Founded by Mathew Carey, 1785.

HENRY CAREY BAIRD & CO. Industrial Publishers, Booksellers & Importers

S10 Walnut St. Philadelphia, Pa., U.S. A.

127 Our New and Revised Catalogue of Practical and Scientific Books, 90 pages, 8vo, and our other Catalogues and Circulars, the whole covering every branch of Science applied to the Arts, sent free and free of postage to any one in any part of the world who will furnish his address.

THE "CLIMAX"

Stereotyper and Moulding Press

combined, for making perfect Cellu-loid Stereotypes to be used in place of metal stereotypes. Also for making Rubber Stamps. Should be in use in every printing office. See Sci. Am., Dec. 38, 1893. Send for circular to THE J. F. W. DORMAN CO.

circular to

THE J. F. W. DORMAN CO.

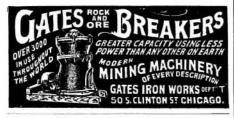
217 E. German St.,

Baltimore, Md.

Manufacturers of

Rubber Stamps, Vulcanizers, Stereotype Machinery and Supplies.

BI-SULPHIDE for use in the arts, Killing Insects in Grain, Killing Burrowing An-OF CARBON imals, etc. Manufactured by E. R. TAYLOR, Cleveland, Ohio



FUNDAMENTAL PRINCIPLES OF Business; Their Application in Practice.—A lecture delivered in the Sibley College Course by T. Dunkin Paret. A very interesting presentation of the subject, full of practical suggestions as to the conditions necessary to obtain business and professional success. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 998 and 9999. Price 10 cents each. To be had at this office and from all newsdealers.

RAPID TRANSIT WRENCH

Bar open hearth steel, drop forged and case hardened. Every werkman will appreciate this wrench, which can instantly be changed as desired. Sent by mail prepaid.

as desired. Sent by mail prepaid.

6 inch, black, \$1.75; bright, \$1.00

8 " ... \$1.10

10 " ... \$1.00; " 1.25

12 " " 1.25; " 1.50

Mechanics' Fine Tools of all kinds.

FF Send for Rlustrated Catalogue B.

Standard Tool Co., - Athol, Mass.

PROTECTION FROM LIGHTNING.-BY Alexander McAdie. A valuable paper discussing the efficiency of lightning reds and the proper method of erecting them, Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 998. Price 10 cents. To be had at this office and from all newsdealers.



MACHINISTS LATHE.

Latest Improvements
New Styles.
New Prices.
Growing rapidly in
favor.

American Watch Tool Co.,

Waltham, Mass.

Wemanufacture Tents of every variety and size, fo all conceivable purposes

We have been in the business for fifty-four years and know how to make them properly.

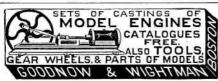
We have made Tents for the War Department of the U. S. Government for many years.
We are now quoting the lowest prices ever heard of

owing to the low price of cotton canvas.

e solicit your orders, large or small, and will send our illustrated Catalogue of Tents and Camp Furniture if you are interested, upon receipt of your address and six cents in stamps.

GEO. B. CARPENTER & CO.

202-208 S. WATER ST., CHICAGO.



THE NEWSPAPER AND THE ART of Making It.—An address delivered at Cornell University, by Charles A. Dana, editor of the New York Sun. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 995. Price 10 cents. To be had at this office and from all newsdealers.



Music Leaf Turner.

A new mechanical contrivance for turning leaves of music without using the hands. Suitable for attachment to Piano, Organ or Music Stand.

Patented July 3, 1894, No. 522,336

Patent Rights for Sale. Apply to ARKELL & DOUGLAS, 95 Broad Street, New York.

PUMPS FOR COMPRESSING OXYGEN & HYDROGEN GASES INTO CYLINDERS
BY HAND POWER PRICE \$ 15.00
SENDFOR CATALOGUE Nº 2 TO
CHAS. BESELER.
218 CENTRE ST, NEW YORK.

COMPANY, DAIMLER MOTOR

BUILDERS OF

Highest Grade Single and Twin Screw Launches.



Safest, cleanest and speediest power boat built. No smoke or smokestack, no boiler, no electricity. No steam or naphtha under pressure. Run on one pint of gasoline per horse power per hour, and are under way in less than one minute. No licensed engineer or pilot.

Also Stationary Motors.

Send for Illustrated Catalogue and Price List. OFFICE AND WORKS, "STEINWAY," LONG ISLAND CITY, N. Y.

ARTESIAN WELLS -BY PROF. E. G. Smith. A paper on artesian wells as a source of water supply. Essential geological conditions of artesian wells. Some chemical features of artesian wells supply. Centained in SCIENTIFIC AMERICAN SUPPLEMENT. No. 943. Price 16 cents. To be had at this office and from all newsdealers.

