## 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. "U. S." Metal Polish. Indianapolis. Samples free. Yankee Notions. Waterbury Button Co., Waterb'y, Ct.

Handle & Spoke Mchy. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.

Gear Cutting of every description accurately done. The Garvin Machine Co., Spring and Varick Sts., N. Y. Ferracute Machine Co., Bridgeton, N. J., U.S. A. Full line of Presses, Dies, and other Sheet Metal Machinery. The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foct of East E8th 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.

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 CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated: correspondents will bear in mind that some answers require not a little research, and, though we encieavor to reply to all either by letter or in this department, each must take his turn.

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

Special Written information on matters of personal rather than general interest cannot be expected without remineration.

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

Books referred to promptly supplied on receipt of price.

Ninerals sent for examination should be distinctly.

price.

Ninerals sent for examination should be distinctly marked or labeleo.

(7818) E. A. writes: I have an experimental-science book on electricity bought from you and would like to know if you could give me a few explana-tions about caustic potash batteries, page 408, Fig. 404, illustrated. I would like to know if possible the propor tion for making this battery, how much zinc, oxide of copper and potash solution. Is it good for sparking purpose? A. The zinc may be of any size you find convenient. The potash solution is to be saturated, that is dissolve all the caustic potash in the water which you can, at ordinary temperature. The copper oxide may be put on the bottom of the cell to the depth of an inch or so. Proportions are not important, else they would have been given in the book. You would better buy the Edison-Lalande cell, which is an improved form of this cell. It is widely used for sparking purposes.

(7819) C. L. says: I want to get a preparation of gums or some sticky material to use in this manner in tableting sheets of paper, spread thinly on cloth and dried; when wanted, to be wet with water in sponge and applied to the end of tablet, where it will hold every sheet, yet allow them to be torn off and will remain flexible. A. The composition is said to be prepared as follows: Glue, 4 lb.; glycerine, 2 lb.; linseed oil, ½ lb.; sugar, ¼ lb.; aniline dyes, q. s. to color. The glue is softened by soaking it in a little cold water then dissolved together with the sugar in the glycerine, by aid of heat over a water bath. To this the dyes are added, after which the oil is well stirred in. It is used hot. Another composition of a somewhat similar nature is prepared as follows: Glue, 1 lb.; glycerinc, 4 oz.; glucose sirup, about 2 tahlespoonfuls; tannin, one-tenth oz. Give the compositions an hour or more in which to dry or set before cutting or handling the pads.

# TO INVENTORS.

An experience of fifty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable 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, 361Broadwav. New York.

# INDEX OF INVENTIONS OVERHEAD

For which Letters Patent of the United States were Issued for the Week Ending

JANUARY 23, 1900,

AND EACH BEARING THAT DATE.

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

Adjustable bracket, T. Smith	641.748
Adjustable cutter, A. A. Glaser	641 855
Advertising device, car. W. Keys	
Advertising refrigerator, Young & Thompson	
Advertising refrigerator, roung & Inompson	. 041,917
Aermotor, multiple, S. Otis	. 641.795
Air compressor, hydraulic. L. E. Mitchell	. 641,981
Alarm. See Burglar alarm.	
Amalgamator, H. M. Thompson	. 641.808
Antiseptic apparatus, J. A. Merritt	641715
Auger, earth, J. Herfert	
Auger, earth, J. Herrert	. 041,300
Axle for automobile vehicles, combined driving	5
and steering. J. H. Bullard	641,844
Axle lubricator, dust guard, and wiper, car, J. S.	
Patten	. 641,723
Back pedaling brake, A. P. Morrow	
Bag. See Letter carrier's bag.	. 021,000
	640.010
Bailer or pump, R. B. Shaw	. 042,012
Balance, spring, R. H. Forschner	. 641,686
Ball coupling, reversible, C. N. Hunter	. 641,700
Banjo, R. Kuenstler.	641.709

## Advertisements.

ORDINARY RATES. Inside Page, each insertion. - 75 cents a line Back Page, each insertion. - 51.00 a line For 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 ine, nd 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.



# NGINE & FOOT MACHINE SHOP OUTFITS, ATHES. SEBASTIAN LATHE CO. 20 COLUNE TE ST

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

Foot and Power and Turret Lathes, Planers, Shapers, and Drill Presses SHEPARD LATHE CO., 133 W. 2d St., Cincinnati, O

# Stick to It and Win

Wedo not advise you to change your business to succeed. Increase your knowledge rather than become "a rolling stone," and rise quickly to a high salaried position. We have sent thousands of young men and women to prosperity through



**EDUCATION BY MAIL** in Electrical, Mechanical, Steam, Min-ing and Civil Engineering; Metallurgy, Art, Architecture, Practical Newspa-per Work, English Branches, Steno-graphy, Machine Design and Mechan-ical Drawing. Low price; easy terms. Mention subjects interested in when

The United Correspondence Schools, 154-56-58 Fifth Avenue, New York, for Catalogue No. 33.

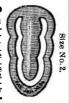


CUNSMITHS, Too MAKERS, EXPERIMENTAL AND REPAIR WORK, ETC. Send for Illus. Catalog.

W. F. & Jno. Barnes Co 1999 Ruby Street, ROCKFORD, ILI

THE EUREKA CLIP

The most useful article ever invented for the purpose. Indispensable to Lawyers. Editors, Students, Bankers, Insurance Companies and business men generally. Book marker and paper clip. Does not mutilate the paper. Can be used repeatedly. In boxes of 100 for 25c. To be had of all booksellers, stationers and notion dealers, or by mail on receipt of price. Sample card, by mail, free Manufactured by Consolidated Safety Pin Co., Box 121, Bloomfield, N. J.



# ARMSTRONG'S PIPE THREADING



CUTTING-OFF MACHINE

Both Hand and Power.
Sizes 1 to 6 inches.
Water, Gas. and Steam Fi
ters' Tools. Hinged Pipe Vise
Pipe Cutters. Stocks and Di
universally acknowledged to
THE BEST. 12 Send forcatalo THE BEST. Les Sena jorcatado
THE ARMSTRONG MFG. CO
Bridgeport, Conn.

# The Forbes Patent Die Stocks for Hand Power

Ten inch pipe cut off and threaded by one man with ease.

