



LOZIER GAS ENGINES LAUNCHES

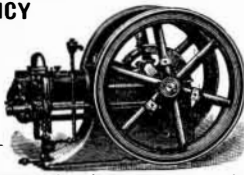
Three handsomest and most elaborate catalogues ever published sent free on receipt of five stamps for mailing.

THE LOZIER MOTOR CO., 26 Water Street, PLATTSBURGH, N. Y.

HIGHEST EFFICIENCY attained in the

STOVER GASOLINE ENGINE

The best is always cheaper. Write for prices.



STOVER ENGINE WORKS, FREEPORT, ILL.

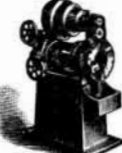
OUR MARINE MOTORS ARE GUARANTEED TO GIVE SATISFACTION.

Durable in Construction and Easy and Safe in Operation. Send for Catalogue and investigate our claims. TRUSCOTT BOAT MFG. CO., St. Joseph, Mich., U. S. A.



For Heavy Continuous Work

every machine shop will commend our Power Pipe Threading and Cutting Machine. Gears 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. Send for Catalogue.



THE MERRELL MFG. CO., 501 Curtiss Street, TOLEDO, OHIO.

THE MIETZ & WEISS KEROSENE and GAS Engine

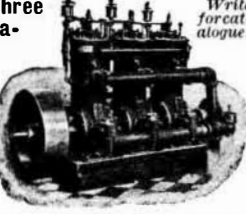
burns KEROSENE cheaper and safer than gasoline. Automatic, simple, reliable. No electric battery or flame used. Perfect regulation. Belted or directly coupled to dynamo for electric lighting, charging storage batteries, pumping and all power purposes. Send for Catalogue.



MIETZ & WEISS, 128-128th Street, New York, Mark & Co., London, Hamburg, Paris

The "Wolverine" Three Cylinder Gasoline Engine.

The only reverse and self-starting gasoline engine on the market. Lightest engine for the power built. Practically no vibration. Absolutely safe. Single, double and triple marine and stationary motors from 3/4 to 30 H. P. Write for catalogue.



WOLVERINE MOTOR WORKS, Grand Rapids, Mich.

ROTARY ENGINES.—ARTICLES ON this type of engine, giving many details and illustrations are contained in SUPPLEMENT Nos. 1158, 1186, 1193 and 1309. Price 10 cents each. For sale by Mann & Co. and all newsdealers.

ARTESIAN Wells, Oil and Gas Wells drilled by contract to any depth from 50 to 300 feet. We also manufacture and furnish everything required to drill and complete same. Portable Horse Power and Mounted Steam Drilling Machines for 100 to 1200 feet. Write us stating exactly what is required and send for illustrated catalogue. Address

PIERCE WELL ENGINEERING AND SUPPLY CO., 136 LIBERTY STREET, NEW YORK, U. S. A.



GASOLINE MOTOR CASTINGS

For MARINE, VEHICLE and BICYCLE MOTORS, with Working Drawings.

LOWELL MODEL CO., 22 Wiggin St., Lowell, Mass.

STANDARD WIRING

for Electric Light and Power, as adopted by the Fire Underwriters of the United States, by H. C. CUSHING, JR., A. I. E. E., Electrical Engineer and Inspector; it is used by over 30,000 Electrical Engineers, Central 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.

Special Machinery, Dies and Tools. Sub Press Dies

For Punching and Forming Sheet Metal, A SPECIALTY. GEO. M. CRISWOLD, New Works, Griswold Building, 33-35-37 Union St., NEW HAVEN, CONN.

SAVE YOUR FUEL

You will find our GASOLINE Hoisting Engines a great saving over steam and a perfect economical boon where wood, coal or water are scarce and high priced. Both friction and gear hoist from 6 to 50 H. P. for mines, quarries, docks etc. Every machine fully guaranteed. Send for free catalogue and state size of engine wanted. Weber Gas & Gasoline Engine Co., P. O. Box 1114-a, Kansas City, Mo.

