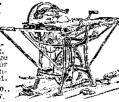
### Wood-working Machinery

For ripping, cross-cut-ting, mitering, grooving, boring, seroil-sawing edge moulding, mortising; for working wood in any man-ner. Send for catalogue A. The Seneca Falls M'f'g Co.,



## CHIER FOOT MACHINE SHOP OUTFIT

#### Veeder Counters

to register reciprocating movements or revolu-tions. Cut full size.

Booklet Free VEEDER MEG. CO. Hartford, Conn.





Every Gas Engine User should learnatout the Apple Automatic Sparker. Easily attached. No more belt, lattery or commutator troubles, Increases power and speed from the Market Sparker. Easily stacked to the Communication of the Communication The Dayton Electrical Mfg. Co. 98 Beaver Bldg. Dayton, Chie.

SEE THAT YOUR TICKET READS VIA THE NICKEL PLATE ROAD

If you are going to Erie, Cleveland, Ft. Wayne, Chicago or beyond, and you will be assured a most satisfactory trip at the lowest possible cost. Through Pullman sleepers from New York and Boston to points above mentioned. Elegant high back seat day coaches. Famous Dining Car Service.

For rates to any point West or on the Pacific Coast, and before arranging for your trip, write R. E. Payne, General Agent 291 Main 8t. Buffallo, N. Y. or A. W. Ecclestone, D. P. A., 385 Broadway, New York City.



# ORIGINAL BARNES Positive Upright Drills 10 to 50-inch Swing

Send for Drill Catalogue. W. F. & JNO. BARNES CO. 1999 Ruby St., Rocktord, Mt.



### WOLVERINE SELF STARTING AND REVERSING

Gasoline Marine Engines 3 to 18 horse power. Launches 18 to 75ft. Write for catalogue. **WOLVERINE MOTOR WORKS** Grand Rapids, Mich., U. S. A.
Breoklyn office, 97 254 St.



The Right Kind of a Motor land or water. Salisbury Double clinder Motor 44x 5. Water Jacket linders and Head, Aluminum Crank use, Self-Giling, Nickel Steel Valves, Forged Steel Shaft. Salisbury Motors are Reliable. Prices mod-

Send for Catalogue. BUFFALO ENGINE CO., Mfrs.

272-274 Michigan St., Buffalo, N. Y. OD INVESTMENT 75 we will send by express (not prepaid) complete N. D. Outfit with full instructions for learning



A fascinating study that will enable you to earn good wages Send for our catalog. Established 1879.

J. H. BUNNELL & Co., Inc. 20 Park Place New York Manufacturers should investigate the



**B. F. BARNES MACHINE TOOLS** before placing orders. The Tool here illustrated is our 20-inch Drill, and we have many other sizes to make a very complete line, including Mukiple Spirate Drills. If interested in the latest Tools for reducing casts of production, let us tell ven what we have. Ask for Catalog S.

B, F, BARNES CO. - Rockford, III.

Eurepean Branch
149 Queen Victoria St., London, E. C.

#### łæŋgwidziz

Artistic Job Printing, Catalogs, Booklets, in English or FOREIGN LANGUAGES. Half-tone and Color Presswork. LANGUAGES PRINTING COMPANY Languages Building, 15 West 18th St., New York

How To Increase

Your Business READ carefully, every week, the Business and Personal Wants column in the

Scientific American This week it will be found

on page 469. Some week you wi'l be likely to find an inquiry for something that you manufacture or deal in. A prompt replymay bring an order.

Watch it Carefully

trated with 101 full-page plates, a number of which are in colors, besides some 46 figures. It is printed in large type on fine paper, and will be found a very instructive and entertaining introduction to the study of evolution.

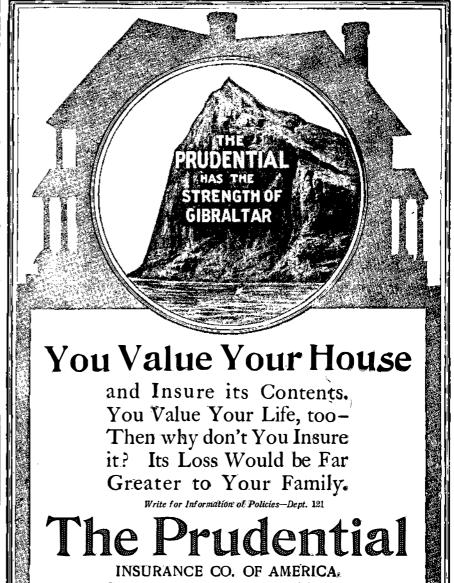
APPLICATIONS OF THE KINETIC THEORY TO GASES, VAPORS, PURE LIQUIDS, AND THE THEORY OF SOLUTIONS. By William Pingry Boynton, Ph.D., Assistant Professor of Physics at the University of Oregon. New York: The Macmillan Company, 1904. 8vo.; pp. 280. Price, \$1.60.

The kinetic theory, which may be regarded as a special or specialized theory of heat. is most thoroughly discussed in the present volume. While any adequate treatment of this theory must be mathematical, and while the majority of such discussions are extremely so, the theory itself is of interest specially from the fact that it is fundamentally a physical one that attempts to present to the imagination the mechanism by which things take place. As the kinetic theory is a physical theory, it has to face not only the problems of the gaseous state, but also of the liquid and solid states, and of mixtures and solutions as well as of pure substances. It is, therefore, desirable to present a treatment of as large a scope as possible, and this the author has attempted to do, and has succeeded very well. The book contains all the latest information regarding the kinetic theory, and will be found valuable to students and others interested in the same.

#### INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending May 30, 1905

AND EACH BEARING THAT I	ATE
[See note at end of list about copies of these ]	atents.]
Abrasive wheel mounting, C. H. Norton Accounts, etc., means for keeping indi- vidual balances in book, M. M.	<b>7</b> 91,159
	790,944
Acid, making hydrohalogenic, F. W. West- hausser	<b>791,36</b> 6
Air brake and car coupling combined, automatic, L. C. Cary	79 <b>●</b> ,953 791,324
Air brake pipe coupling, J. H. Phillips Air cooling device. Peirce & Taylor	791,110 790,979 790,933
air brake and car coupling combined, automatic, L. C. Cary Air brake apparatus, A. B. Currier Air brake pipe coupling, J. H. Phillips. Air cooling device, Peirce & Taylor Air purifying means, F. J. Talbot Alkaline metals, apparatus for obtaining oxids of, Reepper & Harmon Ammonia, manufacturing, W. Hoopes	<b>79€</b> ,933
oxids of, Roepper & Harmon Ammonia, manufacturing, W. Hoopes Animal trap, E. H. Baugh Aparejo, H. W. Daly	79 <b>0</b> ,922 791,194 791,311
Aparejo, H. W. Daly  Ash pan, F. Cris	791,4 <b>0</b> 7 791,185
Aparejo, H. W. Daly Ash pan, F. Cris Asphaltic composition, J. B. Swindle Automobile vehicles, electric motor for, E. Cantono	790,932
Ayla lubricating device vehicle P. Le	791,180
Bag holder, W. Terry	791,037 791,379 791, <b>0</b> 23
Bagasse burning furnace, Ginaca & Keech. Barrel receiving and handling apparatus, Reynolds & Rose	791,367 791,274
Basin, wash, L. Lewis	
Reynolds & Rose Basin, wash, L. Lewis Battery. See Storage battery. Bearing, disk drill, J. Faust. Bearing, self-adjusting, A. Van Wormer. Bearing, self-aljining, I. Deutsch. Bearing, ventilator shaft, Carpenter &	791, <b>0</b> 18 791,059 791, <b>0</b> 86
Bearing, ventilator shaft, Carpenter & Baker	791,244
Bearing, ventilator shaft, Carpenter & Baker  Bed and cradle, combined folding, C. Bakrow  Bed, invalid, W. C. Sennett	791,069
Beds or other articles of furniture, frame- work and spring system for, J. H.	791,295
Bedstead D. W. Whitaker	791,297 791,388
Binder, temporary, G. C. Shepherd Blasting purposes, waterproof explosive cap for, Keith & Boyd	791,296
Blower and exhauster, rotary, T. W.	791,100 791 147
Green Boat or launch, J. C. Burcher Boat or launch, electric, H. Page Boiler blow-off mechanism, W. R. Mc-	791,147 791,242 791,285
Boiler blow-off mechanism, W. R. Mc- Keen, Jr.	791,358 791,281
Keen, Jr. Boiler setting, steam, M. J. McCarthy Booster sets, means for protecting, F. L. Sessions	
Bottle closure, H. S. Brewington	791,22 <b>0</b> 79 <b>0</b> ,882 791,097
Bottle drip receptacle, J. H. Jeriche Bottle, non-refillable, J. C. Condo Bottle stopper fastener, S. H. Patterson	791,136 791,1 <b>0</b> 8
Bottles, flasks, etc., manufacture of, C. Boucher Bottles or other vessels, stopper for, G.	<b>791,24</b> ●
West  Brake hanger, W. H. Wilkinson  Brake shoe, J. R. Cardwell  Brake shoe and step connection, combined  vehicle, F. A. Hawk  Breast drill, P. H. Jaegers  Brick machine, W. P. Grath  Brick or artificial stone, making, L. F.  Kwiatkowski	791, 661 $790,991$
Brake shoe, J. R. Cardwell	791,181
Breast drill, P. H. Jaegers Brick machine. W. P. Grath	791,419 791,267 791,262
Brick or artificial stone, making, L. F. Kwiatkowski	790.904
Kwiatkowski	791,007 79 <b>0,8</b> 97
Bronzing machine, M. Fritsche Brooder, poultry, E. F. Hodgson Broom and brush holder, J. Hutchinson	791,337 79 <b>0</b> ,898 791,422
Builder's block G I Roberts	791,053 791,291
Building block for cylindrical structures, F. T. Hellyer	791,194
Building block for cylindrical structures, F.T. Hellyer Building blocks, machine for the manufacture of hollow, F. W. Hagloch	791,417



Incorporated as a Stock Company by the State of New Jersey Home Office: NEWARK, N. J. "Awarded Grand Prize at St. Louis Exposition, 1904."

PROTECT YOUR HOMES AND PROPERTY. Badger's Fire Extinguisher will put out any kind of a fire at the start.



It rrints numbers consecutively, duplicates or repeats—changed instantly by turning pointer. To learn how it will save for you, send for Booklet 48 new. BATES MFG. CO., 31 Union Sq., New York CHICAGO—304 Wabash Avenue Factory, Orange, N. J.



Our Hand Book on Patents, Trade-Marks, etc., sent free. Patents procured through Munn & Co. receive free notice in the SCIENTIFIC AMERICAN

MUNN & CO., 361 Broadway, N.Y. BRANCH OFFICE: 625 F St., Washington, D.C.

### ANATOMY OF THE AUTOMOBILE

By "DR. DYKE"

Contains full descriptions and detailed mechanical evavings of ALL standard American automobiles and several types of foreign cars, Diagrams of Electrical Connections. Full descriptions and fracings of Successful air ships. Three Books in Sec. Over 700 pages and 800 illustrations. Invaluable to auto owner, operator, repairman, agent and intending purchaser. Price, postpaid, \$2.50. Send for our catalogue of auto supplies.

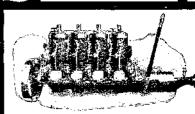
A. L. DYKE AUTO SUPPLY CO.
Olive and Walton Streets, - St. L



#### THE SUPPLEMENTARY SPIRAL SPRING

Absorbs all vibration. No joits or rebounds, Acts alike under light and heavy leads. Stanks the test, adds canfort and new delight to motering. Saves engine, tires and springs, will please you as hundreds of others. State make and model of your car.

4529 Delmar Ave., St. Louis, Mo.



## "It Beats the Devil"

A customer writes us as follows: "It beats the devil what a man will semetimes do to save mency. Two years ago I purchased an engine of —. The price was very low and I figured I would not be much out of pocket even if the engine was a failure, but I was wrong; I paid nearly twice the price of the engine trying to get satisfaction out of it. Neither could I get any satisfaction from the people who built the engine. I guess they figured they sold it so cheap they couldn't afford to pay postage answering my letters. Last year I was again attracted by auther 'something for nething' proposition and got sold again. I believe I new knew the difference between a cheap meter and a good one. A number of your machines are used in beats here on the river and I knew what they are. Send me your latest catalogue and I will place order within ten days for one of your 5 horse pewer double-cylinder engines."

The above letter is a fair sample of similar experiences that constantly come to our notice. Perhaps you are in the same boat. In any event, if you are interested in marine meters, send 10 cents in stamps and we will ferward our 34-page handsomely illustrated 1095 catalogue. Address Dept. W.

SMALLEY MOTOR CO., LTD., Bay City, Mich., U. S. A.

SMALLEY MOTOR CO., LTD., BayCity, Mich., U. S. A.

### The Buckeye Air-Cooled Engines



are fully warranted as to workmanship and material.

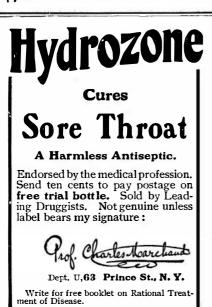
The Oscar Lear Automobile Co., COLUMBUS, OHIO.



## Do You Use Chucks?

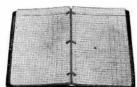
If so our catalogue will interest you. Sent free, New styles. New sizes. Liberal discounts.

SUPPLEMENTARY SPIRAL SPRING CO. THE CUSHMAN CHUCK WORKS Chucks Exclusively Hartford, Conn.





