

ENGINEERING INVENTIONS.

A steam boiler has been patented by Mr. Samuel P. Hedges, of Greenport, N. Y. It has vertical and horizontal cylinders with inlet and blow-off pipes, and with projecting pipes having interior circulation pipes, whereby steam will be generated quickly, and all the parts are easily accessible.

An axle box lid has been patented by Mr. John C. Albrecht, of Columbus, Ga. The axle box has beveled end and vertical side grooves, and the inclined lid has side flanges, the object being to provide a lid which will always be oil tight when closed, and which can be easily opened and locked in the open position.

A hoisting machine has been patented by Mr. Cornele G. Ross, of Rutland, Vt. This invention covers contrivances for unwinding or overhauling the rope of the drum more rapidly than it can ordinarily be done, to economize time when working in deep mines, quarries, etc., where considerable length of rope is required.

A clamp plate for railroad rails has been patented by Mr. Thomas J. Bash, of Lexington, Ky. This invention covers improvements on former patented inventions of the same inventor, and covers a plate adapted to be placed upon the cross tie and flange of a railroad rail, combined with interlocking bolts inserted in the plate and cross tie parallel with the rail.

A dredger has been patented by Mr. Geo. A. Callanan, of New Comerstown, Ohio. The invention covers improved contrivances for working a scoop for dredging out canals and rivers by a derrick and boom erected on the bank, and floats from which to guide and control the scoop, with improvements in its construction for regulating its dip.

A car wheel has been patented by Mr. William H. Herbertson, of Brownsville, Pa. The invention covers more especially an improved device for oiling axles of coal cars, there being a central oil cavity in the wheel, and inclined bars adapted to rest against the surface of the axle, the contrivance saving time and labor, and all waste of lubricating material being obviated.

A base burning steam boiler has been patented by Mr. Micheal E. Herbert, of St. Joseph, Mo. It is an upright boiler, with a downwardly projecting annular chamber at its outer periphery, and a similar chamber at the point where it encompasses the fuel magazine, with other novel features, giving a great extent of heating surface without the complication of a great number of flues.

An automatic hydraulic signaling apparatus for railways has been patented by Mr. Frederick W. Malcolm, of Cincinnati, O. The apparatus is constructed with a hinged bar, a signaling post, and a slotted semaphore arm, the bar being connected to the arm by a piston and piston chamber, an air chamber with a perforated valve, pipes connecting the air chamber with a piston chamber, etc., so the semaphore arm will be displayed by the expansion of air compressed by the weight of the advancing train.

MECHANICAL INVENTIONS.

A lathe dog has been patented by Mr. Samuel N. Silver, of Auburn, Me. Combined with the face plate of a lathe is a casting or plate with jaws and receiving a set screw from the face plate, an apertured plate being held between the jaws, while the set screw serves as a pivot for the apertured plate, with various other novel features.

Watchmakers' pliers are the subject of a patent issued to Mr. Calvin W. Little, of Denver, Col. The invention covers a novel construction, one of the jaws being flattened to a chisel edge and slotted, and the other made longer and having beyond the end of the lower jaw a bearing for the watch face, the whole being designed to facilitate the removal of the hands from a watch without straining or twisting the hands or the shaft to which they are applied.

AGRICULTURAL INVENTIONS.

A peanut planter has been patented by Mr. Christopher C. Boykin, of Ivor, Va. The invention covers a combination with slides having cups, of adjustable plates adapted to be set nearer to or farther from the same, to regulate the capacity of the cups, with various other novel features to improve wheeled planters for planting peanuts, peas, or other seeds.

A cultivating harrow has been patented by Mr. Joyeux Collins, of Tyro, Ark. This invention covers a novel construction, so the harrow can be drawn along a row of plants to cultivate both sides at the same time, or the space between two rows, so as to cultivate their adjacent sides at the same time, the side parts of the harrow, in either case, adjusting themselves to the inclination of the sides of the ridges.

MISCELLANEOUS INVENTIONS.

A fire kindler has been patented by Mr. George C. Kiesewetter, of Hoboken, N. J. The invention covers a composition of matter in specified proportions, made into cakes, consisting of resin, benzine, water, caustic soda, raw oil, nitrate of lead, sulphate of magnesia, etc.

A wire fence has been patented by Mr. Richard B. Combs, of Cincinnati, Ohio. The invention covers a combination of improved wire straining and fastening devices, improved post brace for wire fences, with novel support for the wires, and other special features in design and construction.

