Iron, Steel, and Copper Drop Forgings of every de scription. Billings & Spencer Co., Hartford, Conn.

Curtis Pressure Regulator and Steam Trap. See p. 364 Pat. Geared Scroll Chucks, with 3 pinions, sold at same prices as common chucks by Cushman Chuck Co., Hartford, Conn.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Safety Elevators, steam and belt power; quick and smooth. D. Frisbie & Co., 112 Liberty St., New York.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N.Y. See illus. adv., p. 28.

Quints' patent automatic steam engine governor Correspondence solicited from manufacturers of throttle governor engines. Leonard & McCoy, 118 Liberty

Catarrh Cured.

A clergyman, after years of suffering from that loath some disease, catarrh, and vainly trying every known remedy, at last found a prescription which completely cured and saved him from death. Any sufferer from this dreadful disease sending a self-addressed stamped envelope to Prof. J. A. Lawrence,212 East 9th St., New York, will receive the recipe free of charge.

Wanted by a Brick Manufacturing Co.-A good draughtsman. Also a first class mechanic as foreman. Address box 87, Lancaster, Pa.

No. 11 planer and matcher. All kinds of woodworking machinery. C. B. Rogers & Co., Norwich, Conn.

Patent Rights for Sale. Apparatus for building Concrete Buildings and Walls. County rights, \$50. State rights, \$500. See descriptive notice in SCI. AMERICAN, May 22, 1886. Send for circulars. Ransome, 402 Montgomery St., San Francisco, Cal.

Leather link belting is the most reliable for dynamos and swift running machinery. For particulars write Chas. A. Schieren & Co., 47 Ferry St., New York.

Talcott's belt hooks. Best made. Providence, R. I Send for new and complete catalogue of Scientific Books for sale by Munn & Co., 361 Broadway, N. Y. Free on application.



HINTS TO CORRESPONDENTS.

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 This is for our information, and not for publication.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 auswered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

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 cente-each.

Hooks referred to promptly supplied on receipt of price.

price.

Minerals sent for examination should be distinctly marked or labeled.

- (1) J. T.—Forthe horse power, multiply the area of the piston by the mean engine pressure, which is always something less than the boiler pressure, and may be computed by knowing the point of cut-off. This product multiply by the speed of the piston in feet per minute. Divide the last product by 33,000 for the horse power. Your engine probably indicates 23 to 25 horse power. Exact instructions cannot be given for setting the eccentrics of your traction engine without the exact measure of the lap and plan of lever connection. Place the crank on the center and the cams ; scribed exactly opposite to each other with their central line; leaning forward in the direction in which the crank is moving, sufficient to open the port at or near the time of passage of the crank over the center, is a general rule, from which a trial can be made. For casehardening, see Scientific American Supplement, No. 23.
- (2) W. M.—The brazing of iron and steel is readily accomplished by first cleaning the surfaces that are to be brazed free from scale or rust and the parts together with iron wire or in any other conpulverized borax and tie on a piece of ordinary vellow brass large enough to fill the joint. Sprinkle the brass with borax powder, and place the work in a forge fire with the brass on the upper side, and heat gently until the brass melts and draws through the joint. Copper may also be used in the same way, it being very suitable and strong for iron. Good tough brass is best for
- (3) J. P. B. writes: Some three weeks since, a large barn containing baled hay was burned in this place. The fire was first seen near the floor of the loft, and there were several layers of bales of hay above the fire. Will baled hay become heated so as to become ignited and take fire? A. Baled hav that has not been well cured is liable to heat and ferment; and if packed closely in a barn, its spontaneous ignition would be possible. A box packed with damp sawdust has been caused by the escape of gases (as coal gas) rises to the memoranda on each leaf. Upon each slip also is printed known to ignite in the central portion of the sawdust. A short time since, we saw a smoking barrel rolled out of a store and broken open. It was filled with sawdust room by the heated currents. as a packing for telegraph insulators. The sawdust on the outer side next the barrel was wet, the interior was charred. The report was that the barrel had been received the day before as freight, and had been wet in a shower. Cotton in bales stowed as freight in ships has been known to take fire. A wet bale was probably
- (4) M. R. W. asks for a weight motor that could be cheaply constructed, to developsay one horse power for about five hours at a time, and whether such motor would be practicable for continuous use. Howheavyweights would be required? Also the power weights are used? A. Efforts to utilize large weight weight of the earth in pounds, or units of gravity at way, New York.

To maintain a horse power for five hours will require the descent through 30 feet of space of a weight of is founded on the change of the intensity of gravity in 1.650 net tons, to which must be added a large percentage for the friction of the machinery. To wind up the weight requires a full horse power for 5 hours and enough more to overcome the friction. The friction alone of such contrivances is almost unavoidably very great. The power to drive an ordinary tower clock is comparatively small, always depending upon its size and perfection. A one man power for half an hour will run the clock a day or a week, according to its construction.

