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Railroads of the United States.

Dinsmore's excellent *Railroad Guide* for this month contains a summary of the number of miles of railroad now in operation in the United States, from which we learn that we have more railroads than all other countries put together.

The total amount of railroads is 19,664, miles. Great Britain and Ireland have only about 8500 miles in operation, while those on the continent of Europe do not amount to 6000 miles. In 1828 there were only 3 miles of railroad in our country; in 1338, 1843 miles; in 1848, 5682 miles; consequently 13,162 miles have been built during the past seven years. This is a most astonishing and rapid increase, being nearly double those that were built during the previous twenty years.

New York has the greatest number of miles in operation, namely, 2692; Ohio is next, having 2427; Illinois comes next, having 1892; Pennsylvania next, having 1627; Indiana next, having 1482; and Massachusetts has 1317. No one of the other States come up to a thousand miles, and Arkansas, California, and Iowa, have none.

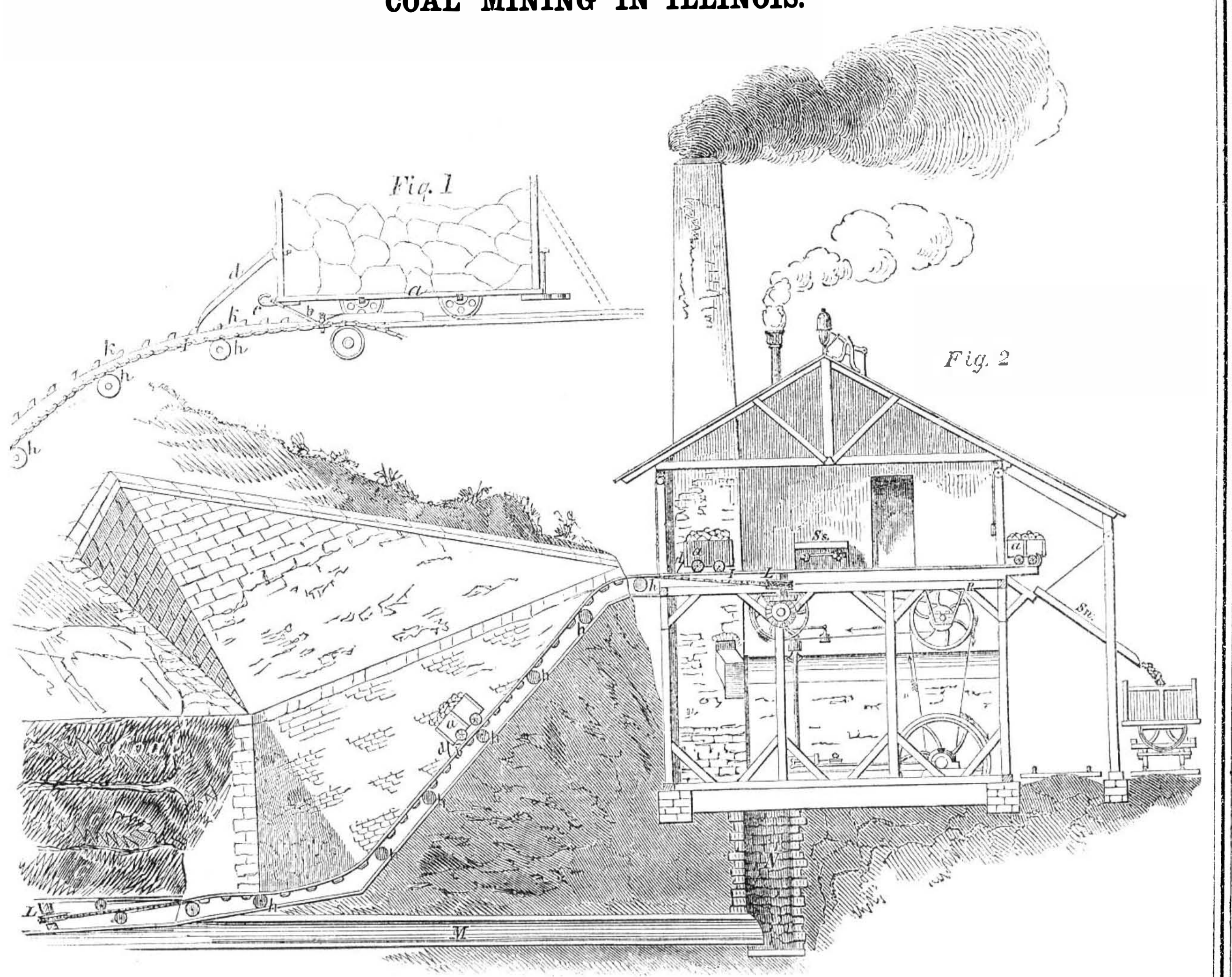
There are now 6000 miles more under construction—as much as there is in continental Europe—and these, it is calculated, will be completed and in operation in two years. The total value of completed railways at $30,000 per mile is $589,920,000. We do not know the exact cost of constructing railways per mile in Illinois and Indiana, but we have been informed that it does not amount to one-third that of Massachusetts, which cost over $40,000 per mile, owing to numerous deep cuttings, and heavy embankments being required. The western States being more level are better adapted than the Eastern States for building cheap railroads. The railroad interests are now a mighty power in the Federal Common wealth.

Dangerous Eating.

Pheasants are said to be poisonous as food during severe cold and deep snow. They are then deprived of their ordinary food, and eat the leaves of evergreen bushes, some of which are poisonous. The Philadelphia *Ledger*, on this subject, says: "During the British occupation of Philadelphia, when the officers indulged themselves in pheasant shooting on Wissahickon hights, seven persons were poisened at the supper succeeding the sport. The bird, unable, on account of the depth of the snow, to find his natural food, was compelled to feed on the buds and leaves of the laurel (kalmia latifolia.) Death ensued. A scientific friend has just exhibited to us the crop and intestines, with the body of the pheasant, weighing 1 lb. 14 3-4 oz. The crop and stomach were crammed with half decomposed laurel. One pair of such birds might render a family helpless for weeks, if not poison them to death."

N. K. Wade, of Pittsburg, Pa., has gone to Russia, in the Emperor's employ, to superintend the manufacture of cannon at St. Petersburgh. He is to receive $5000 per annum.

COAL MINING IN ILLINOIS.



The Wood River Coal Mines are located in Madison County, Illinois, eight miles from Alton and about eighteen miles from St. Louis, Mo. The mines are owned by an incorporated stock company, of which Wm. Richardson is the Resident Agent, and contain near 400 acres of coal land, which, being perfectly level—with the exception of a small portion on a branch of Wood river—contain a solid body of coal, 6 feet 6 inches average thickness, extending under the whole of the company's lands. The coal is a very superior bituminous, containing, according to a analysis by Dr. Jackson, of Boston:

Gas-making bitumen	50 50
Fixed carbon in coke	46 05
Gray ashes	3 45
Sulphur	0 00
	100 00

During the year 1853 and 1854 the Company opened several shafts, principally for ventilation, but also to test the extent and thickness of the coal. They also opened at the head of a bluff on the margin of Wood river, a drift or entry where the building and machinery which form the subject of the accompanying engraving are situated. The cut will give an idea of the manner in which coal is mined in some parts of the country, though probably few localities afford so many natural advantages and facilities for mining operations as are here combined.

The building is placed at the base of the bluff before mentioned, and contains a powerful steam engine for raising the coal from the mines, and also for pumping the water there from. The water is drawn from the floor of the mine through sewer M, which empties into the well N, whence it is pumped by steam.

The coal is elevated from the mine in small car (*a*) loads. A suitable track extends from the bed of the mine to the upper story of the building, the cars being propelled by the endless chain L, which passes over friction rollers, *h*. There is a hitch bar, *b*, attached to one end of each car, which passes into a link of the chain, and thus connects the car and chain together during the ascent and descent. For purposes of safety a rack, *k*, is laid in the center of the track, over which the pawl, *d*, trails. If the chain should happen to break, therefore, the car will not be precipitated down the incline, but will stand still.

When the cars arrive at the landing, I, they disconnect with the chain, pass along the floor to the scales, *S s*, where they are weighed, thence across the floor to the other side of the building, where they are dumped upon an inclined screen, *S n*, and fall, ready for market, into the railroad cars below, as shown. The empty cars are then pushed back to the other side of the building, connected with the downward line of chain, and so are carried back to the mine to receive new loads of coal.

The cars are propelled 168 feet in 24 seconds, and from 3000 to 3500 bushels of coal can, and several times have been raised per hour. The same chain can be extended entirely through the main entry, and thereby render further important assistance. It can also, by a slight alteration, be used for raising coal from a vertical shaft.

Nothing can be more simple, convenient, or rapid, than these arrangements for mining. Taken together with the remarkably favorable situation of the mines, as respects navigation and railroads, the Company will be enabled to supply the western markets with immense quantities of fuel.

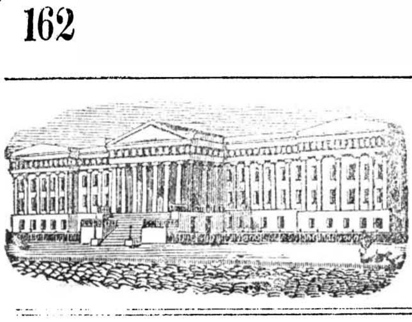
To form a connection with Alton a railroad has been built from the mines to the Terre Haute and Alton Railroad, a distance of two miles. Since that time, however, finding that Alton did not offer a market for half of the coal capacity of the mines, another railroad has been built from the Terre Haute and Alton Railroad direct to the bank of the Mississippi river, at a point opposite the mouth of the Missouri. Here a large wharf boat of 1200 tuns capacity is moored. A truss work rests on the boat and also upon the bank, and the cars, as they arrive, are let down by means of a brake—one ascending and one descending—worked by one man on the boat. They then run on turn-tables, and thence along the whole length of the boat—some 270 feet—dumping on either side, as required, and also into flatboats, for the St. Louis market. The Company are thus prepared to supply all the upper Mississippi, the Missouri, and Illinois river boats, which is an immense trade. The wharf boat lies in the direct channel of all boats passing, and there is ample depth of water around her. By coaling here boats save a wharfage which is charged at Alton, they also obtain their coal less than elsewhere, besides other advantages in time, &c.

The present capacity of the mines is about 10,000 bushels per day. The Company have in use their own locomotive and cars, and have arrangements made for doing a large business as soon as navigation opens in the Spring. The machinery, plans, railroads, &c., were drawn and superintended by Joseph A. Miller, Civil and Mining Engineer, St. Louis, Mo., and Alton, Ill.

Report of the New England Inventors and Mechanics Industrial Exhibition.

The Committee on Machinery (W. P. Parrott and Saml. Cooper,) submit a brief yet somewhat interesting summary of the different machines on exhibition.

In noticing a pianoforte action, they introduce the remark "that this piano felt better under the touch than any of the pianos on exhibition." This quotation has reference to the opinion of the International Jury of the Paris Exhibition, and is credited to the New York *Times*. We venture to assert that the *Times* never published the extract, and further, that it was copied from an article in the SCIENTIFIC AMERICAN, of Sept. 22, 1855.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING JAN. 22, 1856.

BENDING PLOW HANDLES, &c.—Benj. F. Avery, of Louisville, Ky.: I claim the strap, G, described, constructed in any manner substantially the same, for the purposes set forth.

I also claim the combination and arrangement of the several devices constituting the machine, substantially as described.

OPENING AND CLOSING FARM GATES—J. A. Ayres, of Hartford, Conn.: I claim, first, the employment and arrangement of the double-acting, self-adjusting jointed treddle, J J' J'', in combination with the self-locking catches, I I, substantially as, and for the purpose set forth.

Second, opening and closing the two parts of the gate, anp re-adjusting the driving boards, H H', by means of the simple arrangement of mechanism shown, consisting of weighted crank shafts, E E', elbow links, d d', and connecting rods, F F', arranged and combined with the two parts of the gate, B B', and the driving boards, H H', as described.

FLOURING MILLS—Thomas Crane, of Fort Atkinson, Wis.: I claim securing the bed stone within a hoop, rising from a suitable bed plate, when the said hoop has an open annular space surrounding it, which is supplied with a discharging spout, and has a rotating hoop arranged and operating therein, substantially in the manner and for the purpose set forth.

ECCENTRIC EXPLOSIVE SHELLS—Wm. W. Hubbell, of Philadelphia, Pa.: I am aware that shells having eccentric hollows and reinforcements around the fusee hole have been used before my invention. but in different arrangement of the metal and with different effects from those discovered by me, and I do not claim such arrangement of metal nor their effects.

I claim, therefore, the combination of the head or segment of the solid sphere with flat base uniformly around the fusee hole, with the segment of the hollow part, forming a spherical shell, with flat based head, and externally smooth, as described.

