

Our students succeed because they use I. C. S. textbooks.

Steam Engineering

A course in Steam Engineering enabling students to pass examinations and secure better positions. Includes operation of dynamos and motors.

Written by mail, Mechanical, Steam, Electrical, Civil and Mining Engineering; Shop and Foundry Practice; Mechanical Drawing; Architecture; Plumbing; Sheet Metal Work; Chemistry; Ornamental Design; Lettering; Book-keeping; Stenography; Teaching; English Branches; Locomotive Running; Electrotherapeutics.

When writing state subject in which interested.

taught by mail.

International Correspondence Schools, Box 942, Scranton, Pa.

THE ORIGINAL AND GENUINE

Rubber Goods. Perfectly imitate lines. Are durable and keep white. They go to all parts of the Globe. Write for Catalog. We want Agents everywhere. M'fd only by

Windsor Collar & Cuff Co., Windsor, Conn.

DRY BATTERIES.—A PAPER BY L. K. Bohm, treating of open circuit batteries, historical dry batteries, modern dry batteries, Heijesen's battery, Bryan's battery, Koller's battery, and the efficiency of dry cells. With three illustrations. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1001. Price 10 cents. To be had at this office and from all newsdealers.

A GRADUATED Automatic REDUCING VALVE

Physicians, Surgeons, Jewelers, Dentists, Artists, Brewers, Bottlers, etc., in fact all users of power require the

AUTOMATIC REDUCING VALVE.

Graduated to regulate the pressure exactly and does it automatically. Absolutely air-tight. No packing. No leakage. Handles high or low pressures or temperatures. Only Valve known that retains a uniform low pressure independent of varying high pressure.

Automatic Reducing Valve Co., 125 La Salle St., Chicago

10 PER CENT. TO 50 PER CENT. SAVED on all makes of

CAMERAS

Headquarters for Buying, Selling and Exchanging Cameras or Lenses.

PHOTOGRAPHIC SUPPLIES of every description. The bargains we offer will surprise you. Write for our 68-page illus. catalogue and bargain list—mailed free.

Dept. 2, N. Y. Camera Exchange, 114 Fulton St., New York

SENSITIVE LABORATORY BALANCE.

By N. Monroe Hopkins. This "bargain" laboratory balance will weigh up to one pound and will turn with a quarter of a postage stamp. The balance can be made by any amateur skilled in the use of tools, and it will work as well as a \$25 balance. The article is accompanied by detailed working drawings showing various stages of the work. This article is contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1184. Price 10 cents. For sale by MUNN & Co., 361 Broadway, New York City, or any bookseller or newsdealer.



MORROW COASTER BRAKE

The cyclist who has not used the MORROW COASTER BRAKE does not know the joys of cycling. It will enable you to coast all hills with safety, and have absolute control of your wheel. Quite as great a luxury on the level.

THE MORROW COASTER BRAKE has given cycling new interest. More than 200,000 in daily use; every one giving satisfaction. Guaranteed for full riding season. Ask your dealer, and if he cannot supply you, write us.

Illustrated booklet free.

Eclipse Manufacturing Company, Box X, ELmira, N. Y.

50 YEARS' EXPERIENCE

PATENTS

TRADE MARKS, DESIGNS, COPYRIGHTS & C.

Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. Handbook on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms: \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co., 361 Broadway, New York
Branch Office, 625 F St., Washington, D. C.