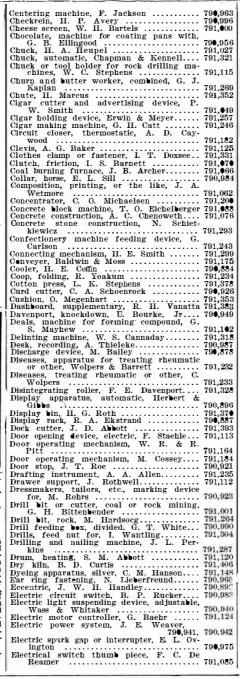
#### LOOSE LEAF BOOK



For Vest Pocket, Coat Pocket and Desk

Used by Business Men, Professional Men, Salesmen. Engineers, Draughtsmen—in fact every man should use the "Unimatic" Book for nemoranda, prices, costs and records of all kinds. Better than genuine black leather, fiexible; is perfectly flat opening and sheets may be instantly inserted or removed from any part. Twenty-eight sizes carried in stock. Five rulings, with or without index. Write for complete description, price list and sample sneets.

SIEBER & TRUSSELL MFG. COMPANY



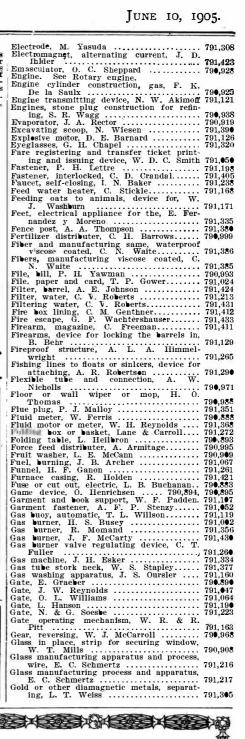


100 per cent. of our installations are successful.

Regenerated Cold Air Co. 88 Broad Street. BOSTON, MASS.







To be published on July 1, 1905: A NEW PUBLICATION entitled

### merican Homes Gardens SCIENTIFIC AMERICAN BUILDING MONTHLY



HIS new monthly magazine will be much broader in scope than its predecessor. It will have the word "HOME" for its keynote. The one to whom this word has no meaning will have no interest in this new publication. It is the intention of the Editor to take the reader with him to various parts of the country, and show him how the better class of people live, whether the house may have cost \$3,000 or \$300,000. Good taste is, perhaps, more necessary in the building and furnishing of a house of small cost than in a mansion of importance.

The Editor will not leave you on the outer doorstep, however, but will take you within, where you may see how the house is furnished and decorated, and how the owners live. Then you may have a walk through the garden, and then to the summer house, where, perhaps, the plan of the formal garden culminates.

There will be published articles on room decoration and furnishing, showing how the furniture may be arranged to produce the best effects, what pictures may be hung, and what bric-à-brac, inherited from some former mansion, may with advantage be discarded.

Each issue will contain an article on some important mansion, showing, if possible, various views of the exterior, the interior, and the garden. Plans are published with most of the residences shown.

The new publication will be issued monthly, and will be somewhat smaller in page size than the "Building Monthly," viz.: 10½ x14. It will have a handsome colored cover. It will have about 50 pages each issue. Price, 25 cents each issue; \$3.00 a year.

#### "SCIENTIFIC OFFER TO READERS OF AMERICAN SPECIAL THE

To any one subscribing before July 1, 1905, the subscription price will be \$2.50 for "American Homes and Gardens" for one year from July 1, 1905, to

To any one subscribing after July 1, 1905, the subscription price, without exception, will be \$3.00 a year.

Subscribe at once and obtain the most favorable terms.

COMPANY, Publishers, 361 Broadway, NEW

## Now Ready

## for Delivery

\*\*\*\*

#### Electricians' Handy Book

By Prof. T. O'CONOR SLOANE. 768 Pages. Nearly 600 Illustrations. Handsomely Bound in Red Leather, with Title and Edges in Gold. Price \$3.50



This thoroughly practical book of 758 pages covers the entire field of electricity. It contains no useless theory-everything is to the point, and readily understood by student or practical man. The advanced electrical engineer will also receive great benefit from its study. It is a work of the most modern practice Written in a clear, comprehensive manner, it covers the field thoroughly, but so simply that any one car understand it fully. It teaches you just what you need to know about electricity.

#### A Practical Work for Practical Men.

CONTAINS SPECIAL CHAPTERS ON

Mathematics.
Electric Quantity and Current.
The Electric Circuit. Ohm's Law.
Electro-Chemistry.
Primary Batteries.
Storage Batteries.
The Field of Force.
Magnets.
Induction.
Direct-Current Generators and Motors.
Direct-Current Armature
Winding.
The Direct-Current
Generator.
Armature Reactions.
Characteristic Curves.
The Direct-Current
Motor.
Open-Coil Generators. Motor.
Open-Coil Generators.
Generators and Motor
Construction.
The Alternating Current.
Alternating Current
Generators.

Alternating Current Motors.
Transformers
Management of Motors
and Dynamos.
Care of Dynamos and
Motors.
Station Notes.
Switchboards.
Voltmeters and
Ammeters Voltmeters and Ammeters. Distribution. Lighting Arresters. The Incandescent Lamp. The Arc Lamp. Photometry. Electric Railroads. Electrical Measuring Instruments. Electrical Engineering Measurements. Electric Meters. Telephony. Beil Wiring. Electric Meters. Telephony. Beil Wiring. Electric Heating Wireless Telegraphy.

#### American Tool-Making and Interchangeable Manufacturing.

By J. V. WOODWORTH. 544 Pages. 600 Illustrations. Price \$4.00

A practical treatise on the Art of American Tool Making and System of Interchangeable Manufacturing as carried on to-day in the United States. It describes and illustrates all of the different types and classes of small Tools, Fixtures, Devices and Special Appliances which are in general use in all machine manufacturing and metal-working establishments where economy, capacity, and interchangeability in the production of machined metal parts are imperative. It is a practical book by an American Toolmaker, written in a manner never before attempted, giving the 20th century manufacturing methods and assisting in reducing the expense and increasing the output and the income.

#### Gas Engines and Producer-Gas Plants.

By R. E. MATHOT.

320 Pages. Fully Illustrated. Price \$2.50

Gas Engines and Producer Design, the Selection and Installation of an Engine, Conditions of Perfect Operation, Producer-Gas Engines and their Possibilities. Th Care of Gas Engines and Producer-Gas Plants, with a Chapter on Volatile Hydrocarbon and Oil Engines Thoroughly up-to-date in its treatment of the subject, the work discusses at considerable length the generation of producer-gas and its utilization in gas engines No other book in English presents anything like as full a discussion of this most important phase of the gas engine. Indeed, no other book devotes even a chapter to producer-gas, despite the fact that it is the coming fuel for gas engines of high power.