COTTON SEED PLANTER—John M. Jones, (assignor to Newton Foster,) of Palmyra, N. Y.: I claim the disk, D, constructed with exit apertures, K, cavities, V, and ratchet, W, and also the vibrating rim, I, with flexible arms, y, thereon, the said disk being rotated upon said rim, in combination with, and in opposite direction to the flexible arm, G, in the manner and for the purpose set forth.

ARRANGEMENT OF TAN VATS—David H. Kennedy, of Reading, Pa.: I claim the arrangement of a tank, the tan vats, the main supply pipes and their branches, substantially as set forth, whereby the tanning liquor may be caused to flow regularly through a series of vats, from one to another, without the aid of pumps, and any one or more of the vats may be insulated from the system of circulation for any required length of time, without impeding a regular circulation of the tanning liquor through the rest.

DRESSING STICKS—Jos. W. Killam, of East Wilton, N. H.: I do not claim any of the parts of the described machine separately.

But I claim planing at one operation sticks of timber of polygonal form, straight and out of wind, without confining the same to a carriage, by using the combination and arrangement of the feed rollers, F F, and the bed, B, the guide plates, L, and weights, p, with the rotary cutter heads, I K, as shown and described.

RIVETING MACHINE—Emmons Manley, of Marion, N. Y.: I claim the arrangement of the punch, e, lever, A, and mandible, q, in relation to the anvil, d, and self-adjusting hammer head, D, in the manner and for the purposes set forth.

MOWING MACHINES—Jos. S. Manning, of Philadelphia, Pa.: I claim forming the teeth or fingers, H H, with a central rib, g, closing the usual slot, in combination with cutter plate, K, and reciprocating blades, H, constructed substantially as described, for the purpose of more effectually preventing clogging of the cutters, as set forth.

I claim the device for elevating the cutter bar or beam, consisting of pulley or windlass, F, ropes, a a, and straps, d, passing over the shoulders of the horse, arranged and operated in the manner set forth.

VENTILATING RAILROAD CARS—Wm. H. Medcalfe, of Baltimore, Md.: I claim the passing of a current of air, the force of which is regulated by the motion of the car, and a self-regulating bonnet, through a body of water, which water is retained within a certain space by a certain number of wire screens, placed as shown. The air thus freed from water, dust, cinders etc. is carried directly into the car through registers or by pipes around the stove, and out of the car by a similar apparatus, emptied of water, after the air has been used.

HAMMERING LEATHER.—Jean Pierre Molliere, of Lyons, France. Patented in France July 22, 1853: I claim the hammering of sole leather upon a hard surface after it is cut into heel and sole strips, for the purpose of closing its pores without any displacement thereof, in order to render it water-proof, by means of steel hammer heads of slightly rounded face, attached to the hollow rods, C C' C'', which may be weighted at pleasure, and shall be so governed by a cam movement that no two strike at the same moment, while they are kept by their shoulder piece from crushing the leather after it is hammered, the whole constructed and operated substantially as described.

SEWING MACHINES—John O'Neil, of Xenia, O.; I do not claim a feed bar, or one divided into a number of points; nor do I claim a roughened surface of any kind.

But I claim the broad chisel-edged piece, e, which takes hold of several of the warp or weft threads, and thus feeds along the material without piercing or penetrating the cloth, when such edge is of sufficient width to catch or hold several threads of the fabric being sewed, substantially as set forth.

GRATE BARS—John F. Osborn, of New Orleans, La. I claim increasing the hight of ordinary grate bars of furnaces by an addition to their top of a piece having its sides concave, and without any fags in its entire length, substantially as described and for the purposes set forth.

I distinctly disclaim all other features of the grate bar described, except what I have specifically claimed.

REGULATING VELOCITY OF WIND WHEELS—Francis Peabody, of Salem, Mass.: I claim the wind gate described for the purpose specified.

I claim the method described of controlling the wheel, by means of the rods, c c, and screw, i, arranged and operating in the manner substantially as set forth.

SEED PLANTERS—Freeman Plummer, of Manchester, Ind.: I claim the seed cup, z, as formed by slide, f, conductor, i, and hinge, h, as described.

OPERATING THE STEAM VALVES IN BLOWER ENGINES—James P. Ross, of Lewisburgh, Pa.: I claim the cam yoke, y, in combination with the adjustible weights and counterpoise levers, or the mechanical equivalents of these several parts, constructed, arranged, and operating substantially as, and for the purposes specified.

PRIMERS FOR CARTRIDGES OF FIRE ARMS—Horace Smith, of Norwich, Conn., and D. P. Wesson, of New Haven, Conn. (assignors to "The Volcanic Repeating Arms Company," of New Haven, Conn.): We do not claim the steel disk, nor placing the percussion powder on it in the rear of the powder, nor the method of exploding the same, as a patent has already been granted to us for that.

But we claim the combination of a copper or brass case, an iron or steel disk, with cork or its equivalent, and fulminating powder, substantially as set forth and specified.

BORING CARRIAGE WHEELS.—Chas. Schmidt, of Union, Mo.: I claim a new and useful machine for boring carriage wheels.

GRAIN AND GRASS HARVESTERS—John H. Manny, of Rockford, Ill.: I claim, first, in connection with a dividing piece, for throwing the grain inwards from the extreme ends of the cutters or platform, a recess or space, behind said space into which a portion of the grain may afterwards drop and be cut, for the purpose of obviating the tendency to choke or clog at the ends of the cutters, substantially as described.

I also claim the intermediate piece, P, between the tongue and the cutter beam, for the purpose of providing a yielding or elastic joint, not only at or about the line of the cutters, but also at the heel of the tongue, substantially as described.

I also claim, in combination with the lever, U, having its fulcra pivoted intermediately between the tongue and the frame of the machine, the strap, V, and hinged supporting piece, S, for the purpose of regulating the hight of the cutters, substantially as described.

HARVESTER CUTEER BARS—John H. Manny, of Rockford, Ill.: I claim the tempered steel finger bar, by which the delivery of the cut grain or grass upon the stubble is facilitated, and other advantages attained, as described.

RE-ISSUES.

APPARATUS FOR DISSOLVING SILICA—Benj. Hardinge, of New York City. Patented originally May 8, 1855: I do not claim the dissolving of silex with alkaline salts and steam under high pressure, nor do I claim heating liquids by causing them to circulate from a boiler through a coil of pipes in a furnace.

But I do claim, in the described apparatus, the method of taking the liquid from the upper part of the charge in the boiler or digester containing the silicious matter, and the solvents thereof, passing it through a heater, and discharging the vapor thereof in the lower part of the charge, substantially as described, when this is combined with a boiler or digester. provided with stirrers, for stirring the charge, substantially as described.

SEWING MACHINES—Allen B. Wilson, of Pittsfield, Mass. Patented originally Nov. 12, 1850: I claim forming a stitch by each throw of the shuttle, and corresponding motion of the needle, that is to say: making one stitch at each backward motion of the shuttle, this being effected by the needle in combination with the shuttle, both constructed, arranged and operated as described, or in any other mode substantially the same.

SEWING MACHINES—Allen B. Wilson, of Pittsfield, Mass.: Originally patented Nov. 12, 1850: I do not claim a spring foot or rod serving only the purpose of stripping the material to be sewed off the needle, or holding the cloth down to a table as the needle rises, as such a contrivance has been used prior to the date of my invention.

But I claim the method of causing the cloth or material to be sewed in a sewing machine, to progress regularly by the joint action of the surfaces between which it is clamped, and which act in combination, substantially in the manner and for the purposes specified.

Secondly, I claim holding the cloth or other material at rest, by the needle or its equivalent, in combination with the method of causing it to progress regularly, the whole, substantially as set forth.

Thirdly, I claim arranging feeding surfaces, substantially such as described, in relation to the needle, a, set forth, that they, or one of them, shall perform the office of stripping the cloth or material from the needle, as it rises, or recedes from it, as described.

Fourthly, I claim so mounting and attaching one of the feeding surfaces to some other part of the machine, that it may be removed or withdrawn away from the surface at pleasure, substantially in the manner and to effect the objects set forth.

DESIGNS.

COOKING STOVES—Garrettson Smith, Henry Brown, and Jos. A. Read, (assignors to J. G. Abbott and Archilus Lawrence,) of Philadelphia, Pa. Ante-dated Dec. 31, 1855: We claim the design, configuration, and arrangement of the several ornaments in bas relief and moldings on the plates of stove "Premium," as described and shown.

PORTABLE FURNACES—Garretson Smith, H. Brown, and Jos. A. Read, (assignors to A. E. Warfield,) of Philadelphia, Pa. Ante-dated Dec. 31, 1855.

PORTABLE RANGES—Garrettson Smith, Henry Brown, and Jos. A. Read, (assignors to A. E. Warfield,) of Philadelphia, Pa. Ante-dated Dec. 31, 1855.

Zinc, and its Uses.

This metal was known in very ancient times in India and China, and was employed for making brass. As now understood, brass is an alloy of copper and zinc, but there is reason to believe the ancient brass of the Phœcians and Hebrews was what we now call "bronze"—an alloy of tin and copper. The famous "Corinthian brass" is supposed to have been an alloy containing gold, silver, copper and tin. Zinc exists native as an oxyd, and is found combined with carbonic acid, and as a sulphuret. Its color is a bluish white; it is brittle at an ordinary temperature, but malleable and ductile at about 300°, at which temperature it may be drawn into wire, or rolled into plates. It is flexible at a dull red heat; volatalizes at a white heat, and becomes gas; it oxydizes readily in the atmosphere, and burns when highly heated. The ore of zinc occurs in veins traversing primitive or transition rocks. The red oxyd of zinc is found native in some places, especially in the State of New Jersey. The sulphuret of zinc, or blende, occurs in rocks of all ages, and is usually associated with ores of lead. It is generally of a yellow color, and of a crystalline form. This kind of ore (sulphuret) is difficult to smelt, and is not very valvable. The carbonate of zinc or calamine is a valuable ore, and so is the silicate of zinc, which is often found associated with the carbonate. As zinc fuses at a low temperature, the reduction of calamine is easy. The ore is first calcined, then reduced to powder by stampers or a Chilian mill, then mixed with ground coal, and heated in earthen retorts, when the oxygen of the zinc combines with the carbon and escapes as carbonic acid gas, while the zinc vapor is condensed in receivers, and the metal thus obtained. A little arsenic is generally associated with zinc. The processes of reducing zinc ores are different in different countries. The most extensive zinc smelting works in the world are those of the Vieille Montagne Co., near Liege, in France, which supplies our country with most of its foreign zinc, and also supplies England with it so cheap that the native blende cannot be worked profitably.

The zinc ores of New Jersey are believed to be the richest in the world. A single block of the red oxyd weighing 16,400 lbs., obtained from the Sterling Hill mine, was exhibited at the London World's Fair, and surprised all who saw it. The American Zinc Manufacturing Company at Newark, N. J., which was established a few years since, promised to flourish; yet we have been informed that it has not been so successful as to compete with the Vieille Montagne Company, at whose works the smelting is conducted with great skill. Its success, however, is simply a question of time where the ore is rich and abundant and fuel plenty, as is the case in our country.

A few years since much was said about the white oxyd of zinc superseding white lead as a paint, and we believe it has been very effectually tried, still white lead maintains its old place. As lead paints are injurious to the health of painters, zinc paints should be used in preference to them wherever this can be done judiciously. The white oxyd of zinc for paint is made by burning the ore at a high temperature, and supplying it with a great quantity of air while burning.

Zinc is extensively used in the manufacture of common brass, of which it generally forms from 40 to 50 per cent. In the sheathing metal for ships it forms about 40 per cent., the other three-fifths being copper. We import about $600,000 of this sheathing yearly, and about $300,000 worth of other brass manufactures.

Zinc is employed to some extent in casting statues; the group in our Crystal Palace representing the Amazon attacked by a lion, is cast in zinc, and is merely bronzed on the surface. Many of our mechanics are acquainted with the mode of making brass from copper and zinc—by first reducing the copper to a molten state in a crucible, then adding the zinc. Waterbury, Conn., has long been famous for various kinds of brass manufactures especially brass kettles. This alloy is one of the most common and useful in the arts.

As the positive metal in galvanic batteries, zinc plays one of the most wonderful and useful parts in generating electricity and conveying messages on lightning's wings by telegraph. It is also the great agent in batteries for electro plating, by which silver is deposited on pewter and copper, on the types of the printer, and for making copies of engravings. The reason why zinc is the best metal for this purpose, is because it is the most easily oxydized. When placed in water it has such an affinity for oxygen that it separates it from the hydrogen of the water, which is set free. A little sulphuric acid is added to the water in electric batteries, and the product is a sulphate of zinc.

This salt is much used as a drier for paints, especially light colors. By using a pound of it to a gallon of linseed oil, in boiling the latter, it imparts to it valuable drying qualities. It is also used as an emetic in medicine, and as an eye wash, (in a very diluted state,) for mild inflammation of the eyes. It is also a good wash for very virulent sores in animals. Farmers will find it superior to any other for washing the sores of their cattle.

