

**WILLIAMS' SHAVING STICK**

"The Shaver's Joy."

Creamy—comforting.

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

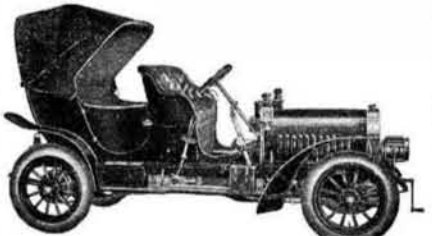
Write for booklet "How to Shave"

THE J. B. WILLIAMS CO.  
GLASTONBURY, CONN.

**Columbia**



The name COLUMBIA is a synonym of leadership and the maximum of merit in automobile construction. The element of chance does not enter into the purchase of a COLUMBIA. Each model stands for known quantities and the highest qualities.



35-40 H. P. Royal Victoria, \$5,000

COLUMBIA 35-40 H. P. and 18 H. P. CARS are America's most representative automobiles in the gasoline class. They are built for practical work, and claims for their superiority are not based upon the performance of specially constructed racing machines.

COLUMBIA ELECTRIC CARRIAGES provide the most convenient, luxurious, and the safest conveyance for town service.

COLUMBIA COMMERCIAL VEHICLES cover the whole range of business motoring, from light delivery to heaviest trucking.

A special catalogue is issued for each of the three classes. Sent to any address on request.

Electric Vehicle Company  
Hartford, Conn.

New York: 134, 136, 138 West 39th St.  
Boston: 74, 76, 78 Stanhope St.  
Chicago: 1413 Michigan Ave.

Member Association Licensed Auto. Mfrs.

**Convert Your Bicycle into a Motorcycle**

at a moderate cost by attaching the Vesco 1 1/2 h.p. Motor Outfit which includes all accessories to make a complete machine of three transmissions. Complete Motorcycles and Marine Motors. Parts sold separately. Write for catalogue. Agents wanted.

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

**Boiler Room Economy**

is the name of a small book which we have issued, telling how boiler scale is formed and how best removed, with the Dean Boiler Tube Cleaner. The illustration below shows the Dean Boiler Tube



cleaner, and we shall be glad to send "Boiler Room Economy" to any power user on request. If you operate two or more boilers you'll find that "Boiler Room Economy" will amply repay you for the time spent in reading it. The Dean removes scale from water tube as well as return tubular boilers.

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

**BEST FOR YOUR BOILER**

A great saver of trouble, annoyance and money, of labor and anxiety is the **STANDARD STEAM TRAP.** It is a new invention that is simple and exceedingly durable. Working parts all on outside. Valves two-piece simple check operating automatically. No waste of steam or water. If you have a boiler investigate this trap.

E. HIPPARD, Manufacturer, YOUNGSTOWN, OHIO

piston motion in engine mechanisms of the slider crank order. As the problems thus arising are generally considered more suitable for advanced than elementary students, and also on account of the nature of the subject, the graphical has been made to go hand in hand with the mathematical in the present instance, thus presenting a kind of exercise of great value to drawing students. Several different methods have been shown for arriving at the same result, the work being as complete and explicit as it is possible to make it.

THE COPPER HANDBOOK. By Horace J. Stevens. Published by the Author at Houghton, Mich., 1904. 8vo.; pp. 778. Price, \$5.

The revised, fourth edition of this manual of the copper industry of the world will be found extremely useful to all who are in any way connected with this great mining business. The present edition is more complete than any former edition in a number of ways. The statistical tables have all been revised and brought up as near to the close of 1903 as possible. The chapter devoted to detailed descriptions of 3,311 copper mines and copper mining companies throughout the world is very complete, and all these descriptions have been brought up to date. The descriptions have been amplified, and the number of mines and mining companies is one-half greater than heretofore. Besides the descriptions mentioned, the book contains several complete chapters on the history of copper, the geology of this metal, and the chemistry, mineralogy and metallurgy relating to it. The book also has a complete index and glossary of mining terms.

**INDEX OF INVENTIONS**

For which Letters Patent of the United States were Issued for the Week Ending June 20, 1905 AND EACH BEARING THAT DATE [See note at end of list about copies of these patents.]

Acid from iron cyanogen compounds, making hydrocyanic, W. Field	792,880
Acid, manufacture of prussic, W. Muthmann	792,783
Acids, making dialkyl barbituric, M. Engelmann	792,886
Air compressor regulating means, G. J. Henry, Jr.	792,987
Air compressors, electric unloader for, W. Frelwitz	792,787
Air ship, J. G. & J. D. Schweers	792,933
Album, J. B. King	792,904
Anchor, J. E. Wolf	792,869
Atmospheric motor, W. M. Fulton	792,588
Automobile or other vehicle, E. Cliff	792,649
Axle, car, P. M. Thompson	792,946
Axle, lubricating, O. C. Moon	792,838
Baler, hay, J. H. Pitkin	792,786
Baling chamber locking device, H. D. Smith	792,937
Baling press, device for contracting the discharge ends of, T. E. & S. R. Sikes	792,935
Bar, See Sickle bar	
Barn structure, A. B. Culp	792,970
Battery grid, H. C. Porter	792,613
Battery plate separator, H. C. Porter	792,612
Bearing for cream separators, spring, H. B. Garman	792,980
Bearing, meter, De Lancey & Smith	792,713
Bed, couch, H. F. Sewle	792,799
Bed, sofa, H. F. Sewle	792,798
Bed springs to wire bases, apparatus for fastening, Dixon & Ridgway	792,585
Beet extracting and cleaning machine, C. H. Beach	792,961
Belt coupling, W. H. Tins	792,947
Binder structure, adjustable leaf, D. C. Anderson, et al.	792,747
Book or ledger, loose leaf, H. C. Miller	792,664
Boot or shoe tree, J. Greenwood	792,701
Bottle, fraud detecting, H. Metzinger	792,911
Bottle necks, forming interiorly grooved, M. J. Owens	792,608
Bottle, non-refillable, H. S. Arnold	792,578
Bottle, non-refillable, F. Jost	792,991
Bottle stopper, A. R. Smith	792,936
Box filling machine, Mitchell & Aiken	793,014
Box making machine, J. M. Carnecross	792,583
Box nailing press, W. D. Davis	792,780
Brake beam fulcrum block, R. F. Lamont	792,907
Brick cutting apparatus, C. M. & A. P. Steele	792,941
Brick repressing apparatus, Ludlam & Bonnot	792,999
Briquetting or molding machine, G. W. Rigby	792,729
Buggy seat, detachable, E. Nolte	792,724
Buggy top, J. M. Marmon	792,837
Buttons in collars, machine for locating, H. C. Miller	793,008
Buttons in collars, machine for locating and stitching, H. C. Miller	793,006
Cable and wire supporting clip, combined, W. J. Hiss, Jr.	792,594
Calendar and office tickler, perpetual, C. T. Wilbur	792,641
Can-making machine, W. H. H. Stevens	792,556
Candy, machine for making silk, A. Kechs	792,710
Car door, grain, M. M. John	792,829
Car, dumping, D. King	792,680
Car fender, J. O'Leary	792,919, 792,920
Car or engine replacer, F. J. Feiwings	792,977
Car wheel, J. Rigby	792,850
Car window guard, street, H. Witte	792,951
Carbureter, H. Brasler	792,878
Carbureter, gas engine, T. L. & T. J. Sturtevant	792,628
Carpet sweeper wheel, L. P. Halladay	792,772
Carriage or other windows, apparatus for balancing, raising, or lowering, Livingston & Stevenson	792,602
Centrifugal machine, H. J. Hurd	792,899
Chain, key, D. A. Stowell	792,677
Churn, L. C. McCarty	792,721
Churn dasher, R. A. Wood	792,952
Cigar or lamp lighter, electric, F. W. & W. H. Smith	792,738
Cigar tip cutter, E. Walker	792,864
Circuit closer, trolley signal, H. E. Bradley	792,689
Cleaning device, J. R. Staples	792,676
Clock, electric, I. Kitsee	793,036
Clock, watchman's, A. A. Newman	792,784
Coach pad, C. M. Crane	792,651
Coal or grain distributing apparatus, C. A. Turner	792,682
Collar casing, horse, W. O. Barnett	792,808
Collar forming die, H. C. Miller	793,011
Comb, M. Erstling	792,887
Combustion, apparatus for supplying mixed fluids for, C. Scott-Snell	792,940
Commutator brush, C. W. Speirs	792,739
Composition, Murphy	792,720
Compressor, W. Prelwitz	792,788 to 792,790
Controlling and pouring can, A. H. & T. A. Schlueter	792,621

**Hydrozone**

Cures **Sore Throat**

A Harmless Antiseptic.

