

that does not serve a useful purpose can permanently succeed. Frauds may flourish for a time, but their season is brief.

G. B. HECKEL.



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 This is for our information and not for publication.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.

(9934) A. C. A. says: Please inform me through the Notes and Queries column, how the number of lines of force in a magnet are calculated. A. To calculate the number of lines of force in air through a given coil of wire, multiply the amperes by the number of turns of wire and this by 0.4 or by 1.257.

(9935) B. F. B. asks: I wish to procure the best method for drilling glass. A. For drilling glass make a solution of 1 ounce gum camphor, 1 1/2 ounces spirits of turpentine, and 3 drachms of ether. Keep the end of the drilling tool wet with this fluid.

(9936) L. E. B. asks: Does the space occupied by the spokes in a carriage appear to be filled with black dots when the moving carriage is seen through a lace curtain? I did not notice it when the carriage moved rather slowly, but when it was moving at a brisk rate. A. The phenomenon of the moving wheel viewed through a mesh of lace is due to the persistence of vision.

(9937) W. W. G. says: We would consider it a great favor if you will have the kindness to advise regarding driftwood fire powder. This is a powder which, as we understand it, is thrown on the fire and produces the same lights as driftwood does. Kindly advise if possible where same can be obtained.

(9938) F. S. J. asks: 1. Can you tell me what a wattless current is? How is it caused? A. The so-called "wattless current" is the component of the total current which is in quadrature with the energy current. It may be found explained in Sloane's "Electricians' Handy Book," which we send for \$3.50.

(9939) T. W. B. asks: As it is an accepted fact that an electric current can be caused to flow between the poles in a circuit connecting two metals such as bismuth and antimony when the point of juncture is heated, I should like to know what voltage and amperage can be produced or caused to flow if the ends of two rods 1/4 inch in diameter, one of bismuth and the other of antimony, be joined together and heated in say 500 deg. of

heat. I have the electric library published by Munn & Co., but do not seem to be able to get this information from same. In one place they state that a combination of this kind will generate "1 microvolt," but nowhere in the book can I find a statement as to what constitutes a microvolt. I have an apparatus in which a large amount of heat is radiated or wasted, and thought possibly that I would be able to generate a current of about six volts, twenty amperes. If this is possible will you kindly give me some information as to how to go about the work of assembling the apparatus? A. A microvolt is one millionth of a volt. Probably any dictionary would contain the word, or else the prefix "micro," which is used as meaning a millionth part. Webster's Dictionary contains it. A treatise on electricity would assume that the reader had a dictionary and would not stop to define such a term. You cannot maintain a bismuth-antimony junction at 500 deg. F., since bismuth melts at 514 deg. F. Nor has anybody yet succeeded in making a thermo-electric generator which would produce six volts. One which gave about half this was on the market a few years ago, but cannot now be had. This one gave perhaps 1.5 amperes. We cannot encourage you to expect to invent a generator which would give 20 amperes.

(9940) H. E. E. asks: As a reader of your most valued publication, I am taking on myself the privilege of asking you where it would be possible to secure information regarding the latest or the best system of wireless telegraphy. I am seeking to build a system between two stations, about three hundred yards apart. Have been unable to secure anything satisfactory on the subject except from the columns of the AMERICAN, and that is all so condensed that it doesn't help much in putting in a system. I ask you, then, where I may secure a clear, concise treatise on the subject, which would enable an amateur to build his own system and at a nominal cost. A. Maver's "Wireless Telegraphy," price \$2, is a very good book upon the subject, although Collins is somewhat more recent and is reliable. Its price is \$3. We can send either or both upon your order. We have published in our SUPPLEMENT No. 1363, price ten cents, a very complete description of a set of instruments which will transmit much farther than you propose to send messages. We would advise you to get this, if you have not already done so, and to follow the instructions given therein. A large number of people have built sets from these instructions. We would say, however, that no one can build the instruments at a nominal cost. The coherer, the relay, and the induction coil must be well made or else they are worthless.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending March 27, 1906.

