

Business and Personal Wants.

READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send your name and address to the party desiring the information. In every case it is necessary to give the number of the inquiry.

Marine Iron Works. Chicago. Catalogue free. Inquiry No. 617.—For manufacturers of beads. For mining engines. J. S. Mundy, Newark, N. J. Inquiry No. 618.—For wholesale dealers in shells. "U. S." Metal Polish. Indianapolis. Samples free. Inquiry No. 619.—For rotary furnaces similar to those used in heating bolt blanks.

WATER WHEELS. Atcott & Co., Mt. Holly, N. J. Inquiry No. 620.—For manufacturers or dealers in horseshoe machinery. Yankee Notions. Waterbury Button Co., Waterbury, Ct. Inquiry No. 621.—For parties to make a patent self opening can.

Turbines.—James Lefell & Co., Springfield, Ohio, U.S.A. Inquiry No. 622.—For aluminium castings to be made by a concern near San Francisco. Dies & Special Machinery. Amer. Hdw. Mfg. Co., Ottawa, Ill.

Inquiry No. 623.—For manufacturers of small malleable iron castings. Machine chain of all kinds. A. H. Bliss & Co. North Attleboro, Mass.

Inquiry No. 624.—For manufacturers of gravers for half-tone finishing. Handle & Spoke Mch. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.

Inquiry No. 625.—For a machine to sow phosphate by horse power. Sheet Metal Stamping: difficult forms a specialty. The Crosby Company, Buffalo, N. Y.

Inquiry No. 626.—For a second-hand gasoline motor of about 8, 10 or 12 h. p. Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

Inquiry No. 627.—For manufacturers to assemble device having powerful springs attached under tension. Our number 4 Catalogue of Automobile parts, write us, Standard Welding Co., Cleveland Ohio.

Inquiry No. 628.—For manufacturers of dairy supplies for city creamery with steam separator, butter, ice cream machines, etc. Rigs that Run. Hydrocarbon system. Write St. Louis Motor Carriage Co., St. Louis, Mo.

Inquiry No. 629.—For manufacturers of light springs, such as are used in typewriters. FOR SALE.—Patented invention, "Nut Lock." S. Koralewski, 19 Eagle Block, 20th Street, Pittsburg, Pa.

Inquiry No. 630.—For parties engaged in punching and other light machine work. Ten days' trial given on Daus' Tip Top Duplicator. Felix Daus Duplicator Co., 5 Hanover St., N. Y. city.

Inquiry No. 631.—For power looms for weaving fine cloth 30 to 40 mesh 48 inches wide. SA WMILLS.—With variable friction feed. Send for Catalogue B. Geo. S. Comstock, Mechanicsburg, Pa.

Inquiry No. 632.—For manufacturers of peat-pressing machines, also for parties controlling plants for the manufacture of peat into paper. For Sale. Foundry and Machine Shop, doing a good business, in a fine locality, at a great sacrifice. Address Foundry, Box 773, New York.

Inquiry No. 633.—For a double-headed, two-inch bolt cutter with oil pump and counter shaft. Second-hand preferred. Automobiles built to drawings and special work done promptly. The Garvin Machine Co., 149 Varick, cor. Spring Streets, New York.

Inquiry No. 634.—For machinery for grinding lawn mowers. The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foot of East 138th Street, New York.

Inquiry No. 635.—For parties having facilities for making pens. The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4. Munn & Co., publishers, 361 Broadway, N. Y.

Inquiry No. 636.—For parties willing to manufacture special machines. Sheet Metal Novelties, Articles and Stampings of all sizes. Tools and dies manufactured on contract. Address Standard Stamping Co. Cor. 7th & Hudson Sts., Buffalo, N. Y. U. S. A.

Inquiry No. 637.—For machinery for making back saws. WELL DRILLERS.—St. Landry Oil and Mineral Co., Opelousas, La., will receive proposals until May 20, for drilling oil well. Bond required and usual rights reserved. St. Landry Oil and Mineral Co.

Inquiry No. 638.—For complete plant for photo-engraving or half-tone work. WANTED.—An experienced specification writer and patent expert having a thorough knowledge of the patent practice and preferably one competent to handle electrical cases. Munn & Co., Solicitors, Office of SCIENTIFIC AMERICAN, 361 Broadway, New York.

Inquiry No. 639.—For ice machinery. Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.

Inquiry No. 640.—For water swivels and rotaries for drilling rotary oil wells. Inquiry No. 641.—For manufacturers of electric smelters suitable for copper ores.

Inquiry No. 642.—For latest improvements and labor-saving devices (except in forgings) in manufacture of pocket cutlery. Inquiry No. 643.—For parties to make table tops of alternate strips of cherry and black walnut, or other suitable hardwood glued together under pressure.

Inquiry No. 644.—For machinery to straighten iron pipes warped by fire. Inquiry No. 645.—For quarry stripping machines. Inquiry No. 646.—For a safe process for heating hot water boilers by crude oil.

Inquiry No. 647.—For manufacturers of adhesive tacks for hanging pictures. Inquiry No. 648.—For an improved process for extracting the juice out of living India rubber trees. Inquiry No. 649.—For dealers in oxide vanadium, or a salt of the metal. Inquiry No. 650.—For manufacturers of novelties for the mail order business.

Inquiry No. 651.—For cautery batteries, knives and burners for surgical use.

Inquiry No. 652.—For rotary knives.

Inquiry No. 653.—For crude oil burners suitable for heating and cooking stoves, also an apparatus for burning crude oil in furnaces and boilers.

Inquiry No. 654.—For second-hand pinion cutter for cutting pinions about 2 to 10 inches in diameter.

Inquiry No. 655.—For manufacturers of hemlock tanned leather 1/2 inch thick.

Inquiry No. 656.—For parties to manufacture a new electrical device that has a balance wheel and hair spring enclosed in a nickel-plated case, with a brass bezel and glass front.

Inquiry No. 657.—For a second-hand Otis elevator engine 7-inch cylinders right hand.

Inquiry No. 658.—For second-hand 10 horse and 5 horse motors and arc light dynamo of 30 lamps.

Inquiry No. 659.—For a 48-inch swing lathe, bed not over 10 feet.

Inquiry No. 660.—For manufacturers of electric fans for hotels.

Inquiry No. 661.—For bolt header or other inexpensive machine for making pins, etc., 3/4 inch to 1 1/2 inch diameter; also machine for punching 1/2-inch holes through such pins.

Inquiry No. 662.—For apparatus for bottling soda pop, and for the necessary bottles.

Inquiry No. 663.—Wanted at once from stock soft bright (white) ribbon steel as a substitute for sheet brass, sizes about No. 13, 1/4 inch wide; No. 16, 1/2 inches wide; and No. 20, 3/4 inch wide.

Inquiry No. 664.—For dealers in small stamped out articles made of leather, such as tops for umbrellas, mattress tufts, etc.

Inquiry No. 665.—For manufacturers of all kinds of ax handle machinery.

Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and though we endeavor to reply to all either by letter or in this department, each must take his turn. Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same. Special Written Information on matters of personal rather than general interest cannot be expected without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price. Minerals sent for examination should be distinctly marked or labeled.

(8184) F. P. H. asks: Would you, through your information department, tell me why a condenser on an induction coil reduces the sparking at the platinum point of the circuit? A. When the primary circuit of a coil is closed, a current is induced in the primary coil by the rush of the battery current through it, which flows in the opposite direction to the battery current, and thus weakens and retards its effect. When the circuit is broken a current is induced in the primary circuit in the same direction as the primary, or battery current, which thus increases the effect of the battery current. This is called the extra current. It is this which produces the spark at the platinum point, which would be rapidly burned away, were it not for the condenser. When the circuit is broken, the large surface of the condenser is a reservoir, as it were, to receive the rush of the current. As soon as it is full, the condenser discharges itself backward through the primary coil, to which it is connected for this purpose. This discharge, being in the opposite direction to the primary current, demagnetizes the core very rapidly and makes the secondary spark on the break much stronger. The spark at the platinum point is prevented because the current can rush into the condenser easier than to jump the spark gap at the platinum point. This is, however, only one object attained by the condenser. The outrush of this charge makes the secondary spark at break much larger. Indeed, in a coil properly adjusted there is no secondary spark at the closing of the primary circuit, but only at the break of the circuit.

