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The "Scientific American" Office, New York, is fitted with the Miniature Electric Telegraph. By touching little buttons on the desks of the managers signals are sent to persons in the various departments of the establishment. Cheap and effective. Splendid for shops, offices, dwellings. Works for any distance. Price \$6, with good Battery. F. C. Beach & Co., 246 Canal St., New York. Makers. Send for free illustrated Catalogue.

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The Original Skinner Portable Engine (Improved), 2 to 8 H.P. L. G. Skinner, Erie, Pa.

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Pipe and Bolt Threading Machines. Prices from \$80 upwards. Address Empire Manufacturing Company, 48 Gold Street, New York.

For best Bolt Cutter, at greatly reduced prices, address H. B. Brown & Co., 25 Whitney Avenue, New Haven, Conn.

For Solid Emery Wheels and Machinery, send to the Union Stone Co., Boston, Mass., for circular.

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

All Fruit-can Tools, Ferracote W k's, Bridgton, N. J.



E. W. P. will find a recipe for waterproof glue on p. 204, vol. 31.—J. M. B. will find a recipe for cement for wood and glass on p. 238, vol. 30.—J. A. L. will find directions for makingsun dials on p. 409, vol. 29.—E. I. will find a recipe for aquarium cement on p. 202, vol. 28.—E. A. H. will find directions for tinning iron on p. 362, vol. 31.—F. H. R. will find an answer to his question as to proportions of an oscillating engine on p. 359, vol. 32.—A. E. M. will find a recipe for filling for black walnut wood on p. 315, vol. 30.—E. S. H. will find details of a simple method of galvanizing iron on p. 348, vol. 31.—M. B. will find a recipe for a cement for leather on p. 119, vol. 28.—W. C. L. will find a recipe for shoe polish on p. 283, vol. 31.—E. R. B. can glid devices on china by the method described on p. 41, vol. 27.—J. B. Jr. can stain glass blue and red by following the directions on p. 390, vol. 30.—G. O. Jr. will find an explanation of the silvering on glass mystery on pp. 267, 331, vol. 31.—J. K. will find directions for making a cool chamber on p. 251, vol. 31.—H. H. can polish tortoiseshell by following the directions on p. 122, vol. 27.—P. F. T.'s literary queries are not in our line.—M. G. F. can coat iron castings with copper by the process described on p. 90, vol. 31.—P. & Co. can enamel iron by the methods given on p. 362, vol. 32.—L. K. Y. will find a recipe for cement for leather on p. 119, vol. 28.

(1) A. F. A. asks: Would a meniscus lens 1 1/2 inches in diameter, of 6 inches focus, do for a camera for taking photographs? A. Yes, with a stop in front of lens.

(2) C. S. asks: 1. How many times the focus of the lens must a radiant be placed so that the rays may reach the lens sufficiently parallel to form an accurate image at the principal focus? A. At finite distances the image is found at the shorter conjugate focus. 2. In testing an achromatic, while correcting for spherical aberration, is there any means of knowing on what surface the local correction should be made? A. The outer surface. The modern practice is to slightly under correct for color, the spherical aberration being entirely removed. 3. If you will favor us with some practical points in the testing and centering of achromatics, going into details, you will do a great deal for us who are interested in optical experiments, by saving us numerous failures merely from our want of knowledge. A. To test an achromatic, remove the eyepiece and look at the objective lighted by the full moon. Every streak, bubble, or scratch will appear. To center the objective glass, put on the cap, place a candle flame at the focus, and tip the glass by bits of tinfoil until the reflected images seen through the blue cone are coincident. Repeat, revolving the tube 90° at a time. In testing for spherical aberration, the images must be sharp, and blurred quickly by a slight movement of eyepiece. Drops of mercury in the sun make a good test object. The test for achromatism: The edge of moon must be claret purple inside the focus and yellowish green outside, colorless when most distinct. Remember that the Huyghenian eyepiece shows color at the edges.

(3) S. asks: 1. How long after interment in the usual mode can human remains be identified? A. The time depends on the nature of the soil. 2. Are the skulls and bones of savage races more enduring in the earth than those of civilized races? A. No.

(4) J. S. C. asks: What will remove the stain of linseed oil from white cotton material? A. Try a little benzine or benzole.

(5) I. McL. asks: When phosphide of calcium is put into water, does the base reduce to powder (simultaneously with the evolution of sulphuretted hydrogen) or does it remain solid? A. The hypophosphite formed is readily soluble in water and goes into solution immediately on formation.

