Business and Personal.

The charge for insertion under this head is One Dollar 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-

Marine Iron Works. Chicago. Catalogue free.

"U. S." Metal Pelish. Indianapolis. Samples free.

Gasoline Brazing Forge, Turner Brass Works, Chicago

Yankee Notions. Waterbury Button Co., Waterb'y, Ct Improved Bicycle Machinery of every description

The Garvin Machine Co., Spring and Varick Sts., N. Y. Concrete Houses - cheaper than brick, superior to

"Ransome," 757 Monadnock Block, Chicago.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foot of East 138th Street, New York.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins By mail, \$4. Munn & Co., publishers, 361 Broadway, N. Y

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

NEW BOOKS, ETC.

NINTH SPECIAL REPORT OF THE COM-MISSIONER OF LABOR. The Italians in Chicago. A Social and Economic Study. Prepared under the direc-tion of Carroll D. Wright. Washing-ton, 1897. Pp. 409.

EUCLID: Books I-IV. By Robert Dea-kin. The University Tutorial Series. London: W. B. Clive. New York: Hinds & Noble. Pp. 309. Price 70 cents.

The object of the extensive series of books, of which this forms one of the volumes under the department of mathematics and mechanics, is to provide candidates for examinations and learners genetally with text books which shall convey, in the simplest form, sound instruction, in accordance with the latest results of scholarship and scientific research. The writer of this volume has had more than twenty years' experience in teaching Euclid to large and small classes, and this book presents the results of his endeavors to reduce the labors of teachers and students.

Manual of Hydraulic Mining. By T. F. Van Wagenen. New York: D. Van Nostrand Company. Pp. 95.

A second edition of this excellent little hand book comes out very appropriately at this time, when, on account of the general interest felt in the Klondike region, so many people are desirous of learning something of practical mining operations. This book necessarily does not claim to cover the whole subject, with all its engineering problems, but is written for the practical work ing miner, who will here find valuable details and much to aid him in intelligent prospecting, while guiding his judgment in the actual work.

LETTERING FOR DRAFTSMEN, ENGINEERS AND STUDENTS. By Charles W. Reinhardt. New York: D. Van Nostrand Company.

To facilitate attaining excellence in purely freehand lettering is the object of the simple lessons and numer ous plates and other illustrations presented in this volume, by a draftsman of high attainments. The author does not present ornate, carefully engraved alphabets but such as may be readily mastered, enabling the draftsman to do the best class of work in the shortest possible time.

SLIDE VALVES. By C. W. MacCord, Jr., M.E. New York: John Wiley & Sons. Pp. 168. Price \$2. This is a book for practical men, on principles and

methods of design, with an explanation of the princiles of shaft governors. The book contains 101 illustrations, and its subject matter comprises a revision and rearrangement of articles heretofore presented in a mechanical and engineering serial publication.

CHEMISTRY FOR PHOTOGRAPHERS. By Charles F. Townsend, F.C.S., F.R. P.S. New York': Spon & Chamber-lain. Pp. 158. Price 75 cents.

This simple and practical hand book is designed to be of especial value to the beginner and amateur, as well as affording a valuable text book for the experienced photographer. Its explanations of the chemistry of the subject are as simple as it seems possible to make them, nd its treatment of developers and various printing p cesses covers a wide range.

BIBLIOGRAPHY OF X RAY LITERATURE AND RESEARCH. Edited by Charles E. S. Phillips. New York: D Van Nostrand Company. Pp. 68. Price

This book contains a historical retrospect of and a ready reference judex to the literature of a subject which has occupied a very prominent place in the public mind for the last eighteen months. The editor also adds a chapter giving practical hints on setting up and operating apparatus for this description of work.

REPERTORIUM DER TECHNISCHEN JOUR-NAL-LITTERATUR. Herausgegeben im Kaiserlichen Patentamt. Jahrgang 1896. Berlin: Car Heymanns Verlag. 1897. Pp. 563. Price \$4.50.