(8185) T. J. Y. asks: 1. What is the difference in the winding of a bridge and series telephone bell? A. The armature of the bridging magneto is wound to a higher resistance than that of the ordinary or series magneto. 2. Can a series bell be rewound so as to make it a bridge bell? If so, how? Can they be rewound and used without rewiring the 'phone? A. The series armature may have from 300 to 650 ohms, while the bridging bell has its armature wound to 1,000 to 1,600. If there is room for the wire, it may be added to the present coil till the proper resistance is reached. Otherwise the old coil should be unwound and replaced with wire which will give the proper resistance. No. 33 wire is commonly used for the coils. 3. Can you recommend some cheap book on telephones and their construction that would give this and other information in full? A. The best book is the cheapest in the end. This is Miller's "American Telephone Practice," price \$3 by mail. It covers the subject.

(8186) M. T. H. asks: I would like to know if malleable iron has as high a permeability as wrought iron or steel, and which is the best? A. Malleable cast iron is intermediate between cast and wrought iron, and mild-annealed steel has very nearly the same permeability as wrought iron. Soft steel is much used for cores of dynamos. Wrought iron or mild steel is the best.

"Star" Foot and Power Screw Cutting Lathes. Automatic Cross Feed. FOR FINE, ACCURATE WORK. Send for Catalogue B. SENECA FALLS MFG. CO. 695 Water Street, Seneca Falls, N. Y., U. S. A.

THE STEAM TURBINE; THE STEAM Engine of Maximum Simplicity and of Highest Thermodynamic Efficiency. By Prof. R. H. Thurston. A valuable series of articles having cuts of some of the most efficient engines of this type—the Parsons, De Laval, Dow, etc.; with exhaustive tables giving the result of tests and much general data on the subject. Contained in SUPPLEMENT Nos. 1309, 1307 and 1308. Price 10 cents each. For sale by Munn & Co. and all newsdealers.

ENGINE & FOOT TOOLS AND SUPPLIES. SEBASTIAN LATHE CO. 29 CENTRE ST. CINCINNATI, O.

COMPLETE TOOL LIST

comprising those in use by every trade or profession, with market prices and discounts of same is Montgomery & Co.'s Tool Catalogue. Best book of reference in the world for tools of all kinds. 510 pages, illustrated, pocket size. By mail for 25c. MONTGOMERY & CO., 105 Fulton St., New York City.

Acetylene Gas Lighting

Reduced to the most Efficient, Safest, Simple and Economical Use. We guarantee our machines perfectly automatic in action, to extract all the gas from the carbide, and absolutely no over production or loss of gas. Approved by the various Boards of Fire Underwriters. Standard sizes 10 to 150 lights. Exclusive territory given to responsible agents. Correspond with NIAGARA FALLS ACETYLENE GAS MACHINE CO., Niagara Falls, N. Y. and Canada.

FOR LIGHT AND MEDIUM WORK this new 14 inch B. F. BARNES Upright Drill is several laps ahead of any other drill on the track. It will drill from 1/16 of an inch up to 3/4 of an inch and is a strong, well built, durable tool. It doesn't cost a whole lot either. Details are yours for the asking. B. F. BARNES COMPANY, Rockford, Ill.

FOR VEHICLE AND MARINE PURPOSES. Nothing better or more economical than our four-cylinder motors. Possess every known point of excellence. Durable in every part. Detachable igniters, heavy bearings and shifting spark, water-jacketed head, runs any speed from 100 to 1500 per minute. 4 to 10 H. P. Fully guaranteed, Ground joints throughout. Buffalo Gasoline Motor Co., Buffalo, N. Y., U. S. A. Apply for Catalogue.

NEW IMPROVED Microscope for Projection. New metal track plate with keys to unlock standard and change instantly combining also polariscope and stamioscope. New series of projection objectives, with flat field, well lighted and clear definition. New sub-stage condenser on a new system. Illustrated circular catalogue, etc., free. QUEEN & CO., 1010 Chestnut St., Philadelphia, Pa.

IT SIMPLIFIES DIFFICULT WORK There are many unique features in our Hand and Power Pipe Threading and Cutting Machine. It has our Standard Adjustable Quick Opening and Closing Die Head with convenient "cam" movement. Five Chasers, set by graduation to any size needed. Can be released from Threading while in motion, opened to permit pipe being cut and closed instantly and positively. Send for Catalogue. THE MERRELL MANUFACTURING CO., 501 Curtiss St., Toledo, Ohio

NICKEL AND Electro-Plating Apparatus and Material. THE Hanson & VanWinkle Co., Newark, N. J. 136 Liberty St., N. Y. 30 & 32 S. Canal St. Chicago.

GASOLINE MOTOR CASTINGS For MARINE, VEHICLE and BICYCLE MOTORS, with Working Drawings. LOWELL MODEL CO., 22 Wiggin St., Lowell, Mass.

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. 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., 126 LIBERTY STREET, NEW YORK, U. S. A.

INDEX OF INVENTIONS

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

May 7, 1901, AND EACH BEARING THAT DATE.

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

Table listing inventions with patent numbers and names of inventors. Includes items like Acetylene generators, Air apparatus, Apron fastener, Atomizer, Awning for lawn swings, Bag, Bag or envelope, Baker, Basin stepper, Basins, Batteries, Battery cell, Bayonet, Bearing, Bedstead, Bell, Belt, Billiard cue, Billiards, Binder, Blower, Boiler, Bolt, Book, Boot, Bottle, Bowls, Brake, Bridge, Broom, Brush, Bunsen burner, Burial apparatus, Button, Cabinet, Camera, Can, Can closure, Cane, Car, Car seat, Car spring, Carbureter, Carpet, Cash register, Caster, Castings, Chain link, Chair, Chalk line, Chatelaine bag, Cheese cutter, Churn, Cinder and ashes separator, Cistern, Clamp, Clothes line, Coat lapel spring, Coffee roaster, Coffee roasting apparatus, Coin controlled apparatus, Coin operated machine, Compass, Composition of matter, Concentrator, Conduit, Conveyor, Conveying apparatus, Cooler, Copying press, Core making machine, Corn cutter, Couches, Crane, Crane, Crate, Crushing roll, Current regulator, Currycomb, Curtain pole, Curtain rod, Cushion beating machine, Cutting machine, Cycle frame, Cycle gearing, Cycle pedal, Cycle duck, Dentistry, Desk, Die, Dies, Dish washing, Disinfecting, Display device, Door guard, Draft, Draft equalizer, Draft rigging, Drier, Drying and ventilating apparatus, Drill, Drill apparatus, Drum, Dumb waiter, Dust collector, Dust pan, Dusting and sweeping apparatus, Dye, Dye and making same, Dye and making same.

(Continued on page 317)

AUTOMOBILE PARTS

IF YOU ARE BUILDING AN AUTOMOBILE, WE CAN SUPPLY YOU WITH PARTS AND FITTINGS.

IN OUR SEVEN FACTORIES WE MAKE RUNNING GEARS, TOOL STEEL BALLS, STEEL RIMS, STEEL STAMPINGS, CHAINS, SHEET STEEL AND FORGINGS.

ALL FOR AUTOMOBILE CONSTRUCTION

QUOTATIONS ON APPLICATION

THE AUTOMOBILE & CYCLE PARTS CO.

CLEVELAND, OHIO.

TO MINE OWNERS

You need a Hoisting Engine. You want the best, strongest, safe, most up-to-date engine that is made. The most durable and yet the greatest saver of money. Send for our free catalogue and state the size of engine you want. We build them for mines, quarries and docks. Both for electric and gas engine. Write to E. H. P. All parts easily interchangeable.

WEBER GAS & GASOLINE ENGINE CO., P. O. Box 1114-u, Kansas City, Mo.

GAS and GASOLINE ENGINES

1-4 and 1 horse power MARINE and STATIONARY.

Built in accordance with the latest practice in Gas Engine design. Also complete set of castings. Write for particulars.

CLIFTON MOTOR WORKS,

233 E. Clifton Ave., Cincinnati, Ohio.

The "Wolverine" Three Cylinder Gasoline Marine Engine.

The only reversing 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 to 30 H. P.

WOLVERINE MOTOR WORKS,

Grand Rapids, Mich.

RUBBER STAMP MAKING.

