



One-third of a Century Standard of the World

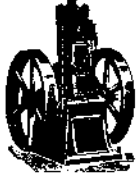
A delicious beautifier, preserver and cleanser of the teeth; makes the breath sweet and the gums less tender.

The Buckeye Air-Cooled Engines

are fully warranted as to workmanship and material. The Oscar Lear Automobile Co., COLUMBUS, OHIO.

An Ideal Electric Light Engine

because of its simplicity, safety and reliability under all conditions; because it is built on tried principles after years of experiments in the Universal Kerosene Engine.



UNIVERSAL KEROSENE ENGINE CO. 6, 8 and 10 First St., New York

NOW READY

Bound Volume OF THE

SCIENTIFIC AMERICAN BUILDING MONTHLY

VOLUME XXXIX

January to June, 1905

277 Illustrations 6 Covers in Tint 132 Pages

PRICE OF SEMI-ANNUAL VOLUME \$2.00, POSTAGE PAID

SPECIAL FEATURES

Notable American Houses. By Barr Ferreo.

Mrs. A. Cass Canfield's House, Roslyn, L. I., N. Y. The House of Ogden Mills, Esq., Staatsburg, N. Y. "Bellevue," the Estate of Girard Foster, Esq., Lenex, Mass.

Helps to Home Building. What the House Builder should know. Difficulties to Overcome. The Plan. The Structure. Designing the House. The Rooms and Their Uses.

Departments. Roads, Landscape Architecture, Ventilation, New Building Patents, Publishers' Department, The Automobile, The Plumber Exhibitions, Correspondence, Fire Protection, Civic Betterment, Unknown Buildings, The House, Monthly Comment, The Household, The Garden, Fifty Suggestions for the House, The House Interior, New Books, Sanitation.

The Building Monthly aims to help its readers to better building. The illustrations reproduce homes and other structures of the highest grade and of varying costs. It seeks to interest the architect, the house owner, the real estate promoter, the home maker, and the builder.

Volume XXXIX, January to June, 1905, price \$2.00. Six covers in tint and three hundred and eight illustrations. A rich conspectus of interesting notable houses. Many fine estates are treated with ample fullness.

FOR SALE BY MUNN & COMPANY No. 361 Broadway, New York City AND ALL NEWSDEALERS

flame is desirable, as in fire under a steam boiler, it is a common practice to wet the coal before firing it, for this reason. These facts will probably help you to explain the phenomenon you have observed.

(9663) W. G. M. asks: Will you please inform me through your Notes and Queries whether putting zinc in a stove affects in any way the formation of creosote in the chimney; if so, what is the theory? It is popularly said here that the zinc will prevent the evil.

NEW BOOKS, ETC.

THE SECRET OF THE CIRCLE AND THE SQUARE. By J. C. Willmon. Los Angeles: The McBride Press, 1905. 12mo.; pp. 30.

In this small book the author endeavors to demonstrate the possibility of constructing a straight line equal to any given arc of a circle, and also of constructing a square equal in area to any circle, and vice versa, together with solutions of similar geometrical problems.

THE SPINNING AND TWISTING OF LONG VEGETABLE FIBERS. By Herbert R. Carter. Philadelphia: J. B. Lippincott Company, 1904. 8vo.; pp. 360; 161 illustrations. Price, \$5.

This book is a practical guide for the technical student and man engaged in the business, to the spinning of the long vegetable fibers, such as flax, hemp, jute, tow, and ramie. The same general principles underlie the preparing and spinning of all these long vegetable fibers, and so it is merely the details of the various processes which differ somewhat on account of the coarseness or special nature of the different fibers.

REFUSE DISPOSAL AND POWER PRODUCTION. By W. F. Goodrich. New York: E. P. Dutton & Co., 1905. 8vo.; pp. 384. Price, \$5 net.

The sanitary destruction of garbage is one of the great problems of all large cities. The author of the present volume has gone into this subject very thoroughly, and, after describing the usual methods of disposing of refuse by dumping it at sea or on land, he goes into the modern and more scientific methods of disposal by burning it under a steam boiler for power-generation purposes.

LES DECHETS INDUSTRIELS. RÉCUPÉRATION—UTILISATION. By Paul Razous. Paris: Vve. Ch. Dunod, 1905. 8vo.; pp. 379. Price, \$4.20.

Much progress has been made in the last few years in the utilization of the waste products and residues of large industrial plants. In the present volume, M. Razous has shown this progress, and indicated what may be done with waste products in various industries.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending

June 6, 1905

AND EACH BEARING THAT DATE

[See note at end of list about copies of these patents.]

- Adding machine, Wolfe & Merten..... 791,849
Adding machine recording mechanism, W. H. Pike, Jr..... 791,941
Air brake slack adjusting device, L. T. Block..... 791,605
Anchor, ship's, R. Fowler..... 791,893
Animal catching device, W. McEnderree..... 791,933
Annealing box, W. E. Harris..... 791,901
Audiophone instruction apparatus or set, H. G. Pape..... 791,573
Axle box, car, W. W. Wallace..... 791,518
Axle gage, car, G. Rieinger..... 791,578
Axle lubricator, W. A. Jameson..... 791,697
Bag filling device, E. Kaiser..... 791,472
Bags or analogous packages, fastening attachment for, W. H. Coleman..... 791,609

THE IDEAL SIGHT RESTORER Is Your Sight Failing? All refractive errors, muscular trouble & chronic diseases of the Eye cured by scientific MASSAGE.

The Wizard Engine With Pump OLDS ENGINES Economical Power

LUFKIN TAPES AND RULES ARE THE BEST. For sale everywhere. Send for Catalog No. 16. LUFKIN RULE CO. Saginaw, Mich., U. S. A.

THE EUREKA CLIP The most useful article ever invented for the purpose. Indispensable to Lawyers, Editors, Students, Bankers, Insurance Companies and business men generally.

ARTESIAN Wells, Oil and Gas Wells drilled by contract to any depth from 50 to 3000 feet. We also manufacture and furnish everything required to drill and complete same.

You Can Earn from \$3000 to \$5000 A YEAR IN THE REAL ESTATE BUSINESS. No other business yields the profits that are made every year in the real estate business.

KLIP-KLIP BEST EVER MADE A perfect manicure Quick, easy, simple and strong. The Original, made in German silver, 25c.

STA-RITE Ignition Plugs stay right the longest. 36 sizes. Porcelain, \$1.50, Mica, \$1.75, postpaid, with handy wrench, motor accessories.

Catch Fish by Electricity \$1.00 complete OUTFIT. Any kind of fish may be caught by this new method at will. No State in the Union has passed any law against this practice.

PATENT OFFICE EXAMINERS WANTED

The position of Assistant Examiner in the Patent Office is the most attractive situation to be secured in the Government service. The entrance salary is \$1,200 a year and promotions are rapid, with salaries reaching \$2,500.

A POSITION AND A PROFESSION Clerks or Examiners in the Patent Office have opportunity to attend one of three of the best regular law schools in the country. All have evening sessions exclusively.

WHO SHOULD PREPARE The examination is open to all over twenty years old, but an applicant should be well rounded in mathematics, drafting, chemistry, and German or French.

Telescope and Optical Mirror Making

In SCIENTIFIC AMERICAN SUPPLEMENTS, 1512, 1513, 1514, 1515, 1516, and 1517, Professor Ritchey of Yerkes Observatory has presented a most exhaustive account of the construction of a modern reflecting telescope, and the making and testing of optical mirrors.

WILLIAMS' SHAVING SOAP

"The only Real Shaving Soap"

Williams' Shaving Sticks, Shaving Tablets, Toilet Waters, Talcum Powder, Jersey Cream Toilet Soap, etc., sold everywhere.

Write for booklet "How to Shave"

THE J. B. WILLIAMS CO.
Glastonbury, Conn.

U. S. A. LIQUID PISTOL

Nickel-plated 5 in. long Pat'd

Will stop the most vicious dog (or man) without permanent injury. Perfectly safe to carry without danger of leakage. Fires and recharges by pulling the trigger. Loads from any liquid. No cartridges require. Over 10 shots in one loading. All dealers, or by mail. 50c. Rubber-covered holster 5c. extra.

PARKER, STEARNS & SUTTON, 226 South St., New York

TOOLS FOR MECHANICS.

Send for Free Catalogue No. 16 B.

The L. S. Starrett Co., Athol, Mass., U. S. A.

THE EJECTOR MUFFLER

The Greatest Advance in the Gasoline Age

For particulars, write to The Motor and Manuf'g Works Co., Ithaca, N. Y.

GLENWOOD DANSVILLE, N. Y.

EPILEPSY

Facilities and Location Unsurpassed. Rates Moderate.

DR. J. W. WHERRY, Medical Superintendent.
DR. W. M. P. SPRATLING, Chief Consultant.

For brochure, terms, etc., address the management.
The Health Resort Co., Box 3027 Rochester, N. Y.

