NEW BOOKS, ETC.

ON THE SPRINGING AND ADJUSTING OF WATCHES. By F. J. Britten, London: E. & F. N. Spon. New York: Spon & Company. Pp. 152, 12mo.

This volume contains a description of balance springing and the compensating balance, with directions for ap plying the springing and adjusting for isochronism and temperature. It is intended for those tolerably conversant with watch-making and those who desire guidance in this particular branch, rather than for beginners and therefore a knowledge of the many elementary branches is assumed. While we are not particularly familiar with watch-making, we can see that the book is a fairly practical one for those who are engaged in this form of mechanics on a small scale.

A PRACTICAL ENGINEERING POCKET BOOK FOR 1899 Manchester, England: Practical Engineering Company, Limited. New York: D. Van Nostrand Company. 1898. Price 60

This annual compilation is an interesting little pocket book and contains considerable information not found elsewhere. If an engineer nowadays should have all the packet books which are published, he would have a foundation for a fine engineering library. It is remarkable to see what excellent matter is contained in the different pocket books. The little volume before us is no exception to this rule.

PORTLAND CEMENT ITS MANUFACTURE AND USE. By Charles D. Jameson. New York: Van Nostraud & Com-pany. 1898. Pp. 192. 8vo. Price

This monograph is the outgrowth of a short course of lectures delivered each year to the junior engineer students of the State University of Iowa, upon limes mortars, and cements. The book deals in a clear and logical manner with the making of Portland cement, including the selection of raw materials, their proper treatment by the different methods, the burning of this material with the types used, testing of Portland cement, the comparative value of different cements, the use of Portland cement as a material of construction, the proper methods of manipulation, estimates of quantities, costs etc. The book is eminently practical and scientific and is well illustrated by engravings which elucidate the text.

TWENTIETH CENTURY MAGIC AND THE CONSTRUCTION OF MODERN MAGICAL APPARATUS. With the Introduction of New Experiments, Mechanical, Chemical, Electrical, etc. By Nevil Monroe Hopkins. New York and London: George Routledge & Sons, Limited. 1898. 12mo. Pp. 160. 100 illustrations. Price \$1. 160, 100 illustrations. Price \$1.

The volume before us is a collection of magical tricks divided into mechanical, chemical, and electrical tricks. It is written by an amateur and is dedicated "To the Amateur Conjurers of America and England." It should be said in the beginning that it is an entirely different work in scope from "Magic: Stage Illusions and Scientific Diversions, Including Trick Photography," of our Mr. A. A. Hopkins. "Twentieth Century Magic" deals rather with clever tricks devised in the laboratory, while our "Magic" concerns rather the actual tricks of the prestidigitateur, which were in many cases furnished by the magicians themselves, or by their master machinists. Having noted the marking distinction between the two books to prevent confusion, we have no hesitation in saying that "Twentieth Century Magic" is an admirable collection of new and clever tricks, and, as the author says, it is primarily designed to furnish an additional field for the amateur to operate in as well as constructive occupation, if he has a mechanical turn of mind. As such it will undoubtedly prove of value to the amateur, and the professional conjurer may also glean some valuable hints which will doubtless prove useful to him. The illustrations are very largely in the line of working drawings andserve to admirably elucidate the text. It is tastefully

PROCEEDINGS OF THE TENTH ANNUAL MEETING OF THE ASSOCIATION OF ECONOMIC ENTOMOLOGISTS. Washington: Government Printing Office, 1898. Pp. 104.

The work which is done by the government alone in practical entomology is simply enormous and is highly creditable to Dr. Howard and his assistants. The present pamphlet is the proceedings of the meeting which was held in Boston, August, 1898, and contains a number of papers of interest to all who are in any way connected with practical entomology,

DIE TECHNISCHE VERWERTHUNG DES STEINKOHLENTHEERES. Nebst einem Anhange: Ueber die Darstellung des natürlichen Asphalttheeres und Asphaltmastrix aus den Asphalt-steinen und bituuinösen Schiefern, sowie Verwerthung der Nehenpro-ducte. Von Dr. Georg Thenius. Vienna: A. Hartleben. Pp. viii, 216. 8vo. Price 60 cents.

The rapid development of organic chemistry within the last forty years has been largely due to the particularly exhaustive study of certain organic bodies. The thorough examination of comparatively few compounds has been sufficient to bring about radical changes in chemical theories. Among these organic bodies should be mentioned the products of the distillation of coal tar, many of which have played a not unimportant part in technical chemistry. Substances such as benzol, phenol, naphthalin, anilin, and the other derivatives of coal tar, have been extensively used in many industries. For many years the author of this work has been engaged in the manufacture of benzol, nitrobenzol, phenol, anilin, and other coal tar products, and of asphalt and asphalt cements; for this reason the second edition of the "Steinkohlentheere," containing as it does information obtained from the experience of years, should be of more than usual interest to chemists engaged in the making of

Business and Personal.

The charge for insertion under this head is One Dollar a line for each insertion; about eight words to a line Advertisements must be received at publication office as early as Thursday morning to appear in the follow ing week's issue.

Marine Iron Works. Chicago. Catalogue free. For boisting engines. J. S. Mundy, Newark. N. J. "U.S." Metal Polish. Indianapolis. Samples free. C. E. Sontum & Co., Christiania, Norway, Mfrs. Agts. Gasoline Brazing Forge, Turner Brass Works, Chicago Yankee Notions. Waterbury Button Co., Waterb'y, Ct. Bee keepers, send for 1899 catalogue of supplies. J. H. M Cook, 60 Cortlandt St., New York.

Gear Cutting of every description accurately done The Garvin Machine Co., Spring and Varick Sts., N. Y. New volume Model Engineer begins now. Annua sub., 75c. Spon & Chamberlain, 12 Cortlandt, New York The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. For t of East 138th Street, New York.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4. Munn & Co. publishers, 361 Broadway, N. Y. Roche's "New Standard" Electric Necktie Pin. Works like a charm. Midget Battery. The electric light is a beauty and a wonder. Sent postpaid for \$1.00. Agents wanted. Wm. Roche, 259 Greenwich St., New York.

Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway New York. Free on application.



HINTS TO CORRESPONDEN'TS.

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.

Bu yers 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

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

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.

(7587) A. C. S. writes: I have several cells of bichromate of potassium battery, so arranged that the zincs can be raised from the solution, when not in use. The rods and zinc holders are made of brass. After being chargeda few days a salt begins to cover the parts men tioned and I fear will, after a time, destroy them. With

what shall I coat the brass parts to properly protect them from the action of the acid? A. To prevent the acid of a b ttery from climbing and reaching the brass fittings, proceed as follows: Dip the upper end of the carbons in melted paraffine till they are completely saturated for an inch with paraffine. Coat the upper end of the zincs with asphaltumvarnish. Of course, the cells must be taken to pieces and the plates thoroughly washed and dried before treating them.