Endorsed by the medical profession. Send ten cents to pay postage on free trial bottle. Sold by Leading Druggists. Not genuine unless label bears my signature:

Prof. Charles Harchand

Dept. U, 63 Prince St., N. Y.

Write for free booklet on Rational Treatment of Disease.

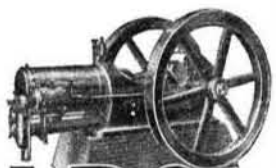
ROTARY PUMPS AND ENGINES. Their Origin and Development.—An important series of papers giving a historical resume of the rotary pump and engine from 1688 and illustrated with clear drawings showing the construction of various forms of pumps and engines. 38 illustrations. Contained in SUPPLEMENTS 1109, 1110, 1111. Price 10 cents each. For sale by Munn & Co. and all newsdealers.

**BUFF**

**TRANSITS AND LEVEL** are used exclusively on the largest works where utmost precision is required. Send for new catalog No. 22. THE BUFF & BUFF CO. Boston, Mass.

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

Type G Engine 2 to 100 H. P.



**OLDS ENGINES**

**Economical Power**

In sending out their last specifications for gasoline engines for West Point, the U. S. War Department required them "to be Olds Engines or equal." This speaks volumes for our engines. It means they excel all others or the U. S. Government would not demand them.

They are the horizontal type, 2 to 100 H. P., and are so simply and perfectly made that it requires no experience to run them, and Repairs Practically Cost Nothing.

Send for a catalogue of our Wizard Engine, 2 to 8 H. P. (spark ignition system, same as in the famous Oldsmobile) the most economical small power engine made; fitted with either pump-jack or direct connected pump; or our general catalogue showing all sizes.

Olds Gasoline Engine Works, Lansing, Mich.

New York Agents, R. H. Devo & Co., Binghamton, N. Y.

**French Motors for Lighting Plants**

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

**ASTER COMPANY**  
1459 Broadway NEW YORK CITY

**Men Turn as by a Common Impulse**

To Safety from Disease Germs. The Buffalo Sanitary Sterilizer sterilizes Towels, Razors, Cut, etc., in less than one minute. This machine will do the work of a Barber Shop up to 10 chairs. Each doing its own work. Hot Water and Towels with no trouble nor expense. The water is always pure and can be used for lather or any other purpose. Implements always in antiseptic condition. Agents wanted.

**KINGORY MANUFACTURING CO.**  
1448-1459 Niagara St., Buffalo, N. Y.

**Napoleon Bonaparte**  
[His Complete Life]

and the story of the **French Revolution**

by **John S. C. Abbott**



"NAPOLEON AS EMPEROR"

IN SIX VOLUMES

With plans, maps, facsimiles of letters, important documents, etc., etc.

THE story of Napoleon and the French Revolution is the most vivid, brilliant, and interesting chapter in the world's history. It has been told by many writers, but, we think, never in a more authoritative and enthralling narrative than this. The eminent author, John S. C. Abbott, has here written in his most brilliant style and imbued the whole work with the results of his profound studies and judgment. The six volumes are of royal-octavo size, bound in dark-green silk cloth, with gilt tops and uncut edges. They are profusely illustrated with portraits, scenes from the Revolution, maps, facsimiles of documents, etc.—an important and distinctive feature.

**Our Offer** On receipt of \$1.00 we will send you NAPOLEON AND THE FRENCH REVOLUTION, in six uniform volumes—all charges prepaid. If you do not like the books, send them back at our expense and we will return the \$1.00. If you do like them, send us one dollar a month until the total amount, \$12.00, is paid. In addition to the books we will enter your name, without additional cost to you, for one year's subscription to either HARPER'S MAGAZINE, HARPER'S WEEKLY, HARPER'S BAZAR, or THE NORTH AMERICAN REVIEW. The total cost to you for both books and periodical is twelve dollars. In writing, please state which periodical you want.

Harper & Brothers, Publishers, Franklin Square, New York

"These two I use daily."

## ARNICA Tooth Soap



Is antiseptic; preserves while it beautifies. No spilling or wasting; convenient and economical.

25 Cents  
At all Druggists

### STRONG'S Arnica Jelly (Carbolated)



Keeps the skin free from roughness and pimples. Nothing better for sunburn or chapping; also for cuts, bruises, burns and all eruptions. Keeps the skin soft, smooth and delicate. The collapsible metal tube is convenient and unbreakable.

Take it with you wherever you go. If your druggist hasn't it—Send to us. Sent postpaid on receipt of 25 cents.

**C. H. STRONG & CO. CHICAGO**

### SENSITIVE LABORATORY BALANCE.

By N. Monroe Hopkins. This "built-up" laboratory balance will weigh up to one pound and will turn with a quarter of a postage stamp. The balance can be used by any amateur skilled in the use of tools, and it works as well as a \$125 balance. The article is accompanied by detailed working drawings showing various stages of the work. This article is contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1154. Price 10 cents. For sale by MUNN & Co., 361 Broadway, New York City, or any bookseller or newsdealer.

## WELL DRILLING Machines

Over 70 sizes and styles, for drilling either deep or shallow wells in any kind of soil or rock. Mounted on wheels or on sills. With engines or horse powers. Strong, simple and durable. Any mechanic can operate them easily. Send for catalog.

**WILLIAMS BROS., Ithaca, N. Y.**

### THE BERKEFELD FILTER

The Standard of the World  
The only filter removing typhoid and cholera bacilli from the water. Tested and recommended by Bacteriologists all over the world.

The greatest invention in the filter technic during the last ten years. The filter gives water in small and large quantities according to the sizes. Easily cleaned, filter cylinders sterilized by boiling in water. Send for circulars to

**BERKEFELD FILTER CO.**  
4 Cedar Street, New York

### MILLS FOR ALL MATERIALS.

OUR BUSINESS IS TO MAKE MACHINERY FOR GRINDING GRAIN, CRUSHING ROCKS AND PULVERIZING ALL HARD SUBSTANCES. WE HANDLE ALL KINDS OF MATERIALS FROM COTTON-SEED TO ROOTS AND HERBS. BY AN UNEXCELLED PROCESS, IF YOU WANT ANY KIND OF A MILL OR GRINDING MACHINE, COME TO US AND YOU WILL GET THE BEST AND STILL SAVE MONEY.

DEAL WITH US ONCE AND YOU WON'T CHANGE.

