

MODERN AMERICAN DWELLINGS. With Constructive Details. By Numerous Architects. Practical Designs for Builders and Those Intending to Build. Illustrated by means of 33 half-tone engravings and 127 full-page plates of details. New York: David Williams Company. 1897. Price \$2.

The selection of designs of residences in this volume is intended for the practical builder, who is frequently called upon to act as his own architect in the erection of dwelling houses. The designs range in cost from \$2,000 to \$5,000, and there is also a large number of details of the interior and exterior construction, a feature which the practical builder will recognize at once as of inestimable value in the building of houses. The designs represent work already executed and illustrate the efforts of architects scattered over a territory which includes practically the entire country. The half-tone engravings are well reproduced, but the elevations, while useful, are not particularly handsome. The floor plans are on a rather small scale. The details are specially to be commended.

MODERN SWITCHBOARDS. By Alfred B. Herrick. Philadelphia: The Cutter Electrical and Manufacturing Company. Pp. 200. Price \$3.

While this handsome quarto volume, full of illustrations, is published primarily to set forth the business and describe the appliances manufactured by the Cutter Company, it is a book which cannot fail to be extremely valuable to the electrical engineer or to any one engaged in electrical work, as the abundant engravings represent a multitude of minute details not often found in a single volume. The book also has an interesting historical resume of early practices and expedients, indicating the advances recently made in electrical apparatus, and valuable data on approved methods of construction.

GREENHOUSE MANAGEMENT. By Prof. L. R. Taft, of the Michigan Agricultural College. New York: Orange Judd Company. Pp. 382. Price \$1.50.

A manual brimful of valuable condensed and well arranged information on the forcing of flowers, fruits and vegetables in greenhouses is here presented to the public, the book also covering the propagation and care of house plants. To the florist especially, who pursues the business as a commercial enterprise, and to the growers of early vegetables and choice fruits, the work should be of great value, as not only are new and improved methods continually being brought into use, but the plants grow change from year to year, and this work of Prof. Taft is up to date in elucidating the most recent methods. The same author has also published a standard work on greenhouse construction.

HYDRAULIC AND PLACER MINING. By Eugene B. Wilson. New York: John Wiley & Sons. Pp. 234. Price \$2.

The times are especially propitious, since the development of interest in the Klondike region, for publications on placer mining, which so many thousands of inexperienced men are now entering into in our Alaskan territory. The book before us is well adapted to set before the miner in a very practical way the leading features of the work, including methods of panning, cradling, booming, sluicing and the construction of riffles, flumes, ditches, valves, gates, weirs, etc.

THE CENTURY ATLAS OF THE WORLD. Prepared under the superintendence of Benjamin E. Smith, A. M., managing editor of the Century Dictionary, editor of the Century Cyclopedia of Names, etc. With 117 double page maps in color, 138 inset maps, 45 historical and astronomical maps, and indexes (382 x pp.) of places, rivers, mountains, etc. Published by subscription. New York: The Century Company. Cloth. Price \$12.50.

The Century Atlas contains some of the finest specimens of map making we have ever seen. It is an entirely new atlas of the world, uniform in size with the Century Dictionary, which is known everywhere the English language is spoken or written. It is without doubt the most comprehensive and up-to-date atlas of the whole world, as it contains the latest details as to political changes, such as the new boundary of Greece resulting from the late war and the limits of Greater New York. The atlas has 117 double page maps, 138 inset maps and 45 historical and astronomical maps. They are printed in from five to ten different colors. The most recent government surveys of all parts of the world, the latest lake, sea and harbor soundings, the most recent explorations and the latest measurements of mountain peaks are given. The various railway, steamship and cable lines are all shown, and they are, of course, brought down to date. Important battlefields are plainly marked and the dates affixed. The historical maps illustrate the most important epochs of sacred as well as ancient and modern history. Standard time divisions are shown throughout in the United States and Europe; the special tourist map of Europe shows the chief routes of travel. As an example of what the older atlases lack and which the present atlas contains are the routes of celebrated explorers, including those followed by Nansen in his recent expedition to the Arctic regions and by Glave and Donaldson Smith in their recent African explorations. The index shows about 300,000 entries, and the foreign words used in connection with place names are translated, adding greatly to the utility of the atlas. The present time is particularly suited for the production of an entirely new series of maps, and the Century Company have done wisely in beginning at the bottom and making each map fresh from the newest and best material. The latest geographical surveys of civilized countries have been incorporated, and in those regions of the world for which no official surveys have been made, the most authoritative sources of information have been used. Space forbids us to enumerate all of the distinctive features which tend to make this atlas so valuable. The maps are clear and handsomely executed and bristle with details, to some of which we have referred.

Business and Personal.

The charge for insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in the following week's issue.

- Marine Iron Works. Chicago. Catalogue free.
"U. S." Metal Polish. Indianapolis. Samples free.
Gasoline Brazing Forge, Turner Brass Works. Chicago
Yankee Notions. Waterbury Button Co., Waterbury, Ct.
Bicycle Electric Light Co., Cleveland, O., want agents.
Handle & Spoke Mch'y. Ober Lathe Co., Chagrin Falls, O.
Schwaab Stamp & Seal Co., Milwaukee. Send for cat'g.
FERRACUTE Machine Co., Bridgeton, N. J. Full line of Presses, Dies and other Sheet Metal Machinery.
Improved Bicycle Machinery of every description. The Garvin Machine Co., Spring and Varick Sts., N. Y.
Gasoline Engines and Launches. Free catalogue. Monitor Vapor Engine and P. Co. Grand Rapids, Mich.
The celebrated "Hornaby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foot of East 138th Street, New York.
The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4. Munn & Co., publishers, 361 Broadway, N. Y.

