

The Secrets of the Ocean.

Mr. Green, the famous diver, gives the following sketch of what he saw at the "Silver Banks," near Hayti: "The banks of coral on which my divers were made are about forty miles in length and from ten to twenty in breadth. On this bank of coral is presented to the diver one of the most beautiful and sublime scenes the eye ever beheld. The water varies from ten to one hundred feet in depth, and is so clear that the diver can see from two to three hundred feet when submerged, with but little obstruction to the sight. The bottom of the ocean in many places is as smooth as a marble floor; in others it is studded with coral columns, from ten to one hundred feet in height, and from one to eighty feet in diameter. The tops of those more lofty support a pyramid of pyramidal pendants, each forming a myriad more, giving reality to the imaginary abode of some water nymph. In other places the pendants form arch over arch; and, as the diver stands on the bottom of the ocean and gazes through in the deep winding avenues, he finds that they fill him with as sacred an awe as if he were in some old cathedral which had long been buried beneath old ocean's wave. Here and there the coral extends to the surface of the water, as if the loftier columns were towers belonging to those stately temples that are now in ruins. There were countless varieties of diminutive trees, shrubs and plants, in every crevice of the corals where water had deposited the earth. They were all of a faint hue, owing to the pale light they received, although of every shade, and entirely different from plants that I am familiar with that vegetate upon dry land. One in particular attracted my attention; it resembled a sea fan of immense size, variegated colors, and the most brilliant hue. The fish which inhabit these 'Silver Banks' I found as different in kind as the scenery was varied. They were of all forms, colors, and sizes, from the symmetrical goby to the globe-like sunfish, from the dullest huet to the changeable dolphin."

DECISION IN A REISSUE CASE.

In the Supreme Court of the District of Columbia, before Justice Geo. P. Fisher, June 3, 1868. In the matter of the appeal of Gage & Whiteley from the decision of the Commissioner of Patents:—

It appears in this case that the appellants surrendered their original patent more than three years ago, and for various causes which it is unnecessary to recapitulate, a reissue has been withheld from them by the Commissioner until a few weeks since. Upon the determination of the Commissioner to grant the reissue, demand was made by the appellants that the reissued patent should be antedated back to the date of the surrender of the original patent. This demand was refused by the Commissioner, upon which the appellants have taken their appeal. The question to be determined by me, therefore, is whether a party surrendering an original patent by reason of a defective or insufficient description or specification, or by reason of his having claimed in his specification, as his own invention, more than he had a right to have, is entitled to have his reissued patent dated back to the day on which the surrender was made. In my opinion he is entitled to have it so antedated. I think the language of the act of Congress is clear upon this point. The thirteenth section of the act of July 4, 1836, contains this language: "That whenever any patent shall be deemed inoperative, or the Commissioner shall be satisfied that the same is defective, or that the inventor shall be allowed to have a new patent issued, or for the residue of the period then unexpired for which the original patent was granted," etc. Section eight of the act of March 3d, 1837, provides "that whenever a patent shall be returned for correction and reissue, the Commissioner shall not grant the reissue until the applicant shall have altered his specification of claim in accordance with the decision of the Commissioner. These are the only provisions which relate to the time at which a reissue is to be granted. It would seem from the language of these provisions that so soon as the original patentee shall have made surrender of his original patent and altered his specification of claim so as to conform it to the decision of the Commissioner, he is at once entitled to have the reissued patent, for the residue of the period then unexpired, that is to say, the residue of the period unexpired when he shall have made the surrender and filed his application containing his corrected description and specification of claim, altered in accordance with the Commissioner's decision.

The law contemplates that the Commissioner shall grant the reissue "upon the surrender" to him of the defective patent, the payment of the fee, and the conforming of his specification to the Commissioner's decision. If we ask the question, at what time the reissue should be made, the thirteenth section of the act of July 4, 1836, in the use of the words "whenever," that is to say, so soon as or at whatever time the surrender shall be made of the original patent and the filing of the corrected description and specification, and also in the use of the words, "the Commissioner, upon the surrender," etc., shall cause a new patent to be issued. Beside, every consideration of justice and sound policy supports this construction. The object of the patent laws is to encourage the efforts of honest inventive genius by giving to each inventor, upon the payment of the prescribed fee, a monopoly in the usufruct of his discovery or invention for a limited period. In consideration of the benefit which the public is to derive from the production of his genius. It can neither be honest nor politic to say that when an inventor, by reason of a mistake honestly made by himself or his agent in describing the contrivance he has invented, comes forward to have that mistake corrected after half the life of his original patent has worn out, shall have the other half to run out in the Patent Office between the time of his surrender and the time when the reissue is actually granted. The case before us furnishes an instance of the manner in which the life of a patent may be wasted in the effort to have such honest mistake as the law contemplates corrected by a reissue. Believing that the law leaves no discretion in the Commissioner when the surrender of the original patent and the payment of the prescribed fee, which are the prerequisites which the law requires, have been made and complied with, but peremptorily commands him thereupon to grant the reissue, so as that the inventor may be put in the position of enjoying his discovery for the residue of the term of his original patent, commencing with the date of the surrender and the amended specification, the decision of the Commissioner in this case is overruled, and it is ordered that the reissue be antedated accordingly.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

Owing to a break in the Delaware and Raritan Canal, about three weeks since, there was an accumulation of ten miles of canal boats, laden with coal, sufficient to supply this city with anthracite fuel for three months.

