Our students succeed because they use I. C. S. textbooks. Steam Engineering course in Steam Engineering enabling stu-nts to pass examinations and secure better sitions. Includes operation of dynamos

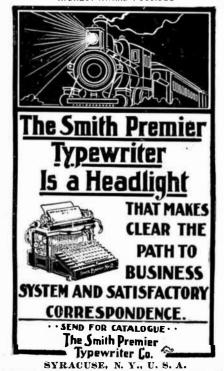
positions. Includes operation or dynamos and motors.

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

taught by mail.

International Correspondence Sch Box 942, Scranton, Pa.

GRAND PRIZE, PARIS, 1900.



One with a "dependable" point, a uniform grade—one that draws a clear, sharp. well-defined line, and to do this you will have to choose



Dixon's American **Graphite Pencils**

the best made lead pencil in any country. Hard, soft or medium. Suitable for all purposes. Architects, draughtsmen, clerks, report ers, etc., find them a boon. Send 16 cents for samples. Worth

double the money.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.



HOLD ON THERE!

Send 3c. for catalog of Monarch Marine Gasoline Engines. 34 to 45 H. P. \$200 up. Grand Rapids Gas Engine & Yacht Co., Grand Rapids, Mich,



THE OBER LATHES



For Turning Axe, Adze, Pick Sledge, Hatchet, Hammer, Auger, File, Knife and Chisel Handles, Whiffletrees, Vokes, Spokes, Porch Spindles, Stair Balusters, Table and Chair Legs and other irregular work. Send for Circular A

The Ober Mfg. Co., 10 Bell St., Chagrin Falls, O., U.S.A.



FLY PAPERS. - FORMULAS FOR Sticky Fly Papers are contained in SCIENTIFIC AMERICAN SUPPLEMENT Nos. 1057 and 1324. Each issue contains several receipes. Price 10 cents each, from this office, and from all newsdealers.

Acetylene Safety

Is tenfold greater than with city gas when our generator is employed. It stops making gas immediately you stop using gas. Fourteen sizes, \$15 to \$100. Write for our literature.



Is based on the only correct and approved system, that of feeding dry carbide in small quantities to a large volume of water. It is safe, simple, economical, practical and patented

THE J. B. COLT COMPANY

21 Barclay Street, Dept. S, New York.
Philadelphia. Bostos. Chicago. Criterion Stereopticons. Acetylene Search Lights

Typewriting machine, C. H. Shepard, 677,706, 677,707

Typewriting machine, C. H. Shepard, 677,707
Typewriting machine, G. H. Smith. 677,746
Unhairing machine, J. C. Rothe. 677,426
Unloading apparatus, R. Thew. 677,610
Unloading apparatus, G. E. Titcomb. 677,718
Valve, totary cut off. C. Pignet. 677,730
Valve, testing, E. Hafner. 677,470
Valve, testing, E. Hafner. 677,470
Valve, testing, E. Hafner. 677,470
Vegetable cutter, R. B. Royal. 677,473
Vehicle, R. McClaskey. 677,473
Vehicle, R. McClaskey. 677,473
Vehicle brake, Callahan & Shoot. 677,635
Vehicle top and For counceting differential gearing to driving axies of, E. T Birdsall
Ventilator, T. A. Dungan. 677,334
Ventilets, means for counceting differential gearing to driving axies of, E. T Birdsall
Ventilator, T. A. Dungan. 677,334
Vashing machine, E. Campbell. 677,635
Wasthobler, F. M. Bain. 677,334
Washing machine, E. Campbell. 677,633
Watch halance staff, D. H. Church. 677,633
Watch halance staff, D. H. Church. 677,638
Water bag, S. A. Woods. 677,638
Water module or delivery regulator, C. E. Livesay
Water, purifying, C. H. Kayl. 677,668
Water softening and purifying apparatus, C. H. Koyl. 677,668
Water strip for doors, automatic, W. E. Mogan
Wealber, J. Manes. 677,688
Weighing machine, J. Manes. 677,678
Wheel. See carriage wbeel. 677,408

Wheel. See carriage wbeel.

Wheel See carriage wbeel.

Wheel equalizing mechanism, vehicle, T.

B. Doeley.

Wheel securing device, T. A. Keogh.

677,520

Whistle, electric, S. A. Brown.

Windmill, A. A. E. Sterzing.

677,747

Windmill, A. T. Scott.

Windw, pivoted, E. Hipolito.

Wire recling machine, C. L. Winget.

Wire recling machine, C. L. Winget.

Wire weaving loom shuttle, W. I. Whitehurst.

Wrench, J. J. A. Miller.

677,520

Yoke fastening, neck, T. M. McVay.