(7588) F. A. B. asks: 1. Would four cells of battery, each giving 1.75 volts and 6 amperes, when connected in series give a total of 7 volts and 6 amperes? A. Yes. 2. Would this light six 7 candle lamps (connected in parallel), each of 7 volts and lampere? A. Yes, theoretically, but practically, no. 3. About how long would an ordinary battery of this size run that number of lamps? A. Any battery used in this way would run down very rapidly. It is like taking the dam of a reservoir away all at once for the purpose of drawing out the water to turn a mill. The water runs out all at once The cell is used up all at once.

(7589) G. S. Y. asks: How is rubber dissolved for the use of moulding tips for crutches, shoes, etc.? A. Rubber is not dissolved, but is vulcanized into shape. We can send you an important series of papers on rubber manufacture on receipt of 30 cents, which will give you full information regarding the manufacture of such articles as you mention.

(7590) "Subscriber" describes a dynamo casting which he has, and asks how to wind it for series and for compound winding, both of field and armature, both for battery current and for 100 volt circuit. He finally asks what would be candle power gen erated by it. The whole frame is only 416 inches long. A. The machine is a toy of no real use. Wind it up with No. 26 or 28 magnet wire. A cell or two of battery will make it turn. Scientific American Supplement, No. 600, price 10 cents, contains drawings of connections armature, etc., to show you how to proceed.

(7591) A. A. C writes: I wish to stain a number of glass electric light globes. What chemicals shall I use, and how use them? Red, blue, and green are the colors I wish to use. A. 1. Prepare the glass by thoroughly washing in soap and water and drying. Then dip in bath made by beating up the whites of two eggs in 11/2 pound or pint of water and filtering. and hang up to dry. Dissolve the aniline color in photographer's com mon collodion. 2. Red or blue aniline will form clear solutions, while the green solution will require filtering 3. Yellow aniline forms a handsome color, but the surface of the glass presents a frosted appearance after the application. 4. Violet and purple colors may be obtained by combining red and blue in different quantities. When the solution is ready, dip the prepared glass bulbs therein, hang up to dry, and finally pass a current through the bulb for half an hour, that the heat thus generated may harden the coating of the collodion, or place in a current of air. 5. The preparation can easily

be removed with alcohol or sulphuric ether, but is not affected by water. Experience has shown that the hest esults are obtained by not using too much aniline. Make the color light rather than deep, and apply two or three

(7592) L. P. asks: 1. What are the methods for making the different kinds of imitation woods? A. Imitation woods are made by staining and by the grainet's art. See our "Cyclopedia of Recepts" for a full account of staining and graining imitation of all kinds of wood, \$5 by mail. 2. Why is it that the lowest part of music sung by female voices is the alto, while if played on an instrument it is the tenor? A. We cannot agree with your statement concerning the parts in music as sung and as played. Alto as sung does not become tenor when played, though the ranges of the alto and of the tenor have many notes in common. The usual range of the parts in music, as given in the "Encyclopedia Britannica," vol. 24, is as follows: Bass, from F below bass C to include middle C; baritone, from A below bass C to include E above middle C; tenor, from bass C to include G above middle C; alto or contralto, from E below middle C to include B above middle C: mezzo soprano, from G below middle C to include Dof octave above middle C; soprano, from B below middle C to include F of octave above middle C. By this table you will see that even bass and soprano have two notes in common, B and middle C, but a bass voice does not become soprano by singing middle C.

(7593) J. H. B. asks: Hasany substance, either animal, vegetable, or mineral matter, either liquid or solid, ever been discovered or manufactured which can resist and is not penetrated by the electric waves which pass through the ether ? A. We suppose thatelectric waves to some extent penetrate most substances, but not with equal ease. Electric waves are also reflected by sheet metal, refracted by a lens of pitch, and polarized by gratings of parallel wires. All these changes suggest a degree of resistance to the waves which retards them, and in the end would stop them. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 718, 720, 734, 967, 968, 969, price 10 cents each, for the work of Hertz; "Elementary Lessons in Electricity," Thompson, price \$1.40, and Lodge's "Modern Views of Electricity," price \$2.

TO INVENTORS.

An experience of fifty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, emble us to understand the laws and practice on both continents, and to possess unequaled facilities for procuring patents everywhere A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business, Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

JANUARY 31, 1899,

AND EACH BEARING THAT DATE. (See note at end of list about copies of these patents.)

Car door lock, Smith & Delano.
Car door lock, Smith & Delano.
Car pipe connection, rail way, T. Griffiths.
Car, railway, L. T. Pyott.
Car record apparatus, W. E. Beecham.
Carbon feeding mechanism, E. P. Hopkins.
Card or picture mount, G. C. Warner.
Cardin kenkine flat stripping motion. J. Edge.
Carlinge, folding, C. S. White
Cash register, F. Woodbridge.
Cash register, F. Woodbridge.
Cash register or like apparatus, J. Pallweber.
Casting plant, M. M. Suppes.
Centrifugal machine, J. H. Darby.
Centrifugal machine, T. C. Gooch.
Chandelier, piano, P. Anderson.