OIL WELL SUPPLY GO

Manufacturers of everything needed for ARTESIAN WELLS

for either Gas, Oil, Water, or Mineral Tests, Boilers, Engines, Pipe, Cordage, Drilling Tools, etc. Illus'd catalogue, price lists, and discount sheets on request. Pittsburg, Oil City and Bradford, Pa.
Also, 32 Cortlandt St., New York.

BELL'S ASBESTOS COMPANY, Ltd., of London, with Branches and Agencies throughout the United Kingdom, Europe and the Colonies, are open to represent good American houses for the sale of Machine Tools, Pumps, and Machinery generally. Besides having extensive show rooms, a competent staff of practical representatives and travelers are employed. Reply with full particulars to Bell's Asbestos Co., Ltd., Southwark, London.

SINTZ GAS ENGINE CO.

GRAND RAPIDS, MICH.,
U. S. A.

Manufacturers of the Sintz Stationary and Marine Gas and
Gasoline Engines. Especially
adapted for Boats and Electric
Lighting. Runs with manufactured or natural gas—Boats and
launches. Prices within the reach
of all. Especially
Mention this paper.

WELL DRILLING MACHINERY MANUFACTURED BY WILLIAMS BROTHERS. ITHACA, N.Y.

MOUNTED OR ON SILLS, FOR DEEP OR SHALLOW WELLS, WITH STEAM OR HORSE POWER
SEND FOR CATALOGUE
FADDRESS WILLIAMS BROS. STHACA, N. &

ENGINES.

1½ to 75 horse power. For Propelling Boats of all kinds. Cheapest Fuel, Absolute Safety, No Licensed Engineer, Simple Construction, Hundreds in Successful Use.

Write for illustrated catalogue.

GLOBE GAS ENGINE CO.,
Merion Avenue & 49th Street, Philadelphia, Pa.



SUPERIOR TO COTTON WASTE • RAW SILK MACHINERY WIPERS

AMERICAN SILK MFG. CO. 313 Walnut Street, Philadelphia, Pa. OLDS GASOLINE ENGINES

,..... 200 with best results, is why we lead to-day. Ten Years on the Market.

P. F. OLDS & SON, Box 218, Lansing, Mich.





Our facilities are the Best in the World for the Production of the Finest Possible Results. Every Machine Fully Guaranteed.

21 lb. Scorcher, = = = \$85.00 = = = 75.00 Ladies' 22 lb.,

INDIANA BICYCLE CO., INDIANAPOLIS, IND., U. S. A.



Catalogue Free

General of local Agents. \$75
Ladies or gents. Agents. \$75
a week. Exclusive territory. The
Rapid Blab Washer. Washes all the
dishes for a family in one minute.
Washes, rinses and dries them
without wetting the hands. You
push the button, the machine does
the rest. Bright, polished dishes,
and cheerful wives. No scalded
fingers, nosoiled hands or clothing.
No broken dishes, no muss. Cheap,
durable, warranted. Circular free.
Clock No. 12. Columbus. Qu.

W. P. HARRISON & CO., Clerk No. 12, Columbus, O. WORCESTER POLYTECHNIC INSTITUTE,

Are Warranted the Highest of all

World, Regardless of Price.

High = Grade Machines Built in the

WORCESIER POLITICITIES.

Four years' courses in Civil, Mechanical, Electrical Engineering and Chemistry. New and extensive laboratories and workshops, thoroughly equipped. Expenses low. For catalogue and information address.

T. C. MENDENHALL, President.





with Ball bearing turntable. Galvanized Steel
Mills and Towers.
Your address calls for
half-tone engravings.
WILLIAMS MFG. CO.
Kalamazoo, Mich.
16 Murray St., New Yerk.
36 So. Market St., - Boston.

Experimental & Model Work E. V. BAILLARD, 106 Liberty Street, N. Y.

THE ELECTRIC LAUNCH $oldsymbol{\mathcal{C}}$ 0. OFFICE AND WORKS: 186 STREET MORRIS HEICHTS, NEW YORK CITY.

THE HYPNOSCOPE for physicians, dentists, in-the occult, proves hypnotization possible in all cases. 286 page book on hypnotism, etc., \$2. 109 page pamphlet, 10c, NATIONAL INST., 321 Spring St., S.3., Los Angeles, Cal.