THIS article describes a simple method of making rubber stamps with inexpensive apparatus. A thoroughly practical article written by an amateur who has had experience in rubber stamp making. One illustration. Contained in SUPPLEMENT 1110. Price 10 cents. For sale by Munn & Co. and all newsdealers.

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,

128-129 Mont St., New York, Markt & Co., London, Hamburg, Paris

The AUTOSPARKER

The completion of the Gas Engine.

Throw away your batteries and use them no more. The Autosparker saves its cost many times over during the life of your engine. Address **MOTSINGER DEVICE MFG CO.,** Pendleton, Ind., U. S. A. or any gas engine or motor carriage manufacturers

IMPROVED GASOLINE BURNER

Gas is admitted through circular slots instead of perforations. It is fitted with pilot light. Can be left burning any length of time. Carriage is always ready to start. This burner is a quick steamer, gives a blue flame, and will not light or blow back. It is fitted with automatic fire regulator which shuts gas off from main burner at any desired pressure.

FRANK MILNE, Everett, Mass.

HIGHEST EFFICIENCY attained in the STOVER GASOLINE ENGINE

The best is always cheapest. Write for prices.

STOVER ENGINE WORKS, FREEPORT, ILL.

THE AUTO-CARBURETTOR

made upon a new principle furnishes a reliable explosive mixture. Easy ignition and greatest expansion. No pump required. Uses any grade of gasoline with no waste. Especially adapted to automobile and cycle motors. Our customers say it is the best Carburetor in the market. We make also the Register Valve for controlling the flow of gasoline or other fluids. Write us for prices and booklet on Carburetors. Gasoline and Steam Engines and Automobiles built to order and repaired.

The Avery & Jenness Co., 60 South Canal St., Chicago.

CREST MFG. CO.

CAMBRIDGEPORT, MASS.

3 to 5 H. P. MOTORS

CREST Sparking Plug

Coils Batteries Carburetors

THE JOHNSON ROTARY PUMP.

Simple of 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.

Dye and making same, green blue, Bender & Mayer	673,632
Dye, anthraquinone, O. Bally	673,601
Edge iron, F. H. Rutheneyer	673,456
Electric coils, manufacture of solenoid or other, L. A. Henry	673,531
Electric controller, W. Morrison	673,585
Electric motor controller, O. F. Shepard, Jr.	673,731
Electric resistance, device employing, C. Robinson	673,476
Electric signal and telephone system, C. L. Fortler	673,791
Electric transformer, L. M. Pignolet	673,507
Electrical outlet boxes, bushing for, H. Krantz	673,856
Electrode connector, L. L. Roberts	673,453
Electrolytic apparatus, L. L. Roberts	673,452
Electrolytic decomposition, G. & G. W. Bell	673,751
Electromagnet and annunciator, Scribner & McBerty	673,628
Emery wheel dressing tool, J. A. Butler	673,634
Engine. See Gas engine. Rotary engine.	673,670
Engine shut off mechanism, C. F. Cowdrey	673,513
Envelop opener, G. C. Bayne	673,375
Excavator bucket tooth, A. M. Cupples	673,423
Explosive and making same, colloid, J. B. Bernaldon	673,377
Eye-glasses, shaded, J. B. Ricketts	673,781
Eyeletting machine, P. R. Glass	673,814
Fabric cutting machine, H. A. Meyer	673,405
Fabric turning implement, C. Sebastian	673,720
Fan, J. E. Robinson	673,477
Fare indicator, O. Kuntzen	673,401
Fastening for strings, cords, etc., A. S. Nichols	673,472
Feeder, boiler, C. L. King	673,543
Feeding folded blanks, mechanism for, E. F. Hanson	673,680
Fence, W. L. Soles	67,454
Fence fastener, cross wire, G. W. Hooker	673,557
File, J. L. Dean	673,387
File sharpening and regrinding apparatus, E. C. Huntley	673,576
Filter, pressure water, C. Diehl	673,597
Firearms, ejector mechanism for breech loading, King & Hayes	673,641
Fire extinguisher, chemical, E. J. Chapman	673,283
Flash light apparatus, S. S. Pingree	673,474
Flooring machine, W. O. Vivartas	673,529
Fuel and treating same, E. D. Douglass	673,954
Furnaces and means for plugging same, iron notch for blast, J. M. Hartman	673,556
Game, R. W. Conant	673,535
Gas burners, spark discharging device for electric lighting for, P. Hoffmann	673,713
Gas engine, J. Eckhardt	673,427
Gas engine, W. O. Worth	673,809
Gas generator, acetylene, P. F. & T. E. McCaffrey	673,843
Gas making apparatus, C. J. Johnson	673,542
Glass bending apparatus, plate, T. W. Conington	673,615
Glass rolling machine, J. T. Hugh	673,837
Glass sheets or plates, apparatus for the manufacture of, J. Proeger	673,548
Glue press, A. S. Nichols	673,400
Glue spreading machine, power, A. S. Nichols	673,410
Gold saving, placer mining, amalgamating, and concentrating machine, G. C. Walters	673,806
Governor, combined speed and pressure, J. W. Gardner	673,575
Grate, C. Patterson	673,844
Greenhouse, A. Dietsch	673,497
Gun lock, E. H. Thorneley	673,503
Gutta percha, refining characteristic gums of, E. F. von Wilimowsky	673,570
Hair crimper, A. E. Fenley	673,691
Hair fastener, M. Potter	673,419
Hair retainer, W. Nowacke	673,650
Hammer, power, T. W. Breckenridge	673,997
Harrow, spring tooth, C. S. Sharp	673,738
Harvester, D. T. Denton	673,389
Harvester covering, J. F. Appleby	673,593
Hay crane, J. E. Thompson	673,486
Hay press, J. A. McRae	673,623
Head rest and chair seat, combined, L. H. Deaner	673,437
Heddle and heddle frame, W. Febr	673,493
Heel, J. H. Reed	673,450
Hinge, J. R. Carter	673,573
Hook and eye, J. R. Haron	673,773
Horse sunshade, J. F. Haron	673,738
Horseshoe attachment, J. Ricks	673,728
Hose band, F. W. Chaffee	673,852
Hot air furnace, J. W. Hornsey	673,337
Hot air furnace, J. W. Hornsey et al.	673,434
Hot air motor, Thornton & Lea	673,462
Hub, vehicle, E. Sendelbach	673,850
Hub, wheel, W. P. Bettendorf	673,415
Hunter's tool, J. R. & J. A. Sullivan	673,999
Hydrant, J. J. Sullivan	673,668
Incandescent mantle support, M. & A. Herskovitz	673,304
Index, card, F. Macey	673,408
Insulating purposes, machinery for covering electrical or other wires for, W. W. Colley	673,691
Ironing machine, G. F. Kuhnle	673,683
Irrigating device, H. Blueher	673,695
Jars, etc., closure for, C. Y. Whiter	673,570
Journal box, G. S. Mars	673,920
Kilns, means for utilizing waste heat in, F. E. & H. E. Frey	673,520
Label pasting machine, E. E. Rothchild	673,565
Ladle stopper, G. W. Baldt	673,651
Lamp, flash, J. Courtier	673,283
Lamp, signal, R. J. Armour	673,751
Lamps, safety catch for incandescent electric, G. B. Millen	673,503
Last, N. W. Arnold	673,571
Lathe, F. Duncan	673,703
Lenses, making, A. Riekl	673,647
Life preserver, H. A. Aqvad.	673,672
Liquids from or discharging liquids into vacuum, apparatus for removing, E. L. & D. McGary	673,650
Lock, E. L. Appleby	673,612
Locomotive draft appliance, J. Plaver	673,726
Loom let off and take up mechanism, W. F. Kintzing	673,828
Loom lug strap, F. A. Millis	673,582
Loom shuttle motion, W. F. Kintzing	673,839
Loom shuttle, self threading, E. S. Stimpson	673,821
Loom warp stop motion, H. Jones	673,518
Loom warp stop motion, E. S. Stimpson	673,824
Lubricator, Gray & Cox	673,836
Lumber hook, L. G. Wade	673,930
Malt turning apparatus, Franz & Jiroutek	673,835
Manifolding register, T. McDowell et al.	673,724
Mason's platform for buildings, C. J. Clark	673,784
Match base, J. Koster	673,537
Match, headless, C. Haselwarter, Jr.	673,420
Match, sheet, Christoph & Hart	673,420
Measuring and delivering liquids, apparatus for, A. Brake	673,532
Medicinal use, pad for, F. W. Warner	673,630
Metal sheets or plates, manufacturing compound, E. Martin	673,525
Metal turning machine, J. Midhae, Jr.	673,496
Metal working machine, A. B. Tenney	673,490
Metallophone, A. R. Wiley	673,495
Microtelephonic apparatus, J. Beulmer	673,512
Mirror support, Bader & Cartwright	673,752
Miter box attachment, W. Potter	673,785
Money, etc., safety holder for paper, B. G. Devich	673,574
Monkey wrench, L. H. Kroke	673,521
Mortising machine, R. S. Brown	673,378
Mortising machine, W. J. Smith	673,737
Mower, Murray & Penny	673,725
Necktie and collar fastener, combined, R. E. L. Johnson	673,797
Newspaper delivering machine, coin controlled, W. S. Conner	673,760
Nozzle, T. F. Burke	673,756
Numbering machine printing wheel, O. S. Follett	673,518
Nut lock, automatic, G. L. Eason	673,832
Operating table, W. F. Bernstein	673,675
Ordinance breach closing mechanism, Darmancler & Balzon	673,702
Ordinance, semi automatic, breech loading, W. H. Bevans	673,594
Ore concentrating table, V. Willits	673,489
Ore jigger, A. L. Le Grand	673,607
Oven, W. Frohne	673,771