Balcony, portable, F. C. Hotchkiss.....	791,786
Baling press, J. B. Savell.....	791,948
Balls, apparatus for casting playing, F. H. Richards.....	791,946
Balls, apparatus for making golf, F. H. Richards.....	791,648
Balls, apparatus for molding playing, F. H. Richards.....	791,649
Barber's chair, R. Stitts.....	791,588
Barber's use, sterilizer for, E. O. Bauer.....	791,862
Barge, ore or coal carrying, T. Kiddle.....	791,916
Beating muller for Huntington mills, roller, H. Eggers.....	791,680
Bed and couch, combined, D. T. Owen.....	791,721
Bed and couch, combined folding, D. T. Owen.....	791,720
Bed, folding, D. T. Owen.....	791,717
Bed, folding, W. A. Arnold.....	791,857
Bedstead, metal, J. F. Brown.....	791,976
Beehive, F. Danzenbaker.....	791,754
Beet tapper, L. Gettelmann.....	791,687
Bicycle support, M. R. R. Jones.....	791,914
Bitumen, etc., apparatus for spreading, A. E. Schutte.....	791,726
Bituminous compositions or pitches, manufacture of, F. J. Warren.....	791,960
Block, See Moisture proof block.	
Block system, electromagnetic, G. Thompson.....	791,594
Boat, M. M. Lewis.....	791,630
Bobbin casting machine, C. L. Bailey.....	791,745
Boiler, J. Rodriguez y Penell.....	791,947
Boiler tube cutter, A. A. Hendrickson.....	791,784
Bolster, E. D. Brenner.....	791,449
Bolt turning machine, C. K. Lassiter.....	791,818
Book finisher's stand, V. Kling.....	791,798
Book, manifold, A. Devison.....	791,706
Book, mileage exchange, C. B. Blythe.....	791,868
Book, stubless check and columnar cash, A. M. Benedic.....	791,865
Boot or shoe wear protector, W. H. Colbath.....	791,539
Bottle cleaner, L. Gettelmann.....	791,497
Bottle neck finishing tool, Ebmether & Langheid.....	791,459
Bottle, non-refillable, R. J. Bartley.....	791,444
Bottle, non-refillable, W. I. Wolf.....	791,850
Bottle, non-refillable, A. W. Welkert.....	791,962
Bottle, siphon, D. Landau.....	791,628
Bottle washing machine shot cup, E. A. Lufkin.....	791,634
Bottles or other articles, holder for, G. A. Henckel.....	791,781
Brake beam, C. H. Williams, Jr.....	791,739
Brake shoe head, interchangeable and reversible, E. L. Adreon, Jr.....	791,854
Breast strap, pneumatic, C. T. Howard.....	791,787
Bridge, S. Szentjanyessy.....	791,659
Brush, A. L. Sonn.....	791,510
Brush, blacking holder and dauber, combined blacking, J. D. Bloom.....	791,867
Bucket, dredger, J. J. King.....	791,700
Building construction, G. F. Buente.....	791,875
Building construction, G. F. Fisher.....	791,960
Burglar alarm system, J. Weatherly, Jr.....	791,961
Butter cutter, P. F. Gibbons.....	791,462
Cabinet, kitchen, F. S. Thomas.....	791,512
Cake iron, A. Andersen.....	791,443
Candies, machine for forming drop, J. M. Demerath.....	791,611
Car, convertible, M. Power.....	791,575
Car door, G. Almond.....	791,530
Car door, W. F. Wendt.....	791,662
Car door fastener, C. W. Gill.....	791,688
Car dump, W. A. Lathrop.....	791,477
Car fender, Hastreiter & Dillhoff.....	791,777
Car, freight, J. A. McGhie.....	791,642
Car replacing frog, M. H. Kenaston.....	791,474
Car side bearing, R. L. Ellery.....	791,760
Car step, E. Howe.....	791,910
Car, street, H. F. Vogel.....	791,742
Car window passenger shield, P. H. Neffien.....	791,488
Cars, current collecting device for electric, L. W. Pullen.....	791,816
Carburetor, J. T. Orr.....	791,810
Carburetor for hydrocarbon engines, N. Lefnau.....	791,801
Carpet cleansing apparatus, A. E. Moorhead.....	791,567

\$20 to \$50 WEEKLY made selling this NEW INVENTION, the **STANDARD SELF-FILLING Fountain PEN**

No ink dropper. No smeared fingers. No twisted rubber. No complication. **\$178.50** earned in 32 days by retired business man in Ala.

\$35.80 for a month's spare time by G. Jos. Lovett, of Mass.

\$5.40 made in first two hours by Mrs. Mary M. Lennon, of Mich.

Our free lessons in successful salesmanship make experience unnecessary. We send all particulars and figures to prove above records; write to-day.

Energetic Agents and District Managers Wanted.

Standard Pen Co. 1565 Baker Bld., TOLEDO, O.

THE BEST LIGHT

Brighter than electricity or acetylene - cheaper than kerosene - makes and burns its own gas.

No GREASE, DIRT, SMOKE or ODOR. A safe, powerful, white, steady light - durable and handsome. Over 100 styles - every lamp warranted.

AGENTS WANTED EVERYWHERE.

THE BEST LIGHT CO., 87 E. 5th St., Canton, O. Owners of Original Patents.

A. W. Fisher

Manufactory Established 1761

Lead-Colored Slate Pencils, Rubber Bands, Erasers, Inks, Penholders, Rulers, Water Colors, Improved Calculating Rules.

Send for descriptive Circular S.

44-60 East 23d Street, New York, N. Y. Grand Prize, Highest Award, St. Louis, 1904.

WARREN'S NATURAL ASPHALT SAND SURFACED ROOFING

Apply it yourself. Makes a finished gravel roof. Comes ready to lay in rolls of 108 square feet. Write for sample, circular and prices.

Warren Chemical and Mfg. Co., 18 Battery Pl., New York

USE GRINDSTONES?

If so we can supply you. All sizes mounted and unmounted. Always kept in stock. Remember, we make a specialty of selecting stones for all special purposes. Send for catalogue "I".

The CLEVELAND STONE CO., 2d Floor, Wilshire, Cleveland, O.

Cartridge, M. E. Bailey.....	791,858
Case, See Eggs case.	
Cash register, driving mechanism, J. P. Cleal.....	791,536
Caster, Morris & Taylor.....	791,712
Censer, D. J. Mullen.....	791,930
Centrifugal separator, W. G. Laird.....	791,703
Chandelier support, J. Kuhlereyer.....	791,627
Chimney, D. D. Elder, Jr.....	791,545
Chimney or stack, Cree & Miller.....	791,452
Chimney stopper, C. H. Townsend.....	791,514
Chuck and feed mechanism, W. S. Davenport.....	791,543
Churn, W. O. Lindgren.....	791,632
Churn, E. J. Wilson.....	791,664
Churn, W. P. Boone.....	791,870
Chutes, etc., counterbalancing mechanism for pivoted, F. F. Waechter.....	791,959
Clasp, ornamental, G. A. Walter.....	791,737
Clasp pin, ornamental, J. F. Kuhn.....	791,476
Clock, electric self-winding, A. van Kaspis.....	791,797
Clothes drier, laundry, Mannen & Esterly.....	791,565
Clothes sprinkler for laundry uses, hand, C. Danforth.....	791,541
Coal bed attachment, T. A. Girardot.....	791,619
Coke grapple, W. M. Pugh.....	791,944
Collar, pneumatic horse, C. T. Howard.....	791,788
Collar shaping means, laundried, J. T. Truitt.....	791,734
Collar supporter, J. W. Trexell.....	791,841
Comb, F. W. Grell.....	791,690
Concentrator attachment, F. S. Morgan.....	791,711
Concrete building blocks, machine for making, W. L. Dew.....	791,612
Concrete columns or the like, mold for, L. Schuller.....	791,585
Concrete steel constructions, collapsible form for, L. F. Brayton.....	791,446
Condensing apparatus, A. F. Burdch.....	791,876
Condensing apparatus, surface, W. Weir.....	791,963
Conveyer, bucket, A. J. Prith, reissue.....	12,354
Conveyer, endless, R. M. Andrus.....	791,601
Cords, etc., device for holding, J. G. Merrill.....	791,485
Cotton chinner, check row, A. G. M. Combee.....	791,880
Couch and folding bed combined, D. T. Owen.....	791,716
Counter or register, W. H. Hawkins.....	791,803
Coupling, W. S. Halbert.....	791,551
Crane, G. W. Shem.....	791,951
Cream separator, J. F. McDowell.....	791,486
Cream separator, centrifugal, A. Penten.....	791,496
Culinary boiler, S. R. McKenzie.....	791,935
Cultivator blade attaching device, A. M. Ward.....	791,853
Cuspidor, C. E. Jones.....	791,913
Decanting fluids into specially prepared receptables, apparatus for, E. Maynard.....	791,480
Decorating machine, H. T. Epperson.....	791,681
Dental appliance, prophylactic, Apel & Merkley.....	791,668
Dental separator and tooth holder, E. D. Barnes.....	791,859
Desk, portable writing, E. A. Simmens.....	791,506
Desk, school, A. Fischer.....	791,763
Desk writing attachment, G. E. & G. C. Poignant.....	791,942
Dining table or counter, N. N. S. Matcovitch.....	791,708
Discharge device, Ellis & Rohne.....	791,889
Display rack, G. M. Davis.....	791,455
Display standard, adjustable, A. J. Fall.....	791,682
Ditching jack, R. Rue.....	791,819
Dividers, C. Sansom.....	791,725
Door hanger and track, combined, G. J. Doer.....	791,899
Door hanging apparatus, M. H. Shirley.....	791,507
Door or screen, G. J. Record.....	791,498
Doors, combined roller support and track for sliding, C. F. Kade.....	791,915
Draft equalizer, I. N. Noyer.....	791,715
Drain pipe, R. S. Cuddy.....	791,453
Dress form, T. P. Colby.....	791,879
Dressmaker's fitting stand, V. H. Cannon.....	791,451
Drier, W. F. Robinson.....	791,578
Drier, C. H. Caspar.....	791,877
Drying apparatus, D. J. MacLean.....	791,803

