(31) J. L. W. asks: How can I prevent the twisting of belts? A. By using a good quality of belting, setting the pulley true, and lacing the belt even and straight.

(32) G. W. G. says: 1. I am about building a steam yacht 36 feet long and of 7 feet beam. Are there any objections to using iron for the hull? A. We see no objection to using iron. 2. Of what thickness should the iron be? A. About ⅛ of an inch thick, or less. 3. Would galvanized iron be the best? A. Galvanized iron will be best on many accounts. 4. Would it be advisable to use side wheels? A. If the boat is to be generally run in smooth water, side wheels will answer well.

(33) J. B. F. asks: What shall I use on the point of a small drill to prevent it from clogging and heating, in boring copper, silver, and gold? A. Lard oil.

(34) R. B. says: I sent you last June the dimensions of a tow boat I was building. At her first trial trip we started out with 65 lbs. of steam, and made the run of 2 miles in 11 minutes, the propeller making 109 revolutions per minute, and the steam being cut off at $\frac{9}{16}$ of the stroke. She has a been running and towing ever since, and has proved herself to be one of the best boats in Baltimore. She has towed a three-masted schooner, laden with 750 tuns of coal, 20 miles in 3½ hours, and made the run back in 2 hours. She has a 16 x 16 inch square cylinder. Her dimensions are as follows: Length 60 feet over all, width 14 feet, depth of hold amidships 7 feet. She draws 7 feet 4 inches water aft and 4 feet forward. Her propeller is 6 feet in diameter. She cost about $9,000, complete. A. You seem to have a very satisfactory and powerful boat. We are much obliged for your letter.

(35) F. M. L. L. says: What kind of power is best for operating coal-mining machines? A. Compressed air or steam.

(36) F. W. B. says: Wishing to build a dam and to put up a mill, and having on hand a 24 inch turbine wheel, I desire to learn if, by suitable gearing, I can use the wheel for the small amount of work to be done, say not over 5 hours grinding per day, or from 20 to 30 bushels? The head of water is from 20 to 25 feet. A. As you have a wheel that can exert more power than is needed, you will scarcely experience much trouble in reducing the effect somewhat.

(37) E. B. asks: What is the best method of straightening stencil plates, after cutting the letters, so that they will lay flat on the work? A. Place each plate on a large block of wood, then straighten it with a small block of wood and a light hammer.

(38) S. K. J. says: In your issue of January 1, you speak of the conductor in Mr. Edison's experiments not requiring insulation, and say that it may be wound round large bodies of metal. Will these bodies of metal, round which it is wound, yield the spark? That is to say, will the "etheric" fluid leave its conductor and pass to the mass of metal, and can the spark be obtained from the mass? So also in the case where it has trailed along the ground, or in the water: can the spark be obtained from the ground or the water? Its practical application depends on this very important point. A. It is now generally believed that the "new force" referred to is electricity, consequently it should be subject to electrical laws. Provided insulation is good, we would, therefore, expect to obtain sparks by induction from the bodies about which the wire is wound.

(39) W. K. asks: What is the best remedy for leaks round the flues and seams of a steam boiler? A. Caulk the leaks.

(40) J. H. L. asks: 1. How are the electro-magnets in the Gramme magneto electric machine wound, to make the poles come in their centers? A. The armature coils are wound separately, the inside end of one coil being connected to the outside end of the one next following. Wires also lead from the junctions to strips of metal attached to a cylinder of some insulating substance. The latter is placed on the armature axis. The coils, for what are called the "field magnets," are all wound one way, but the connections are so arranged that north and south poles come on opposite sides of the armature. If coils with like ends pointing in one direction are put on a magnet, similar poles will be produced at opposite ends of the latter when the inside ends of the coils are connected together and the outside ends joined to a battery. 2. Why could not the frame and magnets be cast in one piece, making the magnets of cast iron? There would be no work on this part but to bore out the journals and cover parts intended for the electro-magnets with copper, thus saving considerable cost. A. They are now made that way.

(41) R. B. asks: Which is the correct way to connect a throttle valve on an engine, that is, which end of the valve should take the steam first? A. The steam should enter on the underneath side of the valve, so that it can be packed whether the steam is on or off.

(42) J. N. P. says: In an article in your issue of January 29, the writer claims that the breakage of band saws is due to the saw being obliged to turn a wheel or pulley, which causes friction, straining of the saw, etc. Could not that be very easily remedied by turning the pulleys by a mechanical movement, independent of the saw? A. The device mentioned is already in use. Another and a beautiful device supplies the supplementary outer rim on the upper or loose pulley. The friction of the supplementary rim is sufficient to turn the loose or upper wheel. But when the lower or driving wheel is stopped suddenly, the upper or loose wheel turns inside of the supplementary rim, which effectually prevents the sudden jerk on a thin narrow blade, which causes most of the breakage. Another device is to belt from the shaft of the driver to that of the upper or loose wheel shaft, so that, when the lower shaft is suddenly stopped, the belt stops the upper one also.—J. E. E., of Pa.

