TO INVENTORS.

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An experience of more than thirty years, and the pre paration of not less than one hundred thousand applications for patents at home and abroad, enable us to un derstand the laws and practice on both continents, and to possess unequaled facilities for procuring patents everywhere. In addition to our facilities for preparing drawings and specifications quickly, the applicant can rest assured that his case will be filed in the Patent Office without delay. Every application, in which the rees have been paid, is sent complete-including the modelto the Patent office the same day the papers are signed at our office, or received by mail, so there is no delay in fling the case, a complaint we often hear from other sources. Another advantage to the inventor in securing his patent through the Scientific American Patent Agency, it insures a special notice of the invention in the SCIENTIFIC AMERICAN, which publication often opens negotiations for the sale of the patent or manufacture of the article. A synopsis of the patent laws in foreign countries may be found on another page and persons contemplating the securing of putents abroad are invited to write to this office for prices, which have been reduced in accordance with the times and our perfected facilities for conducting the business Address MUNN & CO., office SCIENTIFIC AMERICAN.

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 offic as early as Thursday morning to appear in next issue.

Steam Tug Machinery. Engines, Boilers, Sugar Ma chinery. Atlantic Steam Engine Works, Brooklyn, N.Y Valves and Hydrants, warranted to give perfect satis

faction Chapman Valve Manuf. Co., Boston, Mass. Assays of Ores, Analyses of Minerals, Waters, Commercial Articles, etc. Technical formulæ and processes

Fuller & Stillman, 40 & 42 Broadway, N. Y. Jarvis Patent Boiler Setting, same principle as the Siemens process for making steel; burns screen-ings and all kinds of waste fuel, without blower, A. F. Upton, Agent, 48 Congress St., Boston, Mass.

Kimball's Catarrh Cigarettes, an instantaneous relief and a pleasant smoke. They contain no tobacco

For Sale or Exchange .- A partly finished Foot Lathe swing 10 x 30 inches. W. Bulkeley, Ballston, N. Y.

Ten years' experience has enabled Mr. A. H. Downer, Slip, N. Y., to produce a liquid for the preven-17 Peck tion and removal of scale in steam boilers, which is perfectly safe and thoroughly effective. An honest trial will convince the most skeptical of its utility.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St., N.Y. Wm. Sellers & Co

Lathes, Planers, and Drills, with modern improve ments. The Pratt & Whitney Co., Hartford, Conn

Important.-See Hogins' Patent Laundry Table, illustrated in last week's SCIENTIFIC. For State, Canada, or entire right, address A. H. Hogins, Box 15, Morrisania, N. Y.

Artists, call at 36 Platt St., N. Y., and see lantern with oil lamp for tracing card pictures to any size.

Wanted-A manufacturer to make on contract 500,000 improved Screw Wrenches. Address Lock Box 146, Athol, Mass.

Manfs. of Rubber Rolls, address A. T. Melvin, Pitts ville, Md.

For best Portable Forges and Blacksmiths' Hand Blow ers, address Buffalo Forge Co., Buffalo, N. Y.

American Watch Tool Co., Waltham, Mass. Lathes for Watchmakers, Dentists, and Jewelers. Special machinery for watch and clock factories.

Makers of Ilvdraulic Motors and Elevators, please send circulars and price lists to C. L. Allen, Box 442, Worcester, Mass.

For Sale Cheap.-Second-hand 8 foot Boring and Turning Mill, Lathes, Planers, Drills, Bolt Cutters, etc Circulars. D. Frisbie & Co., New Haven, Conn.

Wanted-A man to take charge of and run a Stove Foundry. Must be thoroughly competent. Address, with references, X. R., Baltimore P. O., Md.

Steel Stamping Figures, 1-16 to 1/2 in., \$1 per set. All work warranted. C. L. Alderson, Cleveland, O.

For Sale.-60 H. P. Engine, one 35 H. P. Boiler: A No. 1. Box 28, South Windham, Conn.

Manufacturers and other owners or occupants of large buildings, will conserve their interests by sending for samples and price list of H. W. Johns' Asbestos Liquid Paints. H. W. Johns Mfg. Co., 87 Maiden Lane, New York, sole manufacturers of genuine Asbestos materials.

Gutta Percha. pure and sheeted, for sale in quantities to suit. Anderson & Reynolds, Salem, Mass

Wanted-Second-hand Corliss Engine, 100 to 125 II. P. Address P. O. Box 1208, New Haven, Conn. 17 and 20 in. Gibed Rest Screw Lathes. Geo. S. Lin-

coln & Co., Hartford, Conn

Bewins & Co.'s Hydraulic Elevator. Great power, Implicity, safety, economy, durability. 94 Liberty St.N.Y. A Cupola works best with forced blast from a Baker Blower, Wilbraham Bros., 2.318 Frankford Ave., Phila. Special Planers for Jointing and Surfacing, Band and croll Saws, Universal Wood-workers, etc., manufac-

tured by Bentel, Margedant & Co., Hamilton, Ohio. Steel Castings true to pattern, of superior strength and durability. Gearing of all kinds. Hydraulic cylin-ders, crank shafts, cross heads, connecting rods, and machinery castings of every description. For price list and circular, address Chester Steel Castings Company, Evelina St., Philadelphia, Pa.

Elevators, Freight and Passenger, Shafting, Pulleys, and Hangers. L. S. Graves & Son, Rochester, N. Y

Machine Cut Brass Gear Wheels for Models. etc. (new Models, experimental work, and machine work list). generally. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in SCIENTIFIC AMERICAN of this week.

Diamond Self-clamp Paper Cutter and Bookbinders Machinery, Howard Iron Works, Buffalo, N. Y.

Best Power Punching Presses in the world. Highest Centennial Award. A.H. Merriman, W. Meriden, Conn. Improved Steel Castings; stiff and durable; as soft and easily worked as wroughtiron; tensile strength not less than 65.000 lbs. to sq. in. Circulars free. Pittsburg Steel Casting Company, Pittsburg, Pa.