	93
Channeling, feather edging, and rounding ma	. 618.564
Channeling, feather edging, and rounding machines, mechanism for, W. E. Fischer. Chart holder, B. F. Balmer. Chlorin, zinc, etc., from mixed ores, method of and apparatus for producing, F. M. Lyte. Circuit closer, automatic, H. F. Blackwell, Jr. Clamp for saddle posts, etc., J. H. Bullard. Cleaner. See Boiler cleaner. Seed cleaner clock dial, electric illuminated, R. T. Crane, Jr. Clock, electric, W. W. Hastings. Clock, repeating, J. J. Fifield. Clod crusher, J. Dieter. Clotbes rack. Wiechel & Himmelheber. Clottes pin, W. A. Simmons. Clottes rack. Wiechel & Himmelheber. Clover hulling machine feeder, F. T. Wright. Clutch, T. J. Koven. Cock, gage, B. A. Legg. Cock, gage, J. H. Warren. Cock, stop and waste, I. N. & J. H. Glauber. Coffee mill, J. Rhino. Coin carrier, J. N. Crabb. Collar and cuff dampener, L. G. Carr. Collar crimper, W. W. Youmans. Commutator short circuiter, E. C. New comb. Confectionery ornamenting machine, T. Robert Son.	. 618,767 f . 618,575
Circuit closer, automatic, H. F. Blackwell, Jr Clamp for saddle posts, etc., J. H. Bullard Cleaner See Roiler cleaner, Seed cleaner	. 618,773 . 618,639
Clock dial, electric illuminated, R. T. Crane, Jr Clock, electric, W. W. Hastings	. 618.646 . 618,670
Clot crusher, J. Dieter. Clotbes pin, W. A. Simmons. Clotbes reak Wisehal & Himmelhaber	. 618,400 . 618,444
Clover hulling machine feeder, F. T. Wright	. 618,451 . 618,639
Cock, gage, B. A. Legg. Cock, gage, J. H. Warrell Cock ton and wests blockbart & Keogh	618,696 618,527
Cock, stop and waste, I. N. & J. H. Glauber Coffee mill, J. Rhino	618,503
Collar and cuff dampener, L. G. Carr Collar crimper, W. W. Youmans.	. 618.641 . 618.552
Confectionery ornamenting machine, T. Robert	. 618,482 . 618,647
Cooking and drying apparatus, F. Cox	. 618,496
Cotton to openers, apparatus for supplying, J	. 618,797
Corrigan. Counter cutting machine. Sawin & Putnam Coupling. See Bicycle coupling. Car coupling. Pipe coupling. Tbill coupling. Crate, shipping. Test & Jones	. 018,386
Cuff attachment, D. J. Gue. Cultivator, P. Herrick Cultivator and harrow attachment, C. N. Lam bert.	. 618,673 . 618,473 618,519
bert. Cultivator attachment, W. A. Norton. Cultivator implement, S. I. Allen. Current motor, alternating, E. C. Newcomb.	. 618,553 . 618,578
Curtain fixture, H. M. Stevenson. Curtain pole hanger and shade roller holder, combined, G. Bell.	618,492
Curtain ring and holder, H. S. Brewington Cutting square holes, tool for, N. Rosenberg Cycle saddle, M. Pedersen	. 618,557 618,585 618,613
Dental appliance, I. S. Kirkwood Dies, hydraulic holder for rotating, F. Ecaubert Digging and tamping implement, . M. Knox	618.421 618.651 618.469
Dish wasber, L. B. Hale. Display card, B. B. Goldsmitb. Door check, C. F. Haulngton.	618,410 618,505
Door closer and check, J. P. Magney Door or gate closer, H. O. Sparks Door, sliding, W. K. Hairigh	618,476 . 618,446 618,617
Draught equalizer, Burrous & Brewer Draught equalizer, G. W. Russell Draught rigging, J. J. Jones	. 618,779 . 618,736 . 618,417
Draughting apparatus, adjustable pattern, F. E. Buddington	618.352 618.652
Dust guard, F. B. Harrison Dye, basic disazo, E. Konig (reissue) Elastic wheel, Needham & Smith	. 618.434 . 11.43 . 618.439
Curtain fixture, H. M. Stevenson. Curtain pole banger and shader eller holder, combined, G. Bell. Curtain ring and holder, H. S. Brewington. Cutting square holes, tool for, N. Rosenberg. Cycle saddle, M. Pedersen. Dental appliance, I. S. Kirkwood. Dies, hydraulie holder for rotating, F. Ecaubert Digs, hydraulie holder for rotating, F. Ecaubert Digsing and tamping implement, M. Knox. Dish wasber, L. B. Hale. Display card, B. B. Goldsmitb Door check, C. F. Hailington. Boor closer and check, J. P. Magney. Door or sate closer, H. O. Sparks. Door, sliding, W. K. Hairigh. Draught equalizer, Burrens & Brewer. Draught equalizer, G. W. Russell. Draught rigging, J. J. Jones. Draughting apparatus, adjustable pattern, F. E. Buddington. Diving mechanism, S. F. Clouser. Dust guard, F. B. Harrison. Dye, basic disazo, E. Konig (reissue). Elastic wheel, Needham & Smith. Electric furnace, H. Bovy. Electric meter, prepayment, Long & Schattner. Electric motor, direct acting reciprocating, J. H. Mason. Electrical protector, D. J. Cartwright.	. 618,554 . 618,699
Mason. Electrical protector, D. J. Cartwright	. 618.702 . 618.812 . 618.664
Mason. Electrical protector, D. J. Cartwright. Elevator door, D. J. Harding. Embroidering machine, J. A. Groebli. Engine. See Gas engine. Rotary engine. Ro tary reciprocating engine. Triple cylinde engine. Wind engine. Engine autachment. steam. G. Palm.	618,458
engine. Wind engine. Engine attachment, steam, G. Palm Engine indicator steam Kinney & Vaughan	. 618.434
Engine attachment, steam, G. Palm. Engine indicator, steam, Kinney & Vaughan Engine muffler, explosion, E. J. Pennington Engines, automatic stopping mechanism for, V. K. Hunter	618,479
Engine automatic stopping mechanism for, v E. Hunter. Envelop, H. D. Wolfersberger. Eraser. blackboard, C. L. Yeo Exbibitor, card, F. C. Watson Explosive motor, E. Brillie. Eyeglasses or spectacles, H. Abbott. Fair leader, adjustable, W. F. Murray. Featber renovator, W. W. G. Reed. Feeder, boiler, O. J. Scott. Fence, iron, G. D. Sheer. Fifth wheel, E. D. Eastman. Fifth wheel, W. Knapp. Fire alarm, F. D. Wallace. Fisb book, spring actuated, D. W. Anderson. Fisbing reel tension attachment, A. V. Chapin. Floor clamp, E. C. Ingersoll. Folding tub and similar vessel, J. A. Shearer. Frountain, F. W. Darlington. Frogless switch, J. Graham. Furnace. See Assay furnace. Electric furnace.	618,632 618,759 618,548
Explosive motor, E. Brillie. Byeg lasses or spectacles, H. Abbott. Kair leader, adjustable, W. K. Murray.	618,638 618,760 618,607
Feather renovator, W. W. G. Reed Feeder, boiler, O. J. Scott	. 618.481 . 618.484
Fifth wheel, E. D. Eastman. Fifth wheel, W. Knapp. Fire alarm, F. D. Wallace.	. 618,649 . 618,467 . 618,526
Fisb book, spring actuated, D. W. Anderson Fishing reel tension attachment, A. V. Chapin Floor clamp. E. C. Ingersoll	618,764 618,599 618,573
Folding tub and similar vessel, J. A. Shearer Fountain, F. W. Darlington Frogless switcb, J. Graham	618.442 618.398 618,411
Frogless switch, J. Graham Furnace. See Assay furnace. Electric furnace Metallurgical furnace. Furniture, composition for cleaning and polish). 1-
ing, F. R. Wegerdt Gage. See Tympan gage. Gas burner, J. F. Williams.	618.592
Gas engine, G. Palm. Gas generator, P. A. N. Winand. Gas generator, acetylene, Ernst & Philips	618.435 618.549 618.455
Gas generator, acetylene, G. F. Owen Gas generator, acetylene, J. Reibel Gas generator, acetylene, E. L. Williams. 618.59	618.730 3, 618.59 i
Gate, D. S. McMullen.	618 872 618 714 618 814
Metallurgical furnace. Furniture, composition for cleaning and polisting, F. R. Wegerdt. Gage. See Tympan gage. Gas burner, J. F. Williams. Gas generator, P. A. N. Winand. Gas generator, acetylene, Ernst & Philips. Gas generator, acetylene, G. F. Owen. Gas generator, acetylene, J. Reibel. Gas generator, acetylene, G. F. Owen. Gas meter, prepayment, T. Phillips. Gate, D. S. McMullen. Gate, C. Rice. Gate, H. J. Ritter. Gear, reversing, G. Palm. Generator. See Gas generator. Steam generator.	. 618, tc.
Glass, decorated, J. A. Luxheim	618.606 618.606
Governor and speed indicator, centrifugal, K. W. R. Lynen Governor, steam engine, H. C. Nichols.	. 618.423 . 618.431
R. Lynen. Governor, steam engine, H. C. Nichols. Grain drying and cooling apparatus, G. H. Hes: Jr. Grate attachment, W. I. Bagley.	618.508 618.766
Jr. Grate attachment, W. I. Bagley. Grinding machine, ball, H. J. Gantt. Guil, gas operated machine, L. Silverman. Hair crimper, N. Whelan. Hame strap, H. G. Spraker.	., 618,502 618,743 618,630
Hame strap, H. G. Spraker. Handle. See Broom handle. Handle bar fastening. A. Jerome.	