THE MUTUAL LIFE'S 5% Gold Bonds

Are as safe as Government Bonds and Give more than four times the net returns of U. S. 5% bonds.

The Mutual Life's 5% Gold Bonds yield 5 per cent.

U. S. 5% Bonds, because of premium, yield about 1 per cent.

Government Bonds must be paid for, spot cash. The Mutual Life's Bonds are to be paid for during 10, 15, or 20 years, or life, and in every case are full paid and deliverable either at maturity if living, or whenever death occurs, no matter if but one premium payment has been made. They are coupon bonds, in denominations of \$1,000, and, if desired, the Company will agree to cash them at \$1,305 for each \$1,000 as soon as they are deliverable.

Write or ask for particulars.

Business men and Capitalists are taking these bonds in large amounts.

The Mutual Life Insurance Co.

OF NEW YORK

RICHARD A. McCURDY, President

Is the largest, strongest, most progressive Life Insurance Company in the world. Its policies are liberal, free from technicalities, and meet every requirement of protection and investment.

Total Cash Assets of the United States Government (including \$150,000,000 gold reserve), January 1, 1901	\$290,107,072
Assets of the Mutual Life for the protection of policy-holders, January 1, 1901	\$325,753,152
Income Mutual Life in 1900	\$60,582,802.31
Paid policy-holders in 1900	26,361,863.83
Insurance and Annuities in force, Jan. 1, 1901	1,141,497,888.02

BETTER THAN SAVINGS BANKS

Ask for 5% Gold Bond Printed Matter—FREE

ROOM 601.

Head Office: Liberty, Nassau & Cedar Streets, New York.

A PLEASURE LAUNCH

Must have speed, combined with safe and reliable power; she must be built upon lines of grace and beauty. The "Recreation" covers these requirements. In its use you are tranquil in mind, body and estate, no fixing and figuring upon "her going." Minimum weight, maximum power, economy of maintenance. Throttle speed regulator. Write for circular "S."

WESTERN GAS ENGINE CO., MISHAWAKA, IND.

GERE GASOLINE ENGINES

SIMPLEST BOAT ENGINE MADE

CABIN—OPEN BOATS

ENGINE CASTINGS, BOAT FRAMES

GEORGE YACHT LAUNCH WORKS, GRAND RAPIDS, MICHIGAN.

HOT BLAST WATER JACKET FURNACES FOR COPPER ORES.

MATTE FROM SULPHIDES AT ONE OPERATION.

UNION IRON WORKS, San Francisco, Cal., U. S. A.

Send for Catalogues.

LET US START YOU! \$100.00 MONTHLY

Gold, Silver, Nickel and Metal Plating. At home or traveling, taking orders, using and selling Prof. Gray's Machines, Plates, Watches, Jewelry, Tableware, Bicycles, all metal goods. No experience. Heavy plate. New methods. We do plating, manufacture outfits, all sizes. Guaranteed. Only outfits complete. All tools, lather, material, etc., ready for work. We teach you, furnish secrets, formulas free. Write today. Pamphlet, samples, etc. FREE.

P. GRAY & CO., Plating Works, CINCINNATI, O.

BICYCLE TIRE REPAIRING.—THE Mending of Single Tube Tires.—A practical article illustrating the method of inserting patches and plugs with pliers and pluggers, together with rubber band plugging and the use of puncture bands. 3 illustrations. Contained in SUPPLEMENT 1112. Price 10 cents. For sale by Munn & Co. and all newsdealers.

PROSPECTIVE BOAT BUYERS.

By constructing your boat from a set of my Boat Building Materials more than one-half the boat factory's price can be realized. Also economize freight 500 per cent. Launchees, Sail and Row Boats, Gasoline Engines. Catalog free.

FRED MEDART, 3545 DeKalb St., St. Louis, Mo.

THE NEW BRISTOL COUNTER

Registers an accurate account of work done on printing presses, grain tallies, 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.

HOLD ON THERE!

Send 3c. for catalog of Monarch Marine Gasoline Engines 3/4 to 4 1/2 H. P. \$200 up.

Grand Rapids Gas Engine & Yacht Co., Grand Rapids, Mich.

DRY BATTERIES.—A PAPER BY L. K. Bohm, treating of open circuit batteries, historical dry batteries, modern dry batteries, Bales' batteries, Bryan's battery, Koller's battery, and the efficiency of dry cells. With three illustrations. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1101. Price 10 cents. To be had at this office and from all newsdealers.

SAVE MONEY BY USING THE COMMERCIAL MUTOSCOPE.

Takes the place of expensive demonstrations. A moving picture showing your device in action. In a small, compact traveling case. Infinitely superior to models. Send for illustrated pamphlet and prices.

AMERICAN MUTOSCOPE & BIOGRAPH CO., 841 Broadway, New York.

PERFORATED METAL

OF EVERY DESCRIPTION AND FOR ALL USES.

THE HARRINGTON & KING PERFORATING CO., 225 N. UNION ST., CHICAGO, ILL., U.S.A.

GRAND PRIZE, PARIS, 1900. HIGHEST AWARD POSSIBLE.

FROM A TO Z THE SMITH PREMIER WILL FULLY MEET YOUR EVERY TYPEWRITER REQUIREMENT BUILT RIGHT - WORKS RIGHT USED BY THE LEADING MANUFACTURERS AND MERCHANTS EVERYWHERE...

The Typewriter Exchange



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. 636 California St., SAN FRANCISCO, CAL.

Perfection Air Mattresses FOR CAMP - YACHT - HOME - HOSPITAL NON-ABSORBENT, HYGIENIC, ODOORLESS. When deflated can be rolled into small package for storage or transportation.

THE Topophone, \$25 PREVENTS MARINE DISASTERS IN FOGS.

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.

"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.

ARMATURE WINDING, RIGHT AND LEFT HANDED.—An important paper for all amateurs. 17 illustrations. SCIENTIFIC AMERICAN SUPPLEMENT No. 1134. Price 10 cents.

WILL SELL OR HAVE MADE ON ROYALTY this PATENTED NOVEL PIPE AND STUD WRENCH.

EUROPEAN PATENTS FOR SALE.

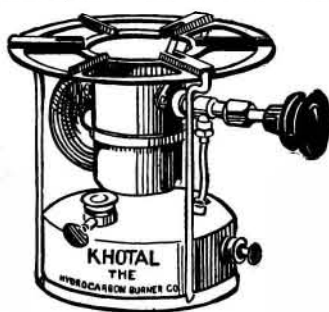


I own the European rights—France, Germany and Belgium—of a useful and cheap kitchen utensil that will sell at sight. It is a Pot and Pan Scraper, so constructed that it can be handled at either end, for scraping out pots, pans, cupboards, spoons, etc., whether of square or round shape.

Buy the Dearborn Special and get a genuine American model Full Jeweled adjusted, patent regulator, stem wind and stem set, movement WARRANTED 20 YRS. ladies' or gents' size 14k Gold plate hunting case, elegantly engraved.