Turbine, fluid pressure, F. Hodgkinson... 677,082
Type and holder therefor, W. Berri... 676,975
Type distributing machine, Nydahl & Darling... 676,908
Type writer ribbon feed mechanism, B. A. Brooks... 677,111
Type writing machine, B. A. Brooks... 677,116
Type writing, type setting, or analogous machine and telegraphic apparatus, P. B. W. Kershaw... 677,311
Umbrella, folding, G. W. Feislich... 677,197
Upholstering apparatus, A. F. Feschl... 676,884
Valve, F. Grinnell... 677,076
Valve, C. J. Johnson... 677,085
Valve, alarm, H. A. Fiske... 677,072
Valve and vapor tube, thermostatic, A. Kitson... 677,312
Valve attachment, A. Thiel... 676,927
Valve gear, explosive engine, H. M. McCall... 676,907
Valve, steam actuated, Reeder & Freville... 677,228
Varnish making apparatus, Cooper & Bjerggaard... 677,117
Vehicle running gear, W. F. Dodge... 677,068
Vehicle wheel, E. McConville... 677,319
Vehicle wheel, road, H. Houldsworth et al... 677,215
Vending machine, counter controlled, C. Duhamel... 677,189
Vessel hull, apparatus for cleaning, M. A. & A. L. Stump... 676,926
Veterinary obstetrical instrument, G. Gabel... 677,199
Wagon brake lever, F. B. Cook... 677,063
Wagon jack, D. E. De Lape... 677,067
Wagon running gear, J. Mock, Sr... 677,252
Watch, stem winding, A. Anzelewitz... 677,151
Water cooling tower, G. J. Kennedy... 677,235
Water supply system, J. F. Barker (reissue)... 11,915
Weighing machine, automatic, G. Hoepner... 677,213
Wheel. See Grinding and polishing wheel.
Wheel, G. W. C. Robinson... 677,120
Wheel repairing device, H. W. Deinhart... 677,183
Wheel rims, apparatus for bending into circular form metallic, Richardson & Price... 677,142
Wheel scraper, P. G. Fogelstrom... 677,073
Winding, measuring, and severing machinery, D. G. Baker... 676,973
Windlass, portable, M. O'Keefe... 676,994
Windmill, M. G. Robinson... 677,273
Window, H. H. Roberts... 677,274

DESIGNS.

Bolt, W. M. Monroe... 34,691
Egg beater member, W. G. Browne... 34,690
Glass light, prismatic, S. Marcus... 34,687
Glass, sheet or plate of, Brogan & Malloch... 34,698
Hat holder, A. C. Mills... 34,689
Horseshoe pad, A. Buck... 34,692
Key guard, A. J. Ranert... 34,687
Lamp globe, R. M. Dixon... 34,685
Match scratch plate, Hay & Hartmann... 34,686
Sash fastener hook, window, G. C. Gardner... 34,689
Sifter frame, sand, F. L. Eberhardt... 34,695
Stocking, J. H. Blatz... 34,700
Tricycle frame, G. W. Millor... 34,693
Type writing machine ribbon spool, T. G. Volger... 34,688
Wagon body, F. L. Davis... 34,694

TRADE MARKS.

Advertising medals, C. M. Martin... 36,622
Bicycles, tricycles, and parts thereof and accessories thereto, Stearns Bicycle Agency... 36,657
Bread, biscuit, cakes and crackers, Octers Bread Co... 36,641
Calculating machines, Mallmann Addograph Co... 36,650
Cigars, Saxby & Co... 36,630
Cigars, cigarettes, and cheroots, Independent Tobacco Co. of Baltimore City... 36,631
Coverings, certain named protective, Hibbard, Spencer, Bartlett & Co... 36,647
Devices for certain named purposes, C. J. Tagliabue... 36,649
Fastening devices for wearing apparel, James V. Washburne Co... 36,623
Flour, Cape County Milling Co... 36,642
Food, stock, C. Geng... 36,645
Gloves, Journey & Burnham... 36,624
Grain drills, Bickford & Huffman Co... 36,658
Hydraulic, pneumatic, and electric machinery, "Long Arm" System Co... 36,652
Knitted garments and knitted fabrics, Elk Knitting Mills Co... 36,626
Kummel, E. Cuseuier Fils Aine & Cie... 36,633
Lubricators, Glyco Metall Gesellschaft, G. M. B. H... 36,648
Medicated tablet, curative, Arthur Remedy Co... 36,637
Medicinal remedies, B. S. McKean Co... 36,638
Medicine, certain named, A. D. Loar... 36,639
Metal, bearing, Frictionless Metal Co... 36,651
Metal goods, certain named, Russell & Erwin Mfg. Co... 36,653
Metals and packing rings, babbitt, G. E. Muzzy... 36,654
Moth destroyers, Boyajian Bros... 36,646
Pianos, Franklin Piano Co... 36,660
Rheumatic cure, Muntzel Drug Co... 36,640
Salt, G. N. Skinner... 36,643
Sheetings and drillings, Piedmont Mfg. Co... 36,629
Sheetings and drills, Ore Cotton Mills... 36,628
Silk, raw, Yokohama Ki-Ito Gomei Kwaisha... 36,627
Skirts, ladies' dress, E. Auerbach & Co... 36,625
Sprinkler system apparatus, International Sprinkler Co... 36,659
Tonic, E. E. Sutherland Medicine Co... 36,636
Tonic, nerve, Drexel Drug Co... 36,634
Tonics, Wintersmith Medicine Co... 36,635
Vehicles, automatically propelled, New York Motor Vehicle Co... 36,656
Vehicles, self-propelled road, Overman Automobile Co... 36,655
Whisky, W. Muehleisen... 36,632
Yeast, compressed, F. H. Philbrook... 36,644