AND EACH BEARING THAT DATE [See note at end of list about copies of these patents]

Table listing inventions with names and dates. Includes: Account cabinet, B. C. Maxwell; Adding machine, Kosama & Gancher; Adjustable seat and desk, J. T. Brent, Jr.; Air purifier, H. Platz; Amalgamator, W. H. Morgan; Amusement apparatus, C. C. Dean; Amusement apparatus, O. M. Connelly; Animal chase, Elder & Turner; Animal trap, J. D. Kittler; Animal trap, C. C. Spuhng; Animal trap, J. J. Swint; Armor plate, making, J. Strauss; Asphalt screen and storage bin, F. A. Hetherington; Automatic carrier, S. H. Libby; Bale tie machine, G. A. Rumbel; Ballast trimmer, J. H. Drinkwater; Battery, E. W. Schneider; Bearing for electric meters, frictionless, T. J. Johnston; Bed, invalid, J. W. Summers; Bed, sofa, Strand & Haugen; Bias cutting implement, N. B. Burt; Bicycle attachment, G. W. Pulliam; Binder frame and leaf therefor, loose leaf, H. J. Moore; Binder, loose leaf, J. B. Barlow; Blackboard trestle with adjustable map display and roll support, M. Nacken; Bleaching and sterilizing apparatus, S. Lechman; Blind fastener, Burn & Anderson; Blind slot clipper, S. C. Smith; Block. See Pulley block; Block molding machine, G. Wilhelm; Bobbin holder, A. E. Rhoades; Boiler water feeding device, steam, J. T. Innes; Bolt threading machine, J. H. Haskins; Book support, F. E. Ruger; Book support, E. Smering; Boot and shoe tree, S. French; Boot or shoe polishing machine, Bladreau & Chapdelaine; Bottle, W. W. McLaren; Bottle, J. C. Anderson; Bottle cap and brush, J. Lane; Bottle clip, J. J. McGarry; Bottle, corkless non-refillable, R. I. Maxwell; Bottle holder and opener, combined, Mulvaney & Keller; Bottle holder, nursing, E. S. Lewis; Bottle, non-refillable, Perry & Pierpoint; Bottle, siphon, J. G. Henrich; Bottle stopper, H. K. Gilbert; Bottle stopper, H. E. Payne; Bottles, etc., stopper for, J. P. Crane; Bracket, A. R. Ferguson; Brake hanger, G. M. Brill; Brake shoe, J. F. Powers; Brick making machine, C. W. Pratt; Bucket and trap, combined minnow, E. Petmecky; Bucket or conveyor, W. F. Jones; Building construction, O. Price, reissue; Bur, loop unifying and cast-off, E. Tompkins.

'Star' Lathe advertisement. Features: Automatic Cross Feed, Power and Screw Cutting. FOR FINE, ACCURATE WORK. SENECA FALLS MFG. CO. 695 Water Street, Seneca Falls, N. Y., U. S. A.

Engine and Foot Lathes advertisement. MACHINE SHOP OUTFITS, TOOLS AND SUPPLIES. BEST MATERIALS. BEST WORKMANSHIP. CATALOGUE FREE. SEBASTIAN LATHE CO., 120 Culvert St., Cincinnati, O.

Foot and Power Lathe advertisement. SHEPARD LATHE CO., 133 W. 2d St., Cincinnati, O.

GIANT STEAM SHOVELS advertisement. Toledo, Ohio, USA. The Vulcan Iron Works Co. 125 Vulcan Place.

1 1/2 H. P. MARINE ENGINE advertisement. \$33.50 Engine Only. Engine and Engine Fittings \$37.50. For your Row Boat, Sail Boat or Launch. DETROIT ENGINE WORKS, 1425 JEFFERSON AVE. DETROIT, MICH.

A. M. Faber advertisement. Manufacture Established 1761. Lead-Colored & Slate Pencils, Rubber Bands, Erasers, Inks, Penholders, Rulers, Water Colors, Improved Calculating Rules. 44-60 East 23d Street, New York, N. Y.

ORIGINAL BARNES Upright Drills advertisement. Positive Feed. 10 to 30-inch Swing. W. F. & JNO. BARNES CO. (Established 1872) 1999 Ruby St., Rockford, Ill.

Presses for Sub-Press Work advertisement. Five sizes. Sub-Presses and Tools to order. BLAKE & JOHNSON, P. O. Box 1054, WATERBURY, CONN.

THE B. F. BARNES 14-INCH DRILL advertisement. Adapted for work from 1-16 inch to 3/4 inch. B. F. BARNES COMPANY, Rockford, Ill.

Mustard & Company advertisement. GENERAL IMPORTERS AND COMMISSION AGENTS. Plumbing Supplies, Safes and Scales. The largest Hardware Machinery and Tool House in China. 9a NANKING ROAD SHANGHAI CHINA.

