RECENTLY PATENTED INVENTIONS.

Apparatus for Special Purposes.

KILN.—H. M. BUCK, Burlington, Wash. Mr. Buck's invention relates to improvements in kilns for drying shingles, lumber, and other substances; and one object he has in view is to construct the kiln in an airtight manner in order to retain the heat and overcome warping or buckling of the parts, thus contributing to economy in the use of steam or other heating medium and mininizing repairs.

Electrical Devices.

INSULATOR.—L. STEINBERGER, New York, N. Y. The several objects of this inventor are to product a neat, simple, efficient, and cheap construction admitting of a cable being secured thereto in more than one manner and having advantages of strength and thorough insulation, safety connection with the cable, and perfect adhesion between the portions made of metal and insulating material.

BINDING-POST.—L. STEINBERGER, New York, N. Y. In this case the purpose is to produce a device adapted for service in a great variety of places in or about electrical machines and to provide a mode of attachment which, while forming a perfect electrical contact between conductors shall also mechanically clamp them together securely without diminishing their tensile strength and which shall, at the same time permit them to be attached to or detached from the support when necessary and admit of either wire being attached or removed without disturbing either of the remaining wires.

ELECTRIC FIRE-ALARM.—J. A. BARTEN and S. R. SNEERINGER, Philadelphia, Pa. The invention relates to automatic electric fire-alarms of the type in which a fusible substance is melted when the apparatus reaches a certain temperature, thereby sounding an alarm. This substance may be paraffin, stearic acid, rosin, wax, tallow, or lead or a mixture of several substances. When it melts and flows upward around the piston, the movable contact member closes upon the fixed contact and sounds the alarm.

AUTOMATIC ELECTRIC PUMP.—F. L. ORR, Thurman, Iowa. Mr. Orr's improvement is in the nature of an automatic electric pump designed to lift and force water or other liquid to any desired height, to be automatically started into action or stopped, according as the tank is empty or full, and operating in a smooth and practically noiseless manner and with an economic expenditure of electric current.

Engineering Improvements.

BOILER-BRACE.—E. COOK, Portland, Me. The object of the invention is the provision of a new and improved brace which is simple and durable in construction, cheap to manufacture, readily applied, and arranged to prevent the boiler-head from bulging outwardly and loosening the joints of the tubes in the head.

ROTARY ENGINE.—W. S. CHAPMAN, dec'd, C. A. HASTINGS, Lewiston, Idaho, Administrator. In this patent the invention consists in the novel construction and arrangements of parts designed to form a rotary engine of high efficiency adapted to operate with steam at a high pressure of three hundred pounds, more or less, and in which the steam exerts a steady pressure with little or no back pressure and a great economy of steam.

Heating and Lighting Apparatus.

HOT-AIR FURNACE.—T. F. MEINHARDT, Charlottesville, Va. This inventor has made an improvement in hot-air furnaces, and particularly in that class of such furnaces wherein the products of combustion are caused to traverse a somewhat circuitous passage in order to extract as far as possible all the heat units. The furnace may be made of steel, wrought or cast iron, or other material, in one piece or in several sections.

Machines and Mechanical Devices.

PUNCHING-MACHINE.—O. P. WOODBURN, Pierce, Texas. In this patent the object of the improvement is to furnish a new punching-machine more especially designed for punching holes in hollow bodies—such as pipes, casings, and the like—and arranged to punch the holes from the inside of the hollow bodies in a very simple and economical manner.

COMBINED LOCK AND LATCH.—B. SCHACHT, New York, N. Y. The invention has reference to improvements in combined locks and latches of that class wherein there is united a lock-bolt adapted to be operated by a key and a latch-bolt normally under control of a knob-spindle and adapted by a push-button controlled dog mechanism to be locked in a projected or shot position.

WIRE-WORKING TOOL.—B. B. FELTUS, Mingary, South Australia, Australia. In this instance the invention pertains particularly to improvements in tools for manipulating wire in building wire fences, the object being to supply a tool of simple construction and having in its several devices implements for stretching, twisting, holding, and cutting wire, and other devices found useful in fence-building.

