

Prime Movers and Their Accessories.

EXPLOSION-ENGINE.—R. O. LE BARON, Pontiac, Mich. The object in this case is to provide a gas, gasoline, or the like explosion-engine arranged to utilize the expansive power of the gas to the fullest advantage and to allow running the engine with the greatest economy. Mr. Le Baron does not limit himself to the number of pairs of cylinders as the same may be varied and two or more than three pairs may be used and connected with each other for producing the desired result.

DRAFT-DRIVEN GENERATOR.—W. H. JOHNSON, Hays, Kan. This invention relates to engines, the inventor's more particular object being to economize the draft thereof in such manner that when the draft is excessive it may be used to operate machinery, thus utilizing a certain amount of power otherwise wasted. It is of peculiar value upon locomotives, where under certain conditions the draft requires to be frequently shut off.

ROTARY ENGINE.—J. P. BRUYERE, Passaic, N. J. A purpose of the inventor is to provide an effective construction of rotary engine, and one which will be economic in the use of steam. A further purpose is to so construct the engine that a piston is located in a casing, both of which parts may be employed as drivers, and wherein each is mounted to revolve relatively to the other. Another is to provide the engine with a simply-applied and readily-effective reversing mechanism and cut-off.

Railways and Their Accessories.

CONCRETE RAILWAY-TIE.—G. S. MILLER, Burlington, Vt. The purpose of the improvement is to provide an economic form of tie in which the devices for seating and securing the rails consist in box structures having chambers to receive spikes and means for removably holding the spikes in said chambers in firm clamping engagement at their heads with the flanges of the rails, it being possible to expeditiously and conveniently replace any damaged spike without disturbing the rails or an adjacent spike.

FOLDING EXTENSION-STEP.—J. S. COXLEY, Aberdeen, Wash. The intention in this case is to do away with the small tool or box employed to facilitate the landing of passengers from railway-coaches at stations where there is no convenient platform and to accomplish such result by providing an auxiliary bottom step having folding or swing connection with the lower step of the usual series fixed to the platform of a coach, and to control the movements of the auxiliary steps by means of a series of levers conveniently operated through a handle member located at the platform of the coach.

VENTILATING MEDIUM FOR CARS.—C. P. BONNETT, New York, N. Y. The aim of the inventor is to provide means for ventilating cars in a thorough manner and without subjecting the occupants to drafts, and in the construction of the appliance to provide means for regulating the amount of air to be admitted, the said means being conveniently operated from the interior of the car, and further to so construct the upper portion of the car that the foul air will be sucked out from the interior and fresh admitted.

Pertaining to Recreation.

APPARATUS FOR INDICATING THE SCORES OF PLAYERS IN SUCH GAMES AS BILLIARDS OR THE LIKE.—C. S. OAKES and J. A. MANTON, Parramatta, New South Wales, Australia. The invention refers more particularly to a mechanical device for indicating the score of players in the game of billiards, and has for its object to provide a simple scoring-board which may be easily read and understood from a distance, so that the players, as well as the onlookers, may be kept advised as to the state of the game as it progresses, while at the same time it is capable of easy and accurate manipulation by the marker.

Pertaining to Vehicles.

REELING DEVICE.—C. A. HADLAND, Bennington Township, Minn. This device is for use in reeling wire and the like and is designed to be mounted upon a wagon-body, so that the wire may be reeled or unreeled as the wagon moves. The principal objects are to provide means for removably attaching the device to the body of a wagon, to provide for securing the reel in operative or in inoperative position, and for manipulating a guide for the reel, and for operating these devices conveniently from the seat.

HITCHING-WEIGHT HOLDER.—H. H. THILL, Lockport, N. Y. This invention has reference to improvements in devices for supporting a horse-hitching-weight on a delivery-wagon or other vehicle, an object being to provide a supporting device of simple construction by means of which the weight when not in use may be suspended from the foot-board or other portion of a vehicle in such manner as to be readily lowered to the ground or raised by a person sitting in the vehicle.

Designs.

DESIGN FOR A BUTTON-RIM.—G. E. SCHWAB, New York, N. Y. In the present design, from the open center of the button neat and attractive scroll work radiates to the outer edge of the rim, which edge is dotted

with a row of small circles, the whole giving a very clean and pretty ornamental effect.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.

Business and Personal Wants.

READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. In every case it is necessary to give the number of the inquiry.