(6) F. W. D. says: I am experimenting in photography, and meet with pretty good success in taking negatives; but when I come to fix the prints, the operation baffles me. I have made a silver bath for the prints in two or three different ways, and the result is the same in every case, namely, the print will always turn to a tan color, instead of remaining black or dark purple. My fixing solution is hyposulphite of soda and water, dissolved in proportions varying from 8 ozs. in 1 quart water to 8 ozs. in 3 quarts water. I leave the prints in the fixing solution about 15 minutes; but they turn within a minute or two. I do not think the fault is in the printing, for I have exposed them till they were so dark as to be almost imperceptible. Where is the difficulty? A. This brick red color will always be found in ordinary silver prints. To obtain this required depth of color it is necessary to subject the print to a toning process, with chloride of gold, or with sulphur, as described in answer to W. P. K., p. 409, vol. 32.

(7) W. P. S. asks: In parts of the west, lightning rods are not insulated but built in the substance of the building. Would it not be equally safe and much cheaper to insert platinum points from the most elevated parts of the building? A. The rods should not be insulated. Platinum points neither add tonor diminish the safety. No rod is safe unless it is continuous, and is connected at its lower end with a large amount of metal or conducting material to the ground.

(8) W. P. H. asks: Do you know of any means by which writing on old parchment can be brought out so as to be legible? A. Cover the letters with powdered ferrocyanide of potassium, with the addition of a little dilute muriatic or nitric acid. This treatment will cause the letters to immediately change to a beautiful deep blue color of great intensity. The superfluous fluid may then be immediately absorbed by the application of the edge of a piece of blotting paper, carefully handled so as not to erase the letters, which are at first very soft, and also to avoid staining the manuscript.

(9) W. W. R. asks: Can I make a cheap microscope, powerful enough to show the sap cells in hard and soft woods, such as maple, pine, spruce, etc.? What lenses do I want, and how shall I place them? A. Showing the sap cells of wood depends more on the preparation of the wood than on the power of the lens. You must cut very fine shavings (best done with a razor) in three ways, across the fiber, parallel to the fiber and with the year rings, and parallel to the fiber and across the year rings. Each shows the cells in a particular way; and by combining the observations, you can obtain the best idea of the cell structure. It takes only a weak power to see these cells. But do not attempt to make a microscope; rather buy one. A small microscope, that is, one with a single lens, will answer, and this costs so little that it would be time lost to attempt to make lenses. If you can buy a very small lens of short focus, that is, with sharp curves, you may easily mount it in a stand; and a simple trial will soon show you where to place the lens and the object.

(10) I. K. says: In a dispute upon the subject of electricity, my friend said that it was a force, and I said it was a substance. Which is right? A. This is a question about which the best electricians disagree.

(11) W. P. asks: In making sulphur molds, what is used to harden the sulphur and take away the brittleness? A. We do not know of anything that satisfactorily fulfils both these requirements.

(12) C. G. V. P. says: Pounded glass dusted on fresh paint makes a beautiful effect for ornamental work. Is such glass an article of trade? A. The substance known as pounded glass is manufactured in the glass house by dipping the end of the ordinary long metallic tube into the pot of pasty or semi-fluid glass in the furnace, when on removing the rod a ball of the pasty material remains attached to its extremity. This is blown by the workman into a huge bubble, and until the sides approach the thinness of the soap bubble film, when an additional puff of air into its interior from his lungs causes it to burst and fall in minute spangles and dust into a proper receptacle prepared for them.

(13) E. E. D. asks: How can I make a camera lucida? A. The simplest form of this instrument consists of a thick and finely polished piece of plate glass placed perpendicular to the drawing board and also to the body of the draftsman. The picture or design which it is wished to reproduce is placed with its back upon the board at one side of the glass plate, while the paper for the reproduction is placed in like manner upon the opposite side. On looking at the glass plate from above, and slightly on that side upon which the design lies, an image of the same is distinctly seen, apparently on the drawing paper on the opposite side of the plate.

(14) B. D. asks: Can a lithographer perfect the corners, turns, shading, etc., of imperfect writing? A. Yes.

1. In a new schoolroom the blackboards, painted on brick walls, sweat so much that they become useless for several days. The room is on the lower floor, out not in a basement. Can you give me the cause, with a remedy to prevent it? A. It is very likely due to the fact that the walls have not yet become thoroughly seasoned. Keep the interior of the room at as warm a temperature as possible until the annoyance is dissipated. 2. I have a prescription for painting blackboards in which spirits and spirit varnish are both mentioned. Please tell me the difference between them. Is not spirits another name for alcohol? A. Spirit varnish is probably a solution of shellac in alcohol. Alcohol is commonly called spirits.