Electro-Bronzing on Iron. Philadelphia Smelting Company, Philadelphia, Pa.

Hand Fire Engines, Lift and Force Pumps, for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N.Y., and 93 Liberty St., N. Y. City, U.S.A.

Vertical and Yacht Engines. F. C. & A.E. Rowland, New Haven, Conn.

Wm. Sellers & Co., Phila., have introduced a new Injector, worked by a single motion of a lever.

Shaw's Noise Quieting Nozzles and Mercury Pressure Gauges. T. Shaw, 915 Ridge Ave., Philadelphia, Pa.

For Solid Wrought Iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

H. Prentiss & Company, 14 Dey St., N. Y., Manufs. Taps, Dies, Screw Plates, Reamers, etc. Send for list. Presses, Dies, and Tools for working Sheet Metal, etc.

ruit & other can tools. Bliss & Williams, B'klyn, N. Y. Nickel Plating .- A white deposit guaranteed by using our material. Condit, Hanson & Van Winkle, Newark, N.J.

Hydraulic Elevators for private houses, hotels, and public buildings. Burdon Iron Works, Brooklyn, N. Y.

The Lathes, Planers, Drills, and other Tools. new and second-hand, of the Wood & Light Machine Company, Worcester, are being sold out very low by the George Place Machinery Agency, 121 Chambers St., New York.

Hydraulic Presses and Jacks, new and second hand. athes and Machinery for Polishing and Buffing Metals E. Lyon & Co., 470 Grand St., N. Y.

Solid Emery Vulcanite Wheels-The Solid Original Emery Wheel – other kinds imitations and inferior. Caution.-Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row. N. Y.

Portland Cement-Roman & Keenc's, for walks, cisterns, foundations, stables, cellars, bridges, reservoirs, breweries.etc. Remit 25 cents postage stamps for Practi-cal Treatise on Cements. S. L. Merchant & Co., 53 Broadway, New York.

Needle Pointed Iron, Brass, and Steel Wire for all purpeses. W. Crabb, Newark, N. J.

Manufacturers of Improved Goods who desire to build ap a lucrative foreign trade, will do well to insert a well displayed advertisement in the SCIENTIFIC AMERICAN Export Edition. This paper has a very large foreign cirulation

Galland & Co.'s improved Hydraulic Elevators. Office 206 Broadway, N.Y., (Evening Post Building, room 22.)



HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the numbers of the SCIENTIFIC AMERICAN and SUPPLEMENT. can be softened by boiling, but the operation is more writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

('orrespondents whose inquiries do not appear after

a reasonable time should repeat them. Persons desiring special information which is purely

a we cannot be expected to spend time and labor to

(3) C. N. M. asks how the preparation is made now used by manufacturers of colored. glazed, and plated papers, to render the article partly waterproof, or to resist, in a measure, the rubbing away of the color when slightly moistened. A. The paper is heavily sized with a prepared glue size, and the printed colors protected by the subsequent application of a thin, colorless spirit varnish.

(4) A. G. asks how to describe a parabola by mechanical means. A. Place a straight edge to the directrix, E N, and apply to it a square, L E G; fasten



at G oneend of a cord equal in length to E G; fix the other end to the focus, F; slide the square steadily along the straight edge, holding the cord taut against the edge of the square by a pencil, D, and it will describe the curve.

(5) W. B. M. asks: 1. Could a double dy namo-electric machine be made after the plans in Sci-ENTIFIC AMERICAN SUPPLEMENT No. 161, by placing two similar machines together end to end, and connecting the two armatures so as to form a continuous shaft with the commutators at the outside end; and so winding the magnets as to bring dissimilar poles into juxtaposition? A. It might be done, but a single large magnet would be better, using an armature made in two sections, one shorter than the other, the shorter one being used to excite the magnet. 2. ('ould the current from one machine, arused to excite the magnets of the other machine, and This has been done in several different machines. 3. Could a dynamo-electric machine made with permanent magnets be coupled on to one of the other kind in a manner similar to the above, with a great advantage in way.

by removing the sulphur that it will not tarnish more than tin or nickel? If so how refined so that it will tarnish the least? A. No; chemically pure copper quickly tarnishes in the air unless protected by a lacquer.

(7) B. R. J. asks: What is the cause of the drumming noise in some furnaces when the door of the boiler is closed tightly? I am now running a boiler which shakes the building to the foundation when the door is closed tightly. A. It is generally due to uneven firing, holes being formed through which the air rushes with great velocity. The noise can generally be stopped by the judicious application of a little coal.

(8) J. S. B. asks: 1. Has the State of New taining rapid canal navigation without injury to the canal? A. Yes. 2. Was this prize offered simply for best method of preventing the washing away of the banks by the waves from the canal boat? A. No; it was found by experience that this washing was not caused by any of the boats that were tried, at the slow speed that they developed.

(9) G. G. asks: Can the telephone be worked by using a small creek in place of the second or return wire? A. Yes.

(10) D. E. J. asks where to find out how

have also noticed that a steam fire engine will also cement and 2 measures of sand. show more pressure of water in the hose than there is steam pressure in boiler. A. The pressure which an air pump will deliver against, will depend on the diameter of the pump and power applied.

of a personal character, and not of general interest, ever been tried in marine boilers as a preventive of curing a di- or tri-chloride. should remit from \$1 to \$5, according to the subject, priming, and if considered safe to use with steam at 50 or 60 the pressure and if so what has been the general

[APRIL 5, 1879.

be black when first written, and will not get thick when left standing a long time. A. Triturate 1/4 ounce of commercial soluble nigrosine and 1 drachm of alum, with about 1/4 pint of hot water, and digest for an hour in the water bath at 212° Fah., strain the resulting solution through a piece of fine cotton cloth, and dilute with a little hot water, if necessary, for usc. It is well to add a few drops of clove oil to prevent alteration. 2. How to make a good blue ink. David's blue ink is just the color I want, but the trouble with it is, it wont flow when it gets a little old. I would prefer an aniline ink if there is any that will give a rich deep blue. A.

