

veloped troubles that delayed or stopped them. The "Igniter," a 32-footer equipped with a 15-horse-power, four-cylinder Buffalo engine, developed a broken thrust bearing (which was of the ball-bearing type) before she had gone 40 miles. By putting in at Norwalk, the crew got the bearing repaired and afterward ran as far as Plum Island, when cracks in the thrust collars developed again, and they were obliged to give up the race. The "May" also dropped out of the race at New Haven, on account of trouble with her clutch.

During Saturday night and Sunday the boats encountered a severe easterly storm, which caused several of them to put into the nearest harbor and wait for the weather to moderate. Among the boats that withdrew during this part of the race was the "Em Bee." The first boat to appear at Cottage City, Mass., was the "Blink," which arrived at 9:30 Sunday morning. The "General Bumps" arrived at 1:40 P. M., and left a half hour later. As this boat was passing out of the harbor "Talisman" came in, and reported sighting several boats anchored along the Rhode Island shore. As no more of the leaders arrived before dark, it was apparent that the average time made by the winner would be slow. The "Aquila" was obliged to put into Vineyard Haven on Sunday afternoon because of weak batteries. These were replaced, and she left at 5:50 P. M.

The first boat to appear at the finishing point opposite Marblehead was the "Talisman," which, it will be remembered, had the biggest handicap and the lowest rating of any of the craft. She crossed the finishing line at 9:24:56 A. M., having made the run of 280 nautical (322 statute) miles in 45 hours, 24 minutes, and 56 seconds. During all this time the engine had been kept running without a single stop; and, although the boat stopped a few minutes at Cottage City to report, it had immediately resumed the race, and fought its way against a head wind and heavy sea around Cape Cod and northwest to Marble-

head. Not until after passing Highland Light at 2:10 A. M. Monday morning did the wind shift from dead ahead, at which point it had been for more than twenty-six hours. Although this made the course somewhat easier, the weather was still very rough, and the wind, striking the boat astern, drove the spray in cutting sheets over its occupants. While crossing Massachusetts Bay a heavy fog was passed through. Despite this long journey through the various sounds along the coast and around Cape Cod in the Atlantic Ocean during a heavy gale, the staunch little "Talisman" showed but little the effect of the tremendous tossing she had received during the greater part of her trip. The putty was squeezed out of her forward seams, but she did not leak, and the only damage she sustained was to her steering gear. A rope broke, and a temporary iron tiller was used while repairs were being made. That the little boat could maintain an average speed of  $6\frac{1}{2}$  knots (7.49 miles per hour) under the severe weather conditions encountered is truly remarkable, and is a thorough demonstration of the great seaworthiness and reliability of the American launch or motor boat, as it is nowadays termed.

The second boat to finish, the "Blink," reached Marblehead at 5:27:10 Monday afternoon, or 8 hours, 2 minutes, and 14 seconds after the "Talisman," which, if her time allowance is considered, beat the larger boat by 24 hours, 46 minutes, and 33 seconds. Rough weather on the shoals and trouble with her muffler, which became disconnected in a heavy sea, caused the "Blink" to put in at Hyannis, where she lay several hours during Sunday night, and was passed in the meantime by the "Talisman." The third and fourth boats to finish were the "Aquila" and the "Glissando," which arrived within four seconds of each other, the former at 7:30:08. The latter boat, because of her time allowance of 10:37:56, won second place from the "Blink" by 8 hours, 34 minutes, and 58 seconds, and was awarded the second prize.

