

Languages Taught by Mail
 with the aid of the phonograph. Only successful method. Specially written I. C. S. Textbooks teach you to read and understand the language. The native teacher's voice, through the Edison Standard Phonograph, teaches the exact pronunciation. French, Spanish or German. Circular free. International Correspondence Schools, Box 942, Scranton, Pa.

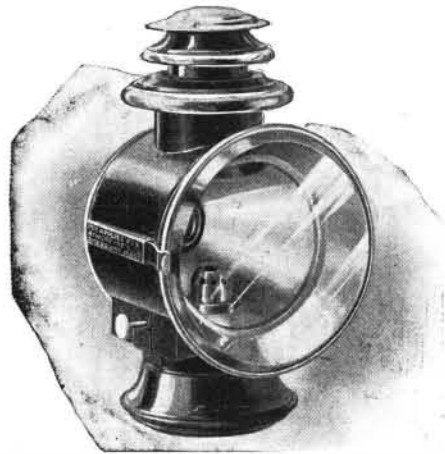
ELECTRICAL ENGINEERING TAUGHT BY MAIL.
 Write for our Free Illustrated Book. "CAN I BECOME AN ELECTRICAL ENGINEER?"
 We teach Electrical Engineering, Electric Lighting, Electric Railways, Mechanical Engineering, Steam Engineering, Mechanical Drawing, at your home by mail. Institute indorsed by Thos. A. Edison and others. **ELECTRICAL ENGINEER INSTITUTE.** Dept. A. 240-242 W. 23d St. New York.

A CHANCE to take a better position will come to you some time. We can teach you by mail in your spare time what you will need to know to fill it, give you the best books free and help you to
EARN MORE WHILE LEARNING
 Courses in Electrical, Mechanical, Steam and Civil Engineering, Drafting, Art, Architecture, Mining, Metallurgy, Business, Stenography, Journalism, Bookkeeping, etc.
 Write for free catalogue 6, with full particulars. **THE CONSOLIDATED SCHOOLS, 156 Fifth Ave., N. Y.**

Do You STAMMER?
 Our 200-page book "The Origin and Treatment of Stammering," with full particulars regarding treatment, sent Free to any address. Enclose 6c to pay postage. Address **LEWIS SCHOOL, 49 Adelaide St., Detroit, Mich.**

The No. 4 YOST WRITING MACHINE
 The distinctive features of the Yost Machine, permanent alignment, direct linking, beautiful work, strength, simplicity, and durability are shown in perfection in the No. 4 Model.

Yost Writing Machine Co.
 NEW YORK CITY. LONDON, ENG.
STAYLIT AUTOMOBILE LAMP



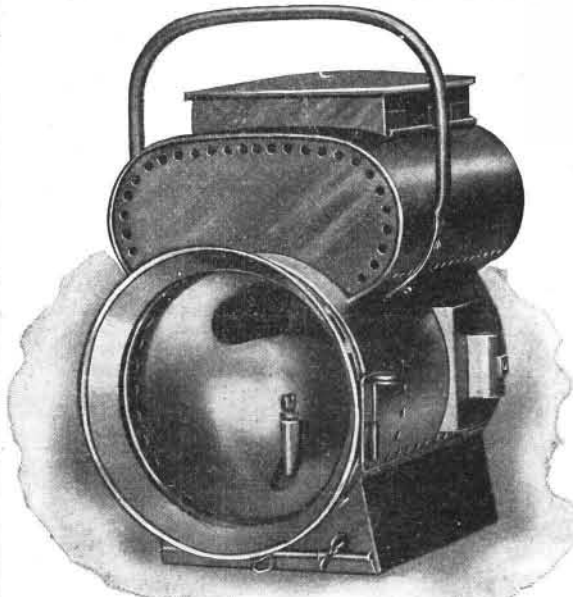
Best Oil Lamp in the World. Gives a big light, wind-proof, cannot be jolted out. A light that never fails. Fully guaranteed. Description and price on application. **ATWOOD MANUFACTURING COMPANY, Amesbury, Mass., U. S. A.**

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 ORIGINAL AND GENUINE
 Rubber Goods. Perfectly imitate linen. Are durable and keep white. They go to all parts of the Globe. Write for Catalog. We want Agents everywhere. Mfd only by **Windsor Collar & Cuff Co., Windsor, Conn.**

50 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, \$3 a year; four months, \$1. Sold by all newsdealers.
MUNN & Co., 361 Broadway, New York
 Branch Office, 625 F St. Washington, D. C.

The STAR FEATURES OF THE "STAR"
 Are peculiar to this Lathe. You shall seek them in vain in other makes and designs. They are the "Star's" Own. "Star" Lathes are heavy, rigid, and above all else, accurate. Can furnish with Draw-In Chuck, Gear-Cutting, Milling and Taper Attachments.
 9 AND 11-INCH FOOT LATHES.
 9, 11 AND 13-INCH POWER LATHES.
 Sent on Trial. Send for Catalog "B".
SENECA FALLS MFG. CO., 656 WATER ST. SENECA FALLS, N.Y.



