from the line, using a wire fence to receive with. In subsequent experiments the same writer states: "A large induction coil similar to that used by Marconi was used, and 10 to 20-mile messages were of common occurrence."

(10137) A. B. asks: 1. Why are magneto calls used on telephones instead of the common make and break bells? A. The magneto machine generates a current well adapted to ringing the bell. No battery is required. It is less liable to get out of order than if a battery were employed to ring the bell. 2. Is the armature of a magneto bell a permanent magnet? If not, please state what causes it to vibrate. A. The bell has a polarized armature. This is a permanent magnet, which moves the instant the current varies the magnetism around it. It works more easily than a bell with a battery could do. All such matters are fully explained in Webb's "Telephone Handbook," price $1 by mail.

(10138) H. L. B. asks: How much No. 36 wire will it take for the secondary of a coil giving a one-inch spark, and how much and what size wire for the primary coil to be used for wireless telegraphy? A. It is a very good coil which gives an inch of spark for a pound of secondary. For primary coils from 12 to 16 wire may be used.

(10139) J. R. F. asks: 1. What amount of weight can be lifted with a pound of metal charged with lodestone as heavily as it can be charged? A. There is a great difference in the weight lifted by permanent magnets. You will do well if you lift a pound with a magnet weighing as much as a pound. Nor can you magnetize a bar magnet well with lodestone. It should be magnetized with an electric current, if you would produce a strong magnet. 2. Does the metal charged lose its power to lift in time by using it? A. No; a magnet is not injured by working. If left with a keeper on its poles and handled with care, no loss of strength need take place. 3. Can cast iron be charged as well as any other metal? A. Steel is the only metal of which a permanent magnet can be made. The best tool steel should be used.

(10140) K. S. A. asks: Is there any method known by which a picture or outline can be thrown on a screen in daylight, on the principle of the magic lantern, without making the room dark? For instance, could the outline be thrown on as a shadow? A. A lantern slide can be thrown upon a screen in a room by daylight if an electric arc lamp is used for an illuminant. It will not be as distinct as if the room were darkened, but still it can be distinctly seen.

(10141) W. E. F. asks: What would be the apparatus necessary to charge a storage battery from a trolley wire of an electric railway, and what size battery for 5 horse-power motor to run say 10 hours; and about what would the outfit cost, and how long would it take to charge it? A. You will require half as many storage cells to run your motor as the volts taken by the motor, since each cell will give 2 volts. To obtain the number of amperes you will need, divide 746 by the voltage of the motor. This gives the amperes for one horse-power hour. Multiply this by 5 and by 10, and you will have the ampere hours required for 5 horse-power for 10 hours.

(10142) L. E. A. K. asks: 1. Is the current that leaves a telephone in talking the battery or an induced current? A. An induced current. The induction coil is to be seen in the box of the transmitter in many forms of apparatus. 2. Are telephone generators alternating or direct current? A. The magneto generator by which the call bell is rung is an alternating current machine. 3. Can a direct current be transformed from a higher to lower or lower to higher without going through a rotary transformer? A. Yes; by an induction coil it is transformed to a pulsatory current in one direction.

(10143) C. C. McC. asks: Do you publish a work on the construction of voltmeters and ammeters that would enable one to construct one for use on an isolated plant? A. SUPPLEMENT No. 1215, price ten cents, will give information for the construction of a voltmeter and ammeter which may answer your purpose.

(10144) S. C. asks: 1. A party of us visited an electric plant. The electrician attached to the end of the poles of the dynamo two large pieces of iron, then inserted them into a saline solution, saying he would boil water, but I thought what he called boiled was only the decomposition of the water to H_2+O. Am I correct? A. Both decomposition and heating of water takes place, and the water is soon heated to boiling. 2. The electrician said if the two pieces of iron at the end of the poles were to touch one another, it would blow up the dynamo. In that case what would cause it to blow up? A. If the plates were brought to touch each other, the resistance would be brought so low that an enormous flow of current would take place (Ohm's law), and this would heat the dynamo so that the wire would soon melt, unless there were a fuse which would blow and cut off the current. It would not be an explosion in any ordinary sense of the term, but a burn-out.

(10145) S. B. S. asks: 1. Will a 4-ohm telegraph work on a line one mile in length? A. Yes, if all else is in good shape. 2. If so, how many gravity batteries will be required to work the instruments if No. 12 galvanized iron wire is used with ground circuit? A. The number depends upon the joints and insulation. We should put 4 to 6 cells and try it. Then add others if necessary. 3. How many gravity batteries will be required to work two 4-ohm telegraphs on a line 265 feet in length, where No. 18 uninsulated wire is used with ground circuit? A. Probably two will do the work.

(10146) D. H. asks: 1. Is there any way that a number of open-circuit sal-ammoniac cells (say twelve) can be connected together so as to produce a continuous current for an incandescent light? Is there any apparatus made for such cells to make them produce a more continuous current? A. No. It is impossible to use a sal-ammoniac cell on a closed circuit for any length of time. 2. Will dry cells recuperate as quickly and as well as wet open-circuit cells? A. No.

(10147) M. B. T. asks if putting the antennæ of a wireless telegraph system in an iron or other pipe will prevent the emission of the Hertzian waves? A. Anything which disturbes the free outflow of the waves from the vertical wires will disturb the transmission.

(10148) E. H. S. asks: 1. I should like to know something about the mathematics of an induction coil; how to calculate its probable output and what vital points tend to increase or diminish its efficiency. A. You will find in our SUPPLEMENT No. 1124, price ten cents, the description of a coil which gives a 6-inch spark. This will do X-ray work upon the thinner portions of the human body. For the thickest parts, a coil is employed which will give a spark of 14 inches or more. Such a coil is described in Hare's "Large Induction Coils," price $2.50 by mail. 2. Something about the Wehnelt electrolytic interrupter. A. We can send you five numbers of the SUPPLEMENT containing illustrated articles upon the Wehnelt interrupter, at ten cents each. SUPPLEMENT, pages 19602, 19811, 20871, 20982, 21500. 3. How to build an induction coil suitable for X-ray work, etc.? A. Faraday's laws of the induced current cover the action of a coil. The correct designing of a coil is the result of experience extending over many years, as well as the application of law to the case.

(10149) A. E. W. writes: 1. I would like to know if there is any advantage in using plate rather than ordinary glass regardless of difference in price? The plate will run oppositely 1-16 inch apart (20 inch D.), while some window-glass may run seldom less than ¾ inch apart. A. It is an advantage to bring the plates of any static machine as near to each other as possible. If they will not run nearer than ¾ inch apart, the machine will not be very efficient. 2. The plate is usually about 3-16 inch thick. Does this thickness of glass take away from the efficiency of the machine? A. It is not advisable to use glass of a greater thickness than will stand the strain of the running. 3. Could you also tell me as to how I can obtain drawings or descriptions of the arrangement of conductors or carriers for a two-plate Wimshurst? A. A good design of a Wimshurst machine can be found in Bottone's "Electrical Instrument Making," price 50 cents, by mail.

(10150) J. F. McG. asks: 1. What is the temperature of a 30-candle-power incandescent electric light? A. The temperature of incandescence is not directly connected with the candle power of a lamp. Ganot gives the temperature as 2,350 deg. Foster's Pocketbook gives it at about 2,500 deg. 2. What is rare earth and where can it be obtained? A. Certain minerals have been known among chemists as earths. The rarer ones are zirconia, glucinia, yttria and thoria. They are oxides of elements of similar names. 3. What candle-power would a 220-volt lamp give? A. It may be of any candle-power, depending upon the resistance of its filament.

(10151) R. B. asks: 1. Will a watch become magnetized by a motor? A. Yes; if there is much external magnetism in the space around the motor. 2. How can you tell if it is? A. By its irregular motion, or failure to keep time as well as it has been doing, often even stopping entirely. 3. How can it be demagnetized thoroughly? A. The quickest way is to take it to a jeweler, who is nowadays quite accustomed to this disease of watches. We can send you two valuable articles on the subject for 20 cents.

(10152) D. S. asks: Will you please answer through the columns of your valuable paper, if a small motor or dynamo, say 1-16 to 1-8 horse-power, can be designed the same as larger machine of 1 horse-power or over, that is in regard to the magnetic flux in the different parts? A. All dynamos are designed by the same rules.

(10153) F. M. C. asks: 1. In winding the primary and secondary coils for a medical battery (faradic current) should both be wound right or left hand, looking from the same end of the coil, or should one be wound right hand and the other left hand? A. We do not see how it can make any difference in which direction the turns of a coil are wound. The electrical induction will find that out for itself. 2. In using a galvanic battery, for medical purposes, of say ten carbon and ten zinc plates arranged zinc to carbon through the entire number, is it absolutely necessary to have each element, that is, a carbon and zinc plate, in a separate cup or cell with the fluid, or will the battery work as well, and the current last as long, if *one* large cup is used containing *all* the elements and fluid? A. If all the plates are in one cell, you will have one cell with the electromotive force of one cell, but with the amperes due to the large surface of your single plate. The same state of the current results if you connect all the positive plates together, and all the negative plates together from a larger number of smaller sized cells. This is *connecting in multiple*. If, on the other hand, you join the zinc of one cell to the carbon of the next in series, you will have an electromotive force equal to that of one cell multiplied by the whole number of cells, and a less number of amperes because of the greater resistance of the arrangement. This is a battery *connected for intensity*.

