

the provision of a tubular axle for the hub and in the peculiar combination with this axle of a tie rod or bolt which is passed through the tubular axle and through the fork or other part of the vehicle-frame on which the wheel is mounted. By this arrangement upon taking out the tie-rod the wheel may be readily removed from the fork without danger of displacing any of the bearing-balls or other parts of the structure, excepting of course, the tie-rod.

**Railways and Their Accessories.**

**CAR-FENDER.**—O. THIBAUT, Fall River, Mass. The intention in this instance is to provide a new and improved car-fender arranged to readily follow the curvature of the track to insure picking up of persons or other obstacles in the path of the car at all times without danger or unduly injuring the person or other obstacles.

**COMBINED STOCK, COAL, AND COKE CAR.**—G. E. SIMONSON, Vanwert, Ohio. The object of this invention is to provide a metallic structure which may be used to transport live stock in one direction over a railroad and thereafter converted into a car adapted to carry coal, coke, ballast, or other material when reshipping the car, thus making the car useful in transporting freight any direction and increasing the earning capacity of the car by obviating the return of the same in an empty condition.

**RAIL-CLEANER.**—P. C. HUNTER and W. C. BAMBER, New York, N. Y. In this patent the invention relates to improvements in devices for cleaning snow, ice, and the like from the "third" rails or other electricity-conducting rails in electric-railway systems, the object being to provide a device that shall be simple in construction and that may be readily applied to cars of existing types.

**DEVICE FOR PLACING RAILWAY-TORPEDOES.**—E. M. JONES, Enid, Oklahoma Ter. By means of this invention a person on a train may place one or a number of torpedoes successively on the rails without stopping the movement of the train. The device is hand-operated entirely, and being light and simple, it may be handled with facility by the trainmen.

**NUT-LOCK.**—A. M. WILSON, Cherokee, Iowa. Briefly stated, this invention relates to a nut-lock especially adapted for use at rail-joints and in analogous structures where two nuts are adjacent to each other and to devices of that class in which a connecting piece or shank extends between the two nuts, each end of the shank carrying a lock proper working with the respective nuts.

**SAND-CLEANING APPARATUS.**—W. S. VANZANT, Eldredge, N. J. In carrying out the present invention Mr. Vanzant contemplates the provision of an apparatus which will produce filter-sand of the proper grade, such sand being thoroughly tested and washed in its passage through the apparatus, and he has particularly in view so constructing the apparatus that sand may be taken from the sand-bank and passed to a car or bin without delay.

**Prime Movers and Their Accessories.**

**GOVERNOR FOR MARINE ENGINES.**—J. MATTHIASEN, 56 Wendelstadtstrasse, Darmstadt, Germany. The object in this invention is to provide a device for preventing racing when the propeller leaves the water or upon the breaking of the shaft or the like. It consists in the closing of the throttle-valve as soon as the engines, from one or other of the causes mentioned, exceed a predetermined maximum velocity. The valve is re-opened as soon as the engines have resumed their normal speed. The displacement of the valve is effected by means of a rod connected with the ship's engines.

**SAFETY SPARK-SHIFTING DEVICE FOR EXPLOSIVE ENGINES.**—R. B. HAIN, Los Angeles, Cal. The invention comprises the combination, with the shaft of an explosive-engine and a shiftable electrical circuit breaker and a sparking device connected with the latter, of a cover for the end of the shaft, a rocking journal for the cover having a radial arm, and a link pivotally connecting such journal-arm with the circuit-breaker, whereby upon raising the cover, the circuit-breaker is shifted correspondingly.

**Designs.**

**DESIGN FOR A HANDLE FOR MIRRORS, BRUSHES, OR LIKE TOILET ARTICLES.**—S. A. KELLER, New York, N. Y. This highly ornamental design for a handle, comprises a woman's head posed at the upper part of the handle, a handle narrowing then swelling then coming to a point at the lower end in graceful lines, the handle beautifully scrolled and flowered.

**DESIGN FOR A BADGE.**—J. S. MALLERY, Grants Pass, Ore. This ornamental design for a badge is neat and simple, and consists of a bird's web-foot and a well curved shield covering the heel or upper part of the foot, with a claw projecting slightly from one side of the shield.

**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. 5677.**—For manufacturers of electric fans which run with a dry battery.