Oven, annular chamber, L. O. Boeing..... 673,696 Paper for sympathetic ink, E. Kretschmann..... 673,400 Paper making machine dandy roll, Johnson & Garnett..... 673,523 Pen, fountain, E. Relsert..... 673,451 Pencil, helical grip paper, D. M. Dickinson..... 673,469 Pencil sharpener, M. S. Fortunati..... 673,770 Pharmaceutical implement, G. L. Allen..... 673,592 Phonogram or record holder, multiple, Baker & Clayton..... 673,413 Phonograph horn or trumpet, G. L. Hogan..... 673,396 Photographic printing frame, H. Higgins..... 673,522 Piano player, automatic, E. M. Skinner..... 673,736 Picture mat cutting machine, C. I. Shawver..... 673,483 Pile, concrete, G. L. Mouchel..... 673,443 Pile, concrete, G. L. Mouchel..... 673,780 Pineapple shed, G. M. Yancey..... 673,819 Placket fastener, P. A. Chellis..... 673,759 Plow, G. A. Kelly..... 673,606 Pneumatic despatch tube carrier, A. W. Pearsall..... 673,725 Pouch, C. C. Rahn..... 673,821 Power transmission device, H. A. Knox..... 673,643 Precious metal bearing ores, treating, Duncan & Beach..... 673,425 Press for cotton, wool, hay, etc., J. M. King..... 673,544 Pressure regulator, H. Shoemaker..... 673,732 Pressure tank, T. M. Murphy..... 673,842 Printing machine, E. Prebay..... 673,475 Printing plate holder, E. R. Storm..... 673,485 Printing press gripper, V. A. Hancock..... 673,555 Propeller, G. H. Cove..... 673,468 Propeller, D. H. Rohwedder..... 673,787 Propelling machine, hand boat, G. W. Prouty..... 673,583 Propelling mechanism, hand boat, G. W. Prouty..... 673,584 Pulverizing mill, F. L. Kent..... 673,956 Pump, H. C. Stouffer..... 673,780 Pump, differential, J. H. Fox..... 673,602 Pump rod grip, Foster & Richey..... 673,679 Pumps, governor valve for automatic, N. A. Smithwick..... 673,508 Punching machine, note sheet, H. M. Salzer..... 673,586 Radiator, steam, G. W. Eycleshymer..... 673,767 Rail bond, W. T. Pringle..... 673,690 Rail bond, tiltale, J. A. Emery..... 673,765 Rail joint, Nichols & Yoynow..... 673,649 Rail joint, A. Barr..... 673,811 Rail joint, C. B. Yoynow..... 673,829 Railway conduit, electric, F. Hewer..... 673,538 Railway controller, electric, E. M. Bentley..... 673,531 Railway switch, Voynow & Angerer..... 673,590 Railway switch, D. H. Cleveland..... 673,637 Railway tie, metallic, Hayward & Bryson..... 673,639 Ram, hydraulic, W. L. Deming..... 673,764 Reflector, R. B. Lamb..... 673,840 Refrigerating apparatus, condenser for, C. W. Vollmann..... 673,865 Refrigeration, G. A. Manwaring..... 673,561 Rein guard for vehicle thills, J. E. Coleman..... 673,422 Rheostatic support, J. P. Erie..... 673,392 Rheotrope, W. Morrison..... 673,504 Riveting apparatus, J. H. Mull..... 673,444 Riveting apparatus support, J. J. Tynan..... 673,487 Riveting machine, J. H. Allen..... 673,631 Riveting tools, apparatus for supporting, J. H. Mull..... 673,408 Rolling mill, C. Merzadour..... 673,407 Rolling system for continuous metal, T. V. Allis..... 673,791 Rope clamp, J. A. Lawler..... 673,658 Rotary engine, J. Dow..... 673,470 Rotary engine, D. Morell..... 673,648 Rubbing or polishing machine, P. H. Barz..... 673,692 Ruler, measuring slide, M. Kleinberger..... 673,579 Sash fastener, G. W. Durant..... 673,498 Sash holder, M. Sebastian..... 673,729 Sash lock, W. J. Potter..... 673,783 Sash, reversible window, G. Hoersch..... 673,655 Saw, B. N. Nelson..... 673,624 Saw set, W. E. McKie..... 673,416 Sawmill set works, W. T. Brown..... 673,493 Scale attachment, weighing, H. D. Lane..... 673,684 Scale, computing even balance, E. Finn..... 673,834 Seattle door, A. Velt..... 673,583 Scythe guard fastening device, D. Schumann..... 673,479 Seaming or like machine, can, C. F. Mendham et al..... 673,720 Separator, J. Anderson..... 673,671 Sewing machine ruffer and braider attachment combined, J. Younce..... 673,490 Sewing machine welt guide, H. Marshall..... 673,719 Sewing on buttons, machine for, F. T. Lellich..... 673,851 Shade or curtain fixture, R. W. Morgan..... 673,779 Shaft coupling, vehicle, C. L. Welhe..... 673,650 Sheet metal, cast, J. W. Wallace..... 673,550 Shepherd's crook, J. E. Thurmond..... 673,629 Shingle, metallic roof, P. H. Bennett..... 673,611 Shoe tree, G. E. Belcher..... 673,492 Show case, J. S. Harper..... 673,712 Sidewalk covering or protector, R. Lustig..... 673,529 Sign, A. L. Melvin..... 673,562 Sign, illuminated, E. A. Mowham..... 673,647 Signaling by night, apparatus for, L. Sellner..... 673,481 Signaling system, electrical, H. E. Bennett..... 673,376 Siphon, J. M. Nye..... 673,546 Skirts, apparatus for marking and trimming lower edges of, M. Newgarden..... 673,782 Sleigh, bob, W. C. Pierce..... 673,626 Soap holder, A. E. Seashols..... 673,661 Soap supplier, J. Schwechler..... 673,662 Sodium compounds, reducing, A. H. Cowles..... 673,761 Soldering apparatus, T. L. Carbone..... 673,554 Soldering iron, W. J. Holway..... 673,775 Spark arrester, F. M. Philip..... 673,689 Spring edge seat, J. Staples..... 673,509 Squaring shears, automatic hand over for, G. C. Mors..... 673,721 Steam boiler, C. F. Bergmann..... 673,414 Steam boiler, multitubular, P. W. Burke..... 673,494 Steam generating apparatus, Douglne & Reynolds..... 673,707 Steam generator, J. W. Sutton..... 673,667 Steering gear, mechanism for recording the movements of, J. E. Liarde..... 673,777 Storage battery, Chamberlain & Sutphen..... 673,674 Storage battery, D. W. Beebout..... 673,792 Stove, W. A. Livingston..... 673,428 Stove and lamp, combination oil, Ballard & Blanchard..... 613,551 Stove, combined heating and cook, C. B. Russell..... 673,627 Stove, cooking, D. Cline..... 673,701 Stovepipe fastener, C. E. Yates..... 673,461 Street sweeper, G. B. Siccardi..... 673,774 Stud lacing, R. S. Watson..... 673,669 Stuffing box, J. Barrow..... 673,572 Stuffing box, I. Karns..... 673,714 Sugar in crystal form, producing, H. Claassen..... 673,493 Switch and signal mechanism, Byers & Shafer..... 673,379 Switch locking mechanism, C. H. Andrus..... 673,673 Switch throwing mechanism, F. Kumber..... 673,667 Take up mechanism, J. B. Humphreys..... 673,540 Telegraph instrument, printing, L. M. Calla..... 673,381 Telegraph key, F. J. Raab..... 673,449 Telegraph, multiple, S. T. Foster, Jr..... 673,519 Telegraphy, apparatus for use in wireless, J. Barry..... 673,418, 673,796 Telephone service apparatus, U. S. Jackson..... 673,504 Telephone switchboard, I. J. Kusel..... 673,526 Testing apparatus, L. C. Moore..... 673,481 Thill coupling, W. E. Sherwood..... 673,481 Ticket and sample holder, price, F. O. Luck..... 673,716 Tobacco bottling machine, H. Levy..... 673,402 Tool handle, J. A. Hall..... 673,772 Tool handle, gripping, J. A. Pitts..... 673,506 Tool holder, H. C. Warren..... 673,743 Tool, ratchet brace, lifting appliance, etc., combination hand, J. A. Wade..... 673,742 Top, spinning, F. L. Cook..... 673,831 Toy, S. I. Clawson..... 673,636 Toy balloon, M. Kavanagh..... 673,776 Toy brick weighing machine, W. C. Dunn..... 673,515 Transformer controller, rotary, T. S. Watson..... 673,807 Trolley base, Merrick & Garrett..... 673,441 Trolley, overhead, H. C. Eno..... 673,766 Trousers hanger, S. J. Levy..... 673,686 Truck, B. S. Schoelch..... 673,690

(Continued on page 319)



The "Khotal" Blue Flame Oil Stove

(FOR HOME OR CAMP OR YACHT) generates gas from common kerosene. It will boil a quart of water in two minutes and cook a dinner quickly. It can be regulated to any desired degree of heat. It has no wick and no asbestos substitute. It is strong, durable and ornamental, being made of brass of superior finish and excellent workmanship. A child can operate it.