A solution of the double salt chloride of zinc and ammonia is very useful in tinning and soft soldering copper and iron. It is made by dissolving zinc in hydrochloric acid, then adding some salammoniac. It is applied to the seam to be soldered with a fine brush, then the solder is put on with the common iron in the usual way. Thin plates of iron may be soldered in this manner, as well as common tin plates. The chloride of zinc is employed as a preservative for timber, and as a disinfectant in hospitals, by pouring it into sewers, sinks, &c., &c.

Zinc has been used in the art of printing as a substitute for lithographic stone. Plates of this metal possess a peculiar lithographic quality. We have seen maps and designs printed from them, which gave evidence that they are admirably adapted for the coarser and cheaper kinds of lithographic printing—or rather "zincographic"—it being a distinct art in itself.

Galvanized iron is simply iron covered with zinc in the same manner that thin plates of iron are covered with tin. The iron as a positive condition to receive the zinc, must be well cleaned and scoured bright. The zinc is then melted in an iron vessel and covered with salammoniac, to prevent it volatizing, and the sheets of iron are dipped into this, and gently stirred until they are sufficiently coated. It is also a good plan to dip the plates in a weak solution of salammoniac before they are dipped into the molten zinc, as they then take on the zinc sooner. Chains for pumps and various other purposes are thus coated with zinc. Iron wire covered with zinc has been used for telegraphs; galvanized iron is said to be very durable; and a little zinc mixed with iron is stated to render it very tough and strong.

Sheet Zinc has been used as a roofing material for houses, but it is not so good as tin plate for this purpose. It has also been tried—and said to be somewhat successful—as a sheathing for ships; its principle use, however, in a metallic state, is for electric batteries and the making of brass. Its applications are very numerous, and it is one of our most useful metals.

PLASTIC ZINC CEMENT FOR ROOMS—At a recent meeting of the Academy of Sciences in Paris, M. Dumas communicated the particulars of a recent invention by M. Sorel, which promises to be of great advantage to plasterers and workers in stucco. He stated that the invention consisted in the discovery of a property possessed by oxychloride of zinc, which renders it superior, to the plaster of Paris for coating the walls of rooms. It is applied in the following manner:—"A coat of oxyd of zinc mixed with size, and made up like a wash, is first laid on the wall, ceiling, or wainscot, and over that a coat of chloride of zinc applied, being prepared in the same way as the first wash. The oxyd and chloride effect an immediate combination, and form a kind of cement, smooth and polished as glass, and possessing all the advantages of oil paint without its disadvantages of smell, &c. The inventor further suggests the employment of oxychloride of zinc as a paint for iron, and also to stop hollow teeth, for which its plasticity and subsequent hardness and impenetrability to the moisture of the mouth, render it particularly applicable."

Theory of Odors.

So much has been written on our five physical faculties, sight, hearing, taste, touch, and smelling, that it has occupied a large portion of the various published works from the time when printing was invented. The three senses first named have been fairly "written out;" but not much has yet appeared relating directly or indirectly to the others. Mr. Septimus Piesse now gives us a theory of the olfactory nerve in distinguishing perfumes. Scents appear to influence the smelling nerve in certain definite degrees. There is as it were an octave of odors, like an octave in music. Certain odors blend in unison like the notes of an instrument. For instance, almond, heliotrope, vanilla, and orange blossom blend together, each producing different degrees of a nearly similar impression. Again, we have citron, lemon, verbena, and orange peel, forming a higher octave of smells, which blend in a similar manner. The figure is completed by what are called semi-odors, such as rose and rose-geranium for the half-note; petty-grain, the note; neroly, a black key, or half-note; followed by fleur d'orange, a full note. Then we have patchouly, sandal-wood, and vitivert, with many others running into each other.—From the perfumes already known we may produce almost any flower. When perfumes are mixed which strike the same key of the olfactory nerve, no idea of a different scent is produced, as the scent dies off from the handkerchief; but when they are not mixed upon this principle, then we hear that such and such a perfume becomes "sickly," or "faint," after it has been in use a short time.—[Piesse's Art of Perfumery.

Philosophical Inquiry.

Do the rays of the sun lose any of their caloric in passing through free space?

On elevated mountains where the pressure of our atmosphere is about seven pounds to the square inch, everything is in a frozen state, even in the torrid zone. Query—What is the required pressure of atmosphere to separate caloric from the rays of the sun? PERDEX.

Binghamton, Jan. 12, 1856.

(For the Scientific Amrican.)

Photographic and Stereoscopic Angles.—The True Theory.

The public will expect an answer to Mr. Mascher's article on page 91, this volume ef the SCIENTIFIC AMERICAN. His opinions would have been appreciated had his remarks been confined to scientific examples and illustrations —avoiding personal allusions to any neglect or lack in studying and understanding his article on my part.

The article of Brewster, heretofore referred to by me, is upon the size of lenses, as affecting their images, and Photographs made by the same images. A photograph for a stereoscopic tableaux is, singly, the same as any other, and if one or both are distorted, separately considered, they must be when stereoscopically combined. My inference was true from that paper. I might have quoted columns, published three years since, which Mr. Mascher, on page 251, last volume SCIENTIFIC AMERICAN, through nearly one half of his whole communication, follows in every essential, thus decidedly endorsing the error into which Brewster and others had been led, and which our "true theory" corrected. Was there the least necessity for so doing. Mr. M. appealed to persons to read Brewster's article, and "that they would not find one word about stereoscopes at all," but I had not so implied, nor used the term "stereoscope."

Here permit me to rectify an error (in the use of Brewster's name, as follows, "In this fact Brewster and others were not mistaken," &c.,) into which I was led by the statement of Mr. M., on page 251 (before referred to) in connection with this sentence, "To explain the why and the wherefore of these facts has challenged the attention of Prof. Wheatstone, Sir David Brewster, and a host of others," &c. One of these facts, as Mr. M. has it, is "the human eyes are only placed two and a half inches apart, and see solid objects in their proper solidity and relief." Now, what says Brewster on this point, my denial of which Mr. M. calls "monstrous doctrine?" He says, "we do not see the true forms of objects in binocular vision. . . But though we see more of the body in binocular vision, it is only parts of vertical surfaces perpendicular to a line joining the eyes that are thus brought into view, the parts of similar horizontal surfaces remaining invisible as with one eye. . . The two eyes were necessary to give beauty to the human form."

I trust these quotations will be considered ample reparation for inadvertently imputing to Brewster so unphilosophical an idea on Mr. Mascher's authority. This is the doctrine of all writers on Optics. Nor has there been published one word of controversy or difference of opinion on the "two facts" above mentioned, between Prof. Wheatstone and Brewster.

But "writers on binocular vision have spoken of the eyes as if they possessed no compensating power for loss of stereoscopic relief of distant objects." Smith published the fact of the eyes turning outward when viewing distant objects a century since, and it is known to every body that knows an eye from a mathematical point. Did Mr. M. mean to tell us that *he* had discovered the two ingenious contrivances which he describes? It surely required more than ordinary ingenuity to discover, first, that the eyes having turned outward to their furthest limit, and exhausted their power to discern stereoscopic relief, turn further apart still, and separate objects which they cannot see at all; and, second, that the aperture diminishes for distant objects, when every general writer upon Optics and the anatomy of the eye, tells us that it is for "near objects" that the aperture diminishes.

Stereoscopic relief is lost at a point from which the optic axes converge, and continue onward in a direct line. Beyond this the joints of the body and our powers of locomotion and the telescopic arrangement of lenses permit the selection of such points of sight as will, by parallax, afford the best positions for trigonometrical calculations. This is the *only* compensating power which the eyes possess for loss of relief of distant objects.

We come now to the fourth section of Mr. Mascher's article containing his proposition for solution. I will arrange, as he proposes, a quarter size daguerreotype plate and pin. I will take one picture from one point chosen by himself, and then will change the position of the plate by reversing its ends, and take the other picture from his second chosen point. When stereoscopically arranged, he cannot detect the change; or I will turn the pin one half round in the second picture, and it will not appear that there has been any movement of the objects in the interval of taking the pictures. The most inexperienced tyro will know at once, that similar points do not coalesce when the ends of the plate are changed, or when the pin is moved half round, though they seem to.

Let me propose an example: take a small statue of the Apollo Belvidere, and stand it on the window-sill; make one picture, and turn it half round and make the other. Will these coalesce? Surely not. Corresponding points and outlines must be dissimilar enough to show relief, and not so dissimilar as not to blend or harmonize in vision. If two points of sight horizontally are chosen, the extended arm will appear as though viewed with one eye, and will appear in the same plane with the horizontal bars of the window sash, but the body will be seen as from two points, and its vertical surfaces will be relieved, and will stand out from the vertical bars of the sash. But suppose the two points of sight are selected on a vertical line, that is, having the two cameras placed one over the other. The arm is now seen from two points, over and under, whilst the vertical surfaces of the body are seen as from one point. When stereoscopically arranged, the arm will be relieved from the horizontal bars of the sash, whilst the body will be in the same plane as the vertical bars.

If we now arrange these last taken pictures of the "model man," as Mr. M. proposes, lying down, in the stereoscope, what becomes of the arm? Will that appear lying down? Will the windows and all nature in the back-ground appear to be lying down? By the same reasoning, two pictures of the statue, or "man," lying down, made from two horizontal points would represent the same standing up.

If such were the facts, the stereoscope would be, as Brewster terms it, an instrument of "ocular equivocation."

How easy to go to work philosophically and take the two pictures from two points at an angle of 45 degs. with the horizon, giving equal relief to both horizontal and vertical surfaces, with the bars of the sash in the same plane.

I need scarcely allude to the concluding section of Mr. M.'s article. He says, "Having taken a picture according to our claim, it possesses the fault one might naturally expect, and if placed in the stereoscope with the four eyes parallel to the sides of the case, the rounds of the chair will not be parallel," &c. Now, how can the four eyes in the two pictures be parallel in the stereoscope, two being taken from one point of sight, and two from another point. There are two different perspectives to the same vanishing point, and of course the four eyes cannot be on the same line in nature, according to the laws of perspective. Two corresponding eyes in the different pictures may be arranged parallel, and two corresponding points of the chair rounds, but not the *four* eyes nor the rounds in their length. Therefore, if Mr. M. placed the four eyes on a line, he turned the plates obliquely, and thus, in unskillful hands, a single experiment has resulted unsatisfactorily.

After three years' carefully experimenting, we have never failed in, nor discovered a single exception to, our rule. We have the Apollo, and the Laocoon, the monument and the street, the forest near and distant, the ship on her stocks, with her horizontal bracing, all as perfectly modelled and as perfectly relieved in their horizontal lines and surfaces as in their vertical. The eyes may view all our stereoscopic tableaux, without weariness at all for any length of time, and the artist may copy forms with pencil, brush, or chisel, as perfectly as from nature itself.

ALBERT S. SOUTHWORTH.

Boston, Jan. 11, 1856.

[Two eyes are given to man for another purpose beside beauty of form. A person having only one eye is not a correct judge of distance.—[Ed.

Our Foreign Correspondence.

NAPLES, Italy, December, 1855.

MESSRS. EDITORS—Reflecting upon the numerous "patented inventions" to be met with everywhere in America, the contrast in the older portions of Europe seems astonishing. Instead of labor-saving machinery, it would appear as if the only improvements required were those that would increase the quantity of labor to be done in Sardinia. However, I actually saw advertisements offering large rewards for a process of manufacturing wholesome flour from the chestnuts, which are the main food of the poorer classes.

Throughout France, agricultural implements, harness, &c., bore no traces of the inventor's brain, they were usually of the rudest construction—many of them plainly indicating that they had been handed down from some remote generation.

In Italy, the first object that attracted my attention were the plows,—an exact counterpart of one of them is described in "Anthon's Classical Dictionary," as having been in use among the ancients. One, which I examined, consisted of a short shoe, or thick triangular slab of hard wood, the peaked end pointed with iron; a donkey and cow were harnessed to the implement by the ordinary contrivances; a long guiding pole attached to the wider end, completed this agricultural curiosity, which by the aid of "the team," opened the ground for a few inches below the surface, with half the rapidity, and less facility, than the same labor could be performed by a pick-axe in the hands of a Yankee farm boy.

The soil hereabouts is mainly cultivated by men, who use a heavy, short handled hoe. I did not mean cultivated, the ground is "pawed up," manured, and flattened down again, ready for the seed, which is sown broad-cast,—nature being supposed perfectly capable of doing all the rest, on the principles, I suppose, that it is dangerous to interfere too much with the ways of Providence.

Cultivators, shovels, spades, and so forth, seem to be wholly unknown. Wood is split by an instrument resembling a blacksmith's hammer, aided by iron wedges, which last perform the main part of the labor. Olive oil is expressed by machinery that should disgrace an old-fashioned cider mill. Rye, oats, etc., are thrashed by the active exertions of a score of bare-footed men and women; who "circulate" over a floor, upon which it has been laid for that purpose. Wheat and other grain, is winnowed or cleaned by repeated washings and dryings on a tile-paved yard in front of the granary.