Send for Catalogue

CURTIS & CURTIS,



**Patent Carrying Track** 

TRAMWA I
for Mills, Foundries, Machine Shops, or for
Merchandise. Send for Book.

Cohum Trolley Track Mfg. Co., ... HOLVOKE, MASS ...



CARDS, etc. \$5 PRESS Circular or Small Newspaper Press \$18. Typesetting easy. Money maker or saver. Send stamp for catalogue, presse, type, paper, etc. THE PRESS CO., Meriden. Coun.

OWN



	American.	
Ī	Bath cabinet, folding vapor, F. B. Losee	-
- [	Bath cabinet, folding vapor, F. B. Losee         541,719           Bearing, crank hanger, H. Beest on         641,667           Bearing, roller, B. F. Barnes         641,819           Bed, folding, J. J. McIntyre         641,863           Bed, sofa, H. R. Kuersten         641,863	F
e	Bed, Sora, H. K. Kuersten	
اية	Beer, carbonating, J. F. Wittemann   641,748	1
t 2.	Belt, endless, J. Collins. 641,841 Bicycle, E. Y. White. 641,914 Bicycle brake, V. Rehm. 642,001 Bicycle gear, high speed, W. W. Lower. 641,980 Bicycle driving mechanism, T. C. Robinson, 641,789, 641,789	a
e	Bicycle driving mechanism, T. C. Robinson, 641,729, 641,729 Bicycle driving mechanism, J. Shellabarger 642,013	ľ
- 1	Bicycle driving Mechanism, J. Shellabarger	
1	Boat detaching apparatus, A. May 641,714 Bolt, H. C. Hart. 641,956 Ropus indicating machine C. D. C. Huestis 641,866	
1	Bin. See Grocer's bin. Binder attachment, W. L. Muender	0
	Box. See Cigar box. Miter hox. Box, A. C. McCandless	2
1	ner	A
	Bracket. See Adjustable bracket. Braiding machine, T. K. Ober	ou
	Brake. See Back pedaling brake. Bicycle brake. Car brake. Carriage brake. Vehicle brake Brick making machine, F. C. Norris. 642,023 Buckle, hame tug, E. Maues Brick making machine, F. C. Norris. 642,023 Buckle, hame tug, E. Maues Building construction, Donaldson & Borgner. 641,942 Building for amusement. etc. H. Clay. 641,843 Burglar alarm, Spencer & Pethick. 641,902 Burnel apparatus, Kinney & Barnard. 641,773 Burner. See Hydrocarbon burner. 641,802 Burner, W. Scott. 641,802 Button, Hall & Griffith. 642,040 Button and button fastener, E. A. Griffith. 642,040 Button and button fastener, O. W. Ketchum. 641,778 Button stick and cleaning shield, Curtiss & Curtiss, Jr. W. D. Easley Canpy, I. E. Palmer. 641,837 Car brake, P. S. Kingsland. 641,972 to 641,873 Car brake, P. S. Kingsland. 641,972 to 641,974 Car brake, P. S. Kingsland. 641,972 to 641,674 Car brake, P. S. Kingsland. 641,873 Car card holder, freight, D. P. Cory. 641,674 Car for use in warfare, motor driven, F. R. Simms. 641,873 Simms. 641,879	9
	Building construction, Donaldson & Borgner	-
1- 8.	Burigiar alarm, Spencer & Pet hick	can Fo it i
Ď.	Burner, W. Scott	FA
l	Button and button fastener, E. A. Griffith	Ph
1	tiss, Jr. 641,676, 641,677 Cane header, W. D. Easley 641,943 Canopy, I. E. Palmer 641,883	G
ı	Car bolster, C. E. Bauer	ST
I	Car card holder, freight, D. P. Cory	G/
1	Simms	E.
		E
1	colai. 641,791 Carbonating liquids, means for, H. S. Ferry. 641,680 Carriage, baby, C. Dilling. 641,680 Carriage brake, cbild's, H. Thomsett. 642,019	
	Carriage brake, child's, H. Thomsett. 642,019 Case. See Show case. Casting mold G. P. Reseatt Ir. 642,025	THE REAL PROPERTY.
	Cattle guard, J. H. Threikeld. 631,740 Centrifugal machine, H. Hueschen. 641,773 Chair et tachmach and the Common 641,773	
-	Chair attacement, recking, C. Chausen	
	Churi, E. Burk. 641,853 Cigar, F. C. Reed. 642,000 Cigar box, M. Blaskower. 641,757	Si
L	Carriage brake, child's, H. Thomsett.         642019           Case. See Show case.         642085           Casting mold, G. P. Bassett, Jr.         642085           Cattle guard, J. H. Threlkeld.         641,740           Centrifugal machine, H. Hueschen.         641,740           Chair attachment, rocking, O. Clausen         641,761           Chair flxture, reclining, W. J. Seng.         642,010           Chopper.         See Cotton chopper.           Churn, E. Burk.         642,000           Churn, E. C. Reed.         642,000           Cigar, F. C. Reed.         642,000           Clamp. See Dental clamp.         642,021           Clamp. See Dental clamp.         642,021           Cleaner.         See Display clasp.           Cleaner.         See Grant cleaner.	31
I- R	Clasp. See Display clasp.         642.026           Cleaner. See Grain cleaner.         642.026           Cloth piler, J. B. Barton.         641.921           Cock, blow off, W. McIntosh.         641.920           Collar, H. L. Gulline.         641.930           Compound en gine. H. C. Clay.         641.762           Cowker, steam. C. E. Swartzbaugh.         641.762           Coy skewer holder. J. V. Cunniff.         641.765           Cotton chopper. R. W. Kirby.         641.765           Cotton stalk pulling machine, G. H. Brush.         641.830           Coupling. See Ball coupling. Hose coupling.         1 hill coupling.	Fo
	Collar, H. L. Gulli ne	
0. L.	Conpound engine, H. C. Clay. 641.752 Cooker, steam, C. E. Swartzbaugh. 641.753 Cop skewer holder, J. V. Cunniff. 641.765	N
-	Cotton enopper. R. W. Kirby	_
	Thill coupling.  Cracker or biscuit machine, F. M. Peters. 641,724, 641,725  Cream separator, E. P. Doty	
Size	Tanneoupinis.  Cracker or biscuit machine, F. M. Peters. 641,724, 641,725 Cream separator, E. P. Doty. 641,849 Creamseparator, Hendrickson & Kimball. 641,959 Crushing mill, T. L. & T. J. Sturtevant 642,016, 642,017 Cultivator, W. R. Salisbury. 641,731 Cultivator, S. E. Spencer. 642,014	*
No. 2.	Current motor, submerged, R. E. Hardaway 641,695	His.
	Cycle driving mechanism. M. E. Bollinger 641,926	**
	Dental clamp, W. I. Brusham.   641.672     Desk pad, I. Sainberg.   641.844     Dish cleaning apparatus, J. W. Wright.   642.032     Dish pad pagaratus, J. W. Wright.   642.032     Dish play clasp for garments. Benner & Plock.   641.673     Domino, Bloomingdale & Kenyon.   641.823     Door. S. S. Colt.   641.844     Door. Corbin & Henry   641.844     Corbin &	0
G	Display clasp for garments. Benner & Plock. 641.669 Domino, Bloomingdale & Kenyon. 641.823 Door. S. S. Colt. 641.823	0
S	Door, Corbin & Henry 641.844 Door, C. H. Cramer 641,675 Door hanger track and weather shed, combined,	0
t- es. ies	Domino, Bloomingdale & Kenyon.   641.823	***
be g.	Drier. See Frune drier. Drill. See Grain drill. Driving mechanism. S. N. Rapp	0
). —	Driving mechanism. S. N. Kapp. 641.691 Drum, A. G. Soistmann 641.901 Dust collector. E. R. Draver. 641.801 Dye, fast brøwn. Green & Meyenberg. 641.804 Dyes. making fast brown, Green & Meyenberg. 641.954 Dyes. making fast brown, Green & Meyenberg. 641.952 Edge triuming machine. C. G. Belmer. 641.822 Educational appliance or game. T. E. Thompson. 641.738 641.738	1
	Dyes, making fast brown, Green & Meyenberg 641,953 Edge trimming machine, C. G. Belmer	
	641,738, 641,739 Educational or similar device, C. A. Evans	П
	Educational or similar device, C. A. Evans. 641,738, 641,738 Ejector, I. E. Miller. 642,046 Ejector, I. E. Miller. 642,046 Ejectric arc heating and apparatus therefor, metbod of H. Drosse. 641,767 Electric foot battery, D. W. Prosser. 641,850 Electric lighting apparatus, G. Heidel 641,857 Electric machine. dynamo, W. L. Emmet. 641,857 Electric switch, quick break, Bossert & Holton. 641,957 Electrical distribution system, C. P. Steinmetz. 641,957 Electrical furnace, downdraught, R. H. Laird. 641,976 Electrolyzing apparatus, W. Barnes. 641,820 Engine. See Compound engine. Gas engine. Gasolene engine. Rotary engine. Traction engine.	
•	Electric lighting apparatus. G. Heidel	
ne ch	Electrical distribution system, C. P. Steinmetz 641.903 Electrical furnace, downdraught, R. H. Laird 641.976 Electrolyzing apparatus W. Barnes	1
ly	Engine. See Compound engine. Gas engine. Gasolene engine. Rotary engine. Traction engine.	
nd	Engine stopping system, steam, Purinton & Reynolds (reissue)	
of er	Everysting and alevating gravel apparatus for	
00	L. R. Miller 642,048 Fabric. See Plush fabric. Fanning mill. E. Rousse 642,006 Feed water filter for steam boilers. H. B. & J. S.	St
n.	Feed water filter for steam boilers, H. B. & J. S. Watson (reissue). 11,805 Feeder, automatic stock. D. A. Askew	So
	Fence. E. L. Sill	So
	Fence picket Tastener, S. J. Rea	В
	Fire eacape, B.W. Ahne	Ì
	Fire escape, H. C. Thiotison	Se
	Prier. 641,796 Frieman's respirator, Von Walcher-Uysdal & Grettner. 642,057 Friendlega I. C. Andra. 641,057	Se

