Scientific American.

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

Vol. XIII---No. 21. (NEW SERIES.) | NEW YORK, NOVEMBER 18, 1865. | $3 PER ANNUM IN ADVANCE

Improved Chronometer Governor and Balanced Throttle.

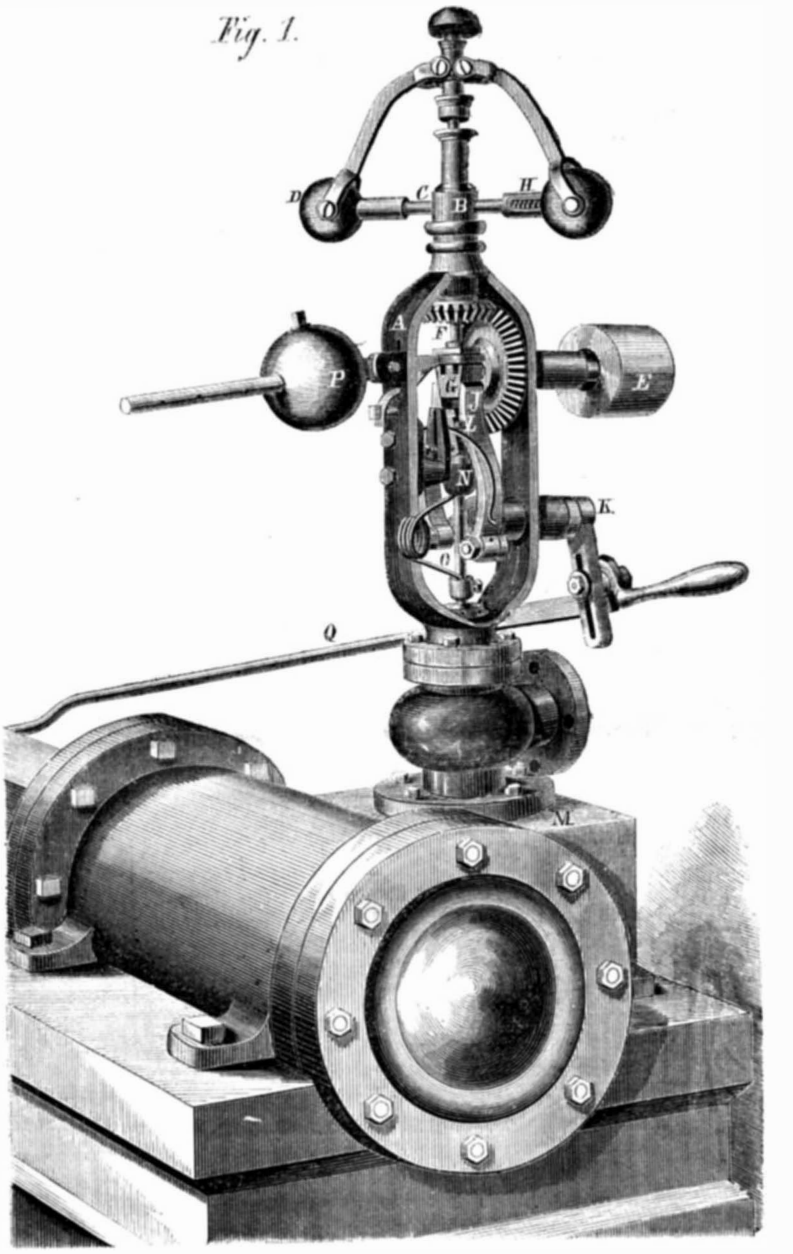
In this engraving we have a view of a new governor, designed by Mr. John Tremper, of Philadelphia, and intended to economize fuel, keep the engine under perfect control, render any speed attainable at a moment's notice, and thereby improve the value of the steam engine as an economical motor.

It is notorious that of all good servants steam engines are the hardest used. They are not only badly designed, built, and run, but they are placed in all sorts of exposed situations, and neglected so much, in various ways, that it is no wonder that it takes 12 pounds of coal to produce a horse-power on an average, when one-sixth of that amount ought to suffice.

This mechanism governs the engine by cutting off the steam at the point required to do the work. It admits just as much steam at every stroke of the piston as may be required, and in that way maintains a constant and regular action.

In the engraving, A represents a frame carrying an upright spindle, B, in which the arms of the governor are fixed.

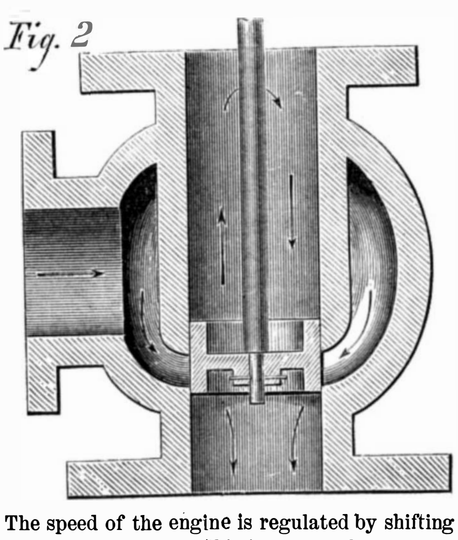
This governor is peculiar in construction, as can be seen at a glance. The balls, D, are fitted to the arms, C, and slide thereon, the arms being revolved by the bevel gears and pulley, E. When revolved, the balls fly out, and in doing so depress the stem, F, which connects to the wedge, G, for a purpose described below. Any fluctuation in the speed of the engine, whether above or below that the governor is set to, is, therefore, instantly corrected by the movement of the balls, they being thrown out by centrifugal force, and returned to their positions by the centripetal action of the springs shown in the broken-out portion of the shank, H.



TREMPER'S CHRONOMETER GOVERNOR AND BALANCED THROTTLE.

When the wedge before alluded to is depressed it acts on two jaws, J, which are connected to a rock shaft, K. These arms have steel bars, L, let into them which catch on the head of the valve stem and raise it, as clearly shown by the engraving. The arms receive motion from the rock shaft before mentioned, and are, therefore, raised vertically, carrying the valve stem and valve with them, until they strike the wedge, G, up which they continue to rise until the valve below is released from them, when it falls and shuts off the steam in the steam chest, M; from this chest it goes to the cylinder through the valve, as usual.

The throttle valve is shown in Fig. 2, and it will be seen that it has no seat, and that consequently there is no jar or concussion at every stroke, as in some machines. The valve is stopped, so that it shuts at the right place by a bracket, N. The socket on the head of the valve stem brings up on a cork facing in this bracket. The spring, O, is to seat the valve quickly. As it is a balanced valve, it needs some aid of this kind to shut quickly and prevent wiredrawing the steam.



The speed of the engine is regulated by shifting the ball, P, on the lever. This increases the labor on the balls by adding to the weight to be overcome by the centrifugal force, so that the engine runs faster to make the force greater. The cut-off valve is operated by an eccentric on the shaft, and a rod, Q, as shown.

The governor will act just as well without this weight, and it is only applied where a variable speed is required. At whatever velocity it is set to give, the governor will maintain it regularly for all time. The cut-off jaws, being attached below the center of the rock shaft, have a tendency to fall in toward the valve-stem socket, so that they always hold well without any danger of slipping, and the hard-steel edge in both the jaws and socket enable them to wear a long time. The engine can be stopped from any part of the building, if necessary, and the governor can be applied to any engine, new or old.

It is stated that hundreds are now in use in Philadelphia and vicinity, and giving entire satisfaction. We are of opinion that the governor will effect a saving in fuel on engines without cut-offs, and that it will act properly when well taken care of.

It was patented through the Scientific American Patent Agency by John Tremper, of Philadelphia. Address him at No. 316 North Third street, Philadelphia, or E. Weston, agent, Vulcan Foundery, Buffalo, N. Y.

The Manufacture of Paper.

A substitute for rags in the manufacture of paper has been discovered by M. Caminade, for which he has obtained a patent. According to M. Caminade, the root of the lucern plant when dried and beaten shows thousands of very white fibers, which form an excellent paste for paper makers, and may be substituted with great advantage for rags. The pulp, beside the thread for paper, produces salt of soda and a coloring matter called by the inventor luzerine. It is calculated that France produces annually 75,000,000 kilogrammes of paper, of which one-seventh is exported, leaving not more than two kilogrammes for each inhabitant. It is consequently inferred that the production of paper would increase considerably were it not for the scarcity of the raw material. M. Gratiot, a good authority on the subject, states that it requires one pound and a quarter of rags to make one pound of paper, and that rags are eagerly sought after by every nation where paper is manufactured. This warm competition makes rags scarce and dear. Those who possess this article store it up in order to obtain a higher price, well aware that the quantity is limited. French economists express their conviction that, according as instruction becomes developed among the mass of the population, the 75,000,000 kilogrammes of paper at present produced will not be sufficient for the home consumption. It consequently becomes a matter of necessity to find a substitute for rags

Men working at the treadmill perform work equivalent to ascending half a mile per hour.

NOTES ON NEW DISCOVERIES AND NEW APPLICATIONS OF SCIENCE.

SAVING SULPHUR FROM SULPHURETS.

In last week's "Notes" we estimated the value of the sulphur dissipated in the Swansea "copper smoke" at a quarter of a million sterling per annum. We based this estimate on the calculation made by Leplay, which is quoted in the first volume of Dr. Percy's "Metallurgy." Mr. Peter Spence, of the Pendleton Alum Works—the largest alum works in the world, we believe—has put forth, however, a much higher estimate of the value of the sulphur in the copper smoke. The quantity of copper ores smelted weekly at Swansea is about 5,000 tuns, and the proportion of sulphur in them averages from 24 to 28 per cent. "This," says Mr. Spence, "is equivalent to 3,300 tuns of brown oil of vitriol, and this weight I would undertake to produce therefrom. The present value of this weekly quantity is £9,900," which is at the rate of £514,800, or more than half a million sterling per annum. Mr. Spence proceeds, "this quantity of acid would meet the requirements of our staple chemical manufactures, or nearly so; while these manufactures have never been so pressed for a supply of sulphur ores as now. Spain, Portugal, Germany, Belgium, Norway, and even Iceland are being ransacked, but have so far failed to yield them in sufficient quantity. Shall this dearth on the one hand, and needless waste on the other, continue?" There is certainly no good reason why it should.

Mr. Spence invented about four years ago a "Copper Ore-calcining Furnace," which has, over M. Gerstenhofer's furnace, which we described last week, the great advantage, besids several others, of not requiring that the ores calcined in it should first be ground. This furnace Mr. Spence has had in constant work for the last three years—all the sulphuric acid which he has used during that period, whether at his works at Pendleton or at those at Goole, having been produced by its agency. It is of considerable length, measuring about fifty feet from end to end, and consists of two chambers, one above the other, separated by a thin partition of fire-brick. The fireplace is at one end of the lower chamber, the other end of which communicates with the chimney, and the products of combustion are confined to that chamber. It is in the upper chamber—between which and the lower chamber no communication exists—that the ores are calcined. In each side of this upper or ore-chamber are six apertures, placed at equal distances apart, and ordinarily closed by suitable doors. These apertures are for the purpose of enabling the workmen to move the ores gradually from one end of the furnace to the other. At one end of the ore-chamber is an opening through which a current of air is forced continuously while the furnace is in action; the other end communicates with a sulphuric acid chamber. In commencing working, a batch of ore, usually about ten hundred weight, is introduced through the pair of doors which are furthest from the fireplace, and so at the coolest part of the furnace, for, by reason of its length, and of the position of the fireplace, the furnace is very much hotter, of course, at one end than at the other. Having been spread evenly on the floor of the upper chamber, this first batch of ore is then allowed to remain undisturbed for two hours. At the end of that time it is raked eight feet forward, and a second batch of raw ore is introduced into the place the first has thus been removed from. At the end of the second two hours the first batch is moved a further eight feet forward, and the second batch is also moved eight feet, making room for a third batch; and so the process goes on continually. At the end of twelve hours the first batch is withdrawn, and thereafter a batch is withdrawn, as well as a batch introduced, every two hours. The action of the furnace is thus unintermittent, and it calcines about six tuns of ore every twenty-four hours. The ores, as they pass from one end of the furnace to the other, are exposed to a gradually increasing temperature, whereby clotting is entirely prevented, and under the influence of the heat to which they are thus gradually subjected the sulphur in them combines with the oxygen of the current of air which is passed over them, to form sulphurous acid, which is afterward converted into sulphuric acid, in the usual way. The cost of calcination by his furnace, Mr. Spence states to be only 2s. 1½d. per statute tun of ore, which is less than the cost of calcination by the furnaces at present in use, while for every five tuns of ore calcined in Mr. Spence's furnace £9 worth of sulphuric acid is obtained, at a cost of not more than £1, from constituents of the ore, which the ordinary furnaces turn to no account whatever. Whether M. Gerstenhofer's furnace will prove capable of yielding better results than Mr. Spence has thus for the last three years been obtaining from his, may be fairly doubted. Be that as it may, we really seem at last to have reached the beginning of the end of the enormous waste which has so long been going on at Swansea of a substance which is quite as important to the chemical arts as iron is to the mechanical ones.

THE MOST FUSIBLE ALLOY.

The most fusible alloy at present in use is a compound of two parts by weight of bismuth with one of lead and one of tin. It is called "fusible metal" *par excellence*, by reason of its melting at so low a temperature as 93·75° Centigrade. Dr. C. R. von Hauer has found, however, that by the addition of cadmium to alloys of bismuth with lead and tin, compounds may be produced which will fuse at a lower temperature still. An alloy of four equivalents of cadmium, with five equivalents each of lead, tin, and bismuth is quite liquid, he states, at 65·5° Centigrade. In parts by weight this alloy would consist of cadmium 224, lead 517·5, tin 295, and bismuth 1,050. An alloy of three equivalents of cadmium with four each of tin, lead, and bismuth fuses at 67·5° Centigrade, and an alloy of one equivalent of cadmium with two equivalents each of these three other metals at 68·5° Centigrade, which is also the fusing point of an alloy of one equivalent each of all the four metals. Dr. von Hauer made these alloys by fusing their ingredients in a covered porcelain crucible at the lowest practicable temperature. Their melting points were determined—under hot water, and also by placing a thermometer in the fused mass, without water—after they had been melted and cooled several times. They all become pasty at low temperatures than those given above; the temperatures quoted are those at which the alloys are perfectly fluid. It should be added that, unfortunately, all these alloys very rapidly oxidize when placed in water.

INDIUM.

Profs. C. Winkler and Schrotter, who are the only chemists, other than its discoverers, MM. Reich and Richter, who have yet experimented on that latest discovery and as yet least known of all the elements, have each recently published some new researches on indium. Winkler finds the atomic weight of that metal to be 35·918, instead of 37·07, which Reich and Richter estimated it at. Schrotter states that the magnificent blue line in the spectrum of indium, from which the metal derives its name, does not coincide with any of the dark lines in the solar spectrum, and hence deduces the conclusion that this element does not exist in the atmosphere of the sun. Both Winkler and Schrotter agree with the discoverers as to the physical characteristics of the metal, which seems to closely resemble cadmium in color and luster, but to be softer than cadmium, marking paper easily. The streak produced by it on paper is bright, with a very slight shade of gray. Reich and Richter believe that indium was not preceptible by sulphureted hydrogen, but Schrotter finds that gas will precipitate it from any solution which is sufficiently dilute and not too acid. The precipitated sulphide cannot be distinguished, as regards color, from sulphide of cadmium. Indium seems, indeed, to bear in all respects a very close likeness to cadmium.

REDUCTION OF POTASSIUM BY ALUMINUM.

According to the "Zeitschrift fur Chemie und Pharmacie," Beketoff has found that potassium may be reduced by means of aluminum more readily than by any other agent yet tried. If we had cheap aluminum, therefore, it would enable us to cheapen potassium; but, of course, aluminum will never be used on any extensive scale for the reduction of potassium so long as aluminum has itself to be obtained by means of sodium. The potassium compound best adapted for reduction by aluminum is the hydrate.

REAL RUBIES MADE ARTIFICIALLY.

Many chemists have endeavored to produce artificial diamonds, but hitherto with invariable insuccess. Most of the other gems, however, have been produced artificially, the artificial stones having exactly the same composition and properties as the natural ones. Rubies have till now been the most difficult gems to produce artificially, but MM. Ste. Claire Deville, Caron, and Troost have just communicated to the Academy of Sciences a method by which they can be made with ease. A mixture of fluoride of aluminum with a small quantity of fluoride of chromium is placed in an earthen crucible which has first been carefully lined with calcined alumina, after the fashion in which it is customary to line crucibles with charcoal. In the center of this crucible, in the midst of the mixture of fluorides, is placed a small platinum crucible containing boracic acid. The outer crucible having been well covered, the whole is exposed to a temperature sufficiently high to volatilize both the boracic acid and the fluorides. The vapor of the boracic acid then decomposes that of the fluorides, with formation of fluoride of boron and deposition of crystals of the mixed oxides of aluminum and chromium. If the fluorides were originally mixed in the right proportions, these crystals will have exactly the same composition, and exactly the same color, luster, specific gravity, and other properties, as the most perfect natural rubies.—*Mechanics' Magazine.*

Strength of Iron.

A very extensive and interesting test of the relative strength of iron has just been completed, as will appear by the subjoined report, at the gunboat yard of Messrs. Snowdons & Mason, South Pittsburgh, under the immediate supervision of Jos. S. Kirk, general manager of that establishment. The object of the test has been to determine the strength of the cylindrical boilers of different diameters and thicknesses of iron; the best method of riveting; proper size of rivets, and space between them to produce the greatest strength:—

MESSRS. LYON, SHORB & CO.—*Gentlemen:*—Agreeable to your request, the four boilers marked "A," "B," "C," and D," I submitted to a hydraulic pressure, with a view of testing their relative strength. The gages used in these experiments were two,—one of the celebrated manufacture of Schæffer and Budenberg Buckau, Madgeburg, Germany, with a range of 66⅔ atmospheres; the other, Ashcroft's make, of 40 atmospheres; water used at a temperature of ninety (90) degrees.

Boilers "A," and "B," were not ruptured, owing to a disproportion between the size of rivets, diameter and thickness of iron, resulting in a general leak through the entire length, at the rivets and calking: four blows with an eighteen-pound sledge, applied under the greatest pressure, produced no material effect.

Boilers "C" and "D," were ruptured by tearing out through the center of outside course of rivets, in the direction of the length, for a space of about eighteen inches. The following table will furnish you with such detailed information as it is hoped will be satisfactory.

Respectfully yours, JOSEPH S. KIRK.

Pittsburgh, Oct. 25, 1865.

	A	B	C	D
Brands of Iron	Sligo.	Sligo.	Sligo.	Tyrone.
	Inch.	Inch.	Inch.	Inch.
Inside Diameter	50	48	36¼	36¼
Length	73	73	67	67
Thickness of Iron	⅜	5-16	¼	¼
Size of Rivets	⅝	⅝	⅝	⅝
Rivets staggered and centered on	1⅝	1⅝	1⅝	1⅝
Space between center of rivets in parallel lines	1⅛	1⅛	1⅛	1⅛
Rivets in parallel lines centered on	2 5-16	2 5-16	2 5-16	2 5-16
	lbs.	lbs.	lbs.	lbs.
Pressure per square inch	383	438	583	502
Tensile strength of iron per sq. inch force as applied in boilers	80,246	105,722	132,842	114,386

A Boat Propelled by a Pump.

Nearly a year ago a dreadful accident occurred in Glasgow Harbor. About six o'clock on a dark winter evening the Clyde-street Ferry (a small open boat, pulled by one man with a pair of oars) with upward of thirty souls, was swamped by the waves of a passing steamer while crossing the stream, and the whole of the passengers were precipitated into the river, whereby twenty of them were drowned. Immediately after the accident the whole affair was carefully investigated by the Clyde trustees. Various schemes and remedies for the prevention of such another catastrophe were proposed by themselves, and laid before them by others, when, after due consideration, it was determined to try a steam ferry as an experiment, and, if successful, have a number of boats built and put upon the principal stations. Messrs. Hedderwick & Co., shipbuilders, of Govan, were entrusted with the construction of the hull, while the engines and a novel mode of propulsion were to be furnished by Messrs. Howden & Co., engineers, Scotland street, Glasgow. Last week the first boat was finished and launched, and the following is a description of the craft:—She is an open boat, 30 feet long by 12 feet broad, and draws about 2 feet 6 inches of water; both ends of the boat are alike; or, in other words, she has two bows. She is nearly flat-bottomed, and, although after the trial they affixed a keel, they have since cut the first greater portion of it off, finding it superfluous. The floor of the boat is about the water level, and between the bottom and the floor are tight-water compartments. The first intention was to have small ports or scuppers pierced through the sides flush with the floor, to carry off any accumulated water in the boat; but, as she draws rather more water than was at first expected, this object has been frustrated. A light hand-rail runs round the gunwale, open at both bows, for the ingress and egress of passengers. The engine and boiler are placed about the center of the boat, in such a position that the passengers can freely walk round about them. The boiler is an upright cylindrical one, with one furnace; it is neatly incased in wood, with brass hoops, and the funnel has an external covering of brass, polished. The boat is propelled by means of a pump worked by the engine in any direction required. The following is the manner in which this is accomplished: Underneath each of the four quarters of the boat there is an aperture or tube open to, and always submerged in, the water in connection with the pump, but these waterways are not parallel to, or straight fore and aft the vessel, but run at a considerable angle from the pump in the center of the boat to the port or starboard side, as the case may be; thus we have four pipes in connection with the pump diverging from the center of the boat in the form of a St. Andrew cross, their apertures all open to the water. The pump is fitted with suitable valves, so that the water can be admitted by any of the apertures and expelled by the others. It will now be easily understood that by arranging the valves to allow the water to flow into the pump by the two stern apertures, for instance, when the pump is set in motion the water will be expelled with force through the two apertures at the bow, which will cause the boat to move stern first, and *vice versa*. Thus, without a helm, the boat can be propelled either backward or forward, broadside on, or made to revolve on its axis, simply by shifting the valves; its rate of speed is about five miles per hour. It has not yet been put on any station, as the trustees wish the ferryman to gain experience how to work it before carrying passengers, but it is expected it will be quicker, more easily steered and managed, and safer than the present laborious system of pulling with oars.—*London Engineer.*

[What a roundabout way this is? Why not put in a screw at once? pumps, valves, and pipes are much more liable to get out of order, and more costly to keep in repair than a propeller would be, to say nothing of the hull of the boat being pierced full of holes below the water line.—Eds.