The present bibliography is of great value to all those who are interested in the technical literature of the day It is interesting to note the number of papers which have been read to obtain the entries. The entries are made in the language in which the articles are published. and an excellent index renders the whole collection of value to the English-speaking reader.

COMMERCIAL DIRECTORY OF THE AMERI-CAN REPUBLICS. Compiled by the Bureau of American Republics, International Union of American Republics, Joseph P. Smith, Director. In two volumes, Washington. 1897. Pp. 1069.

This volume comprises the addresses of manufacturers merchants, shippers, banks and bankers engaged in foreign trade, together with the names of official maps, commercial statistics, industrial data and other information concerning the countries of the International Union of American Republics, the American Colonies and Hawaii. This volume treats of the Argentine Republic, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Falkland Islands, the greater republic of Central America. Guate mala, Guianas, Haiti, Hawaii, Honduras and British Honduras. This book will prove of value to those in terested.

CARPENTRY AND JOINERY. A Text Book for Architects, Engineers, Surveyors and Craftsmen. Fully illustrated and written by Banister F. Fletcher and H. Phillips Fletcher. London. 1898. Pp. 293.

One of the authors of the present book is the author of A History of Architecture," which will long rank asone of the important works upon the subject. It is chiefly notable for its remarkable analysis of the various styles In the present book the authors have made a concitreatise both for reference and for the instruction of students on the important subjects of carpentry and joinery. Of course, the practice is English practice, and some of the tools appear queer enough to American eyes Still, the chapters relating to joints used in carpentry, roofs, scaffolding, floors, framing, etc., certainly are of value to the student. There are 420 illustrations in the book. They serve admirably to elucidate the text.

HIGH MASONRY DAMS. By E. Sherman Gould. New York: D. Van Nostrand Company. 1897. Pp. 88. Price 50

The present volume replaces the original number 22 of the Van Nostrand Science Series, bearing the same title by John B. McMaster. The splendid treatise of Mr. Wegmann upon the same subject has so completely superseded all other treatment of the mathematical features involved that it would be useless to revive old material. The present work cannot but prove of value to all civil engineers.

A MANUAL OF FISH CULTURE. Based on the Methods of the United States Commission of Fish and Fisheries. With Chapters on the Cultivation of Oysters and Frogs. Washington. 1897. Pp. 340.

This is a very valuable book containing an excellent description of the modern methods of fish culture as carried on by the remarkable bureau known as the United States Commission of Fish and Fisheries. It is illustrated by 35 plates.

Received.

STIRPICULTURE; or, the Improvement of Offspring through Wiser Generation. By M. L. Holbrook, M.D. New York: L. Holbrook & Company. Pp. 192. Price \$1.

THE KING'S DAUGHTER AND THE KING'S SON. By a King's Daughter. New York: Fowler & Wells Company. Pp. 288 Price \$1.

TRUE DETECTIVE STORIES. From the archives of the Pinkertons By Cleveland Moffett. New York: Doubleday & McClure Company. Pp. 250. Price

LEE'S VEST POCKET POINTERS FOR BUSY PEOPLE. A Ready Reference Manual. Chicago: Laird & Lee. Pp. 230. Price, morocco, gilt, 50 cents.

WHIP AND SPUR. By Col. George E. Waring, Jr. New York: Doubleday & McClure Company. Pp. 245. Price

Not in It. By Anna O.cott Commelin. New York: Fowler & Wells Company. Pp. 96. Price 75 cents.



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 oe repeated; correspondents will bear in mind that some answers require not a little research, and though we endeavor to reply to all either by letter or in this department, each must take his turn.

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

houses manufacturing or carrying the same.

Special Written Information on matters of

personal rather than general interest cannot be expected without remuneration.

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

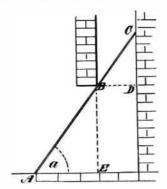
Books referred to promptly supplied on receipt of price.

Vinerals sent for examination should be distinctly marked or labeled.