677,369

DESIGNS.

| DESIGNS | Badge, L. Sickles | 34,702 | Badge or similar article, W. L. Panikoff | 34,701 | Beam, metal, N. H. Davis | 34,721 | Boot or shoe, C. T. Maguire | 34,733 | Bottle, H. C. Heinz | 34,712 | Boot or shoe, C. T. Maguire | 34,733 | Bottle, H. C. Heinz | 34,712 | Broiler, P. M. Harrington | 34,725 | Brooch or pendant frame, J. H. Theherath | 34,703 | Cane or umbrella ring, D. Rose | 34,703 | Cane or umbrella ring, D. Rose | 34,703 | Cheese mold, N. Simon | 34,726 | Clothes pin, O. H. Greene | 34,713 | Cream separator, P. C. Smith | 34,727 | Cup, A. C. Bosselman | 34,710 | Fabric, woven, W. T. Smith | 34,734 to 34,739 | Fence wire, barbed, D. C. Smith | 34,734 to 34,739 | Fence wire, barbed, D. C. Smith | 34,731 | 34,732 | Nasal cup, W. J. Evans | 34,731 | 34,732 | Nasal cup, W. J. Evans | 34,731 | 34,732 | Nasal cup, W. J. Evans | 34,716 | Rug, A. Petzold | 34,710 | Rug, A. Petzold | 34,740 | 34,740 | Saddletree, R. G. Davis | Saewing machine fumme, R. G. Woodward | 34,730 | Sewing machine fumme, R. G. Woodward | 34,730 | Sewing machine needle lever, R. G. Woodward | 34,730 | Sewing machine needle lever, R. G. Woodward | 34,732 | Stove leg, gas, H. P. Stimpson | 34,728 | 34,728 | 34,728 | 34,728 | 34,728 | 34,728 | 34,728 | 34,728 | 34,740 | Stove, G. Thompson | 34,723 | Stove leg, gas, H. P. Stimpson | 34,723 | 34,724 | Stove leg, gas, H. P. Stimpson | 34,723 | Thill coupling plate, Kell & Garthe | 34,730 | Stove, G. Thompson | 34,724 | Tombstone or monument, E. C. Hodges | 34,740 | 34,742 | Stove leg, gas, H. P. Stimpson | 34,743 | 34,744 | Stove leg, gas, H. P. Stimpson | 34,724 | 34,744 | Stove leg, gas, H. P. Stimpson | 34,724 | Stove leg, gas, H. P. Stimpson | 34,725 | 34,729 | Stove, g. Thompson | 34,724 | Stove leg, gas, H. P. Stimpson | 34,725 | 34,726 | Stove, g. Thompson | 34,724 | Stove leg, gas, H. P. Stimpson | 34,725 | 34,726 | Stove, g. Thompson | 34,724 | Stove leg, gas, H. P. Stimpson | 34,725 | 34,726 | Stove leg, gas, H. P. Stimpson | 34,724 | Stove leg, gas, H. P. Stimpson | 34,725 | 3

TRADE MARKS.

Warson
Cooperage, certain named, J. H. Hamlin & Son

LABELS.

"Gold Band Shoe Polish," for shoe polish, P. McLaughlin 8,509
"Hood's Foot Friend," for a powder, Hood Chemical Co. 8,505
"Kentneky Belle." for whisky, W. P. Strader. 8,501
"Life Saving Cholera Cure," for a medicine, L. V. Fischer. 8,507
"Lithia Malt," for malt extracts, A. Lieber. 8,502
"Primos," for ments, A. von Cotzhausen. 8,510
"Shakespeure Rye." for whisky, L. Blum. 8,500
"Stryx Tonic." for a hair tonic, W. D. S. Co. 8,503
"The Keystone." for cigars, J. M. Downs. 8,499
"The Penny Cohbler," for a leather dressing, G. M. Port. 8,508
"White House Kitchen Set," for kitchen cut-G. M. Port....
"White House Kitchen Set," for kitchen cut-lery, Bridgeton Knife Co..... . 8,512

PRINTS.

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.

ulars





IF YOU SHOOT A RIFLE Pistolor Shatgan, you'll make a Bull's Pistol or Shatyan, you'll make a Bull's Eye by sending three 2c. stamps for the lideal Hand-book "A." 126 pages FREE. The latest Encyclopedia of Arms, Powders, Shot and Bullets. Mention SCIENTIFIC AMERICAN. Address IDEAL MFG. CO., NEW HAVEN, CONN. U. S. A.



Don't buy until you get our catalogue-100 pages of money saving values. AMERICAN STORE STOOL CO., 33 Howard St., New York

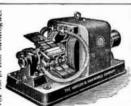




authority on Wiring and Construction."