Is there any method, process, or ingredient that will keep ink from freezing? A. Ink may be preserved from freezing by enveloping the vessel containing it in some non-conducting substance, such as straw, sawdust, or woolen fabrics.

(15) T. S. G. asks: How high can a pump draw water up a tube? Can it draw over 33 feet? A. No: 33 feet is the highest. The pump should never be more than 28 feet from the water, and even then it requires a first-rate pump to suck water.

(16) F. A. B. asks: What are the ingredients for glazing earthen or crockery ware? A. For ordinary earthenware use the following: White sand 40 lbs., pearlash 21 lbs., and common salt 15 lbs. Calcine them for some time over a moderate fire, and when the mixture is cold grind to a very fine powder. When wanted, temper it with water, and it will be ready for use.

(17) W. E. T. asks: Is there any preparation for silver plating iron? A. Yes. See pp. 84 and 405, vol. 32.

How can I take ink stains out of leather? A. Try a little oxalic acid in water.

(18) F. S. asks: How can I cut glass tubing easily and without difficulty by first scoring it all the way around, at the point where the separation is desired, by means of a small three-cornered file. The tube is then grasped firmly with both hands on either side of the file mark, with the thumbs approaching it on opposite sides to within about an eighth of an inch; a quick and firm pressure

with both thumbs, simultaneously, while the rest of the hand remains in position, will do the work satisfactorily. To remove the sharp edges of the severed tube, it is only necessary to hold its ends alternately in the flame of a spirit lamp or Bunsen burner for a few minutes.

(19) A. L. B. asks: 1. What is citrate of magnesia? A. It is a combination of citric acid (acid of lemons) with magnesia. 2. How is it made? A. It may be formed by decomposing the carbonate of magnesia by a hot aqueous solution of citric acid. 3. What are its properties? A. It is used medicinally as a mild laxative.

(20) E. L. G. asks: Is there a cheap way of producing an electric light to be used for 12 hours? A. A suitable light for your purpose would require an electromotive force equal to about 50 Grove or Bunsen cells. The cost of such a light (derived from the consumption of zinc, etc., in the battery), for the period of time that you mention, would be considerable. The electric light may now, however, be obtained at a very moderate cost, by means of a Gramme's machine, driven by a small steam engine or other available power. In this case the electric energy is not obtained by chemical action, but by the direct conversion of mechanical motion into electricity.

(21) B. F. T. asks: Is the heaviest coal the best? A. Not always. The impurities contained in coal very materially affect the specific gravity.

(22) C. D. asks: How can I transfer printed letters to silver or silver plate for engravings? A. Try the process of daguerreotypy.

(23) M. S. W. says: I desire to utilize the escape steam of an engine 12x48 inches, working at 75 lbs. pressure, by passing it through copper pipes placed in a wooden tank 25 feet long by 36 inches wide. I use a 4 1/2 inch exhaust pipe of copper, which I propose to connect with two 4 1/2 inch copper pipes that will run round in the tank. 1. Shall I, in this arrangement, utilize much heat? A. You can utilize a considerable portion of the heat in the exhaust steam by this method. 2. Will this make much back pressure on my engine? A. Not materially. 3. Would you advise a steam trap? A. A trap will render the apparatus more efficient.

(24) J. C. H. says: I have a 1 horse power engine and vertical boiler. The boiler is 18 inches in diameter, 32 inches high, with firebox 15 inches diameter, 16 inches high, and 24 half inch tubes 16 inches long. In using wood or coke for fuel it works very well, but I desire to use soft coal because it saves firing so often. One day's use of soft coal stops the tubes up with soot, so that they require to be cleaned every day. How can I remedy it? A. Try the plan of dampening the coal a little before firing.

(25) J. M. asks: What size of boiler will suit a 15 feet long boat with a 15 inch diameter screw propeller, and of what size should the cylinder be? A. Cylinder 24x4 inches. Boiler with 40 to 50 square feet of efficient heating surface.

(26) E. R. says: A mill takes its supply of water from a well that is dug to the depth of 45 feet, and bored 50 feet further; the well does not supply sufficient water, and I propose to remedy it by closing the top of the well airtight, and conducting the exhaust steam of the engine into the well at the top, then suspending a pipe of same size as pipe from engine from the top to within 3 or 4 feet from the bottom of the well, and connecting the top of this pipe with the open air by means of another pipe. The well being 5 feet in diameter, the steam would be brought in contact with over 700 square feet of rock condensing surface, which would, I believe, condense the greater part of the steam, or enough to supply the deficiency. How will this arrangement do? A. Your idea strikes us very favorably.