Write for Free Illustrated Book G.

THE HYDROCARBON BURNER CO., 197 Fulton St., New York Boston, Mass.: Globe Gas Light Co., 77-79 Union St.



Letters copied while Writing.

No press; no water; no brush; no work. Any ink; any pen; any paper. Our Pen-Carbon never smuts; our clip holds paper firm. Write with no extra pressure, and our Pen-Carbon Letter Book produces a perfect copy. For letters, bills, etc. Can be used anywhere. If your stationer does not keep it, write for free specimen of work. Address Department L. PEN-CARBON MANIFOLD CO., 145-7-9 Centre Street, New York.

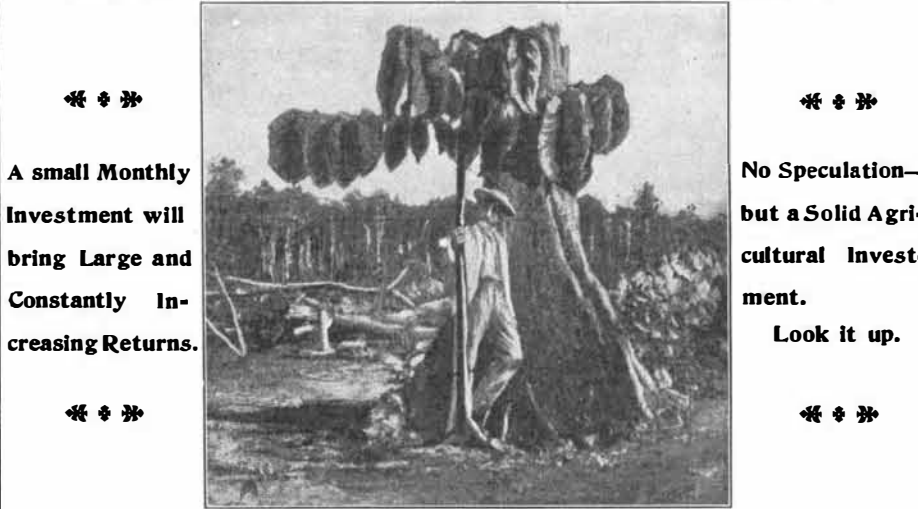
ROTARY PUMPS AND ENGINES. Their Origin and Development.—An important series of papers giving a historical resume of the rotary pump and engine from 1588 and illustrated with clear drawings showing the construction of various forms of pumps and engines. 38 illustrations. Contained in SUPPLEMENTS 1149, 1150, 1151. Price 10 cents each. For sale by Munn & Co. and all newsdealers.

EMPIRE GEARLESS TRANSMISSIONS FOR AUTOMOBILES & TRICYCLES. EMPIRE MOTOR WKS., 888 WASHINGTON ST., BUFFALO N.Y.

Williams' Shaving Stick. The Only Kind that Won't Dry on the Face. SOLD EVERYWHERE. Williams' Shaving Stick, 25c. Genuine Yankee Shaving Soap, 10c. Luxury Shaving Tablet, 25c. Swiss Violet Shaving Cream, 50c. Williams' Shaving Soap (Barbers'), 6 Round Cakes, 1 lb., 40c. Exquisite also for toilet. Trial cake for 2c. stamp. The only firm in the world making a specialty of SHAVING Soaps. THE J. B. WILLIAMS CO., Glastonbury, Ct. LONDON PARIS DRESDEN SYDNEY

FORTUNES IN RUBBER CULTURE!

ASSURE YOURSELF AN INCOME FOR LIFE.



A RUBBER TREE NINE MONTHS OLD.

The investment of \$2.50 each month for 48 months will, in six years, produce a large and constantly increasing income. As safe as an endowment, and with greater returns. Shares can be fully paid up if so desired by the purchaser. It is the Chiapas Rubber Plantation and Investment Company, of San Francisco, California, U. S. A., that makes these assertions. Mr. L. H. Bonestell, of Bonestell & Co., is President; Mr. L. S. Sherman, of Sherman, Clay & Co., is the First Vice-President; Mr. Geo. T. Hawley, of Hawley Bros., Second Vice-President. All of them merchants of acknowledged sagacity and financial standing. These men are large cash investors in the stock of the plantation. What safer investment can be made than in the cultivation of natural products with an ever-increasing demand for them? The whole earth is being ransacked to supply rubber for countless uses. At present the natural production of rubber is unequal to the increasing demand. No artificial substitute has been discovered, nor probably ever will be. The cultivation of the rubber tree under intelligent direction is as safe a proposition as growing wheat. The plantation of the Chiapas Rubber Plantation and Investment Company is situated in the State of Chiapas, Department of Palenque. It consists of 24,000 acres of the best rubber lands in Mexico. Each share represents one acre. The Company cultivates. The income goes to the investor. The Company owns outright, and has paid for in cash all the land included in the plantation. In the nurseries of the Company are 500,000 trees ready for transplanting. There are now 81,000 rubber trees that have been transplanted from the nurseries and are in vigorous growth. 200 trees are planted on each acre. The first yield will give 2 to 3 pounds of rubber per tree, five years after planting. Every year the yield will be larger. Look at the New York quotations for crude rubber and figure results for yourself. You will be interested to learn how the Company is able to make these assertions so confidently. Send for the profusely illustrated pamphlets giving minute information on all points.

CHIAPAS RUBBER PLANTATION AND INVESTMENT COMPANY, 63-65 CROCKER BUILDING, SAN FRANCISCO, CALIFORNIA, U. S. A. N. B.—The Company requires responsible Agents in all prosperous communities. Apply as above.

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.

ELECTRO MOTOR, SIMPLE, HOW TO MAKE.—By G. M. Hopkins. Description of a small electric motor devised and constructed with a view to assisting amateurs to make a motor which might be driven with advantage by a current derived from a battery, and which would have sufficient power to operate a foot lathe or any machine requiring not over one man power. With 11 figures. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 641. Price 10 cents. To be had at this office and from all newsdealers.

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. Operates with a Push. A. H. BAMBERGER, 381 Broadway, New York. Pat. Jan. 9, 1900. Closes with a Pull.

ELECTRIC AUTOMOBILE.—Directions, with many illustrations, for making a complete machine from two bicycles are given in SUPPLEMENT No. 1195. The motor and battery are also treated of in detail. Price 10 cents. For sale by Munn & Co. and all newsdealers.

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

THIS GRINDER UPRIGHT DRILLS. Has no pumps, no valves. No piping required to supply it with water. Always ready for use. Simplest in construction, most efficient in operation. W. F. & JOHN BARNES CO., 1999 RUBY ST., ROCKFORD, ILL. Established 1872.

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 founded by Thos. A. Edison and others.

ELECTRICAL ENGINEERS INSTITUTE, Dept. A, 240-242 W. 28th St., New York.



LEARN TO WRITE ADVERTISEMENTS

Employed Graduates averaging good salaries. More than they ever commanded.

TAUGHT THOROUGHLY BY MAIL.

Ad. Writing is not genius but an easily acquired business. Answer this now.

Page-Davis School of Advertising, Suite 20 187 Adams St., Chicago.

SPEED!

A high-grade tire, to be worthy of its name, should possess four virtues — speed, easy riding qualities, ability to wear, ease of repair.

G & J Tires have all these virtues. When punctured, take off the outer cover, repair the inner tube and go on your way in a jiffy.

So simple a child can do it. Catalogue free.

G & J TIRE COMPANY, Indianapolis, Ind.