Mdvertisements.

ORDINARY RATES.

Inside Page, each insertion, - 75 cents a line Back Page, each insertion, - - \$1.00 a line EFFor some classes of Advertisements, Special and Higher rates are required.

The above are charges per agate line—about eight words per line. This notice shows the width of the line, and is set in agate type. Engravings may head advertisements at the same rate per agate line, by measurement, as the letter press. Advertisements must be received at Publication Office as early as Thursday morning to appear in the following week's issue.



POWER & FOOT | SHAPERS, PLANERS, DRILLS, LATHES | MACHINE SHOP OUTFITS, TOOLS AND SUPPLIES, CANADGUE FREE SEBASTIAN LATHE CO. 120 CULVERT ST. CINCINNATI. O.

695 Water St., Seneca Falls, N. Y.

FOOT POWER and TURRET LATHES, Plan-ers, Shapers, and Drill Presses. SHEPARD LATHE CO., 133 W. 2d St., Cincinnati, O.

HAVE THE LATEST IMPROVEMENTS. No machine shop can be thoroughly up-to-date unless it has the most modern perfected tools. For instance, the



SKINNER UNIVERSAL LATHE CHUCK

Has many improvements original with us. Among some of its advantages are accuracy, greatest strength, most powerful grip, and largest capacity.

For Send for Catalogue * S. A."

SKINNER CHUCK CO. Church St., New Britain, Conn.



WE ARE THE INVENTORS OF THE CAULKING MALLETS



NOW USED IN ALL THE SHIP YARDS OF THE WORLD.

We make Mallets of all descriptions. This is our specialty. Illustrated Price List and Catalogue mailed upon application. mailed upon application.

N. Y. MALLET & HANDLE WKS.

Established 1945 460 E. Houston St., N.Y., U. S.A.

UBMARINE TELEGRAPH.-A POP-Har article upon cable telegraphing. SCIENTIFIC AMERICAN SUPPLEMENT 1114. Price 16 cents. For sale by Munn & Co. and all newsdealers.



Price, \$1.50 each.

e and 510 page catalog sent postpaid for \$1.40 or alone for 25c.

MONTGOMERY & Co., TOOL MAKERS, 105 FULTON STREET, NEW YORK CITY

HIGH GRADE WORKING MACHINERY



Single Machines or Complete Equipments for Any Class of Work.

Your Correspondence is Solicited. Illustrated Matter and Prices on application.

J. A. FAY & CO. 10-30 John St., CINCINNATI, OHIO

DORMAN'S VULGANIZERS

are used all over the world.

Exclusive Manufacturers of Steam Machines for Rubber Stamps. We also make Dry Heat Vulcanizers. Complete outfits from \$10 to \$1,000. All Stamp and Stencil Tools and Supples. Brass and Steel Dies for all purposes. Seals, Engraving and Die Sinking of all kinds. Established 1860. Printing Presses, with complete outfits, from \$1 to \$100. The J. F. W. DOR MAN CO. 121 E. Fayette St.. Baltimore, Md., U.S.A.

Water Emery

1999 Ruby St., Rockford, III.

THE OBER LATHES



For Turning Axe, Adze, Pick, Sledge, Hatchet, Hammer, Auger, File, Knife and Chisel Handles, Whiffletrees, Yokes, SPokes, Porch Spindles, Stair Balusters, Table and Chair Legs and other

Send for Circular A. The Ober Lathe Co., Chagrin Falls, O., U.S. A.



Padlock, F. Van Cauwenberghe.
Padlock, H. G. Voight.
Painting, method of and apparatus for, J. H.
Davis.
Paper assembling and stapling machine, T. C.
Dexter.
Paper pox, F. Knobeloch.
Paper feeding machine, L. Gero.
Paper, producing and fixing iridescent colors on,
C. Henry.
Pedal, G. F. Marchant.
Pelt plucking machine, J. W. Sutton.
Percolator package, H. M. Humphrey.
Phonographic, Bettini.
Photographic plate bolder, Altschwager & Joy.
Photographic sputter, J. A. Mosher.
Pillow sham holder, B. F. Schrock.
Pillow sham holder, B. F. Schrock.
Pillow sham holder, S. Simmons.
Pipe lining machine, F. E. Keyes.
Planter corn, W. Klein.
Plows, and or turf cutting attachment for, W. J.
Blocker.
Plug or valve, turning, F. V. Winters. 618,799 618,440

Plows, sod or turf cutting attachment for, W. J. Blocker.
Plug or valve, turning, F. V. Winters...
Pocket knife, J. Conover.
Pop corn gems, machine for making, J. E. Harvie...
Potato bug catcher, O. C. Sanger...
Power transmitting mechanism, F. Durr...
Press. See Lard press. Printing press.
Printing machine, Gledbill & Whitner...
Printing press, H. A. W. Wood.
Propulsion mechanism, boat, A. Belz...
Pump, G. B. Petsche...
Pump, G. B. Petsche...
Pump geteric, C. Eickemeyer.
Pump dectric, C. Eickemeyer.
Pump for extracting kerosene or other liquids from tins, hand, W. J. Rawling.
Pumping apparatus, deep well, W. A. Springer...
Railway bumping post, B. Haskell...
Railway crossing J. C. Viseler...