THE "ST. JOHN" BOILER EXPLOSION.

The public has reason to congratulate itself we think, on the manner in which disasters are examined into of late, and the determination evinced to get at the root of the trouble. "Died by visitation of God" used to be a common verdict with coroners' juries, anxious to be relieved from an unpleasant duty, and "nobody to blame," has not been so long out of fashion but that we can recall many instances of it.

The boiler explosion on the steamer *Arrow* was rigidly investigated, and the cause disclosed. The boilers were old, worn out, and unfit for duty, and the proprietors of the boat were indicted for manslaughter. In the recent explosion on the steamer *St. John*, whereby many persons lost their lives, the boilers were entirely new, and were perfectly sound, except in one place, and that place was where they gave way, as the appended examinations of the principal witnesses will show:—

Capt. Peck, on being examined, said :—I am Captain of the *St. John*, and have been one for many years ; I have not had charge of an engine, neither am I acquainted with the management of them.

After some other particulars not essential to the point, a juror said:—

Did you notice any mark on the boiler where the fracture took place? A.—Yes, sir.
Q.—Was it a cut with a chisel? A.—Yes, sir.
Q.—Do you think that cut was made by the calker in chipping the sheet? A.—I think it might have been so made.
Q.—Do you think that cut weakened the boiler? A.—I think it did weaken it some.
Q. Was not the line of the fracture directly along the cut or chisel mark? A.—Yes, sir.
Q. Do you think that mark was, in any way, a damage, or that it caused the disaster? A.—I think it was the principal cause.

The first assistant, Joel Wright, was then examined, and testified that the boiler had plenty of water at the time of the accident. Some firemen were also examined as to the general conduct of affairs in the engineering department of the boat, and the Chief Engineer was also examined, and corroborated the testimony of the Captain—that the sheet tore along the line of the chisel cut before mentioned.

THE GOVERNMENT INSPECTOR AND HIS MAGNIFYING GLASS.

Mr. J. W. Hopper was the next witness. He testified that he was inspector of boilers and steamers ; examined the boilers of the *St. John* after they were placed in the boat, and found they were properly braced and safe. [The witness then described the mode by which boilers are tested.]

Question by Mr. Fox—How were you appointed Inspector? A.—The Secretary of the Treasury appointed me.

Q.—What is necessary to be appointed? A.—I was nominated for the office by a Government committee appointed for the purpose, consisting of Hiram Barney, Ex-Collector, Mr. Thomas B. Stillman, and a Judge of the United States Circuit Court ; they recommended me for the office, and the Secretary of the Treasury appointed me

Q.—Were you examined as to your fitness for the office by them? A.—No ; I was employed before that as an engineer on a revenue steamer.

Q. Did you run the engine on the steamer? A.—No, my assistants did ; it is usual for them to do so.

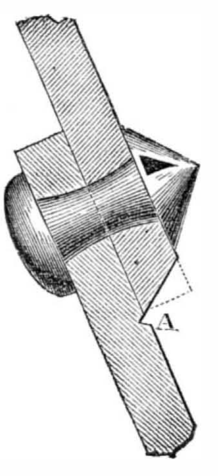
[The witness then testified that Mr. Secor's boilers were braced in the same way as the boilers of the *St. John*.]

Question by Mr. Fox—You say you made a very careful examination of the boilers of the *St. John* after they were placed in the boat—did you see a chisel cut on it? A. No, I did not ; I examined it with a magnifying glass, and did not see a chisel cut on it.

Here Mr. Fox took the piece of the boiler with the chisel cut on it, and exhibited it to the witness, remarking—"You say you failed to discover this chisel cut with a magnifying glass, which I observed several feet off. How is that?"

[The witness made no answer, but subsequently gave it as his opinion that the explosion was caused by a bad plate of iron. He then left the stand.]

As many of our readers do not know the nature of this technicality, we give herewith a diagram representing it.



When two sheets of boiler iron are lapped to form a joint, the outside sheet is chipped off on the edge, as shown by the dotted lines, and afterward calked or riveted tight on the edge. The tool used is an ordinary flat chisel, made thin and sharp, and unless common care is used by the work man the lower corner of the chisel will rest on the lower sheet and cut a slight channel all the way along, as shown at A. This chisel mark is that alluded to by the witnesses above mentioned.

If any person reading this article has ever had a pair of boots cut in the upper by the carelessness of the shoemaker in paring off the sole, he will know the nature of this damage done by the chisel. Since the skin of the iron is the strongest part of it, it follows that the plate is weakened to that extent by being so cut. In view of the fact that the rent followed the line of this chisel mark, it does not seem difficult to account for the accident.

The makers of the boiler, no doubt, took every precaution against disaster—it is unreasonable to suppose otherwise. Men who make boilers do it for money, and a desire to build up a reputation, not to have them explode. Moreover, as these boilers were built by the pound, and not by contract, every additional sixteenth of thickness in the plate was just so much in their pockets.

We have always endeavored to get at the real cause of these disasters, and are wary of the theories which are so volubly uttered on all such occasions.

It will be found in most cases that honest examination into boiler explosions will reveal the cause, whether it be bad workmanship, flaws in the material, or neglect. The true way is to try and find some mechanical or other defect—not to mislead engineers and the public into supposing that, in spite of all the care in building or running steam boilers there is some mysterious agency which will defeat all their efforts at any moment.

The jury returned the following

VERDICT.

The jury found that, at the time of the explosion, the boiler was in a weakened condition, from the force of the hydrostatic pressure brought to bear in testing its capacity by the United States Inspector in the use of cold water, by insufficient bracing on the circular part, above the flat surface, by the effects of chipping and calking, and by the corrosion of the boiler on the inside, at the high-water mark ; but from the diverse views and opinions of the many witnesses who have testified before us, the jury are unable to say from which of the causes the explosion occurred, or whether from one or more combined. The jury find that this boiler was made of the best material, and braced in the usual manner of constructing such boilers by the best boiler makers, and approved by scientific and practical men : but the jury recommend that hereafter boilers be braced above the flat surface on the circular part. The jury recommend that steamboat boilers be inspected oftener than the practice now is, by competent inspectors, and that said inspections be made as often as once in three months ; also, that the hydrostatic test with cold water be abolished, and that warm water be used in its stead. The jury also strongly recommend and urgently adjure all boiler-makers to extraordinary care in constructing steam boilers, and that especial pains be taken to avoid breaking the fiber of the iron by calking or by other means.

We, of course, do not know what passed in the secret deliberations of the jury, but we shrewdly suspect that the same juryman whose searching cross-examination we report, used his influence to get in the significant words, "*by the effects of chipping and calking.*" After these the remainder of the verdict is of no consequence.

Rescue of Shipwrecked Mariners.

The Boston *Courier* gives the following account of the rescue of the crew of a schooner lately wrecked on the south side of the Island of Nantucket:—

"By means of a gun provided for such emergencies by the Massachusetts' Humane Society, a line was thrown over the vessel, and, after considerable delay, owing to the exhausted condition of the shipwrecked crew, a rope attached to the line was hauled on board and fastened to the masthead. When this was done, a chair made for the purpose was run off on a hanging block, and one of the crew got in to be hauled on shore. When his weight began to press on the small line from the masthead to the shore, it began to stretch and he to sink down toward the top of the raging billows beneath him. When a little more than half way to land, the small line of the vessel used to veer him along the line and pull the chair back, got foul, and, for more than an hour, there the poor fellow hung, the line stretching, and the waves ready to swallow him in case it parted. At last he was drawn within a few yards of the nearest breaker, in which he was submerged every time the vessel rolled toward the beach. A rope was thrown to him by men wading up to their necks in the breakers, and he was dragged to land. In a similar manner, after toilsome exertions, continued all day long, the other shipwrecked mariners were rescued, the last man reaching the shore just at sunset."

"Hands Off."

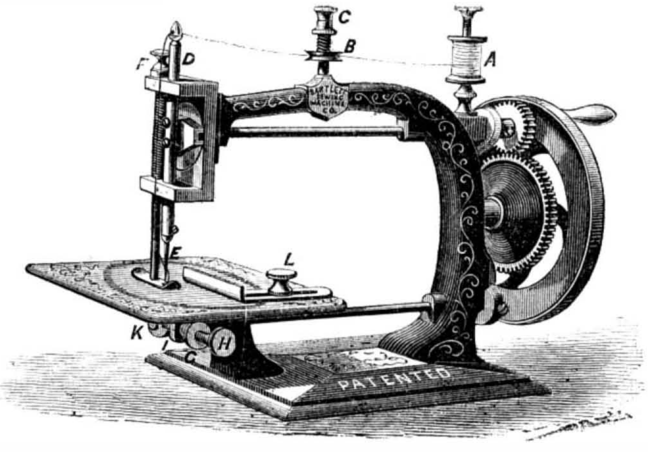
The futility of placing this notice on goods at fairs is well set forth in the spirited paragraph subjoined, cut from the Minneapolis *State Atlas:*—

"The people are very curious, and inspection is the order of the day. The great placards, 'Handle not,' might as well have been turned wrong side out. You can never keep the hands of the briarean public off anything. They were on the delicate embroidery and snowy quilt; they left the furs with a new gloss; they fumbled the stockings, the pin-cushions and tanned skins; they dirtied the picture glasses, and felt all the rough spots in the oil paintings; if the book covers were lifted once, they were lifted a million times; the bright stoves soon got dingy faces, and the oil on the machines was carried off on a thousand fingers. How many digits were punctured by the needles on the Grover & Baker, and Wheeler & Wilson, would be a hard sum for Greenleaf himself. The vegetables had to 'take it;' hard potatoes got soft; fresh melons went rotten under the pressure, and the smell of onions was upon all. The only real iron-clads were the pumpkins, which couldn't be dented except by a hammer. Segars were much sought after, and, apparently, the awarding committee on these articles was very large.

The New Sewing Machine.

The engraving published herewith represents a new sewing machine. The objects its originator had in view in its production was to supply the great want existing for a really good practical sewing machine for family use, obtainable at a moderate price, simply constructed, readily understood, and easily operated and kept in working order.

The stitch made by it is elastic, which experience proves to be best adapted for all the varieties of family sewing, and is made from the spool direct as purchased at the store. It is self-fastening, yet can be taken out, without injury to the fabric, when necessary. The needle is readily adjusted, and is like that used by Mr. Howe, only shorter, and consequently stronger and less liable to be broken. The feed is the well-known "four-motion under feed," as used in the Wheeler & Wilson, Grover & Baker, and other first-class machines. It is now considered the only really reliable feed. The length of stitch is varied by simply turning the thumb-screw, H, in or out, securing it in place by the jam nut, C. The tension is laid directly upon the thread by passing it between two highly polished steel disks, B, instead of applying the pressure upon the spool which, from the unevenness of these spools, is found very unreliable. The spool, A, rests loosely upon the upright rod, and may be removed and replaced by another without disturbing the tension—a very valuable feature, especially when the thread gives out in the midst of sewing a seam. The pressure upon the foot resting upon the cloth is obtained by a coiled spring upon the rod. The foot is raised by lifting the nut, F, and held at rest by a pin fitted to the nut in such a manner that the foot may be thrown entirely around and away from the needle when desired. A gage is attached to the plate of each machine adjustable to different widths of sewing and tucking by the screw, L. In short, all the motions are obtained by the simplest mechanism, which, in practice, is found to be durable and noiseless.



BARTLETT'S SEWING MACHINE.

The machines are made adapted both for the treadle (foot-power) and hand use. The annexed engraving represents the machine as adapted for hand use, and although they can be worked upon any house table without being secured, a clamp will be furnished with each machine to be used, if desired. Those for treadle use are made without the gear wheels, and with a smaller pulley or fly-wheel attached directly upon the main shaft for the belt.

These machines sew with double or single thread, and the stitch is far superior to that made by the cheap machines. It did not rip upon being tested, and the general appearance of the machine is satisfactory.

Mr. Joseph W. Bartlett, long and favorably known in the sewing-machine and needle interests, and a resident of this city, is the patentee. Full particulars in relation to machines or agencies will be promptly given by addressing The Bartlett Sewing Machine Company, No. 569 Broadway, New York. The manufactory is at Winchendon, Mass. Page Brothers, Agents, Toledo, Ohio.

On the Practical Results Obtained from Blast Furnaces by the Use of Hot Blast of Very High Temperature.

One of the most valuable papers read before the British Association, at its meeting this year, was one by E. A. Cowper, on the subject above stated. It will be seen that the blast is heated by a cellular mass of brick work on the principle of Siemens's furnace. This plan of obtaining an intense heat is destined to play a great part in the arts, and we wonder that it has not attracted greater attention in this country.

"It is not proposed to detain the meeting with a history of the numerous attempts which have been made to raise the blast for blast furnaces to a very high temperature, nor will the author occupy much time in the description of the means by which the desired result has been obtained, as a full account of the apparatus was given at the meeting of this association held at Oxford, though the paper on the subject was not printed in the Transactions.

"In 1861, experimental stoves only, on the new plan, had been erected and worked for heating the blast for one tweer out of the five used for one blast furnace. Such satisfactory results were, however, obtained, that it was clear that the difficulty of procuring blast of very high temperature had been overcome, and Messrs. Cochrane & Co., of Woodside Ironworks, Dudley, and Ormesby Ironworks, near Middlesbro'-on-Tees, forthwith erected large stoves on the new plan for a complete blast furnace, and it is now proposed, with your permission, to lay before the section the results obtained during upward of four years' practical working with these stoves.

"The effect of heating air on the new plan, was that a temperature of blast of 1,150° Fah. was obtained, instead of only 600 or 700° as with cast-iron pipes in the common stoves; there was no loss of blast from leakage, owing to cracked or damaged cast-iron pipes; the iron produced was of rather better quality; twenty per cent more iron was made from the same furnace, and fully 5 cwt. of coke was saved in the blast furnace per tun of iron made.

"The details of the construction of the new stoves will be readily understood by reference to the drawings.

First, There are two stoves, which are heated alternately and used alternately in heating the cold air; these are filled with brick work 'set open,' or with small spaces between the bricks, and form 'regenerators,' on the principle of Mr. Siemens's 'regenerator furnaces,' as now so largely and successfully used in glass-houses, gas works, iron works, etc., both for obtaining great heat and economizing fuel.

"The outside of the stoves are of thin wrought-iron plate lined with fire brick, the iron skin being necessary to retain the blast under pressure, while the fire brick resists the heat.

"Second, There are provided for the purpose of heating the stoves valves, for the admission of gas and air into a central flue, where combustion takes place when a stove is being heated, the products of combustion passing up the flue and down through the mass of fire bricks forming the regenerator, and escaping at the bottom to the chimney, after the whole of the heat has been abstracted by the fire bricks, the temperature of the chimney being from 212° to 250°, or thereabouts, during the time a stove is being heated, viz., for a period of four hours.

"Then, when a stove is hot, the gas and air are turned off, the chimney valve shut, and the cold blast is turned on at the bottom of the regenerator, and passes up through the bottom courses of brick work in the regenerator, thus very quickly becoming heated; and passing in the heated state up through the remaining courses of the brick work, and down the central flue, through the hot-blast valve to the blast furnace; the process of absorption of heat by the air being so perfect that, as long as a few of the top courses of brick work remain hot, the blast is well heated, the variation in the temperature of the blast being only about 100° Fah., with four-hour changes.

"Third, The gas for heating the stoves is supplied from gas producers, similar to those commonly used by Mr. Siemens for his regenerator furnaces, and which have already been described before this Association. They consist of a simple brick inclosure or fireplace, with bars near the bottom, for the admission of a very small quantity of air. The gas is formed by the slow combustion of a very thick fire, supplied with poor coal or slack down a slope or hopper, the gas passing off from above the fuel through pipes to the hot-blast stoves. Gas, may, however, be taken from the top of the blast furnace for heating the stoves, provided proper arrangements are made to separate it from the dust which comes over from the blast furnace with it; and, judging from recent practical experiments, it is certain that there are several ways in which this may be done with perfect success.

"The late James Beaumont Neilson, who did so very much for the iron manufacture by his original invention of the hot blast, in 1829, was sufficiently long-sighted to predict the advantages that would flow from the use of blast of very high temperature, though, as it happened, he was limited to what could be obtained from passing the air through iron pipes exposed to a fire, as in common stoves.

"Mr. Neilson said:—'In the new regenerator ovens that had just been described the great capacity of fire brick for heat had been well taken advantage of, and a very important step in advance had been made by giving the means of raising the temperature of blast much above the extreme limit practicable with the old ovens; and he considered this would be productive of the greatest benefit in the working of the blast furnace. He had no doubt the make of iron would be considerably increased by the higher temperature of blast given by the regenerator ovens.'

"These anticipations have been fully borne out in practice during upward of four years' regular working of the stoves. The high temperature of the blast produces such an improved effect in the furnace that the 'burden' is increased so as to save fully five hundred weight of coke per tun of iron made; and there is less fuel supplied, so there are less impurities taken in, and the quality of the iron is improved, the tweer-breasts do not 'work hot,' or burn, or give more trouble than usual, as the burden is increased as just stated. The same furnace, is, of course, enabled to do more work, the 'make' being increased fully one-fifth; so that a given plant produces 20 per cent more iron per annum, beside saving nearly 3s. per tun for coke.

"There is less friction or loss of pressure of blast in the stoves than in common ones, and there is no loss of blast by leakage through cracked or burnt cast-iron pipes or joints. More stoves are now being erected on the same plan."

How to Cure Scalds from Steam.

All readers of the Scientific American, but more particularly engineers, should read and remember the simple remedy here given for a most painful affliction. Engineers are often exposed to burning by steam, and it fortunately happens that the materials here recommended as a sovereign cure are always at hand. The *Medical and Surgical Reporter* says:—

"Mary S., æt. 30, was scalded a few days ago with the steam from hot ashes. The scald is on the middle of the chest, and about one foot square. The surface is raw, and covered with lymph. It is only a superficial scald, embracing the cuticle, and, at some points, the true skin. It is covered with granulations. The pain she suffered for a few days was intense; she could not sleep at all, but when the ordinary white lead, mixed to a thick cream, with linseed oil, was applied, in her own words, 'it took her up to heaven.' She is doing well under its use. No danger exists from lead-poisoning, and if it did, sulphuric acid lemonade would be the only prophylactic needed."

Sulphuric acid lemonade, we take to mean water slightly acidulated with vitriol.

Water-proof Paper.—Dissolve 8 ounces of alum and 3¾ ounces of castile soap in 4 pints of water, and 2 ounces of gum-arabic and 4 ounces of glue in another half gallon of water. Mix both, heat, dip in the paper, then suspend until dry.

The temperature of the Lake of Geneva, at the depth of 1,000 feet, is always 42°.

THE WAY BANKS ARE MANAGED IN NEW YORK.

To persons who have nothing to do with banks except to receive and pay away their bills, it naturally seems that furnishing these bills for use as money is the principal function of banks; it is in fact an incidental and comparatively unimportant part of their operations. Banks are companies of money lenders, who associate for the purpose of getting larger revenues from their capital, and with greater safety, than they could if each loaned his funds separately on his own account. The principal advantage of the association is the better credit obtained with the community by the large amount of paid-up capital, and the publicity which is given in relation to the bank's condition. This credit is advantageous in two ways.

First, it enables the bank to get the use of a large amount of capital without paying anything for its use. In every civilized community there are at all times persons having money on hand which they wish to deposit temporarily in some safe place where they may be sure to find it when they want it. Banks offer to receive such funds, and to return them promptly when called for; their whole capital being, of course, a pledge for the safety of the trust. Though each one of these deposits is liable to be called for at any moment, experience shows that others are constantly coming in, and thus a certain average amount, subject to some fluctuation, may be counted on with great confidence. A portion of this amount the bank officers consider it safe to loan to business men on good security, keeping sufficient funds on hand to meet any call of depositors likely to take place. The interest on this property of other people is, of course, a clear profit to the bank.

A second, but less important advantage of a good credit to the bank is the ability to pay out its notes and have them circulated in the community as money. As these notes draw no interest, while they are given in exchange for the notes of business men drawing interest, they are, of course, a source of profit.

Our joint-stock banks are all under the management of Boards of Directors—men selected from among the largest stockholders—those, therefore, who are most interested in managing the bank with profit to the owners. The directors choose a President from among their number, and hire a cashier and the necessary clerks; they then offer to merchants and other business men to open accounts with them, to receive their surplus funds on deposit, and to loan them a limited amount of capital. In paying large sums it is safer and more convenient to make the payment by a check on a bank than to count the bills; every man in active business, therefore, keeps an account in some bank, depositing with it all the money he receives, and making his payments by checks, which are simply orders to the bank to pay the amount stated in the check.

Banks in New York are opened at 10 o'clock, A. M., and closed at 3 P. M. Merchants having accounts with a bank generally make a deposit in the afternoon, as near as may be before the closing hour, of all the funds they may have received during the day. These are partly in bank bills, but mostly in checks, and they are sent to the bank by a trusty clerk. A list of the checks is sent with the funds, together with a little blank book, in which the receiving teller enters the amount of the deposit; this entry being the bank's official receipt for the funds. The receiving teller compares the checks with the list, counts the money, if there is any, and enters the amount in the little book, and also in a large account book in the bank. This work is done with great rapidity, as in the afternoon there is usually a long line of clerks awaiting their turn at his window.

To avoid the inconvenience both to the bank and the merchant of having several deposits made in a day, it is customary for the merchant to draw checks for whatever payment he has to make during the day, even if he has not sufficient funds in the bank at the moment to meet them; and the bank pays these checks, trusting to the honor of the merchant to deposit sufficient funds to make all his checks good before the bank closes. Occasionally a customer fails to make his checks good, and the bank suffers a loss from its misplaced confidence; but a conclusive proof of the general prevalence of mercantile honor is furnished in the fact that losses from this source are of very rare occurrence.

Twice a week the directors meet to loan the funds on hand at the time. Loans are usually made by discounting notes. A commission merchant, for instance, has notes of different jobbers to the amount of $20,000, payable two or three months in the future, and he wants the money for them now. He writes his name on the back of each, and sends them to the bank for discount. The directors examine the notes, and if the names are satisfactory and they have the funds to loan, the paper is discounted; the book-keeper computes the interest on the several notes to the time they are due, deducts it from the principal, and carries the amount remaining to the credit of the merchant.

