

### Tubular Steel Wheels

... for ...  
**AUTOMOBILES**



AMERICAN TUBULAR WHEEL CO.  
Dept. C. Pittsburgh, Pa.

### 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.

If You Want the Best Lathe and Drill

### CHUCKS

BUY WESTCOTT'S Strongest Grip, Great Capacity and Durable. Cheap and Accurate.

Westcott Chuck Co., Oneida, N. Y., U. S. A.  
Ask for catalogue in English, French, Spanish or German.  
FIRST PRIZE AT COLUMBIAN EXPOSITION, 1893.

### JUST \$1

buys best bell outfit built. Easy to put up and an up-to-date convenience. We sell Bells, 35c; dry batteries, 50c; push buttons, 7c; Insulated wire, 30c. lb.; lamps, 50c. Write for price list.

LIBERTY ELECTRICAL SUPPLY CO.  
136 Liberty St., New York

### CARRIAGE-AUTO & MOTOR TIRES

AT LOWEST PRICES.  
ALL GUARANTEED. SEND FOR ILLUSTRATED CATALOG.

BROADWAY RUBBER CO.  
9 WARREN ST. NEW YORK.



Put your ice on the

### SAVIN ICE PAD

Greatest household invention of years. Just a simple pad chemically treated. Lowers the temperature of the ice chest several degrees and REDUCES ICE BILLS 1-3

Keeps the ice box clean and free from slime. No odor, no taste—you can use the ice and drink the water.  
Price 75c, a square foot. Send measurements of your ice box.

MONEY BACK IF NOT SATISFACTORY.

AGENTS wanted in every town. The Savin Ice Pad FAIRLY SELLS ITSELF. Write to SAVIN ICE PAD CO., Philadelphia, Pa.  
1028 Filbert Street, Philadelphia, Pa.

D. L. HOLDEN  
REAL ESTATE TRUST BLDG PHILA., PA.  
SOLE MANUFACTURER

### REGALED ICE MACHINES

SEE FIRST PAGE, SCIENTIFIC AMERICAN SEPT. 2, 1902.

## Scientific American Building Monthly

VOL. 33.  
JANUARY--JUNE, 1902.

278 Illustrations. 120 Pages. 6 Tint-Blocks.

The Thirty-Third Volume of this beautifully illustrated and finely printed Monthly Magazine, comprising the numbers January to June, 1902, is now ready.

... SPECIAL FEATURES ...

**ILLUSTRATIONS.**  
The volume contains 6 tinted cover pages and 278 illustrations, including many fine examples of recent dwellings, gardens, views of groups and estates, interiors, exteriors and plans. Photographs of agricultural details, porches, doorways, mantels, etc., are especially helpful and suggestive. The illustrations of the Building Monthly are made from specially taken photographs and are not obtainable elsewhere. Most of the houses are accompanied with full sets of plans.

**TALKS WITH ARCHITECTS.**  
This interesting series of conversations with eminent architects by Mr. Barr Ferree comprises important talks with Mr. Thomas Hastings on "Some Suggestions for New York"; Mr. William J. Fryer on "The New Tenement House Law of New York"; Mr. Charles A. Rice on "The Development of the Small Cottage"; Mr. John Galen Howard on "The Beaux-Arts Architects"; Mr. J. Monroe Hewlett on "The Architect and the Municipality"; and Mr. George L. Morse on "The Durability of Steel Construction."

**EDITORIAL ARTICLES.**  
Suggestive discussions on timely subjects for the home-builder: "Municipal Art"; "Roads and Houses"; "Washington the Magnificent"; "The House and the Terrace"; "The Art of Home-Building"; "Kitchen Ends and Back Yards."

**DEPARTMENTS.**  
The Departments of the Monthly cover a wide range of topics and summarize the latest advance in current architectural thought and practice: "Monthly Comment"; "The Household"; "The Garden"; "Legal Decisions"; "New Books"; "Country Life"; "The Country House"; "Fire Protection"; "Sanitation"; "Civic Betterment"; "New Building Patents"; "Publishers' Department."

The SCIENTIFIC AMERICAN BUILDING MONTHLY is a national magazine of architecture conducted with special reference to domestic architecture. Its text abounds with practical suggestions and its illustrations cover a wide range of subjects selected with scrupulous care and printed in the most artistic manner.

Price, Express Paid, \$2.00.

MUNN & CO., Publishers. 361 Broadway, New York

## Notes and Queries.

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(8643) H. S. L. asks: 1. About an ink which can be used with a drawing pen upon zinc and which when dry or burned in will be acid-proof. A. Ink for Zinc Labels: Take 1 drachm verdigris, 1 drachm sal-ammoniac powder and 1/2 drachm lamp black, and mix them with 10 drachms water. This will form an indelible ink for writing on zinc. 2. A means for an amateur to impart a polish (high) to chestnut boards. A. Fill the wood with any good filler, let it dry, then apply a good varnish, two or three successive coats. Rub it down with powdered pumice stone, then with rotten stone, and finally finish with whiting, all in water. Apply with a felt or flannel rubber.

(8644) A. P. F. asks: 1. What would be the effect on a corrugated iron roof if lightning should strike it? Is it dangerous to the inmates of a house to use such material for a roof? A. If your corrugated iron roof is connected with water or moist earth at several points by heavy telegraph wire or small iron rods, it will serve very well as a lightning rod to protect the premises from being struck. If not connected to the earth, we think it is a source of peril. 2. Of what cheap material can we make a belt about 8 feet in length for light service, width 1 1/2 inches? 2. Belts are either made of leather or webbing. They must be inelastic, so as not to stretch in service. We do not know of any cheap substitute for regular belting.

(8645) A. B. D. asks: In applying gold leaf to sign work, what would be the sizing used? A. In wood signs use gold size. For glass signs use a thin solution of gelatin.

(8646) H. S. asks for a remedy for dandruff, also a preparation for cleaning soiled spots from clothing. A. The treatment of the hair consists in daily washing of the head or other parts affected with warm water, 1 pint; glycerine, 1/2 ounce. This should be thoroughly rubbed over the skin; the dilute citrine ointment (sold by all chemists) may be used at night. A good preventive, and in mild cases, a curative wash is water, 1 pint; borax, 1 ounce. As a preventive, it should be used once weekly; as a curative, twice daily. Use true benzol for taking grease from clothing. Keep it away from a light or fire.