YOUR BICYCLE

May need a new crank handle or higher gear. We can furnish crank handles — complete with caps and cones, to fit any wheel. Write us for full information.

The Avery & Jenness Co., 60 S. Canal St., Chicago, Ill.

BY-THE-BYE, WHEN YOU BUY A BICYCLE

be sure and buy the best, and that means the

BUFFALO KING.

either "Racer" or "Special." The "Queen" is for a lady. No better built wheels on the market — every rider satisfied. Thoroughly up to date in improvements. All parts of best materials. Put together by skilled workmen. Prices, \$35 and \$42. Illustrated Catalogue free on application.

THE WM. HENGENER CO., Buffalo, N. Y., U. S. A.



THE BICYCLE: ITS INFLUENCE IN Health and Disease

By G. M. Hammond, M.D. A valuable and interesting paper in which the subject is exhaustively treated from the following standpoints: 1. The use of the bicycle by persons in health. 2. The use of the bicycle by persons diseased. (Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1002. Price 10 cents.)

To be had at this office and from all newswriters.

THE HUB

will keep you posted on Automobiles.

At news stands or by mail, 25 cents. Six months' subscription \$1.00.

Room 6, 24 Murray St., New York.



THE GOODYEAR

Puncture Proof Tire

Outwears ALL OTHERS.

Write for Catalogue and Prices.

The Goodyear Tire and Rubber Co., Akron, O. LARGEST TIRE MAKERS IN THE WORLD.



RIDER AGENTS WANTED

One in each town to ride and exhibit sample 1901 Bicycle. BEST MAKES 1901 Models, \$10 to \$18

'99 & '00 Models, high grade, \$7 to \$12.

500 Second-hand Wheels all makes and models, good as new, \$5 to \$8. Great Factory Clearing Sale at half factory cost. We ship anywhere on approval and ten days trial without a cent in advance.

EARN A BICYCLE Distributing Catalogues for us. We have a wonderful proposition to Agents for 1901. Write at once for our Bargain List and Special Offer. Address Dept. 62 L. MEAD CYCLE CO., Chicago.



Truck for carrying barrels, etc., W. P. Cherrington

Truck, hand, Heiss & Ricardo.....	673,681
Truck, radial, J. Player.....	673,727
Tunnel boring apparatus, A. W. Manton.....	673,717
Tunneling devices, tubing for, W. S. Mac-Harg.....	673,852
Twister machine stop indicator, D. Clark.....	673,813
Twyer for cupola furnaces, G. A. True.....	673,668
Twyer for forges or furnaces, J. Overall.....	673,505
Typewriter, long distance, A. J. Farmer.....	673,429
Typewriting machine, J. H. Dvett.....	673,426
Typewriting machine, E. B. Cram.....	673,514
Valve, R. Bonnell.....	673,812
Valve and operating means, T. Barrow.....	673,573
Valve for hydrants, auxiliary, W. H. Baker.....	673,974
Valve mechanism, E. B. Roth.....	673,455
Vaporizer, liquid burner, L. D. Leugel.....	673,545
Varnished surfaces for revarnishing, preparing, C. P. Staley.....	673,665
Vehicle driving mechanism, F. B. Stearns.....	673,739
Vehicle, motor, Haynes & Apperson.....	673,619
Vehicle spring, pneumatic, W. W. Humphreys.....	673,682
Vehicle washer, S. V. Hanley.....	673,433
Vehicle wheel, J. P. Erie.....	673,390
Vehicle wheel, A. Pinover.....	673,845
Vein opener and clamp, C. B. Dolge.....	673,598
Vending box, P. M. & F. W. Claus.....	673,744
Vending machine, U. Di Marco.....	673,704
Vessel stand, portable, Happe & Israel.....	673,746
Vise and pliers, combined band, I. Jacques.....	673,605
Voting machine, Cumingham & Major.....	673,793
Wagon, dumping, W. Ross et al.....	673,454
Walls and ceilings, sheet metal lining for, M. Van Zanten.....	673,510
Water closet, J. Kennerly (reissue).....	673,820
Water closet, F. S. Perrin.....	673,820
Water cooler and filter, combined, T. T. Moulton.....	673,722
Water meter, H. Fredrick.....	673,431
Weather strip, W. O. Mikeseil.....	673,581
Welsher, automatic, F. C. Stueckel.....	673,740
Welding steel and copper, Smith & Sherry.....	673,664
Well drilling apparatus, N. G. Hall.....	673,500
Well tubes, filter or strainer for, Keller & Jeffers.....	673,398
Wire coil machine, J. H. Tomplin.....	673,588
Wire fabric, woven, T. W. Klipfel.....	673,642
Wire splicing tool, Stoolfire & Mitchell.....	673,459
Wire winding apparatus, J. Farrell.....	673,599
Wrapper, mailing, M. C. McCord.....	673,471
Wrapping machine, newspaper, R. G. Clyne.....	673,421

DESIGNS.

Ash tray, L. N. Moss.....	34,472
Badge, H. S. Stovall.....	34,467
Badge, E. L. Logee.....	34,468
Bedstead side rail, G. C. Luther.....	34,401
Billiard table, O. F. Bartel.....	34,403
Bottle, E. Greiner.....	34,474
Cup, R. Harris.....	34,473
Drill bar, Guthrie & Wilson.....	34,484
Fabric, D. Seeman.....	34,494
Grinding mill casing, W. H. Dodson, Jr.....	34,485
Holdback iron, C. R. Silvers.....	34,487
Lace fastener, shoe, F. B. Yarbro.....	34,479
Musical instrument body, A. Nordwall.....	34,476
Napkin ring blank, J. I. Burt.....	34,471
Pen and pencil holder, E. S. Devlin.....	34,475
Pliers, jaw member for carbon cutting, E. O. Lundin.....	34,483
Shaft iron, J. Teschler.....	34,486
Sharpening steel, knife, C. D. Miles.....	34,470
Spoon, W. F. Ehnman.....	34,469
Spring joint plate, J. A. Traut.....	34,481
Stove, gas, C. C. Malton.....	34,490
Switch stand standard, A. A. Strom.....	34,489
Telephone supporting bracket, R. V. Griggs.....	34,482
Towel holder, J. S. Walker.....	34,492
Umbrella runner operator, N. D. Ingram.....	34,480
Violin cases, bow holding spring for, N. E. Kenny.....	34,477
Wagon body, W. Leonard.....	34,488
Water bag, C. W. Meinecke.....	34,475

TRADE MARKS.

Blackboards, American School Furniture Co.....	36,394
Boots and shoes, Munroe, Packard & Linscott.....	36,365
Boots, shoes, and slippers, Colonial Shoe Co.....	36,363
Boots, shoes, and slippers, Kenny & Fitzpatrick.....	36,364
Carpet cleaner, C. O. Parkinson.....	36,387
Cement, Portland, Helderberg Cement Co.....	36,397
Chicory preparations, Aktien-Gesellschaft Emil Seelig.....	36,372
Corsets, bust-supporters, corsets, and corset steels, B. Altman & Co.....	36,361
Fish and oaten flour powder, Patent Fish Food Syndicate.....	36,376
Flat and hollow ware and cutlery, certain named, Simeon L. & George H. Rogers Co.....	36,395
Flour, wheat, Clark-Jewell-Wellis Co.....	36,374
Fuses, Chimax Fuse Co.....	36,392
Grocers' sundries, certain named, Acme Tea Co.....	36,375
Guano, C. M. Colchester.....	36,390
Gum, chewing, American Physicians Supply Co.....	36,379
Harmonicas, Strauss Bros. & Co.....	36,393
Lenses, U. Nebring.....	36,368
Medicinal preparations, Calenduline Co.....	36,384
Medicines, certain named, J. Miller.....	36,382
Medicines for certain named diseases, E. E. Suteland Medicine Co.....	36,381
Nerve calmative, Dax Chemical Co.....	36,379
Paint, Akron Mining, Milling and Manufacturing Co.....	36,389
Painters' and glaziers' supplies, certain named, E. E. Nice.....	36,391
Paper and chemicals used therewith, collodion and gelatin coated photographic, Monarch Paper Co.....	36,369
Peanuts, Love & Sunshine Co.....	36,373
Pins, toilet, John V. Farwell Co.....	36,367
Remedy for certain named diseases, M. E. Houchens.....	36,380
Remedy, proprietary, M. Graham.....	36,383
Respiratory sedative, Schiefelin & Co.....	36,378
Sardines, F. W. Williams.....	36,377
Sarsaparilla, K. Mandell & Co.....	36,385
Sewing machines and their attachments, certain named, E. J. Carey.....	36,396
Shoes, men's and women's, Sidney Shoe Co.....	36,366
Silk and woolen mixtures, Perkins, Van Bergen & Co.....	36,362
Stove polish, Eureka Mfg. Co.....	36,388
Toilet cream and toilet soap, G. W. Stringer.....	36,380
Umbrellas, B. Altman & Co.....	36,360
Wine, white, Schroder & Schuyler & Co.....	36,371