AERIAL WHIRLING TOWER.—J. H. WELSH, New York, N. Y. The object in view of this inventor is to provide a simple and secure form of apparatus wherein provision is made for carrying passenger-cars to a desired height above the ground and for moving the cars in a circular horizontal path during the elevation and lowering movements, whereby the cars travel in spiral paths and a good panoramic view of the locality is afforded to the passengers.

FAN-ACTUATING MECHANISM.—J. F. CARR, Coushatta, La. This inventor's improvement refers to a class of actuating mechanism driven by the descent of an attached weight, and has for its object the provision of novel simple details of construction for an apparatus which adapt it for the vibration of a pluri[illegible]y of fans connected therewith. Means are provided for adjusting the length of the arms that carry the fan-blades, so that a current of air may be produced at different heights from the floor in rooms of various heights.

WINDMILL-PUMP COUPLING.—C. W. DECKER, Charles City, Iowa. In this case the invention pertains to a windmill-pump coupling of that form in which the windmill-rod and the hand-lever may be alternately coupled to the pump-piston to allow the latter to be worked either by hand or by the windmill without interference with each other, the change being made by a mere adjustment of the hand-lever of the pump.

MIXING-MACHINE.—C. E. FOOTE and C. T. FOOTE, Nunda, N. Y. The purpose in this instance is to provide a mixing-machine, particularly designed for producing concrete, mortar, and the like and arranged to insure a thorough mixing of the ingredients to produce a mass of uniform composition throughout and to allow of running the machine either as a continuous-discharge machine or for forming and discharging the mass produced in batches.

Of Interest to Farmers.

TONGUE-SUPPORT AND SIDE-DRAFT CHECK FOR GRAIN OR GRASS HARVESTERS.—C. F. ORTMAN, Martinton, Ill. The invention relates to means for supporting the tongue of a grain harvester and binder or of a wide-cutting grass mower. The object is to provide a device which embodies details of construction that adapt said attachment for convenient adjustment to compensate for turning movements had by the harvester while in operation and also reliably counteract side draft incidental to such machines.

Pertaining to Vehicles.

DRAFT MECHANISM FOR TRACTION-SLEDS.—N. E. BROWN, Robbinsdale, Minn. The object here is to provide means for anchoring forward ends of a doubled transmission-cable having the rear or intermediate portion connected with a winding-drum or an engine which is placed on a sled, the operation being in such a manner that while the portion used for draft is being wound on the drum the opposite portion is being unwound and laid forward for repeated use, and means for reversing the winding-drum simultaneously with each change of anchorage, so as to make draft and forward motion practically continuous.

SPRING DRAFT ATTACHMENT.—G. W. KING, Washington, D. C. The present invention is an improvement upon a device shown in a former patent granted to Mr. King. Its operation is that of a draft-spring to favorably modify by elasticity all irregularities of action, receiving with safety sudden shocks and blows which might otherwise injure the animal, load, harness, or vehicle. The spring is subject to no more strain than is sufficient to counterbalance its resistance to compression, the remaining strain being confined to the trace and other connections. If the spring breaks the accident should not involve the separation of the draft connections.

Railways and Their Accessories.

RAILWAY.—S. E. JACKMAN, New York, N. Y. This railway is for amusement use in pleasure resorts, etc., and Mr. Jackman's object is to furnish a new and improved switch-back or inclined railway arranged to take up a comparatively small amount of ground or floor space and to afford a long and exciting ride, especially as a car during a part of its journey races side by side with a preceding car and again with the next following car to the great diversion of the occupants.

BRAKE-SLACK-ADJUSTER.—W. J. KEVILLE, Denver, Col. Mr. Keville's invention relates to improvements in devices for taking up or adjusting the slack in railway-car air-brake mechanism, an object being to provide a simple device for this purpose that will automatically take up any slack that may occur through the wearing away of parts or other abnormal travel of the brake-operating system.

GRAIN-CAR DOOR.—E. E. KENFIELD, Washburn, Wis. In this instance the invention has reference to grain-car doors. It consists, broadly stated, of a peculiar door adapted for ready adjustment across the doorway. The special object in view is to provide a door or barrier specially adapted for freight-cars in hauling wheat or other cereal grain, the barrier being placed on the inside of the car-doorway and secured together by cleats.

Miscellaneous.

