RECENTLY PATENTED INVENTIONS.

Of General Interest.

HOSE-HOLDER.—A. G. BURTON, Denver, Col. The invention is an improvement in hose holders, especially designed for holding hose in use for sprinkling lawns and the like. Construction is simple and easily applied. By bending the points of the tripod so they extend parallel to each other and may be forced straight into the ground it is found in practice that but slight pressure is required to force the points into the ground and that the holder will not turn over, no matter how heavy the force of the water.

TRUCK.—W. H. ARMSTRONG, Vanwert, Ohio. The invention pertains to improvements in hand-trucks particularly adapted for carrying heating-radiators, the object being to provide a truck that may be readily adjusted to different sizes of radiators and having means for firmly gripping a radiator so as to prevent any movement thereof relating to the truck.

NON-REFILLABLE BOTTLE.—R. BERNSTEIN, New York, N. Y. The purpose of the invention is to provide an economic construction of bottle which after having been once filled and emptied can not be again filled and presented as an original package. Another purpose is to provide a bottle from which fluid can be conveniently and freely poured, and which will require no other stopper than that constituting a portion of the improvement.

MEANS FOR DISCHARGING FLUIDS FROM DRYING-CYLINDERS.—R. D. TACKABERRY, Lewiston, Maine. The invention refers to devices for expelling the air and water of condensation from drying-cylinders—for example, such as are disclosed in a prior patent, No. 643,198. The object of the present invention is to simplify the devices as much as possible, and also to maintain uniform and equal pressures in the various parts of the system. The inventor not only provides very simple and efficient means for removing air from cylinders at the beginning of operation, but also prevents sudden rises of pressures in the trap and erratic action incident thereto.

TROUSER STRETCHER AND CREASER.—H. C. WARFEL, Philipsburg, Pa. The device in this improvement is adapted for use both for stretching and creasing trousers, is readily collapsible, so it can be folded in a small space, can be readily adjusted at one end to a desired width and be locked in such adjustment and be then spread at its opposite end to stretch the trousers, and can be fastened in stretched position.

CARTRIDGE - PACKET.—J. H. BLAKE, Batavia, N. Y. The object of the invention is to provide a packet for use in magazine boltguns, and is especially designed for use with the gun for which a patent was formerly granted to Mr. Blake, and a further object is to provide an efficient packet for such purposes and one which will be durable, economic, and simple in construction, and which may be readily removed from the cartridge-chamber in which it is adapted to be placed.

HYDRANT AND HOSE COUPLING.—W. R. THURSTON, Jacksonville, Fla. In this case the invention relates to improvements in couplings for connecting a fire-hose or the like to a hydrant, the object being to provide a simple and novel mechanism whereby a hose may be quickly connected to a hydrant and practically in instantaneous use, the parts being so constructed that the hose may be turned in any desired direction with relation to the hydrant.

FLUSH-VALVE.—J. P. GOODFELLOW and S. R. RAMSAY, New Westminster, Canada. The objects of this invention which relate to a flush-valve are to improve the construction of devices of this character in such a manner as to do away with the annoyances of the ball-cocks, floats and the like now in use, to simplify the construction of such devices, and especially to provide a valve which will be balanced under all pressures.

FOLDING TABLE.—M. LANDSMAN, New York, N. Y. This improvement has reference to tables, and more particularly to those which may be folded to occupy a comparatively small space. Its principal objects are to provide a device of this class which may be conveniently operated, and which will furnish a table support when in an opened or assembled position. The table is preferably made up of wooden members and is light and strong.

PREPARATION FOR CLARIFYING CANE JUICES.—G. B. WILLIAMSON, Gramercy, La. The invention relates to a preparation for clarifying cane juices and syrups and to a method of using the preparation. The inventor treats the raw juices with paste, then evaporates them to syrups, next treats them with a liquid made from the paste, and finally reduces them to sugar. The paste is likewise used in syrups before filtration through ordinary bone-black, the impurities being removed by mechanical filtration. Neither sugar nor syrup is injured, and percentage of output is greatly increased.

