more easterly and westerly than the one seen at Harmar.—Eds.

Petroleum—Important Discovery.

Messrs. Editors :—Under the above heading an article appeared in the Scientific American of June 12 (page 376), in which it is stated that Mr. Deville, in a memoir presented to the French Academy of Sciences, dwells largely on the danger incident to the storage of petroleum, and attributes it to the very great expansion in bulk which mineral oils undergo by increase of temperature ; so that when oil is barreled during the cold season it will expand on the first appearance of hot weather and burst the containing vessels, as the freezing of water ruptures hydrants, and that the inflammable material oozes out by this cause.

The whole theory is erroneous.

1. Mineral oils do not expand more by heat than most other liquids ; the writer of this article made the physical and chemical properties of petroleum a subject of study several years ago, and found the expansion of crude oil, and of kerosene, from 32° to 212° Fah., 0·076 of the original bulk at 32° ; this is the mean expansion ; like other liquids it is somewhat less between 32° and 60°, and more from about 180° to 212°. The heavy tar remaining after the distillation expands less at about 0·070, the light products of distillation, chymogene, gasoline, and benzine somewhat more about 0·080.

Let us compare this with the expansion of other liquids, commencing with that which expands least.

Water expands from 32° to 212°	0·047
Saturated solution of common salt	0·050
Hydrochloric acid	0·060
Oil of turpentine	0·070
Ether	0·070
Petroleum	0·076
Whiskey and brandy (proof)	0·076
Sulphuric acid	0·075
Animal oils	0·080
Nitric acid	0·100
Alcohol	0·100
Olive oil	0·130
Linseed oil	0·160

It is seen from this table that the supposed very great expansion of petroleum does not exist ; only water and watery solutions possess an expansion of one third less, alcohol as much more, and vegetable oils expand twice as much.

2. The leakage of petroleum barrels in hot weather, and principally when exposed to the sun, is due to the simple fact that the hoops expand by the heat, and the wooden staves shrink by its drying effect, thus they get loose, and the barrel leaks ; in yards where petroleum is stored, this leakage is corrected by simply tightening the hoops from time to time during the hot season, and as barrels with a larger or smaller space above the oil leaks equally, the expansion of the oil is not the common cause of leakage.

3. The reason that petroleum fires take place mostly in hot weather is, that the volatile and inflammable portions contained in the oil are not evaporated during a cold spell, but require heat in order to mingle as vapor with the air, and in summer will evaporate through the pores of the wood, even if the barrel is only half full ; wooden barrels with gasoline will be found empty after exposure to heat for only a few weeks.

4. The writer of this article has never yet seen a petroleum barrel which was entirely full, even in summer, and in which then not a space was left of at least a whole gallon ; in fact, it would be impossible to close the bung hole of a barrel when it was entirely full ; the space wanted for extreme cases, when the oil was barreled at 0° Fah., to leave room for expansion at the summer temperature of 100 Fah., would be to leave 0·038 or 1-26th of the bulk empty, which corresponds with a space of one and a half, say two gallons for a common barrel of forty gallons. This space has to be left, when barreling oil in very cold weather, supposing the barrel to be perfectly tight, which, however, rarely is the case.

P. H. Vander Weyde, M. D.

New York city.

[The point of difference between our correspondent and Mr. Deville seems to be only in regard to the amount of expansion in petroleum oils. It is not probable that Mr. Deville has ventured to express opinions based merely upon a guess. Our own experience in handling hydrocarbons is, that the expansibility of the gas which is always produced from the lighter oils during hot weather is the cause of the mischief. This being the case, the leaving of a space would not permit its escape through wooden barrels. Not being acquainted with the method by which the results given by our correspondent were obtained, and being equally uninformed in regard to the basis upon which M. Deville has formed his opinions, as given in the article above referred to, we cannot decide between them. Our correspondent, however, agrees that at least a space of one twenty-sixth the entire bulk ought to be left when petroleum is barreled in cold weather.—Eds.

Sundry Inventions Wanted.

Messrs. Editors :—In a recent issue of the Scientific American, a correspondent writes for you to tell him "what to invent." If your correspondent is desirous of trying his hand, I can give him the name of a few things that will bring him money and fame if he should be successful.

1. A plastic filling for decayed teeth, that will "set" in the mouth notwithstanding the saliva, and which will not "eat out," or be acted upon by the acids of the mouth. It must be white.

2. A successful scale for weighing, that will indicate the weight, in pounds and ounces, of anything placed thereon. It must be made without springs, or, in other words, it must weigh upon the principle of one weight balancing another.

3. A good substitute for rubber as a base for artificial teeth.

4. A machine for planting corn so that it can be plowed both ways without first "laying off."

5. A successful means of uniting iron and glass to make a boxing for gudgeons, and for other purposes.

When our friend has worked up any of these, we can give him and others, who desire to know what to invent, some other hints. Inventor.

Lincoln, Ill.

Hay Loader Wanted.

Messrs. Editors :—I noticed in your last number an inquiry respecting the improvements in machines now most demanded. I know of no one in greater demand among farmers during the press of haying than some good efficient machine for loading hay, and some simple contrivance for carrying back hay into a deep bay or loft, after it has been raised by a hay fork and there is no opportunity for swinging it back. Chas. B. Maxson.

De Ruyter, N. Y.

As an evident proof of the greatly advanced desire to procure for domestic purposes good and pure water and a plentiful supply thereof, it is interesting, says the *Chemical News*, to learn that within the last five years the under-mentioned wells have been bored, some of them at very great expense. At Antwerp, to a depth of 165 meters below the surface ; at Ostend, 300 meters ; at Oeynhausen, Prussia, 696 meters ; at Mondorff, Grand Duchy of Luxemburg, 730 meters ; at Passy, France, 624 meters ; at Rochefort, Charente Inférieure, France, 816 meters (this is the deepest bored well now existing in Europe). At Grissee, Soerabaya, Java, a well has been bored to a depth of 549 meters through hard rock. The deepest boring in Holland has been carried to a depth of 182 meters below sea level at Gorkum, at which depth in that locality, the tertiary formation has been reached, but water only of very indifferent quality ; with this exception, all the above-named wells yield water in abundance, and of great purity. As our younger readers may wish to reduce the given depths to feet, for the purpose of comparing them with the depth of some of our own wells, we may remind them that the meter is equal to 3·281 feet.

ELECTRICAL PHENOMENA OF THE PRESENT YEAR.

The frequency and violence of thunder storms do not seem to have been confined to New York city and vicinity. Accounts reach us from a distance of frequent and violent electrical displays, and those quiet but grand exhibitions, known as Northern Lights, have been more frequent than usual during the spring and the opening of summer.

We are in receipt of accounts from various parts of the country in regard to the singular freaks of lightning. In general these accounts contain little of value, but we will notice one or two of them.

"On the morning of Friday, June 18," writes a correspondent from La Crosse, "that town was visited by a severe thunder storm. The weather for a week previous had been cold and rainy. The wind during the storm was from the southwest. During a period of 35 minutes there were a great many discharges of lightning, one bolt striking the telegraph wire about one mile south of the city, and running along the wire in a southerly direction, shivering in its course forty-three poles in succession, leaving the line at last for a barn which stood within a few rods. No great damage was done to the building and the charge seems to have spent itself in this last effort. None of the telegraph poles were prostrated though every one of the forty-three had more or less wood splintered away. The wire was not damaged though the fluid came in at the office so strong as to burn the wood of the casing to a window where the end was secured."

An exchange gives an account of a singular stroke of lightning which took place June 1st, at Lexington, Virginia, injuring the residence of a citizen of that town:

"The features of the phenomenon were in some respects very remarkable. 1st. It seems to have been what the electricians call 'an upward stroke.' That is, according to Dr. Franklin's theory of electricity, the cloud was in a negative condition, and by its attractive force had accumulated a heavy charge of the 'electric fluid' (if it be a fluid) in that part of the earth below. In its efforts to reach the cloud the electricity would of course pass off at the point where it found the least resistance to its upward flow, which in this case seems to have been Mr. Jink's lightning rod.

"2d. A second peculiarity was the effects upon the ground in the vicinity of the house. The soil near the surface was furrowed in four zigzag lines nearly at right angles to each other, and all converging towards the lightning rod which stands at the western end of the house. These furrows were up-heaved very much as if a large mole had plowed his tortuous path beneath the soil—coming near enough to the surface in some parts to throw the clay entirely out on both sides of its open track. Two of the furrows seem to have commenced at least twenty feet from the base of the rod on opposite sides, and to have run in lines nearly parallel with the end of the house, while a third one met them, coming a distance of fifteen feet, and varying a little from a perpendicular to a general line of the first two. These three seem to have taken their harmless flight through the rod. The fourth, however, which had its origin on the opposite end of the house and more than 30 feet from the rod, behaved in a much more singular manner—in fact it appears to have acted as a sort of independent stroke. Instead of passing on to the rod, it took a shorter route into the atmosphere (or wherever it went) by running into a heavy locust post on which a corner of the back porch rested, and at the point of the building most remote from the lightning rod. This post was utterly demolished, its fragments being thrown off in every direction, some knocking the planks off the yard fence, and others flying away to the distance of a hundred yards.

"From the locust post the electricity passed up a wooden pillar which supported the porch roof, tearing it into a thousand splinters. When the charge reached the roof it tore up a few shingles near the corner, but after that it seems to have lost its power, for, although the house is a story higher than the porch, and intervenes between the stricken corner and the lightning rod, not a trace of electric action could be found beyond the corner of the porch roof.

"Mr. and Mrs. Jink's, who were at the time in their basement dining room, were both severely shocked, but received no permanent injury.

"The place was carefully examined after the storm was over by Professor Campbell, of Washington College, who expresses the opinion that the lightning rod saved both the house and its occupants. He thinks that the violence of the discharge was due in part to the insufficient size of the rod (it being a slender iron rod), and in part to the want of perfect conducting communication between the rod and the earth."

A violent thunder storm passed over this section on the 27th ult. At Montclair, N. J., the house of Mr. Julius H. Pratt—to which there are four lightning rods attached—was completely enveloped and pervaded by electricity. The current seemed to have been attracted to the rods in such a volume that they failed to conduct it all to the ground, and it tore off a part of the roof and entered the house. A person whose attention was attracted to the house at the time from the outside, saw upon the roof what appeared to him a ball of fire as large as a barrel. Mr. Pratt was ascending the stairs when the fluid entered, and when opposite the open door of the dining room, saw it brilliantly illuminated with waves of flame, which appeared to shoot off from a common center, each wave separating from the central point with a report. When he got up stairs he found that his little daughter, who was lying in bed with a broken collar bone, had been violently moved from one side of the bed to the other, and she informed her father that she felt as if she was all on fire. Two panes of glass in the parlor windows were broken out, and the gilding upon the molding at the top of the ceiling peeled off in considerable quantities. In the cellar the plastering was torn off the ceiling, and two servants, who had a pan of currants between them, which they were preparing for tea, said the current passed directly between them. It also traversed the wires of the burglar alarm, and left the house pervaded by a sulphurous smell. The wonder is that no lives were lost and so little damage done.

Copper, Brass, and Iron Tubes.

Were all the locomotives in the kingdom tubed with copper or brass tubes, upwards of a quarter of a million would require to be renewed yearly; indeed we are not certain that the number would not approach much more nearly to half a million. The introduction of the tubular system for locomotive and marine boilers, and also for surface condensers, has given an immense impulse to the metal tube trade. A single Birmingham manufactory, works up, probably, 2,500 tuns of copper yearly, although started only eleven years ago, long after Green and Alston's patents had been worked. The copper selected is almost invariably that from Chili, which contains a less quantity of impurities than that from Cornwall or Spain. It is melted, four tuns or more at a time, in reverberatory furnaces and thus purified, after which, for copper rollers, it is cast, under powerful pressure, into hollow ingots. These are first turned, to remove the unsoundness of the external portion, and afterwards heated and softened in cold water. They are then rolled, under very powerful pressure, upon a mandril, are afterwards soundly hammered, and are finally turned to a smooth surface for engraving. Heavy calico printing rollers are made up to 10, in. diameter, and copper steam pipes up to 16 in. diameter, and ½ in thickness in 12 ft. lengths. This great thickness for steam pipes is given, less, we apprehend, to fulfill any necessary conditions of strength than from considerations of the price at which such large pieces must be sold, per hundredweight. On the other hand, the same works made, for the International Exhibition of 1862, a long coil of tube of but 1-16th in. bore, and of very slight thickness, yet weighing 28 lb. The tube was duly tested, and water was forced through it under very moderate pressure. The brass tubes are made of a mixture of 2 copper to 1 of zinc, and are drawn in the usual manner upon a mandril. Mr. Alexander Parkes, the manager of the works, and the well-known inventor of "Parkesine," as also of an improved process for volcanizing india-rubber, has done some remarkable things in tube punching. There is still at his works a punch, made and used more than ten years ago, of the form employed by Messrs. Deakin and Johnson, for working out gun-barrels from solid ignots. And there is the screw press with which he punched, cold, for Mr. Bessemer, in the early part of 1862, the remarkable "pots" of Bessemer steel, a foot in diameter, and nearly as deep, one of them from a flat plate of Bessemer steel ⅝ in. thick, and the other from a like plate ⅞ in. thick. Mr. Parkes revived, a few years ago, and, we believe, as an independent discovery of his own, the practice of hardening and otherwise improving copper by the admixture of phosphorus. This process was announced, about ten years ago, as the discovery of Mr. Abel, of Woodwich Arsenal; but it was first described by M. Sage, in France, early in the present century, and his account was translated into the *Philosophical Magazine* for 1805. Of its value, as now practiced by Mr. Parkes, there is no dispute.

There are many lines of railway on which iron tubes are found to answer as well as brass, if, indeed, they do not answer better. We believe iron tubes are very largely used on the Lancashire and Yorkshire Railway, and with good success. A single Birmingham house might be mentioned which has turned out 550 tuns and upwards of iron tubes a month, and of these as many as 10,500 have been for locomotives, corresponding to perhaps sixty locomotives in number, although it is not to be supposed that a single house has gone on at the same rate for a year together, iron tubing, in that time, as many as seven hundred or more locomotives.

It is beyond question that really good iron tubes must be of good, not to say the best, iron, and that they must be well made. To this end a fair price must be paid. Nominally all iron tube makers make at the same price, the list price, but from this there are almost all rates of discount from 20 to 47½ per cent. No users, knowing their real interest, would prefer inferior tubes at the lower price, but manufacturers, under the pressure of competition, often feel compelled to accept the lower quotations.

Editorial Summary.

CANADIAN PATENT LAW.—The Dominion of Canada has enacted a new patent law, which goes into operation at once. It is a ponderous statute, filling nearly four columns of the Montreal *Telegraph*, but inasmuch as it excludes all non-resident alien inventors from the benefits of its provisions our inventors can feel no special interest in its full details. Section 6th provides, however, that "any person having been a resident of Canada for at least one year next before his application, and having invented or discovered any new and useful improvement not known or used by others before his invention or discovery, may obtain a patent therefor." This provision, to say the least, is one step in advance of the old law, as, under the new system, a citizen of the United States who is willing to suffer an exile of one year by summering and wintering in the Dominion may secure a patent for his invention.

SUBMARINE DRILLING.—A board of scientific engineers, consisting of Messrs. Mowatt, Forrest, Peterson, Waite, Buckett, Marsland, and Cooper, have indorsed the mechanism of Samuel Lewis, for the removal of submarine obstructions, as illustrated in the SCIENTIFIC AMERICAN, June 19th. It is proposed to form a stock company for working the invention.

A PHENOMENON of a most extraordinary nature, says the *Pall Mall Gazette*, has lately been witnessed by the inhabitants of the borders of the Caspian Sea. This huge salt lake is dotted with numerous islands which produce yearly a large quantity of naphtha, and it is no uncommon occurrence for fires to break out in the works and burn for many days before they can be extinguished. Early in April, owing to some subterranean disturbances, enormous quantities of this inflammable substance were projected from the naphtha wells, and spread over the entire surface of the water, and becoming ignited, notwithstanding every precaution, converted the whole sea into the semblance of a gigantic punch bowl, many thousands of square miles in extent. The fire burnt itself out in about forty-eight hours, leaving the surface strewed with the dead bodies of innumerable fishes. Herodotus mentions a tradition that the same phenomenon was once before observed by the tribes inhabiting the shores of the Caspian Sea.