When capital in market is not worth more than seven per cent the main question in regard to discounting any paper offered is the certainty of its being paid, but when capital is worth more than the legal rate, a second question has quite as much influence in deciding who among the several applicants for loans shall have the preference—that question is, who keeps the largest deposit with the bank. If two merchants want each $20,000, and, on examining the books, it is found that one has an average deposit of $5,000, and the other of $10,000, loaning the $20,000 to the former is equivalent to loaning $15,000, while to the latter it is equivalent to loaning $10,000, receiving in either case the interest on $20,000. In one case the interest on the capital actually furnished is $9\frac{1}{3}$ per cent; in the other it is 14 per cent. Bank directors, like other men, generally accept the best offer, and the man who keeps the best account gets the discount. In this way bank directors always manage to get the market rate of interest for their capital, in spite of any usury laws, however cunningly devised, that any legislators can enact.

NITRO-GLYCERIN.

The last number of *Le Genie Industriel* has an article by M. Alf. Nobel, engineer, setting forth, at length, the advantages of nitro-glycerin over gunpowder for blasting rocks. The economy claimed is in the cost of drilling the rocks, as much smaller holes suffice, owing to the greater explosive force of nitro-glycerin. M. Nobel says that this force is in hard rocks from eight to ten times that of ordinary blasting powder, and in soft rocks from twenty to thirty times.

"Four principal causes contribute to its superior explosive force:—1st, its great specific gravity, which permits the introduction into a hole of nearly double the weight of powder which the same hole will receive; 2d, its perfect gasification, leaving no solid residue; 3d, its richness in oxygen, which produces com-plete combustion; 4th, its extraordinary suddenness of explosion.

"According to Regnault, gunpowder, in burning, forms, theoretically, 260 times its volume of gas, taken cold, but in practice, owing to incomplete combustion, it does not exceed 200 volumes. The formula of nitro-glycerin is—

$$C^6H^5O^3+5NO_3$$

which in burning would give—

$$6CO_2+5HO+5N+O$$

So that one volume of nitro-glycerin would produce about—

544 volumes of the vapor of water.
469 volumes of carbonic acid.
39 volumes of oxygen.
236 volumes of nitrogen.

1,288 volumes, taken cold."

[We give M. Nobel's formula but do not understand how he gets his NO_3. The formula of glycerin is $C_6H_7O_5,HO$, and the usual view of nitro-glycerin is that it is a substitution compound in which two atoms of hydrogen are replaced by two atoms of nitrous acid. making the formula of nitro-glycerin—

$$C_6H_62NO_4O_6$$]

"It is evident that gunpowder, the combustion of which is very incomplete, cannot produce an elevation of temperature so great as nitro-glycerin, of which all the carbon is transformed into carbonic acid, and all the hydrogen into water. This is proved in practice by the fact that a small addition of nitro-glycerin to powder communicates much more brilliancy to the flame. It is difficult to measure the heat of an explosive substance, but, in view of the above-mentioned circumstance, it wil be admitted that the temperature of the flame ought to be nearly double that of gunpowder. We shall have then for powder 200 volumes, which, with a quadruple expansion, will be 800 volumes, and for nitro-glycerin 1,288—in round numbers 1,300 volumes—which, with an octuple expansion, will be 10,400."

Nitro-glycerin is made by dropping glycerin into a mixture of equal parts of strong nitric and sulphuric acids. It is a heavy oily liquid, its specific gravity being 1·6. It is insoluble in water, and the usual plan is to fill the hole above it with water in place of tamping, and then to fire it with a safety fuse, having a heavily charged percussion cap at its lower end. This mode of firing has been patented in France and other countries.

According to M. Nobel, nitro-glycerin does not explode by direct fire, decomposing itself with flame by contact with an ignited body, but being extinguished so soon as the hot body is removed. He also says that it detonates under a violent blow of a hammer, but only the part that is struck explodes: the fire is not propagated to the surrounding portions. A few drops spread on an anvil may, by repeated blows, produce a series of explosions. By the gradual application of heat it explodes at 180° Cent.—356° Fah. It is a very permanent compound, preserving itself indefinitely, and not being decomposed by either phosphorous or potassium.

THE ELECTRIC RAY OF THE ENGLISH CHANNEL AND OTHER ELECTRIC FISH.

[Translated from the French for the Scientific American.]

In a paper communicated recently to the French Academy of Sciences, by Mr. Charles Robin, occur the following statements regarding certain electric fish;—

"The varieties of these fish are but few in number; the *raya*, ray, or skate, the *gymnotus electricus*, or electric eel, and the *silurus electricus*. The *raya* belongs to the skate family, hence they are sometimes termed electric skates, while fishermen call them *tremblers*, or magic fish. This fish has a smooth, flat body and short tail, resembling somewhat an almost circular disk. There are several kinds to be found on the coasts of Provence, and the channel between France and England. If a ray be taken up in the hand a strong shock will at once be felt, so violent as to benumb and even paralyze the entire arm during several minutes. The sensation may be compared to that experienced from a violent blow on the elbow. The force of the shock is estimated as equal to that of a pile of 100 to 150 pairs charged with salt water. The discharges succeed each other with very great rapidity, as many as fifty discharges having been counted in one minute. A shock can be given to twenty persons simultaneously, if they stand touching each other in a circle, with the two persons at each end touching, the one the back and the other the belly of the ray. It has been discovered that the back of the fish emits positive and the belly negative electricity. After a fisherman has emptied the contents of his net into his boat, if he pours a large quantity of salt water upon the fish, should there be an electric ray among them, he is at once apprised of the fact by a shock in the hand he uses to pour out the water.

"Plutarch mentions this peculiarity as having been known to the ancients. The discharge from the ray emits sparks similar to those of an electric machine, produces magnetization and chemical decomposition, and gives marked signs of heat when passed through a thermo-electric pair.

"The electric organs are of three kinds, viz:—

"First, In the lower half of the body and at each side of the head there are several hundred small tubes (Hunter counted as many as 1,182) or membraneous, vertical prisms close together, like honey combs, and subdivided by horizontal partitions into little cells filled with mucus.

"Second, In the hinder part of the brain there is a lobe known as the electric lobe. Every time that this lobe is touched strong discharges are produced, even if the organ be separated from the brain and spinal marrow. All action upon the body of the ray, determining the discharge, is transmitted by the nerves from the irritated spot to the electric lobe of the brain.

"Third, Three very large branches of the fourth pair of nerves start from the above lobe and communicate with the electric batteries. If these nerves be cut or tied all electric phenomena cease; but in order to completely prevent any discharge they must all be tied or cut, for if they are only cut or tied on one side of the body the discharge will continue on the other side.

"The *gymnotus* is similar to an eel in appearance, and is commonly known by the name of 'electric eel.' These eels average about seven feet in length, and their skin is covered with a glue-like substance. They abound in the rivers and lakes in certain parts of South America. Their electric power is so great as to knock down men and even horses. Whenever a fisherman chances to catch a *gymnotus* and a young crocodile in the same net, when it is hauled in the latter reptile is generally found dead or paralyzed, while the electric eel shows no mark—the crocodile having been electrified before it could reach the fish.

"In certain sections of South America when it is necessary to enter a pond or stream of electric eels, wild horses are driven into the water infested by these formidable fish. Humboldt describes the method pursued. As soon as the eels hear the unusual noise caused by the plunging of the horses, they rise to the surface and attack the animals with their powerful electric batteries. The natives surround the pond or occupy the branches of trees overhanging the water, armed with harpoons and long reeds, and by their wild cries and reeds prevent the horses from landing. After a desperate combat, in which many horses are often killed and others paralyzed by the repeated and terrific shocks of electricity, the *gymnoti* being weakened by fatigue and loss of galvanic power, seek to escape in order to rest themselves and recuperate their electric strength, when the horses remaining drive them to the shore, where they are easily captured by harpoons attached to ropes.

"Professor Farraday has described the characteristics of the electric discharge from these fish. By the aid of two metal plates joined to the extremities of the galvanometer and applied to various points on the body of a *gymnotus* he succeeded in determining the direction of the discharge. He discovered that the anterior portion of the eel always formed the positive pole, and the posterior portion the negative pole, so that the direction of the current in the galvanometer was from the head to the tail. By causing the discharge of the *gymnotus* to pass over a wire arranged in a spiral, in the interior of which several needles were placed, he succeeded in magnetizing these needles in the required direction, by the direction of the discharge from the head to the tail of the fish. The same philosopher obtained chemical decomposition by the employment of iodide of potassium, and produced the electric spark by introducing into the circuit an electro-magnetic spiral, having a cylinder of soft iron in its interior.

"The electric apparatus of the *gymnotus* extends over the entire length of the back and tail, and consists of four longitudinal fasciæ, composed of a large number of membraneous laminæ, nearly horizontal, parallel, and very close together, and united by an infinite number of scales placed vertically and crosswise. The little prismatic, transverse cells formed by the junction of these laminæ are filled with a gelatinous substance. The whole apparatus is supplied with very large nerves emanating from the spinal nerves.

"The *silurus electricus* of the Nile is about two feet in length. Its mouth is provided with six fleshy tentacles. It is to be found chiefly in Egypt and Senegal. The Arabs call it RAASCH, *anglice*, thunder. Its galvanic power is considerable. Geoffroy Saint-Hilaire made many curious experiments upon this fish during the siege of Alexandria. The electric apparatus of the *silurus electricus* consists of a species of fatty cellular tissue extending over the whole body between the skin and the muscles.

"In conclusion, the phenomena presented by electrical fish may be said to be of the same order as those produce by our scientific apparatus, viz.: deviation of the needle of the galvanometer, elevation of temperature in conjunctive wires, magnetization, chemical decomposition, and, lastly, electric sparks."

THE Pacific Ocean covers seventy-eight millions of square miles the Atlantic twenty-five millions.

Correspondence

Toughening Steel by Hot Water.

MESSRS. EDITORS:—I am a constant reader of your truly valuable journal, and have been since the first number; now it has become one of the indispensables, and I look with eager interest for each number. I am always instructed and often amused at the questions asked, and the answers to them by your numerous readers. I have been a worker in steel since 1815 for edge tools and machinery, and all other purposes for which it is used in this country, and am particularly interested in all I see written on the nature of that metal. Some time since I saw the question asked, "Why is a Razor Put in Hot Water?" I felt competent to answer the question, but not being accustomed to writing for the public prints, I felt a diffidence to appear before your hundreds of thousands of readers, and waited to see some one explain it. I will explain why a razor should be put into hot water before using.

Every degree of heat there can be put into a razor or any other tool, without injuring the temper, strengthens the steel. A razor has, or should have, the most delicate edge of all edge tools, and the highest or hardest temper; unless strengthened by heat, it would not stand the harsh usage that its delicate and hard edge is put to, as any man can prove by trying without heating it. He will find it broken out in notches wherever it has come in contact with the beard. The saw appearance of the edge, as one of your correspondents explains it, is caused by sharpening it. Any one examining a beautifully polished razor with a microscope is astonished at the rough and scratched appearance, and when examined carefully the scratches will be found to be cut through its delicate edge, producing a sickle instead of a saw edge. Hot water is the safest way to heat any tool and give it strength without danger of injuring the temper. All tools should be heated that are to be put to harsh usage, especially in cold weather. Most tools that cause great friction by use will produce the heat after they get to work.

Every wood-chopper does, or should, understand that if he attempts to work with a frosty ax he will break it, but when once at work the friction produces the necessary heat to strengthen it.

In my experience, the most difficult tool to make stand for the purpose intended, and the severest trial for steel, is a pick edge for cutting French burr-mill stones. These stones are the third hardest substance in nature, and a pick to answer has to be of the best steel, and must be the hardest temper of all tools whatever. In this case the hot water answers an admirable purpose, and is really indispensable in cold weather; in a great many trials and experiments I find it very beneficial, even in hot weather, as it allows the edge to be made very hard, and prevents the steel from flying if it is kept sharp by grinding.

I would say, for the benefit of millers, never use a pick so dull that it does not cut freely, as it should be made too hard to stand much hammering. If you use it dull it shatters the steel and is pronounced too hard, when the fault is improper usage.

D. C. STONE.

Kingston, N. Y., Nov. 4, 1865.

[Our correspondent need have no diffidence in writing to this paper. Some of the most valuable communications that we receive are from practical men, making known some fact that has come under their personal observation. While we leave communications with as little alteration as possible, we always correct grammatical errors, and if the matter is not new, or if we think it will interest few or none of our readers, we throw the letter into the waste basket, and it gives us no trouble whatever. We frequently receive the same explanation or statement from several correspondents; then we generally publish the first received, and, of course, throw the others away.—EDS.

Negative Slip.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of the 21st October, page 257, "Negative Slip," of the screw propeller is noticed from an English publication, and variously, but I think erroneously, accounted for. This so-called "negative slip" gives a greater speed to the vessel than demanded by the rotation of the screw.

An article from the present writer, T. W. B., of Oct. 8, 1864, page 233, on "The Peculiarities of the Paddle Wheel," contains the following solution of the above phenomena:—"Experience shows an advantage of the screw propeller over the paddle wheel, of 10 to 15 per cent, and the cause of this superior efficiency may be found in the partially dead water against which the screw acts, and yet without drawing back the vessel, owing to the continued advance of the vessel beyond the immediate influence of the backward ejected water."

This saving effect attends the stern-wheel and screw steamers of the West.

THOMAS W. BAKEWELL.

Cincinnati, Oct. 27, 1865.

Power Required to Drive Machinery.

MESSRS. EDITORS:—I take pleasure in giving you my experience as regards the amount of power I obtained from a water wheel I put up two years ago. I was at that time manager of a wood-turning establishment. We were running four of Weymoth's patent wood-turning lathes, at the rate of 3,500 revolutions per minute, by a three-inch belt on each spindle, stretched to its utmost capacity. Also, a gage lathe, using two three-inch belts, running at about the same rate of speed; one common turning lathe; one two-foot circular saw, at 1,800 revolutions per minute; one twenty-inch circular, 2,000 revolutions; one sixteen-inch, 2,500 per minute, and one small eight-inch circular saw, 3,000, with a circular cross-cut saw, of twenty inches, for cutting slab, plank, etc. We were also running a muley saw rotary feed, put up in the best manner, cutting 1,500 feet of hard-maple boards, or 2,500 feet of pine boards in ten hours. The whole was driven by one water wheel, four feet in diameter, using 360 inches of water under an 8½-foot head and fall. The wheel was one of my own make, and is what we call a "direct-action" wheel, with a reaction bucket attached underneath the direct-action floats. The wheel, with its upright shaft, only cost me $110 to build and put up, it being principally made of wood. It ran perfectly steady, and almost as even as a steam engine with a governor.

B. A. STRATTON.

Towanda, Pa., Nov. 1, 1865.

Tarnishing of Silver-plated Ware.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of August 19, 1865, you published correspondence on the causes of tarnish on silver plated ware. Your correspondent says, if it would be interesting to your readers, he could give the best modes of preventing the tarnishing of silver ware and of removing the same from silver-plated or solid silver articles.

There are a great many in the retail trade that would like to be informed of the best modes of doing the same—myself being one of them. Please ask "E. W. C." to be kind enough to publish the information on the subject, and he would oblige a great many of your readers in this section of the country.

H. P., Watchmaker.

Peoria, Ill., Oct. 28, 1865.

SPECIAL NOTICES.

Alfred Platt, Waterbury, Conn., has petitioned for the extension of a patent granted to him on the 13th day of January, 1852, for an improvement in buckwheat fans.

Parties wishing to oppose the above extension must appear and show cause on the 25th day of December next, at 12 o'clock, M., when the petition will be heard.

Byron Densmore, New York City, has petitioned for the extension of a patent granted to him on the 10th day of February, 1852, for an improvement in grain harvesters.

Parties wishing to oppose the above extension must appear and show cause on the 22d day of January next, at 12 o'clock, M., when the petition will be heard.

OBITUARY.—Chief Engineer Cushman, U. S. N., who was upon the *Kearsarge* when she cruised for and sunk the *Alabama*, died on Thursday last.

RECENT AMERICAN PATENTS.

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

Coffee Roaster.—This invention relates to certain improvements in a coffee roaster, for which Letters Patent were granted to this inventor, bearing date April 28, 1863. The original invention consisted of a rotating sheet-metal coffee receptacle, hung on a shaft or pivot horizontally, and operated by means of a clock movement provided with a single spring. The present improvements consist in substituting a wire-cloth coffee receptacle for the sheet-metal one previously used, whereby the coffee is screened while being roasted, and the husk and other substances which give the coffee a disagreeable, bitter taste, removed or separated from the coffee. Another improvement consists in using a detachable lid or cover with the receptacle above mentioned, whereby the heat is retained around said receptacle, and also the aroma of the coffee, while, previous to the roasting operation, the lid or cover is removed in order to admit of all moisture being expelled, so that the coffee may be roasted in a dry state. Another improvement consists in applying two driving springs to the clock movement, whereby the device may be wound up during the time it is in operation, and without stopping the rotation of the coffee receptacle. Another improvement consists in a novel manner of applying the coffee receptacle to the device, whereby it may be readily detached for the purpose of being filled and emptied, and readily applied and connected for use. C. A. Mills, of Bristol, Conn., is the inventor.

Manufacture of Mirrors, Etc.—This invention relates to a new method of precipitating on the inner surface of a mirror or looking glass nitrate of silver or other suitable substance, from a solution, by placing the glass plates edgewise into a vat, the face of each glass being protected by placing it against the face of the adjoining plate, with an intervening sheet of india-rubber, gutta-percha, or other bad conductor of electricity, whereas the backs of the plates are free, so that when the vat is filled with the solution of silver or other material the metallic salt contained in said solution is evenly and uniformly precipitated on the back of all the glass plates, and a large number of mirrors of great brilliancy can be made in a short time, and with comparatively little expense. On taking the plates out of the bath, a coat of varnish is applied over the layer of metal as a protection, and, thereby, mirrors made according to this plan are rendered cheaper and much more durable than mirrors coated with mercury in the ordinary manner. Rudolph Keck, of New York City, is the inventor.

Car Spring.—This invention relates to a new and improved spring for railroad cars, and it consists in the employment or use of a series of steel plates, placed within a box, which is fitted in the pedestal of the car, as usual; said plates being arranged with india-rubber or other suitable yielding substance, also placed within the box, and in such relation with the plates as to form a spring very compact in form, and one which will have a gradually resisting power when subjected to weight or pressure. George Douglas, Scranton, Pa., is the inventor.

Caloric Engine.—This invention relates to certain improvements in caloric or hot-air engines, and it consists in an improvement in the air-heating device, whereby the air is subjected to a large area of heated surface within a chamber of limited dimensions. The invention also consists in an improved arrangement of the flue of the heater and hot-air conducting pipe and the driving cylinder, whereby the heated air, in its passage from the heating device to said cylinder, and while within it, is prevented from being cooled and rendered inefficient. The invention also consists in a novel arrangement of slide valves for the pump and driving cylinder, whereby a perfectly balanced valve is obtained; and the invention further consists in a novel means of communicating a rotary motion to the shaft from which the power is taken, from the reciprocating motion of the piston rod of the driving cylinder. Hiram Kilbourn, of Waterloo, Iowa, is the inventor.

Bottles.—This invention relates to a new manner of constructing the head of a bottle, particularly such as are used for bottling soda water, wine, mineral waters, etc., so that a wooden plug can be used instead of a cork, which will materially reduce the expense of corking bottles, for the reason that the corks now used in such bottles are destroyed as soon as drawn from the bottle, and are made of cork now, which is expensive. The invention consists in forming on the inside of the head of a bottle a groove of suitable extent, into which is introduced a packing or lining of rubber or other suitable elastic material, which will, when the plug is driven in, insure a perfectly tight sealing or corking of the bottle. Thos. B. Way, of Bennington, Vt., is the inventor

Paddle Wheel.—This invention relates to a new and improved paddle wheel, of that class which are provided with feathering buckets, and it consists in a new and improved manner of operating or feathering the buckets, whereby the same are made, during the revolutions of the wheel, to radiate from its summit, so that the plunge and lift attending the ordinary paddle wheels are avoided, and the improvement rendered capable of being used as a submerged wheel, possessing the advantage over the screw propeller of a direct instead of an oblique action, and also rendered capable of working effectively when turned in either direction. Edgar Haight, of Buffalo, N. Y., is the inventor.

Method of Coloring Photographic Prints.—This invention has for its principal object the cheapening and increasing the durability of photographic prints, and relates more particularly to a new system of coloring photographs, by means of chemical substances, which so combine with the photographic prints, when applied to them, as to be indestructible either by water, alcohol, or spirits of turpentine, and, moreover, in beauty are equal to, if not superior to, prints colored by any of the ordinary modes hitherto known or practiced, and can never fade or discolor by exposure to the sun or any other light—said chemical substances being of such a nature that they can be readily and easily applied to the prints by any person, whether acquainted with the art of coloring or not. J. C. Beyse, of St. Louis, Mo., is the inventor.

Bolt-heading Machine.—The object of this invention is to produce bolts with square or polygonal heads, by the action of a mechanism which requires no more attention except that necessary to feed the blanks to the machine. The blanks are cut off to the proper length from round iron bars of the requisite thickness, and one blank after the other is fed into the machines by the attendant. Suitable tongs grasp hold of the blank and carry the same along under the several heading tools, by the successive action o which, combined with that of suitable heading dies, heads of the proper size and shape are formed, and the bolts, after having been headed, are discharged from the machine automatically. During the heading operation the blanks are held in position by suitable clamping jaws, and, while the first heading tool is brought into action, the head to be formed is sustained by sliding spring jaws. Simultaneously with the second heading tool the head to be formed is exposed to the lateral action of heading dies, and, when the last heading die comes into action, the head is confined by a heading die having a suitable recess representing one-half of the head to be formed. The tongs which carry the blanks from one heading tool to the other are secured in a sliding spring head so that they rise and clear the blanks in going back, and the blanks are raised after the heading tools have acted thereon, to such a position that the tongs on their forward stroke are enabled to grasp them, and advance them to the next succeeding heading tool, or to the discharge opening. While being moved from the second to the third heading tool, each blank receives a quarter revolution or less, by the action of a sliding pusher, so as to bring the heads in the proper position in relation to the last heading dies. Franz Schweizer, of New York City, is the inventor.