SHOE LACING.—ELIZABETH FALCONER, Louisville, Ky. The object in this method or system of lacing shoes, is to obviate the annoyance of the tangling loops and ends and also to dispense with the necessity of daily lacing and unlacing the shoe, thereby providing a system of lacing which requires no attention except when a new lace is needed to replace a lace worn and useless. The invention is adapted and suitable for all kinds of laced shoes.

Heating and Lighting.

APPARATUS FOR MIXING AIR AND GAS FOR ILLUMINATING PURPOSES.—H. L. KARGER, 26 Frankfurter Allee, Berlin, Germany. In accordance with this invention uninterrupted operation is provided for by means of circulation-conduits in appliances for mixing gas and air; and also for the supply of the mixture at a high pressure, so that in this case both air and gas or two different kinds of gas are sucked in and forced out. Suction of two kinds of gases may be effected either into a common chamber or separate chambers. Employment of special circulation-pipe for gas and another for air is not possible, because exact co-operation of the valves leading back to the pressure-main is unattainable.

Household Utilities.

SHADE ATTACHMENT.—J. K. PUTNAM, Montpelier, Ind. This improvement pertains to shades such as used upon the inner side of windows in order to exclude the light. It concerns itself especially with the construction of the shade attachments, the purpose being to facilitate the mounting of the shade and to provide improved means for controlling the position of the same.

Machines and Mechanical Devices.

GEARING.—H. H. GOODSELL, Leechburg, Pa. Mr. Goodsell's invention relates to heat-controlled gearing, and admits of general use, but is of peculiar importance in connection with furnaces and the like for the purpose of compensating the effects of expansion and contraction, which otherwise tend to disturb the relative positions and proper working relations of the various movable parts. It is preferably employed in connection with furnaces of the general type described in this inventor's application formerly filed, but the present invention is not limited to use upon furnaces of that kind.

APPARATUS FOR COALING VESSELS.—L. A. DE MAYO, New York, N. Y. The prime object of this invention is not only to elevate the coal to and distribute it into the coaling-port of the ship, but to provide means for distributing the coal into the bunker-hatches, thus reducing to a minimum the work of hand-trimming. Mr. De Mayo attains this end by providing, in combination with the elevator proper, a peculiarly arranged distributer, which takes coal from the elevator proper and conducts it to any point within the interior of the ship, this means being extensible and adjustable and being of such structure that it may be taken apart and removed from the ship through the coaling-port.

LINOTYPE - MOUTHPIECE.—R. COLLINS, San Francisco, Cal. In the present patent the object of the inventor is the provision of a mouth piece for the metal pot or crucible of a linotype machine, by means of which mouthpiece to allow a better flow of metal into the mold and also to allow for the thorough venting of the mouth piece, thus preventing defective slugs.

REVERSIBLE TRANSMISSION-GEARING.—C. W. CASE, JR., and T. E. CASE, New Orleans, La. This invention refers to a means for transmitting rotary movement in either direction, and in its preferred embodiment the apparatus comprises clutch-faces acting directly to connect the two shafts or other parts and friction-gears and an intermediate pinion serving to connect the two parts to turn them in the opposite direction, the clutch and gears having a peculiar arrangement whereby upon shifting the device the clutch and gears go alternately in and out of action.

Railways and Their Accessories.

CAR-UNLOADER.—W. P. WHITNEY, Veedersburg, Ind. The aim in this instance is to provide a construction whereby any material that will slide—such as coal, shale, grain, etc.—may be readily unloaded from a car. The conveyer or conveyers may be extended over the ends of the car in order to dump material higher or lower or to side or sides or at any suitable distance from the car and under certain construction may be operated to unload from both ends of the car at the same time.