(8647) E. A. B. writes: I would be pleased to know by what chemicals or solutions blue prints may be changed from their original color (blue) to colors heretofore discovered? A. Blue Prints, to Change to Brown: Borax, 2 1/2 ounces; hot water, 38 ounces. When cool add sulphuric acid in small quantities until blue litmus paper turns slightly red, then add a few drops of ammonia until the alkaline reaction appears and red litmus paper turns blue. Then add to the solution 154 grains of red crude gum catechu. Allow it to dissolve with occasional stirring. The solution will keep indefinitely. After the print has been washed out in the usual way, immerse it in the above bath a minute or so longer than it appears when the desired tone is reached. An olive brown or a blackish brown is the result. To Make Blue Prints Green: Make four solutions as follows: Solution A. Water 8 ounces and a crystal of nitrate of silver as big as a pea. Solution B. Hydrochloric acid 1 ounce and water 8 ounces. Solution C. Pour a solution of iodide of potassium (iodide of potassium 1 ounce and water 8 ounces) into a saturated solution of bichloride of mercury until the red precipitate is just dissolved, and then add four times as much water as the resulting solution. Solution D. Water 16 ounces and iodide of potassium 1 drachm. Then take the blue print and bleach it with solution A, when the image will become pale slate color or sometimes a pale yellow. Then wash thoroughly and immerse the print in solution B, when the image will again become blue. Then, without washing, immerse the print in solution C, when the image will become green but the "whites" will be of a yellow tint. Then put the print in solution B again, without washing. Then wash and pour solution D over the print to purify the whites and to give the green image a bluer tint; but do not leave print in this solution too long, as it has a tendency to make the print blue again.

(Continued on page 80)

## If You Wear a Watch In a Factory or Shop

you should have a Jas. Boss Stiffened Gold Case in order to protect the works and lessen the cost of repairs. The Boss Case is made of two layers of solid gold with a layer of stiffening metal between. It is better than a solid gold case because it is stronger and so close-fitting as to keep out gas, smoke, dust and dampness.

### JAS. BOSS Stiffened GOLD Watch Cases

are recognized as the standard the world over, and sold as such by all jewelers. The Boss is the only stiffened case in use long enough to prove by actual wear that they will outlast the 25-year guarantee. There is none "just as good." The Keystone trademark here shown is stamped in each Boss case.

Consult the jeweler. Write us for booklet.

THE KEYSTONE WATCH CASE CO., Philadelphia.

### \$1250 TO \$3600 Per Year & Expenses.

#### FOR HUSTLERS—BOTH MEN & WOMEN

At home or traveling. Let us start you. Our Puritan Water Still—a wonderful invention. Great seller—big money maker. Enormous demand. Over 60,000 already sold. Everybody buys. It purifies the foulest water by distillation—removes every impurity. Furnishes absolutely pure, aerated, delicious drinking water. Beats Filters. Saves lives—prevents fevers, sickness, doctor bills—cures disease. Write for NEW PLAN AND OFFER.

HARRISON M'F'G CO., 12 Harrison Bldg., Cincinnati, O.

### FLY PAPERS. — FORMULAS FOR

Sticky Fly Papers are contained in SCIENTIFIC AMERICAN SUPPLEMENT Nos. 1057 and 1324. Each issue contains several recipes. Price 10 cents each, from this office, and from all newsdealers.

### THE BRIGHT WHITE LIGHT FOR MAGIC LANTERNS

Also for Bromide Enlarging, Copying, Photo-Engraving. Intensely brilliant, very portable, burns kerosene, costs 1 cent per hour. Send for lists including Stereopticons, Moving Pictures, Slides and Microscopes.

WILLIAMS, BROWN & FARLE, Dept. G, 918 Chestnut St., Philadelphia.

## THE ADIRONDACK MOUNTAINS.

The lakes and streams in the Adirondack Mountains are full of fish; the woods are inviting, the air is filled with health, and the nights are cool and restful. If you visit this region once, you will go there again. An answer to almost any question in regard to the Adirondacks will be found in No. 20 of the "Four-Track Series." "The Adirondacks and How to Reach Them;" sent free on receipt of a 2-cent stamp, by George H. Daniels, General Passenger Agent, New York Central & Hudson River Railroad, Grand Central Station, New York.

### Largest Line of Rubber Goods Made

Ask for new line for trade, or exclusive line for agents. This is the season for you now. Collars do not wilt; look like linen; never change color. Manufactured only by the Windsor Collar & Cuff Co., Windsor, Conn.

