signed by this inventor relates to the forcing of nitric oxid or other gas mixed with air through wheat flour and other products in bleaching and refining the flour, an important object being to effect a uniformity in the generation of the gas. An examination of the specification and drawing of the patent is necessary to an appreciation of the mechanism and its operation.

WASHERS.—JOHN R. HUGHES, Chama, New Mex., has patented an improvement in the washers employed in connection with cotter-pins of various machines. The washer is slitted and has pressed upward at opposite sides of its opening or eye, integral portions of a shape to constitute offsets and receive the cotter-pin.

GAGE.—GEORGE ARNOLD, Chicago, Ill. A unique gage forms the subject of a patent granted to this inventor, the device being applicable to augers and like boring tools, and so formed that it may be quickly secured in place on the bit at the desired distance from the point of the auger so as to define the depth to which the hole will be bored.

CRUSHING ROLLS.—JOSÉ PELAEZ RODRIGUEZ, Caibarien, Cuba. This patentee primarily intends his improvement to be embodied in the rolls for crushing sugar cane. The improvement is characterized by a special form and disposition of teeth on the surface of one of the rolls, the merits claimed being that a more complete laceration of the cane is effected, so as to enable a thorough extraction of the juice to be obtained.

IMPROVED ROD PACKING.—G. STEWART and G. F. STEWART, New York, N. Y. These inventors have devised a modification of the metallic packing of piston rods. The packing is of the type employing split rings, and the arrangement of retaining and adjusting devices is such as to cause frictional contact between the rod and the packing rings when the piston is on the outward stroke, so as to force the packing rings tightly together and in close contact with an encircling sleeve, the frictional contact releasing on the return stroke.

Prime Movers and Their Accessories.

TRANSMISSION-GEAR.—J. CHALMERS, Bath, Maine. The improvement refers to a means for transmitting rotary motion reversely and at various speeds. It is useful, particularly in connection with internal-combustion engines employed for driving boats and vehicles. Novel features reside in the construction and organization of the devices for connecting the loose gear at will with the transmitting element coacting therewith, in the arrangement of the reverse transmission, on the general organization of the mechanism within its case, and various others of importance.

LUBRICATOR.—J. J. SLAGEL, Fairbury, Ill.—The invention relates to a lubricator of that type used in connection with engines, particularly steam engines, and embodying a pump for forcing the lubricant through a sight-feed device and thence into the steam pipe or other part of the engine, so that the oil passing into the engine with the steam lubricates the valves and cylinder.

COMBINED VALVE-STEM CLAMP AND LUBRICATOR.—J. C. WILLIAMSON and W. D. BARKER, Tallahassee, Fla. The purpose of the invention is to provide a combined valve-stem clamp and lubricator arranged to lubricate the valve-stem outside and immediately adjacent to the stuffing box, and to permit the engineer to quickly and securely lock the valve-stem, and hence the valve, against movement in case of a breakdown of the corresponding engine so as to allow running of the locomotive by the use of the other engine alone.

Railways and Their Accessories.

CAR-COUPLING.—H. V. ROGERS, Tiosa, Ind. The object of this inventor is to provide a novel form of coupling that will not only automatically couple when two cars are brought together, but will uncouple should an accident occur—such, for instance, as the derailing of a car, tipping over of a car, or a car breaking down at the center.

RAILWAY-SWITCH.—C. E. MCDONALD, Butte, Mont. In the present patent the invention has reference to railway switches; and the object of the improvement is the production of a switch which is so constructed that it will enable a car on the main track to pass from the main track in either direction.

AIR-BRAKE ATTACHMENT.—J. B. O'DONNELL, Freeland, Pa. The object in this case is to provide means by which the engineer on a train equipped with the automatic air-brake system may be given full control of the triple exhausts independently of and notwithstanding the usual retaining-valves. This is attained by fitting to the triple exhaust a valve closing by the brake-cylinder pressure and commanding a vent to the atmosphere, which valve is under the control of the engineer through the medium of a fluid pressure device actuated by the train-line pressure.