CHEMISTS and others know well the difficulty of keeping very volatile liquids. Bottles of ether, for example, are shipped for India, and when they arrive are found to be more than half empty. The chemist sometimes puts a bottle of benzole or bisulphide of carbon on his shelves, and when he next requires it he finds the bottle empty and dry. The remedy with exporters is a luting of melted sulphur, which is difficult to apply and hard to remove. A new cement, therefore, which is easily prepared and applied, and which is said to prevent the escape of the most volatile liquids, will be useful information to many. It is composed simply of very finely ground litharge and concentrated glycerin, and is merely painted around the cork or stopper. It quickly dries and becomes extremely hard, but can be easily scraped off with a knife when it is necessary to open the bottle.

STAINING WOOD.—Dr. Stolzel adds another to the many recipes already given for staining wood of a brown color. He first of all paints over the wood with a solution made by boiling one part of catechu (cutch or gambier) with thirty parts of water and a little soda. This is allowed to dry in the air, and then the wood is painted over with another solution made of one part of bicromate of potash and thirty parts of water. By a little difference in the mode of treatment and by varying the strength of the solutions, various shades of color may be given with these materials, which will be permanent, and tend to preserve the wood.

VERY DURABLE CEMENT FOR IRON AND STONE.—M. Pollack, of Bautzen, Saxony, states that, for a period of several years, he has used, as a cement to fasten stone to stone and iron to iron, a paste made of pure oxide of lead, litharge, and glycerin in concentrated state. This mixture hardens rapidly, is insoluble in acids (unless quite concentrated), and is not affected by heat. M. Pollack has used it to fasten the different portions of a fly wheel with great success; while, when placed between stones, and once hardened, it is easier to break the stone than the joint.

THE *Chemist and Druggist* give an account of the death of a small child from sucking lucifer matches. It appears deceased was left at home with a younger sister, and reaching some lucifer matches, which had been carelessly left on a shelf, placed them in her mouth. This, however, was not discovered until the child was seized with sickness and convulsions, the vomit smelling of phosphorus. The child only lived about an hour from the commencement of the convulsions.

FISH-JOINT.—At a late meeting of the Institution of Civil Engineers, London, there was exhibited a plan of a fish-joint, consisting of two curved plates fitting on each side of the rail, and curved to its contour, meeting below the bottom flange in the center, where the edges of the plates are turned down for a depth of about two inches, and a bent cover plate, clipping these projecting edges, is slipped over them to keep them together—the fishplates being bolted to the rail in the usual manner.

OLIVE OIL.—The two edible oils of this class, known to trade are the superfine virgin oil, cold-pressed and perfectly free from mixture, and the ordinary oil, extracted by the application of heat. The great use of olive oil, particularly in Europe, and its high price, have encouraged all sorts of adulterations, among which we may mention the mixture with it, of nut-oil, honey, goose-grease, poppy-oil, oil of sesamum, beech-oil, and oil of arachnida.

COLOR OF VERMILION.—It is a fact well known to artists that the splendidly bright color of vermilion (cinnabar, sulphide of mercury) has a tendency, especially if it has been mixed with white lead, to become blackish brown and very dark colored in a comparatively short time, This tendency of the vermilion is altogether obviated if, previous to being mixed with oil, it is thoroughly and intimately mingled with about one eighth of flowers of sulphur.

WHITEWASH FOR OUTSIDE WORK.—Take of good quick-lime half a bushel, slake in the usual manner, and add one pound of common salt, half a pound of sulphate of zinc (white vitriol), and one gallon of sweet milk. The salt and the white vitriol should be dissolved before they are added, when the whole should be thoroughly mixed with sufficient water to give the proper consistency. The sooner the mixture is then applied the better.

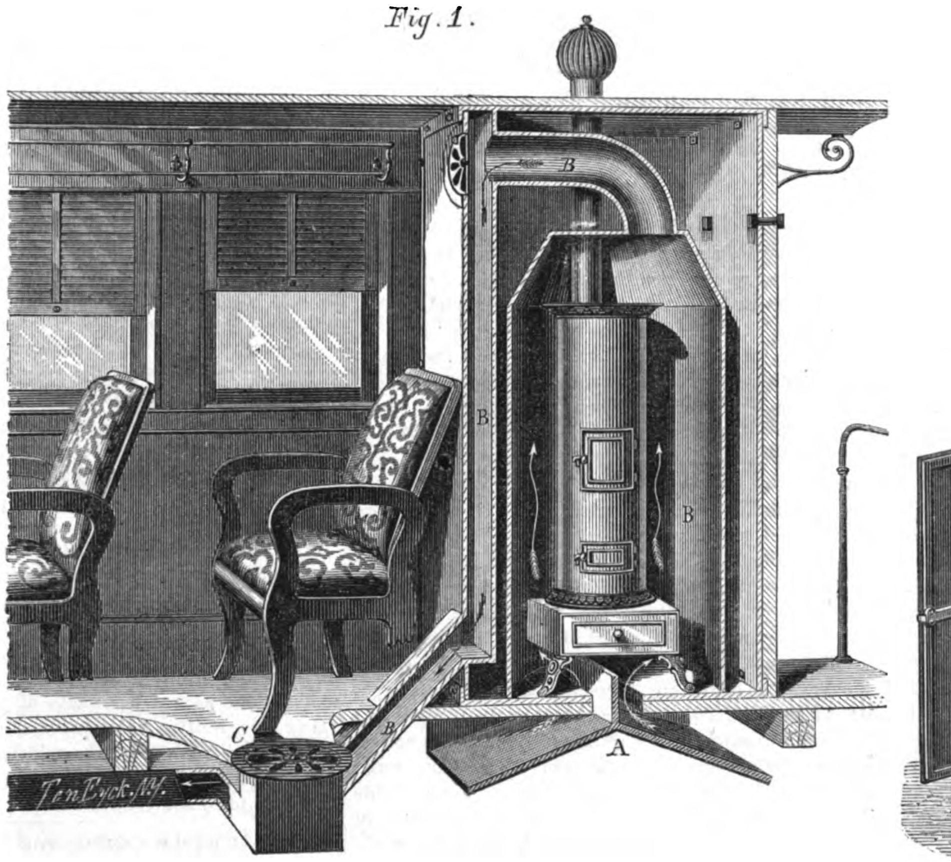
GAS, WATER, AND DRAIN PIPES.—We have received through Messrs. W. P. Converse & Co., of this city, some samples of bamboo pipes made by Benj. F. Smith, of New Orleans. They appear to be well prepared to resist the elements and can be produced in abundance from a comparatively use less article.

Improvement in Heating and Ventilating Railroad Cars.

The chief discomforts of railroad traveling arise from the imperfect manner in which cars are heated in winter, and the defective mode of ventilating them at all seasons. The stove, placed at the end or ends of the car, overheats those in its immediate vicinity, while those in the middle of the car suffer with cold feet, and shiver in discomfort. The stoves, unprotected, in case of accident, are liable to discharge their glowing charge of fuel among the wounded and disabled, adding untold horrors to their situation.

In summer, when the stoves are not in use, and passengers are sweltering with heat, if the windows are opened to admit air, a vile and irritating dust, composed of ashes, pulverized cinders, and ordinary road dust, comes in with the air, not unfrequently mixed, also, with smoke from the locomotive, so that the last case of the much-enduring passenger is worse than the first; and he closes the window with the conclusion, that to perspire in a temperature of 90°, is better than to weep and sneeze and cough in one of 85°.

Fig. 1.



HIMROD'S CAR HEATER AND VENTILATOR.

The remedy for these evils would be speedily applied if an exasperated public would demand, as a unit, reform on the part of railroad officials, too much absorbed in so manipulating stocks as to obtain liberal returns for themselves, to heed a small clamor against the neglect of the rights of passengers.

The invention herewith described, shows one of many excellent ways to prevent the evils complained of. In this device, the inventor has given us, first, a stove, completely boxed in with a case of boiler iron with riveted joints, and a door fastening securely with a spring lock. This part of the fire-proof apparatus is shown in Fig. 2.

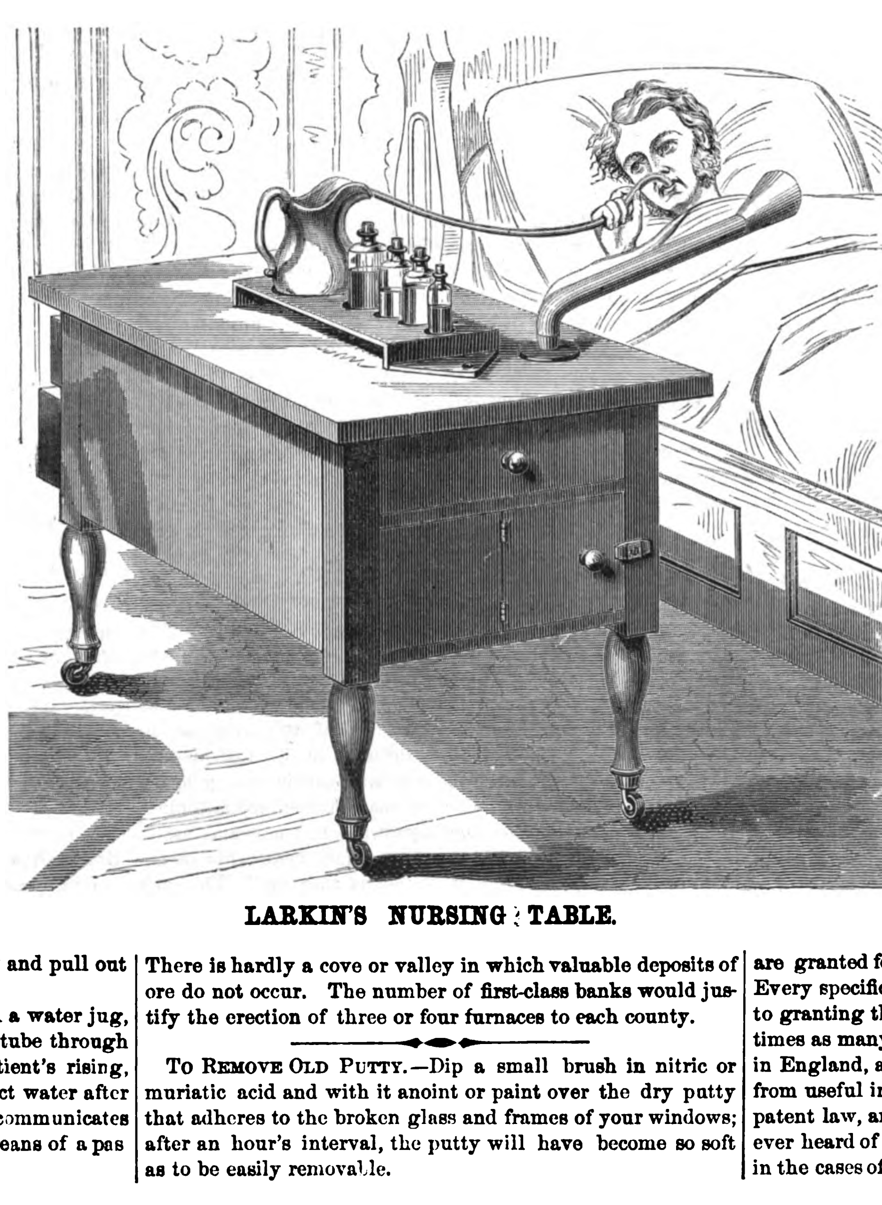
Inside this case is placed, and securely fastened, an iron jacket, air-tight—see Fig. 1—which holds in warm embrace a stove of approved form, the smoke pipe passing out through the top of the jacket, inside the iron case, Fig, 1, and then through the top of the car. Underneath the car is arranged a double funnel, partitioned in the center, A, Fig. 1, so that in whichever direction the car may be moving, air enters the funnel, rises, and passes in the direction of the arrows, through the air-tight jacket, descending and horizontal flues, B, and emerges at registers, C, placed in the bottom of the car. Suitable registers, placed at the top of the car, give a constant circulation of fresh, pure, and, whenever required, warm air, moving, as it should, from the bottom of the car to the top, without any danger of roasting passengers, should a car-load of them be pitched down an embankment; a contingency not so remote in this country, under the present systems of railroad management, as to render the business of accident and life insurance an unprofitable investment. The device is perfectly safe, cheap, practical, and worthy the attention of railroad officials.

This invention was patented through the Scientific American Patent Agency, March 16, 1869, by Edward Himrod, of Dunmore, Pa.

Improved Nursing Table.

The inventor of this nursing table, has endeavored to afford greater comfort to the sick by providing them with the means of supplying in a measure their own wants during the absence of an attendant. In large hospitals the want of something of this kind has been long felt, and in many cases its use in private houses would be a great convenience.

The engraving exhibits the purpose and scope of the device so admirably that a verbal description is hardly necessary.



LARKIN'S NURSING TABLE.

The table is supported on casters, so that a sick person can easily move it, and is provided with tight drawers capable of receiving the contents of the stomach in vomiting, the patient being required only to rise upon one elbow and pull out the drawer.

A caster is fixed to the top of the table to hold a water jug, medicine, bottles, etc. There are also a suction tube through which water may be obtained without the patient's rising, and a discharge tube through which he may eject water after rinsing and moistening the mouth. This tube communicates with a drawer provided for the purpose by means of a passage through the top of the tal le

By this means a person unable to procure a nurse, may be rendered much more comfortable, and where in crowded hospitals nurses are greatly overtaxed, both they and the patients will find the table a desideratum.

Patented through the Scientific American Patent Agency, April 13, 1869, by Jeremiah Larkin, of Unionville, S. C., whom address for further information.

The Geology of Tennessee.

The report of the geological survey of Tennessee, made by Dr. Safford, of Cumberland University, State Geologist, asserts that the coal measures are co-extensive with the table-land, occupy an area of 5,100 square miles, and underlie more than one eighth of the surface of the State. The coal beds are often three, four, five, and sometimes nine feet in thickness. The quality of the coal is generally good. It is not often highly bituminous. Of the deposits the report says that their variety, amount, and fine quality entitle the State to rank among the first as an iron producing region. There are three great iron producing regions, viz.: The eastern, the dyestone, and the western. The first embraces the counties of Johnson, Carter, Sullivan, Washington, Greene, Cocke, Sevier, Blount, Monroe, Polk, and the eastern part of McMinn. There is hardly a cove or valley in which valuable deposits of ore do not occur. The number of first-class banks would justify the erection of three or four furnaces to each county.

TO REMOVE OLD PUTTY.—Dip a small brush in nitric or muriatic acid and with it anoint or paint over the dry putty that adheres to the broken glass and frames of your windows; after an hour's interval, the putty will have become so soft as to be easily removable.

SCIENTIFIC TESTS OF HYDRAULIC MACHINERY.

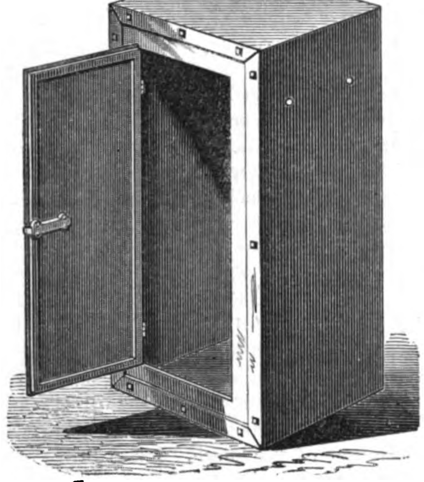
[Reported for the Scientific American.]

A test of turbine wheels, with the object of determining the economy of these motors and a means of saving water, which in some of our manufacturing districts is becoming a matter of considerable importance, was begun in Lowell, Mass., on the 15th of June, and is now in progress. It is a matter that concerns not only the builders of turbines, but also those who use these wheels in all parts of the country.

The turbine is rapidly taking the place of the overshot and breast wheel, as well for its economy in its first cost as for the larger percentage of power obtained. It may be used under any head and at any stage of back water, and is employed for all kinds of manufactures requiring power. These facts prove that a series of tests which will determine the absolute economy of the turbine, the best methods of using, and the best form of wheel, will be, if properly conducted, under competent supervision, and scanned by experts, of great advantage to the manufacturing interests of the country.

The interest excited by the statement made in the SCIENTIFIC AMERICAN, some time ago, that these trials were to be made, is evinced not only by the reception of many letters of inquiry, but also by the presence at the place of trial of such men as W. A. Norton, Prof. of Civil Engineering, Yale College; Prof. Winlock, Superintendent of the Cambridge Observatory; Jas. B. Francis, N. R. Harlow, C. H. Latham, J. H. Sawyer, and James Francis, of Lowell; L. B. Stone, J. H. Shedd, and Edward Sawyer, of Boston—beside a number of wheel builders and manufacturers from St. Louis, Mo.; Nashville, Tenn.; Montpelier, Vt.; St. John, N. B., and others whose names escape us.

