FOOT-PROPELLED VEHICLE. — W. J. SHIELDS, Bedford, Ala. The principal object of this inventor is to provide a vehicle which will enable occupants to propel it easily, while affording a far greater degree of comfort than usually attained in vehicles of this class. Further, one which may be easily controlled and adapted to be propelled by one or two persons, the seats being independently adjustable to facilitate simultaneous effort of two persons of different sizes in the propulsion of the vehicle.

TIRE-INFLATING PUMP.—S. E. SPENCER, Springville, N. Y. In this patent the invention has reference to improvements in pump mechanism for inflating the tires of motor-vehicles, an object being the provision of a pump mechanism that may be detachably connected to the driving-shaft of the motor and operated therefrom to quickly inflate the tires.

FELLY-JOINT.—J. B. HIGGINBOTHAM, Aberdeen, S. D. In this instance the invention relates to an improved device for connecting the sections of a wheel-felly so that the necessary tension may be exerted on said sections to draw them forcibly together and produce a rigid self-sustaining felly, which with the addition of the tire encircling it forms a most secure and durable structure.

SHIFTING-RAIL FASTENER FOR VEHICLE SEATS.—F. H. DELKER, Henderson, Ky. This invention consists in certain improvements upon the fastener for which Letters Patent of the United States were formerly granted to Mr. Delker. The present invention has for its principal object the provision of a simpler fastener than that disclosed in the former patent and one which may be more cheaply constructed. A further object is to provide a fastener which cannot be so easily accidentally disengaged and which will operate satisfactorily without an aperture in the spring-leaf member to weaken it.

### Prime Movers and Their Accessories.

TURBINE.—C. N. SCHOTTMULLER, Taylor's Falls, Minn. In this patent the invention has reference to improvements in steam-turbines, and an object is the provision of a motor of this type that may be operated in either direction with an economical use of steam. Two or more turbines may be connected together, with condensers attached and operated as compound condensing-engines.

SHAFT LIQUID-SEAL PACKING.—C. L. COOK, Louisville, Ky. In this case the invention refers to improvements in packing for shafting, and particularly the shafting of turbine-motors and propeller shafts of steamships, an object being to provide a novel form of packing in which a liquid is employed as a packing or sealing medium, rendering the packing impervious to atmospheric pressure.

ROTARY ENGINE.—I. SEVERANCE, Minneapolis, Minn. The object of this inventor is to provide an engine arranged to allow convenient reversing to insure a positive working of the valves in unison with the rotary motion of the piston and to provide a continuous action of the motive agent under initial pressure on the piston-heads without the usual cut-off for each revolution of the piston.

### Railways and Their Accessories.

TIE-PLATE.—B. S. WASSON, Chicago, Ill. In this patent the object is to provide a plate so constructed that when secured on a tie it will not buckle or work loose, also providing protection for the tie from cutting or wear from the rail-base and furnishing a means for rigidly securing the plate to a tie without danger of splitting the tie.

COAL, ORE, OR BALLAST CAR.—G. F. SIMONTON, Vanwert, Ohio. The invention relates to metallic freight-cars, the same being especially adapted for transportation of dumpable material—such as coal, ore, and ballast—although it may be employed for other classes of dumpable substances. In some features the present car is similar to the metallic cars disclosed by Mr. Simonton's prior applications for Letters Patent. One improvement of the present invention is a metallic underframing usable in connection with any style of car. Another, is the construction of the hopper-doors by which material may be discharged in the middle of the track, this being especially desirable when unloading ballast.

### Designs.

DESIGN FOR A TOILET-POWDER RECEPTACLE.—S. M. COLGATE, Orange, N. J. The design of this ornamental receptacle for containing toilet-powder is very neat in appearance. It shows a receptacle very practical in shape for easy and convenient handling in use, and in fair proportion to its height the rounded article shows a width about double the thickness.

DESIGN FOR OIL CLOTH.—N. KLAU, New York, N. Y. The design of this ornamental oil-cloth is wholly pictorial, and comprises individual or cluster pictures of children in distinctly separated scenes of games, sports, and diversions of juvenile life of that kind enjoyed almost entirely out of doors.

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 the 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.**

Marine Iron Works. Chicago. Catalogue free.