DEVICE FOR MOVING CARS.—J. D. TUSAR, Forest City, Pa. Mr. Tusar has invented a device which may be attached to heavy cars to move them a short distance. The invention is particularly applicable to mining cars to move them up a steep grade. The device may be operated by one man without any danger to the operator.

RAILWAY-SWITCH.—J. HERRINGTON, Houston, Texas. The invention is an improvement in switches of the type adapted to be operated automatically by the wheels of the cars or engines, thereby dispensing to a considerable extent with the work of a switchman, and at the same time lessening the likelihood of an accident caused by negligence in leaving the switch open.

SANDER.—G. E. CUMMINS and H. S. FERGUSON, Cherokee, Kans. The invention relates particularly to a sander for locomotives. In sanding devices operated by compressed air the sand tends to clog the air passages and interfere with the proper operation of the device. It is the object of the present invention to overcome this disadvantage.

RAIL-JOINT.—T. CRANE, East Branch, and J. M. WHEELER, Fishs Eddy, N. Y. The object of the present invention is to produce a rail-joint of simple construction which may be quickly applied and which will operate to hold the abutting ends of the rails securely without necessitating the employment of bolts and nuts.

Pertaining to Recreation.

PLACE AND POSITION INDICATOR.—F. H. SCHAUFFLER, New York, N. Y. One purpose here is to provide a device whereby to indicate place and position by lot or design for various persons at tables or at other places where games of cards and other games are played, whether independently or as partners, in which latter event partners have their places and positions decided by lot or design, and, further, to provide a device applicable to any occasion where place and position are not to be selected by participants.

Pertaining to Vehicles.

LUBRICATOR.—S. J. WELTER and G. C. WELTER, Roswell, New Mex. The invention pertains to a device for lubricating wagon-axles successfully and doing away with the necessity of taking the wheel from the axle when the oil is applied. On account of the inconvenience of taking wheels from axles it is well known that they are frequently left on so long as to become dry and to burn out the bearings. This device can be filled with oil while a wheel is on the axle.

DUMPING-CART.—J. GUIRY, New York, N. Y. A cart is employed having a body, together with a cover and means for raising the same to enable the cart to be dumped when desired. Means are also used for sustaining the cover of the cart in its raised position and for preventing the cover from being carried or thrown beyond a determinate position forwardly of the structure.

STREET-CLEANER'S TRUCK.—J. REHM and T. VON GERICHTEN, New York, N. Y. The object of the inventors is to produce a truck which will afford means for carrying a receptacle, such as a can, conveniently, which will facilitate the raising and dumping of the refuse from the street into the receptacle, and which will facilitate the removal and replacing of the receptacle upon the truck.

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.

Marine Iron Works. Chicago. Catalogue free.

Inquiry No. 8412.—Wanted, a light-running pump, which will pump about a half-inch stream of water; force pump preferred.

J. C. Sparks, B.Sc., F.C.S., Chemical Expert. See adv't.

Inquiry No. 8413.—Wanted, machinery for use in the manufacture of carbonic acid gas.

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

Inquiry No. 8414.—Wanted, granulated iron oxide and aluminium, suitable for the Thermit process of welding.

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

Inquiry No. 8415.—Wanted, makers of elastic rope or cord similar to that used on the Whitly exercising machines.

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

Inquiry No. 8416.—Wanted, an automatic machine or electric pencil or needle for writing on glassware and engraving on pearl or glass novelties.

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

Inquiry No. 8417.—Wanted, addresses and catalogues of manufacturers of machinery for making rubber horse-shoes.

The celebrated "Hornsby-Akroyd" safety oil engine. Koerting gas engine and producer. Ice machines. Built by De La Vergne Mch. Co., Ft. E. 138th St., N. Y. C.

Inquiry No. 8418.—Wanted, addresses of schools of automobile engineers in cities in the vicinity of Fort Wayne, Ind.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machine work and special size washers. Quadriga Manufacturing Company, 18 South Canal St., Chicago.

Inquiry No. 8419.—Wanted manufacturers of pyroline.

Inquiry No. 8420.—Wanted odorless excavator for handling night soils and sewage.