CAR-DOOR LOCK.—T. CODE, Chickasha, Indian Ter. The invention pertains particularly to improvements in locking devices for grain-car doors, the object being to provide a locking or securing device that may be readily operated and that when in locking position will hold the door closely against the inner side of the door-frame, thus preventing the leaking out of grain.

MAIL-CRANE.—W. E. WESTERMANN, Oldfort, N. C. This inventor's improvement is in that class of devices or apparatus arranged alongside a railroad track for holding a mail-pouch or mail-bag suspended in such position that it may be seized by a person or a passing train or removed by a device forming an attachment of a mail car.

CAR-BRAKE.—C. J. SPECHT and C. R. KRUEGER, New York, N. Y. This invention is mainly intended as an improvement over a brake previously patented by the same inventors. The subject of the present improvement relates largely to the means for supporting the shoe, separate sustaining means being arranged to coact respectively with the upper and lower portions of the brake shoe, whereby to better insure the desired movements of the shoe for its effective action.

Pertaining to Recreation.

MERRY-GO-ROUND.—B. KIPPELS, Moorhead, Minn. This invention is an improvement in what are variously termed "merry-go-rounds," "carousels," and "roundabouts." It is more particularly an improvement upon the machine or apparatus for which Mr. Kippels obtained a former Letters Patent. The inventor forms a merry-go-round which is distinguished by maximum strength, lightness, and ease of propulsion. It may be produced at small cost and easily set up or removed.

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. 7200.—For manufacturers of balloons which can lift a weight of about 2 pounds.

For logging engines. J. S. Mundy, Newark, N. J.

Inquiry No. 7201.—For manufacturers of metal castings.

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

Inquiry No. 7202.—For manufacturers of laboratory supplies and all kinds of chemicals.

Drying Machinery and Presses. Biles, Louisville, Ky.

Inquiry No. 7203.—For manufacturers of oxide of tin.

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

Inquiry No. 7204.—For manufacturers of bottle-capping machines.

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

Inquiry No. 7205.—For furniture manufacturing concern capable of working up hardwood into a superior article of sufficient novelty and utility to insure a good mail order business.

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

Inquiry No. 7206.—For manufacturers of machinery for sawing and splitting cord wood.

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

Inquiry No. 7207.—For manufacturers of invalid's tricycles.

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

Inquiry No. 7208.—For manufacturers of aluminum gas tip burners.

WANTED.—Patented specialties of merit, to manufacture and market. Power Specialty Co., Detroit, Mich.

Inquiry No. 7209.—For manufacturers of wooden button moulds.

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. 7210.—For manufacturers of luminous paint.

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. 7211.—For manufacturers of large gasoline burners.

WANTED.—Information concerning manufacturers of vacuum pans for evaporation of liquids. Sligo Furnace Co., Sligo, Dent County, Mo.

Inquiry No. 7212.—For manufacturers of mimeographs.

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

Inquiry No. 7213.—For manufacturers of colored glassware; also address of a dental supply house.

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. 7214.—For manufacturers of yacht and launch supplies and fittings.

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. 7215.—For manufacturers of looms for weaving woolen blankets.

WANTED.—The patents or sole agency for Britain and France, of new machines and articles used in the Brewing and Allied Trades. Highest references given and required. State best terms with full particulars to "Wideawake," care of Street's Agency, 30 Cornhill, London, England.

Inquiry No. 7216.—For address of Stevens Dishwashing Machine Co.

PATENTS ON DREDGES AND DREDGING MACHINERY FOR SALE.—By reason of the death of Ralph R. Osgood, valuable patents, having a long term to run, are offered for sale. For terms communicate with
The Albany Trust Company, Executor,
Albany, N. Y.

Inquiry No. 7217.—For a small hand vacuum pump for experimental purposes.

GENTLEMAN FROM ANTWERP, BELGIUM, with first-class references, now staying in New York, is visiting the United States for the purpose of opening relations with American manufacturers desiring to export their goods to Belgium and Holland. Address
G. W. D., Box 773, New York.

