Pyrometers.

In our issue of August 5th, we referred to the instruments for indicating high temperatures, made by Wedgewood and Daniel. There are however others of American and English make, in extensive use, depending in their construction, on the difference of expansion of various metals under heat, which answer well for lower temparatures, and are less expensive. Mr. Gauntlett has long supplied the Blast Furnaces in England, with an instrument having a brass stem about four feet long inclosing a steel rod; this gives good satisfaction in biscuit manufacturing, oil refining, wire annealing, and similar operations, where the temparature is under 800 degrees. Above this figure and especially if continued for a length of time in a red heat, the brass tube is liable to be injured. To indicate the increased temperature now used in blast furnaces, Mr. Gauntlett has introduced an instrument the stem of which is composed of tubes of refractory clay, enclosed in an iron stem about three feet long, this is more durable in a temperature of 1,000 or 1,200 degrees, and is highly spoken of. The Agent for them is Edward Brown, 311 Walnut St., Philadelphia.

Effect of the Galvanic Current upon the Tenacity of Wire.

Mr. James Wylde has made public the results of some experiments which are of great importance to telegraphic science. He says that he found, some years since, that when intense currents were passed through the best copper wire, in only one direction, its tenacity was gradually destroyed, so that it could finally be crushed to pieces by the fingers. This loss of tenacity occurred first and in a greater degree at the negative pole. An examination with a microscope revealed at the broken surface a complete molecular change, a crystalline structure having taken the place of the fibrous. He states that, having entered upon some extended experiments in connection with submarine explosions by means of the voltaic current, he was frequently annoyed by the breaking of one of the wires, and in all cases found the structure at the broken part crystalline. From these facts he infers that intense currents passed through submarine cables must eventually deteriorate them, and counsels their avoidance. The frequent reversal of the current, in regard to direction, lessens or entirely prevents the molecular change in the wire.

Neutralization of Magnetic Influences.

M. Arson has sent to the French Academy of Sciences a second paper on his system of neutralizing magnetic influences on board iron ships, and recommended experiments to be made on the iron advice-boats now constructing in the French harbors. As these boats are being built by sections, nothing would be easier than to introduce plates of copper between them, and to use brass rivets, whereby the magnetic forces, neutralizing each other, would cease to exercise any action on the needle. M. Treves wrote to say that he had communicated to the Minister of Marine a new plan for the construction of the mariner's compass. The binnacle is to be of thick copper, and under each rose a thick horizontal plate of the same metal is to be placed, M. Treves having ascertained that copper exercises an influence on the needle by deadening its oscillations.

The Case of Dawson vs. the Bricklayers' Union.

While we greatly regret the unsettled state of the differences that unfortunately exist between the trades unions, and those who believe these organizations either unnecessary, or injurious to the interests of all parties concerned, we trust that the legal controversies that have grown out of them will result in a definite understanding of the exact legal status of these combinations.

The case of Henry B. Dawson, against the Bricklayers' Union in Westchester Co., the initiatory proceedings of which were noticed on page 3 of the current volume of the Scientific American, has finally resulted in a verdict adverse to the defendants. The complaint charged a conspiracy against the defendants, in that they prevented the son of the plaintiff from obtaining employment. We understand that an appeal from the verdict rendered will be made, and it yet remains to be seen what will ultimately come of it. The case is an important one, and its progress will be watched with interest by employers and employés throughout the entire country. Meanwhile it will not be surprising if the success so far gained by the plaintiff in this case should encourage further litigation, but as the case can not be said to have terminated, it would be wiser, we think, to await its final result.

"The Scientific American.—This journal is certainly one of great value. We have read it with interest for twenty years, and it is among the first papers inquired for by our children when the time for its weekly visit arrives. It is full of important suggestions and scientific facts; and we think it has done more to elevate and stimulate thought among the laboring classes, than any other journal published in this country or Europe. Many years ago we received a suggestion from its pages, which was worth to us pecuniarily several thousand dollars. It is probable others can make a similar statement. We are led to make these observations in justice to an excellent journal."