(7292) W. H. asks: 1. What current and E. M. F. are used with the electric needle in removing hairs from the body? A: About 6 cells of carbon zinc battery, bichromate plunge battery, will do it. For battery, see Scientific American Supplement, No. base of hair to be removed? A. Yes. 3. What kind of contact ball bearings now in common use a purely rolling

needle is necessary? A. Platinum. 4. Is a direct or alternating current required? A. Direct. 5. What Sur-PLEMENT treats on the subject? A. See "Medical and Surgical Electricity," by Beard and Rockwell, page 538, price \$5.50 by mail.

(7293) J. S., New City, N. J., writes: 1. Will some of your correspondents of the Scientific AMERICAN give the solution of the following problem : What is the longest straight pole that can be run up a chimney, the height of the mantel being 48 inches and the depth from front to back 16 inches? A. Solution by C. W. L. Filkins, C.E., Instructor in Mathematics, Adelphi College, Brooklyn, N. Y .:



Let AC = 1; BD = b; BE = mb.

Then by right triangles-

$$B C = \frac{b}{\cos a}$$
; and $A B = \frac{m b}{\sin a}$

$$\therefore l = b \left[\frac{m}{\sin a} + \frac{1}{\cos a} \right]$$

$$\frac{d\,l}{d\,a}=0=b\bigg[\frac{-\,m\,\cos\,a}{\sin^{\,2}a}+\frac{\sin\,a}{\cos^{\,2}a}\bigg]$$
 Whence $m\cos^{\,3}a\doteq\sin^{\,3}a$

and tan 3 a = m

$$\therefore a = \tan^{-1} \sqrt[3]{m}$$

$$\therefore 1_{(m b x)} = b \left[\frac{m}{\sin (\tan^{-1} \sqrt[3]{m})} + \frac{1}{\cos (\tan^{-1} \sqrt[3]{m})} \right]$$

Make m = 3, by condition of problem, and

$$a = \tan^{-1} \sqrt[3]{3} = 55^{\circ} 15' 50.6''$$

$$\therefore 1_{(m b x)} = b \left[\frac{3}{\sin 55^{\circ} 15' 50.6''} + \frac{1}{\cos 55^{\circ} 15' 50.6''} \right]$$

$$= 5'4056 b.$$

If b = 16 inches-

l_(mbx) = 86.49 inches = 7 feet 21/2 inches, nearly.

2. Please give the best method for calculating change gears for screw cutting foot lathes, both simple and compound. A. Rule for gearing lathes for screw cutting: Read from the lathe index the number of threads per inch cut by equal gears, and multiply it by any number that will give for a product a gear on the index; put this gear upon the stud, then multiply the number of threads per inch to be cut by the same number, and put the resulting gear upon the screw. For compound gear: If the gear on the compound stud is two to one, then multiply the threads on the leading screw by two and proceed as above. See Kent's "Mechanical Engineer's Pocket Book," \$5.00 by mail, which gives tables and rules for other compound gears,

(7294) E. E. D. asks: When was the last total eclipse of the sun? Give the day and the date. (Visible in the United States.) A. The last total eclipse of the sun, visible in the United States, occurred on January 1, 1889. The line of totality ran from California through Nevada, Idaho, Montana, and North Dakota.

(7295) B. asks: Will you kindly give in Scientific American a description of the process for enlarging pictures, making life size portraits from small photos, tintypes, etc.? A. Valuable information on photo-enlarging and enlarging apparatus is contained in our Supplement, Nos. 451, 977, and 1053, price 10 cents each by mail

(7296) J. G. B. asks: What per cent loss would be advisable to figure on electrical circuits of different voltage, say 2,000, 1,000, 500, 220, 100 volts What is the customary loss on different voltages? A. The drop in voltage on a line should be very small indeed, only a few volts, not one per cent.