618,429 618,643 Refrigerator, knockdown, Leonard & Solosth.... 618,474 Regrister. See Air register. Cash register. Hot air register.

air register. B. D. Dayis.
Register, R. S. Odér.
Registering device, G. B. Bassett.
Ring. See Curtain ring.
Roaster. See Seed roaster.
Rolling metal balls, die for, H. M. Putnam...
Roofing, metallic, J. S. Moyer.
Rotary engine, J. J. Calliban.
Rotary engine, G. H. Carr.
Rotary ereiprocating engine, Coomes & Rice...
Rowlock, F. Rheault.
Sandbapering machine. A. A. Peiton.

Rowlock, F. Rheault.
Sandpapering machine, A. A. Pelton
Sash lock, F. B. Koues.
Sawmill, F. S. Farr.
Scale. excess baggage, H. Paddock.
Seal, car, S. A. Foster.
Sealed folding hollow body, F. A. Walter.
Section liner, Sheldon & Freeman.
Seed cleaner, cotton, F. C. Frowe.
Seed cleaner, cotton, F. C. Crowe.
Sewing machine, broom, A. E. Miller.
Sewing machine, broom, A. E. Miller.
Sewing machine feeding mechanism, W. J.
Stewart.

Seveng machine, broom A. E. Miller. 618,798
Sewing machine feeding mechanism, W. J.
Stewart. 618,798
Sewing machine, overedge, H. A. Klemm. 619,637
Sewing machine, overseam, D. C. Bellis. 618,597
Sewing machine, overseam, D. C. Bellis. 618,597
Sheet metal can, E. Norton & Larkin. 618,618
Sheet metal can, Torton & Larkin. 618,618
Sheet metal can, Torton & Larkin. 618,510
Sheet metal forming machine, E. A. Franklin. 618,510
Shelving construction, W. H. & F. A. Winslow. 618,530
Shelving, library, J. L. Kail. 618,510
Shee J. W. Chase. 618,510
Shoe box, Mercein & Porter. 618,707
Shutter bower and fastener. R. N. Martz. 618,701
Signal controlling track instrument, E. A. Holla
Stard mechanism H. W. Petros. 618,702

Shutter bower and fastener. R. N. Martz. 618.707
Signal controlling track instrument, E. A. HollaWash marked to supply the station indicator. C. E. Cole.
Seals, Engraving and station indicator. C. E. Cole.
Seals, Engraving and station indicator. C. E. Cole.
Station indicator.

(Continued on page 95)

YOU CAN EARN MORE

if you will devote some of your spare time at home to study, at a cost so low th lay. We will help you to a better position. Thorough courses by mail in I Civil, Minling, Steam, and Sanitary Engineering, Architecture, Machine Design, etc. Best Text Books Free. Seven years of experience in t Write for free illustrated 100 page S. A. circular, sample pages of text books, di letters fram students all over the world.

THE UNITED CORRESPONDENCE SCHOOLS, 156 FIFTH AVENUE, NEW YORK.

Dies, Stocks & Taps for Amateurs, Dentists and Machinists. Stocks drop forged, Dies, adjusted in collets formed to guide the built out full threads

in once passing over the rod. Threads of U.S. and Whitworth standards 1-16 in. to 1% in. diameter. Ask for Die stock catalog. The Fratt & Whitney Co. Hartford, Ct., U.S.A.

GAS and GASOLINE ENGINES. Using Natural Gas, Coal Gas, Producer Gas, and Gasoline di-rect from the tank. 1 to 40 H. P., actual.

The Springfield
Gas Engine Co.
21 W. Wasbington St
Springfield, O.



The most economical power known. Absolutely safe and reliable. Runs with common kerosene. Perfectly auto-matic. Patented 1837, U.S. and European countries. 128-132 Mott St., New Yark,

HOISTING ENGINES

618,631 618,488

618,404



This beats Wind, Steam, or Horse Power, We over the WEBSTER 2% actual horse power GAS ENGINE

for \$150, less 10% discount for cash. Built on interchangeable plan. Built of best material. Made in lots of 100 therefore we can make the price. Boxed for shipment, weight 800 pounds. Made for Gas or Gasoline. Also Horizantal Engines, 4 to 30 borse power.

EWrite for Special Catalogue.

WEBSTER MFG. CO., 1074 West 15th St., CHICAGO Fastern Branch, 38-D Dey Street, New York City.

ower? Power? Power! RACINE GAS AND GASOLINE ENGINES.

LOCAL ENGINE AGENTS WANTED

Racine St am and Vapor Launches. Racine Rowand Sail Boats. Send stamps for Catalogue. Specify one wanted. CARSE BROS. CO., 64-66 Wabash Ave.,





HOW TO MAKE AN ELECTRICAL Furnace for Amateur's Use.—The utilization of 10 voit electric circuits for sma furnace work. By N. Monro Hopkins. This valuable article is accompanied by detailed working drawings on a large scale, and the furnace can be mide by any amateur who is versed in the use of tools. This article is contained in Scientific American Supplications, No. 1182. Price 10 cents. For sale by MUNN & Co., 36 Broadway, New York City, or by any bookseller or newsdealer.

Multipolar Motors and Dynamos



of highest obtainable efficiency.
Compact and symmetrical design
Sparkless operation, self-feeding,
carbon brusbes, rigid commutation, self-oil ng and aligning bearings. Slow and medium speed.
Fully described in our new catalogue No. 33 M.
The Holtzer-Cabot Electric Co.,
(Established 1875)

New Catechism #4 Steam Engine For Engineers, Firemen, Mechanics and Amateurs, 480 pages, 225 illustrations. Bound in green slik cloth, size 6384, 124 in thick. Simple, thorough and complete. Resulty understood, and gives instructions bow to run all types of steam engines. Price \$2.00, postpaid.

THEO. AUDEL & Co., of Fifth Ave., New York.



618.308 alone is worth the mouey. The jaws open eight inches. Weight thirty pounds. Again wanted. Catalog S. A." HLOOMFILLD MFG. CO., Bluomfield, Ind.

SOAP

You instantly recognize WILLIAMS' SHAVING SOAP. It is impossible to mistake its thick, creamy, softening lather or its delicate, refreshing odor, for there is nothing else like it. Under its soothing influence shaving becomes a lathery luxury, and a feeling of intense satisfaction takes possession of you.

WILLIAMS' SHAVING SOAPS are used by all first-class barbers, and are for sale all over the world.

The J. B. Williams Co., Glattonbury, Ct. Depots: London, Paris, Dresden, Sydney.