Table listing various items and their prices, including folding boxes, fuel supply apparatus, furnaces, gas engines, and machinery.

GRAND PRIZE, PARIS, 1900. HIGHEST AWARD POSSIBLE.

THE SMITH PREMIER TYPEWRITER

Occupies an Imperishable Position in the BUSINESS WORLD.

Unquestionable Superior Merit

Annually adds thousands of names to the long list of Smith Premier users, representing every line of trade and every profession.

ILLUSTRATED CATALOGUE FREE.

The Smith Premier Typewriter Co., SYRACUSE, N. Y., U. S. A.



Save Money by using the Remington Typewriter. Typewriter users testify that it gives a better return for the investment than any other writing machine.

WYCKOFF, SEAMANS & BENEDICT, 327 Broadway, New York.

The Typewriter Exchange

- List of typewriter exchange locations: 1 1/2 Barclay St., NEW YORK; 124 La Salle St., CHICAGO; 38 Bromfield St., BOSTON; 817 Wyandotte St., KANSAS CITY, MO.; 209 North 9th St., ST. LOUIS, MO.; 432 Diamond St., PITTSBURGH, PA.; 3 West Baltimore St., BALTIMORE, MD.; 536 California St., SAN FRANCISCO, CAL.

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. 3918, 1014, 1012, 1014, 1015, 1016, 1022, 1034, 1038, 1057, 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.

Telephones

for Interior, Short Line, Intercommunicating and Hotel Work. Write us for prices, catalogue, etc., with testimonials and references. Estimates cheerfully furnished. Agents wanted. THE SIMPLEX INTERIOR TELEPHONE CO., 431 Main St., Cincinnati, Ohio.

FOR GUNSMITHS, TOOL MAKERS, EXPERIMENTAL & REPAIR WORK, ETC. From 9-in. to 13-in. swing. Arranged for Steam or Foot Power, Velocipede or Stand-up Treadle. W. F. & John Barnes Co., 1999 Ruby St., Rockford, Ill.

UPRIGHT DRILLS

Complete line, ranging from Light Friction Disk Drill to 42" Back Geared Self Feed. Latest improvements. Up-to-date in every respect. Send for Catalogue. Established 1872. W. F. & John Barnes Co., 1999 Ruby St., Rockford, Ill.

I PAY THE FREIGHT

WILL SHIP C. O. D. to any Station in the U. S. for \$25

THE "WILLARD STEEL RANGE"

Has 6 8-in. lids, oven 17x12x21, 15 gallon reservoir, large warming closet, duplex grate, burns wood or coal, weighs 400 lbs., lined throughout with asbestos. GUARANTEED TO BE AS REPRESENTED. Write for free descriptive circulars and testimonials from parties in your section who are using one. WM. G. WILLARD, 619 North 4th Street, ST. LOUIS, MO.

Bausch & Lomb Stereo Binocular. Best in the world. You will find it profitable to read our Binocular Booklet before you buy any kind of a glass, free at your dealers or by mail.

THE JOHNSON ROTARY PUMP. Simple construction, positive in action, easy and quiet in operation. Especially adapted to pumping soap, oil, sugar, lard, glucose, acids, starch, glue, varnish, corn and water, malt, etc. Large sizes for irrigation. Made as a belt or steam pump, or combination, or operated by electric motor or gasoline engine. Manufactured by DAVIS JOHNSON CO., Station V, CHICAGO, ILL., 95 Liberty St., New York City.

ADDITIONAL CAPITAL SUPPLIED

Charters Secured in any State. Stocks and Bonds Underwritten or Sold under guarantee and on commission. Good Inventions Marketed. Cash furnished for any good enterprise. DANIELS & COMPANY, Bankers, 6 Wall Street, New York. Also London, Philadelphia, Boston, San Francisco.