The Any of these books sent prepaid on receipt of price. IFA special circular of these books will be sent to anyone on application

#### MUNN & COMPANY

Publishers of Scientific American,

361 Broadway,

_	Scienti	.110
,		790,955 791,029
	Golf ball, C. Davis	790,943 791,201
,	Gun carriage recoil brake, wheeled, •.  Lauber  Hemmer centrifugal. South & Pratt	791,347 790,930
•	Hammer, Camp, Z. L. Chadbourne	791,319 791,359 790,992
•	Hatchet attachment, J. • • • • • • • • • • • • • • • • • •	790,973 790,891 791,389
	Hay loader and stacker, Jenkins & Spairs Hay raker and loader, L. G. Shultz Heat generator and furnace, B. Hol-	791,190 791,375
	Heater. See Feed water heater. Heater, W. H. Jones	790,800 791,344
	Heating systems, heating water in hot water, C. C. Peck  Hide working machinery, J. W. Deckert  Wides skins or leather, machine for treat-	790,976 791,015
	Gun carriage recoil brake, wheeled, Lauber Hammer, centrifugal, South & Pratt. Hammer, centrifugal, South & Pratt. Hat fastener, roller, W. McNaughton. Hatch, L. Williams Hatchet attachment, J. • • • • • • • • • • • • • • • • • •	791,006 791,241 791,219
Ì	Hip strap drop and trace carrier, J. A. Buckstaff Hog trap, W. S. Schwartz. Holsting and power transmitting machine, D. Abrey Horse blanket, R. A. Seaders Hose coupling, J. F. McElroy Hose supporter, M. B. Hammond. Hose supporter device and corset steel lock, combined, M. H. Gerstle Hydrocarbon burner, P. J. • wens Ice mold, B. F. H. Keinke Icing, machine for coating biscuits or • ther articles with sugar, chocolate, or similar, H. Pecher Illuminating effects, apparatus for producing, • Junghans Incubator automatic cut-off, G. Evans. Indicator or sign, E. M. Skinner. Ink well, pen, and blotter holder and calendar, combined sheet metal, W. J. Dietrich Insect trap. G. Andrus	791,219 790,875 791,372
	Horse blanket, R. A. Seauers Hose coupling, J. F. McElroy Hose supporter, M. B. Hammond  device and corset steel	791,372 790,970 790,959
	Hose supporter described by the lock, combined, M. H. Gerstle	790,958 791,2 <b>0</b> 5 791, <b>0</b> 99
Ì	Icing, machine for coating biscuits or other articles with sugar, chocolate, or similar. H. Pecher	791,363
	Illuminating effects, apparatus 101 produc- ing, • Junghans Incubator automatic cut-off, G. Evans	790,9 <b>00</b> 791,188 791,221
	Indicator or sign, E. M. Sannie Ink well, pen, and blotter holder and calendar, combined sheet metal, W. J.	791,221 791,016
	Insect trap, E. A. Dolle	791,016 790,876 791,186
}	& Hein	791,364 790,886
1	Insulating support, third rail, E. w. rain ham Insulators, rail clip for third rail, G. L.	790,957 791,079
	Insulators, rail clip for third rail, G. L. & W. Courtenay Ioning machine, W. E. Andree. Jar cover, display, H. G. Roth Knitting machine feeding mechanism, straight, I. W. Lamb Lamp, acetylene gas generating, S. N. Rushee	791,079 701,395 701,432
	Knitting machine feeding mechanism, straight, I. W. Lamb	791,271 791,135
	Lamp, electric, R. Kuch	791,135 791,152 791, <b>020</b>
1	Lamp holder and head protector, miner's, Wantling & Doubet	791,231 791,276
'	Lamp regulating means, electric, A. G. Davis Lamp, street, R. Momand Lamps or gas heaters, preheating chamber	791,253 791,355
Ì	Lamp regulating means, electric, A. G. Davis Lamp, street, R. Momand Lamps or gas heaters, preheating chamber for gas, C. C. Malton Latch, L. C. Campbell Lath holding strip, N. Coleman Lathe appliance, A. T. Anderson Lathes, etc., indicator for, H. J. Nichols. Lathes, stub extractor for wood turning, W. E. Buxton	791,278 791,317 791,249 791,394
	Lathe appliance, A. T. Anderson Lathes, etc., indicator for, H. J. Nichols. Lathes, stub extractor for wood turning,	791,394 791,283 <b>7</b> 91,1 <b>7</b> 9
	Leather stoning out machine, J. W. Deckert Ledger, manifold pad, A. F. Schultz	791,014 791,294 791 254
	Life saving appliance, Dougherty & Wilkinson Ligature container, P. S. Bauer	791,255 791,128
}	Life saving appliance, Dougherty & Wilkinson Ligature container, P. S. Bauer Linotype machine, J. R. Rogers 791,165, Liquid dispensing apparatus, S. W. Moran Lock and latch, H. G. Voight Locking device, strap, S. J. •ford Locomotive boiler, E. Blass Locomotive cellar puller, J. F. Killian Log turning mechanism, W. M. Wilkin, reissue Loom for weaving Axminster or other pile fabric carpets, T. Cooper Loop coupling, W. Smith Lubricator, G. B. Stock Lubricator, T. Davis Lubricator, W. A. Hatcher Manhole and junction box, combined, Reed & McComiskey Massage machine G. F. Trotter	791,100 791,04 <b>0</b> 790.936
	Locking device, strap, c	791,239 791,€32
-	Loom for weaving Axminster or other pile	12,353 791,4 <b>0</b> 4
	Loop coupling, W. Smith Lubricator, G. B. Stock Lubricator, T. Davis	790,925 791,054 791,084
	Lubricator, W. A. Hatcher	791,418 791,289 791,058 791,222
	Match box, A. E. Smith	791,058 791,222 791,004
	Matrix assembling machine escapement mechanism, B. F. Bellows	791,131 791,130
	Measurer, skirt, A. T. Mccampoen Measuring device, cloth, Taylor & Church- well trousers. W. C. Mertz	791,280 790,934 791,039
	Measuring machine, electrical, F. J. Per- kins	<b>7</b> 90,917 791, <b>●</b> 46
	Metal working machine, C. Prouty  Metals, electrolytic deposition of, Harrison  & Day  Meter. See Fluid meter.	<b>7</b> 91 <b>,2</b> 88
	Meter. See Fluid meter. Meter dials, J. M. McPheeters Milk, cream, etc., treating, S. R. Kennedy.	791,044 791,27 <b>0</b> 790,913
	Molding apparatus, N. A. Austin  Molding apparatus, J. A. Brodin  Molding flask, J. W. Myers	790,918 790,948 791,177 791,041
	Motors, operating alternating current, A. Churchward	791,440
	for, W. Gaterman  Musical instruments, tracker for mechanical, T. Danquard	791, <b>€</b> 22 791,441
	Musical stringed instrument. L. C. Smith Necktie, H. Apfelbaum Noot hen's J. •'Dell	790,986 $791,123$ $791,105$
	Nickel from nickel bearing substances, ex-	501 00 <b>0</b>
	Weaver Nut lock, A. P. Steel Nut lock, J. E. Ford Nut lock, J. E. Ford	791,38. 791,051 791,258
	Nut lock washer, W. B. Neel  • liling device, R. Nelsen  • nion digger, Richards & Gerlach	791,360 791,369 791,073
	Packing, metallic, J. G. Smith Packing, piston rod metallic, F. E. Small	791,300 790,985
	tracting, H. A. Frasch  Nozzle for wet concentrators, jet, J. L.  Weaver  Weaver  Nut lock, A. P. Steel  Nut lock, J. E. Ford  Nut lock washer, W. B. Neel  oling device, R. Nelson  oling device, R. Nelson  oling device, R. Nelson  Packing, metallic, J. G. Callan  Packing, metallic, J. H. Smith  Packing, piston rod metallic, F. E. Small  Packing, piston rod metallic, F. E. Small  Paper feeding and controlling device, G.  W. Donning  Paper in autographic registers, etc., centering device for rolls of, E. J. Barker.  Paper recentacle, O. L. Parmenter  Paper, weatherproof, Bird & Moore  Parcel carrier box, C. F. Coleman  Pavement, F. E. Cudell  Piano action, A. Bergeron	791,187 790,998
	Paper recentacle, • L. Parmonter Paper, weatherproof, Bird & Moore Parcel carrier box, C. F. Coleman	791,362 791,312 791,077
	Parcel carrier box, C. F. Coleman Pavement, F. E. Cudell Piano action, A. Bergeron Piano fall board mechanism, W. P. Kelly Picture hanger, adjustable, B. G. Wallace.	191,420
1	Picture hanger, adjustable, B. G. Wallace. Piles or pipes, device for facilitating driv-	791,060 790,910
	Pipe joint, metal, C. C. Peck Pipe joint, wood, C. C. Peck Pipe stock reamer attachment, W. E. Eich-	791,063 790,977 <b>790,978</b> <b>791,409</b>
ı	Piping, elbow terminal for ventilation, D. F. Asbury	791,409 791,397 791,236
ı	Plate closing and riveting machine, hy-	791,236 791,162 791,161
П	draulic, H. A. Carpenter	791,074 791,141