SPECIAL ANNOUNCEMENT

To be published on July 1, 1905: A NEW PUBLICATION entitled

American Homes and Gardens Successor to SCIENTIFIC AMERICAN BUILDING MONTHLY



THIS new monthly magazine will be much broader in scope than its predecessor. It will have the word "HOME" for its keynote. The one to whom this word has no meaning will have no interest in this new publication. It is the intention of the Editor to take the reader with him to various parts of the country, and show him how the better class of people live, whether the house may have cost \$3,000 or \$300,000. Good taste is, perhaps, more necessary in the building and furnishing of a house of small cost than in a mansion of importance.

The Editor will not leave you on the outer doorstep, however, but will take you within, where you may see how the house is furnished and decorated, and how the owners live. Then you may have a walk through the garden, and then to the summer house, where, perhaps, the plan of the formal garden culminates.

There will be published articles on room decoration and furnishing, showing how the furniture may be arranged to produce the best effects, what pictures may be hung, and what bric-a-brac, inherited from some former mansion, may with advantage be discarded.

Each issue will contain an article on some important mansion, showing, if possible, various views of the exterior, the interior, and the garden. Plans are published with most of the residences shown.

The new publication will be issued monthly, and will be somewhat smaller in page size than the "Building Monthly," viz.: 10 1/2 x 14. It will have a handsome colored cover. It will have about 70 pages each issue. Price, 25 cents each issue; \$3.00 a year.

SPECIAL OFFER TO READERS OF THE "SCIENTIFIC AMERICAN"

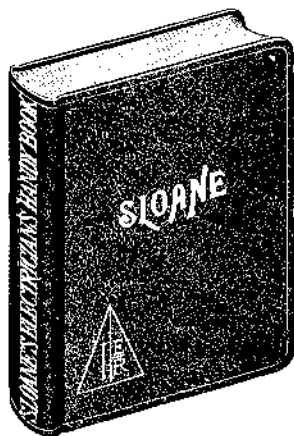
To any one subscribing before July 1, 1905, the subscription price will be \$2.50 for "American Homes and Gardens" for one year from July 1, 1905, to July 1, 1906.
To any one subscribing after July 1, 1905, the subscription price, without exception, will be \$3.00 a year.
Subscribe at once and obtain the most favorable terms.

MUNN & COMPANY, Publishers, 361 Broadway, NEW YORK

Now Ready for Delivery

Electricians' Handy Book.

By Prof. T. O'CONNOR SLOANE. 768 Pages. Nearly 600 Illustrations. Handsomely Bound in Red Leather, with Title and Edges in Gold. Price \$3.50



This thoroughly practical book of 768 pages covers the entire field of electricity. It contains no useless theory—everything is to the point, and readily understood by student or practical man.

A Practical Work for Practical Men.

CONTAINS SPECIAL CHAPTERS ON

- Mathematics. Electric Quantity and Current. The Electric Circuit. Ohm's Law. Electro-Chemistry. Primary Batteries. Storage Batteries. The Field of Force. Magnets. Induction. Direct-Current Generators and Motors. Direct-Current Armature Winding. The Direct-Current Generator. Armature Reactions. Characteristic Curves. The Direct-Current Motor. Open-Cell Generators. Generators and Motor Construction. The Alternating Current. Alternating Current Generators.

American Tool-Making and Interchangeable Manufacturing.

By J. V. WOODWORTH. 544 Pages. 600 Illustrations. Price \$4.00

A practical treatise on the Art of American Tool Making and System of Interchangeable Manufacturing as carried on to-day in the United States. It describes and illustrates all of the different types and classes of small Tools, Fixtures, Devices and Special Appliances which are in general use in all machine manufacturing and metal-working establishments where economy, capacity, and interchangeability in the production of machined metal parts are imperative.

Gas Engines and Producer-Gas Plants.

By R. E. MATHOT. 320 Pages. Fully Illustrated. Price \$2.50

A practical treatise setting forth the principles of Gas Engines and Producer Design, the Selection and Installation of an Engine, Conditions of Perfect Operation, Producer-Gas Engines and their Possibilities. The Care of Gas Engines and Producer-Gas Plants, with a Chapter on Volatile Hydrocarbon and Oil Engines. Thoroughly up-to-date in its treatment of the subject, the work discusses at considerable length the generation of producer-gas and its utilization in gas engines. No other book in English presents anything like as full a discussion of this most important phase of the gas engine. Indeed, no other book devotes even a chapter to producer-gas, despite the fact that it is the coming fuel for gas engines of high power.

Any of these books sent prepaid on receipt of price. A special circular of these books will be sent to any one on application.

MUNN & COMPANY Publishers of Scientific American, 361 Broadway, New York

What Will the Machine Do

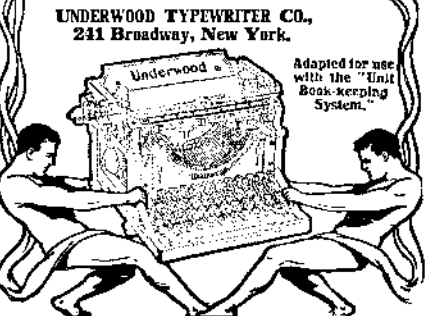
That's the real test Names are mere sound If the business man will approach the typewriter as a brand-new proposition, without prejudice, the real vital excellence of the

Smith Premier Typewriter

will be apparent THE SMITH PREMIER TYPEWRITER CO. Syracuse, N. Y. Branch stores everywhere

IT WILL STAND ANY TEST

Wherever language is written the Underwood Typewriter becomes as necessary to modern business as the mail service, telegraph, or telephone. Visible writing, perfect construction, easy operation, and great speed, produce MONEY RESULTS, by saving 25 per cent. of your operator's time with better and neater work.



WORK SHOPS

of Wood and Metal Workers, without steam power, equipped with BARNES' FOOT POWER MACHINERY allow lower bids on jobs, and give greater profit on the work. Machines sent on trial if desired. Catalog Free. W. F. & JOHN BARNES CO. Established 1872. 1999 RUBY ST. ROCKFORD, ILL.

Advertisement for BUFF TRANSITS AND LEVEL, featuring an image of the instrument and text describing its precision and use in various works.

Advertisement for PATENTS, featuring the text 'Our Hand Book on Patents, Trade-Marks, etc. sent free. Patents procured through Munn & Co. receive free notice in the SCIENTIFIC AMERICAN' and contact information for MUNN & CO.

Advertisement for Knock Down Boats, featuring an image of a boat and text describing various launches, row and sail boats, capoes, and hunting boats.

Advertisement for Acetylene Search Light, featuring an image of the light and text describing its use for small yachts, launches, and pleasure boats.

Advertisement for WELL DRILLING Machines, featuring an image of a drilling machine and text describing various sizes and styles for drilling deep or shallow wells.

