RECENTLY PATENTED INVENTIONS.

Electrical Devices.

LOCKING NUT.—L. STEINBERGER, New York, N. Y. This invention relates to locking-nuts, and more particularly to a form of locking-nut admitting of general use and peculiarly applicable in instances where it is desired to lock a nut used in electrical features and especially for the purpose of securing wires in position. It may be applied in any position and practically in any place and upon any work or to any structure where bolts provided with revoluble nuts may be needed.

CIRCUIT-BREAKER.—S. WATERBURY, Schenectady, N. Y. The improvement relates to circuit-breakers and more particularly to those which may be operated both manually and automatically, its principal objects being to secure independence between the two operating mechanisms, so that the closure of the circuit by hand will not interfere with its again automatically opening, and to otherwise improve the apparatus.

Of Interest to Farmers.

HAY-PRESS.—E. W. KELSEY, Collierville, Tenn. The type referred to here is that of the "rebounding-plunger" press. The purpose of the inventor is to provide an economic form of press operated by horse-power, and to provide a single double-cam-faced operating-lever for the plunger-shaft which has a direct action and which operates with the least possible friction and which also acts upon the plunger-shaft almost immediately upon its return from its pressing-stroke.

Of General Interest.

CABINET.—FANNIE WOLF, Jersey City, N. J. This cabinet is for use in stores in lieu of shelving, and comprises a plurality of boxes for holding goods, the boxes being arranged in tiers or normally one upon another, the object of the invention being to provide a simple means for raising the several boxes in a tier and supporting the box or boxes above the one from which it is desired to remove articles after said box is lowered from those above it.

GARMENT-RACK.—FANNIE WOLF, Jersey City, N. J. In this case the invention has reference to improvements in racks for displaying cloaks and other garments, the object being the provision of a rack of simple and novel construction on which the garments can be suspended and displayed to customers to the best advantage.

HOSE-SUPPORTER.—A. M. WILSON, Cherokee, Iowa. The aim of the present invention is to provide a supporter and belt for the same arranged to provide an abdominal pad without danger of forming wrinkles and binding the wearer on walking, stooping, or bending sidewise; to obviate the use of undesirable metallic connecting-pieces and to form a convenient means for the attachment of the supporter straps of ordinary construction or such as described in a former patent granted to Mr. Wilson.

MEANS FOR TYING BLOOD-VESSELS.—A. W. FRENTZEN and J. SCHOEMAKER, Leyden, Netherlands. This improvement obviates a former disadvantage by forming the loop separately and thereupon placing on the nippers with which the vein is gripped, the ends of the thread being then pulled to close the loop. The loop slides along the nippers toward the rounded end of the latter, by which the vein is held. Reaching the end the loop slides onto the vein and is then drawn tightly together. To prevent the loop taking unfavorable position on the nippers, the latter are provided with an abutment in form of a finger, spring, or the like which keeps the loop from changing position on the instrument.

Hardware.

KNIFE.—W. F. WATSON, Tidioute, Pa. The principal object in this instance is to provide means for automatically locking the blade of a knife, especially of that form known as a "jack-knife," in open position. Although especially adapted to jack-knives, it can be used for any kind of a knife having a movable blade. For accomplishing this object means is provided which is inexpensive and which does not add a single piece to the jack-knife of ordinary construction.

VISE.—J. F. MCLEAN, Montreal, Canada. In this case the invention relates to improvements in vises, particularly vises of the "quick-acting" type, in which a pair of jaws are arranged to be freely and quickly closed onto an object, after which they are moved to closer engagement with said object by means of a screw or other mechanical device.

Household Utilities.

MOP-HEAD.—M. HARTMAN, Upper Sandusky, Ohio. In this instance the invention has reference to improvements in mop-heads made of mop-jam, wicking, or other suitable material and a holder for the same, and the object of the inventor is to produce a simple, cheap, and efficient mop-head and holder which can readily be applied to a handle and can be easily packed and conveniently shipped in large quantities.