SURREY, TYPE ONE 16-18 horse power, \$1350, other models \$750,\$500,\$2000,\$3000,\$3000,\$4000,



N May 1904 the Moxie Nerve Food Company of Boston bought one of our touring cars and Dadrove it over eight

thousand miles in the distribution of advertising literature.

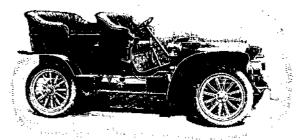
They spent but a trifle over five dollars for repairs during the entire season. [In March of this year they bought six of the model pictured here and have al ready increased their order. Their comments on our machines, together with the comments and ac counts of trips made by others, will be sent you on request. We will also tell you in detail why our machines are perfectly suited to American roads.

Main Office and Factory Kenosha, Wisconsin. Branches, Boston, Chicago, Philadelphia. New York ngeng, 124 West Thirty-eighth Street. Representatives in all other leading cities. THOMAS B. JEFFERY & COMPANY.

fumbia GASOLENE

18 H. P. and 35-40 H. P.

Are completely illustrated and described in the handsomest automobile catalogue ever printed. Sent free to any address on request.



10 H. P. Light Touring Car, 35-40 H. P. Touring Car, St 35-40 H. P. Touring Car, 11	andar	d. 10	8-inc	h whe		ase,	\$1,750 4,000
35-40 H. P. Royal Victoria, 35-40 H. P. Double Victoria.		т.мл	ں ایک	, عدي			4,200 5,000 5,000
35-40 H P Landaulet, 35-40 H. P. Limousine,	•	•		• .	•		5,500 5,500

112-inch wheel base Touring Car Bodies are interchangeable with Limousine Bodies. Touring Car Body, separate, \$750; Limousine Body, separate, \$1,800.

Special Catalogues of Columbia Electric Carriages and Columbia Electric Delivery Wagons and Trucks on application.

## ELECTRIC VEHICLE COMPANY HARTFORD, CONN.

134 West 39th St. NEW YORK

1413 Michigan Ave, CHICAGO

74 Stanhope St. BOSTON

Member Association Licensed Automobile Manufacturers.

MANY LIVES. "To guard against a bad mistake, The cyclist has the Morrow Brake," There never was an invention better calculated to be of benefit to the cyclist than the far-famed and now universally adopted

IN OKROW COASTER BRAKE

It protects both wheel and rider from danger, giving the latter supreme control over the machine even when coasting the steepest hill. Safety, simplicity and efficiency assured. All parts interchangeable. Chief parts cut from solid steel, giving great strength and lightness. No increased friction when pedaling. Only one chuck—the Forward Drive. Price \$5.00 complete. MORROW COASTER BRAKE

ECLIPSE MACHINE CO.,

Elmira, N. Y., U. S. A.

## **SAVE ONE THIRD**

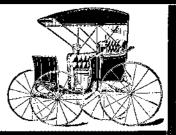
By Buying of the Makers

We are actual manufacturers—not a commission house. We can and do save our customers one third on retail prices by selling direct to user and cutting out all dealers? profits. All our goods carry our guarantee. Our free illustrated catalogue shows a greater assortment of carriages and harness than any dealer can show you. Send for it.

THE COLUMBUS

CARRIAGE AND HARNESS COMPANY,

COLUMBUS, OHIO.



## Celescope and Optical Mirror Making

In SCIENTIFIC AMERICAN SUPPLEMENTS, 1512, 1513, 1514, 1515. 1516, and 1517. Professor Ritchey of Yerkes Observatory has presented a most exhaustive account of the construction of a modern reflecting telescope, and the making and testing of optical mirrors. Here are some of the chapter headings:

Disks and Glass for Optical Mirrors; Grinding and Polishing Machines; Grinding Tools; Pelishing Tools; Rough Grinding the Face and Back of a Rough Disk of Glass; Grindingthe Eages of the Glass and Roundingthe Corners; Fine Grinding and Polishing the Back of the Mirror; Grinding the Concave Surface; Polishing: Testing and Figuring Paraboloidal Mirrors; Silvering; Mounting of a large Reflecting Telescope.

SCIENTIFIC AMERICAN SUPPLEMENTS cost ten cents each by

## Will Hair Grow?

### Ten Minutes' Test Will Tell



You can tell by a ten minutes' use of the Evans Vacuum Cap whether it is possible for you to cultivate a growth of hair and we will send you the Cap without expense on your part and let you determine this for yourself.



If the Vacuum makes

your scalp red and gives it a healthy glow, you can rest assured that by a reasonable use of the Cap you can cultivate a natural growth of hair. If, however, the scalp remains white and lifeless after applying the Vacuum, such a case would be a hopeless one, regardless of all the infallible hair restorers advertised.

If the gradual loss of hair and the baldness which follows were caused by DISEASE—physicians would have long ago found a remedy. Tonics and lotions applied to the outside of the scalp do soften the hair—but that's all. By exercising the arms, we build up muscle—not by outside application of medicine. The arms, the body and the lower limbs can be exercised at will—but the scalp requires mechanical aid. Exercise makes the blood circulate, lack of exercise makes it stagnant.

