

## RECENTLY PATENTED INVENTIONS.

## Engineering.

**ROTARY ENGINE.**—Julius M. Farmer, New York City. A revolving disk secured to the main driving shaft carries sets of two cylinders each placed diametrically opposite each other, and connected by a piston rod carrying a crosshead held to slide on a fixed pin arranged eccentrically to the revolving disk, a steam chest being formed on the bearing of the disk and connected by ports with the sets of steam cylinders.

**METALLIC RAILROAD TIE.**—George W. Thompson, Sag Harbor, N. Y. This invention is an improvement on tubular metallic ties having bearing blocks within the rail-bearing portions, and provides for inserting the bearing blocks in the ends of the ties after the inner bolts have been applied, the heads of the bolts abutting against the sides of the blocks and holding them in position.

**RAILWAY SPIKE.**—Thomas A. Davies, New York City. This invention covers an improvement on a spike formerly patented by the same inventor, and provides means whereby the spike when driven will be guided diagonally of the tie, its bottom edge being formed to gather the wood fibers and cut them evenly and cleanly.

**CUSHION FOR RAILROAD RAILS.**—Thomas A. Davies, New York City. This is a hard metal plate having one face covered with soft metal, designed to be placed between the rail and tie, whereby the wear of the fish plates by the abutting ends of the rail sections will be avoided, and the loosening of the joints thereby prevented.

**FLOOD GATE.**—Jacob Erkmann, Enfield, Ill. It is made with two hinged gates, each provided with roller and inclined ways therefor, a latch for locking the gate, the latch being provided with a float, the construction being such that the gates will open automatically as the water rises and close as it falls, while the gate is not liable to be opened by stock.

**BOAT.**—Franklin M. Smith, Leaper, Ohio. The hull is made of a waterproof endless web, with paddle sections upon the outside of the web, and endless chains with plates upon its inside, in connection with a pair of shafts with sprocket wheels, the hull itself supplying the means of flotation, while the web constituting its body revolves around the sprocket wheels like an endless belt to supply means of propulsion.

**CHAIN PROPELLER.**—Franklin M. Smith, Leaper, Ohio. In this propeller paddles are attached to endless chains passing around sprocket wheels, the paddles being braced and held in proper position to secure a hold upon the water, and also enabled to travel around the sprocket wheels with the least friction and cramping strains.

**WELL SINKING MACHINE.**—Chester A. Overtun and Oscar E. Ingersoll, Bliss, Neb. This invention covers a specially constructed sliding support for the tubing of a drilling tool and a perforated pipe forming part of the boring tube and covered by a shell adapted to be cut and raised after the well is sunk to the proper depth, the device effectively furnishing water for the work of the drill.

**UNLOADING CARS.**—John Scully, South Amboy, N. J. This invention covers an improvement on a machine for such purposes formerly patented by the same inventor, whereby the shovels may be shifted sidewise upon a stationary supporting frame for carrying them to different positions in a car, and from one track to another.

## Agricultural.

**FERTILIZER APPARATUS.**—Stephen V. Mills, Richfield, Pa. A receptacle containing chemical absorbents is connected by pipes with a trough located in the farmyard and a collecting box in the stable, for collecting the liquid manures and converting their valuable properties into drill fertilizers, while preventing overfermentation, etc., of the solid manure of the farmyard.

**HOE.**—John M. Hefner, Marietta, Texas. The hoe is formed with a curved neck, made broad or deep and thin, with a straight sharp cutting edge, thus forming an upper, thin, independent blade, capable of being filed or sharpened, and making the implement a practically double-bladed one, the cutting edges of the two blades being in crosswise relation with each other.

## Miscellaneous.

**BREECH-LOADING FIREARM.**—Elmore A. Harris, Norwich, Conn. The barrels of this firearm are placed one above the other, there being two rifled barrels, or two shot barrels, or one of each, a trunnion extending from each side of the web connecting the barrels, these trunnions resting in horizontal slots formed in side plates of the stock, while there is a novel arrangement of extractors and firing pins.