(10154) W. H. G. asks: 1. Please give acid used in pole indicator and ground detector and state what size and kind of wire is used. A. Make a solution of alcohol, 10 cubic centimeters, phenolphthalein, 1 gramme. Add to this distilled water, 110 cubic centimeters. Make a second solution of sodium sulphate, 20 grammes, in 100 cubic centimeters of water. Soak blotting paper in the first solution, and drain off the superfluous liquid. Then soak the paper in the second solution and dry the paper. To test the poles of an open circuit, moisten a strip of the paper, and place the ends of the wires about two inches apart upon it. A red spot will appear around the end of the negative wire. 2. Is there any way in which a bipolar dynamo can be made to give a steady current and not an alternating current? I cannot run a Ruhmkorff coil because of this, and would like to know if there is any instrument or battery that I can connect in circuit to stop this alternation? A. A dynamo gives a direct or continuous current when its armature is provided with a commutator. The same machine gives an alternating current when its armature is fitted with rings connected to the windings. Either form of dynamo will work a Ruhmkorff coil equally well. If the alternating current is to be used, screw down the vibrator so that it will not vibrate. 3. Do I understand that in the system of wireless telegraphy explained in SCIENTIFIC AMERICAN of January 4, 1902, there is no Ruhmkorff coil used in the transmitting part, but just the batteries connected to the earth? A. Yes; but Hertzian waves are not used in this system. 4. What are inductance coils, and please give idea of how made? What is a choke coil, and how made? A. An inductance or a choking coil is a coil to reduce the current by its induction upon the current as it pases through it. A second current is set up in the inductance coil, which flows in the opposite direction to the main current and thus chokes it off, so to speak. 5. Please give number of SUPPLEMENT, if you have same, that has plans and working drawings for constructing small gasoline motor. A. See SUPPLEMENTS Nos. 715 and 716, for construction of gas engines, 23 figures, 10 cents by mail. Also a book on "Gas Engine Construction" by Parsell and Weed, $2.50 by mail.

(10155) L. P. L. writes: We have an angle iron tower 100 feet high on which is a 50,000-gallon tank. Miscreants annoy us by climbing to tank. Electric light and trolley lines are near; how best connect them to tower to give a good stiff shock, and what size wire should we use? A. You can connect your tank to the electric lines you mention, but you will render yourself liable for the injury or death of anyone who may be connected to the circuit through your act. A man does not render himself liable to be murdered by climbing a neighbor's tower. It is simply a trespass, which has not so severe a penalty in the law. There are other ways of meeting the case.

(10156) M. P. C. asks: 1. What metal is next in quality to platinum for contact pieces in a bell, induction coil and a telegraph key? A. There is no metal which can take the place of platinum for this use. There are several which have higher melting points, but they cost from five to ten times as much as platinum and the price prohibits their use. Most metals oxidize too easily to enable them to be used for contact points. 2. Does carbon or graphite make a good contact? A. No. They are too brittle, and would soon be broken in pieces. 3. How many pounds of wire should be wound on the armature and field magnet of the hand-power dynamos described in SUPPLEMENT No. 161? A. The winding calls for so many turns, not so many pounds. 4. Is this dynamo suitable for running a motor? A. Yes, a small one.

(10157) L. A. G. asks: We have a small motor wound for 25 to 30 volts, which we would like to utilize in running a small job press which we are at present running by foot. Would it be advisable to use a battery of the Grenet cells; or would the cost of maintaining them be too high? A. The voltage is only one element in determining the output of a battery, and in rating the power required to run a motor. To furnish the voltage for your motor will require 16 bichromate cells. The type described in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 792, price ten cents, is best adapted to this purpose. The size of cell therein described will doubtless be large enough to run motor. One charge will last six hours. You can determine the cost from the price of bichromate of soda or potash and sulphuric acid at your place.

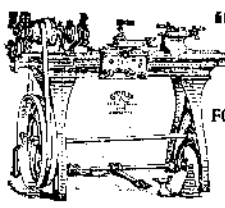
INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending September 4, 1906.

AND EACH BEARING THAT DATE

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

Acid-menthol ether, producing salicylic, Bibus & Scheuble 830,043
Aidhesive applying device, F. E. Brickett .. 830,049
Adjustable bracket, A. Jordan 830,232
Air current governor, S. P. Smith 830,459
Aldehydes, manufacture of certain, G. Darzens 830,213
Ammonia and caustic alkali, producing, G. E. Cassel 830,299
Amusement device, R. Repp 830,004
Anchoring device, F. W. Gartrell 830,428
Animal trap, J. W. Rogers 830,177
Bailer, convertible, J. C. Swan 830,464
Barber's pole, W. H. Young 830,399
Bearing, antifriction, J. Post 830,100
Bed, W. B. Sterling 830,261
Bed, tilting, J. B. Eastman 830,141
Bedstead attachment, F. L. Morgan 830,246
Bending tool, E. J. Sarbach 830,104
Bicycle hubs, driving and brake mechanism in, L. A. Hermann 830,229
Billiard cue, Hickman & Herbine 830,070
Blast charges, device for firing, J. Dowd .. 830,056
Blue print frame, M. S. Whipkey 830,269
Boat, stone, H. A. McLean 830,097
Boiler. See Water tube boiler.
Boiler, W. W. Bonson 830,129
Boot clipper, H. K. Porter 830,453
Bolt cutting machine, C. K. Lassiter 829,972
Bookbinding, M. S. Moll 829,988
Bottle, R. Pitt 830,001
Bottle closure, H. A. Olsson, reissue 12,529
Bottle neck making and finishing device, W. S. & H. H. Breeden 830,408
Bottle, non-refillable, H. Parker 829,998
Bottle, non-refillable, T. J. Cahill 830,205
Box fastener, C. W. Ingledue 830,074
Box loop forming and embossing machine, H. S. Kemp 830,077
Box machine, H. F. Odenkirchen 829,995
Braid tip feeding mechanism, G. Rowbottom 830,008
Braiding machine, A. B. Diss 830,137
Bread mixer, P. C. Smith 830,256
Brick making and re-pressing machine, W. L. St. Clair 830,111
Brick making machine, C. H. Nesselroad. 830,357
Bridle, F. Sommers 830,019
Brush bridle, J. T. Hart 830,065
Buckle, cross-rein, C. A. Powell 830,101
Burglar alarm, H. F. Alburger 830,038
Burning brand, J. J. Sayre 830,371
Cable clamp, wire, J. H. Cook 830,134
Cable trackways, device for taking up the slack in overhead, G. G. Schroeder 830,012
Caddy for coffee, etc., sheet metal, E. W. Carnes 830,050
Calculating machine, Laganke & Smith ... 829,971
Can heading machine, G. H. Stewart 830,189
Cans, etc., handle for milk, G. E. Pitts ... 830,002
Candy pulling machine, C. M. Waite 830,468
Cannon, guns, and the like, means for absorbing recoil in, B. Behr 829,939
Car brake, P. M. Kling 830,154, 830,155
Car brake, E. L. Fenstermaker 830,476
Car brake, railway, W. Kraemer 830,156
Car curtain fastener, vestibule, F. L. Madison 829,983
Car, flat, A. E. Beck 830,471
Car, motor, W. T. Urie 830,384
Car, passenger, C. H. Turner 830,263
Car protector and rail cleaner, N. P. Danielsen 830,212
Car seat, Budd & Conde 830,410
Car spragger, mine, S. Sluder 830,107
Car wheel, Pilcher & Lemen 830,363
Cars, folding table for railway, R. L. Spencer 830,187
Cars or vehicles along a railway, control of apparatus governing the passage of, H. A. Wallace 830,119
Carding engine condenser, E. Berger 830,290
Carriage bow filler and support, H. W. Cole 830,412
Case, bag, portfolio, and the like, C. J. Winter 830,396
Cask manufacturing apparatus, O. Koszto vits 830,084
Casting machine, C. H. Bierbaum 830,199
Cement block machine, L. T. Lowe 830,157
Cement blocks waterproof, rendering, J. M. Rauhoff 830,003
Cement, burning, B. E. Eldred 829,956
Cement clinker-making apparatus, B. E. Eldred 829,957
Cementitious binder or liquid glue, G. Kelly 830,329
Centering construction, A. L. A. Himmelwright 830,150
Centrifugal machine, A. Hoffbauer 830,230
Centrifugals, driving mechanism for, W. L. D'Olier 830,474
Chair seat, G. Kelly 830,328
Chopper. See Cotton chopper.
Churn, W. Sanders 830,010
Churn, G. Lake 830,336
Cigar holder, J. Gauntlett 830,061
Clamp, G. H. Anderson 830,128
Clamp or circular and irregular shapes, F. A. Spencer 830,110
Clay product burning kiln, J. T. H. Warwood 830,386
Clock, electrically wound, P. L. Clark 830,473
Clock, talking, C. C. Bishop 830,200
Clothes-line support and tightener, L. C. Weaver 830,469
Cock, ball, J. H. Knight 830,235
Collar, horse, T. S. Harris 830,228
Collar shaping machine, horse, R. S. Mason 829,985
Composition post or analogous structure, R. B. Bennett 829,940
Concrete and similar structures, system of reinforcement for, D. B. Luten 830,483
Concrete block machine, C. Clayton 830,132
Condenser regulating device, A. H. Helander 829,964
Condiment holder, W. Ebbing 830,142
Conveying system, H. W. Blaisdell 830,045
Cooker, steam, J. Riggsbee 830,173
Coop and brooder for young chickens, combined, J. A. Clark 830,301
Corn tester, seed, C. E. Twamley 830,383
Corset and stocking suspender, combined, J. Gutmann 829,962
Cotton chopper and cultivator, A. Thompson 830,113
Cotton picking and cleaning machine, G. E. Richmond 830,102
Cotton picking and harvesting machine, W. H. Le Vin 830,443
Crate, A. C. McKee 830,096
Crate, foldable shipping, F. E. Golightly .. 830,145
Crate, shipping, D. T. Harbison 830,227
Cream whipping machine, C. H. Siegmund 830,255
Crocks, etc., closure fastener for, W. E. Dawson 830,418
Cross head, J. B. Kingan 830,080
Crucible, E. A. Colby 830,208
Cuff holder, W. T. Robinson 830,368
Cultivator, W. T. Lawing 829,973
Current motor, Neyland & Nagel 830,449
Curtain and other roller supporting bracket, C. A. Corman 830,135
Curtain, metallic, M. Schultes 830,456
Curtain support, H. C. Schofield 830,251
Cut out, automatic transformer, Conkling & Winn 830,209
Cutter head, M. Button 830,297
Cutting tool, J. A. Dale 830,417
Damper regulator, Rowe & Rittenbender .. 830,178
Dehorner, G. Webster 830,470
Distilling apparatus, water, O. Parker 829,999
Door or closure, N. O. Nelson 830,355
Door or panel for lockers and the like, metal, R. W. Jefferis 829,966
Dough mixing and kneading apparatus, L. A. Roberts 830,174
Draft rigging, combined friction and spring resistance, J. F. O'Connor 829,994