The fifth and last boat to finish was the "Woodpile,"

which crossed the line at 2:48 A. M. July 25. This was one of the two boats equipped with a two-cylinder, two-cycle motor, all of the others having motors of the four-cycle type. Although less than half of the contestants finished, the race may be considered a success, as most of the boats which failed did so on account of minor troubles, and not because of unseaworthiness or badly-operating motors. While most of the boats were new this year, and specially built for the occasion, the winner is a year old, and was built for her owner to be used as a comfortable family cruising boat. The great seaworthiness of this type of boat, and the entire practicability of its use in the roughest weather, stamps it as a type far superior for comfort and for every-day use to the high-powered freaks, such as tried to cross the Mediterranean last spring with such disastrous results. That a boat of this kind can live in the open sea during a storm, shows the entire practicability of equipping our life-saving stations with motor life-saving boats, and it is to be hoped that the government will soon take some steps in this direction.

A new type of coupling for railroad cars has been devised by Mr. Edward Watson, of Glasgow, and some interesting demonstrations were recently carried out therewith. The coupling comprises two similar steel castings, one fixed to each car and projecting from the center of the ends of the wagon, and limited as regards side and end motion due to buffing shocks by springs in the usual way. Each coupling has two catches with taper faces. When the cars meet, the pressure between the opposing faces causes a partial rotation of the coupling. This allows the catches to engage with each other, and the vehicles are locked together. The coupling heads are absolutely devoid of pivoted catches, springs, and other such devices. The heads may be unlocked by raising a lever on each side of the train, and return automatically to their working position as the wagons separate, if required.

## RECENTLY PATENTED INVENTIONS.

### Electrical Devices.

**SAFETY SIGNAL SYSTEM.**—F. V. KING, Winslow, Ariz. Ter. Train and engine men sometimes forget that they have to meet and pass another train at a point on the run and run past and collide with the other train. The object of the inventor is to provide mechanism whereby when the predetermined point has been reached a signal will be operated in the cab or car, so that the conductor's or engineer's attention will be called to the order received from the train-dispatcher at some station back on the road, whereby he will again read his order and be prevented from passing such predetermined point without carrying out such order.

### Of Interest to Farmers.

**FOLDING COOP.**—R. YOAKUM and P. C. MCKEE, Houston, Texas. The invention relates to folding coops used for the transportation of poultry, such as live fowls, from one point to another by boat or rail, and has for its object to provide novel details of construction for a folding coop which render it very substantial either when erected for service or when folded into a compact package and enable the production of the coop at a moderate cost. The invention affords convenient means for supplying food and water and to keep these clean in transit when a number of these coops with poultry are piled in tiers in cars or vessels.

**HARVESTER.**—J. W. BURTLESS and J. W. LITTLE, McCook, Neb. This machine operates advantageously in cutting and loosening the earth and turning away a portion at each side of the row by the disks, which relieves the scoop and prepares the beet to be readily freed from the soil; in maintaining position of the beet until grasped by the conveyers, preventing its presentation to the cutters in a wrong position; in the automatic adjustment of cutters by the gage, which compels a fixed depth of cut, without regard to position of beet, and in ready adjustment of all operating parts and their adaptability to varying conditions.

**HAY-RETAINING DEVICE FOR STACKERS.**—J. O. MCCREERY, Fort Morgan, Col. This device has a fixed position relative to the carrier-teeth of the stacker, the rake-teeth being adapted to pass over the device when depositing hay on the carrier-teeth, and the device has tension-controlled fingers automatically depressed as the rake-teeth pass over the carrier-teeth to deliver their load to the latter and which fingers automatically rise at the back of the load of hay prior to the withdrawal of the rake-teeth, so that when the latter are withdrawn from the carrier-teeth no portion of the load is withdrawn.

### Of General Interest.

**TROUSERS-RETAINER.**—S. REITER, Jersey City, N. J. One feature of the invention is to provide a belt or elastic strap which follows the exterior of the trousers at the waistband, extending along the back of the waistband, being attached at its extremities to the for-

ward suspender-buttons, so that while the trousers are held up by the device in a comfortable manner no severe pressure is brought to bear upon the abdomen.