The Waltham (Mass.) Chemical Works cover an area of eight acres, three of which are roofed over. The principal product of the works is sulphuric acid, and in the manufacture 100,000 pounds of sulphur are used each week. The company have five platinum retorts of the capacity of one hundred gallons each. These vessels cost the company \$15,000 in gold apiece.

In the vicinity of Virginia City, Nev., are several miles of flumes, all lined with blankets, which require hundreds of men, to change every few hours. This arrangement is for collecting the tailings from the mills, and they yield a much larger profit, according to their cost of production, than is realized from working the ores in the mills. Nearly one third of the bullion shipped from Storey county, in Nevada, is obtained from the waste of these mills, collected in flumes.

A new railway is projected, to connect Buffalo, N. Y., and Baltimore, Md., by a direct route. The road is styled the Buffalo and Southern railway, and with proper connections will only require 120 miles of new rails to be laid, although making the distance between these two cities equal to that between Buffalo and Albany. The company is already organized, and the route is to be surveyed at once.

At Swindon, the London and Great Western railroad company have extensive mills for re-working iron rails. At this establishment, Mr. Hewitt saw a steel-headed rail, made by balling up cast steel turnings in a common balling furnace, and placing the resulting bar on top of a rail pile. The fracture was admirable, and the weld appeared perfect.

Railway postal car, it is reported, by July 1st will be established on a continuous line from Bangor, Me., to Washington, D. C., and from Bangor to Toledo, O. When the service between Toledo and Chicago is established, there will be a continuous line from Bangor to Omaha.

The discovery of a large bed of porcelain clay in Pope county, Southern Illinois, promises to inaugurate a new branch of industry, and develop an important source of prosperity in that county. The clay resembles magnesia, and produces a ware rivaling, if not surpassing, the iron stone of Liverpool.

The gross earnings of all the railroads of the United States, the past year, amounted to \$540,000,000, or equaling about twenty-one per cent of their total cost. This sum averages ten dollars per head for our entire population. The ratio of expenses to earnings is fully seventy per cent, and the net earnings of the northern roads is said to be six and a half per cent of their total cost. In 1840, there was one mile of railway for every 7,465 people in the country; in 1850, there was one mile to 3,298 inhabitants, and in 1860, one mile to every 905 of our population. Mr. Poor thinks that by 1870 we shall have 45,000 miles of road opened, or one mile for every 837 inhabitants.

In the American Watch Factory, at Waltham, Mass., steel screws are made so small that to the naked eye the thread is invisible. It takes 300,000 of them to make a pound, and the iron which at first may have been worth two or three cents, in its new form is a product valued at \$4,000. The jewels for the watches, until lately imported from Europe, are now all cut, polished, and drilled by machinery, in the establishment. Twenty thousand jewels are used per month. Most of the finest work in the factory is done by girls.

In the recent address of Mr. Amos Lawrence, before the Cotton Spinners and Planters' Association, it was stated that the production of cotton cloth increased 76 per cent between the years 1850 and 1860, making it in that year 46½ yards for every individual of the land. There are now in this country above 6,400,000 spindles. During the past winter these have averaged a daily product of 4½ skeins—twenty-four to the pound—or 16,000 bales of cotton of 460 pounds per week, which is 832,000 bales per year. This is higher than the average, despite dull times. Some years ago we manufactured one-seventh of the cotton produced in the United States, now we manufacture one-third, and whenever we begin again to export cotton goods, as we did in 1860, the manufacturers will require much more.

One of the finest of railway bridges in Great Britain has just been thrown across the Mersey river, at Runcom. It is a girder bridge 1,000 feet long, and is supported on stone piers rising seventy-five feet above high-water mark. The span of each division is 327 feet, and there are ninety-seven arches, each of sixty feet span. By the completion of this bridge the distance between London and Liverpool is shortened by fifteen miles. The cost of the structure is about \$1,250,000.

Turkey proposes a railroad undertaking on quite as extensive a scale as the Pacific road. Belgrade on the Austrian frontier, and Bassora on the Persian Gulf, are to be put in railroad connection, the line passing through Constantinople and traversing both European and Asiatic Turkey entire. With certain branches, the road will be nearly 8,000 miles long, and the estimated cost is \$300,000,000. The Turkish government guarantees the interest on this sum, seven per cent on a part, and five per cent on another part, amounting to about \$175,000,000 a year. The engineers are now at Belgrade, arranging with the Servian government as to the route through Servia.

Recent American and Foreign Patents.

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

FENCE.—W. D. Hillis, Elgin, Ill.—In this invention upright wooden pickets are supported by horizontal wire rails, to which they are attached in a novel manner, the rails being themselves fixed to the posts by a different method than any heretofore practiced, whereby great lightness and strength are combined, and the fence is rendered convenient to handle and cheap in construction.

BEVEL SQUARE.—W. T. Fisher, Lenoir's, Tenn.—This invention has for its object to furnish an improved tool, simple in construction and convenient in use, and which shall combine within itself many of the separate tools now necessarily used in every workshop, such as a bevel square, right-angle square, plumb and level, and rules for measuring distances, measuring heights, taking angles, etc.