(Continued on page 78)

# MILLS FOR ALL MATERIAL EAL WITH US ONCE AND YOU WONT CHANG 5PROUT, WALDRON & CO. USEFUL ATTACHMENT One of the most useful appliances in connection with r8-inch Precision Lathe is the Traverse Miller and Grinder which mills and grinds work the entire length of lathe. It is invaluable for such work as fluting, channeling, grooving, keyway cutting, etc. Easy of adjustment to any angle. The finest and most accurate of work for fluting taps, reamers, broaches, counter bores, etc., is unrivaled. is unrivaled. ANEUIL WATCH TOOL CO., Brighton, Boston, Mass. hysical and School Apparatus IALVANUME I EKS TANDARD, SINE, TANGENT, EFLECTING and WIEDEΠANN ALVANOMETERS . . . . . S. Ritchie & Sons, Brookline, Mass. pecial K Sub or Punching nd Formus Metal. A SPECIALTY. GEO. M. CRISWOLD, New Works, Griswold Building, 33-35-37 Union St., NEW HAVEN, CONN. **P8∪ USE GRINDSTONES ?**

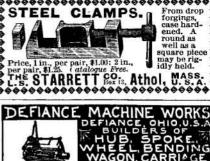
# Economy Drilling Compound

Superior to Oil or other Lubricants. Keeps Tools Cool and Sharp, Produces Smooth Work and Fine Finish, is Clean and Does Not Rust or Gum. Adopted by L. S. Government, Railroads, and Leading Man-facturers, Barrels, 7c. ath. Half-Barrels 8c. ath. Freight prepaid, Sent on approva',

THE WHITE & BAGLEY COMPANY. MACS U. S.A.



