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.

KNOCKDOWN 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.

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. 5082.—Wanted, the two following addresses: C. C. Stuart, maker of horizontal band saws; also D. A. Kennedy, maker of sawmill machinery.

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

Inquiry No. 5083.—For manufacturers of advertising novelties.

AUTOS.—Duryea Power Co., Reading, Pa.

Inquiry No. 5084.—For machinery for making water-colored and oil-finished shade cloth.

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

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

American inventions negotiated in Europe, Felix Hamburger, Equitable Building, Berlin, Germany.

Inquiry No. 5086.—For the makers of the Merrill hand paper punch, made of stamped metal.

Edmonds-Metzel Mfg. Co., Chicago. Contract manufacturers of hardware specialties, dies, stampings, etc.

Inquiry No. 5087.—For makers of paint grinders' and mixers' machinery.

Special and Automatic Machines built to drawings on contract. The Garvin Machine Co., 149 Varick, cor. Spring Streets., N. Y.

Inquiry No. 5088.—For makers of a small, light-weight jack screw, also for makers of spring washers for bolts,

FOR SALE.—Patent on finest spike and bolt puller in existence. No. 714,107. For particulars write W. L. Harris, Central City, W. Va.

Inquiry No. 5089.—For makers of machines for beveling glass.

We manufacture anything in metal. Patented articles, metal stamping, dies, screw mach. work, etc., Metal Novelty Works, 43 Canal Street, Chicago.

Inquiry No. 5090.—For makers of electric registers for use with single dry battery and counting exact number of revolutions.

Empire Brass Works, 106 E. 129th Street, New York. N. Y., have exceptional facilities for manufacuring any article requiring machine shop and plating room.

Inquiry No. 5091.—For makers of a check board to be used as a time clock or register.

The largest manufacturer in the world of merry-go rounds, shooting galleries and hand organs. For prices and terms write to C. W. Parker, Abilene, Kan.

Inquiry No. 5092.—For manufacturers of electrical pumps.

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.

Inquiry No. 5093.—For makers of machinery for manufacturing straw board fillers for egg cases.

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

Inquiry No. 5094.—For manufacturers of all kinds of handles.

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.

Wanted—Revolutionary Documents, Autograph Letters, Journals, Prints, Washington Portraits, Early American Illustrated Magazines, Early Patents signed by Presidents of the United States. Valentine's Manuals of the early 40's. Correspondence solicited. Address C. A. M., Box 773, New York.

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.

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

Powder Patents for sale, Nos. 177,347 and 159,385. For particulars, write W. M. Spore, Argenta, Ills.

Inquiry No. 5098.—For the address of the Monoplex Telephone Co.

☞ Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway New York. Free on application

Inquiry No. 5099.—For makers of optical and photographic novelties.

Inquiry No. 5100.—For a machine for manufacturing small seamless rubber tubing or small rubber rod.

Inquiry No. 5101.—For manufacturers of glass paper weights.

Inquiry No. 5102.—For makers of tools for repairing watches and clocks.

Inquiry No. 5103.—For makers of castings for gasoline motors.

Inquiry No. 5104.—For the makers of the X-ray slot machine.

Inquiry No. 5105.—For makers of iron fence and tree guards.

Inquiry No. 5106.—For machines for making concrete building blocks, bricks, fence posts, pipes, etc.

Inquiry No. 5107.—For makers of revolution counters.

Inquiry No. 5108.—For manufacturers of water motors.

Inquiry No. 5109.—For addresses of a parachute factory, an umbrella factory and a place to buy thin, light-weight steel tubing.

Inquiry No. 5110.—For makers of finished hand wheels about 4 and 6 inches in diameter.

Inquiry No. 5111.—For a small, hand portable fire escape.

Inquiry No. 5112.—For manufacturers of ice-making and refrigerating machinery.

Inquiry No. 5113.—For manufacturers of cast steel tubing.

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.

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.