**PROJECTILE.**—Hugo Bischoff, Berlin, and Armand Mieg, Leipsic, Saxony, Germany. The projectile is made of a hard metal casing containing lead or similar material, while a guide ring of soft metal is forced into the hard metal casing, to guide the projectile through the barrel without injuring its grooves.

**POUNCING FELT.**—Henry G. Wolcott, Matteawan, N. Y. This invention consists in a rapidly revolving flap-like beater for pouncing or finishing irregular shaped articles of felt, by subjecting them while on their lasts to the action of the beater, the flaps or surfaces of which are of a granulated, cutting, and abrading character.

**STENCILING MACHINE.**—John A. C. Hamill, Racine, Wis. It is for stencilizing a pattern on a continuous web, the machine consisting of a perforated cylinder held over a fixed table over which passes the web to be stencilized, while a brush is held in contact with the inside of the cylinder to brush a color or other substance through the perforations.

**JUTE STRIPPING MACHINE.**—William Menzies, Paterson, N. J. The machine comprises a set of crushing rollers for breaking the butts of the stalks, a revolving drum and a draw frame working in an opening thereof for drawing the crushed butts and the butt fibers down into the inside of the drum, the principal part of the fiber being stripped by the revolution of the drum and wrapped around its outer surface, the machine having various other novel features and being also designed for stripping other fibrous plants.

**BUTTON MACHINE.**—Clyde J. Coleman, of Gideon, Kansas. This is a machine for threading staple fasteners to buttons and passing the fastener-threaded buttons to a shuttle, which, when filled, will be adjusted to another machine, which secures the buttons by the fasteners to the vamps of boots or shoes or other articles, the machine working automatically.

**SASH BALANCE.**—James H. Jenkins, Thomasville, Ga. This invention covers a novel method of balancing one sash by the other, dispensing with box frames, cords, weights, and pulleys, and whereby the upper sash may be held at various points of suspension for ventilating purposes.

## 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.

I have applied for a valuable Patent and want some assistance to introduce and manufacture same. For particulars address "Patent," Baltimore, Md.

Air compressor for sale cheap. Also steel tanks, iron rail cars, etc. Address The Buffalo Wood Vulcanizing Co., Buffalo, N. Y.

Pratt & Letchworth, Buffalo, N. Y., solicit correspondence relative to manufacturing specialties requiring malleable gray iron, brass, or steel castings.

For the latest improved diamond prospecting drills, address the M. C. Bullock Mfg. Co., Chicago, Ill.

Link Belting and Wheels. Link Belt M. Co., Chicago.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

Perforated metals of all kinds for all purposes. The Robert Aitchison Perforated Metal Co., Chicago, Ill.

The Holly Manufacturing Co., of Lockport, N. Y., will send their pamphlet, describing water works machinery, and containing reports of tests, on application.

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

Safety Elevators, steam and belt power; quick and smooth. The D. Frisbie Co., 112 Liberty St., New York.

"How to Keep Boilers Clean." Send your address for free 96 page book. Jas. C. Hotchkiss, 120 Liberty St., N. Y.

The best Coffee roasters, coolers, stoners, separators, polishers, scourers, glossing apparatus, milling and peaberry machines; also rice and macaroni machinery, are built by The Hungerford Co., 63 Cortlandt St., N. Y.

Pays Well on Small Investment.—Stereopticons, Magic Lanterns, and Views illustrating every subject for public exhibitions. Lanterns for colleges, Sunday schools and home amusements. 152 page illustrated catalogue free. McAllister, Mfr. Optician, 49 Nassau St., N. Y.

For best quality, order your steel castings from the Buffalo Steel Foundry, Buffalo, N. Y.

Wardwell's patent saw benches. All sizes in stock. Rollstone Machine Co., Fitchburg, Mass.

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

Duplex Steam Pumps. Volker & Felthousen Co., Buffalo, N. Y.

Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.

## NEW BOOKS AND PUBLICATIONS.

**CHEMICAL LECTURE NOTES.** By Peter T. Austen, Ph.D., F.C.S., Professor of General and Applied Chemistry, Rutgers College, and the New Jersey State Scientific School. John Wiley & Sons, New York, 1888. Pp 96. Price \$1.