A cabbage slicer has been patented by Mr. Theodore A. Cook, of Brooklyn, N. Y. The knives have a double action, making the device do its work very rapidly, and an eccentric lever is so arranged that it is very easy to operate, making a machine that is cheap, durable, and practical for its purpose.

A hand loop for driving reins has been patented by Messrs. Charles E. Rand and Francis H. Audley, of New York city. The invention covers a series of hand loops, with an end loop, slides, and keep-

ers for securing the hand loops to a driving rein, and readily adjusting them upon the rein.

Scenery for theatrical plays is the subject of a patent issued to Mr. Frank L. Rees, of Bridgeport, Conn. This invention covers such an arrangement of partitions as to enable the actors to appear in five different apartments, each of which is exposed to the view of the audience at the same time.

A hay elevator and carrier has been patented by Mr. Abner J. Burbank, of Harvard, Ill. The invention combines with a weighted lever and stop a curved arm and catch, and various other novel features to enable the carrier to be run in either direction, the locking and tripping gear being simple and efficient.

An oil cup faucet has been patented by Mr. John S. McGuire, of Centerville, N. J. In combination with a screw neck is a spout, an apertured plate with a washer, and a screw cap with a valve plate, thus providing a cap for closing the spouts of oil cans, and one which also serves as a faucet.

A vehicle spring has been patented by Mr. George B. Malette, of Watkins, N. Y. It is a device of corrugated or serpentine anti-friction spring, with novel devices for so connecting with the vehicle that the body of the latter will always be depressed equally without reference to the locality of the load.

A bill or letter file has been patented by Mr. Michael B. Hurly, of Quebec, Canada. This invention relates to bill files formed with a wire stringer having jointed ends, on which bills or letters are strung after being punctured by the wire, for which purpose a device of novel construction is provided.

A method of securing heels to rubber boots has been patented by Mr. Alfred V. B. Carlisle, of New Brunswick, N. J. The method consists in applying the heel to the outsole, inserting screws through the outsole into the heel, and then connecting the outsole and heel to the body of the boot and vulcanizing the same, so that the screws will be wholly embedded in rubber.

A buck for beer coolers has been patented by Mr. Frank T. Cladek, of Rahway, N. J. The invention covers an improved swing beer buck for refrigerators used for holding beer on tap, the buck being adapted to be swung out of the refrigerator for facilitating the labor of placing the keg of beer in and removing the empty keg.

A thill loop for harness has been patented by Mr. Alexander C. Davison, of Jefferson City, Mo. It consists of a metallic core, with an anti-friction supporting roller at its lower end, with various novel devices for greater convenience in attaching and detaching the hold back strap, besides being cheap and durable.

A protector for harness saddle skirts has been patented by Mr. Ephraim K. Dennis, of New Bedford, Mass. The protector is made with a cushion having a nut in its back, and a screw for securing the cushion to the back strap, to keep the latter out of contact with the saddle skirt, and thus prevent the latter from being chafed and marred.

A paper or letter box has been patented by Mr. Harry Stocks, of Lowell, Mass. The invention consists in a box with a side opening and a slot in its bottom, the edges of the slot being turned inward to form flanges, the box being held to the door or casing in such manner that the side opening is closed when the door is closed.

An improved perpetual calendar has been patented by Mr. Thomas A. Bereman, of Mount Pleasant, Iowa. The object of this invention is to show at a glance the different days of the month on which any day of the week occurs, the device to be easily changed to give the same information relative to any month of any past or future year.

An inner sole for boots and shoes has been patented by Mr. Albert G. Gardner, of Portsmouth, O. It is flexible, and has a flexible filling in its center, whereby the "brace" is taken out of the inner sole against the outer sole without damaging the wear, a heavier outer sole may be used, and a more flexible boot or shoe is obtained.

A hot bed sash has been patented by Mr. Charles J. Asimus, of Guttenberg, N. J. The invention covers a novel construction of the mullions or strips dividing the contiguous glasses of the frame, and the means for supporting and holding them, so in case of the rotting or breaking of the mullions or strips they can be readily removed and replaced without disturbing the frame.

A twine holder has been patented by Mr. Reuben Melvin, of Cincinnati, O. In combination with the receptacle for the ball of twine is a band or cord with a weight at one end and a ring or eye at the opposite end, through which the free end of the twine is passed, making a device by which the end of the twine is kept out of the way, but can at all times be reached easily.

A wheel for roller skates has been patented by Mr. Edward F. Johnson, of Jersey City, N. J. The wheel is a combination of saucer-shaped side plates, central block, and leather rim, the latter serving both as felly and tire to the wheel, although instead of leather rubber or other flexible material may be used, making a wheel that is light and cheap, but strong and durable.