**SPROUT, WALDRON & CO.**  
MUNCY, PA.

## SOUTHERN FARMS

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

### GOOD LANDS AT LOW PRICES

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

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

**M. V. RICHARDS**  
Land and Industrial Art., Southern Railway, Washington, D. C.

## 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 14.

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

Core composition, J. M. Hudson.....	792,828
Crate, banana, O. Granke.....	792,771
Crushing roll, O. H. Schoenherr.....	792,733
Cup, See Grease cup.....	792,768
Curbstones, etc., device for withdrawing templates in the manufacture of, A. H. Kennedy.....	792,830
Cuspidor, W. B. & E. F. Alford.....	792,871, 792,872
Cutting apparatus, A. J. Connell.....	792,967
Dental obtunder, B. A. Loveless.....	792,836
Denture, artificial, F. E. Roach.....	792,618
Derailing frog, W. Y. Bain.....	792,807
Derrick sheave or crown pulley, J. B. Forker.....	792,768
Designs on velvets, machine for cutting, J. F. M. Riffard.....	792,849
Desk, L. B. Altaffer.....	792,746
Die, G. W. Lentz.....	792,781
Die head, G. R. Rich.....	792,791
Display rack, salesman's trunk attached, J. Richmond.....	792,793
Display stand, H. Welke.....	792,806
Display tray, J. H. Smith.....	792,938
Door fastener, Coleman & Gregory.....	792,966
Door opener, Hoopes & Marriott.....	792,989
Draft equizer, J. Farmer.....	792,976
Dredging device, J. L. Searless.....	792,796
Drill, H. M. Norris.....	792,842
Drill making and sharpening machine, J. B. word.....	792,643
Driving and compensating mechanism, bevel gear, A. P. Brush.....	792,690
Dye, reddish azo, Krekeler & Blank.....	792,600
Edge setting machine, G. M. Carnes.....	792,648
Electric apparatus, vapor, W. R. Whitney.....	792,639
Electric circuit, I. Kitsee.....	793,033
Electric machine, dynamo, G. S. Dunn.....	792,762
Electric meter, I. Kitsee.....	793,035
Electric motor, T. S. Watson.....	792,684
Electric motor counter shaft attachment, E. R. Douglas.....	792,974
Electric switch, automatic, H. A. Schultz.....	792,734
Electric system, A. L. Sieberg.....	792,855
Electrical switch, H. Färmann.....	792,845
Electrical wires in conduits, system and means for laying, G. M. Gest.....	792,892
Electrolytic cell, J. F. Kelly.....	792,597
Electromagnet switch, Sundh & Lindquist, 792,559.....	792,560
Electromagnetic mechanism, E. A. Buell.....	792,692
Electromedical appliance, P. Wenigman.....	792,637
Electrostatic apparatus, L. I. Blake.....	792,751
Elliottic spring, G. Baummann.....	792,805
Embroidery frame, J. H. Kamerer.....	792,765
End gate fastener, W. D. Spencer.....	792,624
Engine, R. L. Ramsey.....	792,615
Engine muffler, gas, J. Williams.....	792,804
Engine vaporizer, carbureter, gas, D. Shain.....	792,670
Engines, oil or gasoline attachment for, J. E. Green.....	792,894
Envelop, A. de Saint Chamas.....	792,665
Excavating apparatus, W. H. Fulcher.....	792,699
Explosive compound and making same, high, H. Maxim.....	792,716
Fabric or paper to be assembled, means for picking up layers of, H. C. Miller.....	793,009
Fasteners, machine for forming and setting metallic, R. B. Lewis.....	792,905
Faucet, B. J. Casey.....	792,879
Feed water purifier, J. P. Sneddon.....	792,939
Feeding, separating, and band-cutting mechanism, G. F. Conner.....	793,025
Fence machine, J. W. Keppert.....	792,994
Fence machine, wire, J. A. Cocker.....	792,697
Fence, wire, J. E. Fredrick.....	792,820
Fertilizer, distributor, M. M. McKinnon.....	792,724
Fifth wheel, H. C. Swan.....	792,861
Filaments from viscose, manufacturing, C. A. Ernst.....	792,858
File renewing apparatus, T. S. Hamilton.....	792,822
Filing apparatus, W. E. S. Strong.....	792,857
Filter, L. Quimby.....	792,926
Fire alarm circuits, automatic non-interfering repeater for, W. H. Kirnan, re-issue.....	12,364
Fire extinguisher valve, automatic, C. W. Kersteter.....	792,598
Fire extinguishing building construction, J. Rogers.....	792,794
Fireproof shutter, Lyman & Hood.....	792,603
Fireproof wall, A. L. A. Himmelwright.....	792,593
Fishing reel with adjustable end plates, W. & A. F. Meisselbach.....	792,910
Flanger, R. S. Berger.....	792,876
Flooring, wood, E. J. Fulghum.....	792,879
Flower pot holder, C. Kirchner.....	792,985
Fluid pressure regulator, J. Closs.....	792,757
Flushing tank, M. A. Alexander.....	792,956
Fly trap, L. Lacaille.....	792,996
Folding and reclining chair, C. Kempf.....	792,712
Fumigating candle, J. P. Cunningham.....	792,695
Furnace charging box, C. L. Taylor.....	792,681
Furnace filling apparatus, J. W. Seaver.....	792,735
Furnace for melting steel or other metals, portable, L. Rousseau.....	792,619
Galvanometer, E. F. Northrup.....	792,843
Game apparatus, R. D. Martin.....	793,002
Garment clasp, Menser & Greenblatt.....	792,717
Gas check, P. Riess.....	792,928
Gas generator, acetylene, B. W. Harris.....	792,984
Gas generator, acetylene, J. S. Dickey.....	792,816
Gas heater, H. W. Martin.....	792,715
Gasket, F. J. Jewett.....	792,901
Gate, A. J. McCormack.....	792,722
Gate, W. C. Hooker.....	792,774
Gate, P. H. Connelly.....	792,968
Gate, H. H. May.....	793,038
Gearing, J. Heberling.....	792,656
Gearing, E. D. Cahen.....	792,964
Generator, See Gas generator.....	
Glass apparatus for making cylinder, J. Haley.....	792,590
Glass blowing machine for forming parisons, W. E. Beck.....	792,581
Glass grooving machine, A. Wetzler.....	792,685
Glass machine for making wire, C. H. Tondeur.....	792,803
Glass tank furnace, A. O. Hurley.....	792,705
Globe lifting device, J. H. Hill.....	792,657
Glove protector, A. R. Liebenstein.....	792,662
Go cart, folding, G. H. Barschow.....	792,579
Golf club, F. W. Taylor.....	792,631
Grain elevating means, portable, O. E. Casey.....	792,880
Gramophone attachment, G. Königstein.....	792,779
Grave marker, B. F. G. W. Lengood.....	792,835
Grease cup, W. E. S. Strong, et al.....	792,858
Grinding and scouring machine, L. Schulte.....	792,854
Gun, C. D. Leutenhizer.....	792,909
Gun sight, S. M. Murray.....	793,016
Harrow, A. D. Angele.....	792,956
Harvester, A. M. Hemberg.....	792,592
Harvester, F. J. Lampton.....	792,832
Hat, coat, and umbrella rack, W. J. Steffler.....	792,942
Hat pin, A. A. McRae.....	792,918
Hay tedder fork arm, W. W. Shaw.....	792,622
Head rest attachment, J. S. Schaff.....	792,669
Headlight for vehicles, dirigible, O. E. Mitchell.....	792,718
Heat transferring apparatus, W. T. Donnelly.....	792,883
Hinge, H. A. Paquette.....	793,023
Hog trough, O. H. P. & J. W. Good.....	792,981
Horseshoe, J. C. Flickinger.....	792,890
Horseshoe calk, C. W. & E. A. Sneek.....	792,674
Hose coupling, J. H. Stephens.....	792,626
Hose supporter clasp, J. A. Yates.....	792,734
Hose supporter clasp, E. Cleary.....	792,965
Hydrocarbons, making sulphureted, F. S. Valentiner.....	792,683
Hydrocarbons or other combustibles, burning, J. S. Rogers.....	792,667
Hydroextractor, centrifugal, N. Cautley.....	792,755
Ice creeper, P. Wenz.....	792,867
Ingot stripper, C. L. Taylor.....	792,630
Inking ribbon attaching means, M. H. Chapin.....	792,881
Jar fastener, fruit, E. Nolte.....	792,841
Jar or bottle closure, R. E. Browne.....	792,812
Journal box, J. W. Stephenson.....	792,943
Journal box, car wheel, W. M. Duncan.....	792,761
Kiln fire box, A. Gillett.....	792,769
Lamp adjustable support, incandescent, P. Ferg.....	793,030
Lanterns, frame for the glasses of signal, R. Black.....	792,877
Laundry iron, electric, E. H. Richardson.....	792,792
Lawn trimmer, E. Barton.....	792,750
Leg rest and foot warmer, E. L. Barber.....	792,644