RELIABLE MARINE ENGINES advertisement. Reliability under all conditions is the characteristic of the "Lamb" Engines. TERRY & CO. Managers Eastern and Foreign Branches. 92 Chambers St., New York.

WELL DRILLING Machines advertisement. Over 70 sizes and styles, for drilling either deep or shallow wells in any kind of soil or rock. WILLIAMS BROS., Ithaca, N. Y.

KEROSENE OIL ENGINES advertisement. Marine Stationary Portable. NO DANGER, Maximum Power. International Oil Engine Co. 253 Broadway, N. Y., U. S. A.

Watch Tacoma Grow! advertisement. POPULATION 1900, 37,714. 1906, 85,000. Leading manufacturing city of Pacific Northwest. Best steamship and railway terminals on Pacific Coast.

Table listing various mechanical devices and their prices. Includes: Burglar alarm, J. A. Dillen; Bushings, machine for forming hollow split; Butter, E. Kohlbrenner; Button making machines, gripping device; Carrier for J. Iloriby; Calculating machine, H. Hanson; Calculating machine and typewriter attachment, H. Hanson; Can opener, W. T. Seerup; Can top, powder, J. H. Goss; Cans, handled head for sheet metal, C. Sherman; Cans or boxes, hinged cover for square or rectangular sheet metal, E. H. Larkin; Candy machine, W. J. Morrison; Car body, bolster, railway, C. S. Shallenberger, reissue; Car construction, R. L. Brenger; Car coupling, W. Kelso; Car coupling, Keller & Bowers; Car, dump, S. Otis; Car, hopper bottom, T. R. Brown; Car, sleeping, H. M. Pfleger; Car wheel, H. C. Odenkirk; Car window, H. F. Dietz; Carbureter, G. W. Kellogg; Carbureting apparatus, M. Steel; Cards, playing, J. H. Noonan; Carpet cleaning and disinfecting machine, E. A. Thomas; Carrier, O. Johnson; Carten making machine attachment, R. Sunderman; Cash register, Beckhoff & von Pein; Caster, G. E. Neuberth; Caster, F. F. Bischoff; Caster, C. Stengel; Castings, metal mold for making brass, F. Haggenges; Cement and making the same, slag, J. A. Shinn; Cement block machine, C. F. Davis; Cement block molding machine, F. F. Martin; Centrifugal machine, W. E. Andree; Chain, H. A. House; Chain link, F. V. Hetzel; Chain securing device, logging, F. Peikard; Chair, A. E. Beall; Chair lounge, J. Flindall; Channeling machine, L. F. & A. J. Uthe; Cheese cutter, J. Halliday; Chime ringing apparatus, A. E. Adriance; Churn, F. E. Krenquest; Churn motor, J. M. McBride; Clear presser, B. Wittmer; Cigarmeister, J. S. Winget; Cigarette making device, A. E. Buckingham; Circuit controlling apparatus, R. D. Mershon; Circuits, making and breaking high potential, E. M. Hewlett; Circuits, transfer switch for testing, Whitaker & Wood; Clamp, See Woodworking clamp; Clamping jaws, means for preventing differential movement of, F. Van Amber; Coal crusher, J. W. Dalrymple; Coal and other granular material, apparatus for handling, A. Smith; Cock, self-closing basin, J. A. Johnston; Coffee and cereal reaster, K. H. Remmel; Collapsible table, C. R. Sheldon; Collar pad, horse, W. F. Sachse; Column cap and base, combined, J. Lally; Composite construction, tension member for, J. Kahn; Concrete, apparatus for lining tunnels with, J. W. Rene; Concrete building blocks or veneer blocks, machine for manufacturing solid, R. Edmondson; Condenser, L. Schutte; Conveying apparatus, C. H. Lecher; Conveying apparatus, pneumatic, A. C. Lynch; Cooler, cream ripener, and pasteurizer, combined, D. W. Payne; Coop, folding chicken, C. J. Laidig; Copying press, letter, G. H. Taylor; Cord fastening device, B. A. Wedmore; Coupling, H. C. Clay; Coupling device, A. E. Scuten; Crate, folding, F. J. Hipp; Cream separator, centrifugal, F. A. West; Culinary vessel, H. McConnell; Cultivator, T. Mulally; Cultivator, F. E. Schaal; Cultivator, road machine, and farm wagon, disk land, A. L. Foote; Current generator, alternating, C. P. Steinmetz; Curtain and counterbalance for book and other cases, A. McKenzie; Curtain holder, G. W. Barnett; Curtain pole, H. N. Mills; Decorticating machine, M. Castellon; Dental tool holder or clutch, B. S. Brown; Desk, school, W. H. Stockman; Diaper, Peters & Mason; Disappearing seat, S. M. Curwen; Display apparatus, illuminated, F. M. Arsi; Display can or box, sheet metal, E. M. Hallbauer; Display can, sheet metal, Rudolphi & Geiger; Display can, floral, E. Wittbold; Door, F. K. Eastman; Door controller, sliding, A. M. Easton; Door, grain, E. A. Hill; Door locking mechanism, E. F. Tripp; Door securer, E. M. Hoagland; Dressing apparatus, J. Hamilton; Drill shafts, equalizing weight feed for, K. Brooks; Drilling machinery feeding mechanism, C. F. Preslar; Driving mechanism, variable speed, W. L. Schellenbach; Drapper, G. Spencer; Drum screen, revolving, Brev & Sutter; Dry closet, T. Macfarlane; Duplicating machine, H. C. Gammeter; Dust collector and like apparatus, A. C. Lynch; Dynamic trap or drain valve, J. F. McElroy; Easel, J. B. Thompson; Edge trimmer, J. A. Gates; Egg boiler, time, H. H. Chesbrough; Electric cable, H. W. Buck; Electric heater, Morse & Frazer; Electric light socket and key, O. C. Cover; Electric light wires, rosette for, J. H. Parker; Electric machine, dynamo, C. P. Steinmetz; Electric meter, W. H. Pratt; Electric pressure indicator, J. E. Wertz; Electric road crossings, safety system for, A. H. Johnson; Electric switch, M. H. Johnson; Electric switch, Everest & Barker; Electrical device and circuit, W. H. Lane; Electrical generator, W. Stanley; Electrical regulation system, W. L. R. Emmet; Electrical switch, J. F. McElroy; Elevator, See Grain elevator; Elevator safety device, S. Kacso; Engine, W. Heckert; Engine and car coupling, railway, E. Pesson; Engines, current controller for igniting devices for hydrocarbon, F. O. Farwell; Engines, drill bit rotating mechanism for rock drilling, J. G. Leyner; Engraving machine, W. S. Eaton; Excavator shovel, T. Alexander; Explosive engine, T. J. Lutz, Jr.; Eyeglass cleaner, H. C. Fosberg; Eyeglass, adjustable guiding mechanism for screwing bridge threaded, E. T. & E. H. Marble; Fastening device, headed, E. T. House; Faucet, W. A. Speakman; Faucet, F. A. Dunham; Faucet and filter, combined, A. P. Whalen; Feeding device, D. Collins; Fence making machine, wire, J. M. Denning; Fencing tie, wire, F. H. Benedict.