A mould and mould hoisting apparatus for building concrete walls has been patented by Mr. Thomas W. Carrico, of San Antonio, Texas. The invention consists in a mould in which a course of the wall can be formed, and in devices for raising the mould for the formation of another course, the construction being novel, and such as will facilitate building operations.

A tobacco mould has been patented by Mr. James M. Gaston, of Louisville, Ky. The invention covers improvements in the construction of moulds, for more readily adjusting them to plugs of different sizes, and also a contrivance for arranging several series of moulds and followers in frames, the series being readily lifted apart after pressing, to facilitate removing the plugs and refilling.

A draught equalizer has been patented by Mr. Benjamin W. Sutherland, of Fillmore, Minn. The

invention covers a novel construction and combination of parts, whereby the draught upon a three horse team is perfectly equalized, the horses are allowed to travel close up to both sides of the pole, side draught is prevented, and the evenness is supported from the ground, with other advantages.

A fire escape has been patented by Mr. Don Juan Arnold, of Brownville, Neb. There is a special combination of cord, drum, high speed brake wheel, brake, and governor, with any approved form of sling, and other devices and attachments, whereby either goods or persons may be lowered from a burning building, the machine being attached near a window, and made ready for use by simply throwing out a rope.

A fire kindler has been patented by Mr. Eugene J. Dunbar, of Romulus, Mich. The invention consists of a coal or carbon kindling made with an exterior film of hard, smooth, resinous matter that incloses the coal or carbon and prevents soiling, but is readily inflammable; this improved kindling has been used for the firing of locomotives, and is obtaining much favor for domestic use.

A device for truing grindstones has been patented by Mr. Chester A. Weller, of New York city. A rigid bed carries a nut plate and screw, a frame sliding in ways and carrying housings, a shaft journaled in the housings having cutter disks with intermediate elastic spaces, with other devices of novel design and combination, for dressing stones by traversing rotary cutters across their faces.

A trunk lock has been patented by Mr. Mortimer C. Ogden, of Brooklyn, N. Y. The lock casing has a raised part with a rim, the mechanism being entirely within the raised part, and not projecting beyond the inner surface of the rim or flanges, the object being to provide a lock which can be secured on the outer surface of the trunk, without the necessity of mortising or cutting the surface of the trunk.

A steam generator has been patented by Mr. James W. Bailey, of Monmouth, Ill. This invention is designed more particularly for steam heating purposes, and covers a novel sectional arrangement whereby the circulation of the water diminishes at a distance from the fire when the fire is low, while steam is still generated near the fire more effectively than it would otherwise be.

A fishing machine has been patented by Mr. Thornton F. Williams, of Cascade Locks, Ore. A wheel with revolving dip nets is mounted on a scow, the supports being arranged on an extension at the stern, and the nets having double inclined chutes for discharging the fish out of each end of the wheel and conveying them into the hold of the scow, the wheel arms having buckets for rotating the nets.

A coffee roaster has been patented by Mr. Napoleon B. Powell, of Versailles, Ill. This invention covers improvements on a former patent issued to the same inventor, the feet that support the shaft and cylinder being so connected by an extensible bar and clamping screw that the roaster will be held from longitudinal movement in the stove oven, and the cylinder can be readily detached from its supports.

A combined fifteen ball pool rack and spotter has been patented by Mr. William A. Tea, of Clyde, Ohio. This invention relates to improvements on a former patented invention of the same inventor, and consists in the construction and arrangement of the parts of the rack, and of the trough or conduit attached to it, and in the attachment of the triangle for spotting, whereby the balls may be accurately and automatically spotted.

A paddle wheel has been patented by Mr. Andrew S. Morrison, of Portland, Ore. This invention provides a wheel which automatically adjusts itself according to the current, the paddles being on two circular frames, of which the inner one is rigidly mounted on the shaft and the outer one is mounted loosely, so that when the pressure is greater on the outer ends of the paddles they will be inclined accordingly.

A heel for rubber boots or shoes has been patented by Mr. Walter Southwick, of New York city. The invention relates to that class of heels where an outer plate of rubber, leather, wood, or roughened metal is used to protect the heel, and prevent the wearer from slipping on ice; the heel is made very firm and strong, is of novel construction, and cannot by any common usage be detached from the bottom or sole of the boot or shoe.

A curve for portable railroads has been patented by Mr. George W. Thomas, of Fuselier Home Place, La. This invention is an improvement on a former patented invention of the same inventor, and consists of two curved rails united by ties, on each end of which curved rail a tongue is hinged; the curve thus formed being placed on a crossing, the tongues are inclined from the ends of the curved rails to the surface of the regular track.