NEEDLE-THREADER AND PINCUSHION.—H. G. WILMERLING, New York, N. Y. The purpose of the invention is to provide a construction of needle-threader comprising a tubular body made in telescopic sections for the reception of needles and a head constructed mainly of glass, the glass section being provided with an opening to receive the eye-section of a needle, which latter opening is at right angles to and crosses the needle-opening, whereby such a smooth surface is presented to the thread that it can be quickly and conveniently passed through the eye without any danger of chafing the thread. The base for the body of the threader is in the form of a cushion.

Machines and Mechanical Devices.

SNOW LOADER AND UNLOADER.—J. O. LINDEN, Prophetstown, Ill. This machine cleans snow from streets or roads and loads the snow into a wagon, from which it may be unloaded at any suitable place, the object being to provide a machine so constructed that the loading and unloading will be practically automatic and in which the working parts may be controlled from the driver's seat.

RAZOR-STROPPING MACHINE. — E. G. KAUFMAN, Yonkers, N. Y. The invention relates to machines in which the strop is manually actuated to rock a shaft connected with the clamp employed for holding a razor in contact with the runs of the strop. The object is to provide a machine more especially designed for stropping ordinary handled razors and arranged to permit convenient insertion and removal of the razor and to insure easy rocking motion of the razor-clamp to bring the cutting edge of the blade into proper contact with the runs of the strop.

PNEUMATIC BRUSH-FILLING MACHINE.—J. MORRISON, JR., Troy, N. Y. The inventor provides improved devices for use in filling brushes and he is enabled to utilize advantageously pneumatic means for showering the bristles upon the dies which are provided with holes for receiving the tufts. He arranges a screen in connection with the die to facilitate the assembling of the tufts. Economy of manufacture results more particularly when the pneumatic showering devices are used.

Prime Movers and Their Accessories.

HYDRAULIC MOTOR.—J. SCHROEDER, Davenport, Iowa. This invention pertains to improvements in hydraulic motors, the object being the provision of a motor of this character that may be operated with comparatively low water-pressure and having a novel valve-controlling mechanism, and, further to so arrange the parts that there will be no dead-centers.

Railways and Their Accessories.

HOSE-COUPLING FOR CARS. — D. P. FAHRNEY, H. E. DORAN, and G. A. NEWTON, Springfield, Mo. The purpose of the invention is to produce a coupling which will couple automatically when the cars are brought together and which will have a desirable flexibility, adapting the device for the passing of curves and enabling it to accommodate itself to roughness in the road-bed. The purpose is to provide efficient means for connecting the air-hose and other hose which should run through the train.

RAILWAY-BRAKE.—W. H. WOOD, Lloyd Street, Petersburg, South Australia, Australia. The invention relates to brakes for railway-trucks and other railway-vehicles, and comprises a brake-gear whereby the brakes may be applied to or lifted from the wheels from either side of the vehicle by hand-power. The several parts are so situated and connected that they do not in any way interfere with the side, end, or bottom doors of the vehicle. The hand-levers whereby the brakes are applied have a horizontal movement only and can be operated as a vehicle passes.

RAIL-JOINT.—C. K. FREER, Memphis, Tenn. This improvement pertains to railroad-rails; and its object is to provide a new and improved rail-joint arranged to securely fasten the abutting ends of the railroad-rails together. The joint is comparatively simple and durable in construction, and its parts can be readily assembled to insure a strong joint and support for the meeting ends of the railroad-rails.

Pertaining to Vehicles.

SPEED-INDICATOR FOR MOTOR-CARS AND OTHER VEHICLES.—R. M. RUCK, 44 Thurloe Square, South, Kensington, London, England. Mr. Ruck's invention has reference to speed-indicators for vehicles (more particularly motor-cars), and it has for one of its main objects to provide in connection with the "excess-speed" indicator, means whereby to enable the speed at which the vehicle is at any moment running to be more readily ascertained than heretofore.

WHIFFLETREE-HOOK. — J. R. HUGHES, Chama, New Mex. Ter. The inventor employs an appliance comprising duplicate reversely-disposed hooks of special embodiment for engaging therewith of a specially-constructed double cockeye having a tug for attachment to or connection with the end of an ordinary harness-trace. The embodiment is such that when this cockeye on the trace-tug is applied to or connected with the said hooks it is practically impossible for the same to become accidentally disconnected therefrom, irrespective of the directions or angles assumed by the tug under ordinary conditions of operation.