"Star" Foot and Power Screw Cutting Automatic Cross Feed **Lathes**

FOR FINE, ACCURATE WORK

Send for Catalogue B.

SENECA FALLS MFG. CO.
695 Water Street,
Seneca Falls, N. Y., U. S. A.

Engine and Foot Lathes

MACHINE SHOP OUTFITS, TOOLS AND SUPPLIES. BEST MATERIALS. BEST WORKMANSHIP. CATALOGUE FREE

SEBASTIAN LATHE CO., 120 Culvert St., Cincinnati, O.

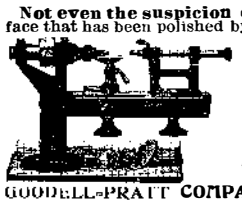
Curtiss Airship Motors

7 H. P., 50 Pounds.

All extras ready to install. Now used by every successful aeronaut. Highest Award at Lewis & Clark Exposition. World's Record, Ormond Beach, Fla. *Send for Catalog B.*

G. H. CURTISS MFG. CO., Hammondsport, N. Y.

Not even the suspicion of a blemish on the surface that has been polished by this **Polishing Lathe.**



Complete with tail stock, tee rest, face plate, saw arbor, and three-jawed chuck milled bed. 5-inch swing. Hollow spindle, 12-inch bed. Polishing, grinding, and kindred operations. A useful machine in many places. Price $7.50 each. *Catalogue free.*

GOODELL-PRATT COMPANY, Greenfield, Mass.

WORK SHOPS

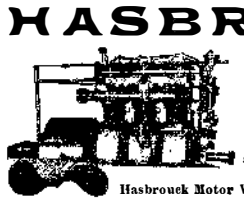
of Wood and Metal Workers, without steam power, equipped with

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.

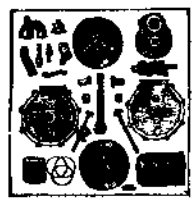
HASBROUCK



SAFE! SIMPLE! SILENT! SAVING

A combination of excellence unsurpassed in the motor world. Send for illustrated catalogue, sent free

Hasbrouck Motor Works, Inc., New London, Conn.



Motor Castings

We furnish castings for eight different motors, 1½ to 5 H. P., air and water-cooled. Also complete motors for airships, runabout, bicycle and marine purposes. Send stamp for complete motorcycle supply catalogue. The only one of its kind published.

Second-hand Motorcycles $40 up. Send for List No. 102.

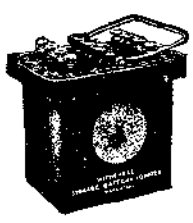
HARRY R. GEER CO.
1015 Pine St., St. Louis, Mo.

The Best Dry Battery for **AUTOMOBILE SPARKING** IS THE

Becko Spark Cell

4 Cells $1.25

J. H. BUNNELL & CO.
Electrical Manufacturers 20 Park Place, NEW YORK



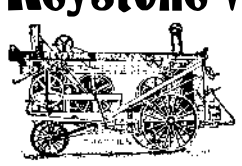
"The Battery With-er-bee"

Fifty-two leading makers of automobiles and motor boats adopted the **Witherbee Storage Battery Igniter** because tests showed it to produce the biggest, hottest sparks and to run an average of over 1,200 miles without recharging.

Send for booklet and name of satisfied user living near you.

WITHERBEE IGNITER CO.
552 W. 43d St., New York City

Keystone Well Drills



for Artesian and Ordinary Water Wells; Mineral Prospecting and Placer Testing for Dredgers; Deep Drilling for Oil and Gas; Contractor's Blast Hole Drilling, River and Harbor Exploration, etc. Our five catalogs are textbooks in these lines.

KEYSTONE WELL WORKS
Beaver Falls, Pa.

How To Increase Your Business

READ carefully, every week, the **Business and Personal Wants** column in the

Scientific American

This week it will be found on page 197.

Some week you will be likely to find an inquiry for something that you manufacture or deal in. A prompt reply may bring an order.

Watch it Carefully

Draft timber support and strengthening device, H. F. Loeschner 830,240
Drafting device, A. H. Andrews 830,282
Drain pipe, H. J. Robinson 830,175
Dredges, spud for, G. W. King 830,079
Dredging machine, C. V. Foreman 830,426
Driving mechanism, F. Kleinvogel 830,153
Dyeing wool black, F. Kroenitzer 830,082
Ear guard, I. D. James 830,439
Elastic seat, J. Loftus 829,978
Electric brake, F. L. Sessions 830,457
Electric light and power controller, F. C. Damm 830,300
Electric machine and the like, dynamo, L. Torda 830,025
Electric motor, D. Mendelson 830,347
Electric motor and generator, continuous-current, L. Torda 830,262
Electric motor, variable speed, J. C. Lincoln 829,975
Electric time switch, C. A. Ballou 830,041
Electrodes, press for manufacturing arc-lamp, A. Blondel 830,201
Electrothermal device, C. E. White 830,391
Elevator guard, W. K. Fraser 830,427
End gate, dumping wagon, J. Hovas 830,073
Engines, device for distributing steam in rotary, P. Berger 830,291
Eraser cleaning apparatus, Shannon & Milligan 830,377
Excavating and loading machine, D. H. Mahoney 830,090
Explosive engine, H. A. Frantz 830,144
Extension table, G. Behm 830,042
Eyeglass, nose-guard, A. M. Ward 830,120
Eyeglasses, R. S. Blair 830,405
Fabrics, etc., producing lappet figures upon woven, W. K. Greer 830,223
Farm gate, J. W. Sherwood 830,181
Feed-water heater, T. J. Cookson 830,210
Fence or dike, J. W. Humphrey 830,437
Fence post, M. A. Smith 830,108
File wrapper, E. C. Ziegler 830,127
Filter, oil, J. B. Bell 830,286
Filter, water, W. Akin 830,277
Fire extinguisher, G. G. Schroeder 830,252
Fire extinguisher, hand, S. M. Stevens 830,380
Fire hoe, J. P. Hanson 830,147
Fire protection signal system, J. E. Shepherd 830,254
Firearm, J. L. Saget 830,370
Firearm, recoil operated, A. E. Hall 830,226
Firearm sight, F. C. Chadwick 830,052
Fishing device, E. & B. D. Barnes 830,404
Floor clamp, F. L. Buff 829,946
Flush tank, F. A. Magowan 830,243
Flushing tank, W. A. Alexander 830,280
Fly catcher, C. Wenigmann 830,266
Fog horn, J. Wilson 830,395
Folding and other machines, delivery mechanism for, C. A. Sturtevant 830,190
Folding table, H. K. Fowhl 830,314
Fortune telling device, M. Kohn 830,081
Fuel and making the same, artificial, V. J. Kuess 830,333
Fuel, artificial, J. W. Leadbeater 830,086
Furnace. See Matte producing furnace.
Furnace door, water cooled, L. L. Knox 830,237
Furnace for charring wood, peat, and the like, C. J. R. Mueller 830,352
Furnaces, compound for forming the bottoms of metal heating, D. Aderholt 830,037
Furnaces, hot air system for blast, T. Kiddie 830,152
Furniture, combination, T. J. Young 830,273
Game apparatus, A. Mark 830,344
Game apparatus, A. K. Ferris 830,424
Game attachment for tables, R. H. Schultz 830,180
Game device, B. C. Kenyon 830,078
Game device, C. A. Berberich 830,288
Game of skill, apparatus for playing a, E. H. Bock 830,202
Garbage and sewage, reducing, E. R. Edson 829,954
Garbage and sewage reducing apparatus, E. R. Edson 829,955
Garbage crematory, W. M. Venable 830,027
Garment stretcher, Smith & Shultz 830,257
Garment stretcher, T. T. Hall 830,429
Gas engine, R. Willetts 830,270
Gas generating apparatus, Shaw & Rhody 830,015
Gas generator and controller, acetylene, H. Symonds 830,465
Gas lights, device for intermittent, Matthews & Laun 830,092
Gas meter, F. Smith 830,017
Gases, appliance for storage vessels for liquid, L. von Orth 830,248
Gaseous mixtures, testing, F. Haber 830,225
Gate, O. E. Conat 830,414
Gate opener, E. T. Hill 830,434
Gear, reversing, F. E. Fairman 829,958
Gear, variable speed, W. E. Marx 830,159
Gearing, transmission, T. Stafford 830,460
Glass and other like articles, manufacture of cylinders for window, G. H. Nevergold 829,991
Glass holder, J. F. Conlin 829,950
Glass mold, C. G. Drew 830,057
Globe, celestial, F. Malina 830,091
Grinding and abrading wheels, tool for truing, L. Bingell 830,293
Grinding machine, W. E. Paine 830,360
Gun, air, G. W. Warren 830,121
Gun, repeating shot, H. J. Boosted 830,048
Gun sight, D. W. King, Jr. 830,442
Hair waving device, A. Scharer 830,372
Handles for containers, means for attaching, A. A. Morse 830,095
Harvester, potato, J. H. Pennick 830,362
Hat frame forming device, wire, L. Friedenberg 830,218
Hay gatherer and loader, J. A. Bernhard. 830,292
Hay loader, J. E. Dowden 830,139
Hay ricker, H. B. Zimmerman 830,035
Head gates, adjustable opening stop for, C. D. Butchart 830,411
Head rest, Head & Mackey 830,149
Heater, P. Manfred 829,984
Heater, J. W. Mellott 830,244
Heating systems, means or device for improving the circulation and augmenting the heating capacity of the fluid in, F. H. Wheelock 830,268
Heel, boot or shoe, J. B. Sheehan 830,458
Hinge, H. Stiles 830,022
Hoist, S. T. Wallace 830,385
Hollow objects, conduits, etc., making, J. M. Boyle 830,204
Hook. See Suspending hook.
Horseshoe, S. V. Clark 829,949
Horseshoe, W. J. Connally 830,133
Horseshoe, R. Barclay 830,403
Hydrocarbon engine for motor vehicles, J. W. Packard 830,099
Hydropneumatic elevator or injector, G. Land 830,085
Ice and refrigeration machine, B. Thoens 830,466
Ice cream freezer, T. K. Parrish 830,166
Ice creeper, J. Hunt 830,324
Incubator, Guyer & Gamble 830,224
Incubator, G. H. Lee 830,339
Indicating device, potential, G. N. Eastman 830,475
Ink roller and making the same, J. H. Hennessey 830,432
Ink well, T. S. Miles 830,351
Insect exterminator, C. L. Ferriott 830,143
Insole for shoes, cushion, C. H. Preble 830,250
Insulating means and manufacturing the same, G. Kelly 830,441
Insulation and forming same, field coil, L. W. Downes 830,419
Jar and the like closure, milk, R. E. Pearce 830,450
Jar ring, fruit, F. C. Pelster 830,167
Jar wrench, S. F. Stever 830,021
Jewel setting, L. E. Sadler 830,179
Journal box dust guard, J. A. Haley 830,062
Journal box or lubricating receptacle dust-guard, J. A. Haley 830,063
Junction box, E. T. Greenfield 830,316, 830,317
Ketone and making same, aromatic, H. S. Blackmore 830,044
Key box, Watchman's, A. A. Newman 830,098
Kitchen utensil guard, O. V. Sims 830,016
Knee cushion, C. E. Rundell 830,103
Knee rest, invalid, L. H. Cowan 830,416
Knitted fabric and making same, R. W. Scott 830,373, 830,374
Knitted web, R. W. Scott 830,375
Labeling machine, E. H. Baare 830,194