### \$7.50 for 5-SHOT SOUVENIR MAUSER RIFLE

(Captured at Santiago; reliable; parts missing.) \$10.00 for reversible gun with box etc. \$12.50 for gun like new with spring, model stock and box etc. Mausers are the best high-power rifle made. Range 2 miles, penetration through 1/4 inch iron. Band 7.50; \$10.00 C.O.D. for balance and shipping; 25-100-150-200-250-300-350-400-450-500-550-600-650-700-750-800-850-900-950-1000-1100-1200-1300-1400-1500-1600-1700-1800-1900-2000-2100-2200-2300-2400-2500-2600-2700-2800-2900-3000-3100-3200-3300-3400-3500-3600-3700-3800-3900-4000-4100-4200-4300-4400-4500-4600-4700-4800-4900-5000-5100-5200-5300-5400-5500-5600-5700-5800-5900-6000-6100-6200-6300-6400-6500-6600-6700-6800-6900-7000-7100-7200-7300-7400-7500-7600-7700-7800-7900-8000-8100-8200-8300-8400-8500-8600-8700-8800-8900-9000-9100-9200-9300-9400-9500-9600-9700-9800-9900-10000-10100-10200-10300-10400-10500-10600-10700-10800-10900-11000-11100-11200-11300-11400-11500-11600-11700-11800-11900-12000-12100-12200-12300-12400-12500-12600-12700-12800-12900-13000-13100-13200-13300-13400-13500-13600-13700-13800-13900-14000-14100-14200-14300-14400-14500-14600-14700-14800-14900-15000-15100-15200-15300-15400-15500-15600-15700-15800-15900-16000-16100-16200-16300-16400-16500-16600-16700-16800-16900-17000-17100-17200-17300-17400-17500-17600-17700-17800-17900-18000-18100-18200-18300-18400-18500-18600-18700-18800-18900-19000-19100-19200-19300-19400-19500-19600-19700-19800-19900-20000-20100-20200-20300-20400-20500-20600-20700-20800-20900-21000-21100-21200-21300-21400-21500-21600-21700-21800-21900-22000-22100-22200-22300-22400-22500-22600-22700-22800-22900-23000-23100-23200-23300-23400-23500-23600-23700-23800-23900-24000-24100-24200-24300-24400-24500-24600-24700-24800-24900-25000-25100-25200-25300-25400-25500-25600-25700-25800-25900-26000-26100-26200-26300-26400-26500-26600-26700-26800-26900-27000-27100-27200-27300-27400-27500-27600-27700-27800-27900-28000-28100-28200-28300-28400-28500-28600-28700-28800-28900-29000-29100-29200-29300-29400-29500-29600-29700-29800-29900-30000-30100-30200-30300-30400-30500-30600-30700-30800-30900-31000-31100-31200-31300-31400-31500-31600-31700-31800-31900-32000-32100-32200-32300-32400-32500-32600-32700-32800-32900-33000-33100-33200-33300-33400-33500-33600-33700-33800-33900-34000-34100-34200-34300-34400-34500-34600-34700-34800-34900-35000-35100-35200-35300-35400-35500-35600-35700-35800-35900-36000-36100-36200-36300-36400-36500-36600-36700-36800-36900-37000-37100-37200-37300-37400-37500-37600-37700-37800-37900-38000-38100-38200-38300-38400-38500-38600-38700-38800-38900-39000-39100-39200-39300-39400-39500-39600-39700-39800-39900-40000-40100-40200-40300-40400-40500-40600-40700-40800-40900-41000-41100-41200-41300-41400-41500-41600-41700-41800-41900-42000-42100-42200-42300-42400-42500-42600-42700-42800-42900-43000-43100-43200-43300-43400-43500-43600-43700-43800-43900-44000-44100-44200-44300-44400-44500-44600-44700-44800-44900-45000-45100-45200-45300-45400-45500-45600-45700-45800-45900-46000-46100-46200-46300-46400-46500-46600-46700-46800-46900-47000-47100-47200-47300-47400-47500-47600-47700-47800-47900-48000-48100-48200-48300-48400-48500-48600-48700-48800-48900-49000-49100-49200-49300-49400-49500-49600-49700-49800-49900-50000-50100-50200-50300-50400-50500-50600-50700-50800-50900-51000-51100-51200-51300-51400-51500-51600-51700-51800-51900-52000-52100-52200-52300-52400-52500-52600-52700-52800-52900-53000-53100-53200-53300-53400-53500-53600-53700-53800-53900-54000-54100-54200-54300-54400-54500-54600-54700-54800-54900-55000-55100-55200-55300-55400-55500-55600-55700-55800-55900-56000-56100-56200-56300-56400-56500-56600-56700-56800-56900-57000-57100-57200-57300-57400-57500-57600-57700-57800-57900-58000-58100-58200-58300-58400-58500-58600-58700-58800-58900-59000-59100-59200-59300-59400-59500-59600-59700-59800-59900-60000-60100-60200-60300-60400-60500-60600-60700-60800-60900-61000-61100-61200-61300-61400-61500-61600-61700-61800-61900-62000-62100-62200-62300-62400-62500-62600-62700-62800-62900-63000-63100-63200-63300-63400-63500-63600-63700-63800-63900-64000-64100-64200-64300-64400-64500-64600-64700-64800-64900-65000-65100-65200-65300-65400-65500-65600-65700-65800-65900-66000-66100-66200-66300-66400-66500-66600-66700-66800-66900-67000-67100-67200-67300-67400-67500-67600-67700-67800-67900-68000-68100-68200-68300-68400-68500-68600-68700-68800-68900-69000-69100-69200-69300-69400-69500-69600-69700-69800-69900-70000-70100-70200-70300-70400-70500-70600-70700-70800-70900-71000-71100-71200-71300-71400-71500-71600-71700-71800-71900-72000-72100-72200-72300-72400-72500-72600-72700-72800-72900-73000-73100-73200-73300-73400-73500-73600-73700-73800-73900-74000-74100-74200-74300-74400-74500-74600-74700-74800-74900-75000-75100-75200-75300-75400-75500-75600-75700-75800-75900-76000-76100-76200-76300-76400-76500-76600-76700-76800-76900-77000-77100-77200-77300-77400-77500-77600-77700-77800-77900-78000-78100-78200-78300-78400-78500-78600-78700-78800-78900-79000-79100-79200-79300-79400-79500-79600-79700-79800-79900-80000-80100-80200-80300-80400-80500-80600-80700-80800-80900-81000-81100-81200-81300-81400-81500-81600-81700-81800-81900-82000-82100-82200-82300-82400-82500-82600-82700-82800-82900-83000-83100-83200-83300-83400-83500-83600-83700-83800-83900-84000-84100-84200-84300-84400-84500-84600-84700-84800-84900-85000-85100-85200-85300-85400-85500-85600-85700-85800-85900-86000-86100-86200-86300-86400-86500-86600-86700-86800-86900-87000-87100-87200-87300-87400-87500-87600-87700-87800-87900-88000-88100-88200-88300-88400-88500-88600-88700-88800-88900-89000-89100-89200-89300-89400-89500-89600-89700-89800-89900-90000-90100-90200-90300-90400-90500-90600-90700-90800-90900-91000-91100-91200-91300-91400-91500-91600-91700-91800-91900-92000-92100-92200-92300-92400-92500-92600-92700-92800-92900-93000-93100-93200-93300-93400-93500-93600-93700-93800-93900-94000-94100-94200-94300-94400-94500-94600-94700-94800-94900-95000-95100-95200-95300-95400-95500-95600-95700-95800-95900-96000-96100-96200-96300-96400-96500-96600-96700-96800-96900-97000-97100-97200-97300-97400-97500-97600-97700-97800-97900-98000-98100-98200-98300-98400-98500-98600-98700-98800-98900-99000-99100-99200-99300-99400-99500-99600-99700-99800-99900-100000-100100-100200-100300-100400-100500-100600-100700-100800-100900-101000-101100-101200-101300-101400-101500-101600-101700-101800-101900-102000-102100-102200-102300-102400-102500-102600-102700-102800-102900-103000-103100-103200-103300-103400-103500-103600-103700-103800-103900-104000-104100-104200-104300-104400-104500-104600-104700-104800-104900-105000-105100-105200-105300-105400-105500-105600-105700-105800-105900-106000-106100-106200-106300-106400-106500-106600-106700-106800-106900-107000-107100-107200-107300-107400-107500-107600-107700-107800-107900-108000-108100-108200-108300-108400-108500-108600-108700-108800-108900-109000-109100-109200-109300-109400-109500-109600-109700-109800-109900-110000-110100-110200-110300-110400-110500-110600-110700-110800-110900-111000-111100-111200-111300-111400-111500-111600-111700-111800-111900-112000-112100-112200-112300-112400-112500-112600-112700-112800-112900-113000-113100-113200-113300-113400-113500-113600-113700-113800-113900-114000-114100-114200-114300-114400-114500-114600-114700-114800-114900-115000-115100-115200-115300-115400-115500-115600-115700-115800-115900-116000-116100-116200-116300-116400-116500-116600-116700-116800-116900-117000-117100-117200-117300-117400-117500-117600-117700-117800-117900-118000-118100-118200-118300-118400-118500-118600-118700-118800-118900-119000-119100-119200-119300-119400-119500-119600-119700-119800-119900-120000-120100-120200-120300-120400-120500-120600-120700-120800-120900-121000-121100-121200-121300-121400-121500-121600-121700-121800-121900-122000-122100-122200-122300-122400-122500-122600-122700-122800-122900-123000-123100-123200-123300-123400-123500-123600-123700-123800-123900-124000-124100-124200-124300-124400-124500-124600-124700-124800-124900-125000-125100-125200-125300-125400-125500-125600-125700-125800-125900-126000-126100-126200-126300-126400-126500-126600-126700-126800-126900-127000-127100-127200-127300-127400-127500-127600-127700-127800-127900-128000-128100-128200-128300-128400-128500-128600-128700-128800-128900-129000-