PASSENGER REGISTER.—John Enright, Louisville, Ky.—This invention has for its object to furnish an improved apparatus for registering the number of passengers or persons entering street cars, ferryboats and other places, which shall be so constructed and arranged as to register said passengers accurately, and, at the same time, so arranged that it cannot be falsified or made to register an incorrect number without breaking the apparatus and thus showing that it has been tampered with.

WASHING MACHINE.—William Hachenberg, White Pigeon, Mich.—This invention has for its object to improve the construction of washing machines so as to make them more convenient and effective in operation.

COMBINED NECKTIE AND WATCH GUARD.—Thomas J. Flagg, New York city.—This invention has for its object to combine a necktie and watch guard with each other so as to furnish a neat, convenient, and serviceable article.

HOP STRIPPER.—Sidney Holt, Baraboo, Wis.—This invention has for its object to furnish a simple and convenient machine for stripping the hops from the vines, and, at the same time, breaking the clusters into pieces.

RAILWAY STRUCTURE.—John G. Cross, Brattleboro, Vt.—This invention has for its object to improve the construction of railroad rails and chairs, so as to enable the rails to be made stronger and lighter, and so as to make the surface of the track continuous.

LEATHER ROLLER.—James T. Harris, Swampscott, Mass.—This invention has for its object to furnish an improved attachment for rollers for rolling leather, so as to make the machine more convenient in use, and to do away with the annoyance now so frequently experienced from the wet leather adhering to the roller.

BLIND OPENER AND FASTENER.—Martin Streeter, New Haven, Conn.—This invention has for its object to furnish an improved device by means of which window blinds and shutters may be opened, closed and secured in place, when fully closed, when fully opened, or when opened at any desired angle, which shall be simple in construction and easily operated.

THRILL COUPLING.—James P. Thorp, Southington, Conn.—This invention is designed to regulate the ordinary leather safety straps which are employed to obviate accidents in the event of the breaking of the coupling, the casual detachment of the bolt therefrom, etc. The invention consists in having a hook formed on the plate of the clip, said hook passing through the thrill rein in part of the eye through which the bolt passes, whereby the desired end is attained.

PORTABLE DEVICE FOR GRINDING TOOLS.—Daniel W. Ayres, Sheldon, Ill.—This invention relates to a new and improved portable device for grinding tools of various kinds, but more especially for grinding the knives of the sickles of grain and grass harvesters.

FRISKET.—T. W. M. Castle and J. B. Conner, Adrian, Ind.—This invention relates to a new and improved frisket for printing presses, and it consists in a novel construction and application of the former to the tympan of a press, whereby the frisket is operated, opened, and closed, automatically by the raising and lowering of the tympan.

COMBINATION OF HAMMER, RULE, SCREWDRIVER, NAIL HOLDER, AND TACK CLAW.—J. H. Goodwin, Scotland Neck, N. C.—The object of this invention is to combine, in a very simple and inexpensive manner, a hammer with a series of implements used most generally in connection with it, so that several tools or implements may be manufactured in connection with a hammer nearly as cheap as the hammer alone.

MECHANICAL MOVEMENT.—Kenelm John Winslow, Twickenham, England.—This invention consists of an improved method of obtaining motion from a treadle by means of oscillating collars provided with ratchet pawls and retracting springs or cords, and may be arranged for one or two treadles.

MANUFACTURE OF BUTTER FROM WHEY.—Ira Page, Adams, N. Y.—This invention relates to a new and improved mode of manufacturing butter from whey.

SMUT MACHINE.—Carl Millar, Sandoval, Ill.—This invention consists in providing on a suitable framing a vibratory screen to which the grain is first fed, to remove the straw and coarse material from which the grain is delivered to a vertical conical smutter made of an outer shell, and interior drum of perforated sheet metal, and provided at its base with a fan through which the grain is passed to a vertical conically shaped brushing appa-

atus, also provided with a fan at its base, through which the grain is also passed; to another vibrating screen, and thence to the hopper for grinding.

RAKING DEVICE FOR HARVESTERS.—Henry F. W. Deterding, Alton, Ill.—This invention relates to a new and improved device for raking automatically the cut grain from the platforms of harvesters, and it consists in a peculiar construction and arrangement of parts, whereby the desired work may be performed in a perfect manner.

MITER BOX.—C. O. Hansen, Memphis, Tenn.—This invention consists in hinging two boxes to a vertical post having a laterally projecting arm, which serves as a guide for a slide to which the two swinging boxes are connected by connecting rods of equal length, and by which the said boxes are caused to oscillate around the said post to bring them to the required angle, by moving the said sliding blocks in either direction on the said laterally projecting plate or arm, and in providing on either end of the said arm opposite to that on which the sliding block works, a post, through which and through a post which forms the axis of the swinging boxes, slots are formed to guide the saw in sawing the angle; and in providing on the said arm a scale indicating the proper position of the boxes for sawing miters for frames of figures having different numbers of sides, and also in arranging the sides of the said boxes so that they may be applied to any body having an angle of any degree, and setting the same thereby, so that miters may be sawed in the boxes without further adjustment of the same to fit the said angle.