In this admirable little work the general subject of chemistry is most graphically treated, and what is ordinarily considered a very dry branch of science is, by the distinguished author, made vivid and interesting. The powers and extent of the science, rather than its limitations, are dwelt upon, and in the text a prophetic view of what chemistry will yet achieve is included. A reproduction of the table of contents will show how completely the subject is covered, and it gives some idea of the condensation to which the matter has been subjected. The book is one for both student and professor, and representatives of both classes may be certain that they will find much new matter in it.

**MODERN HELIOGRAPHIC PROCESSES.** Manual of Instructions in the Art of Reproducing Drawings, Engravings, Manuscripts, etc., by the Action of Light. Thirty-two illustrations on wood and ten specimen heliograms. By Ernst Lietze, M.E. D. Van Nostrand Company, New York, 1888. Pp. viii, 143. Price \$3.

This work is pre-eminently a practical one. After a short treatise on the theory of the subject and classification of the processes, the practical portion of the work begins. The qualities of paper, methods of sensitizing, apparatus and its use, and the question of exposure are all treated of. Then the different processes are treated, including those with silver, iron salts, and chromium and uranium salts. A very practical table giving commercial and scientific factors of photographic chemicals and a copious index add to the volume of the book. The specimens of heliograms produced by different methods are very interesting. The other illustrations show typical apparatus of the advance type.

## Notes &amp; Queries

## HINTS TO CORRESPONDENTS.

Names 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 in this department, each must take his turn.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(61) C. W. W. asks: Is it the custom in the building of high chimneys, say one of 250 feet, to make the flue larger at the top than at the bottom? If so, please state reason. A. Chimneys have been built with a slight inside taper, smaller or larger at top. They are the exception. Parallel or straight on the inside is the general and best practice.

(62) P. W. G. writes: Referring to your issue of October 13, 1888, article on alum baking powders: 1. Is the formula given in avoirdupois or druggists' weight? A. The grain is the same in all systems. The ounce alluded to is the apothecary's or Troy ounce of 480 grains. 2. And what is the meaning of the characters thus, 3ij, at the right of the bicarbonate of soda ounces? A. The characters read, "three drachms."

(63) J. S. S. writes: In your issue of October 6, 1888, an article entitled "Manufacture of Light without Heat" says: "The means adopted was the oscillatory discharge of a Leyden jar, whose rate of vibration has been made as high as 1,000 million complete vibrations per second." 1. Is it possible to count as high as 1,000 million complete vibrations per second? If so, with what machinery can it be done? A. The "counting" is not done mechanically, the velocity and number of waves and their length are deduced from experimental observation coupled with mathematical deduction. As a parallel case, consult any good book on physics and see how the number of light waves per second is determined. 2. Can light be produced without heat? If it can, please give an instance. A. Probably not. It never has been hitherto.

(64) A. H. G. writes: 1. What do professional singers use to clear the throat before commencing to sing? Or what is the best known remedy for this purpose? A. Chlorate of potash or common salt may be dissolved in water and used as a gargle. It is far better to use nothing. A person whose throat troubles him when singing probably sings incorrectly, not using the abdominal muscles properly. 2. What should be eaten the last meal before singing? A. Different singers follow different customs. A good meal about two hours before singing is a common sense rule. Apples are considered good, also raw or soft boiled eggs.

(65) E. W. C. writes: 1. Would it be more advisable for a student of mechanical drawing to study books or go into an office? A. You should first study and then try to get a position in an office. 2. If to study books, what to study, and where to get them, estimated cost, etc.? A. We can supply you with many excellent works by mail. We name a few. "Mechanical Drawing Self-Taught," by Joshua Rose, \$4.00. MacCord's "Easy Lessons in Mechanical Drawing," \$2.50 and \$3.50. "Mechanical Drawing" prepared for the use of students of the Mass. Institute of Technology, by Faunce, \$1.25. 3. Are there schools where mechanical drawing is a specialty? A. Mechanical drawing is taught in all of the principal colleges and in many public and private schools all through the United States. Mechanical drawing alone is hardly enough to be called a specialty.