We extract the above notice from the *Boston Journal of Chemistry*, one of our most valuable exchanges, edited by Dr. James R. Nichols.

It it stated that the Conecuh and Pensacola rivers are literally jammed for a distance of 200 miles with saw logs belonging to the Pensacola Lumber Co. They are destined to be sawed at Molino.

Editorial Summary.

A New England paper speaks of a flourishing establishment at Middletown, Conn., engaged in the manufacture of silver plated ware, calling special attention to the fact that the business was begun four years ago in a small room, and with one machine, while seventy-five men are now required to produce the goods which the market demands. The success of this concern, and its quick growth into a large business is not a rare event. Beekman street, in this city, is the home of hardware dealers, for example; and many of the most extensive and attractive stores devoted to the sale of hardware sundries on the street, are the metropolitan salesrooms of gigantic manufacturing concerns that commenced like this one quoted by the New England paper, "in a small room, with one machine." The history of some of the heaviest hardware manufacturers of New Britain, Middletown, Bridgeport, Waterbury, and Norwalk, Conn., would be an exceedingly interesting and attractive one.

One of the most industrious streams in the country, is the Quinnebaug, which starts for the Atlantic from Massachusetts, *via* Norwich, Conn. Before it is fairly on its way, it is pressed into service at Southbridge and obliged to turn the wheels of at least a dozen factories, most of them cotton, and extensive. After that it hurries southerly through eastern Connecticut, turning a wheel at almost every furlong of the way, and setting in motion hundreds of thousands of spindles. At Norwich it is obliged to take on its back a dozen propellers, and some of the most magnificent steamers that run to New York, and carry them to the Sound; and there, setting them afloat on the sea, it indulges in the rest and quietude which its eventful career has fully earned.

Cincinnati has heretofore insisted on making a break in the railroads centering at that city in order that travelers through might be levied upon by the hackmen and hotels. The result has been disastrous to the interests of the city, and the papers are urging an improvement in this respect, and an endeavor is made, also, to procure a direct line to the south, by bridging the Ohio from Cincinnati across to Newport. The navigational interests of that section oppose the bridge, as it is feared that it will injure the navigation of a river which is at present none too reliable in the matter of floating facilities.

American Art has suffered a serious loss in the death of Charles Loring Elliot, of Albany, the most eminent portrait painter which this country has ever produced. He began life as a clerk in a country store, but his innate love for art conquered his business faculties, and he soon applied himself to portrait painting, and achieved a deserved fame. His first sitters in this city were Mr. and Mrs. Cornelius Vanderbilt, for whose portraits he received fifty dollars each. His last ten pictures brought him seven hundred and fifty dollars each. We are glad to learn that he leaves his family well provided for.

A curious case of spontaneous combustion took place recently at Gaines, Michigan. Some cotton saturated in linseed oil that had been used as a dressing for a burn, was removed and thrown aside, when in a few hours it commenced burning spontaneously. Cotton or woolen covered with oil which oxydizes rapidly when distributed thinly over a great extent of surface has often been the source of disastrous conflagrations.

Captain Stevens Rogers who is said to have taken the first steamship over the Atlantic that ever crossed it, died recently at his residence at New London. Among his personal effects is a magnificent gold snuff box presented to him by the Emperor of Russia in honor of his success in the first experiment in transatlantic steam navigation.

The propeller *Congress*, of Detroit, after fully testing the invention, has adopted and just commenced running with petroleum for fuel. The cost is half the cost of wood; while the oil to do the work of forty cords of wood can be carried in the space of four cords, leaving the space occupied by thirty-six cords for freight.

The ties of the Chicago & Quincy railroad are all kyanized by immersion, for thirty hours, in carbolic acid, at 245°. They are, when so prepared, as black as charcoal, and believed to be practically indestructible.