EXTENSION HORSE OR TRESTLE.—George H. Pierce and Martin T. Gilmard, Mineral Point, Wis.—This invention relates to a portable trestle horse for scaffolding and other purposes, and consists of certain elevating and extension devices for accomplishing the purpose.

HINGE FOR WINDOW BLINDS AND SHUTTERS.—E. H. Benjamin, Oak Hill, N. Y.—This invention relates to certain improvements in window blind hinges, whereby the same is held open by the automatic action of the hinge and weight of the shutter.

TIRE BENDING MACHINE.—Robert Tyrrell, Sumner, Ill.—The object of this invention is to accomplish the bending of wagon tires in an easy and expeditious manner. It consists of revolving disk operated by a lever arm, by means of which the tire is drawn between the periphery of the disk and a roller wheel, and bent around the disk, together with other devices perfecting the whole.

HORSE RAKE.—Jacob Ginther, Mier, Ill.—The object of this invention is to provide a horse rake which will operate more satisfactorily than those of similar construction heretofore made. It consists of mechanism for revolving the rake proper.

TRACE BUCKLE.—Martin Gayhart, Young America, Wis.—The object of this invention is to provide a buckle for leather traces or tugs, which shall be simple, effective, and easily operated. It consists of two parts, which are pivoted together, and which pinch the trace when strain is brought upon the two parts, whereby the pinching action relieves the tongue from a portion of the draft strain of the trace.

DEVICE FOR STOPPING AND STARTING CALENDER ROLLS.—Wm. T. Porter, Wilmington, Delaware.—The object of this invention is to operate the friction clutch of calender rolls in paper machines by means of a rod bar or bolt running through the axial center of said roll.

HAY FORK.—Henry L. Doane, Green Oaks, Mich.—The object of this invention is to furnish a hay fork of the class generally known as horse hay forks. It consists of a pair of hinged or swinging tines connected with a corresponding pair of fixed tines, the construction and operation of which is exceedingly simple and effective.

HOISTING APPARATUS.—Dexter Head, Medusa, N. Y.—This invention relates to a new device for elevating loads of suitable description, and consists in the application of a system of levers, known under the denomination of lazy tongs. By the use of this invention articles can be elevated to considerable heights, with the aid of inconsiderable motive power.

PLOW.—J. M. Wilson, Lexington, Mass.—This invention relates to a new plow, to be used by cotton planters; the object being to work the ground, when the young cotton plant is just out. Cotton, when young is a very delicate plant, and is difficult to work the first time; my improved plow is intended to work close to the plants without injuring the same, leaving the cotton on a very narrow space at the surface, yet with sufficient base at the bottom of the furrow, to prevent it being knocked up by the hoos, when they are used in working through the drill. The plow will also turn up the soil sufficiently to thoroughly cover up the middle of the row. This plow will work in every kind of land more effectually than the ordinary turning plow.

CARPENTERS' GAGE.—A. H. Blaisdell, Newton Corner, Mass.—This invention relates to a new carpenter's gage for drawing marks parallel to the straight or curved lines of a board or other article, and the invention consists in the use of V-shaped tusks or fingers, pivoted to a sliding block, said tusks being by means of rods connected with a beam that is pivoted to another fixed but adjustable block. The ends of these fingers form the edge of the gage, and they will when the gage is drawn along the curved edge of the beam, always adjust themselves, by swinging around their pivot pins, so as to keep the marking point the required distance from the board's edge.

SHOE LASTER.—Peter Thompson, Sardis, Ohio.—This invention relates to an improvement in pincers or for other purposes, and consists in combining four jaws which are operated by the ordinary pincer handles or levers.

HORSE POWER.—Joseph H. Kleppinger, Cherryville, Pa.—This invention relates to a new manner of arranging the mechanism, for converting the power of horses or other animals into rotary motion for driving thrashing and other machines. The object of the invention is to equalize the motion of the driving shaft, so that if the horses should not move quite regular or should be slightly disturbed in their work, the machine should not also acquire such irregular motion, but should continue in equal motion and move with the same velocity.

MEAT CUTTER.—S. L. Stockstill and H. H. Dille, Medway, Ohio.—This invention relates to a new machine for cutting meat for the production of sausages, hash, and other articles of food, and consists chiefly of two rollers, of which one carries a set of cutters that work between arms projecting from the other and through a stationary slotted plate. The cutters and the arms are set spirally around their respective rollers so as to feed the cut meat toward one end of the machine, where it is discharged.

HAT BLOCKING MACHINE.—Jacob Eberhardt, Newark N. J.—This invention relates to a new device for pressing hat bodies into the required form, and consists in the use of a rubber or other elastic punch, which is of suitable shape, and upon which the unshaped hat body is fitted, and of a counter-sunk die, in which the hollow has the required shape to be given to the hat. By forcing the punch into the die it will become pressed, so as to assume the shape of the die, and the hat will thus be easily formed.

GAS BURNERS.—A. C. Rand, New York city.—This invention relates to a new manner of constructing gas burners of that class in which the gas issues through a long, narrow slot, and consists in making the width of the aperture adjustable, so that a larger or smaller jet may be discharged from the burner, as may be desired.

