

Business and Personal.

The charge for insertion under this head is One Dollar a line for each insertion; about eight words to a line.

"U. S." metal polish. Indianapolis. Samples free. For mud dredging engines. J. S. Mundy, Newark, N. J.

Agricultural patent for sale.—P. J. Ebersohl, Center-ville Station, Ill.

Cheapest Water Power.—See top of 1st column, page 170. Also top of 2d column, page 239.

Bookbinding.—All classes of work. Magazines a specialty. Haddon & Co., 129 Center St., New York.

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

Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Laight and Canal Sts., New York.

Centrifugal Pumps. Capacity, 100 to 40,000 gals. per minute. All sizes in stock. Irvin Van Wie, Syracuse, N. Y.

Emerson, Smith & Co., Ltd., Beaver Falls, Pa., will send Sawyer's Hand Book on Circulars and Band Saws free to any address.

Guild & Garrison, Brooklyn, N. Y., manufacture steam pumps, vacuum pumps, vacuum apparatus, air pumps, acid blowers, filter press pumps, etc.

Patent for Sale—Stall for comfort and cleanliness of milk cattle. Agents wanted at 50 per cent commission. M. Schembri, 386 Van Buren St., St. Paul, Minn.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4; Munn & Co., publishers, 36 Broadway, N. Y.

For the original Bogardus Universal Eccentric Mill, Foot and Power Presses, Drills, Shears, etc., address J. S. & G. F. Simpson, 26 to 36 Rodney St., Brooklyn, N. Y.

Patent Electric Vise. What is claimed, is time saving. No turning of handle to bring jaws to the work, simply one sliding movement. Capital Mach. Tool Co., Auburn, N. Y.

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

Notes & 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 This is for our information and not for publication.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.

(5974) J. E. E. asks: 1. Could storage battery plates be made porous by making them of lead and zinc melted together and afterward eating the zinc out with acid? A. It is doubtful.

(5975) I. A. H. asks: Is the electric spark the passage of a mass of electrified matter, or a current through rarefied air similar to a Geissler's tube? If neither, what is it?

(5976) H. E. says: Kindly give me a recipe for destroying moths and worms, such as infest upholstered furniture and ruin carpets.

A. Alcohol.....500 parts. Naphthaline.....10 " Carbolic acid.....10 " Camphor.....5 " Essence lemon.....5 " Oils of thyme, lavender and savine (of each).....2 "

This can be used by sprinkling over furs, clothes, carpets, furniture, etc., or, better still, by application by a spray producer.

(5977) P. M. asks (1) if the current from an induction coil would be of any use if it was constant. A. Yes; it might be desirable for some work. 2. Is the current from an induction coil the same as that of an alternating current dynamo?

(5978) T. R. E. writes: 1. I have a piece of pyrites I overheat trying to solder a scarf pin to it. Is there any way to get it back to its bright color again? A. You cannot restore the color and luster. Use cement

for pyrites, you cannot solder it. 2. How can I drill a hole through it? A. For drilling, use a diamond drill. 3. Suppose a box car is running 30 miles an hour, doors shut tight. A man jumps on the floor with and against the motion; can he jump one way further than the other? A. The person jumping in a car can jump no further one way than another.

(5979) E. W. M. asks: 1. Is there any serious difficulty in charging a storage battery of 30 cells, arranged in three parallel series of ten each, and discharging them all in series, provided all the cells are as nearly alike as possible and the several series as nearly as possible of the same resistance? A. There is a difficulty. It is advisable to charge them in three series, one series at a time, if you cannot charge the whole number in series at once.

(5980) W. A. S. asks how to stain a gun barrel. A. Clean the barrel thoroughly, then sponge with the following solution which is made up by weight: Antimony protochloride, 4 parts; sulphuric acid, 2 parts; empyreumatic pyroigneous acid or gallic acid, 1 part. Apply several coats until the barrel is dark enough.

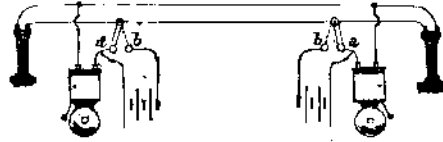
(5981) C. W. T. says: We have a number of small water motors here, and I desire to get at the amount of water used by them. What is the volume of discharge in cubic feet or gallons, due to 50 pounds pressure, or a head of 118 feet, from respectively 1-16 inch, 1/8 inch and 1/4 inch nozzles, of the kind usual in small motors?