The number of threshing machines in the country is about 225,000, and they save five per cent more of the grain than the flail. There is a total to the credit of the machines of about 10,000,000 bushels annually.

Forge Village, Mass., makes 1600 pounds of horse shoe nails daily, and the factory gains a profit of 1600 a month, which is at once returned to the works by increasing their capacity to the demands of their rapidly growing business.

Allegheny, Pa., has a flowing salt well on one of its streets and though much of the water runs to waste, the owners make one hundred barrels of salt daily. They intend, soon, to work up the whole of the product of the well.

Detroit is using a new invention for keeping the water in the boilers of steam fire engines in such condition that steam can be generated and the engine working in two minutes. The fuel used is coke, and the expense seven cents a day.

Pittsburg is examining, with much satisfaction, a machine for undermining coal. The local papers say that it works easily, cheaply, steadily, saves coal, does not strike, and can go by steam, horse, or man power.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Mayo lode (Colorado), west of the Coin lode, is at present yielding silver ore that assays $965 to the ton.

The shaft on the celebrated Cornet lode is now sixty-five feet in depth, carrying three feet of pay ore.

The bar mining below Idaho has been seriously interfered with by the high water which is now subsiding.

The owners of the Equator lode, Colorado, have commenced shipping ore to Newark, N. J., for reduction on account of the limited facilities for shipment to Cheyenne.

The shaft in the Awanda lode, Leavenworth Mountain, is now fourteen feet deep. The vein is four feet wide carrying a very fine gangue thoroughly interspersed with mineral.

Railroad Bridge Burned.—The Chicago and Northwestern railroad bridge at Sterling, Ill., 300 feet in length, was burned on 21st Aug. It will shortly be replaced.

Prosperity of our Railroads.—The gross earnings of the principal railroads of the country for July of this year, exceed those of the same month of 1867 by about nine per cent.

Silver in the Arts.—It is estimated that one hundred thousand ounces of silver is daily consumed throughout the world, in the manufacture of silverware, watches, jewelry, photographs, and in the other manufactures and arts.

Perseverence and Industry of American Workmen.—Several mill operators at Lewiston, Maine, are building houses in their spare hours. Working in the mills nearly twelve hours per day they manage to secure a little time before the bell rings and after they come out at night, which they devote to building operations. A short time ago one of these persevering men was seen shingling after eleven o'clock at night, and the next morning was at work almost before light.

Recent American and Foreign Patents.

[illegible]

Grain Screen.—J. H. H. Wiseheart, Shawneetown, Ill.—The object of this invention is to furnish a cheap and simple apparatus whereby grain may be thoroughly cleaned and separated from dirt, sticks, cheat, dwarfed kernels, etc., in an expeditious and convenient manner.

Composition for Grinding Marble.—J. C. McAfee, West Alexander, Pa.—The manner of applying the sheets or plates of my improved composition to planes or polishing tools is represented by a longitudinal vertical section of such plane or tool, having a detachable shoe or sole formed of the composition.

Steam Governor.—Thomas Alsop, Elkhart, Ill.—The object of this invention is to construct a steam governor, with its parts so arranged and operating, that if the belt slips, or an accident happens to the machinery, the governor will cut off the steam and stop the engine, in addition to properly performing its functions as a steam regulator at other times.

Warming Attachment for Stoves.—John Fahrney, Boonsborough, Md.—This invention consists of an attachable and detachable horizontal iron rim which is to be used in connection with upright cylindriform stoves, for the purpose of supporting dishes, etc., around the stove, to be warmed by the heat radiated from its body.

Low-water Indicator.—T. G. Eiswald and James Barbour, Providence, R. I.—The object of this invention is, so to construct a low-water indicator that the fusible plug, when melted, shall not be blown into the whistle, but shall be forced in another direction, so as to prevent the possibility of its obstructing or interfering with the operation of the alarm apparatus.