LABELS.

"Dr. Towns' Epilepsy Cure," for a medicine, W. Towns... 8,494
"Independence," for cigars, A. G. Schulz & Co... 8,482
"Insectend," for an insecticide, Drescher & Adams... 8,497
"Lotus Cottons," for cotton goods, R. B. Treat... 8,498
"Mack's Sure Death to Ants," for an ant exterminator, G. W. McDuff... 8,496
"No-Mo-Roach," for an insect powder, A. Wortmann... 8,495
"Patent Satin Gloss Hydro Carbon Gas Black," for gas black, L. Martin Co... 8,488
"Pompeian Massage Cream and Skin Food," for a skin food, F. W. Stecher... 8,493
"Quite Right," for cigars, American Lithographic Co... 8,483
"Royal Garter," for cigars, American Lithographic Co... 8,480
"Royal Grade," for cigars, American Lithographic Co... 8,484
"Sunset Carbon Works," for carbon, L. Martin Co... 8,487
"The Germicide Tooth Wash," for an antiseptic, O. B. Braum... 8,492
"2 Rac O," for cigars, American Lithographic Co... 8,485
"Val. Blatz' Sons' Soluble Sparkite," for graphite, V. Blatz Sons... 8,489
"White Fawn Natural Sparking Lithia Water," for lithia water, D. L. Ormsby... 8,490
"White Fawn Natural Sparking Mineral Water," for mineral water, D. L. Ormsby... 8,491

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1863, will be furnished from this office for 10 cents. In ordering please state the name and number of the patent desired, and remit to Munn & Co., 361 Broadway, New York.

Canadian patents may now be obtained by the inventors for any of the inventions named in the foregoing list. For terms and further particulars address Munn & Co., 361 Broadway, New York.

PERFORATED METAL


OF EVERY DESCRIPTION AND FOR ALL USES.

THE HARRINGTON & KING PERFORATING CO., 225 N. UNION ST., CHICAGO, ILL., U.S.A.

CREST MFG. CO.

CAMBRIDGEPORT, MASS.

3 to 5 H. P. MOTORS



CREST Sparking Plug Coils Carburetors

ACETYLENE GAS AND CARBIDE OF CALCIUM.

All about the new illuminant, its qualities, chemistry, pressure of liquefaction, its probable future, experiments performed with it. A most valuable series of articles, giving in complete form the particulars of this subject. Details of furnaces for making the carbide, gas generators, gasometers, burners, etc. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 998, 1001, 1002, 1012, 1014, 1015, 1016, 1022, 1035, 1037, 1052, 1064, 1071, 1072, 1082, 1083, 1084, 1085, 1086, 1104, 1124, 1132, 1149, 1150, 1203, 1204, 1206 and 1209. Price 10 cents each, by mail, from this office, and all newsdealers.