**RAZOR.**—C. L. GIRARD, Little Valley, N. Y. This implement belongs to that class known as "safety razors," and the purpose of the improvement is to provide a razor of the usual form or type in which instead of the blade being an integral portion of the shank a shell is directly connected with the shank, having the customary cross-sectional and longitudinal shape of an ordinary razor-blade, while the blade is made very thin, with straight side faces, and is mounted for movement in said shell to and from its back and open front edge.

**SHIPPING-PACKAGE.**—A. FONTS, New York, N. Y. This improved shipping-package is more especially designed for safely shipping fresh tomatoes and like perishable products from a warm climate to a cold one and for distributing the products in the cold climate to retailers during the winter season, to prevent freezing of the products while in transportation, or distribution.

**PNEUMATIC PILLOW.**—L. F. DOELLINGER, Des Moines, Iowa. In this instance the invention refers to pneumatic pillows and the like, Mr. Doellinger's more particular object being to provide means for readily inflating it. These means very conveniently and quickly insure the operation of inflating, deflating and folding. The pump is a portable affair forming practically a part of the pillow and is preferably left in position while in use. When the pillow is in use the pump is concealed.

**COPY-HOLDER.**—J. COOK, Oelwein, Iowa. This holder is of that class used by the operators of type-writing machines for holding notes or copy which is being transcribed. The object of the invention is to produce a device of simple construction which is especially adapted for holding copy of all kinds, in a simple manner. A feature is the extensibility of the device and the simplicity of its construction to facilitate its easy operation.

**FRAMELESS AWNING.**—S. C. CROWE, Boston, Mass. The chief objects of the invention are to do away with the frames that are ordinarily used and to provide means for efficiently and effectively operating the awning-cover to open and close it. These objects are accomplished by substituting movable bars for the frame and employing a system of flexible connections for manipulating the bars and cover.

**CHEESE-CUTTER.**—B. BLOOD, Coeur d'Alene, Idaho. In the present patent the invention is an improvement in cheese cutters, and relates particularly to the devices in connection with the knife whereby to indicate accurately the amount of cheese to be cut from any bulk to secure a slice of any desired weight.

**COUNTER-GUARD.**—J. S. AUERBACH, New York, N. Y. In this case the improvement has reference to counter-guards, the inventor's more particular object being to provide a type of guard which can be used for supporting transparent plates over a counter, so as to protect candies or other merchandise and to enable the same to be displayed to advantage.

**ARTIFICIAL UPPER DENTURE.**—L. L. WHITE, Portland, Ore. The invention relates to dentistry, and its object is to provide cer-

tain new and useful improvements in artificial dentures whereby the plate is caused to cleave to the roof of the mouth by atmospheric pressure. The arrangement can be cheaply manufactured, and the dentist can conveniently place the denture securely in position.

**TENT STRUCTURE.**—J. E. WALSH, New York, N. Y. This claim is on improvements in tent structures, the object of the inventor being to provide a tent having a framing the several members of which may be readily put together to form a strong and durable structure and that may be separated and packed in a comparatively small space convenient for transportation or storage. It is particularly designed for military camps, fields, hospitals, etc.

### Heating and Lighting.

**VENTILATING-HEATER.**—C. B. HOLDING, Toledo, Ohio. This improvement refers to a heating device which is arranged to act as a ventilator and which is provided with means for causing circulation of the heated air. The objects are to provide for the above functions, and especially to obtain a stove or other heating device which will permit the passage of air directly through the fire, but out of contact with it, in order to quickly and efficiently heat it.

### Household Utilities.

**SHUTTER-FASTENER.**—W. A. JORDAN, New Orleans, La. The invention pertains to improvements in fasteners which are used on the inside of ordinary hinged shutters and which engage with lugs or catches on the window frame. The object is to provide a fastener which cannot be released from the outside when the shutters are closed and which will be certain in its action and which can be securely locked in operative position.