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. 8223.—Wanted, addresses of manufacturers of all kinds of machine planes and molders for steam engines.

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

Inquiry No. 8224.—Wanted, a ¼ h. p. gasoline motor for attachment to an invalid's wheel chair, operating to draw the same by friction of the tire.

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

Inquiry No. 8225.—Wanted, the address of the makers of the Ferguson road carts.

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

Inquiry No. 8226.—Wanted the manufacturer of the machine for making elbows for stove-pipe and gutters.

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

Inquiry No. 8227.—Wanted, makers of paper fiber and wood fiber tanks, about 20 feet to 30 feet long by 15½ feet wide.

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. 8228.—Wanted, machinery for making wooden toothpicks.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery tools, and wood fiber products. Quadriga Manufacturing Company, 18 South Canal St., Chicago.

Inquiry No. 8229.—Wanted, electric welded wire hoops, galvanized gas pipe crosses large enough to receive ⅜-inch pipe with one end cast heavy enough to turn a ball race around the opening to receive the gas pipe and large enough to retain 3-16-inch ball, also steel plate 3 16 inch thick.

Automobile experts are in constant demand at high salaries. Our seven weeks' course is the most thorough and practical, fitting men to drive, handle and repair Day and evening classes. Special course for owners New York School of Automobile Engineers, 146 West 56th Street, New York.

Inquiry No. 8230.—Wanted, manufacturers of chest handles, hinges for washing machine, also gas pipe.

Inquiry No. 8231.—For manufacturers or dealers in wire for making ornamental novelty.

Inquiry No. 8232.—Wanted, manufacturers of charcoal burners, for making charcoal out of refuse wood; also for makers of stump pullers.

Inquiry No. 8233.—Wanted, the manufacturer or dealer in the patented device for recording notes of music.

Inquiry No. 8234.—For manufacturers of "knuckle-joints" or device used in a similar manner.

Inquiry No. 8235.—Wanted, manufacturers of centrifugal gas-cleaning apparatus, of the Edward Theisen type, such as used in Europe.

Inquiry No. 8236.—Wanted, dealers in pearl-bearing mussels, also in asbestos.

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.

(10061) G. B. W. asks: 1. Does the magnetic field of an inductor dynamo rotate just as if the field coil were fastened to the inductor? A. No; we think the type you name does not. 2. In a slotted armature does the field have to cross an extra wide gap due to the depth of the slot? A. No; the air gap is smaller in a slotted armature. The lines follow the iron in preference to the air, and do not pass out at the bottom of the slots. 3. Does a conductor cut the lines of force or do the lines of force cut the conductor? That is, do the lines of force break on one side of the conductor and reunite on the other when it is swept through the field on the armature of a dynamo? A. Lines of force are not like threads, to be cut. They are not of material substance, and are not cut in any such sense. The wire passes through the field and is resisted in doing so with a force which has a certain value and effect in generating an electric current which is well expressed by the convention of imaginary lines. The lines are as imaginary as the earth's equator. 4. Is there an arc lamp which does not throw shadows because of the up-and-down rods by the side of the carbon? A. Lamps have been made which do not throw shadows. There need be but a small conductor to carry the current to the lower carbon.

(10062) W. B. asks: In a recent issue in Notes and Queries, 5.846 deg. F. is given as the latest figure for the melting point of platinum. Is this misprint for 3.846? A. No; the error in the melting point of platinum arose from using a temperature which was in Fahrenheit degrees as if in Centigrade degrees. The melting point of platinum is given variously from 1775 deg. C. to 2200 deg. C., which would be equivalent to about 3200 deg. to 3992 deg. Fahr.

(10063) S. C. asks: 1. Please let me know the amount of iron wire which is necessary for the core of the armature of the simple motor described on page 500 in "Experimental Science." A. About a pound of wire is required. 2. Would the carbon plates made by the process given on page 705 be all right for the plunge battery on page 401? A. Yes, if well made; but we do not advise an amateur to attempt the manufacture of carbons. He cannot obtain very good results, and they are very cheap in the market. 3. How much bichromate of soda is required for one charging of the same battery? A. To every 6 quarts of water take 3 pounds of sodium bichromate and 1 quart of strong sulphuric acid.