- (5) O. S. P.—For casehardening large pieces of steel, a box of cast or wrought iron should be provided large enough to hold one or two of the pieces with sufficient room all around to pack well with the casehardening materials, which may be leather scrap, hoof shavings, or horn shavings, slightly burned and pulverized, which may be mixed with an equal quantity of pulverized charcoal. Pack the pieces to be casehardened in the iron box so as not to touch each other or the box. Put an iron cover on the box and lute with clay. Heat gradually in a furnace to a full red, keep at an even temperature for from 2 to 4 hours, raise the heat to a cherry red during the last hour, then remove the cover and take out the pieces and plunge endwis vertically in water at shop temperature; 2 per cent of hydrochloric acid in the water improves its tempering qualities and gives the metal an even gray color
- (6) J. T. writes: This bank is heated by steam, and the air is oppressively dry. Is there any device on the market for introducing steam into rooms in a noiseless way? A. You may take steam from the radiators with a very minute air valve. This will have an odor. A better way is to have small tin boxes fastened against the pipes behind the radiator in such a way as to allow of removal for cleaning. Keep them full of clean water.
- (7) M. N. B. asks (1) how to take down the rust of old cast iron and steel machines, which have not been in use for ten years. A Scrape off all rust scales, boil in strong caustic soda and water to remove grease and oil. Then dip in a bath of hydrochloric acid 1 part, water 4 parts, for a few hours or until the rust is removed. Wash in hot water, then dip in strong hot lime water and dry. 2. A receipt for japanning small hooks. A. String the hooks on fine wire dipped in thin japan varnish, and hang in an oven heated to 260° to dry. If varnish is too thick, thin with turpen tine.
- (8) J. T. T. writes: We are having iron castings made in which we cast a ¾ inch wrought iron rod, and we find after the casting is cold that the rod is loose. How can this be prevented? A. Tin the rod A. Thoroughly dry and clean the tanks. Paint with 2 or such parts as are required to adhere.
- (9) Subscriber asks what chemical preparation becomes ignited on coming in contact with water. A. Metallic potassium. It is very dangerous. as it explodes when thrown upon water. Phosphide of calcium ignites when moistened.
- (10) O. D. asks (1) if an induction coil would be injured by using too many cells to operate it. A. Yes; you must be very careful not to use too strong a current. 2. How can I get a copy of the Smithsonian report? A. Address your representative in Congress, or the Secretary of the Smithsonian Institution, Washington, D. C.
- (11) A. J. asks: What acid is used in engraving on glass, causing the picture to appear as if ground? A. Hydrofiuoric acid is used in glass etching, and the sand blast is often used to effect the result de
- (12) H. A. R. asks: 1. Can you tell, as as closely as possible, what lengths of No. 28 (B. & S. gauge) copper and German silver wire represent one ohm, according to the standard determined by the Paris congress, read of not long ago? A. Of No. 28 copper wire 67:542 feet are given as corresponding to 1 ohm resistance. This is only approximate in practice, as every particle of impurity affects the conductivity of wire. The resistance of Germansilver varies also with make them to fit closely, as the brass or copper used for its composition. The relative resistances of German brazing does not flow well into open spaces. Rub the silver and copper are given as 21-17 (German silver) is surfaces to be united with borax and water, then tie to 1616 (annealed copper). 2. Why is the E. M. F. of Daniell's cell sometimes given as 1.079, 1.105, and 1.122 venient manner. Sprinkle the edge of the point with volts? Is the first the actual working E.M. F. and the last two potential or chemical E. M. F.? A. The E. M. F. of a. Daniell cell varies with the solutions used. 3. Will a differential galvanometer do to measure the E. M. F. of a battery by Wheatstone's method? What is a convenient resistance for such a galvanometer? A For Wheatstone's method any sensitive galvanometer will answer. A good galvanometer, giving resistances etc., is very fully described in Scientific American SUPPLEMENT, No. 628. 4. Will a gravity Daniell do for measuring, or has it too high resistance, and what form of the same cell has the lowest resistance with least polarization? A. A good Daniell standard battery is described in the Scientific American, vol. 56, No. 24. from the north. We are anxious to know the origin of large sized porous cup Daniell has the lowest resistance for a non-polarizing battery.
 - (13) C. H.—The position of foul air in a room depends entirely upon its kind. The foul air top of the room, and the carbonic acid gas from something pertaining to cycling, a collection of quotaburning gas or a stove is only carried to the top of a tions illustrating the popularity and universality of cy-
- (14) O. E. V. asks how the world is weighed and its density and mass computed. A. The density, mass, or weight of the earth was found by the observed force of attraction of a known mass of lead or iron for another mass: or of a mountain by the deflection of a torsion thread or plumb line. In this manner the mean density of the earth has been found to be from 4.71 to 6.56 times the weight of water, 5.66 being accredited as the most reliable. The weight of a cubic foot of water being known, and the contents of the earth being computed in cubic feet, we have but to multiply the number of cubic feet by 5.66 times needed to drive the works of large tower clocks where the weight of 1 cubic foot of water to obtain the

motors generally cause loss of both time and money. its surface, which is the unit usually used. Another method of determining the mean density of the earth descending deep mines.

> (15) A. R. D.-Professor C. V. Riley akes the following reply: The twig of Euonymus (lati folia?) sent is infested with a scale insect, Chionaspie euonymi, Comstock, described and figured Rep. Dept. Agr. 1880, page 313, plates v., Fig. 3, xvii., Fig. 2. It is common on Euonymus, and has also been taken from orange in Louisiana. Those remedies which have been successful against scale insects infesting orange trees will prove successful against this. The most successful wash is the kerosene emulsion, made by either of the follow ing formulæ:

Milk.....1 part.

Sour milk (not buttermilk) is preferable, as the emulsion is more stable when thus made. Instead of milk. water can be used by adding a small amount of soap. The proportions remain about the same. The following formula is a very convenient one to use for small quan-

Water 1 quart.

In either case the milk, or soap and water, should be heated to boiling, and with the latter the soap tho roughly dissolved, then the kerosene added while hot, and the mixture thoroughly agitated until it forms a homogeneous mass of cream-like consistency. It can be agitated by churning, shaking, or otherwise, but where a force pump is at hand, the most convenient method is to pump the liquid back in upon itself violently, forcing it through a small nozzle. This continued for five to fifteen minutes will produce a good emulsion, if proper care has been taken in preparing the mixture. The emulsion will remain stable for an indefinite period, and should be diluted only as wanted for use. The strength required varies for different insects, also some plants will bear it stronger than others. This wash can safely be used on orange 1 part to 10 of water. The treatment should not be repeated until first application has had time to be effectual, say ten days or two weeks. It is best not to apply during freezing weather. On a small scale application may be made with brush or cloth, but the most convenient and effective method is with force pump, using a fine spray nozzle like the cyclore or some other good nozzle. The treatment of such insects has been fully discussed from time to time in my official reports, and especially in Hubbard's report on Insects Affecting the Orange.

- (16) P. G. asks: What kind of paint can I use to keep cold water iron tanks from sweating? coats Prince's metallic paint in boiled linseed oil, first coat to be dry before painting second coat. No paint will entirely prevent sweating, but it does diminish it.
- (17) A. M. D. asks if the use of sal soda to clean the scale and grease from a steam boiler would he detrimental to the hoiler. A. Sal soda and caustic soda are both used for cleaning boilers. They are not injurious. See also for other boiler cleaners, "Davis on Boiler Incrustation," which we can furnish for \$2.00.
- (18) R. W. J. asks if one 2 inch pipe will carry more water than four 1 inch pipes, all things being equal. A. Area of 2 inch pipe equals 3.1416 inches; area of four 1 inch pipes equals 3.1416; the internal surface of 2 inch pipe=6.2832; the internal surface of four 1 inch pipe=12.664; the coefficient of discharge for one 2 inch pipe is 26.66; the coefficient of discharge for four 1 inch pipes is 1884. These figures give the proportionate discharge of one 2 inch pipe or four 1 inch pipes for any length.

NEW BOOKS AND PUBLICATIONS.

POPE'S ESSAY ON MAN, WITH RESPOND-ING ESSAY, MAN SEEN IN THE DEEP-ENING DAWN. By Caleb S. Weeks. Fowler & Wells Co., Publishers. Paper. 25 cents.

On one page is given Pope's grand essay, and on the opposite page Week's responding essay-the latter being written in like form, like meter, and with the same number of lines as the original. It is designed to explain and amplify the prototype in the light of the learning and philosophy of the present century.

ANDARDS OF LENGTH AND THEIR PRACTICAL APPLICATION. Edited by George M. Bond. The Pratt & Whitney Company, Hartford, Conn.