HANDLE FOR BASKETS.—B. J. RAGATZ, St. Joseph, Mich. Broadly stated, the invention comprises a rod having at one or both ends for attachment to a basket or the like a substantially U-shaped portion with parallel sides lying in close proximity and one of said sides having at its lower portion a projection arranged to engage under the supporting-strip at the top of the basket. The handle can be quickly and easily applied to the top edge of a basket having on one or both sides a reinforcing-strip.

BOX-FASTENER.—E. T. REILLY, Evansville, Wis. Mr. Reilly's invention has reference to fastening means for boxes in general, but intended more particularly for boxes in which tobacco is packed. The invention as a whole provides a box specially adapted for packing leaf-tobacco, owing to the fact that the box is many times opened for tobacco inspection. The improvement affords material advantage over any similar box, as a protection to original packages of leaf-tobacco against rough usage.

BELT AND GARMENT FASTENER FOR SUPPORTING SKIRTS OR TROUSERS.—G. SCHMITT, Pittsburg, Pa. That class of devices which are adapted for detachable connection with a shirt-waist and belt for the purpose of supporting either skirts or trousers is improved by this invention, which provides attaching devices of novel form arranged to be concealed when in use whether a belt be worn or not. It is thus adapted to be worn by either sex and is so constructed that it may be quickly applied or detached.

SQUARE.—G. A. STEPHENS, Memphis, Tenn. This invention refers to a class of plate-metal squares used by woodworkers and other mechanics, and has for its purpose to so construct a tool of the class indicated that its two members are rockable one on the other, so as to permit them to be folded flatwise together and also to adapt the members for instant adjustment to form a true square when desired.

OPTICAL DEVICE.—M. F. SHEA, Newport, R. I. This device is designed to contain views or pictures. In the present instance the inventor has in contemplation providing an optical device which may contain a number of views or plates, each of the views or plates being brought into use in line with the vision as the box or main body of the device is turned in various directions.

GLAZED STRUCTURE.—J. A. PAYNE, Jersey City, N. J. In this patent the invention relates to the construction of greenhouses, skylights, and similar structures; and its object is to provide a structure arranged to combine strength with lightness and preserve the wood against the ill effects of moisture, thereby insuring long life to the structure.

CABINET.—I. MASON, New York, N. Y. The object is to provide a cabinet of novel construction and particularly adapted for the convenient storage of cigars, beverages, and the like and so arranged that the top and front closures will swing together, whereby the contents of the cabinet may be reached both from the top and front, the top closure serving as a support for articles when in either closed or open position.

CLASP.—O. J. JONES, Bangor, Pa. In this case the invention pertains to improvements in clasps particularly designed to be used in lieu of buttons for securing suspender-ends to trousers, an object being to provide a clasp of simple construction that may be quickly engaged with the waistband of trousers and as readily detached.

ROLL NOTE-BOOK.—O. HULBACK, Crookston, Minn. This invention refers particularly to improvements in devices for holding rolls or thick strips of note-paper for the use of stenographers, an object being to provide a device for this purpose that shall be simple and inexpensive in construction and of great value and convenience in making notes from extended discources or dictations.

FLASK FOR VOLATILE OR OTHER LIQUIDS.—H. GOETZ, Frankfort-on-the-Main, Germany. Inconveniences often result from the obstruction of the capillary exit in flasks of the sort designed for the issue of ethyl chlorid, the obstructions being generally caused either by the rubber which closes the capillary orifice at its upper part directly pressing upon its upper part or by dust in the flask or liquid, which dust clogs the capillary canal at its lowest part. By making the capillary orifice independent of the flask the inventor obviates this objection.

INSTRUMENT FOR DETERMINING THE POSITION OF CUTTERS ON MOLDING CUTTER-HEADS.—J. FAY, Jersey City, N. J. Mr. Fay's invention has reference to an instrument for determining the position of knives on the cutter-heads of wood molding or planing machines, and the object in view is the provision of a device which may be used advantageously in ascertaining the extent or distance that any kind of knife or cutter should project from a cutter-head of any style or pattern.

HORSESHOE-CALK.—C. L. DAHLY, Decorah, Iowa. One of the principal objects of Mr. Dahly's invention is to overcome numerous disadvantages and objections common to many similar devices and also to provide devices of this kind which are effective and reliable in use, besides being easily applied and comprising few parts not easily broken and not liable to get out of order. A new calk may be substituted by simply removing the screws, sliding the calk-plate back out of its retaining portion of the shoe, and attach a new plate.