Common Sense Chairs.

Several years ago, about the time Mr. F. A. Sinclair commenced the manufacture of his now world wide known chairs, at Mottville, N. Y., he sent to the office of this paper specimens of his several styles of manufacture. Those first sent have passed away, but others have been ordered from time to time from Mr. Sinclair's manufactory, and the result is that we have had the Common Sense chairs in constant use for many years, and for the piazza, hall, sitting room, or parlor of a country house we know of no kind of seat so comfortable and satisfactory to the user as the Sinclair chair. From a small beginning Mr. Sinclair has built up a very large business, and has added to the production of chairs the manufacture of settees and other seats of double cane or ash splints all mounted in hard wood frames. For hotels and country boarding houses, the Common Sense chairs and settees of Mr. Sinclair are not surpassed by any other class of goods, and parties furnishing country houses and desiring inexpensive, comfortable, and durable furniture will do well to write to Mr. F. A. Sinclair, at Mottville, N. Y., for a copy of his hand book, which contains illustrations of the various articles he manufactures, with a schedule of prices.

Rendering Paper Uninflammable.

Gaspard Meyer, of Paris, France, obtained a U. S. patent July 3, 1883, for rendering paper incombustible, by the adding to the pulp while in process of manufacture into paper, asbestos fiber, mica, flint silicium pulverized, or any other silicate. Mr. Lara, who represents the patentee, has recently arrived in New York for the purpose of introducing the invention in this country, and a few days ago he made some experiments at State Island before representatives of the fire department and a number of gentlemen, who had been invited to witness his exhibition. A small, dry, pine wood building was constructed, the walls and rafters of which were covered with the incombustible paper. After the fire had been kindled the heat was intensified by frequent injection of petroleum and incandescent masses of tar, all of which the building withstood, much to the gratification of those who witnessed the experiment.

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

John Stuart Mill had a pipe sticking around in nearly every tree and nook of his spacious lawn. In his walks he regaled himself frequently with a smoke. He changed his pipe often, but when he struck a superior tobacco like Blackwell's Durham Long Cut, he stuck to it like a philosopher, evolving political economy from the smoke thereof.

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Stephen's Vises. Special size for amateurs. See p. 13.

For Steam and Power Pumping Machinery of Single and Duplex Pattern, embracing boiler feed, fire and low pressure pumps, independent condensing outfits, vacuum, hydraulic, artesian, and deep well pumps, air compressors, address Geo. F. Blake Mfg. Co., 44 Washington St., Boston; 87 Liberty St., N. Y. Send for Catalogue.

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Cyclone Steam Flue Cleaner saves Fuel, Labor, and Repairs. "Investigate." Crescent Mfg. Co., Cleveland, O. Hercules Water Wheel—most power for its size and highest average percentage from full to half Gate of any wheel. Every size tested and tables guaranteed. Send for catalogue, Holyoke Machine Co., Holyoke and Worcester, Mass.

If you want the best cushioned Helve Hammer in the world, send to Bradley & Company, Syracuse, N. Y.

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Stationary, Marine, Portable, and Locomotive Boilers a specialty. Lake Erie Boiler Works, Buffalo, N. Y.

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"The Sweetland Chuck." See ad. p. 44.

Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn. For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.

If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, \$40. Various other foreign patents may also be obtained. For instructions address Munn & Co., SCIENTIFIC AMERICAN Patent agency, 361 Broadway, New York.

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Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y.

Curtis Pressure Regulator and Steam Trap. See p. 12.

Munson's Improved Portable Mills, Utica, N. Y.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 14.

Woodwork'g Mach'y. Rollstone Mach. Co. Adv., p. 13.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 286.

Drop Forgings. Billings & Spencer Co., Hartford, Conn.

Barrel, Keg, Hogshead, Stave Mach'y. See adv. p. 46.

Gear Cutting. Grant, 66 Beverly St., Boston.

We are sole manufacturers of the Fibrous Asbestos Removable Pipe and Boiler Coverings. We make pure asbestos goods of all kinds. The Chalmers-Spence Co., 419 East 8th Street, New York.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

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Hoisting Engines, Friction Clutch Pulleys, Cut-off Couplings. D. Frisbie & Co., Philadelphia, Pa.

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Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Vocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

NEW BOOKS AND PUBLICATIONS.

MODERN HIGH EXPLOSIVES. By Manuel Eissler, Mining Engineer. John Wiley & Sons, New York.