Fig. 2



Several thousands of dollars were expended in preparing for the tests, which are conducted under the direction and supervision of Mr. Hiram F. Mills, C.E., of Boston. The head of water is from twelve feet six inches to fourteen feet six inches; at one time, after a heavy rain, it reached fifteen feet eight inches. The weir is excellently constructed, and is a model. Every thing is planned with a view to give each wheel tested a fair trial, and the experiments are conducted with great care. The amount of water delivered to the wheel, and the amount discharged from the wheel, are accurately measured, constantly, during the trial.

The velocity of discharge, number of revolutions of the wheel, temperature of the water, variations of head, and resistance offered are all carefully noted by experienced assistants during each trial, which lasts from five to twenty minutes, and in one case one hour and thirty-nine minutes. The test of power is made by the well known Prony brake and the Emerson dynamometer, described and illustrated in Vol. XX., No. 1, SCIENTIFIC AMERICAN. These testing instruments were applied both conjointly and separately, and in either case the result was almost the same; so near that one was used to correct the other. An ingenious arrangement, contrived by Mr. Emerson, kept the parts embraced by the friction band perfectly cool, and lubricated the parts in contact, while the amount of friction could be accurately determined

At the time of our observation (June 16th and 17th) the Swain wheel, built at North Chelmsford, Mass., was on trial. The Leffel and the Bryson wheels are to follow, and others will undoubtedly be entered. In such a notice as this, and at this stage of the experiments it would, of course, be improper to draw conclusions as to the relative merit of different wheels. A full report will be published in pamphlet form at the close of the experiments Our object is merely to call the attention of those interested to the importance of these trials. Information may be obtained by addressing James Emerson, Lowell, Mass.

A SIGNIFICANT FACT.—*Engineering* contains the following, which needs no other comment: "In the United States patents are granted for seventeen years for a single payment of £7. Every specification is carefully examined by experts previous to granting the patent. The consequence is that about four times as many patents are applied for, yearly, as are protected in England, and that no nation has derived so great benefits from useful inventions as America. In Switzerland there is no patent law, and, practically, no inventions. Nobody, we think, ever heard of an invention coming from Switzerland, unless, as in the cases of Bodmer and Heilman, the inventor came with it

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VOL. XXI., No. 3...[NEW SERIES.]....*Twenty-fourth Year.*

NEW YORK, SATURDAY, JULY 17, 1869.

Contents:

(Illustrated articles are marked with an asterisk.)

THE USE OF PULVERIZED COAL AND COAL SCREENINGS AS FUEL.

The two motive powers upon which the world must rely, probably for some time to come, are the fall of water and the heat generated from the combustion of fuel. The latter source is limited, and it is time the world opened its eyes to the fact. It is a duty we owe to posterity, not merely to give a general assent to this proposition, but to appreciate its full significance. The world, at the present time, begins to feel the pressure of scarcity. Wood has so advanced in price, by its vast consumption, in many districts where it has hitherto been relied upon as the principal fuel, that coal is now transported long distances, at much cost, to supply the want.

Although the amount of coal buried in the earth must still be enormous, and the period at which it will ultimately be exhausted very remote, it may, by no means, be so long before the nearest and most accessible supplies may be sufficiently reduced to greatly enhance its price. In view of these facts, and in view of the fact that all kinds of fuel upon which any reliance can be placed, aside from coal and wood, would, in the aggregate, only supply a small fraction of the world's necessities, those who are struggling to reduce the enormous waste of coal now prevailing, must rank as philanthropists, and ought to have all the encouragement possible.

The waste of coal may be placed in two categories—that consequent upon imperfect combustion, and that which takes place in the mining of coal and its transportation. Of all these causes of waste, two only are of much account; namely, imperfect combustion, and the waste occasioned by the necessity of screening. Really, however, impossibility of producing perfect combustion, in unscreened coal, in many kinds of apparatus, is the origin of screening, and hence we find that the great bulk of the waste is, directly or indirectly, caused by imperfect combustion.

This is an anomaly. Combustion of coal is neither more nor less than the chemical combination of carbon and oxygen to form carbonic acid. And it is a well-established fact in chemistry, that one of the conditions necessary to a rapid and complete reaction, when one or more constituents are solid, is, that the solid substances shall be pulverized. The main other conditions are, that the substances to be combined shall be intimately mixed and a proper temperature maintained.

We see, then, that if the other conditions can be fulfilled, the combustion ought to be all the more rapid and perfect the finer the fuel is pulverized. The defects in combustion must be attributed, therefore, to imperfect admixture. In other words, if sixteen pounds of oxygen be intimately mixed with six pounds of heated fine carbon powder, an almost instantaneous combustion would take place, and the combustion would be complete. No loss from debris would occur, and no smoke would be generated, carbonic acid being the only material product of the combustion.

In the furnaces of marine engines and locomotives, nothing like such a result is obtained. There is more or less carbon always passing out at the smoke pipe, and more or less waste of fuel through the grate. In smelting and puddling furnaces of the old type, there is always a still greater waste. An old iron master told us, not long since, that more than half the coal consumed in the works which he superintended was wasted. We believe that the proportion of waste is, on the average, fully three fourths in such works. And we are surprised that, ere this, some more perfect mode of producing combustion has not been generally adopted. The reason, certainly, is not that such modes do not exist. The furnaces of Whelpley and Storer, and the Siemens furnace, are a sufficient demonstration of this.

But although the combustion of pulverized fuel is much more rapid than that of coarse fuel, still it takes time to burn it, instantaneous combustion not being practically possible.

We now learn from *Engineering*, that Mr. Thomas Russell Crampton has been experimenting, in England, with a view to produce a furnace that should conform to the principles above enunciated in a more perfect manner than has yet been accomplished. In reducing the coal to powder, Mr. Crampton uses ordinary millstones, having a blast of air passing between them, operating to keep the stones cool, and to carry away the fine dust as soon as produced. The coal is passed through crushers before being fed to the stones. Mr. Crampton employs various methods for delivering the coal, intimately mixed with air, to the combustion chamber. The most ordinary one, however, and the one most generally applicable, is as follows:

A kind of injector, formed of a conical pipe or nozzle, receives the powdered dust as it is fed from a hopper. Within the first nozzle is a smaller one through which a blast of air is forced. Instead of introducing the mixed air and coal dust directly into the chamber, where the heat is to be utilized, it is forced through a long chamber with baffling screens, to give time for the combustion to become complete before the hot gases, thus produced, are brought to the point where the heat is required.

The system is said to have given very satisfactory results, but while we are bound to pronounce it correct in theory, it is not impossible that further use may develop practical difficulties not yet discovered.

The progress of the improvement will be watched with interest everywhere, and we shall notice any further information that comes to hand respecting it.

THE PHILOSOPHY OF CHEAP PRODUCTION.

How is it that certain articles can be produced so cheaply? We find ourselves surrounded with luxuries and comforts which cost us little—so little that the power to obtain them at their price is almost a miracle. Take, for example, this newspaper which you are now reading. You get fifty-two copies for three dollars, or a single copy, if you are a regular subscriber, for a small fraction over five and three fourths cents. To produce this newspaper in just the way it is now produced, and in as perfect a manner, beginning at the very outset, with nothing but raw material, would cost an enormous sum, yet you get it for less than six cents.

Let us see. First, there is the paper to be made which implies the growth of the fiber, harvesting, marketing, and not only the manufacture of the implements for these operations, but the tools and machines to make the implements. Then comes the paper mill, with its hands for sorting, attending the pulping machines, packing, shipping, etc., etc., and the machinery, and the tools and machines and labor necessary to make the machinery. Then the shipping, and the facilities for shipping, be it railroad or canal, warehouse for storage, and all the labor and tools etc., for constructing these. Then the commercial part of the business, the merchants and clerks who buy and sell, and the banks and bankers who facilitate commercial transactions, and at last the drayman who delivers it at our office.

We are now in possession of our paper on which to print. Now to get our type we must mine at least four kinds of ores, and erect reducing works to get this metal in a sufficiently pure state. We must have separate metal molds cut for each kind of capitals and small letters of the alphabet, and for every kind of rule, dash, punctuation mark, space, figure, or character used in the printing of our paper. This alone would involve an enormous labor and expense. Then the types must be cast, and cases made to hold them, and the composing sticks, and the minor tools employed in type-setting manufactured, and still we are not ready to make a newspaper.

We have yet to have a power press and a steam engine to run it, coal to be mined and transported, blocks upon which to engrave our illustrations, which implies tools and machines to shape them; engravers, and costly machines and tools for their use; draftsmen with the utensils of their art; paper upon which to draw, another kind for ordinary writing, still another kind for wrappers and the paper mills to manufacture them; a library of costly books, office, and fixtures; brain labor to furnish the matter; and oftentimes physical labor too, prolonged long after the paper you are now reading has dropped from your hand, and you have gone to revolve in dreams the wheels and pinions, belts and pulleys, over which you have been poring.

Then there is the engineer, fireman, and pressman, and the folders and mailers, and Uncle Sam's army of postmen and postmasters, and the stamp office, and so, finally, the one copy comes out, costing, Heaven knows how much, but having through contributions of labor from countless workers, and employing capital to an extent which makes one hold his breath even to think of, at last been perfected and laid upon your table a welcome weekly visitor.

What would it cost to produce a single paper in this way? Dear reader, it passes our power to estimate, but we venture to say, that were the most experienced publisher in the world to hazard a candid guess, he would not at first thought say one tenth the real cost. The cost of the manufacturing establishments required would crowd up into millions of dollars without saying anything about the labor.

How is it then that you can get your paper for less than six cents? The answer to this question involves the entire philosophy of cheap production. It will be seen that in the manufacture of our one newspaper the principal expense was entailed in making the preparation to do the work in the manner required. It would have been cheaper to have employed an artist to draw each letter and character and each engraving upon the paper itself, were only one copy required, but to produce cheaply it is necessary to produce infinitely more rapidly than unaided manual labor can possibly produce. Therefore we make all this extensive and thorough preparation, open our mines, cultivate our land, put up enormous paper mills and type founderies and printing press manufactories, build our railroads and canals and warehouses, incorporate our banks, inaugurate commerce and trade, print books, etc., etc., establish mail routes and telegraph lines, and when thus finally and thoroughly prepared, the world is flooded with literature in less time than the artist can finish the drawings which illustrate a single number of a pictorial paper.

It is seen in this case, and it will be found true in all others, that the production of large amounts of one kind of thing, in a short space of time, implies previous great distribution of labor through a long period of time. It has taken centuries to render the modern newspaper possible.

In the physical, as well as the moral world, a man's works live after him. So the great dead workers, Faust and Watt and Stevenson and Fulton, and hosts of others, stand as it were to-day the dead helping the living to live; giving the poor man of to-day luxuries that a few centuries ago a king could not purchase, pulling the lowly up faster than the high, so that they continuously approach that grand universal level which all mankind shall one day attain.

We also see how no department of work is independent of any other. As soon as mankind begins to improve and adapt the productions of nature, so that they will better minister to his wants, a bond is created strong in proportion to the advantage achieved. The individual who makes an improvement, makes others more or less dependent upon him only in turn to become dependent himself upon others. Thus we have this great bond of mutual dependence which unites the workers of the world not only with those who now exist but with those who are dead, and the yet unborn workers who will begin where we leave off, strengthening and tightening the bond, and so on through the ages, until labor, co-operating throughout the world, shall redeem it.

HIDDEN GENERATORS OF DISEASE.

Although earth closets by properly mixing the earth with fœcal matters, enable the absorbent power of the earth upon foul gases to act in the most efficient manner, eliminating all smell, and effectually guarding against the production of disease from this source, it is not to be supposed that the burial of a large mass of such matter in the earth without intimate mixture of earth, will act in like manner. The cases are very different.

The cesspools employed to receive the contents of water closets, in new streets and suburban districts of American cities, accumulate large quantities of night soil, which gradually decomposes, generating fœtid and poisonous gases which make their way through the thin superstructure of earth and masonry employed to cover them, gradually tainting the air and becoming a fruitful cause of disease.

Were the escape of the foul gases less insidious, it would become so unendurable that prompt remedies would be applied. It is because their escape is undetected that they are more dangerous. The sense of smell becomes deadened to peculiar odors when generated continuously. This is shown by their almost immediate detection by those who have long been accustomed to pure air, while those who are accustomed to them do not perceive them.

Thus in entering large cities, those whose residences are in rural districts almost invariably detect a peculiar sickening smell, arising from the commingled odors of decaying organic matter in the streets, effluvia of leaking sewers, gas-pipes, and, last but not least, those hidden generators of disease, the cesspools.

In deep sand and gravel beds like that upon which a large portion of the city of New York stands, the fluid contents of cesspools filter through and are soaked up, while the gases are more perfectly absorbed and retained than they would be on other less favorable sites; but where the fine soil is thin lying upon a clay hardpan, into which the opening is dug, the fluids are soaked off very slowly, and a very small portion of the gases generated are absorbed, the bulk filtering through the superstratum of earth to the air above.

Sometimes the abominable practice of placing cesspools directly under houses is permitted. In other cases they are placed so near, and are made so small that they overflow, and their contents leak through into the cellar. But the most dangerous practice is that of allowing them to remain, after sewers are opened, to be forgotten, and to breed pestilence for years afterward. We say most dangerous, because as the closed cesspool is for the most part in this country used only as a make-shift until a sewer is completed, its deleterious action in many cases, hardly commences before it ceases to be used while it frequently continues many years afterward.

It is not our intention to cite the numerous instances on record of violent and destructive epidemics, either directly traceable to, or greatly aggravated by this neglect, but to point out simple and effective means whereby such ill consequences can be avoided. Of these the most obvious and thorough is to empty and fill with earth every cesspool as soon as it ceases to be used, but another method may in many cases be adopted. A hole being dug at some distance from the original cesspool, of considerably larger size than the first, the contents may be gradually drawn through a narrow earth-cut into the new reservoir while the earth is thrown back, thus intimately mixing the gas generator with the gas absorber. After the first cesspool has been thus almost emptied of its contents, it may in time be filled with earth, and thus a stop put to any foul exhalations in the future.

Whatever may be the regulations in the cities of New York and Brooklyn in regard to cesspools, we know it to be a common practice to leave them as they are when the water closets are connected with sewers, simply cutting off and often imperfectly closing the communication between them and the dwelling. It is not often, we believe, that cesspools are placed directly underneath dwellings in this country, but it is we know sometimes the case. The evils that arise from leaving unused cesspools thus situated is shown in the following extract from a report of the health of the parish of Marylebone, England, by Dr. Whitmore.

"In my last report, I had occasion to notice the unusual prevalence of typhoid fever in certain districts of the parish, and I ventured to predict that, unless measures of sanitary precaution were promptly adopted, not only by the local authorities but by the householders generally, it would in all probability increase and assume a decidedly epidemic character. * * * * *

"Have the householders in these districts attended to the cleansing and disinfecting of their houses, drains, and closets; and have they caused careful examination to be made in the basements of their respective dwellings to ascertain if old disused cesspools still exist there? For if they do not, the inevitable result will be that, sooner or later, some member of the family will be attacked, and probably die of typhoid fever. A large proportion of the fatal cases of this disease have been clearly traceable to some such cause as this. I have the strongest reasons to believe that in the basements of many of the largest and best houses in the parish, large disused cesspools still exist; which at the time that the house drains were connected with the sewers, were bricked and cemented over, but which were not previously emptied. So long as the mortar and cement covering these pits of abomination and filth remain undisturbed, probably no great risk or injury to health will ensue, but in time some portion of the mortar and cement gives way, or perchance an adventurous rat eats its way through this covering, and thus makes a vent hole for the more rapid escape of the pent-up gases, the deadly poison of which has become greatly intensified, owing to the length of time that the process of putrifactive fermentation has been going on, thus rendering the foul emanations from these old cesspools far more dangerous to health and life than those which ordinarily come from untrapped drains or closets.

THE INTERESTS OF LABOR.

Our attention has been called to a well-written article bearing the above title, which appeared in the Albany *Morning Express*. It is evidently written in a spirit of earnest friendship for the workingman, and a strong desire to aid him in attaining his proper status in relation to capital; a feeling which we as well as all true philanthropists share.

We have ever given the broadest and strongest expression in regard to the intrinsic value of labor, its nobility, and its effect upon the well-being of mankind; and have never failed to give it its appropriate place as the highest and most effective of all human agencies at work to ameliorate the condition of our race.

Nevertheless, there are some statements in the article referred to from which we must dissent if they are to be considered as fundamental principles upon which systems of ethics and political economy are to be reared; while there is much with which we can agree.

