

ing there seems to be no end, but the present volume is a most admirable treatise. It will be specially appreciated by those who have to learn mechanical drawing at home. The author's selection of typical examples is most excellent. It is a thoroughly safe book.

We have received from the American School of Correspondence at Armour Institute of Technology, Chicago, Ill., the first number of a new periodical issued by the school, called the Technical World. The magazine promises to become a valuable addition to technical magazine literature. This first number contains an excellent article by Prof. R. A. Millikan, on Radium, and general discussions of such subjects as wireless telegraphy, current science and industry, new things in engineering, and great technical schools. A consulting department tells instructive things about the control of electric lights, comparative weight of motors, transferring heat to boilers, and the like.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending March 8, 1904. AND EACH BEARING THAT DATE

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

Table listing inventions with patent numbers, including items like 'Air and gas regulating apparatus', 'Antiseptic attachment for toothbrush', 'Bookbinding machine', 'Steam turbines', 'The Waterbury Emery Grinder', 'The B. F. Barnes Water Emery Tool Grinder', 'Mind the Microbes', and 'Berkefeld Filter'.

WOOD or METAL Workers. Without Steam Power should use our Foot and Hand Power Machinery. Send for Catalogues. A—Wood-working Machinery, B—Lathes, etc. SENECA FALLS MFG. CO. 695 Water St., Seneca Falls, N.Y.

ENGINE & FOOT LATHES. MACHINE SHOP OUTFITS. TOOLS & SUPPLIES. SEBASTIAN LATHE CO. CINCINNATI, OHIO. A GREAT DEAL DEPENDS ON BELTING. No matter how reliable the source of power is if the transmission of it is doubtful. SCHIEREN BELTING will transmit more power per inch width than any other belting, and do it continually. Why? Because from start to finish it is made with an eye to quality. Our Dixie Belt Leather Book should be on your desk. It's interesting. CHAS. A. SCHIEREN & CO. PITTSBURGH: 243 Third Ave. PHILADELPHIA: 228 N. Third St. BOSTON: 192 Lincoln St. HAMBURG: Pichhufen 4.

THE NICKEL PLATE ROAD AGAIN SELLING LOW RATE COLONIST TICKETS TO THE PACIFIC COAST. Tickets on sale every day, March 1 to April 30, at rate of \$42.50. These tickets are good in our trans-continental tourist sleepers and via any route desired beyond Chicago. For full particulars see local agents, or write R. E. Payne, General Agent, 231 Main Street, Buffalo, N. Y., or A. W. Ecclestone, D. P. A., 385 Broadway, New York.

Veeder Counters. to register reciprocating movements or revolutions. Cut full size. Booklet Free. VEEDER MFG. CO. Hartford, Conn. Cyclometers, Odometers, Tachometers, Counters and Fine Castings.

A GOOD INVESTMENT. For \$1.75 we will send by express (not prepaid), complete N. D. outfit with full instructions for learning TELEGRAPH OPERATING. A fascinating study that will enable you to earn good wages. Send 25 cents for universal rating stamp, by mail, postpaid. Send for our catalogue. Established 1873. J. H. BUNNELL & CO., Inc. 20 Park Place New York

THIS GRINDER. Has no pumps, no valves. No piping required to supply it with water. Always ready for use. Simplest in construction, most efficient in operation. Price will interest you. W. F. & JNO. BARNES CO., Established 1872. 1999 Ruby St., Rockford, Ill.

STEAM TURBINES—THEIR CONSTRUCTION, Operation and Commercial Application. SCIENTIFIC AMERICAN SUPPLEMENTS 1306, 1307, 1308, 1422, 1406, 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.

THE WATERBURY Emery Grinder, with adjustable table, for flat surface grinding and finishing, and for ordinary tool grinding. Send for Catalogue. BLAKE & JOHNSON P. O. BOX 7, WATERBURY, CONN.

THE CARE OF ACETYLENE GAS IS DISCUSSED IN SCIENTIFIC AMERICAN SUPPLEMENTS 1189, 1444, 1289. Price 10 cents, by mail. MUNN & Company, 361 Broadway, New York City, and all newsdealers.

THE B. F. BARNES WATER EMERY TOOL GRINDER. Swings a 24x2-inch Wheel. It has no pump but a simple trough uniquely arranged for supplying water to the wheel. Easily manipulated and cannot be broken. Without question it is the most practical and durable wet tool grinder on the market. Details on request. B. F. BARNES COMPANY, Rockford, Ill.