(7297) G. W. asks: 1. How can electric motor described in Supplement, No. 641, be wound for charge a storage battery? A. You do not need to rewind motor of Supplement, No. 641, to use it as a dynamo, provided it has a cast iron field magnet. Drive it with power and it will give out current. It is then a dynamo. and will charge three storage cells in series. 2. How many lamps would it run, and what candle power? A. It will light three or four 4 candle power lamps. 3. What kind of armature do you suggest? A. It does not

(7298) W. M. M. asks: 1. What theoretical per cent advantage is gained by the substitution of say 34 inch balls for 36 inch balls in the ordinary bicycle bearing? A. The only theoretical advantage that can be derived from the larger ball may be found in the greater rolling diameter; but practically, the increased bulk of balls and hub will make any theoretical advant: ge a negative quantity. 2. Will you give a formula for the determination of the above by which other sizes may be calculated? A. The problem is a practical one, depending entirely upon the admissable size and weight of the hub and its mechanism. There is no formula that will apply to a case having so wide a range of practice in 792, 10 cents. 2. Am I right in supposing one electrode construction as the ball bearing system has developed. is held to some part of the body and the other placed to 3. Theoretically, is the contact in the two or three point

contact, or is it a combination of rolling and sliding contacts? A. The two-contact system of ball bearings is essentially a purely rolling contact. The three-point contact system may be a combination of rolling and sliding contact and subject to considerable friction. 4. Theoretically, are both these forms of bearings equally correct and free from friction, and if not, which is the more correct form? A. Both systems are correct in regard to some requirement of design and condition of construction. Theoretically, the two-contact system is the more efficient as regards friction.

(7299) J. A. R. says: Please give in your next issue what you consider the best combined! toning and fixing bath formula for solio paper. A. 1. For solio paper use the formula recommended by the makers. The following are formulas for combined baths. The operation of toning and fixing is much simplified by using the combined bath. The print coming out of the printing frame is left in the bath till the color is arrived at, then washed and dried. The bath is composed of two solutions, and will keep for a long time. Dissolve water 24 ounces; hyposulphite of soda, 6 ounces; sulphocyanide of ammonia, 1 ounce; acetate of sodo, 11/2 ounce; saturated solution of alum, 2 ounces. Fill the bottle containing the solution with scraps of sensitized paper, bad prints that are not fixed, and leave it for a day. Then filter and add the following solution: Water, 6 ounces; chloride of gold, 15 grains; chloride of ammonium, 30 grains. It is necessary to print deep enough, and to leave the prints in the bath till, in looking through them, the desired color, brown dark or bluish, is observed. Used for Omega and other paper.

2. Chloride of gold 1 gr. Sulphocyanide of ammonium...... 25 " Water. 2 oz.

Dissolve the gold separately in a small quantity of

water and add it to the other solution. 3. Water...... 32 oz. Нуро...... 8 " Chloride of gold...... 15 " Nitrate of lead (c. p.).. 75 "

(7300) E. F. R. writes: 1. I am build ing a telephone from the circuit described in "Experi mental Science," on page 582 of the edition of 1890, au. want to know if an induction coil of 150 ohms will work properly on a short line of about 250 feet with return wire, also, if two batteries will be sufficient to call over the line if it is iron wire or should I use copper wire, and what size? A. The primary of the induction coil has a resistance of about 0.5 ohm; the secondary, about 150 ohms. One cell Leclanche battery will oe sufficient st each end of the line. For so short a distance the regular No. 12 A. W. G. galvanized iron wire will answer very well. 2. Will a Hunning type transmitter do? A. Yes.

(7301) J. H. C. asks: 1. How nu h power can be realized from a waterwheel of five hundred horse power capacity running a dynamo, the dynamo to operate motor three miles away? A. About 375 horse ower, if modern machines are used, and line properly constructed. 2. What size wire would it take, and what voltage would be most satisfactory? A. Using the three phase system for transmission, with a loss of 5 per cent in the line, you would require three wires each number 0000 B. and S. Particular conditions may change the size of wire a trifle. Generate the current at a potential of 1,000 volts two phase, step up to 3,000 volts by means of transformers and transmit by three phase to save copper. If energy is to be used for both light and power, it can be transformed at the receiving end to 120 volts two phase. This gives you the advantage of the three phase for transmission and that of the two phase for generating and distribution. Alternating.