SORE THROAT

To prove the Efficiency of

Hydrozone

to Sore Throat Sufferers, I will send **One 25 Cent Bottle Free** to everyone sending me this advertisement with 10 cents to pay postage and packing. Hydrozone is a harmless germicide, indorsed and successfully used by leading physicians. Not genuine without my signature on label. Ask for Booklet on Treatment of Diseases. Sold by Leading Druggists. Good until Nov. 10, 1906.

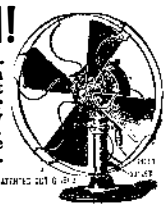
Prof. Charles Marchand

Dept. U, 63 Prince Street, New York

Very Low Colonist Rates to Pacific Coast via Nickel Plate Road.

Daily until October 31, the NICKEL PLATE ROAD will sell special one-way colonist tickets at greatly reduced rates to all points in California, Washington and Oregon. Good on all trains and in tourist sleepers. Write R. E. Payne, General Agent, 291 Main St., Buffalo, N. Y., or call on A. W. Ecclestone, D. P. A., 385 Broadway, New York City.

It's Easy to Keep Cool!

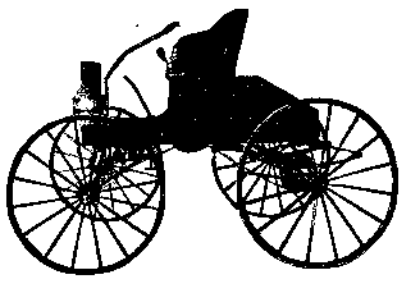


The simplest, smallest, safest, neatest and most successful Motor Fan made is the **Rawlings Patent High-Speed Water Motor Fan.** Can be installed in a few minutes. No operating expenses. Made of high-grade brass. Price 14-in. Fan with complete couplings, **$10.00.**

E. GINTZEL
150 Nassau St., New York City

A. B. C. Automobiles

Easy to Buy, Easy to Operate, Easy to Keep **$300** No Valves, No Springs, No Gears, No Cams, No Tires to Puncture



Simplest and most durable Automobile ever made. Built like a buggy for any country or city road. Any speed up to 20 miles per hour forward and the reverse. Write at once for particulars.

Auto Buggy Mfg. Co., 4390 Olive St., St. Louis

HESS FURNACES CUT COAL BILLS

Principles of construction obey scientific laws of combustion, radiation and heat-control. Medium in price because we sell direct from maker to user. Book free.

Hess Warming & Ventilating Co.,
916 Tacoma Bldg., Chicago.

Frictionless Metal

A babbitt that is all the name implies. Satisfied customers are the best argument. You can reduce expenses in the plant by reducing long expensive stops and tearing down of machinery to babbitt it, by the use of Frictionless.

Frictionless Metal Co., Chestnut St., Chattanooga, Tenn.

Asbestos and Magnesia Products

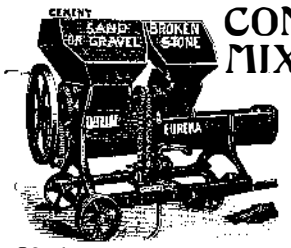
STEAM PIPE AND BOILER COVERINGS.
ASBESTOS PACKING (For all purposes).
ASBESTOS FIRE-RESISTING CEMENTS.
ASBESTOS BUILDING MATERIALS.
"J-M" ASBESTOS ROOFING.
ASBESTOS FABRICS.
KEYSTONE HAIR INSULATOR.
ELECTRICAL SUPPLIES.

H. W. JOHNS-MANVILLE CO.

New York, Milwaukee, Chicago, Boston, Philadelphia, St. Louis, Pittsburg, Cleveland, New Orleans, Kansas City, Minneapolis, Dallas, San Francisco, Los Angeles, Seattle, London.

Eureka Machine Co.

Manufacturers of

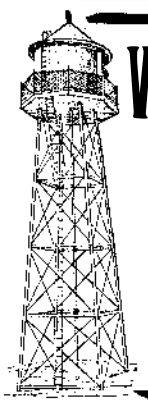


CONCRETE MIXERS and **Block Machines**

Write for Catalog A

420 N Jackson St., Jackson, Mich., U.S.A.

Wooden Tanks



Any Size or Shape

Steel Towers

Any Height

The Baltimore Cooperage Co.

MANUFACTURERS
BALTIMORE CITY, MD.
CATALOGUE GRATIS

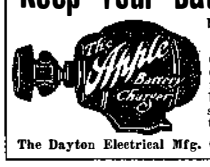
STEAM TURBINES. — THEIR CONSTRUCTION, Operation and Commercial Application. SCIENTIFIC AMERICAN SUPPLEMENTS **1306, 1307, 1308, 1422, 1400, 1447, 1370, 1372.** The articles have all been prepared by experts in steam engineering. Price 10 cents each, by mail. Munn & Co., 361 Broadway, New York City, and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

GAS ENGINE DETAILS.—A VALUABLE and fully illustrated article on this subject is contained in SUPPLEMENT No. **1292.** Price 10 cents. For sale by Munn & Co. and all newsdealers.

Keep Your Battery in Condition

by installing an

Apple Battery Charger

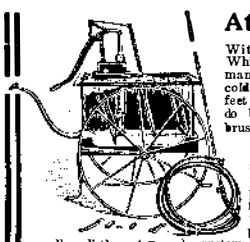


on your car. A perfect dynamo that charges your battery right on your motor car or boat as fast as the battery discharges. Insures fat, hot sparks to meet every charge. Write to-day for full information.

The Dayton Electrical Mfg. Co., 98 St. Clair St., Dayton, Ohio

Whitewash Your Buildings

At Lowest Cost



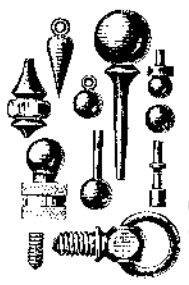
With a Progress Spraying and Whitewashing Machine. One man can apply whitewash or cold water paint to 10,000 square feet of surface in one day and do better work than with a brush. It is also adapted for **spreading disinfectants, destroying insect pests and diseases on trees, vegetables and other plants, extinguishing fires, washing windows, wagons, etc., and other purposes.** The machine is really a little water works system on wheels because the easy movement of the pump develops a pressure exceeding 80 pounds, and will raise the liquid more than 80 feet above its own level. The **Progress,** 12 gallon size, costs only $21.00; the 20 gallon size, $30.00. It will last a lifetime and pays for itself the first year. Other types of machines sold as low as $9 and $10. Write for detailed description.