Inquiry No. 8421.—Wanted, a machine for printing metal signs with paint.

Inquiry No. 8422.—Wanted, cardboard disks, or disk-making machinery.

Inquiry No. 8423.—Wanted, machinery for making starch from potatoes; also for the production of alcohol from potatoes.

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.

(10177) P. H. K. writes: Is ice formed from sea water salt or fresh? A claims that it is salt. B claims that it is impossible to have salted ice, as in the process of freezing the salt is eliminated. Who is right, A or B? A. When aqueous solutions freeze, the solids in solution tend to separate from the water, and the ice thus formed is pure or nearly so. It would not be easy to form a block of uniformly salted ice. This is sometimes expressed by saying that water freezes itself pure, which is not a very correct manner of stating what takes place. The water freezes molecule by molecule, and the solid in solution is separated from its solvent, the unfrozen portion of the solution becoming finally a saturated solution. B has the better of the argument.

(10178) H. L. S. says: Will you please inform me how to connect up an electric bath-tub? A. If the tub is of metal, connect one of the electrodes to the metal, while the other is held in the hand. If of porcelain, connect one electrode to a metal plate and place in the water.

(10179 M. M. asks: 1. If lightning strikes in a body of water where a man is swimming, will he feel it if it strikes within a hundred yards of him? A. We do not know any reason why a person should be affected by lightning striking the water in which he is swimming. The earth is at zero potential and is of infinite capacity, from which it follows that no amount of electricity can raise the electrification of the earth so that a man could be shocked by it when he is immersed in it. The case is the same as that of a man buried in the ground or in a cellar under the ground. No lightning stroke can harm him in either of these positions. Of course a man's head projecting above the water might be struck, but this is not the condition which you suppose. 2. Which will break first, a rope 5 feet long or a rope 100 feet long, if it has the same strength all over the rope and the same strength pulling it? A. If two ropes, one 5 feet long and the other 100 feet long, are pulled equally, the ropes being supported at the ends only, the longer rope will break first, since its weight is greater than that of the shorter rope, and is added to the pull upon it. If the ropes were lying on the ground or other support, we do not think the difference in length would make any difference in breaking strength, although we are aware that many hold the opposite opinion.

(10180) J. W. H. asks: Is there any difference in the strength of a magnet with a ¼-inch core and one with a ⅛-inch core if both are wound with the same amount of wire? Would it make any difference to the strength of a magnet having a ¼-inch core to have the core thinned down to ⅛ inch at the bending point? The reason for doing this is to make it easier to bend after the magnet is bound. A. The ease with which lines of magnetic force can pass through the core of an electromagnet is proportional to the sectional area of the core. For this reason a core ¼ inch in diameter will transmit four times as many lines as a core ⅛ inch in diameter, if all other conditions were the same. We should not advise the winding of an electromagnet and bending the core after the winding. It is much better to wind the coils on spools which will slide over the iron core and put them in place after the core has been bent into its final shape.

(10181) N. R. R. asks: Will you please let me know whether natural ice is colder than manufactured ice or not? The latter is made at a temperature of 20 degrees above zero, and natural ice undergoes a temperature sometimes many degrees colder. Does it retain this greater cold? A. All ice, natural or artificial, in any place below the freezing point will have the temperature of that place; in any place above the freezing point it will have the temperature of the freezing point. Ice does not retain its temperature below the freezing point. It cannot be heated above the freezing point, under ordinary circumstances. Like any other solid, ice is cooled in the winter to the temperature of the air, be it zero or below, and becomes warmer as the temperature rises till its melting point is reached. Then it cannot be made hotter. It changes its condition to the liquid form.

NEW BOOKS, ETC.

SYMMETRICAL MASONRY ARCHES. By Malverd A. Howe, M.Am.Soc.C.E. New York: John Wiley & Sons, 1906. 8vo.; pp. 170. Price, $2.50.