# EUGEN SANDOW

Announces that he is now prepared to prescribe for those who desire the benefits of his famous System of Physical Culture, a Course of 14 lessons (two weeks) for \$5.00, or a complete course (three months) for \$10.00. Full directions will be forwarded on receipt of money order or draft, accompanied with particulars as to age, sex and general physical conditions, past and present.

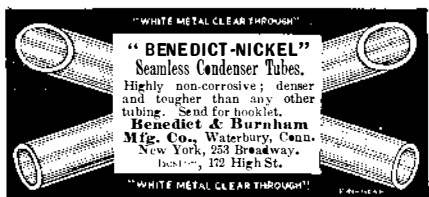
What I have been able to do for myself, I have done in no small measure for over 300,000 pupils from all parts of the world. The number of individuals exercising to-day under my system is many times greater than under all other systems combined.

Dr. D. A. Sargent, Professor of Physical Training at Harvard University, in writing to the New York Herald March 24, 1902, says:—

"It was nine years ago that I first made acquaintance with Eugen Sandow and his system of physical culture. I learned whether he has advanced to advance forward even greater than I had known. From my personal observations of Sandow at that time I was led to believe that his living habits were of so correct a nature and his system of Physical Culture so intelligently conducted that his advancement would be steady. I have not been disappointed. At that time Sandow was but twenty-five years old, and it was apparent that the climax of his power would not be reached for many years. In recent examination I found that he had made the improvement that I had expected. I do not hesitate to say that, in my opinion, Sandow is the best developed man the world has ever known."

I WILL MAIL FREE to any address my latest BOOKLET (48 pages) containing a full description of my SYSTEM OF PHYSICAL CULTURE. This booklet contains many engravings, illustrating my Physical Development, accompanied with Anatomical Charts, giving the name and use of each of the principal muscles of the human body.

Sandow's College of Physical Culture  
269 St. Botolph St., Boston, Mass.



## YACHTS AND LAUNCHES

(OPEN OR CABIN)  
Marine Gasoline Engines

Row Boats and Dealer in Boat Fittings. I have on hand boats built and ready for delivery, guaranteed in every way to give perfect satisfaction. If you would have the best of boat construction at reasonable prices write or call on



AUG. J. FRITZ  
180 Main St., West,  
Rochester, N. Y.

K. OF P. MEETING, SAN FRANCISCO. The Nickel Plate Road will sell August 1 to 10 inclusive, special excursion tickets. Buffalo to San Francisco and return, at rate \$62.00, good returning to September 30th, account above meeting. Best accommodations, fast time. See nearest agent or write A. W. Ecclestone, D. P. A., 35 Broadway, New York City.



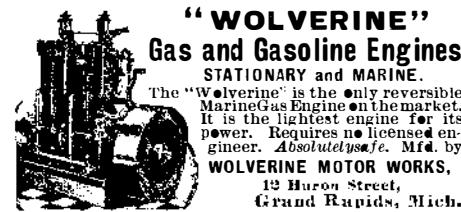
### SPECIAL OFFER.

We will give the first person answering this advertisement in every town in each town of the United States an unusual opportunity to obtain

THE AMERICAN \$10 TYPEWRITER

OR  
THE AMERICAN \$40 TYPEWRITER

For full particulars mention SCIENTIFIC AMERICAN and promptly address  
The American Typewriter Co., 267 B'way, New York City



### "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 licensed 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

### BOOKS

Stromberg's Steam User's Guide, . . . \$2.50  
Zwicker's Practical Instructor, . . . 1.00  
Spangenberg's Practical Arithmetic, . . . 0.50  
Spangenberg's 157 Questions and Answers Relating to Steam Engineering, . . . 0.75  
Books Mailed, Postpaid, on Receipt of Price.  
GEO. A. ZELLER, Pub., 18 S. 4th St., St. Louis, U.S.A.  
Mention Scientific American.  
New 96-Page Catalogue Sent Free to Any Part of the World.

(8648) F. W. H. asks: I wish to make an electro-magnet with the greatest lifting power possible to be furnished current from a 10-volt 75-ampere plating dynamo. What size and how much wire should I use, and what size and length of core? Do you think such a magnet could be so insulated as to be used under solution for raising iron articles from bottom of tanks? A. A magnet can be made which will lift any weight from nothing up to several tons with the current named above, provided the armature were in contact with the poles of the magnet; but to draw articles from the bottom of a tank through an open space, that is, a space not filled with iron, is a different matter. It would require an enormous power to lift a very small weight from the bottom of even a shallow tank. The method proposed is not economical or practical. Better fish them up in the old-fashioned way.

(8649) O. W. W. writes: On Christmas day in 1900 the sun was shining very warmly in the south door. On a table near the door we had a fish globe. As we were eating dinner, smoke was seen rising from the table on which the fish globe was placed. A close examination showed that the table cloth had been set on fire by the sun's rays being magnified by the fish globe. A fish globe is a frequent source of fires. The action is the same as that of a lens or burning glass. The rays of the sun are brought to a focus, and their heat is sufficient to ignite combustible material. When a fish globe is hung in a window so that the sun's rays strike it, a curtain behind the globe is easily set on fire, and people wonder how the fire started. There is no mystery about it.

(8650) G. M. T. asks: In still air will two spheres of the same size, one of aluminum and one of lead, fall from a given height in the same time? A. Since the velocity of a freely falling body is dependent only upon the mass of the earth, it follows that all bodies will fall in a vacuum with the same velocity, viz., 32.16 feet at the end of the first second of fall; and since the air will resist two spheres of the same size equally, because they displace the same weight of air, it follows that the two spheres of the same size will fall with the same velocity under the action of gravity in the air, and therefore will fall through a given height in the same time.

(8651) C. C. N. asks: Where can I find instructions to make appliances and use "Electro Culture" for gardening? A. We regret to say that we do not know where appliances for "electro-culture" for gardening can be found. We have never heard of any such apparatus on the market. We have read of experiments upon plants, but doubt if these have led as yet to practical results, so that apparatus has been devised for such use.