Inquiry No. 7218.—For the address of the importers of wire called "meteor" wire, used for the ignition points on igniters for explosive engines.

FOR SALE.—Canada and all foreign rights. Flynn's Little Giant Controller. The New Theory in driving, and a guaranteed conqueror of hard pullers and runaway horses, or your money refunded. Fits all bridles; absolutely humane. Does not interfere with wind or gait. No overdraw or checkbit necessary. Lightest and neatest controller made. Price, $2.50 each. Address Dr. P. Harvey Flynn, Patentee and Sole Manufacturer, 73 Warren Street, New York City.

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.

(9743) P. E. F. says: On rear of St. Patrick's Church, Elizabeth, N. J., is a large copper cross. When it was put up about ten years ago it was turned northwest and southeast; now it is turned about 80 deg. to the right. It turned by degrees and is still turning. Can you or any of your readers explain how or why it turned? A. We can only suggest what seems to be a possible cause for the turning of the cross on the top of the church, that it may be due to some slight inequality in the length of the arms of the cross, so that the wind is able at times of storms to turn it by its unequal pressure on the two arms.

(9744) R. E. S. says: In your valuable paper, the SCIENTIFIC AMERICAN, of July 29, 1905, under the heading, "Five Thousand Degrees of Heat," I find these words: "We have a heat that cannot be surpassed, and we obtain, in fact, a heat of 5,000 deg." Now, are you aware of the fact that the Carborundum Company, of Niagara Falls, uses 7,000 degrees of heat in producing its so-called carborundum? A thousand horse-power of electric energy, furnished by Niagara, is said to be converted into over 7,000 degrees of heat. In fact the heat is said to be so intense that it burns and vaporizes every known element. I have heard, from various sources that Thomas Edison, in trying to produce diamonds, led to the discovery and manufacture of carborundum. Carborundum is a mixture of sawdust, sand, and salt fused with coke at the tremendous heat of 7,000 deg. It is said to be diamond in character, of the same hardness, and even more indestructable. It is made up into wheels for grinding purposes and also made into hones and the like, and is, I assure you, absolutely the best grinding substance known. The above facts I take from a paper furnished by the Carborundum Company to one of its agents. A. We note your criticism of the phrase used by our Paris correspondent, "A heat of 5,000 deg." It is doubtless true that the electric arc furnishes the highest known temperature, and that this is the temperature at which carbon volatilizes. It is not so easy as you seem to assume it to be to determine just what that temperature is. The latest book on the electric furnace, by J. Wright, published 1905, contains this statement, page 9: "The temperature of the electric arc itself has never been determined." The highest authority in the world upon the electric furnace is without doubt Henri Moissan, of Paris. In his book, "The Electric Furnace," published July, 1904, page 19, he says, "We do not know the temperature of these pieces of apparatus; it depends upon the temperature reached by the electric arc which may be, according to Violle, 3,500 deg." This corresponds to 6,300 deg. F., since Violle used the Centigrade scale. The temperature of the electric arc is probably limited by the temperature at which carbon is volatilized. This has been variously estimated at from a little above 5,000 deg. F. to about 7,000 deg. F. In Chatelier's "High Temperature Measurements," published September, 1904, page 302, the "extreme temperature of the electric arc" is given at 3,600 deg. C., which is 6,500 deg. F. Wootham, in his book, published 1904, "Recent Development of Physical Science," page 77, gives the temperature of the electric arc as 3,000 to 4,000 deg. C., or 5,400 to 7,200 deg. F. We have given you the results as stated by the most reliable authorities. And we can say that we are not aware that it is certain that a temperature of 7,000 deg. exists in the electric furnace. It appears that our Paris correspondent used the lowest estimate of the temperature, while the advertising circular which you quote and which we have at hand uses the highest estimated temperature of the apparatus, as is natural that it should do. We do not know why our correspondent used the lowest figures, and personally we are accustomed to give both extremes when we use any figures on this point. One way or the other there is nothing to dispute about. If you will read the books we have quoted, especially the "High Temperature Measurements," which we can furnish for $3, you will appreciate the work done in this direction and the difficulties of the problem. Moissan's "Electric Furnace" is also a book well worth reading by any one who would know the facts in the matter. We send it for $3. This book contains the full history of the effort to produce diamonds arti-

