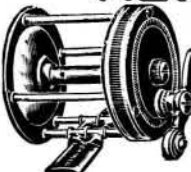


"HENDRYX"
It's a Guarantee of Quality
2,000,000 Sold in 12 Years
EVERY REEL WARRANTED
Booklets mailed free
The Andrew B. Hendryx Co.
New Haven, Conn., U.S.A.



A QUAKER CITY LANDMARK
More than 150 Smith Premier Typewriters are used by the City Departments having Offices in this Building.




Philadelphia City Hall
550 Feet in height

ILLUSTRATED CATALOGUE FREE


THE SMITH PREMIER TYPEWRITER CO.

SENSITIVE LABORATORY BALANCE.
By N. Monroe Hopkins. This "built-up" 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 \$125 balance. The article is accompanied by detailed working drawings showing various stages of the work. This article is contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1154. Price 10 cents. For sale by MUNN & Co., 361 Broadway, New York City, or any bookseller or newsdealer.

I PRINT MY OWN CARDS
Circulars, newspaper, Press, \$5.
Larger size, \$18.00. Money saver.
Big profits printing for others.
Type setting, essays, rules sent. Write for catalogue, press, type, paper, etc., to factory, The Press Co., Meriden, Conn.

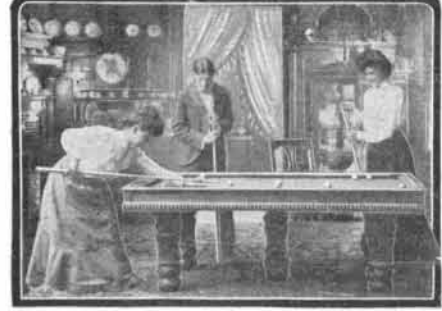


SALESMEN AND AGENTS WANTED.
SIC WAGES—Our Famous Parisian Water Still, a wonderful invention—beats Filters. 22,000 already sold. Demand enormous. Everybody buys. Over the kitchen stove it furnishes plenty of distilled, aerated, delicious, Pure Water. Only method—saves lives and Dr. bills; prevents typhoid, malaria fevers, cures disease. Write for Booklet, New Plan, Terms, Etc. FREE. Address, Harrison Mfg. Co., 15 Harrison Bldg., Cincinnati, O.



A FOLDING CAMERA.—WORKING
Drawings showing how to build a folding camera. A practical paper by an amateur for amateurs. 4 illustrations. Contained in SUPPLEMENT 1021. Price 10 cents. For sale by Munn & Co. and all newsdealers.

BILLIARDS and POOL



Indianapolis Combination Table
Library-Dining-Billiard-Pool
Handsome, massive Tables. Equal in every particular, except size, to standard billiard tables. Nine styles. 5/8, 3/4, 7/8 Standard Size. Catalogue Free.
COMBINATION BILLIARD MFG. CO.,
388 N. Claypool Bldg., Indianapolis, Ind.

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.

The covering for floors or other surfaces.
J. K. Sierer..... 36,247

TRADE MARKS.

Bath tubs, T. G. Knight	39,948
Beverage, certain named, Sociedad Vinicola, S. & L. Duracher.....	39,939
Beverages, tonic, Kalola Company.....	39,938
Buttons, certain named, United Button Co.....	39,932
Capsules containing liquid or solid medicines, gelatinous elastic, Hanco Bros. & White	39,941
Cigarettes, Societe Anonyme le Khehive.....	39,935
Confections, chocolate, H. D. Foss & Co.....	39,935
Hair restorer, Schon Chemical Co.....	39,940
Lamps, incandescent electric, Independent Incandescent Lamp Co.....	39,946
Liniment, E. Bach	39,944
Medical compound for certain named diseases, Schon Chemical Co.....	39,942
Medicine for certain named diseases, Anarsarin Chemical Co.....	39,943
Milk, condensed, Helvetia Milk Condensing Co.....	39,936
Ointment and tablets for certain named diseases, J. Kean.....	39,945
Shirts, collars, cuffs, and men's shirt waists, G. P. Ide & Co.....	39,931
Shirts, collars, cuffs, and men's shirt waists, dress, G. P. Ide & Co.....	39,930
Sifters, ash, J. P. Hill.....	39,947
Stationery, certain named, Dove-wreath Card Co.....	39,928
Stationery, certain named, Earl Thompson Co.....	39,929
Yeast cakes, Mrs. McCullough Yeast Co.....	39,934

LABELS.