Usc Nicholson's soluble aniline blue in place of nigrosine as above. 3. How to make an ani-line red. A. Warm gently 3 drachms of Porrier's soluble scarlet or red scarlet with about 1/2 ounce of water, and add a few crystals of tin salt (stannous chloride), or use a strong slightly ammoniacal aqueous solution of aurine or coralline. Address the chemists who advertise in these columns. 4. Would it be practicable to produce an electric light, the machinery to be driven by a weight? How large a weight would it take to produce electricity enough to light a room 15x20 feet with as much light as 3 or 4 gas burners would make the weight to fall 10 fect in five hours? A. With the Werdermann or Sawyer-Man lamps we think it would require the fall of about a ton weight through from 6 to 8 feet a minute.

(16) J. J. C. asks: If a rifle be shot off perpendicularly on a moving railroad car, where will the ball fall? A. By "perpendicular" we suppose you mean "vertical"; if so, when leaving the rifle the ball would have the same progressive velocity as the car, but the moment it leaves the rifle, its progressive speed (as well as its vertical velocity) is gradually reduced, and its path will be a curved one; the ball striking the ground in advance of the point from which it was fired and in rear of the position of the rifle at the instant of the ball striking the ground, as the latter has continued to advance with the train and with velocity unretarded.

(17) H. J. L.-We give below 19 patented fillings for safes: No. 1. Residuum of soda water manufacture. No. 2. Soapstone. No. 3. Tiles, alum and clay. No. 4, Alumina and ammonium alum. No. 5. Copperas and gypsum. No. 6. Starch, water, gypsum. No. 7. Alum in small pieces embedded in gypsum. No. 8. Epsom salt and gypsum. No. 9. Cement, lime, sawdust, and silicious mortar. No. 10. Paper pulp and ranged to work either with or without a battery, be alum. No. 11. Steam and water vessels. No. 12. Removable water vessels between the casings. No. 13. thus, as it were, multiply one machine by the other? A. Moistened sponge and powder. No. 14. A system of fusible pipes with water. No 15 Sulphuric acio in bottles with fusible plugs, and sodium carbonate to aberate carbonic dioxide on contact with the acid. No. 16. Paper pulp and alum. No. 17. Raw cotton, fawthe way of power of current produced from the second dust, and whiting. No. 18. Asbestos, plaster cement, machine? A. Yes; Wilde's machine is arranged in this chemical salts, and alum. No. 19. Asbestos, marble dust, pipe clay, gypsum, glycerine, mucilage, magnesium (6) R. A. G. asks: Can copper be so refined and sodium sulphates, borax, alum. sal soda, and paraffine

> (18) C. W. C. asks (1) if a tank lined with sheet lead would have any poisonous or injurious effect upon the water in case it was used as a cistern for rain water. A. Water stored in such a reservoir would not be fit to drink. 2. Can you inform me of any paint that can be used to paint the inside of a rain water tank so that water may be kept in it? A. Several well dried coats of good asphaltum varnish may be applied; but it would be better and safer to collect the water in clean wooden hogsheads or cemented cisterns

(19) R. H. H. writes: A French burr millstone has come apart just between the face and the York awarded the prize offered for best method of ob- plastering. Can I coment it together with plaster of Paris without taking it all apart? A. A good cement can be made of alum and powdered burrstone. Plaster of Paris is generally used to cover the stone after making the joints with the cement.

(20) D. & C. write: 1. We run our mills with a Leffell wheel. The wheel is situated 60 feet from mill shaft and connected by a shaft 60 feet long. Will we gain any power by putting water house and wheel nearer, and how much? A. The gain will be very slight, and will hardly justify the expense of moving. 2. Please tell us how to bend rims, buggy shafts, plow handles, etc., cheaply, without the use of a steam to make a small stationary engine. A. Consult the back boiler. Can they be bent by simply boiling? A. They (11) C. M. P. asks: Why will a locomotive tedious than when a steam box is used. 3. How can baving an air pump, pump more pressure of air into the we mix up Portiand cement mortar to resist the action air drum than there is steam pressure on the boiler? I of water? A. You can make a mixture of 1 measure

(21) W. S. writes: To try a proposed experiment, I will need a bi- or tri-chloride of sodium. Can this be obtained, or made chcaply. and what process? A. Sodium is a monad metal, and combines with but (12) J. R. F. asks if refined petroleum has one equivalent of chlorine. You will not succeed in pro-

(22) H. writes: 1. I want to build a steam launch 47 feet long, 101/2 feet beam, slauting at sides 8 Any numbers of the SCIENTIFIC AMERICAN SUPPLE- for checking foaming in boilers, but from the well inches each side, and in front about 10 feet of bottom flat; will a 6 horse power boiler and engine propel it in the swift water of our Western rivers, the Ohio and troducing it in small quantities at first, and that its effect Wabash, say a fair rate of speed 5 or 6 miles up stream? The boat will be built light, one deck, boiler and engine 1.400 lbs, empty. The boat will not draw light with boiler and engine in place more than 6 inches. A. No, a graph been perfected so that a speech. sermon. or a 6 horse power (actual) would not drive it more than 5 or 6 miles Der hour in smooth water. 2. What position of wheel would be most advantageous, on sides or at stern? A. Stern. 3. Would belt gearing answer as well as cogwheel? A. Belting would not do as well as gearing; it would become wet and slack, and slip. 4. Could wire belting be made available? A. No.

w Pamphlet of "Bu Wheel" sent free by N. F. Burnham, York, Pa. Gaume's Electric Engine. 171 Pearl St., B'klyn, N.Y. Diamond Planers. J. Dickinson, 64 Nassau St., N. Y. Engines, % to 5 H. P. G. F. Shedd, Waltham, Mass. Case Hardening Preparation. Box 73. Willimantic, Ct Vertical Burr Mill. C. K. Bullock, Phila., Pa. Sheet Metal Presses, Ferracute Co., Bridgeton, N. J. Excelsior Steel Tube Cleaner, Schuylkill Falls. Phila., Pa. Mundy's Pat. Friction Hoist. Eng., of any power, double and single. Said by all to be the best. J. S. Mundy, Newark, N. J

The SCIENTIFIC AMERICAN Export Edition is published monthly, about the 15th of each month. Every number comprisesmost of the plates of the four preceding weekly numbers of the SCIENTIFIC AMERICAN, with other appropriate contents, business announcements etc. It forms a large and splendid periodical of nearly one hundred quarto pages, each number illustrated with about one hundred engravings. It is a complete record of American progress in the arts.