This book affords a resume of methods employed, by the enterprising company publishing the work, for the production of standard gauges, to insure uniformity and interchangeability in every department of manufactures. It includes reports by Professor William A. Rogers, the Committee on Standards and Gauges of the American Society of Mechanical Engineers, and other valuacan Society of Mechanical Engineers. and other valuable information, all illustrative of the great care and thoroughness with which the company conduct their Cotton chopping and siding machine, Johnson & thoroughness with which the company conduct their manufacture of standard gauges.

The Pope Manufacturing Company has issued a calendar for 1888, in pad form, with blank for

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for pa tents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unsynopsis 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 ex-tensive facilities for conducting the business. Address MUNN & CO., office SCIANTIFIC AMERICAN, 861 Broad-

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

December 27, 1887, AND EACH REARING THAT DATE. [See note at end of list about copies of these patents.] Addressing machine, T. C. Eberhardt........... 375,481 Alarm. See Burglar alarm. Clock alarn Arches, device for constructing, F. Gorman...... 375,620 Ash pan, C. W. Eckerson 375,416 Automatic lubricator, H. Billeter, Jr. 375,597

 Ax, E. Wickert
 375,588

 Ax blanks, die for forming, A. Siegel
 375,573

 Axles, making carriage, C. I. Sheldon...... 375,388 Baling press, S. W. Trabue..... Bar. See Check rein bar. Battery. See Electric battery. Galvanic battery.
Bedstead attachment, H. J. McCormick........... 375.645 Boat. See Life boat. Boilers, pedestal for range, A. P. Creque...... 375.412 Bolt, M. S. Cedarvall 375,604
Bookbinding, G. Huether 375,488 Boot, felt, J. Berkey...... 375,381 Boot jack, J. Berkey 375,330
Boot or shoe. M. Wise. 975,663
Boot or shoe buttonhole piece, Thomas & Phelps. 375,581 Boots and shoes, machine for moulding counters Boots or shoes, detachable sole for, J. Wust...... 375,718 Bottle and stopper, combined, G. A. Fullerton.... 375,347 Bottle show stand, F. F. Cummings...... 375,413 Box. See Electric call box. Lunch box. Box, J. M. Waddill..... Brake. See Car brake. Elevator brake. Hoisting machine brake. Vehicle brake. Brake block, M. Potter..... Brush, blacking, A. W. Brown..... . . 375,836 Building blocks, machine for moulding, H. S. 875,377 Button, E. H. May. 375,373
Button, J. E. Totten 375,582, 375,583 Button and button fastening, J. Ewig....... 375,698 Calelectric generator, E. G. Acheson. 375.408
Calendar stand, Fowler, Jr., & Pope. 375,545 Caliners, dividers, etc., leg joint for, C. P. Fay.... 375,703 Calipers, dividers, etc., leg joint for, L. S. Star Can. See Paint can. Can opener, M. C. Lilly...... Cane crushing mill, sugar, J. H. Man............ 375,579

 Can brake, automatic, J. P. Wood.
 375,407

 Car coupling, D. B. Bowling.
 375,488

 Car coupling, E. M. Reynolds.
 375,386

 Car coupling, W. L. Schlager
 375,386

 Car coupling, W. H. Van Buskirk. 375,661 Car door, grain, W. McGuire. 375,449 . 375,521 Casting chains, mould for, W. Penman... Cement, hydraulic and other, R. Bosse et al. 375,599 Chair, S. Hayward...... 375,448
 Chair, J. A. Rosen
 375,570

 Chair back and head rest, F. Binder
 375,471
 Chest. See Flour chest. Chopper. See Cotton chopper. Churn, G. W. Snadon..... Cigar mould and lifter, combined, W. F. Newhoff. 875,713 Cigar moulding machine, G. D. Eiges...... 375,615, 375,616 Cigar wrapper cutting machine, H. C. Myers..... 375,502 Clasp. See Garment clasp. Clamp. See String clamp. Cleaner See Boiler cleaner Clock alarm. McGlynn & Howells.....
 Coat and vest, combined, H. L. Basch
 375,595

 Coffee roaster, C. H. Madsen
 875,641
 Commutator or electric circuit breaker, C. D.
 Baker
 375,328

 Composing stick, P. S. Kellogg
 375,360
 Converter, motor, and generator, electrical, R.
 Eickemeyer.
 375,542

 Copy holder, Parkinson & Locke.
 375,425
 . 375,968 . 375,492 Coupling. See Car coupling. Hose coupling. Pipe

 Cultivator, J. R. Wyatt
 375,719

 Cultivator attachment, A. E. Kunderd
 375,68

 Cultivator. gopher, T. O. Thorson
 375,514

Curtain fixture, R. P. Trimble....... 375,585

Ditching and tile laying machine, O. C. Carr...... 375,602

Derricks and cranes, attachment for, J. Q. Dick

Digger. See Post hole digger. Potato digger. Distilling wood, apparatus for. G. Hunziker....

Derrick, windmill, T. O. Perry.....