Milking Stool.—Otis Earl, Hermon, N. Y.—This invention consists in a clamping device, arranged to be closed and maintained in a closed condition, by the weight of the milker, in a sitting position on the stool, whereby the long hairs of the tail, being placed between the clamping jaws by the milker, before sitting down, will be clamped and held until he rises, when the jaws will separate and release the tail.

Let-off Motion for Looms.—Benj. F. Carter, Manville, R. I.—This invention relates to improvements in let-off mechanism for looms, designed to provide means whereby the warp yarns shall be held rigidly against the action of the lay, while beating up, as is found to be highly necessary in weaving heavy goods, and, at the same time, permit the tension of the yarn to effect the delivery of the same after the lay has beaten up the weft.

Plane.—George Buckel, Detroit, Mich.—The object of this invention is to provide a plane so arranged that the thickness of the cut may be regulated, either in a positive manner, or by the pressure of the hand, and that the bit may be raised out of contact with the board being operated on when it is being moved back.

Machine for Forming Raised Panels.—F. D. Green, Williamsport, Pa.—This invention has for its object to furnish an improved machine for forming raised panels, so as to raise and finish a panel at one operation.

Trace Fastening.—Thaddeus Peck, Stratford, Conn.—This invention has for its object to furnish an improved device for securing traces to whiffletrees which shall be simple in construction, allowing the traces to be easily and quickly attached and detacked, and holding them securely in place.

Churn.—C. N. White, Batesville, Miss.—This invention has for its object to furnish an improved churn, simple in construction, easily operated, in which waste in churning and the ingress of dust, or other impurities, are effectually guarded against, and which will bring the butter in a very short time.

Sawing Machine.—Peter S. Beidler, South Easton, Pa.—This invention consists of an arrangement of means for feeding an adjustable circular carriage. Also, an arrangement of means for automatically stopping the feed when the cants have been sawed through. Also, an arrangement of means for automatically varying the feed.

Platform Springs for Vehicles.—Chas. D. Sutton, Tarrytown, N. Y.—This invention has for its object to furnish improved platform springs for vehicles, which shall be stronger, more durable, no heavier, and no more expensive than the ordinary platform springs, and which will allow the draft to be attached lower down than it can be with the ordinary springs.

Operating Belt Saws.—George Thompson, Nashua, N. H.—The object of this invention is to provide a means of operating belt saws, whereby the curve of the saw at the point of its operation on the wood may be varied to cut staves, lagging (so called), and other work of a curved character for which it may be applicable. It consists of a belt saw steadied by a number of adjustable small pulleys and running on a main pulley, which is driven by a driving belt which is so arranged upon several other pulleys as to hug the main driving pulley for half of its circumference, and by its friction against the same transmit motion to it.

Wagon Brake.—F. D. Ladenberger, Glenbeulah, Wis.—The object of this invention is to provide an effective wagon brake, which is operated in a simple and convenient manner.

Automatic Fly Brush.—B. F. Day, East Freedom, Pa.—This invention is a machine for actuating pendent brushes with a horizontal reciprocating motion, the motive power being furnished by a spring and train of wheel work. It is designed to be placed upon a table during meals, or at the side of a sick bed, to produce a gentle current of air and drive away flies, mosquitoes, and other annoying insects in the air.

Automatic Liquid Meter.—Charles H. Riggs, Warwick, N. Y.—This invention consists of a combination of floats and siphons arranged within a chamber to operate automatically in moving the registering mechanism as the water passes through the meter.

Coupling for Vehicles.—Chas. W. Greter, Three Rivers, Mich.—The object of this invention is to accomplish the abrupt or sharp turning of the front wheels of vehicles without jointing the coupling or reach pole of the same.

HORSE COLLAR FASTENING.—W. A. Sharp and J. A. Shannon, Tama City, Iowa.—This invention relates to a new and improved method of constructing the collars of horse harness whereby many advantages over the ordinary method are secured.

SECTIONAL STEAM BOILERS.—Charles Bean, East Douglass, Mass.—This invention relates to a new and improved plan for constructing steam boilers whereby they are rendered more durable and more effective as steam generators than those of ordinary construction.