ficially, in which Moissan has been the chief experimenter and the most successful one. It may be that Mr. Edison has taken a hand in this line of work, since he has done so in almost every line, but his name has not been publicly associated with the artificial production of diamonds. Your sources of information in the matter may be better than ours. The invention of carborundum is credited to Mr. E. G. Acheson in 1893. Moissan, "Electric Furnace," page 264, says: "I had occasion to find, in 1891, . . . small crystals of a silicide of carbon . . . I did not, however, publish anything on this subject at the time, and the discovery of the crystallized carbon silicide really belongs to Acheson." It is not "diamond in character," as you state, since the diamond is simply crystallized carbon, while carborundum is a compound of silicon and carbon. It is next to the diamond in hardness, or between 9 and 10 on the mineral scale of hardness. Being harder than emery it is a better abrasive, although emery is still preferred by some.

(9745) M. H. asks: 1. What is a range-finder, such as are used on warships? A. A range finder is an instrument for determining the distance and direction of any object. We can send you eleven SUPPLEMENTS containing valuable articles describing various kinds of range finders, at ten cents each. 2. Is it identical with a distance indicator? A. There are many forms of this instrument, some of which may be called distance indicators. 3. About how long, or how much time is usually consumed in finding the range with such an instrument? Has any instrument yet been invented or devised which will show or tell the distance of an object in from five to fifteen seconds of time? A. We do not know how quickly an experienced person could plot the result after the observations are taken. 4. Can a wind gage be made by an amateur mechanic which will record somewhat accurately the velocity of the wind? A. The velocity of the wind is usually measured by revolving cups placed upon arms. The revolving parts actuate gears which communicate motion to hands upon a dial. A skillful amateur could copy such an instrument if he had one at his disposal.

(9746) A. G. says: I think your explanation of the cause of a ball's curving in Question 9680, erroneous. You say: "The rotation of a ball is such that the air pressure is greater on the side toward which the ball rotates, pushing the ball in the opposite direction. Now, while without doubt the ball curves in the opposite direction from its rotation, I don't think you have stated the true cause of its curving. It seems to me that the greater air pressure is not due to the rotation of the ball but to its flight, hence it is always on the same side, namely the front, hence the ball must act upon it, not it upon the ball, to produce a variety of curves. In a word, the rotation of a moving ball gives it the tendency to circumvent, as it were, the resistance of the air, and so force itself more and more from its path. The only rotation that has no curving effect upon a ball's flight is that which has its plane parallel to the plane of the resistance such as is given the rifle projectile. A. We regret that you should not be able to agree with our statement of the curving of a ball, since it is not ours simply, but the conclusion of the highest authorities in mathematical physics. We would refer you to Hasting and Reach, "General Physics," page 135, where you will find the discussion of the subject.

(9747) M. W. S. asks: Is there any difference between a foot square and a square foot? Also, is there any difference between an inch square and a square inch? The last one was answered in a certain paper as follows: "Yes, twelve times the difference." Professors here claim there is no difference. A. There is no difference in area of surface between a square inch and an inch square, between a square foot and a foot square. There is a difference in meaning, however, between the two expressions, which we will illustrate. A piece of paper is an inch square when its corners are all right angles and its sides are all one inch in length. Similarly a board is one foot square when its sides are all equal and exactly one foot long and its corners are all square or right angles. A foot square implies a square whose surface is one foot. On the other hand a board may be of any shape whatever and be a square foot, if its area is one square foot or 144 square inches. A strip one inch wide and 12 feet long would be such a board. It might be irregular in shape and contain a square foot of surface. It would then be a square foot. The answer you quote from a paper is not correct.