# CADILLAC

Climbing steep grades or under other severe conditions of travel, the Cadillac not only reaches its own destination without annoyance, but is a "friend in need" to others.

Whatever the test, there is power enough and to spare. Simplicity and accuracy of construction reduce the liability to damage or derangement of mechanism so low as to make the Cadillac almost trouble-proof. The money-saving in consequence of this, combined with remarkably low cost of fuel and lubrication, make the Cadillac the most economically maintained of all motor cars. Ask any Cadillac owner. His expense book is our best advertisement.

Model F—Side-Entrance Touring Car, \$950. Model E—Light, stylish, powerful Runabout, \$750.  
Model B—Touring Car, detachable tonneau, \$900. Model D—Four-cylinder, 30 h. p. Touring Car, \$2,800.

All prices f. o. b. Detroit.

Write for catalog N, and address of nearest dealer where you may try a Cadillac.

**CADILLAC AUTOMOBILE CO., Detroit, Mich.**

Member Association Licensed Automobile Manufacturers.

## WE GUARANTEE

OUR OUTFITS TO HANDLE MORE AIR FOR THE POWER CONSUMED THAN ANY OTHER SET OF THE SAME SIZE. TO BUY THEM IS GOOD ECONOMY. GENERATORS, VARIABLE & CONSTANT SPEED MOTORS

**Rochester Electric Motor Co., 10-12 Frank Street, ROCHESTER, N. Y.**

# Opaque Projector

The Mark That Multiplies Your Salary

When an institution with a working equipment valued at \$5,000,000 and a reputation of 13 years' continued success offers to show you *without charge* how to **multiply your salary**, either by advancing in your present work or by changing to a more lucrative occupation offering greater opportunities for your natural talents, isn't the offer worthy of your consideration?

When this institution further offers to give you the names and addresses of **a thousand and one** who as the direct result of investigating this offer have either secured lucrative positions or are managing enterprises *of their own*, isn't it worth the time it takes to ask how **you** can do likewise?

When this institution places before you a selected list of the most profitable and promising occupations, and invites you, without further obligations on your part, to indicate the position you would like to have by simply making

**A Mark Like This X**

doesn't your curiosity, if *not* your ambition, make it impossible for you to allow the opportunity to go by?

**Study the List—Mark the position you desire—Cut out the Coupon and mail it to us**

**INTERNATIONAL CORRESPONDENCE SCHOOLS**  
Box 942, Scranton, Pa.

Please send me your booklet "1001 Stories of Success" and explain how I can qualify for position before which I have marked X.

Bookkeeper	Electrician
Stenographer	Electrical Engineer
Advertisement Writer	Electrical Lighting Supt.
Show Card Writer	Mechanical Engineer
Window Trimmer	Surveyor
Mechanical Draughtsman	Stationary Engineer
Ornamental Designer	Civil Engineer
Illustrator	Building Contractor
Civil Service	Architectural Draughtsman
Chemist	Architect
Textile Mill Supt.	Structural Engineer
French } With Edison	Foreman Plumber
Spanish } Phonograph	Mining Engineer

Name.....

Street and No.....

City..... State.....

**Rushton Canoes**

Lengths 15, 16, 17, 18 Feet

**INDIAN GIRL MODEL**

As rapid in delivery as she is speedy in the water—no delay—immediate shipments—strong, light and graceful. Built of seasoned cedar—covered with best quality of canvas. Price, packed, \$32 to \$44. Send for catalogue of Dinghies, pleasure boats, all-wood and canvas-covered canoes, oars, paddles, sails and fittings. Write to-day.

**J. H. RUSHTON, 819 Water Street, Canton, N.Y.**



**Mullins Stamped Steel Boats Can't Sink**

Staunchly built of strong, rigid steel plates with air chambers in each end like a life boat, they are buoyant, strong, safe, speedy—as much better than a wooden boat as a steel greyhound is better than a wooden schooner. They don't leak, crack, dry out, wear out or become waterlogged and can't sink because of the air chambers. All boats sold direct and fully guaranteed.

**Motor Boats, Row Boats, Hunting and Fishing Boats**

Mullins Steel Motor Boats are elegantly equipped, torpedo stern motor boats—not row boats with motors in them.

Motor Boats, 16 foot, 1 1/2 h. p. \$185; 16 foot, 3 h. p. \$165; 18 foot, 3 h. p. \$240. Row Boats, \$20 up.

Catalogue of all styles sent on request.

**The W. H. Mullins Company (The Steel Boat Builders), 118 Franklin St., Salem, Ohio**  
Member National Association of Engine and Boat Manufacturers

**Truscott Pleasure Craft**

are not ordinary boats in quality or appearance. You can tell a Truscott—you can trust one.

Won the GRAND PRIZE at St. Louis—the first and only Grand Prize awarded makers of small boats or engines at any exposition anywhere. Send stamps for catalogue. Our quarterly "The Launch" is free.

**TRUSCOTT BOAT MFG. CO.**  
Dept. 729, St. Joseph, Mich.  
Adapted and used exclusively by Lewis & Clark Expedition, Portland, Oregon.

**BACKUS**

**GAS & GASOLINE ENGINE**

Simple, Economical, Durable. Suitable for all kinds of work.

**BACKUS WATER MOTOR, cheapest power known.**

Write for circular and prices.

**BACKUS WATER MOTOR CO., Newark, N.J., U.S.A.**

**The Cushman Motor**

never disappoints. The least weight for the power developed makes it the Best Motor and a top Motor on the market. The New 1905 Model is better than ever. The engine proper is valveless. The cylinder, water jacket and head are cast in one piece. It is the simplest as well as the most efficient. Holds many speed records. Made in single and Double Cylinder patterns. Prices make it economical. Cut shows 2 h. p. make, weight 15 lbs. We make Auto Motors and Stationary Engines. Catalog free.

Agents Wanted. **CUSHMAN MOTOR CO.**  
2026 N Street, Lincoln, Neb., U.S.A.

**A. W. Fisher.**

Manufactory Established 1751.

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

Send for descriptive Circular S.

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

**Four-Cycle Motor**

Single and double cylinders. Simple and reliable. Best materials and workmanship. Not how cheap but how good. They are moderate in price. Write us. Catalogue Free.

**Grant-Ferris Co., Troy, N.Y.**

**The Genuine Armstrong's STOCKS and DIES**

Acknowledged to be the best. Different sizes and capacities. Write for catalog.