### Machines and Mechanical Devices.

**REELING-MACHINE FOR PAPER OR OTHER FABRICS.**—W. H. WALDRON, New Brunswick, N. J. The object of the present invention is to provide a machine arranged to insure automatic reeling or winding up of paper or other fabric, to allow convenient adjustment of the winding-roll, and to permit bringing the paper under proper tension. The invention relates to machines, such as shown and described in the Letters Patent of the United States formerly granted to Mr. Waldron.

**FIRE APPARATUS.**—S. A. A. STENBERG, San Francisco, Cal. The object of this invention which relates to stationary fire-systems, is to provide a fire apparatus designed for use on fire-hydrants in streets and other places and arranged to permit firemen, policemen, watchmen, and other authorized persons to make immediate use of the apparatus for extinguishing fires in the immediate neighborhood in which the hydrant is located.

**GAS-GENERATOR.**—J. J. NIX, Los Angeles, Cal. An important feature of the invention lies in the provision of two combustion and expansion chambers separated by a shallow checker-work of large area, thus allowing perfect expansion of the gas and a consequent

gain in volume and bringing about a thorough association between the gas and checker-work, so as eventually to fix the gas. It relates to apparatus for generating gas, particularly from hydrocarbon oil atomized by air and steam.

**MACHINE FOR MAKING PAPER ARTICLES.**—F. J. MOTZ, New York, N. Y. The invention resides in a certain novel machine by which seamless paper articles may be produced, the machine being of that form having a vat and means for automatically submerging foraminous shapes therein and withdrawing them therefrom and exerting through the shapes a fluid movement during the submergence, thus causing the pulp to adhere to the shapes, so that after withdrawal from the vat the pulp may be allowed to harden or set on the shapes to form the finished articles.

**OIL-PRESS.**—D. J. HEDERICH, Boyce, La. The leading feature of the invention resides in the arrangement of (preferably two) rotary turrets, each bearing a number of press-cylinders. The inventor employs means by which he greatly increases the capacity of the press and by a novel manner of interarranging the elements is able to dispense with a large percentage of the labor skilled and unskilled heretofore employed in this class of machinery. It relates to a press adapted particularly for producing oil from cotton seed and other oil-producing material.

**SAW-FILING MACHINE.**—C. H. SLACK, New York, N. Y. In this patent the invention has reference to a machine for filing saws; and by this means a saw may be placed in the machine and the machine adjusted so that by driving the machine the saw will be accurately and uniformly filed throughout its length.

**RATCHET-WHEEL MECHANISM.**—A. BENOIT, J. GUENIFFET, J. NICAULT, and E. DANGER, 7 Rue Deparcieux, Paris, France. The object of this invention is to provide a mechanism which will allow of the ratchet-wheel being rapidly revolved by a step-by-step rotation, while being prevented each time from turning farther than the distance at which the pawl has moved forward whatever may be the speed and momentum of the wheel and the elements which revolve with the same.

**LAWN-MOWER ATTACHMENT.**—J. W. BONSALL, Glenville, Ohio. Mr. Bonsall's invention has reference to an improvement in lawn-mowers, his object in this instance being the reduction of the number of parts and the prevention of any grass being carried around by the rotating knives and insuring the cutting of all grass within the path of the mower.

### Prime Movers and Their Accessories.

**ROTARY ENGINE.**—H. M. LORTON, Atlanta, Ga. This invention relates particularly to that class of engines in which a revolving piston, provided with blades which may be projected from and drawn into its rim, operates within a casing to which steam is admitted and exhausted; and has for an object to provide means whereby to secure an efficient operation of the steam upon the blades and to relieve any tendency of steam to press the blades tightly against the walls of their guide-grooves in such manner as to impede free operation of the blades in the piston.

**ROTARY ENGINE.**—J. R. LEWIS, Jersey City, N. J. The invention relates to engines and more particularly to those of the rotary type. Its principal objects are to provide a simple and efficient engine. By the means employed both the impact and expansion force of the steam are utilized. If the apparatus is to be used as an internal-combustion engine, the supply may be to the casing-section, the exhaust of which is delivered to one of the two separate sections. In this manner not only is the impact of the exhaust applied to the rotating of the shaft, but a muffling effect is secured in its passage between the blades with comparatively little back pressure.