(8652) J. H. R. writes: I desire to purchase books which would thoroughly inform me upon the following case: A building is lighted with 23 incandescent lamps arranged in parallel. The current is supplied through a transformer which reduces the voltage from 2200 to 110. A man takes hold of the socket of one of the lamps and is killed. I want to be able to inform myself on the following questions: 1. The precautions necessary in handling high-tension currents and where the danger points are. 2. The liability of transformers to leak, break down, etc., thus delivering the full voltage to the wire leading from it, etc. 3. What is the cause of death? Is it wattage, voltage, amperage, and what is the usual amount necessary to kill a person? Would the current coming from a transformer cutting it down to 110 volts and necessary to supply 24 incandescent lamps be sufficient? Would that supplied to one of these lamps be sufficient? A. Thompson's "Elementary Lessons in Electricity," price \$1.40 by mail, contains as much as is given in any one book upon the topics concerning which you inquire. Rubber gloves and tools with insulated handles are necessary for handling wires carrying current above 110 volts. This pressure may have inflicted severe injury or even death in extreme cases, but we do not recollect any instance of death from it. In the case cited it would seem as if there must have been a connection with the primary of the transformer. Death is caused either by the shock of the current or by the disintegration of the vital tissues from its continued action on them. The amperes are the agent of electrolysis; the volts determine the amount of amperes which can flow through a circuit in proportion to its resistance, as expressed in ohms. The resistance of the human body is a variable quantity, from a few hundred to perhaps five thousand ohms. What current a man can get is not a question of the supply of one lamp or any number of lamps. It is a matter of the voltage of the current and the resistance of the body.

(8653) J. H. L., Jr., asks: 1. How many sal-ammoniac batteries should one pound of sal-ammoniac charge, divided equally among them? A. That depends upon the size of the cells of the battery. The sal-ammoniac solution is saturated. In the cell with a porous cup about a quarter of a pound of the salt is required; in the forms with larger carbons, or the prism, in which more liquid is used, a larger quantity would be needed. 2. The cause of crystals forming on the carbon element of a

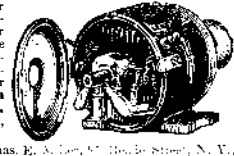
(Continued on page 81)

## PERFORATED METALS

OF EVERY DESCRIPTION AND FOR ALL USES.  
THE HARRINGTON & KING PERFORATING CO.  
225 N. UNION ST. CHICAGO, ILL. U.S.A.

### Apple Economical Gas Engine Igniters.

Are positively the best built for Stationary, Automobile and Marine Gas Engines, either touch or jump spark system. We are the leaders in the manufacture of Igniting Dynamos, Magnets, Governors, Coils, Plugs, etc. Write for printed matter. The Dayton Electrical Mfg. Company, No. 38 South St. Clair St., Dayton, Ohio, U. S. A.  
New York stock carried by Chas. F. Johnson, 100 Broadway, N. Y., Philadelphia Office, The Bourse; Chicago Office, 1211 La Salle Street; St. Louis stock carried by A. L. Dyke, Linnar Building.

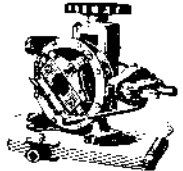


### MADE \$105 THE FIRST MONTH

writes FRED. BLODGETT, of N. Y. J. L. HARRICK, of La., writes: "Am making \$3.00 to \$4.00 every day I work." MRS. L. M. ANDERSON, of Iowa, writes: "I made \$3.50 to \$4.50 a day." Hundreds doing likewise. So can you. \$5.00 to \$10.00 daily made plating jewelry, tableware, bicycles, metal goods with gold, silver, nickel, etc. Enormous demand. We teach you FREE. Write—offer free.  
G. GRAY & CO., Plating Works, A Miami Bldg., Cincinnati, O.

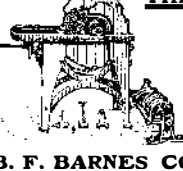
### ARMSTRONG'S No. 0 THREADING MACHINE

Can be attached to bench or post. Designed for threading the smaller sizes of pipe, iron or brass, also bolts. Hastens speeds, one for pipe 1/2 to 1 inch; the other for pipe 1 1/4 to 2 inches, inclusive. Uses the regular Armstrong adjustable dies. Other attractive features. Send for particulars. The Armstrong Mfg. Co., 139 Centre Street, New York, Bridgeport, Conn.



### THE B. F. BARNES WATER EMERY TOOL GRINDER

is the best on the market—bar none. No pump to cut out, no float to reset, no adjustments required. It is all that a Tool Grinder should be, and the price is right. Details on request  
B. F. BARNES COMPANY, Rockford, Ill.



## SELECT A PEN

Suitable for your handwriting from a sample card of 12 leading numbers for correspondence, sent postpaid on receipt of 6 cents in stamps.  
SPENCERIAN PEN CO.  
349 Broadway, New York.

### ELEVATING - CONVEYING POWER TRANSMISSION MACH'Y COAL WASHING MACHINERY

Coal Mining Machines  
ELECTRIC MINE LOCOMOTIVES  
POWER COAL DRILLS  
COAL HANDLING MACHINERY

ELECTRO MOTOR, SIMPLE, HOW TO make.—By G. M. Hopkins. Description of a small electric motor devised and constructed with a view to assisting amateurs to make a motor which might be driven with advantage by a current derived from a battery, and which would have sufficient power to operate a foot lathe or any machine requiring not over one man power. With 11 figures. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 6411. Price 10 cents. To be had at this office and from all newsdealers.

## THE VICTOR Steam Pumps

Size, 9 inches by 3 inches, weight, 4 1/2 pounds. Capacity of Air Pump, 50 pounds pressure on 1 1/2 in. of tires.  
Capacity of Water Pump, 3 gallons per minute against 200 pounds boiler pressure.  
PRICE, \$30.00 EACH.  
These pumps have been adopted by the Locomobile Co., the Mobile Co., and other leading manufacturers of steam carriages.  
OVERMAN AUTOMOBILE CO.,  
7 East 42d Street, New York.  
Send for Illustrated Circular.

FOOT-POWER LAUNCH with ADJUSTABLE SEATS.

Sometimes when a man starts a Gasoline Launch he says something without saying. We also manufacture Gasoline Launches, Canoes (Canadian Model), St. Lawrence Skiffs. We build to any model specified. The Launches we carry in stock are the most suitable for our beat waters.  
DURAND MFG. CO., 219 South Avenue, Rochester, N. Y.