FRENCH TYPE AUTO HEADLIGHT.
 2 Sizes Listing at \$35.00 and \$50.00 each.
BADGER BRASS MANUFACTURING CO., KENOSHA, WIS.

TO ALL WHO SUFFER FROM Spinal Deformities
 85 per cent. cheaper than the old methods. 100 per cent. better. Weighs ounces, where others weigh pounds. For Men, Women and Children; none too young, none too old to be cured.
 We offer the only Scientific Appliance ever invented for the relief and cure of this unsightly condition; cured Mr. P. B. Sheldon, the inventor, of curvature of the spine of 30 years' standing.
 Throw away the cumbersome and expensive plaster of paris and sole leather jackets.
 Our Appliance is light in weight, durable, and so conforms to the body as not to evidence that a support is worn. It is constructed on strictly scientific anatomical principles, and is a godsend to all sufferers from spinal troubles, male or female. We also make Scientific Appliances for protruding abdomen, weak back, stooping shoulders. Send for free booklet and letters from Physicians, Physical Instructors and those who know from experience of our wonderful Appliances. Satisfaction guaranteed. Prices \$4 to \$25.
STAMBURG, N. Y., February 14th, 1901.
 After having worn the plaster of paris jackets, I can truthfully say your appliance is far more comfortable to wear. It corrects curvature quite as well and fits the body so perfectly that no one would suspect I was wearing one. You have my lifelong gratitude and well wishes.
 I DA BROWN.
 The plaster of paris jacket above mentioned weighed 8 1/2 lbs. The Philo Burt Appliance put on in its place weighed 1 1/2 ounces—a difference of 115 ounces.
THE PHILO BURT MFG CO., 63 1/2 Third Street, Jamestown, N. Y.

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

"WOLVERINE" Gas and Gasoline Engines
 STATIONARY and MARINE.
 The "Wolverine" is the only reversible Marine Gas Engine on the market. It is the lightest engine for its power. Requires no hoisting engineer. Absolutely safe. Mfd. by **WOLVERINE MOTOR WORKS, 12 Huron Street, Grand Rapids, Mich.**

INDUCTION COILS for experiments in X rays and other electrical work.
 Catalogue Free.
E. S. RITCHIE & SONS, BROOKLINE, MASS.

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 newsdealers.

PERFECT - PUMP - POWER. is attained only in the **TABER ROTARY PUMPS**. They are mechanical, simple and durable. Will pump hot or cold fluid, thin or thick. Requires no skilled mechanic. Most power at least cost. All parts interchangeable. Made of iron, steel or bronze. Can be driven by belt, motor or engine attachment. Large Illustrated Catalogue Free. **TABER PUMP CO., 32 Wells St., Buffalo, N.Y., U. S. A.**

D L HOLDEN
 REAL ESTATE TRUST B'LOG PHILA. PA.
SOLE MANUFACTURER
REGEALD ICE MACHINES
 SEE FIRST PAGE SCIENTIFIC AMERICAN SEPT 2 1899

SOLAR LAMPS
 ... FOR ...
Automobiles, Cycles and Launches
BURN ACETYLENE GAS SUCCESSFULLY
 Because of our patented system of gas generation. Projects an intense white light 1000 feet ahead of vehicles. Are made in a variety of styles and finishes, ranging in price from \$3.50 to \$50.00 each.
"THEY ALWAYS SATISFY"
 Ask for catalogue.

Blindness
 Prevented and Cured
 By the Great "Actina," an Electrical Pocket Battery which removes Cataracts, Pterygiums, etc. Cures Granulated Lids. Restores Vision. Positive proof of cures given. No Cutting or Drugging. Eighteen years' success. Write for our 50-page Dictionary of Diseases, Free. Address: **NEW YORK & LONDON ELECTRIC ASS'N Dept. 19. Arlington Building, Kansas City, Mo.**

ARE YOU GOING TO BUILD?
 If so, you want the best and most economical system of heating. The Vance System will heat your house in zero weather to summer temperature with only 1/3 of the amount of coal required by other systems. We would like to have you investigate it before deciding. Our booklet, giving full particulars with patrons' printed testimonials, sent free. **VANCE BOILER WORKS, 18 Fay Street, Geneva, N. Y.**

MULLINS' SHEET METAL BOATS
"GET THERE" Ducking Boat. The GREAT FAVORITE with SPORTSMEN. Send for Catalogue.
W. H. MULLINS, 384 Depot Street, SALEM, OHIO.

ROOF YOUR OWN BUILDINGS at slight expense of time, labor or money with **Warren's Natural Asphalt Stone Surface Ready Roofing.** Surface is completed at factory and requires no painting. Durable and comparatively fire-proof. In rolls of 108 square feet, made of genuine Trinidad asphalt. Write for particulars to **Warren Chemical & Mfg. Co., 85 Fulton St., New York.**

Cash for REAL ESTATE no matter where it is. Send description and cash price and get my wonderfully successful plan. **W. M. OSTRANDER, North American Bldg., Philadelphia, Pa.**

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. Ask for catalogue. **The CLEVELAND STONE CO., 2d Floor, Wilshire, Cleveland, O.**

Queen Transits and Levels
 High Grade Instruments with the Latest Improvements. 160 page Engineering Catalogue on application. **THE QUEEN** 240 page Mathematical Catalogue on application.
ENGINEERS' AND DRAFTSMEN'S SUPPLIES. QUEEN & CO., Optical and Scientific Instrument Works, 59 Fifth Ave., New York. 1010 Chestnut St., Phila.