(66) E. A. D. asks: 1. How many standard sixteen candle power (Edison) lamps may be used on the dynamo described in SUPPLEMENT 600? A. The dynamo will run six or eight lamps. 2. Give the measurements by which the machine, if not sufficiently powerful, may be increased in power to use sixteen standard lamps on it? A. Make it one quarter larger in all its lineal dimensions and use one size larger wire. 3. Have you any book on electric lighting? If so, give price. A. We recommend and can supply you with Thompson's "Dynamo Electric Machinery." Price \$5. Herring's "Principles of Dynamo Electric Machines." Price \$2.50. Also Atkinson's "Treatise on Electric Lighting." Price \$1.50. These are all recent works. 4. Is there an explosive called extralite, a later invention than bellite? A. For bellite we refer you to SCIENTIFIC AMERICAN, vol. 56, Nos. 17, 20, and 22. We have no information concerning extralite.

(67) B. R. W. asks the cause of polarization and rapid running down of all forms of the sal-ammoniac batteries. A. The reaction is usually expressed as follows:  $Zn + 2NH_4Cl = ZnCl_2 + 2NH_3 + 2H_2$ . The hydrogen goes to the carbon electrode or prism and quickly polarizes the battery. The porous cup in the Leclanche couple is filled with binoxide of manganese and graphite. The former is reduced by the hydrogen, and thus prevents polarization. The reaction is as follows:  $2MnO_2 + 2H = H_2O + Mn_2O_3$ . Where no depolarizer is used the large surface of the carbon is relied on to prevent too quick polarization, when the depolarization is due to the escape of the hydrogen.

(68) R. E. S. asks (1) if a U-shaped tube, with one arm twice the diameter of the other, is half filled with mercury, and the pressure of the atmosphere is removed by placing the tube in vacuum, will the weight of the mercury in the larger arm raise the mercury in the smaller arm, or will it retain its level? A. The mercury will retain its level in both tubes entirely irrespective of atmospheric pressure. 2. Is there any substance which is a conductor of electricity, that can-

not be destroyed by fire (except metal)? A. No; graphite is destroyed by fire only with great difficulty, and is a conductor, though not a good one.

(69) C. F. G. asks: Could any one get a good knowledge of law by studying at leisure time? What law books would be necessary, and where could he get such books? A. Study without court and office practice would be a very imperfect way of learning law. We can supply you with the books free by mail at regular prices. Blackstone's "Commentaries" is the first book to read. This we can supply for \$7.50.

(70) A. B. asks: When it is 12 o'clock noon at Washington what will be the time at other places? A. Ascertain longitude of other places, then for every 15 degrees west of Washington subtract one hour and for every 15 degrees east add same. For every 4 minutes longitude allow one minute time, and for every 4 seconds longitude allow one second.

(71) D. J. W. asks what process cast iron goes through, to give it the appearance of oxidized brass. A. A bronzed surface may be produced on clean iron surfaces or articles by exposing to the vapors of a heated mixture of equal parts of hydrochloric and nitric acids for a few minutes, and then heating the articles to about 600° Fah., to continue until the desired color appears. The objects are then to be cooled and rubbed with vaseline and heated until the latter begins to decompose. If not deep enough in color, repeat the last operation. A bronze colored oxide coating is also obtained by adding acetic acid to the above mixture, with variations in depth of color by varying the proportions of the acids. For the method of applying the "Tucker bronze" so much used on cast iron trimmings, see SCIENTIFIC AMERICAN of August 9, 1884, page 24. Also see "Techno-Chemical Receipt Book" for a variety of receipts for bronzing, browning, and blacking iron and other metals, which we can mail for \$2.

## Enquiries to be Answered.

The following enquiries have been sent in by some of our subscribers, and doubtless others of our readers will take pleasure in answering them. The number of the enquiry should head the reply.

(72) Will you please inform me through the SCIENTIFIC AMERICAN if there is a spring, fountain, or lake where petrifying is done? And if there is such a place, where is it? And how long will it take to petrify a cubic inch?—K. C.