"A Men-Da-Mi-Na," for a cleaning preparation for the hands, etc., M. S. Knibb.....	9,812
"Andrea Delsarto," for cigars, Landfield Bros. & Co.....	9,807
"Baby's Bath Toilet Soap," for soap, Liberty Soap Co.....	9,811
"Benj. B. Miller's Cholera Remedy," for a medicine, B. B. Miller.....	9,802
"Economy Cleaner," for a cleaning preparation, Bloss-Elmermann-Muhly Manufacturing Co.....	9,814
"Freeman's Face Powder," for face powder, W. D. Freeman.....	9,809
"King of Kings Cure," for a medicine, F. J. Dill.....	9,801
"Maltopentine Gum," for chewing gum, J. W. Morrison, Jr.....	9,815
"Non-Corrosible Tube Dry Powder Fire Extinguisher," for fire extinguishers, Non-Corrosible Tube Dry Powder Fire Extinguisher Co.....	9,820
"Oak Orchard Apples," for apples, Orleans County Canning Co.....	9,819
"Old Jamestown Ter Centenary Rye Whiskey," for whiskey, White Bros.....	9,804
"Our Baby's Bath Toilet Soap," for soap, Liberty Soap Co.....	9,810
"Prime Choice," for cigars, American Lithographic Co.....	9,805
"Kidney Pills," for kidney pills, W. T. Ballagh.....	9,799
"Rose's Medicinal Malt Whiskey," for whiskey, R. M. Rose Company.....	9,803
"Silver Star Tomatoes," for tomatoes, Orleans County Canning Co.....	9,818
"Sip Sap," for wafers, Lafayette Cracker & Confectionery Co.....	9,816
"Smoky City Cleaner," for a cleaning preparation, Sanitary Chemical Co.....	9,813
"Sweet Erin," for cigars, American Lithographic Co.....	9,806
"Tom Barrett," for cigars, H. J. Cohn.....	9,808
"Vanlike Tonic Laxative," for a medicine, T. S. Booth.....	9,800
"Vim," for a food preparation, Theo. Poehler Mercantile Co.....	9,817

PRINTS.

"American Leghorn," for a poultry journal, F. E. Murphy.....	625
"Regal Mirrorgraph," for boots and shoes, Regal Shoe Co.....	626

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, provided the name and number of the patent desired and the date be given. Address 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.

NEW BOOKS, ETC.

ASSAYING and METALLURGICAL ANALYSIS FOR THE USE OF STUDENTS, CHEMISTS, AND ASSAYERS. By E. L. Rhead and A. Humboldt Sexton, F. I. C., F. C. S. London, New York, and Bombay: Longmans, Green & Co. 8vo. Pp. x, 431.

The authors inform us that in writing the present work it was their object to provide the student, chemist or assayer with a handbook sufficiently comprehensive to include the greater part of the work likely to be required in the laboratory or assay office. Most of the improved modern methods in general use are included. The directions for work and the descriptions of processes have been made as simple as possible, to reduce the size of the book. By including the chemical reactions of the materials it has been sought to make the reasons for the procedure clear. Chemical explanations have even been given in great length. Of the three parts in which the book is divided, the first is devoted to laboratory appliances, general processes; the second considers the materials and products in which a metal's estimation is commonly required, the dry test, the methods of conducting dry assaying by fusion or otherwise, the methods of dissolving substances and preparing solutions for the determination of the metals and the method for the gravimetric, volumetric and calorimetric determination with the necessary precautions; and the third is devoted to metallurgical analysis.

ROMANCE OF NATURAL HISTORY. By P. H. Gosse. New York: New Amsterdam Book Company. 1902. Pp. 348.

As its title indicates, this book contains a poetic treatment of a scientific subject. Instead of giving statistics which are harsh and dry, the author attempts an æsthetic exposition of natural history. He does not always indicate the emotion to be elicited but he has sought to paint a series of pictures, the reflection of scenes and aspects in nature which in his mind awaken poetic interest, leaving them to do their proper work.