			. 0	_
Door hanger, W. B. Cogger	375,468 375,690	Lunch box, M. C. Louis Lunch box, expansible, J. S. McGuire Magnets, tension, device for winding electro, J. W. Easton	375,498	ļ
Draught equalizer, G. H. Inghram Drill. See Railway track drill. Dyeing wool tops, apparatus for, W. S. Alexan-	375,357	Mail bag fastening, T. H. Gordon Mail bag fastening, J. Hellings Mail bags. trunks, etc., fastening device for L.	375,446	
der Earmuff, D. Basch	375,591 375,594	Russell	-	
Egg boiler, automatic, G. L. Dale	375,363	Greene		İ
Electric call box, L. B. Firman Electric circuit changing and signalingapparatus. I. H. Farnham	375,617	Medical compound, L. B Hoppel Metal bending machine, T. W. Stewart Metal roll, T. Handloser	375,706 375,512	
Electric conductor, underground, D. C. James Electric lights, flexible standard and conductor	375,633	Meter. See Electric meter. Micrometer gauge, G. E. Whitehead		1
for, E. C. Fasoldt Electric meter, W. A. Stern Electric motor, E. Julien	375,392	Mill. See Cane crushing mill. Fanning mill. Grinding mill. Pug mill. Rolling mill. Mincing knife, J. F. Foster	375 489	
Electric motor, J. F. McLaughlin Electrical cut out device, J. C. Chamberlain	375,560 375,476	Mining machine, portable electric coal, J. B. Sneathen et al		(
Electro-magnetic arresting and releasing mechanism. I. H. Farnham Elevator, W. Z. Ransom	375,544	Mirrors, apparatus for silvering glass in the manufacture of, C. Laval	375,640	
Elevator brake, R. L. Teed Elevator chain, G. Lauder Engine. See Steam engine.		Motor. See Electric motor. Motor, M. J. Barrow Mowing machine, J. M. Waldorf		
Engraving machine for multiple combinations Gudel & Chopard	375,705	Multiple switch boards, double spring loop key and circuit for, C. E. Scribner	375,6 85	İ
Explosive, C. Roth		Music chart, C. S. Mason		1
Fanning mill, C. Altringer Farm rake, A. C. Wait Faucet, W. B. Rodman	375,401	Muzzle, B. U Hiester	375,4 18	÷
Feather edging and channeling tool, G. B. Dunham	375,345	Nut iock, J. J. Mulvaney, Jr Organs, pneumatic action for, G. S. Hutchings	375,711 375,356	1
Feather tip pin, E. W. Moch	375,329	Packing, elastic core, A. Montgomery	375,505	ï
Ferrule or like article, C. P. Hawley Filter. H Stockheim (r)	10,891	Pan. See Ash pan. Paperhanger's folding table, E. M. Addaman	375 , 52 3	
C. D. Rogers	. 375,5 6 9 . 375,626	Pianoforte, W. H. Ivers	375,671	1
Fire escape, Conover & Conrick	. 375,701			
Fire escape, J. M. Wakeman Fire extinguisher and alarm, C. E. Kells, Jr	. 375,587 . 375,636	Pipes, method of and apparatus for laying submarine, Thacher & Breymann	375,474	ļ
Flour chest, D. W. McCullough	375,519	P'anter, R. E. Hyde	375,469)
Frog, J. A. Durvin	•	Plow, garden, B. McHatton	375,525	ŀ
Furniture, concealed repository in cabinet, F		Post. See Lathe tool post. Post hole digger, S. L. Madden	875,556	1
Gauge. See Micrometer gauge. Galvanic battery, H. B. Cox		Potato digger, C. M. French		
Game, H. Guillaume	. 375,41 9	Pug mill, D. Peters	375,415	6
Garment clasp or fastener, J. Ewig	. 375,699 -	Pulverizer, C. La Dow	375,465 875,635	,
bonic acid, J. H. Digeon	. 375,424	Quilting machine, W. Koch		1
Gas lighting, sparker coll for, R. Eickemeyer Gas lighting, system of electric, W. H. Doering Gate. See Counter gate. Railway gate.		Railway channel, cable, W. Dinham	375,480 375,550	5
Generator. See Calelectric generator. Stean generator.		Railway gate, J. E. Secord	375,65 3	3
Glass grinding machinery, Besson & Kent Grain binder, W. M. Steinle Grain separator, J. Grider	. 375,659	Railway signal, Patton & Conner	375,649	Ρį
Grinding and polishing metals, etc., machiner for, J. Hampton	. 375,625	Railway system, portable, A. M. Leinwather	375,422	? [
Grinding mills, fastening for runners of, H. H	[.	Ratchet and lever mechanism, J. Bayet	875.592	}
Guard. See Spectacle nose guard. Hair cutting implement, A. Frey Hame attachment, I. H. Hockspeier		Reamer, H. Kingman		1
Handle. See Shovel handle. Hanger. See Door hanger. Hat hanger. Harmonicas, sliding mouthpiece for, G. A. De		Register. See Bank register. Rheostat and contact point, automatic, A. G. Waterhouse		,
lano	. 375,608 . 375,691	Ring. See Curtain ring. Riveting device, R. J. Kyle		
Harrow, A. W. Stevens Harrow, L. W. Stevens Harrow for cultivating listed corn, J. A. Pimlot.	. 375,511	Rolling mill, F. W. Stammler		
Harvester, A. B. Mouck Harvester reel, J. C. & G. A. Cunningham Hat hanger, T. A. Johnson	. 375,694	Rubber fabric, gossamer. M. L. Derick Rubber, manufacturing non-blooming vulcanized	. 375,478 1	8 j
Hay rake and loader, W. L. Evans, Jr	375,444	Rubber, recovering and utilizing waste, S. M.	375,43	; 6 ₁
Heating apparatus, G. A. Barnard Heating apparatus, A. Walker Heel nailing machine, E. E. Orr	375,662	Sad iron, M. J. Shimer	. 375 ,3 8	
Hinge, J. Strachan	375,555	Sal ammoniac or flux skimmings, treating, G. G		
Holder. See Copy holder. Hose holder. Hook. See Snap hook. Whiffletree hook.		Sash fastener, T. Beecher	. 3 7 5,52	8
Hose coupling, J. H. Sewall	375.472	securing.S. R. Deacon	. 375,34	4
Hotel signal, H. B. Cox Indicator. See Dose indicator. Station indicator.		Saw, stereotyper's, R. E. Lloyd	. 375,36	9
Iron. See Sad iron. Jack. See Boot jack. Lasting jack. Lifting	ıg.	Saws, device for dressing the teeth of, R. E. Poin dexter	- . 375, 6 5	0
jack. Jewelry, B. J. Angell			. 375,35	0
Knife. See Mincing knife. Knitting machines, burr wheel for, R. W. Gorm Lace fastener, shoe, E. E. Warner			. 375,41	
Ladder and adjustable bench, combined ste	M. 375,40	rator. Sewing machine ruffler attachment, W. R. Par	-	~•
Ladder, folding, W. S. Ethridge	375,53 •••	Sewing machine shuttle, P. Diehl	. 375,69 }	95
Last, Shaw & Chase	375,57	Shovel handle, C. A. Maynard	. 375,45	54
Lasting jack, D. F. Messer Lathe tool post, C. W. Hunt Leather, uniting pieces of, L. O. Dion	375,50 375, 4 8	0 Signal. See Hotel signal. Railway signal. 9 Sleeve stay, F. H. Nichols	375,50	03
Leveling instrument, hydrostatic, C. A. Karr Life boat, W. W. Parker	375,45 375,56	0 Slicer, vegetable, D. F. McDonald	375,64 375,5	46 54
Lifting jack, E. HuberLighting device, J. O. HoweLock. See Cylinder lock. Nut lock. Seal lock	375,63		375,5	22
Locking device for hatches, doors, etc., T. J. Pe	et - 375,45	Soda water apparatus, F. H. Lippincott	375,4 375,3	52 34
Locomotives, pilot or cow catcher for, F. Norel Loom, Bowker & Williams Lubricator. See Automatic Jubricator.			375,5	86