(73) Will you kindly inform me the electrical horse power and internal resistance of an accumulator whose capacity is 2 volts and 135 ampere hours? The rule? What is the resistance of an incandescent lamp, 16 candle power, 110 volts, six-tenths of an ampere? Is there not a difference in the resistance of an incandescent lamp hot and cold? I have a small arc light dynamo of five lamps capacity in my store. Can I charge a set of storage batteries with it while it is sup lying current for the lamps? If so, how must I connect them? What instruments must I use, if any?—C. W. F.

(74) I write to ask you if you can give me a little idea as to best way and method, together with the formulas for making bromide prints. I have long sought a good method for so doing, but have never succeeded with them to any satisfaction.—E. A. B.

(75) Please let me know what metals to use and what size strips, and how to put together to make a regulator bar for an egg drawer to an incubator to hatch eggs. Want to set it so that it will work from 100° to 108°, and if heat gets more, so that it will work valves open and turn check burner to lamp. Let me know particularly in regard to making bar, etc.—L. M. C.

(76) Will you inform me through your columns whether there is a relief valve made that will take off back pressure when exhaust is used to heat dry kilns with? Also whether a smaller sized pipe can be used in the kiln than the exhaust pipe from engine, without creating back pressure. How near should fire wall in furnace be to shell of boiler, and whether it should be curved on top or straight?—F. R.

(77) Will you kindly inform a reader of your paper, of a way to recover silver from waste paper and filtering cottons? Also how to take a negative, to use for an etching print direct from a photograph, without drawing.—G. A. T.

(78) Please give me a receipt or method for making gas burn red. I wish to use the receipt for our Christmas tree festivities.—D. A. R.

(79) Can we run a 30 h. p. engine, eight hundred feet from boiler, with 3 in. pipe, by burying it in sawdust or earth, and what pressure should we have on boiler to get 30 h. p. from a 12 by 18 engine? Give us any further information regarding the above that you can.—K. & W.

(80) We have lately erected an iron smoke stack which stands 10 or 15 feet higher than any of the surrounding buildings. Should any precautions be taken to protect it from lightning or to prevent it causing discharges dangerous to the attached and surrounding buildings?—G. A. S.

(81) 1. Is there any way of preventing patent leather from cracking? 2. Is there any way of closing the cracks if the leather is already cracked? 3. In intimately mixing dry powdered niter (6 parts by weight), sulphur (2 parts) tersulphuret of antimony (1 part), is there any danger of an explosion?—S. P. P.

(82) Would you please answer and explain the correct answer to the following problem? Does it require any more power to raise a weight from the ground by means of a rope while standing on a platform 30 feet high than it requires when you are on the ground close to it, provided the total weight raised and all other conditions remain the same in both cases?—J. C.

(83) We have had a discussion as to who invented the telephone. Please inform us as to who did invent it.—C. D. M.

(84) What is a wheel used by lapidaries for cutting hard stone or metals made of, and how is it used?—F. E. W.

(85) Our dwelling has an exposed wall which is damp inside, especially in rainy weather. It is covered with a coat of roughcasting (mortar), but does not seem to have the desired effect. Will you inform me of a remedy for this dampness, excluding wood?—A. J. C.

(86) Will you kindly inform me the method and machinery used in preparing the wood for the manufacture of matches, and wood best adapted for the purpose?—M. C. H.

(87) We have a hot water heating apparatus in our establishment. Any time in cold weather when fire is rushed we can turn air cock on a radiator and obtain a gas, igniting and burning with the characteristic hydrogen flame. The boiler manufacturer says this water gas whenever there is a good hot fire. May not steam boilers manufacture this same gas, and would that not be one of the reasons of the many unaccountable explosions?—F. S. W.

(88) I have nearly completed an electric motor one-half size of one you described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 641. Will you please inform me how many volts electromotive force will be required to operate it?—J. M. A.

(89) The size iron wire to use on an induction coil 6 inches in length, also the size copper wire and how many coils each way. Is a No. 2 Grenet battery sufficient to operate a coil of that size?—W. S. P.

(90) How is granite iron or tin ware made, that is, how is the color and gloss put on, and can other colors, such as red, blue, or white, be put on in the same way? And is there a patent on making such wares?—T. G. A.

(91) I have some galvanized wire netting nailed on frames on which I dry glue. The galvanizing has worn off and the wire rusted, and I want to find some solution with which to cover the wire to keep rust off the glue. Can you give it to me? Of course I could have it regalvanized, but the expense of taking wire off frames and nailing on again is too much.—W. H. B.

