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-operatve 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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AUTOS.—Duryea Power Co., Reading, Pa.

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

Inquiry No. 5085.—For makers of sheet metal stampings.

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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.

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Inquiry No. 5096.—For makers of machines for making cloth buttons and for stamping the tin parts for such buttons.

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.

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Inquiry No. 5114.—For manufacturers of rubber mucilage.

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

Inquiry No. 5116.—For makers of coin-operating, engraving and name-plate machines.

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.

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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