10 DAYS' TRIAL

DAUS' TIP TOP

written original and 50 copies from typewriter. It takes an expert to tell the duplicates from the original. FELIX DAUS DUPLICATOR CO., 5 Hanover St., New York

TELEPHONES SOLD OUTRIGHT.

All kinds of Telephone Apparatus. Absolutely warranted. Switchboards for large or small exchange. Kellogg Switchboard & Supply Co., 243 So. Green Street, Chicago, Ill. Our Specialty: Knock-Down Boats of any description. AMERICAN BOAT & MACHINE CO., ROW, SAIL AND PLEASURE BOATS, Marine Station, ST. LOUIS, MO.

Perfection Air Mattresses. FOR - CAMP - YACHT - HOME - HOSPITAL. NON-ABSORBENT, HYGIENIC, ODORLESS. When deflated can be rolled into small package for storage or transportation. Send for Illustrated Catalogue with Prices. Mechanical Fabric Co., PROVIDENCE, R. I.

ELEVATING - CONVEYING POWER TRANSMISSION MACH'Y COAL WASHING MACHINERY. Coal Mining Machines. ELECTRIC MINE LOCOMOTIVES. POWER COAL DRILLS. COAL HANDLING MACHINERY. The JEFFREY MFG. CO., U. S. A.

PERFORATED METAL OF EVERY DESCRIPTION AND FOR ALL USES. THE HARRINGTON & KING PERFORATING CO., 225 N. UNION ST., CHICAGO, ILL., U. S. A.

The Search for Work

The man who can do something better than anyone else doesn't search for work. Employers search for him. We teach the theory of engineering and the trades to men already at work. Thousands of our students have secured a

Salary-Raising Education

In Mechanical, Electrical, Steam, Civil or Mining Engineering, Chemistry, Architecture, Plumbing, English Branches. When writing state subject in which interested.

International Correspondence Schools, Box 942, Scranton, 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.

ROSE POLYTECHNIC INSTITUTE A College of Engineering. Mechanical, Electrical, Civil Engineering; Chemical Courses; Architecture. Extensive shops. Modernly equipped laboratories in all departments. Expenses low. 19th year. For catalog, address C. L. MILES, President, Terre Haute, Ind.

The Bliss Electrical School

offers a Practical Course in Applied Electricity, complete in one year. Opens September 24th. Catalog on application to L. D. BLISS, Principal, 612 12th Street, N. W., Washington, D. C.

FREE SCHOLARSHIPS. Improve your spare time. Get an education for which employers are willing to pay and pay well. To introduce the high standard of the American School of Correspondence, the Trustees will award a limited number of Free Scholarships in Electrical, Mechanical, Stationary, Locomotive, Marine ENGINEERING; Heating, Ventilation and Plumbing; and Mechanical Drawing, to properly recommended applicants.

Learn to Write "Ads." Our employed graduates are making good salaries. More than they ever commanded in other positions. Taught thoroughly by mail. Ad. writing is not genius, but an easily acquired business. Literature on request. Page-Davis Advertising School, Suite 20, 167 Adams St., Chicago.

Better than Red Lead

For making joints in gas pipes, steam pipes, water pipes, compressed air pipes, and putting around gaskets and flanges, caps, headers, bolts and nuts, nothing excels

Dixon's Pipe-Joint Compound. Joints can be easily taken apart after years of use even when the pipes are rusted. Manufacturers, machinists, engineers, contractors and gas companies freely use and endorse it. Booklet free.

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

ACETYLENE BRILLIANCE

Such as our Generator produces, is almost sun-light, surpassing any other known artificial light. The flame has neither smoke nor smell; and yields 25 candle-power from each 1/2 ft. per hour burner.

The COLT Carbide Feed Generator. Is based on the correct principles; it is safe, it is simple, it is economical; endorsed by the Pennsylvania State authorities; approved by scientists. Send for literature and our price list. \$15 to \$1000. 4 to 1000 lights.