(92) Can I work 25 gallons silver solution with 3 cells of Wollaston batteries containing 4 gallons each, zinc to be 6 by 18 inches? Copper plates the same size. How can I produce a bluish black on brass that will be durable? I have seen some that was copper plated, and that was blacked, especially on smoke jacks of lamps in cars. Is it absolutely necessary to quick articles of brass or copper before placing them in bath, in order to produce good results?—S. B. R.

(93) 1. What is the first thing that moves on the locomotive, the valve or the piston, after the steam is admitted, that is, after the throttle is opened? 2. What moves first, the crossheads or the engine (locomotive)? 3. Place the engine on the back dead center, right side, with the reversing lever down in the corner (forward motion), now reverse the lever to the extreme back motion (but do not move the engine), is the valve on the right side in the same position as it was before she was reversed?—A. M. S.

(94) 1. I have a telephone line about 1/4 of a mile, of No. 30 hard phosphor bronze wire. Will you tell us if that size wire (phosphor bronze) will carry current enough from battery, or the magneto call bell, to ring a bell at that distance? 2. How many cells, say the largest, of Dr. Gassner's dry battery will it require to instantly heat a No. 30 platinum wire to white heat?—C. B. H.

(95) How many, and what, are the constant movements of the ocean's water?—S. P. E.

(96) What is the horse power of 200 gallons of water per minute over a 25 ft. fall, and what would the same be of a 50 ft. fall?—L. M. M.

(97) Please inform me which side of a belt is proper to turn next to a pulley—the smooth side or rough?—A.

Replies to Enquiries.

The following replies relate to enquiries recently published in SCIENTIFIC AMERICAN, and to the numbers therein given:

(1) In issue of December 23, (1) G. W. asks for a recipe for hardening soles of shoes. If a pair of new shoes has the soles made warm by holding them near a fire or stove, and then varnishing them with copal varnish, drying them, warming, and applying a second and third coat, the leather will become waterproof, and very hard, lasting about twice as long as if not thus treated.—D. P.

(15) Speed of House Fly.—The maximum rate of speed in flight of the common house fly (Musca domestica) is 53-35 meters per second.—R. B.

(32) Preventing Condensation of Moisture on Tin Roofs.—A tin roof should have placed under the tin a layer of shoddy sheathing paper, such as is used to make into tarred felt, but without the tar. This will prevent the condensation of moisture upon the lower side of the tin. The tin should be thoroughly painted upon both sides with Prince's metallic paint and linseed oil, half boiled and half raw. More tin roofs are destroyed by condensed moisture upon the lower, unpainted side of the tin than in any other way.

(33) To Prevent Dripping Ceiling.—Use tarred paper between tin and ceiling boards. This will tend to overcome the dripping by preventing too great chilling of the upper layer of air. Ventilation from the highest point of the roof will also alleviate the trouble.—X.

(32) J. A. B.—Preventing Moisture on Roofs.—Yes. Anything that will prevent the contact of the moist inside air with the cold tin. Tarred roofing paper is the best. If not attainable, hardware or carpet paper will answer the purpose.

(33) Lacquering Brass.—Caustic soda lye will loosen lacquer. The articles to be lacquered must be warm and perfectly clean. A finger touch will mar the work. Use alcoholic solution of shellac.

(33) About Lacquers.—Clean the brass work of instruments by boiling in caustic soda water, if convenient, otherwise soak in alcohol and wipe. For aluminum lacquer, dissolve bleached shellac in the best, or 95 per cent alcohol. Heat all work to about 212° before lacquering, use a broad camel's hair brush, work quickly and place the work in a hot oven or over a spirit lamp for a few minutes, to glaze the surface of the lacquer. To deaden the gloss on instrument work: Clean perfectly free from grease with soda water, rinse, and dip in a bath of nitric acid 1 part, water 4 parts, for from 2 to 5 seconds; rinse off the acid in hot water, dip again in hot soda water and in hot clean water to leave the surface perfectly from acid. Dry in sawdust. Color lacquers with dragon's blood and saffron to the required depth.