MACHINE FOR MAKING GINGER SNAPS.—Daniel M. Holmes, Williamsburgh, N. Y.—This invention has for its object to furnish a imple, convenient, and effective machine by means of which ginger and other snaps may be made from soft dough rapidly, conveniently, and accurately.

PIPE CUTTER.—John Peace, Camden, N. J.—This invention has for its object to furnish an improved tool for cutting off pipe, which shall be simple in construction and durable, and which will cut off the pipe quicker and better than the pipe cutters now in common use; cutting away the metal, and not leaving a burr upon either the outside or inside of the pipe.

CAR HEATER.—W. S. McNeil and O. S. Cadwell, Jr., Springfield, Mass.—The object of this invention is to so construct a heater for heating or warming railroad cars by heated air that the air shall be purified before it is heated and discharge into the car and properly distributed therein, and so that fuel shall be economized and proper provision made for protecting the passengers and car from injury from fire in case of accident.

HAND DRILL.—Alois Wirsching, Brooklyn, E. D., N. Y.—This invention relates to a new and improved drill, which is designed to supersede the ordinary bow drill, now generally used for fine or small work, by watch-makers, etc.

HORSE RAKE.—A. H. Robbins, Copenhagen, N. Y.—This invention relates to certain new and useful improvements on the ordinary wooden-toothed revolving horse rake; and it consists in a peculiar construction of the same, whereby the operator may control and operate the machine with the greatest facility, and the latter connected to a sulky or cart if desired, so that the driver or operator may ride if he prefers to do so.

GRAIN AND GRASS HARVESTER.—Amos Smith, Vienna Cross Roads, Ohio.—This invention relates to certain new and useful improvements in grain and grass harvesters, and it consists, first, in a novel and improved construction and arrangement of the driving gear; second, in a peculiar manner of applying the draft pole; third, in a novel manner of attaching or applying the finger bar to the machine; fourth, in a peculiar application of a lever for raising the finger bar; fifth, in a novel construction of the guards or fingers.

SOIL PULVERIZER.—Cornelius Berninger, Mier, Ill.—This invention relates to a new and improved device for pulverizing the soil, and it consists in a novel combination of a rotary toothed pulverizer, and a harrow fitted in a swinging or suspended frame, and attached to a mounted frame, all arranged in such a way as to admit of the soil being pulverized in an expeditious and perfect manner.

CORN-SHELLING MACHINE.—Geo. F. Johnson, Marshall, Iowa.—This invention consists in a rotary wheel provided with a central opening in which are provided a series of hooked shellers, having gages which press upon the cob to prevent the shellers from scraping the cob too deeply, the said shellers being provided with radial stocks, which slide on corresponding grooves in the rotary wheel, and surrounded by a spring which constantly bears them towards the center of the said rotary wheel A set of feeding rollers is also provided for grasping the cob after a portion of corn on one end of the ear has been shelled off, and drawing it through the sheller, the whole being actuated from a hand crank

LOCKING DEVICE FOR LOOSE PULLEYS.—William J. Linton, Detroit, Mich.—The object of this invention is to provide a simple and effective locking device, to be used in machinery, when pulleys or other wheels are required to run loose or fast on a shaft for locking or unlocking them.

JOINERS' PLANES.—F. Smith, and I. Carpenter, Lancaster, Pa.— This invention relates to improvements in joiners' planes, whereby it is designed to render the stocks less liable to warp, to regulate the weight of the same, to provide for a more perfect delivery of the shaving, adjusting the same to be used as a single or double plane, and adjusting the mouth so as to govern the width of the same, for the passage of the shaving.

SAW-SET.—W. B. Weaver, Reading Center, N. Y.—This invention relates to a new and improved saw-set, and it consists in a peculiar construction of the same whereby it may be readily adapted for setting the teeth of large and small saws, and also adapted for other purposes or uses than setting saws.