(10064) B. H. G. asks: Please inform me through your Notes and Queries the principle and details of the radiometer? A. The radiometer is a heat instrument. Light has no connection with it. It consists of a glass globe, usually about two inches in diameter, exhausted to a suitable degree. Within is a steel pivot upon which revolves a cross arm carrying four vanes of aluminium, one face of which is blackened by carbon. When heat falls upon the vanes the black faces absorb more than the bright and are hotter. The molecules of air coming in contact with the black faces are heated more than those coming in contact with the bright faces and rebound with more force. The reaction of this rebound causes the vanes to revolve with their black faces in the rear. The globe itself has been made to show a tendency to rotate in the opposite direction to the vanes, this being due to the bombardment of the inner surface of the glass by the stream of molecules which rebound from the vanes. Thus the radiometer is a heat engine, transferring heat from the black side of the vanes to the surface of the glass opposite. A satisfactory explanation of the phenomenon is given in Barker's "Physics," price $3.75 by mail. See also SUPPLEMENTS 13, 37, price ten cents each. 2. Please state also whether energy exists in light, and to what extent. A. Light and heat are now classed together as radiant energy by scientists, and the energy of both is measured by absorbing some material and determining the heating effect it produces. The energy of light as light has not been measured by any mechanical effect which it can produce.

(10065) J. L. M. asks: What is the most practical and least expensive process to produce, as near as possible, an absolute vacuum in a chamber containing about four cubic feet? Will it require a greater capacity of power to empty a large space than it will a smaller one? A. To exhaust so large a space it will be necessary to use a mechanical air pump. It is not possible to produce an absolute vacuum by any means of exhaustion. It will, however, not require any greater power to empty a large reservoir. It will require more time.

(10066) A. L. N. asks: 1. Are there any known substances, preferably metal, which allow some kind of gas to pass through, about the same as light through glass? If so, which? A. We do not know any such metal or substances. The molecules of any gas are much too large to pass between the molecules of a metal. Red-hot cast iron will allow some gases to escape through it, but not with the ease with which light passes through glass. 2. Are there any known substances, preferably metal, which will change temperature, when immersed in some gas? If so, which? A. Powdered antimony or heated copper foil will burn with the evolution of light if dropped into a jar of chlorine gas.

(10067) E. V. V. writes: I have had some little trouble in convincing a man that ice forms on the bottom of a running stream of water, but having seen the same I know I am right. Would you kindly answer same in your valuable paper? A. Anchor ice is often to be seen fastened to the stones on the bottom of a stream, and also to the timbers around a mill. Very frequently mills are stopped by the anchor ice during a very cold snap.

(10068) H. W. J. says: 1. Is concrete made wet stronger than if made dry? A. Concrete should be made wet. It will be a great deal stronger than if made dry. 2. Are concrete walls made of the common form of concrete blocks non-porous? A. Concrete walls of common concrete blocks are porous. 3. Are walls made with oyster shells liable to fail on account of the shells bursting? A. It is somewhat difficult to answer this question, as there are a great many ways in which oyster shells could enter into building material successfully. 4. Is the proportion 1, 3, 5 considered about the proper one for concrete? A. The proper and standard mixture for concrete is 1 part Portland cement, 3 parts clean sharp sand, 5 parts fine crushed stone.

(10069) R. L. M. asks how to make Pharaoh's serpents. A. These are little cones of sulphocyanide of mercury which, when lighted, give forth a long, serpent-like, yellowish brown body. Prepare nitrate of mercury by dissolving mercury dioxide in strong nitric

acid as long as it is taken up. Prepare also sulphocyanide of ammonium by mixing 1 volume sulphide of carbon, 4 strong solution of ammonia, and 4 alcohol. This mixture is to be frequently shaken. In the course of about two hours, the bisulphide will have been dissolved, forming a deep red solution. Boil this until the red color disappears and the solution becomes of a light yellow color. This is to be evaporated at about 80 deg. F., until it crystallizes. Add little by little the sulphocyanide to the mercury solution. The sulphocyanide of mercury will precipitate; the supernatant liquid may be poured off, and the mass made into cones of about ½ inch in height. The powder of the sulphocyanide is very irritating to the air passages, and the vapor from the burning cones should be avoided as much as possible. To ignite them set them on a plate or the like, and light them at the apex of the cone.