(43) L. R. asks: What is the best substance as a non-conductor of heat, which can be packed in a cavity in iron? A. A mixture of ⅔ plaster of Paris and ⅓ alum is a good one.

(44) O. H. Y. asks: What is the fastest speed at which it is safe to run circular saws? A. Nine thousand feet per minute, that is, nearly two miles per minute, for the rim of a circular saw to travel, may be laid down as a rule. For example: Run a saw 12 inches in diameter, 3 feet around the rim, at 3,000 revolutions; 24 inches in diameter, or 6 feet around the rim, at 1,500 revolutions; 3 feet in diameter, or 9 feet around the rim, at 1,000 revolutions; 4 feet in diameter, or 12 feet around the rim, at 750 revolutions; 5 feet in diameter, or 15 feet around the rim, at 600 revolutions. Of course it is understood that the rim of the saw will run a little faster than this reckoning, on account of the circumference being more than three times as large as the diameter. Shingle and some other saws, riveted to a cast iron collar or very thick at the center and thin at the rim, may be run with safety at a greater speed.

(45) E. D. E. asks; 1. What is the smallest shaft, 14 inches in length, that I can put in a steam engine, the crank being 2 inches long and the pressure on the end 600 lbs.? A. Use a 1½ inch shaft. 2. What is the best iron for the purpose? A. Low Moor iron or Ulster iron.

(46) G. B. C. asks: Can you give me a good recipe for lathe cement, for holding small articles? A. Use beeswax 1 oz., resin ½ oz., pitch ½ oz.; melt, and stir in fine brickdust.

(47) D. L. R. asks: After a current of electricity has passed through an electro-magnetic engine and done its work, what becomes of it? Does it not pass on in its circuit? If it does, why will it not run another engine of same capacity? A. The energy is absorbed in performing the work.

(48) G. S. D. asks: 1. Will a magnet, placed near a piece of iron or steel, impart its magnetism to the iron and steel to that extent that an equilibrium between the two bodies will take place, and so that neither will have any power to attract the other? A. No. If the iron or steel is free from magnetism, there will be attraction; if not, there will be attraction or repulsion: attraction when unlike poles are opposed, repulsion in the opposite case. 2. Will an artificial magnet always retain its magnetism in full force, without any loss from any cause? A. No, unless special precautions are taken with regard to it. 3. Is an artificial magnet as strong as a natural one? A. Artificial magnets can be made with power greatly exceeding that of natural magnets.

(49) T. P. says: Joshua Rose writes the most interesting articles in your journal. This makes it a pity that he should say that, to divide the circumference of a circle into 60 equal parts, "we have only to divide the radius of our circle into 10 equal parts to get the required distance." A. In "Practical Mechanism," No. XLI, the division of the radius of a circle was given as an aid to setting the compasses approximately; it was not intended to imply that by such a rule the compasses could be set correctly to the exact distance. We are obliged to T. P. and other correspondents for calling our attention to the matter.

(50) W. S. says, in reply to J. B. R., who asked for a solution to clean articles after brazing: I have succeeded by dipping, while hot, into a dilution of sulphuric acid in water.

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

G. H. S.—It consists mainly of sesquioxide of iron and silex.—R. B. J.—It is argentiferous galena.—S. P. W.—Write to Professor C. D. Cope, Corresponding Secretary of the Academy of Natural Sciences, Philadelphia. The petrefied wood is not rare enough to be of much value.

S. asks: What amount of flour of both grades is contained in a bushel of good wheat, and how much bran and other refuse?—H. V. says: We get from a cow milk of which the cream is of a light red color, as if there were blood in it. Can any one tell me the cause and the remedy?—G. W. C. asks: How can I repair a rubber comb?—S. asks: Is there any veterinary college in America?—H. G. H. asks: How can I make the flexible composition of which toy heads are made, which looks somewhat like vulcanized rubber?

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 Ocean. By C. O.
On Spontaneous Generation. By S. R.
On Cleaning Chimneys. By W. P. E.
On a New Motor. By A. F. G.
On the Mississippi Jetties. By E. G. F.
On the Life of Matter. By J. R.
On a Pneumatic Tube and Carrier. By A. B. H.

Also inquiries and answers from the following:

B. M. Jr.—C. P. S.—J. E.—W. S. M.—J. L.—Z. & S.—W. C.—C. D.—W. M.—A. B. C.—R. K.—F. C. W.—N. Y.—B. D. W.—N. J.—F. C.—J. T. B.—R. C. N.—W. D.—J. McB. S.—E. T. D.