This book is one for the engineer, the contractor, and the manufacturer of explosives—full details of the methods of production being given as a part of the explanation of the nature and power of the various explosives. The production of glycerine is followed, from its first manufacture in a commercial way in 1850 down to the most recent and greatly improved processes; the dangers, and the best protection against them, in making nitroglycerine are pointed out, and the various kinds of dynamite—from those made with infusorial earth and a large percentage of nitroglycerine down through those with lower explosives and chemically combining with the nitroglycerine—are described as to their manufacture, storage and transportation, and effectiveness for various uses. Gun cotton and the fulminating compounds are likewise fully treated, also electricity as applied to blasting operations, many examples being given from well known engineering works and the author's practical experience in mining. The applications of these explosives for military purposes are only mentioned briefly, the design of the work being principally to promote industrial ends, and, by disseminating more correct ideas, render the handling and use of these powerful destructive agents more safe.

THE MATERIALS OF ENGINEERING. By R. H. Thurston. John Wiley & Sons, New York.

This is the third volume of Professor Thurston on this general subject, the present book being devoted to the non-ferrous metals and their alloys—copper, tin, zinc, brass, bronze, etc. It treats generally of the properties of the metals and their alloys, and their manufacture and working, but will be more especially useful for what it says relative to their strength—elastic limits, resistance to compression and transverse stress, etc.—under varying conditions. The volume tabulates and analyzes a great number of tests of brasses, bronzes, and like alloys, made by the United States Government, and by the author personally at the Mechanical Laboratory of the Stevens Institute of Technology.

MODERN FOREST ECONOMY. By J. Croumie Brown, LL.D. Oliver & Dowd, Edinburgh.

This is the eleventh volume of the author on subjects directly connected with that indicated in the title of the present book. He believes in forest culture and preservation, and has especially studied the subject as it is brought to mind by the present and past conditions in England and Scotland, and in the various countries of Europe, as also in South Africa, where he was for some time Professor of Botany at the Cape of Good Hope. The present volume treats of the true elements of forest economy and forest administration, classing the latter as a science of no mean order, and advocating the organization of schools of forestry. It is well worth the reading of those who are now so earnestly urging that something be done to prevent the total destruction of our own forests which is so rapidly going on.

WROUGHT IRON AND STEEL IN CONSTRUCTION. John Wiley & Sons, New York.

A handbook of rules and tables for the strength of wrought iron shapes used as beams, struts, shafts, etc., manufactured by the Pencoyd Iron Works.

METROLOGICAL SYSTEM OF THE GREAT PYRAMID. By F. A. P. Barnard, LL.D. John Wiley & Sons, New York.

This is a reprint of a paper read before the American Metrological Society, in which President Barnard summarizes the tenets of the pyramid faith, and investigates the deductions made by those who thus believe, besides advancing a new theory of his own.

THE METHOD OF LEAST SQUARES. By Mansfield Merriman. John Wiley & Sons, New York.

The elimination of error in numerical observations, and the best method of reaching as nearly as possible absolute accuracy in measurements and computations more or less indirect, is here made the subject of a carefully prepared text book by the Professor of Civil Engineering at the Lehigh University. It has been the endeavor of the author to present this by no means simple subject in a manner so plain and direct, that civil engineers who have not extended mathematical training may be assisted thereby, and the numerous practical examples given afford a comparatively easy road to the acquirement of such knowledge of the higher mathematics as is essential to the engineer, while the book is one in which the industrious student will make rapid progress.

Notes & Queries

HINTS TO CORRESPONDENTS.

Name and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

References to former articles or answers should give date of paper and page or number of question. **Inquiries** not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or mail, each must take his turn.

Special Information requests on matters of personal rather than general interest, and requests for **Prompt Answers by Letter**, should be accompanied with remittance of \$1 to \$5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each. **Minerals** sent for examination should be distinctly marked or labeled.

(1) O. K. L. asks: Can water 80–90° Fah. be forced by means of a hydraulic force pump under pressure 70–80 pounds into the pores of wood which has been cut across the grain in blocks a quarter of an inch thickness and put in an air tight copper or iron vessel? If so, how long a time would it take for the water to reach the center of the blocks of wood a quarter of an inch thick? Would exhausting the air from the vessel (and so in part from the wood blocks) before permitting the water to come in, facilitate the penetration of water subsequently forced under hydraulic pressure, as before described? A. Water should penetrate the blocks of wood, under the circumstances mentioned, in a few minutes. The air in the wood would be compressed to about one-fifth its volume, and would be absorbed by the water, which might take several hours. If the compression is only for a few minutes, it is possible that the air, not being absorbed, would drive out part of the water by its expansion. Exhausting the air at first would insure the immediate penetration of the water under pressure. Fill the vessel with steam, and allow it to condense; this will probably produce sufficient vacuum.