If so, we can supply you. All sizes mounted and unmounted, always kept in stock. Remember, we make a specialty of selecting stones for all special purposes. IF Ask for catalogue The CLEVELAND STONE CO. 2d Floor, Wilshire, Cleveland, O. TEEL CLAMPS. From drop forgings, case hard-ened. A





# Che Scientific 开merican

# PUBLICATIONS FOR 1900.

The prices of the different publications in the United states, Canada, and Mexico are as follows:

# RATES BY MAIL.

cientific American (weekly), one year, - - \$3.00 cientific American Supplement (weekly), one year, 5.00 Export Edition of the Scientific American (month-ly) in Spanish and English, - - - - 3.00 Building Edition of the Scientific American (monthly), - - 2.50 COMBINED RATES

in the United States, Canada, and Mexico. Scientific American and Supplement. Scientific American and Building Edition, Scientific American, Scientific American Supplement, and Building Edition,

# TERMS TO FOREIGN COUNTRIES.

The yearly subscription prices of Scientific American publications to foreign countries are as follows: U. S. English

	Money.	Mor.	еy.
Scientific American (weekly),	- \$4.00	0 16	5
Scientific American Supplement (weekly	6.00	1 4	8
Building Edition of the Scientific American (monthly),	- 300	0 12	4
Export Edition of the Scientific American (monthly) in Spanish and English	a 3.00	0 12	4

# COMBINED RATES TO FOREIGN COUNTRIES

Scientific American and Supplement, - 8.50 1 14 11 Scientific American and Building Edition, - - 6.50 1 6 9 tion, - - - - - - - - 6.50 1 6 9
Scientific American, Scientific American
Supplement, and Building Edition, - 11.00 2 5 2 Proportionate Rates for Six Months.

The above rates include postage, which we pay. Remit by postal or express money order, or draft to order of

MUNN & CO., 361 Broadway, New York.

# THE ENGINEERING MAGAZINE

will present a galaxy of notable papers, full of suggestion alike to student and prac-tical man A handsomely illustrated prospectus, with sample copy, free on request.

THE ENGINEERING MAGAZINE,

120-122 Liberty Street, New York. 222-225 STRAND, W. C., LONDON.



Automatic Machines
FOR
FORMING WIRE
from coil into shapes similar
to cuts. We can furnish machines or goods, as desired.

chines of Room.

Send for Circulars.

BLAKE & JOHNSON,
WATERBURY, CO WATERBURY, CONN.

If you want the best CHUCKS, buy Westcott's



Little Giant Double Grip Drill Chucks, Little Giant Drill Chucks Improved, Onerda Drill Chucks, Cut-ting-off Chucks, Scroll

Couply on the second athe Chucks, Geared mbination Lathe Chucks, Plain Universal Lathe uncks, Independent Lathe Chucks. Made by Cestoott Chuck Co., Onedia, N. Y., U. S. A. k for catalogue in English, French, Spanish or German. First Prize Ar Collimnian Exposition, 193.

# WILL PAY CASH

for second-hand Dynamos, Arc Lamps, Motors, Engines and Electrical Apparatus. Turn your dead property into money which is more useful. Send me description of what you desire to dispose of. I will make an offer for same. A. J. VANDEVENTER, 27 Thames St., New York.

Buy Telephones

THAT ARE GOOD...NOT "CHEAP THINGS."

The difference in cost is little. We guarantee our apparatus and guarantee our customers against loss by patent suits. Our guarantee and instruments are both good.

MESTEPH TELEPHONE CONSTRUCTION CO western telephone construction co. 250-254 South Clinton St. Chicago.

Largest Manufacturers of Telephones exclusively in the United States.



\*\* Wind, Steam, or Horse Power.

\*\*\* Wind, Steam, or Horse Power.

\*\*\* ISATER 2½ actual horsepower

\*\*\* ENGINE
for \*130, less 10 per sent dacount for cash. Built on interchangeable plan. Built of best material. Adade in lots of 100 therefore we can make the price.
Boxed for shipment. weight 800 lbs. Made tor Gas or Gasoline Also Horizontal Engines. 4 to 30 h. p.

WEBSTER MFG. CO., 1074 West 15th St. Chicago. Eastern Branch: 38-D Dey Street, New York City. Southern Agents: Boland & Gachwind Co., Ltd., So. Peter and Lafayette Sta., New Orleans, La.

rine Engine.

The only reversing and self-starting gasoline engine on the market. Lightest engine for the power built. Practi-cally no vibration. A beolute-ly safe. Single, double and triple marine and stationary motors from \$\frac{1}{2}\to 3\to 1. P. WOLVERINE

MOTOR WORKS, Grand Rapids, Mich.



# **DRILLING Machines**

s and styles, for drilling either deep or in any kind of soil or rock. Mounted on sills. With engines or horse powers Strong, simple and durable.
Operate them easily. Send for WILLIAMS BROS., Ithaca, N. Y.

TAKE AN OLDS



**W**E EXCEL AND UNDERSELL ALL! lectric Carriage Lights, 15 Telephones, complete, elegraph Ontfits, S Medical Batteries, lattery Table Lamps, lectric Railways, lectric Necktie Lights, liniature Electric Lamps, twanted Send for New Cat

Agents Wanted. Send for New Catalogue, just out. OHIO ELECTRIC WORKS, Cleveland, Ohio



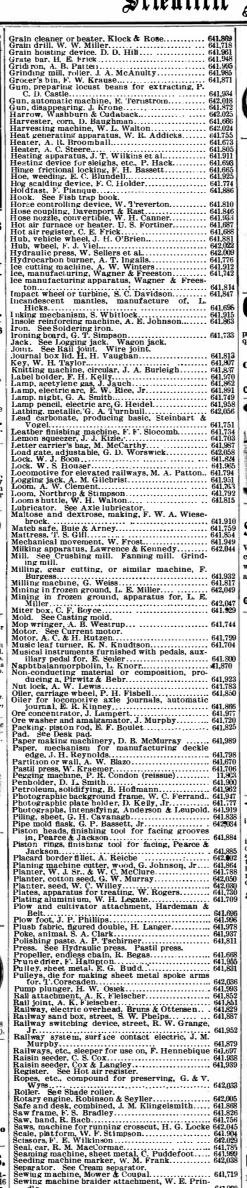
# Dynamos—Motors.

bynamos for Electric lighting, 15 lights up to 110 lights, 16 C. P. Motors for power purposes 1-4 H. P. to 7½ H. P. First class machines of mcdern construction and fully guaranteed. Send for descriptive Bulletin.

ROTH BROS. & CO.. Mfrs. 88-9 W. Jackson Street, Chicago, Ill., U.S. A.