FRAME FOR FLOWER DESIGNS.—C. Hochbrunn, New York city.—This invention relates to a new manner of constructing the frames for flower ornaments of that class in which suitable designs, such as wreaths, anchors, hearts, stars, etc. are made of amaranths or other suitable flowers or plants. The invention consists in making these frames by winding wire around moss, and in strengthening the whole by means of strong wire or other stays.

TOY CANNON.—George H. Hutchinson, Cleveland, Ohio.—This invention relates to a new spring toy cannon, which is so arranged that it can be easily set, and easily discharged, and consists chiefly in arranging the device for returning the compressed spring upon the body of the cannon, and not at the breech end of the same, as is now generally done. The invention also consists in confining the front portion of the spiral spring in a barrel, so that a pin, which forms part of the detaining apparatus, can, by falling in front of the barrel, detain the compressed spring.

TAILORS' MEASURE.—Wm. Shnott and John McNaughton, Brooklyn, N. Y.—This invention relates to a new device for facilitating tailors to take corre-

measures for gentlemen's coats, and consists in the use of an adjustable quadrangular frame, composed of metal bars, upon each of which a graduating scale is marked. This frame, when laid around the arm of the person whose measurement is to be taken, can be adjusted to give the exact width of the arm, and the distance from the shoulder to the armpit.

SADIRON.—James Gray, Newark, N. J.—This invention relates to a new self-heating sadiron, which is so arranged that the cover of the iron will remain cool, and so that the draft can at all times be regulated at will. It consists in the use of a perforated body fixed stationary in the lower part of the hollow sadiron, its interior communicating with the outside air by a hole in the side of the iron; the hole being arranged high enough to prevent the falling out of ashes.

POCKET COOKING STOVE.—Joseph Smallwood, St. Johns, N. B.—This invention relates to improvements in portable stoves for workmen and others, whereby they are enabled to heat their coffee or tea, and warm their dinners, when laboring in the field or wood.

INNER SOLES FOR BOOTS AND SHOES.—R. A. Webster, Sandisfield, Mass.—This invention relates to a new and useful improvement in soles for boots and shoes, whereby such boots and shoes are rendered impervious to water, and soft and pleasant to the wearer.

HOT AIR CHAMBER.—Wm. H. Lee and Charles M. Hardenburgh, Minneapolis, Minn.—This invention relates to a method of constructing hot air chambers, to be combined with air-heating furnaces, for heating public buildings and private dwellings by heated air.

CARBURETING AIR.—Henry C. Appleby, Conneaut, Ohio.—This invention relates to a new and useful improvement in an apparatus for carbureting or charging atmospheric air with the vapor of hydrocarbon liquids, for illuminating purposes.

CONVERTIBLE LOUNGE.—Lewis H. Baker, Tarrytown, N. Y.—This invention relates to the construction of lounges or sofas whereby they are made to serve various purposes, and are made much more convenient as an article of household furniture than the ordinary kind.

ORGAN.—Isaac Roush and J. W. Truby, Otto, N. Y.—This invention particularly relates to a connection and arrangement of parts, whereby the stops can be operated without requiring the use of the hands, and enables all double levers to be dispensed with.

TABLE CUTLERY.—R. H. Fisher, West Meriden, Conn.—This invention consists in the use of a bifurcated or split tang, which is formed at the end of the blade, in such a manner that the outer edges of the two tines or prongs will be flush with the edges of the handle. The ends of the prongs are bent in so as to have a firm hold in the wooden or other handle. The bolster is fitted into recesses formed in the edges of the tang, so as also to be flush with the edges of the handle and tangs.

SAFETY GUARD FOR MINING SHAFTS.—E. O. Leermo, Gold Hill, Nevada.—This invention consists in the arrangement in a transverse, dovetail groove in the rail, a short distance from the mouth of the shaft of a sliding bar, the upper surface of which projects above the top of the rail sufficiently to block the wheel of a car when it is moved in the right position, which sliding bar is caused to slide in front of the wheels of the car, to block it by the action of a spring when the cage is not ready to secure the car, and which is drawn away from before the said car wheel by the action of a lever, which is actuated by the cage when the latter is moved into the right position to receive the car, whereby the car is allowed to run on to the said cage.

THREAD CUTTER.—C. A. Woodbury, Woodstock, Vt.—This invention consists of a circular cutter of somewhat larger diameter than the spool having a central hole and provided with a shield of larger diameter than itself, having notches in the edge forming rounded points or teeth. Near the center the shield is provided with springs projecting therefrom in an axial direction. The shield is attached to the cutter by inserting the springs in the eye of the cutter and bending the pointed projection of the edge over the edge of the cutter, which when so constructed is attached to the spool and held thereto by inserting the springs in the axial hole of the spool.

CULINARY DEVICE.—Clayton Denn, Frankford, Pa.—This invention consists of a gridiron provided with a flange projecting downward from the bottom for fitting into the stove hole, also an upward projecting rim and a hollow handle so inclined with reference to the grate as to admit the gray to flow therefrom into the handle. It also consists of a cover provided for the said gridiron with a rim to fit over the rim of the latter hollow handle which serves as a cover to that of the gridiron, and flanges projecting upward from the top whereby it may be used separately from the gridiron to serve as a cake griddle by turning it bottom side up and setting the said flange in the stove hole. An opening is provided through the rim of the gridiron in the direction of the handle, whereby a wire gridiron also having a handle may be set within the above described device, when it is desired to cook oysters, or other small things which would fall through the bars or grates.