Send for Circulars of Indestructible Boot and Shoe Soles to H. C. Goodrich, 40 Hoyne Ave., Chicago, Ill.

For Sale.-7 foot bed Putnam Planer, \$350. A. A. Pool & Co., Newark, N. J.

obtain such information without remuneration. Price 10 cents each. office.

(1) J. E., Jr., writes: I have a bichromate battery composed of 12 cells; after 2 weeks I find that the carbon plates are covered with crystals; they interfere with the working of the battery. Mybelief is that I saturated the solution with too great an amount of bichromate. The battery is constructed after the form published in SCIENTIFIC AMERICAN, No. 146, consisting of porous cup, zinc, and carbon; the solutions are salt and sulphuric acid. A. They are crystals of potassio-chromium alum (K2('r2(SO4) 24 Aq). They invariably form after a time in the bichromate battery when the acid bichromate solution becomes partially exhausted and concentrated by evaporation. The bichromate solution should be more frequently renewed.

(2) L B. asks: How many horse power is a boiler, 10 feet long, 42 inches diameter, with 36 3-inch tubes, or an engine, 8 inch cylinder, 12 inch stroke, making 150 revolutions a minute, at 60 lbs. pressure? A. Boiler. 16 horse power nominally. Engine, 20 horse power.

results. A. We are not aware of the use of petroleum MENT referred to in these columns may be had at this known effect of the use of other oils in such cases, should expect beneficial results. We would advise inbe closely watched.

> (13) A. E. W. asks: 1. Has the phonomusical piece may be registered by having the speaker a few feet from the instrument, say 15 or 20 feet? A. We think not. 2. Has there ever been a telephone invented in which a diaphragm and artificial magnet arc placed in the circuit of a common electrical battery? A, Yes.

> (14) W. H. C. asks: Can you inform me if there is a cheap residuum of the distillation of petroleum of which can be made a cheap black varnish, and if so what solvent is used? A. The pitchlike residue remaining in the stills, where the distillation is not forced at the last, is sometimes sold as an artificial asphalt. It is soluble for the most part in oil of turpentine, benzine, or benzole.

(15) A. B. H. asks: 1. How to make a first class aniline black ink, something that will flow easy, for sale,

(23) W. H. W.-The plant is the evergreen or pyracanth thorn (Cratægus pyracantha), a native of the south of Europe, distributed several years ago in the United States as a hedge plant. It is excellent for the latter purpose, in a climate no more severe than that of Virginia. An accidental variety with white berries has proved hardy near New York in the most severe winters. The plant is propagated by cuttings, although dealers in shrubs and trees might possibly have seeds

a "peculiar explosion took place on the Ottawa river; about one hundred feet square of ice, twenty inches thick, was thrown up into the air, followed by a loud report; it is supposed to have been caused by the gas from a deposit of sawdust in the bed of the river." I wish to ask: What kind of gas was generated; also what was the action of the gas, and why did it explode? A. We cannot explain the occurrence on the hypothesis that it was primarily caused by sawdust. We have known such explosions to occur through the sudden yielding of thick ice at its weakest point to the stress of air confined and condensed by an unusually strong or obstructed current below.

(25) J. A. L. asks: 1. What is the resistance per mile in copper wire, No. 17 and No. 25 American gauge? A. Approximately 20 and 168 ohms respectively. 2. What temper is best for strong and constant magnets? A. A straw color. 3. What is the best method of magnetization, by currents or by friction, on tween the lens and the surface is the same as that which a permanent or electro-magnet? A. By contact with a strong electro-magnet or by inclosing them in a helix traversed by a strong electric current. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 142. 4. What should be the lifting power of a horseshoe magnet, weight half a pound? I made one which will lift nine times its weight: is that a good one? A. Your magnet does very well, 5. ('an I obtain from you back numbers of the Scien-TIFIC AMERICAN or the SUPPLEMENT, giving directions for making telephones, microphones, or phonographs? A. Telephones, No. 142. Microphones, No. 163. Phonographs, No. 133. 6. What kind of carbon will do for Edison's telephone, and how can it be made? A. The carbon used in Edison's telephones is deposited from burning kerosene oil. Mr. Edison's method is to set a lamp smoking, collect the carbon, and form it into buttons under strong pressure.

(26) Bolckow asks: 1. Will two steam engines, size 2 inch bore and 4 inch stroke, with cranks ing pulley. What is the correct position for the driving at right angles, give more or less power than one engine 2x4, using a flywheel to overcome the dead center, with a steam pressure of 100 lbs. Der square inch in the boiler? A. More, 2. Did Congress ever pass a law prohibiting the running of traction engines over public a belt tightener? A. We see no objection to this plan. roads? A friend of mine claims Congress did enact such a law, while I claim that it did not; that the roads are open toall, and that the driver of an unruly horse runshis own risk. Who is right? A. You are right.