We agree that workingmen have the right to combine to protect what they consider their mutual interests. We have never denied this right; but we have had doubts, and still have doubts, that the organizations called "trades unions," as they have been, and are now conducted, are wisely calculated to promote the interests of the workingmen belonging to them. We have heretofore expressed our reasons for entertaining these doubts.

We dissent from the opinion that labor-saving appliances have had any depressing effect upon labor, or that they have produced any disability on the part of labor to compete with capital, which did not exist in a still greater degree before their invention and introduction. We have shown in elaborate articles on this subject heretofore, that all so-called labor-saving machines are in reality labor-creating machines, which, although they decrease the amount of labor necessary to produce a given quantity of any article of luxury or utility, invariably increase the demand for the same in a far greater ratio, and thus increase the amount of labor required in its manufacture. This might be shown to be true on general principles of political economy, but it is also confirmed in the history of any department of industry where labor-saving machines have been largely employed. There is to-day an enormously increased consumption of any kind of goods produced by such aid, estimated proportionally to a given population, than existed when labor-saving machinery did not exist, so that many more laborers are required in their production. It is safe to say that when, by the aid of machinery, the labor of producing any article of general adaptability is so reduced that the cost of production is diminished one half, the number of workmen required to keep pace with the increased demand will be quadrupled. In many cases the ratio has been far greater than this.

We do not think the following quotation from the article in question will bear close scrutiny:

"There are certain principles lying at the foundation of the relation between capital and labor, which they should seek to understand, and from which they cannot deviate without endangering their usefulness and efficiency, nay, their very existence. Let us endeavor to state a few of these.

"First, it is the right of every man to do what he will with his own; not only the right of the operative to do what he will with his labor, but the right of the employer to do what he will with his capital, for capital is only stored-up labor."

The only thing sound in this quotation is, that "capital is stored-up labor." There are two forms in which labor, or rather the results of labor are perpetuated. One is material wealth, the representative of which is money, and the other is the entire category of scientific lore and mechanical improvements, preserved from diminution or total loss formerly by written, but in the present age by printed records. The latter category is by far the most valuable, and is generally diffused. It cannot be monopolized by individuals, put to usury, issued in stocks, or speculated in "on change." We see, then, that though capital is stored-up labor, it is only a small portion of the wealth of the world. It should, therefore, be subjected, as far as practicable, to the same laws that govern labor, of which more anon.

No man has a right to do what he will with his own. Man in his earliest association in savage tribes, accepting their social laws, renounces certain natural rights held in common with wolves and bears, accepting in return the protection formed in association. He agrees not to take the property or lives of his associates, if they will agree not to take his and band together to protect each, confiningtheir depredations to those not belonging to their tribe. At each step from a savage state toward civilization more rights are surrendered, until, when civilization is reached, savage license has been almost entirely shorn away; and man finds himself merged into a civilized body, a member capable of many motions seemingly independent, but found, on strict analysis, to be intimately connected with the motions of all the other members.

Certainly, if a man owns anything it is his own body, but he has not the civil right to do what he will with even that. He may not obstruct the motions of other men's bodies with it, except under certain conditions; nor when it is corrupted with infectious disease expose others to contagion from contact with it. Neither is he permitted to violate public decency and good order. Further, he has not the right to be lazy. The laws of civilization suppose each man who accepts them to have some lawful occupation, a *visible* means of support; and if he has not that, he is declared a vagabond, ruled out of society, outlawed, and confined as a person dangerous to the public weal. Clearly, society does not recognize the right of idleness. Of course it is understood by this that general and habitual idleness is meant, not temporary relaxation from work, or honorable retirement from active life in old age, after a life of honest toil, or the leisure gained by the possession of capital, requiring little attention on the part of its owner.

It is just because capital is stored-up labor that the latter should not be permitted to lie idle. A miser who hides away money in nooks, or buries it in the earth, is morally more culpable than the vagabond. There is a consideration, however, in favor of the miser; namely, there is not a contingency that he may become a dependent upon others for support.

Practically, however, there are great difficulties in putting the miser legally on the same footing with the vagabond, although we believe him the greater sinner of the two. The vagabond buries only the labor of one, the miser secretes the stored-up labor of many.

The right of a capitalist to do what he will with his money amounts to this only. He may select whatever field he thinks best in which to employ it. He may loan it to others in interest, which is simply equivalent to furnishing labor—stored-up labor—to others for a consideration, or he may exchange money, the representative of property for property, or in conjunction with the labor of workingmen, he may use it in producing anything included in the two categories of wealth above-named.

The workingman has precisely the same right of selection in regard to his labor; and we are firmly convinced, that if these two fundamental rights, which if not tampered with can never conflict, are not interfered with, and all attempts at coercion of individuals by associations should cease, the time would not be far distant when the only way capital could find employment would be by taking labor *into partnership* with it. By this we mean that it would have to be loaned to co-operative associations of workingmen, at low rates of interest, or enter into co-operation with them dividing profits rather than paying stipulated wages, taking its share as stored up labor *pro rata*, with the labor co-operating with it.

We believe that, on the average throughout the country, taking all kinds of business into consideration, capital is not really getting its *pro rata* share, considering it as stored-up labor.

We are informed, that in some of the iron districts in Pennsylvania, a step has been taken in this direction, the wages of the workmen rising and falling with the price of iron, and this adjustment has proved so satisfactory that strikes on the part of the workmen are no longer dreaded.

We have been led into a much longer discussion upon this interesting topic than we intended, yet we cannot refrain from making one other quotation.

"There is also a little point in human nature which must not be overlooked. Men do not like dictation in what they have a right to consider their own business. It is not dictation to tell a man you must have so much for your labor, or you will not work, for selling your labor is *your* business; but when you tell him that he must discharge this person, or employ that person, or must sell or refrain from selling to such and such parties, or for such and such prices, or you will leave his employment, you must be a very valuable man or set of men to him if he does not tell you to 'stand not upon the order of your going, but go at once.'

"If anything will induce combination among capitalists it is this spirit of dictation on the part of trades unions. So long as it is a mere question of dollars and cents, that course which has the most profit in it is likely to be adopted; but when it comes to a question of the right of every man to manage his own business, an element of personal pride and feeling, 'grit,' comes in, and pride and 'grit' are luxuries which the capitalist can afford better than the operative.

"This is written in true friendship for the workingman. Let the trades unions be kept within their proper bounds and they will do, as they have done, much good. They have, too, at times done harm, and always will do harm when swayed by passion and prejudice rather than reason."

The sum of the matter may be stated thus: So long as workingmen quietly, but firmly, demand prices within such limits that capital is not compelled to withdraw from the partnership, they will obtain their demands; but if coercive measures are adopted, to prevent those who feel disposed from laboring, or capital from employing such as are willing to labor, the fundamental rights of both capital and labor are menaced; society itself is menaced, and the horrors of anarchy begin to assert themselves.

This matter is beginning to be seen in its true light, both by capitalists and the thinking workingmen. Co-operation, not oppressive and arbitrary "trades unions," is the hope of the workingman. Remember, also, that great reforms must be accomplished slowly, and avoid destructive haste.

REFRIGERATOR CARS.

The Davis Refrigerator Cars, of which we gave a brief description on page 197, Vol. XIX. of the Scientific American, are again employed this season for transporting fish, fruits, etc., over long distances. These cars are made thirty feet in length, and are about seven feet wide. The walls are nine inches thick, filled in only partially. The space between the inner and outer surfaces of the walls is partly occupied by a layer of felt, in all three inches thick. A board partition separates this layer from the remainder of the space, leaving an air chamber between the partition and the outside wall.

Ice boxes of galvanized iron are placed at each end of the car. Two and a half tuns of ice last ten days. On the roof are placed two boxes of salt, one barrel of which lasts ten days. The ice boxes are filled from the top once every twenty-four hours. They are narrower at the bottom than at the top so that as the ice melts it falls down slowly, the water and condensed moisture passing through escapes made in the floor of the car. It is stated in the Detroit *Post* that strawberries have been kept sixty days in these cars; and other fruits and different kinds of meats are equally well preserved.

If this is the case there are few products raised in any part of the United States that need fail to find a market, however perishable they may be. We shall expect to see grapes, raised in California and brought over the Pacific railroad, for sale in the New York market this season.

Artificial Coloration of the Electric Spark.

Mr. E. Becquerel has shown that the electric spark may be diversely and beautifully colored by being made to pass through saline solutions. If an electrical spark from an inductive apparatus be made to pass into the extremity of a platinum wire suspended over the surface of the solution of a salt, this spark will acquire special coloration according to the chemical composition of the solution traversed. The saline solutions are best concentrated and the platinum wire positive. The experiment is readily performed in a glass tube.

Salts of strontia will color the spark red; chloride of sodium yellow; chloride of copper bluish green, etc.

The light from these sparks, analyzed by the spectroscope, furnishes a method for the determination of the nature of the salts contained in the solution.

Exhibition of the New York Skating Club.

Mr. J. L. Plimpton, patentee of a number of inventions on roller skates, flung open the doors of his magnificent skating parlors, corner Ninth street and Stuyvesant square, on Tuesday evening, to the New York Skating Association. The evening was sultry, but, regardless of the hot weather, a large number of ladies and gentlemen assembled, and vigorously exercised themselves around the large room during the evening. The idea of providing this kind of amusement for young people is a good one, and Mr. Plimpton, who is something of an enthusiast in this line, spares no pains to promote the comfort of his guests.

Production of Ozone for Industrial Purposes.

M. Beanes, as noted in the *Genie Industriel*, recently exhibited to his scientific friends an electrical apparatus for the production of ozone at a small cost, which has not received the attention it deserves. His apparatus consists in a condenser between the plates of which atmospheric air, the oxygen of which is to be ozonized, is made to pass. The electricity acts here by influence and directly. The gas, on leaving the machine acts energetically on india-rubber, turmeric, etc. It is suggested that this simple electrical ozonizer might probably be applied with profit to the bleaching of tissues, liquors, and other substances.

Enormous Belt.

There is now on exhibition at the warehouse of the New York Belting and Packing Company, 37 and 38 Park Row, a mammoth rubber belt which is quite a triumph in the way of American manufactures—being the largest ever made. It is 4 feet wide, 320 feet long, weighs 3,600 lbs, and is to be used as a main driving belt for the largest grain elevator in Chicago. To make a leather belt of this size the hides of 180 cattle would be required, and these would have to be selected from three or four thousand in order to get the necessary size and quality.

THE REPORT OF THE HON. ISAAC N. MORRIS ON THE PACIFIC RAILROAD.

The official report of the Hon. Isaac N. Morris, one of the Government Commissioners appointed, last March, to inspect that portion of the Pacific Railroad remaining unaccepted, has submitted a report, not at all reassuring as to the condition of the road. The portion of the road which was to be examined, extends a distance of eighty-six miles from what is called the "Thousand-mile Tree," to the eastern summit of the Promontory Range.

The report of Mr. Morris sets forth that the trestles are very frail and dangerous, so much so, that, on one occasion, the cars were detained twenty-four hours, while they were being braced. The width of the road at the grade line on the embankments is, in many places, no wider than the length of the ties, and, in some cases, even narrower, so that the ends of the ties project over the embankment.

Out of sixteen culverts, two only are of stone, the rest being of pine timber. The two stone culverts are partially built of sandstone so poor that it is even now crumbling to pieces, although only quarried last winter. It seems that large use of this worthless material has been made in the construction of the road. Mr. Morris says:

One culvert having sandstone abutments, west of Morgan City, had given way, and as a further evidence of the unreliability of such stone used upon the road, for they are evidently all about alike, I must introduce into my report, as germane, an extract from a letter I received from a gentleman in high official position, who traveled over the road with his family. The letter bears date April 26, 1869, and while it was intended for my eye alone, I think the Government is entitled to its benefit.

[Extract.]

"We had one or two narrow escapes on the Union Pacific Railroad. A bridge over Bitter Creek, just east of Green river, crumbled away under the train, precipitating the engine, tender, and express car into the creek, and the passenger car in which I was, was only saved by a stringer or beam of the bridge catching into the roof and holding it suspended about half over the brink. We had to crawl out the best we could. One passenger was killed, and several more or less injured. The conductor and engineer both prudently walked over first and then signaled the fireman to run us across. The bridge, as well as two others in the same vicinity, had been examined the day previous and pronounced unsafe, and the officers were notified of the fact. The unanimous opinion is that it was criminal to attempt to cross. The western portion of the road is *dangerous.*"

The writer is correct. The portion of the road he refers to, is the worst I ever traveled over, and decidedly dangerous. It is as well to state in this connection as anywhere else that a gentleman long and still identified with the road, and who passes over it daily in the discharge of his duty, stated that he never rode over the bridges, so-called, without holding his breath and drawing a long one of relief after he got over, that he considered them, especially the one at the Devil's Gate; as unsafe, and he would not ride across at all but to give confidence to passengers. Two tunnels are passed through, one 750 and one 260 feet long. These tunnels are not arched. They are cut through a sandstone formation, and are only wide enough for a single track—not a double one, as the standard of construction requires. With this exception, I think them safe. While I may be possibly somewhat at fault in the details I have given, I feel satisfied I am substantially correct. But, however important or unimportant these details may be, they cannot affect the great truths I shall now state:

First, the road is not, as the law requires, a "first-class road."

Second, it is not supplied with the necessary buildings.

Third, it has not safe and substantial bridges.

Fourth, the tunnels are not wide enough for a double track.

Fifth, the road bed at the grade line is not of a uniform width of fourteen feet, nor has it been properly leveled nor the rails lined.

Sixth, it would be extremely dangerous for heavy trains to pass over the western portion of the road.

Seventh, the ties in many instances have sunken, sometimes at one end and sometimes entirely, the dirt being washed from under them on the embankments. Miles upon miles of them were laid during the winter, while the frost was in the ground. The rails, consequently, have an uneven bearing, and in numerous instances are bent, and appear, as you look back upon them, like a succession of small waves. I saw, however, a number of men at several different points engaged in raising the ends of the ties and packing dirt under them, so as to even the track as far as that would do it.

Two considerations remain which I deem of more importance than others:

First, the road is not ballasted, nor is any part of it. True, hands have been employed in throwing a few shovels of such materials as the road-bed is composed, taken in all cases from the sides of the embankments where the road passes over them, between the ties. But this, I submit, is no compliance with a provision under the head of "ballasting" established by the board convened to fix upon a standard of construction. I again refer to that provision to be found with others in a former part of this report. It is certainly of the highest moment that the road through Salt Lake Valley, which passes mainly over an alkali land should be well ballasted with stone certainly not less than eight inches in thickness. Cross-ties are laid with great irregularity on the bed of the road. They appear, indeed, to have been pitched on, and the rails spiked to them wherever they fell, provided they did not fall too far apart. No attention appears to have been paid to regularity of distance between the ties, that varying from fifteen to twenty-six inches, the distance at the ends being rarely uniform. The material objection is, however, to the ties themselves. They are soft white pine on the road I examined, as well as on the Central Pacific, the first being obtained from the neighboring mountains and the latter from the Sierra Nevada. The board which fixed the standard of construction says of cross-ties: "Oak or other suitable timber should be used where it can be obtained with reasonable transportation. When such timber cannot be had for all the ties at reasonable cost, then the best the country affords may be adopted; but if it be cottonwood, or similar soft material, it must be Burnettized or Kyanized thoroughly so as to increase its durability. But in all cases the joint-tie should be of oak or other suitable timber the better to hold the spikes at their points."

The ties, as I have stated are all white pine, there being none of oak or other desirable wood used at the joints and none of them are Burnettized or Kyanized. Their average on the face, I should judge, from a number I measured, is about six and a half inches. Whether such ties were ever before used on any other road I am not advised. White pine will soon rot on the surface or in the ground; it is easily destroyed by heat or dampness, and consequently is affected by both the winter's snows and the summer's sun. Even in the dry latitude of Salt Lake it is not possible for it to last long.

I had no opportunity of weighing a rail, but have no question that they weigh 56 pounds to the yard. The iron is of American manufacture, and has the appearance of being a good article. The joints are braced by plates on each side of the rails, secured by four bolts with heads and nuts, two on each side of the joint, the bolts of course pass through the plates and rails.

It appears that the only thing praiseworthy about the portion of the road examined is the quality of the iron. The report is a damaging one, and confirms the doubts we have hitherto expressed in regard to the manner in which the work was being performed. The main object the Company seem to have had in view was to hasten the work forward to as rapid completion as possible, in order to receive the subsidies from the Government. The durability of the work appears to have been altogether a secondary consideration.