Dayton Supply Co., Dept. R, Dayton, O

Screw Machine Products

in HIGH BRASS, LOW BRASS and STERLING SILVER

from 1 inch down.



Quotations Made From Model or Working Drawings

GEORGE W. DOVER CO.
Factory B Providence, R. I.

E. H. Beach, Editor

Send 15c. for 3 months' trial subscription to

The Business Man's Magazine

The best business magazine in the world. It will give you each new development—teach you all the new and easy ways of doing work—teach you Salesmanship, Accounting, Book-keeping, Cost Accounting, Advertising, Business Management, Banking, Insurance, Financial Management, Collections and Credits, the whole field covered. Price $1.00 a year.

THE BOOK-KEEPER PUBLISHING CO. Ltd.
59 Fort Street, Detroit, Mich.

INDUSTRIAL OPPORTUNITIES

on the

LEHIGH VALLEY RAILROAD

Desirable sites for manufacturing purposes can be obtained on reasonable terms.

If you want to establish a new industry or relocate one already established, information to your advantage may be obtained from

P. H. BURNETT, *Industrial Agent,*
143 Liberty St., N. Y.

Inexpensive Classified Advertisements

Advertising in this column is 50 cents a line. No less than four nor more than ten lines accepted. Count seven words to the line. All orders must be accompanied by a remittance. Further information sent on request.

SALE AND EXCHANGE.

FOR SALE.—Complete File of Official Gazettes 1848 to now. In bound vols. to end of 1902; since, unbound. For further particulars address Jabez Burns & Sons, 542 Greenwich Street, New York City.

FOR SALE.—Patent No. 724,914 Double Stroke Wind Mill. This device doubles the power of wind mills, utilizing both strokes, simple in construction, handle more water with less wind than any mill. O. Johnston, Coleman, Tex.

FOR SALE STATE RIGHTS.—Patent embracing carpenters' gauge, square, bevel, miter box, angle and framing table in one small tool. Simple and inexpensive, enabling anyone to build a house or similar work. Will sell on sight. O. Johnston, Coleman, Tex.

FOR SALE.—White Rubber Tubing, ¾ inch and 1 inch, at special prices. 50 foot lengths. Samples furnished For further particulars address Burlington Drug Co., Burlington, Vt.

FOR SALE.—Patents and all right on slot machine Exerciser and other new slot machine patents. For further particulars address R. H. Hartley, 405 Fourth Avenue, Pittsburg, Pa.

POULTRY PAPER, 44 pages, illustrated, 25c. per year, 4 months, 10c; sample free; 64-page practical poultry book free to yearly subscribers; book alone, 10c.; catalogue poultry books free. Poultry Advocate, Syracuse, N. Y.

IF YOU WANT to buy a machine, engine, boiler, power equipment, electrical, steam, pneumatic or other machinery—anything in the machine line—Tell Us and we will see that you get full descriptions, prices, catalogs, etc., from all the first-class manufacturers We charge nothing for the service. Address Modern Machinery Daily News, Security Building, Suite 10, Chicago.

MANLOVE AUTOMATIC DRIVEWAY GATE.—Always in order: operated by any wheel. Safe, handsome, valuable. 10,000 working. (Canadian rights for sale.) Manlove Gate Co., 272 Huron Street, Chicago, Ill.

BUSINESS OPPORTUNITIES.

STEEL WHEELS to fit any wagon or cart. Made any size, any width of tire. Also handy wagons with low wheels and wide tires. Wood wagons with steel wheels, or steel wagons with steel wheels. Log wagons and heavy traction wagons of all kinds, for horses or traction engine power. Steel axles of any size and shape. Address Electric Wheel Company, Walton Square, Quincy, Ill., U. S. A.

TO MANUFACTURERS.—Are you represented in this territory? Are results through your jobber or agent in proportion to the population? (2,800,000 within 150 miles.) Are your goods being pushed? Are you manufacturing something not handled generally? I want the agency upon a commission basis of a line of goods that can be sold in this market; have wide acquaintance with manufacturers, contractors and packers of this city and vicinity; reference and bond given. Address Box 72, Armour Station, Kansas City.

LET US BE YOUR FACTORY.—Hardware specialties manufactured under contract, models developed. We are specialists in patent articles. Prompt service, first-class workmanship, reasonable prices. America Company, Momence, Ill.

AUTOMOBILE EXPERTS are in constant demand at high salaries. Our seven weeks' course is the most thorough and practical, fitting men to drive, handle and repair. Day and evening classes. Special course for owners. New York School of Automobile Engineers, 146 West 56th Street, New York.

A CEMENT Machinery Manufacturer looking for first-class practical cement mixer, desires to hear from inventors having something along this line that has been developed and tested. Address Buyer, Box 773, N. Y.

BARGAIN for one desiring a small and well-established manufacturing business, fully protected by patents, clearing $10,000 annually. Investigation solicited. Inquire Manufacturer, Box 773, New York.

WANTED.—Buyers for our one and two-seated business and pleasure Concord spring wagons. Send for 80-page carriage and harness catalog, free. Box 525. Kalamazoo Carriage & Harness Co., Kalamazoo, Mich.

HELP WANTED.

OPPORTUNITIES contains descriptions of hundreds of positions now open for Salesmen, Executive, Clerical and Technical men. $1,000 to $5,000. Sample copy free, Hapgoods, 305 Broadway, New York.

WANTED.—Good executive to take charge of order and shipping departments of large electrical factory in Canada. Apply, stating experience, references, age, salary wanted, to Executive, Box 773, New York.

POSITION WANTED.

YOUNG MAN GRADUATE of a celebrated technical school desires position where he can advance himself by hard work and attention to duties. Address Mechanical Engineering, Box 773, N. Y.

A COMPETENT ENGINEER wants good position. A plant generating its own electric light and power preferred. For further particulars address P. O. Box 868, San Jose, California.

WANTED a position as a General Foreman or Superintendent. Has been successful in producing first-class work at a satisfactory cost in Gas, Gasoline, or Kerosene Engines. Twenty years' experience. Open for engagement. Address C. R., Box 773, New York.

PATENTS FOR SALE.

NEW PATENT.—My Rubber Angle Worm, just patented, for sale cheap. If taken at once will take $750. For further particulars address C. H. Olsby, Valley City, North Dakota.

PATENTS SOLD ON COMMISSION.—If you wish to buy or sell a patent write for particulars to E. L. Perkins, 72 Broad Street, Boston. Patent Sales Exclusively.

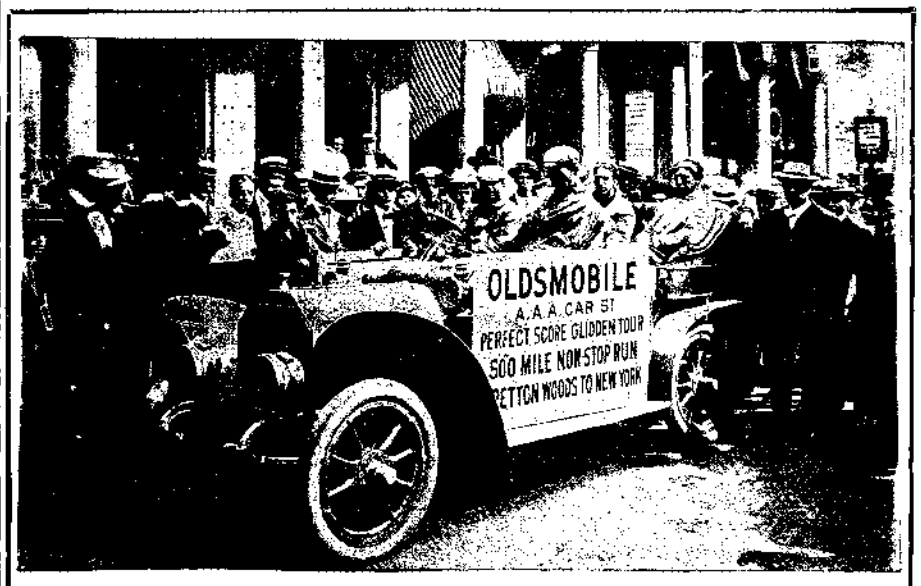
PATENT ON ELECTRIC EXERCISER may be had on royalty by capable parties or bought outright. Should yield a fortune by advertising, and through the trade in athletic goods. For further particulars, address P. O. Drawer 468, Buffalo, N. Y.

To Book Buyers

We have just issued a new 48-page catalogue of recently published Scientific and Mechanical Books, which we will mail free to any address on application.