FLY-CLOSER FOR SHOE-UPPERS.—S. CLOUTIER, Lewiston, Me. The object of this invention is to provide a closer or holder for the convenient and reliable closure of the fly for a shoe-upper which will without injury thereto be adapted for a removable engagement with the perforations of the edges of the fly in the vamp or shoe-upper and hold the edges from spreading apart while the shoe is manufactured.

MOVABLE TOP.—S. CLOUTIER, Lewiston, Me. In this patent the object of the invention is to provide novel details of construction for an ordinary peg-top, which facilitates the raising of the top, while it is spinning and changing its position without materially checking the speed of rotation. The top is spun in the usual way by the use of a cord.

PROCESS OF MANUFACTURING VARNISH SUBSTITUTES.—R. BLUME, 46 Kaiserstrasse, Magdeburg, Germany. This invention has reference to a process for the manufacture of a varnish substitute from rosin-oil, the said product being distinguished by great elasticity and uniform drying qualities. Varnishes and varnish substitutes as manufactured heretofore by the employment of rosin-oil presented the inconvenience of being difficult to dry and of becoming sticky after a short time upon the action of heat. This process avoids a liability of the coating cracking, becoming sticky again or getting brittle.

NECKTIE-RETAINER.—M. C. LEWELLYN, Buffalo, N. Y. The object in this improvement is to supply a device that can be readily applied to a tie after it is put in position that will effectually prevent the displacement of the tie and keep it from moving upward. A strip or plate has projections at one end arranged to engage the tie, while the opposite end contains a slot or similar means for engaging a portion of the adjacent wearing-apparel.

COMBINED SCHOOL SEAT AND DESK.—J. H. SUTHERLAND, Dawkins, Col. A prominent object in this improvement is to furnish a structure which is simple in construction and also in which the desk is bodily adjustable as to height, while the top thereof is independently adjustable to varying inclinations, whereby a scholar or pupil is enabled to occupy a natural position seated at the desk perusing a book or studying a lesson placed upon the top of the desk.

COOLER FOR LIQUIDS.—J. L. STEITZ, Chicago, Ill. The invention refers to improvements in cooling devices for liquids under pressure—such, for instance, as beer—the object being to provide a device for this purpose designed to be placed in a box of cracked ice and not liable to be broken or injured by the ice, as often happens to the usual coiled pipes.

CURLING-IRON HEATER.—O. WALSH, New York, N. Y. In this patent the invention has reference to curling-iron heaters, the inventor's more particular object being the production of a neat and simple heater, preferably made from a single sheet of metal and otherwise suitable for an article of manufacture. The structure affords a maximum of strength and ornamentation with a minimum of metal.

MEGAPHONE.—C. MELVILLE, New York, N. Y. Among other advantages this inventor has for an object the production of a collapsible article which may be folded compactly to facilitate storage and transportation and at the same time may be easily and quickly adjusted in a way which prevents collapsing of its parts, so that the device can be used like an ordinary rigid megaphone.

REVOLUBLE WINDOW.—E. C. SOMERS, deceased, N. L. Somers, administrator, Corning, N. Y. The aim of this inventor is to provide a new and improved window which is simple in construction and arranged to permit of conveniently locking the sash to the slide, to move the sash up and down or to unlock the sash from the slide for turning the sash on its pivots.

BAG-CLOSURE.—G. WINKLER, Sardis, Ohio. Mr. Winkler's invention pertains to improvements in bag-closures, the same being designed for use more especially on flour and grain bags; and the object he has in view is the provision of a construction for easily and quickly closing the mouth of a filled bag without tying or sewing the same, and which also allows the bag to be renewed by securing a new bag to the closure.

MINNOW-BUCKET.—T. B. WILSON and A. L. DAVID, Epes, Ala. In this case the invention is an improvement in that class of minnow-buckets which are provided with an air-pump for forcing air through the water for the purpose of aerating the liquid, and thereby extending the life of the minnows to an indefinite period.