Mr. Morris also points out the danger that the Government lien may be altogether extinguished by foreclosure and sale under the mortgage bonds. We pointed out this danger some time ago. The Act of July 2, 1864, subordinates the Government lien to the mortgage bonds of the Company, and its extinguishment is, therefore, only a matter of adroit financial manipulation, requiring far less skill than many operations which were successfully manœuvered through the past year.

Notwithstanding the danger is plain, we have no confidence that adequate measures will be adopted to avert it, and patiently wait the final move in this stupendous confidence game.

Final Appeal in the Patent Office.

The late Commissioner decided, when in office, that under the act of 1861, the appeal fee, on an appeal from the decision of the Commissioner of Patents, in person, to one of the Judges of the District Court of the District of Columbia, was abolished. The present Commissioner reverses this decision, after submitting the point to the Attorney General and receiving his opinion thereon, and the fee of twenty-five dollars has now to be paid with the filing of the paper taking such appeal.

NEW PUBLICATIONS.

PAPERS FROM OVER THE WATER. A Series of Letters from Europe by Sinclair Tousey. Published by the American News Company. New York: 121 Nassau street.

The author of this book of 204 pages was a *companion du voyage* with us for about six months; our trip together extending through France, Spain, Italy, and Great Britain. The letters, however, include observations of a run through Switzerland, Germany, Holland, and Belgium. Mr. Tousey is the well-known President of the American News Company, and claims only to be a man of business, but he is a keen observer of men and things, and in his sketches he has taken notice of a great variety of "little things,' such as enter largely into the every-day life of the people, which a purely literary traveler would scarcely notice, and yet they are the things that make up the very spice of European life, and are so woven together as to form, not only an agreeable, but very instructive volume. We are able to bear testimony to the correct judgment which Mr. Tousey has formed respecting the manners and customs of the transatlantics.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Paris correspondent of the *American Traveler* says: "American institutions seem to flourish finely in Europe. The sewing machines, the rubber goods, the Remington rifles, etc., are all making fortunes for their owners and those who represent them here. Just now a new stock is being sold upon the Bourse and seems much sought after. It is a company of 4,000,000 francs, organized some little time ago, to work and extend the operations of the Works' Liquid Fuel Patents, as a general fuel for metallurgy and for steam generation. Its success seems to be well established, and the company prosperous.

The Chicago journals assert that iron can be manufactured in that city at very low rates. Lake Superior pig iron, it is asserted, can be procured at Chicago for $18 a tun, and Indiana coal for $2 a tun. From these facts, it is argued, that smelting furnaces should be established in Illinois and Indiana. The coal is reported to be free of sulphur and of good quality.

At a town meeting in Meriden, Conn., Conn., on Saturday afternoon, it was voted almost unanimously, to petition the legislature for the privilege of subscribing $100,000 of the stock, or loaning the credit of the town to that amount, toward building the Meriden and Cheshire Railroad.

At San Francisco, in a meeting between the Congressional Ways and Means Committee, and several Chinese capitalists, the latter complained of the injustice of California laws bearing on their countrymen, and advocated that the Government act so as to induce men of money in China to invest in this country.

The Australian wool growers, it is stated, have become alarmed at the competition from South America, where, it is reported, 70,000 000 sheep are shorn every year, and the exports of wool amount to 230.000,000 pounds.

It has been officially announced that the Pass a l'Outre channel of the Mississippi has been deepened by the Government steam dredge, *Essayers*, from 15 to 18 feet, and that a steam vessel of 17½ feet draft of water had passed over the bar.

The engines of the United States Steamer. *Nantasket*, are said to have been the first ever built at Portsmouth, N. H., and they are reported to be satisfactory in every respect.

Wilmington, N. C., is soon to have horse cars on the street railway now nearly completed. This is the first enterprise of the kind in that State.

The work of constructing the telegraph line from Boston to Duxbury, Mass., to connect with the new French cable, was begun on the 29th of June.

The land along the coast of Florida, from Indian River to Cape Sable, is considered to be very suitable for the cultivation of coffee.

The California State Fair will open in Sacramento on September 6th. The premiums offered amount to $20.000.

APPLICATIONS FOR EXTENSION OF PATENTS.

INTERLOCKING GRATE BARS.—Samuel Van Syckel, of Titusville, Pa., has petitioned for an extension of the above patent. Day of hearing, September 20, 1869.

PRODUCING MUSIC BY STEAM OR CONDENSED AIR.—J. C. Stoddard, of Worcester, Mass., has applied for an extension of the above patent. Day of hearing Sept. 20, 1869.

CHIMNEY STACK.—B. F. Miller, New York city, has petitioned for an extension of the above patent. Day of hearing September 13, 1869.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; beside, as sometimes happens, we may prefer to address correspondents by mail.

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

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

A. H. M., of Conn.—Your mode of testing belts is defective, as you do not take into account the diameter of the shaft to which the clamps are applied. We give elsewhere a rule for proportioning width of belts to horse-power.

C. H. C., of Iowa.—Byrne's Practical Metal Workers' Assistant, published by H. Carey Baird, Philadelphia, contains the information you require.

J. McD., of Ill.—Proto-phosphate of iron is thrown down as a white powder by adding a solution of phosphate of soda to photo-sulphate of iron. It will turn blue after a little. Perphosphate of iron is precipitated by adding phosphate of soda to persulphate of iron, as well as by several other methods.

F. R., of N. Y.—The discrepancy of which you speak is owing to the fact that the pressure in your boiler is far greater than the mean effective pressure in your cylinder or even the initial pressure. The gain from condensation only directly affects mean effective pressure in the cylinder; it does not directly affect the pressure in the boiler, or initial pressure, although of course, to do the same work when you condense, you do not need to carry much steam in the boiler.

O. R., of N. Y.—We think it would be hard to devise a worse boiler than the one of which you send us a diagram. We think it an unsafe and uneconomical plan, and should not expect it to give more than half the horse power of a properly constructed boiler. The number of square feet usually allotted to a boiler of a stationary engine where condensation is not employed is from ten to twelve feet according to the circumstances of the case.

H. B., of Ohio.—The tenacity of lead is much weakened by heating it to a temperature of 212 degrees, this will account for your pipe bursting when hot water was passed through, and withstanding the same pressure when cold water was forced through it. The expense of your advertisement will be $4 for each insertion outside, and $3 inside.

J. R. J., of R. I.—A common preparation for frosting glass to prevent the too direct action of the solar heat in green houses, etc, is a wash of whiting and glue water. It must not contain too much glue, as it is desired to wash off late in the season by the action of rain to compensate for the decrease in temperature.

C. F. P., of Ga.—We know of no cheap work specially treating of hydraulics, that is exhaustive. "The Power of Water," by Glynn, published by D. Van Nostrand, N. Y. will probably contain all you desire. You can raise water in the shorter leg of syphon as high as you can raise water in an atmospheric pump, no higher. Therefore the syphon you propose will not work.

C. D. R., of Ohio.—The scales and the white powder sent are identical in composition except that the scales have a little oxide of iron and organic matter in them. They are carbonate of lime with a little sulphate of lime. Its precipitation from the exhaust steam indicates that your boiler primes.

J. V., of Ala.—Lead may easily be detected in solution in several ways. Add sulphuric acid, a white precipitate of sulphate of lead is formed. Add hydro-sulphuric acid, a black precipitate of sulphide of lead is produced. Add solution of bichromate of potassa, and a brilliant yellow precipitate of chromate of lead is found. These three are the most ordinary and useful tests.

H. F. C., of Pa.—The plastic slate made by the Plastic Slate Roofing Company, of this city, makes a good blackboard surface to be used either with chalk or slate pencil. The "steam man" was in Newark, N. J., the last we heard of him. He is not a man we would repose a great deal of confidence in.

T. F. R., of Ohio.—The work you need is the "American Entomologist" published at Salem, Mass. You will find that more or less fading in the tints of bright-colored insects is inevitable in the cabinet.

P. O. M., of Mo.—The specimen of ore you send us is nothing but iron pyrites, bisulphide of iron. It is of no marketable or industrial value, if we except the fact that clays containing it are in some places made use of to manufacture alum.

H. C. S., of R. I.—The relative horse power of engines which is what we suppose you mean by size, cannot be estimated from the sizes of their cylinders alone.

A. S. G., of Conn.—You will not probably be able to restore the blue color of your pistol. The process is one requiring delicate manipulation.

J. D., of N. J.—The mineral sent us is hornblende. There is no silver in it.

W. F., of Pa.—Bourne is a standard authority on the steam-engine.

Inventions Patented in England by Americans.

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

PROVISIONAL PROTECTION FOR SIX MONTHS.

980.—PAPER PULP.—J. G. Holbrooke, New York city. March 31, 1869.

1,641.—MANUFACTURE OF WROUGHT IRON.—J. O. York, New York city. May 28, 1869.

1,719.—CRUCIBLES AND OTHER REFRACTORY ARTICLES.—J. L. Hall and J. V. Morgan, Montreal, Canada. June 3, 1869.

1,721.—MANUFACTURE OF IRON.—John Burt, Detroit, Mich. June 3, 1869.

1,726.—MACHINERY FOR THE MANUFACTURE OF WOOD-BORING INSTRUMENTS AND IN AUGER BITS.—W. A. Ives, New Haven, Conn. June 4, 1869.

1,740.—BRAKES FOR WHEELS.—William Loomis, Wilkes Barre, Pa. June 5, 1869.

1,762.—APPARATUS FOR FOLDING PRINTED SHEETS OF PAPER.—R. M. Hoe, New York city. June 7, 1869.

1,798.—METHOD OF CONVEYANCE AND TRANSPORTATION IN PNEUMATIC TUBES.—Albert Brisbane, New York city. June 10, 1869.

1,800.—EXPLOSIVE POWDER.—P. A Oliver. New York city. June 10, 1869.

1,797.—COVERING FOR FLOORS AND OTHER SURFACES.—S. H. Pearce, Boston, Mass. June 10, 1869.

1,824.—SUBMARINE CANNON OR MORTAR.—D. Fitzgerald, New York city. June 14, 1869.

1,849.—MACHINERY FOR PRODUCING A POLISHED SURFACE UPON SHEET IRON.—George Weeden, F. E. Garfield, J. W. Bliss, and Geo. W. Williams, Hartford, Conn. June 15, 1869.

Business and Personal.

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

Jonas Hinkley—"We sold 846 of your 'Family Knitters' last week." See advertisement on last page. Write to 176 Broadway.

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

A new 50-H. P. engine for sale for $800. C. Boynton, Lyons, Iowa.

A valuable patent for sale. For particulars inquire of, or address D. P. Keator & Co., Kingston, N. Y.

Wanted—a machine for making slate pencils. Address Mr. Felton, 17 Ledger Building, Philadelphia.

Patent, for sale cheap, of a velocipede propelled by a rocking chair. Suitable for children, invalids, or aged persons. Adjusted to any speed. Address T. Van Skelline, 247 Grand st., Brooklyn, E. D.

Dussauce's Great Treatise on the Manufacture of Soap, over 800 pages, 8vo., price $10. Published by Henry Carey Baird, Industrial Publisher, 406 Walnut st., Philadelphia. Sent free of postage. Send for the book, or a circular of contents.

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

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

Automatic Lathes, for spools and tassel molds, made by H. H. Frary, Jonesville, Vt.

Wanted—Large or small capital, to sell Walker's Ventilator protector from sun-stroke. Send 50c. for sample, pamphlet, and terms. J. B. Walker, Lexington, Va.

Mill-stone dressing diamond machine, simple, effective, durable Also, Glazier's diamonds. John Dickinson, 64 Nassau st., New York.

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

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

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

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

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

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

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

The Tanite Emery Wheel—see advertisement on inside page.

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

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

Diamond carbon, formed into wedge or other shapes for pointing and edging tools or cutters for drilling and working stone, etc. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

The paper that meets the eye of manufacturers throughout the United States—The Boston Bulletin. $4·00 a year. Adv'g 17c. a line.

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

Recent American and Foreign Patents.

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

MACHINE FOR UPSETTING TIRES, AXLE TREES, ETC.—Orlando Patee, Ypsilanti, Mich.—The object of this invention is to construct a machine for the purpose of upsetting tires, etc., which shall operate effectively and with greater convenience than any heretofore employed.

FEED GEAR FOR SAW MILLS.—Geo. L. McCahan, Baltimore, Md.—The object of this invention is to provide for public use, a more simple and perfectly operating feed gear for saw mills than any heretofore employed.

MACHINE PAPER FOLDER.—John Macnair, New York city.—The object of this invention is to provide for public use, a cheap and easily operated machine which will rapidly, neatly, and uniformly fold paper, or textile fabrics, and drop them,thus folded, into a suitable receptacle.

OXYGENATING FURNACE.—George Stamm, Pittsburgh, Pa.—The object of this invention is to increase the proportion of oxygen in the air that supports combustion in the furnace, and thereby to cause the gases to be consumed more thoroughly, and a greater intensity of heat to be produced than in ordinary furnaces.

COMBINED CORN PLANTER AND FERTILIZER.—G. W. Moy ers, Gordonsville, Va.—The object of this invention is to improve the construction of combined corn planters and fertilizers, in such a manner as to prevent their cracking the corn, and to distribute the fertilizer in a better manner than heretofore. In attaining this object an improved arrangement of the several parts of such a combined machine is also had.

HORSE HAY FORK.—B. F. Alexander, Glen Hope, Pa.—This invention relates to that class of forks, in which is employed a piercing instrument that slides upon a stock and operates in connection with a locking device, and with arms that are thrown out and drawn in by its movements. This improvement consists in the peculiar construction and arrangement of the operating parts, whereby the instrument is made stronger, less costly, and more convenient of operation than heretofore.

STEREOSCOPE.—John Francis Adams, New York city.—This invention relates to a new and important improvement in instruments used in viewing stereoscopic or photograph pictures, and consists mainly in the use of magnets for receiving and holding the picture in the proper position.]

CAR AXLE BOX.—Willis Davis, Elizabethport, N. J., and Crowell Macan, Rahway, N. J.—This invention relates to a new and useful improvement in car axle boxes, and consists in the novel method of securing the cap of the box.

STEAM GOVERNOR.—Charles A. Condé, Indianapolis, Ind.—This invention relates to a new and important improvement in governors for regulating the motion of steam engines.

VELOCIPEDE.—Lyman F. Hodge, Poughkeepsie, N. Y.—This invention relates to a new and useful improvement in velocipedes, having particular reference to the steering gear and the method of operating the brake.

METHOD OF RAISING WATER.—Christian H. Kock, Davenport, Iowa.—This invention relates to a new arrangement for elevating water from wells and cisterns.

COMBINED ANVIL AND VISE.—R. D. Chandler, Fairhaven, N. J.—This invention relates to a combination of two well-known articles, the blacksmith's anvil and iron vise.

POCKET STEREOSCOPE.—T. D. Simonton, St. Paul, Minn.—This invention relates to a new and useful improvement in stereoscopes, whereby they are made much more convenient and useful than they have hitherto been.

COMPRESSING DEVICE.—Tappey, Lumsden, and Steel, Petersburgh, Va.—This invention relates to a new and useful device, designed to facilitate the operation of packing tobacco.

AIR-HEATING FURNACE.—Peter H. Carman, Brooklyn, N. Y.—This invention relates to a new and useful improvement in furnaces for heating air for warming purposes.

SPOKE FASTENING.—H. N. Houghton, Brattleboro', Vt.—This invention relates to a new and useful method of repairing buggy, carriage, or wagon wheels, applicable where spokes are broken off at the felly for new wheels.

STOCK AND BALANCE INDICATOR.—Christopher Brunschwiler, New York city.—This invention relates to a new and improved method of showing or indicating the state of the account of those dealing in gold and stocks with brokers and bankers, and for all operations of a similar nature.

HANGING SLIDING DOORS.—A. J. Culver, White Hall, Ill.—This invention has for its object to furnish an improved device for hanging sliding doors upon cars, buildings, and other places, which shall be simple in construction and easily attached, and which will not require the lower part of the door to be provided with a guard or guide to keep the door in place.

TUCKER ATTACHMENT FOR SEWING MACHINES.—A. S. Dinsmore, New York city.—This invention has for its object to furnish an improved tucker for sewing machines, which shall be so constructed that it may be conveniently attached to and detached from the ordinary presser foot of a sewing machine, and which will enable narrow tucks to be conveniently and accurately formed.

FURLING GAFF TOPSAILS.—Capt. George A. Ford, Oswego, N. Y.—This invention has for its object to furnish an improvement in furling gaff topsails, and other triangular sails, which shall be constructed and arranged that the sails may be furled and unfurled from the deck quickly and conveniently even when a strong wind is blowing.