PUMP.—Jehyleman Shaw, Bridgeport, Conn.—This invention consists in placing the ordinary lift pumps within a cylinder, provided at its lower end with a holding valve; the piston rods of the two pumps being connected by ends or chains passing over a pulley, and all arranged in such a manner that the device is made to operate as a force pump, and elevate water or other fluid to any desired hight, according to the amount of power applied to operate it.

CAR BRAKE.—S. W. Y. Schimonsky, Cheyenne, Dakota Ter.—This invention relates to a new and improved brake for railway cars and consists in a novel construction of the same, whereby the principle of the wedge is applied to the shoes, and the brake rendered self-acting and entirely self-locking. The object of the invention is to obtain a brake which will be efficient in its action, strong, and not liable to get out of repair, and which may be applied with a very slight effort or expenditure of power.

LAMP WICK.—Wilhelm August Gensch, New York city.—This invention relates to a new lamp wick, which is composed of animal and vegetable fibre, fitted together so as to be more effective and useful than those now generally made.

MACHINE FOR CUTTING MITER JOINTS.—Frank A. Howard, Belfast, Me.—The object of this invention is to accomplish the cutting and fitting of miter joints for moldings, picture frames, and the like, in a perfect and expeditious manner. It consists in a sliding V-shaped cutter, composed of two shear edges and an adjustable V-shaped rest plate, together with other devices perfecting the whole.

CAN HOLDER.—M. M. Shurr, Delaware, Ohio.—This invention consists in the combination of expanding staves with a hollow box and staff sliding thereon, together with other devices perfecting the whole. It is used for holding cans to be soldered, and is designed as an improvement upon a machine for the same purpose patented by Henry P. Dennis (No 45,143).

PERMUTATION LOCK.—T. J. Sullivan, Albany, N. Y.—This invention relates to improvements for setting the combination of any lock having indented wheels, actuated by a knob bearing a graduated circle exterior to the lock, but is designed more particularly to improve a lock previously patented by the same inventor. The invention consists in attaching circular springs to the disks containing the combination wheels, said springs being each provided with a detent pin for detaining the combination wheels at any desired point, by fitting into the indentures of the same, together with other devices relating to and perfecting the whole.

SEWING MACHINE.—Robert Barclay, Buffalo, N. Y.—This invention relates to a new and improved sewing machine, and it consist in a novel feed mechanism and a take-up movement for the thread, whereby simplicity, economy in construction, and durability of the working parts are obtained.

FIRE GRATE.—G. H. McElevey, Newcastle, Pa.—The object of this invention is to so construct and arrange a fire grate and the plates and fixtures connected therewith, that the fuel shall receive a supply of oxygen from the back and ends as well as from the front and underside of the grate, and so that the heat generated shall be utilized instead of being passed directly to the chimney from the throat of the grate, as is ordinarily done.

WATER WHEEL.—P. H. Wait, Sandy Hill, N. Y.—This invention relates to a new and improved water wheel of that class which is secured on a vertical shaft and rotate in a horizontal plane at the lower end of a cylindrical case underneath chutes or water guides.

CAR COUPLING.—Leonard Monzert, New York city.—This invention relates to a new car coupling, of that class in which two jaws are employed for holding the connecting link, and consists in the application of a ring, which is fitted around the coupling box, and which, by being turned, serves to lock the jaws together, or to release them, to allow their opening, as may be desired.

WEAVING MACHINE.—Adolph Wagner, New York city.—This invention relates to a new machine for weaving hoopskirts and other fabric of suitable tubular or irregular shape, but is more particularly intended for the manufacture of petticoats and hoopskirts. The invention consists principally in the use of a circular machine in which the fabric is woven around a block suspended between the warp carriers and the track of the shuttles, said block being up and down as well as laterally adjustable, so that it may always be adjusted centrally between the shuttles however irregular its shape may be.