Table listing various items and their prices, including Dye, Educational apparatus, Egg case, Electric apparatus, Electric heater, Electric machine, Electric meter, Electric motor, Electric meter controlling device, Electric time controlled switch, Electrical contact device, Electrical distribution system, Electrical motor generator, Electric bell, Electrode, Electrode, primary battery, Electromagnet, Elevator indicator, Elevator safety device, Emery board or sandpaper nail file holder, Engine, Engine atomizer, Engine piston and piston rod, Engine steering device, Exhaust head, Eyeglasses, Feed, boiler, Feed mechanism, Fertilizer distributor and planter, Filtering system, Fire escape, Fire extinguisher, Fire extinguisher valve, Firearm trigger mechanism, Fishing reel, Flood gate, Floor, spring dancing, Flue stop, Forge, Foundations in water logged ground, Frogless switch, Fruit picker, Fruit sifter and sizer, Fruit pitting machine, Fruit press, power, Furniture fastening, Fuse, projectile, Garment fastening device, Garment supporter loop, Gas burner, Gas burner, thermostatic self-closing, Gas fixture safety attachment, Gas furnace, Schramm & Skinner, Gas generator, acetylene, S. C. Corbin, Gas or explosion engine, E. C. Richard, Gas producer apparatus, C. Ellis, Gasket material, R. C. Hance, Gin saw, cotton, J. R. Miller, Glass beveling machine, Gibban & Freeman, Glass mosaics of irregular shapes, shearing, Glove, A. H. Fisher, Grain and feed drying apparatus, Anderson & Weolner, Grain drill distributor mechanism, F. J. Neechel, Grain prior to grinding, machine for tempering, A. W. Patrick, Grapple hook, W. A. Wiley, Grate bar, A. C. Fletcher, Grinding machine, G. H. Newton, Grinding wheel, A. Hurford, Grubber, laut, S. Cyr, Harvester, beet, A. B. Lovett, Hat pin, J. P. Runkel, Hat pin, W. Wittigschlager, Hat pin, F. S. H. Johnson, Hay press, J. M. Gurley, Heating apparatus, water, J. Hurley, Heels or soles of shoes, machine for inserting protectors into, R. A. Register, Hee, A. E. Holmes, Hoisting machine or power transmitter, D. Abrey, Hoop lug, M. Benz, Horse power and watt meter, direct reading, Hertzberg & Snyder, Hose coupling, A. B. Lees, Hose or tube manufacturing machine, E. D. Speer, Hose supporter fastener, A. E. Searle, Hydrocarbon burner, H. B. Scammell, Hydrocarbon burner, Mummery & Best, Hydrocarbon furnace, T. A. Tyas, Ice creper, E. M. Scarritt, Incandescent burner, H. B. Cox, Incandescent burner, D. Fried, Iron and steel therefrom, treating ferruginous ore for the manufacture of, Moore & Heskett, Journal bearing, L. A. Keene, Keir, vomiting, E. D. Jefferson, Knitting machine bur wheel, S. T. Harshaw, Lacing head, J. M. Gorman, Ladder, Jack, W. F. & E. H. Althoff, Ladder, step, J. G. Seergel, Lamp holder, C. J. McKinney, Lamp mantle, E. J. Selley, Lead, making white, C. P. Townsend, Letter carrier's pouch, rural, J. P. Woodland, Letter sheet, C. S. Sundgren, Life preserver holder, W. J. French, Lifting jack, J. B. Runner, Liquid treating apparatus, L. Bessey, Liquids, apparatus, for settling and drawing off, J. G. Reilly, Loading apparatus, T. J. Lower, Locomotive brake, Laflerty & Reynolds, Logotype casting mechanism, B. F. Belows, Loom for fancy leno weaving, F. F. Roche, Loom for leno weaving, F. F. Roche, Loom fringe pulling mechanism, P. McPeak, Loom, pile fabric, J. E. Dustin, Lubricating device, J. H. Miner, Lubricator, G. Hicks, Lubricator, E. G. Swift, Lubricator, E. Einfeldt, Magnetic separation apparatus, C. Q. Payne, Mangle, T. S. Wiles, Manhole door for brewers' or other vats, tanks, casks, etc., W. Heiser, Manure separator, Weller & Howe, Match striker, J. B. Chamberlain, Matches, toothpicks, or like articles, holder, F. E. Metzger, Mattress, folding, P. J. Leyendeker, Measure, lens, J. E. Briggs, Measure winding handle, tape, J. G. Eddy, Measuring instrument, R. D. Hunt, Moisture proof block, R. B. Hansell, Molding machine, O. Bryant, Monkey wrench, T. Olsen, Motor controlling system, A. C. Eastwood, Music leaf turner, F. P. Parker, Music, machine for making perforated, P. J. Meahl, Music rack, O. G. Goring, Musical instrument self-playing attachment, F. W. Draper, Musical instruments, automatic expression device for mechanical, T. Danquard, Nail, G. Anderson, Nebulizer, O. Q. Holman, Non-refillable box, W. T. Kosinski, Nut lock, Walter & Chapman, Nut lock, Scudder & Barlow, Nut lock, A. C. Fletcher

DIAMONDS ON CREDIT

THE fair sex have an eager appreciation of Diamonds. Diamonds not only make women beautiful and successful in society but in the hour of need are a savings bank. All women know that they can get instant cash for their Diamonds—at any moment—anywhere. The earnest desire of woman is for Diamonds. Every woman loves a Diamond. Nothing pleases her so much as to be presented with a Diamond. Save a Diamond—Win a Heart. Write for a copy of our interesting Catalog, 1000 illustrations of Diamonds, Watches and Jewelry.

The Loftis Catalog is Free Write-to-day for a copy of this beautiful and sumptuous Catalog. You will be interested in looking through its marvelous pages containing 1000 illustrations of Diamonds, Watches and Jewelry. There are sixty-six pages of unique information especially valuable to the Diamond buyer. The popular Loftis System of Diamonds on Credit is explained in every detail, the quotations being the lowest. All applicants also receive from us our Souvenir Diamond Booklet. Don't delay. Write at once. We will mail you both Catalog and Booklet free. Write-to-day.

The Loftis System of Diamonds on Credit is famous. It won the Gold Medal at the St. Louis Exposition. By this system, which is both easy and confidential, distant buyers are enabled to select at leisure the very finest Diamonds and highest grade Watches and Jewelry, securing them at the lowest prices. The article is sent on approval to your home, place of business or express office as desired. You can examine it. You are free to buy or not, as you please. We deliver our goods anywhere in the United States. We pay all charges. We take all risks. We ask no security—we create no publicity—we make no inquiries from employers. All transactions absolutely private and confidential. Your account will be welcomed. Write for Catalog.

Our Credit Offer We trust all honest people. We trust you. We will open a confidential account with you. One-fifth the price you pay on delivery, you retain the article and then send the balance direct to us in eight equal monthly installments. These small monthly payments you will never miss from your income. Remember, that a Diamond is better than a savings bank. Diamonds are predicted to increase 20 per cent during the present year.

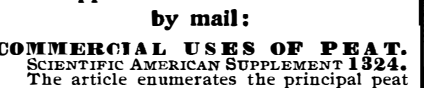
Our Cash Terms our Catalog. You pay us cash for it. We give you a written guarantee that you can return the Diamond any time within one year and we will pay you all you paid for it less ten per cent. By this arrangement you are able to wear a \$50 Diamond Ring or Stud for one year. You can then return it to us—we will return you \$45—which is less than ten cents per week for one year. Every Diamond we sell may be exchanged at full price for a larger stone.

Guarantee We give a written guarantee of quality and value with each Diamond we sell. This guarantee assigned by a member of our firm. We refer you to your local bank. They will refer to their company records and tell you what our responsibility, promptness and reliability are unquestioned in the business world. We are the largest retailers of Diamonds, High Grade Watches and Jewelry in America. Finest goods—lowest prices—easiest terms. Every sale is a matter of confidence and personal honor between our customers and ourselves.

Advertisement for LOFTIS DIAMOND CUTTERS Watchmakers Jewellers, featuring the name 'LOFTIS' in large letters and contact information: Dept. F 180, 92 to 98 State Street, CHICAGO, ILLINOIS.

Do You Want to Reduce Your Fuel Bills?

Our pamphlet "Boiler Room Economy" tells you how to do it. It tells about scale and the best remedy.



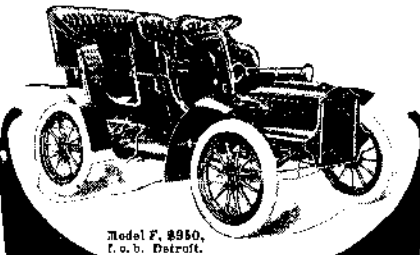
The Dean Boiler Tube Cleaner. therefore. If you have two boilers or more you should write for this pamphlet to-day without fail.

THE WM. B. PIERCE CO. 319 Washington Street. Buffalo, N. Y.

SUBSTITUTES FOR COAL

Are described from the technical standpoint in the following Scientific American Supplements. Each Supplement named costs 10 cents by mail:

COMMERCIAL USES OF PEAT. SCIENTIFIC AMERICAN SUPPLEMENT 1324. The article enumerates the principal peat bogs and states their financial possibilities. GERMAN BRIQUETTING MACHINERY IN AMERICA. SCIENTIFIC AMERICAN SUPPLEMENT 1411. A valuable economic report. A NEW ELECTRICAL PROCESS FOR THE MANUFACTURE OF PEAT FUEL. SCIENTIFIC AMERICAN SUPPLEMENT 1492. The paper fully describes the Bessey process. LIGNITE, PEAT, AND COAL DUST FUEL. SCIENTIFIC AMERICAN SUPPLEMENT 1426. A careful consideration of German methods. MOOR CULTIVATION AND PEAT INDUSTRY IN GERMANY. SCIENTIFIC AMERICAN SUPPLEMENT 1481. An excellent critical review. DOMESTIC COKE AND BRIQUETTES FROM RETORT COKE OVENS. By R. M. Atwater, SCIENTIFIC AMERICAN SUPPLEMENT 1211. A valuable monograph by an expert. THE WHITE MINERAL PRESS FOR BRIQUETTING. SCIENTIFIC AMERICAN SUPPLEMENT 1224. An article describing and illustrating an American briquetting machine. Price 10 cents each, by mail. Order through your Newsdealer or from MUNN & COMPANY 361 Broadway NEW YORK



Model F, 2950, f.o.b. Detroit.