WELL DRILLING Machines

Over 70 sizes and styles, for drilling either deep or shallow wells in any kind of soil or rock. Mounted on wheels or on sills. With engines or horse powers. Strong, simple and durable. Any mechanic can operate them easily. Send for catalog.

WILLIAMS BROS., Ithaca, N. Y.

The JOHN R. KEIM ENGINE

Slide valve, link motion. Steam chest in one piece. Cast iron slide valves. Stuffing boxes bored for 1/4 in. metallic or asbestos packing. Slides of bronze metal. Connecting rod fitted with roller ball-bearings. Crank shaft in one piece. Cylinders covered with asbestos cement. Engine columns finished in black enamel. Under 50 lbs. pressure engine develops 8 h. p. Neatly, compactly, strongly made. Best on the market. Price \$125.

JOHN R. KEIM, Buffalo, N. Y.

American Sheet Steel Company
Battery Park Building
New York

Manufacturers of all varieties of
Iron and Steel Sheets
Black and Galvanized
Plain and Painted
Flat, Corrugated and
"V" Crimped

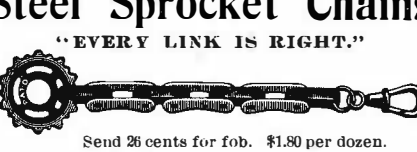
Apollo Best Bloom Galvanized Sheets
W. Dewees Wood Company's
Planished Iron
W. Dewees Wood Company's
Refined Iron
Wellsville Polished Steel Sheets

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.

Steel Sprocket Chains

"EVERY LINK IS RIGHT."



Send 26 cents for job. \$1.80 per dozen.

INDIANA CHAIN COMPANY, - - INDIANAPOLIS, IND.

Experimental Science


By GEORGE M. HOPKINS.

20th Edition Revised and Enlarged.

914 Pages, \$20 Illustrations.

Price \$4.00 in cloth; \$5.00 in half morocco, postpaid

This is a book full of interest and value for Teachers, Students, and others who desire to impart or obtain a practical knowledge of Physics. This splendid work gives young and old something worthy of thought. It has influenced thousands of men in the choice of a career. It will give anyone, young or old, information that will enable him to comprehend the great improvements of the day. It furnishes suggestions for hours of instructive recreation.



Send for large illustrated Circular and complete Table of Contents.

MUNN & Co., PUBLISHERS,
Office of the SCIENTIFIC AMERICAN,
361 BROADWAY, NEW YORK.

ELECTRIC FOUNTAINS

DARLINGTON ELECTRIC FOUNTAIN & SUPPLY CO.
1120 REAL ESTATE TRUST BLDG., PHILADELPHIA, PA.

ELECTRICAL ENGINEERING TAUGHT BY MAIL.

Write for our Free Illustrated Book. "CAN I BECOME AN ELECTRICAL ENGINEER?"

We teach Electrical Engineering, Electric Lighting, Electric Railways, Mechanical Engineering, Steam Engineering, Mechanical Drawing, at your home by mail. Institute endorsed by Thos. A. Edison and others.

ELECTRICAL ENGINEER INSTITUTE,
Dept. A, 240-242 W. 28th St., New York.

WANTED, DRAFTSMAN.—A COMPETITIVE EXAMINATION of applicants will be held at the Navy Yard, Norfolk, Va., July 16, 1901, for structural steel work draftsmen at \$1,500 per annum. For application and additional information, address "Commandant, Navy Yard, Norfolk, Va."

JOHN D. LONG, Secretary of the Navy.

INVENTIONS PERFECTED.

Accurate Model and Tool Work. Write for Circular.

PARSELL & WEED, 129-131 West 31st St., New York.

GASOLINE AUTOMOBILES.—VALUABLE illustrated articles on the above subject containing many details of the motors and vehicles, are contained in SUPPLEMENT Nos. 1099, 1270, 1295 and 1311. Price 10 cents each. For sale by Munn & Co. and all newsdealers.