MUNN & CO.

Manne Iron Works. Chicago. Catalogue free.

Inquiry No. 7075.—For makers and dealers in novelties and newly patented articles.

"U. S." Metal Polish. Indianapolis. Samples free.

Inquiry No. 7076.—For manufacturers of self-propelling invalid chairs.

2d-hand machinery. Walsh's Sons & Co., Newark, N.J.

Inquiry No. 7077.—For dealers in colored celluloid goods, also celluloid in the crude state.

Perforated Metals, Harrington & King Perforating Co., Chicago.

Inquiry No. 7078.—For makers of rubber goods.

Handle & Spoke Mch. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.

Inquiry No. 7079.—For manufacturers of springs wound by a key and run for five or ten minutes.

Adding, multiplying and dividing machine, all in one. Felt & Tarrant Mfg. Co., Chicago.

Inquiry No. 7080.—For manufacturers of and dealers in hydraulic rams for use in shallow wells or ponds.

WANTED.—Bids for making an article similar to a safety pin. Box 337, Blairsville, Pa.

Inquiry No. 7081.—For makers of machinery used in manufacturing dynamite, stumping powder, etc.

Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

Inquiry No. 7082.—For makers of ice-making machinery.

Marketers of meritorious inventions and specialties throughout the world. Tatem Mfg. Co., Buffalo, N. Y.

Inquiry No. 7083.—For manufacturers of small spring motors, such as used in toys and novelties.

I sell patents. To buy them on anything, or having one to sell, write Chas. A. Scott, 719 Mutual Life Building, Buffalo, N. Y.

Inquiry No. 7084.—For makers of camera fittings, as screws, etc.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Machine Company, Foot of East 138th Street, New York.

Inquiry No. 7085.—Wanted, second-hand, small rail for miniature railroads.

Gut strings for Lawn Tennis, Musical Instruments, and other purposes made by P. F. Turner, 46th Street and Packers Avenue, Chicago, Ill.

Inquiry No. 7086.—For makers of "Buffalo" stock whips.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, wood fiber machinery and tools. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.

Inquiry No. 7087.—For makers of face masks.

Absolute privacy for inventors and experimenting. A well-equipped private laboratory can be rented on moderate terms from the Electrical Testing Laboratories, 548 East 80th St., New York. Write to-day.

Inquiry No. 7088.—For manufacturers of a game known as parlor croquet.

Manufacturers of all kinds sheet metal goods. Vending, gum and chocolate, matches, cigars and cigarettes, amusement machines, made of pressed steel. Send samples. N. Y. Die and Model Works, 568 Pearl St., N. Y.

Inquiry No. 7089.—For manufacturers of road-making machinery, rock crushers, etc.

WANTED.—To buy ideas or patents for new articles to manufacture as a side line. Will consider all propositions, but prefer articles commonly used by the populace. Briefly give full particulars. F. Ranville Co., Grand Rapids, Mich.

Inquiry No. 7090.—For makers of machinery for manufacturing wood screws.

VACATION TRIPS.

If you are going away this summer be sure to send for "Mountain and Lake Resorts," a beautifully illustrated publication of one hundred and twenty-eight pages, just issued by the LACKAWANNA RAILROAD. The Jersey Hills, the Pocono Mountains, Delaware Water Gap, Richfield Springs, Lake Hopatcong and other delightful summer resorts are described in a way that will tell you how you can go, where you can stay, what you can see and how much it will cost. It is a book that will help you in making your plans.

It will be sent for ten cents in stamps addressed to T. W. LEE, General Passenger Agent New York City.

Inquiry No. 7091.—For makers of raw rubber, such as used by makers of rubber stamps.

Inquiry No. 7092.—For dealers in gold leaf for gilt woodwork.

Inquiry No. 7093.—For makers of painted satin, canvas or perfume boxes or bags.

Inquiry No. 7094.—For makers of town clocks.

Inquiry No. 7095.—For makers of motor canoes, motors, fire engines, or fire pumps, without horse power.

Inquiry No. 7096.—For machinery to cut metal in thin strips like tinzel.

Inquiry No. 7097.—Wanted, wholesale powdered aluminium and barium peroxide.

Inquiry No. 7098.—For the manufacturers of the Fairy Floss candy machine.

Inquiry No. 7099.—Wanted, machinery to manufacture granular effervescent salts, for druggists' use.