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

Notes & 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.

(7436) C. L. P. writes: I have a square dining extension table which has become somewhat marred by use, that is it has lost its polish. Can you tell me what I can do to give it the fine polish a new table has? A. Formulas for furniture polishes are given in our SUPPLEMENT, Nos. 1067, 1099 and 1145, price 10 cents each by mail.

(7437) H. B. D. writes: I have had great difficulty with X ray tubes becoming punctured by the passage of the current through the glass. What is the cause of this? A. To be punctured is the natural death of an X ray tube. When it will occur no man can tell, whether in infancy or in old age. The static machine seems to use up tubes faster than the induction coil. The spark jumps through the glass because under existing conditions that is the path of least resistance. Sometimes punctures seem to be preceded by a creeping out of an electric discharge upon the tube; at others there is a flash, a stroke and a hole. It is difficult to account for them. Two valuable works may be mentioned. "The Induction Coil in Practical Work," Lewis Wright, price \$1.25 by mail, and "The Roentgen Rays in Medical Work," David Walsh, price \$2.25 by mail.

(7438) P. L. G. asks: Will you kindly inform me, through the Notes and Queries of the SCIENTIFIC AMERICAN, the way to ascertain the distance from a receiver to the place that a submarine cable is severed? A. The general method of localizing a fault is to measure the resistance of the cable. This will be the resistance from the end on shore to the break, since the earth has no resistance. The resistance of the whole divided by the resistance per mile gives the number of miles to the place where the break occurred.

(7439) J. E. W. asks: How are electric lights tested for candle power? What apparatus is required, etc.? A. The best way to rate electric lights is by the power they use in watts. The National Electric Light Association has defined a 2,000 candle power lamp as one consuming 450 watts. This is 10 amperes at 45 volts. Incandescent 15 candle power lamps use from 50 to 55 watts. If the candle power is to be measured, the light of the lamp is compared directly with that of a standard. The legal candle is one consuming 120 grains an hour, made to have 6 to the pound. The method of comparison is to adjust the two lights till they illuminate a surface equally. Then the light of each is represented by the square of its distance from the surface. Thus, if the standard candle were 1 foot and the light to be tested 4 feet from this surface, the lights are as 1^2 to 4^2, or as 1 to 16. The light to be tested is giving 16 candles. This is explained in Hopkins' "Experimental Science." Price \$4.

(7440) R says: Please give a receipt for making cider. The coal to be about 16 cents per gallon. A. Mix well 10 gallons cold water, 7 1/2 pounds brown sugar, 1/4 pound tartaric acid, add the juice expressed from 2 or 3 pounds dried sour apples, boiled.

(7441) G. says: Kindly let me know how much a knot is. I would like to know whether it is a mile or a little over. A. A "knot" is a nautical mile and is equal to (6080/27) / (6280) 115156 statute miles.

TO INVENTORS.

An experience of fifty years, and the preparation of more than one thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted MAY 17, 1898, AND EACH BEARING THAT DATE. (See note at end of list about copies of these patents.)