STANDARD WIRING

for Electric Light and Power, as adopted by the Fire Underwriters of the United States: by H. C. USBAING, Jr. A. L. E. Electrical Engineer and Inspector; in use by over 36,000 Electrical Engineer Control Engineer Control Station Managers and Wiremen Because it is the only book on Wiring and Construction kept strictly up to date Flexible Leather Cover, pocket Size, \$1. Sent postpaid upon receipt of price, by H. C. CUSHING, Jr., 39 Cortlandt Street, New York City



NICKEL Electro-Plating

Apparatus and Material. Hanson & Van Winkle Co.,

Newark. N. J. 136 Liberty St., N. Y. 30 & 32 S. Canal St., Cbicago.

LYON & HEALY'S BRASS BAND



the great Jules Levy as the best in the world. Big Catalog, 400 linch trations, FREE. Positively the lowest prices on Band Instruments, Uniforms and Supplies of all kinds. Also contains Music and Instructions for New Bands. Lyoné Healy, Mannfacturers, 48 Adams st.. Chicago. (Lyon & Healy is the largest music house in the world—Editor.)

LEROY RACER



Is in every way a strictly up-to-date mount. It is one of the handsomest bicycles on the market and a pleasure to own one. We manufacture bicycles in every state of completion or complete from \$25 to \$35 and guaranteed for one

year. Get our catalogue. Address Bicycle Dept., John R. Keim, Bufalo, N. Y.



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.

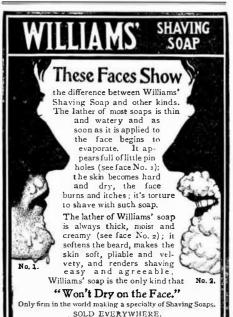
ELECTRICAL ENGINEERING TAUGHT BY MAIL.

Write for our Free Illustrated Book.

"CAN I BECOME AN ELECTRICAL ENGINEER?"

We teach Electrical Engineering, Electric Railways, Slechanical Engineering, Stream Engi

neering, Mechanical Drawing, at voor bone by mail. Institute indorsed by Thos. A. Edison and others. ELECTRICAL ENGINEER INSTITUTE, Dept. A, 240-242 W. 25d St., New York.



"A great deal in a little space."

— The Press.

THE J. B. WILLIAMS CO., Glastonbury, Conn. NDON. PARIS. DRESDEN. SYDN

"The Four-Crack Series."

'Ibis is the title of a series of books of travel and education issued by the Passenger Department of the

NEW YORK CENTRAL & HUDSON RIVER R. R

These small books are filled with information regarding the best modes of travel and the education that can best be obtained by travel.

They relate specifically to the great resorts of America to trips to the islands of the sea and around the world.

They also contain numerous illustrations and new and accurate maps of the country described.

Takeny of the 40-page Hustrated Catalogue of the "Four-Take Series" will be sent free, Jost-paid, 1960 receipt of postage stamp by George H. Daniels, General Passenger Agent, New York Central & Hudson River Railread, Grand Central Station, New York

NEW DOMESTIC are equal to two ct any other, because they make both sewing MACHINES chain and lock SEWING MACHINES chain and lock stitch.
GENERAL OFFICES, 16 Exchange Place, New York.

1/2 H. P. GAS ENGINE CASTINGS Materials and Blue Prints. Write for Catalogue 9. PARSELL & WEED, 129-131 W. 31st Street, New York.

MACHINES, Carliss Engines, Brewers', Machinery. THE VILTER MFG. CO., 859 Clinton Street, Milwaukee, Wis.

STEEL MYPEWRUTER TYPE
TYPEWHEELS, MOCELS & EXPERIMENTAL WORK, SMALLMEHIER
NOVELTES & ETC. NEW TON, STENCH WORKS IND. NASSAU ST. N.Y.

MODELS & EXPERIMENTAL WORK. Inventions developed. Special Machinery.

E. V. BAILLARD, Fox Bldg.. Franklin Square, New York. SHORTHAND BY MAIL. Pioneer home course Catalogue and First Lesson Free. Potts Shorthand College, Box 33, Williamsport, Pa.

AGENTS.—You can't find a better proposition.
Honest business, large profits, advancement. Write, give us a change to convince you. Lewis & Company, 466 North Third Street. St. Louis. Mo.

AGENTS on salary or commission; \$12 daily or \$100 file to merchants and physicians. Sayers & Company, D 60, 408 Olive Street, St. Louis, Mo.

D'AMOUR & LITTLEDALE MACHINE CO. PATTERN AND MODEL MAKERS.

STATLER'S American HOTEL

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

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



Has no pumps, no valves. No piping required to supply it with water. Always ready for use. Simplest in construction, most efficient in operation.

The Send for Catalogue.

Established 1872.

**Light Friction Disk Drill to 42" Back Geared Selfplest in construction, most efficient in every respect.

The Send for Catalogue.

Established 1872.