### IROQUOIS MACHINE COMPANY

Manufacture under patents  
Improved Universal, Plain, Dist. Fare  
GRINDING MACHINES  
150 Nassau Street, NEW YORK, U. S. A.

Andrew Carnegie, Thomas A. Edison and many other successful men began their careers at Telegraph operating. Why don't you learn? For \$1.75 we will send you a complete N. D. outfit with book of instructions, by express (not prepaid) Send for catalogue of electric apparatus, supplies and novelties.  
J. H. RUSSELL & CO., INC., 20 Park Place, New York.

### SAVE 50 PER CENT

ON PHONOGRAPHS, CELEBRATED VICTOR TALKING MACHINES, SUPPLIES, RECORDS, HORNS, REPRODUCERS, ETC. BUY FROM THE LEADING SUPPLY HOUSE. ILLUSTRATED CATALOGUE FREE. TALKING MACHINES. BROADWAY CYCLE CO. 7 WARREN ST. NEW YORK.

### TRUSCOTT MARINE MOTORS.

The simplest, most powerful, and highest speed gasoline engines of their class upon the market.  
Made single, double, and triple cylinder, both two and four cycle, ranging from 1 to 40 H.P.  
Catalogue for the asking.  
Truscott Boat Mfg. Co.,  
ST. JOSEPH, MICH.

### SEND FOR 125 PAGE ILL. CATALOGUE

ALSO TOOLS, GEAR WHEELS & PARTS OF MODELS  
GOODNOW & WIGHTMAN  
132 Mill Street.

### BEST REPEATING SHOT GUN ONLY \$15.75

Sportsmen write: "I prefer this gun to any other in the world." No more after present lot sold. Original silver lever gun made of best forged steel. Best fitted with steel barrel. Double extractors. Take down system. Six shots in 2 seconds. Strongest repeater made. Send \$5; gun sent C. O. D. balance \$10.75 and postage; examination allowed. F. Baerman, 679 Broadway, N. Y.

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.

### THE MOST MODERN AUTO

ELMORE AUTOMOBILES.  
Practical, Durable, Efficient, Easy to control at any speed. Double cylinder motor, smooth gliding motion. 2 models, \$200-\$1500. Get further information free.  
ELMORE MANUFACTURING CO., Clyde, O., U. S. A.

## Compressed Air

ITS PRODUCTION, USES AND APPLICATIONS.  
By GARDNER D. HISCOX, M. E.  
AUTHOR OF "MECHANICAL MOVEMENTS."  
LARGE 8V0. 820 PAGES. 547 ILLUSTRATIONS.  
PRICE, bound in Cloth, \$5.00. Half Morocco, \$6.50.

A complete treatise on the subject of Compressed Air, comprising its physical and operative properties from a vacuum to its liquid form. Its thermodynamics, compression, transmission, expansion, and its uses for power purposes in mining and engineering work; pneumatic motors, shop tools, air blasts for cleaning and painting. The Sand Blast, air lifts, pumping of water, acids and oils; aeration and purification of water supply; railway propulsion, pneumatic tube transmission, refrigeration. The Air Brake, and numerous appliances in which compressed air is a most convenient and economical vehicle for work—with air tables of compression, expansion and physical properties.  
A most comprehensive work on the subject of Compressed Air  
A special illustrated circular of this book will be sent to any address on application.

### MUNN & CO.,

Publishers of the Scientific American, 361 Broadway, New York.



**The First Step to Success**

is technical training for the work in which you propose to succeed. For ten years we have been training ambitious people to succeed.

Write to-day for circular showing how you can get the

**TECHNICAL TRAINING BY MAIL**

required by a Mechanical Engineer, Mechanical Draftsman, Steam Engineer, Electrical Engineer, Electrician, Telephone Engineer, Civil Engineer, Surveyor, Mining Engineer, Architect, Architectural Draftsman, Sign Painter, Letterer, Analytical Chemist, Ornamental Designer, Bookkeeper, Stenographer, Teacher, Cotton Mill Superintendent, Woolen Mill Superintendent, to Speak French, to Speak German, to Speak Spanish. State position you want.

International Correspondence Schools, Box 942, Scranton, Pa.

**EARN MORE** Study in spare time. We teach you what you need to know to earn more in your own business or another. Engineering, Drafting, Art, Architecture, Mining, Metallurgy, Business, Stenography, Journalism, Bookkeeping, etc.

Write for free catalogue, with full particulars.

Special Discounts Now.

THE CONSOLIDATED SCHOOLS, 156 Fifth Ave., N. Y.

**ROSE POLYTECHNIC INSTITUTE**

A College of Engineering, Mechanical, Electrical, Civil Engineering, Chemical Courses; Architecture. Extensive shops. Modernly equipped laboratories in all departments. Expenses low. 20th year. For catalogue address C. L. MEES, President, Terre Haute, Ind.

**THE WORCESTER POLYTECHNIC INSTITUTE.**

EDMUND A. ENGLER, Ph.D., LL.D., President.

Courses of study in Mechanical, Civil, Electrical Engineering, Chemistry, and General Science. Extensive laboratories in Engineering, Electricity, Physics, General and Industrial Chemistry. Special facilities in Steam and Hydraulics. Catalogue, showing positions filled by graduates, mailed free. Address J. K. MARSHALL, Registrar, Worcester, Mass.

**PATENT FOR SALE TEMPORARY BOOK BINDER**

Librarians and Bookbinders claim it is the best and most easy to use of any made. Can be manufactured at a very small price and good profits realized. Covered in Canada and England. Wish to sell patent outright.

CHAS. K. REED, - - - Worcester, Mass.

**MUNROE, HALL & HOPKINS, CHEMISTS, ELECTROCHEMISTS, and ENGINEERS**

Room 725, BOND BUILDING, WASHINGTON, D. C.

Inventions and Processes Perfected. Plants and Equipments Designed. Experts in Patent Causes. Measurements, Tests, and Efficiency Determinations. Laboratory Investigations carried on and Reports rendered. Analyses of every description made.

CHARLES E. MUNROE, Ph. D., F. C. S.  
N. MONROE HOPKINS, Ph. D., A. I. E. E.  
CLARENCE HALL, M. A. C. S.

Long Distance Telephone No. Main 2583-Y.

**MENNEN'S BORATED TALCUM TOILET POWDER**

A Positive Relief for PRICKLY HEAT, CHAFING, and SUNBURN, and all affections of the skin.

Removes all odor of perspiration. Deodorant after Shaving. Sold everywhere, or mailed, on receipt of 25c. Get Mennen's (the original). Sample Free.

GENARD MENNEN COMPANY, New York, N. Y.