GATE.—N. Harrier, Muscatine, Iowa.—This invention has for its object to furnish an improved gate, which shall be so constructed and arranged that it may be opened and closed by the wheels of the passing vehicle.

AIR-ESCAPE FUNNEL.—Joseph I. Beaumont, St. Paul, Minn.—This invention has for its object to improve the construction of the improved air-escape funnel, patented by the same inventor, July 7th, 1868, and numbered 79,799, so as to make it simpler and cheaper in construction, and equally or more convenient in use.

CORN PLANTER.—George W. Bunker, St. Anthony, Minn.—This invention has for its object to improve the construction of corn planters, so as to make them more convenient and effective in operation, doing more and better work than the corn planters constructed in the ordinary manner.

COPPER WATER BOILERS.—A. C. Brownell, Brooklyn, N. Y.—This invention has for its object to furnish an improved water boiler, or distributing reservoir, which shall be simple in construction, strong, close, and durable.

CULTIVATOR.—Josiah Shepard, Newport, Me.—This invention has for its object to furnish an improved cultivator, which shall be so constructed and arranged that it may be readily adjusted for turning the soil towards or from the row of plants being cultivated, or to break down and level off ridges or rows of hills, or for digging potatoes.

PLOW.—Josiah Shepard, Newport, Me.—This invention has for its object to improve the construction of plows, so as to diminish the friction at the bottom and landside of the plow, and thus lessen the draft.

CORN, CANE, AND SEED HARVESTER.—John Poffenberger and Ira M. Poffenberger, Urbana, Ohio.—This invention has for its object to furnish a convenient and effective machine for cutting and shocking corn, cane, and hemp, which shall be so constructed and arranged as to do it work thoroughly and well.

RAILROAD CAR.—John M. McGehu, Milton, Fla.—This invention has for its object to furnish a simple and convenient car and track, designed especially for use in handling lumber, and similar uses, in places where ordinary roads are difficult of construction, and where ordinary railroads, if built, would be too expensive.

HAY FORK.—F. L. Morrison, New Albany, Ind.—This invention relates to a new hand hay fork, which is so constructed that it can be used to convey a load of hay from places where it is inconvenient to employ other conveying apparatus.

BED BOTTOM.—F. C. Hagen, Cuba, N. Y.—Thisi nvention relates to certain improvements in spring bed bottoms, whereby the same are made more durable and convenient and more easy to repair. The invention consists in arranging separate head and foot pieces at the ends of the mattress, so that they can be removed and changed at will.

HARNESS TUG OR TRACE SUPPORTER.—Clinton W. Terpening, Geneseo, Ill.—This invention relates to a new device for suspending the tugs or traces of the harness from the hip strap, so that the connection can be readily separated or re-established. The invention consists of the peculiar construction of the snap hook whereby an ornamental and convenient fastening device is produced.

MACHINE FOR TURNING AND SCRAPING GRINDSTONES.—P. Leonard, Sharon, Pa.—This invention relates to a new machine for holding the tool that is used for turning and scraping grindstones, and has for its object to make the said tool adjustable in every direction and position, to be adapted to grindstones of different sizes and kinds.

CHIMNEY TOP.—Henry Markthaler, Elizabeth, N. J.—This invention has for its object to provide an improved cap for smoke stacks, ventilators, or lamps of all kinds, whether used on buildings, locomotives, cars, or other devices, in such manner that free egress of the escaping air or gases is provided, while the ingress of wind through the top is successfully prevented.

DEVICE FOR OPENING CANS.—Wm. M. Bleakley, Verplanck, N. Y.—This invention relates to a new device for opening sheet metal cans of all sizes, and consists of a double-pointed swivel bar, secured in the end of a lever that carries the adjustable cutter. The two points of the swivel bar are forced through the cover of the can, and serve to hold the can fixed, while the lever is revolved to cut a circular hole.

ROPE, CORD, ETC.—Louis Gabriel Yon, Paris, France.—This invention relates to a new manner of making ropes and cables, so as to utilize the material to the best advantage.

POTATO DIGGER.—Wm. T. Andrews, Watson, N. Y.—This invention relates to a new potato digger which is made adjustable, to work to any desired depth, and which is provided with a self-acting vine-pulling attachment, whereby the operation of gathering the potatoes from the ground, is considerably facilitated. The invention consists chiefly in the application of two rotary vine-pulling cones which operate in front of the machine, above the digging implement of the same.

SLIME ORE CONCENTRATOR.—J. W. V. Rawlins, and Samuel Stephens, Houghton, Mich.—This invention consists in a peculiar arrangement of apparatus for spreading the slime upon a slowly revolving table, whereon the ore will be deposited while the water flows away, and from which the said ore is finally scraped off into a receptacle.

DINING TABLE.—John Simonsen, Hermon, N. Y.—The invention consists in the arrangement of an extension table, so that when extended it will assume the form of a portion of a circle, having a space at the axis thereof for the head of the family, permitting the other occupants to be disposed around the curved outer side at equal distances from the said central person.

CULTIVATOR.—Wm. Snook, Pleasant Plain, Iowa.—This invention relates to improvements in cultivators, designed more especially for cultivating corn, and adapted for cultivating on each side of a row simultaneously and to be operated by two horses.

APPARATUS FOR REDUCING ROTARY MOTION.—Adin Gauntt, Chagrin Falls, Ohio.—The invention consists of an arrangement of reducing gear, within the space inclosed, by a set of hollow conical pulleys having a fast motion, whereby a slow, unpowerful motion is imparted to a live spindle, as the spindle of a lathe, or other rotary shaft having the same axis of motion as that of the said pulleys, and adapted to disconnect the reducing gears and connect the said shaft or spindle directly to the pulleys, so as to move at the same speed that they do when required.

MANUFACTURE OF ENAMELED BRACELETS.—Abiel Codding, North Attleborough, Mass.—The object of this invention is to provide a more simple and inexpensive method of manufacturing a kind of bracelet called enameled bracelet.

MACHINE FOR DISTRIBUTING AND SETTING TYPE.—M. Umstadter, Norfolk, Va.—This invention relates to a new and improved machine for distributing and setting type; and it consists in a novel means employed for carrying the types to be distributed from the stick in which they are deposited to a series of chambers, from which they are taken to be set up. The invention also relates to certain means for adjusting or placing the types in proper position to be conveyed to the chambers above specified, and also in certain means for depositing the types in said chambers. The invention further relates to certain means for discharging the types from the type chambers upon a carrying device which conveys them to the receptacle from which they are adjusted in a proper stick. This part of the invention includes the "setting up," as it is technically termed.

STRAW CUTTER.—L. B. Hyatt, Flemington, Pa.—This invention relates to improvements in the construction of straw cutters. The object is to provide a more durable pivot joint for the hand vibrating cutter lever, also to prevent lateral play of the said lever on the pivot.

PLATFORM FOR SUBMARINE DRILLING.—John Cody, New York city.—This invention has for its object to furnish an improved adjustable platform designed especially for use in submarine drilling, but which may be used with equal advantage for other purposes, and which shall be so constructed that that it may be readily adjusted as required.

BURIAL CASE.—A. Crosby, Westfield, N. Y.—This invention relates to a new and useful improvement in the construction of leaden burial cases, and has for its object economy in the manufacture of the same, strength and lightness combined, facility in making the cases air-tight, and an improvement in the general appearance and finish of the same.

ROCK-DRILLING APPARATUS.—John Cody, New York city.—This invention has for its object to improve the construction of the improved drill, patented by the same inventor, April 5, 1864, and numbered 42,167, so as to make it more effective in operation and more convenient in use.

MACHINE FOR FORMING PAPER BOXES WITH FLANGED ENDS.—Joseph Spooner and Ebenezer Spooner, New York city.—This invention has for its object to furnish an improved machine for forming paper boxes with flanged ends, which shall be simple in construction and effective in operation, enabling the work to be done quickly, conveniently, and neatly.

HARROW.—Thomas B. Collins, Noank, Conn.—This invention has for its object to furnish an improved harrow, simple in construction, strong, and durable, which will adjust itself to irregularities of the surface of the ground, and which may be conveniently adjusted for transportation without its being necessary to load it upon a wagon, or other vehicle for that purpose.

SPRING-BED BOTTOM.—James Collins, Grand Rapids, Mich.—This invention has for its object to furnish a simple, strong, durable, and elastic bed bottom which shall not be liable to break or get out of order.

CULTIVATOR.—F. L. Perry, Canandaigua, N. Y.—This invention relates to a new and improved cultivator, of that class which is constructed with a view of being expanded and contracted to suit the width of the spaces between the rows of plants. The object of the invention is to obtain a cultivator of this class which will, in being expanded or contracted in width, automatically adjust the teeth, so that the latter will, at all times, or under any adjustment of the harrow, be in line with the draft, or all the teeth of the cultivator be in parallel planes. The invention has further for its object a means for regulating the depth of the penetration of the teeth into the earth.

SUSPENDER POCKET.—J. Summers, Winchester, Va.—The object of this invention is to provide for public use a neat and cheap pocket which can be attached between the suspenders and the waistband of the pantaloons, for the purpose of carrying the watch or other valuables, it being so constructed that it cannot be cut open, and cannot be detached or unbuttoned in any way without the owner being instantly aware of what has been done.

PLOW CLEANERS.—J. Miles and E. P. Miles, Pleasant Hill, Ohio.—This invention relates to improvements in plow-clearing devices, such as patented January 8, 1867, and numbered 61,083. The object being to make the apparatus therein described applicable for attachment, so as to be readily removed from one side to another of any plow, also for adjustment vertically.

LOCK.—A. Crosby, Westfield, N. Y.—This invention is designed as an improvement upon the ordinary padlock, whereby simplicity is obtained with security, and difficulty in picking or illegitimately opening the lock, while the interior of the same is protected from moisture, and prevented from being choked or clogged up with rust or ice during the winter season.

HARROW AND CULTIVATOR.—R. W. Cummings, McCutchansville, Ind.—This invention relates to improvements in apparatus for harrowing an cultivating corn, cotton, etc., planted in rows, whereby it is designed to provide a machine adapted for harrowing and cultivating at the same time on each side of a row, and which may also be readily adjusted for operation as a harrow alone.

CORN PLANTER.—S. Y. Orr, Morning Sun, Iowa.—This invention relates to a new and improved corn planter, of that class which is designed f planting in check rows; and it consists in a novel construction and arrangement of the same.

MEDICAL COMPOUND.—W. L. McCord, Abbeville C. H., S. C.—This invention relates to a new and useful medium for the cure of the colic in horses and other animals.

MOUSTACHE GUARD.—M. C. Heptinstall, Enfield, N. C.—The object of this invention is to provide moustache guards for drinking cups, capable of removal and attachment to any cup within certain ranges as to size, to which the said guards may be adapted.

PARASOL.—James Williams, New York city.—This invention relates to improvements in parasols, designed to provide an arrangement of the arms which support the cover and the braces, whereby the cover, when extended, will represent in form a flat disk with a conical central part. Also a reversible arrangement of the said cover, arms, and braces, whereby the conical part may be made to project upward or downward from the flat part. Also certain improvements in the springs for holding the runners; and also an arrangement whereby the cover may be folded towards either end of the stalk.

MILK COOLER.—R. D. Gardner, Watertown, N. Y.—This invention relates to improvements in apparatus for cooling milk, and consists of an arrangement of means for causing a circulation of the milk between two vats of cold water, or other cooling substance.

ALARM GUN.—M. C. Heptinstall, Enfield, N. C.—The object of this invention is to provide a simple and reliable alarm gun. It consists of a metallic cylinder having a bore in each end for holding the charge to be fired, the said bores running nearly to the center of the cylinder, where each is provided with a nipple and fuse hole, over which are spring hammers which are allowed to escape from the set position to strike the nipples, by the turning of a vertical pin having arms to which cords may be drawn in any position to be disturbed and cause the escape of the hammers by any person or thing approaching.

FAN ATTACHMENT FOR SEWING MACHINES.—Thomas A. Lyle, Pittsburgh, Pa.—This invention consists in combining with the needle arm of sewing machines, fans with clamping devices suited to the needle arm of any machine, and adapted to be readily detached when not wanted, or adjusted so as not to disturb the arm or act thereon to produce a current.