(27) C. S. asks: Does using the flywheel as a driving pulley detract from its efficiency as a flywheel. Does the use of a pulley larger than a fly- to the bottom, the exhaust all discharging into bottom wheel on the flywheel shaft affect the efficiency of the flywheel? A. No, in either case; but the effect would be better if the flywheel were larger than the pulley

(28) M. P. asks: How can I conveniently straighten brass or iron wire without a wire and 20 percent, straightener? A. It cannot be done without a straightener of some kind. Probably the simplest straightener is three steel pins driven into a plank. If the pins are properly arranged and the wire is drawn over the first, under the second, and over the third, it may be straightened well enough for some purposes

(29) B. A. M. asks whether the greater bearing is on the upper or lower side of the crosshead steam pressure. The fiber contains tannic and other when the engine is running back. A. On the upper acids and iron. I am told that the iron and acids in side.

(30) C. E. A. asks: 1. What is the power of an engine with 4 inch stroke, 21% inch bore, running 600 revolutions per minute, with 120 lbs. of steam? A. If worked without cut-off, 5 horse power, 2. What are the dimensions of an upright boiler which would run such an engine? A. You would require a vertical tubular boiler of 95 feet heating surface. 3. ('an a boiler be made from coils of gas pipe? If so, how is the best way to coil the pipe, and how much pipe will it take, and what will it cost for a boiler for the above engine? A. A boiler of coiled pipes can be made. Apply to iron pipe workers.

(31) X. Y. Z. writes: 1. I have an electric engine; the magnets are wound with No. 17 cotton covered wire (Stubs' gauge). I want to use Daniell's battery with porous cups 4 inches high and 1% diameter. What quantity and intensity shall I use to get the most power? A. It depends altogether on the construction of the engine. You can easily determine by experiment which method of connecting up the batteries is best, 2, How many of the above cells will it take to make an electric light to light a room 12 feet square? A. 50. 3. How can I loosen the binding screws, that are corroded in carbon plates? A. It is possible that soaking them in hot water may be of some benefit.

(32) R. B. N.-Prices for yacht engines : 3 inch cylinder x 5 inch stroke, \$640; 314 inch cylinder x 5 inch stroke, \$720; 4 inch cylinder x 6 inch stroke, \$800, including boiler, propeller, and appurtenances. For maker's address, see our advertising columns, or insert an advertisement in the Business and Personal

in boilers, namely, impure water, deficient circulation, would depend upon which of these causes operated. The introduction of oil with the feed water in small quantities will frequently check foaming for a time.

(37) H. C. P writes: I am making a drawing camera from "Aids to Drawing" in SUPPLEMENT, No. 158, and have two double convex lenses about one inch in diameter, and I would like to know how to use them, and at what distance from the lenses to place the ground glass, and about what size box it would require for the camera so as to bring the rays to a focus and make the image appear plain on the glass. A. You will need but one lens, which may be either single or double convex. For practical purposes you may get its focal length by holding it remote from a window in front of a white surface, and moving it back and forth until a clear image is seen on the white surface. The distance beshould separate the lens from the ground glass. The size of the ground glass and of the box will of course be controlled by the size of the image which the lens is capable of forming.

here contains a circular saw driven by a direct belt from the pulley on the shaft of the turbine water wheel, the belt running over guide pulleys up to the saw. It is now desired to use the power without running the saw and for other putposes, and not wishing to go to the expense of putting in a bevel gear, as that in this case would be rather an expensive job, we wish to know if a quarter twist belt from the water wheel to a line shaft is practicable for the heavy work of driving a 46 inch circular saw. A. A quarter turn belt would not do well for so heavy work, and would wear very rapidly, 2. The center of the pulley on the saw shaft is at right angles with a line drawn through the center of the $\operatorname{\mathbf{d}riv}$ pulley on the line shafting so as not to use a guide pulley? A. For ascertaining position of pulleys, see p. 27. (5), current volume of the SCIENTIFIC AMERICAN. 3. Is it a good method of stopping and starting the saw to use

(39) B. F. M. writes: It takes from 10 to 18 barrels of water per day to run a grain separator with an agricultural engine. I propose to make a tin pipe, 1 foot diameter, 6 feet high, terminating below in a 20 gallon tank, from which an extra pump is to elevate a continuous stream in at top of pipe, running over shelves of said pipe. How much water can I probably save? Would it not be more conomical to dispense with nozzle and consequent back pressure, and use small fan to createdraught? A. By changing the exhaust as proposed, you could probably effect a saving of between 15

(40) D. L. D. asks: In discharging a rifle does the recoil occur at the moment of explosion or after the ball leaves the muzzle? A. It commences at the instant of explosion, and continues until the pressure is relieved by the exit of the ball.

(41) W. E. F. writes: I use a large iron tank, in which I boil a vegetable fiber under 60 lbs. the fiber combine with the iron of the boiler, forming a kind of ink which dyes the fiber, making it hard to get white; but that if I can use a boller in which the iron plates alternate with zinc plates (if practicable) this will establish a galvanic or electric condition that will pre vent the formation of this black ink or dye; or that If I secure a few zinc plates to the inside of the boiler, the same happy result will be obtained. Is this the case ? A. The arrangement of a few plates of zinc, in good contact with the Iron within the tank, as suggested, would doubtless protect the iron and fiber, but you will probably find that the addition of a few ounces of carbonate of soda introduced with each charge will prove as effectual and more economical.

(42) T. J. B. asks: What effect would vitriol have on the skin, and what is it used for? A. If you refer to undiluted oil of vitriol (sulphuric acid), the timbers to them. Around these pikes the first pier it would quickly disorganize or char the skin. The was built and filled with stone. Other timbers were acid diluted with from 10 to 30 parts of water is sometimes administered in very small quantities as a refrigerant, to check profuse perspiration, in skin diseases to relieve the itching, and in dyspepsia, etc.