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From NEW YORK to ICELAND SPITZBERGEN and NORWAY

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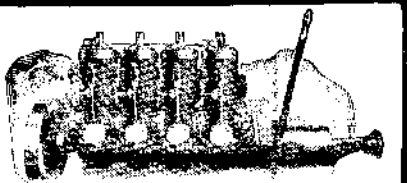
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"It Is Self Starting"

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SMALLEY MOTOR CO., LTD., Bay City, Mich., U. S. A. Member of the National Ass'n of Engine and Boat Mfrs.

HANG IT

upside down if you like, and it won't spill a drop. Of course it's the "GEECEE" Dry Storage Battery, which during the recent New York Show was used in all the demonstration cars of the following firms: U.S. Motor Works, Berkshire Automobile, York Automobile, etc.

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.

Will make for you \$100 A DAY Spin sugar into cotton candy any color or flavor. Agents wanted. BARTELL MACHINE CO. 53 W. 8th St., New York, U.S.A.

Automatic Water Supply Most economical, reliable and efficient. If you have running water the Niagara engines will elevate 35 feet for each foot fall obtainable from spring, brook, or river, delivered to any distance. Write for catalogue. Niagara Hydraulic Engine Co 140 Nassau St., N. Y.

Table listing various mechanical parts and their prices, including items like fertilizer distributor, fibrous material, fire alarm box, and various engines.

The Prudential Insurance Co. of America advertisement. Features a large illustration of a mountain peak with the text 'THE PRUDENTIAL HAS THE STRENGTH OF GIBRALTAR'. Text includes 'Over \$6,500,000 Given to Policyholders' and 'In Cash Dividends and Other Concessions'.