(5982) F. M. B. asks how to make a cheap single coil electric sander and the materials needed. A. Make a core of bits of iron wire each 2 inches long, the bundle being 3/4 inch thick. Glue paper around it and wind with four or five layers No. 20 wire. As armature use an iron nut soldered to the end of a spring. Bend the lower half inch of the spring at a right angle and screw to base board. Mount the magnet horizontally on a block screwed to the board.

(5983) A. M. R., Toronto, asks for the best method of dealing with water supply pipes to prevent condensation of moisture in passing through warm apartments, or secondly (if it cannot be prevented) the best plan to protect wall or ceiling from the dripping of the water. A. Thorough felting of the pipes, the same as with steam pipes, will prevent dripping of water.

(5984) J. K. asks: If the balance wheel on machinery run by an electric motor was changed from the main shaft as now run, making 40 revolutions per minute, to the intermediate, making 120 revolutions per minute, what would be the gain in power to overcome loads suddenly thrown on the main line, as compared to the present arrangement? A. It would have nine times the energy.

(5985) F. H. W. asks if there is any way that two hand telephones (receivers) can be connected by two wires only, and no ground, between two stations, and to signal with a two-point switch at each station, without using a push button with the battery and bell call; there are to be a set of batteries and bell at each station. What I want to accomplish is to have or give the signal to the distant station by simply moving the switch over and back. As the line is not very long (about 100 feet), I do not care to use a magneto, and if it can be done by only two wires, and no ground, with a two-point switch, I should like to know the way; otherwise I will use three wires, as there is no good means to make a ground connection. A. The annexed cut will give you an idea of the method of connecting up the required circuit. The normal position of the switch would be on the



point, a, connected with the bell. When it is desired to call, the switch arm is moved over to the contact, b; after the call is answered, the switch arm at either end of the telephone line is thrown off from the point, b, and left open. As soon as the conversation is finished, the arms are returned to the point, a.

(5986) C. W. H. asks (1) whether a magneto telephone will work on the same line with an electric telephone? A. Yes. 2. Also please give a diagram of a magneto telephone on a line 1,000 feet long with common electric bells for calls. Please give the diagram with the smallest number of line wires possible. A. See reply to query above.

(5987) J. S. M. asks: 1. On a common slide valve engine, cylinder 12+18 inch, how large ought the steam and exhaust pipe be? Is it best to have the exhaust pipe larger than the steam pipe? If so, how much larger? A. The speed of the engine is also an indication of the size of the steam and exhaust pipe. If your engine is to run at 30 revolutions and under a 2 1/2 inch steam pipe and 3 inch exhaust pipe will be the proper size. If a high speed engine of from 125 to 150 revolutions per minute, a 3 inch steam and 3 1/2 inch exhaust pipe will be the proper sizes. 2. How fast can a cast iron band wheel 7 feet diameter, rim 14 inches wide, and 1 1/2 inch thick, be run with safety? A. The band wheel as stated, if a solid

casting and sound, will be run at a velocity of 400 revolutions per minute with safety. If a split pulley with a bolted rim, it should not be trusted for more than one-half the velocity above stated. 3. Will lime in a boiler cause the tubes to leak? If so, what is the best remedy? A. Lime does not make boiler tubes leak, unless it should become so thick as to cause the tubes to become overheated and by their expansion disturb the joints. Boilers in limestone districts should be treated to a dose of caustic soda or lye, say at the rate of a pound for each 5 horse power, as often as once a month, kept in the boiler for a day's working and the boiler then thoroughly cleaned. See Davis' book on "Boiler Incrustation," \$1.50 by mail. 4. Some boiler makers tell me that in putting new tubes in a fire box boiler it is best to let the tubes extend out past the tube sheet 1/8 or 3/4 inch; expand to them without beading them. Others say it is best to have them the proper length and bead them down on tubesheet. Which is the best and most durable way? A. Tubes of locomotive boilers at the fire box end, if well expanded and projecting ends turned slightly out, should project no more than 1/4 of an inch. If left longer, they are liable to be burned and become ragged on the edge. Close beading the end of the tube is old style, and should be abandoned. The beading tends to disturb the perfect joint made by expanding. 5. What is caustic soda, and where can I get it? There is not a merchant in all this country that can tell what it is or where it can be bought. A. It is sold as caustic lye or caustic potash. It is sodium hydrate.