**THE ARMSTRONG MFG. CO., Bridgeport, Conn.**  
New York Office, 139 Centre Street

**Power Wipe Rope**

SAINT LOUIS WORLD'S FAIR

**GRAND PRIZE**

MOST POWERFUL WIRE ROPE MADE

**BRODERICK & BASCOM ROPE CO**  
ST. LOUIS MO

**An Automatic Pump**

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

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

**THE CURTIS DOUBLE CYLINDER MOTOR**

5 h. p. 60 lbs. Roller Bearings. Capt. Baldwin's famous airship, the California Arrow, is propelled by this motor. Also our motorcycle, which holds the world's record of 10 miles in 3 min. 54 2-5 sec.

Catalogue Free.

**G. H. CURTIS MFG. CO.**  
Hammondsport, N. Y.

**Measurements Read at a Glance**

The improved Depth Gauge here illustrated combines the advantage of the rule and the vernier. Made in two sizes of stocks. It will satisfy the most exacting mechanic. Send for catalogue.

Prices, No. 57

4 inch stock with red and 4 inch rule	\$1.25
4 " " " " " " " "	1.50
4 " " " " " " " "	1.50
6 " " " " " " " "	1.75

Postpaid upon receipt of the above.

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

**USE THE MICHIGAN**

Famous two and three-blade Solid and Reversible Propeller Wheels, supplied to over one hundred engine builders. They have no equal for speed and strength. They are in use in every resort and on all fast racers. Independent Reversible Clutches. Can be readily attached to any motor, has absolute control over boat at full speed ahead, idle or reverse. Have four different sizes, suitable for motors from 1 to 80 H.P.

**Michigan Motor Co.**  
Grand Rapids, Mich., U.S.A.

**ELECTRIC LAUNCH MOTOR. — THE**

design in this paper is for a motor of unusual simplicity of construction, which can easily be built by an amateur at small cost. It is intended for a boat of about 24 feet over all and 4 feet 6 inches beam, drawing 18 inches, and is capable of propelling such craft at a speed of 7 miles per hour. Illustrated with 21 cuts. See SCIENTIFIC AMERICAN SUPPLEMENT No. 1202. Price 10 cents by mail, from this office, and from all newdealers.

**BARKER MOTORS**

Have more good points, fewer parts and require less attention in operation than any other.

Launches, Valves, Specialties.

**C. L. Barker, Norwalk, Ct.**

**Higher Rents — Lower Insurance**

That is what the building owner secures who builds fireproof. He secures a lot of other things too that make his investment more profitable.

**Fireproof Magazine**

shows how. No prospective builder can afford not to read it. Sample Copy Free. Write for it.

**FIREPROOF MAGAZINE**  
1310 Great Northern Bldg., Chicago

**Surveying and Drawing Instruments**

**DRAWING AND ARTISTS' MATERIALS AND SUPPLIES**

We are the largest house in the world. Try us on BLUE PRINT PAPER, TRACING CLOTH, DRAWING INKS, or SURVEYING and ENGINEERING INSTRUMENTS.

**A. S. ALOE CO, 515 Olive Street, St. Louis, Mo.**  
Write for Catalog. "Sent Free." Correspondence Solicited.

**"STANDARD" Two-Speed Automatic Coaster Brake Hub**

Makes wheeling a delight, eliminates the drudgery. Do not waste money on experiments when you can buy a perfect attachment all in one hub. Our little booklet tells all about it and is mailed free. Write to-day.

**STANDARD SPOKE AND NIPPLE CO. Torrington, Conn.**

Level and gage, combined spirit, T. D. Rowan	792,930
Leveling and pitch indicator, combined, M. Geligthly	792,821
Limb, artificial, E. Keeber	792,711
Linoleum manufacturing machine, G. Frenkel	793,031
Lithotype machine, J. R. Rogers	792,851
Lithotype machine, P. T. Dedger	792,973
Lithotype machine, D. S. Kennedy	792,993
Locomotive, Klien & Lindner	792,906
Logging car stake socket, Tew & Mizell	792,742
Loom heddle mechanism, A. Weimar	793,025
Loom jacquard mechanism, Halton & Morrow	792,983
Lubricator sight, F. W. Edwards	792,765
Lumber tally or recorder, J. C. Hurley	792,775
Magnetic separator, E. C. Kavanaugh	792,776
Mail bag holding device for mail cranes, Ludwig & Leffarge	792,714
Mail bag receiving mechanism, G. R. Moore	792,782
Mail cabinet, M. C. Finney	792,973
Mail deliverer, rural route, V. F. Springer	792,975
Manual recorder, J. P. Cleal	792,696
Massage machine, eye, F. H. May	793,004
Meat hook, J. D. Tally	792,945
Melting furnace, W. E. Williams	792,642
Metal coating tank, G. Porter	792,610
Metal cutting machine, expanded, G. G. McKay	792,723
Metal mixtures produced as a by-product in electrolytic metal refining, treating, A. G. Betts	793,039
Metal tie and rail fastening, T. A. & J. V. Enloe	792,587
Metal working machine, J. Hartness	792,591
Meter. See Electric meter	
Mine curtain, Good & Hall	792,893
Mining tool, W. J. Farbee	792,891
Money changing apparatus, W. N. Porter	792,923
Motor starter, A. J. Horton	792,658
Mower attachment, F. & F. A. Blocki	792,752
Music leaf turner, F. J. Ward	792,865
Musical instrument, D. H. Haywood	792,455
Nest, poultry, G. F. Jenkins	792,707
Nut lock, A. L. Eicher	792,854
Nut lock, J. Hileman	792,896
Oil burner, blue flame, W. R. Jeavons	793,032
Opera chair, M. F. Levy	792,834
Ordnance, sighting and working of quick firing, Dawson & Buckham	792,972
Paper bags, pre-cut, H. K. Hiltsee	793,034
Paper bag, H. L. R. Wolf	792,686
Paper, printing, J. von Schmiedel	792,932
Parachute, J. Edwards	792,586
Pavements, construction of bituminous macadam, or other pitch, J. H. Amies	792,873
Pebble mill, W. A. Koneman	792,778
Pen, fountain, S. H. Hodges	792,898
Pencil sharpening machine, P. P. O'Hara	792,785
Percolator, S. B. Grimes	792,589
Photographic printing frame, F. A. Brownell	792,645
Photographs or the like, receptacle for, I. Kellner	792,709
Pipe coupling, P. W. Staff	792,740
Pipe coupling seat, W. W. Bateman	792,580
Pipe gasket, laminated, H. C. Roentgen	793,024
Pitchfork holder, safety, C. Schade	792,931
Plant balsam orriza, treating the, W. Sunderland	792,629
Planter clutch mechanism, corn, R. S. Kirkpatrick	792,831
Planter, seed, W. Bagger	792,958
Plate shears, C. Swan	792,802
Pliers, P. Broadbooks	792,962
Plow, Hanger & Thomas	792,703
Plow lever mechanism, wheeled, S. D. Poole	792,846
Plumb bob suspension hook, A. H. New	792,944
Pole tip, means for attaching, J. F. McElroy	792,607
Pole tip, S. Bates	792,960
Pot or pan lifter, J. Sjastram	792,736
Powder keg carrier, J. L. Hower	792,596
Power transmission mechanism, B. J. Arnold	792,748
Precious values in soils, apparatus for saving, B. W. Rice	792,617
Pressure regulator safety device, W. U. Griffiths	792,895
Printing press, G. E. Pancoast	793,022
Printing press ink distributor, platen, C. F. Egan	792,652
Projector, R. B. Patterson	792,727
Propulsion marine, K. O. Well	792,687
Pulleys, E. E. McIntyre	792,915
Pulleys, friction clutch for, W. D. Massengill	792,604
Pump, rotary, W. Patterson	792,665
Pumping mechanism, Neathery & Adams	792,839
Punch and shears, L. Van Dorin	792,949
Quick acting clamp, A. M. Colt	792,758
Railway crossing, J. H. Byren	792,647
Railway crossing gate mechanism, Craig & Pease	793,029
Railway rail joint and chair, G. Teller	792,633
Railway signal, A. M. Bullard	792,800
Railway signal, A. M. Bullard	792,963
Railway signal apparatus, L. Reidel	792,616
Railway signaling, E. C. Irving	792,900
Railway signaling system, E. R. Fern	792,818
Railway spike lock, Allen & Feigley	792,745
Railway switch, electric, T. B. Stewart, et al	792,741
Railway traffic controlling apparatus, T. H. Patenall	792,922
Recorder. See Manual recorder	
Recording mechanism, Taylor & Laroek	792,680
Records, etc., locking bar for loose leaf, C. M. C. Mumford	792,840
Reflector, daylight, J. Cossmann	792,759
Refractory compound and making same, G. L. Davison	792,882
Regenerative retort furnace, H. & J. W. Hegeler	792,773
Resilient tired wheel, J. Partington	792,921
Resistance, artificial, W. R. Whitney	792,638
Riveting or the like, portable tool for, H. G. Morse	792,912
Rolling mill indicating attachment, H. H. & J. L. Burten	793,027
Rolling pipe couplings, etc., machine for, H. J. A. Heck, reissue	12,363
Roof ventilator, building, W. J. Kelly	792,902
Rotary engine, G. A. Probert	792,614
Rotary engine, K. A. Staablgren	792,625
Rubber tubing, pipe, hose, etc., coupling device for, J. J. Mulcenroy	792,913
Rule, bevel, H. W. Young	792,953
Sail, vessel, G. E. Postgate	792,924
Salt, manufacture of, H. Tee	792,632
Sandpapering machine, Harman & Crooks	792,825
Sanitary attachment for speaking tubes or telephone mouthpieces, W. S. Little	792,601
Sap bucket cover, J. F. Warner	792,950
Sash fastener, C. L. Holland	792,595
Sash, window, G. Burkhardt	792,814
Saw clamp, J. Loken	792,998
Saw tooth swage, inserted, Newell & Staley	793,020
Scissors or shears for gaging fields, ruffles, bands, etc., gage for, F. M. Underkuffler	792,948
Screw driver or similar tool, J. Swan	792,679
Scrubbing device, F. E. Whitney	792,868
Seed dropping mechanism, T. Ryan	792,620
Sewing machine needle and shuttle thread cutting device, H. C. Miller	793,007
Shade and making same, pressed and blown ribbed, O. A. Mygatt	792,606
Shaft, divided vehicle, F. C. Goettert	792,770
Shoe cushion, E. J. Bliss	792,658
Shoeshining machine, automatic, S. M. Cohn	792,815
Shoe tread piece, detachable, J. Martin	793,001
Show case, W. Schmitt	792,732
Shutter or door guide, window, F. E. Warner	792,866
Sickle bar, W. H. & O. F. Brusman	792,582
Sight feed lubricator, F. W. Edwards	792,764
Sign, C. W. Bruden	792,813
Sign, illuminated, H. Christensen	792,756
Signaling mechanism, block, C. P. Bass	792,875
Silo, C. N. Crosby	792,969
Silver, coating materials with, F. Hilpert	792,826
Silver, trimming, J. G. Zink	792,954
Skiving machine, H. M. Weary	792,636
Sound box, H. C. Miller	793,012
Sparking plug, E. E. Clark	792,695
Spectacle nose-guard, W. H. Eccleston	792,763