(9748) A. W. P. writes: 1. What is a noise? Is it simply the vibrations caused by a moving object, or is it the action of the vibrations on the ear drum? For instance, suppose that a tree in the woods fell with no one near to hear it. Would there be a noise? Psychology teachers claim there would not. A. The word "noise" is used in two senses: in one sense it is the sensation which the mind perceives, in the other it is the physical cause of that sensation. If there were no person present the fall of a tree would not produce any sensation in any one's mind. It would, however, produce the same shock upon the air as if some one were present to hear it. The psychologist would say there was no sound, the physicist would say there was a sound. It is simply a difference in definition of a word. Both are right. The dictionary would give you this statement of the case. Text books of science and psychology usually contain it. 2. What is the complementary color of purple or violet? Is it green or yellow? A. The complementary color of purple is green. 3. Concerning wireless telegraphy, I have read that "the receiving antennæ should be about one-fourth the length of a wave." How may the length of the wave be determined? A. The length of electrical waves is dependent upon the number of oscillations per second of the discharge. With 300,000,000 oscillations the waves are about 3 feet long, since the speed of the waves is about the same as that of light. The mode of securing waves of a particular length is discussed in the several systems in Mayer's "Wireless Telegraphy," price $2. 4. Which is the best battery to use with a small induction coil (spark) for experimental purposes—one that will give a steady current and not annoy one by polarizing every few minutes? A. For experimental purposes you will find the plunging bichromate battery as satisfactory as any. A good form is described in our SUPPLEMENT No. 792, price 10 cents.

(9749) G. R. M. asks: Will you kindly answer the following through the columns of notes and queries in your valuable paper, and oblige a faithful reader: 1. What causes the changes of the moon? A. The phases of the moon are produced by the moon's revolution around the earth. The sun shines upon the moon all the time. When the moon in its motion around the earth comes between the sun and the earth, the sun is shining upon the side of the moon which is farthest from the earth. The dark half of the moon is toward the earth. That is the time of new moon. About two weeks later the moon has traveled around so that it is farther from the sun than the earth is, and the earth is between the moon and the sun. The lighted side of the moon is toward the earth. That is full moon. As the moon has changed from showing no lighted surface to the earth to showing the entire lighted surface to the earth, there was a time when she showed half her lighted surface to the earth, That was first quarter. Similarly there will be a time between full and new moon, when she will show half her lighted surface to the earth. That is last, or third quarter. If you will look up this matter in astronomies in your city library, you can read about it, and see the illustrations of it in the books, which will give you a much better idea than mere description in words. Ask the librarian about it. 2. Why does the mercury in the barometer stay higher when storms come from an easterly direction than it does when they come from any other direction? I have noticed this time and again and some of our largest and worst storms come from the east, and still the mercury will stay away up. I have wondered if the ocean had anything to do with it. As regards the power of a telescope, what is meant when manufacturers say they magnify 20, 33, or 50 diameters, A. We were not aware that a storm coming with an easterly wind was characterized by a higher barometer than one which comes with the wind from a southerly quarter. Storms always travel from west to east around the world. In crossing our country the paths curve considerably because of the mountain ranges, plains, and rivers. In the storm the wind blows inward toward the center, and the storm as a whole rotates from east to north, west and south, as we say, opposite to the hands of a clock in the northern hemisphere. This causes the northeast winds in the northern front quarter of such a storm. The ocean has little influence on these storms as far west as Ohio. The storm does not come from an easterly direction, but from the west, and the wind in its whirling in the storm blows from an easterly quarter in the front, and from a westerly quarter in the rear of the storm as it goes away. It clears off with a westerly wind, as you have observed.