A New Steam Engine.

A new steam engine, on the rotary principle, was exhibited before the British Association, at Birmingham, England, lately. The boiler is vertical, having a cylinder of three feet in diameter by six feet in hight; the internal fire surface consisting of a hemispherical bottom, with the heat spreading all over it by leading to a circle of vertical fire tubes, passing through the water. To one side of this boiler is attached the engine, which shows externally as a horizontal cylinder, about twelve inches in diameter by two feet in length, within which the pistons revolve, the entrance and exist of the steam being provided for by the action of external elliptical tooth wheels fixed on the revolving shafts, which, causing alternate faster or slower movements of the pistons past each other, opens and closes the passages. A drum-wheel on the axis of the cylinder carries a strap, which will put in motion any required machinery. The whole is supported on one pair of wheels, with a pair of shafts attached, and can be moved by one horse. The machine, as shown, was stated to be the equivalent of an ordinary eight-horse portable engine, and that the relative weights were thirty hundred weight, the rotary engine, against fifty-five hundred weight on the ordinary plan. No fly-wheel is needed, it was said, to keep up the movement, and there is an absence of all the vibrating motion induced by the reciprocation of ordinary engines. The principle is applicable to portable purposes or to boats or locomotive engines. The actual consumption of fuel for work done was not given to the meeting.

[We are unable to see any novelty in this engine. —Eds.

MISCELLANEOUS SUMMARY.

Japan Black.—1. Asphaltum, 3 oz.; boiled oil, 4 quarts; burnt umber, 8 oz. Mix by heat, and when cooling thin with turpentine. 2. Amber, 12 oz.; asphaltum, 2 oz.; fuse by heat, add boiled oil, half a pint; rosin, 2 oz; when cooling add 16 oz. oil of turpentine. Both are used to varnish metals.

Dr. Richardson has succeeded in making the heart of a dog, which had been dead some time, pulsate perfectly for at least twenty minutes, by introducing blood heated to 90° Fah. into the coronary arteries.

A Dentist of Edinburgh has patented an ingenious modification of forceps, which admits artificial cooled air through its points to the gum, so as to deaden sensation previously to the extraction of the tooth, and thus render the operation painless.

Artificial Ivory Tablets for Photography.—Finely pulverized heavy spar (sulphate of baryta) is mixed with gelatin or albumen, compressed into sheets, dried and polished.

Pineapple essence is a solution of butyric ether, with some oil of lemon and orange peel, in deodorized alcohol; essence of raspberry, a tincture of orris-root with a little butyric ether.

Vegetable ivory shows a red stain where a drop of oil of vitriol is applied, which again disappears on washing it with water. Bone or genuine ivory does not show this reaction.

Our notice of the Fair of the American Institute made mention of the Clinton Wire Cloth Co., and located them in Connecticut. This was erroneous. The Works are located at Clinton, Mass.

A chess problem, published by the Philadelphia Fair paper, is the most complicated in the records of the game. The proposition is, "White to move and compel Black to mate in eighteen moves."

The journeymen shipwrights of Baltimore, determined to mark out a path for themselves, have established an independent shipyard, and are already taking contracts.

The diminution of the magnetic dip has been going on in London for the last half century with great regularity at the rate of about three minutes annually.

A weight which would only be 3 oz. on the moon would be 1 lb. on the earth, and the same force would throw a body six and a-half times further or higher on the former body.

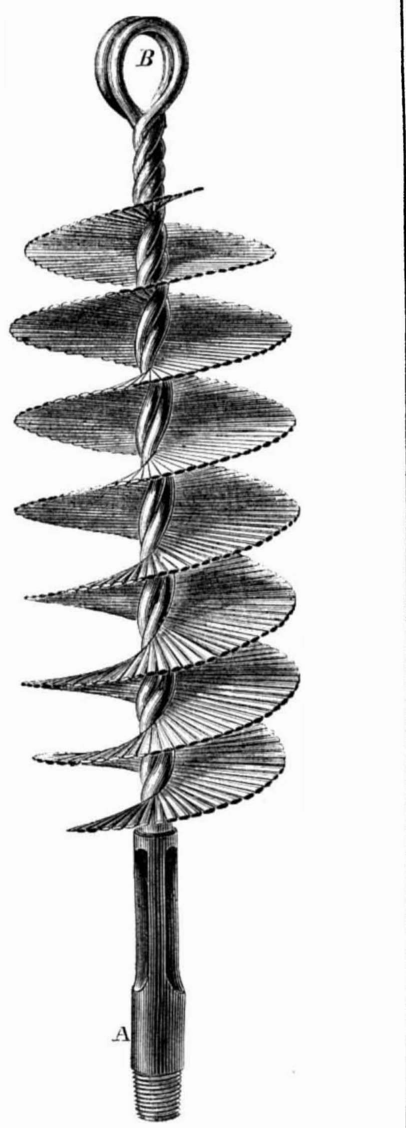
In the mines of England there were 998 deaths by accident in the year 1864, and in the previous year 933.

Fraunhofer, in his optical experiments, made a machine by which he could draw 32,900 lines in an inch breadth.

The highest inhabited place on the globe is the Post-house of Ancomarco, in Peru, which is nearly 16,000 feet above the sea.

STEEL BRUSH FOR BOILER TUBES.

Fuel of all kinds is costly now, and a great deal is wasted by allowing steam boilers to get thickly coated with layers of ashes. Many tubular boilers are so neglected that the lower row of tubes is suffered to get entirely closed. This is a bad state of things, and any engineer guilty of it is not fit for his place. Whalebone brushes, to remove ashes and soot from the tubes, have been used for years, but they cannot be employed unless the boiler is quite cold, otherwise they will be destroyed. Steel-wire brushes have also been introduced, and are very useful.



The engraving published herewith shows an improved brush made of steel wire, spring tempered. It can be used when the boiler is hot, which is a decided advantage, for in some boiler tubes a tarry residuum is deposited by the smoke, which is best taken out while hot. For, when cold and mixed with ashes, it forms a very hard cement, which is almost immovable. The wires are flat on the ends, and act like cutters, and, being firmly soldered to the shaft, can be turned and twisted in any direction without danger of becoming detached.

These brushes are made with a screw shank, A, to which rods are fastened, a line is attached to the eye, B, and one man draws the brush through while the other turns and twists it about to perfect the operation.

We think this the best tube brush that we ever saw, and can recommend it as an effective instrument to all who own or use steam boilers. A medal was awarded to D. Stillwell, the patentee, at the late Fair of the American Institute.

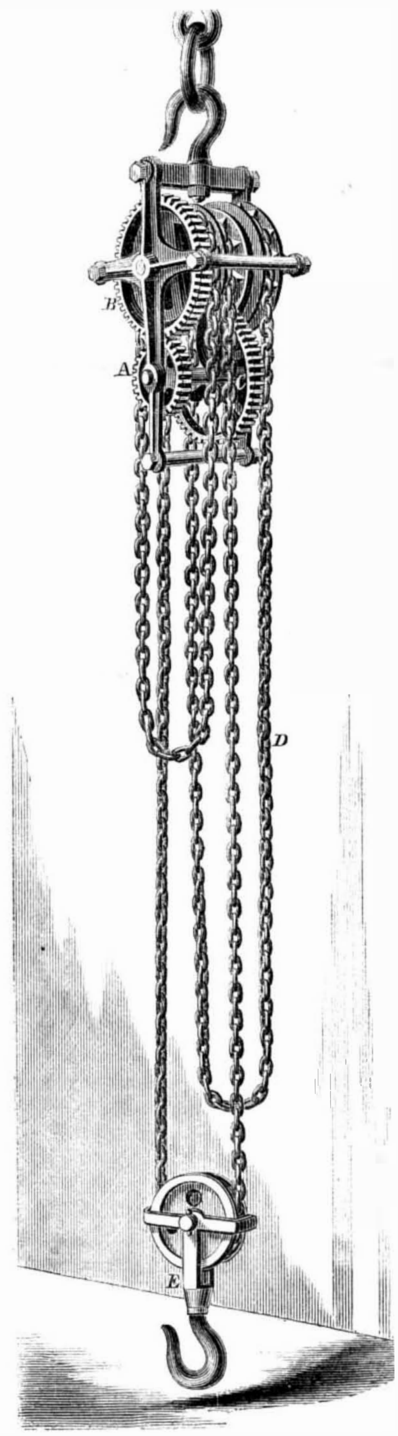
It is manufactured by the New England Tube Brush Company, Fall River, Mass., D. Stillwell, Agent, and was patented through the Scientific American Patent Agency on March 20, 1864. For sale in this city by Bradley & Smith, No. 251 Pearl street.

Clarifying Liquors with Burnt Clay.

Burnt clay is a very effective means of clarifying wine, liquors, beer, vinegar, and cider. You may use broken flower pots or any unglazed pottery-ware free from lime. These materials must be finely powdered in a mortar and washed with water; let them rest for one hour and decant the water containing the finely distributed dust-like particles of clay. Repeat the same operation with another portion of pure water, and afterward dry the burnt clay. Two or three pounds of this material should be used for about one barrel; shake the fluid thoroughly with the clay, and allow it to rest. If necessary, the fluid may be finely filtered.

BIRD'S GEARED DIFFERENTIAL PULLEY.

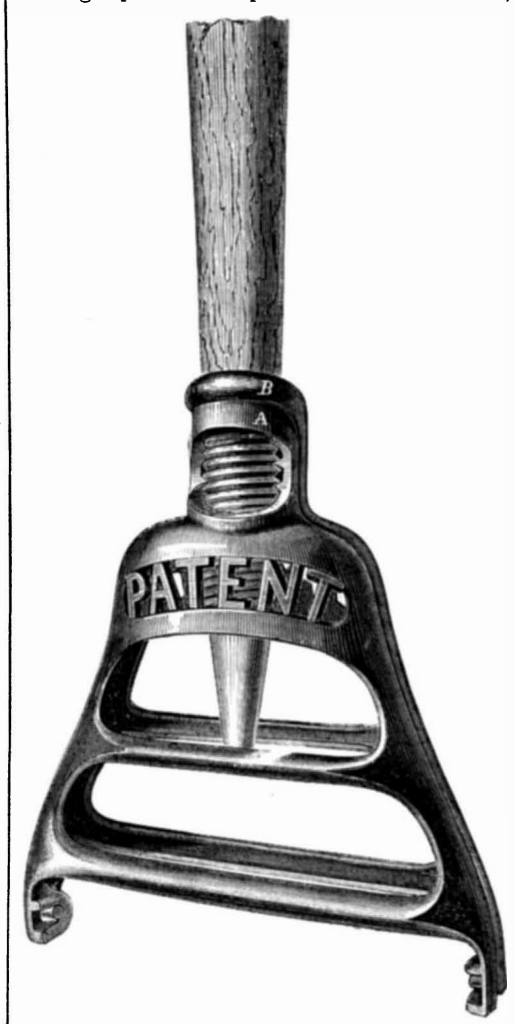
The ordinary differential pulley blocks are coming into use in machine shops and workshops generally, where heavy bodies have to be lifted. In marine-engine works particularly, where many heavy jobs have to be put in lathes—sometimes in places so situated that laborers cannot get a chance to exert their strength—these hoisting machines have a marked advantage. The machine here shown is an improvement on the plain differential pulley, where the advantage gained is by making one more tooth in one of the wheels the chain passes over than in the other. This block is so made, but is also geared, in addition, by the common method of a pinion, A, working in a spur wheel, B; on the shaft of the pinion another spur wheel, C, being fixed, which gears in another not seen on the main block. By this arrangement additional power is gained in proportion to the measure of gearing employed, or in proportion to the diameters of the pinions and the wheels driven by them. One man can raise great weights with these blocks, and the weight is sustained by hanging on the chain, no fastening being required. By hauling on the bight, D, the weight attached to the pulley, E, will be raised.



This block was patented through the Scientifi American Patent Agency on June 6, 1865, by James Bird; for further information address him at No. 167 East Twenty-sixth street, New York.

BROWNE'S BROOM HEAD.

The annexed engraving represents a head or clamp for house brooms; it is made of malleable iron in two pieces, jointed together, between which the brush or filling is placed. One piece is made with a socket,



A, having a sharp-threaded screw on the inside to receive the handle; the other piece is made with a yoke or ring, B, which passes over the socket. The handle is made a little tapering and pointed at the end. By inserting it, when the clamp is closed, through the yoke into the socket, and turning it round, the screw in the socket cuts a thread on the handle, which secures it very firmly, and, at the same time, fastens the clamp and compresses the filling.

This improvement obviates the difficulty hitherto complained of, in keeping the handle fast after having been in use a while; or, should a handle get broken, it is very easily replaced, requiring no special tools for the purpose. There are no separate or detachable parts to lose or break, and it is better and preferable on that account. It is cheap, durable, and effective, and is easy and simple of construction. It is intended for family use, so that parties in the country, who have the facilities, can raise their own broom corn, and fill these clamps with it without trouble.

The patent for this invention was allowed on Oct. 3, 1865. For further information address the patentee, J. D. Browne, care of James L. Haven & Co., No. 177 West Second street, Cincinnati, Ohio.

Sizing for Gold on Glass.—The following recipe has been recommended:—Copal varnish is rubbed up fine with either white bole, burnt umber, or ocher—all of which must be quite dry—and then strained through cloth. The glass having been cleansed with fine chalk, is painted over with this varnish and placed in a warm room protected from dust. Experience soon teaches when it has become dry enough for applying the leaf, which is pressed on with cotton and then allowed to dry. If necessary, it may then be polished.—*Chemist and Druggist.*

THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

PUBLISHED WEEKLY AT

NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

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

VOL. XIII., NO. 21....[NEW SERIES.]...*Twentieth Year*

NEW YORK, SATURDAY, NOVEMBER 18, 1865.

Contents:

(Illustrations are indicated by an asterisk.)

TO OUR READERS ON THE PACIFIC COAST.

The SCIENTIFIC AMERICAN has now a large and increasing subscription list in California, Oregon, and other Pacific States. Our professional business in those States is also increasing, which clearly indicates a healthy progress in the manufacturing and mechanic arts.

We now desire to thank our patrons and friends upon the Pacific coast for their generous encouragement, and also to remind them that a new volume of the SCIENTIFIC AMERICAN will commence January 1, 1866, at which time there are a large number of subscriptions that will expire. We make the announcement at this early date for the purpose of securing the co-operation of our friends in getting up clubs for the next volume.

Notwithstanding the increasing cost of paper, we have determined to offer the SCIENTIFIC AMERICAN in clubs of ten and upward for $2 50 per year, at which rate we hope to largely increase our circulation.

Of the future value of the SCIENTIFIC AMERICAN the past twenty years must be our guaranty. No other journal of the kind in this country, or Europe, can compare with it in the extent and value of the information which its columns supply.

Send in your clubs and subscriptions early, in order to secure the first numbers of the new volume.

FASHIONS AND TRADES.

Our ancestors, who clothed themselves in primitive fabrics, made in the plainest manner, would doubtless be astonished if they could realize the rage for unique articles of dress at the present day, and be still more surprised at the enormous consumption of them. There are cravats with all the colors of the rainbow, and a good many more not in it; there are hoop-skirts elastic, incompressible, and with countless other qualities unmentionable to profane ears; there are coats of shoddy, which, like the possessions of their owners, arise and disappear in a day; there are somber hats, shocking hats, hats invisible and waterproof, and other hats; there are boots with thick soles and square toes, with spring shanks, with rotary heels, boots with bootjacks already attached to them, and boots with wooden soles; there are shirts that pretend to be both shirt and vest together, when they are only simple shirts; and there are collars of steel, whitened by enameling, which are claimed to be all that fancy paints them. Truly, a man may wonder at the diversity and variety of human attire, and he must be critical indeed, if out of all this array there is "nothing to wear."

The manufacture of clothing in various forms is immense, and gives employment in different branches of trade to thousands of persons.

When the hoop-skirt became popular with ladies, the energies of machinists, steel rollers, and wire drawers were taxed to the utmost. The call for the steel springs was such that hundreds of persons bought sets of rollers, hired a room and power in some factory, and with a forge went into business on their own account. All they had to do was to start the wire in the rolls, run it through them into the furnace, temper it as it went, and the job was done. Of course, much of it was wretched stuff, but it sold, and that was the main thing, for it kept the market brisk and supplied.

The latest candidate for popularity is the paper collar. The rapidity with which it has been seized upon, and the extent to which it is manufactured surpasses even the hoop skirt in its palmiest days.

To say nothing of the number of collars made, which is almost beyond estimate, statistics concerning one branch of trade involved with it—the manufacture of paper boxes—will prove interesting.

One firm has a contract with paper-collar manufacturers, to furnish 11,000 paper boxes daily, for twelve months. This is but one out of numerous others in different parts of the country. Of course, with such demands upon them, the paper mills are busy, and the price is high. The men who furnish paper material are also busy; girls are busy with the boxes, in making and filling them; packing-case makers and machinists have enough to do, and, in short, every one whose business is in this line has his hands full.

That such wide-spread activity should spring from such a simple thing as a paper collar seems incredible. The impulse given to trade by this one thing ramifies in all directions. It stimulates inventors to produce better machines for making paper. It sets chemists to work on cheap processes for bleaching. It furnishes an incentive to capitalists to erect works and thereby call into requisition the services of all tradesmen in that line, and the list of persons and industries benefited by the adoption of the paper collar might be extended infinitely. Fashion does some good in the world, after all.

NEGATIVE SLIP.

Sir John Herschel remarks that the problem of the tides is one of the most difficult of any that has engaged the attention of the human mind, and it seems to us that the explanation of negative slip is of analogous character. When a fluid is acted on by contending forces, the direction and power of which cannot be measured, to determine the motion of the fluid by *a priori* reasoning, requires more than human intelligence; when, also, a ship is driven through the water by the rotation of spiral blades at its stern, the currents produced in the water, and the action of these upon the ship and upon the screw, form a problem too complicated and difficult to be unraveled by the mind of man.

That a screw propeller should exert part of its power in moving the water, and that the vessel driven by it should, consequently, move with less velocity than if the screw were running in a solid nut of metal, is precisely what would have been anticipated, but that the vessel should run faster than if the screw were revolving in a solid nut, would seem to be impossible. This strange circumstance was, however, observed in the running of the *Niagara*, and several other vessels, before its extraordinary development in the case of the *Bellerophon*.

THE "ALGONQUIN" AND "WINOOSKI" TRIAL.

Having thus far considered the circumstances of the entire trial with due seriousness, we may be pardoned if we smile at the scientific character with which the whole performance has been invested. No engineer in his senses would expect to realize economy, either by expansion or otherwise, from engines making barely fifteen revolutions, and pistons running at less than 300 feet per minute in unjacketed cylinders, with a stroke of 10 feet. It would seem as though neither Mr. Dickerson nor Mr. Isherwood are able to realize the fact that, in order to obtain economy of fuel by the aid of expansion, certain conditions must be complied with. The former apparently imagines that expansion is all-powerful, and, regarding steam as a permanent gas, he takes no account of condensation in the cylinder, and constructs his engines without the least regard for principles which English engineers know to be essential to success. Mr. Isherwood, on the other hand, selecting a single machine of a construction notoriously the worst adapted to the application of the principle, tried a few experiments, carried out and worked up with a minuteness sufficient to invest them with a false importance, and gravely states that he has tested expansion, and that there is nothing in it. We have thus the remarkable spectacle of two men, equally ignorant of the fundamental principles of the subject on which they presume to discourse, trying experiments with machinery no more calculated to decide the questions at issue—if there be a question at issue—than a pair of water-wheels; while the Government of a great nation consents to identify itself with the one, and the great nation acts as bottle-holder to the other. As it is, the correctness of a principle has asserted itself, according to the reports which have reached us, under the most unfavorable circumstances. Whether Mr. Isherwood did or did not beat Mr. Dickerson is a matter of the least possible real importance. He would find in any of our English firms a very different opponent. There is such a thing as philosophy in sport as well as science in earnest. As far as we can see, the Washington competition comes under neither head, and its value is almost infinitesimal as compared with the importance with which the American public appear to have invested it.—*London Engineer.*

We are surprised that the editors of the *Engineer*, with their extensive knowledge of steam engineering, should regard the result of running two engines under such very different conditions as the triumph either of expansion or non-expansion. Suppose the pressure of steam in the two engines had been reversed—that the *Algonquin* had run with 17 lbs. to the inch and the *Winooski* with 70 lbs.—in what way would "the correctness of a principle" have asserted itself? We have no doubt of the economy of working steam with some measure of expansion; the most economical measure varying with the pressure of the steam, the extent to which it is superheated, the velocity of the piston, and several other circumstances, but to suppose that this principle can be established by experiments like that of the *Winooski* and *Algonquin* is preposterous, as we have already pointed out.

VELPEAU ON CHOLERA.

Among those men who have devoted themselves to the study of that department of medical science which relates to the cure of disease—therapeutics—the most eminent are two Frenchmen, Pierre Charles Alexandre Louis and Alfred Armand Louis Marie Velpeau. Louis is the author of a revolution in the mode of investigating the effect of medicine on disease. Previous to his labors, while anatomy, physiology, and pathology, contained a great mass of ascertained and unquestioned facts, almost every thing in the department of therapeutics was the subject of disputes among physicians, so constant and so general that they were the theme of universal ridicule. This uncertainty was the result of the defective method employed in observing the effect of medicines upon diseases. Each physician deduced the general law from the few cases that occurred in his own practice; and even these few cases were generally observed with prejudiced minds, and in a loose and careless manner. Louis undertook the task of ascertaining the effect of the medicines in general use upon the more common diseases by a series of observations so careful, thorough, and honest, and conducted upon so large a scale, that the results would command universal respect. The great hospitals of Paris gave him the most favorable opportunity for carrying out his plans, and he went through his task in such manner that his results are accepted by physicians throughout the world as indisputable and established science.

To illustrate his method: it had been the most general practice to give antimony in lung fever.—Louis said, "Let us see whether antimony does any good in lung fever." He selected for experiment a hundred patients sick with lung fever, and divided them into two parts as nearly equal as possible in regard to age, strength of constitution, force of the disease, and all other conditions; to fifty he gave antimony in the usual quantity, and to the other fifty he gave no medicine whatever; treating the patients alike in all other respects. The effect on each patient was carefully observed and recorded. The experiment was then repeated in another hundred patients divided in the same manner.