Flour mills, worked by hand, are common, and make a flour considerably commoner, but perfectly in keeping with other arrangements of a similar nature too numerous to speak of.

Throughout this country there are a few steam mills or factories, owned chiefly by English or French capitalists—who are looked upon by the country people as akin to the witches that anciently annoyed the good people of Salem.

I find many articles "old" here, for which patents have been granted in the States; for example, Russ pavements have been in use, in every little town in these parts, for centuries. The darkness of my first evening in an Italian inn, was lighted by a copper lamp, similar, in every respect, to the "swinging" articles lately patented at home; and, if I am good at guessing, I should "calculate" that Mr. Richardson took his first notions of a "Tube Telegraph" from a very ingenious arrangement, in all the large hotels of this country, where iron chairs, tables, washstands, bedsteads, repeating fire-arms, chain pumps, awning frames, speaking tubes, and dumb waiters, have almost gone out of fashion. J. P. B.

Floating Mahogany Logs.

MESSRS. EDITORS—In my youth, like other wild boys, I had a burning desire to see the *ultima thule* of the earth's surface, so I went out on my first voyage in the mahogany trade to the old city of Santa Domingo, which is so renowned for fine mahogany. We had to raft our timber some distance down the river, and some of the logs would swim or float, while others would sink. We therefore moored the heavy logs and light ones close together, by using spikes, little eye bolts, and rope, precisely as is done at Porto Rico, and thus we floated them all to the vessel—the light logs sustaining the heavy ones. Every cubic foot of crotch mahogany weighs about one-half more than that of plain grained mahogany; this will explain the cause why some mahogany logs float and others sink in water, and why iron dogs or spikes are driven into the heavy logs to make them float, by connecting them thereby to the light floatable logs. J. C.

Monticello, Fla., Jan., 1856.

Regenerative Steam Engine.

In Fairbairn's account of the machinery of the Paris Exhibition as published in the London *Mechanic's Magazine*, we find the following:—

"Amongst other novelties of the Exhibition is the engine of Mr. Siemens. It is upon the regenerative principle, or that of rendering active the latent heat of steam by a process of applying heat to the steam of the cylinder as it is exhausted at the end of the stroke. This steam having performed its work upon the piston, is discharged through conducting pipes into a second and third cylinder, and these two latter are enveloped by exterior cylinders, having furnaces at the ends, and on which the heat currents of these furnaces impinge, giving to the lower end a temperature in the interior of almost 500°. This increase of temperature surcharges the steam as it passes from the center cylinder, doubles its volume, and acting upon the piston or plunger by its expansion, drives it forward ready for the same repetition in the succeeding stroke. The steam thus expanded and reduced in temperature, is passed by another conducting pipe into the opposite side of the piston, which, acting upon it in a state of saturation, having received some additional heat in its passage through some wire gauze which fills the annular space between the two cylinders over the furnaces, it is again ready for the succeeding stroke. In this way the engine is worked, the steam making a constant circuit, and worked over and over again with about 1-10th of supply from a small vessel or boiler attached immediately above the heated cylinders. The results, according to Mr. Siemens, are highly satisfactory, and produce from the same quantity of coal more than double the force of the steam engine."

[This is certainly a *pure* steam engine, the same steam being used over and over again without condensation into water, and is the only one of the kind we have ever heard of. All the heat required (and consequently the only fuel) is simply to replace that lost by the expansion of the discharged steam. This is the idea clearly set forth in the foregoing description—the steam making a constant circuit, and worked over and over again. Now while we confess this engine will require but little fuel, it will exert just as little force, for to us it appears that the amount of radiation or loss of heat in it is just the exact exponent of the force exerted. Its supposed economy appears to be based on fallacious reasoning. How can it be otherwise? Let us suppose for a moment that there is no loss of heat in this engine, how will it operate, or will it operate at all? It will not move. The steam vessel into which the steam of the cylinder is exhausted, must be of a lower temperature than the exhausting steam, or the resistance will be equal, and balance the direct action of the steam. It is, therefore, evident that in a *pure* steam engine like that of M. Siemens', the amount of radiation or loss of heat at each stroke, is the exponent of the force of the engine.

The Fate of Mummies.

The mummies of Egypt are sometimes quarried by the Arabs for fuel, and, whether those of the Pharaohs, their wives, their priests, or their slaves, are split open and chopped up with the same indifference as so many pine logs. The gums and balsams used in embalming them have made them a good substitute for bituminous coal; and thus the very means employed to preserve them have become the active agents of their dissipation.

The Life Saving Benevolent Association of this city have presented to Capt. Nye, of the steamer *Pacific*, a gold medal, as a testimonial of his humane conduct in saving 19 of the crew of the wrecked ship *Jessie Stephens*.

New Inventions.

Recent American Patents.

Timber Planing Machine.—By Joseph W. Killam, of East Wilton, N. H.—The invention has for its object the planing of timber and all kinds of angular wood stuffs, large or small, the various sides being all planed simultaneously. Two cutter heads only are employed, the shape of the cutters being arranged to correspond with the number of sides which it is desired to cut on the stuff. For example, suppose a square piece of timber is to be planed; the cutters are made V-shaped, and placed one above the other; the stuff, instead of laying flat, is turned on angle when fed in, so that each cutter planes two sides of the timber at once. Six sides, octagonal, and other angles, can be planed with equal facility by a change in the form of the cutters. There is an ingenious feeding bed device connected with the machine which we cannot here describe.

This improvement is calculated for dressing off large timbers of all kinds, for dwellings, churches, ships, &c., also for finishing table legs and angular sticks of every description.

Self-Closing Gate.—By J. A. Ayres, of Hartford, Conn.—Gates that may be opened and closed by the mere pressure of a carriage wheel upon a lever, without subjecting the occupant of the vehicle to the necessity of getting out for that purpose, are becoming quite common. They have been already introduced, with success, in many parts of the country.

The present invention is one of the latest improvements of this class. It consists in placing a pivoted board at a suitable distance from the gate, the board being connected by a rod with the lower gate hinge. The board is so weighted that one end is always elevated above the ground. When a carriage comes along it strikes the board, presses it down, and acts through the rod on the hinge, causing the gate to open. The gate is held, after opening, by a catch which the carriage wheel releases in passing through, and the weight attached to the board just mentioned. The hinge which connect with the rod then causes the gate to swing back and remain shut. This appears to be a very cheap and simple device.

New Method of Casting Metals—By Ezra Ripley, of Troy, N. Y.—This consists in a peculiar method of quickly withdrawing the air from the mold, so as to insure a better filling of the same with the metal. This is done by the application to the mold of an air-tight expansive chamber. The withdrawal of the air begins at the same instant that the molten metal commences to fill the mold.

Water Proofing Leather—By J. P. Molliere, of Lyons, France—This is a method of rendering the soles and heels of boots and shoes water proof, by hammering them, thus closing their pores. The leather is first cut out into the desired form, and then subjected to the active operation of a series of small steel hammers, having slightly rounded faces. It is alleged that the leather thus treated is not displaced or spread, and that it is rendered wholly impervious to water.

Tan Vats—By David H. Kennedy, of Reading, Pa.—The inventor employs a large tank placed above the vats, and connected with them by suitable main and branch pipes, for the purpose of causing the tanning liquor to flow regularly from one vat to the other, without the aid of pumps. Any particular vat may be cut off or isolated from the others whenever it is desirable, without stopping the circulation of liquor through the remaining vats. This is a good improvement. Mr. Kennedy is the inventor of a process for tanning, patented some time ago, which, it is said, greatly reduces the time commonly required to convert hides into leather.

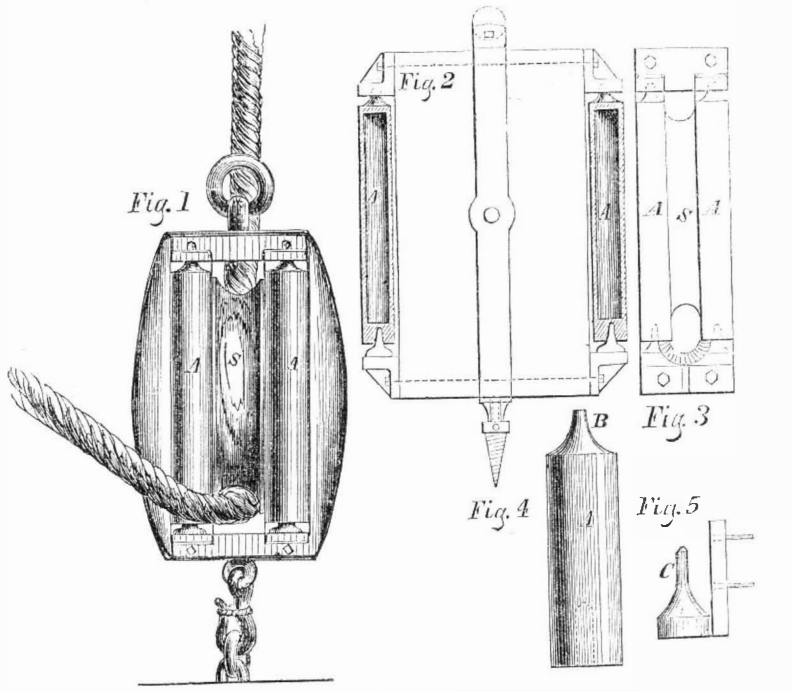
Method of Melting Iron Filings—By A. Pevey, of Lowell, Mass.—The inventor provides a perforated cast iron vessel, in which he deposits the filings, and melts them up, vessel and all, in a suitable furnace.

Note.—Patents for the above inventions, except the two last, were granted Jan. 22nd, 1856. For claims of the inventors see official list in another column.

Registering Thermometer.

It is sometimes very convenient and useful to have a thermometer that will not only indicate but leave a record of the lowest temperature of the atmosphere during a certain period—such as at night—when the instrument cannot be watched. As mercury freezes at 28 degs. below zero, alcohol colored with alkanet root is the medium used to indicate degrees of cold as low as 40 degs. A spirit thermometer (a very neat one of which is now before us manufactured by G. Tagliabue, No. 298 Pearl st., this city,) is made to register the lowest degree of cold to which the spirit may fall during night, by a peculiar fine small tube placed inside of the spirit tube, and which allows the spirit to rise past it when set, (if a rise in temperature occurs,) but which falls with the spirit to the lowest point of atmospheric temperature, and thus leaves a record of the lowest degree of cold.

IMPROVEMENT IN HOISTING BLOCKS.



In almost every species of hoisting, whether on ship board or shore, it is frequently necessary to change the bend of the rope, so that while one portion moves, for example, perpendicularly, the other part moves horizontally. Such a change of bend is indicated by the rope in fig. 1.

The block through which a rope thus bent is to pass, must be made specially for that purpose, and its cheeks must be provided with friction rollers, so as to prevent the rope from being chafed by so short an angle. The present improvement relates to this class of blocks. It is the invention of Mr. H. Merrill, of Taunton, Mass., and was patented Dec. 25, 1855.

Our engraving shows, at fig. 1, a side view of the improved block, the sheave of which is of the ordinary construction, indicated by S, the friction rollers by A. The other figures are sectional views of the parts.

This improvement does not consist in the use of the friction rollers, for they are not new, but in a peculiar method of hanging the rollers. When placed in the ordinary bearings, their journals soon become so clogged up by dust or dirt, that they cannot revolve, and the rope is then worn or scored. In the present invention this difficulty is wholly obviated. The rollers are made pointed, (B,) at one end, which point or pintle revolves in a suitable socket, as shown; the other end of the roller has a socket, and rests upon a point or pintle, C. The inventor claims that the socket which receives the pointed end of the roller serves as a cover to prevent the entrance of dirt, while the cavity in the other end of the roller acts in the same manner to cover the lower pintle.

We are told that hoisting blocks thus made will never become clogged and useless from the causes named. The improvement adds nothing to the cost of construction. The rollers may be cast hollow, and the strap terminate in an auger point, for convenient fastening, when desired, as shown in fig. 2.

For further information address the inventor as above.

(For the Scientific American.)

Marble and Marble Sawing Invention.

Messrs. Editors.—Something more than six months since it was made known, through your columns, that an invention was needed for sawing tapering forms in marble. You accompanied that notice with editorial remarks, in which you prophesied that the required machine would be produced, and encouraged inventors to undertake the work.