(43) C. E. S. asks for the process so generally used for coating malleable or gray iron castings in length, or a single line with ground wire same length? with copper. I can deposit the copperall right, but cannot get the luster or polish. Castings are very small, will average about 1 oz. each and easily handled. A. Rub the clean iron, or tumble it in a barrel for a few minutes with bran, sand, or saw dust, moistened with a solution of 31% ounces of copper sulphate and 31% ounces of sulphuric acid in about 3 gallons of water, rinse in running water, and dry in sawdust. The iron should not be allowed to remain too long in contact with the copper solution or absorbent materials con-

or shocks, or if the armature is applied and removed to." Will you be so kind and inform the writer of this or small steam capacity. The remedy to be applied manytimes in succession, the magnet will be injured. in "Notes and Queries:" 1. How to accomplish a more 2. Does it lose its magnetian from non-use? A. If pro- rapid action of the pen? A. By using a stiff spring in the vided with an armatnre it may improve. 3. Does the interrupter, and adjusting it carefully, the sparks may mentioned, but it probably will not lift it.

> wheel and 2inch rope for hoisting purposes. The groove in the wheel and the rope have both worn very smooth, so the rope slips with a heavy load. Can anything be done to the wheel to make the rope hold better? A. Wind the wheel tightly in the bottom of the groove with small tarred rope.

> (49) E. H. asks for a receipt for making a cement to stick rubber to iron. A. Fuse together equal parts of gutta percha and pitch. For cement receipts SCE SCIENTIFIC AMERICAN SUPPLEMENT, No. 158.

(50) O. H. P. asks for directions for making alcoholic shellac varnis..., A. Place a quantity of gum shellac in a bottle; pour over it enough 95 per (38) W. H. R. writes: 1. The saw mill cent alcohol to cover it. Allow it to stand for 24 hours, shaking it occasionally.

> (51) T. C writes: I wish to propel a Sharpie boat, with padule wheels, at the speed of 12 miles per hour. The boat is fifty feet long with 8 feet beam. and draws 8 to 10 inches water. 1. What should be size and power of boiler and engine? A. We would not advise the use of paddle wheels in so small a boat; you can hardly attain the speed you want, except by the use of feathering wheels. The power required could not well be determined without knowing the model of the boat. 2. Would two cylinders be better than one? A. For maneuvering, yes; otherwise, no. 3. Would I gain any- horse power these several pressures of steam are equal lutions? A. No.

(52) E. G. A. asks: Through what chemical process is the paper passed that is used in recording telegraphic messages, a blue mark being produced each time a current of electricity is passed through it? A. The paper is saturated with one of the following solutions: 1. Nitrate ammonia, 2 lb.; muriate ammonia. 2 lb.; ferricyanide of potassium, 1 oz.; water, 1 gallon. 2. Iodide potassium, 1/2 lb.; bromide potassium, 2 lb.; dextrine or starch, 1 oz.; distilled water, 1 gallon.

(53) C. B. asks: 1. Does it make any difference whether the screw end of a phonograph shaft rests in a Babbitt metal bearing instead of a steel one? A. No. 2. What is meant by clastic tubing in descripplaced, end ways or flat, and how many pieces? A. pieces.

(54) S. B. G. asks how the pier was put in the rapids of Niagara river for the bridge to Goat may adhere to the face of the type. Island. It is a mystery to me, and doubtless is to many others who have seen the rapids. A. Mr. P. A. Porter, one of the owners of Goat Island, furnishes the following account of this piece of engineering: First, a large and strong bulkhead was built in the shallow water near the shore; a solid backing was put in behind this. and the whole well floored over with plank. On this platform, and parallel with the river, several strong rollers were securely fastened. Large oak trees were felled and hewed "tapering' so that when finished they were about 18 inches square at the butt, 15 inches square at the top, and about 80 feet long. Large auger holes were then bored through the smaller ends of these. it and let it stand for a few weeks, it spoils. How can I Two of these timbers, laid parallel and 6 feet apart, were placed at right angles to the river, the smaller ends lying to the cider, and keep it from the air in bottles or scaled on the rollers and projecting over the water, and the ' jars. shore ends heavily weighted down. Levers were then applied, and these timbers were run out until their front ends reached an eddy in the water. Two men, each provided with a strong iron-pointed pike staff (through the holes in the upper ends of which some 10 feet of new rope was drawn), walking out to the ends of these timbers, drove their pikes down among the stones, and tied then run out, all were planked over, and the first span was finished. The other spans were completed in the same way.

(55) B. B. S. asks: Which will require the least battery, a double to legraph line two hundred yards A. The double line.

(56) F. G. & S. write: We have an upright boiler, 9 feet high by 4 feet diameter, 124 2-inch flues, which leaks very had at times. When there is a hot fire in the boiler the flues scarcely leak at all, but as soon as we throw in fresh coal and deaden the fire it were beaded, would it stop them from leaking? A. Your "Chemistry of the Potato," Bliss.

(24) F. J. writes: Our newspapersstate that is horizontal. A. There are several causes of foaming A. It depends upon how it is used. If submitted to jars rapid in its action than the costly instrument alluded quality make any difference? A. Yes. 4. I have flat be made more rapid than the revolutions of the wheel bar steel $\frac{1}{4x}$, Can I have that size magnetized to of the electric pen. 2. Whether a one cup Grenet bat-lift from 4 to 8 lbs.? A. It may solve that the weight tery with induction coil, as commonly used in medical practice, will answer in connection with the pen? A. A medical coil is not suitable for the phrpose, 3. How (48) H. M. R. writes: We have a 6 foot many cups of a Grenet battery without induction coil it would require to furnish a current strong enough to perforate common note paper? A. It cannot be done by the batteries alone.

> (61) C. N., Jr., asks (1) for the best mixture for polishing tortoise shell. A. Tortoise shell is usually finished by filing, scraping, and the application by a buff wheel of powdered pumice stone and water, putty powder and water, and lastly by means of rotten stone in water. 2. What can I do with a gunstock that has had a very severe wetting so that it has raised the grain of the wood and made it rough? A. File it, scrape it, and polish it, by applying to it with a woolen cloth, alcoholic shellac varnish, 2 parts, boiled linseed oil, 1 part, well shaken together before each application. The polish must be rubbed briskly after each application until the surface is smooth and dry.