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 makes galvanometers, and what do they cost? Who makes an economical rotary engine, and what is its cost? Who makes ice-making machinery? Who sells the best amateur printing press? Who sells barber's chairs? Who sells agricultural machinery? Who makes machines for tearing up tarred rope? Who sells the Gramme magneto-electric machine?" 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

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8,937.—Locket.—G. W. Gill, Philadelphia, Pa.
8,938.—Badge.—J. F. Naulty, Philadelphia, Pa.
8,939 to 8,941.—Tobacco Pipes.—L. Nax, Phila., Pa.
8,942.—Glass Dishes.—J. Proeger, Pittsburgh, Pa.
8,943.—Cigar Stand.—W. E. Ryder, Sing Sing, N. Y.
8,944.—Breastpins, etc.—C. T. Sloan, New York city.
8,945.—Type.—D. W. Bruce, New York city.
8,946.—Card Receiver.—G. E. Hatch, East Cambridge, Mass.
8,947.—Furnace Brick.—G. H. Nott, Hyde Park, Mass.
8,948.—Saddle Clip.—M. Seward, New Haven, Conn.
8,949.—Arm Chairs.—M. Sulzbacher, New York city.
8,950.—Advertising Card.—J. P. Thomas, N. Y. city.
8,951.—Tea Set.—W. C. Beattie, Taunton, Mass.

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CANADIAN PATENTS.

List of Patents Granted in Canada, January 28 to February 5, 1876.

5,632.—H. Varner, Montreal, P. Q. Fruit gatherer. Jan. 31, 1876.
5,633.—E. Bartlett, Renfrew, Ont. Machine for digging and picking potatoes. Jan. 31, 1876.
5,634.—B. and C. Hickox, Brantford, Ont. Breast iron. Jan. 31, 1876.
5,635.—P. Williams, Detroit, Mich., U. S. Wagon body and hay rack. Jan. 31, 1876.
5,636.—F. Bramer, Little Falls, N. Y., U. S. Wheel harrow. Jan. 31, 1876.
5,637.—F. S. Malloch, Brockville, Ont. Rounding and straightening metallic rods, etc. Feb. 2, 1876.
5,638.—L. and J. Gaffney, Osgoode, Ont., *et al.* Combination and burglar-proof lock. Feb. 2, 1876.
5,639.—A. J. Millikin, Smith's Falls, Ont. Shirt bosom. Feb. 5, 1876.
5,640.—C. E. Carpenter, Syracuse, N. Y., U. S. Side plaiter. Feb. 5, 1876.
5,641.—G. H. Little, Peabody, Mass., U. S. Injector and ejector. Feb. 5, 1876.
5,642.—C. A. Shaw, Boston, Mass., U. S. Nail-cutting machine. Feb. 5, 1876.
6,643.—J. L. Whiting, Boston, Mass., U. S. Making brush handles. Feb. 5, 1876.
5,644.—W. Pearson, Philadelphia, Pa., U. S. Hosiery-sewing machine, etc. Feb. 5, 1876.
5,645.—W. Vassie, Hamilton, Ont. Lamp holder for sewing machines. Feb. 5, 1876.
5,646.—P. K. Dederick, Albany, N. Y., U. S. Wire baling tie. Feb. 5, 1876.
5,647.—W. T. Nichols, Maywood, Ill., U. S. Road scraper. Feb. 5, 1876.
5,648.—E. D. Wright *et al.*, Springfield, Vt., U. S. Lamp chimney. Feb. 5, 1876.
5,649.—F. G. Farnham, Hawley, Pa., U. S. Glove fastener. Feb. 5, 1876.
5,650.—C. Corby, London, Ont. Nut lock. Feb. 5, 1876.
5,651.—W. T. Doremus, New York city, U. S. Chair base. Feb. 5, 1876.
5,652.—C. E. Patric, Springfield, Ohio, U. S. Grain drill and seeding machine. Feb. 5, 1876.
5,653.—E. Curtiss, Findley, Ohio, U. S. Cider mill. Feb. 5, 1876.
5,654.—H. Préfontaine, Montreal, P. Q. Hand blower. Feb. 5, 1876.
5,655.—E. Fisher, Kincardine, Ont. Machine for cutting boiler plate. Feb. 5, 1876.
5,656.—S. Warrick, Montreal, P. Q. Steam engine. Feb. 5, 1876
5,657.—A. J. Griffin, Lowell, Mass., U. S. Hydro-carbon burner and gas generator. Feb. 5, 1876.
5,658.—N. Seibert, San Francisco, Cal., U. S. Lubricator. Feb. 5, 1876.
5,659.—J. J. Hathinger, Hyde Park, Mass., U. S. Carpet sweeper. Feb. 5, 1876.
5,660.—J. L. Whiting, Boston, Mass., U. S. Making brushes. Feb. 5, 1876.
5,661.—H. Disston, Philadelphia, Pa., U. S. Hand saw and handle. Feb. 5, 1876.

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