(10070) J. H. K. asks how to platinize silver. A. Place some platinum in a small quantity of aqua regia or nitrohydrochloric acid, and keep it in a warm place for a few days, when it will have dissolved. As soon as it has dissolved, evaporate the liquid at a gentle heat until it is as thick as honey, so as to get rid of the excess of the nitric and hydrochloric acids. Add a little water, and it is ready for use. A dozen drops of this solution goes a long way in platinizing silver. The operation is performed in a small glass or beaker, covered with a watch glass to keep in the fumes, and placed in a little sand in a saucer to equalize the heat.

(10071) A. J. C. asks for formulas for printer's rollers. A. To 8 pounds transparent glue add enough water to cover it; let it stand with occasional stirring seven or eight hours. After twenty-four hours, all the water should be absorbed. Heat it in a water bath, as glue is always heated as soon as melted, and when both rise, remove from fire, and add 7 pounds molasses that has been made quite hot. Heat with frequent stirring for half an hour. The molds should be clean and greased. Pour into molds after it has cooled a little, and allow to stand eight or ten hours in winter, longer in summer. Some use far more molasses; three to four times above quantity, and less water. In this case, after soaking one to one and one-half hours, the glue is left on a board overnight, and then melted with addition of no more water, and three or four times its weight of molasses added. Two hours' cooking is recommended in this case.

(10072) B. F. M. asks for information concerning sunstroke. A. Sunstroke is caused by excessive heat, and especially if the weather is muggy. It is more apt to occur on the second, third, or fourth of a series of hot days than on the first. Loss of sleep, worry, excitement, close sleeping rooms, debility, abuse of stimulants, predispose to it. It is more apt to attack those working in the sun, and especially between the hours of eleven o'clock in the morning and four o'clock in the afternoon. On hot days wear thin clothing. Have as cool sleeping rooms as possible. Avoid loss of sleep and all unnecessary fatigue. If working indoors and where there is artificial heat (laundries, etc.), see that the room is well ventilated. If working in the sun, wear a straw light hat (not black, as it absorbs the heat), etc., and put inside of it, on the head, a wet cloth or a large green leaf; frequently lift the hat from the head and see that the cloth is wet. Do not check perspiration; but drink what water you need to keep it up, as perspiration prevents the body from being overheated. Have, whenever possible, an additional shade, as a thin umbrella when walking, a canvas or board cover when working in the sun. If a feeling of fatigue, dizziness, headache, or exhaustion occurs, cease work immediately, lie down in a shady and cool place, apply cold cloths to and pour cold water over head and neck. If any one is overcome by the heat, send immediately for the nearest good physician. While waiting for the physician, give the person cool drinks of water or cold black tea, or cold coffee, if able to swallow. If the skin is hot and dry, sponge with or pour cold water over the body and limbs, and apply to the head pounded ice wrapped in a towel or other cloth. If there is no ice at hand, keep a cold cloth on the head and pour cold water on it, as well as on the body. If the person is pale, very faint, and pulse feeble, let him inhale ammonia for a few seconds, or give him a teaspoonful of aromatic spirits of ammonia in two tablespoonfuls of water with a little sugar.

(10073) J. M. H. wants to know how to harden wood pulp. A. Various substances can be used to harden the pulp, such as glue, starch, and gum arabic, tragacanth, etc. The dry pulp should be mixed with as thin mucilage as is possible to make it stick together when pressed. White clay or kaolin can be also mixed with the pulp to make it like a putty. The molds should be slightly oiled to keep from sticking.

(10074) C. M. A. asks for information concerning sodium silicate. A. Silicate of soda (or soluble glass) is prepared by fusing together carbonate of soda and sand, or by boiling flints in caustic soda under great pressure. It is not soluble in cold water, but dissolves in 5 or 6 times its weight of boiling water. It is employed in the manufacture of soap, in fixing colors, in preserving stones from decay. In admixture with other silicates, silicate of soda occurs in glass; and it (equally with silicate of potassa) imparts the property of viscidity before fusion to such mixtures, which is of great value in the working of glass.