MUNN & COMPANY
Publishers of SCIENTIFIC AMERICAN
361 Broadway, New York

Labels, affixing, E. H. Baare	830,195
Lacing hook or stud setting machine, W. J. Coombs	830,303
Ladder, convertible extension step, L. M. Norton	830,485
Lamp, incandescent, J. W. Forster	830,477
Land roller, E. S. Wilder	830,126
Land roller, G. J. Carpenter	830,298
Last, R. Pierce	830,168
Latch, door, L. C. & F. R. Peck	830,361
Latch, gate, J. W. Johnston	830,327
Lath and facing tile, W. B. Fenn	830,313
Lead producing apparatus, white, J. W. Bailey	830,196
Lenses simultaneously, apparatus for grinding both fields of bifocal, B. Mayer	830,346
Lifting jack, Hunefeld & Laub	830,479
Linotype machine, W. G. Middleton	830,350
Linotype machine, T. S. Homans	830,436
Liquid discharging device, pneumatic, I. W. Heysinger	830,433
Liquid meter, J. W. Ledoux	830,338
Load binder, S. Gibson	830,220
Loading frame, W. Lichte	830,340
Lock, J. H. Shaw	830,013
Lock, Shaw & Page	830,014
Lock, H. G. Voight	830,117
Lock and latch mechanism, H. G. Voight	830,118
Locking device, R. W. Jefferis	829,965
Locking device, Hamilton & Stroud	830,146
Locomotive tender, Z. M. Little	830,444
Looms, filling feeder for filling replenishing, E. S. Wood	830,397
Mail box, H. G. Homme	830,231
Mail carrier, T. S. Smith	830,109
Mailing card and indicating device, combined, W. MacGerald	830,343
Match box, G. Borst	830,406
Match making machine, W. E. Williams	830,031
Matte-producing furnace, R. Baggaley	830,039
Mattress, spring, K. Henry	830,320
Measure and weighing device, combined, P. A. Dietz	830,308
Measuring device, J. T. Crenshaw	830,211
Meat baster, J. O'Conner	829,993
Mechanical movement, J. H. McElroy	830,162
Medical compound, J. M. Mendez	829,986
Melting apparatus, G. Cruise	830,305
Metal vessels of angular cross-section, manufacturing seamless plate, O. Andersson	830,193
Metals and minerals, mold for molten, R. H. Adams	830,192
Metals, apparatus for the electrolytic extraction of, C. F. Carrier, Jr.	830,051
Milk can, S. R. Skov	830,182
Mill. See Roller mill.	
Mine door, C. R. Anderson	830,281
Mine door actuating mechanism, electrically operated, J. C. Lincoln	829,974
Motion to sieve boxes and other bodies, means for imparting gyratory, E. R. Drayer	830,309
Motor control system, A. Magnuson	830,158, 830,242
Mouse and rat trap, self setting, W. Mackel	829,960
Mower grass collecting receptacle, lawn, W. Boss	829,943
Muffler, A. F. Lungren	830,482
Music sheet holder, F. W. Barrows	830,197
Musical instruments, pneumatic for, J. Binnig	829,941
Musical instruments, variation indicator for automatic, M. Clark	830,302
Nail extractor, J. A. Houlihan	830,072
Needle cushion for spools, A. C. Loomis	830,087
Numbering machine, typographic, J. A. Loyster	830,445
Nut lock, J. L. Lusher	829,982
Nut lock, E. A. Doty	830,055
Oil can, P. Eppersen	830,422
Oil cup, L. C. Sebelin	830,376
Optical appliance, electrically controlled, J. C. Fredell	830,217
Ordnance, I. F. Good	830,222
Ore concentrator, W. E. Ford	830,425
Ore separator, W. B. Frantz	829,959
Overalls, R. S. Breckenridge	829,944
Packing gasket, H. C. Wiedeman	830,392
Packing, stuffing box, J. Williamson	830,394
Paint can, G. W. Weber	830,122
Paper bag machine, E. Stanley	830,259
Paper holder, toilet, H. T. af Zellen	830,400
Paper making machines, dandy roll stand for, W. C. Nash	830,165
Paper receptacle, roll, W. A. Knilans	830,236
Paper winder, J. Butler	830,296
Peat or turf, apparatus for treating wet, M. Ekenberg	830,311
Permutation lock, J. Clement	830,207
Pipe forming apparatus, W. McKee	829,990
Planing machine, Smith & Strickland	830,378
Planter, S. Hogan	830,071
Plow, A. Lindgren	830,341
Plow, garden, W. E. Hawkins	830,430
Plow, rotary disk, W. Hay	830,431
Plow stock, Whitehurst & Bradshaw	830,390
Plows, foot lift for sulky, Pennock & Johnson	830,000
Pole, parlor, L. S. Carter	829,947
Potato digger, Smith & Fisher	830,185
Preserving prunes, J. L. Bowers	830,407
Printing machine, G. W. Mascord	830,448
Propelling and steering mechanism, vessel, N. P. Nelson	830,356
Propulsion and lighting, marine, G. G. Schroeder	830,011
Pulp or paper stock screen, W. W. Wells	830,389
Pulp screen, E. Meurer	830,349
Pump, W. A. Mitchell	830,484
Pump rod connection, W. Dickson	830,136
Purse for money, etc., foldable, R. W., Sr., R. W. Harvey, Jr.	830,148
Pyrometer, F. J. Albrecht	830,278
Radiator, W. E. Roys	830,369
Radiator, portable hot water, H. T. Offterdinger	830,359
Rail guard, joint, F. C. Anderson	830,402
Rail joint, J. S. Imes	830,438
Rails, anchor or sustaining and securing appliance for tramway and like, J. Kirkland	830,233
Railway controller, automatic, B. F. Carpenter	830,472
Railway gate, A. Dyer	830,310
Railway metal draft, R. J. Hall	830,318
Railway metal sleeper, O. Liss	830,171
Railway rail joint, S. F. Stever	830,020
Railway rolling stock, frame for, T. E. Adams	830,401
Railway safety appliance, C. J. Kintner	829,969
Railway selective signal system, F. R. McBerty	830,247
Railway signal and safety appliance, C. J. Kintner	829,968
Railway system, electric, W. M. Brown	830,131
Railway tie, N. Benjamin	830,287
Railway tie, H. E. Keyes	830,330
Railway track construction, V. Uedelhofen	830,026
Railway track drill, E. Cook	830,054
Railway track structure, W. M. Brown	829,945
Railway turn table, A. C. Scarr	830,455
Railways, electrically operated line indicator for, C. D. McPhee	830,164
Rat trap, A. E. Salisbury	830,009
Razor, safety, E. Scharff	830,105
Recorders. See Time recorder.	
Red lake, O. Ernst	830,312
Reducing and separating system, M. S. Weber	830,387
Refining engine, W. White	830,125
Reflector and cluster frame, combined, W. H. Spencer	830,258
Refrigerator, J. W. MacDonald	830,342
Refrigerator cars, rack construction for, Coleman & Kessel	830,413
Registering mechanism, ball actuated, C. A. Snyder	830,186
Rein guard, C. T. Waggoner	830,191
Rein guard, E. H. Elmore	830,421
Revolving drier, R. C. Hills	830,435
Ribbon holder, A. H. Gardyne	830,060
Rock and coal drilling machine, N. Zomer	830,036
Roller mill, combined bruising and crushing, A. Joel	830,075
Rolling apparatus, cross, J. J. Dunn	829,953
Rolling metal billets, adjustable mill for cross, Stiefel & Nicholson	830,462
Rolling press, F. H. Richards	830,006
Roof for houses, W. M. Ducker	830,216
Rope and rope socket protector spear, E. Porter	830,169



On the Glidden Tour the

OLDSMOBILE

easily equalled the performance of the cars selling for twice its price and completed the run of over 1,100 miles with a PERFECT SCORE.

To demonstrate how thoroughly it had stood the strain of this trying contest the same car was immediately started on a non-stop run from Bretton Woods to New York City WITHOUT RECEIVING A SINGLE ADJUSTMENT, REPAIR OR TIRE CHANGE. The run of 505 miles over rough roads, through heavy rains and deep mud, was made at an average of 24 miles an hour. The car carrying 4 passengers, one of whom was an official of the touring committee who acted as observer, left Bretton Woods at 12.10 P. M. Sunday and arrived at the headquarters of the New York Motor Club, Broadway and Fifty-fourth Street, at 2.28 o'clock the following afternoon. The total elapsed time was 26 hours and 18 minutes and THE ACTUAL RUNNING TIME 21 HOURS AND 30 MINUTES.

This is the most notable automobile achievement of the year. YOU DRIVE A WINNER WHEN YOU DRIVE AN OLDSMOBILE.

Olds Motor Works, Dept. L, Lansing, Mich., U. S. A.

Members of Association Licensed Automobile Manufacturers

Canadian trade supplied from Canadian Factory, Packard Electric Co., Ltd., St. Catharine, Ont.

Cement Concrete Reinforced Concrete Concrete Building Blocks

SCIENTIFIC AMERICAN SUPPLEMENT 1543 contains an article on Concrete, by Brysson Cunningham. The article clearly describes the proper composition and mixture of concrete and gives the results of elaborate tests.

SCIENTIFIC AMERICAN SUPPLEMENT 1538 gives the proportion of gravel and sand to be used in concrete.

SCIENTIFIC AMERICAN SUPPLEMENTS 1567, 1568, 1569, 1570, and 1571 contain an elaborate discussion by Lieut. Henry J. Jones of the various systems of reinforcing concrete, concrete construction, and their applications. These articles constitute a splendid text book on the subject of reinforced concrete. Nothing better has been published.

SCIENTIFIC AMERICAN SUPPLEMENT 997 contains an article by Spencer Newberry in which practical notes on the proper preparation of concrete are given.

SCIENTIFIC AMERICAN SUPPLEMENTS 1568 and 1569 present a helpful account of the making of concrete blocks by Spencer Newberry.

SCIENTIFIC AMERICAN SUPPLEMENT 1534 gives a critical review of the engineering value of reinforced concrete.

SCIENTIFIC AMERICAN SUPPLEMENTS 1547 and 1548 give a resumé in which the various systems of reinforced concrete construction are discussed and illustrated.

SCIENTIFIC AMERICAN SUPPLEMENTS 1564 and 1565 contain an article by Lewis A. Hicks, in which the merits and defects of reinforced concrete are analyzed.