THE J. B. COLT COMPANY 21 Barclay Street, Dept. S, New York. PHILADELPHIA, BOSTON, CHICAGO, Criterion Stereopticons. Acetylene Search Lights.

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.

THE NEW BRISTOL COUNTER



Registers an accurate account of work done on printing presses, gram talies, weighing, measuring and other automatic machines. Counts up to 1,000,000 and repeats automatically. Simple, accurate, durable. Special counters to order. Send for circular. C. J. ROOT, Bristol, Conn., U. S. A.

Table listing various mechanical parts and their prices, such as Waffle iron, Washboiler, Washer, Washing and bleaching compound, etc.

DESIGNS. Table listing various designs and their prices, such as Badge, E. L. Logee, Boiler brace, J. J. O'Brien, Box, paper, P. B. Myers, etc.

TRADE MARKS. Table listing various trade marks and their prices, such as Ale, beer and porter, Frank Jones Brewing Co., Ammunition, certain named, Peters Cart-ridge Co., etc.

LABELS. Table listing various labels and their prices, such as "Anti Trust Axe," for axes, J. H. Mann, "C. A. D. Cough and Lung Remedy," for a medicine, F. S. Walker, etc.

PRINTS. Table listing various prints and their prices, such as "Broadway at Midnight," for cigars, S. W. Hoke, "For the Land's Sake," for fertilizers, Bowker, etc.

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.

GENTLEMEN: - The GOODFORM Trousers Hanger is made of fine, specially rolled spring steel, heavily nickel-plated on copper. The parts in contact with the fabric are wide and the edges rounded. It operates automatically. "You press the button," and the keeper does the rest. Sample by mail, 35c.; 3 for \$1.00; 6 and a closet loop, \$2.00. All express prepaid. This is what you want if you want the best. Sold by Hardware and Furnishing stores, or prepaid for the price. Remit to the maker. CHICAGO FORM CO., Dept. 76, 124 La Salle St., CHICAGO

EXERCISE AT HOME with a "NEW" PUNCHING BAG AND FRAME. Noiseless. Weighs 7 lbs. complete. Requires wall space only 6 inches square. Can be put up on wall, door or window casing. Frame is beautifully nickle-plated. An ornament to any room. This bag is a wonderful muscle developer. Endorsed by physicians and athletes. N.B.-The bag is made of finest imported leather, guaranteed to be the equal of any \$6 bag on the market. Price of bag and frame complete \$5.95, delivered. H. D. CRIPPEN, Room 880, 52 Broadway, New York.

DRIVING A PLEASURE when holding your horse with an IMPERIAL BIT, giving 100 per cent more leverage than any other. Any lady can control the most vicious horse. Positive cure for tongue-lolling. Will prevent side pulling and driving on one line. Sent to any address, postpaid, upon receipt of price. In X.C. plate of imitation rubber, \$1. In fine nickel plate, \$2. Imperial Bit and Snap Co., 14th Street, Kalamazoo, Wis.

EUROPEAN PATENTS FOR SALE. I own the European rights—France, Germany and Belgium—of a useful and cheap kitchen utensil that will sell at sight. It is a Pot and Pan Scraper, so constructed that it can be handled at either end, for scraping out pots, pans, cupboards, spoons, etc. whether of square or round shape. Its edges are useful for the scraping of flat surfaces. Made in one solid piece of indestructible steel. Those interested please write to CHAS. A. SUTTON, Pitkin, Colorado.

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, 425 F St., Washington, D. C.

"HOT BATH IN ONE MINUTE" FOR ONE CENT. Moses, by the aid of a rod, struck a rock and got cold water. You by the aid of a Humphrey Crescent Heater strike a match and get hot water. They require no complicated piping, simply connect with water and gas in your bathroom. Guaranteed. Write for Booklet. HUMPHREY MFG. & PLATING CO., Kalamazoo, Mich.