(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

means of compressed air acting upon the surface of the water in the tank. The three following experiments are supposed to be tried, so that at the beginning of each surrounding conditions are precisely alike, viz., pressure, temperature, quantity of heat or heat energy in the boiler, quantity of water delivered, etc. No heat is to be added to nor taken away from the boiler except as mentioned; the air compressor is to be run by some entirely separate source of energy, as a water power. The loss of heat by radiation is to be ignored. A cubic foot of feed water is to be delivered into the steam space or above the water line, and in the form of a jet or spray, in order to condense as much steam as possible. In this case the feed water absorbs the heat of the condensing steam. The temperature and pressure would change, but not a particle of heat or heat energy would be lost or used in any sense of the word. Heat is a source of energy solely on account of its position in the boiler, and under the conditions of the experiment the only possible loss or escape for the heat is by radiation, and this we are to ignore. We therefore have in the boiler, after the experiment, precisely the same amount of heat energy that we had before the experiment began; in other words, we have the same amount of available energy. In a water power, in order to derive energy therefrom, the water must be allowed to pass through the wheel into the tail race, and in this position the water is absolutely void of energy in so far as the water power is concerned. The boiler is the pond, so to speak, for heat, and the tail race must be some place outside of the boiler; for we could no more have the tail race inside of the boiler than we could have the tail race of a water power in the pond itself. The amount of energy that must be expended in order to force a cubic foot of feed water into a boiler against a pressure of 100 pounds per square inch is about $144 \times 100 \times 1 = 14{,}400$ foot pounds. The same amount of feed water is to be delivered to the boiler, but this time it is to enter below the water line. It is clear that the final results would be the same as described above. In this case the water is to be delivered through an injector which is to be in operation on its own account, and the delivery pipe from the tank is to be the suction pipe of the injector. Now, the injector, according to all the best authorities, returns all the heat used with the feed back to the boiler, and it is a fact that cannot be disputed, so that the final results as to temperature, available energy, etc., are precisely the same as in experiments 1 and 2; in other words, the injector has used neither heat nor heat energy. The mere fact that the steam in passing through the injector is condensed cuts no figure, or no more than in the first case. It is heat and not steam that is a source of energy, and the fact that it remains in the boiler will prove to anyone in his right mind that it is not used in any sense of the word in any of the above cases. In the latter case no energy is required to run the air compressor, since atmospheric pressure is sufficient, if allowed to press upon the surface of the water in the tank. It plainly follows from the above that since the injector uses no heat, it is not an instrument in which heat is used as a source of energy; or in other words, the steam or heat passing through an injector furnishes no energy whatever. In this case there is work done, and none of the medium supposed to be the source of energy is used or lost. Were a perpetual motion possible, it would do the same thing. Why is it that since the injector uses neither heat, heat units, nor heat energy, and therefore cannot assist the air compressor, there is such difference in the amount of energy required to force a cubic foot of water into the boiler in the above cases? A. We find no difference in the amount of work or energy to force a cubic foot of water into a boiler under pressure, whether it is done by the boiler through an injector, or by some outside power. Heat is a potential form of energy, and its conservation in this case is of two methods of utilizing it. By the injector the boiler furnishes the total amount of heat energy to raise the cubic foot of water to the boiler temperature, and has to expend exactly the same amount of energy to heat the cubic foot of cold water pumped in by other means. The assertion that the air compressor uses no energy is an error; air pressure is potential energy in the tank, produced by the energy expended in the air compressor.

(9314) W. J. S. asks: In G. E. Bonney's "Induction Coils," on page 228, it says the secondary wire best adapted for this coil is No. 36 single silk-covered. Does this mean Birmingham wire gage or Brown & Sharpe? I ask you this to make sure that I will be right. A. Bonney's "Induction Coils" is an English book printed in London. There is no reference to the B. & S. wire gage in it. All sizes are to be understood as those of the Birmingham wire gage.

(9315) C. G. McC. asks: Will you kindly give me formulas for the manufacture of dry powder fire extinguisher, at the same time kindly indicating what you consider the most reliable? A. The following formula is copied from our Cyclopedia of Receipts, Notes, and Queries: Common salt, 60 parts; sal-ammoniac 60 parts; sodium bicarbonate, 80 parts. Sal-ammoniac, 100 parts; sodium sulphate, 60 parts, sodium bicarbonate, 40 parts.

NEW BOOKS, ETC.

DISEASES OF A GASOLENE AUTOMOBILE AND HOW TO CURE THEM. By A. L. Dyke and G. P. Dorris. St. Louis: A. L. Dyke Automobile Supply Company. 1903. 12mo. Pp. 232. Price $1.50.

This is the most practical book we have seen on this subject. It will save time, temper, and money. Theory does not enter into the present volume, but the information conveyed is of just such a nature as will prove of value to a man who owns or repairs a machine. A thorough knowledge of its contents would result in far fewer strandings by the roadside. It would not be a bad idea to carry a copy of this book in the tool box. The diagrams are particularly clear. Tires, transmission gear, and batteries also come in for a fair share of attention. Automobilists will read this book with pleasure.

THE NEW INTERNATIONAL ENCYCLOPÆDIA. Edited by Daniel Coit Gilman, LL.D., Harry Thurston Peck, Ph.D., L.H.D., and Frank Moore Colby, M.A. New York: Dodd, Mead & Co. 1903. Vol. xi. 4to. Pp. 1050.