The circumstance which has given peculiar authority to Louis' investigations, even more than their large scale, is the honesty with which they were conducted. While other physicians had generally made experiments in order to prove the efficacy of some favorite treatment, or to establish the truth of some preconceived notion, it was the ambition of Louis to win fame by the impartial conduct of his observations.

The most eminent disciple, or rather colleague of Louis, is Velpeau; and his observations are received with equal respect in the world of medical science. When he recommends a remedy it may be accepted, not, as in the case of most physicians, as a guess founded on some half dozen cases, but as the conclusion of a long series of careful and honest comparisons.

At a recent meeting of the Academy of Sciences, in Paris, the treatment of cholera was discussed, and most of the published remedies denounced as utterly useless, when M. Le Verrier, the astronomer, complained that the time of the Academy was taken up in condemning remedies without indicating those which were more capable of arresting the evil. The newspapers publish recipes every day which contradict each other. Every medical man had his own system. What was necessary, was to point out at least what should be first done in the absence of the doctor. In a word, he wanted positive suggestions instead of negative discussions.

These remarks called up Dr. Velpeau, who said:—

"I am obliged to avow that it is not always in our power to point out an efficacious remedy. The cholera is no doubt caused by the introduction of a poison into the organism. If the poisonous element is in small quantity, and the organism strong, it makes no ravages; if the contrary be the case, the danger is real. Also when the patient absorbs what is administered to him, his cure is probable. But sometimes the stomach refuses to absorb any thing; and in this case recourse should be had to external means, which are often insufficient. In a word, the malady almost always commences by characteristic symptoms, such as premonitory diarrhea. The preventive treatment is easy, and it is for each person to guard himself. Excess of every kind should be carefully avoided, and the rules of salubrity attentively observed. The means of arresting the malady at its outset are very simple. My advice is this—pour from three to four drops of laudanum on a lump of sugar, and swallow it. Repeat in two hours afterward, and so on, until the colic and vomiting pass away. Take also very small injections of starch, poppy flowers with six, seven, eight or ten drops of laudanum. This treatment will almost always suffice to stop the diarrhea, and will be a guaranty against the malady."

The premonitory diarrhea of the cholera is of a very peculiar character, very easily distinguished from other forms of diarrhea. The discharges are frequent, and are white and watery, generally compared to rice water. Even for these it is best to consult a physician if possible, but if no physician is within reach, then, according to Velpeau, we are to swallow three or four drops of laudanum every two hours till the diarrhea is checked.

EGYPTIAN KOHL.—The kohl, or kheul, which we have seen in use for darkening the eyelids since the time of the ancient Egyptians, is made by the Arabs in the following way:—They remove the inside of a lemon, fill it up with plumbago and burnt copper, and place it on the fire until it becomes carbonized; then phey pound it in a mortar with coral, sandal wood, tearls, ambergris, the wing of a bat, and a part of the body of a chameleon, the whole having been previously burnt to a cinder, and moistened with rose water while hot.—*Rimmel's Book of Perfumes.*

TO OUR READERS.

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

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

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

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING NOVEMBER 7, 1865.

Reported Officially for the Scientific American.

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

50,783.—Banding and Covering Projectiles.—John Absterdam, New York City:

I claim the employment or use of an alloy, such as herein described, for making bands, sabots, or packings of projectiles, substantially as specified.

Second. Cooling the alloy suddenly after casting on the projectiles, substantially as and for the purpose set forth.

50,784.—Siding and Covering Buildings with Wood.—Henry B. Adams, Brooklyn, N. Y.:

I claim a new article of manufacture, formed like clapboards, but with the grain of the wood running up and down, the same being made in long strips by cutting them from around the log, as herein described, by which I avoid the numerous joints of a covering of shingles, and produce a more perfect covering for buildings, and more econmical than has been heretofore known.

50,785.—Spring Seat for Wagons.—Thomas J. Alexander, Westerville, Ohio:

I claim the spring seat, consisting of the boards, f f, united by the cleat, i, and attached to the knees, E E, combined with the links, C C, and slats, B B, arranged and operating substantially as and for the purpose set forth.

50,786.—Mode of Lubricating Journals.—Charles Andrew, Providence, R. I.:

First, The combination of the lubricating reservoir with an adjustable screw plug, constructed and operating substantially as and for the purpose specified.

Second, I claim the combination of the box or bearing, H, the chamber, m, and the ducts or passages connecting with the same, the whole being constructed to operate substantially as and for the purpose specified.

Third, I claim the lickers or conductors, k k, or their equivalent, in combination with a suitably constructed bearing, substantially as described for the purpose set forth.

50,787.—Combined Platform and Windlass.—Tunis J. Burhyte, Fond du Lac, Wis.:

First, I claim a platform, hinged and mounted on wheels, for the purpose of moving it, substantially as shown and described.

Second, I claim the rollers, a b c, and d, provided with cog wheels, and having the grooves for keeping the coils of rope separate, substantially as and for the purpose set forth.

Third, I claim the reversible frame, E, in combination with the platform, as shown and described.

Fourth, I claim mounting one of the rollers, c or d, in an adjustable bearing, as and for the purpose set forth.

Fifth, I claim the anchor, D, constructed as shown, and arranged to operate in combination with the movable platform, as herein set forth.

50,788.—Boot-crimping Machine.—J. D. Batchelor, Upton, Mass.:

I claim the combination with the clamping jaws of the screw shafts, B and c, gears, E D, and crank, F, substantially as set forth.

I also claim operating the clamping jaws in boot-crimping machines by means of two parallel shafts, each shaft having a gear which meshes into the gear upon the other shaft.

50,789.—Grain Dryer.—H. H. Beach, Rome, N. Y.:

I claim, First, The employment of a perforated rotary cylinder, or drum, which is constructed that grain can be passed through it in a continuous stream, and subjected at the same time to currents of air, and by flyers or buckets, h h, substantially as described.

Second, Providing a rotating grain-drying cylinder, which is perforated, with a bonnet or cover, S, or its equivalent, substantially as described.

50,790.—Granary and Fruit House.—S. R. Beckwith, Cleveland, Ohio:

I claim, First, The drying of grain in bins or boxes by causing a current of cold, dry air to be circulated through the same by means of the pipes, h h' and I, in combination with the ice chamber, D, substantially as set forth.

Second, I claim the chamber, D, rack, D', slotted frame, F, and and annular or rectangular chamber, N, in combination when constructed substantially as and for the purpose set forth.

Third, I claim the ice floor, a, in combination with metallic troughs, c, and wood gutters, e, constructed and arranged substantially as and for the purpose described.

50,791.—Machine for Molding Potters' Ware.—Ephraim N. Blackmer, McGranville, N. Y.:

I claim the combination of the shouldered mandrel, b, and the molding box, b, operated as above set forth.

50,792.—Grain Dryer.—Alonzo T. Boon and Charles L. Stevens, Galesburg, Ill.:

First, We claim the heating of air from a force-pump blower, or otherwise, in a series of ring tubes placed within a cylindrical or other shaped furnace, and the application of it thereafter to the outer surfaces of rotary grain cylinders through perforated longitudinal tubes, substantially in the manner and for the purpose set forth.

Second, The passage of the products of combustion from the furnace into the oven through flues for increasing the heat therein, whereby the condensation arising from damp or moist grain is dried quickly or absorbed, substantially in the manner and for the purpose set forth.

Third, The passage of the products of combustion back again from the oven, together with the discharged hot air from the longitudinal tubes, and whatever volatile oil or other matter that may be emitted from the grain while drying, to the fire-box of the furnace, for facilitating the combustion therein, substantially in the manner and for the purpose as set forth.

Fourth, The combination of the longitudinal tubes, E, with the flues, H, whereby the hot air, in conjunction with the products of combustion in the oven, serve to give an increased heat therein, substantially in the manner and for the purpose as set forth.

Fifth, The ring tubes, a, air chamber, B, distributing pipes, C, longitudinal tubes, E, having jets or nozzles with oblong openings, smoke pipe, h, flues, H, and pipe, J, as constructed and arranged, substantially in the manner and for the purpose as set forth.

50,793.—Steam-engine Governor.—Augustus Brown, New York City:

I claim the swivel arm, C, and spring, k, in combination with a governor and its valve and with the belt which serves to impart motion to said governor, substantially as and for the purpose described.

[The object of this invention is to combine with the governor of a steam engine a stop motion, which is so arranged that when the belt of the governor breaks or parts from some cause, the throttle valve will be closed, and the engine is prevented from running away and doing some injury.]

50,794.—Ventilator.—B. J. Burnett, Mount Vernon, N. Y.:

I claim the construction and arrangement of the air ducts and regulating valves, substantially as and for the purpose herein specified.

50,795.—Glass Caster Wheel.—J. B. Capewell, Gloucester, N. J.:

I claim the employment of glass wheels with ribbed bushes, for casters, substantially as and for the purposes herein specified.

50,796.—Car Axle.—John W. Clark, Manchester, Wis.:

I claim a car axle, composed of the independent short axles, A, provided with the journals, a, having the projections, b, thereon, in combination with the central connection pieces, B, constructed and operating as and for the purposes herein set forth.

50,797.—Car Coupling.—Samuel A. Corser, Holyoke, Mass.:

I claim the arrangement of the draw-head, with its chamber, D, the gravitating pin, C, the pointed and notched shackle bar, B, the whole arranged substantially as set forth and represented.

50,798.—Construction of Baling Presses.—F. F. Cornell, Jr., New York City:

First, I claim forming a close press box or chamber by the employment or use of bars or strips of metal or other material placed between the upright posts of the framing, and working in suitable guides, and arranged so that their inner faces will be flush, or nearly flush, with the interior surface of the press box or chamber, and connected to the platen or follower and to the toggle levers, and operating substantially as and for the purpose herein specified.

Second, Forming feet or lugs, n' n'', upon the lower ends of the bars or strips, M M', and connecting together each pair by the rods, r, substantially as and for the purposes herein shown and described.

Third, The use in a toggle lever press of the lever sills, E E, and sheave frame, F F F, and guide sheave, d d d d, so arranged as to form a secure foundation for the fulcrum points of the radii of the toggle levers, and at the same time provide a means of carrying the chains, d' d', around the press chamber, so that the plane of the motion of the lower ends of the toggle levers and of the capstan used for winding the chains connected with the same may be placed at any required hight above the base of the press chamber, substantially as and for the purposes herein specified.

Fourth, The joints in the lower part of the suspension rods, in combination with a side door or doors for liberating the ball from lateral pressure, substantially as described.

Fifth, The use of mechanism for retaining and liberating the platen on finishing the bale, substantially as described.

Sixth, The use of mechanism for opening the feed door automatically, substantially as described.

Seventh, The use of mechanism for liberating the cope automatically from the fixed position, so as to be used as a beater, by the action of the lifting rope, substantially as described.

50,799.—Double-lever Fishhook.—Germond Crandell, Washington, D. C.:

I claim the lever hooks, A A, either with or without the side hooks, a a, in combination with the bait-holder, b, and the spring, d, the whole arranged to operate substantially as and for the purposes herein set forth.

50,800.—Refining Lead.—John J. Crooke, New York City:

I claim the improved process of refining impure lead by treating it, while melted, with the melted oxide of lead, substantially in the manner herein before set forth.

50,801.—Neck Yoke.—Jeptha Cummings, Perry, Mich.:

I claim the combination of the pivoted lever, F, rods, E E, and sliding rings, C, arranged in the manner and for the purpose described.

[The object of this invention is two-fold—first, to have the yoke adjustable in such a manner that it may be vertically lengthened or shortened so as to have a short and long yoke in one; and, second, to have it so arranged that it will equalize the draft, or, rather, subject each horse to an equal share of the labor of holding back the vehicle and its load in descending an eminence.]

50,802.—Roller for Washing Machines.—John Danner, Canton, Ohio:

I claim a washing-machine roller, the ribs of which are covered by sheet rubber or rubber cloth, and which is held to the ribs by the pieces, C, or their equivalents, clamping the edges of the rubber substantially in the manner and for the purpose herein described.

50,803.—Device for Spurring or Driving Horses.—John Davis, Northampton, Ill.:

I claim the attachment to a sweep horse-power of a series of rods provided with spurs and arranged with suitable levers, and in such relation with the sweeps that all of the horses attached to the power, or such as require it, may, by a single manipulation of a lever, be spurred simultaneously, substantially as described.

[The object of this invention is to obtain a simple device by which horses may be spurred in a sweep horse-power without the aid of a driver, and a plurality of horses, when used, spurred simultaneously —that is to say, those which require it—the spurs only acting upon these which do not perform their share of the work.]

50,804.—Manufacture of Steel.—Julien Derby, New York City, Alexander Trippel, Brooklyn, N. Y., and Eugene Ganssion, Baltimore, Md.:

First, We claim the tweers passing through the walls of an arch and carrying steam to the liquid pig after it has left the furnace, so as to produce granulation.

Second, The water tank or reservoir placed under said arch, for the purpose of receiving and chilling the granulated pig.

Third, The tweers adapted to the furnace, Fig. 2, for the purpose of carrying steam to the reheated granular pig, with a view to transform it into magnetic oxide; and

Fourth, We further and especially claim the general disposition of the appliances herein described and figured, for the production of said granulated, chilled and oxidized iron, as herein substantially set forth and specified.

50,805.—Grinding Mill.—Roswell Denison and John B. Moon, Grand Rapids, Mich:

We claim the combination of the fan blower, d, air pipes, r t, arranged and described, and the discharge pipe and chamber, y z, in which latter the air is withdrawn from the inside of the curb, distinct from the aperture through which the meal is discharged.

[This invention consists in supplying currents of cold air to the interior of the mill-stone curb, and also through and into the eye of the stone, for the purpose of exhausting the moisture from the wheat as it is being ground, and thus preventing its gathering upon and adherence to the surface of the stone and curb, and other contiguous parts, where it soon sours; the air thus charged with the moisture from the wheat then passing freely out of the curb into a receiver, where, leaving such particles of wheat as may have been carried with it, it escapes to the atmosphere.]

50,806.—Stopper for Fruit Jars.—Charles R. Doane, Spotswood, N. J.:

I claim the improved stopper, composed of the radially divided or notched tightening disk, B, combined with the packing ring, D, and counter disk, C, substantially as and for the purpose herein specified.

50,807.—Car Spring.—George Douglass, Scranton, Pa.:

I claim the elastic plates, C, in combination with blocks, B B', of india-rubber or other suitable elastic or yielding substance, arranged within a box, A, to operate in the manner substantially as and for the purpose herein set forth.

50,808.—Screw Thread Cutting Tool.—Casper Dreher, Detroit, Mich.

I claim as an article of manufacture a tongs whose jaws are provided with dies and set screws, substantially as described and represented.

[This invention consists in attaching to each of the inner faces or surfaces of two jaws, made of cast iron or other suitable metal, and susceptible of being opened and closed at pleasure, and directly opposite to each other, a steel die, having their inner surfaces or faces partially cut out in a circular shape, and provided with a series of screw-threads of corresponding size and pitch to those of the bolts or clips, which it is intended to restore or cut.]

50,809.—Hat.—Jeremiah H. Earle, Fall River, Mass.:

I claim the separation of the body of the hat into two parts in front, and making the inside part or body open at the top and bottom, substantially as described.

I also claim fastening the sweat leather to the inside part or body, and the lining and brim to the outside.

50,810.—Washing Machine.—John B. Fisher, Cincinnati, Ohio:

I claim the washboards, b, folding leaves, d, circular bosses, c', and regulating rod, f, combined as above specified, and for the purposes set forth.

50,811.—Car Coupling.—H. H. Fleming.—Kokomo, Ind.:

I claim the yielding draw heads, B B, in connection with the pin-sustaining bars, H, arranged substantially as shown, so that when the draw heads are pressed inward or forced back in consequence of coming in contact with each other, the bars, H, will be actuated, and the pin let down through the link or shackle.

I also claim, in connection with the yielding draw heads and pin-sustaining bars, the yielding plates, D, arranged to operate in connection with the spring-catch links and draw heads, substantially as and for the purpose set forth.

[This invention relates to a new and improved car coupling, of that class which are termed self-acting or self-coupling, and it consists in a novel arrangement of the draw bar, and the manner of supporting and letting fall the coupling pin, and the retaining of the link or shackle in proper position, whereby the coupling is made to act in the most efficient and perfect manner, and without the liability of getting out of repair.]

50,812.—Crucible Mold.—Thomas G. French, Jersey City, N. J.:

I claim mounting the forming tool for the interior, substantially as and for the purpose set forth.

I also claim securing the mold in the chuck by means of the screwed bars, K, and grooved hoop, substantially in the manner set forth.

50,813.—Stone Breaker.—P. W. Gates and D. R. Frazer, Chicago, Ill.:

We claim, First, Constructing a stone breaker, with a primary cylinder jaw, G, and a movable breaking jaw, B, and arranging these parts substantially as described.

Second, So arranging a single re-breaking device, L, with respect to two primary breaking devices, B G, one of said devices being a cylinder, that the stone will be subjected to a second breaking operation after it leaves the primary breakers, by means of a co-action of the primary and secondary breakers, G L, substantially as described.

50,814.—Machine for Binding Grain.—Albert Goodyear, 2d, New Haven, Conn.:

I claim, First, The twister, T, constructed substantially as described, so as to gather the straw and twist the band in the manner described.

Second, The combination of an apparatus for twisting the band, substantially as described, with a mechanism for gathering the grain to be bound into bundles.

Third, The twister, H', in combination with the twister, T, for the purpose specified.

50,815.—Carpet Bag.—Nicholas Groel, Newark, N. J.:

I claim the metallic corner piece herein described, constructed with the flange, f, and prongs, h h, and adapted for application to a traveling bag, in the manner and for the purposes specified.

[This invention consists in attaching to the corners of traveling bags, metallic corner-pieces, made of such a form that they can be readily and with no trouble fastened to the bags, and without materially increasing the expense of manufacture.]

50,816.—Rolls for Rolling Railroad Rails.—A. J. Gustin, Worcester, Mass.:

I claim the combination and arrangement of a set of three high rolls, A, B, and C, for rolling railroad iron, constructed, arranged and operating as set forth, whereby the blank spaces in the top and bottom rolls as heretofore used are utilized and made available, as shown and decribed.

50,817.—Feathering Paddle Wheel.—Edgar Haight, Buffalo, N. Y.:

I claim, First, The combination of the axially hung buckets, F, having grooved ends, G, and the eccentric rim, C, and pins, g, by which the plane of the buckets may be made to radiate during their entire revolution from the summit of the wheel, substantially as described.

Second, The brackets, I, applied to the wheel, C, to operate in connection with the buckets, F, substantially as and for the purpose specified.

50,818.—Instrument for Tuning Pianos, Organs, Etc.—L. V. Hall, Mount Morris, N. Y.:

I claim the special construction and arrangement of the automatic instrument herein described, for tuning pianos and organs, the same consisting of the weighted bellows, B, tube board, C, valves, D D, whose stems are provided with the notches, p p, for engaging with the catch, o, springs, n n, and the stop board, E, the whole so operating that the device is self-acting, and so that a simple tone or a chord may be produced at once, and without the constant attendance of the operator, substantially as herein set forth.

50,819.—Seat for Drivers and Conductors of Street Cars.—Thomas C. Hambly, San Francisco, Cal.:

I claim a swinging seat for street or other cars, applied to the dash board or other place on a car, constructed substantially as shown and described.

[The object of this invention is to provide a movable seat for conductors and drivers of street cars. It consists in applying a seat upon the end or upper bar of a crane or swinging frame, and bringing the crane to the inner side or face of the dash board of the car. When the seat is to be used, the crane is swung out from the dash board, and when it is not to be used it can be swung against the dash board and secured thereto by a spring catch. The seat itself is weighted on one side, so as to take always a vertical position on the top of the crane.]

50,820.—Tool for Opening Boxes, Etc.—Ephraim Hambujer, New York City:

I claim a combination hammer containing a flat face and a sharp cutting edge, a stationary claw and a movable chisel claw, and a scraper, substantially as herein set forth, as a new article of manufacture.

[This invention relates to a hammer which, besides the ordinary flat face for driving nails, presents a cutting edge for cutting off hoops in opening boxes, or for cutting a recess in the edge of a box in closing, a scraper either stationary or adjustable, for scraping off the address on a box or for other similar purposes, a stationary claw for extracting nails, and a movable chisel claw, inserted in a socket in the hammer for the purpose of forcing open the covers of boxes in such a manner that one and the same tool contains all the devices necessary or convenient in opening and closing boxes and for other operations.]

50,821.—Petroleum Stove.—Thomas C. Hargrave, Boston, Mass.:

I claim the pressure pipe, b', connecting the reservoir with the vaporizer, substantially as and for the purpose above set forth.

50,822.—Bridle.—S. B. Hartman, Millersville, Pa.:

I claim a bridle provided with a safety attachment formed by the employment or use of supplemental reins, connected directly to the cheek straps which pass through the rings of the bit, substantially in the manner as herein set forth.

I further claim the fitting or placing of the supplemental lines or reins within the ordinary reins, when such supplemental lines or reins are connected to the cheek straps of the bridle, and the former pass through the rings of the bit, substantially as set forth.

[This invention relates to a new and improved safety attachment for bridles, and is an improvement on a bridle for which Letters Patent were granted to this inventor, bearing date June 28, 1864. The object of the present invention is to simplify and render less cumbersome the device as originally arranged, and at the same time retain all its advantages, and possess the additional and important one of allowing martingales to be used.]

50,823.—Mode of Adjusting Car Wheels upon Axles.—Henry Helm, Alleghany City, Pa.:

I claim placing the wheels, B, on the axle between two flanges or bearings, a b, secured tightly on the axle, the flange or bearing, b, being provided with two journals, c c', on the former of which the wheels are placed, and the latter fitted in the ordinary boxes, substantially as and for the purpose herein set forth.

[This invention relates to a novel way of applying car wheels to their axles, whereby the advantages attending the securing of the wheels permanently on the axle, and leaving the latter to rotate—the usual plan—are obtained, as well as those attending the placing the wheels loosely on a fixed axle, or one which does not rotate, while the disadvantages of both modes are avoided.]

50,824.—Coupling for Railroad Cars.—John R. Hill, Millville, N. J.:

I claim the shape and construction of the jointed car coupling and lever, combined as herein decribed and for the purposes set forth.

