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valuable for strength and durability. Circu Pittsburgh Steel Casting Co., Pittsburgh, Pa.

For Best Presses, Dies, and Fruit Can Tools, Bliss & Williams, cor. of Plymouth and Jay Sts., Brooklyn, N.Y. Hydraulic Presses and Jacks, new and second hand.

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10 cts. Second-hand catalogue, 10 ets. Circulars free. Theo. J. Harbach, 809 Filbert St., Pniladelphia, Pa. Friction Clutches warranted to save Rolling Mill Ma-

chinery from breaking. Also Hoisting Machines and Safety Elevators. D. Frisbie & Co., New Haven, Conn. For Sale.—An Elevator, with Carriage, suitable for a Hotel. Apply to Morgan & Co., 154 South 4th St., Phila-

For Solid Wraught Iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for

Felt of every description for Manufacturers' purposes especially adapted for Polishing, can be furnished in any thickness, size or shape. Tingue, House & Co., Manufacturers. Salesroom, 69 Duane St., N. Y. Factory at Glenville, Conn.

Improved Wood-working Machinery made by Walker Bros., 73 and 75 Laurel St., Philadelphia, Pa.

ican, which I will sell (singly or together) at \$I each, to be sent by express. See advertisement on page 29. John Edwards, P.O.Box 773, N. Y.

Ice Machines. Clayton & Cook, Daretown, N. J. Skinner Portable Engine Improved, 2 1-2 to 10 $\,$ H. P. Skinner & Wood, Erie, Pa

Best Machinists' Tools. Pratt & Whitney, Hartford, Ct. Lansdell & Leng's Lever and Cam Gate Valves. Cheapest and best. Leng & Ogden, 212 Pearl St., N.Y.

More than twelve thousand crank shafts made by iron. See advertisement, page 46.

For the best Bone Mill and Mineral Crushing Machines, address Baugh & Sons, Philadelphia, Pa.

AN ASTONISHING OFFER.

in another column to give away, absolutely, mystery; but that they do there is no ques-

The Independent is now publishing Rev. tures, which are creating so much discussion everywhere.

See advertisement of The Independent in this paper.



- means of a coil of steam pipe placed in the oil vat and fromrust. connected with an ordinary flue, would it be necessary to superheat the steam? A. It will be advisable to superheat the steam, as the pressure of saturated steam due to the required temperature is very high.
- black thoroughly ground with good soap and a very little dilute glycerin gives satisfaction. Shellac dissolved in strong aqueous solution of borax may also be used as a vehicle. For fine work, soluble aniline black dissolved in hot dilute glycerin is preferred.
- (3) O. A. asks: Is there some cheap way that I can regulate my baking oven automatically when it gets heated to about 300°? A. We do not recall any electro-magnet, a long coil of fine wire or the reverse? means to do this better than by a thermometer, having its column of mercury in an electric circuit; so that the circuit will be closed by the mercury when the column reaches the height of 300°, and whereby an electromagnet will be caused to attract an armature secured to the lever of a damper.
- (4) A. F. W. says that he has been told that those who subsist almost wholly on a vegetable diet are liable to lose their mental power and vigor in old age. A. We do not think that there is any very good foundation for this statement.

How great an atmospheric pressure can a man of average power accustom himself to exercise in moderately? A. The precise limit at which men can work has probably never been definitely ascertained, while at the same time it is doubtful whether work can be carried on under any increase of pressure without danger