Power Economy

Cadillac construction is so simple—so closely does it approach absolute perfection—that practically all energy the motor develops is used in an actual propelling force. This principle of economizing power—and hence minimizing the cost of maintenance—is the chief feature of Cadillac superiority.



economy, coupled with unflinching reliability, has placed the "Car that Climbs" in the front rank of motor vehicles. Of all automobiles it comes nearest to being actually trouble-proof.

You would be interested in our beautiful catalog—still more interested in seeing and trying a Cadillac at the nearest dealer's.

Write for booklet N and the dealer's address

Model F—Side-Entrance Touring Car shown above, \$950.

Model B—Touring Car with detachable tonneau, \$900.

Model E—Light, stylish, powerful Runabout, divided seat, \$750.

Model D—Four Cylinder, 30 h. p. Touring Car, \$2,800.

All prices f.o.b. Detroit.

CADILLAC AUTOMOBILE CO. Detroit, Mich. Member A. L. A. M.

SOUTHERN FARMS

In Virginia, North and South Carolina, Georgia, Alabama, Mississippi, Kentucky and Tennessee.

GOOD LANDS AT LOW PRICES

A healthy climate, long growing season, and an all-the-year working season.

Good locations for Textile and Manufacturing Plants.

The South is now making greater progress than any other section. If you would learn about its developments and the opportunities for good locations along the Southern Railway, write for copies of our publications, including The Southern Field, a 16-page illustrated journal, sent free on request.

M. V. RICHARDS

Land and Industrial Art., Southern Railway, Washington, D. C.

"Free from the care which wearies and annoys. Where every hour brings its several joys."

"AMERICA'S SUMMER RESORTS."

This is one of the most complete publications of its kind, and will assist those who are wondering where they will go to spend their vacation this summer.

It contains a valuable map, in addition to much interesting information regarding resorts on or reached by the

NEW YORK CENTRAL LINES

A copy will be sent free, upon receipt of a two-cent stamp, by George H. Daniels, General Passenger Agent, New York Central & Hudson River Railroad, Grand Central Station, New York.

Oil burner, M. A. Fessler	791,617
Oil burning apparatus, J. Palmatary	791,812, 791,813, 791,771
Oil cup, L. Gleason	791,613
Oil for combustion, preparing, Drasel & Tyas	791,508
Optometer, trial frame, J. C. McAllister	791,572
Ore, apparatus for circulating and mixing crushed, F. C. Brown	791,799
Ore briquet, W. A. Koneman	791,676
Overalls, F. G. Dodson	791,740
Package, thread, T. H. Williams	791,671
Pad, See Water pad	791,631
Pail or the like separator, candy, Carrier & Shotts	791,672
Paint, luminous, H. Lieber	791,793
Palette, W. A. Cochrane	791,652
Paper cutter, wall, A. Johnson	791,904
Paper exhibitor, wall, S. S. Roszell	791,466
Paper, pigmented, A. Heskell	791,800
Pen, self-filling fountain, E. M. Heyman	791,829
Photographic attachment for firearms, D. L. Laur	791,922
Photographic picture carrier, J. E. von Slawik	791,834
Photographic plate holder, J. D. Lyon	791,701
Photographic printing machine, C. Spaulding	791,967
Piano automatic playing attachment, C. A. Kuster	791,710
Piano player attachment, F. C. Whitmore	791,952
Pianos, etc., fall board actuated music desk actuating device for, R. Moe	791,905
Pile fabric, woven, W. M. Stevenson	791,504
Pipe coupling, A. Higginbotham	791,537
Pipe hanger, M. C. Rosenfeld	791,796
Plaster, barrel head, G. Cluthe	791,770
Planter, corn, J. M. Jones	791,684
Plow, W. W. Giddens	791,666
Plow, ditching, W. P. Foster	791,846
Plumbing T. J. M. Wishart	791,847
Pneumatic drill, J. Whitelaw	791,968
Pole raising and planting machine, W. A. Wiley	791,908
Pole, tent, T. J. Hook	791,821
Potato screen, H. Sauve	791,877
Powder nozzle, M. I. Dowling	791,929
Power installation, W. Morrison	791,667
Power transmitter, D. Abrey	791,450
Printing machine, stencil, C. L. Burdick	791,503
Printing upon pyroxylin materials, R. E. Roehm	791,679
Projectile, J. M. Edmunds	791,552
Propeller, boat, A. Worcester	791,733
Pump, F. E. Ten Eyck	791,919
Pump, S. B. Leidy	791,861
Pump and deep tubular well strainer, E. J. Easyc	791,636
Pump, oil, C. W. Manzel	791,767
Push drill, Z. T. Furbish	791,560
Rag cutting machine, L. E. Kennedy	791,713
Rail and lantern holder, guard, D. F. McCarthy	791,804
Rail joint, L. S. & J. A. Mellinger	791,925
Rail joint, F. P. Meyer	791,985
Rail joint truss support, L. Mueller	791,772
Rail support, G. Gow	791,965
Rails, means for securing and adjusting guard, W. Wharton, Jr.	791,972
Railway automatic electric signaling system, D. C. Wolfe	791,907
Railway block signal system, C. Holtmann	791,445
Railway carriage automatic coupling, A. Beurrier	791,982
Railway electrical traction system, M. Leblanc	791,979
Railway rolling stock underframing, R. L. Ettenger	791,574
Railway signaling, automatic, Patenall & Dryden	791,727
Railway tie, J. Sledge	791,727
Ratchet tool, Z. T. Furbish	791,895
Razor strop, J. H. Wall	791,736
Reduction furnace, G. Walzel	791,660
Refining engine, S. R. Wagg	791,843
Refrigerator, J. B. White	791,738
Register, F. K. Fassett	791,616
Register partition plate, credit, Ellett & Vick	791,546
Retort charging apparatus, S. J. Fowler	791,685
Riveting machine, H. C. Pomeroy	791,724
Road machine, I. F. Noble	791,937
Roller mill, S. Snyder	791,833
Rotary engine, Hudson & Daniell	791,694
Rotary engine, J. A. Peterson	791,939
Rotary explosive engine, C. A. Dreisbach	791,757
Rotary motor, E. E. Waxel	791,596
Rubber articles, form for making seamless, T. M. Gregory	791,774
Rubber dam holder, R. P. Ludwig	791,563
Rug holder, L. P. Wood	791,851
Rule, J. E. Wilson	791,848
Rule holder, W. E. Bell	791,864
Running gear, J. P. Terry	791,511
Running gear, J. Herby	791,557
Sad iron, J. Cook	791,851
Safe, provision, E. S. Reed	791,518
Safes, day lock for screw door, C. E. Blechschmidt	791,534
Safety lock, J. S. Brandon	791,669
Salad dressing mixer and dropper, M. C. Horton	791,624
Sash balance, C. H. Oumpangh	791,489
Sash holder and alarm, window, W. F. Evans	791,614
Sash holder and fastener, A. Wilkie, Jr.	791,970
Sash suspending and operating means, window, A. J. Park	791,645
Saw frame, buck, S. Toles	791,513
Saw handle, G. M. Ready	791,817
Sawing machine, wooden pin, J. C. Rockwell	791,992
Scale, recording, H. Hathaway	791,554
Scale, wagon, B. T. Jr., & J. M. McDonald	791,568
Scraper, road, C. S. Hunt	791,789
Screen, E. E. Hendrick	791,782
Screw driver or drill, push, Z. T. Furbish	791,766
Screw set, M. H. Frisell	791,548
Scythe snath fastening, H. S. Earle	791,758
Sealer, fruit jar, J. N. Hieronymus	791,467
Sealing device, W. E. Heath	791,778
Seeds, hulling, J. H. Kellogg, et al.	791,473
Separator, W. V. Meyer	791,566
Sewing machine button adjusting mechanism, W. J. Smith	791,831
Sewing machine button feeding mechanism, W. J. Smith	791,830
Sewing machine motor, H. J. Young	791,528
Sewing machine tension, J. B. Watson	791,661
Shade roller attachment, spring, E. F. Harsthorst	791,553
Shaft liner, F. E. Hitter	791,900
Shaft or pole coupling and antirattler, H. H. Piper	791,988
Shears, tension device for, J. H. & W. W. Stull	791,590
Sheet speed regulating device, traveling, J. C. Hagey	791,550
Shock compressor and binder, S. D. McGuire	791,987
Show card, M. Jackson	791,912
Sight and force feed lubricator, Ivor & Ward	791,696
Sign, electric flash, J. C. Lion	791,562
Sign, revolving, E. E. Boyd	791,606
Siphon, P. McGrath	791,934
Skirt, combined riding and walking, J. M. Goldberg	791,620
Slabs, billets, etc., feeding device for, C. von Philip	791,940
Slack adjusting device, automatic, McCabe & Payton	791,932
Sled, coasting, P. V. Fee	791,683
Sled, coasting, C. Sattler	791,820
Smelting ore, E. Riveroll	791,577
Smoke consumer and cinder arrester, S. M. Walker	791,517
Smoker's article, J. M. A. Darrach	791,454
Snap switch, W. A. Church	791,977
Sound box, L. P. Valiquet	791,595
Spark arrester, I. N. Kalbaugh	791,699
Speed mechanism, variable, I. M. Foster	791,618
Spike lock, H. S. Waterman	791,520
Spinning and twisting ring, P. P. Farmer	791,615
Spring finishing machine, F. M. Stambaugh	791,586
Springs, manufacture of, Daniels & Marshall	791,751 to 791,753
Square, folding, M. A. Hoagkins	791,906
Stacker, hay, H. Bergman	791,533
Stamp, Butterworth & Hart	791,608
Stamp mill drives, apparatus for operating, R. Taylor	791,732
Starting or stopping mechanism, R. P. McFeely	791,986