\$1 YEARLY FOR REPAIRS. It has been found that it costs a trifle less than \$1 per year to keep our Hoisting Engines in repair. That speaks well for their durability, doesn't it? There is no more mechanical or service engine made for quarries, docks, etc. Much cheaper than steam. Both friction and geared hoists to 100 lb. Webber Gas & Gasoline Engine Co., P. O. Box 114, Rockville, Md. EASTERN OFFICE, 115 Liberty Street, New York City.

MIND the MICROBES! You get them in all ordinary drinking water. Before drinking, purify it. You can transform it into pure water in the surest and quickest way by using the well-known BERKEFELD FILTER. which is so constructed as to eliminate from the water all foreign bodies. One gallon of pure water in 4 minutes. Easy to clean, easy to care for. BERKEFELD FILTER CO., 4 Cedar Street, New York

Table listing various mechanical and electrical items with prices, including 'Cooking machine, dough, Betz & Seibel', 'Electric motor', 'Fire extinguisher', 'Game apparatus', 'Gas burner', 'Gate fastener', 'Glass plates', 'Governor', 'Grinding machine', 'Hair parting device', 'Harrow', 'Hoisting mechanism', 'Hoof pad', 'Horse blanket', 'Horse breaking device', 'Horse shoe creeper', 'Horse supporter', 'Hunting post', 'Hunting weight', 'Hoisting mechanism', 'Hoof pad', 'Horse blanket', 'Horse breaking device', 'Horse shoe creeper', 'Horse supporter', 'Hunting post', 'Hunting weight', 'Hoisting mechanism', 'Hoof pad', 'Horse blanket', 'Horse breaking device', 'Horse shoe creeper', 'Horse supporter'.

WANTED!! to rent during the early Spring and Summer a GREEN HOUSE or GREEN HOUSES, covering in the aggregate about one acre of ground, within about 100 miles of New York, for the experimental cultivation of cotton on a large scale. Address stating terms, THEODORE H. PRICE, 71 Wall Street, New York. Use ACETYLENE GAS and be independent of gas companies. You can make it yourself for house, store, school, church or other public building with the "Carter" Gas Generator. Safe, simple, no waste, dirt or odor. Requires small floor space and is cheaper than ordinary gas with ten times the light. NIAGARA FALLS ACETYLENE GAS GENERATOR CO., Niagara Falls, N.Y.

A Constant Water Supply Without Cost of Maintenance is best afforded by the use of a NIAGARA HYDRAULIC RAM. The Niagara is a new improvement upon the old-fashioned ram, and delivers from 2 to 5 times as much water under the same condition. Our rams have been used in almost every state in the Union, and have proved the superior of all others. Write for catalogue and testimonials. Niagara Hydraulic Engine Co., Chester, Pa.

Volt Ammeters. Pocket size, but large enough for accuracy and practical use. Various ranges for testing batteries, electric light, telephone and other circuits, etc. Also Voltmeters and Ammeters for general measurements. Send for Circular. L. M. PIGNOLET, 80 Cortlandt St., New York, N.Y.

Squabs Pay Beat Hens. Easier, need attention only part of time, bring big prices. Raised in one month. Attractive for poultrymen, farmers, women. Send for FREE BOOKLET and learn this immensely rich home industry. Plymouth Rock Squab Co., 14 Friend St., Boston, Mass.

A Handy Book To Have. Montgomery & Co.'s Tool Catalogue. It is illustrated throughout and describes and prices Tools. 704 pages, 6 1/2 x 9 1/2 ins. The latest edition, with discount sheet by mail for 25 cents. MONTGOMERY & CO., 105 Fulton St., New York City.

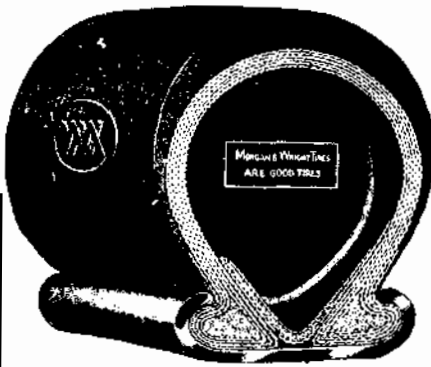
ELECTRICAL ENGINEERING TAUGHT BY MAIL. Write for our Free Illustrated Book. "CAN I BECOME AN ELECTRICAL ENGINEER?" We teach Electrical Engineering, Electric Lighting, Electric Railways, Mechanical Engineering, Steam Engineering, Mechanical Drawing, at your home by mail. Institute endorsed by Thos. A. Edison and others. ELECTRICAL ENGINEER INSTITUTE, 240-242 W. 28th St., New York.