		_
Lunch box, M. C. Louis Lunch box, expansible, J. S. McGuire		Sı
Magnets, tension, device for winding electro, J. W. Easton	j	Sı
Mail bag fastening, T. H. Gordon	375,446	Sı
Mail bag fastening, J. Hellings	375,551	Sı
Russell	375,684	Sı
Greene	375,671	8
Mattresses. adjustable support for wire, J S. Wertz	875,432	Si
Medical compound, L.B Hoppel Metal bending machine, T. W. Stewart		St
Metal roll, T. Handloser	375,352	St
Micrometer gauge, G. E. Whitehead	375,6 88	80
Mill. See Cane crushing mill. Fanning mill, Grinding mill. Pug mill. Rolling mill.		St
Mincing knife, J. F. Foster	375,483	Si
Sneathen et al	375,390	S
Mirrors, apparatus for silvering glass in the manufacture of, C. Laval	375,640	St
Mould. See Cigar mould. Motor. See Electric motor.		St
Motor, M. J. Barrow	375,410	Sı
Mowing machine, J. M. Waldorf	375,431	Т
and circuit for, C. E. Scribner	375,685	Т
Musical instrument, mechanical. Chinnock &		Т
Taylor		т
Necktie fastener, B. Goodman Nut lock, P. Fesler	375,418	Т
Nut lock, J. J. Mulvaney, Jr	375.711	Т
Organs, pneumatic action for, G. S. Hutchings Packing, elastic core, A. Montgomery	375,356 375,501	T
Padlock, permutation, Palmer & Mudge	375,505	т
Paint car, W. Vogel Pan. See Ash pan.		
Paperhanger's folding table, E. M. Addaman Parasol, W. H. Belknap		T
Photographic shutter, C. D. Durnford	375,671	Т
Pianoforte, W. H. Ivers		Т
Pipe coupling, G. Gibbs Pipe laying apparatus, A. Wilbur	375,547 375,404	Т
Pipes, method of and apparatus for laying subma-		Т
rine, Thacher & Breymann		
Plow, C. Anderson		T
Plow, garden, B. McHatton	375,647	V
Plows, skeleton frame for, C. Anderson Pocket case, combined, L. G. Raffel		V
Post. See Lathe tool post. Post hole digger, S. L. Madden	875.556	V
Potato digger, C. M. French	375,484	V
Protector. See Tree protector.	373,433	V
Pug mill, D. Peters Pulley, G. T. Eames		7
Pulverizer, C. La Dow	375,365	7
Pumps, connecting rod for oil, W. H. Wheeler Pumps, vent stopper for, Johnston & Buffington	875,635	7
Quilting machine, W. Koch	875,552	V
Radiator, P. J. Kelly	375,493	7
Railway crossing frog. O. S. Hawyer	375,550	v
Railway frog. Hart & Hendry	375,627 375,6 5 3	v
Railway rail joints, device for preventing the depression of, Lyon & Gorrell		V
Railway signal, Patton & Conner	375,649	į
Railway signal connection, F. H. Treacy		V
Railway track drill. L. J. Crecelius375,669, Rake. See Farm rake. Hay rake.	375,670	1
Ratchet and lever mechanism, J. Bayet		V
Razor, safety, A. S. Aloe		1
Reel. See Harvester reel. Refuse burner, C. T. Bucher	375,667	1
Register. See Bank register.		1
Rheostat and contact point, automatic. A. G. Waterhouse		1 _
Ring. See Curtain ring. Riveting device, R. J. Kyle	375,677	١,
Roaster. See Coffee roaster.		١,
Rolling mill, F. W. Stammler	375,716	1
Rubber fabric, gossamer, M. L. Derick		١
soft, F. Wilhoft	375,405	ļ :
Rubber, recovering and utilizing waste, S. M. Allen	375,436	I
Ruler, nautical parallel, C. Wilson	375,590	
Sails, anti-frictional leader for the sheets of L		1
Sal ammoniac or flux skimmings, treating, G. G		¦ 1
Convers	375,528	. (
Sash fastener, J. H. Shaw	. 375,656 r	្រ
securing_S. R. Deacon		
Catababa ata analan aita aatab faa D. W. Chan	. 375,344	1
Satchels, etc., spring side catch for, R. W. Chap man	. 3 75,344 -	
Saw, stereotyper's, R. E. Lloyd	. 375,344 - . 375,340 . 375,369	1.
Satchels, etc., spring side catch for, R. W. Chapman	. 375,344 . 375,340 . 375,369 . 375,623	Ė
Satchels, etc., spring side catch for, R. W. Chapman. Saw, stereotyper's, R. E. Lloyd. Saw tooth dresser, J. Hadden Saws, device for dressing the teeth of, R. E. Poin dexter Scale, weighing, F. S. Washburn.	. 375,344 - 375,340 . 375,369 . 375,623 - 375,650 . 375,520	
Satchels, etc., spring side catch for, R. W. Chapman	. 375,344 - 375,340 . 375,369 . 375,623 - 375,650 . 375,520 . 375,350	
Satchels, etc., spring side catch for, R. W. Chapman. Saw, stereotyper's, R. E. Lloyd. Saw tooth dresser, J. Hadden. Saws, device for dressing the teeth of, R. E. Poin dexter. Scale, weighing, F. S. Washburn. Screw, saw, C. Glover. Scythe sharpening device, M. Humpfner. Seal lock, Coale & Brumble.	. 375,344 . 375,340 . 375,369 . 375,623 . 375,650 . 375,520 . 375,350 . 375,768	
Satchels, etc., spring side catch for, R. W. Chapman	. 375,344 - 375,340 . 375,369 . 375,650 . 375,520 . 375,350 . 375,708 . 375,417	
Satchels, etc., spring side catch for, R. W. Chapman. Saw, stereotyper's, R. E. Lloyd	. 375,344 . 375,340 . 375,369 . 375,623 . 375,650 . 375,520 . 375,708 . 375,417	
Satchels, etc., spring side catch for, R. W. Chapman. Saw, stereotyper's, R. E. Lloyd. Saw tooth dresser, J. Hadden	. 375,344 375,369 . 375,623 - 375,623 - 375,623 . 375,620 . 375,520 . 375,520 . 375,417 375,681	
Satchels, etc., spring side catch for, R. W. Chapman. Saw, stereotyper's, R. E. Lloyd. Saw tooth dresser, J. Hadden. Saws, device for dressing the teeth of, R. E. Poin dexter. Scale, weighing, F. S. Washburn. Screw, saw, C. Glover. Scythe sharpening device, M. Humpfner. Seal lock, Coale & Brumble. Seam pressing machine, H. Fellows. Separator. See Grain separator. Steam separator. Sewing machine ruffler attachment, W. R. Parasons. Sewing machine shuttle, P. Diehl. Sheet metal, die for cutting planchets from, J. G.	. \$75,344 . 375,369 . 375,623 . 375,623 . 375,650 . 375,520 . 375,360 . 375,417 . 375,681 . 375,681 . 375,681	
Satchels, etc., spring side catch for, R. W. Chapman. Saw, stereotyper's, R. E. Lloyd. Saw tooth dresser, J. Hadden	. 375,344 . 375,369 . 375,623 . 375,623 . 375,623 . 375,520 . 375,708 . 375,708 . 375,417 . 375,681 . 375,681 . 375,691 . 375,691	
Satchels, etc., spring side catch for, R. W. Chapman. Saw, stereotyper's, R. E. Lloyd. Saw tooth dresser, J. Hadden. Saws, device for dressing the teeth of, R. E. Poin dexter. Scale, weighing, F. S. Washburn. Screw, saw, C. Glover. Scythe sharpening device, M. Humpfner. Seal lock, Coale & Brumble. Seam pressing machine, H. Fellows. Separator. See Grain separator. Steam separator. Sewing machine ruffler attachment, W. R. Parsons. Sewing machine shuttle, P. Diehl. Shovel handle, C. A. Maynard. Shovel handle, C. A. Maynard.	. 375,344 . 375,360 . 375,369 . 375,623 . 375,650 . 375,520 . 375,568 . 375,417 . 375,681 . 375,681 . 375,681 . 375,681 . 375,681 . 375,681	
Satchels, etc., spring side catch for, R. W. Chapman. Saw, stereotyper's, R. E. Lloyd	. \$75,344 - 375,340 . \$75,369 . \$75,523 - 375,623 - 375,520 . \$75,520 . \$75,708 . \$75,681 . \$75,681 . \$75,681 . \$75,356 . \$75,435 . \$75,435 . \$75,435	3
Satchels, etc., spring side catch for, R. W. Chapman. Saw, stereotyper's, R. E. Lloyd. Saw tooth dresser, J. Hadden. Saws, device for dressing the teeth of, R. E. Poin dexter. Scale, weighing, F. S. Washburn. Screw, saw, C. Glover. Scythe sharpening device, M. Humpfner. Seal lock, Coale & Brumble. Seam pressing machine, H. Fellows. Separator. See Grain separator. Steam separator. Sewing machine ruffler attachment, W. R. Parsons. Sewing machine shuttle, P. Diehl. Sheet metal, die for cutting planchets from, J. G. Hodgson. Shovel handle, C. A. Maynard. Shutter worker, F. E. Brown. Signal. See Hotel signal. Railway signal. Sleeve stay, F. H. Nichols. Sleigh, Cox & Forton.	. \$75,344 - 375,369 . 375,369 . 375,623 - 375,623 . 375,520 . 375,568 . 375,417 - 375,681 . 375,691 . 375,691 . 375,691 . 375,417	37
Satchels, etc., spring side catch for, R. W. Chapman. Saw, stereotyper's, R. E. Lloyd. Saw tooth dresser, J. Hadden. Saws, device for dressing the teeth of, R. E. Poin dexter. Scale, weighing, F. S. Washburn. Screw, saw, C. Glover. Scythe sharpening device, M. Humpfner. Seal lock, Coale & Brumble. Seam pressing machine, H. Fellows. Separator. See Grain separator. Steam separator. Sewing machine ruffler attachment, W. R. Par sons. Sewing machine shuttle, P. Diehl. Sheet metal, die for cutting planchets from, J. G. Hodgson. Shovel handle, C. A. Maynard. Shutter worker, F. E. Brown. Signal. See Hotel signal. Railway signal. Sleeve stay, F. H. Nichols. Sleigh, Cox & Forton. Slicer, vegetable, D. F. McDonald.	. \$75,344 - 375,369 - 375,623 - 375,650 - 375,520 - 375,68 - 375,68 - 375,68 - 375,69 - 375,41 - 375,50 - 375,41 - 375,50 - 375,43 - 375,43 - 375,50 - 375,60 - 375,60 - 375,60 - 375,60 - 375,60 - 375,60 - 375,60 - 375,60	37 37 37 37 37 37 37 37 37 37 37 37 37 3
Satchels, etc., spring side catch for, R. W. Chapman. Saw, stereotyper's, R. E. Lloyd. Saw tooth dresser, J. Hadden. Saws, device for dressing the teeth of, R. E. Poin dexter. Scale, weighing, F. S. Washburn. Screw, saw, C. Glover. Scythe sharpening device, M. Humpfner. Seal lock, Coale & Brumble. Seam pressing machine, H. Fellows. Separator. See Grain separator. Steam separator. Sewing machine ruffler attachment, W. R. Parasons. Sewing machine shuttle, P. Diehl. Sheet metal. die for cutting planchets from, J. G. Hodgson. Shovel handle, C. A. Maynard. Shutter worker, F. E. Brown. Signal. See Hotel signal. Railway signal. Sleeve stay, F. H. Nichols. Sleigh, Cox & Forton. Slicer, vegetable, D. F. McDonald. Snap hook, J. Letchworth. Snap hook, Sears & Kelley. Snow shoe attachment. B. C. Woodbury.	. \$75,344 - 375,369 . 375,369 . 375,623 - 375,650 . 375,520 . 375,683 . 375,417 - 375,681 . 375,691 . 375,401 . 375,401 . 375,401 . 375,500 . 375,500 . 375,500 . 375,500 . 375,500 . 375,500	37 :
Satchels, etc., spring side catch for, R. W. Chapman. Saw, stereotyper's, R. E. Lloyd. Saw tooth dresser, J. Hadden. Saws, device for dressing the teeth of, R. E. Poin dexter. Scale, weighing, F. S. Washburn. Screw, saw, C. Glover. Scythe sharpening device, M. Humpfner. Seal lock, Coale & Brumble. Seam pressing machine, H. Fellows. Separator. See Grain separator. Steam separator. Sewing machine ruffler attachment, W. R. Parsons. Sewing machine shuttle, P. Diehl. Sheet metal, die for cutting planchets from, J. G. Hodgson. Shovel handle, C. A. Maynard. Shutter worker, F. E. Brown. Signal. See Hotel signal. Railway signal. Sleeve stay, F. H. Nichols. Sleigh, Cox & Forton. Sliegr, vegetable, D. F. McDonald. Snap hook, J. Letchworth. Snap hook, Sears & Kelley.	. \$75,344 . 375,369 . 375,623 . 375,623 . 375,623 . 375,520 . 375,683 . 375,683 . 375,684 . 375,693 . 375,417 . 375,524 . 375,434 . 375,504 . 375,64 . 375,507 . 375,524 . 375,525 . 375,57 . 375,525 . 375,57 . 375,525	375