ICE BOATS-THEIR CONSTRUCTION and Management. With working drawings, details, and directions in full. Four engravings, showing mode of construction. Views of the two fastest ice-sailing boats used on the Hudson river in winter. By H. A. Horsfall, M.E. Contained in SCIENTIFIC AMERICAN SOPPLEMENT, No. 1. The same number also contains the rules and regulations for the formation of ice-boat clubs, the sailing and management of ice-boats. Price 10 cents.



Manufactory Established 1761.

LEAD PENCILS, COLORED PENCILS, SLATE
PENCILS, WRITING SLATES. STEEL PENS, GOLD
PENS, INKS, PEN'IL CASES IN SILVER AND IN
GOLD, STA'I'IONERS' RUBBER GOODS, RULERS. COLORS AND ARTISTS MATERIALS

78 Reade Street, - - New York, N. Y. Manufactory Established 1761.



Over 70 sizes and st les. 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.



ON A STILL HUNT,

The up-to-date sportsman needs for success, personal comfort, and protection the Ideal Hunting Shoe.
Tanned horselide uppers gray color, soft as a glove, touch as steel, cannot harden. Widedoub e soles, rubber cemented together. Practically waterproof, flexible, easy. The most serviceable shoe for surveyors and cugmeers. Plus circulars free.
M. A. SMITH & SON.
Manuficturers, 28 31 N. 13th Street, Philadelphia.
Sporting Shoes of all kinds.





SAVE \$8 ON A HARNESS!

We are the largest manufacturers of harness and carriages in the world selling to the consumer exclusively.

WE HAVE NO AGENTS, DEALERS OF MIDDLEMEN. We sell you direct from the factory at wholesale prices and save you all dditional expense. We ship anywhere for examination. We guarantee and warrant everything.

This Elegant Team and Farm Harness for \$19.50 Many customers who have bught it report that they have saved from \$8 to \$10 in buying this ha rness sum us. For full description of this and 60 other styles of harness and 125 styles of vehicles see our new Illustrated Catalogue. Your name on a postal card will get it.

ELKHART CARRIAGE & HARNESS MFG. CO. W. B. PRATT, ELKHART, INDIANA.





SECTORLESS WIMSHURST MACHINE -This article gives directions for making. 4 illustra-tions. SCIENTIFIC AMERICAN SUPPLEMENT 1131. Price 10 cents. For sale by Munn & Co. and all news-dealers. Send for new catalogue.

THE BUHRING SYSTEM



perfectly decolor-izes and deodorizes without the aid of any chemicals. Over 300.000 Purifiers in use. Celebrated for 30 years as the most remarkable

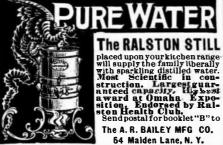
Water Purifier everdevised. Cata-logue mailed free up-on application Lib-eral terms to agents. BUHRING WATER

PURIFYING CO.

KEP IN SHAPE! You spoil your Coat or Over-coat by hanging it on a nail or pec. Keep it in shape by using the "Name in Your Coat "Coat Hanger. It pre-vents wrinkles and tears, and preserves the garment.



Made of Aluminum. Special kinds for bicycles, satchels, etc. Attached in a minute to anything. Any kind with yourname on, 25c., postpaid. Circular free. Agents wanted. R. A. Chapman, Patentee, 40 Stanton St., N. Y.



MACHINES FOR ROLLING SCREW

THREADS. Any size up to 1" diameter, 3" long. Four sizes of machines,

Send for Circulars. BLAKE & JOHNSON, P. O. Box 7. Waterbury, Conn.



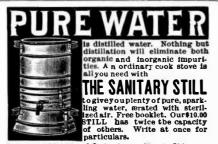
HALF PRICE

We will sell you any typewriter made for one half regular price, many for one quarter. Every machine guaranteed in perfect order. TYPEWRITERS SOLD, RENT ED, EX. CHANGED. Sentanywhere with privilege of examination. Send for Illustrated catalogue.

National Typewriter Exchange, Chicago.

ACETYLENE APPARATUS

Acetylene number of the SCIENTIFIC AMERICAN SUP-PLEMENT, describing, with full illustrations, the most recent, simple or home made and commercial apparatus for generating acetylene on the large and small scale. The gas as made for and used by the microscopist and student; its use in the magic lantern. The new French table lamp making its own acetylene. Contained in SCIENTIFIC AMERICAN SUPPLEMENT. No. 1057. Price 10 cents prepaid by mail. For other numerous valuable articles on this subject we refer you to page 30 of our new 1897 Supplement Catalogue, sent free to any address. MUNN & Co., 351 Browdway New York.



CUPRIGRAPH CO., 318 No. Green Street, Chicago



Registers an accurate account of work done on printing presses, grain tailies, weighing, measuring and other auromatic machines. Counts up to 1,000000 and repeats automatically. Simple, accurate, durable. Special counters to order. 13° Send for circular.

C. J. ROOT, Bristel, Cenn., U. S. A.

Turning machine, post, R. Harris.

Typpang gage, B. McGinty.

Type distributing apparatus, A. Low.

618,473
Type stetting apparatus, Johnson & Low.

618,483
Type space, serpentine or crimped. C. R. Murray 618,390
Typewriter, P. B. W. Kersbaw.

Uterine curette, M. J. Palmer.

618,521
Valve, C. E. Moreland.

618,703
Valve mechanism. W. T. Davis.

618,414
Valve, piston, Ide & Fernstrom.

618,416
Valve, stesm engine reversing, H. E. Brown.

618,705
Vehicle body, Young & Thompson.

618,705
Vehicle, motor, L. Benier.

618,562
Vehicle, motor, L. Benier.

618,562
Vessel, antispilling, Stanek & Axt.

618,656
Wasp or other yarns, apparatus for marking, S. A. Fowler.

Washer. See Dish Washer. Street washer.

Washing machine, W. R. Green.

Washing machine, G. Gsekwendtner.

618,504
Way bil, consignee's receipt, and agent's record envelop, combined, R. A. Grout.

Wheel. See Elastic wheel. Fifth wheel. Tension wheel. Traction wheel. Trolley wheel.

Window, E. Hipolito...

618,662
Window, E. Hipolito...

618,662 Whip socket and rein holder, combined, G. W. Hyde.
Wind engine, W. D. Staplin (reissue).
Window, E. Hipolito.
Window frame, sash, and attachments, G. Grahn.
Window, slidable hinged, W. McCall.
Wire man uf acturing machinery, C. A. Cowles..
Wrench, J. H. Hanson.
Wrench, C. L. Henderson.
Wrench, W. R. Smythe.
Wringer, See Mop wringer.
Wrist pin, Field & Palmer.

DESIGNS.