(62) E. L. asks: What is the horse power value of a jet of steam through a one inch pipe 50 feet from the boiler, at a pressure of 50, 75, and 100 lb, per square inch respectively? A. There is no definite relation between the discharge of steam through a pipe and the horse power at 50 lb. pressure per square inch (total); the weight of steam discharged would be-84.6 lb. per minute; at 75 lb. pressure, 51.39 lb. per minute; and at 100 lb. prossure. 67'8 lb. per minute; but the thing by gearing up with cog wheels to increase [revo- to will depend upon the manner of its use, whether in condensing or non-condensing engines, simple or compound, and to what extent it is used expansively

> (63) C. M. S. asks how to clean lace. A. Lace may be restored to its original whiteness by first ironing it slightly, then folding it and sewing it into a clean linen bag, which is placed for 24 hours in pure olive oil. Afterwards the bag is to be boiled in a strong solution of soap and water for 15 minutes, then well rinsed in lukewarm water, and finally dipped into water containing a slight proportion of starch. The lace is then to be taken from the bag and stretched on pins to dry. **-(Sp●n**.)

(64) T. A. M. asks: Is there any remedy for air holes in plaster of Paris casts for moulding rubtion of phonograph in SUPPLEMENT No. 133: does it ber stamps? A. By properly mixing the plaster air mean small rubber hose, and which way should they be holes may be avoided. Take about the quantity of placed, end ways or flat, and how many pieces? A. water required for mixing the batter, sprinkle into it the Small rubber tubing placed flatwise; it requires 4 or 5 plaster, allow it to settle to the bottom, pour off the surplus water, stir it carefully, and pour. After pouring, it is well to jar the type to liberate any air bubbles that

> (65) J. J. M. asks: Do you know anything better than borax for welding steel? A. The following has been suggested, but we cannot vouch for it: " Heat the pieces to be joined together, roll them in marble dust, and join them promptly, subjecting them to a good hammering." Should any of our correspondents find this a practicable method we should be pleased to hear from them.

> (66) C. G. writes: I have some cider which is boiled down; one quart of it may be diluted with 4 quarts of water and taste good. When I mix water with remedy it? A. Add a small quantity of calcium sulphite

> (67) O. A. S. asks: 1. What is the average cost of quicksilver by the cwt. or ton? A. Mercury it quoted at 55 cents per lb.; the cost varies considerably with the market. 2. Does the supply exceed the demand? A. No. 3. If by a new discovery it should become useful in large quantities generally over the United States, for mechanical purposes (I mean in addition to its present use-), what would be the prospect of procuring it? A Quicksilver mines are few in number. An increased demanchfor the metal would, for a time at least, proportionately increase its market value.

(68) P. J. N. asks if unleached wood ashes and Peruvian guano, say about half and half of each, may be mixed together for fertilizing purposes; or whether there are chemical properties in one which would neutralize the chemical properties in the other, and thus deteriorate their fertilizing value? I propose using this combination in the cultivation of the potato. A. The addition of a small quantity of the ashes to the manure used at the time of planting will prove advansoon as we throw in fresh coal and deaden the fire it tageous; the quantity mentioned would be excessive. commences to leak. The flues are rolled; if the flues Consult Johnston's "Agricultural Chemistry," and

column.

(33) A. F. B. asks: What is the length of taining it. 1 lb. of No. 28 copper wire? Also of 1 lb. of No. 24 copper wire? A. By Birmingham W. G., of No. 28 there would be 1686 34 feet; of No. 24, 683 feet. By American W. G., of No. 28 there would be about 1955 feet; of No. 24, there would be about 827 feet.

(34) M. F. S. asks: Will a fish placed in a pail of water increase the weight? The pail is supposed to be brimful. A. If the pail is so full that the water displaced by the fish runs over, the pail will weigh A. About sixty-five and one third United States gallons, the same as before, as the specific gravity of the fish is the same as that of water,

(35) J. V. A. asks: What are the proper dimensions for making a compound bar magnet capable of sustaining a weight of 20 lbs. ? A. Jamin by arranging together several thin plates magnetized to governor save for the purpose of changing the speed? port 15 times their own weight. The dimensions of a See SCIENTIFIC AMERICAN, vol. 31, p. 389. 3. In your magnet to support a given weight will vary greatly with opinion is it a detrimental practice for firemen to admit cylinder and 10 inch stroke. the quality of the steel from which it is made and the cold water on the hot ashes in the furnace to avoid dust treatment it receives.

(36) J. G. S. asks: What is the cause of (47) J. J. L. asks: 1. How long will mag- "Electric Pen," you say toward the end of the article is made to cohere by heating the mixture until the foaming in boilers, and what is the remody? My boiler i netized steel, with constant use, retain its magnetism? referred to: "The pen may readily be made far more shellac is melted.

(44) T. T. P. asks: Could a siphon be made to turn a water wheel with sufficient force to pump the spent water back and up to the proper elevation to again supply the siphon, thus causing the wheel to be kept in motion by the same water? If not, why not? A. No, because it would require a creation of power.

(45) L. W. Y. asks: How many gallons of fluid will 400 feet of 2 inch (inside diameter) pipe hold? (46) E. L. asks (1) how to ascertain the

speed of belting. A. Multiply the diameter of the pulley in feet by 3.1416 times the number of revolutions per minute. 2. Could you tell me the necessity of having the lever and ball attachment to the valve stem of a when cleaning fire? A. Yes.

leakage must be due to unequal expansion and contrac-

tion. Beading the tubes would probably remedy the trouble in a measure. How is your feed water introduced? Does not the starting or stopping of the feed affect the leakage?

(57) G. W. & S. ask: Is a belt in a half twist liable to slip as much as one running straight? A. If by half twist you mean running shafts at right angles to each other, the twist belt is more liable to slip. as it has less surface of contact with the pulleys

(58) F. C.-In experimenting with a magnetic motor 1 am at a lossfor a non-conducting material. The magnetism penetrates all substances I have been likely to answer my purpose? A. No.