**EVERY ONE WANTS A DIAMOND**

There are eighty-two millions of people in the United States. Every one of them wants a Diamond. Diamonds with hearts. A Diamond is a shrewd investment. Diamonds increase in value twenty per cent per year. Better than savings bank. Write to day for our Catalogue—1000 illustrations. Select the Diamond which is your special fancy. We will send it for your examination. Our credit terms: One-fifth the price to be paid when you receive the article, the balance in eight equal monthly payments. We pay all express charges. Write To-day!

**LOFTIS Diamond Cutters**  
Manufacturing Jewelers  
Dept. G 180  
BROS & CO. 1556 92 to 98 State St. Chicago

**KEY AND TYPE ON ONE STEEL BAR**

An adaptation of the simple lever principle to typewriter construction. This is our exclusive patent and has made possible the first Standard machine at \$50—a saving to you of one-half. The new No. 7 American has universal keyboard, ball-bearing carriage, prints from ribbon with interchangeable steel type and has unlimited speed.

"The American Way" mailed free.

**AMERICAN TYPEWRITER COMPANY**  
264-C Broadway, New York

**NAIL HOLDER AND SET**

THE Nail can be driven where the hand cannot reach. Don't pound your fingers. 85 cents buys it all. Order to-day. Catalogue No. 17 of Fine Tools free.

**THE L. S. STARRETT CO., Athol, Mass.**

**ELECTRIC SEWING MACHINE MOTOR.**

The instructions and numerous illustrations of details contained in this article will enable any mechanic of average ability to build an efficient motor that will operate a sewing machine. The cost of materials for this machine should not exceed five dollars. See SCIENTIFIC AMERICAN SUPPLEMENT No. 1210. Price 10 cents by mail, from this office and from all newdealers.

**THE BEST LIGHT**

Beautiful to behold, useful beyond any light made. The cheapest, most efficient light on the market. Makes and burns its own gas, giving a 100-candle power light.

Over 100 different styles. No GREASE, DIRT, SMOKE or ODOR. Every lamp warranted.

Agents Wanted Everywhere.

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

TERRE HAUTE, IND., February 17, 1905.

**BRENNAN MOTOR CO., Syracuse, N. Y.**

Gentlemen—The writer has been operating one of your motors, a double cylinder 8 horse power, for the past two seasons and wishes to state that the motor has given excellent satisfaction and the repairs on same has been nothing whatever. World state that with the exception of twice I do not know of the motor stopping of its own accord during the season. I am satisfied that I have had excellent good luck and wish to recommend the Brennan Motor to any one wishing a motor for an automobile. Yours truly,

Name given on application.

The Wonderful **"AUTO-MARINE MOTOR"**

**\$37.50**

ENGINE ONLY

Weight 37 1/2 lbs. Height 11 1/2 in.

Convert Your Row Boat into a LAUNCH

Rated at 1 h. p. Has shown nearly 2 h. p. No valves, gears, springs or cams. Jump start. Reversible. Speed control. Only three moving parts. Could not be made better if it cost five times as much. ORDER NOW—they are selling so fast you may be disappointed later.

**Auto-Marine Motors from 1 to 20 h. p.**  
**Detroit Auto-Marine Co., 75 E. Congress St., Detroit, Mich.**  
Formerly Detroit Lackawanna Co.

**STA-RITE**

Lubrication Plugs stay right the longest. 3/8 size. Patent. Each, \$1.50, Mica, \$1.75, postpaid, with handy wrench, motor accessories. See R. E. HANCOCK, 225 Broadway, New York

**Cheap Power from Kerosene**

**SAFE, SIMPLE, VALVELESS AND RELIABLE**

**Universal Kerosene Engine.**

Automatic in operation, easily started, and runs steadily and at a comparatively high rate of speed at a cost of less than one pint of kerosene oil per actual horse power hour. Praised wherever used. Highest efficiency at lowest cost. For prices and terms address

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

Yours— For the Summer Only



How about Pictures for your Summer Home? There will be dark days to brighten, and dull days when out-of-door pleasures pall...