		▔
İ	Speech and other sounds, apparatus for recording and reproducing, C. S. Tainter 375,579	
ļ	Spinning machines, spindle driving mechanism	Ī
	for, Clarke & Williams	i
!	Spooling machines, stop motion mechanism for, B llings & Parkhurst	a
l	Spooling machines, thread severing stop for, J. T. Willmarth	t
	Spring. See Vehicle spring. Springs, etc., apparatus forforming, J. N. Short 375,577	i
	Sprinkler. See Water sprinkler.	
	Stand. See Bottle show stand. Calendar stand. Flower stand.	l
	Staples, machine for cutting and forming, W. G. Morgan	ì
	Station indicator, R. Fyfe. 375,348 Steam engine, J. A. Arthur 375,689	ı
	Steam generator, A. B. Thomas. 375,580 Steam separator, E. P. Stratton 375,463	l
	Stencils, frame for holding, C. E. Marsh 375,371 Stove, gas, W. A. Whalen 375,686	ı
	Stove or range, R. M. Hermance	U
ĺ	Stove, ventilating, W. J. Keep	1
ļ	String clamp, R. A. G. Lorenz 375,710 Suspenders, J. R. Pollock 375,380	
	Table. See Paperhanger's folding table. Tanning, Millochau & Chailly	
	Tape line case, J. M. Harper	
	Telegraphy, system of synchronism for, G. A. Cassagnes	1
1	Telephone, E. C. Newton 375,456	1
i	Textile fabrics, dry cleaning, J. Scott 375,652 Thermometer, metallic, T. W. Shepherd 375.576]
	Thill coupling. T. G. Mandt	ļ
i	Thong cutter, G. Marsh	
1	Toy and motor for toys and light machinery, J. T. Marean	[
	Toy cannon J. J. Loud	. 1
į	Toy game, T. R. Thompson	1
ļ	Tray and case, carrying, Andrews & Ramsdell 375,437 Tray, gathering, J. Benedict 375,596	
	Tree protector, J. O. Brown	3
ļ	Truck, barrel, Wilson & Newton	` ;
	Tubes, machine for making spirally jointed metal, W. B. Alden	
	Tuning fork, D. W. Segrove	۱ · غ ۲
I	Valve, closet flushing, P. Harvey	3 ∶
İ	Vehicle brake, J. K. P. Timmons	7
	Vehicle running gear, F. G. Mandt 375,642	2
ļ	Vehicle spring, O. Cassity 375,603 Vehicle spring, A. J. Cooper 375,411	ч
	Vehicle springs, shackle for, C. C. Bradley 375,529 Vehicle, two-wheeled, N. S. Parker 375,585	
	Vehicle, two-wheeled, D. S. Pembroke	
	375,381, 375,382	
	Vehicle wheel, A. P. Ricard 375,426 Velocipede, H. J. Hudson 375,700	ĭ !
	Velocipede, H. M. Pope	1 ₁
	Vinegar, making, C. Gould	l į
İ	Vise, M. Crawford	} [
	Wagon body, C. F. Folsome	
İ	Waistband, expanding, A. Levy \$75,367	7
	Washing machine, B. C. Woodrome	1
	Water sprinkler, R. Exley 375,446 Weather strip, S. C. Gooch 375,619 Weighing apparatus, grain, L. C. Tryon 375,516	5
	Weighing apparatus, grain, I. C. Tryon	7
	Wheat, machine for scouring, F. M. Drake 375,612 Wheel. See Car wheel. Vehicle wheel.	
	Wheel, A. Partridge	2
	Whip and cane, combined, O. Godward 375,486	5
	Whips, machine for laying button moulds on, C. J. Bradley	3
,	Wind wheels, automatic regulator for, J. F. Snethen	
	Window, Palmer & Munro	4 .
	Wire coiling machine, F. M. Leavitt 375,678	8
,	Wrench, C. E. Murray	5
	DESIGNS.	1
)	Badge, pin, etc., C. G. Malliet 17,98;	3 3
•	Bell stand, portable electric, C. A. Tucker	2
Ó	Curtain, J. Ferguson	3
	Lamp body, J. K. Brown	
3	Rug, J. Pegel	
L	TRADE MARKS.	
)	Accordions, J. F. Stratton	9!
3	Phosphor Bronze Smelting Company 15,06 Beer, lager, Germania Brewing Company 15,06	
)	Cure for piles, J. E. Hooper	
)	faced, Crompton Company 15,06	
3	Lamps and tubular lanterns, tubular, R. E. Dietz	1
7	Lard, refined and leaf, G. C. Napheys & Son 15,06	
	Medicines for the cure of dyspepsia and malaria, F. Hiller, Jr	
	Silk dress goods, J. Wanamaker 15,07	