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91,811.—EXTENSION WAGON COUPLING.—John P. Allensworth, Mackinaw, Ill.
91,812.—LAMP-LIGHT EXTINGUISHER.—J. M. Aubrey, Portage City, Wis.
91,813.—MODE OF CONSTRUCTING ARCHITECTURAL ORNAMENTS OF SHEET METAL.—Herman Bacuerle, New York city.
91,814.—MACHINE FOR PREPARING BAR LEAD.—Harry J. Bailey, Pittsburgh, Pa.
91,815.—MACHINE FOR MAKING TIN-LINED LEAD PIPE.—Harry J. Bailey, Pittsburgh, Pa.
91,816.—FARM GATE.—James Baughman, Suffield township, Ohio.
91,817.—OAR LOCK.—Wm. E. Beman, Portland, Me.
91,818.—METALLIC CARTRIDGE.—Edward Mounier Boxer, Royal Arsenal, Woolwich, England. Patented in England, October 13, 1866.
91,819.—MACHINERY FOR RAISING AND LOWERING GOODS.—Wm. Bradbury, Newton, Mass.
91,820.—DOOR PLATE AND BELL ALARM.—Wm. G. Brady, Lowell, Mass.
91,821.—COAL STOVE.—Moses Breen, Troy, N. Y.
91,822.—MACHINE INDICATOR FOR CLOTH MANUFACTURING, ETC.—Wm. H. Brown, Lowell, Mass.
91,823.—EAVES-TROUGH ATTACHMENT.—Francis M. Buckles (assignor to himself and John A. Stuckey), Altoona, Ill.
91,824.—RAILROAD CAR HEATER.—De Witt C. Chipman, Noblesville, Ind.
91,825.—BOOT-BLACKING APPARATUS.—Henry Churchman, Horsham, England. Patented in England, August 6, 1868.
91,826.—SHINGLE MACHINE.—Walter R. Close (assignor to himself and Thomas N. Egery), Bangor, Me.
91,827.—SPEAKING TUBE SIGNAL.—James R. Creighton, Boston, Mass.
91,828.—SEWER.—Thomas Dark, Buffalo, N. Y.
91,829.—VELOCIPEDE.—J. G. Dillaha, Waco, Texas.
91,830.—DRESSING CASE.—H. W. Eastman, Baltimore, Md.
91,831.—HOLDBACK FOR THILL.—J. B. Eaton, Fryeburg, Me.
91,832.—ROCKING AND RECLINING CHAIR.—Jacob Edson, Boston, Mass.
91,833.—POCKET LAMP.—John Erpelding and Wm. E. Huttmann, Chicago, Ill. Antedated June 15, 1869.
91,834.—STEAM RADIATOR.—Hampton W. Evans, Philadelphia, Pa.
91,835.—WALL OR BRACKET CASTER.—Andrew J. Forbes and Wm. G. Fletcher, Boston, Mass.
91,836.—WINDOW PULLEY.—J. M. Ford, Brooklyn, N. Y.
91,837.—PUSHING JACK.—Alfred Freeman, Peoria, Ill.
91,838.—WRENCH.—Thomas Garrick, Providence, R. I.
91,839.—HOUSEHOLD IMPLEMENT.—Thomas Garrick, Providence, R. I.
91,840.—APPARATUS FOR TREATING AND AGEING SPIRITOUS LIQUORS.—George Goewey, Philadelphia, Pa.
91,841.—NUT MANDREL.—George A. Gray, Jr., Cincinnati, Ohio, assignor, by mesne assignment, to himself and Alexander Gordon.
91,842.—MACHINE FOR MAKING PAPER.—Richard C. Harris, Harrisville, N. J.
91,843.—INSTRUMENT FOR TESTING THE INFLAMMABILITY OF ILLUMINATING OILS.—Henry M. Hartshorn, Malden, Mass.
91,844.—MANUFACTURE OF BOOTS AND SHOES.—Gilbert Hawkes, Lynn, Mass.
91,845.—PROPELLER.—J. O. Heyworth, Chicago, Ill.
91,846.—TENONING MACHINE.—Levi S. Hicks, Peoria county, Ill.
91,847.—PLOW CULTIVATOR.—E. S. Huff, Zanesville, Ohio.
91,848.—MACHINE FOR KYANIZING WOOD.—David W. Hunt, San Francisco, Cal. Antedated June 22, 1869.
91,849.—PNEUMATIC DENTAL PLUGGER.—Edward A. Hyde, Ann Arbor, Mich.
91,850.—SUGAR SIFTER.—Gustavus A. Jasper, Charlestown, Mass.
91,851.—RESERVOIR COOKING STOVE.—Wm. H. Johnson, Troy, N. Y.
91,852.—BELLOWS FOR REED ORGANS.—Samuel H. Jones (assignor to S. D. and H. W. Smith), Boston, Mass.
91,853.—CANT HOOK.—Wm. P. Kilgore, Hampden, Me.
91,854.—MODE OF HITCHING HORSES.—John L. Kreider, Dru-more township Pa.
91,855.—DEODORIZING APPARATUS FOR WATER CLOSETS.—Peter S. Luther (assignor to the Earth Closet Company), Hartford, Conn.
91,856.—MACHINE FOR RE-PRESSING BRICKS.—Henry Maurer, New York city.
91,857.—COAL STOVE.—Oscar F. Mayhew, Indianapolis, Ind. Antedated June 17, 1869.
91,858.—HORSE RAKE.—Robert W. McClelland, Springfield, Ill.
91,859.—CARRIAGE WHEEL.—Robert W. McClelland, Springfield, Ill.
91,860.—GRAIN BINDER.—J. M. McMaster, Rochester, N. Y.
91,861.—WOOD PAVEMENT.—Alexander Miller, Chicago, Ill.
91,862.—FLUX FOR SMELTING ORES OF GOLD, SILVER, AND OTHER METALS.—Charles W. Moore, San Francisco, Cal.
91,863.—SELF-OILING CAR WHEEL.—Wm. Owen, Hubbard, Ohio, assignor to himself, Daniel B. Stambaugh, same place, and Daniel Smith, Girard, Ohio.
91,864.—ORDNANCE.—William Palliser, Pall Mall, England. Patented in England, December 10, 1867.
91,865.—COMBINED LATCH AND LOCK.—Herman G. Pein, Peoria, Ill.
91,866.—MACHINE FOR REMOVING LINT FROM COTTON SEED.—William F. Pratt (assignor to E. Carver Company), East Bridgewater, Mass.
91,867.—SEED SOWER.—George H. Reister, Washington, Iowa. Antedated June 15, 1869.
91,868.—WIND WHEEL.—G. H. Reister, Washington, Iowa.
91,869.—STEAM GENERATOR.—W. K. Rhodes, Portland, Me.
91,870.—MANUFACTURE OF ROASTED COFFEE.—Edward E. Rinehart, Pittsburgh, Pa.
91,871.—MEANS FOR ATTACHING COVERS TO GLASS JARS.—Daniel C. Ripley, Pittsburgh, Pa.
91,872.—SHINGLE MACHINE.—Adam C. Ritz, Elizabethtown, and John B. Carter, Heartsville, Ind.
91,873.—CASTER.—T. L. Rivers, St. Louis, Mo. Antedated June 22, 1869.
91,874.—SULKY CORN PLANTER AND PLOW COMBINED.—Rezin Robins and Albert S. Robins, Dundas, Ill.
91,875.—COOKING STOVE.—J. J. Savage, Troy, N. Y.
91,876.—CULTIVATOR.—Alexander Shaw, Monmouth, Ill.
91,877.—RAILWAY RAIL SPLICE.—W. S. Shoemaker, Towson, town, Md., and E. H. Shoemaker, Lancaster, Ohio.
91,878.—AMALGAMATOR.—George Stevens, San Francisco, Cal.
91,879.—COFFEE BOILER.—W. H. Stewart and J. H. Tilley, Orion, Wis.
91,880.—COTTON SEED HULLER.—John D. Stillman, Memphis, Tenn.
91,881.—DEVICE FOR FEEDING SWINE.—Nathan Stockwell, Windsor, N. Y.
91,882.—TWEER.—Peter Sweeny, New York city.
91,883.—COMPOUND FOR EXTINGUISHING FIRES.—Eli Thayer, New York city, assignor to Paul P. Todd, Boston, Mass. Antedated June 11, 1869.
91,884.—PACKING CASE FOR BOTTLES AND JARS.—William Thompson, Dublin, Ireland. Patented in England, November 19, 1868.
91,885.—BEE HIVE.—David G. Watt, Lawrence, Kansas.
91,886.—MEDICAL COMPOUND.—William Weber, Cincinnati, Ohio.
91,887.—HOG TRAP.—Charles B. Weeks (assignor to himself and F. H. Ferris), Galesburg, Ill.
91,888.—REED FOR LOOMS.—Benjamin F. Whitcomb, Claremont, N. H.
91,889.—METAL-CORRUGATING MACHINE.—James B. Williams, Glastenbury, assignor to the Hartford Sorghum Machine Company, Hartford, Conn.
91,890.—EVAPORATING PAN.—J. B. Williams, Glastenbury, assignor to the Hartford Sorghum Machine Co., Hartford, Conn.
91,891.—MACHINE FOR WINDING THREAD, ETC.—Henry Willis and Geo. Rice, Worcester, England.
91,892.—COMBINED TRY SQUARE AND BEVEL.—Chas. Winterbottom (assignor to W. S. Winterbottom), Philadelphia, Pa.
91,893.—RAILWAY SLEEPER.—E. H. Woodsum and F. H. Whitman, Harrison, Me.; said Woodsum assigns his right to said Whitman.
91,894.—CULTIVATOR.—J. A. Woodward, S. S. Woodward, and Thos. Mason, Sandwich, Ill.
91,895.—SCRUBBING AND MOPPING MACHINE.—Wm. Zierath and C. J. Smith, Sheboygan, Wis.
91,896.—VELOCIPEDE.—A. M. Allen, New York city.
91,897.—POTATO DIGGER.—Wm. Andrews, Watson, N. Y.
91,898.—EMBROIDERING ATTACHM'T FOR SEWING MACHINES.—W. B. Bartram, Danbury, Conn. Antedated June 17, 1869.
91,899.—FUNNEL.—J. I. Beaumont, St. Paul, Minn.
91,900.—SCROLL-SAWING MACHINE.—James M. Blackstock, Tarentum, Pa.
91,901.—APPARATUS FOR THE MANUFACTURE OF PIG BLOOM.—T. S. Blair, Pittsburgh, Pa.
91,902.—CAN OPENER.—W. M. Bleakley, Verplank, N. Y.
91,903.—CONSTRUCTION OF SHEET METAL BOILERS.—A. C. Brownell, Brooklyn, N. Y.
91,904.—CORN PLANTER.—G. W. Bunker, St. Anthony, Minn., assignor to himself and David Thayer, Boston, Mass.
91,905.—COMMERCIAL ACCOUNT INDICATOR.—Christopher Brunschwiler, New York city.
91,906.—BUTTON.—L. L. Burdon, Providence, R. I.
91,907.—BROOM.—Marshall Burnett, Boston, Mass.
91,908.—AIR-HEATING FURNACE.—Peter H. Carman, Brooklyn, N. Y.
91,909.—ANVIL AND VISE COMBINED.—R. D. Chandler, Fairhaven, N. J.
91,910.—LATHE.—C. S. Clark, Providence, R. I.
91,911.—PLATFORM FOR SUBMARINE DRILLING.—John Cody, New York city.
91,912.—ROCK-DRILLING APPARATUS.—John Cody, New York city.
91,913.—SPRING-BED BOTTOM.—James Collins, Grand Rapids, Mich.
91,914.—HARROW.—T. B. Collins, Noank, Conn.
91,915.—STEAM-ENGINE GOVERNOR.—C. A. Conde, Indianapolis, Ind.
91,916.—HANGING SLIDING DOOR.—A. J. Culver, White Hall, Ill.
91,917.—HARROW AND CULTIVATOR COMBINED.—W. R. Cummings, McCutchanville, Ind.
91,918.—FENCE.—P. Davis, Newport News, Va.
91,919.—RAILWAY CAR AXLE BOX.—Willis Davis, Elizabethport, and Crowell Macan, Rahway, N. J.
91,920.—BOOT AND SHOE STRETCHER.—J. L. Devol, Parkersburg, West Va.
91,921.—IRONING TABLE AND CLOTHES DRYER.—J. L. Devol, Parkersburg, W. Va.
91,922.—TUCKING ATTACHMENT FOR SEWING MACHINES.—A. S. Dinsmore, New York city.
91,923.—CURTAIN FIXTURE.—Le Grand Dodge, Syracuse, N. Y.
91,924.—WATER FILTER.—A. T. Dunshee, Pittsburgh, Pa.
91,925.—COMBINED GRAIN DRILL, SEED SOWER, AND CORN PLANTER.—David Evans, Newton, Iowa.
91,926.—CAR WHEEL.—H. B. Fernald, Dedham, Mass. Antedated June 19, 1869.
91,927.—FURLING GAFF TOPSAILS.—G. A. Ford, Oswego, N. Y.
91,928.—MILK COOLER.—R. D. Gardner, Watertown, N. Y.
91,929.—APPARATUS FOR CHANGING SPEED IN MACHINERY.—Adin Gauntt, Chagrin Falls, Ohio.
91,930.—LATHE.—Myron Gore, Shelby, Mich.
91,931.—BED BOTTOM.—F. C. Hagen, Cuba, N. Y.
91,932.—GATE.—Nathaniel Harrier, Muscatine, Iowa.
91,933.—LAMP.—E. K. Haynes (assignor to William Carleton), Boston, Mass.
91,934.—LAMP EXTINGUISHER.—M. C. Heptinstall, Enfield, N. C.
91,935.—ALARM GUN.—M. C. Heptinstall, Enfield, N. C.
91,936.—MOUSTACHE GUARD.—M. C. Heptinstall, Enfield, N. C.
91,937.—VELOCIPEDE.—L. F. Hodge, Poughkeepsie, N. Y.
91,938.—SPOKE FASTENER.—H. N. Houghton, Brattleborough, Vt.
91,939.—STRAW CUTTER.—L. B. Hyatt, Flemington, Pa.
91,940.—HEATING DRUM.—Thomas Jefferis, Council Bluffs, Iowa.
91,941.—WAGON BRAKE.—W. K. Johnston (assignor to himself, Edith R. Wynkoop, and Daniel Zimmerman), Cordova, Ill.
91,942.—APPARATUS FOR OPERATING CHURNS.—H. J. Klingenberg and J. J. Mau, Davenport, Iowa.
91,943.—WATER ELEVATOR.—Christian Henry Kock, Davenport, Iowa.
91,944.—MACHINE FOR TURNING AND SCRAPING GRINDSTONES.—Philip Leonard, Sharon, Pa.
91,945.—SASH HOLDER.—B. B. Lewis, New York city.
91,946.—MOLD FOR GLASS FROM GAS CARBON OR GRAPHITE.—Jean Baptiste Lhote, Paris, France, assignor to Sewell H. Fessenden, Boston, Mass.
91,947.—DUST DEFLECTOR FOR RAILROAD CARS.—J. P. O. Lownsdale, Portland, Oregon.
91,948.—PAPER-FOLDING MACHINE.—John Macnair, New York city.
91,949.—STEAM GENERATOR GRATE BAR.—James Mahoney, Newport, R. I.
91,950.—CHIMNEY TOP.—Henry Markthaler, Elizabeth, N. J.
91,951.—TILE MACHINE.—Samuel Mattix and Jas. McPherson, Clinton county, Ind.
91,952.—SHINGLE MACHINE.—Benjamin F. Mayhew, Carmel, Me.
91,953.—DISTILLATION OF HYDROCARBON OILS.—Francis McCarty, Smith's Ferry, Pa.
91,954.—MEDICAL COMPOUND.—W. L. McCord, Abbeville, S. C.
91,955.—SELF-CLOSING TELEGRAPH KEY.—J. H. McElroy, Warwick, N. Y.
91,956.—RAILWAY CAR TRUCK.—John M. McGehu, Milton, Florida.
91,957.—PLOW CLEANER.—J. Miles and E. P. Miles, Pleasant Hill, Ohio.
91,958.—PORTABLE STRAINING PRESS.—Stephen Moore and Homer Rogers, Sudbury, Mass.
91,959.—HAY FORK.—F. L. Morrison, New Albany, Ind.
91,960.—SIRUP-HOLDER FOR SODA FOUNTAIN.—A. J. Morse, Boston, Mass.
91,961.—CORN PLANTER.—S. Y. Orr (assignor to himself and J. M. Virgin), Morning Sun, Iowa. Antedated June 22, 1869.
91,962.—MODE OF UTILIZING TIN-PLATE CUTTINGS IN THE MANUFACTURE OF IRON AND STEEL.—D. D. Parmlee, New York city.
91,963.—CULTIVATOR.—F. L. Perry, Canandaigua, N. Y.
91,964.—CORN HARVESTER.—John Poffenberger and I. M. Poffenberger, Urbana, Ohio.
91,965.—MACHINE FOR FORMING THREADS ON SCREWS.—T. T. Prosser, Chicago, Ill.
91,966.—ORE CONCENTRATOR.—J. W. V. Rowlins and Samuel Stephens, Houghton, Mich.
91,967.—CLOTHES BOILER.—J. H. Rickett, West Dover, Vt.
91,968.—COOKING STOVE.—Francis Ritchie, Troy, assignor to S. S. Jewett, Buffalo, N. Y. Antedated June 15, 1869.
91,969.—FOLDING OPERA GLASS.—Joseph Saxton, Washington, D. C.
91,970.—BRAIDING MACHINE.—Socrates Scholfield, Providence, R. I.
91,971.—MACHINE FOR CUTTING VERMICELLI.—Gottlied Schwarzwalder, Pittsburgh, Pa.
91,972.—PLOW.—Josiah Shepard, Newport, Me.
91,973.—CULTIVATOR.—Josiah Shepard, Newport, Me.
91,974.—EXTENSION TABLE.—John Simensen (assignor to himself and Otis Earl), Hermon, N. Y.
91,975.—POCKET STEREOSCOPE.—T. D. Simonton, St. Paul, Minn.
91,976.—POCKET STEREOSCOPE.—T. D. Simonton, St. Paul, Minn.
91,977.—HARROW.—Valentin Sippel, Niagara City, N. Y.
91,978.—DOOR HOLDER.—Otto Sliker, Lincoln, Ill.
91,979.—EXTENSION TRESTLE.—Otto Sliker, Lincoln, Ill.
91,980.—PIPE FOR WATER, GAS, ETC.—B. F. Smith, New Orleans, La.
91,981.—CULTIVATOR.—Wm. Snook, Pleasant Plain, Iowa.
91,982.—COMPOSITION FOR COVERING STEAM GENERATOR.—F. H. Snyder, Jersey City, N. J.
91,983.—PAPER-BOX MACHINE.—Joseph Spooner and Ebenezer Spooner, New York city.
91,984.—ATTACHMENT FOR COMB.—Geo. Stackhouse, Mount Washington, Pa.
91,985.—TOBACCO PRESS.—W. H. Tappey, W. C. Lumsden, and Alex. Steel, Petersburgh, Va.
91,986.—HARNESS TUG OR TRACE SUPPORTER.—C. W. Tepening, Geneseo, Ill.
91,987.—AXLE.—H. W. Tilton, Walpole, Mass.
91,988.—TYPE-SETTING AND DISTRIBUTING MACHINE.—M. Umstadter, Norfolk, Va.
91,989.—FLUID METER.—J. B. Van Deusen, New York city.
91,990.—WOOD PLANE.—Paul Vicellio, New Orleans, La.
91,991.—FLUID METER.—Franz Wagner (assignor to himself and Joseph Metzner), New York city.
91,992.—COOKING STOVE.—J. B. Wilkinson, Troy, N. Y.
91,993.—COOKING STOVE.—J. B. Wilkinson, Troy, N. Y.
91,994.—REVERSIBLE PARASOL.—James Williams, New York city.
91,995.—ROPE, CORD, ETC.—L. G. Yon, Paris, France.
91,996.—HORSESHOE.—A. A. York, De Lancey, N. Y.
91,997.—STEREOSCOPE INSTRUMENT.—John F. Adams, New York city.
91,998.—HORSE HAY FORK.—B. F. Alexander, Glen Hope, Pa.
91,999.—GRATE FOR STEAM GENERATOR AND OTHER FURNACES.—B. T. Babbitt, New York city.
92,000.—STEAM GENERATOR.—B. T. Babbitt, New York city.
92,001.—COMBINED SEED SOWER, HARROW, AND ROLLER.—E. A. Barton, Boonville, Ind.
92,002.—STUMP EXTRACTOR.—Isidore Bezenah, St. Martins, Ohio.
92,003.—FUEL.—Ira Bicknell, Cincinnati, Ohio.
92,004.—MANUFACTURE OF STEARIC ACID.—F. C. A. Bock, Copenhagen, Denmark.
92,005.—ROCK DRILL.—N. P. Bradish, Jerseyville, Ill. Antedated June 18, 1869.
92,006.—APPARATUS FOR COLLECTING THE WASTE GASES OF SMELTING FURNACES.—Barnerd Branon and G. H. Baldwin, Sharon, Pa.
92,007.—REGULATOR FOR GAS BURNER.—Jos. S. Bromhead, Peckham, England. Patented in England, July 23, 1868.
92,008.—BROILER.—W. F. Browne, New York city.
92,009.—PROCESS OF ROASTING AURIFEROUS SULPHURETS.—Wm. Bruckner, Central, Colorado Ter.
92,010.—ANIMAL TRAP.—D. R. Bruton, Thomasville, N. C.
92,011.—HARNESS TUG BUCKLE.—G. H. Buckius (assignor to himself, C. Aultman, A. C. Tonner, and P. S. Sowers), Canton, Ohio.
92,012.—WINDOW SHADE FIXTURE.—A. H. Burgess, Philadelphia, Pa.
92,013.—BREECH-LOADER.—Bethel Burton, Brooklyn, N. Y.
92,014.—ROCK DRILL.—G. F. Case, New York city.
92,015.—SODA FOUNTAIN.—J. W. Chapman, Madison, Ind.
92,016.—GANG PLOW.—Luke Chapman (assignor to himself and Collins Company), Collinsville, Conn.
92,017.—WATER WHEEL.—Gardner Cox, Pierrepont, N. Y.
92,018.—BEEHIVE.—Joseph Croner, Cross Creek Village, Pa.
92,019.—GANG PLOW.—F. R. Crothers, Sparta, Ill.
92,020.—STENCH TRAP.—J. F. Dacey, Charlestown, Mass.
92,021.—RAILWAY RAIL SPLICE.—Geo. E. Dering, Lockleys near Welwyn, England. Patented in England, Nov. 23, 1860.
92,022.—PLASTERING TROWEL.—J. C. Dietrich and Charles I. Humphrey, Rochester, N. Y.
92,023.—FRUIT CAN LABEL.—John Dunlap, Pittsburgh, Pa.
92,024.—POTATO DIGGER.—Robert Dunlap, 1st, South Lyons, Mich.
92,025.—WAGON BRAKE.—David Eaton, Rochester, Vt.
92,026.—MAT AND SCRAPER.—Wesley Farrington, Morrisania, N. Y.
92,027.—PROCESS OF PREPARING WOOD FOR PAPER STOCK.—Albert Fickett (assignor to himself and C. T. Moore), Rochester, N. Y.
92,028.—STENCILING APPARATUS.—T. E. Fields, Louisville Ky.
92,029.—SPRAY DAMPENER.—R. R. Foote, Chicago, Ill.
92,030.—WINDMILL.—F. J. Forsyth, Au Sable, Mich.
92,031.—ARTIFICIAL LEG.—J. A. Foster, Detroit, Mich.
92,032.—COPYING PRESS.—Joseph Fowler, Saugatuck, Mich.
92,033.—SUBMARINE FOUNDATION.—W. H. Foye, San Francisco, Cal.
92,034.—SCRUBBING TOOL.—Joseph Frey and Wendel Ederle, Battle Creek, Mich.
92,035.—APPARATUS FOR SLAUGHTERING AND CURING MEAT.—G. W. Fulton, Fulton, Texas.
92,036.—CARRIAGE SEAT.—John Gale and M. B. Ames, Lawrence, Mass.
92,037.—SHOE-PEGGING MACHINE.—A. C. Gallahue, Riverdale, N. Y.
92,038.—SMUT MACHINE.—Jacob Getz (assignor to himself and Samuel Wilson), Buffalo, N. Y.
92,039.—STOVEPIPE SHELF.—C. M. Granis, Morrisville, N. Y.
92,040.—MACHINE FOR PREPARING CLAY FOR BRICK MAKING.—W. N. Graves (assignor to himself and E. C. Sterling, St. Louis Mo.
92,041.—LATHE.—O. M. Grimes, Newark, N. J.
92,042.—SELF-ADJUSTING EQUALIZER FOR PLOWS, ETC.—J. T. Hagerty, Camp Point, Ill.
92,043.—COAL STOVE.—Wm. Hailes, Albany, N. Y.
92,044.—VELOCIPEDE.—H. F. T. Hale, East Saginaw, Mich.
92,045.—RAILWAY RAIL AND SPLICE.—Jos. Hall and Daniel Hall, Chicago, Ill.
92,046.—FARM GATE.—Calvin Hart, Farmington, Ill.
92,047.—DOOR LATCH.—C. F. Herrick, Independence, Iowa.
92,048.—BREECH-LOADING FIREARM.—M. J. Hinden, Detroit, Mich.
92,049.—FIRE-PLACE GRATE.—G. W. Hinman, Paducah, Ky
92,050.—PRINTING PRESS.—R. M. Hoe and S. D. Tucker New York city.
92,051.—STEAM ENGINE GOVERNOR.—W. H. Howland, San Francisco, Cal.
92,052.—STEAM ENGINE VALVE.—W. H. Howland, San Francisco, Cal.
92,053.—LAMP BRACKET.—T. A. Hunter and John Blewitt, New York city.
92,054.—FLUX FOR MANUFACTURING STEEL.—Jacob Jameson, Philadelphia, Pa.