BUSHNELL'S PERFECT LETTER COPYING BOOKS



Make perfect copies of letters with ordinary office ink.
No press required. Becks reli
upto make the copy. Indersed by leading men everywhere.
Over one hundred thousand
books in use. Indispensable to
the traveler and for private
use. Sample sheet, descriptive
circulars and prices sent free.
Alvah Bushnell.
403 Chestnut St., Philadelphia, Pa.

THE "MUNSON" TYPEWRITER

This machine is an "evolution," the outgrowth of years of experience and the best results of scientific work. Its principles appeal at once to the educated mechanic. It is Light. Small. Compact. Easily operated, with Universal Key Board. INTERCHANGEABLE STEEL TYPE WHEEL,

durable and easily kept in order. 30 keys, 90 characters. Weight, with carrycase, 16 pounds. Special wheels for different languages.

Highest Medal Awarded, Word's Fair, Chicago, 1893. Send for circular to The Munson Typewriter Co., 171 E. Division Street, Chicago, Ill., U. S. A.

PROPOSALS.

PROPOSALS FOR ERECTION OF MEMORIAL Hall, West Point, N. Y.—Gice of Post Quartermaster, West Point, N. Y., April 4, 1835.—Sealed proposals in triplicate will be received at this office until noon WEDNESDAY, May 15, 1835, for the construction of a Memorial Hall. Plans can be seen and forms and specifications obtained at this office or at the office of Messrs. McKim, Mead and White, Architects, 180 Fifth Avenue, New York City. The right is reserved to reject any and all proposals. J. B. BELLINGER, Captain and A. Q. M., U. S. Army.

MATCH * MACHINERY.

Latest improved. Complete plants furnished. JOS. C. DONNELLY, 1268 Buttonwood Street, Philadelphia, Pa.

Reece's Patent Hand Bolt

Edw. J. Reece, Manuf.,

Cutter or Screw Plate.

Screw Cutting Tools. Greenfield Mass.

ACETYLENE. THE COMMERCIAL Synthesis of Illuminating Hydrocarbons.—A paper by Prof. Vivian B. Lewes, read before the London Society of Arts. The production of acetylene from calic carbide obtained by means of the electric furnace, the light-giving value of this hydrocarbon, its value as a stepping stone to the synthesis of other hydrocarbons, and its commercial possibilities. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 998. Price 10 cents. To be had at this office and from all newsdealers.



POSSIBILITY OF LIFE IN OTHER Worlds.—A most interesting discussion of this much debated question by the great astronomer, Sir Robert Ball. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 992. Price 10 cents. To be had at this office and from all newsdealers.

WANTED.—A second-hand No. 1 Automatic Screw Co.'s make; must be in good condition. Reply to A. B., Box 773, New York.



WANTED. The owners of a well equipped Foundry minutes of New York, wish to enter into negotiations for the manufacture of Specialties; also for their sale, if desired.

Address or call 49 Wall St., Room 20, New York City.



The United Autographic Register Co., 148-154 Monroe St. Chicago REGISTERS LEASED at a cost of less than 2 cents per day.

OR SOLD at from \$15 to \$50.

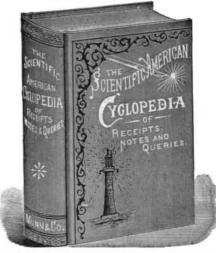
52000 in use. Made in 25 styles. Send for Circulars

A NEW PIPE WRENCH

Grips quickly and firmly, GALVANIZED as well as other pipe, and will not Crush it. Won't lock on pipe. Does not mar a nut or highly polished fittings. Other features. All dealers.

Samuel Hall's Son, 229 West 10th St., New York.

A Valuable Book



12,500 Receipts. 708 Pages. Price \$5. Bound in Sheep, \$6. Half-Morocco, \$6.50.

This splendid work contains a careful compilation of the most useful Receipts and Replies given in the Notes and Queries of correspondents as published in the Sci-entific American during the past fifty years; together with many valuable and important additions.

Over Twelve Thousand selected Receipts are here collected; nearly every branch of the useful arcs being represented. It is by far the most comprehensive volume of the kind ever placed before the public.

The work may be regarded as the product of the stud-ies and practical experience of the ablest chemists and workers in all parts of the world; the information given being of the highest value, arranged and condensed in concise form convenent for ready use.

Almost every inquiry that can be thought of, relating to formulæ used in the various manufacturing industries, will here be found answered.

Instructions for working many different processes in the arts are given. These who are engaged in any branch of industry probably will find in this book much that is of practical value in their respective callings.

Those who are in search of independent business or employment, relating to the home manufacture of simple articles, will find in it hundreds of most excellent suggestions.

Send for Descriptive Circular. MUNN & CO., Publishers,

SCIENTIFIC AMERICAN OFFICE, 361 Broadway, New York.