**AUTOS.**—Duryea Power Co., Reading, Pa.  
**Inquiry No. 5678.**—For the manufacturers of the "Ever-ready" electrical goods.

For hoisting engines. J. S. Mundy, Newark, N. J.  
**Inquiry No. 5679.**—For makers of electric motors with attachment of emery wheels and polishers.

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

**Inquiry No. 5680.**—For makers of tinfoil for wrapping moist goods, etc.  
Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery and tools. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.

**Inquiry No. 5681.**—For makers of gas traction engines.  
Handle & Spoke Mch. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.

**Inquiry No. 5682.**—For the makers of a cigar called "Good Health Cigar."  
If it is a paper tube we can supply it. Textile Tube Company, Fall River, Mass.

**Inquiry No. 5683.**—For a large quantity of screws, cold rolled thread, having flat bottom, with slot on top, either flat or round; all to be about 3-8 inch or 5-16 inch and from 3/8 to 5/8 inches long.  
Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

**Inquiry No. 5684.**—For makers of vending machines, also makers of fire extinguishers.  
**WANTED.**—Exclusive sale improved automobile specialties. Specialties, Box 73, New York.

**Inquiry No. 5685.**—For makers of artificial ice machines, also for plant erectors.  
Wanted, agency or right for any good-selling specialty or machine. Best reference. W. C. Linehan, Cincinnati, Ohio.

**Inquiry No. 5686.**—For the makers of the stamping machine, for stamping on aluminium, called the "Simplex."  
In buying or selling patents money may be saved and time gained by writing Chas. A. Scott, 340 Cutler Building, Rochester, New York.

**Inquiry No. 5687.**—For makers of an ice cream freezer consisting of 6 or 8 individual cylinders.  
The largest manufacturer in the world of merry-go-rounds, shooting galleries and hand organs. For prices and terms write to C. W. Parker, Abilene, Kan.

**Inquiry No. 5688.**—For makers of tattooing machines, also supplies for tattooing.  
The celebrated "Hornsey-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Machine Company, Foot of East 138th Street, New York.

**Inquiry No. 5689.**—For hand pumps capable of use to 40 pounds pressure, for air receiver.  
We manufacture anything in metal. Patented articles, metal stamping, dies, screw mach. work, etc., Metal Novelty Works, 43 Canal Street, Chicago.

**Inquiry No. 5690.**—For a good, serviceable, light-draft boat about 20 feet long, for use on the Mississippi River.  
**Inquiry No. 5691.**—Wanted, a practical garbage crematory.

**Inquiry No. 5692.**—For manufacturers of the Haunted Swing.  
**Inquiry No. 5693.**—For manufacturers of porous stones or material suitable for filtering water.

**Inquiry No. 5694.**—Wanted, refined kerosene in cases and barrels of 62 gallons, for export.  
**Inquiry No. 5695.**—For manufacturers of mechanical toys.

**Inquiry No. 5696.**—For firms desiring pattern work, in quantities, at cost. Berby's Pattern and Model Works, Perth Amboy, New Jersey.  
**Inquiry No. 5697.**—For parties to manufacture several dental devices, including forceps.

**Inquiry No. 5698.**—For manufacturers of lawn clippers or mowers other than rotary or Beal mowers.  
**Inquiry No. 5699.**—For the manufacturers of the "Crown Corking Machines."

**Inquiry No. 5700.**—For the manufacturers of the Lyman Boat, which is a round tub snape, made of rubber, with heavy rubber legs and feet, designed for sportsmen's use, and so constructed that one can sit in it and paddle around by means of his feet.  
**Inquiry No. 5701.**—For manufacturers of wool-scouring machinery.

**Inquiry No. 5702.**—For manufacturers of a stamp and envelope moisture, made of sheet iron or tin.  
**Inquiry No. 5703.**—For manufacturers of patented fodder forks on contract, made of cast steel.

**Inquiry No. 5704.**—For a machine that will rivet both ends of a bar at once, one inch apart.  
**Inquiry No. 5705.**—For makers of furnaces for smelting lead, tin and babbitt brass.

**Inquiry No. 5706.**—For a small canning outfit.  
**Inquiry No. 5707.**—For machinery to manufacture handkerchiefs by weaving.  
**Inquiry No. 5708.**—For Machinery to cut, hem, etc., cotton or linen cloth into handkerchiefs.