(2) T. P. Y. asks: What kind and size of pipe is best to lay from a spring of ordinary soft water, 80 rods distance and 25 feet fall, for family and barn use? Will it be best to take a slight curve from a straight line to save a sag, or not? A. The size of pipe depends upon the quantity of water you may require and the capacity of the spring; 1 inch pipe will give a constant flow of 5 gallons per minute, 1½ inch pipe 9 gallons per minute, 1¾ inch pipe 15 gallons. A galvanized iron pipe is best. It will make no difference about the sag, except as every bend from the straight line increases the friction, and this would not be saved by laying the pipe in a circuitous line.

(3) F. W. F. says: I have a flat iron casting about three feet long and two wide, which represents in relief the siege of Troy. Can I cover this with a film of metallic copper or treat it with any solution to make it resemble the bronze so much admired? A. You will find a description of Process for Bronzing Iron in No. 235, SCIENTIFIC AMERICAN SUPPLEMENT, No. 28.

(4) A. B. wants to know how best and cheapest to get rid of partially decayed pine and oak stumps, and cheap and simple device or implement for pulling them? Or is blasting cheapest and best, reducing them to fragments so they can be hauled and burned? A. A wooden lever with three clevises, chains and hooks makes a simple and easily arranged device for pulling stumps. For blasting them see SCIENTIFIC AMERICAN, December, 1, 1883, page 341.

(5) R. M. H. says: 1. Providing the slide valve on a locomotive has a certain lead, can lead be either increased or decreased by any other means than by slipping eccentric? A. We understand that it cannot except by altering the construction of the valve. 2. Has the reversing lever any other control over the valve than its name implies, and to regulate the throw or travel of slide valve, independent of any influence on lead? A. The reversing lever regulates the amount of the throw of the valve or cuts off the steam when on center, having no control over the lead.

(6) P. T. asks the best mode for pumping out a lake containing about 250,000 cubic yards water, the kind of pump to be used, amount of horse power to accomplish certain results, cost of pumps, etc. A. A pump and boiler capable of pumping out your lake in 50 days of 20 hours each will cost about \$1,000 in New York. Boiler 12 horse, steam cylinder 8x12, water cylinder 10x12. Much depends upon how high the water has to be pumped and length of pipes required, which for such a pump should be 6 inches suction, 4 inches force.

(7) J. E. T. says: I have been trying to do a little tinning, such as dipping table cutlery in a pot of melted block tin, and have met with rather poor success. My melted tin seems to be too thick, and will not run off smooth, but leaves the knife rough. How shall I make the melted tin thinner or run smooth on article tinned? A. You may have used your tin bath too long. The tin absorbs a little iron, or it may be too cold. A little powdered sal ammoniac sprinkled on the surface tends to clear it.

(8) J. F. L.—Water meters are read in the same manner as gas meters. The 1st dial is cubic feet up to 100; 2d dial is cubic feet by 100 for each figure; 3d dial 1,000 cubic feet for each figure, and so on to the 6th, each dial indicating 10 times the amount of the whole of the preceding dial. Always read the figure behind the index in the direction that it moves. The index hands alternate to the right and left in their motion to accommodate the plan of gearing.

(9) J. L. asks if water impregnated with sulphur will be injurious to steam boilers, and how to determine whether sulphur is present in the water. A. Yes. The sulphur combines with the iron, making it

brittle. If you suspect sulphur in the water, you may detect it by the smell of bad eggs. If there is too little to detect in this way, boil a clean piece of silver (quarter dollar) in some of the water; sulphur turns it black.

(10) M. M. W. asks if there is any preparation of metal in liquid form of unlimited supply that is cheaper than quicksilver? A. There is none.

(11) J. P. says: I want to cast a number of small bells not exactly the usual shape, and cannot use copper because it requires too much heat to melt it. What combination of metals of low fusing point can I use, and is there any process of making the base metals sonorous? A. You cannot make any combination of metals properly sonorous at a low fusing point.

(12) E. C. H. asks about mica and isinglass. Can they be bent or moulded into any shape? Do they stand a high degree of heat when applied in the form of water or steam? Is there any work published which treats of these articles? A. Mica is the proper name for isinglass. It is a silicate of alumina, with a little potassa. It is not plastic or capable of being moulded. It will stand any heat below red. In steam and boiling water it is disposed to become opaque by dissolving of potassa from the surface. See Dana's Mineralogy for a description and analysis of all kinds of mica.