TOY GOLF-PLAYER.—P. A. VAILE, Auckland, New Zealand. One object of this invention is to produce a toy figure in which the parts normally take the position assumed by

a player in "addressing" a golf-ball, a part of the figure being capable of movement in a correct or true manner to strike the ball by a miniature golf-club in the hands of the figure.

WASHING-MACHINE.—W. T. Rusk, Sterling, Neb. This apparatus belongs to that class of washing-machines in which an agitator is mounted to operate in a tub, and the water caused by this agitator to circulate through the clothes to clean them. The invention resides particularly in the construction of the agitator and in the relative arrangement of the same with the tub, the operating means, and the framing of the apparatus.

ICE-CREAM FREEZER.—J. Prade, Waco, Texas. This invention comprehends generally a peculiar co-operative arrangement of an insulated jacket, a cream-holding cylinder endwise movable into the jacket joined with a feed member for feeding the liquids to be frozen into the cylinder, a rotary dasher operable within the cylinder for agitating the material being frozen, and a second rotary dasher device operable between the cylinder and jacket for keeping in agitation the refrigerating mixture.

CASE.—J. F. Prentice, New York, N. Y. The case invented by Mr. Prentice comprises a base and a cover, the latter being fitted with a suitable handle and mounted to slide on the base. Fastening devices are provided for holding the cover in active position and means are also provided for automatically moving the cover back out of position as soon as the fastening devices are released. The case is for use in inclosing type-writing, adding, sewing, and other machines.

STOVEPIPE-LOCK.—W. A. Petrie, Petoskey, Mich. The aim in this improvement is to provide a novel simple device for automatically locking the inserted end of a stovepipe in the aperture it occupies in a draft-flue or chimney and also to provide convenient means for releasing the stovepipe-lock when this is desired.

TROUSERS CREASER AND PRESSER.—E. Graham, Orangeburg, S. C. In this patent the invention relates to improvements in devices for creasing and pressing the legs of trousers, an object being to provide a device for this purpose of simple construction that may be operated by any one and that will form a lasting crease without employing a hot iron.

DRAWERS.—J. Gugenheim, G. A. Capiton, L. D. Herrick, and H. Jacobs, Scranton, Miss. These inventors have made an improvement in that class of undergarments which are composed of fabrics of different degrees of elasticity, one being preferably a woven fabric and the other a knitted one. In the drawers the invention is embodied in the particular form and arrangement of the knitted or most elastic portions with reference to the woven or less elastic portions, whereby certain advantages are attained.

STAIR STRUCTURE.—N. Bois, Brooklyn, N. Y. In this case the invention has reference to improvements in metallic stairs, an object being to provide a stair structure of novel construction in which a plurality of steps and risers are formed from a single length of sheet metal. The stair structure embodying this invention is very light, yet sufficiently strong for the purpose designed.

FLUE-EXPANDER.—J. W. Faessler, Moberly, Mo. This invention is an improvement in flue-expanders of the roller type—that is to say, in expanders whose body is provided with a longitudinal bore to receive an expanding-mandrel and with antifriction-rollers working in contact with the mandrel and adapted to move laterally in longitudinal slots. Mr. Faessler has invented another improvement in that class of flue-expanders which are composed of a cylindrical body having a longitudinal bore to receive the expanding-mandrel and longitudinal slots to receive antifriction-rollers and are further provided with an enlarged circular collar, the latter forming a circumferential shoulder which in practice works in contact with the end of a boiler-flue when the same is being expanded. Means are provided to work in contact with the end of a flue when the tool is used for expanding the latter.

KETTLE.—R. Brandt, Athens, Ga. The object in this improvement is to produce means whereby the surface within a given area exposed to the heat may be increased in order that the contents of the kettle may boil in less time than with the flat-bottomed kettle, and the invention may be embodied in kettles, including double boilers for kitchen use, boilers for candy-making, those used in preparation of chemicals, in cabinet-makers' glue-pots, chafing-dishes, tea-kettles of all kinds, evaporating-pans, and the like.

KNOCK-DOWN UMBRELLA.—H. Fesenfeld, Hoquiam, Wash. The umbrella is of the so-called "Knock-down' type. It is made up of parts which may be readily assembled or taken apart. If almost any piece be broken, it may be replaced by another without the aid of a workman. It is strong, cheap, and durable.

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.