Finger-Reach Control

In this car all controlling levers are assembled at the steering post. Wheel, gear shift, clutch, throttle and spark control are all within finger reach, so that the operator need never take either hand away from the steering post. This arrangement, together with the responsiveness of the Autocar running mechanism, makes this car easier and simpler than a horse to drive. The greatest value ever offered in a light four-passenger car is

Type VIII, AUTOCAR at \$1400

Horizontal two-cylinder opposed motor—no noticeable vibration. Twelve actual horsepower. Threespeeds forward and a reverse. Ball bearing shaft drive. Front and rear construction has ball bearings throughout. Gasoline tank holds 10 gallons—sufficient on good roads for 200 miles.

Engine and transmission case are accessible from above without disturbing body. Catalogue describing Type VIII, Type X Runabout, and Type XI Four Cylinder Car, with dealer's name, sent free.

THE AUTOCAR COMPANY, Ardmore, Pa.
Member Association Licensed Automobile Manufacturers.

Convert Your Bicycle into a Motorcycle

at a moderate cost by attaching the Mesco 1 1/2 h.p. Motor Outfit which includes all accessories to make a complete machine without alteration. Choice of three transmissions. Complete Motorcycles and Marine Motors. Parts sold separately. Write for catalogue. Agents wanted.

Motor Bicycle Equipment & Supply Co., Buffalo, N. Y.

The LATHROP Portable Fence

Can be constructed by any handy person who buys from us the necessary supports and the right to use our method. Such fencing is strong and permanent, can be changed at will to alter size or shape of enclosure. Our plan saves the cost of transportation, as supports only need be sent. Send for catalogue.

The Lathrop Mfg. Co., 47 Central Av., Rochester, N. Y.

STEAM TURBINES.—THEIR CONSTRUCTION, Operation and Commercial Application.

SCIENTIFIC AMERICAN SUPPLEMENTS 1306, 1307, 1308, 1422, 1400, 1447, 1370, 1372. The articles have all been prepared by experts in steam engineering. Price 10 cents each, by mail. Munn & Co., 361 Broadway, New York City, and all newsdealers.

RADIUM AND THE RADIO-ACTIVE Substances.

No better or clearer scientific account has been published than that contained in SCIENTIFIC AMERICAN SUPPLEMENT 1429. The paper presents all that is at present known about radium and the radio-active substances. Price 10 cents by mail. Munn & Co., 361 Broadway, New York City and all newsdealers.

HANDY RULE CASE

A polished black walnut case. Convenient and useful. 12 1/2 inches long, 1 3/4 inches high, 1 3/4 inches wide. Containing eight spring tempered rules and one centre gauge. Rules rest on two crescent-shaped pieces of brass at bottom and anyone can be easily taken out by pressing the end of the rule at finger hole, thus tilting it up. Keeps your rules together and protects them from injury. Price, complete, \$4.00. Send for catalog.

SAWYER TOOL MFG. CO., Fitchburg, Mass., U.S.A.

Crescent Machinery

Quality and Price, both right

BAND SAWS, JOINTERS, SAW TABLES, BAND SAW BLADES

Catalogue tells the rest

CRESCENT MACHINE CO., 280 Main Street, Lectonia, O., U. S. A.

It's all in the OLDSMOBILE

Just think a moment: Do you buy a particular car because of a peculiar spring adjustment, a few pounds more or less of weight, the motor, the transmission, or the carburetor equipment alone, or because of the complete co-ordination of every part to every other part, and the way each part does its work—in short, a car that is built to run and does it?

Satisfactory service means: Reasonable cost of maintenance, freedom from any tendency to get out of order, durability to stand the wear and tear of use; power to climb hills, and take you along as fast as you want to go. Then, too, your car must be easy to start and easy to stop—always under perfect control. It must be dependable in emergencies. It must leave you nothing to watch but the road.

The Oldsmobile is a recognized public utility—as indispensable as the telephone, the typewriter or sewing machine. It fits into your requirements as a business or professional man, as well as into the average pocket-book.

For runabout service you can find no equal to the Oldsmobile Standard Runabout of 7 h. p. Its single cylinder horizontal motor gives durability with freedom from complication. The two cars in which Megargel of Buffalo, and Huss of Detroit, are racing from New York City to Portland, Oregon, for a prize of \$1,000, are stock cars of this type, differing in no particular from the thousands of these cars now in daily use. When you invest \$650 in a car which can successfully stand the strain of a 3,500-mile race across the American continent, under all kinds of

road and weather conditions, you will get pretty satisfactory returns for daily use.

For touring service the Oldsmobile Touring Car, at \$1,400, is a prime favorite. In design it is distinctive; in construction strong and substantial. Its 20 h. p. two-cylinder motor gives ample speed. It has side entrance tonneau, tilting steering post, and all the latest Oldsmobile improvements. You will find it a tremendous hill climber.

For commercial purposes our Standard Delivery Car and Ten-Passenger Wagonette, both of 16 h. p., are meeting with substantial success, the former appealing to the enterprise and thrift of merchants in all lines of business, while the latter opens a hitherto untouched field in the establishment of transportation lines in towns too small for street cars, or for stage, resort and depot service. In every locality there are opportunities yet undeveloped, and it will pay you to write to us for information.


If you need a car for everyday business use, for pleasure, for commercial service, or an investment, you will buy satisfaction in the Oldsmobile. You will find much valuable information in Catalog "A," which we will send on request. The opportunity is yours. Write today. Address Dept 21.

Send 25 cents for one year's trial subscription to Motor Talk, a handsome illustrated monthly devoted to automobilism. Subscriptions sent now will include free the March, April and May numbers containing the first three installments of the practical series on "The How and Why of the Automobile." We have arranged with the publishers for a limited number of these subscriptions—this offer is only good while they last.

Olds Motor Works, Detroit, U. S. A.

Member Association of Licensed Automobile Manufacturers

A BOY'S SUMMER



For a growing boy there is no summer outing equal to the naval course at Culver. 119 boys from 21 States last season. For illustrated booklet, address The Headmaster, **CULVER NAVAL SCHOOL**, Culver, Ind. (Lake Maxinkuckee)

A 1000 years of mistakes and then the NATURO



the closest with a hand, the only sort of construction that is healthy, clean, comfortable. The NATURO is the only improvement made in water closets since the style YOU know was introduced. Are you interested in knowing why? Write for book. It tells in detail, with illustrations. **THE NATURO CO.**, Salem, N. J.

Satisfaction Guaranteed

WE BUILD Special Machinery, Machine Parts, Interchangeable Machinery, Punches and Dies, Gear Cutting, Etc.

The John R. Williams Co. Machine Works
114-118 Liberty Street, New York, N. Y.
120-126 Pacific Street, Newark, N. J.


French Motors for Lighting Plants



The "ASTER" is the best French motor on the market for lighting houses, hotels, etc. Small, compact, simple and safe to operate. Motive power alcohol, oil or gas. 2 and 4 cylinders. Great power for small engines. Easy running. Write for illustrated Price List.

ASTER COMPANY
1659 Broadway NEW YORK CITY

An Automatic Pump



that works wherever there is a spring, creek or pond. It costs but little and works day and night without attention or expense. The Niagara Hydraulic Ram, USED AND ENDORSED BY THE U. S. GOVERNMENT. Is made in all sizes. Free booklet and terms to agents upon request.

Niagara Hydraulic Engine Co
CHESTER, PA.
140 Nassau St., New York, N. Y.

MAXIMUM POWER—MINIMUM COST

If you use a pump for beer, lard, acids, starch, petroleum, brewer's mash, tannin liquor, cottonseed oil or fluids, hot or cold, thick or thin you want to get the **TABER ROTARY PUMP** which does the most work at the least expense. Simply constructed. Can be run at any desired speed. Perfectly interchangeable. Needs no skilled workman. Defects guaranteed. Catalogue free.