SCIENTIFIC AMERICAN SUPPLEMENT 1551 contains the principles of reinforced concrete with some practical illustrations by Walter Loring Webb.

SCIENTIFIC AMERICAN SUPPLEMENT 1573 contains an article by Louis H. Gibson on the principles of success in concrete block manufacture, illustrated.

SCIENTIFIC AMERICAN SUPPLEMENT 1574 discusses steel for reinforced concrete.

SCIENTIFIC AMERICAN SUPPLEMENTS 1575, 1576, and 1577 contain a paper by Philip L. Wormley, Jr., on cement mortar and concrete, their preparation and use for farm purposes. The paper exhaustively discusses the making of mortar and concrete, depositing of concrete, facing concrete, wood forms, concrete sidewalks, details of construction of reinforced concrete posts, etc.

SCIENTIFIC AMERICAN SUPPLEMENT 1372 contains an article by A. D. Elbers on tests and constitution of Portland cement.

SCIENTIFIC AMERICAN SUPPLEMENT 1396 discusses the testing of cement.

SCIENTIFIC AMERICAN SUPPLEMENT 1325 contains an article by Professor William K. Hatt giving an historical sketch of slag cement.

SCIENTIFIC AMERICAN SUPPLEMENTS 955 and 1042 give good accounts of cement testing and composition, by the well-known authority, Spencer B. Newberry.

SCIENTIFIC AMERICAN SUPPLEMENTS 1510 and 1511 present a discussion by Clifford Richardson on the constitution of Portland cement from a physico-chemical standpoint.

SCIENTIFIC AMERICAN SUPPLEMENT 1519 contains an essay by R. C. Carpenter on experiments with materials which retard the activity of Portland cement.

SCIENTIFIC AMERICAN SUPPLEMENTS 1465 and 1466 publishes an exhaustive illustrated account of the Edison Portland cement works, describing the machinery used.

SCIENTIFIC AMERICAN SUPPLEMENT 1491 gives some fallacies of tests ordinarily applied to Portland cement.

SCIENTIFIC AMERICAN SUPPLEMENT 1561 presents an excellent review by Brysson Cunningham of mortars and cements.

SCIENTIFIC AMERICAN SUPPLEMENT 1533 contains a resumé of the cement industry and gives some valuable formulæ.

SCIENTIFIC AMERICAN SUPPLEMENT 1575 discusses the manufacture of hydraulic cement. L. L. Stone is the author.

SCIENTIFIC AMERICAN SUPPLEMENTS 1587 and 1588 contain an able paper by Edwin C. Eckel on cement material and industry of the United States.

SCIENTIFIC AMERICAN SUPPLEMENT 1586 contains a review of concrete mixing machinery by William L. Larkin.

SCIENTIFIC AMERICAN SUPPLEMENT 1583 gives valuable suggestions on the selection of Portland cement for concrete blocks.

SCIENTIFIC AMERICAN SUPPLEMENT 1581 splendidly discusses concrete aggregates. A helpful paper.

SCIENTIFIC AMERICAN SUPPLEMENT 1595 presents a thorough discussion of sand for mortar and concrete, by Sanford E. Thomson.

Each number of the Supplement costs 10 cents. A set of papers containing all the articles above mentioned will be mailed for $3.50

Order from your Newsdealer or from

MUNN & CO., PUBLISHERS, 361 BROADWAY, NEW YORK CITY

JUST PUBLISHED

Electrician's Handy Book

BY

Prof. T. O'Conor Sloane, A.M., E.M., Ph.D

Handsomely Bound in Red Leather, with Titles and Edges in Gold

Pocketbook Style Price $3.50

A thoroughly practical up-to-date book of 768 pages, covering the entire field of electricity. Contains no useless theory. Everything in it is to the point and can be easily understood by the student, the practical worker, and the every-day working electrician. The advanced electrical engineer will also receive great benefit from its perusal and study.

Fifteenth Edition Revised, Enlarged and Reset

Gas, Gasoline and Oil Engines

Including Gas Producer Plants

By GARDNER D. HISCOX, M. E.

Price $2.50

The only complete American book on the subject for Gas Engine Owners, Gas Engineers, and intending purchasers of gas engines, treating fully on the construction, installation, operation and maintenance of gas, gasoline, kerosene, and crude petroleum engines.

The new rewritten, enlarged and revised 15th edition of this work has been prepared to meet the increasing demand for a thorough treatise on the subject. Its 450 pages give general information for everyone interested in this popular motive power, and its adaptation to the increasing demand for a cheap and easily managed motor requiring no licensed engineer. It is fully illustrated by 351 Engravings and Diagrams.

MODERN MACHINE SHOP CONSTRUCTION

Equipment and Management

By OSCAR E. PERRIGO, M.E.

Nearly 400 Large Quarto Pages, Illustrated by over 200 Engravings Specially Made by the Author

Price $5.00

A work designed for the practical and every-day use of the Architect who designs, the Manufacturers who build, the Engineers who plan and equip, the Superintendents who organize and direct, and for the information of every Stockholder, Director, Officer, Accountant, Clerk, Superintendent, Foreman, and Workman of the Modern Machine Shop and Manufacturing Plant of Industrial America.

SEND FOR DESCRIPTIVE CIRCULAR

Electric Wiring, Diagrams and Switchboards

By NEWTON HARRISON, E. E.

Instructor of Electrical Engineering in the Newark Technical School

PRICE $1.50

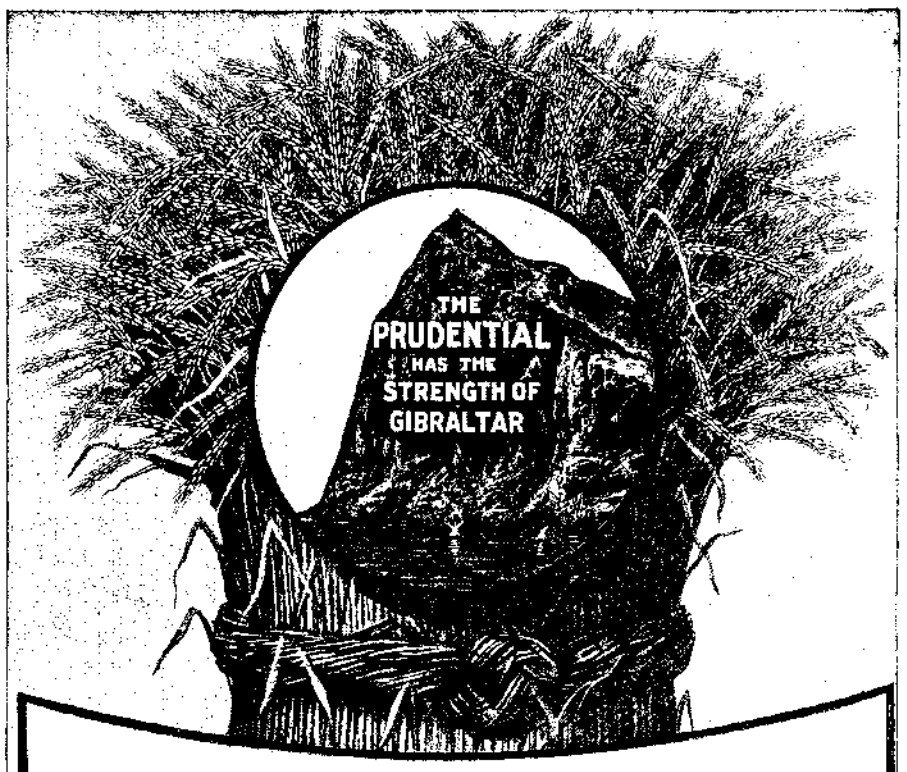
A thoroughly practical treatise covering the subject of Electric Wiring in all its branches, including explanations and diagrams which are thoroughly explicit and greatly simplify the subject. Practical every-day problems in wiring are presented and the method of obtaining intelligent results clearly shown. Only arithmetic is used.

MUNN & CO., Publishers,
361 BROADWAY, NEW YORK.