- Acid, making pyrocatechin sulphonic, P. P. Monnet..... 604,066
Air brake controller, J. C. Wands..... 604,244
Annunciator and spring jack, combined, G. W. Sutton..... 604,340
Awning, window, J. I. Sargent..... 604,687
Badge, A. Phelps..... 604,213
Baling press, J. H. Holmgren..... 604,324
Bath. See Cabinet bath.
Bayonet, hors power, A. J. Johnson..... 604,153
Bell, bicycle, J. Keith..... 604,356
Belt, H. Carroll..... 604,288
Bicycle, J. A. Anderson..... 604,011
Bicycle, C. E. Cain..... 604,226
Bicycle, W. H. Castle..... 604,187
Bicycle, J. C. Ernst..... 604,073
Bicycle brake, J. C. Ernst..... 604,030
Bicycle chain adjustment, C. W. Bernson..... 604,294
Bicycle coaster, B. H. Divine..... 604,168
Bicycle saddle, E. W. Bray..... 604,347
Bicycle saddle, J. W. Morgan..... 604,068
Bicycle support and lock, W. E. Jones..... 604,246
Bicycle tool holder or carrier, J. O. Glase..... 604,210
Bicycle trainer, H. Vogeler..... 604,200
Bleaching boiler, rotary, B. D. Rising..... 604,086
Board. See Whist board.
Boat, submarine, G. V. Bennum..... 604,185
Boiler, steam, G. W. Bennum..... 604,063
Boiler flue cleaner, H. L. Hildreth..... 604,047
Boiler furnace, steam, W. Kent..... 604,158
Hook binding machine, F. P. Hill..... 604,170
Bottle, A. Mazzanovich..... 604,120
Bottle, F. L. Meyer..... 604,062
Bottle, J. C. Patterson..... 604,193
Bottle and seal, non-refillable, A. J. Jose..... 604,328
Bottle holder, nursery, J. W. Sykes (reissue)..... 11,665
Bottle, mucilage, M. P. Brennan..... 604,245
Bottle, non-refillable, A. N. Woodard..... 604,104
Bottle stopper, E. A. Parker..... 604,259
Box, See Display box. Folding box. Letter box. Paper box.
Box or can, A. R. Ferguson..... 604,112
Brake. See Bicycle brake. Elevator safety brake. Vehicle brake.
Bracing apparatus, B. Rein..... 604,080
Burner, gas, G. E. Myer..... 604,334
Burner. See Gas burner. Incandescent burner.
Butter, etc., apparatus for removing, Rohl & Usedom..... 604,124
Cabinet bath, V. Christensen..... 604,300
Cameras, magazine, J. J. Chase..... 604,204
Can opener, P. Beavers..... 604,016
Candy machine, E. F. Gould..... 604,314
Cans, etc., device for closing, G. J. Record..... 604,079
Car coupling, H. F. Camp..... 604,227
Car fender or guard, tramway, J. Leighton..... 604,171
Car fender, street, J. E. A. Walker..... 604,037
Car gate, H. W. Brett..... 604,225
Car side bearing, railway, C. C. Borton..... 604,186
Cars, electric lighting apparatus for, Wilhelm & Richards..... 604,101
Cars, electric lighting apparatus for railway, W. F. Richards..... 604,083
Cars, electric lighting system for railway, W. F. Richards..... 604,082
Carpet fabric, cut pile, H. Hardwick..... 604,320
Cellulose and preparing same, modification of, C. F. Cross et al..... 604,206
Chair, See Child's chair.
Chair, F. H. Karrer..... 604,156
Chair, I. E. Palmer..... 604,212
Chair, crib, cradle, bed and walker, combined, F. A. Fustison..... 604,341
Child's chair, F. C. Hannabuss..... 604,045
Churn, J. A. Maddox..... 604,059
Churn and butter worker, Penn & Brown..... 604,262
Cigarette machine, pocket, T. S. Fitch..... 604,208
Cigarette wrapper, C. H. Mehner..... 604,257
Circuit closer, W. D. Kennedy..... 604,157
Clamp. See Car clamp.
Cloth clamp for textile machinery, R. P. Winsor..... 604,103
Cock safety attachment, gas, J. F. Smith..... 604,197
Coin holder, J. Green..... 604,315
Comminuted materials, apparatus for handling, E. F. Dyer..... 604,141
Commutator brush holder, W. B. Stull..... 604,220
Conveyer, endless chain, W. F. Hunt..... 604,234
Cooking and pressing apparatus, J. F. Bussella..... 604,348
Cooling and sealing, J. Sedlacek..... 604,162
Copper matte, treating, J. Colquhoun..... 604,023
Cord knotting device, H. E. Fridmore..... 604,337
Cotton handling machine, pneumatic, J. T. Fuller..... 604,037
Cotton press, W. E. Anderson..... 604,012
Cotton press, F. L. Dyer..... 604,028
Coupling. See Car coupling. Pipe coupling.
Tube coupling.
Cover for crocks, etc., Gribben & Smith..... 604,040
Crate, G. H. Owens..... 604,072
Cultivator, D. M. Motherwell..... 604,175
Cultivator, N. O. Starks..... 604,130
Cultivator pulverizing attachment, G. G. Gilbertson..... 604,313
Cultivator, G. G. Crobarger..... 604,205
Cutter. See Feed cutter. Paper cutter. Thrashing machine band cutter.
Cutter bar, C. E. Frye..... 604,311
Cycle pedal, Lloyd & Keeling..... 604,251
Demijohn, I. M. Schellinger..... 604,089
Dentist chair, E. E. Keefe..... 604,365
Display box, A. M. Hance..... 604,190
Display cabinet, card, W. H. Wickers..... 604,221
Doll, Verpillier & Graves..... 604,243
Dredge, hydraulic, L. W. Bates..... 604,015
Drill. See Grain drill. Rock drill.
Drill rods, device for removing broken, J. Hurst..... 604,327
Dumb waiter, W. Fishel..... 604,222
Dust pan, K. A. Clabaugh..... 604,301
Dust pan, S. W. Milligan..... 604,064
Electromagnet having rotating fields, W. Langdon-Davies..... 604,055
Elevator doors, electrical apparatus for operating, H. R. Smith..... 604,128
Elevator safety brake, G. Hancock..... 604,247
Engine controlling device, A. P. Loper..... 604,253
Engine stop, automatic, J. H. Eastwood et al..... 604,142
Fare register operating mechanism, car, C. Bernstedt..... 604,295
Feed cutter, C. F. Search..... 604,127
Feed water and circulation, heating, J. King..... 604,052
Feed water heater, C. J. Jackson..... 604,249
Fence stay, L. S. Mohler..... 604,055
Fence weaving machine, wire, W. H. Warner..... 604,059
Fencing machine for making wire, Griswold & Goldthwait..... 604,041
File, prescription, A. H. Cook, Jr..... 604,108
Fire escape, F. Underwood..... 604,096
Flue scraper, Lukens & Zschech..... 604,058
Flushing tank, E. M. Stirling..... 604,178
Folding box, M. B. Clark..... 604,228
Furniture and support, F. Reiser..... 604,150
Fuel and making same, composite, G. Griffiths..... 604,317
Furnace. See Boiler furnace. Smelting furnace.
Furnace door, G. R. Steward..... 604,093
Garment distender and drier, P. O'Thayne..... 604,122
Garment supporter, W. G. Washburn..... 604,134
Gas burner, T. Wilson..... 604,209
Gas burner for water heaters, H. F. Gabel..... 604,209
Gas engine, D. M. Tuttle..... 604,241
Gas from fermenting liquors, collecting, J. Schneible..... 604,125
Gas generating apparatus, acetylene, E. N. Dickerson..... 604,139
Gas generating apparatus, acetylene, Thorn & Huddle..... 604,199
Gas generator, acetylene, E. J. Dolan..... 604,140
Gas generator, acetylene, E. Godin..... 604,039
Gas mantles and apparatus therefor, method of incinerating incandescent, T. J. McTigue..... 604,121

(Continued on page 350)

Advertisements.