(59) M. F. asks: Which of two engines has the most power according to steam consumed: one with saturation succeeded in making bar magnets which sup- A. The object is to render the governor more sensitive. an 8 inch diameter cylinder and 10 inch stroke, or one with a 7 inch diameter and 12 inch stroke? A. 8 inch

> (60) O. B. H. writes: In No. 8, Vol. XL. of the SCIENTIFIC AMERICAN, in the description of an

(69) B. A. M. asks: 1. By what means is glue maintained in the liquid state? A. Use strong acetic acid. 2. How is slating fluid or slating silica made? A. Dissolve water glass in boiling water to a thin syrup, and form into a paste with a mixture of equal parts of dry plaster of Paris and fine calcined clay passed through an 80 inch sieve. 3. What are the principal uses of silicate of soda, and how can it be made sufficiently fluid to flow easily? A. It is used extensively in the manufacture of artificial stone, in mortars, cements, and lutes, as a vehicle for pigments in fireproof paints and varnishes, in stereochromy, in soaps, and certain laundry preparations, in metallurgy able to find. Do you know of any non-conductor that is (as a flux, and in various laboratory operations. It may be dissolved and diluted with boiling water,

> (70) E. F. F. & H. S. P. write: In making the cakes of powdered carbon. peroxide of manganese, and gum lac, as expressed in SCIENTIFIC AMERICAN SUPPLEMENT, No. 159, page 2528. Fig. 48, how is the gum lac made to mix freely with the other ingredients? A. Gum shellac powdered is mixed with the peroxide of manganese and carbon in a dry state. The whole

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(71) W. S. writes: I have a breech loading shot gun which has had the browning taken off by salt water. I would like to ask how to stain gun bar rels a rich brown such as seen on our best guns. A. 1 Mix chloride of antimony to a thin cream with olive oil, and apply this uniformly to the warm iron. It should be left undisturbed until the re-quisite degree of color is developed. A few drops of nitric acid is sometimes added to the paste to haster the operation. 2. Nitric acid, 1/2 oz.; sweet spirits of niter, ½ oz.; spirits of wine, 1 oz.; cupric sulphate (blue vitriol), 2 oz.; chloride of iron tincture, 1 oz. water, 40 oz.; warm the water, dissolve in it the powdered copper salt, cool and add the other materials. Use the burnisher and scratch brush to produce the markings For polishing a piece of hard wood is used. Finish while warm with rather thin pale shellac varnish (colored with dragon's blood if desired), polished after dry ing with the hard wood polisher. The time required to properly brown the iron is about 24 hours. The iron should be scoured or cleaned with moistened lime be fore applying the browning composition.

MINERALS, ETC.-Specimens have been received from the following correspondents, and examined, with the results stated:

A. C. O.-No. 1. A serpentine rock. No. 2. Contains quartz, orthoclase, magnetic pyrites, and traces of copper glance. No. 3. Serpentine rock containing much iron sulphide. No 4. Quartzite and ferruginous earth or ocher.-G. H. P.-The silicious limestone (not shale containing bituminous matters offers no positive indica tions that petroleum exists in the locality in paying quantities; on the contrary, thousands of dollars have been lost by oil seekers in this rock. See chapters on petroleum in Professor Winchel's "Sketches of Creation."-J. S. F.-It appears to be a wax of the paraffine series (ozocerite or hatchettite). If found in large quan tities, of some value. Larger specimens are desirable to settle the question.

COMMUNICATIONS RECEIVED. On Perpetual Motion. By J. K. On the Gary Motor. By W. W. G. On the Analysis of some Ancient Pieces of Metal. By E. II. S. B. A Simple Ellipsograph. By S. W. B. On the Telephone. By F. F. P.

[OFFICIAL.]

INDEX OF INVENTIONS FOR WHICH

Letters Patent of the United States were Granted in the Week Ending February 25, 1879,

AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list. including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city.

Amalgamating ores, apparatus for, C. E. Ball 212,644 Basket, L. W. Beecher..... 212,58 Basket, S. Friend. 212,65 Bed bottom, spring, A. S. Burnham 212,65 Bed, invalid, Southard & Sears...... 212,757 Bolt, L. F. Burrell. 212,539 Book, copy, J. W. C. Gilnan 212,537 Book, copy, J. W. Wakeman. 212,577 Boot and shoe manufacture, P. Mann 212,717 Bott estopper and fastener, H. W. Putnam. 212,673 Bort G. Poren (a) 557
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n	Folding table, G. W. Low	212,56
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2	Heat and moisture regulator for factories, clec-	010 000
)	Heel shave, C. H. Brown	212,65
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	of railway carriage, J. N. Smith Journals of railway car axles, dressing, J. N. Smith Key fastener, Dopp & Walters	212,75, 212,75, 212,548 212,548 212,766 212,766 212,777 212,676 212,777 212,678 212,771 212,675 212,555 212,557 212,55
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	of railway carriage, J. N. Smith Journals of railway car axles, dressing, J. N. Smith Key fastener, Dopp & Walters	212,75 212,75 212,543 212,543 212,543 212,760 212,70 212,052 212,770 212,052 212,771 212,656 212,771 212,657 212,657 212,657 212,657 212,657 212,657 212,658 212,558 2
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	of railway carriage, J. N. Smith Journals of railway car axles, dressing, J. N. Smith Key fastener, Dopp & Walters. Lamp, J. H. Irwin	212,75 212,75 212,542 212,542 212,542 212,762 212,762 212,762 212,762 212,771 212,551 212,552 212,551 212,552 212,551 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,552 212,555
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	of railway carriage, J. N. Smith Journals of railway car axles, dressing, J. N. Smith Key fastener, Dopp & Walters	212,75 212,75 212,58 212,58 212,58 212,56 212,76 212,71 212,56 212,71 212,56 212,71 212,56 212,71 212,57 21
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