(13) C. F. A. asks: What is nickel, and where does it come from? Please give a short account of it. A. Nickel is a metal first known more than a hundred years ago. Its ores are mined the same as iron, copper, etc. It mostly comes from Germany, France, and England. There are mines in the highland range in the State of New York, and other places. It has also been found in small quantities in the meteorites that fall upon the earth.

(14) C. B. R. asks the name and character of insects sent; they were found attached to a rope swing on a scrub oak tree. A. The specimens are the larvæ and pupæ of the Twice-stabbed Ladybird (*Chilocorus bivitatus*; family Coccinellidæ), a common and very useful little beetle, preying as larva and imago on plant lice and scale insects. The larva is easily recognizable by its body being covered with very stout, long, black, prickly spines, the perfect beetle being black with a red spot on each wing case. The specimens evidently attached themselves to the rope to undergo their transformation.

(15) I. K. asks: 1. What is the surest way for a family to find out if there is any sewer gas in their house? A. Sewer gas has a peculiar pungent, sickening odor; when once familiar with it a person will readily recognize it in a house. The surest way is to have a reliable plumber examine the premises. If you cannot trust a plumber, obtain the services of some of our sanitary engineers or experts. 2. What is the best way to clean or renovate old steel engravings? A. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 44, 115, 124, for directions for cleaning old steel plate prints.

(16) W. S. asks where one can be educated for civil engineering, and what primary learning is required. A. There are special courses of civil engineering at the School of Mines of Columbia College, and also at the College of the City of New York. The great school of civil engineering in the country is the Rensselaer Polytechnic at Troy, N. Y. The requirements vary with the institution, and can be ascertained by consulting the catalogues. These can readily be procured by application.

(17) S. E. C. asks a recipe for making sulphur soap? A. Take half a pound white curd or castile soap (recent), 1 ounce best flowers of sulphur (levigated), 1 fluid ounce rectified spirit (strongly colored with alkane), and sufficient attar of roses to strongly scent the mass. Beat the whole together, to a smooth paste, in a marble or Wedgwood mortar. The spirit and coloring matter may be omitted at will, and as a toilet soap one-half the above quantity of sulphur will be found sufficient.

(18) A. B. J. asks for a solution or dip that will give luster to tinned articles. A. Tin may be cleaned by a rapid scouring with potash lye and a rubbing with a hard substance. Sometimes dipping into hydrochloric acid is beneficial, but the first operation is generally necessary. Answer to query 8 in the SCIENTIFIC AMERICAN for May 10, 1884, gives some information on this subject.

(19) D. S. writes: The elm with us is infested by some insect; a majority of the leaves are like the one I inclose herein. What are the cause and remedies for it? A. It is impossible without better specimens to say precisely what the insect is, but we think likely that it is the canker worm, which injures the elm as well as the apple tree. The most approved remedies are as follows: To prevent the pests from going from tree to tree, a band of canvas or paper is wrapped around the trunk and besmeared with tar or a mixture of tar and molasses, which must be frequently applied; or a band of rope or closely twisted hay is put around the trunk and over this a tin band about 4 inches wide, so placed that the rope shall be at the middle of the two, in such a manner that there will be a cavity below and a free edge above it. If these insects are prevented from ascending the tree, they will deposit their eggs below the obstruction and near it, and the eggs can be destroyed by a single application of kerosene oil. This should be done about March in this latitude, and earlier further south. If the worms have been permitted to hatch, as soon as they are large enough to be seen jar them from the trees and sweep away with a pole, as they hang by their threads, and burn or otherwise destroy them. If the worms have matured and gone into the ground for winter quarters, plow the ground late in the fall so as to expose the pupæ to frost and to their natural enemies. See also Professor A. S. Packard's article on the canker worm, page 304 of SCIENTIFIC AMERICAN SUPPLEMENT, No. 19.

(20) U. M. F. Co. ask for a cement that will set almost instantly for uniting leather together. A. Gutta-percha dissolved in carbon disulphide to form a mass of treacly consistence forms a very good cement for splicing leather. The parts to be joined must be thinned down, a small quantity of the cement is then

poured on each end, spread so as to thoroughly fill all the pores of the leather; the parts are warmed over a fire for a few minutes, applied quickly, and hammered well together.