(34) Rules for Size of Wire for Given Current, etc.—1. There are several such rules founded on the heating of the wire. The English Board of Trade rule allows 1,000 amperes per 1 square inch sectional area. Of course this is well within the safe limit, and is often exceeded in practice. 2. The wire on a line should be as large as possible, as its resistance consumes energy. The armature of a dynamo requires a considerable number of turns of wire to give electromotive force at reasonable speed of rotation, and cannot well be made of large enough dimensions to use heavy wire. 3. Practical rules are obtained for the different types of machines. A true theoretical rule is yet a desideratum. 4. Yes.

(35) Circular Saw Practice.—You cannot work a saw from the shaft of your engine, as the speed is insufficient. You do not give enough particulars forrest of query to be intelligently answered.—Sawmill.

(35) X. L., Boilers and Belts.—If you carry 60 lb. pressure in your boiler and can run the engine at 150 revolutions per minute, you can make your saw available only by belting, so as to give it 1,000 revolutions per minute. At the above pressure and speed the engine should indicate 30 h. p. If your boiler is large enough, it will furnish steam for this power. You give us no data to compute the boiler power. It should have 300 square feet of heating surface to stand up fairly with the above speed. If you can run your saw at the above speed with the saw in good order, you should turn out 12,000 feet of pine lumber per day of 10 hours, or in proportion for less speed.

(36) In answer to R. D., No. 36, in your issue of December 15, we would say that we have a cell of the "gelatine battery" manufactured by the H. B. Cox Electric Company, of New Haven Conn., which has been ringing a bell in our office ever since September 6, and has not stopped yet—a total of 106 days. And it seems to vibrate as strongly now as any time in the past 60 days.—G. S. A.

(36) Bronzing Steel.—Expose cleansed objects to vapor of a heated mixture of concentrated hydrochloric and nitric acid for a few minutes and then heat to 572° to 662° F., until bronze color appears. Cool rub with vaseline and heat until latter is decomposed, and repeat process if necessary. Heating polished steel will develop the blue color.

(36) Bronzing and Bluing.—Steel spectacle frames are blued by placing them, polished and perfectly clean, in a muffle or oven heated to exactly the temperature necessary to bring out the exact color, which is between 500° and 600° F. The frames are laid on little racks, so that the heat will strike every part alike. The workmen watch for the color. When obtained, the rack is withdrawn and cooled in a cold air blast. The bronze frames are plated with a very thin coating of brass and heated in the same way as for bluing, but at a less temperature. A bronze color is also obtained by a higher polish on the steel and heating to a straw color, about 350° to 400°.

(37) Leather Tanning without Bark.—In 1877 Knapp patented a process for using iron salts. It is described in Davis' manufacture of leather.

(38) Your jars are very small for your purposes. Use a zinc plate well amalgamated and a carbon plate about 1/4 inch from the zinc. Excite with electrotonic fluid (bichromate potash, sulphuric acid, and water). For each candle power you would need two or three such cups, and they would soon be exhausted.—Electric.

(39) Copying Writing without Blotting.—You may use too much water. The secret of success consists in using just the right amount.

(40) Luminous Paint.—It is best to buy it ready made. The SCIENTIFIC AMERICAN SUPPLEMENT, No. 249, describes the manufacture.—P. P.

(41) Burning Stumps, and Maple Sirup.—Bore holes in stumps and fill with kerosene or nitrate of soda and water. After long standing ignite them.—Filter maple sirup through bone-black to improve color. Before boiling filter through cotton drilling.—M. M.

(42) Coloring Gas Tar.—No powder is known that will color gas tar.—Gas Engineer.

(43) Sighting Rifles.—The sights are adjusted by the maker to cause their line and the axis of the barrel prolonged to intersect, as nearly as possible, at the different ranges for which the back sight is calibrated. Your question implies too broad an assertion, as with fixed sights no such fact obtains except at a single range. Even with the finest sighted pieces it is doubtful if such a requirement is practically applied.—Creedmore.