1		
ı	Abdominal belt, J. H. Keating	30,123
н	Balance frame, spring, E. N. Gilfillan	30,114
ı	Bicycle frame coupling, C. L. Travis	30,118
ı	Bicycle hub. P. H. Barker	30.116
1	Boiler section, J. A. Rathhone.	30.104
ı	Bor W R Zuck	30.089
ı	Box. W. B. Zuck. Bridle fastener blank, M. Wilson.	30.097
1	Brush head. J. F. Hoke. Jr.	30.092
1	Button holder, A. Sametz	30.079
1	Can postat grass A Crashore-	30,101
1	Clothog rock frame h' Hisman	30,110
1	Cam pocket grease, A. Crocheron. Clothes rack frame, F. Hiemenz. Curling irons, member for hair, G. Havell. Eaves trough hanger, W. Heib. Eaves trough screen, T. C. Keller. Exg carton filler, R. J. Barkley. Regrice archines core plate for Alvano R. D.	20,000
1	Fores trough harger 117 Hair, G. Havell	$\frac{30,093}{30,108}$
1	Pares trough server of C Kelle-	30,108
1	War conton files D I Desti-	20,100
1	Marking machines	30,088
1		
1	Priest	30.102
1	Escurcieon plate, B. Phelps	30,113
1	Fabric, hemmed, L. F. Boomer	30,126
1	Fare register dial, A. E. Nielsen	30,077
1	Fur trimming, imitation, A. Bierman	30.127
1	Glass, sheet or plate, E. Offenbacher	30.085
1	Glass vessel, cut, T. B. Clark	30,086
1	Harness loop. A. Lobdell	30.038
1	Hat rack, A. J. Curry. Heaters, section for hot water, W. H. Page	30.121
1	Heaters, section for hot water, W. H. Page	30,105
į	Hook, back band, H. P. Quin	30.096
1	Horseshoe pad. E. D. Flint	30,095
1	Jar. butter. W. H. Kremer	30,087
1	Jigs, screen supporting frame for mineral or ore	
1	washing, C. J. Hodge	30,106
1	Lamp body, L. S. Buffington	30,082
1	Lemn chimne▼ R Marsh 30.090.	30.0×1
1	Lamp fixture, L. C. Hills	30,084
1	Light fount, L. S. Buffington	30,083
1	Lightning arrester, A. Morgan	30,109
1	Nail, slug, B. F. Mayo	30.112
1	Pump frame, P. A. Myers	30,103
1	Pump frame, P. A. Myers	30.122
1	Shade bracket, G. W. Rush	30,099
1	Shade holder, W. C. Homan	30.100
1	Skirt protector J. Loeb	30 124
1	Skirt supporting attachment for helts and corects	
1	Skirt supporting attachment for belts and corsets, Moulton-& Jones	30.125
1	Spike extracting implement. W. P. Thomson	30,111
41	Stud, lacing, C. M. Beard.	30.078
	Stud, lacing, C. M. Beard. Toy bank, A. C. Williams.	30.076
1	Trueshoon E H Rusch	30 007
1	Wagon body, speed, W. R. White	30.119
1	Wagon body, s peed, W. B. White Warming vess el, R. Swartz	30.001
1	Wheel, sprocket, G. W. Hadley	.30,117
1	Wrench, nut. D. Hill.	30.115
		50,220

	TRADE MARKS.	
		32,444 32,434
	Chemical and pharmaceutical preparations, Chemische Fabrik von Heyden, Gesellschaft mit Beschrankter Haftung32,451, Cleansing purposes, certain solution for, Tabor &	32,452
	Craig. Coffees and teas. Shapleigh Coffee Company Corsets. J. Beckel & Company	32,437 32,441 32,433 32,455
	Electric motors, J. P. Williams. Feed mills, Stover Manufacturing Company Feed stuffs, certain named, J. W. Biles Company	32,456 32,458
	Food for poultry and domestic animals, certain named. Bowker Fertilizer Company	32,447 32,460
	Horse powers, Stover Manufacturing Company Jewelry, certain named articles of, W. & S. Black- inton	32,459 32,431
	Medicinal plasters, Kelley & Son	32,449 32,450 32,453
	Periodical paper, monthly, A. D. Porter Company Plows and their parts, Wiard Plow Company Powder for destroying insects, J. Maddocks	32,432 32,461 32,448
	Shoes, Hungerford & Crocker Shortening, J. C. Henderson Machine Motor and Manufacturing Company Soda ash, bicarbonate of soda, and caustic soda,	32,435 32,443
	Michigan Alkali Company	
t	Tea and coffee, H. N. Bate & Sons	32,439 32,440
i	Tire Company Tobacco, smoking and chewing, B. F. Weyman Windmills, Stover Manufacturing Company	32,454 32,436 32,457

LARELS

LABELS.	
Anderson's Cream Flakes." W. Anderson	6,791
'Febrol.' for a medicine, T. Bednarek 'Napthoil Soap," for soap, G. E. Marsh & Com-	
pany One Night Cough Cure," for a cough medicine,	6,792
W. L. Hackley	0.790
Rex Baking Powder," for baking powder, C. A. Seither. Roxane Pure Wheat Flour," for flour, Akin Ers-	6,790
'Roxane Pure Wheat Flour," for flour, Akin Ers- kine Milling Company	6.789
The Olympia Washing Gem,' for a washing com-	
'Webb's Blood Renewer and Anti-Rheumatic,"	
for a medical compound, G. B. Webb	0,790

PRINTS.

A Pleasant Duty," for whisky, Sentenne & Green 99 Anticipation: "for champagne, Sentenne & Green 100 Honeymoon," for beer, Sentenne & Green... 101 Jolly Set." for beer, Sentenne & Green... 104 Picnic," for beer, Sentenne & Green... 104 Purity," for beer, Sentenne & Green... 104

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 18%, will be furnished from this office for 10 cents. In ordering please state the name and number of the patent desired, and remit to Munn & Co., 361 Broadway, New York. Special rates will be given where a large number of copies are desired at one time.

Canadian patents may now be obtained by the inventors for any of the inventions named in the foregoing list, provided they are simple at a coat of \$40 each.

If complicated the cost will be a little more. For full Instructions address Munn & Co., 361 Broadway, New York. Other foreign patents may also be obtained.

CAN I BECOME AN ELECTRICAL ENGINEER?

For our Free, handsomely illustrated bookentitled * Can I Become an Electrical Engineer? * ? Address THE ELECTRICAL ENGINEER INSTITUTE OF CORRESPONDENCE INSTRUCTION, Dept. A. (Conducted under the auspices of "THE ELECTRICAL ENGINEER").

Endorsed by Every Prominent Electrical Engineer.

120-122 Liberty Street, New York, U. S. A.