ORDINARY RATES. Inside Page, each insertion, - 75 cents a line Back Page, each insertion, - - \$1.00 a line

For some classes of Advertisements, Special and Higher rates are required. The above are charges per agate line—about eight words per line. This notice shows the width of the line, and is set in agate type. Engravings may bear advertisements at the same rate per agate line, by measurement, as the letter press. Advertisements must be received at Publication Office as early as Thursday morning to appear in the following week's issue.

Star Foot power Lathes...cutting Automatic Cross feed 9 and 11-inch Swing. New and Original Features Send for Catalogue B. Seneca Falls Mfg. Company, 695 Watcr St., Seneca Falls, N. Y.

AMERICAN PATENTS.—AN INTERESTING and valuable table showing the number of patents granted for the various subjects upon which petitions have been filed from the beginning down to December 31, 1894. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1002. Price 10 cents. To be had at this office and from all newsdealers.

POWER & FOOT LATHES. SHAPERS, PLANERS, DRILLS MACHINE SHOP OUT FITS TOOLS AND SUPPLIES. CATALOGUE FREE. SEBASTIAN LATHÉ CO. 120 CULVERT ST. CINCINNATI O.

HAVE THE LATEST IMPROVEMENTS. No machine shop can be thoroughly up-to-date unless it has the most modern perfect tools. For instance, the

ASHLEY PATENT NIPPLE HOLDERS hold nipples for cutting either right or left hand threads. They hold the sleeve from turning and take the strain of both the sleeve and shank thread. Made of best quality cast steel, carefully fitted. Long or short nipples cut with equal facility. The Ashley Holders are of light weight and compact form. WALWORTH MFG. CO., 20 Oliver St., Boston, Mass.

LATHES FOR GUNSMITHS, TOOL MAKERS, EXPERIMENTAL AND REPAIR WORK, ETC. Send for Illus. Catalogue. W. F. & Jno. Barnes Co. 1909 Ruby Street, ROCKFORD, ILL.

ROCK DRILLS AIR COMPRESSORS SIMPLEST, MOST EFFICIENT and DURABLE. RAND DRILL CO. Send for Catalogue. 100 Broadway, New York.

WOODWORKING MACHINERY. For Planing Mills, Carpenters, Builders, Furniture, Chair, Vehicle, Wheel and Spoke Makers, etc. Correspondence Solicited. Illustrated 312-page Catalogue free to manufacturers and foremen. THE ECAN CO. 327 to 347 West Front Street, CINCINNATI, OHIO.

PHYSICAL AND SCHOOL APPARATUS TOEPLER HOLTZ SELF CHARGING MACHINE For School, College X Ray work. E. S. RITCHIE & SONS, Brookline, Mass.

The Coburn Patent Trolley Track Store Ladders. A PAIR OF STAIRS ALL ALONG THE LINE OF SHELVES. Send for Book. The Coburn Trolley Track Mfg. Co. HOLYOKE, MASS.

"QUEEN" ARCHITECT LEVEL \$50 Improved Transits & Levels Graduated entirely on our large dividing engines. Special award at the World's Fair. All kinds of Engineering, Surveying and Drafting Instruments and Materials. 220 p. illustrated catalogue mailed free only if this ad. is mentioned. QUEEN & CO., Inc., 1011 Chestnut St., Philadelphia.

Gas Blast Furnaces GAS PRODUCERS AND PRESSURE BLOWERS. For Illustrated Pamphlets, apply to AMERICAN GAS FURNACE CO. 23 John Street, New York, N. Y.

"A Tome That Tells of Tools." All about every known Tool, large and small, and its uses, size, weight, and present market price. Every Tool described and illustrated by fine and accurate cuts. Send at once for MONTGOMERY & CO.'S thoroughly up to date TOOL CATALOGUE for 1898. 510 pages with Index. Pocket size 6 1/4 x 9 1/4, rounded edges and stitched covers. Every foreman or workman or factory should have a copy. Mailed for 25 cents by MONTGOMERY & CO. 105 Fulton Street, New York.

STEAM ENGINEERING



Learned by study at home in your spare time. Able instructors. Superior textbooks free. Fees moderate.

\$2 in ADVANCE and \$2 a MONTH

Pays for a College Education at Home.

Established 1891. 35,000 students and graduates. Courses in Electrical, Mechanical or Civil Engineering; Mathematics; Chemistry; Mining; Architectural or Mechanical Drawing; Surveying; Plumbing; Architecture; Metal Pattern Drafting; Prospecting; Book-keeping; Shorthand; English Branches. References in every city and town. All who study guaranteed success. We have helped thousands to better positions. Circulars free. State subject you wish to study.

INTERNATIONAL CORRESPONDENCE SCHOOLS,
Box 92, Scranton, Pa.

ROSE POLYTECHNIC INSTITUTE

A College of Engineering. Mechanical, Electrical, Civil Engineering; Chemical Courses; Architecture. Extensive shops. Modernly equipped laboratories in all departments. Expenses low. 16th year. For Catalog address C. L. MEES, President, Terre Haute, Ind.