SMUT MACHINE.—Henry Stanley, St. Johnsbury, Vt.—This invention consists of an arrangement of fan-blowers within cases which are curved around the fans in the form of scrolls, into one of which the grain to be cleaned is admitted through the air passage to the fans, and from which it is forced by the blast of air around the scroll (the sides of which are perforated), to the mouth into a spout communicating with the next fan chamber, and in like manner forced from there to the mouth of the scroll, when it encounters another blast of air from another fan which is designed to separate the chaff.

MACHINE FOR ROLLING SAW LOGS.—Esau Tarrant, Muskegon, Mich.—This invention has for its object to furnish an improved device for turning or rolling logs upon the carriage of circular or other saw mills, which shall be simple in construction, effective in operation, and conveniently operated.

FIRE ESCAPE.—Thomas Tompson, Jr., New York city.—This invention has for its object to furnish an improved fire escape for permanent attachment to the outer sides of buildings, which shall be so constructed and arranged, that it may be conveniently lowered when required for use, and raised again out of the way when not required for use.

VULCANITE RUBBER BILLIARD BALLS.—For many years, indeed, since the game of billiards became popular, there has been a demand for a substitute for the ivory of which billiard balls are made. The game seems to demand a certain weight, a fixed diameter, and a degree of elasticity to the balls; qualities difficult to combine in their necessary proportions in any manufactured material. But Mr. W. H Lippincott, of Pittsburgh, Pa., claims by a patent obtained through the Scientific American Patent Agency, May, 12, 1868, to have succeeded in obviating these difficulties, and in producing a ball superior in some respects and equal in others, to those made from solid ivory. He says:—"Although a number of attempts have been made to construct billiard balls of vulcanized rubber, none have succeeded in overcoming the difficulties of thoroughly vulcanizing them. Balls vulcanized by single layers in square blocks, when turned, will be only one half the requisite weight, and are liable to be porous. By my process all the qualities of elasticity, density, weight, etc., are obtained, and the balls will last for years; cheaper in first cost, smooth as ivory, and not liable to chip, crack, or get out of truth. These balls are susceptable also of a high polish, and can receive any color desired" The inventor forms first a ball of say one inch diameter and vulcanizes it, then increases the size by successive vulcanizations until the desired thickness is attained. The constant expense for the renewing of the stock of billiard balls amounting for each table to $32 for eight sets per year, makes this invention worthy of attention.

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 advertisemets at $1 00 a line, under the head of "Business and Personal."

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

A. M. C., of Mo.—Is there any depth in the ocean to which an iron weight or bar would not sink. Ans. No.

E. B., of Pa.—Wire can only be properly coated with gutta-percha by machinery. For any small work, it may be coated by hand, softening the gutta-percha by immersing in water heated to 200° Fah.

S H., of N. J.—The contraction and expansion of the spindle by heat and cold is sufficient to account for the fact you describe. We can supply some back numbers but not all; the rates are the same.

R. C., of Mass.—The pressure upon a closely fitted steam valve not covering any ports is as the area of the valve and the pressure of the steam When it covers ports it is the same minus the back pressure from the cylinder.

H. A. S., of Mo.—Owing to the variety of circumstances under which stones and bricks are used in building no general rule can be given for computing the strength of structures. Each case must be worked by itself. Mahan's Civil Engineering gives all the necessary tables and data.

J. H. W., of Mass.—Sheet iron plates are galvanized by first cleansing the sheets with dilute sulphuric acid, hammering, and scrubbing with emery and sand. The plates are then immersed in a bath of melted zinc covered with sal-ammoniac. Galvanized iron plates are simply iron coated with zinc. There are several other processes of manufacturing it.

H. A. S., of Me.—"Would coal tar on a roof injure the rain water caught from the roof when used for domestic purposes?" If the roof has been newly coated the taste will be perceived for a time, but it is in no sense unhealthy.