Your expectation has been met. Sixteen patents have already been granted for machines of the character proposed, and several of these are now doing satisfactory work. In a short time a number more will be added to the list. With so many earnest, practical minds directed to a single point a failure was impossible. This competition, unparalleled in point of success, has had, and must continue to have, the effect greatly to diminish the commercial value of each patent from the price it might have commanded standing alone. As no one or two of these machines can enjoy anything like a monopoly of the public confidence or of actual merit, they will at once be introduced into general use. What the patent right of a machine of exclusive excellence would have been worth may be "guessed," from the fact that several discriminating inventors, when they had satisfied themselves of their success in the production of a good machine, refused the $10,000 offered, and one of them sold the right of using a single machine to one of the largest marble manufacturers in Vermont for $1000. An ordinary gang of saws is worth $1000, but this invention, by doubling its efficacy, makes it pay for itself the first year. The absolute or aggregate value of this invention must be very imperfectly understood by those who are ignorant of the present extent of the marble business in this country at the present rate of its development, and of its capacity for unlimited expansion. The business is yet in its infancy, although it has increased more than a hundred-fold in ten years. I have no hesitancy in saying that the entire marble interest of Vermont is now valued, by its owners, at not less than $15,000,000! Here is found marble of almost every hue, from the ebony black to the snowy white, and varying nearly as widely in texture. Sudbury, Brandon, and Middlebury have statuary marble equal to the best Italian; as the busts of our native sculptor, Kinney, testify. Roxbury has an inexhaustible supply of the true *Verd Antique*, so identical in composition and appearance with that hitherto obtained from ancient ruins, that the best judges have mistaken the one for the other. Although these quarries have been opened but a couple years, this beautiful stone has already found its way into the new capitol extension at Washington, and into the parlors of the rich in New York and Paris. The committee for the erection of the Benjamin Franklin monument in Boston, adopted it for that purpose after subjecting it to the severest tests of heat, cold, and pressure. The "Vermont Italian" quarry of Dorset presents a bold front on the side of the mountain, half a mile long by 150 feet high, and of a breadth which ages cannot exhaust. Rutland alone turns out half a million dollars worth a year.

And yet this marble formation which extends the entire length of Vermont, runs also through Berkshire County, in Massachusetts, through western Connecticut, and, I believe, into New Jersey. And probably the marble interests above briefly alluded to are not a moiety of those which exist in the country.

No sane person, with these facts before him, will say that an improvement which at once does away with one-half of the expense of an important branch of the business is not of great value, and no reasonable person will charge mercenary motives upon those who were instrumental in the production of these improvements. Some inventors, in their too great haste, seizing upon the first idea that presented itself, instead of carefully and experimentally feeling their way to the truth, have made failures; and now finding themselves minus a trifling sum of money for patent fees and models, seem to forget that some waste of property and life always attends a great victory.

There is yet ample room in the marble business for the exercise of the inventive faculty; some important improvements are yet needed. In conclusion, Messrs. Editors, allow me, in behalf of the marble manufacturers of Vermont, to thank you for the early "aid and comfort" you gave this great improvement

M. M. Manly.

South Dorset, Vt., Jan. 1856.

[The above letter, as will be seen by the signature, is from the gentleman who offered the prize of $10,000 for the best marble sawing invention. The letter contains some very interesting information.

Salt to Remove Ice.

By sprinkling common salt on ice it absorbs water, and in the act of so doing thaws or softens the ice by the heat generated during the action of attracting the moisture. This quality of salt is often taken advantage of to thaw the ice on pavements in order to prevent persons slipping on them. A correspondent of the New York *Courier* warns persons not to pursue this practice unless they wish to injure the surface of their pavements. He says "the salt causes the surface of the stone to peel off as if rotten. A few months after such application, scales of one-fourth or one-eighth of an inch in thickness may be picked off by the fingers. The salt (chloride of sodium) which soaks into the stone, becomes decomposed, and forms chlorides with its constituent salts, which being soluble leak out by subsequent rains, and impair its adhesive properties. The city railroads of New York have made liberal use of salt to clear their tracks of ice and snow. The concrete in which the ties are imbedded might be injuriously affected by repeated applications; deliquescent salts being formed and carried off by the rains."

To prevent the stone flags scaling off, it would be a very easy thing to sweep or scrape off the salt with the thawed ice, which should always be done. If the above is true with regard to the action of the salt on stones, would it not be an excellent and easy plan to use salt for roughing the Russ pavement—something much to be desired.

Death of an Inventor.

William Blake, the inventor of Blake's Fire Proof Paint, died at Westfield, Mass., on the 8th inst., from the effect of an explosion that occurred in some chemical experiments which he was making. A few weeks previous to this event he called upon us to consult about obtaining a patent for a new explosive material for fire-arms, and described the experiments which he had made conjointly with an acquaintance, who was an experienced chemist. He stated that all their experiments were not completed, but they had already obtained very satisfactory results. His experiments are now ended forever. *Memento Mori.*

Life Boats.

The Committee appointed by the Secretary of the Navy, to test various Life-boats at the Navy Yard, Brooklyn, have reported very favorably on the compressible boat of Mr. Berdan, described on page 86, Vol. 10, Scientific American.

Scientific American.

NEW-YORK, FEBRUARY 2, 1856.

Heat and Cold Phenomena.—The Cause.

We have heard and read much about heat and cold, and we are quite sensitive in our *feelings* on the subject. But what is heat, and what is cold? Many theories have been advanced respecting heat, all the authors of which seem to have committed the blunder of supposing they had demonstrated what heat is, by merely describing its effects. We have never heard of an attempt being made to explain what cold is, beyond that lucid one, "it is the absence of heat," and which is just as applicable to heat, —"it is the absence of cold." Both heat and cold produce peculiar effects.

By heat, substances are made to expand, metals to assume the form of gas, and the flinty rock to run like water. Cold, on the other hand, reduces fluids to solids, but like heat it also expands substances. Strong cannon have been burst to pieces, as with gunpowder, by filling them with water and submitting them to severe cold. Rocks are split asunder, and limbs of trees are burst from their trunks during intense cold. If heat is a *substance*, as is asserted by some, why may not cold be a substance also? The fact is that heat and cold are just terms in general use for describing certain effects arising from a cause, or from causes not yet distinctly known. We know something respecting the operations of gravity, but no person can tell what gravity is; and it is the same with heat and cold. Faraday has come to the conclusion that all the forces of nature may be traced to electricity in different conditions; and heat and cold being forces of nature would come under his classification as electrical phenomena. The recent "cold term" or *cycle*, experienced through such an extent of our continent seems to favor his hypothesis, at least so we would conclude from the information published on the subject by E. Merriam, the well-known meterologist. He states that this cold term lasted thirty days, and that very intense cold was experienced in many places which heretofore always enjoyed mild winters. At Waverly, Mo., on the Missouri river, the temperature on the 25th of December was 24 deg. below zero; and on the 9th of this month it fell again to the same point; and had there been a wind prevailing at the time, it is believed that all the live stock in that part of the country would have perished, as the temperature was more like that of the Arctic regions than that of the mild southwest of the United States. Mr. Merriam says, in relation to the severe cold, "it must come down from the high mountains and from the great ethereal where the cold holds perpetual dominion. He also alludes to the recent eruption of the great volcano in the Sandwich Islands as having something to do with it, and says: "from the gigantic crater, nine miles in circumference, such a volume of electricity is discharged into the ethereal that human estimate cannot count it up." These remarks favor the views of Faraday respecting electricity being the cause of natural forces.

On the 12th and 13th ult. myriads of live black bugs fell on the snow at Fairfax, Va, and covered it as with a mantle of velvet; and many other strange things have also taken place during this cold term, such as the shock of an earthquake felt at Ogdensburgh, N. Y., on the 6th ult., several shocks in Virginia on the 9th, and an electric cloud, which sent forth a current of great length, on the 19th. As earthquakes have heretofore been attributed to electricity, the shocks mentioned in connection with the recent cold term, furnish further proof in favor of Faraday's theory; so that it may be positively true, that the same cause which plates a tea-spoon and dispatches a telegraph message, also sends us our cold and hot terms.

By recent accounts from Europe we learn that the cold has been as intense there as it has been here. At Odessa, on the Black Sea, the thermometer stood for several days at 27° below zero, and many persons had been frozen to death in their beds. It had also been very cold in England. We have often heard it asserted that when we had a cold winter in America, mild weather used to prevail in Europe, and *vice versa;* but the past and present winters have been equally severe on both con tinents. We wonder if philosophers have observed any peculiarity in the dip of the magnetic needle during such severely cold seasons?

The Woodworth Patent Extension.—Appeal to Governors and State Legislatures.

During the progress of the memorable efforts made in 1852 to foist the Woodworth extension bill upon Congress, the attention of many of the State Legislatures became turned to the subject and some of them passed resolutions instructing their Senators and Representatives at Washington to use their influence and their votes against the passage of the act. These resolutions had a powerful effect, and contributed, perhaps as much as any one cause, at that time, to the signal defeat of the scheme.

In less than one year from to-day this venerable monstrosity, if ignored by the present Congress, will die a natural death. Its lease of life expires, by law, in December, 1856, and after that time, unless the patent is now renewed, it will trouble no one. It is fully sensible of this fact, to speak figuratively. It knows that its dying hour approaches, and it is mustering all its forces with a view to avert the catastrophe; it is about to make a grand final struggle. Its most powerful agent is money. Richer than Crœsus, it is lavish in its expenditures and profuse in its promises. To obtain influence or put down opposition, it freely pays gold. Its great hope is, directly or indirectly, *to subsidize Congress*; to effect this purpose, secret agents are busily at work, in many directions, concentrating every possible influence that will aid in carrying out the end. If the votes of less than half the members can, in any manner, be secured, the victory will be won, and the whole country will once more be laid under disgraceful tribute to its avarice. For years the patent has brought in an annual revenue of over three millions of dollars. Vast sums can be afforded to be spent to secure its continuance; but, if successful, the re-payment of these amounts, ten thousand times over, will be required, and the money must come from the earnings of hard-working, industrious people.

Under these circumstances we appeal to the Governors and Legislatures of our States to lend their assistance, for the last time, towards the suppression of this gigantic wrong. We ask them to draw up messages, to pass resolutions, to direct Congressional Representatives, and to exercise every other power within their control to prevent its consummation.

We call upon good men, everywhere, for aid. Citizens of all classes can greatly assist in this matter, if they are so disposed; we hope they will, for once, do their whole duty. Let them write letters to friendly Members of Legislatures requesting attention to the subject, and explaining its necessities. Let them keep petitions in constant circulation, and send them, as often as possible, to Washington. Let them be up and doing, for there is danger in delay. Whatever is to be done should be done quickly.

Remonstrances to the Woodworth Patent Extension.

We would again remind our readers that printed petitions of remonstrance against this outrageous scheme can be had gratis, on application at the SCIENTIFIC AMERICAN office. Enclose a stamp for postage.

One more vigorous effort made and the monster receives his death-blow. The parties interested are earnestly seeking, to obtain the extension. On no principle of right or justice can they succeed Come forward, one and all, and help to put the millstone round their necks.

Life Benevolent Association.

There is an Association composed of the most respectable merchants in this city, the object of which is to procure life boats and station houses, with apparatus and means of saving life in cases of shipwreck on our coast, and also to encourage meritorious conduct in persons for saving life, by granting medals and pecuniary rewards. Congress has provided many life-boat stations on the New Jersey and Long Island coast, and these have been the means of saving 1700 persons from death; but owing to the increase of commerce in New York, the present means for saving life in shipwreck are not adequate, hence the formation of this Association. It appeals to the public for support. Robert C. Goodhue, Esq., No. 64 South street, is treasurer.

History of Gas Lighting—Who was its Inventor.

We have lately noticed a paragraph in a number of our exchanges, attributing the invention of gas lighting to Phillip Le Bon, an engineer of roads and bridges in France, in 1785. The following is an extract from the paragraph referred to:—

"Le Bon commenced by distilling wood, in order to obtain from it gas, oil, pitch, and pyroligneous acid, but his work indicated the possibility of obtaining gas by distillation from fatty or oily substances. He eventually died, ruined by his experiments. The English soon put in practice the crude ideas of Le Bon. In 1804, Windsor patented and claimed the credit of inventing the process of lighting by gas; in 1805 several shops in Birmingham were illuminated by gas manufactured by the process of Windsor and Murdoch; among those who used this new light was Watt, the inventor of the steam engine. In 1816 the first use was made of gas in London, and it was not until 1818 that this invention, really of French origin, was applied in France."

So far from the foregoing being correct, gas was made from coal in England in 1688. The Rev. Mr. Clayton, of Crofton, Yorkshire, who had visited Virginia, in giving an account of his observations in that colony to the Royal Society, compared the nature of the violent thunder of Virginia to the spirits which he had drawn from coals, and exploded, and which he had caught in bladders, and burned until it was consumed, which was nothing less than coal gas. Dr. Watson, in his Chemical Essays, in 1773, describes the process of distilling Newcastle coal in a retort, and obtaining inflammable gas therefrom. The discovery of making gas from coal was therefore made long before Le Bon's day; yet there can be no doubt but this French engineer made illuminating gas from wood, wihtout any knowledge of what the English chemists had done before. W. Murdoch, spoken of in the above extract, illuminated his own house and his office with gas, in Redruth, Wales, in 1792, and was the first person who introdnced it into public use. He did for gas illumination what Fulton did for steam navigation—he brought it into successful public use.