CONNECTING LEAD PIPES.—Isaac Davis, Brooklyn, N. Y.—This invention relates to a new method of connecting the ends of lead pipes, without soldering, so that they can be easily secured together and easily taken apart.

Answers to Correspondents.

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

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1.00 a line, under the head of "Business and Personal."

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

Ezekiel Moores, Mount Vernon, Ill.—Twenty dollars received without services.—What is it for?

U. S. of Mich., asks, "How much lead is it advisable to give an engine 14 inch cylinder by 50 inch stroke making 54 revolutions per minute and cutting off at seven-eighths? 2d, How much cord wood ought such an engine to burn in a day running 22 hours and generating 23 actual horse power, the wood being mixed, hard and soft, half seasoned? 3d, Can you give me a rule for setting the axles ordinary wagons with regard to the set and "gather," and other points necessary for wheelrights? As for the lead of your engine we can give no positive answer without knowing the style of your valves. If the exhaust can be controlled independent of the inlet, close the exhaust at nine tenths the stroke of the piston and you will not require any steam lead; the "cushioning" of the steam will answer the same purpose. If you cannot cushion on the exhaust, set your valves so they will be just perceptibly open when the engine is on the center. 2d, If your engine is in order, cutting off at seven-eighths of the stroke, it would require about 6 lbs. of anthracite coal per hour for each indicated horse power. A cord of well seasoned hard wood is reckoned as about equal to half a ton of anthracite; one pound of the first being calculated to raise 5,000 lbs. of water to one degree of heat and the same amount of anthracite 9,560 lbs. 3d, See page 217, vol. XV, SCIENTIFIC AMERICAN.

E. B., of Mass., asks if some of our correspondents will give the reason of the long continued sound of thunder. "Distance, reverberation, echo, etc., are referred to as the reason. Do they sufficiently explain the phenomenon?"

C. L. A., of D. C., asks, "Is there any practical objection to the construction of a railroad on the following plan: Track 8 feet wide between rails; wheels 12 feet diameter, of wood and iron combined; curves never less than the radius of a mile? In running 100 miles car wheels of 3 feet diameter make about 58,666 revolutions, while those of 12 feet diameter would make only about 14,666 revolutions. It appears to me that ease of draft and movement and greater speed, with less strain on the wheels, would be attained. Is there any reason why railroad companies, at home and abroad, have adhered to small wheels and narrow gage?" It is a notable fact that wide gage roads—6 feet—as compared with the narrow gage—4 feet 8 inches—have in this country proved unprofitable. The excessive

weight of the rolling stock, its greatly enhanced first cost, the additional expense of the road bed, etc., have more than counterbalanced the increased capacity for freight—there is no increased carrying capacity for passengers. Wheels of 12 feet diameter could not be as cheaply or strongly made as those of less diameter, and the combination of wood and iron would hardly receive the approval of sensible engineers, except as wood is employed in the Griggs' patent to hold locomotive tires in place.

T. C. M., of Wis.—The weight of water being 1, that of cast iron is 7.2, and of lead, 11.3. For further information as to the relative weight of different substances we refer you to any manual on mechanics or treatise on natural philosophy.

J. R., of Pa.—The information on petroleum you desire, can only be obtained in the petroleum regions, from those who make it a business to bore wells, and strike oil when they can. Very little has been published on the subject, it being entirely new.

R. S., of R. I.—There is no danger whatever of coal or wood ashes taking fire by spontaneous combustion, after they are once cold and thoroughly extinguished; only do not pour linseed oil or another similar substance on them.

J. D., H.—1st, Mica can be bought in pretty large slabs, say one foot square, without cracks; however it is never as uniform as glass. 2d, There is no other transparent substance known impervious to water and fire-proof. 3d, You can bend it to any shape, like cardboard, provided thin plates are used, as they are very elastic, but their rigidity increases with their thickness.

J. B. F., of R. I.—There is no difference in the useful effect of a suction or lifting pump of the same size when the same amount of water is attempted to be raised to the same height by the same power employed only in the lifting pump the lower position of the piston, necessitates longer rods, more weight to carry, and more exertion to overcome. In this respect the suction pump may sometimes have a slight advantage.

J. P., of Pa.—Iron bolts may be cleaned from grease, by moistening them with benzine, and rolling them in dry sawdust; afterward brushing.

J. D., Idaho Ter., wants a simple method to treat sulphurets in the raw and unworked state by the wet process, in quantities of at least 500 lb. This is exactly the result that thousands of metallurgists are at present seeking after, but so far without success.

J. A. W.—Condense your ideas on boiler explosions. We have not room to publish so much.

B. K., of Pa.—The plan of using compressed air as a generator of power is one of the usual hobbies of men of limited information; it must be remembered that compressed air acts like a spring wound up, never can more force be got out of it, than is put in.

E. R., of Wisconsin, is a new inventor of perpetual motion. He proposes to use compressed air for working an engine which moves an air pump, and thereby keep up the full pressure of air in the vessel, which again works the engine, several other engines besides, and so on; he says if he "were blessed with a large share of this world's goods" he would develop the idea, though it might cost thousands of dollars. We think it fortunate for our correspondent that he has no money to waste.