LABELS

"Booster," for cigars, Berriman Brothers.....	8,360
"Catechee," for sheetings, Norris Cotton Mills.....	8,357
"Dr. Price's Delicious Table Syrup," for table syrup, Price Flavoring Extract Co.....	8,362
"Dunn's Own Compound for the Blood, Liver and Kidneys," for a medicine, J. M. Dunn.....	8,365
"Home Guard," for cigars, P. A. Gorke.....	8,361
"Our Greenbriar Axe," for axes, Loewenstein & Sons.....	8,359
"Sennol," for a medicine, J. W. Smith.....	8,364
"The Gum that Cleans the Teeth," for a gum, American Physicians Supply Co.....	8,363
"Uncle Sam Mite Exterminator," for a mite exterminator, D. Driscoll.....	8,366
"Union Made," for cloth hats and caps, United Cloth Hat and Cap Makers of North America.....	8,358

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1863, will be furnished from this office for 10 cents. In ordering please state the name and number of the patent desired, and remit to Munn & Co., 361 Broadway, New York.

Canadian patents may now be obtained by the inventors for any of the inventions named in the foregoing list, provided they are simple, at a cost of \$45 each. If complicated the cost will be a little more. For full instructions address Munn & Co., 361 Broadway, New York. Other foreign patents may also be obtained.

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



MORROW COASTER BRAKE.

FITS ANY CYCLE. 100,000 IN USE

ADDS PLEASURE AND SAFETY—ALL DEALERS SELL THEM.

RIDE 50 MILES—PEDAL ONLY 35. ECLIPSE MANUFACTURING CO., BOX X, ELMIRA, N. Y.



PATTON'S Sun Proof Paints

are guaranteed to protect the surface five years. Send for free book about paint. Inducements to dealers.

PATTON PAINT CO., 227 Lake St., Milwaukee, Wis.



FOR SALE - A CHILD'S KNIFE BLADE

PATENTED April 23, 1901


To the highest Cash bidder within thirty days from date. All communications addressed to patentee

MRS. MARY A. BERK, Cape Girardeau, Mo. May 18, 1901.

MORAN FLEXIBLE JOINT

for Steam, Air or Liquids. Made in all sizes to stand any desired pressure.


Moran Flexible Steam Joint Co., Inc'd, 149 East 3d St., LOUISVILLE, KY.



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. Send to any address, postage upon receipt of price. In X C plate of imitation rubber, \$1. In four sided plate, \$2.

Imperial Bit and Snip Co., 14th Street, Racine, Wis.



SALESMEN AND AGENTS WANTED

BIG WAGES—Our Famous Puritan Water Still, a wonderful invention—not a filter. 22,000 already sold. Demand enormous. Everybody buys. Over the kitchen stove it furnishes plenty of distilled, aerated drinking water, pure, delicious and safe. Only method. Distilling Water causes Dyspepsia, Stomach, Bowel, Kidney, Bladder and Heart Troubles; prevents fevers and sickness.

Write for Booklet, New Plan, Terms, etc. FREE

Harrison Mfg. Co., 207 Harrison Bldg., Cincinnati, O.



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 newswriters.

MUNN & CO. 361 Broadway, New York

Branch Office, 625 F St., Washington, D. C.



TOBIN BRONZE

Non-Corrosive in SEA WATER. CAN BE FORGED AT CHERRY RED HEAT. TRADE MARK (Registered).

Round, Square and Hexagon Rods for Studs, Bolts, Nuts, &c. Pump Piston-Rods, Yacht Shafting, Rolled Sheets and Plates for Pump Linings, Condensers, Rudders, Centerboards, &c. Hull Plates for Yachts and Launches, Powder-Press Plates. For Tensile, Torsional and Crushing Tests. See Descriptive Pamphlet, furnished on application.

THE ANSONIA BRASS & COPPER CO.

Sole Manufacturers, 99 JOHN STREET, NEW YORK.

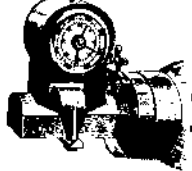
The Improved BELL ODOMETER

APPLIED TO YOUR AUTOMOBILE OR CARRIAGE

will give you the exact distance traveled, and announce each mile passed by the stroke of a bell.

Send for Descriptive Circular S.

S. H. DAVIS & CO., Cor. Portland & Sudbury Sts., Boston, Mass.



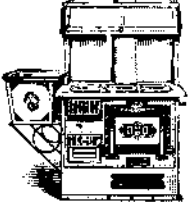
WILL SHIP C. O. D. FOR \$25.00

WITH PRIVILEGE OF EXAMINATION. FREIGHT PREPAID TO YOUR STATION.

"THE WILLARD STEEL RANGE"

Has 6-8 in. lids oven 17x21x12, 15-gallon reservoir and warming closet, lined throughout with asbestos, burns wood or coal. This special inducement is offered for a limited time only. Mention this paper.

WM. G. WILLARD, Manufacturer, 619 and 621 N. 4th St., St. Louis, Mo.



WANTED DRAFTSMEN. AN EXAMINATION

of applicants will be held at the Navy Yard, New York, May 23, 1901, for one mechanical draftsman at \$4.48 per diem, and two assistant architectural draftsmen at \$4.00 per diem. The examination will be open to all comers who can give evidence of experience in the kind of work for which they seek employment and who are citizens of the United States. Applications will be addressed to the Commandant, Navy Yard, New York, and must be delivered to him on or before Wednesday, May 22. No application received after that date will be considered. Each applicant will state in his application his name, age, residence, citizenship, present occupation and previous employment or work done. The applications will be accompanied by evidence of citizenship and by certificates, preferably from previous employers, as to character, habits of industry and sobriety, and skill and experience in work of the kind required.

F. W. HACKBETH, Acting Secretary of the Navy.

ICE MACHINES, Corlies Engines, Brewers' and Bottlers' Machinery. THE VILTER MFG. CO., 899 Clinton Street, Milwaukee, Wis.

MODELS & PATENT OFFICE


CATALOGUE FREE UNION MODELS WORKS & GEARS 193 CLARK CHICAGO.

H. P. GAS ENGINE CASTINGS

Materials and Blue Prints. Write for Catalogue & PARSELL & WEED, 129-131 W. 31st Street, New York.

SHORTHAND BY MAIL.

Pioneer home course. Catalogue and First Lesson Free. Post & Shorthand College, Box 33, Williamsport, Pa.



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.

SALE IN EUROPE, particularly in France, of patented American Machines and Industrial Apparatus, and of patented American inventions.

L. SIMON, Civil & Mechanical Engineer, Troyes, France.

DIAMONDS & SAPPHIRES

for all mechanical purposes. MENDES CUTTING FACTORIES, 12-16 JOHN ST., NEW YORK.

STATLER'S 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.)

D. L. HOLDEN

SOLE MANUFACTURER 14 SOUTH BROAD ST., PHILADELPHIA, PA.

REGEALED ICE MACHINES

SEE FIRST PAGE SCIENTIFIC AMERICAN 5477, 24, 1900.

REVERSING STEAM TURBINE.—Parson's recently perfected turbine for boats. Illustrations showing details. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1158. Price 10 cents, by mail, from this office, and from all newswriters.

LYON & HEALY'S BRASS BAND

Own Make

INSTRUMENTS. Indorsed by the great Jules Levy as the best in the world. Big Catalogue, 400 illustrations, FREE. Positive the lowest prices on Band Instruments, Uniforms and Supplies of all kinds. Also contains Music and Instructions for New Bands. Lyon & Healy, Manufacturers, 28 Adams St., Chicago. (Lyon & Healy are the largest music house in the world.—Editor.)