THE HARRINGTON AND KING PERFORATING CO.
PERFORATED METALS
OF EVERY DESCRIPTION AND FOR ALL PURPOSES
FOR SCREENS OF ALL KINDS
No. 225 NORTH UNION ST. CHICAGO, ILL. U. S. A.

"A great deal in a little space."
—The Press.

"THE FOUR-TRACK SERIES."

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

NEW YORK CENTRAL & HUDSON RIVER RAILROAD.

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 and 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.

A copy of the 52-page Illustrated Catalogue of the "Four-Track Series" will be sent free upon receipt of two-cent stamp by George H. Daniels, General Passenger Agent, New York Central & Hudson River Railroad, Grand Central Station, New York.

The Franklin Model Shop.
Experimental work for inventors; anything in metal from a single piece to a complete working model. Apparatus for colleges. Exhibition models. Introduction samples of patented articles. Special tools for making metal novelties. Inventions perfected. Drawings and designs worked out from inventors' ideas. Send for circular 9.

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




TOOLS AS A TOPIC

must be interesting to every hand-craftsman. There is a mine of information in

Montgomery & Co.'s Tool Catalogue which enumerates thousands of tools. Capital handbook of reference. Profusely illustrated. Sent by mail for 25 cents. discount sheet included.

MONTGOMERY & CO.,
105 Fulton St., New York City.



EVANS' Vacuum Cap
Will Make Hair Grow.
This appliance will massage the scalp, and force a healthy circulation. It will stop hair from falling out and restore a normal growth where live follicles exist. It is used about ten minutes each night before retiring. Price \$35.00, which will be refunded in full if it does not give satisfaction within thirty days. For full particulars address

EVANS VACUUM CAP CO.,
Fulham Bldg., St. Louis, Mo.



A. W. FABER
Manufactory Established 1761.
LEAD PENCILS, COLORED PENCILS, SLATE PENCILS, WRITING SLATES, INKS, STATIONERS RUBBER GOODS, RULERS, ARTISTS' COLORS.
78 Reade Street, New York, N. Y.
GRAND PRIZE. Highest Award, PARIS. 1900.

LEARN TO WRITE "ADS"

The field is open for ambitious men and women to enter. Salaries are large and the business fascinating. Taught Practically by Mail by the first and only school of its kind in the world. Individual instructions by Edward T. Page and Samuel Davis. Send for prospectus.

Page-Davis Co., Suite 20, 90 Wabash Ave., Chicago.



20TH CENTURY CUT RÉMOH DIAMONDS

1 Carat 20th Century Cut Remoh Diamond Ring or Stud, Solid-Gold mountings, each \$3.00 or both at \$5.00. Sent by registered mail upon receipt of price. THE FINEST IMITATIONS ON EARTH. Our magnificent catalogue fully describing them and explaining how to order, mailed to any address upon request.

NO AGENTS WANTED.
RÉMOH JEWELRY COMPANY,
434 OLIVE STREET, ST. LOUIS, MO.



Rider Agents Wanted

in each town to take orders for our new High Grade Guaranteed Bicycles.

New 1903 Models
"Bellise," complete High Grade \$8.75
"Cossack," complete High Grade \$10.75
"Siberian," a beauty \$12.75
"Neudorf," Road Racer \$14.75
no better bicycle at any price.

Any other make or model you want at one-third usual price. Choice of any standard tires and best equipment on all our bicycles. Strongest guarantee.

We SHIP ON APPROVAL C. O. D. to any one without a cent deposit and allow 10 DAYS FREE TRIAL before purchase is binding.

500 Good 2nd-hand Wheels \$5 to \$8.
Do NOT BUY a bicycle until you have written for our free catalogue with large photographic engravings and full descriptions.

MEAD CYCLE CO., Dept. 59-C, Chicago.



THE EASTERN GRANITE ROOFING CO.
IRVING BUILDING, NEW YORK.

1885
1903

ORIGINATORS OF
PERFECTED GRANITE ROOFING
WHICH HAS BEEN ADOPTED BY THE
LEADING RAILROADS, MANUFACTURERS, ARCHITECTS AND BUILDERS
AS THE STANDARD READY ROOFING.