**OIL-BURNER.**—W. S. JENKINS, Cleburne, Texas. This improvement pertains to an apparatus for burning heavy oils with the aid of an atomizing-jet. It is particularly adapted to locomotive-work; but it is useful in other connections—for example, with stationary and marine boilers. A special feature lies in an arrangement causing the oil to flow steadily from the burner in common with the atomizing jet of steam or other fluid, thus producing a regular flame and thorough combustion.

**ROTARY VALVE.**—J. CRUIKSHANK, Yorktown, Va. In the present patent, Mr. Cruikshank's invention is an improvement in the valve action of steam-engines, and is intended to relieve the valve-seat of boiler-pressure and to keep the balance without readjustment, without regard to what pressure there may be in the boiler. This note will be followed later by a cut and a fuller explanation of this important invention.

**Railways and Their Accessories.**

**MAIL-BAG-DELIVERY DEVICE.**—P. J. A. SCHNOOR, Holstein, Iowa. Mr. Schnoor employs a specially-constructed derrick at each of the railway-stations or other places at which the mail-bags are to be delivered and taken up by the devices on the car, and within the car employs a specially-constructed swinging crane, combined with retaining devices therefor, as well as operating devices and specially-constructed brake devices for preventing motion of the car from causing the mail-bag to be carried too violently within the car as the crane is caused to be swung in an inward direction.

**BRAKE.**—C. E. F. BURNLEY, Eckman, West Va. This brake is more particularly adapted for use upon such vehicles as mine-cars. When brakes are mounted upon hangers supported upon fixed pivots, they must be constructed with accuracy to secure equal pressure upon front and rear wheels, and even this will continue only so long as wear on shoes is identical, a condition not attained in practice. Therefore one pair of shoes wears more than the other and power applied is expended upon the least-worn pair and the hangers, with companion shoes having little or no friction upon the wheels. This invention allows the shoes to bear upon the wheels with equal force, this continuing until all the shoes are worn out.

**Pertaining to Recreation.**

**SWING.**—T. H. BARGER, Peekskill, N. Y. Mr. Barger's invention pertains to swings, the main objects being to secure great flexibility and to provide for the operation and expenditure of comparatively little power without introducing any complications or any features likely to get readily out of order.

**Pertaining to Vehicles.**

**LOG-CART.**—R. J. WILLIAMS, Natalbany, La. In operation the tongue of this device is made slidable by removing a pin, and the sets of hooks are attached to the logs to be carried. Horses or other moving power is attached to the tongue end, and by this means a chain will draw a lever forward until the hook engages a catch. Logs are thus raised by reason of chains being wound on a drum. The tongue is then slid back, and the pin is again placed in its opening and logs are ready for transportation. To unload, lift the handle of the catch, to disengage the hook, and the logs' weight causes them to drop upon the ground on skids. Hooks disengage themselves, and the cart is ready for another load.

**VEHICLE.**—T. WILSON, Lewistown, Mont. The invention relates to vehicles, and particularly to sleighs. The principal object is to provide an automobile vehicle of this character which will operate satisfactorily under varying conditions of surface over which propelled. Although in this case the power-shaft is rotated by means of an explosive-engine, any convenient motor may be employed or if the vehicle be sufficiently light hand-operated mechanism may be used to effect the driving of the shaft.

**Designs.**

**DESIGN FOR A PENDANT.**—G. Fox, Cincinnati, Ohio. This design is for a watch-chain pendant, society pin, or badge. It includes two elks facing each other, rampant, their horns being connected by a ring, and the hind legs of the animals being attached to and suspending ornamental scrolls surrounding a disk or plate bearing a representation of a mallet and a rolled chart.