Now is the time to subscribe to the **SCIENTIFIC AMERICAN** for the year 1902
 Subscription Price, - - \$3 a Year
 3 Months Trial, 50 cents

RECENTLY PATENTED INVENTIONS.
Machine Tools.
TIRE-SETTING MACHINE.—**JOHN M. DECKER,** Kingston, Ohio. The invention relates to improvements in machines for setting rubber tires on wheels, which are held by a metal band extended through the tire. The machine which Mr. Decker has provided for this purpose is of such construction that the tire can be quickly set or applied without removing the wheels from the machine. The tire can be made even and smooth at all parts of the wheel.

SHARPENING-MACHINE FOR DRILL-BITS.—**THEODORE H. PROSKE,** Victor, Col. The object of the invention is to provide a new and improved sharpening-machine for quickly and accurately fashioning and sharpening the bits of machine-drills. The sharpening-machine consists of a die toward and from which a dolly reciprocates. The die and the dolly have registering levels to serve as a protection to the shaping part of the dolly and as a guide and bumper.

Tools.
WATCHMAKERS' TOOL.—**SAMUEL W. CHRISTINE,** Washington, N. J. The tool is especially adapted for use in setting roller-jewels in a watch-balance. The tool is so designed that the jewel can be held in position for setting and the balance held through the medium of its staff on the tool adjacent to the jewel. The tool is provided with a locking device for the balance, having a member prepared to punch out old jewels.

DENTAL INSTRUMENT.—**NEWTON T. YAGER,** Louisville, Ky. The tool is especially designed to enable a dentist to force bands, caps, or crowns conveniently, securely, and rapidly in position on the teeth of the upper and lower jaws at either side. No injury is sustained by the band, cap, or crown during the application.

PRUNER.—**JOHN P. M. JOSEPH,** Manhattan, New York city. By means of this pruner a gardener may stand on the ground and conveniently reach the branches of fairly tall trees. The invention comprises parts forming pruning shears or blades. These parts are mounted on a pole, which may be of any length desired; and they are operated by a hand-lever arranged at the lower part of the pole in such a manner that the operation can be brought about by movement of the operator's hands in much the same way as a pair of shears are worked.

WRENCH.—**PATRICK W. WALSH,** Intte, Mont. The improved wrench is intended to be used upon pipes or the bodies of bolts. To this end the gripping surfaces of its jaws are specially fashioned. By reason of this peculiar construction and by reason of the efficient operative mechanism provided to adjust the movable jaw, an implement is produced which is extremely efficient and yet cheap.

SEWING-MACHINE HEMMER.—**ALBERT H. DEVOE,** Chicago, Ill. All the parts of the hemmer are integral. The implement yields equally well in any direction in which the pressure is brought without correspondingly binding upon other parts of the material passing through it. The novel features are to be found in a presser-foot having a spring folding-plate projecting forwardly, branching at each side, and bowed downwardly and inwardly. One of the branches is provided with a rearwardly-projecting turning scroll-plate and a rearwardly-projecting tongue located in the axis of the scroll. Both of these members are held at their forward ends only and are free to spread in any direction to permit the passage of heavy seams or welts, while the hem is turned in a perfect manner without stretching the hemmed edge or retarding the passage of the goods.

Vehicles and Their Accessories.
VEHICLE-SPRING.—**ZACHARIAH T. BUSH,** Grandledge, Mich. The inventor has devised a simple construction by which to secure a considerable length of spring within a given space by forming scrolls at the ends and by leaving the center of the springs free. A novel construction of spring-bar supporter at the center of the spring is provided.

Mechanical Devices.
REEL FOR TAPE-MEASURES.—**VICTOR G. HILLS** and **JOHN E. CHATSON,** Cripple Creek, Col. The reel permits the use of a long, narrow piece of steel tape, band, or wire, and is arranged to permit a ready winding or unwinding of the tape, band or wire without danger of the wound-up portion's uncoiling accidentally from the reel—a tendency which it has from its own elasticity when tension is relaxed.

CRANE.—**SETH L. BATZEL,** Reading, Pa. The crane is intended to lift and handle crucibles. By its means, the crucible can be effectively and readily handled without the necessity of the workman's going close to the furnace. The workman can stand at a safe distance and manipulate a crucible of far greater size than is possible with the methods at present followed.

DEVICE FOR TRANSFERRING CHECKS, TICKETS, ETC.—**JACOB C. WOLFE,** Manhattan, New York city. The device is to be used in connection with a typewriting machine and is so constructed that checks, tickets, or other mat-

(Continued on page 162)