American.	
Speech and other sounds, apparatus for recording	Ï
and reproducing, C. S. Tainter 375,579 Spinning machines, spindle driving mechanism	Ι.
for, Clarke & Williams 375,605]
Spinning spindles, bolster for, T. H. Logan 375,709 Spooling machines, stop motion mechanism for,	ĺ.
B llings & Parkhurst 375,598	1
Spooling machines, thread severing stop for, J. T. Willmarth	1
Springs. See Vehicle spring. Springs, etc., apparatus forforming, J. N. Short 375,577	١
Sprinkler. See Water sprinkler.	ľ
Stand. See Bottle showstand. Calendar stand. Flower stand.	ĺ
Staples, machine for cutting and forming, W. G.	
Morgan 375,375 Station indicator, R. Fyfe 375,348	l
Steam engine, J. A. Arthur	l
Steam separator, E. P. Stratton 375,463	l
Stencils, frame for holding, C. E. Marsh 375,871 Stove, gas, W. A. Whalen 375,686	l.
Stove or range, R. M. Hermance 375,530	Ļ
Stove, straw burning cook, W. W. Swan 375,395 Stove, ventilating, W. J. Keep 375,359	1
String clamp, R. A. G. Lorenz 375,710	Ì
Suspenders, J. R. Pollock	l
Tanning, Millochau & Chailly	l
Tape line case, J. M. Harper	l
Telegraphy, system of synchronism for, G. A. Cassagnes	1
Telephone, E. C. Newton 375,456	1
Textile fabrics, dry cleaning, J. Scott375,652 Thermometer, metallic, T. W. Shepherd375.576	ľ
Thill coupling. T. G. Mandt 375,643	ļ
Thong cutter, G. Marsh	
Thompson	Ì
Marean	Ì
Toy cannon, J. J. Loud	į
Toy pistol, G. Wilken	į
Tray, gathering, J. Benedict 375,596	1
Tree protector, J. O. Brown 375,693 Truck, barrel, Wilson & Newton 375,406	
Tube. See Speaking tube.	
Tubes, machine for making spirally jointed metal, W. B. Alden	;
Tuning fork, D. W. Segrove 375,654 Turn buckle blank, G. E. Whitehead 375,687	٠.
Valve, closet flushing, P. Harvey	
Valve, safetywater gauge, P. Barclay	
Vehicle, electrically propelled, S. D. Field 375,346	1
Vehicle running gear, F. G. Mandt	
Vehicle spring, A. J. Cooper	1
Vehicle, two-wheeled, N. S. Parker 375,565	
Vehicle, two-wheeled, D. S. Pembroke	i
375,381, 375,382	
Vehicle wheel, A. P. Ricard	
Velocipede, H. M. Pope	ij
Vessels, device for unloading, G. W. Price 375,715 Vinegar apparatus, C. Gond 376,622	1
Vinegar, making, C. Gould	1
Wad sorting machine, P. Shelby 375,509	١į
Wagon body, C. F. Folsome	,
Waistband, expanding, A. Levy \$75,367	'
Washing machine, B. C. Woodrome	
Water sprinkler, R. Exley	۱
Weather strip, S. C. Gooch	1
Wells, elevating apparatus for, A. W. Swift 375,717	П