**Inquiry No. 6289.**—For manufacturers of or dealers in Acido Anhidrico Sulfuroso Vinario.

AUTOS.—Duryea Power Co., Reading, Pa.

**Inquiry No. 6290.**—For manufacturers of lens-grinding tools.

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

**Inquiry No. 6291.**—For makers of gates for buggies or wagons which may be opened without having to get out.

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

**Inquiry No. 6292.**—For makers of small gas, gasoline and steam engines and parts for amateur use, ¼ to ½ b. p.; also of castings or draft forgings in mild steel for dynamos.

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

**Inquiry No. 6293.**—For machinery for grinding alfalfa meal.

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

**Inquiry No. 6294.**—For makers of hand fire engines, or "hand tubs," operated by several men at pumps, with hose laid into wells or river.

Special Machinery to order, manufacturing, metal stampings, etc., Brickner Machine Co., Tiffin, Ohio.

**Inquiry No. 6295.**—For manufacturers of small tin caps, such as used on tops of beer bottles.

Thermo-piles for electrolytic assays and direct-current work. $3 each. Walsh's Sons & Co., Newark, N. J.

**Inquiry No. 6296.**—For manufacturers of thread and small spools.

We manufacture tripoli stones of all dimensions, disc, cylinders, etc., samples free. Seneca Filter Co., Seneca, Mo.

**Inquiry No. 6297.**—For makers of small pasteboard boxes for mailing purposes.

In buying or selling patents money may be saved and time gained by writing Chas. A. Scott, 719 Mutual Life Building, Buffalo, New York.

**Inquiry No. 6298.**—For turbine water wheels for a small mill.

We manufacture anything in metal. Patented articles, metal stamping, dies, screw mach. work, etc. Metal Novelty Works, 43 Canal Street, Chicago.

**Inquiry No. 6299.**—For manufacturers of labels.

Patented inventions of brass, bronze, composition or aluminum construction placed on market. Write to American Brass Foundry Co., Hyde Park, Mass.

**Inquiry No. 6300.**—For manufacturers of and dealers in automobile parts.

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. 6301.**—For manufacturers of sewing needles.

Literature on the manufacture of vulcanized fiber and tubing. Would like to correspond with a party familiar with the subject. "H" Box No. 128. Fall River, Mass.

**Inquiry No. 6302.**—For manufacturers of castings for gas engine cylinders.

Patents on a machine being manufactured and sold on royalty which will be used by every grocer and provision man are for sale. Owner in business and need of money. Write for particulars. Address H. W. R., Box 74, Sterling, Mass.

**Inquiry No. 6303.**—For manufacturers of corrugated rollers, such as used for corrugating wrapping paper boards.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery and tools. Quadriga Manufacturing Company, 15 South Canal Street, Chicago.

**Inquiry No. 6304.**—For makers of rice-milling machinery.

FOR SALE.—Patent No. 723,253, telegraph key, simple, durable and inexpensive. Would arrange with manufacturer on royalty. Address William E. Duncan, Train Dispatcher, G. S. & F. Ry., Macon, Ga.

**Inquiry No. 6305.**—For makers of bottles for soda water, on the same style as the English-made "Codd's ball-stoppered bottles."

The SCIENTIFIC AMERICAN SUPPLEMENT is publishing a practical series of illustrated articles on experimental electro-chemistry by N. Monroe Hopkins.

**Inquiry No. 6306.**—For Foster's gluten tester, and for a tintometer to be used in testing wheat and flour.

Robert W. Hunt & Co. bureau of consultation, chemical and physical tests and inspection. The Rookery, Chicago.

**Inquiry No. 6307.**—For manufacturers of razor handles, also for dealers in English steel.

Drawings, Estimates, Tools, Dies, Sheet, Wire and Rod Specialties (all metals). Stamping, Spinning, Turning and Screw Work, Tin Plating, Nickel Plating, Bronzing, etc. The W. S. Burn Mfg. Co., New Haven, Conn.

**Inquiry No. 6308.**—For manufacturers of decorative glass spangles.

**Inquiry No. 6309.**—For manufacturers of or dealers in voting machines similar to those used in New York State.

**Inquiry No. 6310.**—For machines for making gas from gasoline.

**Inquiry No. 6311.**—For a mill for powdering licorice root or any similar hard root.

**Inquiry No. 6312.**—For toy steam engines and steam locomotives for experimental purposes, not to be over ½ h. p.

**Inquiry No. 6313.**—For makers of twisted metal concrete and expanded metal for fireproofing and concrete construction.