THE Scientific American SPECIAL NAVY SUPPLEMENT.

With Colored Map of Cuba.



THE BATTLESHIP "OREGON."

The great desire during the present crisis for accurate information concerning the United States Navy has led to the preparation of a short treatise on the Navy, which has just been published under the above title. Every effort has been made by the publishers to treat the subject in such a manner that it may be readily understood by the reader unversed in naval affairs, and at the same time render the publication a permanent book of reference.

This issue takes the place of the regular number of the Supplement for April 30th, and consists of forty pages.

The number opens with a historical sketch of the birth and growth of the new Navy from 1883 to 1898, in which the programme of shipbuilding authorized in each year is given, together with the classes of ships which it called for.

This is followed by an article which explains the different types of vessels into which a modern navy is divided, and shows, by the assistance of diagrams, the manner in which the various types of vessels are classified. This article will greatly assist the reader in understanding the detailed illustrations and descriptions of each ship which make up the bulk of the issue.

The ships are grouped according to their type, as classified below. A comparison is drawn between different vessels of the same type, and the improvement of each ship on its predecessor is pointed out.

BATTLESHIPS.

"Indiana," 18 cuts; "Massachusetts," 2 cuts; "Oregon," 2 cuts; "Iowa," 3 cuts; "Texas," 2 cuts; "Kentucky," 2 cuts; "Alabama," 5 cuts.

CRUISERS.

"New York," 3 cuts; "Brooklyn," 1 cut; "Minneapolis," 1 cut; "Columbia," 2 cuts; "Chicago," 1 cut; "Olympia," 2 cuts; "Cincinnati," 1 cut; "San Francisco," 5 cuts; "Detroit," 1 cut; "Charleston," 1 cut; "Baltimore," 1 cut; "New Orleans," 2 cuts.

MONITORS.

"Amphitrite," 4 cuts; "Terror," 5 cuts; "Monterey," 3 cuts; "Miantonomoh," 4 cuts.

GUNBOATS AND TORPEDO BOATS.

"Helena," 1 cut; "Annapolis," 1 cut; "Marietta," 1 cut; "Ericsson," 2 cuts; "Porter," 2 cuts; "Maine's" torpedo boat, 1 cut; "Bailey," 3 cuts.

SPECIAL CLASS.

Ram "Katahdin," 4 cuts; submarine boat "Holland," 2 cuts.

Under the cut of each ship is a full table of her dimensions, armor, guns, speed, etc., and this is supplemented by tables at the end of the work, giving complete tables of the whole fleet. The illustrations number about 90, and include handsome half-tone views and wood-cuts of all of the vessels above mentioned. Other pictures show in great detail the guns, gun-turrets, torpedoes, steering apparatus, conning towers, and many interior and sectional views of other parts of these warships. The whole forms a most complete and fully illustrated periodical.

In addition to the above is included a reliable map in colors, showing the island of Cuba and the West Indies.

This issue is inclosed in a handsome colored cover for preservation.

Price, by mail, 25 cents.
MUNN & CO., Publishers,
361 Broadway, New York City.