TABER PUMP CO., 32 Wells St., Buffalo, N. Y., U. S. A.

If You Want the Best Lathe and Drill CHUCKS



BUY WESTCOTT'S Strongest Grip, Greatest Capacity and Durability, Cheap and Accurate.

Westcott Chuck Co., Oneida, N. Y., U. S. A.
Ask for catalogue in English, French, Spanish or German.
FIRST PRIZE AT COLUMBIAN EXPOSITION, 1893.

Pierce's new International French-English and English-FRENCH DICTIONARY.

1312 pages. Half leather. \$2.00. Postage, 32 cents. 20% discount to dealers.

LANGUAGES PRINTING COMPANY
Languages Building, 15 West 18th St., New York

Every Gas Engine User should learn about the Apple Automatic Sparker.



No more belt, battery or commutator troubles. Increases power and speeds. For any kind of ignition apparatus write for literature.

The Dayton Electrical Mfg. Co.
88 Beaver Blag., Dayton, Ohio.

A MONEY MAKER

Hollow Concrete Building Blocks, Best, Fastest, Simplest, Cheapest Machine. Fully guaranteed.

THE PETTY JOHN CO.
513 N. 9th Street, Terre Haute, Ind

THE Nufite Vapor Lamps



For Home, Store and Street. We also manufacture Table Lamps, Wall Lamps, Chandeliers, Street Lamps, Etc. 100 Candle Power seven hours ONE CENT. No Wicks. No Oil. Absolutely safe. THEY SELL AT SIGHT. Exclusive territory to good agents. Write for catalogue and prices.

Chicago Solar Light Co., Dept. G, Chicago

50 Years' Experience PATENTS

Trade Marks, Designs, Copyrights, Etc.

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.

Steam boiler, T. B. Lanier	791,561
Sterilizer, H. W. C. Thomas	791,840
Stone or the like mold, artificial, S. A. Wilson	791,665
Stool, milking, J. N. Tank	791,593
Stove, heating, C. Miller	791,926
Sugar and waste molasses in one operation, making first, H. Winter	791,971
Surgical instrument sterilizer, J. Parmentier	791,490
Switch operating mechanism, E. E. Campbell	791,748
Switch rod mechanism, H. G. Elfworg	791,460
Switches, housing and adjustment for interlocking, Holdeman & Ford	791,622
Syringe, hypodermic, J. De Lisle	791,862
Tag holder, H. E. Hesselstine	791,632
Tap, W. J. Smith	791,632
Target trap, F. Hardy	791,732
Target trap, F. H. Steffen	791,828
Telegraph apparatus, facsimile, H. R. Palmer	791,491
Telephone current reinforcer or relay, H. F. Shreeve	791,656
Telephone transmitter, E. R. Snyder	791,657
Telephone transmitter, M. J. Fletcher	791,892
Tender steering mechanism, F. J. Wood	791,973
Thermostat, J. H. Cornelison	791,882
Thread dressing machine, G. A. Fredenburgh	791,686
Threshers, self pitcher and feeder for, J. K. Rouze	791,653
Threshing machine self feeder, R. & B. Crain	791,610
Tie. See Railway tie.	
Tin, stripping, H. W. Hemingway	791,555
Tire fastener for wheels, rubber, G. T. Reed	791,991
Tire, rubber, J. A. Swinehart	791,592
Tire shrinking machine, cold, S. N. House	791,603
Tire tightener, O. Lynch	791,564
Tobacco case, A. E. & P. F. Magée	791,479
Tobacco pipes, etc., mouthpiece for, C. Peterson	791,495
Tool, combination, J. A. Abolt	791,599
Tool, combination, E. D. C. Koeth	791,917
Tool, artificial, F. R. Denton	791,456
Tooth crown, I. W. McLaughlin	791,641
Tower, skeleton, R. L. Allen	791,975
Toy, F. Garrecht	791,769
Trace, harness, T. J. Wavrunek	791,845
Traction machine wheel, W. S. Kelley	791,626
Train control system, electric, Sundh & Magnusson	791,836
Train controlling mechanism, H. V. Miller	791,984
Tripod, J. L. Gilmore	791,689
Trolley, Lippy & Nicodemus	791,633
Trolley, L. M. Steele	791,835
Trolley retrieving device, H. B. Clarke	791,750
Trolley wheel, J. Hensley	791,556
Truck, A. C. Cook	791,978
Turbine, G. Scheuber	791,949
Turbine, elastic fluid, C. H. Curtis	791,674
Turbine, elastic fluid, J. G. Wagenhorst	791,735
Turbine, elastic fluid, E. R. Arnold	791,743
Turbine, elastic fluid, C. E. Sweet	791,837
Turbine, fluid pressure, H. L. Barton	791,860
Turbine, steam, H. C. Schwarze	791,824
Type distributing apparatus, Johnson & Low	791,558
Typewriting machine, H. W. Merritt	791,483
Typewriting machine, E. Grosbols	791,549
Typewriting machine, A. T. Brown	791,670
Umbrella support, J. A. Alexander	791,855
Valve, automatic, blast temperature regulating, Van den Cappel	791,958
Valve for steam heating systems, pressure, E. F. Osborne	791,811
Valve motion, air compressor, F. Gerb	791,896
Valve, reversing, J. Whitlaw	791,966
Valve, rotary, T. G. Van Sant	791,957
Vapor apparatus, automatic starting device for, R. E. Russell	791,582
Vegetable cutter, B. C. Steffens	791,658
Vehicle spring, M. C. McIntyre	791,714
Vending apparatus, check controlled, D. M. Doonan	791,755
Vending machine, V. E. Randall	791,990
Vending machine, stamp, G. T. Strite	791,589
Veterinary obstetrical instrument, C. Tyler	791,842
Vis. bench, E. S. Williamson	791,741
Wagon box, metal, L. Anderson	791,532
Wagon, lumber, F. L. Joubert	791,625
Warp creel, I. E. Palmer	791,722
Warp thread drawing-in machine, Ganz & Francis	791,768
Washboard, B. H. Tyler	791,516
Washing machine, M. C. Wilkin	791,597
Washing machine, J. H. Dorval	791,756
Water bags, device for the production of the circulation of water in warm, M. Bauer	791,863
Water heater, A. Stewart	791,587
Water pad and advertising device, combined, A. H. Cobb	791,878
Waterproofing compound, Coburn & Buckmaster	791,538
Wearer, animal, M. W. Brender	791,448
Weeder, T. Snyder	791,508
Weeder, L. E. Waterman	791,522
Weeder, T. G. Thompson	791,955
Wheel. See Grinding wheel.	
Wheel protective covering, vehicle, A. H. Rochfort	791,502
Window, metallic, C. H. Hopmann	791,909
Window raising and locking device, F. Bruno	791,874
Window, self balancing, H. C. Smith	791,728
Window ventilator, F. L. Magée	791,924
Wire stretcher, J. Mossman	791,807
Wire tightener, C. L. Sawyer	791,583
Woodworking machine, R. Blair	791,604
Wrench, H. A. Paquette	791,644
Wrench, J. Roemer	791,651
Wrench, W. M. Pitzer	791,814

DESIGNS.

Cigar band, L. C. Wagner	37,459	37,460
Clock case, J. R. Ansteth		37,456
Locket or similar article of jewelry, G. Mason	37,454	37,454
Mirrors, brushes, or similar articles, back for hair, H. B. Beach		37,455
Picture frame, W. L. Cooper		37,457
Stove, M. R. Lehman		37,458

LABELS

"Antiseptic refrigerator," for medicines, H. P. Meyer	12,192
"Dr. Kirby's Golden Formula," for medicine, Dr. Kirby Medicine Co.	12,191
"Dr. Raymond's Pills," for pills, Dr. R. G. Raymond Remedy Co.	12,194
"El Vendoma," for cigar boxes, P. J. Sullivan	12,187
"Garco," for saccharine syrups, Goyer Alliance Refining Co.	12,189
"Gordon Suspenders," for suspenders, Gordon Manufacturing Co.	12,186
"Lista's Antiseptic Solution," for antiseptic solutions, Corporation of Hegeman & Co.	12,193
"Mothers New England Mince Meat, None Better," for mince meat, A. Deiser	12,190
"Sapolin" Stove Pipe Enamel, for stovepipe enamel, Gerstendörfer Bros.	12,188

PRINTS.

"Benefactor," for cigars, United Cigar Stores Co.	1,342
"Eau de Quinine," for hair tonic, E. Utard	1,343
"Educator Shoe," for boots and shoes, Rice & Hutchins, Inc.	1,341
"The Alco System Clothes," for clothing, Arnold, Louchheim & Co.	1,336 to 1,340

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.

THE HARRINGTON & KING PERFORATING CO.

PERFORATED METAL

OF EVERY DESCRIPTION FOR ALL USES.