**Inquiry No. 6314.**—For a metal out of which to make a pump for pumping a weak solution of chlorine in water, without injuring the pump.

**Inquiry No. 6315.**—For makers of rug machinery for manufacturing old carpets into rugs; also for broom-making machinery.

**Inquiry No. 6316.**—For a glass disk 10 or 12 inches in diameter from which to grind a mirror for a reflecting telescope.

**Inquiry No. 6317.**—For the address of the manufacturers of the "Eclipse" smoothing iron.

## Notes and 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.

**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.

(9493) E. L. S. asks: 1. How can you tell from the appearance of copper wire when it is burned out? A. You can tell from the appearance of copper wire that it has burned out. If it has burned out it will not be there, any more than a stick of wood or a coal will still be in existence after it has burned out. A "burn-out" is a melting and burning of the wire because of heat. 2. What is meant by the sidereal system? A. The sidereal system is the portion of celestial space occupied by the stars, in distinction to the space occupied by the sun and the planets, the solar system. 3. Can you give me some of the theories why the planet Mars is red? A. The planet Mars is red because its surface is composed of red materials, or because its atmosphere absorbs the other light waves. 4. Why does green wall paper contain arsenic? A. Green wall paper contains arsenic when arsenic is used as a color to print the paper. Paris green is a very beautiful green, and hence was frequently used for printing wall papers. If Paris green is not used, there will not be arsenic in the color. 5. What causes spontaneous combustion? A. A rapid absorption of oxygen, sufficiently rapid to injure the material, is spontaneous combustion. It occurs with paint oils, principally when cotton rags or waste are saturated with a drying oil. 6. Will you please tell me the names of the lightest and heaviest metals known, and their weights? A. Potassium is the lightest metal, with a density of 0.86 to 0.88, and iridium is the heaviest metal, with a density of 21.78 to 22.42. 7. Please explain the working of a steam turbine? A. A steam turbine is driven by jets of steam striking directly against the blades of the rotating parts.

(9494) W. O. S. writes: I am tempted to use your valuable paper, to find out if it is possible to mold articles out of cement, and what substance or composition would have to be used to get as clean a cast as articles molded out of plaster of Paris. A. It is possible and practical to mold hydraulic cement in the same manner as plaster of Paris. The cement should be finely ground and quickly mixed with water, and thick, so as not to run freely, pressed into an oiled mold the same as with plaster. It requires longer time to set than plaster.

(9495) A. K. S. writes: In the picture of a Panhard going 80 miles an hour, printed on front page of your issue of October 22, I noticed the wheels appear very elliptical and the housing is diamond-shaped. Will you be kind enough to explain how this peculiarity occurred? Was it due to the fact that the whole surface of the plate or film was not exposed simultaneously by the action of the shutter, thus allowing some parts enough time to blur, while others did not have time? A. The drawing out of the image of a wheel in a snapshot picture is due to the fact that the car moved while the picture was being taken. A velocity of 80 miles an hour is 117 feet a second. If the exposure were only a hundredth of a second, the car moved a foot while the shutter acted. The lengths of snapshots are very uncertain quantities, and often they are longer than the figures on the shutter would indicate. A slight friction in the plates will make the exposure longer.

(9496) H. H. says: 1. Please inform me of a simple and reliable method of measuring the internal resistance of primary batteries. A. The simplest method of measuring the internal resistance of battery cells is to connect two cells or any number of pairs of cells in opposition, and measure their resistance by a Wheatstone bridge, in the same manner as any other resistance is measured. The cells in opposition send no current into the apparatus, and thus are like any other resistance in opposing the current of the battery of the measuring set. 2. Also the formula for the mixing of paste for positive and negative plates for storage battery. A. The paste for coating the positive plates of a storage cell is made by mixing red lead to the consistency of putty with dilute sulphuric acid made by slowly pouring one part of concentrated sulphuric acid into four times its volume of water. Be sure to pour the acid into the water slowly and with constant stirring. The paste for the negative plate is prepared in the same way with litharge.