THE Topophone, \$25 PREVENTS MARINE DISASTERS IN FOGS. See Sci. Am., March 30, 1901, or write for Circular to J. B. COLT CO., Room 1, 21 Barclay St., New York.

ICE MACHINES, Corliss Engines, Brewers' and Bottlers' Machinery, THE VILTER MFG. CO., 899 Clinton Street, Milwaukee, Wis. SHORTHAND BY MAIL. Pioneer home course. Catalogue and First Lesson Free. Potts Shorthand College, Box 33, Williamsport, Pa. 1/2 H. P. GAS ENGINE CASTINGS Materials and Blue Prints. Write for Catalogue 9. PARSELL & WOOD, 129-131 W. 31st Street, New York.

STEEL CYLINDER TYPES. 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.

D'AMOUR & LITTLEDALE MACHINE CO. 130 WORTH ST. NEW YORK. PATTERN AND MODEL MAKERS.

STATLER'S American HOTEL The Largest in the World. Send for map of city and Exposition grounds, also folder telling how to SAVE MONEY and secure accommodations. F. C. STATLER, Prop., Statler's Hotel, at Exposition. Buffalo, N. Y. Statler's Restaurant, Ellicott Sq.

GEARS, UNION MODELWORKS. CATALOGUE FREE. MODEL SUPPLIES. 109 5/8 CLARK ST. CHICAGO.

ASK FOR AND INSIST ON getting the quick open and quick shut 20th CENTURY UMBRELLA. It will save your gloves, fingers and temper. 20th Century Umbrella Runner. Open with a Push. A. H. BAMBERGER, 381 Broadway, New York. Close with a Pull.

D. L. HOLDEN REAL ESTATE TRUST BLDG PHILA. PA. SOLE MANUFACTURER. REGEALD ICE MACHINES. SEE FIRST PAGE SCIENTIFIC AMERICAN SEPT. 2, 1899.

BACKUS GAS AND GASOLINE ENGINE Simple, Economical, Durable. Suitable for all kinds of work. Backus Water Motor, cheapest power known. Write for circular and prices. BACKUS WATER MOTOR CO., Newark, N. J., U. S. A.

FOR SALE A CHILD'S KNIFE BLADE PATENTED April 23, 1901. To the highest Cash value, within thirty days from date. All communications addressed to patentee MRS. MARY A. HERR, Cape Girardeau, Mo. May 18, 1901.

WANTED. An experienced party to assist in the introduction of the Webster Air Brake Attachment. Patented in seven countries. Salary or commission. WEBSTER AIR BRAKE ATTACHMENT CO., P. O. BOX 1466, MOBILE, ALA.

AGENTS \$200 to \$500 MAKE FROM a month handling the COMING LIGHT. Brighter than electricity, cheaper than kerosene. Thousands of testimonials from people using them over a year. Latest improvements. Endorsed by Ins. Co.'s. Largest factory in U.S. 41 styles. Lowest prices. Retail \$4 up. Sample lamp half price. We want one agent, merchant or individual, in every town. Illustrated catalogue free. STANDARD GAS LAMP CO., 118-120 Michigan Street, Chicago.

"THE HOGGSON" TIME STAMPS. CORRECTLY TIME Every Act, Operation or Transaction Write for Cat. 267 W. 17th St. N. Y. Price \$12.00

LYON & HEALY'S Own Make BRASS BAND INSTRUMENTS. Indorsed by the great Jules Levy as the best in the world. Big Catalog, 400 illustrations, FREE. Positively the lowest prices on Band Instruments, Uniforms and Supplies of all kinds. Also contains Music and Instructions for New Bands. Lyon & Healy, Manufacturers, 38 Adams St., Chicago. Lyon & Healy are the largest music house in the world—Editor.

What Do You Want To Buy? We can tell you where to buy anything you want. Write us for the addresses of manufacturers in ANY line of business. Novelties, Special Tools, Machinery, Equipments, New Patent LABOR SAVING DEVICES. MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, 361 BROADWAY, NEW YORK.