AMERICAN PATENTS -- AN INTEResting and valuable table showing the number of patents granted for the various subjects upon which petitions have been filed from the beginning down to December 31. 1894. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1002. Price 10 cents. To be bad at this office and from all newsdealers.

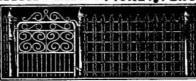




# Sewing machine, overedge, H. A. Kiemm. 941.788 Sewing machine smocking attachment, A. Steward. 642.015 Sewing machine trimming attachment, looped fabric, E. H. Brown. 642.015 Shade roller and clamp, Guntner & Roberts. 642.041 Shears, H. W. Howe. 641.786 Shirt waist lining, T. A. Winter. 642.031 Shoe, anatomical, A. R. Garrod. 641.896 Shoe former or last. A. W. Sutherland. 641.895 Shoe hooks with plastic material, apparatus for covering, M. O. Parenteau. 641.895 Shoe polishing device, C. H. Poore. 641.694 Shoe polishing device, C. H. Poore. 641.695 Show case, revolving, B. C. Bradley. 641.695 Skirt supporter, I. Nitschelm. 652.052 Skirt supporter, I. Nitschelm. 652.052 Smoke or beat in orchards, machine for producting, P. Negens. 641.803 Snow removing apparatus, R. Shirreffs. 641.803 Sondering fron, C. Shields. 641.803 Speaking tube, T. L. Dennis. 641.893 Speaking tube, T. L. Dennis. 641.893 Spong machine, J. Schweiter. 641.732 Spring. See Vehicle spring. (Continued on page 79)

Denoided the Electrical Engineer Limits in the part of any one. This institute is indorsed by Thomas A. Edison and other prominent men of the country. We teach also Mechanical Engineering, Mechanical Drawing, Short Popular Electrical Education in the Country of the Country. We teach also Mechanical Engineering, Mechanical Drawing, Short Popular Electrical Course, Telegraphy, Telephony. Electric Lighting, Electric Railways, X.-Rays, Electro-Therapeutics ing better positions and salaries studying at home by our correspondence system. Writefor free catalog. The Electrical Engineer Institute of Correspondence Instruction, Dept. A, 120-122 Liberty St., New York

HARTMAN STEEL ROD



fills completely all fence requisites as to beauty, utility and durability. Specially designed for lawns, parks, cemeteries, school grounds, &c. Looks best and is best when built with our steel posts. Illustrated catalog free, HARTMAN M'F'G CO., BOX 69 ELLWOOD CITY, PA. 07 99 BEOADWAY, NEW YORK CITY.

# Cork Floors and Tiles.

El egant in appearance, absolutely noiseless, germ-groof and waterproof, and have unequaled wearing qualities. We also manufacture

qualities. We also manufacture
CORK PULLEY COVERING,
CORK PIPE COVERING,
CORK FRICTION CLUTCH BLOCKS,
CORK BULLETIN BOARDS, etc.
Send for Circular "S. A."

CORK FLOOR & TILE CO., 17 Milk St., Boston, Mass.



with the Improved Washburne Patent Cuff Holders can be placed just where you want them; will never slip but may be instantly released. Drawers Supporter easily adjusted or taken offerousers. By mail, 20c, the pair. IF Catalogue showing these and other novelties, free.

American Ring Co.. Box P. Waterbury, Conn.

# WHAT HAVE YOU IN **Special Industrial Machinery**

We have constant inquiries for special American Machinery for the European Market. Something new and without competition. Our facilities for placing same are unequaled. Correspondence solicited.

Offices: London, Paris, Berlin, etc.

GEO. D. MOFFAT CO., Monadnock Bldg., Chicago, III.

# NO COLLISIONS

New Century



Operators will appreciate this great advantage. There are a score of other advanced features. If you are thinking of getting a typewriter or desire the Best, write us.

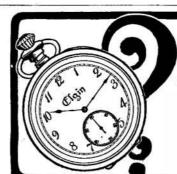
AMERICAN WRITING MACHINE COMPANY, 316 Broadway New York.

Keep Your Horse Healthy

See that his stable is fitted with LOGAN'S PAIENT STALL DRAIN which curries off all fifth and bad odors. Saves its cost in one year. Prolongs the animal's life and adds to its usefulness. EF Booklet Free.

Logan Sanitary Horse Stall Company, 1682 Broadway, New York.





# THE WATCH QUESTION

Is an important one. Time's measurements must be accurate, or they are valueless. Ruby Jeweled Elgin Watches

are the highest type of time recorders. Over eight millions have been produced in the past third of a century since "Figins" began to be,

The World's Standard.

Elgin watches are sold in all sizes by jewelers everywhere. An Elgin watch always has the word "Elgin" engraved on the works—fully guaranteed. Our new booklet, free to all who write, is of universal interest.

Elgin National Watch Co., Elgin, Ill.

The Perfection of Pipe Threading

is admitted tobe reached when our No. 9% PIPE THREADING MACHINE is used. As a hand machine it is the only one known that will cut and thread an 8 inch pipe with ease and satisfaction. One valuable feature is, that it has no arbitrary lead screw for determining style or pitch of thread to be cut. IF Send for Catalogue.

THE MERRELL MFG. CO. 501 Curtiss St., Toledo, Ohio.







\*\*E Send for handsomely Ulustrated atalogue "S. A." free.

REEVES PULLEY CO. COLUMBUS, IND., U. S. A.

MORAN FLEXIBLE JOINT

for Steam, Air or Liquids.
Made in all sizes to stand any desired
pressure. Sendfor reduced price list.
Moran Flexible Steam Joint Co., Inc'd





The Carlisle & Finch Co. Sixth St., Cincinnati, O.



Toget new customersto test my Seeds, I will mail my 1900 Ontalogue, filled with more bargains than ever and a 10c Due Bill good for 10c worth of Seeds for trial absolutely free. Allthe Beat Seeds, Bulbs, Plants, Roses, Farm Seeds, Potatoes, etc., at lowest prices. Nine Great Novelties offered without names. I will pay \$50. FOR A NAME for each. Many other novelties offered, including Glinseng, the great money making plant. Over 20 varieties shown in colon. \$1100 in each premiums offered. Don't give your colon, \$1100 in each premiums offered. Don't give your colon, \$1100 in each premiums of Great did not supprised at the paging offere, Seed your name on a set of the court prised at the paging offere. Seed your name on a set of the court of the paging offere. Seed your name on a set of the court of the paging offere. Seed your name on a set of the court of the paging offere. Seed your name on a set of the court of the paging offere. Seed your name on a set of the court of the paging offere. Seed your name on a set of the court of the paging of the pagin



# Creamer's Automatic PUMP GOVERNOR & RECEIVER.

FUMIT GUY EARNOR & RUGLIVER.