Inquiry No. 7100.—For an etching fluid for use with rubber dies, for making polished steel.

Inquiry No. 7101.—For makers of all kinds of boxes in large quantities, also for makers of all kinds of boxes.

Inquiry No. 7102.—For makers of gasoline motor cars for use on electric lines (see note).

Inquiry No. 7103.—Wanted, an apparatus for compressing air with a capacity of compressing about 500 cubic feet of air per minute, and it is desired, if possible, to use a 3-phase alternating current of 60 cycles at whatever voltage might be best.

**HINTS TO CORRESPONDENTS.**

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

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

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

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(9699) L. F. P. says: In your highly esteemed journal I notice with interest the development of motive power from the wind-mill. Would you be kind enough to answer the following through your columns: Is it necessary that rudder area should be greater than blade area? If not, why would not the mill turn around on the transmission shaft? Am I not right in stating that the rudder has to hold the mill against the wind, and also against its own force, and consequently the rudder area plus its leverage must be greater than blade and power area? We will assume there is a five-horse wheel and five horse-power is being consumed through the transmission shaft. What holds the mill against the transmission shaft? If it is the rudder, does not this rudder exert the five horse-power thrust? A. Windmills are constructed in a great many ways, some transmitting the power from the windmill by crank and connecting rod motion, others by means of gears in such a way that there is no reaction from the driven shaft, tending to move the windmill out of a plane at right angles to the wind. Such windmills require very small rudders, as the force of the wind is balanced on the vanes of the mill, and the rudder is only necessary to turn the mill, so that it will always face at right angles to the direction of the wind. Where, however, the power is transmitted to a vertical shaft by means of a single pair of beveled gears, there is a reaction tending to turn the mill from the plane at right angles from the wind equal to the force tending to rotate the mill multiplied by the leverage. In such a case, the force of the wind on the rudder multiplied by its leverage must be sufficient to balance it.

(9700) K. H. L. says: Will you please give me the numbers of your recent papers that have an explanation of the Edison three-wire system of electric lighting? Also the numbers that have its history and recent application? Will you please also give me the numbers of papers that deal with the subject of electrical heating? A. We can furnish you with two papers, SUPPLEMENT Nos. 309 and 737, containing valuable articles about the Edison three-wire system. We do not know any recent application of this system. It is being very rapidly superseded by the alternating-current systems of lighting, since it cannot be used very far from the central station. The number of articles relating to electric heating is very large. We name SUPPLEMENTS 825, 1037, 1059, 1077, 1112, 1182, 1374, 1375, 1419, 1420, 1421, 1472, 1502. All papers are furnished at ten cents each. New SUPPLEMENT Catalogue sent on request.

(9701) H. B. M. asks: Is there any way that one can change an alternating current of 110 volts to 20 or 25 direct suitable to run small motor? A. Alternating current can be transformed to direct by means of a rotary transformer, wound to give any voltage desired; or a Cooper-Hewitt mercury arc converter can be used. 2. What changes would have to be necessary in a magneto generator to furnish current to operate an induction coil giving a 1-inch spark? A. The changes needed to fit a magneto to run a 1-inch induction depend upon what the magneto is. We do not think the ordinary telephone call magneto can easily be made to do this. 3. How many times does an ordinary door bell make and break with three dry batteries? A. We can only guess how many times a bell strikes a second when three dry cells are attached to the circuit. We guess three times. If you will count a bell for a quarter of a minute, you can find out if we have guessed right. 4. What is the best interrupter for induction coils? A. For small coils a vibrating interrupter is always used. For large coils a rotary interrupter is sometimes used, and sometimes an oscillating arm dipping into mercury is used.

(9702) C. C. B. asks: Will you please tell me through your paper whether the zinc tubes or cups used in making the dry battery described in the SUPPLEMENT No. 1387, August 2, 1902, on page 22225, can be used more than once, that is, can it be refilled? A. In the action of a dry cell, the electricity is produced by the solution of the zinc in the sal-ammoniac. If there are no holes eaten through the zinc when the other materials are exhausted, the zinc cup of a dry cell may be refilled and used for another charge.

(9703) J. L. W. asks: Will you kindly inform me as to the relative speed of light and electricity? A. Electricity travels in space with the speed of light. Indeed, light is simply an electromagnetic disturbance of the ether of space. In wires and through matter electricity travels with other lower velocities. See Watson's "Physics," price \$3.50; Thompson's "Electricity and Matter," \$1.25, or Thompson's "Elementary Electricity," price \$1.50.