50,825.—Wind Wheel.—Earl F. Hough, Martinez, Cal.:

I claim the combination and arrangement of the apron, K, with the wind or storm board, P, together with the wheel box, B, attached to the swivel turn-table, N, and revolving upon the track, R R, by means of rollers, M M, substantially as and for the purposes set forth.

50,826.—Power Presses.—Charles W. Johnson, Waterbury, Conn.:

I claim, First, The combination described of the gear, I, and plate, P, or their equivalents, constructed and arranged to operate together, substantially as and for the purpose specified.

Second, The combination and arrangement of the cam, S, lever, N, and bolt, r, in the manner substantially as and for the purpose specified

50,827.—Bridge.—Joseph E. Kauser, New York City:

I claim, First, Combining in the construction of bridges, viaducts, etc., iron or cast iron, round or polygonal cylinders or tubes, the length of which shall not exceed twelve times their diameter, in the manner herein described; that is to say, in such a way that the pressure of the inherent or extraneous weight shall act in the direction of the longitudinal axis of said cylinders or tubes, substantially as herein described and for the purpose set forth.

Second, Combining the semi-arches which form the bridge with each other at the center of the bridge, and with the abutments at its ends, in the manner described; that is to say, making the central ends of the parallel semi-arches alternately convex and concave, so as to fit into each other, and lower ends of said semi-arches convex so as to fit into concave supports on the abutments, substantially as described and for the purpose stated.

[This invention consists principally in applying, in the construction of bridges, viaducts, etc., iron or cast-iron hollow cylinders or tubes, whether round or polygonal in form, in such a way that the strain shall be in the direction of their longitudinal axes, without relying upon their lateral or cohesive strength; and also in neutralizing the effect of the contraction and expansion of the materials, by constructing the arch or bridge in two separate parts or semi-arches, the lower ends of which are convex and rest in concave recesses, and the upper ends at their points of contact terminate in alternate concave and convex projections, fitting into each other in the form of a pair of hinges, but without the connecting bolt.]

50,828.—Sulky Plow.—Albert Keith, Lisbon, Ill.:

I claim the combination of the lever, v, with the sliding-brace, z, guide standard, a, and standard, M, and the arrangement and combination of the standard, I, with the arm, K, and standard, M, sub-substantially as set forth.

50,829.—Marble-finishing Machine.—Henry W. Kent, Battle Creek, Mich.:

I claim, First, Communicating a combined rocking or reciprocating motion to the grit, S', or other rubber, by attaching the same rigidly to the free end of the pitman, R2, by means of the connecting forks, i i, or other equivalent device, substantially as and for the purpose herein specified.

Second, The use of the single and double-jointed pitmen, R' R2, in combination with the frame, A, and crank arrangement, substantially as herein described and set forth.

50,830.—Mowing Machine.—H. F. Lovejoy, Ninevah, N. J.:

I claim, First, The bar, F, attached to the main frame, C, and passing over the draught pole, A, in connection with the lever, G, link, a, and bar, b, and the supplementary frame, H, all arranged as shown, for the temporary raising of the points of the fingers of bar, N, for the purposes specified.

Second, Elevating the finger bar, N, by means of the bar, P, and levers, Q R, arranged substantially as shown and described.

Third, The shaft, S, in connection with the wheels, T X, and levers, U Y, arranged and applied to the finger bar, N, to regulate the hight of the cut of the sickle, substantially as described.

[This invention relates to a new and improved means for adjusting the finger bar, whereby the same may be raised above the surface of the ground when not required for use; as, for instance, in turning the machine at the ends of a field, or in transporting it from place to place; and also adjusted so that the sickle may cut higher or lower, as may be desired, and prevented from clogging up with cut grass, a contingency of quite frequent occurrence with the ordinary machinery in use.]

50,831.—Ventilating Car Window.—George Mann, Jr., Ottowa, Ill.:

I claim, First, The side windows or valves, C, arranged so as to open and close, substantially as herein specified.

Second, The spring, c, or an equivalent thereof, in combination with the side windows or valves, for the purpose herein specified.

Third, The noses or projections, b, in combination with the spring, c, for the purpose specified.

[This invention consists in constructing a window for a car in such a manner that the frame of the window shall be placed sufficiently far from the body of the car to admit of there being applied to it, on each side, a valve or side window, which can be opened or closed, as desired, and remain in either position, for the purpose of ventilating the car, which is effected by the mere forward motion of the car.]

50,832.—Apparatus for Filling Bottles.—John Matthews, Jr., New York City:

First, In apparatus for filling bottles, I claim an arrangement of the parts, whereby the bottles can be filled in an inverted position, substantially as herein specified.

Second, In an apparatus for filling bottles, I claim two separate passages for the entrance of the liquid and egress of the air, substantially as herein described.

Third, The socket piece, D, provided with a cup having an elastic lining, and with an inlet passage, b, and fitted with a sliding tube, E, substantially as and for the purpose herein specified.

Fourth, The elastic tube, e, in combination with the sliding tube, E, substantially as and for the purpose herein described.

Fifth, The safety valve, G, in combination with the sliding tube, E, substantially as and for the purpose herein specified.

50,833.—Machine for Cutting Scale Board and Match Splints.—J. K. Mayo, Portland, Me.:

First, I claim the arrangement in the reciprocating frame of the dogs, N a a, and weighted pressure bar, I, substantially as described.

Second, The arrangement of the stationary knife, C, throat piece B, deflecting plates, k l, and rollers, Y Z, substantially as described.

Third, The arrangement of the sliding frame, E, straps, T S, pulley, Y, drum, P, and weighted levers, R R', substantially as and for the purpose described.

Fourth, In combination with the subject matter of the second claim, I claim the vertically adjustable slitting knife, D, as and for the purpose described.

50,834.—Instrument for Extracting Nails.—Robert McConnell, Lawrenceville, Pa.:

I claim the lever, A, with the pincers, B and B', in combination with the lever, C, and wedges, l and m, when constructed and arranged as and for the purpose set forth.

50,835.—Treating Straw for Paper Pulp.—H. B. Meech, Fort Edward, N. Y.:

First, I claim my above-described method of treating straw or other material, preparatory for making paper pulp, by so charging it into the boiler, letting into and on to it the liquor and solutions applying the steam and fire heat rotating the boiler, and letting the same remain at rest, in the manner substantially and for the purpose above described.

Second, I claim the use of a weak alkaline liquor, not to exceed two degrees of strength (Baume) in the treatment o straw under pressure, substantially and for the purpose above described.

Third, I claim the combination of the use of such weak alkaline liquor with my method of treating straw, as set out in my first claim herein, in the manner substantially and for the purpose above described.

50,836.—Isomeric Diaphragm Furnace for Desulphurizing Ores.—Daniel Minthorn, New York City:

First, I claim the intervening chamber or diaphragm containing iron borings or equivalent material, whether stationary or rotary, between a fire chamber and an ore receptacle, for the purposes above specified.

Second, I claim, in combination with the above, the annular or equivalent hollow form of the said diaphragm.

Third, I claim the perforated cones or hollow projections in the chamber or diaphragm, D, arranged substantially in the manner and for the purposes herein set forth.

Fourth, I claim the inclined plates forming a tunnel-bottomed furnace for collecting the disintegrated material, arranged relatively to the ore chamber, G F, and to the other parts, substantially in the manner and for the purposes herein set forth.

Fifth, I claim the within-described arrangement of the dishing grate or basket, F, relatively to the annular or hollow diaphragm, D, so as to facilitate the presentation of a thicker stratum of the ore near the center, where the currents of gases and steam strike directly, than near the edges where they strike with less force, substantially as herein specified.

Sixth, I claim the arrangement of the passages, A' B and C, and dampers, A2 b and c, for changing the direction of the heat and gases, substantially as and for the purposes herein described and set forth

50,837.—Wheel Plow.—I. F. Nutting, Palmer, Mass.:

I claim the combination of the head lever, E, connections, a b F, with a plow, D, and axle, B, and draft pole, C, when mounted on the wheels, A A, substantially in the manner and for the purpose described.

50,838.—Attaching Augers to their Handles.—H. W. Olney, Alleghany, Pa.:

I claim the combination of the tube, a, to which the hand pieces, b b, are attached, so as to form the handle of the tool with the tubular sleeve, c, placed over the tube, a, so as to turn thereon, and having an aperture, m, to receive, and a slot, p, the edges of which pass under and hold the barbed head of the auger or bit, and a spring catch, f, to hold it in place, substantially as hereinbefore described.

50,839.—Clap Board.—Hudson Osgood, Hartland, Me.:

I claim in boards for siding and roofing houses, making their inner surfaces plane, their outer surfaces angular, and jointing their ends by means of metallic strips or plate, so as to protect the tongue and groove joints of adjacent boards from the weather, substantially as described.

[This invention consists in a novel construction of clap-boards and other boards, which it is desirable to prepare with a weather joint, the back of the boards presenting a plane surface, and the front an angular surface, so that when several are jointed together they will present the appearance of ordinary clap-boarding.]

50,840.—Elastic Supports for Bedsteads, Etc.—James Perry, Brooklyn, N. Y. Antedated Nov. 2, 1865:

First, I claim the strips, a, arched ribs, b, and elastic support, c, arranged as represented, whether the spring, c, be supported by a pin, d, or attached to the adjacent part or strip, a, as and for the purpose specified.

Second, I claim supporting the compound slats, a b c, on corresponding compound transverse supports, i, so as to obtain an elastic action in both directions, substantially in the manner and for the purpose herein set forth.

Third, I claim the elastic additional supports or stops, c' d', arranged substantially as specified relatively to the compound slats, a b c, for the purpose herein set forth.

Fourth, I claim the knobbed or swelled springs, c q, arranged to operate in combination with the strips, a, and arched ribs, b, or their equivalents, in the manner and for the purposes substantially as specified.

50,841.—Belt Clasp.—I. N. Plotts, New York City:

I claim the buckle plate, A a b, made substantially as herein shown and described.

[This invention is designed as an improvement over the ordinary buckles, which are provided with tongues, and is more especially adapted for garments; such, for instance, as the waistband of ladies' skirts, gents' pants, vests, etc., although it may be applied to other purposes.]

50,842.—Hame Fastener.—A. J. Preston, Dryden, N. Y.:

I claim the combination of all the parts, as described, except the ring, F, and for the purpose of fastening hames.

50,843.—Friction Match for Lighting Cigars, Etc.—Henry Reiman, Brooklyn, E. D., N. Y.:

I claim the preparation of pasteboard or other stock for friction matches with a compound solution of chlorate of potash and niter, substantially as herein described.

50,844.—Harvester.—G. W. Richardson, Grayville, Ill.:

I claim as new the rod, E, in combination with the bars, D E, connected by a joint, a, when arranged in connection with the finger bar, C, and bar, G, and all applied to the main frame, A, substantially as and for the purpose set forth.

[This invention relates to a new and useful improvement in connecting the finger bar to the main frame of the machine, whereby the points of the fingers or guards, and, consequently, the points of the cutters of the sickle, may be elevated in a greater or less degree, as circumstances may require, and be firmly retained in the position in which they may be set or adjusted.]

50,845.—Vapor Gas Burner.—J. J. Riddle, Cincinnati, Ohio:

First, I claim the needle, t, shaped and operated as aforesaid, for the uses and purposes before mentioned.

Second, I claim the holes, Q, or their equivalent, placed at any point in the stem or flue, f, within the body of the burner.

Third, I claim the hot-air chamber, r, or its equivalent, through which the air freely passes to holes, Q, and mingles over nipple, d, with the gas issuing therefrom.

Fourth, I claim the plate, G, or its equivalent, with one or more openings, c, in it, for the uses and purposes mentioned substantially.

Fifth, I claim the flue, f, or its equivalent, above the nipple, for draught and mingling purposes.
Sixth, I claim the tube, x, passing into the body of the burner, for heating purposes.

50,846.—Pumps for Oil Wells.—Timothy Rose, Cortlandville, N. Y.:
I claim the attaching or connecting to the lower end of the pipe or working barrel of pumps in oil or bored wells, one or more globes, with holes in the same in the direction of the center thereof, as above described, and for the purposes set forth.

50,847.—Flour Sifter.—Ziba Saunders, Tewksbury, Mass., and Abiel F. Saunders, Boston, Mass.:
I claim as an improvement in flour sifters the revolving shaft, C' carrying a series of rods or beaters, D, in combination with a yielding bearing, b, constructed and operated substantially as described.

50,848.—Bolt-heading Machine.—Franz Schweizer, New York City:
I claim, First, The tongs, g, with an adjustable jaw, applied in combination with the longitudinally sliding head, G, and heading tools, in the manner and for the purpose substantially as herein set forth.
Second, Supporting the head, G, by springs, as and for the purpose specified.
Third, The combination of a series of heading tools, dies, and clamping jaws, with the reciprocating carrying head G, and cam, c5, and tappet, c4, constructed and operating substantially as and for the purpose described.
Fourth, The heading dies, h, with yielding jaws, h°, constructed and operating substantially as and for the purpose set forth.
Fifth, The swinging levers, i i1, i2, operated by cams. b **, and applied in combination with the clamping jaws, and with the tongs, g, substantially as herein described, whereby the bolts are automatically raised to such a position that the tongs can readily grasp them and carry them along to the next surrounding heading dies.
Sixth, The pusher, j, applied in combination with the heading dies, h', and carrying head, G, in the manner and for the purpose substantially as herein set forth.

50,849.—Car Spring.—John J. C. Smith, Philadelphia, Pa.:
I claim a car spring consisting of the combination or assemblage of the individual and comparatively small springs of convoluted or zig-zag shape, retained in their relative proximity, and operating substantially in the manner described.

50,850.—Car Spring.—John J. C. Smith, Philadelphia, Pa.:
I claim, First, The wires, C C, which pass through the convolution of the spring pieces, A.
Second, I also claim the wire or other washers which connect the said wires, C C, and thereby tie the pieces, A, to each other.
Third, I also claim the method of securing the spring pieces, A, to the upper and lower plate or to an equivalent frame or rods.

50,851.—Churn Dasher.—Milton J. Smith, Dansville, N. Y.:
I claim, First, The combination of the perforated and inverted trough-shaped portion, A, with the elevated frame, B, constructed to operate substantially as described.
Second, The construction of the portion, A, with concave sides, a a, having perforations d and e, through them, substantially as described.

50,852.—Buckle.—James Stanbrough, Newark, N. J.:
I claim a buckle provided with two or more spurs or projections, to fit into a corresponding number of holes in the part or strap which passes through the buckle, substantially as herein shown and described.

[This invention relates to a new and useful improvement in buckles, more especially designed for harness buckles, and for connecting those straps or parts which are subjected to considerable strain, as for instance, the connecting of the traces to the hame straps, and the thill tugs to the saddle straps. The invention consists in having the buckle provided with two or more points, spurs, or projections to pass through the strap, trace, or other part, so that the strength of one point on the buckle and one hole in the strap or trace will not be alone depended upon, as is the case with the ordinary tongued buckle.]

50,853.—Horse Rake.—A. C. Stone, Steeleville, Pa.:
I claim attaching the thills or shafts, B B, to the axle by the bent arms a a, hinged to the upper side of said axle, so that the load will be discharged from the rake by the power of the draught animal, substantially as herein described.

50,854.—Cartridge Retractor for Breach-loading Fire-arms.—T. L. Sturtevant, Boston, Mass.:
I claim the combination and arrangement of the tripping stud, m, the arm, k, and the spring, l, with the block, h, or the barrel, a, the cartridge shell discharger, F, and the lever, D.
I also claim the combination and arrangement of the groove, f, and the stud, e', with the barrel, A, and the lever D, the cartridge-shell discharger, F, and the stud, m, the arm, k, and the spring, l, arranged and applied to the said discharger and barrel substantially as specified.

50,855.—Suspended.

50,856.—Shoe-edge Burnishing Machine.—Nathanial S. Thompson, Stoneham, Mass.:
I claim the combination of the adjustable guide, F, with the burnishing wheel, E, or the mechanical equivalent of such combination, substantially as and for the purpose specified.

50,857.—Drill-rod Attachment.—R. S. Torrey, Bangor, Maine:
First, I claim the brace bar, B, Fig. 6, or its equivalent which connects the temper screw, E, with wing swivel, G, Fig. 2, doing away with jam nuts, substantially as set forth for the purpose described.
Second, I claim the hand wheel, F, Fig. 7, in combination with screw, E, and the ratched head, K, Fig. 7, as herein described.
Third, I claim the wing swivel, G, Figs. 4 and 5, and thumb latch, I, Fig. 4, which makes the whole thing secure while the machine is in operation, the whole operating in the manner and for the purpose set forth.

50,858.—Suspended.

50,859.—Instrument for Gathering Apples.—Erastus Tyler, Hancock, Ill.:
I claim an instrument for picking apples having a perforated plate, B or its equivalent, a slide, as described, and plate and pins, C, or their equivalent, combined and arranged substantially as described.

50,860.—Manufacture of Friction Matches.—Philos B. Tyler, Springfield, Mass., and William M. Chandler and L. F. Standish, Chicopee Falls, Mass.:
We claim the continuous or equivalent repeating match composed of a strip of substance which when ignited will burn with a flame, combined with the preparation of sulphur and phosphorous, or the equivalent thereof, which will ignite by friction, put on along the whole length, or, as the equivalent thereof, in spots at given distances apart along the whole length, substantially as and for the purpose described.
And we also claim piercing the strips with holes and applying the material that ignites by friction thereto, to prevent such material from becoming detached therefrom, all substantially as described, and in the apparatus for using continuous or repeating matches, we claim the nose piece or tube through which the match passes in combination with the vibrating igniter, or the equivalent thereof, substantially as and for the purpose described.
We also claim in combination the nose piece through which the match passes, the roller, or equivalent thereof, for moving the match and the igniter, or the equivalent thereof, as and for the purpose described.
And, finally, we claim in combination, the case for containing the match, the nose piece, the roller for moving the match, and the igniter, or the equivalents of them, as and for the purpose described.

50,861.—Hinge.—Lucian Upham, Pawtucket, R. I.:
I claim the combination and arrangement of the several parts, A C B, and D, when constructed and operated in the manner and for the purposes above set forth and described.

50,862.—Scouring Brick.—James Valentine, Woodbridge, N. J.:
I claim a scouring brick composed wholly or in part of the pulverulent mineral, which I have herein described as Woodbridge silex.

50,863.—Fire and Burglar Alarm.—Daniel Ward and Russel S. Luce, Lawsville Center, Pa.:
We claim, First, The bar, B, provided with the arm, E, in connection with the shaft, F, having a lip or projection, f, and an arm, G, all applied to or used in connection with an alarm mechanism, substantially as and for the purpose set forth.
Second, The spring, H, and the wheel or hub, I, provided with the arm, j, in connection with the rod or stop, k, substantially as and for the purpose specified.
Third, The weights, K, connected by cords, l, to pulleys, p, around which cords, q, pass with weights, r, attached, all arranged as shown, to operate the alarm in case of fire, as described.
Fourth, The plate, C, attached to the upper end of the bar, B, in connection with a suitable match holder, all arranged to operate as set forth.

[This invention relates to a new and improved device by which an alarm will be instantly given, in case of a fire occurring in any apartment of a building, or, in case of a burglar entering through a door or window of a building, and when a fire occurs, the device when the alarm is sounded, indicates in what locality of the building the fire is, and at the same time lights a candle or lamp, so that the occupant may proceed to the spot at once, the lighting of the lamp or candle being also performed in case the alarm is sounded by the entrance of burglars.]

50,864.—Bottle Stopper.—Thomas B. Way, Bennington, Vt.:
I claim constructing the head of a bottle, or the like, in such a manner that a packing of rubber or some other flexible material, may be inserted and held therein, whereby I am enabled to use wooden plugs, instead of corks, as heretofore, for stopping or corking soda water, beer, and other bottles, substantially as shown and described.

59,865.—Hot-blast Furnace Lamp.—J. H. Wilhelm, Chicago, Ill.:
I claim, First, The combination of the air chambers, V V' V, with the air pipes, 5 5 5, for the purpose set forth.
Second, The arrangement and combination of the coiled air pipe, W, with the air chambers, V'' V' V'', for the purpose set forth.
Third, The combination of the heat-concentrating blower, L, with the platform, M, substantially as described, and for the purpose set forth.
Fourth, The elongation of the air chambers, V'' V V V'', terminating in the blow pipes, 2 2 2, substantially as described and set forth.

50,866.—Apparatus for Heating Soles and Shoes.—Freeman Winslow, Marblehead, Mass.:
I claim the combination of the series of wires, a a a, etc., with the lamp or means of generating heat, and the plate, A, or its equivalent, for supporting the said wires, the whole being arranged substantially as and for the purpose specified.

50,867.—Bottle Stopper.—John Woolaver, Suisun, Cal.:
I claim the method of sealing the bottle by means of the tube, D, or its equivalent perforated to correspond with the hole, B, in the neck of the bottle, substantially as described, and for the purpose set forth.
Second, I claim the projection and grove, I, in combination with the lever, H, with the button or disk, G, and the rings, E E, arranged and operating substantially as described and for the purpose set forth.

50,868.—Instrument for Opening Bottles.—John Woolaver, Suisun, Cal.:
I claim in combination with the forcips, K, the perforated tube, F, having an opening at one end and closed at the other, together with the bar, E, substantially as specified and for the purposes set forth.

50,869.—Machine for Rolling Gun Barrels.—Joseph Yates, Mott Haven, N. Y. Antedated Oct. 25, 1865.:
I claim the arrangement of the segmental rolls, C, upon the extremities of the two shafts, and securing the dies to said rolls in the manner described, in combination with the adjusting screws, F, the gages, J, and bed plates, K, as and for the purpose set forth.

[This invention relates to a new and improved machine for rolling or drawing out gun barrels and other articles of metal which require to be of taper form.]