We have seen a statement in one of our cotemporaries to the effect, that no method yet employed to purify coal gas, has been effectual in separating the sulphuretted hydrogen from it. It is indeed true that there are some iron pyrites in all coals used for making gas, and both ammonia and sulphurous gas are produced from coals with the carburetted hydrogen gas. But then the process of separating these impure gases perfectly, is well known. If the gas is first passed through a solution of the sulphate of iron, and then through the common lime purifyer, and then washed in water, every trace of sulphurous acid and ammonia will be removed from it.

Water Wheel Railroad.

On page 137, we copied a short article from the London *Athenæum* describing a new method of drawing up railroad cars on a steep incline on the Mt. Cenis Railroad, Piedmont.—The plan was described to consist of a water wheel operated by the power of a descending current, and made to ascend the incline, by having its shaft bearing on side rails, and its buckets in the water, and thus to draw the train of cars after it. We stated that the plan in all likelihood was not correctly described by the *Athenæum*, and that it probably consisted of a more reasonable method, viz.:—that of a fixed water wheel at the foot of the incline, for drawing up the train by an endless rope; and this plan we stated was not new.

A correspondent in St. Louis sends us such information as proves conclusively that even the plan of the water wheel carriage ascending an incline against the motion of the current which drives it, is not new.

On August 29th, 1825, such a plan exactly, for transporting carriages with goods up an incline on a railway, was described in one of the Philadelphia papers, and the invention of it was attributed to George Reeve, of Orange Co., N. Y.; it was called the "Ascending and Descending Hydrostatic Carriage." When the article describing it was published, Silas Dinsmore, of Mobile, Ala., answered it, stating that Archibald Smoot, of that city, had shown a miniature water wheel carriage of the same kind in 1822; explained its use, and operated it publicly before a large crowd of citizens.

We would really like to see such a wheel in operation on an incline of about 60 feet to the mile. At present we cannot see how it would ascend it, and therefore we do not believe it could. If it will work, a paddle-wheel boat may yet be made to climb up Niagara Falls. The covetousness of no man should be excited respecting the authorship of this railroad water wheel.

Important to Inventors and Model Makers.

Too many applicants for patents, disregard the rules of the Patent Office in preparing their models, and thereby cause themselves unnecessary trouble and expense. Numbers of models are constantly refused by the Department on account of their being too large, too imperfectly constructed, or not properly painted or polished, to meet the official requirements. Before us lies a letter from the Commissioner, which we will publish, giving the names of the interested parties, in initial, as a warning to others who may happen to be engaged in the construction of models for applications for patents, or soon intend to do so:

"U. S. PATENT OFFICE, Jan. 22, 1856.

GENTLEMEN—The models in the following late applications can be repaired by the Office for the prices annexed:

1. D.C.T.—Water Wheels,—broken; charge for repairs, $1,50.

2. A. & T. S. S.—Gang Plow,—broken; charge for repairs, $2.

3. A. A.—Screw Propeller,—too large; charge for reducing, $1.

4. W. H. B.—Spike Machine,—charge for painting, $1.

5. J. S. G.—Converting a Reciprocating into a Rotary Motion, &c.—requires painting; charge, $1. Very respectfully,

C. MASON, Com.

Messrs. Munn & Co., New York."

For the further information of all our readers, we subjoin the official rules in respect to models. If properly observed by model makers, the troubles we have named will be avoided. Annexed are the rules:—

"The model must be neatly and substantially made of durable material, and not more than one foot in length or hight, except when a larger model is permitted by the Office for special reasons, to be shown by the applicant. Models filed as exhibits, in interference and other cases, should also, as far as practicable conform to this rule as to size. Should they exceed this limit, they will not be preserved in the Office after the termination of the case to which they belong. If made of pine or other soft wood, they should be painted, stained, or varnished.

A working model is always desirable, in order to enable the Office fully and readily to understand the precise operation of the machine. The name of the inventor, and also of the assignee (if assigned,) must be fixed upon it in a permanent manner.

When the invention is of a composition of matter, a specimen of the ingredients and of the composition, which the law requires, must accompany the application, (see act of 1836, section 6,) and the name of the inventor and assignee (if there be one) must be permanently affixed thereto."

Many of the models received at this office, and also at the U. S. Patent Office, come packed in cotton. If oil paint or a slowly drying varnish has been used, the model, by the time it reaches its destination, is thoroughly deprived of its beauty by the firm adherence of the cotton to its parts. If cotton is not used dust generally takes its place, and becomes cemented to the model. For the prevention of this vexation we herewith present an excellent recipe:

TO COLOR OR PAINT MODELS—Dissolve gum shellac in alcohol and add a small quantity of coloring matter; any color that is ground in water will answer. Models constructed of hard fancy woods, such as maple, beach, walnut, mahogany, etc., require the shellac only, no coloring water being requisite, as the shellac will bring out the natural grain of the wood. Avoid copal, and all oil and turpentine varnishes, and also oil paints, as they require considerable time to dry, and generally cause the working parts of models to adhere, and so stick together so as to render them inoperative.

Safety of Railway Traveling in England, Car Axles, &c.

At a recent meeting of the English Railway Club, which is composed of the representatives of the principal English railways, Mr. Edward G. Watkin, the General Manager of one of the most extensive lines, presided, and made a speech, which was received with great attention. He said those present represented £300,-000,000, employed more than 90,000 men, and administered a revenue of £20,000,000 annually. In regard to the safety of railway traveling, Mr. Watkin furnished some novel statistics. He said that he had often thought that if a person wanted to be in the safest place in this world he should get into the first class railway carriage, and never leave it.

In 1854 the English railways carried 111,-000,000; the number killed, in consequence of accidents beyond their control was 12. Those 111,000,000 traveled about 15 miles each, so that it was clear a man must make between 10 and 11 journeys, traveling between 150,000,-000 and 160,000,000 miles—and that would take, he calculated, between 2,000 and 3,000 years—before a fatal accident might be expected to happen to him. Now, he challenged comparison, in point of safety, between railway traveling and that of any other avocation. Two-thirds of the accidents occur from moral causes, and not from physical ones, as the breaking of an axle, or some defect in the permanent way.

In the *American Railway Times* (Boston,) a correspondent (A. Lindsay) offers a new theory regarding the cause of railway axles breaking. It has hitherto been supposed that the chief cause of railway axles breaking was their losing their fibrous character, and becoming crystalline and brittle by concussions and vibrations. The following are the views of the *Railway Times* correspondent on this subject:—

"At present we are in the dark as to the cause of the axles breaking after having run a long time, although perfect when leaving the mill; that the quality of the iron is changed, having lost its fibrous and flexible character by use, and it breaks, being but little stronger than cast iron, but will sustain considerable pressure. The question is, from whence comes this change? The iron has lost its original fibrous quality and becomes brittle, having as it were a crystalline body, and of course easily broken and always at the wheel where the vibration ceases, subjecting the iron to the continuous jar and granulating it, thus changing its character and destroying its strength. Allow me to say that the whole hypothesis is, as to the cause, erroneous. The true cause is this, that the iron is converted or changed into steel by the friction and the oil. The latter, though designed to remove the friction, contains a portion of carbon, and it is infused slowly, but certainly, into the iron by means of the heat generated while the car is in motion, thus perfecting the destructive process, and rendering the axle certain to break by a sudden stroke or jar, the same as a bar of cast steel. The process of making steel is simply to subject good malleable iron to a moderate heat with charcoal, which carbonizes it, if it is closed up, very much like the axle of the car in the journal, and leaving it in that state for a long time, and it comes out steel, and will break with a slight tap, but will resist a great pressure if steadily applied. My opinion is that no car should be run over one hunded miles before letting the axles cool, for they do generate more or less heat. The more friction the soon er is the axle converted into steel, and the sooner will it break, having become highly carbonized by the oil and heat. Now the great question is, how to restore the axle to its original state of malleability or flexibility and save it from breaking, thus saving thousands of dollars and many valuable lives annually? The true and only way is to detach the axle, when deemed unsafe, and heat it to a cherry red, and immerse it in a pile of unslacked lime, leaving the lime to slack by the action of the atmosphere, and the axle remaining in it for about thirty days, and the axle is again fit for use. The lime having lost its carbon by the process of burning, and the axle or iron being highly carbonized, the lime has a direct affinity for the carbon in the iron, and thus abstracting it, restoring or changing the iron to its original state or softness. I believe I have solved the mystery, and if any man can disprove it I would be pleased to hear from him."

Fish Breeding not a New Art.

The *Southern Cultivator* published at Augusta, Georgia, commences its fourteenth volume this month, continuing an able article on artificial fish breeding, by Prof. J. Bachman, D.D., of Charleston, S. C., one of the ablest living naturalists. It is generally supposed that artificial fish breeding is quite a recent art, first practiced in France a few years ago, but here we are informed that Dr. Bachman raised fish successfully from the ova, twenty years since. The plan which he practiced was the very same as that now used in Europe, and recently introduced, for raising salmon. Every planter and farmer in our country should read the article of the Reverend Naturalist on breeding fish artificially in ponds.

Recent Foreign Inventions.

Glass Tiles for Roofing—James Bowron, of the Tees Glass Works, Stockton, Eng., has taken out a patent for the manufacture of glass tiles, by pouring the glass when in a fluid state into molds, and then pressing them like clay tiles. After partially cooling they are removed to the annealing ovens, and when cold the tile is complete.

Some of the old houses in the cities founded by the Dutch in New York are covered with tiles, but we suppose that no house built in our country during the past forty years has been so roofed. The common clay tiles do not stand our severe winter weather; they are liable to crack and disintegrate by moisture and frost, otherwise tiles make a very durable fire-proof roof. Slate and tin plate are the materials now most commonly used for roofing in our cities, especially the latter; and we have seen one machine shop in Troy, N. Y., (Starbuck's) covered with cast-iron shingles. Glass tiles would be far more expensive than tin plate for roofing, but for many buildings devoted to particular purposes, such as for daguerreotyping, conservatories, and observatories, a roofing of glass tiles seems to be the very kind required. Glass tiles are not new, but those heretofore manufactured have been made by cutting a piece of crown, sheet, or plate glass to the required shape, then heating and bending it. The claim of Mr. Bowron is for making the glass tiles by molding and pressure, which is a great improvement on the old method.

Coloring Goods—Pierre Depierre, of Paris, has obtained a patent for the employment of alder flowers, to form a substitute for cream of tartar in dyeing, and also for their use in dyeing black on cotton, silk, and wool, also goods composed of wool and cotton, mixed.

The foregoing is taken substantially from the London *Mechanic's Magazine*, which says, "the alder flowers are also applicable to the manufacture of ink." Alder bark was used for dyeing black in Germany and England on wool and linen before logwood was known as a dyewood, and in all likelihood so were alder flowers. We do not see how they can be used as a substitute for cream of tartar; but some of our dyers will soon test their quality for this purpose. Alder bushes are found everywhere, and if their flowers possess the qualities for which P. Depierre has taken out his patent, the foregoing information will be of no small value to our manufacturers of woolen and cotton fabrics.

Iron Lasts for Boots and Shoes—E. Francis, of London, has taken out a patent for metal lasts made with holes to receive the pegs and pins, to keep the sole in its place when making a boot or shoe.

Water-Proof Varnish—R. Paul Coignet, of Paris, has obtained a patent for making a varnish, which, when applied to cotton, cloth, or any other textile fabric, will make it waterproof. It is composed of 100 parts linseed oil, 35 of coal oil, 2 of mineral pitch, 5 of resin, 5 of wood tar, 10 of mutton suet, 1 of lampblack, to color it, 2 of alum, and 2 of litharge. These are all boiled together for two hours, and applied while warm with a brush. This ought to make a first rate varnish for the strong leather boots of fishermen and farmers.

Bleaching Paper Pulp.—Paul F. Didot, chemist, of Paris, has discovered a new method of bleaching paper pulp, for which he has secured a patent. He immerses the pulp in a solution of bleaching liquor,—which is made by saturating chloride of lime in water, and using the clear liquor—and then passes carbonic acid gas through it. It is stated to be an improved process for bleaching both pulp and textile fabrics.

Our paper manufacturers and bleachers of cotton goods should try the experiment. Sulphuric acid is now used in discharging the color from rags and paper pulp to bleach them, and it appears to us that it must be cheaper than carbonic acid gas; the proof of the value of any process, however, is the testing of it.

In the *London Artizan* we find descriptions of some interesting improvements, notices of which we herewith transfer, with engravings.

Improved Tug Hook—By C. J. Hunt, of Surrey Co.—The inventor's object was to make a tug hook that would open out more fully than those in common use, and more easily release itself from the staple, or to whatever it was applied.