**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. 7104.**—For manufacturers of picture mouldings.

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

**Inquiry No. 7105.**—For manufacturers of blue flame (paraffin) stoves.

For bridge erecting engines, J. S. Mundy, Newark, N. J.

**Inquiry No. 7106.**—For manufacturers of red cedar bark.

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

**Inquiry No. 7107.**—Wanted, small planing mill with all equipments.

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

**Inquiry No. 7108.**—For manufacturers of alcohol engines.

Handle & Spoke Mchry. Ober Mfg. Co., 10 Bell St. Chabain Falls, O.

**Inquiry No. 7109.**—For manufacturers of nut-cracking machinery.

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

**Inquiry No. 7110.**—Wanted, address of the Mitchell models of the Westinghouse air brake.

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

**Inquiry No. 7111.**—For manufacturers of advertising novelties.

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

**Inquiry No. 7112.**—For manufacturers or users of automatic electric switching devices for use on street railways.

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. 7113.**—For manufacturers of small, flat, flexible chains.

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

**Inquiry No. 7114.**—For manufacturers of high-grade toilet mirrors.

WANTED.—Manufacturers of the Solid Back Scrub Brush, and other brushes. Handy Article Co., 117 S. Michigan Street, South Bend, Ind.

**Inquiry No. 7115.**—For manufacturers of weight motors or blowers, to be used in connection with gasoline light system.

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

**Inquiry No. 7116.**—For manufacturers of air pumps to be run by water for gasoline light system.

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. 7117.**—For firms who sell all kinds of household goods, hardware, etc., nothing to cost over 10 cents each.

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. 7118.**—For manufacturers of wire goods such as paper fasteners, small coil springs for holding display cards, 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. Raniville Co., Grand Rapids, Mich.

**Inquiry No. 7119.**—For manufacturers of cellulose from cornstalks.

QUANTITY CLERK WANTED.—In the office of a large ornamental iron and bronze manufacturing company. A man understanding plans, opportunity to develop from drafting office to quantity and estimating clerk. Address Clerk, P. O. Box 773, New York.

**Inquiry No. 7120.**—For manufacturers of beads out of soft stone.

**A GOOD LOVE STORY.**

"A Paper Proposal" is the title of a clever piece of fiction contained in "Mountain and Lake Resorts," a book just issued by the LACKAWANNA RAILROAD in which some of the most delightful summer resorts in the east are illustrated and described. The story is well worth reading, and the other information may help you in selecting your vacation place.

The book will be mailed on receipt of ten cents in stamps addressed to T. W. LEE, General Passenger Agent, New York City.

**Inquiry No. 7121.**—For manufacturers of condensers for telephone or wireless telegraph.

Young man, practical engineer, large acquaintance, desires to represent manufacturer on Pacific coast on commission basis; can furnish best of references as to industry, character and ability. Address W. Brown Smith, 624-622 Laughlin Building, Los Angeles, Cal.

**Inquiry No. 7122.**—For manufacturers of glass tubing having 1-16 inch inside diameter, for making wireless telegraph coherers.

**Inquiry No. 7123.**—For parties who can furnish raw hide.

**Inquiry No. 7124.**—For manufacturers of wire musical instrument strings.

**Inquiry No. 7125.**—For manufacturers of advertising novelties.

**Inquiry No. 7126.**—For manufacturers of capsules of carbon dioxide gas; also siphon for charging water.

**Inquiry No. 7127.**—For parties selling sheet aluminum and a soldering flux for soldering aluminum.

**Inquiry No. 7128.**—For manufacturers of machinery for making banana into fine flour.

**Inquiry No. 7129.**—For manufacturers of brass band instruments.

**Inquiry No. 7130.**—For manufacturers of springs wound by a key and run for five or ten minutes.

**Inquiry No. 7131.**—For parties who print colored pictures on paper in one continuous piece of about 6 inches wide and 12 feet long.