The present volume includes "Larrey to Maximianus II." The quality of the work is very sustained—rather a difficult thing to do in a book of this kind. The same admirable treatment of scientific matters is continued. Many of the articles are very interesting. Thus we find under "Leitmotiv" that it applies to the musical phrases which constitute the basic material out of which Wagner constructed his music-dramas. Then follow musical examples and references to literature. Under "Libraries" we find an able discussion of the history of libraries, types of libraries; then buildings, reading rooms, book shelves, furniture and fittings, library administration, are taken up. This is followed by classification, library schools, library associations and clubs, a bibliography, and an excellent table of library statistics. Our own Congressional Library ranks fifth. It is by its thoroughness that this book commends itself to the user.

SOLAR HEAT. Its Practical Applications. By Charles Henry Pope, A.B. Boston: Published by the author. 1903. 16mo. Pp. 160. Price $1.

Many illustrations are reprinted from the SCIENTIFIC AMERICAN. There is little question that the time will come when solar heat will be utilized to a much larger extent than has ever been done in the tentative experiments which have shown the possibilities of the subject. The author has conducted a number of experiments on solar heat, and in the present treatise he endeavors to trace the history of attempts and successes in the utilization of solar heat.

BUILDING SUPERINTENDENCE. By T. Clark. New York: The Macmillan Company. 1903. 8vo. Pp. 306. Price $3.

This is not a treatise on architectural art or the science of construction, but a simple exposition of the ordinary practice of building in this country, with suggestions for supervising such work efficiently. It is a book which we can specially recommend to the young architect, as well as to those persons not of the profession who are occasionally called upon to direct building operations. It is written in simple language, which can be understood by all.

TASCHENBUCH DER KRIEGSFLOTTEN. V. Jahrg. 1904. Herausgegeben von Kapitän-Leutnant a. D. B. Weyer. München: J. F. Lehmann's Verlag. $1.

This new volume of Capt. Weyer's is, if anything, better than the book which we had the pleasure of reviewing twelve months ago. How well it has answered the purpose for which it was prepared is shown by the fact that the Austrian marine almanac, at one time the only reference book in Germany which officers of the imperial navy had at their command, has been completely displaced. Chief among the subjects that find a place in the book may be mentioned complete lists of the fighting ships of all nations, pictures of the various types of ships of all nations, comparisons of fighting strengths, navy budgets, the shipbuilding programmes of most countries, naval ordnance, organization of navies. Constant reference to last year's volume convinces us that Capt. Weyer's annual is in every way a most accurate reference volume. We have no doubt that this year's work is no less precise.