(10075) W. B. K. asks how to temper gun springs. A. To temper gun springs, heat them evenly to low red heat in a charcoal fire, and quench them in water with the cold chill off, keeping them immersed until reduced to the temperature of the water. Place an iron pan containing lard oil and tallow in about equal quantities, over a fire, and place the springs therein, and heat the pan until its contents take fire; then hold the springs in the flames, turning them over and over and dipping them occasionally in the oil to keep them blazing; when the oil adhering to them blazes freely when they are removed from the flames, place them aside to cool off.

(10076) A. S. G. says: Would you please answer by letter or through the columns of your paper, if steam turbine engines have ever been used for automobiles? If so, where can I get a description of them? If not, why could they not be used? A. We have never heard of an instance where an attempt has been made to apply a steam turbine engine to an automobile. The speed at which it is necessary to run the steam turbine of small power would make their successful application to automobile practice extremely difficult. The speed control and power at starting also make the steam turbine less satisfactory than the ordinary steam engine for automobile work. The most serious difficulties with the steam automobiles are with the boilers generating the steam rather than with the engines.

(10077) G. A. D. asks: Would you kindly inform me whether it is possible to build a brick smokestack or chimney 150 feet high, either square or round, which will be strictly plumb from top to bottom? A. In reply to your question as to whether it would be possible to make a brick smokestack or chimney 150 feet high, either square or round, which would be *strictly* plumb, we would say that of course it is impossible to make anything *mathematically* straight or plumb. The difficulty of obtaining proper foundation for a tall chimney, and the possibility of unequal settlement, make it especially difficult to have such a structure come as near to the absolute plumb line as many other structures would. It is customary to give the outer wall of a tall chimney a batter, making the chimney smaller at the top than at the bottom, both for reasons of economy and stability.

(10078) J. N. P. says: 1. Why and how does water put out fire? Why does the water have the same effect whether hot or cold? A. Water puts out a fire by reducing the temperature of a flame below the point of ignition, and is especially efficient for this purpose because of the large amount of heat that is required to turn it into steam. It is almost as effective when hot as when cold, because of the great amount of latent heat in the water. 2. Does the sun shining directly on a cooking stove have any effect upon the cooking? Does it lessen the baking in any way? If when shining on a fire in an open grate, does it reduce the heat? A. The sun shining directly on a stove or fire in an open grate tends to increase the temperature slightly, just as it tends to increase the temperature of any other object. The bright sunlight, however, may make the fire appear less brilliant, and therefore appear to give out less heat. This effect, however, is deceptive.

(10079) J. B. E. says: What will be the approximate cost of installing an electric light plant to furnish 1,000 16-candlepower lights and run one elevator (exclusive of light charges)? The approximate amount of fuel, coal, for 10-hour run? What horse-power steam outfit required? Is direct or alternating current better for private hotel plant? Is gasoline outfit practical for this purpose from standpoints of economy and reliability? What would be the difference in cost of fuel between steam and gasoline with coal say at $2.50 per ton? Is it practical to use exhaust steam in radiators for heating house? Do you consider underground tank with air pressure preferable to elevated gravity pressure tank for private water-works? A. An electric light plant furnishing 1,000 16-candle-power lights and running one elevator will require an engine which will develop from 100 to 120 horsepower and a generator which would generate from 65 to 75 kilowatts. Such a plant will require from three to six tons of coal per ten hours, according to the type of engine and boiler that are installed. Direct current is as efficient and more simple for your purpose than alternating current, and is perhaps more economical and reliable than gasoline. It is perfectly practical to use exhaust steam in the radiators of a heating plant, and if the installation is properly made, this will give satisfactory results and be a great saving in expense. Either an underground pressure tank or gravity pressure can be satisfactorily used for private water works. Nothing is superior to the gravity pressure.