(43) Gun Sights.—The trajectory of the bullet makes an arched curve on the vertical plane of the sights. The sights are set to meet the curve at a certain distance, and are not parallel with the bore. Thus the setting of the sights for a 100 yard target are lower at the breech than for a 200 yard target. The distance of the front sight from the center of the barrel has no connection with the adjustment of the aim.

Books or other publications referred to above can, in most cases, be promptly obtained through the SCIENTIFIC AMERICAN office, Munn & Co., 361 Broadway, New York.

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted December 18, 1888, AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing inventions and their patent numbers, including items like Alarm, Bag catch, Baling press, Barrel support, Batteries, Beer cooler, Block, Blowpipe, Boiler, Boiler feeder, Boiler feeding device, Book, Boot crimping, Boot or shoe heels, Bouquet holder, Box, Brake, Bricks, Bridge, Broom, Buckle, Buggy curtain fastener, Bureau, Burglar alarm, Burial apparatus, Burner, Butter printing machine, Button machine, Button setting machine, Cable grip, Cable roads, Calendar, Calk plate for shoes, Can testing machine, Car coupler, Car coupling, Car coupling, Car coupling, Car door fastener, Car door holder, Car motor, Car mover, Car unloading machine, Cars, Carbonating liquids, Carpet stretcher, Carriage curtain fastening, Cart, Cart, road, Cart, road, L. J. Lyman, Cart, road, S. J. McDonald, Cart, road, W. H. Price, Carving machine, Cash carrier apparatus, Cash registering and indicating device, Cement, Chair, Checkrein holder, Cigar box, Cigar bunching machine, Cigar holder, Cigarette machine, Clam extracts, Clevis, Clock, Coat and hat hook, Collector, Coloring matters, Concentrator, Convertible chair, Coop, brood, J. A. Jackson, Corset cord fastener, Cotton gin, Coupling, Cuffs, Cultivator, Cup, Curb stop, Cutter, Dental anodyne, Desk and card holder, Dial, timepiece, Digger, Display frame, Ditching machine, Door, adjustable screen, Door check, Door hanger, Door hanger, J. C. & E. A. Haldeman, Door hanger, E. Y. Moore, Door hangers, rail support for, Drill, Drum or radiator, heating, Dyeing, hollow perforated tube, Dyeing machine, Electric brake system, Electric circuit, Electric circuit indicator, Electric energy, Electric lights, Electric machine, Electric machinery, Electric meter, Electricity by secondary batteries, Electrode for electric batteries, Elevator, Elevator guide, Elevators, speed regulator for, End gate, Engine, Envelope machine, Feed regulator, boiler, Feed water regulator, Felt or other like articles, Fence making machine, Fence post, Fence, stake and rail, Fence, wire, Fertilizers, apparatus for, Fifth wheel for vehicles, Finger ring, Fire alarm circuits, Firearm, breech-loading, Firearms, ejector mechanism for breech-loading, Firearms, load indicator for magazines of, Fire escape, Fire extinguishing apparatus, Flood gate, Flooring for buildings, Fluid meter, Fly trap, Frame, Fruit picker, Furnace, Gauge, Galvanic battery, Game counter, Garment, ventilated, Gas burner, Gas mains, automatic cut-off for, Gas or other fluids, conduit for, Gate, Gate, J. A. Stevenson, Gear for roving frames, Generator, Glass monument, Glassware, decorating, Glove fastening, Gold leaf cutter, Gold saving apparatus, Governor, steam engine, Grading and ditching machine, Grain binders, tension device for, Grain elevator, Grain meter, automatic, Grain meter, rotary, Grate, heating and ventilating, Grating and slicing device, Grinding and mixing mill, Griptester or similar coin-controlled device, Hanger, Harrow, Harvester, corn, Hat and clothes hook, Hay rake, Head rest, pocket, Heater, Hinge, lock, Hinge, lock, W. P. Patton, Hoe, vineyard or farm, Holder, Hook, Hopper, Horse brushing machine, Hose carriage, Hub attaching device, Hydrant, Ice marker, Incubators, heat regulator for, Indicator, Ingot forming apparatus, Jack, Jacquard machines, Jewelry, plated wire stock for, Joint, Kiln, Kiln for burning decorated china, Kitchen cabinet.