Bither borizontal or vertical.

Adapted for all kinds of Factories,
Hotels, Apartment Houses and
Office Buildings. See illustrated
article in SCIENTIFIC AMERICAN,
December 50. 1898, page 420.

Ger Send for Circular.

Creamer Steam Specialties Co.,
Jansen Hasbrouck, Prop.,
126 Liberty Street, New York.

THE MANUFACTURERS OF CAS ENCINES and Automobiles under the Lieut. Clover patents desire to locate an Eastern factory in New York or Pen sylvania and would like to open correspondence with some improvement club or company with this end in view. Address, R. P. Sharples, care of Omaha Gas Engine and Motor Co., Omaha, Neb.



TRUSCOTT BOAT MFG. CO., St. Joseph, Mich., U. S. A.





Stock Sizes 14 to 22 foot. Safe, Reliable and fully guaranteed.

PIERCE ENGINE Co., 17 N. 17th Street, Racine. Wis,

# J. B. LIPPINCOTT **COMPANY**

beg to announce that their entire stock of

# English Scientific Importations

is once more complete and can be supplied immediately upon receipt of orders.

# JUST PUBLISHED

an Entirely New Edition of

# Foster's Ore and Stone Mining

For the use Mine Owners, Mine Managers, Prospectors, and all interested in Ore and Stone Mining.

By C. Le Neve Foster, B. A., D. Sc., F.R.S Illustrated. Large octavo, cloth, **\$10.00** net.

### **Lubrication and Lubricants**

A treatise on the Theory and Practice of Lubrication, and on the Nature, Properties and Testing of Lubricants. By LEONARD ARCHBUTT, F.I.C., F. C.S., and R. MOUNTFORD DEELEY, M.I.Mech.E., F.G.S. Large 8vo, cloth, \$5.50 net.

Dairy Chemistry.
A Practical Hand-book for Dairy Chemists and others having control of dairies.

By Henry Droop Richmond. F. I. C.,

Analyst to the Aylesbury Dairy Company, Limited. 8vo. Cloth. With numerous tables and 22 illustrations. **\$**4.50.

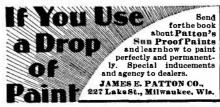
The Metallurgy of Lead and Silver By Henry F. Collins. Part I.—Lead.

Being one of a Series of Treatises on Metallurgy written by Associates of the Royal School of Mines. Edited by Sir W. C. Roberts-Austen, K.C.B., D.C.L.,

Large 8vo. Cloth. With numerous illustrations. \$5.00.

For Sale by all Booksellers, or sent, postpaid, upon receipt of price by the publishers

# J. B. LIPPINCOTT COMPANY. PHILADELPHIA.



# The No. 4 **YOST** WRITING **MACHINE**



# Yost Writing Machine Co.

NEW YORK CITY. LONDON, ENG.

THE GREATEST FAMILY NEWSPAPER IS

# Leslie's ... *Illustrated* Weekly

It tells the story of contemporaneous events and illustrates it with the most artistic pictures. He who reads it every week learns to recognize the countenances of the noblest men and women in public and in private life; the appear ance of the world's most famous places, and the scenes of the greatest historic interest.

LESLIE'S WEEKLY is a paper to keep on the library table, and to read and reread, and to file away for useful reference. It is read by more families of culture and refinement among the masses than any other paper of its class in the world. It is the greatest, best, most attractive and cheapest of all American educators.

It is for sale everywhere-on the stands in the bookstores, on all trains, at 10 cents per copy. One of the best general advertising mediums in the world. Send for rates.

LESLIE'S WEEKLY, 110 FIFTH AVE., NEW YORK.

# Stamp bolder, hand, E. J. Klingenberg. 641,781 Stapling machine, W. G. Metcalf. 641,876 Stay and fastener, combined, R. G. Winter 641,876 Steam generator, G. A. Nussbaum. 641,525 Steam washer, W. P. Burke 641,886 Stoker, automatic grateless, T. M. Eynon. 642,037 Stoke, Kit, G. E. Hughes. 641,710 Store, kit, G. E. Hughes. 641,710 Surgical appliance. J. Lees. 641,773 Swift, J. L. Chalmers. 641,973 Switch. See Electric switch. 641,935 Switch. See Electric switch. 641,935 Switch. See Electric switch. 641,937 Telephone exchange system, F. R. McBerty. 641,721 Telephone switchboard apparatus and appliance T. C. Wales, J. T. Chompson. 641,743 Telephonic measured service-registering apparatus and circuit for, G. K. Thompson. 641,747 Tellurian, G. T. Hugher, 641,843 Thill coupling, W. H. Edwards. 641,943 Thill coupling, W. H. Edwards. 641,943 Thill coupling, W. H. Edwards. 641,943 Thill coupling, W. H. Edwards. 641,744 Tire, pneumatic, J. J. McDonald. 642,051 Tire restring apparatus, rubber, A. W. Grant. 641,957 Tire, pneumatic, J. J. McDonald. 642,051 Tire, vehicle wheel, H. W. Theis. 641,764 Tire, pneumatic, J. J. McDonald. 642,051 Tire, vehicle wheel, H. W. Theis. 641,764 Tire, pneumatic, J. J. McDonald. 641,764 Tire, protective tent, W. H. McFarland. 641,787 Traction engine, T. E. Dodds. 641,843 Topolo, Automobile, H. Maxim. 641,787 Traction engine, T. E. Dodds. 641,845 Trubular telescoping parts, internal fastener for, J. P. Scovill. 641,845 Turubuckle, T. Sherwood. 641,855 Turubuckle, T. Sherwood. 641,855 Turubuckle, T. Sherwood. 641,855 Valve lubricating attachment, gate, W. R. Addicks. 641,754 Valve lubricating attachment, gate, W. R. Addicks. 641,754 Valve operating device for compressors, H. C. 641,859 Type setting machine key mechanism, F. McCilintock. Cilintock. Valve lubricating attachment, gate, W. R. Addicks. Valve operating device for compressors, H. C. Sergeant. Sergeant. Garrels. Garrels. Gal, 896 Valve, throttle, W. L. Garrels. Garrels. Gal, 907 Vebicle brake, Tucker & Boyling. Gal, 907 Vebicle brake, Tucker & Boyling. Gal, 907 Vebicle spring, H. C. Martell. Gal, 908 Veselcloser or stopper, A. Stone. Gal, 908 Wagon jack. U. Dietz. Wagon running gear, S. M. Harris. Gal, 908 Wagon jack. U. Dietz. Washing machine, O. & C. A. Linebarger. Gal, 908 Water, See Ore washer. Steam washer. Washing machine, O. & C. A. Linebarger. Gal, 908 Water, in bath rooms, lavoratories etc., apparatus for supplying bot or cold. M. M. Brophy Gal, 908 Water in bath rooms, lavoratories etc., apparatus for supplying bot or cold. M. M. Brophy Gal, 908 Web feeding mechanism, Miller & Dunn. Gal, 908 Web feeding mechanism, Miller & Dunn. Gal, 908 Web feeding mechanism, Gal, 908 Web feeding mechanism, Gal, 908 Wire joint. A. Gartner. Gal, 908 Wire joint. A. Gartner. Gal, 908 Wrench, F. Kostlan. Gal, 908 Wrench, F. Kostlan.