Rotary engine, C. W. Tandy, Jr. 830,023
Rotary engine, E. J. Weeks 830,123, 830,124
Rotary engine, eccentric cylinder, Stanford & Smith 830,461
Rotary motor, F. C. Kummerow 830,334
Rubber, devulcanizing india, C. A. R. Steenstrup 830,260
Saddle, E. M. Turner 830,114
Sanding machine, E. Tyden 830,116
Saw, L. C. Kurtz 830,335
Scraping tool or implement, J. H. Peterson. 830,451
Screw, ratchet jack, C. H. Jack 830,151
Scriber, F. J. Britton 830,130
Seal and terminal for electric apparatus, H. N. Potter 830,249
Sealing device, package, C. F. Chapman ... 829,948
Sectional tank, Jaques & Sillman 830,440
Sewed articles, seam for, J. G. Lewis 830,481
Sewing machine, W. C. Free 830,059
Sewing machine, H. Mundles 830,353
Shade and curtain clamp bracket, C. W. Moore 830,245
Shade and curtain support, adjustable, J. J. Harper 830,319
Shaft, flexible, M. C. Lockwood 829,977
Shear mechanism, H. Aiken 830,276
Sheet, communication, H. W. McDonald 830,354
Shelving, metal, R. W. Jefferis 829,967
Show case, O. Kampfe 830,076
Sign, illuminated, J. L. Dawes 829,951
Silo, A. T. Stearns 830,379
Siphon, W. M. Venable 830,028
Slicing machine, fruit, Klee & Van Eaton .. 830,234
Slimes and similar materials, apparatus for treating, W. T. Weekley 830,388
Smelting ores and separating mattes, R. Baggaley et al. 830,040
Soap, L. H. Reuter 830,365
Soap and making the same, M. Kuess 830,332
Sound reproducer, T. H. Macdonald 830,446
Spinning and twisting rings, ring holder for, G. L. Pierce 830,452
Spinning frames, adjustable fulcrum for the weight levers of, E. Dixon 830,215
Spool and pincushion holder, T. Cope 830,304
Sprinkling car, electric, S. T. Bole 830,046
Square, carpenter's framing, L. M. Hodge. 830,322
Stacker, hay, J. H. Bauman 830,198
Stamp holding box, P. Sternau 830,188
Steam chest lubricator, D. A. & C. M. Ramage 830,170
Steering gear, A. Mills 829,987
Stool, folding, G. H. Hutton, Jr. 830,326
Stove lid lifter and clothes drier, combined, Small & Mulligan 830,183
Suspending hook for coats, hats, etc., portable, F. S. Cormier 830,415
Switch rod mechanism, G. C. Lucas 830,089
Switch throwing device, automatic, C. J. G. Rickerson 830,367
Switchboard cords, machine for making, W. J. Burton 830,295
Syringe, W. M. Dean 829,952
Target trap, J. W. Haughawout 829,963
Teeth, manufacture of plates for artificial, A. Ollenderff 829,997
Telegraph key, J. T. Sheets 830,253
Telephone, J. Z. Miller 830,161
Telephone apparatus, D. H. Wilson 830,272
Telephone system, D. H. Wilson 830,271
Telephone transmitter, H. F. Albright 830,279
Textile gromet web, A. M. Ziegler 830,034
Threshing machine, F. F. Landis 830,337
Tie. See Railway tie.
Tile and sewer outlet protector, drain, J. A. Tenold 830,112
Tile press, W. P. Meeker 830,160
Time controller, watchman's electric, P. Reitz 830,364
Time recorder, automatic, H. B. Palmer .. 830,486
Tinning apparatus, T. A. Hickman 830,321
Tire, non-slipping, M. Vivian 830,467
Tire, spring, E. G. Ofeldt 829,996
Tire, vehicle, W. Westney 830,267
Tobacco box cover and cutter, combined, W. F. Dugins 830,140
Tool holder, B. F. Rodes 830,176
Tools, manufacture of composite, H. V. Wille 830,030
Tooth bar, T. O. Berg 830,289
Torpedo machine, railway, F. Dutcher 830,420
Toy, F. E. Roberts 830,007
Transparent screen, J. C. Wood 830,398
Trap, T. A. Barry 830,284
Trap, E. M. Streeter 830,381
Tray folding machine, J. H. & J. H. Birch. 830,294
Tray folding machine, box, J. P. Wright ... 830,032
Trolley, H. L. Bryant 830,409
Trousers presser and creaser, R. M. Tate .. 830,282
Truck, engine, T. E. Adams 830,274
Truck, two-wheel engine, T. E. Adams 830,275
Trunk fixture, D. Goldsmith 830,315
Tub fitting, P. Connolly 830,053
Tumblers, hermetic closure for, W. A. Lorenz ..... 829,979 to 829,981
Tunnel lining of reinforced concrete blocks, A. F. Mattson 830,345
Turbine, E. Blücker 829,942
Turbine, W. F. Newman 829,992
Turbine-supporting means, adjustable, J. Wilkinson 829,942
Turpentine, clarifying and deodorizing oil-of-wood, E. Heber 830,069
Twine, cord, etc., C. I. Goessmann 830,221
Type casting mold, Nuernberger & Rettig .. 830,358
Typewriter work gage, H. D. Bolton 830,047
Typewriting machine, H. S. McCormack 829,989
Typewriting machine, R. E. Turner 830,115
Typewriting machine, O. C. Kavle 830,480
Umbrella ribs, emergency repairer for broken, J. W. De Castro 830,307
Undercutter support, F. H. Lamb 830,238
Universal joint, F. H. Begart 830,203
Unloading apparatus, J. E. Knight 830,331
Valve, C. P. Tolman 830,024
Valve, F. Schreidt 830,106
Vehicle controlling spring, J. H. Sager 830,454
Vehicle rear seat, G. H. Hutton, Jr. 830,325
Vehicle wheel, A. H. Kopperud 830,083
Vehicles, winding lever for motor, J. D. Metcalfe 830,348
Vending machine, automatic, G. C. Yocum. 830,033
Vending machines or the like, automatic signaling and detecting device for, E. L. Harman 830,064
Ventilation terminal, C. P. Gould 829,961
Vise, C. J. Lindgren 829,976
Vulcanizer, L. E. Rice 830,005
Wall construction and concrete block for the same, M. C. Momsen 830,094
Washing machine, W. N. Rettinger 830,172
Water circulating device, O. Kunert 829,970
Water cooler, Gaar & Laser 830,219
Water cooling device, G. Fernwell 830,423
Water gage, A. Waibl 830,029
Water mobile, P. F. Maccallum 830,447
Water tube boiler, R. Lees 830,088
Water tube boiler, upright, W. Dougherty .. 830,138
Web rolls while being unwound, means for supporting, H. F. Bechman 830,285
Wedge, Denison & Blake 830,214
Weed cutter, W. R. McKeen, Jr. 830,163
Well tubing, A. Smith 830,184
Wheel. See Car wheel.
Wheel flange and rail lubricator, A. C. Love 830,241
Wheel washing apparatus, vehicle, R. M. Sutherlin 830,463
Whiffletree, J. N. Richards 830,366
Winding mechanism, E. C. Fitch 830,058
Window gravity lock, W. A. Heartt, 830,066 to 830,068
Window, metallic, C. H. Hopmann 830,323
Wire frame machine, A. Velleman .. 830,264, 830,265
Wire galvanizing apparatus, G. L. Meaker. 830,093
Wire goods making machine, H. L. Smith. 830,018
Wire reeling machine, F. D. Lingenfelter .. 830,239
Wrapping or bundling purposes, device for supporting and delivering paper for, R. H. Chase 830,206
Wrench, Christian & Wetzel 830,300
Writing machine, Hess & Stoughton 830,478
Zinc obtaining apparatus, J. A[illegible] ... 830,283

DESIGNS.

Advertising device, O. C. Knight 38,227
Badge, C. S. Sherwood, Jr. 38,218



The Harvest Will Be Certain

If you take out an Endowment or Life Policy in The Prudential. You can thus save small sums, and assure yourself, or family, a substantial income at a later date, when most needed.

Every year The Prudential is paying out Millions of Dollars of Life Insurance to policyholders who are reaping the Harvest of their forethought. This money is being used to support families, educate children, furnish business capital and provide incomes.

You wish to reap the BEST harvest for yourself? Write The Prudential to-day. It has something interesting to tell you. Address Dept. 121.

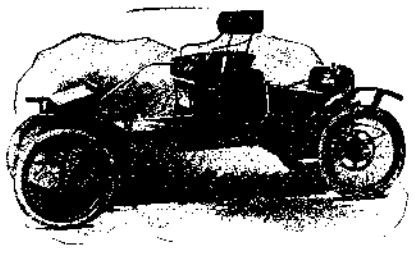
THE PRUDENTIAL

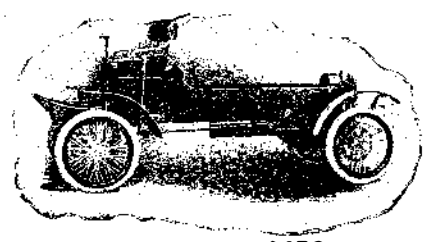
INSURANCE COMPANY OF AMERICA

Incorporated as a Stock Company by the State of New Jersey

JOHN F. DRYDEN, President Home Office, NEWARK, N. J.

Orient Friction-Drive Buckboards, 1907 Models





TWO-PASSENGER RUNABOUT $400

Specifications for Two-Passenger Runabout—

Motor.—Single cylinder, 4 h. p. air-cooled.
Cylinder.—3¼ bore, 4¼ stroke.
Steering.—Tiller.
Wheel Base.—80 inches.
Tread. 42 inches.
Weight.—600 pounds; crated, 800 pounds.
Speeds.—4 forward, 2 reverse.
Clearance.—10 inches.
Tires.—Single tube, 26x2¼.
Double tube tires, $30 extra, net.
Swinehart solid tires, $35 extra, net.
Speed.—Maximum 25; minimum, 4 miles per hour.
Average 12 to 20 miles on ordinary roads.

DELIVERY CAR $450

It does the work of three teams

Specifications for Delivery Car—

Motor.—4 h. p., air-cooled.
Steering.—Lever.
Wheel Base.—89 inches.
Tread.—42 inches.
Weight.—670 pounds; crated, 850 pounds.
Speeds.—4 forward, 2 reverse.
Clearance.—10 inches.
Capacity.—400 pounds, including passengers.
Tires.—Same as Runabout.
Carrying dimensions, 62 inches long, 26 inches wide, 8½ inches deep.
Speed.—4 to 18 miles per hour on ordinary roads.

Energetic agents desired in unassigned territory. Write for particulars.

WALTHAM MANUFACTURING COMPANY - Waltham, Mass., U. S. A.

The Balance of Power

The New American Novel

The Balance of Power

A Story of Real Business

The Balance of Power

Read the Colonel's Sayings

The Balance of Power

A Vital, Gripping Love Story

The Balance of Power

By ARTHUR GOODRICH

$1.50

THE OUTING PUBLISHING COMPANY, NEW YORK