**Inquiry No. 5709.**—For apparatus to weave, cut and hem handkerchiefs when made from piece.  
**Inquiry No. 5710.**—For the manufacturers of the International typewriter.

**Inquiry No. 5711.**—For makers of the vacuum disc or suction shoe for walking upside down on the ceiling.  
**Inquiry No. 5712.**—For a toy balloon for experimenting.

**Inquiry No. 5713.**—For makers of board suitable for playing cards.  
**Inquiry No. 5714.**—For machinery for making paper and straw board from straw.

**Inquiry No. 5715.**—For makers of machinery for making towels.  
**Inquiry No. 5716.**—For machines for cutting tobacco leaves, green or dry.

**Inquiry No. 5717.**—For makers of a machine for breaking coconuts and removing the kernel.  
**Inquiry No. 5718.**—For manufacturers of ice-making machinery for family use.



**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.

(9414) T. L. asks: Does the output of a dynamo armature depend upon the number of turns of wire about the core or upon the amount of wire traversing space between the core and pole-piece? Is the purpose of the iron in armature merely to attract across it the lines of force through which the wire moves? Is it true that in ring armatures the wire on the inside is of no use except to conduct the current generated upon the outside? If so, why? Could the wire be arranged between armature core and the pole-piece in coils so that all the wire will generate current and so that the current induced in one turn of wire would counteract that of the next? A. The output of a dynamo depends upon all the elements of its design, and not simply upon the two which you name. The number of lines of force cut per second determines the volts; the size of the wire determines the amperes. The iron of the armature core is to furnish a path of low magnetic resistance for the lines of force from one pole piece to the other. The wire in the inside of a ring armature is of no use except as a conductor. The turns cut the lines of force in the opposite directions to those on the outside and cannot assist these in producing an electromotive force. A drum armature has all its wire active and of service in generating electricity.

(9415) M. P. C. says: Please answer the following questions: 1. In regard to the gas blowpipe described in "Experimental Science," what should be the diameter and length of the outside tube? What is the size of the hole in the end of the large tube? What is the inside diameter of the small or inside tube? Is it necessary to have the end of this tube contracted 0.05 of an inch? A. The length and diameter of the outside tube in the gas blowpipe is of little consequence. A half inch will be ample to admit the necessary gas. The hole in the end of the larger tube is a quarter inch, as is stated in the description in the book. The small tube may be 1/2 inch, with a tip whose opening is 0.05, as given. You should have a tip, since you cannot get a tube fine enough without a tip, and if you could it would soon clog with dust. 2. Can all the flames required for amateur glass blowing be produced with this blowpipe? A. The flame of this blowpipe is adapted to small jobs of glass blowing, as is stated in the book. We are not able to add anything to Mr. Hopkins's work. 3. Can acetylene gas be used in this blowpipe, and will the generator described in "Experimental Science" produce the gas fast enough? A. Acetylene can be used in place of street gas if you wish, and the generator described in "Experimental Science" will furnish gas enough for the purpose.

(9416) E. P. W. writes: I wish to ascertain the proper place to put an air-chamber in connection with an elevator, to prevent a ram which is caused by a sudden close of the elevator valve. How large should the chamber be according to the supply? Elevator men say the horizontal check valve is the cause of the ram. Is it? I make this inquiry as I am a water-meter man and we have a great deal of trouble with our meters on elevators on account of the ram. A. We apprehend that your troubles from water ram arise from a deficient supply of air in the air chamber. It is well known that water under great pressure absorbs the air in an air chamber, and besides a chamber full of air with no pressure will be compressed to less than 1-9 of the capacity of the chamber, so that your 8-inch pipe under 130 pounds pressure will have less than 7 inches of its length filled with air, which is not enough to take up the water ram. We advise to tap a small pipe into the air chamber at the bottom and connect a high-pressure air pump to fill the chamber with air at the water pressure. This will give enough elasticity to prevent water ram. The location is correct and no other change is needed.