**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.

sal ammoniac battery? A. The action of a Leclanche cell is always accompanied by the formation of a double salt of zinc and ammonium, which crystallizes upon the elements of the bottom and sides of the dish. 3. If the primary coil of the Hopkins induction coil in SUPPLEMENT No. 160 could not be carried to a small magnet that would operate a vibrator, say several inches away from the bundle of wires forming the core of the coil? A. Separate coil may be used for the vibrator in any induction coil. The current used to run this coil will be in addition to that needed for the main coil. When the vibrator is attached to the main coil, the magnetism of the core acts upon the vibrator without requiring any additional current.

(8654) W. A. P. asks: 1. How many 16 candle power 110-volt lamps are required to cut a 110-volt circuit down to about 5 volts and two amperes? It is to be used to light a very small "pea" incandescent lamp. Is there any better substance to accomplish the decrease? Lamps I prefer. A. Connect four 16 candle power lamps in parallel, and complete the circuit with the pea lamp. The four lamps will give the two amperes, and the combined resistance in parallel will very nearly adjust the drop in potential. 2. I should like to know the formula for resistance carbon. I wish to make rods of 1/4 inch diameter, from 6 to 12 inches long. A. For ten cents we can send you a paper giving the details for making carbons.

(8655) L. A. P. asks: 1. I have a small dynamo used for plating. Can I use it for a spark on my gasoline engine? I have taken hold of the wires when running and have not felt any perceptible current. Should I feel any? A. You can find whether your plating dynamo will answer for sparking a gas engine by breaking the circuit suddenly when it is running at full speed. You cannot tell by taking hold of the wires. The voltage used in plating is not sufficient to give a shock. 2. Would it make any difference if I had a coil connected with it? A. The dynamo would probably run an induction coil. 3. If so, will you please instruct me how to make one. A. A coil giving a spark of a half-inch will ignite the charge in a gas engine. Instructions for making a coil may be had in Norrie's "Induction Coils," price \$1 by mail. 4. Which are the best for batteries for motors? A. Four to eight dry cells are commonly used for sparking a gas engine, though any form of sal-ammoniac cell will do the work well.

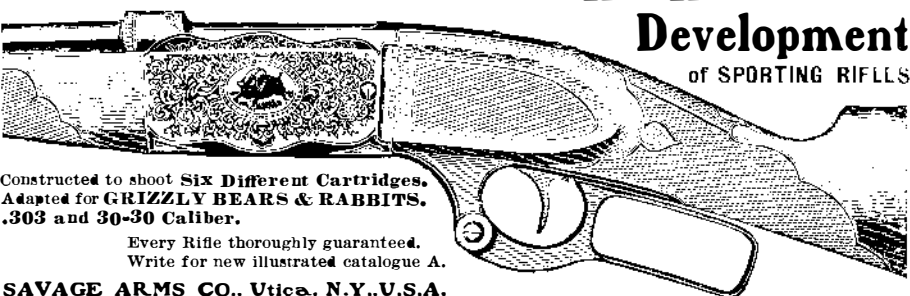
(8656) D. H. asks for a reliable recipe for preserving eggs. A. Lime, 1 bushel (slaked with water); common salt, 2 or 3 pounds; cream of tartar; 1/2 pound; water q. s. to form a mixture strong enough to float an egg. Used to preserve eggs, which it is said it will do for two years, by simply keeping them in it.

(8657) J. K. L. asks: 1. How the plates are obtained which are used in printing pictures in papers? A. There are many ways of making the plates from which pictures are printed in papers, both electrical and photographic. If you wish to learn any particular process, we could refer you to the sources of information upon that process. 2. Are there any non-metallic substances, such as carbon, selenium, etc., which can be electroplated? A. Any substance not a conductor can be electroplated by coating it with graphite, which is a conductor, before putting it into the plating bath. 3. If two bodies were revolved at the same speed or rate, and one of them was larger than the other, in which would the centrifugal force be the greatest? A. The centrifugal force varies directly as the weight of the rotating body, and as the square of the velocity of its motion. It also varies inversely as the radius of its orbit. 4. At about how many revolutions per second do you think a shaft of iron would fly to pieces? A. There is no definite answer to this question. It is entirely indefinite. 5. Would a bar of iron 4 inches long be attracted to a pole of a bar magnet with as much force as if it were 8 inches long? A. The length of a bar of soft iron has nothing to do with the attraction of a magnet for it. The force of the magnetism is in the magnet, and not in the bar of iron.

(8658) N. S. writes: In your issue of June 21 is an interesting communication relative to the Sault Ste. Marie Canal. Will you please reply to several questions relative to this subject through your Notes and Queries column, as doubtless others are interested in everything that relates to canals? What is the origin of the words Sault Ste. Marie? Then we read, in your article, as follows: "Ground was broken on the canal June 4, 1853, by one Charles T. Harry, under whose supervision was continued the original Soo canal." Then in the last paragraph we read: "The Soo Canal has more than four times the traffic of the Suez Canal. Vessels passing through the Soo canal average one for every 15 minutes during the 24 hours." The query is, Why the Soo Canal? Is that word synonymous with the Sault Ste. Marie Canal? A. Sault Ste. Marie is archaic French for the "Falls of St. Mary." "Sault" is pronounced in modern French "So," and "Soo" is probably a corruption of "So." The canal is popularly referred to as the "Soo" Canal.

**SAVAGE HIGHEST Development of SPORTING RIFLES**

Only Hammerless Repeating Rifle in the World.



Constructed to shoot Six Different Cartridges. Adapted for GRIZZLY BEARS & RABBITS. .303 and 30-30 Caliber.

Every Rifle thoroughly guaranteed. Write for new illustrated catalogue A.

**SAVAGE ARMS CO., Utica, N. Y., U.S.A.**  
Manufacturers of SAVAGE Magazine and Magnetic Hammers. Send for Circular.

**QUIET RUNNING**

is only ONE of the advantages to be gained by using

**New Process Pinions**

instead of metal pinions. Our catalogue will tell you others. Write for it. We also make Metal Gears.

THE NEW PROCESS RAWHIDE CO., - Syracuse, N. Y.

**TUBULAR DRIVING LAMP.**

IT is the only perfect one. IT will not blow or jar out. IT gives a clear, white light. IT is like an engine head-light. IT throws the light straight ahead from 200 to 300 ft. IT burns kerosene.

Send for book (free).  
R. E. DIETZ CO., 60 Light Street, New York.  
Mention this paper and get special discount.

ESTABLISHED 1840.

**The Franklin Model Shop.**

Experimental work for inventors; anything in metal from a single piece to a complete working model. Apparatus for colleges. Exhibition models. Introduction samples of patented articles. Special tools for making metal novelties. Inventions perfected. Drawings and designs worked out from inventors' ideas. Send for circular.