(10080) M. L. T. asks: 1. In the so-called "Highlow" lamp, is the small loop of filament which is used for the small candlepower of a greater resistance than the large one? If so, what is its resistance in comparison with the large one? A. We do not know the resistance of the filaments of the "Highlow" lamp, but the resistance of the

side which gives the least light must be much greater than that of the side which gives the brighter light. 2. Is a silk watch chain any protection to a watch from its being magnetized when being carried in the pocket? The first person claims that he wears a silk watch chain while working about a machine (which by the way is a 150-kilowatt rotary converter, 550 volts direct current) so that if it should hit the field casting, his watch would not receive the magnetism by its traversing the chain as it would if it were gold. I claim that the material of the chain would not affect the watch becoming magnetized, but if brought near enough to the machine, the watch would receive the magnetism, even if it were in the pocket. I have always read that magnetism had no insulator; according to this, I believe the silk chain to be no protection from magnetism. Will you please state your opinion of this? A. Your friend and yourself seem to be a little mixed in reference to magnetism, silk watch chains, etc. You are right that magnetism passes through space. It has no insulator, excepting iron. It does not traverse a wire at all. It whirls around a wire in which a current of electricity is flowing, and causes the current to move a magnetic needle, and thus makes voltmeters and ammeters possible. Silk on the other hand is an insulator of electricity, not of magnetism. Electricity cannot get off a wire covered with silk. Gold is a conductor of electricity, and if a gold watch chain touched any uninsulated metal which was carrying a current, a man who might touch the chain in that position would receive a shock. If such a chain should touch the field casting only, nothing could happen, since the field casting is not carrying a current of electricity, but is only magnetized.

NEW BOOKS, ETC.

TURBINES. By W. H. Stuart Garnett. London: George Bell & Sons, York House, 1906. 8vo.; pp. 283. Price, $2.75.

As the author himself states, the book is intended primarily to give a popular account of the history, construction, and operation of the turbine, and particularly of the various steam turbines which are so properly attracting general public interest at the present time. While the book is excellent from this standpoint, it is naturally not of great value to the student or the expert. Both the water and the steam turbine are treated in this volume. The discussion of each is prefaced with a capital historical sketch of the process of its development. Theory is hardly touched upon, the discussion being almost wholly descriptive. It will undoubtedly prove useful and interesting to that numerous class of people who take an intelligent interest in things mechanical, without any desire of actually becoming masters of any particular branch.

CONTINUOUS CURRENT ARMATURES. By C. Kinzbrunner, A.M.I.E.E. New York: D. Van Nostrand Company, 1906. 12mo.; pp. 80. Price, $1.50.

This book is substantially a translation of the work of Prof. Arnold on the same subject, in which, however, the text was considerably shortened by omitting the discussions of all those windings which are seldom employed for standard machines, though they are practically possible of construction. While Prof. Arnold's method of treating the subject has been closely followed, the descriptions have been restricted to the commonly employed drum windings alone. However, the rules are so given that an intelligent student of the text can undoubtedly design any winding, even though it be not actually included in the discussion. The language of the book is such as to make it of great value for popular student reading, so that notwithstanding that the text is mainly intended for students and designers, the artisan of ordinary intelligence will also be able to comprehend the principles set forth.

POLARISATIONSMIKROSKOPS. Von Dr. Ernst Weinschenk. Freiburg im Breisgau: Herdersche Verlagshandlung, 1906. 8vo.; pp. 147. Price, $1.25.

The second edition of Dr. Weinschenk's excellent book is merely intended to bring the work thoroughly up to date, and to include a discussion of the latest advances in the use of the instrument. Few other changes were necessary. The first edition, issued in 1901, was an excellent book to use in connection with investigations in which the polarization microscope was employed. The art of using this instrument is of comparatively recent growth, but within the last four or five years the development has been exceptionally rapid and extensive, so that this second edition is very timely.

ALTERNATING CURRENT WINDINGS. By C. Kinzbrunner, A.M.I.E.E. New York: D. Van Nostrand Company, 1906. 8vo.; pp. 80. Price, $1.50.

As in "Continuous Current Armatures," only those windings are discussed in this book which are commonly used in practice, and special attention has been devoted to discussing the principles underlying the alternating-current windings in such a manner that even the workman will be able to understand them.

THE WHEAT PROBLEM. By Sir William Crookes, F.R.S. London: Chemical News Office, 1905. 12mo.; pp. 506. Price, $1.40.