(9497) O. R. writes: I desire to obtain or purchase a formula to make the best up-to-date instrument for locating gold and silver. Can you sell me formula for the same so constructed that it can be set to attract one metal and cut off all other attractions? A. We know of no formula or instrument for locating the precious metals but the prospector's judgment, founded upon experience and the diamond core drill. All so-called devices for locating gold and silver are inoperative. There is a device described in our issue of May 2, 1903, which will locate an electrical conductor in the ground, but there is no means of determining without the use of pick and shovel whether this conductor is a valuable mineral deposit or a stratum of moist earth.

(9498) E. E. P. says: I am trying to find out what will be the most satisfactory power for grinding corn and pumping water for irrigation—gasoline engine, kerosene engine, electricity by windmill, liquid air, or just the old-fashioned windmill. A. The cheapest power for a farm for all purposes is a windmill of modern type large enough for the requirements of the farm work. A 30-foot windmill will give 3 horse-power in a 16-mile-per-hour wind, and will do much of the work even for a small threshing machine. Where large quantities of water for irrigation and the heavier machinery are in use, a kerosene engine is a very cheap power ever ready and easily managed.

(9499) V. K. asks: What is the cause of the pitting of steam boilers? Does such pitting occur where soft water is used, rain or condensed water or soft spring water? Do you know of any remedy preventing such pitting? I have a steam boiler that is pitted in several places below the water line, pits nearly as large as a dollar, varying in depth to nearly an eighth of an inch deep in places. I am at a loss to find a remedy. I use hard water containing considerable lime and magnesia, and to prevent or retard formation of scale I daily inject a solution of sodium phosphate. A. The pitting of boiler tubes and shell is a common occurrence due to any kind of water, but more active with the purer or rain water. The cause has been attributed to some peculiar molecular condition of the iron inducing electrical action, and also to particles of slag or other metals that induce electrolysis.

(9500) H. E. F. says: 1. A claims that the ocean has deep pits that have never been sounded, the reason being that no solid body could reach the bottom. B claims that the water of the ocean is, no doubt, under a tremendous pressure, but still could not exceed the specific gravity of some of the heavy metals—granting the depth exceeds 60,000 feet. A. We have answered this question five times in recent years, in this column, but will try again. Water is a very incompressible substance. Sea water is compressed but forty-four millionths by a pressure of an atmosphere, and at higher pressures the compression is less than this. It is not very sensibly denser at the depth of the bottom of the ocean than at its surface, nor are the metals. A body which will sink at the surface of the ocean, will continue to sink to its bottom. This is known, since the sounding lines bring up from all bottoms the fine ooze, which consists of minute forms of life which have died and sunk till they rested on the ocean bottom. There have not been any depths found which the sounding line has not measured and brought back testimony that it touched the bottom. The greatest depth yet found is 30,930 feet, in the South Pacific near the Fiji Islands. Another depth near Japan is 27,600 feet, and one near Porto Rico is 27,366 feet. The deepest places are near the shores. For other information on this interesting point, see Query 8959, volume 88, No. 17. 2. What is the increased pressure for volumes injected into a closed vessel filled with water? A. The increase of pressure produced by forcing a plunger into a closed vessel filled with water may be anything which the walls of the vessel can stand. This pressure may be increased till the strongest vessel is burst by the water pressure. This is known in books upon physics as hydraulic pressure, and the machine for utilizing it is called the Bramah or hydraulic press. Pascal stated its law many years ago: "Pressure exerted upon an inclosed mass of liquid is transmitted undiminished in all directions, and acts with equal force on equal surfaces and in a direction at right angles to those surfaces." This press is the most powerful machine man has ever invented. It has no limit except the strength of the material upon which it presses. It is in use for all great press work. Owing to the slight compressibility of water as given above, you cannot inject any considerable volume of anything into a closed vessel filled with water. It will burst the vessel.

(9501) C. D. C. asks: Would you kindly explain the following: A three-speed desk fan and a 16-candle-power light are connected across one side of a three-wire direct-current. The fan is connected about 20 feet from the light, between it and the source of supply, and is turned off. A wireman, thinking the circuit disconnected at the service switch, cuts the lamp cord with his pliers, when the short circuit is formed, the fan starts and runs until the short circuit is broken. What caused the fan to run? A. In the case you describe, when the short circuit was established by cutting the lamp cord, the rush of