R. H. D., of Pa.—Matches without sulphur or phosphorus are made of three parts chlorate of potash, three of ground glass and three of bichromate of potash, two of Dextrine or gum and eight parts water; There are several receipts more or less reliable, the simplest is perhaps chlorate of potash two parts, gum arabic three parts, and soot one part.

T. W., of Vt.—Without having a sample of the deposit on your pans to analyze, we cannot tell what will dissolve it; if it is a compound of lime, hydrochloric acid is the most ready solvent.

E., of M.—A round flue having less interior surface in proportion to the area of its section, gives less resistance to draft. When the flue is wide enough, the form is not as essential as the smoothness of the interior surface. A rough flue gives much more obstruction to draft, than is generally supposed, specially when flat or narrow. When wide enough to give exit to all air and smoke, and long enough to insure the steady and powerful ascent of the heated gases, there is nothing gained by widening it at the top, except when the lower part is too narrow, then a widening at the top may compensate for this to a certain degree.

G. W. B., of Va.—Curiosities of the kind you mention are not very salable, in fact of little value except to some amateur whose fancy induces him to buy.

J. R. C., of Iowa.—You cannot compare the effect of the pressure of a body in rest, with that when in motion; it is the old problem of the *vis viva* revived. Your hammer of 1400 lbs. falling 30 feet, has an effect which cannot be compared by single pressure; after a certain theory it would be equal to 1,260,000 lb. falling 1 foot or nearly 200,000,000 pound falling 1 inch, but the effects are so much influenced by the relative weight of hammers, piles, nature of soil, etc., that no general rule can possibly be arrived at. Imagine only a very small weight driven by great velocity on a heavy mass; it will of course not move it, but its effect will be only confined to the locality of contact. You may find further explanations in any good book on Dynamics.

J. B. W., of Washington.—Your well written communications are not adapted for our paper, being too speculative. Articles to be accepted must be on practical subjects and condensed as much as possible. You rightly attack old dogmism in science, but our advice is to study the modern doctrine of the correlation of forces. For instance in Tyndall's recent work "Heat considered as a mode of motion," you will find an essay on the subject you treat, Cosmogony, and will discover that combustion and chemical action generate only a very small amount of the heat distributed in the universe; they are not the primary producers of heat, but a deeper cause is at the bottom of all these and other phenomena of caloric action. The above mentioned or other recent works of Mayer, Joule, Helmholtz, Grove, etc., explain all this in detail.

EXTENSION NOTICES.

William Thornley, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 19th day of September, 1854, for an improvement in safety washers for securing wheels to axles, for seven years from the expiration of said patent, which takes place on the 19th day of September, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 31st day of August next.

Abner Whiteley, formerly of Springfield, Ohio, now of Platte County, Mo., having petitioned for the extension of a patent granted to him the 19th day of September, 1854, for an improvement in grain and grass harvesters, for seven years from the expiration of said patent, which takes place on the 19th day of September, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 31st day of August next.

Harry H. Evarts, of Chicago, Ill., having petitioned for the extension of a patent granted to himself and A. J. Brown as assignees, the 31st day of October, 1854, for an improvement in shingle machines, for seven years from the expiration of said patent, which takes place on the 31st day of October, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 19th day of October next.

Stephen J. Gold, Cornwall, Conn., having petitioned for the extension of a patent granted to him the 3d day of October, 1854, for an improvement in warming houses by steam, for seven years from the expiration of said patent, which takes place on the 3d day of October, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 14th day of September next.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Carbonate of Barytes wanted in large quantities. Address A. G. Hunter, Fair Haven, Conn.

If you desire to invest moderate capital safely and profitably, we offer City, County, State, or the entire right in "That Dipper," "The Universal Weighing and Measuring Cup," "The Little Wonder," or "Combination Funnel," (with six distinct uses), and the "Adjustable Dredge." Address Marsh & Co., 33 Maiden Lane, New York, Gen'l Agts for U. S.

Wanted—a six-horse portable engine and boiler. Address, with particulars and price, Edward Park, Poughamton, N. Y.

Wanted—illustrated priced list of all kinds of shingle, stave, barrel, and heading machinery. Address L. T., Valley Forge, Mo.

Brick Machine.—Lafier's New Iron Clad has more advantages than any other ever invented. For descriptive circular address J. A. Lafier & Co., Albion, Orleans county, N. Y.

Adams' improved air cylinder graining machine, in operation daily and specimens of work at 44 Murray st. Send stamp for circular, full particulars, prices, etc. Address Heath, Smith & Co., as above.

The surest detective of low and high water, and high steam in boilers yet invented. Springer, Hess & Co., Philadelphia, Pa.

Bartlett machine and needle depot, 569 Broadway, New York. Needles for all machines, hackle, gill pins, etc.

Merriman's patent bolt cutters—best in use. Address, for circulars, etc., H. B. Brown & Co., New Haven, Conn.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct

Winans' Boiler Powder, for 12 years a positive remedy for incrustations, is so extensively imitated and pirated, by pretended agents, that it is not safe to buy except at 11 Wall st., N. Y.