Some inventors, instead of improving and simplifying a subject, render it more complicated and less useful than the original. The annexed engravings show the variety of parts that it is possible to introduce into so small an affair as a tug hook, when an inventor puts his wits to work.

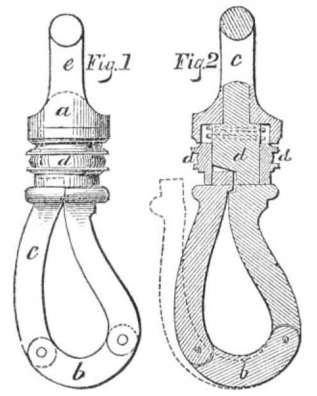
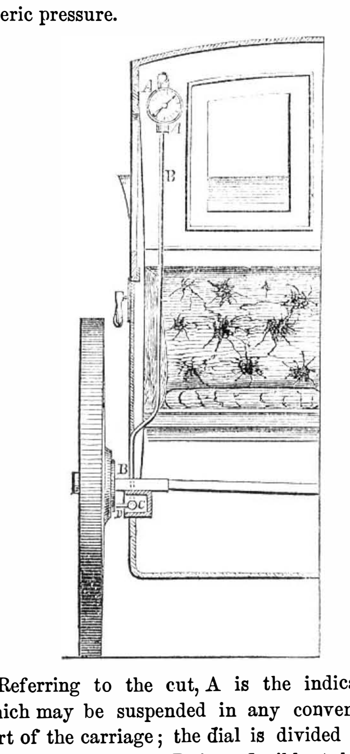


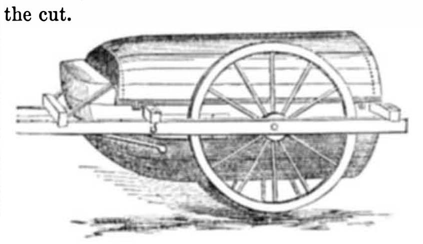
Fig. 1 is a side view, and fig. 2 a section. *a* is the stem to which a swivel eye, *e*, is attached, for receiving the end of the tug. The loop portion of the hook is divided into three parts, two or which, *b* and *c*, are pivot jointed, as shown, so that the hook may be opened out straight. The upper end of *c* is confined by the band, *d*; the part *c* will therefore be released or confined, according to the direction in which *d* is turned. There is a spring placed above *d*, which prevents a self-acting or too easy movement of the parts, and obviates the liability to uncouple when the contrivance is in use.

Norton's Patent Distance Indicator—This invention is intended to be attached to carriages for the purpose of indicating the distance traveled. The dial pointer is operated by atmospheric pressure.



Referring to the cut, A is the indicator, which may be suspended in any convenient part of the carriage; the dial is divided into miles and furlongs· B is a flexible tube, to connect the air-box, C, with the instrument. C is a small iron air-box attached to the axle. D, a pin, stud, or cam, attached to the nave of the wheel, which acts upon the air-box each time the wheel makes a revolution, forcing the air through the flexible tube, and so acting upon the instrument, A. The box, C, being attached to the axle, and it being connected to the instrument by a flexible pipe, is not affected by the oscillation of the body of the vehicle. Mr. Norton also applies his instrument to various other purposes, viz.: as indicators for registering the speed of machinery, steam engines, &c.; as a distance indicator for land surveying; also as a pedometer, for measuring the distance walked or run, and registering from 1 furlong to 20 miles and upwards. The editor of the *Artizan* says he has tested the correctness of one of these contrivances for nine months, and found it to work satisfactorily.

Amphibious Baggage Wagons.—This improvement is designed for army services, and consists of a boat-shaped cart body, made water proof, and placed upon wheels as shown in the cut.



For military transportation in countries that are much intersected with rivers, as in the South of Russia, it appears to be admirable. Experiments with vehicles of this description have been made, during which the horses were made to swim the streams, and drag the cart and contents behind, the latter floating on the surface of the water. Transportation across rivers was thus successfully accomplished without unharnessing the animals. It is proposed to supply the British army with baggage wagons of this kind.

Spiking Logs—Floating some and Sinking others.

A correspondent (M. Capella, of New Orleans,) informs us it is a fact that some unseasoned mahogany logs, which will not float in water, can be made to do so by simply driving spikes into them. This cannot be done with the very heavy logs, but he states, "it is an every day occurrence at Havana with certain logs," and he has witnessed it both at that place and at various other places in South America and the West India Islands. His theory of the cause is given as follows:—

"The specific gravity of unseasoned mahogany is a little greater than that of water, consequently it will sink in it; but by driving a spike into the end of such a log, a partial separation of the fibers take place in the whole log, thus increasing its volume in a greater ratio than the size of the spike, although not noticeable by the eye; and this increase of the volume of the log makes it equal, or a little less in weight than the same bulk of water, consequently it will float in it."

He states that he committed a great mistake upon one occasion, about 20 years ago, in applying the same method to float Mangrove logs. He had some of these logs cut at the mouth of the Orinoco river, and although they are heavier than water, he thought he could easily make them float by driving spikes into their ends, as he has seen done with mahogany. His timber cutters expostulated with him not to try the plan, remarking that "he would never get them out of the water again, and that they would sink like iron;" but he was determined to make them float by spiking them, so spiked some of them were, and then launched into the water, when lo, instead of floating, as he supposed they would, down they went to the bottom like stones, and that was the last he saw of them.

Another correspondent, from Louisiana, informs us that he endeavored to make cypress logs float by plugging them, but when launched, down they went to the bottom of the river, and that was the last he ever saw of them. We have now learned something positive about floating mahogany logs from M. Capella.

Thanks to Dr. Kane.

The Legislature of Pennsylvania has passed resolutions of thanks to Dr. Kane and the officers under his command, in the late Arctic Expedition, for their intrepidity, skill, and daring, and the discoveries made by them in the Northern Polar Seas.

TO CORRESPONDENTS.

Those of our subscribers who have duplicate copies of of No. 6, 12, 15, and 17 present volume, will oblige us by forwarding them to this office.

J. G. C., of D. C.—It is no doubt very desirable to employ some substitute for cast ron in the manufacture of artillery. so as to obviate the immense weight necessary to render them sufficiently strong, and at the same time to insure greater strength. It has been found that cast-iron guns have given way after a very limited number of shots, and thus need frequently to be replaced. In a 72-pounder the pressure of the explosion is about 72 tuns to the square inch, which is ten times the force of the tensile resistance of a square inch of the metal; a patent, however, could not be obtained for substituting one metal for another, such as steel for cast iron.

A. T., of Montreal—The fact of portrait painters making such back grounds, would prevent their application to daguerreotypes being a proper subject for a patent. You do not say how they are to be produced. It is quite probable that there may be something new and patentable in your manner of producing them.

E. P., of Union Point—If you will furnish us with your residence in full, we shall be happy to send you one of our circulars relating to patent business. When you write please to repeat your requests, in order that we may know what you want. You will bear in mind that there are several Union Points in this country.

Messrs. Speed & Bailey, patentees of the Car Spring, will learn something to their interest by calling at this office.

G. McD., of Vt.—In our Fair notices we gave the address of George Whipple, Manufacturer of Knitting Machines, at No. 24 William st. We do not know where else he can be found. If he would advertise his machinery in the Sci. Am., it would pay him fifty times as much as he would make out of its exhibition at the Crystal Palace. We have had numerous inquiries for his machines since our notice appeared. Some papers refuse to give the address of inventors when noticing their inventions, for the reason that they do not wish to advertise gratuitously. This is the right of the publisher, yet we never hesitate to give the fullest benefit to inventors in our columns, and our gratuitous notices are productive of vast benefit to those who are thus favored. We have no selfish desires in this matter, for we do not seek for advertising, but we are very sure that the Sci. Am., with its immense circulation, is the best advertising medium in the world for inventors and patentees to adopt in disposing of rights and machines.

W. H. N., of Ct.—Yours is not a perpetual motion, as understood, any more than a wind or a tide mill. You give motion to a mill by the expansion and contraction of mercury, caused by the changes of atmospheric temperature; which is similar in principle to the ebb and flow of the tides.

J. C. M., of Pa.—Correspondents who write to us for information without signing their names, are not entitled to any attention. It is our rule not to notice their inquiries; but as you are evidently ignorant on this point, we will answer you by referring you to Logan & Lidgerwood, No. 9 Gold st., N. Y. They sell good wrenches, but we do not know their price per dozen.

A. W. H., of Mo.—It would be impossible to get a person with capital to engage in the business to which you refer without perfect assurance that it will prove profitable.

C. & G., of N. Y.—We will have something to say about water power either in the next or succeeding number to that, of the Sci. Am.

G. C., of N. Y.—We do not know anything about the subject brought to our notice.

G. B. McD., of Ky.—Pistons have been applied in many forms for steam gauges, and there is nothing essentially new in your arrangment to entitle you to a patent.

D. G. Mills, of Gulf Prairie, Texas, wishes to procure a good machine for cutting ditches about 2 1-2 feet wide at the top, 18 inches at the bottom, and 2 1-2 feet deep.

Timothy Riggin, and Gerard Sickles, of Brooklyn, H. W. Adams, of this city, and W. H. Wood, of Jersey City, will please to call at this office, and execute their papers for applications for patents.

L. B. M., of Pa.—If you will look over the back files of the Sci. Am., and inform us what numbers you want we will send them if we have them on hand. We do not remember of any numbers which contain such illustrations as you want and it would take up a good deal of our time in looking them up.

J. F. G., of N. Y.—We believe the objection to the loose wheel is that it tends to throw the cars off the track. We think it has been tried on the Erie Road. You had better inquire of McCallum the Superindent.

J. L., of C. W.—We do not perceive any novelty in your plan for ventilating railroad cars. It is not new, and we advise you to abandon it.

F. E. J., of Mass.—The idea of putting a strip of india rubber under railroad rails, to obviate noise and jarring, is not new. We noticed the same thing in the Sci. Am some time ago.

E. W. F., of La.—We were much amused with your description of the spiking and sinking of the cypress log. We have sent you the information desired respecting the Woodworth Patent.

W. B., of——You wish to know the velocity of falling water, at the various hights from five to ten feet. It falls four feet in half a second; five feet in ·557 of a second; six feet in ·636 of a second; eight feet in ·706 of a second; nine feet in ·75 of a second; and ten feet in ·79 of a second. In conducting the water down through a shute, it is estimated that the resistance to the above velocity, which is that of falling bodies, in free space, is equal to a little over twenty-six per cent.

D. C., of Ct.—We may not be able to discover where the deception of the perpetual motion is confined, but certainly no machine can set and keep itself in motion according to the known laws of mechanics.

H. H., of Mass.—The journal to which you refer is a monthly. It is a very respectable publication.

J. C. D., of Newark—Your alleged substitute for a crank has been carefully examined. Its arrangement differs from any other with which we are acquainted, yet we do not see any thing in it that betokens success.—We think it would be valueless except perhaps on very small engines.

J. G., of St. Louis—We do not know anything about your caveat, but if the Commissioner does not acknowledge the receipt of the papers soon you had better write him again. $3 received, will send you a bound volume.

O, A., of Ind.—Not a copy of the *People's Journal* is to be had.

W. T. Boyer & Bro., Harrisburg, Pa.—Wish to procure a machine for breaking copper ore.

J. E. S., of N. Y.—Address John Jones, Clyde, N. Y., for information about mechanical typographer.

W. K., of Ky.—Please send your model as soon as convenient, and we will give prompt attention to the preparation of your case.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Jan. 26, 1856:—

W. & B., of Me., $25; I. A. H., of Mass., $10; W. S., of Iowa, $30; P. D. M. C., of N. Y., $35; M. & C. P., of Md., $55; A. E. C., of Pa., $20; H. & B., of N. Y., $55; B. F. F., of Pa., $25; A. McD. S., of Ala., $60; C. & P., of N. Y., $50; M. & B., of N. Y., $30; B. & F., of N. Y., $35; F. V., of Mich., $25; J. G., of Mass., $25; F. W. T., of Ct., $20; L. J., of N. Y., $30; T. S., of N. Y., $30: L. B. A., of Pa., $43·50; J. M., of Pa., $50; T. McB., of N. Y., $25; H. J. H., of Me., $25; M. B., of N. Y., $55; M. N., of N. Y., $30; G. J. B., of——$30; J. H. B., of Vt., $55; L. & A. T., of Ct., $30; W, M. B., of Del., $25; J. C. G., of N. J., $20: J. H., of Mo., $30; A. C. K., of N. Y., $55; W. H. W., of N. J., $12; E. G., of Mass., $55.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Jan. 26:—

W. & B., of Me.; W. W., of La.; B. F. F., of Pa.; D. F. L., of Pa.; F. V., of Mich.; C. W. C., of N. Y.; J. G., of Mass.; R. T. S., of Geo.; S. T., of Ind.; W. H. W., of N. J.; A. F. & C. M. H. W., of N. Y.; H. & B., of N. Y.; H. J. H., of Me.; T. McB., of N. Y.; J, M. B., of N. Y., W. M. B., of Del.; A. C. K., of N. Y.