(9750) E. C. asks: If the following problem can be solved, please give the solution in your inquiry column of the SCIENTIFIC AMERICAN. You will note that no rate of speed or length of time is given. A column of soldiers twenty-five miles long are on the march. A courier is dispatched from the rear to deliver a message at the head of the column. He delivers the message and returns to the rear, when he notices that the rear of the column is at the same point at which the head of the column was when he started. How far did he ride? A. The problem is possible of solution without having the rate of speed of either the soldiers or couriers given and without having the time known. The solution is as follows: Let Y = the number of miles traveled per hour by the courier. Let X = the number of miles traveled per hour by the soldiers. Then $\frac{25}{Y-X}$ = the time required to reach the front, and $\frac{25}{Y+X}$ = the time required for the courier to reach the rear of the column again. The sum of the two above quantities equals the time required for the soldiers to march 25 miles; therefore,

$$\frac{25}{Y-X}+\frac{25}{Y+X}=\frac{25}{X}$$

Solving this equation we find that X equals 0.41 Y or Y equals 2.41.

The soldiers traveled 25 miles. The courier went 2.41 times as fast and traveled for the same length of time, therefore he traveled 2.41×25 miles or about 60.25 miles. This solution is based on the assumption that both the soldiers and the couriers are traveling at a uniform rate.

(9751) A. W. asks: 1. What is meant by "polyphase" as applied to electric engines; and by "cycle" as applied to gas engines? A. A cycle is a series of changes through which a varying quantity passes, including all its values, and it fluctuates through these changes periodically. Thus a cycle of an alternating current of electricity is the successive values of the E. M. F. through one series of changes from zero to its highest value, and down through zero to the lowest and back again to zero. This succession of values the current will have as many times per second as there are cycles, ordinarily 30, 60, or 120. Polyphase currents are those whose E. M. F.'s differ from each other by a fraction of a phase. Thus three currents a third of a cycle apart will furnish a three-phase current in the lines with which it is connected. See Sloane's "Electrician's Handy Book," price $3.50. A cycle is like a complete succession of the heights of one tide in about twelve hours at the seashore. A phase is any single value or height of the water. If two or three tides come together by different channels in the same place or bay we have a two-phase or three-phase current of the tide. 2. What is meant by jibing a sail-boat? A. A sailing vessel is tacked when in changing from one course on the wind to another it presents its bow to the wind; it is jibed when it is turned in the opposite direction so that it presents its stern to the wind. In a high wind the latter is always a difficult and sometimes a dangerous operation. 3. Is a catboat so called because the mast stands straight up at one end of the boat like a cat's tail from its body? A. We are certain that a catboat is not so called because its mast stands straight up like a cat's tail. The mast is at the front end of the boat, and so far as we have observed cats have their tails set at the stern end. We do not know the derivation of the name catboat, but think it far more likely that it was given because of the quickness with which these boats will come about. 4. Does an electric motor differ in structure from a dynamo? Can they be interchanged? A. There is no theoretical difference between a dynamo and a motor. In general, each may be used for either service. There are, however, many structural differences between the two classes of machines, so that it can be easily told to which class any particular machine belongs. 5. How can a steady, effective current proceed from a dynamo giving an alternating current? The current changes polarity each instant, as understood. A. A steady current is not produced by an alternator. An alternating current can, however, be changed to a steady direct current by means of a rotary converter. 6. What light form of motor would you recommend for driving a dirigible balloon? A. Probably some form of gasoline motor is best adapted for use in a dirigible balloon.