Spinning ring hardening apparatus, C. E. Nutting 792,917. Spittoon, Rötter & Kammerer 792,852. Stairway, F. A. Winslow 792,743. Stairway, or elevator, moving spiral, L. G. Souder 792,623. Stamp mills, split guide box for, W. N. Nolan 792,916. Stamp, time, W. I. Fellett, reissue, 12,360, 12,361. Station indicator, J. H. Shepherd 792,672. Stay bolt, G. S. Thompson 792,863. Steel, making open hearth, N. McConnell 792,914. Steker, underfeed, E. E. Taylor 792,862. Stopper. See Bottle stopper. Store appliance, A. Bowers 792,753. Stove fire pot, cooking, Stroud & Murdock 792,675. Stove, gas, R. Sturges 792,627. Strainer, B. F. D. Miller 793,605. Strainer, tank, J. McAfee 793,017. Sulphur, from the sulphur-containing constituents of petroleum and making hydrogen carbide, separating, H. S. Blackmore 792,026. Superheater, W. Schmiat 792,553. Switch, J. H. Byron 792,646. Switch stand, A. B. Bellows, reissue, 12,362. Tables, shelf support for kitchen, L. R. Helbrook 792,827. Tablet or pill counting machine, Ohlenorf & Brough 792,918. Tablet or plate for facing walls, ceilings, or the like, enamelled metal, J. H. Kirk 792,661. Tag, laundry, W. J. Baker 792,874. Talking machine stand and horn, combined, H. C. Miller 793,013. Tape folder, W. E. Wright 792,570. Target trap, F. Hardy 792,823. Teaching spelling, kindergarten for, H. H. Steele 792,801. Telegraphy, electric, I. Kitsee 793,037. Telephone transmitter, D. A. Reynolds 792,927. Telephony, E. A. Buell 792,693. Thresher, bean, C. H. Schauer 792,785. Threshing machine, W. H. Rettke 792,847. Threshing machine, J. F. Henderson 792,986. Threshing machine, F. Kitten 792,985. Threshing machine feeding device, H. Davies 792,971. Tire construction, Ellis & Davis 792,767. Tire grip tread, pneumatic, W. J. Smith 792,673. Tire tightener, E. Craig 792,554. Tire, vehicle wheel, Ellis & Davis 792,766. Tool, finishing, E. Krebs 792,780. Tool handle, H. E. E. Molkenhuth 792,719. Top, spinning, F. Wieland 792,640. Transportation apparatus, M. Lindblad 792,997. Trap, E. H. Gold 792,700. Trolley head for electric tram cars, S. R. Temples 792,634. Trolley poles of electric cars, safety device for, D. R. W. Hardman 792,985. Trolley stand, F. N. Kelsey 792,903. Trolley wheels, combined pin and thermal lubricator for, W. C. Richardson 792,725. Trolley wire clamp, C. C. Bakewell 792,959. Truck, J. Blood 792,810. Trunk, combination, H. Remunder 792,731. Tunnels, waterways, or such like, building of, E. Molloy 792,605. Turbine, F. M. Faber 792,919. Turbine, elastic fluid, Emmet & Junggren 792,653. Turbines, intermediate bucket and support for, O. Junggren 792,659. Turpentine or other products from wood apparatus for recovering, Sibbitt & McLean 792,934. Twyer molds, mold for producing cores for, S. A. Kelly 792,992. Umbrella cover, seamless, C. Smith 792,737. Vehicle brake, rubber tired, Ferron & Sawyer 792,844. Vehicle driving mechanism, motor, C. F. Lufkin 792,663. Vehicle, motor, N. T. Harrington 792,764. Vehicle spring wheel, flexible, A. Mathey 792,693. Vehicle steering gear, K. Knudsen 792,598. Vehicle wheel, E. E. Irwin 792,706. Vehicle wheel, N. A. Newton 792,725. Vehicle wheel, L. A. Hill 792,597. Velocipede, railway, C. Brandt 792,754. Vending machine, O. B. Phillips 792,609. Vending machine, A. W. Cordes 792,650. Vending machine, coin controlled, R. F. Elliott 792,885. Ventilators. See Roof ventilator. Ventilator, J. Hough 792,990. Ventilator, G. Moulton 793,015. Veterinary dental seat, Reed & Meierhofer 792,693. Wagen dumping apparatus, being apparatus for, Frindle & Fairbrother 792,777. Waist effect, device for producing long, D. A. Seligman 792,797. Wall lining, L. A. Olsen 793,021. Water closet, W. P. Rix 792,730. Water closet bowl, siphon, Wilson & Schulte 792,805. Water heater and alarm, time, Richardson & Sams 792,848. Water wheel attachment, anti-anchor ice, G. M. Brown 792,811. Weaner, calf, J. Fluhman 792,819. Weather strip, A. T. Hansen 792,984. Weighing machine, automatic, J. Haberle 792,982. Weighing machine, coin controlled, A. A. Caille 792,694. Wheel, E. M. Roberts 792,929. Whiffetree hook, E. Pyle 792,925. Winding machine, ball, A. Mantenfel 793,000. Window or door screen, W. B. Lee 792,833. Windows in open or closed positions, means for positively retaining, N. R. Evans 792,817. Wool drier discharger, F. Gutmann 792,792. Yarn guide, J. E. Appleby 792,957. Yoke center, neck, H. & J. R. Shearer 792,671.

INTELLIGENT INVESTMENTS

HOW SMALL INVESTORS CAN GET DOUBLE INTEREST

The safest investment of modern times yielding the best returns with absolute safety is the 6 Per Cent Real Estate Gold Bonds of the Jennings Real Estate Loan Company, of Chicago, Ill., a concern having a capital of \$1,000,000 and vouched for by the Chicago Title and Trust Company. This concern is looking for small investors with \$100, \$200, \$500 or \$1,000, to whom it is selling a safe 6 per cent interest-bearing first mortgage bond.

Each bond may be sold separately or used as collateral for borrowing money, just as a railroad bond. Each bond carries 6 per cent interest and this chance for investment is positively the best and safest ever offered to the small investor.

Jennings Real Estate Loan Co., First National Bank Building, Chicago, Ill.

THE HARRINGTON & KING PERFORATING CO. PERFORATED METAL OF EVERY DESCRIPTION FOR ALL USES. 225 NO. UNION ST. CHICAGO, ILL.

SPECIAL MANUFACTURING. DIES AND STAMPINGS TO ORDER. SPEC'L MACHINERY—MODELS—EXPERIMENTAL WORK. DROP FORGING DIES AND DROP FORGINGS.

ICE MACHINES. Carliss Engines, Brewers' and Malters Machinery. THE VILTER MFG. CO. 383 Clinton St., Milwaukee, Wis.

MODELS & EXPERIMENTAL WORK. Inventions developed. Special Machinery. E. V. BILLAARD. 24 Frankfort Street, New York.

Dies, Tools, Models and Special Machinery. Metal Specialties and Stampings Manufactured. HOEFT & MOORE, Chicago, U. S. A.

BALLOONS. Aeronaut J. Stevens, Box 181 Madison Sq., N. Y.

WORKING AND PATENT DRAWINGS. G. M. MAYER, M.E., 1131 Monmouth Bl., Chicago, Ill.

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

INVENTORS' AND MACHINISTS' Machines and Tools designed. Inventions perfected. Accurate drafting. C. H. McGiehan & Co., 110 W. 34th St., N. Y.

THE SCHWEDTLE STAMP CO. STEEL STAMPS, LETTERS & FIGURES. BRIDGEPORT, CONN.

Experimental & Model Work. Cit. & advice free. Wm. Gardam & Son, 45-51 Rose St., N.Y.