**Inquiry No. 7132.**—For manufacturers of telescoping steel flag poles.



**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.

(9717) P. H. C. asks: 1. I ask you to explain in your column of Notes and Queries why a small battery motor will run on a 110-volt alternating current when a 50 candle-power lamp is put in series. If the 50 candle-power lamp is removed and a 16 candle-power put in its place, the motor will not start. A 16 candle lamp does not carry current enough to run your motor; a 50-candle lamp does. 2. How long a spark ought an induction coil to give which is 8 inches long, 7 1/2 inches in diameter, the core being 1 inch in diameter; the primary coil consisting of two layers of No. 16 copper wire and the secondary coil containing 4 pounds of No. 36 copper wire? A. You may be able to get a spark 3 inches long from your coil, but its proportions are not of the best. The primary winding is of too small a wire. No. 12 would have been right. The coil is too short. It should have been 12 or 14 inches. This would have made the outside diameter less, and brought the secondary nearer the primary and into a stronger magnetic field. The coil might then have given a spark of four inches. See our SUPPLEMENT No. 1527 for plans for a 4-inch coil; price ten cents. 3. Having five known parallel forces applied at known points to a stick, what is meant by taking one of those points as the center of moments? A. When a point is taken as the center of moments, a force acting at that point does not assist in any way to rotate the stick. It simply produces pressure on the point. 4. What is meant by moments of forces? A. The moment of a force is the value of that force in producing rotation of the bar or wheel to which it is applied. The value of any force in moment is equal to the product of the force multiplied by the acting distance of the force. See textbook of physics for full explanation of moments and forces.

(9718) G. W. asks: 1. In a sal-ammoniac battery the zinc was crystallized. Now I suppose that the zinc ions were deposited on the carbon. A. If too strong a solution of sal-ammoniac is used in the Le Clanche cell, the result is the formation of crystals upon the zinc which cut down the current from the cell. The solution should not be stronger than 3 ounces of sal-ammoniac to a pint of water. We do not think the zinc ions had given up their job and returned to the carbon in your case. Since the solution was too strong, there were not so many ions as there should have been for the production of current. 2. I have a small spark coil which we made ourselves, and a while ago tried to work it with four cells of dry battery, and the amperage in four cells was the same as in one. Why was this? A. The discovery that four cells in series gave no more current than one cell has been made as an original discovery by a great many people who had not learned the relation of the resistance of the circuit to the proper arrangement of the battery. When the resistance of the circuit is low (the external resistance, as it is called) put the cells in multiple. The addition of cells in series does not increase the amperes delivered to the line proportionally, and energy is wasted. On the other hand, when the external resistance is high, put the battery in series. You will find this demonstrated in textbooks of electricity. See Swoope's "Elementary Lessons," price \$2 by mail.

(9719) F. J. B. asks: We have a small ground switchboard with series jacks, from which it seems as if we could hear talk when lines are busy, but though they sometimes talk quite loud, nothing can be distinguished. A. Grounded lines are almost inevitably subject to the annoyance of cross talk. It is due to the fact that different wires lie nearly parallel to each other, over some portion of their course; perhaps in coming into or in going out of the central. The only certain remedy for this is a metallic circuit. Then the wires of each circuit are carried on the poles in such a way that they are twisted around each other quite often.

(9720) E. De V. asks: Will you please tell me what kind of steel makes the best bar magnets? Also, I would like to know the relative strength of bar and electro-magnets. A. For permanent magnets some prefer Jessop's steel, some Stubbs' steel, some manganese steel, and some tungsten steel. Probably any good high-grade steel will answer very well for the purpose, with little to choose.

This is generally the case when there are so many opinions on a matter. There is no "relative strength" of permanent magnets. A good permanent magnet may be ten times its own weight. An electro-magnet is much more than this.