The Franklin Gas Engine. One-Half Horse Power. worth \$100 complete. We sell all necessary castings, materials and detail drawings for \$15.00. For real work—not a toy—450 revolutions per minute. Upright or horizontal form. Finished parts sold separately. Runs by gas or gasoline. For boys and men with a mechanical turn. Write for circular. PARSELL & WEED, 129-131 West 31st Street, New York.

WHAT WE DO—HOW WE DO IT. will be sent to you on request. KNICKERBOCKER MACHINE WORKS, Inc., 8-10-12 Jones Street, New York.

Lackawanna Reversing Device. Within the boundary of reversing devices "The Lackawanna" rules supreme. Used in connection with our marine motors, it obviates the necessity of a reversible blade propeller or reversing gear. Simple and reliable. Price \$15.00 net. LACKAWANNA MOTOR CO., 51-61 Letchworth St., Buffalo, N. Y.

50 Years' Experience. PATENTS. Trade Marks, Designs, Copyrights, Etc. 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.



Intrinsic Merit is in every detail of the Morgan & Wright Clincher

Nothing has been omitted, nothing overdone in making a tire that can be depended upon. It is tough, strong, resilient, serviceable. It minimizes tire troubles and enhances the pleasure of automobilizing. The most critical investigation is courted.

Send for a copy of "A Tire Triangle," which treats of the tire's construction in detail. Mail request to home office.

MORGAN & WRIGHT 22 May Street Chicago

An Old English Candy

Let me tell you if you want to get all the sweets of life you cannot afford to ignore or overlook.

Mackintosh's EXTRA TOFFEE CREAM

An old English candy that I am introducing into this country. Its exquisite flavor has made it popular in Great Britain and the same quality is creating a demand for it in this country. I have put it on the American market because I know American people like good things. Ask your dealer to supply you with MACKINTOSH'S TOFFEE.



Try this first. You can, however, buy a handsome family tin, weighing four lbs., for \$1.00 by mail. Large sample package sent for 10c. in stamps.

LAMONT, CORLISS & CO., Importers, 78 Hudson St., New York City.

Dealers supplied everywhere through them.

A Hot Bath anywhere—any time—in one minute—for one cent.

Send for our valuable and interesting booklet "The luxury of a Bath," which tells how

Hot Water

and plenty of it, has been brought within the reach of everyone, no matter where, at an insignificant cost, by the

Humphrey Crescent Instantaneous Water Heater

Sold by All Plumbers

This heater is used in over 50,000 homes, is handsome in appearance and readily and quickly installed. Hot water starts the moment the match is applied and flows in unlimited supply. Gas is the fuel and less of it is used than in any other heater. Saves time and money and is the greatest convenience a house can have. Sent on

30 DAYS TRIAL.

Humphrey Co., Dept. L, Kalamazoo, Mich.

"And they gathered themselves together in cities."

URBAN POPULATION IN 1900.

The growth in the population of a country and the manner of its distribution among cities, villages and the rural districts is always an interesting field for study and investigation. The

NEW YORK CENTRAL'S

"Four-Track Series" No. 13 gives the population of all cities in the United States of more than 8,000 inhabitants according to the census of 1900, and a comparative table showing the population in 1880. It also contains two maps in colors.

A copy of No. 13, "Urban Population in 1900," sent free, post paid, to any address on receipt of a postage stamp by George H. Daniels, General Passenger Agent, New York Central Railroad, Grand Central Station, New York.

Table of contents listing various items and their prices, including tools, machinery, and electrical equipment.

Columbia Light Gasoline Tonneau



12-14 Horse Power (Honest Rating). Weight 1,700 lbs. Price \$1 750. Canopy Top, \$200 Extra

New system of control makes the two-cylinder opposed motor, which is placed forward in a removable bonnet, as flexible as a steam engine with none of its defects and limitations. High gear available for all ordinary speeds and grades. Gear changing by positive levers—no notches, no indices—making this the easiest of all gasoline cars to operate. Speed, two to thirty miles per hour. Lubrication automatic. Tonneau seats of full carriage size. Materials and workmanship highest grade in every detail.

24-30 Horse Power Touring Car (Chicago-New York Record) \$3,500
30-35 Horse Power Touring Car 4,000
Light Electric Runabout, new model 850

Catalogue of Columbia Gasoline Cars and Electric Pleasure Vehicles will be sent on request; also separate catalogues of Electric Town Carriages of the coach class and Commercial Vehicles.