(21) J. E. N. writes: I make a "burnish ink" for shoes of extract logwood, potassa bichromate, and copperas which does not strike in deep enough. Can you suggest the addition of anything, that is cheap, that will make it bite well, or can you furnish a good formula? A. The following are the proportions of an ink similar to your own, but perhaps it may give better results: Make a strong decoction of logwood, preferably in soft water, by boiling; then add iron sulphate, at the rate of 2 ounces to the gallon, with half an ounce each potassium bichromate and gum arabic. Powder the last three ingredients and even the logwood if you like, as it will take the color out quicker; or you can use the prepared extract of logwood at the rate of 1 ounce to a gallon of water. A solution of iron sulphate in 12 times its weight in water is used sometimes. See also SCIENTIFIC AMERICAN SUPPLEMENT, No. 157, for formula for shoemaker's ink.

(22) K. S. N. L. Co. write: We are experimenting with paints, Japans, etc., in our nut locks, to prevent rust, and have been recommended to you for the name of any paint or any combination of chemicals, or receipt, which when applied to iron will prevent or in a large measure do away with rust. A. The following by M. Zein is worthy of trial: Mix 80 parts pounded brick, passed through a silk sieve, with 20 parts litharge; the whole is then rubbed up by the muller with linseed oil, so as to form a thick paint, which may be diluted with spirits of turpentine. Before it is applied the iron should be well cleaned. From an experience of two years upon locks exposed to the air and watered daily with salt water, after being covered with two coats of this mastic, the good effects of it have been thoroughly proved. See also article on "Varnishes for Protecting Iron," SCIENTIFIC AMERICAN SUPPLEMENT, No. 226.

(23) J. N. says: An artesian well, one foot in diameter, throws 25 gallons per minute, and the overflow will all run through an inch pipe. Now, if I drive an inch and a half pipe down to the same depth, close by, can I expect the same overflow, that is, will as much water run over the top of inch and a half pipe as will run over the top of a foot pipe, the other conditions being alike? A. No. The friction in the 1½ inch pipe will slightly retard the flow; otherwise much depends upon the freedom of the opening at the bottom. A 2 inch pipe will be better, and will yield a full flow with a strainer and perforated section at the bottom.

(24) F. G. asks: What are the ingredients of what are called "aniline" colors or "French water colors," "Egyptian colors"—all of the same nature? A. These colors are simply solutions of aniline dyes, many of which can be directly dissolved in water, while others are soluble in alcohol. A little gum water can be added to give consistency if necessary.

(25) R. H. asks the receipt for making the composition called star metal, used for car bearings. A. The composition of the star metal as sold by dealers is only known to those that make it. The following is as near as possible to the composition, and suitable for heavy bearings:

Copper.....	1 part by weight.
Tin.....	10 " " "
Antimony.....	1 " " "

This can be varied to suit almost every requirement by adding tin.

(26) S. & T. say: Having a reservoir full of water and a certain size of pipe out of bottom running down a hill, will more water be discharged 200 feet below than will be at 100 feet, say a 1 inch pipe throughout? The question is whether the additional fall will cause the water to enter the 1 inch any faster in the one case than the other. Should not the inlet be larger? A. If lengths between each station are the same, no more water will be discharged at 200 feet than at 100 feet. Make the upper section larger for more flow at the bottom.

(27) F. C. C. desires us to inform him the best and safest engine for light work, such as to run coffee mill, sewing machine, pump up small amount of water, etc.; something cheap but good and particularly safe, and where to purchase it; something that would be safe in the hands of a lady or young girl. A. There are several forms of gas engine, which, as well as the hot air engine, are safe, and not very expensive.

(28) J. H. writes: I have a lot of cotton stockings which when worn color the feet, the dye coming out; they have been washed and boiled to no effect. Will you please tell me how to fix the color? A. We know of nothing to recommend you. The coming off of the coloring material is an evidence that an inferior quality of dye was used. Colored hosiery should be put into a strong solution of salt and water, and dried in the shade or in a heated room before use. Wash on the wrong side in lukewarm water with pure soap, perfectly free from acid, rinse well in clean cold water, and then dry as previously stated.

(29) T. F. B. asks for some practical work giving instruction in the art of wood engraving for a lad who has an inclination in that direction. A. There are no books of any real value to a beginner in this direction; it requires a pretty long apprenticeship, and is very tedious work, and then success or failure depends largely upon the natural capacity of the individual for this peculiar work.

(30) J. F. K. asks the highest boiler pressure the government allows to be carried. A. This is for the government inspector to decide, according to the build and strength of the boiler, and the use to which it is put. There are no specified limitations.

(31) J. H. P. asks if there is any known method of softening raw ox hide, so that it can be moulded into any shape, and then will recover or assume its original strength, without becoming stiff and brittle like glue. A. There is not, except by tanning, and that gives the substance a decidedly different nature; all ox hides, when dry, are naturally stiff and