Gas manufacturing apparatus, acetylene, H. Cousins.....	604,229
Gas mixer, fuel, Krieger & Coy.....	604,116
Gas producing apparatus, acetylene, H. A. De-roy.....	604,025
Gate. See Car gate. Swinging gate.....	
Gate operating mechanism, J. W. Dean.....	604,308
Grain binder cord knoter, P. P. Coler.....	604,022
Grain drill, E. B. Orser.....	604,024
Grate, C. Fuller.....	604,143
Gun barrel locking device, V. Solodovnikoff.....	604,273
Hair tonic, L. Edwards.....	604,111
Handle. See Implement handle. Velocipede handle.....	
Handle bar, O. B. Mosher.....	604,071
Harrow, H. Babcock.....	604,289
Harrow, E. E. Whipple.....	604,343
Harrow, Ward & Burdick.....	604,345
Harrow, automatic pulverizing, A. Kissell.....	604,352
Harrow bar, spike tooth, H. D. Babcock.....	604,223
Harrow, riding, M. Rowe.....	604,339
Harrow, spring tooth, C. S. Sharp.....	604,271
Harrow, spring tooth, J. E. Sheibley.....	604,272
Harvester cord knoter, self binding, H. E. Pridmore.....	604,336
Header platform connection, J. Morris.....	604,069
Heater, economizer, J. C. Henderson.....	604,046
Heater. See Heater. Water heater.....	
Heating apparatus, air, H. Baetz.....	604,013
Heating system, steam, A. G. Paul.....	604,355
Hinge, spring, A. D. Anthony.....	604,165
Hod, mortar, W. G. Avery.....	604,287
Hook and eye, P. Young (now by marriage P. Young Weeks).....	604,135
Horsehoe, E. F. Smith.....	604,691
Horsehoe, hoop spreading, E. S. Barrows.....	604,014
Horsehoe, rope tread, A. Fremery.....	604,034
Hose nozzle, J. H. Fry.....	604,036
Hose rack, Devendorf & Earl.....	604,231
House. See Knockdown house.....	
Hub, expanding, J. F. Vollrath.....	604,278
Hydraulic press, F. M. Leavitt.....	604,056
Ice cream freezer, Porter & Faulkner.....	604,214
Implement handle, A. L. Adams.....	604,105
Incandescent burner, Zaesek & Gottlieb.....	604,222
Injector, J. E. B. Orser.....	604,233
Iron. See Smoothing and pressing iron.....	
Iron cutting device, H. J. Shaffer.....	604,270
Ironing machine for smoothing cuff and collar edges, F. E. Fay (reissue).....	11,664
Joint. See Rail joint.....	
Kitchen utensil, M. W. Smith.....	604,092
Knitting machine, F. B. Wildman.....	604,100
Knitting machine stop motion, circular, W. Hite & Sullivan.....	604,344
Knockdown house, P. A. Toff.....	604,277
Labeling machine, T. A. Eber.....	604,182
Lace fastener, F. P. Schuler.....	604,282
Lamp, electric arc, Steinacker & Cowley.....	604,219
Lamps, etc., automatic igniting device for gas, C. F. Nebendahl.....	604,074
Lamps, gas burners, etc., support bracket for, C. M. Toland.....	604,133
Lantern, overhead, C. Scott.....	604,239
Leads, spaces and quads from dead matter, machine for discarding, P. F. Cox.....	604,305
Letter box, J. J. Herzog.....	604,323
Lifter. See Skirt lifter.....	
Liquid dispensing apparatus, coin controlled, W. P. Hackett.....	604,318
Liquids, vessel for containing and administering volatile, P. P. Monnet.....	604,191
Liquids with gas, method of and apparatus for charging, H. Carmichael.....	604,018
Loom jacquard mechanism, T. A. B. Carver.....	604,299
Lubricating pump, J. F. & B. T. McCanna.....	604,174
Lubricator, Powder.....	604,265
Lubricator, W. H. & R. Thompson.....	604,132
Lumber stacking apparatus, W. Graham.....	604,145, 604,146, 604,169
Mail bag crane, W. L. Hatfield.....	604,115
Matrices, rengring, Ring & Stickney.....	604,123
Mattress, O. E. Hall.....	604,043
Metals, apparatus for electrically working, J. D. Bishop.....	604,137
Meter coin controlling and recording mechanism, S. E. Mower.....	604,175
Meter prepayment attachment, C. Luke.....	604,263
Meter prepayment, S. E. Mower.....	604,173
Meter registering mechanism, S. E. Mower.....	604,174
Milk hygienically, apparatus for treating, W. F. Niebling.....	604,177
Milk measuring and discharging machine, W. E. Pen.....	604,261
Mining apparatus, G. F. Kibling.....	604,330
Mining machine, E. S. & W. A. McKinlay.....	604,192
Miter cutting and shooting block, W. O. Bailey.....	604,250, 604,291
Mixer. See Gas mixer.....	
Mop holder, H. A. L. Bade.....	604,107
Motor. See Vehicle motor. Wave or current motor.....	
Mowing and reaping machines, rotary sickle for, J. A. Davis.....	604,189
Mowing machine, D. W. Kneisly.....	604,353
Nail machine, W. C. W. Angell.....	604,203
Necktie fastener, B. H. Holmes.....	604,048
Nut lock, Garrigus & Golling.....	604,114
Oil, etc., apparatus for dispensing, A. Haye.....	604,321
Oil can, H. C. Atkinson.....	604,184
Oils and fats, treating, Day & Glacken.....	604,307
Order holder, E. A. Trussell.....	604,055
Ore concentrator, N. E. Mendenhall.....	604,161
Ores, treating metallic, S. C. C. Currie.....	604,187
Organ, reed, W. S. Moses.....	604,070
Orthopedic appliance, Hamel & Hibbert.....	604,044
Overhead switch, Rice & Beitenmiller.....	604,266
Oxydismidophenyl and making same, Jacobson & Tighe.....	604,049
Paddle wheel, steamboat, L. Q. C. Magee.....	604,256
Pail and package, G. J. Record.....	604,078
Pail, milk, C. R. McKinstry.....	604,176
Pan. See Dust pan. Roasting pan.....	
Paper, apparatus for making yarn or thread from, E. Char.....	604,350
Paper box, E. Finch.....	604,031
Paper cutter, toilet, J. Hoberg, Sr.....	604,150
Paperserving machine, C. Fisher.....	604,113
Paper thread, making, E. Clavier.....	604,349
Paper tube making machine, F. Schoettle.....	604,090
Pen and pencil, O. C. Hubbard, by judicial change of name now J. Bernard.....	604,025
Petroleum, etc., process of and apparatus for refining crude, H. Wolf.....	604,280
Pew guard, E. T. Kervick.....	604,236
Photographic plate holder for three color processes, G. S. Hill.....	604,268
Photographs in natural colors, G. Seile.....	604,033
Piano, W. M. Bauer.....	604,186
Pianoforte action, L. A. Barber.....	604,136
Pianoforte transposing mechanism, E. H. Gigney.....	604,144
Pipe bending apparatus, R. Clarke.....	604,021
Pipe coupling, A. C. Hubbard.....	604,279
Planter attachment, corn, W. P. Smith.....	604,129
Planter, seed, A. E. Blake.....	604,017
Plants, flowers, etc., stake for, T. N. Parker.....	604,260
Plating metals, W. J. Wilder.....	604,301
Flow and harrow, combination, A. D. Sperry.....	604,274
Plow carriage, O. C. Hubbard.....	604,033
Plow, cotton, M. Doss.....	604,309
Polisher or brush, W. K. Dumble.....	604,027
Press. See Baling press. Cotton press. Hydraulic press. Printing press.....	
Printing plates to cylindrical surfaces, means for securing, J. T. Hawkins.....	604,149
Printing press, H. F. Bechman.....	604,293
Pulverizer, H. S. Albrecht.....	604,283
Pump, oil well, W. J. Wright.....	604,202
Pumps to barrels, clamp for securing, W. Peoples.....	604,263
Push button card receiver and ejector, combination, O. M. Bossert.....	604,296
Puzzle, F. D. Hopley.....	604,248
Pyroxilin composition, G. Walker.....	604,151
Rack. See Hose rack.....	
Radiator, hot blast, G. I. Rockwood.....	604,217
Rail conductor for electric systems, L. E. Wal-kins.....	604,098
Rail joint, Arnold & Keil.....	604,285
Railway tie, H. T. Armstrong.....	604,183
Register. See Fare register.....	
Roasting pan, E. S. Lockstone.....	604,252
Rock drill, M. C. Jackson.....	604,153
Rotary engine, N. G. Gilbert.....	604,035
Rotary engine, T. C. Luce.....	604,254
Rotary engine, W. S. Sutton.....	604,276
Rotary steam engine, F. D. Moon.....	604,333
Roundabout, Wilde & Hinckley.....	604,164
Safe protection system, electrical, I. Freed.....	604,053
Saw, F. W. Wadsworth.....	604,279
Scale, line dividing, A. A. Olund.....	604,075
Scraper, cotton and corn, T. F. Dove.....	604,207
Screens, etc., detachable foot for, W. J. Quarry.....	604,215
Screw driver and drawer, G. B. Jocelyn.....	604,250
Screw machine, metal, W. S. Davaport.....	604,306
Seine pulling machine, C. H. Ganney.....	604,312
Sewing machine attachment, C. Schneider.....	604,161
Shade, window, J. S. Judge.....	604,329
Shafts, apparatus for making crank, C. F. Roper.....	604,267
Sharpener, scissors, H. C. Lausen.....	604,118
Sheet metal working machine, F. M. Leavitt.....	604,057
Shoe buffer, W. B. Kiebley.....	604,051
Shovel. See Cultivator shovel.....	
Shutter fastener, J. G. Lane.....	604,053
Signal, R. P. Coleman.....	604,303, 604,304