92,055.—Cooking Stove.—B. F. Johnson, Troy, N. Y.
92,056.—Corn Sheller.—John Jordan, Red Wing, Minn.
92,057.—Hydraulic Press.—Agur Judson and S. A. Farrington, Newark, N. J.
92,058.—Harvester Rake.—W. W. Kingsbury, Kalamazoo, Mich.
92,059.—Brick Machine.—Joseph Klinkhardt, St. Louis, Mo.
92,060.—Shovel Handle Tops.—S. M. Knapp and Joseph Switter, Massillon, Ohio.
92,061.—Grain Separator and Scourer.—W. C. Knox, Jacksonville, Ill.
92,062.—Draw Bar.—Wenzel Kotzum, Aurora, Ind.
92,063.—Lantern.—Thomas Langston, Brooklyn, N. Y.
92,064.—Lantern.—Thomas Langston, Brooklyn, N. Y.
92,065.—Compound to be Used in the Cure of Rheumatism.—Reuben Lighthall, Brooklyn, N. Y.
92,066.—Electro-Magnetic Motor.—L. T. Lindsey, Jackson, Tenn.
92,067.—Water Elevator.—Zephaniah Lockwood, Saratoga Springs, N. Y.
92,068.—Sewing Machine.—Daniel Macpherson, Edinburgh, North Britain.
92,069.—Railroad Platform Scale.—Wm. Maguire (assignor to himself and F. B. Loney), Baltimore, Md.
92,070.—Flour Bolt Feeder.—John Mallin, Chicago, Ill.
92,071.—Harrow.—M. R. Marcell (assignor to himself and Hiram Culver), Dansville, N. Y.
92,072.—Thrashing Machine.—I. W. Martin, Goodville, Pa.
92,073.—Cockle-Separating Machine.—F. W. Mase, Waukau Wis.
92,074.—Bed-Bottom.—Abel Matson, Blockville, N. Y.
92,075.—Bedstead and Sofa or Chair.—J. S. McCurdy (assignor to G. L. and J. B. Kelty and Company), New York city.
92,076.—Saw Swage.—John McDonald, Portville, N. Y.
92,077.—Fertilizing Compound.—Edward N. McKimm and H. W. Bender, Benderville, Pa.
92,078.—Speed Indicator for Vessels.—H. Metcalf, Washington, D. C.
92,079.—Skating Shoe.—C. F. W. Meyer, Oconomowoc, Wis.
92,080.—Saw.—Edward Miall, Jr., London, England.
92,081.—Carriage Axle.—J. H. Moffett, Reading, Mich.
92,082.—Fluid Meter.—Chas. Moore, New York city.
92,083.—Weighing Apparatus.—Thos. Morrison, Cincinnati, Ohio.
92,084.—Corn Planter.—G. W. Moyers, Gordonsville, Va.
92,085.—Instrument for Relieving Choke and Bloat in Cattle.—N. Q. Munger, Casco, and G. B. Pomeroy, South Haven, Mich.
92,086.—Medical Compound.—Wm. B. Myers, Frenchtown, N. J.
92,087.—Turbine Water Wheel.—Jas. Newman, Portland, Mich.
92,088.—Hoisting Machine.—J. S. Park, Montondon, Pa.
92,089.—Machine for Upsetting Tires, Axle-Trees, etc.—Orlando Patee, Ypsilanti, Mich.
92,090.—Coffee Roaster.—Jas. B. Peake and Jas. A. Lusby, Washington, D. C. Antedated June 19, 1869.
92,091.—Mechanism for Converting Motion.—E. S. Pierce, (assignor to the National Screw Company), Hartford, Conn.
92,092.—Elevator.—H. G. Porter, Grand Rapids, Mich.
92,093.—Carriage Spring.—Benj. F. Power, Morgan county, Ohio.
92,094.—Curtain Fixture.—R. B. Prindle, Norwich, N. Y.
92,095.—Enameled Bell.—Francois Raymond, Woodhaven, N. Y.
92,096.—Device to Operate the Tilting Floors of Malt Kilns.—J. C. Rhodes, Chicago, Ill.
92,097.—Railway-Car Brake.—J. W. Rice, Springfield, Mass.
92,098.—Process of Treating Vegetable Fibers.—E. T. Rice, New York city.
92,099.—Gang Plow.—Wm. B. Rice, Oakland, Oregon.
92,100.—Pruning Knife.—Wm. Richard, Clyde, Ohio.
92,101.—Tobacco Cutter.—T. M. Richardson, Stockton, Me.
92,102.—Combined Drawer Pull and Label.—C. H. Robinson, Greenwich, N. Y.
92,103.—Corn Sheller.—J. M. Ross, Linden Hall, Pa.
92,104.—Railway Car Brake.—E. S. Scripture, Brooklyn, N. Y., and John H. Darragh, Aurora, Ill.
92,105.—Manufacture of Vapor Gas.—C. A. Seely, New York city. Antedated April 10, 1869.
92,106.—Hand Carriage.—D. S. Shanabrook, Greencastle, Pa.
92,107.—Medicine or Cordial.—John Shapley and A. D. Hutchinson, Rosefield, Ill.
92,108.—Core Bar for Molds used in Casting Metal.—Fred. Shickle, St. Louis, Mo.
92,109.—Stovepipe Shelf and Sadiron Holder.—Henry Shirey and J. M. Furman, Fond Du Lac, Wis.
92,110.—Apparatus for Measuring Fluids.—E. G. Shortt, Carthage, N. Y.
92,111.—Telegraph Insulator.—W. Edgar Simonds, Hartford, Conn.
92,112.—Bottle Washing Machine.—N. H. Sirrelle, Baltimore, Md., assignor to Martin Burnell and Wm. Tasell Tasell.
92,113.—Fruit Dryer.—A. J. Smith, Decorah, Iowa.
92,114.—Stovepipe Drum.—C. D. F. Smith, Geneva, Ill.
92,115.—Safety Stove for Railroad Cars.—C. J. Smith, Norfolk, Va.
92,116.—Combined Cleat and Capstan.—Diton Snedeker, Lockport, N. Y.
92,117.—Hot-Air Engine.—Lars A. L. Soderstrom, Paris, France.
92,118.—Fence.—Frank F. Sommer, Detroit, Mich.
92,119.—Stovepipe Shelf.—R. H. Springsteed, Vandalia, Mich.
92,120.—Oxygenating Furnace.—Geo. Stamm, Pittsburgh, Pa.
92,121.—Hub for Carriage Wheels.—S. T. F. Sterick, Washington, D. C.
92,122.—Hay Spreader.—Joshua C. Stoddard, Worcester, Mass.
92,123.—Safety Pocket for Attachment to Suspenders.—J. Summers, Winchester, Va.
92,124.—Sawing Machine.—J. P. Summers, Tiffin, Ohio.
92,125.—Folding Chair.—Gregor Trinks, New York city.
92,126.—Railway Car Coupling.—Jas. Turnbull, Edinburgh, Scotland.
92,127.—Neck Yoke.—R. Voris, Oneida, Ill., assignor to the Western Neck-Yoke Company.
92,128.—Steam-Engine Slide-Balance Valve.—J. F. Wallace, Birmingham, Pa.
92,129.—Breech-Loader.—W. G. Ward, New York city.
92,130.—Door Bolt.—A. F. Warren, Brooklyn, N. Y.
92,131.—Lubricator.—G. Waters, Cincinnati, Ohio.
92,132.—Velocipede.—Fred. Westphal (assignor to himself J. V. R. Spencer, and Alex. Beakes), Jersey City, N. J.
92,133.—Folding Chair.—C. A. Wiedemann, New York city.
92,134.—Machine for Bending Tubes.—M. G. Wilder (assignor to N. F. Griswold and G. F. Searles), West Meriden, Conn.
92,135.—Sulky Cultivator.—Nathanial Wilson, St. Louis, Mich.
92,136.—Manufacture of Metallic Cartridge Cases.—D. Williamson, New York city.
92,137.—Advertising Device.—R. F. Rankin, Columbus, Ohio.

REISSUES.

56,345.—Corset Spring.—Dated July 17, 1866; reissue 2,929, dated May 12, 1868; reissue 3,520.—F. L. Barnes, New York city, Administratrix of the estate of Samuel H. Barnes, deceased.
15,354.—Mowing Machine.—Dated July 15, 1856; reissue 3,521.—Division B.—E. M. Fowler, Bay City, Mich., assignee of J. W. Thompson.
22,232.—Horse Rake.—Dated Dec. 7, 1858; reissue 3,522.—Christian Garver, Middletown, Pa.
28,482.—Coal Stove.—Dated May 29, 1860; reissue 1,506, dated June 30, 1863; reissue 2,459, dated January 15, 1867; reissue 3,523.—Joseph C. Henderson, Albany, N. Y.
17,779.—Harvester.—Dated July 14, 1857; reissue 3,524.—Division A.—J. P. Manny, Rockford, Ill.
17,779.—Harvester.—Dated July 14, 1857; reissue 3,525.—Division B.—J. P. Manny, Rockford, Ill.
17,779.—Harvester.—Dated July 14, 1857; reissue 3,526.—Division C.—J. P. Manny, Rockford, Ill.
65,826.—Device for Unloading Grain Cars.—Dated June 18, 1867; reissue 3,527.—I. H. Palmer, Lodi, Wis.
79,870.—Water Wheel Regulator.—Dated July 14, 1868; reissue 3,528.—H. D. Snow, Bennington, Vt.
38,521.—Utilizing Waste of Puddling Furnaces, etc., in Generating Steam.—Dated May 12, 1863; reissue 3,529.—James Watt, Charlestown, Mass., and Henry Childs, Buffalo, N. Y., assignees of Jas. Watt.

DESIGNS.

3,556.—Croquet Mallet.—A. C. Bullock, North Providence, R. I.
3,557.—Paper Collar.—C. A. Brown, Troy, N. Y.
3,558.—Trade Mark.—H. D. Dickinson, G. P. Kinney, and M. F. Wilson, Painesville, Ohio.
3,559.—Paper Collar.—Franklin Field, Troy, N. Y.
3,560.—Medallion.—Wm. Miller, Philadelphia, Pa.
3,561.—Trade Mark.—C. L. Morehouse, Cleveland, Ohio.
3,562.—Terret Ring.—C. H. Thornton, Newark, N. J.
3,563.—Cooks' Stove.—N. S. Vedder and Francis Ritchie, Troy, N. Y., assignors to Greer and King, Dayton, Ohio.
3,564.—Frame of a Fireplace.—Alex. Wemyss (assignor to David Stuart and Richard Peterson), Philadelphia, Pa.
3,565.—Stove-Door Bracket.—Alex. Wemyss (assignor to David Stuart and Richard Peterson), Philadelphia, Pa.
3,566.—Show Case.—Gerhard Winter, New York city.

EXTENSIONS.

Bridle Winkers.—Wm. Boyd and Wm. F. Boyd, of Mansfield, Mass.—Letters Patent No. 13,119, dated June 26, 1855.
Method of Securing Cutters to Rotary Disks.—Jonah Newton, of New York city.—Letters Patent No. 13,096, dated June 19, 1855; reissue No. 2,738, dated August 13, 1867.

How to Get Patents Extended.

Patents granted in 1855 can be extended, for seven years, under the genera law, but it is requisite that the petition for extension should be filed with the Commissioner of Patents, at least ninety days before the date on which the patent expires. Many patents are now allowed to expire which could be made profitable under an extended term. Applications for extensions can only be made by the patentee, or, in the event of his death, by his legal representative. Parties interested in patents about to expire, can obtain all necessary instructions how to proceed, free of charge, by writing to
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