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

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

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In buying or selling patents money may be saved and time gained by writing Chas. A. Scott, 705 Granite Building, Rochester, New York.

Highest references.

Inquiry No. 5095.—For manufacturers of spring motors as are used in phonographs and show window turnstiles.

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South American Agency Wanted.—Reliable party resident in South America desires to represent or act as selling agent for manufacturing or export firms. Address A. M.,
122 Front Street, New York.

Inquiry No. 5097.—For manufacturers and distributers of electric carbon.

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Inquiry No. 5115.—For a hand power loom which is suitable for weaving rag carpets.

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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.

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(9306) C. C. asks: 1. Has nitrogen ever been liquefied? If so, by whom, at what temperature, and under what circumstances? A. Nitrogen was liquefied many years ago in an experimental way, but can now be liquefied in large quantities with the oxygen in liquid air. It liquefies at —318 deg. Fahr. For the process and apparatus for liquefying gases see Sloane's "Liquid Air," which we can send you for $2.50 postpaid. 2. What is the full meaning of the term oxidizing agent? A. An oxidizing agent is one that will furnish oxygen to some other substance to change it to an oxide. 3. What temperature is acquired when carbon is gasified? A. Carbon is vaporized at the temperature of an electric arc, 6,300 deg. to 7,000 deg. Fahr. 4. The following experiment was to be performed before the physics class, taken from our text, Carhart and Chute, illustrating the disappearance of heat during solution: Pour a few cubic centimeters of water into a beaker, and ascertain its temperature. Then add a few crystals of sodium sulphate. The temperature will fall as they dissolve. The temperature of the water was 21 deg. C., and when the sodium sulphate was added, the temperature rose to 25 deg. C. What was the cause? A. It would seem as if there were some error in the substances used. The experiment of dissolving sodium sulphate in water to show the latent heat of solution is a common one. If hydrochloric acid were used in place of water, the drop in temperature would be much greater. If by mistake a substance were used in which some chemical action took place, then heat would be produced.

(9307) L. A. S. asks: 1. Why will a polished receptacle hold heat longer than one not polished? A. Bright polished surfaces are well known to radiate less heat than the same surfaces that are rough or colored. Roughness increases the surface area of a radiating vessel or object, and hence the increase in the amount of radiation over the same area with a perfect polish. 2. Will a certain amount of gas heat a room more quickly when burning in a stove, or is directed against a piece of metal heating the metal first, or when it is burning openly in the room? And if it heats the room more quickly when burning in the stove, what is the reason why? A. There is no more heat created in either case by the perfect combustion of the gas, but the low radiant heat from the surface of the metal plate, as well as from the metallic surface of a gas stove, has a soothing effect upon the nerves, and thus induces the feeling of warmth. 3. What is the construction of small barometers, used by the side of thermometers, that crystallize something in a liquid indicating fair, change, and stormy weather? Also what is the cause of this action? A. The so-called weather-glass barometer is a sealed glass tube nearly filled with a saturated solution of camphor in alcohol, which crystallizes more or less by changes of temperature. It is of no value as a barometer, and is not influenced by changes in atmospheric pressure.

(9308) J. R. D. B. asks: Is it possible to produce a perfect vacuum? A. A perfect vacuum cannot be produced by a pump. Some air always remains. A vacuum may, however, be made by a pump so good that electricity cannot pass through it. It is said that a perfect vacuum has been made by taking a long piece of hard glass tubing closed at one end and filling it with a soft glass which melts at a much lower point. Now connect this to a pump, so that the tube may be heated and the inner soft glass be melted while the air is pumped off around the lower end of the tube. The soft glass will slide down the tube, leaving a vacuum above it. When allowed to cool, a perfect vacuum would exist in the space at the top of the tube, but no use could be made of it, even if such an apparatus were ever actually constructed.