The Vacuum method is the kind of exercise that makes the blood circulate. It gently draws the pure and undiluted blood to the scalp and feeds the shrunken hair roots. This causes the hair to grow. It is the simple, common-sense principle of PHYSICAL CULTURE, applied to the scalp.

## Our Guarantee (Backed by the Bank)

We will send you by prepaid express, an Evans Vacuum Cap, allowing you ample time to prove its virtue, and all we ask of you is to deposit the price of the appliance in the Jefferson Bank of St. Louis during the trial period, subject to your own order. If you do not cultivate a sufficient growth of hair to convince you that this method is effective, simply notify the bank and they will return your deposit.

A sixteen-page book, illustrated, will be sent you free.

### **EVANS VACUUM CAP COMPANY**

625 Fullerton Building

St. Louis



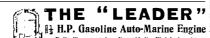
KLEINE OPTICAL CO. State Street, Chicago, Ill.

for flattening wire for all purposes Send for Catalogue.

**BLAKE & JOHNSON,** 

P.O. Box 7, WATERBURY, CONN.

SENSITIVE LABORATORY BALANCE SENSITIVE LABORATORY BALANCE.
By N. Monroe Hopkins. This "built-up" laboratory
balance will weigh up to one pound and will turn with a
quarter of a postage stamp. The balance can be made
by any amateur skilled in the use of tools, and it will
work as well as a \$125 balance. The article is accompanied by detailed working drawings showing various
staves of the work. This article is contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1184. Price 16
cents For sale by MUNN & Co. 361 Broadway, New
York City, or any bookseller or newsdealer.



Built like a watch. Beautifully Finished. Accurately Constructed. Light, Strong, Reliable and Noiscless in operation. Suitable for launchise from 18 to 18 feet in length. Price complete, \$76.00 met, no discount. Theroughly goar anked. Perfect Speed entirel. Complete descriptive catalogue upon application. 

CLAUDE SINTZ,

92 % Front St., Grand Rapids, Mich.



#### Moving Picture Machines Electrical Engineering

and Experimental Work of Every Description We have every facility for producing first-class work promptly. Our factory is equipped with modern machinery throughout.

C. F. SPLITDORF Engineering Dept. 17-27 Vandewater St., N. Y. City

## SUBSTITUTES FOR COAL

Are described from the technical standpoint in the following Scientific American Supplements.

Each Supplement named costs to cents by mail:

COMMERCIAL USES OF PEAT. SCIENTIFIC AMERICAN SUPPLEMENT 1324. The article enumerates the principal peat bogs and states their financial possibilities,

GERMAN BRIQUETTING MACHIN-LILY IN AMERICA. SCIENTIFIC AMERICAN SUPPLEMENT 1411. A valu-able economic report.

NEW ELECTRICAL PROCESS FOR THE MANUFACTURE OF PEAT FUEL. SCIENTIFIC AMERICAN SUPPLEMENT 1492. The paper fully describes the Bessey process. LIGNITE, PEAT, AND COAL DUST FUEL. SCIENTIFIC AMERICAN SUPPLE-MENT 1426. A careful consideration of German methods.

MOOR CULTIVATION AND PEAT INDUSTRY IN GERMANY. SCIENTIFIC AMERICAN SUPPLEMENT 1481. An excellent critical review.

OMESTIC COKE AND BRIQUETTES FROM RETORT COKE OVENS, By R. M. Atwater, Scientific American Supplement 1211. A valuable monograph by an expert.

THE WHITE MINERAL PRESS FOR BRIQUETTING. SCIENTIFIC AMERICAN SUPPLEMENT 1224. An article describing and illustrating an American briquetting machine.

Price 10 cents each, by mail.

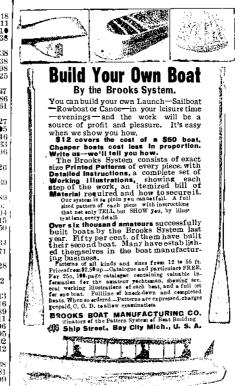
Order through your Newsdealer or from MUNN & COMPANY

361 Broadway

NEW YORK

Poweer, apparatus for the manufacture of strips of explosive, F. I. du Pont. 790,918
Powder die, A. F. du Pont. 791,111
Press, W. J. H. Fetters ... Davis 791,412
Printer and supplier, paper, G. H. E. Davis 791,135
Printer's wood berders, machine for making, Caldwell & Root ... 791,438
Printer's wood berders, machine for making, Caldwell & Root ... 791,038
Pulley. Sash, A. Johnston ... 791,038
Pulley. Sash, A. Pearson ... 791,226
Pump valve seat, removable, P. Heltzmann ... 790,095
Pump valve seat, removable, P. Heltzmann ... 790,295
Pump valve seat, removable, P. Heltzmann ... 791,226
Rails, device fer preventing the creeping of, H. Davis M. Palley. ... 791,233
Rail moving apparatus, switch, M. D. Hanton, ... 791,233
Rails or shapes, manufacture of manganese
steel, R. A. Hadfield ... 791,233
Railway fleek signal system, F. E. Button 791,335
Railway fleek, Signal system, F. E. Button 791,335
Railway fleek signal system, F. E. Button 791,336
Railway fleek, Signal system, F. E. Bu Railway safetty rod, B. Sargent 791,371
Railway signal or alarm, electric, E. L. & J. W. Tatum 791,228
Railway strain device, electric, Davis & Varney 791,012
Railway supporting and strain device, electric, Davis & Varney 791,013
Railway switch, Gray & Smith 791,416
Railway tie, P. Garrisso 790,889
Railway tie, J. R. McFall 790,911
Railway tie, J. E. Owens 791,196
Railway tie, J. E. Owens 791,196
Railway tie, J. R. McFall 790,911
Railway trains, automatic stop mechanism for, G. B. Griskoski 791,202
Railway trains, automatic stop mechanism for, G. B. Griskoski 791,391
Receiver or cath basin, J. M. Thompson 791,391
Received or cath basin, J. M. Thompson 791,391
Received or cath basin, J. M. Thompson 791,391
Received corned from expanded sher material, J. Samuels 790,922
Reilway trains, automatic stop mechanism for, G. B. Griskoski 791,292
Regulater. See Sand blast regulator. Ringing generator, J. C. F. Malthaner 791,197
Regulater. See Sand blast regulator. Ringing generator, J. C. F. Malthaner 791,277
Riveting and plate clesing machines, pneumatic attachment for, H. A. Carpenter 791,405
Roofe cellar and flashing, melded, L. C. Baker 791,408
Roofe cellar and flashing, melded, L. C. Baker 791,408
Rotary engine, W. C. Welfe 791,392
Rotary engine, S. J. Lawrence 791,408
Rotary engine, S. J. Lawrence 791,316
Safe alarm, mechanical, E. Rebischung 790,822
Rotary engine, W. C. Welfe 791,316
Safe alarm, mechanical, E. Rebischung 790,822
Sand blast regulator, F. W. Breidster 791,176
Sand meld slip ever bex, W. E. Rock 791,214
Sash frame, metallic window, E. G. Budd. 791,337
Saw, F. A. Wuest A. 790,947
Saw gumming machine, F. Stahl 791,078
Sewer trap flushing device, S. A. Johnson 791,078
Sewer trap flushing device, S. A. Johnson 791,005
Sewing machine, J. C. Steen 791,125
Sheet astening, L. Duvel 791,325
Sheet sterner, Stringham & Zell 791,337
Sheet pook, H. P. Macdenald 191,153 to 791,168
Shifting device, automatic, G. B. Petsche 791,138
Signal transmitter indicator, G. W. Levimer 790,942
Sheet indicator and time register imiting device, electric, B. G.