PARSELL & WEED,  
129-131 West 31st Street, New York.

**PLAN YOUR SUMMER TRIP**

So as to take advantage of the low rate one way and round trip tickets to points in COLORADO, UTAH, SOUTH DAKOTA, MINNESOTA, WISCONSIN, etc. now being sold via the Nickel Plate Road. Three fast through trains each way daily, finest coaches, Pullman and tourist cars; individual Club Meals 50c to \$1.00, also meals a la carte. See nearest agent or inquire of A. W. Ecclestone, D. P. A., 35 Broadway, New York City.

**THE NEW MARSH MOTOR CYCLE**

Model 1902. Price \$175.

A Gasoline Motor made with crank-disk, shaft in one piece, extra strong bearings, exhaust valve mechanism entirely within base, perfect lubrication, secured against dust, carburetor of the float-type which has reached the greatest perfection. This Motor Cycle is the latest acquisition in the art. Made of the best material, simple and perfect in every detail. Constructed by high skilled experts in every department and is without a peer. Full descriptive circular on application.

MOTOR CYCLE MANUFACTURING CO., Brockton, Mass., U.S.A.

**Rider Agents Wanted**

In each town, to help us sell overstock of high grade bicycles at half factory cost.

**New 1902 Models.**

"Bellise," complete \$8.75  
"Cossack," Guaranteed High Grade \$9.75  
"Siberian," Beauty \$10.75  
"Neudor," Road Racer \$11.75

Any other make or model you want at one third usual price.

Choice of M. & W. or Record tires and best equipment on all our bicycles. Strongest guarantee.

**SHIP ON APPROVAL**

C. O. D. terms and without a cent deposit & allow 10 DAYS FREE TRIAL before purchase is binding.

500 good 2nd-hand wheels \$3 to \$8. DO NOT BUY a cheap one! See us before you buy.

**MEAD CYCLE CO., Dept. 59W, Chicago.**

**MODELS & CHICAGO MODEL WORKS**

ESTABLISHED 1867. WHITE FOR CARBON & WOOD. SPECIALTY IN BRASS & COPPER.

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

**Experimental & Model Work**

Ctr. & advice free. Wm. Gardam & Son 45-51 Rose St., N. Y.

**NOVELTIES & PATENTED ARTICLES**

Manufactured by Contract. Punching Dies, Special Machinery. E. Konigslow & Bro., 181 Seneca St., Cleveland, O.

**VOLNEY W. MASON & CO., Friction Pulleys, Clutches & Elevators**

PROVIDENCE, R. I.

**WOOD ENGRAVING**

HALF TONE. BUFFALO, N. Y.

**DRYING MACHINES.** S. E. WORRELL, Hannibal, Mo.

**Cement Books.** How to Use Portland Cement, 50c; Mortar, Cement & Steel, 50c. Cement and Engineering News, 162 La Salle St., Chicago.

**RESTFUL SLEEP**

In Camp, on the Yacht and at Home.

**"Perfection" Air Mattresses, CUSHIONS and PILLOWS.**



Style 61. Camp Mattress with Pillow attached. Also showing Mattress detailed.

Clean and Odorless, will not absorb moisture. Can be packed in small space when not in use.

Send for Illustrated Catalogue.

**MECHANICAL FABRIC CO., PROVIDENCE, R. I.**

**The MEDART SYSTEM**

of applying Boat Building Materials enables anyone ordinarily handy with tools, to build boats of the highest character at one half the boat factory's price. Freight low. Launches, Sailing Yachts and Row Boats. Send stamp for catalog.

**FRED MEDART, 3545 DeKalb St., St. Louis, Mo.**

**WANTED.**

A young or middle-aged man for position as Foreman in a Machine Shop doing general work. Must be a good mechanic, acquainted with modern methods and have good executive ability. A person with a knowledge of modern paper making machinery would be preferred. Address giving age and experience to:

P. B. TAYLOR, 122 Market Street, Newark, N. J.

**TIRES**

SAVE 50 PER CENT ON BICYCLES-TIRES & SUPPLIES. BUY FROM THE LEADING HOUSE. FIRST QUALITY TIRES. PREPAID FOR \$3.00. CARRIAGE AND AUTO-MOBILE TIRES. ILLUSTRATED CATALOGUE FREE. BROADWAY CYCLE CO., 7 WARREN ST. NEW YORK.

**THE NEW MARSH MOTOR CYCLE**

Model 1902. Price \$175.

A Gasoline Motor made with crank-disk, shaft in one piece, extra strong bearings, exhaust valve mechanism entirely within base, perfect lubrication, secured against dust, carburetor of the float-type which has reached the greatest perfection. This Motor Cycle is the latest acquisition in the art. Made of the best material, simple and perfect in every detail. Constructed by high skilled experts in every department and is without a peer. Full descriptive circular on application.

MOTOR CYCLE MANUFACTURING CO., Brockton, Mass., U.S.A.

**AUCKLAND HARBOR BOARD**

**Appointment of Engineer**

HARBOR BOARD OFFICES, June 25th, 1902.

Applications will be received at this office until Monday, the first day of December, 1902, for the appointment of Engineer to the Board. Salary at the rate of £1,000 per annum. Age 30 to 55. Conditions of appointment to be had upon application.

Applications to be addressed to the Secretary, Auckland Harbor Board, Auckland, New Zealand, and endorsed, "Application for Engineer."

BY ORDER OF THE BOARD,  
M. H. LAIRD,  
Acting Secretary.

**ELECTRIC MOTORS** 1/2 H. P., 110 volts direct. GUARANTEED, \$34 Cash. COLUMBIA CO., 814 Walnut St., Philadelphia, Pa.

**"This Beats New Jersey."** Charters procured under South Dakota laws for a few dollars. Write for Corporation laws, blanks, by-laws and forms to Phil Lawrence, late Ass't Sec'y of State, Huron, Beadle Co., So. Dakota.

**MATCH** Factory Machinery. W. E. WILLIAMS, Mfr., 217 South Clinton St., Chicago, U. S. A.

**ICE** MACHINES, Cortiss Engines, Brewers' and Bottlers' Machinery. THE VILPETER MFG. CO., 29 Clinton Street, Milwaukee Wis.

**MODELS & EXPERIMENTAL WORK.** Inventions developed. Special Machinery. E. V. BAILLARD, Fox Bldg., Franklin Square, New York.

**The Best Thing on Wheels**

ALL ROADS ARE ALIKE TO

**The OLDSMOBILE**

RUNS EVERYWHERE

Nothing to Watch but the Road Ahead.

Our new red catalog illustrates and describes it in detail.

THE PRICE IS RIGHT

OLDS MOTOR WORKS, DETROIT, MICH.