(Continued on page 351)

\$10 A DAY TO AGENTS

MURAT HALSTEAD'S GREAT WAR BOOK.
"Our Country in War." All about armies, navies, coast defenses, Maine Disaster, Cuba, Our War with Spain and relations with Foreign Nations. Nearly 600 pages, written since the Maine Disaster. Magnificent colored illustrations. Agents making \$10 to \$25 per day. No experience necessary. Most liberal terms guaranteed. 20 days' credit. Price low, freight paid. Handsome outfit free. Send 2 two-cent stamps to pay postage.
EDUCATIONAL UNION, 284 Dearborn St., CHICAGO.

DEPTH GAUGE.

Price, \$1.25
Has 4 in. narrow scale which can be used in middle or close or removed and used separately. Fine finish.
Catalogue of Fine Tools free.
The L. S. STARRETT CO.
Box 13, ATHOL, MASS., U. S. A.

HARRINGTON & KING PERFORATING SHEET METALS CO.

WE CAN DELIVER RAPIDLY
OF EVERY DESCRIPTION
NAME THICKNESS OF METAL, SIZE AND SHAPE OF HOLE.
225 NORTH UNION ST. CHICAGO, ILL. U.S.A.

VOLNEY W. MASON & CO.,

Friction Pulleys, Clutches & Elevators
PROVIDENCE R. I.

Oster Pat. Adjustable Stocks & Dies

They are light in weight, dies made of the best tool steel, guaranteed just as strong and reliable as solid dies, cut the thread at one operation and release from the work without running back over finished threads. Each set of dies cuts two distinct sizes.
THE OSTER MFG. CO.
85 Prospect Ave., Cleveland, Ohio, U.S.A.

NICKEL AND Electro-Plating Apparatus and Material.

THE HANSON & VAN WINKLE CO., Newark, N. J., 136 Liberty St., N. Y., 35 & 37 S. Canal St., Chicago.

Boards of Health

will find our Bacteriological Apparatus complete, durable, accurately constructed and inexpensive.
204 page Catalogue and New Supplement, post free.
BAUSCH & LOMB OPTICAL CO.
515 1/2 N. St Paul Street, Rochester, N. Y.

For Heavy Continuous Work

every machine shop will commend our Power Pipe Threading and Cutting Machine. Cones are central over machine, equalizing the weight. Within the cones are compound gears giving six changes of speed. Gears require no extra space, and are protected from dust or accident. Chasers can be opened, threaded pipe removed, another inserted and cut without stopping machine.
THE MERRILL MFG. CO., TOLEDO, OHIO.

If you want the best CHUCKS, buy Westcott's

Little Giant Double Grip Drill Chucks, Lathe Giant Drill Chucks, Improved, Onedra Drill Chucks, Cutting-off Chucks, Scroll Combination Lathe Chucks, Geared Combination Lathe Chucks, Plain Universal Lathe Chucks, Independent Lathe Chucks. Made by Westcott Chuck Co. Oneida, N. Y., U. S. A. Ask for catalogue in English, French, Spanish or German. FIRST PRIZE AT COLUMBIAN EXPOSITION, 1893.

SHERIFFS MANUFACTURING COMPANY,

Established 1854. Manufacturers of
Marine Engines
MILWAUKEE, WIS., U. S. A.

GAS AND GASOLINE ENGINES WATER MOTORS

BACKUS WATER MOTOR CO. NEWARK N. J. U. S. A.