LIGHT MANUFACTURING AND EXPERIMENTAL WORK.

SPECIAL MACHINERY. AUTOMOBILE PARTS.

OTTO KONIGSLOW, CLEVELAND, OHIO.

MODEL AND EXPERIMENTAL WORK.

Electrical and Mechanical Instruments. Small Machinery.

EDWARD KLEINSCHMIDT, 122 Fulton St., New York.

Experimental & Model Work

City and advice free. Wm. Gardam & Son, 45-51 Rose St., N. Y.

NOVELTIES & PATENTED ARTICLES

Manufactured by Contract. Punching Dies, Special Machinery. E. Konigslow & Bro., 181 Seneca St., Cleveland, O.

BICYCLE TIRE REPAIRING.—THE Mending of Single Tube Tires.—A practical article illustrating the method of inserting patches and plugs with pliers and pluggers, together with rubber band plugging and the use of puncture bands. 8 illustrations. Contained in SUPPLEMENT 1102. Price 10 cents. For sale by Munn & Co. and all newsdealers.

MODELS & CHICAGO MODEL WORKS

ESTABLISHED 1867. 179 E. MADISON ST. CHICAGO, ILL. WRITE FOR CATALOGUE OF MODEL SUPPLIES.

\$75 Month and Expenses; no experience needed; position permanent; self-seeker.

PEASE MFG. CO., Station 10, Cincinnati, O.

SALE IN EUROPE, particularly in France, of patented American Machines and Industrial Apparatus, and of patented American inventions.

L. Simon, Civil & Mechanical Engineer, Troyes, France.

VOLNEY W. MASON & CO., Friction Pulleys, Clutches & Elevators PROVIDENCE, R. I.

Cement Books. How to Use Portland Cement. Cement & Steel, etc.; Constitution of Hydraulic Cements, etc. Cement and Engineering News, 102 La Salle St., Chicago.

ICE MACHINES, Corlies Engine, Brewers' and Bottlers' Machinery. THE VILTER MFG. CO., 659 Clinton Street, Milwaukee, Wis.

STEEL OVERHAULING TOOLS

TYPE WHEELS, MODELS & EXPERIMENTAL WORK, SMALL MACHINERY, NOVELTIES & ETC. NEW YORK STENCIL WORKS 100 NASSAU ST. N. Y.

MODELS & EXPERIMENTAL WORK.

Inventions developed. Special Machinery.

E. V. BAILLARD, Fox Bldg., Franklin Square, New York.

AGENTS.—You can't find a better proposition.

Honest business, large profits, advancement. Write, give us a chance to convince you. Lewis & Company, 416 North Third Street, St. Louis, Mo.

AGENTS on salary or commission; \$12 daily or \$100 per month and expenses, selling our claim file to merchants and physicians.

Sayers & Company, 100, 408 Olive Street, St. Louis, Mo.

Whole or State Rights For Sale.—Foot-opening device for doors. Can be attached to any lock. A wonderful money-maker. Every householder a buyer.

E. DENNE, 124 Robinson Street, Winnipeg, Manitoba.

D'AMOUR & LITLEDALE MACHINE CO.

130 WORTH ST., NEW YORK. PATTERN AND MODEL MAKERS.

STATLER'S Pan-American HOTEL

The Largest in the World. Send for map of city and Exposition grounds, also folder telling how to secure guaranteed accommodations.

F. C. STATLER, Prop., Statler's Hotel, at Exposition, Buffalo, N. Y. (Statler's Restaurant, Ellicott Sq.)

WANTED OFFERS

For anything new in the way of...

AUTOMATIC MACHINERY

For the manufacture of

Wire Fencing, Netting, Wire Cloth, etc.

Say whether European Patents to be disposed of. . . .

Address: "WIRE WORKER," Box 773, New York.

DARLINGTON ELECTRIC FOUNTAIN & SUPPLY CO.

1120 REAL ESTATE TRUST BLDG., PHILADELPHIA, PA.