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An experience of nearly fifty years, and the prepara-tion of more than one hundred thousand applications tion of more than one hundred thousand applications for patents at home and abread, 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 kws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business, Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

DECEMBER 28, 1897,

AND EACH BEARING THAT DATE,

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

Bed. J. Arn.
Bed. J. Kaschenbach.
Bed. spring, F. H. Herterich.
Beer and means for cleaning same, apparatus
for dispensing. C. Cronin.
Bell for street cars, electrical signal, Orr & Gal-596,432 (Continued on page 30)

30	
Bicycle or other vehicle pump, Wickersham & 586,223 Bicycle or tourist lock, O. Damon 586,231 Bicycle support, F. Johnson 586,216	Advertisements.
Bicycle vibration absorbing device, W. M. Morse 596,079, 596,080 Bit. See Router bit. Boiler. See Steam boiler.	ORDINARY RATES. Inside Page, each insertion 75 cents a line Back Page, each insertion \$1.00 a line
Bolt and rivet cutter, A. Helwig	TFF for some classes of Advertisements, Special and Higher rates are required.
Bottle, G. W. Taylor. Bottle necks, manufacture of glass, H. Brooke. 586,319 Bottle, non-refillable, A. S. Deutsch. 596,238 Bottle, non-refillable, C. W. Garis. 584,205 Bottle, non-refillable, C. I. Smith. 596,239 Bottle protector, E. J. Faquette. 598,344 Bottle stopper, H. R. Melster. 596,374 Bottle tankard, glassware, or the like, R. R. & A. R. Wales. 596,194 Box fastener, W. G. Davis. 596,688	wordsper line. This notice shows the width of the line and is set in agate type. Engravings may head advertisements at the same rate per agate line, by measurement, as the letter press. Advertisements must be received at Publication Office as early as Thursday morning to appear in the following week's issue.
Bottle, tankard, glassware, or the like, R. R. & A. R. Wales	Foot power
Brake. See Car brake. Vehicle brake. Wagon brake. Brake. S. T. Wellman et al. 598,097 Brake shoe, Allen & Morrison. 598,132 Brush, togth, F. S. Allen. 598,450	Star + Screw Lathes Automatic Cross feed
Buildings, construction of, G. B. Waite. 596,345	9 and 11-inch Swing. Newand Original Features
Burrelar alariu, J. S. Pates. 598,578 Burner. See Gas burner. Hydrocarbon burner. Button, separable, W. A. Ingails. 596,636 Call box system, electric, W. T. Budds. 596,556 Can top, oil, F. Lied. 596,048 Canceling machine, stamp, A. E. Whitehead. 596,048	Send for Catalogue B. Seneca Falls Mfg. Company, 695 Water St., Seneca Falls, N. Y
Canceling machine, stamp, A. E. Whitehead. 596,588 Candy forming machine, Bauer & Heilmann. 596,137 To bater U. F. Catelin. 596,331 Car brake, B. J. Cobelin. 596,331 Car brake, H. Schenck. 596,339 Car consulting H. G. Rubonn. 598,337 596,538	POWER & FOOT SHAPERS, PLANERS, DRILLS, MACHINE SHOP OUTFITS TOOLS OF THE SHAPERS, CATALOGUE FREE SEBASTIAN LATHE CO. 120 CULVERTST, CINCINNATI.O.
Car brake, H. Schenck 596,339 Car coupling, H. C. Buhoup 596,357 596,358 Car coupling, W. Scheel 596,128 Car coupling, A. S. Weaver 596,101 Car door lock, J. Blankart 596,101 Car fender, G. Wiemers 596,101 Car operating mechanism, dumping, W. Mc-Mahon 596,302	Boys! Men! "Strike while the from By Mail complete and Thornough Instruction By Mail