INVENTORS.—Our specialty is practically developing inventions. Design and build special, plain and automatic machinery, presses, dies, models, patterns and jigs. Send for Booklet No. 5. A. NACKE & SON, 236-42S, 9th St., Philadelphia, Pa.

NOVELTIES & PATENTED ARTICLES. MANUFACTURED BY CONTRACT. PUNCHING DIES, SPECIAL MACHINERY, E. KONIGSLOW STAMPING & TOOL WORKS, CLEVELAND, O.

Telegraphy. Circular free. Wonderful automatic teacher, 3 styles 22 pp. OMNIGRAPH CO., Dept. 92, 59 Cortland St., New York.

Magical Apparatus. Grand Book Catalogue. Over 700 engravings 25c. Parlor Tricks Catalogue, free. MARVINKA & CO., Mfrs., 493 Sixth Ave., New York.

MASON'S NEW PAT. WHIP HOISTS. Save expense and liability incident to Elevators. Adopted by principal storehouses in New York & Boston. Manfd. by VOLNEY W. MASON & CO., Inc. Providence, R. I., U. S. A.

The Monthly CONCRETE. 1st standard publication on Portland cement construction, and invaluable to cement workers, engineers and contractors. Send \$1.00 for a year's subscription or write for special offer. Concrete Publishing Co., Dept. P, Detroit, Mich.

BRAZE CAST IRON WITH BRAZIRON. Cheap, easy. Send 12 cents in stamps for information, testimonials and samples of Braziron and flux sufficient for several jobs. THE A. & J. MANUFACTURING COMPANY 9 S. Canal St., Chicago, Ill.

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

SETS OF CASTINGS OF MODEL ENGINES. SEND 10¢ FOR 126 PAGE ILL. CATALOGUE. ALSO TOOLS GEAR WHEELS & PARTS OF MODELS. GOODNOW & NIGHTMAN, BOSTON. Removed to 132 Milk Street.

Agents Wanted

in every railway shop to solicit subscriptions for the Railway Master Mechanic ONE DOLLAR A YEAR LIBERAL COMMISSION TO AGENTS

Address: 305 DEARBORN STREET CHICAGO

Satisfaction Guaranteed

WE BUILD Special Machinery, Machine Parts, Interchangeable Machinery, Punches and Dies, Gear Cutting, Etc. The John R. Williams Co. Machine Works 114-118 Liberty Street, New York, N. Y. 120-126 Pacific Street, Newark, N. J.

Banner Welding and Brazing Compounds

Welds at a low heat, does not fly. Saves time and fuel! GUARANTEED to weld iron to steel or malleable iron. Pass all arguments until you have tried the BANNER BRAND. We will send a large free sample upon inquiry. Cortland Specialty Co. Patented May 10, 1904. Sole Manufacturers. CORTLAND, N. Y.

DO YOU USE GRINDSTONES?

If so we can supply you. All sizes mounted and unmounted, always kept in stock. Remember, we make a specialty of selecting stones for all special purposes. Send for catalogue "I" The CLEVELAND STONE CO. 2d Floor, Wilshire, Cleveland, O.

THE EJECTOR MUFFLER

The Greatest Advance in the Gasoline Age For Particulars, write to The Motor and Manuf'g Works Co., Ithaca, N. Y.

Every Gas Engine User

should learn about the Apple Automatic Spark. Easily attached. No more belt, battery or commutator troubles. Increases power and speeds. For any kind of ignition apparatus write The Dayton Electrical Mfg. Co., 98 Beaver Bldg., Dayton, Ohio.

AUTO STORAGE BATTERIES ALL KINDS

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

BLISS ELECTRICAL SCHOOL

214 G Street N. W., Washington, D. C. Offers a theoretical and practical course in ELECTRICITY complete in one year. Students actually construct Dynamos, Motors, and electrical instruments. 13th year opens September 27. Send for free Catalogue.

TYPEWRITERS ALL MAKES

All the Standard machines SOLD or RENTED ANYWHERE at HALF MANUFACTURERS' PRICES. Shipped with privilege of examination. Send for Cat. Typewriter Emporium, 203 LaSalle St., Chicago

LANGWID 312. Writes or translates, composes, proofreads, electrotypes, prints, binds, sells, buys, exchanges, publishes, BOOKS in many Languages. LANGUAGES PRINTING COMPANY Languages Building, 15 West 18th St., New York

BABBITT METALS.—SIX IMPORTANT formulas. SCIENTIFIC AMERICAN SUPPLEMENT 1123. Price 10 cents. For sale by Munn & Co. and all news-dealers. Send for catalogue.

THE Nulite Vapor Lamps. For Home, Store and Street. We also manufacture Table Lamps, Wall Lamps, Chandeliers, Street Lamps, Etc. 100 Candle Power seven hours ONE CENT. No Wicks. No Smoke. No Odor. Absolutely safe. THEY SELL AT SIGHT. Exclusive territory to good agents. Write for catalogue and prices. Chicago Solar Light Co., Dept. G, Chicago

SAN JOSE CALIFORNIA

Soil Unsurpassed in Fertility. Climate Equable and Healthful. Educational Facilities Leading the World. Opportunities for the Home Seeker. Gift Edge Propositions for the Investor. Magnificent Enjoyment for the Tourist. Send a 2c. stamp for our booklet.

SAN JOSE CHAMBER OF COMMERCE San Jose (Hoay), California. Free Information Bureau and Exhibit, Palace Hotel, San Francisco. Mention SCIENTIFIC AMERICAN

60 YEARS' EXPERIENCE PATENTS TRADE MARKS DESIGNS COPYRIGHTS &c. Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. HANDBOOK on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the Scientific American. A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$5 a year: four months, \$1. Sold by all newsdealers. MUNN & Co. 361 Broadway, New York Branch Office, 625 F St., Washington, D. C.

DESIGNS. Cigar band, L. C. Wagner 37,463 to 37,466. Comb, F. W. Grell 37,467, 37,468. Range, portable, F. J. Frey 37,472. Stove, heating, M. R. Lehman 37,470, 37,471. Trousers hanger, G. T. Robinson 37,469. LABELS. "Carbo-Grape," for beverages, Chautauqua Fruit Co. 12,212. "Onguent Foster," for ointment, Foster McClellan Co. 12,215. "Pillules Digestives Foster," for pills, Foster McClellan Co. 12,216. "Pillules Foster," for pills, Foster McClellan Co. 12,217. "Retriever," for whiskeys, A. L. Twelbridge 12,213. "Royal," for corn starch, W. W. Bealittle 12,211. "Spun Silk Cloth," for mercerized cotton goods, Wilson & Bradbury 12,214. PRINTS. "Gems of the South," for beer, San Antonio Brewing Association 1,353. "Sensible Sliced Plug," for tobacco, Larus & Bra. Co. 1,351. "The Secret of the Sphinx," for patent medicines, Securitas Remedy Co. 1,352. A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1863, will be furnished from this office for 10 cents, provided the name and number of the patent desired and the date be given. Address Munn & Co., 361 Broadway, New York. Canadian patents may now be obtained by the inventors for any of the inventions named in the foregoing list. For terms and further particulars address Munn & Co., 361 Broadway, New York.

DON'T BUY GASOLINE ENGINES UNTIL YOU INVESTIGATE "THE MASTER WORKMAN," a two-cylinder gasoline engine superior to all one cylinder engines; revolutionizing gas power. Costs Less to Buy and Less to Run. Quickly, easily started, no vibration. Can be mounted on any wagon at small cost—portable, stationary or traction. Mention this paper. SEND FOR CATALOGUE. THE TEMPLE PUMP CO., Mfrs., Meagher & 15th Sts., Chicago. THIS IS OUR FIFTY-FIRST YEAR.