ELECTRIC VEHICLE COMPANY, HARTFORD, CONN.

NEW YORK 134-136 1/2 West 39th St. (Opp. Metropolitan Opera House)
CHICAGO 1413 Michigan Ave.
BOSTON 74-78 Stanhope St.

Member Association of Licensed Automobile Manufacturers

\$1000 IN GOLD FREE FOR BRAINY PEOPLE. A word puzzle advertisement with a grid of numbers.

Each one of the above three lines of figures spells the name of a great city in the United States. This is a brand new puzzle and can be solved with a little study, as follows: There are twenty-six letters in the alphabet, and we have used figures in spelling the cities instead of letters. Letter A is number 1, B number 2, C number 3, etc., throughout the entire alphabet. IF YOU CAN SPELL OUT THESE THREE CITIES YOU MAY SHARE IN THE DISTRIBUTION OF \$1,000 WHICH WE ARE GIVING AWAY for doing a little work for us. You can do in less than one hour of your time. This and other most liberal offers are made to introduce one of the very best New York magazines into every home in the United States and Canada. WE DO NOT WANT ONE CENT OF YOUR MONEY. When you have made out the names of these three cities, write them plainly on a postal card and send it to us, and you will hear from us promptly BY RETURN MAIL. It may take an entire evening to solve the three names, but STICK TO IT AND TRY TO GET YOUR SHARE OF THE \$1,000. A copy of this high-class MONTHLY MAGAZINE WILL BE SENT FREE to everyone answering this advertisement. Do not delay. Send your answer in immediately. Address ROBINSON PUBLISHING CO., 24 North William Street, New York City.

We Solicit Contracts

And can compete in QUALITY and PRICE on work for which the varied machinery of our numerous factories is suited.

POPE

Manufacturing Company

21 Park Row New York City

Kerosene Oil Engine. Nothing but Kerosene Oil to run it. Simple, Safe and Efficient. Needs little attention, is less likely to get out of order, and is cheaper to run than any other engine manufactured. Economical and Easily Operated. International Power Vehicle Co. Stamford, Conn.

"Time is Money". And this wrench will do the work for you in less than half the time of other wrenches, and the harder the work, the tighter it holds. The body of this wrench is made of malleable steel and warranted not to break. Retail Price, \$1.00 Each. HUDSON WRENCH COMPANY, Leominster, Props. & Mfrs. Massachusetts

STIMULATION without IRRITATION Means New Life to the Scalp. The Evans Vacuum Cap gives the scalp a thorough massage and encourages a free and healthful circulation without rubbing and without the use of drugs or irritants. It will stop hair from falling out and restore a normal growth where five-fallicles exist. The Cap is used about ten minutes twice a day and its effects are pleasant from the very beginning. We will refund your money by full results are not satisfactory after a thirty days' use. Call on or address EVANS VACUUM CAP CO., 115 Broadway, New York City, 1000 Broadway, New York City.

TYPEWRITER HEADQUARTERS

100 Broadway, New York City. All makes under factory. Don't buy a typewriter until you see it. We have the best and most up-to-date typewriters, and we will show you the best. Shipper for trial. Guaranteed first-class condition. Incomes \$100 per month.

LITTLE WONDER WATER MOTOR

Infallible for home and general use. For sharpening edge tools, such as knives, scissors, hatchets, etc. For cleaning and polishing metals, silverware, glassware and furnishing light power for mechanical purposes. Dentists, butchers, cooks, jewelers, car painters, plumbers, automobile mechanics generally cannot afford to be without this newly patented invention. Price \$3.00 complete, including every wheel, bulging wheel and pulley. Sent upon receipt of this amount, or c. o. d. If preferred, money refunded if not satisfactory—this is not a toy. Booklet giving full description sent free. Correspondence with dealers is solicited, and agents wanted everywhere. WARNER MOTOR CO., Dept. 15, No. 90 Wall St., New York City

THE "BEST" LIGHT Outshines the Sun. It's pure white light makes day of night. Costs less than kerosene; six times more powerful than electricity. Examined, tested and permitted by underwriters' association. CATALOG FREE. NO DIRT--NO WICK--NO SMOKE--NO SMELL. Agents wanted. Exclusive territory, good commission paid. THE BEST LIGHT COMPANY, Sole Owners of Original Patents. 87 E. 5th St., Canton, Ohio.

Telescopes. We supply equatorially mounted Astronomical Telescopes for amateur purposes. Our OBJECTIVES are absolutely guaranteed to be optically perfect. GUNDLACH-MANHATTAN OPT. CO., Rochester, N. Y.