(9721) J. J. G. asks: Does an object which is viewed through the telescope of an engineer's transit appear to be larger than when seen with the naked eye? Although this may seem to you to be a foolish question, I find that several of my acquaintances, two of whom are graduate civil engineers, claim that while the image is clearer, it is no larger. By looking through the telescope with one eye and past it with the other, I am able to see both object and image at the same time, and thus seen the superficial areas appear to be about as 1 to 16. My friends claim that this is due to my eyes, but I do not think so. A. An engineer's transit usually is provided with a telescope which will magnify from 3 to 6 diameters, or from 9 to 16 times. If it did not magnify at all, an object seen through it would not be seen any more distinctly than with the naked eye. A simple way to determine the magnifying power of a glass is to look at bricks at some distance with one eye through the telescope and with the other eye directly. Find how many bricks seen with the naked eye are covered by one brick seen through the telescope. This is the number of diameters the telescope magnifies.

(9722) E. G. S. asks: Will you kindly give an explanation of the following through the columns of your paper? If a one-cent piece be centered over the end of a spool such as cotton thread comes on, and barely supported by pins, a current of air blown through the hole in the spool, instead of forcing the coin away actually produces a kind of suction and holds the coin tighter than ever, so that the spool may be held in a position where the coin will fall off as soon as the current of air stops, while something seems to hold the coin on while the current of air is passing. A. There are many variations of the spool and coin experiment which you ask about. Some of these are given in Hopkins's "Experimental Science," which we send for \$5. The most practical one is the ball nozzle of fire engine hose to disperse the water as it issues from the nozzle in a fine spray, the ball in the nozzle sticking tighter as the pressure of the water increases. The explanation is simple. The air is forced to spread out under the coin as it issues from the hole in the spool, and as it spreads the pressure of the air is reduced. The swifter the stream of air the more rapid the spreading of the air, and the more the consequent reduction of the pressure of the air under the coin. So the air under the coin has less pressure than the outer air, and this excess of pressure of the outer air it is which pushes the coin against the end of the spool.

(9723) J. W. M. says: Does the shadow of a cloud move over the earth's surface faster than the cloud, the cloud moving in an easterly direction? If so, is the difference susceptible of measurement? Would the time of day affect the answer to the question in any way? Or the direction of the cloud's motion? A. The shadow of a cloud does not move perceptibly faster than the cloud itself moves. Clouds vary in altitude above the earth's surface. Aeronauts at the highest altitudes attained have still seen cirrus clouds above them. The ordinary heavy cumulus clouds, however, are not at any high altitudes; probably five miles would be a maximum for them. So the distance of the cloud from the sun is almost the same as the distance of the earth's surface from the sun, and the shadow of the cloud, cast by the sun, will move with the same velocity as the cloud and in the same direction. Nor can the curvature of the earth, that is, the time of day, affect the relative motion very much.

(9724) H. N. asks: 1. G. F. in Query 9677 says: Is there any sound when there is no ear to hear it? I read in a book of the roaring gale on the vast ocean where no ship had ever sailed. The sea gulls were supposed to hear it. Now, can there be a howling gale without such obstructions as a ship's rigging, etc., to cause the sound? A. The explanation of what you write about sound is found in the dictionary in the meanings of the word. There are two. One is the sensation in the mind, as when you say "I hear a sound"; the other the mechanical cause of the sensation, as when you say a sound is produced by the vibration of some heavy body. In the first sense there is no sound where there is no ear to receive it. 2. What reduction is made in the lifting power of an ordinary hand well pump at different altitudes? A. Claims that at this elevation, 3,000 feet above sea level, 25 per cent of height should be deducted, i. e., the pump won't lift water 33 feet, but only 75 per cent of that height, or 24.75 feet. A. At an altitude of 3,000 feet the pressure of the air is about 27 inches when it is 30 inches at the sea level. This is a tenth less than normal; hence a pump will lift water nine-tenths as high as when the barometer is at 30 inches. The height to which an ordinary pump will lift water is practically 23 feet to 30 feet at full pressure; hence at 27 inches such a pump will lift 25 feet to 27 feet. This of course is on the supposition that the pump is in good condition.