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RABBITT METALS.—SIX IMPORTANT FORMULAS. SCIENTIFIC AMERICAN SUPPLEMENT 1123. Price 10 cents. For sale by Munn & Co. and all news-dealers.

NEW YORK SCHOOL OF AUTOMOBILE ENGINEERS. Incorporated. 147 West 56th Street, New York City. Under the Personal Direction of PROF. CHAS. E. LUCKE, M. E., Ph.D.

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A Reliable Two-Cycle Machine, started without a crank.

Our unique Make-and-Break Sparker is admitted to be the best.

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Easily put on or taken off with the thumb and finger, can be used repeatedly, and they always work. Made of brass. Three sizes. Put up in brass boxes of 100 Fasteners each. At all entering stationers. Send 10c for sample box of 50, assorted sizes. Booklet free. Liberal discount on the trade.

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CLINTON, Mich., Dec. 21, 1905.

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Any one wanting a motor will make no mistake if they get a Brennan.

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**BRENNAN STANDARD MOTOR**  
Mounted with Individual Clutch Gear, also Furnish Sliding Gear Transmission.

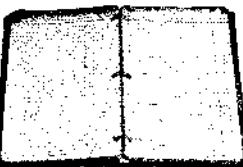
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Complete Outfit. Capacity 150 a day, 2 men.

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Capacity 1200 a day, 1 man.  
Tamped face down, any design.

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"	4412	4 1/2	4 1/2 x 3 1/2	5	1/2	95
Coat Pocket	612	6	6 x 3 1/2	5	1/2	1.20
"	532	5 1/2	5 1/2 x 3 1/2	125	1/2	1.70
"	632	6 1/2	6 1/2 x 3 1/2	125	1/2	1.75
Desk . . .	7732	7 1/2	7 1/2 x 3 1/2	125	1 1/2	2.10
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Ores, treating, Baker & Burwell . . . . .	\$16,061
Packing ring, H. Kirschnig . . . . .	\$16,478
Packing, steam turbine, R. A. McKee. . . .	\$15,973
Paint, varnish, etc., composition of matter for removing old, A. Neishardt . . . . .	\$16,359
Paper bag machine, F. C. Strasburg . . . .	\$16,193
Paper box or container, J. C. Kimsey . . . .	\$16,338
Paper carton, L. G. Reynolds . . . . .	\$16,124
Paper for lithographic prints, producing, L. W. Noyes . . . . .	\$16,497
Paper making machine, C. Tittel . . . . .	\$16,402
Paper tray, F. B. Davidson . . . . .	\$16,302
Peat oven, P. J. Buckley . . . . .	\$16,214
Pedal, extension, H. Taussig . . . . .	\$16,512
Pelt cleaner, J. Hemingway . . . . .	\$16,466
Pen filling device, fountain, R. G. Lockwood . . . . .	\$16,345
Pen, fountain, W. N. Lancaster . . . . .	\$16,344
Pen wiper, J. R. East . . . . .	\$16,086
Percolator, C. E. Trubhella . . . . .	\$16,514
Photographic films, developing receptacle for, S. W. Smith . . . . .	\$16,392
Pipe joint, W. Dean . . . . .	\$16,155
Pipe joint, separable, A. C. Lynch . . . . .	\$15,968
Pipe system, stand, W. F. Conran, Jr. . . . .	\$16,152
Plane, carpenter's, A. Kalla . . . . .	\$16,335
Plaster and mortar, apparatus for mixing and making, A. Dellamora, et al. . . . .	\$16,156
Plastering construction, J. Barbagelata, Jr. .	\$16,420
Plastic material, treating, A. A. Scott . . . .	\$15,385 to \$16,387
Pliers, A. Tracht . . . . .	\$16,278
Plow, H. Morton . . . . .	\$16,173
Plow, R. Nelson . . . . .	\$16,360
Plow, H. Wiard . . . . .	\$16,518
Plow, subsoil, J. B. Harris . . . . .	\$16,548
Plowing attachment, rotary disk, Erb & Pawlson . . . . .	\$16,543
Pneumatic alarm, J. Cairns . . . . .	\$16,430
Pneumatic despatch apparatus, F. S. Smith .	\$16,261, \$16,262
Power transmission means, A. J. Lindsay . .	\$16,022
Press, Fidelity, and McNally . . . . .	\$16,446
Printer's galley, J. F. Rivett . . . . .	\$15,880
Printer's quoin, H. Campbell . . . . .	\$16,324
Printing and numbering machine, time, J. C. Wilson . . . . .	\$16,202
Printing machine, G. A. Main . . . . .	\$16,110
Printing roller composition on fabrics, mold for depositing, J. F. Ames . . . . .	\$16,144
Projectile and its band, Wheeler & McKenna . . . . .	\$15,992
Propeller, G. Mechttersheimer . . . . .	\$16,347
Propeller for boats, steering, H. W. Hellmann . . . . .	\$16,163
Propelling mechanism, F. Fellisier . . . . .	\$16,368
Puller. See Spike puller . . . . .	\$16,196
Pulley block, H. A. Tuttle . . . . .	\$16,184
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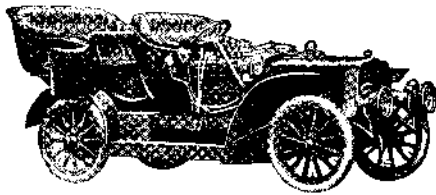
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—Not me.