T. H., of W. Va.—This correspondent states that his steam boiler, fed with good, pure well water, after lying unused for a time, shows honey-combed holes filled with a "substance resembling black lead," and that his boiler leaks badly. He asks if an acid is present an alkali like soda or lime will neutralize it and prevent its deleterious effects. Either, we think, will do the business. It is evident that the water he uses is unfit for boiler purposes. Better procure water from a purer source.

W. M. G., of Vt.—This correspondent has a plan for setting off the divisions of a gear to be cut on an engine which seems to be novel, but the description sent is too obscure to be valuable. We advise him to insert an illustration of his device in our columns if he desires to introduce it to the trade.

E. H. H., of Mich., sends a plan for a gear cutting engine which has been in use for many years, and is not popular among machinists. His plan presents no novel features and its publication does not seem advisable.

C. B., of Iowa., proposes to build a five-horse power boiler thus: The shell, a cylinder 12 feet long and 24 inches diameter with one flue 14 inches diameter, shell and flue to be connected at the ends with heavy cast iron rings 24 inches external and 12 inches internal diameter, to fit shell and flue, they are to be attached to the ring with tapped bolts instead of rivets. Set the boiler at an angle of about 30 degrees making one end a steam chamber, the products for combustion to circulate all around the shell below the water line and return through the flue its whole length to the chimney. The feed water pipe to run down through the flue—coiled if desired—and enter into the lower end at the bottom with check valve. "Do you think such a cheaply constructed boiler would be safe?" The plan is neither new nor safe. Similar boilers have exploded some months ago, one in Williamsburg, L. I., which we noticed at the time.

J. P. J., of Mass.—Paper of the proper sort is a good material for cleaning the face of a mirror or window glass, but the use of ordinary newspaper is not to be recommended. Much of the paper used for printing the common daily and weekly journals is manufactured from straw, which contains a large proportion of silex or flint, and the process of grinding, pulping, etc. is not sufficient to eliminate this substance. Consequently a glass often rubbed with newspapers exhibits in time a congeries of scratches, less pleasant to behold than dust or fly-specks, as flint will scratch glass, if it cannot cut it as the diamond.

B. J. P., of N. Y.—The business information you desire we cannot give, neither are we acquainted with the composition of "Zopissa" cement. We believe it has not yet been made public. Ammonia dissolves copper when exposed to the air. As long as it is thus exposed it has a splendid blue color, when not so exposed it becomes colorless. The copper in the former case is an oxide in solution, in the latter it is a dioxide. The process of making the solution of metallic copper being slow, the same solution may be more rapidly obtained by using the hydrated oxide. The statement that this solution will dissolve lignin has the sanction of good authority. Linseed oil is oxidized by heating it with litharge. Nitro-benzole is made by slowly adding benzole to fuming nitric acid gently heated; upon the addition of water the nitro-benzole separates in the form of a heavy yellow oil.

B. F. L., of Pa.—It is probable that you can obtain the work of Dr. Beaumont referred to in the article, of Lea & Blanchard of Philadelphia.

Business and Personal.

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

NEW PUBLICATIONS.

HANDBOOK OF THE STARS, for School and Home Use. By W. J. Rolfe and J. A. Gillett. Boston: Crosby & Ainsworth. New York: Felt & Dillingham, successors to O. S. Felt.

The study of astronomy is of all others most calculated to enlarge and elevate the mind. Descriptive astronomy is particularly adapted to interest youth, and can be pursued advantageously without a previous knowledge of the higher mathematics. The little work before us is designed to aid the school and family in this important study, and seems well adapted to the purpose. It has maps of the constellations, including all the stars down to the fourth magnitude, with a table of all the constellations visible during each month, and full instructions as to their location, their history and mythology. The book is printed and bound in superior style. An additional attraction is its description of the spectroscope and its use in the study of the heavenly bodies.

THE WORKSHOP.

We are in receipt of the seventh number of "The Workshop," containing besides its usual amount of useful and artistic designs, some very entertaining and instructive remarks upon the subject of antique vessels, and a valuable article on the "Employment of Calcareous Tufa for the Production of a Fine, Artificial Marble."