(5988) W. W. W. asks: 1. What is the principle on which cream separators work, that is, how is the milk separated from the cream? A. The difference in specific gravity causes the separation. Long standing or centrifugal force may be applied. 2. What is the best way to learn electrical engineering—to take a college course or to enter an electrical establishment? If the latter is the better, please tell me what course to adopt to get into one. A. Go to a college. For courses in factories apply to the General Electric Co., Lynn, Mass., and Schenectady, N. Y. 3. Where is Lake Copais, spoken of in your last SCIENTIFIC AMERICAN? A. Lake Copais is situated in Greece.

TO INVENTORS.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

April 17, 1894,

AND EACH BEARING THAT DATE.

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

Table listing various inventions and their corresponding patent numbers. Entries include: Acid, apparatus for distributing carbonic, E. Ruedl; Air heating apparatus, Hay & Kearns; Alarm, fire; Amalgamating ores, method of and apparatus; Ammonia liquor, apparatus for causticizing, E. Solvay; Animal trap, F. J. Bragunier; Armature, electric motor, H. P. Brown; Armature for dynamo-electric machines, E. Thompson; Automobile, J. W. Fry; Axle box car, G. W. Griffiths; Axle box dust guard, T. H. Symington; Axle box dust guard, C. W. Wright; Axle lubricator, car, W. H. Wright; Bag, See Hand bag; Ballot box, H. E. Niebur; Bolt cut, G. A. Hart; Bearing, anti-friction ball, H. La Casse; Bearing for shafts of lawn mowers, E. G. Passmore; Bearing for wheels, etc., thrust, J. S. Chace; Beverages, apparatus for making carbonated, J. McKeay & Co.; Bicycle, H. La Casse; Bicycle, C. E. Whitaker; Bicycle crank, F. J. Ide; Bicycle, folding, M. B. Ryan; Bicycle lock attachment, W. & S. H. Lamb, Jr.; Bicycle stand, F. B. Mueller; Billiard cue, C. Hart; Billiard tables, device for marking balk-lines on, S. S. Harman; Blind stop, L. Jobin; Board, See Drygoods board; Boat, See Paddlewheel boat; Boiler, See Steam boiler; Bolt cut, G. A. Hart & Eilers; Bolt socket, B. Heymanson; Book, duplicating order, E. D. Gibbs; Book rack, G. W. Parker; Boot or shoe uppers, machine for creasing, G. Knight; Boring machine, Meggenbofen & Courtright; Bolt washer, J. V. Ramsey; Bottles, machine for removing tin foil from, E. Rantz; Bottling machine, R. Kolliker; Box, See Ballot box, Collapsible box, Twine box; Box cover, adjustable, G. W. Stoker; Brake, See Car brake; Brick machine mould, J. Leonhardt; Brick machine plunger, J. Leonhardt; Bridle, J. R. McLeod; Broiler, W. Hailes; Brush, revolving cleaning, W. R. Nightingale; Bunting machine, Hutchinson & Tyler; Burglar alarm, McLaughlin & Gallant; Burtal casket, Stein & Happlayea; Burner, See Gas burner, Hydrocarbon burner; Button finishing machine, H. A. Berger; Cabinet, parasol or umbrella, A. Bever; Car, G. A. Hart; Calculating machine, S. E. Stalard; Calculator for wages, D. L. Albert; Can, See Oil can, Sheet metal can; Car brake, F. E. Gilling; Car coupling, W. Dunlap; Car coupling, J. V. Hart; Car coupling, J. W. Ramsey; Car, electric motor, H. P. Brown; Car fender, tram, F. S. Hogg; Car grain door, box, C. F. Langell; Car, mail or express, C. Zimmerman; Car starter and brake, C. H. O. Levernus; Car ventilator, G. A. Boyden; Car, controller for electric railway, W. H. Knight; Cars, safety wrench for, unloading, T. Nicholson, Jr.; Case, See Preserving case.