50,870.—Button-hole Sewing Machine.—Walker B. Bartram, Redding, Conn., assignor to himself and Henry B. Fanton, Danbury, Conn.:
I claim, First, The combination of the arm, H, with the wheel, I, and the eccentric of the driving shaft, or its equivalent, of a sewing machine, substantially as and for the purpose set forth.
Second, The combination of the wheel, I, with the arm, H, and the catch, J, substantially as and for the purpose set forth.
Third, The combination of the catch, J, with the wheel, I, and the plate, A, substantially as and for the purpose set forth.
Fourth, The combination of the cloth-holder, O, with the movable plate, A, and the circular plate, N, substantially as described and for the purpose set forth.
Fifth, The combination of the guide, P, with the movable plate, A, and the cloth-holder, O, substantially as and for the purpose set forth.
Sixth, The combination of the plate, A, with the wheel, I, and the springs, L, or equivalent, to give an alternate backward and forward motion to the plate, A, substantially as described and to the effect stated.
Seventh, The combination of the stop lever, R, with the feed bar of a sewing machine, substantially as described and for the purpose set forth.

50,871.—Process for Coloring Photographic Prints.—J. O. Beyse, St. Louis, Mo., assignor to himself and J. Utossy, Leavenworth, Kansas:
I claim, First, The manipulation of photographic prints herein described, and for the purpose specified.
Second, The preparation of colors, and fixing them upon photographic prints, substantially in the manner described.

50,872.—Tanning.—Sanford A. Hickel, Roan County, W. Va., assignor to himself, C. and J. and B. F. Armstrong, Jackson County, W. Va.:
I claim the employment or use of manure, in combination with bark or other tanning material, substantially as and for the purposes set forth.

50,873.—Washing Machine.—John Keane (assignor to himself and William J. Snyder), New York City:
I claim, First, In washing machines, the dasher, H, fitted at its ends to move in grooves in the frame, F, substantially as shown, in combination with the said frame, substantially as described.
Second, I also claim the dasher, constructed and operated as described, in combination with the roller, G, substantially as above shown.
Third, I also claim the vibrating frame, F, which carries the dasher, H, and roller, G, in combination with the fixed washboard, C, substantially as described.

[The object of this invention is to produce a washing machine worthy of a place in the laundry both on account of the saving of labor and of the preservation of clothes. The box to contain the suds and clothes has an abrading surface on the inside of its front, against which the clothes are brought by a frame capable of vertical and also of horizontal motion. The inventor has given the title of Peerless to his washing machine.]

50,874.—Manufacture of Mirrors.—Rudolph Keck (assignor to Simon Bache & Co.), New York City:
I claim the within-described method of precipitating upon glass plates nitrate of silver or other suitable substance or substances, by means substantially such as herein described, or any other equivalent means.

50,875.—Hot-air Engine.—Hiram Kilbourn (assignor to himself and Sylvester P. Babcock,) Waterloo, Iowa:
I claim, First, The balanced valves, P P U U, arranged respectively with the driving cylinder and air pump, and operated from the piston rod, L, substantially as and for the purpose specified.
Second, The rack, Y, attached to the sliding frame, S, in connection with the pinion, A, and the spring, C', substantially as and for the purpose set forth.

50,876.—Apparatus for Distilling Spirits.—Arnold Kreusler and W. T. Pelton (assignors to W. T. Pelton), New Lebanon, N. Y.:
We claim, First, The rectifier, b, with the plates, 11 12 and 13, for the purposes and as set forth.
Second, We claim the spiral dephlegmator, e, constructed and acting as set forth.
Third, We claim the rectifier, n, constructed in the manner and for the purposes specified.
Fourth, We claim the spiral dephlegmator, p, constructed in sections, as and for the purposes specified.
Fifth, We claim the water partitions in the tub containing the dephlegmator, p, constructed so as to allow the water in different parts of the tub to be different in temperature, as set forth.
Sixth, We claim the bent pipe and cock, u, at the lower part of the condenser, to retain a portion of the alcohol in the condenser or allow it to be entirely emptied, as and for the purposes set forth; and, in combination therewith, we claim the pipe, v, for the escape of gases, said pipe passing through the condensing water, as set forth.

50,877.—Manufacture of Soap.—Frank Kunkel (assignor to William B. Milne), Chicago, Ill.:
I claim, First, The process herein described of treating potatoes which have been previously boiled with the skins on with an alkali and subsequent boiling, substantially as set forth.
Second, The compound or composition of matter formed of boiled potatoes, alkali and creosote, or other antiseptic, substantially as and for the purposes set forth.

50,878.—Coffee Roaster.—C. A. Mills, Bristol, Conn., assignor to the Eureka Manufacturing Company, Boston, Mass.:
I claim, First, A rotating coffee receptable in which coffee is roasted, constructed of a wire cloth so as to form a screen or sieve, when said receptacle is rotated or operated through the medium of a clock movement, substantially as shown and described.
Second, In combination with the coffee receptacle constructed as set forth, I claim the lid or cover, K, arranged to fit over the receptacle, as described.
Third, The application of two springs, E E, to the clock movement, when the latter is used in connection with or to drive a rotating coffee receptacle, substantially as and for the purpose specified.
Fourth, The applying of the coffee receptacle to the device by having a socket, I, at one end of the shaft, H, of the clock movement, to receive one end of the shaft, J, of the coffee receptacle, while the journal at the opposite end of said shaft is fitted in an open bearing, c, substantially as described.

50,879.—Pitman Connection for Harvesters.—David M. Osborne (assignor to himself and Wm. A. Kirby), Auburn, N. Y.:
I claim connecting the pitmen of harvesting machines to the head of the cutter bar or cutters, or other connecting bars to their supports, by means of conical lug fitting into conical seats, and a draw or screw bolt passing through said lugs and seats in the line of their apices, substantially as and for the purpose described.

50,880.—Pitman Connections for Harvesters.—David M. Osborne (assignor to himself and Wm. A. Kirby), Auburn, N. Y.:
I claim a wrist-pin composed, first, of a hollow square or sided shank wrought on or securely fastened to the pitman or other connecting bar or rod; second, a sleeve having a cylindrical perimeter, and a square or sided opening to fit over the shank; and, finally, a through bolt to hold the sleeve to the shank, all arranged, constructed and operating in the manner and for the purpose described.

50,881.—Well-boring Apparatus.—Thomas J. Parke, Philadelphia, Pa., assignor to himself, J. Bryan, T. Gillespie, and E. A. Hintsicker:
I claim the case, A, with its openings, e e, piston, D, and rod, C, combined and operating with a drill or cutter, substantially as and for the purpose specified.

50,882.—Car Coupling.—Henry S. Shepardson, Shelburne Falls, Mass., assignor to H. S. Shepardson & Co.:
I claim the combination of the shackle bolt, B, and latch, C, with the shackle case of a railroad car, substantially as described.
The shackle bolt, B, when constructed with the tail, b, substantially as and for the purpose described.
The shackle case, A, when provided with the openings, F, in combination with the shackle bolt, B, and latch, C.

50,883.—Bed Bottom.—Francois Carre, Paris, France. Patented in France July 4, 1862:
I claim as new the spring, constructed in the manner and for the purpose above described.

50,884.—Apparatus for Purifying Alcohol.—Carl Johann Falkman, London, Eng. Patented in England Nov. 29, 1864:
I claim the within-described apparatus, composed of the serpentine channel, A, jacket, J, perforated bottom, B, and receptacle, C, with suitable supply and discharge pipes, constructed and operating substantially as and for the purpose specified.

[This invention has reference to that part of apparatus for distilling spirituous and other liquids in which the vapors, after separation from the wash or crude liquid by the process of evaporation, are purified from such impurities as are volatilized with them.]

50,885.—Printing and Dyeing Cotton, Linen, Etc.—Alfred Paraf, Mulhouse, France:
I claim the producing an aniline black upon fabrics or yarns by the action of chloric acid and free chlorine upon aniline or its homologues, or any mixture of the same, as herein described, or any modification thereof.

50,886.—Carriage Spring.—William Taylor, East Zora, Canada:
I claim the compound bow and scroll spring, B, in combination with the elliptic spring, D, constructed and applied for the purposes and substantially as described.

50,887.—Auger.—Horace T. Love, Vermillion Township, Kansas:
I claim the semi-circloid edges; the angles of deflection and inflection in disposing these edges in their relation to screw and periphery of the auger, and the combination of these edges with an obtuse angular disposition of them in their relation to the axis of the auger, as and for the purposes substantially set forth in the foregoing specifications.

REISSUES.

2,100.—Manufacture of Paper Pulp.—James B. Brown, Peekskill, N. Y., assignee of Julius Augustus Roth. Patented Aug. 15, 1865:
I claim, in the process of treating vegetable substances, the process, substantially as herein described, of subjecting fibrous vegetable substances to the action of chlorine gas, and for the purpose specified.

2,101.—Baling Press.—Frederick F. Cornell, Jr., New York City. Patented June 20, 1865:
I claim, First, The employment or use, in a beater baling press, of a suspended follower, in combination with a beater used as a fixed head.
Second, Connecting the levers, D, to the sliding sides, E, and follower, B, by means of the staples or eyes, b, and fulcrum pin, d, and rods, e e, or their equivalents, substantially as herein described.
Third, The pawls, H, so arranged as to engage automatically with the racks, I, upon the descent of the beater into the press chamber, thereby preventing its rebounding, and at the same time holding it in position to serve as a head block for the press, substantially as and for the purpose herein described.

Fourth, The racks, I and slides, I', in combination with the pawls, H, as and for the purpose specified.

Fifth, The standards, F F, and cross beam, G, in combination with the rod, h, and pawls, H, arranged to operate substantially as described.

Sixth, The detent rod, f', in combination with the projections, f, and standards, F F, substantially as and for the purpose hereinbeofre described.

Seventh, The cam, J, in combination with the traveling sides, E, and post, A, substantially as and for the purpose herein specified.

2,102.—Harvester.—Reuben Hoffheins, Dover, Pa. Patented Nov. 3, 1863:

I claim, First, The combination in a two-wheeled, hinged-joint machine, of a driver's seat mounted upon the main frame, with a raking mechanism mounted upon the finger-beam, and rotating on a vertical axis, or one nearly so, substantially in the manner described, for the purpose of enabling the driver to ride upon the machine while the rake is in operation.

Second, The combination in a two-wheeled, hinged-joint machine, of a shoe with a hinged joint in it, with a rake and platform having an extension, J2, and with a draft frame which sustains the weight of the cutting apparatus and raking apparatus, with platform attached at a point between the two drive wheels.

Third, The combination with a hinged-joint machine of the inner shoe and raking apparatus, substantially as described.

Fourth, The combination of a revolving or turning rake, extensible tumbling shaft, and driving shaft or axle of the main frame, substantially as described.

Fifth, The combination of a two-wheeled, hinged-joint machine, a raking apparatus, and a driver's seat mounted on the main frame, substantially as described and for the purpose set forth.

DESIGNS.

2,215.—Standard and Treadle of a Sewing Machine.—Joseph W. Bartlett, New York City.

2,216.—Drawer Pull.—Pietro Cinquini (assignor to John E. Parker and H. J. P. Whipple), Meriden, Conn.

,217.—Army Badge.—Isaac T. Hooton and J. H. Cummings, Boston, Mass.

2,218.—Monument to the Memory of Abraham Lincoln.—William H. Maehew, Toledo, Ohio.

2,219.—Parlor Stove.—Charles Williams, Manchester, N. H.

Notes & Queries

G. S. B. & Co., of Vt.—Mr. L. L. Smith, of this city, one of our largest electro-platers, says that in depositing copper on iron he should use an alkaline solution, and should prefer to employ a magneto-electric machine, driven by power, to make the deposit. Smee's Electro-metallurgy was published by John Wiley of this city, in 1852, but we should advise you to learn the art from some practical electro-plater.

L. L. V., of C. E., whose query was answered on page 20, Vol. XIII.—Lieut. John A. Winebrenner, U. S. A., of Scott Foundery, Reading, Pa., would like to communicate with you.

J. M. A., of Pa.—It is possible that you might make an engine work by creating a vacuum through the agency of a stream of water rushing through a pipe. You say you dreamed of it. Did you dream that any power was derived from it?

C. W., of Pa.—The power of an engine is obtained by squaring the diameter of the cylinder in inches, and multiplying by ·7854. The sum so obtained, multiplied by the pressure of steam will give the pressure on the piston in pounds. This last is to be multiplied by the length of the stroke in feet, and again by the number of revolutions per minute, and this sum divided by 33,000. This will give the horse-power, for a horse is capable of raising 33,000 pounds one foot high per minute.

B. B. C. of N. Y., asks:—"Can you tell me the best field for an inventor to work? I think if I knew I would devote my whole time and energies to that particular object." Ans.—The best field is, of course, that in which you are best qualified. For example, an ingenious man who is thoroughly acquainted with cotton and woolen manufacture would be more likely to succeed in making inventions pertaining to such mechanism than if he were to attempt improvements in a direction where he had had no experience. For further hints study the SCIENTIFIC AMERICAN.

J. K., of Ill.—Fairbairn gives the tensile strength of single-riveted boiler plate at 56,000 lbs. to the square inch. To get the strain upon the plate of a spherical boiler multiply the square of the diameter by ·7854, and this by the pressure per square inch Your plan of securing the joints would give increased strength, but how much it is impossible to say, as it depends on so many circumstances.

C. D. R., of Tenn.—It is not new to stamp the exterior of lead pencils with measuring figures and marks, to indicate inches, and parts thereof.

G. W. R., of Mo.—You ask, "Is air a *component* part of a drum?" The reply is, it depends on the meaning of the word drum; and the meanings of words are to be determined by lexicographers. Webster defines drum, "A martial instrument of music, in form of a hollow cylinder, and covered at the ends with vellum, which is stretched or slackened at pleasure." It does not seem that air is a component part of the drum.

W. B., of N. J.—Gum shellac, dissolved in alcohol, will probably render your pine boards impervious to water; or you might line your tank with lime cement.

F. D., of Ky.—An india-rubber cement is made by dissolving pure india-rubber—not vulcanized—in spirits of turpentine. With this cement two pieces of india-rubber may be fastened together by coating their surfaces with the cement, and subjecting them to long-continued pressure. An india-rubber foot-ball might be patched in this way.

T. C. T., of N. Y., asks:—"Do you know of any good patent of which I can get an agency that will pay?" If our correspondent will read the SCIENTIFIC AMERICAN with regularity he will become cognizant of many valuable inventions for which doubtless he could get an agency. Or, if he chooses to advertise in our columns for an agency, probably he would receive a number of suitable replies.

A. F., of Mich.—We do not know where a complete modern model engine, low pressure, and fitted with every detail, could be had cheap. It depends greatly on the meaning people attach to words. Such an engine, with boiler, would be worth $150, and could not now be built for that.

A., of Conn.—One good way of encouraging your boys to take an interest in their work will be to supply them each with a copy of the SCIENTIFIC AMERICAN. Boys take pride in a paper which comes addressed to their names, and generally read its pages with care. A large engineering firm at the West lately wrote us that they are accustomed to make a Christmas gift of the SCIENTIFIC AMERICAN to their best boys. We know of other establishments where the proprietors voluntarily supply their workmen with this journal, and find that it pays a hundred fold and more.

L. P., of N. Y.—Your plan for an aerial car, with an elevating gas bag, to be drawn through the air by birds, may have advantages over the contrivance illustrated in the SCIENTIFIC AMERICAN a short time ago, in which the car was put on and moved by bird power only. Our friend Will Brighteye prefers to drive with birds exclusively.

T. H. B., of N. Y.—We are not sure that we understand your question. To raise water fourteen feet requires a pressure of about seven pounds, and if it takes 20 pounds to draw the water through your nozzle, the power requisite for that would manifestly be nearly three times greater than that required to lift the same water fourteen feet. If, on the other hand, you obtain twenty pounds pressure from the hydrant, it will require less power to work from that.

H. C. P., of N. Y.—We have no doubt that our correspondent was able to understand that the explanation of the motion of a projectile varying from its north or south direction applied to the hemisphere in which we live; it is very plain that in the southern hemisphere the directions would be reversed. Are you not in error in supposing that 751 bears a larger proportion to 397 than 262 does to 74?

PORTABLE STEAM ENGINES.—THESE WORKS have lately increased their facilities for the manufacture of their so popular engines. Prices reduced to a peace standard. Fourteen feet and more of heating surface given to the nominal horse-power.

STATIONARY AND PROPELLER ENGINES, with Boilers of the best design, made to order. The Stationary Engines have Variable Cut-off worked by Governor. Patent Steam Pumps, which can also be used as steam engines, by simply detaching pump. Circular Saw-mills, of latest construction. Pay's Patent Forge Hammers, so popular with rail-roads and machine shops, have lately been much improved in detail. Locomotive boilers built to order. Send for circular. F. W. RAEDER,
18 17 Ames Iron Works, Oswego, N. Y.

FOR SALE—ONE DANIEL'S PLANER—PLANES 20 inches by 18 feet; price, $250. One 36-inch Mackenzie Fan Blower; price, $200. Both in good order. Address
21 3* McC. YOUNG, Frederick, Md.

WANTED—A PARTNER, WITH A CASH CAPITAL of $50,000 to $100,000, to manufacture my Corn Picker—have been seven years developing and testing this machine; have tested it under all possible conditions of the corn, from the 15th of September until May; picks the corn in complete style, down stalks and all; machine runs independent; discharges corn into wagon; drawn by one span of horses; saves two-thirds of the time, and all the hand labor. A complete working machine will be on public exhibition from the 15th of November until the 15th of April, 1866. Will sell the Right of one or two States, but would rather enter into a copartnership, with capital sufficient to manufacture the machines for all the corn-growing States. Patent secured. Come and see the machine work. Come to Summit Station, Knox Co., Ill.
GEO. GEER.
Address Douglas, same place. 21 3*

FINE, POWERFUL DOUBLE-LENS MICROSCOPE, of which Prof. Horsford, of Harvard University, says: "It works very well, and you have got it up very neatly." Free, by mail, 65 cents.
The "Square Lens" Microscopes 50 cents, and the "Little Wonder" 40 cents. One each for $1.
J. EDWIN KING,
1* Box 2,552, Boston, Mass.

$500 WILL BUY THE RIGHT OF BAILEY'S Patent Ice Creeper and Buckle—best ever introduced. See illustrations, page 192, Vol. VIII. (new series), SCIENTIFIC AMERICAN. Creepers for sale. GILBERT L. BAILEY.
21 4* Portland, Maine.

PAGE'S NEW SUPERIOR DRAW LIMEKILN—THE only Kiln that will burn good Finishing Lime with coal, also with wood. Patent runs seventeen years. Warranted to please. Rights for sale. C. D. PAGE,
21 8* Rochester, N. Y.

NOTICE TO LUMBERMEN.—ALL PARTIES MANUFACTURING Lumber with Circular Saws will please send their address to the subscribers, as they wish to correspond with them in relation to a new arrangement for Gumming.
21 4* DOLE & SILVER, Salem, Ohio.

TO PATENTEES.—THE UNDERSIGNED WISH TO Manufacture Circular Saw-mills under some good patent. Address SNYDER BROS., Founders and Machinists,
21 2* Williamsport, Pa.

MACHINERY—STEAM ENGINES—100 AND 150 Horse-power; 8 Boilers, 80 Rolls, 9, 14, and 18 in. diam. Roll Stands, Mill Gearing, Fly Wheels, Furnace Castings, Lathes, Tools, Etc. J. H. JACKSON, No. 155 Broadway. 1*

UPRIGHT BORING MILL WANTED—TO SWING 9 feet or more. Any person having and for sale will send price, description, etc., to CAIRO IRON WORKS,
21 4* Cairo, Ill.

THE OUNCE BOOT-JACK.—REPEATED INQUIRIES for my Ounce Boot-jack have determined me to put it in the market again, although I had not thought of doing so, having more urgent business. This Boot-jack is simply a small metallic plate affixed to the heel of a boot to draw the same off, and to prevent the pantaloons from getting frayed out by being trodden upon. I sold many hundred pairs last winter. Prices are now lower. I will sell one gross, 288 pieces, for $18; one half gross, $9; three dozen set, $5. Colored Show Cards sent with half-gross orders. State and County Rights, or the whole Patent for Sale low.
21 EGBERT P. WATSON, Box 773, N. Y.

PORTABLE STEAM ENGINES, OF SUPERIOR MANUFACTURE, on hand, for sale, by
21 13 LEACH BROTHERS, No. 86 Liberty street.

BOILER INCRUSTATION—A MOST VALUABLE discovery, and a perfect remedy, for the removal of scale in fresh or salt-water boilers. Warranted to free your boilers of scale and prevent the iron from corrosion. High testimonials and circulars furnished on application to A. TEMPLE,
21 12* Bridgeport, Conn.

A VIRGINIA FARM FOR SALE.—WE ARE AUTHORIZED to sell a superb Virginia Corn, Wheat, and Tobacco Farm, situated on the Boydtown Plank Road, twenty-five miles from Petersburg, in the County of Dinwiddee The tract numbers 1,100 acres. Persons desiring to colonize could divide this into several small farms.
Price, $7,500. Title beyond dispute.
Address DANCY, HYMAN & CO.,
21 4* No. 80 Cedar street, New York.

PLATINUM CRUCIBLES, DISHES, TUBE, SHEET Wire, Etc., for sale by H. M. RAYNER, Importer of Platina, 748 Broadway, N. Y. Platinum Scrap and Ore purchased. 21 3eow*

CLUTE BROTHERS, SCHENECTADY, N. Y., MANUFACTURERS of Stationary and Portable Steam Engines and Boilers, high and low pressure; Water Wheels, Flouring and Grist Mills, with portable or large Stone; Gate and Circular Saw-mills; Circular and Drag Cross-cut Steam Sawing Machines; Buckskin Mills; Shafting, Hangers, Pulleys, Gearing, and General Jobbing. Plans made, and competent Millwrights furnished to go to any part of the country. 21 tf

OSCAR BARNETT'S MALLEABLE AND GRAY Iron Foundery and Machine Shop, Hamilton, McWhorter, and Bruen streets, Newark, New Jersey.—Drop, Screw, and Foot Presses, Lathes, Shaping Machines, Jewelers' and Hatters' Presses, Etc., constantly on hand or made to order. Particular attention given to the manufacture of Dies, Punches, and Jobbing generally. Depot, No. 85 Center street, N. Y. 21 3*

PATENT EXCHANGE—ESTABLISHED FOR THE Introduction and Sale of Patents. For terms apply to THOS. G. ORWIG & CO., Patent Exchange, No. 229 Broadway, N. Y. 1*

TO LET—A ROOM 36 BY 86; HIGH CEILING; well lighted; eligible location, in the City of Bridgeport, Conn. Address Key Box 52, Bridgeport, Conn. 21 3*

STEAM ENGINES AND BOILERS FOR SALE.—One horizontal Steam Engine, 40 horse-power, made by Hawes & Phillips, of Newark, in good order.
And three Flue Boilers, 3 feet diameter, 30 feet long, with 16-inch flue.
Also, one Beam Engine, 12 by 30-inch cylinder, with Air Pumps and Water Pumps complete for working a vacuum pan.
And two Tubular Boilers, 4 feet by 12 feet 4 inch tubes, with Grate Bars, Fronts and Connections complete.
21 3* Apply at Nos. 6 and 8 Trinity Place.