	Accordions, J. F. Stratton	15,069	
١	Alloys and articles made therefrom, metallic,		
	Phosphor Bronze Smelting Company	15,068	Į
ı	Beer, lager, Germania Brewing Company	15,063	
	Cure for piles, J. E. Hooper	15,065	
	Fabrics of all varieties except carpets, pile sur-		
١,	faced, Crompton Company	15,061	
	Flour, wheat, J. H. Abbott	15,060	
	Lamps and tubular lanterns, tubular, R. E. Dietz		:
i	Company	15,062	
	Lard, refined and leaf, G. C. Napheys & Son	15,067	
	Medicines for the cure of dyspepsia and malaria,		
	F. Hiller, Jr	15,064	
	Silk dress goods, J. Wanamaker	15,070	
l	Window shadings and fixtures, J. C. Wemple Com-		
5	pany	15,071	
	Yeast powder, Michel & Co	15,066	

A Printed copy of the specifications and drawing of any patent in the foregoing list, also of any patent issued since 1866, will be furnished from this office for 25 cents. In ordering please state the number and date of the patent desired, and remit to Munn & Co., 361 Broadway, New York. We also furnish copies of patents granted prior to 1866: but at increased cost, as the specifications, not being printed, must be copied by hand.

Canadian Patents may now be obtained by the inventors for any of the inventions named in the foregoing list, provided they are simple, at a cost of \$40 each. If complicated, the cost will be a little more. For full instructions address Munn & Co., 361 Broadway,

Advertisements.

nside Page, each insertion - - - 75 cents a line. Back Page, each insertion - - - \$1.00 a line. The above are charkes per agate line—about eight words per line. This notice shows the width of the line, and is set in agate type. Engravings may head advertisement, 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 next issue.

SEBASTIAN, MAY & CO'S Improved Screw Cutting LATHES Power Drill Presses, Chucks, Drills, Dogs, and machinists' and amateurs' outfits. Lathes in trial, Catalogues mailed on application 165 W. 2d St., Cincinnati, O



ARTESIAN

THE COPYING PAD.—HOW TO MAKE and how to use; with an engraving. Practical dissections how to prepare the gelatine pad, and also the an ine inches by which the copies are made; how to apply the written letter to the pad; how to take off copies of the letter. Pontained in SCENTIFIC AMERICAN SUPPLEMENT, No. 43%. Price 10 cents. For sale at this office and by all newsdealers in all parts of the country.



PHOTO-ENGRAVING PROCESSES.— The "Washout" process. The swelled gelatine process Full details of each. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, NO. 612. Price 10 cents. To be had at this office and from all newscealers.



BEST SHORT TELEPHONES

PRICES GREATLY REDUCED. Ellsworth's "El Eco" Telephones

For short lines and speaking tube purposes. \$7.50 per pair. Send two2-cent stamps for illustrated catalogue and circulars.

KNUDSON & ELLSWORTH, 39 Nassau St., N. Y. City.

MACHINERY PALACE OF THE PARIS Exhibition of 1889.—Description of the main gallery of the machinery Palace, and of the 36.2% foot trusses which are to be used in its construction. Wigh 2 engravings. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, NO. 394. Price 10 cents. To be had at this office and from all newsdealers.

OIL, LIME & SCIOPTICONS
ELECTRIC LIGHT & SCIOPTICONS
FOR PUBLIC OF HOME EXHIBITIONS,
Best Plain of Colored Mugic Lanteru Sildes.
L. J. MARCY, 1694 Chestuut St., Philadelphia.



Van Duzen's Pat. Longe Pulley Oller
Highest Indorsements,
Enviable Reputation,
Scientific Pedigree
A two years' test by conservative
manufacturers of national reputation has shown it to be the only perfect Lubricator for Loose Pulleys in
use. Prices very reasonable. Send
for our "Catalogue Number 55."
VAN DUZEN & TIFT. Cincinnati, O.

Telegraph and Electrical SUPPLIES
Medical Batteries, Inventors' Models, Experimental Work, and fine brass castings. Send for ratalogue C. E. JONES & BHO. Cincianati, & Ris important to us that you mention this paper.

ELECTRIC CONVEYORS.-DESCRIPtion of two ingenious systems for the electric carriage of small packages. Illustrated with 18 engravings. Con-464. Price 10 cents. To be had at this office and from all newsdealers.



PRINT PRESS \$3. Circular size \$8. News-paper size \$44. Type setting easy, YOUL OWN for catalogue presses, type, cards, to factory, KELSEY & CO. Meriden, Conn.

COCOAINE.—DESCRIPTION OF DR. J. L. Corning's system of administering this drug in painful nervous affections. With 8 flures. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 612. Price ten cents. To be had at this office and from all newsdealers.

BRASS WORK, Med-ls & Small Brass Work a specialty, Satisfaction Guaranteed. T. L. McKEEN, Easton, Pennsylvania.

TRAMWAY, FLEXIBLE GIRDER.—DEscription of an improved system of constructing a modification of the well known and extensively used rope or wire trumway. With 21 figures. Contained in Science, FIC AMERICAN SUPPLEMENT, NO. 595. Price 10 cents. To be had at this office and from all newsdealers.

New Catalogue of Valuable Papers

contained in Scientific American Supplement, sent free of charge to any address.

MUNN & CO.. 361 Broadway, N. Y.

SUSPENSION Steel Wheels, plain and rubber tires. Tricycles, Velocipedes, etc. Weston & Co., Syracuse, N.Y.

TO AMERICAN MANUFACTURERS Wishing to open business with India, piease send price lists of real aluminum gold jewellery, and all sorts of fancy goods, curiosities, and latest novelties, scientific instruments, and tays, etc., to M. KANK & COMPANY, 134 Kalkudevo Road, Bombay.



ELECTRIC LICHT AND POWER. Edoo System of Arca and Incandescent Lighting. Direct or in connection with the Storage Batteries of the Electrical Accumulator Co. Dynamos, Motors, Lamps. Batteries, and General Elec-