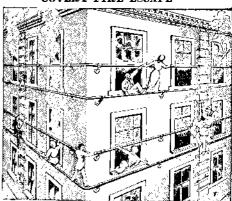
Speed limiting device, electric, B. G.
Barlow 791,435
Spike, C. Shalfer 791,373
Spindle, M. Subber 791,169
Spindle, A. S. Brewne 791,373
Spindle, A. S. Brewne 791,343
Spindle, A. S. Brewne 8 Burlin 791,244
Spindle forging machine, Owen & Burlin 791,244
Spinning machine thread guide attachment,
G. A. Fredenburgh 791,259
Spinning machine yarn controller, J. O'Sullivan 791,361
Sprocket wheel, drive chain, J. M. Dedge 791,329
Squib, sectional, J. R. Pewell 791,211
Stage effects, apparatus for the production
ef, M. Fertuny 791,336
Stair, F. A. Winslew 791,095
Stand pipe, C. Gulland 791,093
Static machine stationary plate, B. E.
Baker 791,315 Stank pipe, C. Gulland. 791,093
Static machine stationary plate, B. E. Baker 791,310
Steam shevel, G. W. King et al. 791,310
Steam strap, F. T. Bailey et al. 790,877
Steel, manufacture of, J. Vernon. 791,176
Steel, manufacture of, J. Vernon. 791,177
Steel, manufacture of, J. Vernon. 791,177
Steel, manufacture of, J. Vernon. 791,175
Still, water, E. B. Keith. 700,901
Stool, automatic store, J. Jamesen. 791,268
Stone saw, A. H. MacNutt. 791,157
Stop for feed mechanisms, adjustable, S. 14. Leavenworth 791,355
Stive, gas, Bresson & King. 790,881
Stive, gas, Bresson & King. 790,881
Stive, heating, Wolf & Loughnane. 791,395
Store or range, D. D. Berry. 791,400
Strainer, fried cake, J. Ramsey. 791,212
Street sweeper, J. A. Paige. 791,206
Stropping machine, S. T. Kane. 791,346
Supfacting machine attachment, W. C. Averill
Surgeon's needle holder, H. Clayton. 791,322
Switch operating mechanism, Waldo
Forst of Synchroneus machine control, J. B. Tayler. 790,989
Synchroneus machine control, J. B. Tayler. 790,989
Synchroneus machine control, J. B. Tayler. 790,989
Telegraph key and switch, T. J. McAdams. 791,981
Telegraphic cipher codes, marginal and sub-index for, E. Peycke. 791,203



#### SAFETY IN CASE OF FIRE

in all hetels, hospitals, asylums, theatres, churches, schools, factories and all public buildings, as well as private residences, is doubly assured when these structures are equipped with the

COVERT FIRE ESCAPE



Each room and window is previded with a safe and permanent means of egress, abunding the rushing through smoky or burning halls and consequent dangers to life and limb. Any number of people can escape easily and quickly by the new method. Best and most economical fire escape system ever devised. For circulars and full particulars, address.

COVERT FIRE ESCAPE CO., . TROY, N. Y.

### Road Freighting Traction Engines



Over 200 in use on Pacific Coastalone. Siberia, iin, India, Central America, Sandwich Islands

THE BEST MFG. COMPANY San Leandro, California

Cable Address, DANBEST. Write for our New Codes, Western Union and McNiel. Catalogue No. 18.



THE ONLY AUTHENTIC EDITION OF

### COLLEGE SONGS

These collections contain the somes artually some at each institution. They include all the favorite glee club and the rousing football somes, many of which have been passed down to the present classes by ear alone and appear here in print for the first time book is handsomely hound in serviceable club. 

OLIVER DITSON COMPANY, BOSTON

C. H. DITSON & CO., New York. J. E. DITSON & CO., Phila. LYON & HEALY, Chicago. Order of Your Home Dealer or the Above Houses.





A MONEY MAKER
Hollow Concrete Building Blocks,
Best, Fastest, Simplest, Cheapest
Machine, Fully guaranteed.
THE PETROV



The lightness and porosity of our Summer Weights secure the body against the clammy feel of a perspiration-soaked underwear.

NEW YORK: 306 Fifth Ave., 157 Broadway. BROUKLYN: 504 Fulton St. BOSTON: 228 BOYISTON St. PHILADELPHIA: 1510 Chest-nut St. CHICAGO: 52 State St. Agents in all Principal Cities



### Facts for men who Shave, or get Shaved, or deal in Shavers' Supplies

For Home, Store and Street
We also manufacture Table Lamps,
Wall Lamps, Chandelers, Street
Lamps, Etc. 100 Candle Fower
seven hours ONE CENT. No
Absolutely cafe The SELL AT SIGHT.
Exclusive territory to good agents.

Chicago Solar Light Co. Dept G, Chicago

A recent careful investigation covering the entire country, made by two of the largest advertisers in America who manufacture goods for shavers, showed that JUDGE was on file in more than 75 per cent. of all the desirable barber-shops.

JUDGE is read until there is nothing left but the file.

In the case of advertiser No. 1, the renewal calls for just double the space on the last order (2,500 lines). Advertiser No. 2, who had never before used JUDGE, placed an order for nearly Two Thousand Dollars (\$2,000.00).

#### A word to the wise Shaver or Shavee should be sufficient.

If you deal with JUDGE you will not get shaved.

Very truly yours,

B. C. EVERINGHIM,

Advertising Man

225 FOURTH AVENUE, NEW YORK



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. Oldestagency 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, \$8 a year; four months, \$1. Sold by all newsdealers. MUNN & CO.361 Broadway, NewYork Branch Office 625 F St. Washington, D.C.

Water cooler equipment, J. T. Cole, resissue
issue
Water heater, instantaneous, J. A. & A.
F. Mustee
Water motor, C. L. Wilkins
Water tube steam boiler, J. D. Bowne
191,307
Water tube steam boiler, J. D. Bowne
191,314
Wave motor, T. Panb
Weed destroyer. W. Gaterman
191,436
Weighing apparatus, F. J. Heybach
Weighing machine, autornatic, G. Prokofiew
Wheel guard, go cart, J. C. Condo
190,885
Wind instrument attachment, E. Kreutzberg
Window cleans DESIGNS.