(9309) J. H. G. writes: 1. If a cylinder is equal to 4 square inches in diameter, and the piston stroke is say 12 inches, and the discharge pipe is equal to one square inch in diameter and 100 feet high, will the friction in the pipe and the friction against the upper end of the cylinder require the same amount of energy to empty the cylinder as it would to lift the 4-square-inch column of water one hundred feet? A. The arrangement as described in your inquiry is rather ambiguous as regards friction, which is a small item in energy of pumping. The pressure and velocity of the fluid pumped control the conditions of friction. The energy of the pump piston to force a column of water 100 feet high is the same in a 1-inch and a 4-inch pipe, save the friction, which is greater in the 1-inch pipe for a given time. 2. If a bottle or vessel is tightly corked, and a weight attached so that the vessel is submerged, will it sink to the bottom of 400 feet of water, or will it require more weight to keep it at the bottom? If so, how much, or what is the proportion? A. The condition of a bottle tightly corked and weighted to sink beneath the water is the same as any solid body of the same density, and if it sinks at all, it will go to the bottom at great depths. Although water pressure increases with the depth, its density is but little changed, as water is but very slightly compressed under great pressures. At the depth of a mile a cubic foot of water will weigh about a half pound more than at the surface. The elasticity of any body sinking in the ocean will have its density increased by the pressure as much or more than the increase in the density of the water.

(9310) G. N. L. asks: Can you furnish formulas for solution for oxidizing copper and another for producing satin finish on brass? A. For oxidizing copper, dip the finished article in a solution of one drachm of nitrate of iron in one pint of water for a few minutes or until the desired color is obtained. The ormolu dip or satin finish on finished brass is made in proportions as follows: to 1 gallon sulphuric acid add 6 pounds niter, ½ pint nitric acid, ½ pint muriatic acid. Add the nitric and muriatic acids a little at a time. The brass must be perfectly cleaned by dipping in hot soda water; wash in hot water, and dip for a few seconds, and wash in hot water.

(9311) G. G. G. asks: Kindly tell me which is correct in his opinion: A says a live organic body dropped into a pool, which has been heavily charged by passing an electric current through it, will be thrown into space by the temporary *annihilation* of gravitation; B says that if any such result is obtained, it is due to the action of said body's muscles in opposition to gravitation. A. Several things may be said in reference to "a live organic body dropped into a pool which has been highly charged with electricity." A pool cannot be charged with electricity. The earth would conduct the electricity away as fast as it reached the water. There would be no difference between dropping a live organic body into the water of a charged pool and a dead organic body into the water of a charged pool, or dropping a stone for that matter. There is no such thing known, as a possibility, as the "annihilation of gravitation." A live organic body would be very likely to jump when it struck water in falling, and if the water was shallow it might jump from the bottom, and so jump out. This could not be called an annihilation of gravitation by any stretch of language whatever; it would be "the action of said body's muscles in opposition to gravitation." Why not say in plain English, if an animal is dropped into the water, it will jump out of it if it can?

(9312) R. M. S. writes: Two large buildings erected by the State for the Northern Normal and Industrial School at Aberdeen, S. D., have caught fire, the one over a year ago and the other December 31, 1903, under peculiar conditions, the theory being that both fires were due to spontaneous combustion, and I write to name the conditions and solicit an opinion. In the case of the last fire, the building was practically completed, no stoves or fires of any kind were in or around the structure, which was heated by steam. The fire caught about five o'clock in the morning, on the first floor above the basement, where workmen had been busy all day oiling the floors. At night the doors were all closed and locked, the rooms being kept warm all night by the steam heating system. The temperature outside was 25 degrees below zero, and on the inside of the building about 70 degrees above zero F. An opinion from so able an authority as the Scientific American as to the cause of this fire, would be greatly appreciated. A. Woodwork, such as floors that have been oiled with linseed oil, generally boiled oil with a drier, is not known to take fire by spontaneous combustion; but the rags or cloths used for oiling or rubbing the floor are very liable to take fire by spontaneous combustion, especially if thrown together in some out-of-the-way place. It will be well to make a rigid inquiry of the workmen as to what they used in oiling the floors and where they deposited the articles used in rubbing the floors. A single rag bunched, not larger than 4 or 5 inches in diameter, left behind or close to a radiator, will take fire in a few hours, and if several such bunches of oily rags are thrown together in a corner or closet, fire will surely follow in a room heated to 75 degrees F. Very interesting articles on spontaneous combustion and its causes are contained in Scientific American Supplement, Nos. 81, 132, 798, 929, 936, 10 cents each mailed.

(9313) W. G. S. writes: The feed water for a boiler is contained in an air-tight tank, and it is to be forced into the boiler by