The present volume arises out of the comments provoked by the address which the author delivered before the members of the British Association in September, 1898. To put the matter briefly, the author stated that under the present conditions of heedless culture, a scarcity of wheat is within appreciable distance; that wheat-growing land all over the world is becoming exhausted, and that at some future time no available wheat land will be left. The author urged that nature's resources, properly utilized, are ample. He urged that a moderate dressing of chemical manure would pull up the average yield from 12.7 bushels to 20 bushels an acre—thus postponing the day of dearth "to so distant a period that we and our sons and grandsons may legitimately live without undue solicitude for the future." Sir William Crookes's address caused world-wide comment. The book is now in its second edition.

A HISTORY OF ARCHITECTURAL DEVELOPMENT. Vol. I. By F. M. Simpson. London and New York: Longmans, Green & Co., 1905. 8vo.; pp. 260. Price, $5.

This is the first of three volumes which aim to trace the development of architecture through the planning, construction, materials, and principles of design of the buildings described, and to try and indicate the broad lessons which may be learned from them. The half-tones and drawings are excellent, and serve admirably to elucidate the text. The typography is excellent. This book will prove a very welcome addition to the library of all students of architecture, and will also be of value to the professional architect.

THE BOOK OF THE ROTHAMSTED EXPERIMENTS. By A. D. Hall, M. A. Oxon. New York: E. P. Dutton & Co., 1905. 8vo.; pp. 294. Price, $3.50 net.

The Rothamsted agricultural experiments were the basis of modern scientific agriculture, and they are classical. For over sixty years the work of Lawes and Gilbert has been recognized as of the utmost importance from an economical point of view. The great object of the Rothamsted experiments is to obtain knowledge that is true everywhere, and to arrive at principles of general application, leaving the farmer himself, through his more immediate advisers, to adapt and translate them into money. Agricultural science involves some of the most complex and difficult problems the world is ever likely to have to solve. The present volume will prove of value, not only to the scientist, but for any man concerned with the management of land, whether farmer or market gardener, landowner or agent, who wants to learn something of the processes going on in the growing crop and in the soil, as they have been elucidated by the most complete set of field experiments the world has yet seen. The book will prove of great value to students.

HOUSEBOATS AND HOUSEBOATING. Edited by Albert Bradlee Hunt. New York: Forest and Stream Publishing Company, 1905. 4to.; pp. 216. Price, $3.

Houseboating is one of the most delightful ways of living that can be thought of. The present volume goes thoroughly into the subject, illustrating each boat and giving plans of the same. The subject is roughly divided as follows: "Houseboating in America," "Houseboating in England," "The Sailing Houseboat," "Steam Power for Houseboats," "Gasolene Power for Houseboats," "The Stationary Houseboat," "Interior Fitting and Furnishing," and "The Inside Route to Florida." It is a most admirable book.

THE COMPETENT LIFE. By Thomas D. West. Cleveland: Cleveland Printing and Publishing Company, 1905. 16mo.; pp. 268. Price, $1.25.

This work is presented to the public as a message on the betterment of labor, and comes from a journeyman to operatives, from an employer to managers, a man to men. The essays are the fruit of much experience and thought concerning the vital question of efficiency, its necessity, and methods of attainment, and is presented with the light and intelligence which two-score years of active service can give. There is much material for thought in the volume.

EMINENT ENGINEERS. By Dwight Goddard. New York: Derry-Collard Company, 1906. 12mo.; pp. 280. Price, $1.50.

This book is composed of brief biographies of American and European engineers. Mr. Goddard has spent a large amount of time in the selection of the engineers to be represented, as well as the matter concerning them. All unnecessary details have been omitted, and only the facts of general interest have been given. Many of the portraits are rare, and were obtained from interesting sources, all of which goes to make the book of great value to everyone who is at all interested in the progress of mechanics.

THE SCHOOL HOUSE: ITS HEATING AND VENTILATION. By Joseph A. Moore. Boston: Published by the author, 1905. 8vo.; pp. 204. Price, $2.

The author has been engaged for the last eighteen years in the inspection of public buildings in Massachusetts, and in supervising the construction of and testing the various methods of heating and ventilation, especially in school