Clock case, T. B. Stephenson, Jr.... 37,448, 37,449 Fabric, printed textile, E. B. Vandergaw, 37,452, 37,453 

#### LABELS. "American Prince," for baking powder, H.

"American Prince," for baking powder, H. Hunter
"Breakfast Cocoa," for cocoa, F. Bischoff. 12,160
"Buster Brown," for confectionery, Homestead Confection Co. 12,166
"Christy Hoe Safety Razor," for safety razors, R. J. Christy Co. 12,186
"Clipper Hanger," for clipper hangers, Clipper Mage, Co. 12,183
"Fancy Ceylon," for tea, Wilmanns Bros. 12,161 "Clipper Hanger," for clipper hangers, Clipper Mfg. Co.
"Fancy Ceylon," for tea, Wilmanns Bros.
Co.
"Harrington Wearproof Sole," for soles, Harrington & Co.
"Hoffman's Hair Tonic," for hair tonic and antiseptic dandruff cure, R. H. Hoffman 12,173
"Home Run," for cigars, H. F. Kohler. 12,163
"Jerry Murphy," for whisky, Fessler & Dunkelberger
"Kowntit," for beer, Meyercord Co. 12,163
"Paragon," for beer, Meyercord Co. 12,163
"Paragon," for beer, Wilmanns Bros. Co. 12,162
"Phospho Sumbul Comp." for medicine, Lenox Chemical Co.
"Prophylactic Tooth Brush," for tooth brushes, Florence Mfg. Co.
"Sa (Not Tear) B E Safe-T-Lu-Pin," for looped plins, E. M. Silberman.
"Save the Baby," for croup specific, W. W. W. W. E. W. Save the Baby," for croup specific, W. W. W. W. Chemann, Silk," for light silks, Friedman & Johnstone
"The H. & O. Comfort Shaving Cream," for shaving cream, B. C. Hanford. 12,175
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence Mfg. Co.
"The 'Keepclean' Tooth Brush," for tooth brushes, Florence

### PRINTS.



Northern Manufacturing Company

Detroit, U. S. A.

Member Association Licensed Automobile Manufacturers

#### THE MIETZ & WEISS



Sizes from 1 to 60 H. P. OIL ENGINES Operated by Kerosene fil, Fuel Oil, Send for Distillate. Safest, Simplest, Most Catalegue. Economical and Most Reliable Power on the market. Highest award for Direct Completed in Engines and Generator, Units Exposition, 1900. Gold Meedia, Fan Exposition, 1900. Gold Meedia, Fan Carpestion, 1900. Gold Meedia, 1900. Gold M

AUGUST MIETZ 128-13 Mott St., New Yerk, Catalegue Dept. 24.

SILENT MUFFLER Excels all muffers because the sisse serve and according to the sisse. A vacuum is created between the created between the chaust valves and the muffler, which draws the burnt gases from the cylinder, and backtastaleg and price.

### THE MIDGET DYNAMO OR MOTOR





### PLUMBING SCHOOLS



#### A BOY'S **SUMMER**

For a growing boy there is no summer outing equal to the navalcourse at Cuiver. 119 boys from 21 States last season. For illustrated booklet, address

The Headmaster
CULVER NAVAL SCHOOL
Culver, Ind. (Lake Maxinbuckee)



#### SPRINGFIELD ABRASIVE POLISHING WHEELS AND BLOCKS.

WHEELS AND BLOCKS.
Used for polishing machinery, cutlery, and edge tools of all kinds and for removing rust spots from highly polished metal. Makes a very smooth surface without marring. Containing rubber whoth gives it the resilient effect. Made with either Emery or Carborundum in different grades. Write for price list and special trade discounts.

The Springial Live and Rubber Co.

The Springfield Tire and Rubber Co., SPRINGFIELD, OHIO, U. S. A.



### THE OBER LATHES



For Turning Axe, Adze, Pick, Sledge, Hatchet, Hammer, Auger, File, Knife and Chisel Handles, Whiffletrees, Yokes, Spotes, Porch Spindles, Stair Baiusters Table and Chair Legs and other irregular work. work.

Send for Circular A. The Ober Mfg. Co., 10 Bell St.. Chagrin Falls, O., U.S.A.

DIES AND STAMPINGS TO ORDER

Corliss Engines, Brewers' Machinery. THE VILTER MIFG. CO. 829 Clinton St., Milwaukee, Wis

MODELS & EXPERIMENTAL WORK.

Inventions developed. Special Machinery.

E. V. BILLAARD. 24 Frankfort Street. New York.

Dies, Tools, Models and Special Machinery, Standard and Special Machinery, Standard and Special Machinery, Standard Machinery,

BALLOONS Aeronaut L. Stevens, Box 181 Madison Sq., N. Y. DRYING MACHINES. S. E. WORRELL Hannibal. Mo.

MODELS CHICAGO MODEL WORKS

179 E MADISON ST CHICAGO, ILL

ESTABLISHED 1867 B WRITE FOR CATALOGUE OF MIDDEL SUPPLIES

MODELS, DIES AND TOOLS Repairing of machinery. Brass novelties and metal articles made under contract or on royalty. LOVINGTON MFG. CO., Lovington, Ill.

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

## MODELS & MYENTIONS PERFECTED UNION MODEL WORKS

Transportable, Tempering and Annealing Furnaces Burning Coal. Firms manufacturing such are requested to send prices and drawings under heading L. A. 2592, to RUDOLF MOSSE, Leipzig.

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

MODEL AND EXPERIMENTAL WORK. EDWARD KLEINSCHMIDT, 82 W. Broadway, New York



EXPERT AND DIE MAKERS

Moulds, Models, Experimental Work INSTRUMENT MAKING and SMALL MACHINERY THOS. H. HART & Co., Charlestown, Ma

## AUTO STORAGE BATTERIES THE WILLARD STORAGE BATTERY CO. CLEVELAND.

PRINTS.

"Fan Base Ball Score Card," for score cards, T. I. Schultz.

1,333

"Mother and Child," for tonic vermifuge, Dr. D. Jayne & Son.

1,332

"On Sale," for beer, Meyercord Co.

1,335

"The Wheel of Progress," for automobiles

J. F. H. Fechtenburg.

Cards," for playing cards, United States.

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in the foregoing list, or any patent in the foregoing list, or any patent in print issued since 1863, will be furnished from this office for 10 cents, provided the name and mumber of the patent desired and the date be given. Address Munn & Co., 361 Broadway, New York.

Canadian patents may now be obtained by the inventors for any of the inventions named in the foregoing list, For terms and further particulars address Munn & Co., 361 Broadway, New York.

PLUMBING SCHOOLS

WANTED-Men and boys to learn plumbing trade to the play of the course of the patent of the course of the patent of the patent of the patent desired and the date begine of any patent in the foregoing list, or any