Car operating mechanism, dumping, W. Mo-Mahon. 596,302 Car, railway, J. Andrews. 596,227 Car seat, J. S. Johnston. 596,302 Car wheel grinding machine, C. F. Norton. 596,304	ADVANCE YOURSELVES.
Car operating mechanism, dumping, W. Mc-Mahon. 596,302 Car, railway, J. Andrews. 556,227 Car seat, J. S. Johnston. 596,434 Car wheel grinding machine, C. E. Norton. 596,342 Carousel, T. B. Tinney. 598,342 Carpet cleaner, W. M. Coonradt. 596,313 Carnage spring, S. R. Bailey. 566,313 Cash register, indicator and check printer, W. H. Clark. 598,359 Cash register key mechanism, W. H. Clark. 598,359 Cash register locking mechanism, E. A. Bedient 596,452	THE HOME SCHOOLS OF Mechanical, Electrical, Steam, Civil, and Sanitary Engineering, Architecture, Metal Work-
Clark. 596,359 Cash register key mechanism, W. H. Clark. 596,350 Cash register locking mechanism, E. A. Bedient 596,452 Centerboard for yachts, J. Northup. 596,083	ing. Pattern Making. To encourage youto start now, we furnish \$11 mechanical drawing out- oft free. Small Fees. Advance or installments. Send for beautifully illus.100 page S. A. catal., postpaid.
Center board for yachts, J. Northup	United Correspondence Schools. 154 to 158 5th Ave., New York, N. Y.
Check hook A. F. Kiehl. 598,116 Chocolate dipping tray, D. F. Gerbereux 598,158 Chronosphyrmometer, O. H. Woodworth 598,233 Churn, J. E. Nohr. 596,023 Geaner. See Carpet cleaner. Dish cleaner.	F. W. EWALD, Gen. Mgr. SAVE WATER AND MONEY The only truly Economical Valve
Clock, eight day alarm, W. Dupen	and one that will not hammer o vibrate, is FOSTER'S AUTO MATIC FLOAT VALVE which is made on strictly scientific
casks, tanks, etc., T. L. Banks. 596,314 Column, forse, H. L. Gulline et al. 596,424 Column or post, J. W. Rapp. 596,213 Combination lock, E. & L. Irwin. 593,185 Communion service, individual, I. K. Bean. 593,385 Communion service, individual, I. K. Bean. 593,385	principles and can be operated with a small float on any pressure from 5 to 300 lbs. per square inch All sizes, \$\frac{1}{2}\$ to 6 Inch inclusives Sent on 30 days' trial to responsible
Communition lock, M. H. Smith	WALWORTH MFG. CO., 20 Oliver St., Boston, Mass
Coop, folding, J. N. Cornelius 593.141 Copying press, W. J. Ellis 596.348 Copying roller, letter, H. L. Reux 596.690 Corn, machine for cutting ear, E. L. Dolsen 595.145 Corn picker and busker E. Turnell 596.132	TUIN OTEEI
Coupling. See Bicycle coupling. Car coupling. Crematory, F. L. Decarie	2 in. \$1.00. 4 in., \$2.00 3 " 1.50. 6 " 3.00 8 page catalogue of Fine Tools, free.
Curd cutter, F. B. Fuller. 596,407 Curling iron heater, H. A. Palmer. 596,087 Curtain pole bracket, W. S. Powell 596,047 Curtain stretcher and clothes horse, combined lace, G. Pierson. F. B. Gigsler. 596,181 Cutoff, fluid pressure, F. B. Gigsler. 596,433 Cutter, See Bolt and rivet cutter. Curd cutter.	Time Tools, free. Lis. STARRETT Box 13, Athol. W. S.A.
Cyclometer, C. T. Higginbotham	LATHES
Dental disk holder, G. W. Watson. 586,254 Dish cleaner, H. R. Stiles. 596,130 Door fastener, E. Byrnes. 596,030 Door fastener, F. C. Lounsbury. 596,138 Door look, sliding, G. Ladewich. 586,189	CUNSMITHS, TOOL MAKERS, EXPERI