223 NO. UNION ST. CHICAGO, ILL.

SPECIAL MANUFACTURING.

DIES AND STAMPINGS TO ORDER.

SPECIAL MACHINERY—MODELS—EXPERIMENTAL WORK. DROP FORGING—DIES AND DROP FORGINGS. HARDWARE SPECIALTIES ETC.—MANAGED TO ORDER. SEND SAMPLES OR DRAWINGS FOR ESTIMATES. WRITE FOR OUR BOOKLET.

THE GLOBE MACHINE & STAMPING CO.
970 HAMILTON ST., CLEVELAND, OHIO.

ICE MACHINES

Corliss Engines, Brewers' Milk Bottling Machinery, THE VILBER MFG. CO., 625 Clinton St., Milwaukee, Wis.

MODELS & EXPERIMENTAL WORK.

Inventions developed. Special Machinery. **E. V. BILLAARD**, 24 Frankfort Street, New York.

Dies, Tools, Models and Special Machinery.

HOFER & MOORE, Chicago, U. S. A.

BALLOONS

Aeronaut, L. Stevens, Box 181 Madison Sq., N. Y.

Experimental Work. Designs for Automatic Machinery. **G. M. MAYER, M.E.**, 1181 Monadnock Bl., Chicago, Ill.

Model Machinery and Experimental Work.

W. H. CLAWFORD, 134 Broadway, New York City.

THE SCHWEDTLE STAMP CO.

STEEL STAMPS, LETTERS & FIGURES. BRIDGEPORT—CONN.

MODELS

dies, boxes, metal stampings, patent articles, novelties, manufactured and sold. Printing on aluminum. U. S. Novelty Co., Lily Dale, N. Y.

RUBBER

Expert Manufacturers. Fine Jobbing Work. **PARKER, STEARNS & SUTTON**, 228-229 South St., New York

Experimental & Model Work

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

NOVELTIES & PATENTED ARTICLES

MANUFACTURED BY CONTRACT. PUNCHING DIES, SPECIAL MACHINERY. **E. KONIGSLOW & TOOL WORKS**, CLEVELAND, O.

Magical Apparatus.

Grand Book Catalogue. Over 700 engravings 25c. Parlor Tricks Catalogue, free.

MARTINKA & CO. Mfrs., 498 Sixth Ave., New York.

INVENTORS.

Our specialty is practically developing inventions. Design and build special, plain and automatic machinery, presses, dies, models, patterns and jigs. Send for Booklet No. 5. **A. NACKE & SON**, 236 42 St., Philadelphia, Pa.

INVENTORS

We manufacture METAL SPECIALTIES of all kinds. To order; largest equipment; lowest prices. Send sample or model for low estimate and best expert advice FREE. **THE EAGLE TOOL CO.**, Dept. A, Cincinnati, O.

SEALED PROPOSALS will be received at the office of the Light-House Engineer, Tompkinsville, N. Y., until 12 o'clock M., June 21, 1905, and then opened for furnishing miscellaneous articles for the Light-House Establishment, for the fiscal year ending June 30, 1906, in accordance with specifications, copies of which, with blank proposals and other information, may be had upon application to Lieut.-Col. W. T. Rossell, Corps of Engineers, U. S. A., Engineer.

AUTO STORAGE BATTERIES

ALL KINDS

THE WILLARD STORAGE BATTERY CO. CLEVELAND, O.

The Monthly **CONCRETE** is the standard publication upon Portland cement construction, and invaluable to cement workers, engineers and contractors. Send \$1.00 for a year's subscription or write for special offer. **Concrete Publishing Co., Dept. F, Detroit, Mich.**

Telegraphy

Circular free. Wonderful automatic teacher. 5 styles \$2.00. **OMNIGRAPH CO.**, Dept. 53, 59 Cortland St., New York.

MASON'S NEW PAT. WHIP HOIST

for Outrigger hoists. Faster than Elevators, and hoists direct from teams. Saves handling at less expense.

Manfd. by **VOLNEY W. MASON & CO., Inc.** Providence, R. I., U. S. A.

Send for this

Print your own cards, circulars, etc. Press \$5. Small newspaper press \$10. Money saver. Printfrothers, big profits. Typesetting easy, printed rules sent. Write to makers for catalogue, presses, type paper, etc. **THE PRESS CO., MERIDEN, CONN.**

BRAZE CAST IRON WITH BRAZIRON

Cheap, easy. Send 12 cents in stamps for information, testimonials and samples of Braziron and flux sufficient for several jobs.

THE A. & J. MANUFACTURING COMPANY
9 S. Canal St., Chicago, Ill.

We Make and Market Patented Articles

Experimental Work and Models. Metal Stamping and Die Work and General Machine Shop.

Anglo-American Corporation, 124 Baxter St., New York

TYPEWRITERS

ALL MAKES

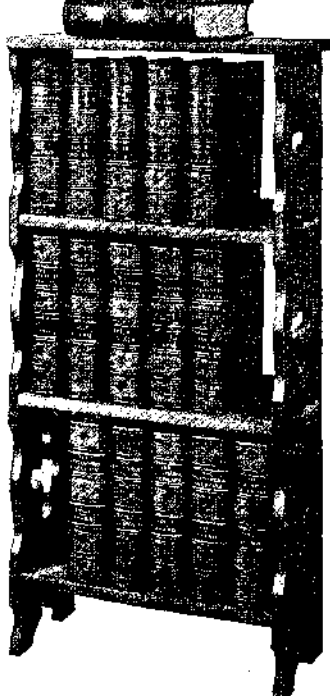
All the Standard machines SOLD or RENTED ANYWHERE at HALF MANUFACTURERS' PRICES. Shipped with privilege of examination. Send for Catalogue.

Typewriter Emporium, 303 LaSalle St., Chicago

PLUMBING SCHOOLS

WANTED—Men and boys to learn plumbing trade. We cannot supply demand for graduates. \$4.50 to \$5.00 per day. Eight weeks completes course. Earn while learning. Address for catalogue **COYNE BROS. Co.**, Plumbing Schools, Cincinnati, O., St. Louis, Mo. Employment guaranteed or money refunded.

Important Announcement



READERS OF THE SCIENTIFIC AMERICAN will be gratified to learn that the great work upon which they have been so long engaged is at last completed after years of patient labor and research and with the co-operation of America's foremost scholars and experts

THE NEW AMERICANA

stands as an achievement which has already met with the enthusiastic approval of the American people. The AMERICANA is the work which the condition of affairs in the Encyclopedia made necessary. Before ever a line was written for this great work the ideal was set: *A National Work—Universal in its information—American in its production.*

The AMERICANA is distinctly a National Work. It is made by Americans. Every section of America has been called upon to contribute, and for the first time in encyclopedia making North, South, East and West, Canada and South America have had full and true representation. The AMERICANA is NEW FROM COVER TO COVER—new and beautiful type, new maps, new engravings and plates in color, new text illustrations, and, best of all, NEW AND ORIGINAL TREATMENT THROUGHOUT by more than

One Thousand American Scholars and Special Writers

The AMERICANA is the only encyclopedia made in this country by a thoroughly organized body of skilled experts and literateurs each selected for his special fitness and intimate acquaintance with the subject assigned to him. These trained and progressive workers have struck out into new paths; they have proceeded upon an entirely new plan and that plan embodies the idea which has made our country the wonder of the nations—the idea of reaching the core of things by the shortest method. This is the American Plan. You'll catch the spirit of it as you turn the pages of the work and note its conscientious yet comprehensive, while the names of the eminent writers of the signed articles are an ample assurance of accuracy and authority. The AMERICANA has commanded the services of so many American educators, scholars and experts as to fully justify its title of the one great

National Reference Library

"I am truly delighted with the tone and arrangement of this strictly American publication."
—B. J. CIGRAND, Director Chicago Public Library.

"I consider it in every respect the best encyclopedia published."
—P. N. JOHNSTON, Reference Librarian, New York Public Library.

FREE No mere advertisement can convey an adequate idea of the vast interest and immense utility of the AMERICANA, or of its exceptional value and sumptuous appearance. We have therefore prepared for distribution among those really interested, a handsome 140 page book containing specimen pages, maps, full-page plates, two tones, color plates, and text illustrations, with 42 portraits of celebrities, full-page photographic plates, showing the fastest train in the world, the largest steamship ever built in America, the famous Flat-Aron Building, New York, the stage mechanism for the Opera of Paris, etc., etc.

We send you this beautiful and expensive book FREE on return of INFORMATION BLANK here printed.

INFORMATION BLANK

THE SCIENTIFIC AMERICAN CLUB,
258 Fifth Ave., New York City.

Without obligating myself to purchase I would like to receive FREE your 140 page Book of Specimen Pages, Maps, Duotones, Color Plates, Portraits, etc., of THE AMERICANA, with particulars of your special advertising proposition.

Name.....
Occupation.....
Street.....
Town and State.....

CUT OUT AND MAIL TO-DAY