(9704) H. A. K. says: I have a hollow cylinder 1 1/4 inches diameter by 3 inches high. How many cubic inches of air will be compressed into it at 100 pounds pressure per inch? At 200, at 300, at 400, at 500? If the height of the cylinder is cut in half, how many cubic inches will it contain at the same pressures? What is the rule for finding the volume of air compressed into a given space at a given pressure? What books treat on the subject. A. Your cylinder contains 3.68 cubic feet of air at atmospheric pressure. At 100 pounds pressure it will contain 3.68 times

14.7 = 28.8 cubic inches. At 200 pounds per

14.7 square inch it will contain 53.8 cubic inches. At 300 pounds per square inch it will contain 78.8 cubic inches. At 400 pounds per square inch it will contain 103.8 cubic inches. At 500 pounds per square inch it will contain 128.8 cubic inches of air at atmospheric pressure. If you halve the height of the cylinder, you will halve the amount of air that it will contain. The pressure of the atmosphere on an average is about 14.7 pounds per square inch. When the pressure is increased, the volume of each cubic inch of air is decreased in the same ratio that the pressure is increased above 14.7. In working these problems it is necessary to remember that pressures as ordinarily measured by gages are pressures above the atmospheric pressure. To obtain the absolute pressure or true pressure, it is necessary to add 14.7 to the pressure given by the gages, as has been done in working the examples above. We recommend and can supply you with the following book relating especially to the subject you refer to: "Compressed Air: Its Production, Uses, and Application," by Hilscox, price \$5 postpaid.

(9705) L. H. N. asks: Where is the north magnetic pole now located? A. The north magnetic pole was found by Ross in 1831 to be on Boothia Felix near Hudson's Bay. This must be considered an approximate determination. It is not probable that the same point is the pole now. 2. Is it moving, and if so, in what direction and how fast? A. The pole is probably not at rest, though little can be said definitely on the point, and nothing is known as to the rate of its motion. An expedition is now engaged in making a new survey to determine the north magnetic pole. 3. How many degrees east or west of a line running north and south does the compass needle point for central lower Michigan? A. In 1902 the needle pointed 2 minutes west of true north in Michigan. In 1896 it pointed 26 minutes west of true north at your place. The line of no variation passed into Michigan almost in the center of the southern boundary of the State in 1902. 4. Is there any easy method by which a person can tell the time to within a few seconds where telegraphic service cannot be had? A. The time of day can be best determined by a sundial in the absence of the telegraph and the railroad.

(9706) O. D. asks: In the type of open-circuit battery listed in catalogues as "National No. 2," how much black oxide of manganese should be put in the porous cups with the pulverized carbon to make the cell give the best results? In mixing the sal-ammoniac solution in quantities, how much sal-ammoniac should be used for each gallon of water? A. For all sal-ammoniac cells with porous cup use granular and not pulverized peroxide of manganese and coke broken into small lumps. A mixture of equal parts may be used. For the electrolyte take from 1 to 2 pounds of sal-ammoniac to a gallon of water. A saturated solution is not desired, since any crystals left in the bottom of the jar tend to cause a deposit of crystals on the zinc, and will weaken the action of the battery.

(9707) M. A. asks: 1. Will a primary uninterrupted galvanic current pass over or through any part of the human body? The writer has failed to detect such passage with a delicate galvanometer, even with twelve or fifteen Sanson cells. A. If your galvanometer is sensitive enough, there is no difficulty in detecting a current which passes through the human body. Connect the wires to a piece of zinc and one of carbon or copper. Dip the hands in water, and take the zinc in one hand and the copper in the other hand. The galvanometer will show a deflection, due to a current produced by the hands. So will it if two pieces of zinc were used as above. Let several persons wet their hands in clear water and join hands, the outer persons taking the zinc and carbon, as above, and the galvanometer will show a sensible deflection. You do not need a number of cells. You need a more sensitive galvanometer. 2. If a mixture of gas and air confined in a tight cylinder was fired by electric spark or otherwise, a disastrous explosion would be the result. Why does not the same occur when firing the mixture in a gas engine cylinder? A. If a quantity of gas and air mixed are exploded in a cylinder