USE GRINDSTONES?

If so, we can supply you. All sizes mounted and unmounted, always kept in stock. Remember, we make a specialty of selecting stones for all special purposes. Ask for catalogue.
THE CLEVELAND STONE CO.
2d Floor, Wilshire, Cleveland, O.

EVERY FARMER interested in Ensilage should investigate the

GALDWELL CYPRESS SILOS
They last a lifetime. This catalogue free.
W. E. GALDWELL CO.,
217 East Main Street, LOUISVILLE, KY.

EVOLUTION OF THE AMERICAN Locomotive.

By Herbert T. Walker. A valuable series by a member of the National Railway Museum Committee. The locomotive from 1825 to date is described and illustrated by careful drawings, great attention being given to historical accuracy. 21 illustrations. SCIENTIFIC AMERICAN SUPPLEMENTS 1112, 1113, 1114. Price 10 cents each. For sale by Munn & Co. and all newsdealers.

ESTABLISHED 1850. THE DEFIANCE MACHINE WORKS

MANUFACTURERS OF SPECIAL WOOD WORKING MACHINERY FOR HUB SPOKE WHEEL BENDING, WAGON, CARRIAGE SHAFT, POLE, NECK, YOKE, SINGLE TREE, HANDLE A BARREL-HOOP FACTORIES.
LARGEST LINE IN THE WORLD SATISFACTION GUARANTEED.

Hon. Chauncey M. Depew writes:

"I have a Gram-o-phone at my house and another on my car. It's the best thing of the kind I know of to entertain one's family and friends."

New York World: "Gram-o-phone does not imitate but actually reproduces with a perfection of results absolutely startling."
New York Mail and Express: "All but human in its talk, and all but original in its music and song."

INDESTRUCTIBLE RECORDS.
GRAM-O-PHONE Complete, \$10, \$15, \$25.
Send for printed matter, and if a subscriber to Scientific American, how to purchase on the installment plan.
NATIONAL GRAM-O-PHONE CO., 874 Broadway, N. Y.

KNIGHT GAS AND GASOLINE ENGINE

Excellency in mechanical design, simplicity in construction, sensitive governing, obtaining steady motion and more desirable results, are the superior points in our engines.
Send for Circular "S. A." Address
KNIGHT MFG. CO.
1718 S. Market Street, CANTON, OHIO.

WEBSTER MFG. CO.

This beats Wind, Steam, or Horse Power. We offer the **WEBSTER 2 1/2** actual horse power **GAS ENGINE** for \$150, less 10% discount for cash. Built on interchangeable plan. Built of best material. Made in lots of 10 therefore we can make the price. Boxed for shipment, weight 800 pounds. Made for Gas or Gasoline. Also Horizontal Engines, 4 to 30 horse power.
Write for Special Catalogue.
WEBSTER MFG. CO., 1074 West 15th St., CHICAGO

"KING" Gasoline Engines

No Oil Cups. Exhausts Under Water. Noiseless.
COMPLETE LAUNCHES, YACHTS, and WORKING BOATS.
THE CHARLES B. KING CO., Detroit, Mich.

ALCO VAPOR LAUNCH

Motor controlled from bow. Valve movement, 12 to 1, 16 to 60 ft. Launches. Twin Screws a specialty. 1, 2, 3, 5, 7, 12 H. P. No licensed engineer or pilot required. Speed and Safety guaranteed. No dangerous Naphtha or Gasoline used. No disagreeable vibration.
Send Ten Cents in Stamps for 1897 Catalogue.
Marine Vapor Engine Co., ft. Jersey Av., Jersey City, N. J.

WE'LL WINNER SURE IF HE HAS
"A RUSHTON CANOE"

THE ILLUSTRATED CATALOGUE OF CANOES, LAUNCHES, BOATS, CASUALTY LAUNCHES, ETC.
J. H. RUSHTON, CANTON, N. Y.

NO FIRE, SMOKE, OR HEAT. ABSOLUTELY SAFE

\$200 and up. Send 5 stamps for Catalogue.
Truscott Boat Mfg. Co., Drawer 9, St. Joseph, Mich.

Buy Telephones

THAT ARE GOOD-NOT "CHEAP THINGS."
The difference in cost is little. We guarantee our apparatus and guarantee our customers against loss by patent suits. Our guarantee and instruments are both good.
WESTERN TELEPHONE CONSTRUCTION CO.
250-254 South Clinton St., Chicago.
Largest Manufacturers of Telephones exclusively in the United States.

TELEPHONE DIRECT!

We make a specialty of manufacturing Intercommunicating Phones for interior or exterior lines. Our instruments have many new and improved features. All kinds of Phones made to order. Our Patent Transmitter can be bought separately if desired, for either short or long distance service. A specialty of Call Telephones for office, warehouse or factory use. Dispenses with switchboard. All sounds audible 50 per cent better than with other phones. **Spencer Electrical Company,** 163 Greenwich Street, N. Y. City.

ADJUSTABLE FIXTURES FOR INCANDESCENT LAMPS

FOR EVERY REQUIREMENT.
SEND FOR CATALOGUE'S
THE O. C. WHITE CO. WORCESTER, MASS.

\$5 Printing Press

Prints your own cards, labels, etc. Larger press for circulars or small newspaper, \$15. Everything easy by printed rules sent. Catalogue for stamp **KELSEY & COMPANY,** Factory 4, MERIDEN, CONNECTICUT.