Drilling machine, hand, J. Murchie	MENTAL AND REPAIR WORK, ETC. Send for Illus. Catalog. W. F. & Jno. Barnes Co
Drive pipe for artesian wells, etc., J. Mulrhead 350,031 Drum. expansible, I. L. Hawkins 596,326 Drykin apparatus, McClatchey & Krum 596,125 Drying apparatus, McClatchey & Krum 596,175 Dye, rhodol, C. O. Muller 598,333 Bocentric, R. Marvin 596,075 Ejector for ashes, etc., F. H. Heath 598,065 Ejector conductors, underground junction box for, W. F. Bossert 596,229 Electric current meter, R. P. Wilson 596,229 Electric leater, H. Helhetper 596,180 Electric heater, H. H. Helhetper 596,180 Electric heater 596,180 Electric heater 596,180 Electric heater 596,180 Electric heater	1999 Ruby Street, ROCKFORD, ILL
Electric conductors, underground junction box for, W. F. Bossert. 596,229 Electric current meter, R. P. Wilson 583,283 Electric heater, H. Helberger. 596,160	ROUND OR SQUARE BASE SKINNER Improved PLANER CHUCKS. Heavy, strong
Electric heater, H. Helberger	SKINNER Improved PLANER CHUCKS. Heavy, strong accurately made. Greater capacity than any other chuck. Set screws of cruci- ble steel. All nuts case- hardened Dropforgedsteel wrench with each chuck
Electric machines, detachable laminated pole piece for dynamo H. Geisenhoner	wrench with 'each chuck. Holds straight or taper work. Can be instantly ad- justed from 0 to greatest capacity. SKINNER CHUCK CO., Church St., New Britain, Conn
ter	THE OBER LATHES
Envelope, extensible, A. Mitchell. 586,435 Convelope for protecting charts, etc., waterproof, J. C. Lea. 586,300 Envelope, sales slip, W. D. Bates. 586,330 Convelope, sales slip, w. D. Bates. 586,330	ger, File, Killie and Chisei Han
ering, Force & Parenteau	dles, Whiffletrees, Yokes, Spokes Porch Spindles, Stair Balusters Table and Chair Legs and othe irregular work.
Fence making machine, W. M. Calhoun 596,394 Fence, wire, S. Shown 596,384 Fiber cleansing apparatus, S. B. Allison 596,199 Fire escape, W. C. Williams 596,198 Fire ascape, bracket C. V. Richay 596,497	I fulfilled. The Cond for Clinarian A
Fence, wire, S. Shown Fiber cleansing apparatus, S. B. Allison	Store Ladders.
H Ind. 556276 Flower holder, J. L. Sturtevant. 556,221 Fluid pressure regulator, G. G. Clark 556,140 Flying machine, J. Richard son. 556,231 Flying machine, J. Richard son. 556,231	A PAIR OF STAIRS ALL ALONG THE LINE OF SHELVES.
Folding gate, Henning & Schmid. 586337 Forks, detachable shovel blade for E. P. Oveson 585,120 Fruit cutting and pitting machine, T. M. Topp 586,343 Furnace, A. Stein. 596,251 Furnace, See Slow combustion furnace.	The Coburn Trolley Track Mfg. Co. HOLYOKE, MASS.
Fuse holder, removable, J. T. Hunt. 596,209 Gage: See Bevel gage. Micrometer gage. Game apparatus, J. F. Patterson. 596,089 Garnient handing loop. M. C. Schwabe. 598,481	"QUEEN" ARCHITECT LEVEL \$50
Gas burner, G. Bray. 590,238 Gas burner, acetylene, Henkle & Goddard. 596,112 Gas burner for burning rich gases especially	large dividing engines. Spe
acetylene, E. J. Dolan. 596,144 Gas engine, J. B. Fenner 596,352 Gas engine, compound, E. R. Bales 596,352 Gas, generating acetylene, W. Bolton 596,139 Gas generating machine, L. T. Bulley 596,351 Gas generator, acetylene, D. B. Blanchard 596,138	