(9417) J. W. L. says: In looking over a copy of "First Lessons in Physical Science" I found the following (on heat): "The difference in the sensation of warmth and vision produced by the ether waves does not depend upon any difference in the waves, but upon the difference of the bodies upon which the waves fall." Is this the correct theory of the relation of heat to light? A. A small portion only of the waves which come to the earth from the sun are able to affect the optic nerve and produce light. A much larger portion of the waves are too long to produce light in man and many of these will be felt as heat, if they strike a portion of our bodies which is provided with nerves for perceiving the sensation which we call warmth. There is no difference between these waves other than that of wave length. The term radiation is employed to denote the sending out of waves through the ether of space in this manner. The statement you quote is in agreement with the best modern statements on this point.

(9418) J. S. F. asks: Will you please tell me if there is a cheap and practical way of testing electric lamps, to tell whether they are up to the standard claimed for them? A. The proper mode of testing electric lamps is by the use of a voltmeter and ammeter or by a wattmeter. You can then determine whether the proper amount of current is consumed by the lamp. There is no simple method of measuring candle power which you can use, since the lamps do not give the same candle power in different directions. The rated candle power is a mean or average of all the light sent out in all directions. If the bulb has become dark with age on the inside, it should be replaced by a new lamp.

(9419) W. R. writes: Would you kindly inform me through your paper how I may be able to obtain the gray color on a leveling instrument? A. The steel-gray finish on brass instruments is obtained by refinishing. First clean off the old lacquer with alcohol, repolish all the surfaces to an even luster or dead finish and make every part clean from grease or finger marks. Then immerse in a solution of one ounce of arsenic chloride to one pint of water or in proportion for larger quantities, until the desired color is obtained. Wash in clear warm water, dry in sawdust, warm and relacquer with a thin and pale solution of bleached shellac in methyl alcohol. Use a broad camel's-hair brush.

**NEW BOOKS, ETC.**

**DIE VERWERTUNG DES SPIRITUS FUER TECHNISCHE ZWECKE.** Von Prof. Dr. N. Wender. Mit 88 Abbildungen. Vienna and Leipsic: A. Hartleben. Large 8vo. Price, \$1.50.

Low-grade alcohol is destined to become of great industrial value as an engine fuel. Up to the present time, there has been no work in German in which the technical utilization of alcohol has been discussed with anything like the thoroughness technologists demand. The present book seems well calculated to supply this want. After treating of the method of utilizing alcohol in various countries, the author describes methods of producing alcohol, alcohol illumination, alcohol cooking and heating apparatus, alcohol motors and automobiles. In a brief chapter the author reviews the utilization of alcohol in chemical industry.

**A TREATISE ON THE PRINCIPLES AND PRACTICE OF DOCK ENGINEERING.** By Bryson Cunningham, B.E. London: Charles Griffin & Co., Ltd. Philadelphia: J. B. Lippincott Company, 1904. 8vo.; pp. 559; 34 folding plates and 468 illustrations in the text. Price, \$9.

From a practical point of view, this is a work that can hardly be too highly commended. It has also a certain historical value that should increase with years. No one can fail to appreciate the high importance of the subject in its relation to commerce, and hence in its relation to municipal and national prosperity. We have not space to review the volume in the manner it deserves, but, to give some idea of the contents, we may say that the practical side of dock engineering is dealt with under the following headings: Dock Design; Constructive Appliances; Materials; Dock and Quay Walls; Entrances, Passages, and Locks; Jetties, Wharfs, and Piers; Dock Gates and Caissons; Transit Sheds and Warehouses; Dock Bridges; Graving and Repairing Docks; and Working Equipment of Docks. The diagrams and illustrations are admirable; plans of many of the principal docks of the world are given, and a design for a model dock system is offered. The book should be in the working library of all who are interested in any phase of harbor improvement, or in the machinery and appliances used in such improvement.

**A STUDENT'S MANUAL OF A SERIES OF QUANTITATIVE EXPERIMENTS.** By Dayton Clarence Miller, D.Sc. Boston: Ginn & Co., 1903. 8vo.; pp. 404. Price, \$2.

This textbook of physics is based upon the course given to the sophomore class in the Case School of Applied Science. The selection of the problems and their treatment is the result of twelve years' teaching experience, and the grade of work is that of the course in general physics which is taught in colleges and technical schools. The several important exercises are here printed for the first time in a laboratory manual; and among others that are given a more efficient treatment than is usual in such