- (5) H. A. Z. asks (1) how to combine an oil with powdered black lead so as to make a black lead lubricator? A. The best way is to grind the clean substance with the oil. 2. What kind of oil could be most ers of Burr Mill Stones and Flour Mill Machinery of all effectually used and with combined cheapness? A. A good quality of rosin oil would perhaps answer best.
- (6) R. J. F. asks: 1. Where can I find the pest description of an electrical engine? A. See p. 184 of our issue of September 22, 1877. 2. Is Bell's tele-MENT, August 25, 1877. 4. In making an electric light, would not 2 or 3 large gravity cells, attached to a Ruhm-Steel Castings from one lb. to five thousand lbs. In- korff coil of medium size, answer the purpose and give Circulars free, as good results as a battery of from 60 to 100 cells of Grove's set up in the intensity way? A. Not by any means known of at present, although the use of the Ruhmkorff coil, as a means to furnish light, is being closely studied.
 - (7) M. I. wishes to know the proper speed for a 55 inch circular saw cutting white pine, and the proper time to gauge the speed, whether when cutting or when running light? A. You can run the saw, when in the cut, 650 revolutions a minute.

Also, having previously used a 10 foot pipe for conpower will be experienced by using a pipe 20 feet in length? A. If the steam pipe is nnprotected there will be more loss from radiation when the length is innot determine from the data sent) and is well fitted, the change will make no material difference.

Also a recipe for a liquid in which to place pens after take the place of a pen stand and penwiper? A. Probably water will do as well as any other liquid.

- (8) H. A. S. asks for a rule to find the required diameter of a shaft where the length of shaft. number of revolutions per minute, and number of horse power to be transmitted is known? A. Let P=pressure in lbs. per square inch acting with an arm of a inches, then the diameter in inches=0.0934×3 VP× a
- (9) W. M. asks: 1. What can I polish zinc stove boards with, to remove the dullness? A. Fine Bound Volumes of the Scientific American.—I have sand moistened with very dilute sulphuric acid (1 part on hand about 200 bound volumes of the Scientific Amer- acid to 20 of water). 2. Is there anything better than oxalic acid for cleaning copper boilers? A. Try dilute hydrochloric acid. Grease must be first removed with a sal soda solution.
- (10) J. P. P. writes: 1. You say in your "Answers to Correspondents," in the issue of December 22, 1877, p. 396, answer 49, that 4 ozs. of copper wire is the amount to use for a pair of telephones. I judge by that you mean the wire wound on the spools at one end of the magnet. I bought 1 oz. of No. 36 insulated Chester Steel Castings Co. now running; 8 year's constant copper wire of an electrician, who said that it was suffiuse prove them stronger and more durable than wrought cient for a pair. Is it impossible to obtain successful results with that amount? Must it be wound in the mechanical appliance in the market, but we cannot say same direction on both magnets? A. The answer you whether or not it is generally efficacious. You can mention refers to the small instrument in common use probably obtain the apparatus at a store where surgical inventa mode of making curves and coils of pipes out Vertical Scientific Grain Mills. A.W.Straub & Co., Phila. described on p. 207 of our issue of October 6, 1877, in instruments are used. which there is but one round barmagnetto each instru-THE INDEPENDENT, of New York, offers arate instruments shown in Fig. 1, which would be 2 is a fact, we must ask some of our readers to aid us in the injector work? A. It is supposed to act somewhat ozs. of insulated wire (of between No. 36 and 40 gauge) a Worcester's Unabridged Quarto Pictorial this amount will give a good result, although the infor the spool of one machine made on that plan: and Dictionary, which retails everywhere for strument may with care be made to work with less. \$10, and is, of course, a household necessity. Wind each spool in the same direction. 2. Must the How they can do it is, we must confess, a ends of the magnets on which the wire is wound be north and south poles, or both similar? A. In the description referred to the spool end of the magnet of each instrument is of north polarity. 3. I have been told that successful results depend greatly on the nice- at the Aquarium become clogged with dirt and slime ty with which the distance between the iron plate and and are difficult to clean. Is there any method of JOSEPH COOK'S famous Boston Monday Lec- magnet is adjusted. Is this so? If not, at what dis- cleaning them readily and thoroughly? A. The Barbary tance should the magnet be set to obtain good results? sponges are often difficult to clean perfectly by any distance, but after finishing discovered that it was ma-A. When the bar magnet in this style of instrument is rect means applicable. Hot water and plenty of good chinery steel. By what process can I harden it so that once set at a proper distance (about 3 inch) from the soap are among the best things. Adhering lichen is it will stand? A. Heat it well hot in a mixture of equal iron membrane, it need not be altered unless the membrane is accidentally bruised. 4. How thin must the to 30). Neutral ammon, chloride used hot also works water containing 1 lb. of salt per gallon.