MILITARY DIVISION OF THE TENNESSEE, CHIEF QUARTERMASTER'S OFFICE, U. S. M. R. R., NASHVILLE, TENN., October 31, 1865.

EXTENSIVE SALE OF GOVERNMENT RAILROAD PROPERTY.—Will be sold at public auction on November 20, 1865, at the foot of Poplar street, St. Louis, Mo.,
Two Flat Cars, 5½ feet gage.
On November 25, 1865, at the yard of the Jeffersonville Railroad Company, Jeffersonville, Ind.,
Nine Flat Cars—Gage, 4 feet 8½ inches.
On November 27, 1865, at Louisville, Ky.,

311 Car Wheels,	43 prs. Wheels and Axles,
217 Old Axles,	1 Tender,
1 Smoke Stack,	1 Engine Truck,
1 Pair Drivers,	4 Springs,
1 Parallel Rod,	1 Bell and Frame,
4 Hand Cars,	14 Truck Cars,

50,000 Pounds of Scrap Iron.
On December 1, 1865, at Memphis, Tenn., the entire stock of the U. S. Military Railroad Supplies remaining on hand at that place, consisting in part as follows:—
Eighty tuns Assorted Iron,
Eight hundred tuns Scrap Iron,
Eight tuns Assorted Steel,
One tun Pig Lead.
And a general assortment of Small Stores, suitable for railroads.
On December 11, 1865, at Nashville, Tenn., the entire stock of new and serviceable Stores of the U. S. Military Railroad remaining on hand at the General Supply Store, consisting in part as follows:—
Twenty thousand Axes,
One thousand tuns Assorted Bar Iron, round, square, hfrd., Angle,
Eighty tuns Boiler and Tank Iron,
Thirty-five tuns Assorted Steel
Three hundred tuns Scrap Iron, wrought and cast,
Twenty five thousand pounds Engine Brass Castings,

Gas Pipe,	Heating Stoves,
Brass Pipe,	Gas Fixtures of all kinds,
Spring Balances,	Oil Cups,
Shovels,	Brass Cocks of every description,
Hatchets,	Globe Valves, all sizes,
Nuts,	Claw, Lining, and Tamping Bars,
Washers, wrought and cast,	Iron and Copper Rivets and Burrs,
Nails and Spikes,	Sheet Copper and Brass,
Mallets,	Chains and Rope of all sizes,
Sash, Glass and Paint of all kinds,	Blocks, Tackle and Snatch,
Railroad Lamps,	Kelly's Head Lights,

Cooking Stoves and Fixtures.
Full Sets of Carpenters, Blacksmiths, and Saddlers' Tools, Rubber Car Springs, Belting Gum, and Leather, Files, Burs, and Screws, Tinware of all kinds; and almost every article suitable for railroad operations; all of the very best quality. Also,
Three Large Lathes, Stevens & Bro. manufacturers,
Two Planers, Sellers & Co. manufacturers,
One Bolt Cutter and 1 Gear Cutter, Gould & Bro. manufacturers,
One Axle Cut-off Lathe, Warner & Whitney,
Two Fan Blowers, medium,
One Upright Engine, 8 horse-power,
One Trip Hammer and Engine, Howell's patent,
One Broomfield Steam Hammer,
One Sellers' Steam Hammer.
Will also be sold at the same time, a large amount of serviceable and second-hand Railroad Tools of all kinds, consisting of Carpenters' Tools, Wheelwright Tools, Blacksmiths' Tools, Machinists' Tools, Stoves and Pipe, Rope, Chains, Etc.
Terms Cash, in Government funds.
Catalogues of the materials to be sold in Nashville can be obtained by application to Capt. S. R. Hamill, A. Q. M., and at Memphis on application to Capt. John Parks, A. Q. M.
The attention of dealers and Railroad Companies is particularly invited to this sale.
Sales will commence at 9 o'clock, A. M., on each day, and continue daily until all the property is disposed of. F. J. CRILLY,
21 3 Capt. and A. Q. M. U. S. A.

CHEAP BREAD, RESTLESS NIGHTS, RECREATION,

Apoplexy,	Who are Happiest,	Warmth and Strength,
Potatoes,	Stomach's Appeal,	Economical Eating,
Hunger,	Weather and Wealth,	Household Knowledge,
Cooking Meats,	Inheritances,	Eating Wisely,
Horse Rations,	Food and Health,	Facts of Eating,
Where to Study,	Value of Food,	Tables of Food,

In Hall's Journal of Health, 15 cents; $1 50 a year; 2 W. 43d st., N. Y.

INDIA-RUBBER AND PERCUSSION-CAP MANUFACTURERS are requested to communicate their address to the undersigned, which will prove mutually advantageous.
S. S. REMBERT, care J. & J. Steele & Co., Memphis, Tenn.
Also, a Gunsmith, who will make me a few fine double-barreled shot-guns for sporting purposes. 21 2*

SPOKE LATHES (BLANCHARD'S) OF AN IMPROVED pattern, manufactured by
J. GLEASON, No. 1,030 Germantown avenue,
21 2* Philadelphia, Pa.

ROLLED SEAMLESS BRASS TUBES—FOR LOCOMOTIVES, Steam Boilers, Sugar Pans, Feed Pipes, Etc. The Tubes are made tapering or perfect bore, the latter of most accurate gage, answering for Oil Wells and all other kinds of Pumps. They can be bent into any shape required without fear of splitting. Manufactured by the Columbian Metal Works,
M. M. FREEMAN & CO., Agents,
21 5* No. 40 Broadway, N. Y.

CLERGYMEN, TEACHERS, THE PRESS UNITE IN saying that the new juvenile magazine, "OUR YOUNG FOLKS," is the best magazine for the young ever published in America It is filled with attractive illustrations, and its articles, in prose and poetry, are by the best writers for children in the country. It is sold at the low price of $2 a year. Each number contains 64 pages, beautifully printed. A liberal discount to clubs. Send 20 cents for a specimen copy and circular to the publishers,
20 tf TICKNOR & FIELDS, Boston.

THE LANE & BODLEY PORTABLE CIRCULAR SAW-MILL combines strength and simplicity in construction with the greatest endurance and economy in operating it. The Patent Simultaneous and Independent Wrought-Iron Head Blocks are worth the attention of Lumbermen, as they can be used on any Circular Saw-mill. For Illustrated Catalogue address
20 14* LANE & BODLEY, Cincinnati, Ohio.

THE LANE & BODLEY POWER-MORTISING MACHINE.—We manufacture six varieties of this well-known machine, adapted to the manufacture of Rail Cars, Agricultural Implements, Furniture, Sash and Blinds, Wagon Hubs, Etc. For Illustrated Catalogue address LANE & BODLEY, Cincinnati. 20 14*

STEAM FIRE ENGINE.—READY FOR IMMEDIATE delivery, one Locomotive Steam Fire Engine, of the style known as the "Cincinnati Engines;" two Cylinders, 8 inches diameter; two pumps, 4 inches diameter—Axles of Steel, Wheels of Wrought Iron; will stand rough running; can be relied on to get to work uniformly in five minutes, and will gain steam while working. Boilers of this construction are in use by the Cincinnati Fire Department that are eleven years old and have needed no important repairs. [20 4*] LANE & BODLEY, Cincinnati, Ohio.

BARAGWANATH & VAN WISKER, NO. 200 BROADWAY, N. Y. Agents for the Sale of Patents in Europe and other countries. Branch offices, London, Paris, and Melbourne. 20 4

TWENTY-FIVE TO THIRTY THOUSAND DOLLARS.—A Partner Wanted with above capital, to engage with advertiser, who is a practical Engineer and Machinist, in the Machinist. Tool and Machine Business. Shops now running, and command first-class patronage. All communications, with real name, strictly confidential. Address CAPITAL, Station A, Philadelphia Post-office. 20 3*

INTEREST IN A VALUABLE PATENT RIGHT.—ON account of the death of one of the parties in interest, a share is offered for sale on very favorable terms in an invention already introduced, of great practical value. From twenty to fifty thousand dollars required, according to the proportion sold. Address
20 4* Box 438 New York Post-office.

THE SUBSCRIBER IS PREPARED TO FURNISH at short notice, of all sizes, the Andrews & Kalbach Water-wheels, which gave 84·97 per cent effective force at Fairmount test, Philadelphia, March, 1860; the Risdon Self-acting Circular Sawing Machines, of all sizes, the best in use for cutting logs into all sizes of lumber. Also, all kinds of mill work.
THEODORE H. RISDON,
20 5* Mt. Holly, N. J.

CLEANLINESS, COMFORT AND CONVENIENCE.—Davis's Patent Water-closet Seat.—Patented Sept. 5, 1865.—A "necessary" invention, by the use of which the most perfect cleanliness is secured in the privy—is so simple, and novel, and yet economical and efficient, that the most casual observer will, at once, recognize its merit. This privy seat can only be used by any one while in a sitting posture; a squatting position being utterly impossible while using the same.
There is no complex machinery in its construction, and it can be manufactured as cheap as the ordinary wooden seat.
Can be placed in any Water Closet in thirty minutes.
State, County, City and Shop Rights for sale.
For Descriptive Circular and full particulars address the inventor,
J. N. DAVIS,
Georgetown, Brown Co.,
19 5* Ohio.

SPOKE AND HANDLE MACHINERY.—THOSE DESIRING to purchase the best machine in the United States for making Spokes, Yankee Ax Handles, Plow Handles, and irregular forms generally, should send for cut and description to E. K. WISELL, Manufacturer and Patentee, at Warren, Ohio. 20 8*

STEAM AND WATER GAGES, SCOTCH GLASS Tubes, Indicators and Pyrometers, for sale at reduced prices.
20 2* E. BROWN, No. 311 Walnut street, Philadelphia, Pa.

S. HEALD & SONS, BUILDERS OF THE MOST Improved Circular Saw-mills, Woodworth Planers, Scroll Saws, and a large variety of other Machinery, Corn and Cob Crackers, Etc. Machines in operation at the works, Barre, Mass. 20 3*

$6,000 WILL BUY AN INTEREST IN A well-established Machine Shop and Foundery, doing an extensive Manufacturing Business in Staple Articles, near Chicago, Ill. Apply to ROBT. IBBOTSON, 57 Fulton st., N. Y. 20 2

HARRISON'S PORTABLE AND STATIONARY Flour and Grain Mills—4 feet, 3 feet, 20 and 12 inches—on hand and finishing. They are unequalled for simplicity, durability and efficiency, and more than 1,000 of them have been sold.
20 4* EDWARD HARRISON, New Haven, Conn.

IMPROVED ATMOSPHERIC WOOL-DRYING MACHINE. Manufacturer's Agent, J. B. MULFORD,
20 4* No. 1,846 Market street, Philadelphia.

THE WASHINGTON IRON WORKS HAVE ON HAND for sale their Improved Portable Steam Engines, Portable Circular Saw-mills, Gang Saw-mills, Flour and Corn Mills, and manufacture to order all kinds of Steam Engines, Marine Stationary, and Propeller, Railroad Cars and Turn Tables, Iron Steam Vessels and Barges; also, General Machinery, Iron and Brass Castings, Large and Small Forgings, Etc. Address
GEO. M. CLAPP, Treasurer, Newburgh, N. Y.,
Or L. C. WARD, Agent,
No. 55 Liberty street, Room 8, New York. XIII 20 26

FOR SALE—THE EXCELSIOR AGRICULTURAL WORKS, Fort Wayne, Ind.—Owing to the death of the Senior Partner, the proprietors of the above works offer the same for sale The works are situated at the junction of the Pittsburgh, Fort Wayne and Chicago R. W. Co., and Toledo and Western R. W. Co., Fort Wayne, Indiana. The buildings are new, erected expressly for the manufacture of Reapers and Mowers, Separators and Agricultural Implements, with new machinery of the most improved kind, and a large amount of stock on hand, and situated in the midst of the finest timber region of the country, with direct access to all parts of Indiana, Illinois, Wisconsin, and Iowa.
No works in the country presents stronger inducements for profitable investment. They will be sold on reasonable terms for cash, or on time, and immediate possession granted. Address
JOHN HOUGH, Agent.
Fort Wayne, Sept. 20, 1865. 20 4*

GEORGE PAYSON, ATTORNEY AND COUNSELLOR AT LAW, No. 56 Dearborn street, Chicago, Ill. Post-office Box 869.
Special attention paid to Patent Law in all its branches. 20 10*

SECOND-HAND COTTON MACHINERY FOR SALE.—4 Mules 3 Speeders, 10 Cards, 1 Willower, 1 Long Lapper, Drawing Frames, Etc. Address H. B. SMITH, Mt. Holly, N. J. 20 5*

FOR SALE—PATENTS IN EUROPE FOR A SAVING in Gas. In daily use. Post-office Box No. 641 Newburgh, N. Y. 20 2*

FOR SALE—THAT VALUABLE PROPERTY KNOWN as NORTH WHITE CREEK MILLS, about one half mile east of Cambridge Depot, in the Village of North White Creek, consisting of three run of burr stone, 35 feet fall, Stevenson's turbine wheels; have run sixty thousand in a year, with a large retail trade; two dwellings, 22x30; barn, shed, etc.—built in 1862, all new. For further particulars address ALFRED WOODWORTH, North White Creek, Washington County, N. Y. 20 2*

INDEPENDENT JAW CHUCK.—A GOOD VARIETY of sizes and styles, made of the best material, and for sale low. Address L. D. FAY, Maker of Machinists' Tools,
20 4* Worcester, Mass.

FOR SALE—THE ENTIRE RIGHT OR STATE RIGHTS, also Single Machines, with shop right, of Hollingsworth's Soldering Furnace, as illustrated in the SCIENTIFIC AMERICAN of July 29, 1865, and patented September 12. An ordinary hand can solder on the tops and bottoms of 1,000 reliable cans per day on a six-hole plate, and more in proportion as the size is increased. For further particulars address ROBERT J. HOLLINGSWORTH, Cincinnati, Ohio. 20 2*

CANVASSERS AND AGENTS WANTED.—$10 PER day can be made selling a new and useful auxiliary to the Kerosene Lamp, "The R. H. Plass Night Lamp Attachment," producing on all family and hand lamps a perfectly smokeless and odorless night light, consuming less than one-quarter of the oil required by present method. Something wanted in every family. Apply at manufactory, No. 110 East Twenty-ninth street. New York. 20 2*

THE ANTI-INCRUSTATION POWDER.—IMITATIONS sold at less prices My article the cheapest at higher cost, owing to the small quantity necessary to keep boilers clean.
20 2* H. N. WINANS, New York.

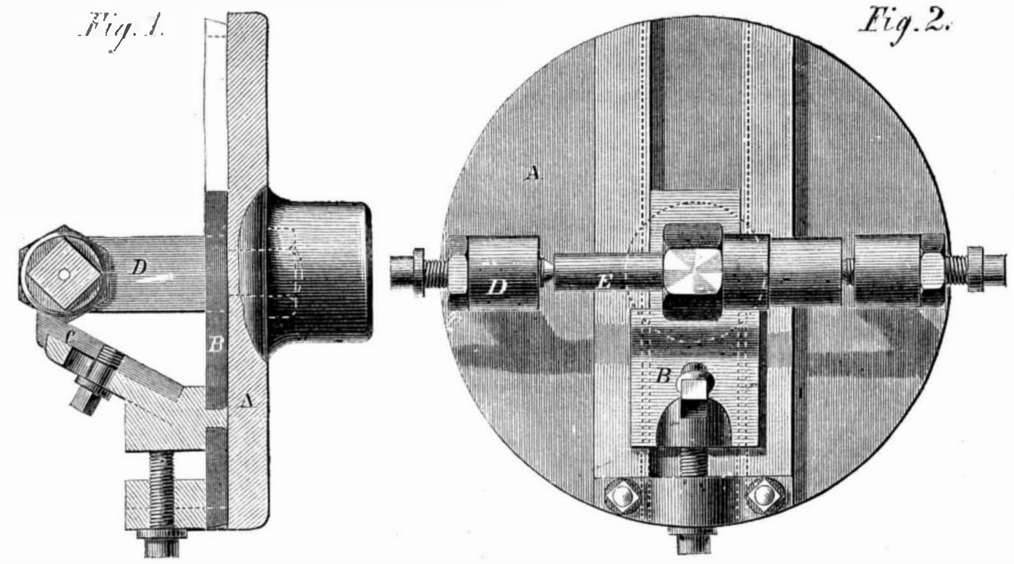
CASTALIA, Ohio, Sept. 10, 1865.
MR. H. N. WINANS:—YOUR ANTI-INCRUSTATION POWDER acts like a charm. Our water is the hardest in the world, but, by using two pounds a week, we have no trouble whatever. [20 2*] JOHN HAYS & CO.

SOLID EMERY WHEELS, SILICATE OF VULCANITE, of every size, promptly made or shipped from stock. Emery by the tun or keg, warranted pure. NEW YORK EMERY WHEEL CO., No. 94 Beekman street, New York. 20 4*

RATCHET, CARRYING, AND SCREW JACKS, FOR Raising Engines, Cars, and other heavy material, and for machine shop work. These are invaluable. Manufactured for and for sale by JESUP, KENNEDY & CO., Chicago, Ill., or E. Burroughs, Lowell, Mich.
A liberal discount to the trade. 20 12

Improved Nut Chuck.

Machinists know very well that hexagonal, or six-sided, nuts take considerable time to finish, and that unless machines are employed the work becomes tedious and costly. In old times apprentices were made to chip and file all the six-sided nuts, but they were not always successful in their attempts. One half the nuts were spoiled from being variable in the size; no two angles were alike, and no single wrench would fit them. It was a great improvement on chipping and filing nuts when "slabbers," or milling machines, were adopted, for then all the nuts were alike in size and in the angles. The machine here shown is intended to face up six, eight, or four-sided nuts on a lathe, the same as is done on a slabbing or milling machine, and, as any mechanic can see at a glance, it will do the work to perfection.



REILLY'S NUT CHUCK.

A common face-plate, A, is fitted with a slide, B, which carries a gage, C, suited to the number of sides on the nut. This gage is shown in section of Fig. 1. From the face-plate two arms, D, project, which carry a mandrel, E, on which the nut is fixed as usual. These are the details, and the operation of them is easily understood. The chuck is screwed on to any common lathe, and the work of facing off the nuts can be done by a boy. Any sized nut can be faced off with the same gage for a guide. For by running the slide, B, out, and lengthening the gage, C, large or small nuts can be accommodated. The angle is always the same for hexagonal nuts of all sizes. This is an ingenious arrangement, worthy the attention of all persons making six-sided nuts. A number of nuts can be cut at once, but by working one at a time a beautiful finish is given, which is peculiar to this machine. The rays of light all converge in the center, as shown in the nut on the mandrel. Rough nuts can be quickly faced up on this chuck, by having two tool posts—one for roughing, the other for finishing. With a water finish the last cut is better than any nut we have ever seen, far surpassing emery polish.

This chuck was patented on May 30, 1865, by William A. Reilly; for further information address him corner of Third and Lawrence streets, Cincinnati, Ohio.

A Pair of Shoes Made in a Minute.

At Lynn, Mass., they make a pair of shoes in a minute; that is, the amount turned out at the end of the week is equal to a pair for every working minute of the time. This is done, says the Boston *Commercial Bulletin*, at Messrs. Bancroft & Purington's establishment:—

"Perhaps the most extensive establishment, in the details of its operations, is that of Messrs. Bancroft & Purington, who make about $40,000 worth of ladies' boots per month. Mr. Purington has introduced the factory system of labor, and to decided advantage. One can witness in his rooms the entire process of making a shoe, from the rough side of leather to the full-finished article. Mr. P. has also introduced new machinery well worthy the attention of the trade. One of these machines, by the simple movement of a small lever, operated by hand or steam power, pierces sixteen holes in the heel, after the 'lifts' are tacked together slightly, at the same time compressing the whole into a solid mass. Then the heel is taken to another machine, of similar construction, and the sixteen holes are pierced with one stroke by sixteen nails, and the heel fastened strongly to the sole of the shoe. The work is performed at a rate of one pair of shoes per minute, or faster if necessary: and the two machines, worked by one man and a boy, do the work of four heelers, thereby saving an outlay, at present prices for such labor, of fifty dollars per week. One hundred and ten operatives, men and women, boys and girls, are employed, divided into 'gangs' of ten or twelve each. Something more than a pair of shoes a minute are now being made during each ten working hours, and these are sent off to the purchaser every morning. The uppers are stitched in a separate establishment, and after a lot is received from the stitchers' hands, two days is ample time to prepare them for the salesroom of the purchaser."

FIELD'S CARRIAGE JACK.

A jack is an indispensable utensil to every one who owns a wheeled vehicle of any kind, for in order to grease the axles or remove the wheels from them they must be raised clear of the ground.

The engraving published herewith shows an improved carriage jack, by the aid of which any wagon or cart may be immediately raised and held securely without danger of falling. The details are as follows:—A represents a wooden standard which has a groove on each side to receive a metallic bar, B. In the latter there are holes and a pin fast to a chain, which passes through both parts, and supports them; in this way the jack can be fitted to any hight of axle. When once brought to its position the lever, C, is thrown down—as shown in the engraving—and the axle rests on top of it. This machine is strongly made, and can be easily worked by any one. It was patented through the Scientific American Patent Agency, on April 25, 1865, by Austin W. Field, of Vergennes, Vt.; for further information address him at that place. State and county rights for sale.

CORRECTION.—In the article on small steam boilers, published in our last issue, it was stated that the threads cut on the tubes should be 28 to the inch. This is an error; the number of threads should be 48—as a brass tube one thirty-second thick would not carry 28 threads.

FROM THE STEAM PRESS OF JOHN A GRAY AND GREEN