The author presents in simple form, with due consideration for the theoretical aspects of the question, the methods to be employed in the designing of masonry arches according to the *elastic theory*. As masonry arches are constructed of materials and under conditions which are more or less uncertain in character, it has been found that rigid and comprehensive formulas are hardly necessary, and consequently those presented in this book are approximate, but nevertheless of sufficient accuracy for the purpose. Many examples are given with each step of the solution in detail. Thus they are easily comprehended by the student or the engineer who has not the requisite time to review the theory of arches thoroughly.

DESIGNS FOR SMALL DYNAMOS AND MOTORS. By Cecil P. Poole. New York: McGraw Publishing Company, 1906. 8vo.; pp. 186. Price, $2.

The text of this book comprises a number of articles which have previously appeared in the American Electrician, and part of which is included in Electrical Designs, by the same author. While Mr. Poole has avoided theoretical calculations and reasonings, as far as possible, a certain amount of practical knowledge of the subject will be necessary for the reader to utilize the text to the best advantage; but the descriptions will be intelligible to any person who is somewhat familiar with the construction of such machines as the book covers. Each chapter comprises one design and gives the actual details of design in the form of working directions, avoiding the underlying principles and the reasons for the various steps. This is a rather unfortunate feature of the book, and greatly decreases its educational value. The working drawings are good, and will be clear to anyone familiar with ordinary shop practice.

COMPLETE EXAMINATION QUESTIONS AND ANSWERS FOR MARINE AND STATIONARY ENGINEERS. By Calvin F. Swingle, M.E. Chicago: Frederick J. Drake & Co., 1906. 32mo.; pp. 367. Price, $1.50.

The past few decades have witnessed such tremendous development in the science of steam engineering that our present day sees the creation of power plants of marvelous complexity and detail as compared with the steam machinery of less than half a century ago. In view of the remarkable improvements in steam machinery which have been made, it is of the utmost importance for the engineer to keep in constant touch with its advances. The author of the present book has endeavored to place before his readers information in a catechetical form to cover the various details appertaining to the operation of modern steam plants both stationary and marine. The questions are practical, and can be understood without extensive scientific knowledge. The answers have been so designed as thoroughly to cover the questions, and in many cases are supplemented with excellent illustrations.

HANDBOOK OF MATHEMATICS. By J. Claudel. Translated and Edited by Otis Allen Kenyon. New York: McGraw Publishing Company. 8vo.; pp. 708. Price, $3.50.

The reader will find this a useful compendium of the so-called "practical" subdivisions of mathematics, including the entire range of the subject between simple arithmetic and differential and integral calculus. The work is well written and well translated, and is an able and successful effort to provide a compendium of the various branches of the subject, each of which is usually treated in a special monograph rather than as a chapter of a larger volume. While individual users may find many omissions, it will be understood that the demands placed on such a work must necessarily be so varied that many of these omissions are hardly avoidable. It is unfortunate that no index is provided, as well as a list of tables.

FIVE-FIGURE LOGARITHMS OF NUMBERS AND ANGULAR FUNCTIONS FOR THE USE OF THE ENGINEER, CONSTRUCTOR, AND STUDENT. By Henry Harrison Suplee. Philadelphia: J. B. Lippincott Company, 1906. 32mo.; pp. 91. Price, $2.

MOTORI A GAZ. By Vittorio Galzavara. Milan: Ulrico Hoepli, 1906. 32mo.; pp. 423 + 64.

STAMPAGGIO A CALDO E BOLLONERIA. By Ing. Gino Scanferla. Milan: Ulrico Hoepli, 1906. 32mo.; pp. 165 + 64.

CARBONI FOSSILI INGLESI. COKE-AGGLOMERATI. By Dr. Guglielmo Gherardi. Milan: Ulrico Hoepli, 1906. 32mo.; pp. 586 + 64.

PLANTS AND THEIR WAYS IN SOUTH AFRICA. By Bertha Stoneman. New York: Longmans, Green & Co., 1906. 16mo.; pp. 283. Price, $1.10.

SUR L'UNITÉ DES FORCES ET DE LA MATIÈRE. By Doct. Prof. Pierre Palladino. Turin: J. U. Cassone, 1906. 16mo.; pp. 143.