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Brake beam, H. C. Buhoup..... 751,051
Brick and tile, combined, D. W. Anderson 750,789, 750,790
Brick or tile cutting machine cleaner, W. J. Eipp 751,269
Brick truck, W. L. Harbin..... 751,283
Bridle, H. H. Poe..... 751,006
Broom bridle, J. B. Ryan..... 751,344
Bucket elevator and conveyor, F. V. Hetzel . 751,390
Buckle, H. L. Perryman..... 751,407
Buggy boot spring, G. T. Wilson..... 750,927
Button, D. P. Katz..... 750,861
Buttonhole stitching machine, E. B. Allen.. 751,239
Cable hanger, Villard & Copeland..... 751,228
Calculating machine, F. C. Rinsche..... 751,207
Cameras, photographic lens for, F. Stark... 751,116
Can catcher, H. P. Hinckley..... 750,973
Can closure, H. F. Maranville..... 751,318
Can elevator, Hopkins & Fellows..... 751,170
Can filling machine, J. W. Carnochan..... 751,257
Can tops and bottoms, apparatus for transferring, J. G. & M. C. Rehfuss..... 751,206
Car brake, E. C. Seaver..... 751,112
Car brake, J. H. Smith..... 751,355
Car buffer, G. F. Starbuck..... 751,212
Car, convertible, H. S. Wilson..... 751,126
Car, dumping, A. Stucki..... 751,437
Car, gondola, G. I. King..... 751,299
Car loader, Stronach & Ross..... 751,359
Car replacer, E. W. Rosenberg..... 750,896
Car seat, C. W. H. Frederick..... 751,277
Car seat, reversible, P. G. Leistner..... 751,312
Car shock reducing mechanism, W. C. Andrews 751,368
Car starter, D. France..... 750,958
Car step, movable, F. Keilwerth..... 750,981
Car stock, A. Stucki..... 751,436
Car, tank, E. Anderson..... 751,040
Car, tank, A. Stucki..... 751,438
Cars, convertible cab for railway, J. S. Doyle 750,951
Cars, cup washer for use in the construction of, L. T. Canfield..... 750,806
Carburetter, petrol motor, Napier & Rowledge 751,434
Card clothing strickle, D. Gessner..... 751,165
Carpenter's tool, F. Lindblad..... 750,866
Carpet fastener, T. R. Diehl..... 751,267
Carriage rocker attachment, baby, O. M. Pond 751,409
Carrier. See Feed or litter carrier.
Carton machine, C. A. Coombs..... 750,814
Casein, preparing food, A. A. Dunham..... 750,832
Cash register, E. W. Applegate..... 750,791
Caster, furniture, J. Bornemann..... 750,799
Caster, furniture, J. W. Kennedy..... 750,984
Cattle guard, P. P. Brannon..... 751,373
Centering support, G. H. Kuenke..... 751,181
Centrifugal separator, P. L. Kimball..... 751,178
Chair wardrobe attachment, H. A. Dodge.. 751,151
Chairs, rubber and metal cap tip for, S. Garrett 751,160
Checks, detachable cover for bank, E. C. Deans 750,826
Chisel, F. E. Norton..... 751,403
Chock block, adjustable, J. P. Abernathy.. 751,366
Chuck, drill, W. H. Saunders..... 751,345
Chuck, rock drilling machine, L. Leigh, Jr. 751,311
Churn, W. G. Radcliffe..... 751,203
Churn, H. A. Bierley..... 751,371
Clarinet of Boehm, E. Bercioux..... 750,935
Cloisonne ware, manufacturing, T. Pfister.. 751,104
Cloth take up and stretching device, C. E. Meding 751,192
Clothes drier, C. C. Crossley..... 751,265
Clutch, friction, J. H. B. Bryan..... 750,944
Clutch mechanism, W. W. Sweetland..... 751,027
Coat, C. Austern..... 751,242
Cock, gage, W. L. Morris..... 750,881
Cock, safety gas, M. R. Daley..... 750,822
Coil structure, field, C. H. Kaler..... 750,980
Coin changer, C. C. Jackson..... 750,976
Coin controlled apparatus, H. H. Cummings. 750,819
Coin controlled apparatus, T. F. Solon..... 751,420
Coin counting, registering, and wrapping machine, C. S. Batdorf..... 751,246
Collar, horse, J. V. Stone..... 751,358
Collar stretching apparatus, A. Sharp..... 751,019
Concentrator, H. Wismeyer..... 751,424
Concrete beam reinforcement, A. J. Bossyns 751,427
Concrete building blocks, making, F. A. Maiette 751,089
Condensing vaporous fluid, apparatus for, W. S. Colwell..... 750,813
Controller casing, C. L. Perry..... 751,003
Conveyer, bucket, C. H. Notter..... 750,886
Cooker, steam, W. J. Kennedy..... 751,433
Cooking articles of irregular outline, wrapper for, L. Horn..... 751,171
Copy holder, J. W. McCann..... 751,327
Corn husker and band cutter and feeder, C. G. W. Wernicke..... 751,232
Corset busk, V. Bovy..... 751,142
Cot and pack bag, combined convertible, S. D. Martin 751,190
Cotton press, A. D. Thomas..... 751,119
Couch truck, Blodt & Dana..... 750,936
Course and bearing correcting device, J. Baxter, reissue..... 12,196
Cover, cooking utensil, W. E. Banzett..... 751,241
Cows, shackle and tail holder for, L. G. Macauley 751,088
Crib, child's, J. Campbell..... 750,805
Culm bar, J. S. Wilson..... 751,127
Cultivator, A. Lindgren..... 751,314
Current motor, alternating, C. A. Brown.. 750,940
Curtain roller bracket, window, C. H. Guiles 750,848
Derrick, well, J. C. Knupp..... 751,078
Diamond draw plates, making, F. Krause.. 751,180
Digger. See Post hole digger.
Discount meter, demand, F. P. Cox..... 750,948
Dish washing apparatus, L. W. Haring.... 750,851
Dispensing tank, W. R. Barton..... 750,794
Display case, C. M. Athey..... 751,137
Display device, J. Russ..... 751,109
Display rack, Burnside & Bedell..... 750,803
Display stand, H. Burnstone..... 750,804
Dock, elevated storage, C. Palmer..... 751,000
Door check and closer, W. J. Byron, Jr... 750,802
Door jamb setting machine, C. L. Bronk... 751,050
Draft equalizer, C. Schnoor..... 751,348
Draft rigging, F. L. Englehardt..... 751,155
Drawers supporter, H. W. Post..... 751,338
Drawing instrument, F. H. Wheelan..... 750,923
Drill joint, F. Ash..... 751,241
Drilled holes, tool for cleaning, F. W. Brady 751,263