Pistol or Shobjun, you'll make a Bull's Eye by sending three 2c. stamps for the ideal Hand-book "A." 125. pages FILEE. The latest Encyclopedia of Arms, Powders, Shot and Bulkts. Mention Scientific American. Address Co., New Haven, Conn., U. S. A.

Commission NEW EAST RIVER BRIDGE. City of New York.

Notice to Contractors.

For the information of intending bidders on the Steel Towers and End Spans of the New East River Bridge the Commission of the New East River Bridge state as follows: As soon as the money necessary for such con-struction is appropriated, advertisements will be issued. and, as the time for opening bids will be fixed at the earliest possible date thereafter, intending bidders can now apply to the Chief Engineer, at his office, 84 Broadway, in the Borough of Brooklyn, City of New York, for plans, specifications, form of contract, and all neces-sary information, in order that they may have ample time to prepare their estimates. By order of the Commission of the New East River Bridge.

SMITH E. LANE, Commissioner and Se

Chambers Street, Borough of Manhattan, Jan. 5, 1899.

TOMKINS HORSE BLANKET PIN. Protect your horse and save your blanket. Once adjusted, always ready. Sent by mall 10c, or 2 hooks and 1 breast pin 25c. Nickel plated. S. P. TOMKINS, TILLY FOSTER, N.Y.

\$3.50 Trojan Sanitary Still **S3.50 | FOJAIT Oddittary of the Best Still made and at 1/4 the usual price. Will furnish one pint of pure distilled water every fifteen minutes. Cash must accompany the order. THE HOBART ELECTRIC MFG. CO., TROY, OHIO.

MAGIC Lanterns Wanted AND FOR SALE MAGIC LANGE & CO., 800 FILDER St., Phila., Pa.

INVENTORS having desirable Patents to push should address Barnes & Basom, Omahu. Nah.

MOOEL MAKER I make Models for Electrical and Mechanical Appliances, also the machinery. M. SANGER, 62 Cortlandt St., New York.

MENTAL NUTS. Sold horse, \$90, bought back, \$80, resold, \$100, what was made on transaction. Book 100 catch questions and answers, great debaters. 10c. stamps. S. E. CLARK, 30 N. 9th St., Philadelphia.

REFRIGERATION One to 25 tons daily called the control of the contr

CARBIDE for acetylene gas generator.
Also generators. Prompt
delivery. G. L. Hogen,
Manager, Equitable Bldg., Baltimore, Md. MACHINES, Corliss Engines, Brewers' and Bottlers' Machinery. THE VILTER MFG. CO.. 599 Clinton Street, Milwaukee. Wis.

TURBINES JAS. LEFFEL & CM."

HOW TO MAKE INVENTIONS, \$1.00.
"Should be in the bands of all inventors."—Amer. Machinist
Free circular. E. P. Thompson. 83 Fulton Street. N. Y.

Agent's profit per week sure. Work for us and ret \$1.50 outfit. Side line, Terms and Premiums FREE. Sells at every house. Try us. Electrograph Co., 28 Bond St., N. Y.

TYPE WHEELS MODELS A EXPERIMENTAL WORK, SMALL WORKEN HOTELS A EXPERIMENTAL WORK, SMALL WORKEN HORS IND MASSAU ST KY.

Wanted—Local Agents to sell our high grade Lubri-cating Oils and Greasea. We have a good business pro-position to make to right party. References exchange For particulars, address Polar Oil Co., Cleveland, Ohio.



@GOLD, SILVER, NICKEL^N₀METAL PLATING

NEW QUICK PROCESS. MODERN METHODS. PROFITS IMMENSE. You can positively make \$5 to \$15 a day, at home or traveling, doing Plating and selling Prof. Gray's Plating Outfits, Dynamos, etc. Uncaualed for plating watches, jewelry, tableware, bicycles, all metal goods. Heavy plate. Warranted. Ac experience necessary.

LET US START YOU IN BUSINESS. We do plating ourselves. Have experience. Manufacture the only practical outfix, including dynamos, tools, lathes and materials. All WE TEACH YOU the Art, furnish recipes, formulas and trade sex. Latest method. Goods dipped in melted metal, taken out instantly with finest, most brilliant plate ready to deliver. Thick plate every time. Guaranteed 5 to 10 years. A boy plates from 206 to 306 ricces tableware daily. No polishing, grinding or work necessary. DEMAND FOR FLATING IS ENORMOUS. Every manufacturer, jeweler, storekeeper and business man has goods to plate. Every family, hotel and restaurant have goods plated instead, of buying new. It's cheaper and better. You will not need to canvass. Our agents have all the work they can do. People bring it. You can hire boy's cheap to do your plating, the same as we, and solicitors to gather work for a small ser cent. Replating is honest and legitimate. Customers always delighted. We Israel An Old ESTABLISHED FIRM. Been in business for years. Know what is required. Our customers have the benefit of our experience. We Are RESHONSIBLE and Guarantee Everything. Reader, here is a chance of a lifetime to go in business for yourself. We START YOU. Now is the time to make money.

WRITE TO-DAY. Our New Plan. Testimonials, and Circulars FREE. Don't wait, Send us your address anyway. Address. D.V. GRAY & CO., PLATING WORKS, 505 Elm St., CINCINNATI, OH10





Anyone sending a sketch and description may ickly ascertain our opinion free whether an rention is probably patentable. Communicans strictly confidential. Handbook on Patents there. Oldest agency for securing patents. Patents taken through Munn & Co. receive cial notice, without charge, in the

handsomely illustrated weekly. Largest cir-lation of any scientific journal. Terms, \$3 s ar; four months, \$1. Sold by all newsdeale is. MUNN & Co. 361 Broadway, New York

ch Office. 625 F St., Washington, D. C





free to any one naming this paper. GEO. H. STAHL, QUINCY, ILL. AGENTS SI an Hour Easily Made.

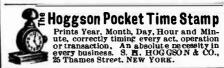
This polisher puts a mirror finish on knives and forks instantly. Free with any 25c, article in our mammoth catalog. Writefor it now. DIAMOND CUTLERY CO., 60 B'way, N. Y.

WATER MOTORS

LARGE LATHES WANTED that will swing 60" over the carriage. Compound rest, with cross feed. 6t, between centers preferred. Also One Heavy Planer, platen 36" wide, 13 or 14 ft. long. Send description, lowest price, and state where same can be seen, to Box 154, Worcester, Mass.



a Day Sure Sendus your address and we will show you furnish the work and teach you free; you work in ty where you live. Send us your address and we will be business fully remember we gramantee aclear profit







TIME RECORDER

The Rochester Card System keeps the record for a full week on a small card. See lilustrated Editorial Sct. AMER., Dec. 24, 1888. WILLARD & FRICK MANUFACTURING CO. ROCHESTER, N. Y.