NEW PUBLICATIONS.

THE BLOWPIPE. Its Practical Use. By G. W. Plympton, A. M. D. Van Nostrand, 192 Broadway, New York.

The object of the compiler of this volume is to present to the beginner in chemical analysis, plain, practical instruction on the use of the blowpipe in the laboratory and workshop, with full directions for its manipulation, descriptions of the best reagents, etc. It is illustrated with cuts and contains valuable tables of the reactions of metallic oxides and metallic acids, with a copious index for reference. It will be found to be advantageous not only to the beginner but to those more advanced in chemical science.

THE AMERICAN CARBON MANUAL.

Photographer: will be glad to know that they can now obtain, in the above work, full and complete directions for producing their prints, without silver, by means of the new carbon process. This method has been so improved and simplified that it may be readily practiced with success by all photographers. The pictures produced by it are very uniform, and any desired tint or shade may be easily imparted. The book before us is from the pen of Edward L. Wilson, the accomplished editor of the Philadelphia Photographer, published by the Scoville Manufacturing Company, 35 Park Row, New York.

THE FAMILY RECORD. Biographic and Photographic. Arranged for recording in detail the personal incidents in the life of each member of the family. By John H. Griscom, M. D., New York.

The author of this record has arranged a very convenient and practical work, which ought to be possessed by every family. The first page is set apart for the names, birth, marriage, etc., of both husband and wife, and also a space for photographs. There is also room for personal incidents, and it contains a register for the different maladies which afflict children. A book of this kind, if well kept, would be invaluable to families, not only for present but for future reference.

NEW YORK CITY DIRECTORY, for the year ending May, 1869. Compiled by H. Wilson. John F. Trow, publisher, 52 Greene street.

The task of collecting the names, business pursuits, and residences of 185,751 citizens, alphabetically arranging the same, and publishing the whole in the space of a few weeks' time, is one the magnitude of which can be known only to those who have attempted similar undertakings, and is only made possible through the perfected system of obtaining information which long experience has taught the publisher of this volume. The yearly growth of the city and the increasing demands of business make us a migratory people, and necessitates the recompliation of the entire work annually. "The whole city is like a huge kaleidoscope which annually dislocates itself and forms a new figure," and to point out these changes is the province of the "Directory." The number of names this year, as stated above, is 185,751, being an increase of 8,434 over the number contained in the issue for 1867-8.

FOOTPRINTS OF LIFE, OR FAITH AND NATURE RECONCILED. By Philip Harvey, M. D. Published by Samuel R. Wells, 359 Broadway, New York.

This volume embraces a poem of considerable literary merit. It traces the origin of the body through a progressive development to the end of life. It also treats of the soul and of Deity with pious reverence.

A GUIDE TO THE STUDY OF INSECTS, and a Treatise on those Injurious and Beneficial to Crops, for the use of Colleges, Farm Schools, and Agriculturists. By A. S. Packard, Jr., M. D., of Salem, Mass. Part I. Price 50 cents.

This very instructive and excellent pamphlet of 60 pages is copiously illustrated with wood cuts of a great variety of insects, and deserves to be read by all those who are engaged in the culture of the soil.

HALL'S HEALTH TRACTS.

This volume contains an interesting series of practical tracts on health, which have appeared from time to time in Dr. Hall's Journal of Health. The author is a prolific writer, and aims to bring to the reader's attention a sensible way of preserving the health by other means than the quack medicines, which curse our go-ahead countrymen and women more than any other people in the civilized world. The French are probably the healthiest people in Europe. They stay out of doors a good deal of their time, and take little medicine.

Inventions Patented in England by Americans.

(Compiled from the "Journal of the Commissioners of Patents.")

PROVISIONAL PROTECTION FOR SIX MONTHS

- 1,604.—APPARATUS FOR SEWING OR STITCHING SEPARATE PARTS OF A VOLUME.—H. G. Thompson, New York city. May 16, 1868.
- 1,618.—APPARATUS USED IN THE MANUFACTURE OF IRON AND STEEL.—A. L. Holley and J. B. Pearce, Swatara, Pa. May 16, 1868.
- 1,644.—APPARATUS FOR OPENING SARDINE AND OTHER SHEET-METAL CANS, AND CUTTING SHEET METALS, ETC.—Bellina Froehlich, New York city. May 20, 1868.
- 1,661.—POWER LOOM.—E. B. Bigelow, Boston, Mass. May 20, 1868.
- 1,664.—MARKING AND CREASING TUCKS UPON A SEWING MACHINE.—Mary Ann Duffy, New York city. May 20, 1868.
- 1,684.—FRICTIONAL GEARING.—Albin Warth and Eberhard Faber, New York city. May 21, 1868.
- 1,689.—GRATE BAR.—A. C. Fletcher, New York city. May 22, 1868.
- 1,767.—MANUFACTURE OF LEAD PIPE AND LEAD PIPE LINED OR CASED WITH TIN OR OTHER METAL.—Wm. A. Shaw, New York city. May 28, 1868.
- 1,777.—PLATING SPOONS, ETC.—Marshall Forbes, West Meriden, Conn. May 29, 1868.
- 1,803.—PAPER SATINING MACHINE.—Thomas Christy, New York city. June 2, 1868.