(9752) O. E. G. asks: 1. Is the speed of radiant heat (whose medium is the same as light) the same as light and electricity? A. The latest science does not make any such distinction as between radiant heat, light, electricity, etc. They are all the same radiation. If the waves are of a length to affect the proper nerves we feel them as heat; if they can affect the eye we see light. 2. Is the difference between light, electricity, and radiant heat due to the difference in wave-length? A. The sole difference between the several effects is due to wave-length. See the "New Knowledge," by Prof. Duncan, price $2. 3. If light moves in transversal waves, how can it move forward? A. In all vibratory motions it is the wave form simply which travels. A wind moving over a field of grain is the very best illustration of this one can have remote from the ocean. Water waves on the ocean are good illustrations of a transverse wave with an onward motion of the wave form. It is not light which moves, but a wave form. The matter which vibrates moves to and fro, the wave advances. 4. Please explain wave-length. A. Wave-length is the distance from a particle moving in a certain direction to the next particle in exactly the same condition of motion. In a water wave, the wave-length is from a drop on the crest, for example, to the next drop exactly on the crest, also. 5. What is the wave-length of electricity, and does it vary with the amperage? A. There are all sorts of wave-lengths of electricity down to very short waves, but not so short as those which produce light. Those used in wireless telegraphy with a single wire as an aerial are very closely four times as long as the height of aerial wire from which they are radiated into space. When a capacity is in the circuit this affects the wave-length. The wave-length varies with the rapidity of the oscillations of the discharge. 6. Does a heated conductor of electricity retard the current? A. A hot metal has more resistance than it has at a lower temperature, and so reduces the current which flows through it. Carbon, however, has a much greater electrical resistance when cold than when hot.

(9753) F. W. M. says: I have a house to wire for burglar alarms, closed-circuit system. Kindly tell me where I can get a cheap book or instruction paper on the subject, as to how to connect up the battery (bluestone) and run the wires from windows to battery and then to annunciator. A. We recommend and can supply you with Horstmann and Tousley's "Modern Wiring Diagrams," price $1.50, which gives a good variety of modes of wiring for burglar alarms, showing all connections.

NEW BOOKS, ETC.

SUCTION GAS. By Oswald H. Haenssgen. Cincinnati: Gas Engine Publishing Company, 1905. 16mo.; pp. 88. Price, $1.

The economy of the gas producer for furnishing fuel for a gas engine has led to its rapid introduction and adoption in this country for many large installations. That a gas producer of the suction type can be made to supply fuel gas almost as economically for a small-sized engine of 3 or 4 horse-power as for a much larger plant, will perhaps be surprising to our readers. Such a producer, however, is described in this little volume, which also gives considerable useful information, together with numerous valuable figures upon suction gas.

WHEEL GEARING. With Tables of Pitch-Line Diameters of Wheels, Proportions and Strengths of Teeth, etc. By Alfred Wildgoose and Andrew J. Orr. New York: Spon & Chamberlain, 1904. Pocket size; pp. 175. Price, $1.

This small handbook should save engineers, draftsmen, and others engaged in making calculations relating to gear wheels, much valuable time. It contains a large number of tables giving the pitch-line diameters, etc., of gears of different sizes. The pitch-line diameters are given with a degree of accuracy sufficient for all ordinary purposes, the diameters being expressed in inches and decimals and fractions of an inch. The proportions of wheel teeth given are those generally adopted by engineers, and the various dimensions for each pitch will be found tabulated in a convenient form.

REPORT OF PROGRESS OF STREAM MEASURE FOR THE CALENDAR YEAR 1903. By John C. Hoyt. Washington: Government Printing Office, 1904.

This book, which forms Paper No. 100 on Water Supply and Irrigation, is issued under the auspices of the United States Geological Survey. It forms Part IV. of the series and has to do with interior basin, Pacific, and Hudson Bay drainage. Besides the regular measurement of the flow of streams made during the year 1903, and reported herein, a considerable amount of other special information that will be of use in general hydrographic studies has been included. Reconnaissances of many of the important rivers in different parts of the country have been made, and these have resulted in a collection of much valuable data with regard to flood, water-powers, river profiles, etc. The number of regular stations for stream measurements is steadily increasing, and at present systematic measurements are taken at over 500 stations, distributed so as to best cover the needs of the various States and Territories. The expansion of the work is the result of the greatly increasing demand from the general and engineering public for stream data collected by the Survey.

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AND EACH BEARING THAT DATE

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