Gas generator, acetylene, D. R. Blanchard. 596;138 Gas generator, acetylene, F. D. Dibble. 596;103 Gas lighting device, electric, Bogart & White. 598;238 Gas producing apparatus, J. G. Sanderson. 596,428 Gate. See Farm or garden gate. Folding gate.	QUEEN & CO., Inc., 1011 Chestnut St. Philadelphia
Gate. See Farm or garden gate. Folding gate. Gate, P. Markley (reissue) 11,643 Gate, T. R. White 56,465 Generator. See Gas generator. Generator frame foundation, S. H. Short. 596,280 Gin saw sharpening and gumming machine, J. J.	"It & Cells & About & Cools" Every Mechanic, Metal Worker, o
Smith. Glass articles, met hod of and apparatus for making hollow, Blair & Hays. Gold washing and amalgamating machine. W.	plies should have our new 1897 Too Catalogue. It contains 710 pages, siz 100-67746, and is an exhaustive an
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	Scientific	A.
r vehicle pump, Wickersham & 586,223 tt lock, O. Damon 596,237 F. Johnson 586,237	Advertisements.	Hay Hear Heat
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brake. Vehicle brake. Wagon	Star * Screwcutting Lathes Automatic Cross feed 9 and 11-inch Swing. Newand Original Features	Ink 1 Iron Jack Joint Key. Kiln. Knif Kn
Iman et al. 596,097 & Morrison 598,132 S. Allen 598,450 mer 598,247 ruction of, G. B. Waite 598,247 S. Fates 598,379 s burner Hydrocarbon burner le, W. A. Ingalls electric, W. T. Budds 596,364 cd. 596,244 ine, stamp, A. E. Whitehead 596,244 ine, stamp, A. E. Whitehead 596,038 anchine, Bauer & Heilmann 596,137 onstein. 598,321 Cobb. 588,361 henck 596,361 596,361	Send for Catalogue B. Seneca Falls Mfg. Company, 685 Water St., Seneca Falls Mr. Y PCWER & FOOT SHAPERS, DLANERS, DRILLS ATHE S. MACHINE SHOP OUTFITS, TOOLS SEBASTIAN LATHE CO. 120 CULVERTST, CINCINNATI, O.	Lam Last Last Last Leat Leve Lifti Lock
C. Buhoup	BOYS! MODI "Strike while the from's Hot." Complete and Thoracture	Lock Lock Lock Lock Lock Loor Loor Loor Loor
ng machine, C. E. Norton 596,336 'yinney 598,342 W. M. Coonradt 596,431 S. R. Bailey 596,313 dicator and check printer, W. H. 596,313 y mechanism, W. H. Clark 596,339 y mechanism, E. A. Bedient, 596,359	THE HOME SCHOOLS OF Mechanical, Electrical, Steam, Civ- il, and Sanitary Engineering, Architecture, Metal Work- ing, Pattern Making. To encourage youto start new, we turnish Sil mechanical drawing out.	Loor Low Lubi Lubi Mail Main I Man
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gate, C. H. Stradley. 596,107 gate, C. H. Stradley. 596,189 aachine, W. M. Calhoun 596,394 hown 596,394 hown 598,199 C. Williams 596,199 sket, C. V. Richey 596,427 n and blower, W. F. Daniel 596,626 epeater, F. A. Skelton 596,220	Porch Spindles, Stair Balusters, Table and Chair Legs and other irregular work. Patented. The Ober Lathe Co., Chagrin Falls, O., U.S. A. The Coburn Patent Trolley Track	Rake Regi Regi Rice Ring I Rock
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T SHAPERS, PLANERS, DRILLS. S. AND SUPPLIES. CATALOGUE FREE E CO. 120 CULVERTST, CINCINNATI. O.	Lock. See Bicycle lock. Car door lock. Com-		ĺ
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