### DESIGNS.

	Bottle, W. E. Heath	32.118
ı	Box, turned wooden, W. C. Estes32,119,	
ı	Button, J. W. Simmons	32 142
1	Clothes pounder, J. D. Hussey	
1	Door fastener, J. B. Meacham	
1	Game board, R. W. Cassell.	20 127
ì	Game board, N. Ross.	20 120
1	Game board, W. O. Weathersby	20.100
1	The best of the Large Page 1	90 140
	Heel, boot or shoe, J. W. Brown	32.140
	Hook, garment fastening, L. L. Diedrick	
	Hook, suspending, M. Robin	32,121
	Hot air register, Dippo & Powell	
J	Lamp body, D. S. Williams	32,14
١	Lamp fixture connecting bracket, G. Bohner	
	Plow shoe, G. W. Ream32,125,	32,126
	Plow standard, G. W. Ream	32,131
ı	Pumps, frame for water ends for steam, E. M.	
1	Corvell	32,133
	Shade brackets and curtain pole supports, rod for	
	window, Hutson & Schupp, Jr	32.124
	Spoon or fork handle, S. J. Large	32.14
	Threshing machine tooth, W. H. George	32 139
	Tile for bake ovens, hollow, J. I. Marshall	32,130
	2 10 201 0000 0 0000, 20 10 W, W M M M M M M M M M M M M M M M M M	0-,10

# TRADE MARKS.

I	Anesthetics, certain local, A. J. Rust	34,073
I	Battery compounds or salts. Federal Battery	
ı	Company34.075.	34.076
ı	Company	
ı	pany	34.066
1	Cigars. Bur ns Brothers	
ı	Cloth finishing compositions. Warren & Stevens	
١	Cough syrup, Seitz & Reisinger	34,071
١	Foods, breakfast, Cream of Wheat Company	34,067
ı	Leather and shoes. J. Lindner	34,062
ı	Machinery and appliances, certain named, H. W.	-
١	Doop & Son	34,081
١	Doop & Son	
ı	m oor & Company34,065,	34.064
ı	Medicines, certain named, F. W. Cook, Jr	34,068
١	Oils and lubricants, W. Paats, Roache & Company	34,079
ı	Pen nibs, Perry & Company	34.C61
١	Pharmaceutical compound, certain named, Far-	
ļ	benfabriken of Elberfeld Company	34.074
1	Remedies, certain named, W. J. Hope	34,069
į	Remedies for certain named diseases, J. V. Steph-	
1	enson	34,070
	Roofing materials, certain named, New England	
	Felt Roofing Works	34,080
	Shoe polish and dressing, Veuve Ch. Leroy & Cie.	34,077
	Stationery miscellany, certain named, United Soci-	
ļ	ety of Christian Endeavor	34,060
	Tooth paste. Thymo Chemical and Manufacturing	
	0	94 080

# LABELS.

"Breesport Oxygenated Mineral Springs," for mineral water, J. A Westlake & Company......, 7,314
"Brooks Brand," for roofing material and roofing paint, H. W. Johns Manufacturing Company......, 7316
"Brooks House Cigar.," for cigars. J. D. Ross....., 7,316
"Buena Tonic," for a lotion, J. W. Butler.........., 7,307
"Crown Hair Preserver," for hair tonic, M. Scholder & Company.........., 7,307
"Dr. Mile's Compound Wine of Sarsaparilla," for a medical preparation, Dr. Miles Medical Company..................., 7,303 

A printed copy of the specification and drawing of any patent in the foregoing list or any patent in print issued since 1863. 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 parents may now be obtained by the inventors for any of the inventors named in the foregoing list, provided they are simple, at a cost of \$40 each. If complicated the cost will be a little more. For full instructions address Munn & Co., \$61 Broadway. New York. Other foreign patents may also be obtained.

# STEEL PENS

Every Esterbrook Pen Is Warranted.

Works, Camden, N. J. THE ESTERBROOK STEEL PEN CO. 26 John St., New York

THE HOMEMADE WINDMILLS OF NEBRASKA.

A most valuable series of articles condensed from the official Bulletin by Erwin Hinckley Barbour, is published in Supplements Nos. 1254, 1255 and 1256. The series is accompanied by thirty-three illustrations and gives a detailed description of a number of types of windmills which can be made by anyone who has any meebanical skill. These wirdmills are being made and used in large numbers in Nebraska and are giving great satisfaction. These Supplements for sale by all newsdralers, 10 cents each, or by MUNN & Co., 361 Broadway, New York City.

# CALCIUM CARBIDE EXERT 35 NASSAU STREET, NEW YORK

(A B C Code.) Cable Address: BRYAXE, NEW YORK

### You Can Make a Fortune by acquiring the rights of an American Patent in the building line. No technical knowledge required.

nunications to A. Z. 183,

RUDOLF MOSSE, Berlin, S. W.



Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. Handbookon Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

# Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 ayear; four months, \$1. Sold by all newsdealers. MUNN & CO.361 Broadway, New York

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

# WANTED.—A Draughtsman with experience in design of Machine Tools. State age, experience and salary expected. Address P. O. Box 1042, Philadelphia.

TURBINES JAS. LEFFEL & CO. Springfield, Ohio, U. S. A. CE MACHINES, Corliss Engines, Brewers' and Bottlers' Machinery. THE VILTER MFG. CO., 899 Clinton Street, Milwaukee, Wis.

PLAYS Recitations, dialogues, and other entertainment books. Catalogue free. DRAMATIC PUB. CO., CHICAGO.

STATESES. TINIPLE WANTED THE THE TOPE WHEELS. MODELS LETERIMENTAL WORK, SMALL MORKEN OF THE STENDE WORKS SO MASSAUS MY.

FOR STEREOPTICONS AND SLIDES Moving Picture Machines and Films, write Williams, Brown & Earle, 320 Chestnut St., Philadelphia, Pa.

MAGICAL apparatus, scientific novelties, etc. Illustrated catalog of parlor tricks free. Complete catalog with 600 engravings, 20c. Martinka & Co., Mfrs., 493 Sixth Ave., N. Y.

INVENTIONS PERFECTED. ccurate Model and Tool Work. Write for Circular PARSELL & WEED, 129-131 West 31st St., NewYork.

MODELS & EXPERIMENTAL WORK.
Inventions developed. Special Machinery.
E. V. Baillard, 106 Liberty St.. New York.

GAS 🗝 GASOLINE ENGINES

NOVELTIES & PATENTED ARTICLES Manufactured by Contract. Punching Dies, Special Ma-chinery. E. Konigslow & Bro., 1818eneca St., Cleveland, O.

Experimental & Model Work

versal Eccentric Mill. Address . SON, 28 Rodney Street, B

MODELS UNION MODEL WORKS

Pneumatic Rivetting and Caulking Tools. Agency wanted by old established London engineers with good connection. Only first class tools will be entertained. Address "Pneumatic" care of J. W. Vickers, 5 Nicholas Lane, London, E. C., England.

BELTING of Various Styles, ELEVATORS, CONVEYORS, COAL MINING and HANDLING MACHINERY.

The JEFFREY MANUFACTURING CO., COLUMBUS, O. Bend for latest complete Catalogue.

New York Branch, 41 Dey Street.

D'AMOUR & LITTLEDALE MACHINE CO. 130 WORTH ST.. NEW YORK. Make Models of Any Machine to Order.

CLACIER WINDOW DECORATION. A most effective substitute for the best Stained Glass at a fraction of the cost. Importing Agent, G. Quaile, 1015 Wool Exchange, New York.



# Fitchburg • Railroad

HOOSAC TUNNEL ROUTE

New England and the West. C. M. BURT, General Passenger Agent, Boston, Mass

PATENT BOOT AND SHOE CLEANER. Takes up very little room. Is only 12 inches square. Cleans top, sides and bottom of any boot or shoe, no matter how soiled they are. Entire patent for sale or noyalty. Patent No. 5163H. Address for further particulars, Cbas. Wm. Veigel 2534 N. 7th St., Phila., Pa.



# A SWELL AFFAIR This is the best Electric Scart Pin manufactured. Will last six months. Throws bright light 25 feet. Includes dry pocket battery, weighing six conces. Can be lighted without any one knowins how its done. Price, complete, by mail, \$1.50. Buy one and have lots of fun. VITALIS HIMMER, Jr., Manufacturer of Electric Novetties, 166-168 Greenwich St., N. Y.

HOW TO SUCCEED Will Power and Personal Magnetism insure the otherwise impossible, attracting friends and business success. All possess this lower. Learn how to use it. "KEY TO POWER" 30cts. or 12 cts. and addresses of three ministers, teachers or physicians. Circulars FREE. Address,

NATIONAL INST. OF SCIENCE, Dept. S. A. 20, Chicago. They Stand High Pressure.





SEED potatoes. Best pure stock, leading early and late varieties cheap. Illustrated catalog free. A. G. ALDRIDGE, Fishers, N. Y. (Mention Sci. Am.)

MACHINISTS wanted, send 25 cts., ½ price for sample. Pat. Thread Points. Saves and makes money. BYER TOOL COMPANY, Chambersburg, Pa.

For Sale Steam Engine built by the Watts Campbell Company, of Newark, N. J. Engine consists of two horizontal condensing Corliss engines coupled to one shaft, with vertical air pump driven from crank pin. The cylinders are 28 in. bore, 60 in. stroke. Belt wheel is 28 ft. dia. by 114 in. face. Gross weight is about 225,000 lbs. Can be seen in operation now; probably ready for delivery in February, 1900. Apply to The Clark Thread Co., P. O. Box 154, Newark, N. J.

A-SHEET METAL STAMPING - PUNCHES & DIES A SHEET METAL STAMPING - PUNCHES & DIES AND PARTS FOR SAME SPECIAL MACHINERY. INQUIRIES SOLICITED OTTO KONIGSLOW-45 MICHIGANST CLEVELAND.O

VOLNEY W. MASON & CO., Friction Pulleys, Clutches & Elevators PROVIDENCE R. I.

For Tools and Machinery Factories.

Energetic German wishes to represent large firm on the Continent. English and French correspondent. Firstclass English references. Address offers to L. D. 8993

YOU CAN MAKE \$100.A WEEK!

OWN YOUR OWN SHOW, COMPLETE OUTFIT-\$100.

LIFE MOTION FILMS & MACHINES.

GREAT PASSION PLAY & SOU OTHER SUBJECTS.

S. LUBIN LARGEST MER. PHILADELPHIA P. A.





PEASE PAYS EXPENSES and per month. Steady position; self-seller; no experience needed. Sent 2 for continuation. Dept. 10.

Sendusyouraddress and we will show you have be locality where you live. Send us your address and we will plain the business fully; remember we guarantee a clear protof \$\$ for every day's work, absolutely sure, when the business fully; remember we guarantee a clear protof \$\$ for every day's work, absolutely sure, write at once.