WRITE FOR TESTIMONIALS, PHOTO PAMPHLET AND SAMPLES.

SEA GRIT
WOOL FELT
GRANITE COMPOSITION
GRANITE COMPOSITION



Magical Apparatus.
Grand Book Catalogue. Over 700 engravings, 25c. Parlor Tricks Catalogue, free. MARTINKA & CO., Mrs. A., 463 Sixth Ave., New York.

TELEGRAPHY Circular free. Wonderful automatic teacher. 5 styles. \$2 up.
Omnigraph Co., 52, 59 Cortlandt St., New York

MATCH MACHINERY.
We manufacture everything pertaining to the business. The Very Latest Process. We will furnish a manager or teach any purchaser the business.
F. W. MURPHY & BRO.,
1118 Ashland Block, Chicago, Ill., U.S.A.

F. N. Roehrich & Co. Machinery
102 FULTON STREET, NEW YORK.
Telephone No. 2440-A JOHN.
Designing, Mechanical Drawing.

Experimental & Model Work
Cir. & 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.

MODEL AND EXPERIMENTAL WORK.
Electrical and Mechanical Instruments. Small Mach'y.
EDWARD KLEINSCHMIDT, 82 W. Broadway, New York.

DRYING MACHINES. S. E. WORRELL, Hannibal, Mo.

SPECIAL MANUFACTURING, SPEC. MACHINERY, MODELS EXPERIMENTAL WORK, DIES AND STAMPING, PROMPT GLOBE MACH. & STAMPING CO., 970 HAMILTON ST. CLEVELAND, O.

Dies, Tools and Special Machines, Models and Experimental Work. General Machine Work.
FR. J. BENDER & SONS, Inc., 87 Franklin St., New York

"THIS BEATS NEW JERSEY."
Charters procured under South Dakota laws for a few dollars. Write for Corporation laws, blanks, by-laws and forms to PHILIP LAWRENCE, late Asst. Sec. of State, Huron, S. Dak. or Room K. 20th floor, 220 B'way, N. Y.

MODELS & CHICAGO MODEL WORKS
ESTABLISHED 1867. 179 E. MADISON ST. CHICAGO, ILL.
Write for catalogue of models, supplies.

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.

INVENTIONS DEVELOPED.
WALTER K. FREEMAN, M.E.
Special machinery, electrical and chemical apparatus made on short notice. Good accommodations for inventors. 403 E. 23d St., New York.

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

BUILDERS OF Special Machinery. Models. Experimental work. Inventions developed. THE FENN-SADLER MACH. CO., Hartford, Conn.

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

THE SCHWEDTLE STAMP CO.
STEEL STAMPS, LETTERS & FIGURES.
BRIDGEPORT CONN.

ICE MACHINES, Corliss Engines, Brewers' and Bottlers' Machinery. THE WILDER MFG. CO., 89 Clinton Street, Milwaukee Wis.

NAME PLATES—EMPLOYEE CHECKS
KEY TAGS, BAGGAGE C'KS & BADGES
J. ROBBINS MFG. CO., 58 KNEELAND ST.
SEND FOR CATALOGUE. BOSTON, MASS.

MODELS & EXPERIMENTAL WORK. Inventions developed. Special Machinery.
E. V. BAILLARD, Fox Bldg., Franklin Square, New York.

A SOUTHERN LOCATION
For Manufacturing, Mining, Lumbering or Farming on
SOUTHERN RAILWAY
In Alabama, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Virginia. Write for information and a copy of the Southern Field, a 16-page magazine, giving information about the South.
M. V. RICHARDS,
Land and Industrial Agent,
Washington, D. C.

I will ship to any Station in the United States for

THE CELEBRATED WILLARD STEEL RANGE \$25.00

It has six 8-inch lids; 15-gallon reservoir; large warming closet; oven 21 ins. deep, 17 ins. wide, 12 ins. high; top cooking surface, 30x36 ins.; lined throughout with Asbestos; Duplex burner for wood or coal. Guaranteed in every respect; weighs 400 lbs. Write for free descriptive circular and testimonials.
AGENTS WANTED.
WM. G. WILLARD, Dept. 112, 619-21 N. 4th Street, St. Louis, Mo.