Important Items.

Back Numbers and Volumes—The following numbers and volumes of the Scientific American, are for sale at this office, at the annexed prices:—Volume VI, Vol. VII, Vol. IX, and Vol. X, complete. Price, *bound*, per Volume, $2,75. Numbers in sheets, complete, $2. Of Volumes IX. and X., we have also about 40 numbers each, not consecutive, which will be sent by mail on receipt of $1.

Receipts—When money is paid at the office for subscription, 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 acknowledgment of the receipt of their funds.

Binding—We would suggest to those who desire to have their volumes bound, that they had better send their numbers to this office, and have them executed in a uniform style with their previous volumes. Price of binding 75 cents.

Literary Notices.

Magazines Received for February—"National Magazine," Carlton & Phillips, New York. "Arthur's Home Magazine"—T. S. Arthur & Co., Philadelphia.—These magazines are excellent, and high toned. They contain interesting illustrations, and several choice articles.

Terms of Advertising.

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☞ All advertisements must be paid for before inserting.

Science and Art.

To Manufacture Acetates of Lead.

BROWN ACETATE OF LEAD—Crude pyroligneous acid is much used for the manufacture of brown acetate of lead, in the following manner. The redistilled pyroligneous acid is saturated in a tub with litharge, and the oxyd of lead not dissolved allowed to subside; the clear liquor is decanted off into a copper boiler, and evaporated, until a drop, let fall upon a cold stone, crystallizes or sets hard, which may take place at sp. gr. 1·980; about three times its weight of water is now added while boiling, the solution being constantly stirred. By this treatment a considerable quantity of pyrogenous matter may be skimmed off as it rises to the surface.—When this is removed, the evaporation is continued. If the solution be still too much colored, more water must be added. Practice soon enables the workman to know when the evaporation is sufficiently advanced. A common test is to rinse the ladle which is used to skim off the tar from the solution, through the liquid, and observe how many drops of solution fall from it before it assumes a stringy appearance; if ten or twelve only fall, then it is sufficiently strong. Another plan is to take the specific gravity of the liquid, which may be considered fit for crystallizing when the density is above 1·980.

The liquid is now run into the crystallizing vessels, which may be made of sheet iron, and are generally 5 feet by 3 1-2 feet, and 6 inches deep, the sides being beveled, or sloping outwards from the bottom.

After becoming sufficiently firm, the sugar of lead is taken out by inverting the vessel on a cloth, and is subsequently dried.

WHITE ACETATE OF LEAD—In preparing this salt, acetic acid is saturated in a tub with litharge; every degree of Twaddel's hydrometer shown by the acid must be raised to 15 degs. Tw., by the addition of litharge—*e. g.* acetic acid of 2 degs. Tw. would be stirred with litharge until the solution of acetate of lead marked 30 degs. Tw. The solution is made in the cold in a wooden tub, and constantly agitated until it acquires the requisite strength. At this point, and while the liquid shows a slight acid re-action, the tub is covered up to allow the impurities to settle. The solution is then transferred into a copper boiler, and evaporated down to about 160 degs. or 180 degs. Tw. at boiling heat. The pan is again covered up for the subsidence of any impurity; the liquid then drawn off, poured into earthenware vessels holding about a gallon each, and allowed to crystallize. The crystals are drained, dissolved in a quantity of water merely sufficient for this purpose, and re-crystallized. These crystals are dried at about 80 or 90 degs. F.

A piece of lead, added to the solution while evaporating, throws out any copper which it may contain, while it assists in preserving the copper boiler from the action of free acid.

According to Dr. Ure, 112 lbs. of good Newcastle litharge, with 127 lbs. of acetic acid of sp. gr. 1·057, yield 180 lbs. of sugar of lead. A tun of Welsh litharge, with the acid from a tun of acetate of lime, produces 28 to 30 cwts.; or a tun of best Newcastle litharge, with the acid from 1 1-2 tuns of acetate of lime, produces 33 cwts. of acetate.

In Germany, thin sheet lead, or the residues from the white-lead manufacture, are exposed to the alternate action of air and strong acetic acid, in a series of vessels ranged one above another. The acid being first introduced into the uppermost, is allowed to flow consecutively into the lower vessels, remaining about half an hour in each. The metal, under these circumstances, becomes speedily oxydized at the expense of the air, much heat being generated, and after having passed twice through eight of these vessels filled with lead, the acid is sufficiently saturated with the oxyd of the metal to be evaporated, and the salt crystallized.

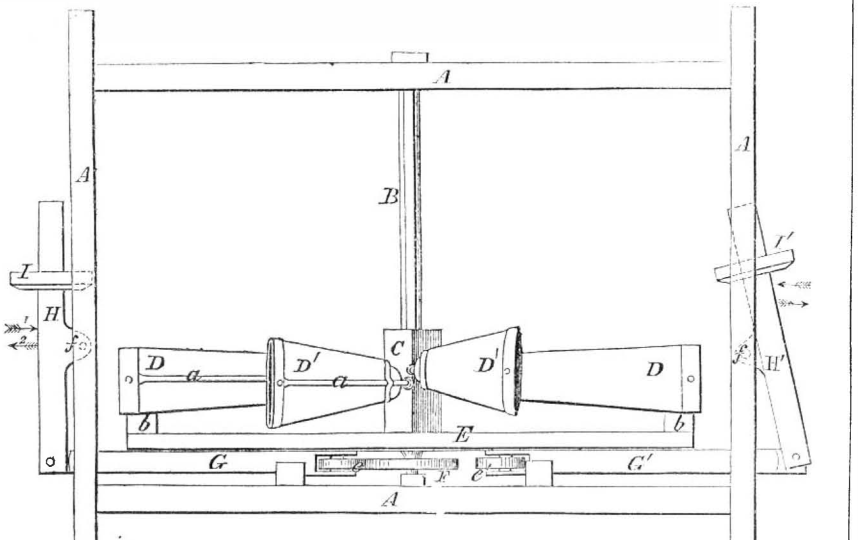
A patent was also secured some time ago for passing the vapor of the acid into close vessels containing a number of perforated shelves on which litharge was spread. In passing through these the acid becomes saturated with the oxyd, and the solution of the acetate falls down and is concentrated in other vessels by the heat of the waste steam which issues from the top of the litharge chambers.

[The above is derived from the recent edition of Knapp's Technology, and to it we will add some remarks on the uses of sugar of lead.

The brown sugar of lead is used in great quantities as a drier for coarse paints, and as a mordant for dyeing orange color on cotton. It is boiled with the oil for paint at the rate of one pound to the gallon of oil, and to this 1-4 of a pound of the sulphate of zinc is added. Oil thus boiled is mixed with any common paint, and applied to the inside of buildings. In dyeing orange color, it is boiled with litharge for about half an hour, then some flour of lime is added, the whole stirred up well, and then used as the mordant or preparation of the cotton, to receive a liquor of the bichromate of potash. Two pounds of the brown sugar of lead, and one pound of litharge are used for every pound of the bichromate of potash (chrome.) After the cotton receives its *chrome* it is run through a vessel containing warm lime water, when its color changes from a yellow to a beautiful orange.

White sugar of lead is also used as a drier for paints the same as the brown acetate of lead, but only for light colors. In the art of dyeing it is used as a mordant for dyeing *chrome yellow*. Six ounces of the sugar of lead, and two ounces of the bichromate of potash will dye a beautiful light yellow on ten pounds of cotton. Mixed with the bichromate of potash, the lead and chromic acid unite, and form a yellow precipitate called "chromate of lead," which is much used as a paint. The white sugar of lead is used as a wash in surgery, and when mixed with sulphuretted alcohol, it forms what is now known by the name of "Twiggs' Hair Dye." Taken internally, the sugar of lead is a poison; it should, therefore, never be kept in a house where there are children, because it has a sweet taste, and may be mistaken for white sugar. The "sulphate of sodium" is used as an antidote for the sugar of lead when taken into the stomach.

IMPROVED TIDAL WATER WHEEL.



In level portions of the country, where the streams are sluggish, and it is difficult to form dams of the requisite hight for common water wheels, it often happens that horizontal wheels, if properly constructed, can be so placed as to render available whatever of power there is in the current; the rise and fall of the tides also furnishes a useful power, which might be advantageously employed in very many localities, by the application of the proper apparatus. The improvement illustrated by the accompanying engraving is designed to serve this purpose, the machine being so contrived as to operate successfully at all stages of tides, high or low, and in all streams of water whether sluggish or fast. It is the invention of Mr. Richard L. Nelson, of Ocala, Marion Co., Fla., and was patented Nov. 13th, 1855.

The wheel consists of a series of floats, D D', radiating horizontally from a hub, C. The hub rises and falls vertically on the shaft, B, to suit the varying tides, and, at the same time imparts rotary motion to B; the power is transmitted from B to other mechanism in the usual manner. The floats, D D', are attached to the rods, *a*, and these are so fastened in the hub, C, as to turn, partially, at the proper moment, and so allow the feathering of the floats.

Below the floats there is a large ring, E, upon which, at suitable places, the upward projections, *b*, are placed, for the purpose of feathering the buckets; the latter, as they come around, strike the projections, and change from a vertical to an edgewise position, and *vice versa*. The ring, E, rises and falls, but does not turn with the hub, C.

Another peculiar feature of this invention consists in a self-acting brake, for regulating the velocity of shaft B. This shaft is furnished at its lower end with a pulley, F. There are two horizontally sliding bars, G G', furnished at one of their ends with friction pulleys, *e e'*, and connected at their other ends with levers, H H'. The latter are pivoted at *f*, and have buoys, I, near their upper extremities, which rise and fall with the tide. When the current moves in the direction of arrow 2, the lever at the right hand will be thrown in by the force of the water against its buoy, and the friction wheel, *e'*, will be drawn away from contact with F, as shown; but the current will act in the reverse manner against the float and lever at the left side of the machine, the tendency being to force the lever, H, outward, and consequently to cause its bar, G, to advance and press its friction roller, *e*, against pulley, F. This pressure, which is in proportion to the velocity of the water, will always regulate the speed of the shaft, B. When the direction of the tide changes so as to flow in accordance with arrow 1, the action of the levers, H H', is reversed. A shows the frame to the machine.

This invention, as already intimated, is susceptible of a very extensive application. The expense of construction is quite small, and can hardly fail to serve a highly useful purpose. For any further information address the inventor.

A Great Iron Steamship.

The Liverpool papers are unsparing in their praise of the *Persia*—the new steamship belonging to the Cunard line—which had recently arrived at that city from Glasgow, Scotland, where it was built, to take up her place for running between this port (New York) and Liverpool. We may soon expect to see her, when we will be able to describe her from personal examination. She is the largest merchant steamship afloat, and is said to have sailed from Glasgow to Liverpool in ten hours, making an average speed of sixteen knots per hour. If she could maintain such an average speed across the Atlantic—3000 miles—she would make the voyage in less than eight days. A voyage across the ocean in mid-winter will test her powers.

Stormy Sundays.

There were recently stormy Sundays in New York for six weeks; and these storms had been periodic—returning regularly every seven days—commencing on Saturday evenings. Four storms were accompanied with rain, and two with snow and very high winds. Dr. Perkins, of Newburyport, Mass., who records the state of the atmosphere at certain hours of each day, to make returns to the Smithsonian Institute in Washington, accounts for these periodic storms on the supposition of atmospheric waves, according to Espy's theory. We have noticed for some years that Long Island is subject to very high winds, and these gales are always most violent during night, especially between the hours of half-past seven and ten. The wind generally commences to blow from the North-east or South-east, accompanied with snow or rain, and shifts round ending with a northwester, to clear up the atmosphere.

Round and Long Heads.

Prof. Retzius, of Stockholm, in Sweden, denies that high skulls betoken high intellect, it being supposed by many that they do. He had visited the schools in England and Sweden and could not find one person in a hundred that did not possess the elongated skull and prominent occiput. In Sweden there are persons who have short high heads, but they do hot resemble the real Swedes, and are allied to the Laps or Fins. He asserts that if Sclavonians belong to the Caucassian race, as is generally asserted by phrenologists, anatomy is of no use to ethnologists. The Poles and Bohemians belong to the round headed nations, and have produced many eminent men.

The Anglo Saxons have long skulls, so had the ancient Celts; the modern natives of Ireland have round heads, unlike the ancient Celtic skulls. The old Romans had long high skulls. The skulls of the ancient Mexicans are of the Mongolian type. The Indians on the western part of our continent have short heads; those on the eastern part have long heads.

Old Babylon.

Dr. Oppert, of France, has spent two years on the site of old Babylon, examining the cuneiform inscriptions on the bricks and slates. He states that this famous old city, in the days of its grandeur and power, covered rather more than an area of 200 square miles, being about two and a half more than the site of London. But all this space was not inhabited, there being immense fields to supply the city with corn and pasture in case of siege.