(27) H. E. S. asks: Is the pressure of water greater on the bottom of a tube that is twice the diameter at the top than it is at the bottom, than in a tube that is the same diameter through the whole length? A. If the height of water in each tube is the same, the pressure on the bottom of each, per unit of surface, is also the same.

(28) J. M. S.—The Chicago newspaper referred to had no authority for saying that the Patent Office had sets of from 20 to 25 volumes of annual reports, which parties could have mailed to them by addressing the Commissioner, enclosing a small fee to cover postage. The reports remaining in the Patent Office are not of a connected series, being mostly for years between 1859 and 1862. These are of no real service in looking up inventions, and, without subsequent volumes, are a delusion and a snare to any who are searching for reliable information as to patents issued. The best way is to employ some one accustomed to making searches in the Patent Office to examine and report if an invention is probably patentable. By sending a model, drawing, or photograph, accompanied with description and a fee of \$5 to the office of this paper, such examination will be made and a written report sent by mail to any part of the world.

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

R. B.—It is iron pyrites.—W. R. W.—Your specimen of tree lice is, so far as we know, undescribed. We have sent it to the Department of Agriculture, Washington, D. C.—W. H. M.—They are fossils, consisting of siliceous, clay, and oxide of iron, but not sufficient to make an ore.—J. C. W.—The clay is worthless for making porcelain.—J. McW.—They are specimens of quartz and serpentine, of no value.—J. G. McM.—It is hematite.—W. M. S.—We did not detect nickel.

Correspondents who send specimens of minerals, well waters, entomological and botanical subjects, etc., for examination, should carefully and legibly mark the package or box containing the

same with the sender's name. Much confusion and trouble is often caused by such unmarked packages becoming separated from the letters sent with them.

W. B. H. asks: When is the best time for moving grape vines?—S. asks; How can I make a red, blue, and white stencil ink, such as is used for marking boxes, etc.?—C. L. S. and others ask: How can I make transfer paper for marking linen indelibly? It is used in this way: Place the transfer paper upon the linen to be marked, and over that place a piece of ordinary white writing paper, and mark with a lead or slate pencil or stiletto. Heat the writing with a moderately hot flat iron for two or three minutes, and it is permanent.—W. F. W. asks: What prevents bees from swarming, and what will induce them to swarm?

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

On the Keely Motor. By J. C., by E. T., by J. J. A., by O., by C. F., by W. L. D., by B. K., and by J. C. H. On Evergreens in Orchards. By F. R. E. On Tides in the Gulf of Mexico. By T. H. On Powder Mill Explosions. By J. M. On the Spider's Web. By S. T. W. On Melting Iron. By T. H. A. On Spring Power for Cars. By F. G. W. On a Singular Electrical Phenomenon. By T. P. C.

Also inquiries and answers from the following: G. H. B.—F. H.—J. D. C.—C. C.—J. D. S.—C. B. B.—H. G. W.—D. A. W.—R. C. T.—R. C. C.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who buys rare coins? Who makes wooden screw bungs? Who builds bridges? Where can molds for ornamental vases be obtained? Who sells pure platinum? Who sells engraver's tools?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH Letters Patent of the United States were Granted in the Week ending June 29, 1875, AND EACH BEARING THAT DATE.

(Those marked (r) are renewed patents.)

Table listing inventions and their patent numbers, including items like Addressing machine, Air compressor valve, Anchor, Bale tie, Band fastener, Basket, Broom, Carriage seat, and many others.

Main table of inventions and patent numbers, covering various mechanical and scientific devices like Radiator, Saw frame, Steam boiler, and others.

Table listing patentees and dates, such as J. C. Rorick, W. A. Beaudry, S. Spencer, and others, along with their respective patent dates.

DESIGNS PATENTED.

Table listing patented designs, including Carpets, Piano stools, Stoves, Pottery, Buttons, and others.

SCHEDULE OF PATENT FEES.

Table detailing patent fees: On each Caveat \$10, On each Trade mark \$25, On filing each application for a Patent \$15, etc.

CANADIAN PATENTS.

Table listing Canadian patents granted from June 18 to July 7, 1875, including patents for cart saddles, rock-drilling machines, and other machinery.

Advertisements section including "For Sale, Cheap" for engines and boilers, "TWIN NOZZLE" for steam engines, and "AGENTS WANTED" for a medicine.