On a "money back" proposition you may feel that there is some chance of not getting your money back if you wanted it—I won't let you feel that way about my razor.

For if the razor don't do all I say you send it back at my expense and you're out nothing, for you've paid me nothing and you owe me nothing.

Now, simply do this—Send me your name, occupation, home and business address—and in any manner that is convenient or agreeable, introduce yourself to me.

I'll take all the risk and send, prepaid, a Sterling Safety Razor with 24 blades, or a Sterling Old Style Interchangeable Razor with 12 blades.

When you have tested it 7 days, if you find it the finest and easiest shaving razor you ever used, keep it.

Then the razor must pay for itself—that's my new plan.

You see the average man should be shaved at least three times a week—at 15c. a shave that's 45c. a week for shaving.

So, if you decide to keep the razor all I ask you to pay me is what you'd pay the barber—45c. a week for a few weeks until the razor is paid for.

That way I make the barber buy you the razor.

At that, my razor does not take any more money to pay for itself than you would have to pay out of your own pocket for an ordinary razor.

And I go even farther.

I see to it that your blades are kept sharp for ever—free.

With any other razor you are always paying out money because you must keep on paying for new blades or resharpening as long as you live.

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That's really "no honing and no stropping."

Did you ever hear of anything as clever as this in the razor line?

It's this way—the reason I can make this offer is because I'm not in the least doubtful or afraid of my razor.

My STERLING blades are made of the finest

**—and a Postal gets It. I Guarantee to Keep your Blades Sharp Forever Without Charge.**



**24 Blades**

razor steel that money can buy—costs me twice as much as the steel used in any other razor blades.

And mine is the only razor on the market that is made of genuine Sheffield steel—that is not a cold rolled steel.

With my careful, systematic process, each STERLING blade is hardened, tempered, ground and honed in oil all by hand, then hand stropped—so that my razor must hold its edge.

And each of my STERLING blades must pass the SHERMAN test, the most rigid test to which a razor blade can be subjected.

No other razor blade could pass this test.

But I must make certain that the temper and cutting edge of every STERLING blade are perfect and lasting.

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You can buy the Sterling Razor for \$5.00, but I am willing to send it to you and let it pay for itself.

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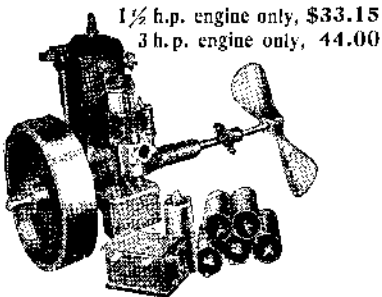
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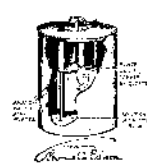
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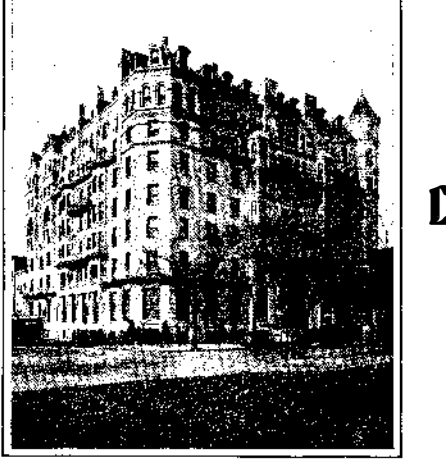
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