of an inch thick, and of about the diameter shown in Fig. 1. 5. I am using a tin-type plate and it is coated 'stiffness, with some preparation. Would that make any difference in the vibrations? A. If not too heavy it may be left on (without causing any material interference with (1) C. C. P. asks: In boiling linseed oil by the vibration, as it serves to preserve the membrane

- (11) W. V. asks: What is the horse power of the largestlocomotive ever constructed? The steam- ${\bf ship\ City\ of\ Washington\ has\ two\ engines,\ which\ are\ rated}$ over 2,000 horse power. A. We do not think that ex- ing not over 10 inches when loaded? What diameter and (2) A. J. H. asks for a recipe for making periments have ever been made to determine the power marking ink that does not contain anything having a actually exerted by the largest locomotive, but the tendency to dissolve rubber? A. Lampblack or bone. "Janus," with four cylinders, each 15 x 22, is probably capable of higher power than that quoted by you,
 - (12) E. H. B. writes: 1. I wish to get a battery for experimental purposes; will you inform me whether the Grove or Bunsen battery is considered the best? A. The Grove battery is generally preferred on account of the durability of the platina strip, which forms its positive pole. 2. Which is the best for an diameter, that is, so many threads per diameter. For I shall use about three cells of battery and want to make as powerful a magnet as possible. A. The wire should be of such size and length that its resistance will equal the resistance of the battery. Three lbs. of using the battery power you mention.
 - (13) C. S. writes: 1. Will you please inform me what the difference is between a high and low pressure steam engine? A. The first exhausts its steam into and against the pressure of the atmosphere; the second exhausts into a partial vacuum produced by the condensation of its own steam. 2. For what purpose are the high and low pressure steam cylinders in a compound engine? A. For the purpose of obtaining more work from steam of a high pressure.
 - (14) H. R. T. & Co. write: We pass our Is it safe to use the water again in the boiler of the steam so condensed, or has it received properties from its contact with the copper pipe and also with the grease (tallow) used in oiling the cylinder, that would make it injurious to the boiler? If not this would give us clear water free from lime deposit, as our exhaust is wholly condensed. A. It is safe, provided you can besure that your copper pipes will not leak, so as to contaminate your condensed water with the liquors through which they pass. Allow your condensed water to run into a tank, so that there will always be a surplus of water, on the surface of which, whatever tallow there may be carried over, will float; and if the water in the tank is three feet deep, draw your feed water from affected in rough weather in a similar manner to the a point one foot from the bottom of the tank. You will notice that the tallow is deposited in the exhaust pipes in which the steam condenses, and it would be well to p'ace an ordinary sink trap (which any plumber can furnish) at that point in the exhaust pipes where the tallow accumulates.
- (15) L. N. B. writes that he has a stream running through his land, the water being 2 feet deep and 20 feet wide; the current runs 200 feet a minute. What kind of wheel, he asks, can he use without a dam to work a threshing machine? A. What is called a curducting steam from boiler to steam engine, what loss of rent wheel will answer. It is very similar to the paddle wheel of a steamboat.
- (16) C. R. A. asks: 1. If there exists a law creased. But if the pipe is large enough (which we can- in Pennsylvania requiring steamboilers to be inspected? Or a law prohibiting the hanging of extra weights on safety valves, such as shovels, pokers, tongs, etc.? A. We think not, but we are not very familiar with Pennusing, to prevent their clogging with ink, said liquid to sylvania laws. Some of our readers will please correct us if in error. 2, How often should a boiler be cleaned out that fills up from 11/2 to 2 feet with loose scale in the course of six months? A. Every week.

Should the stopcock be opened at a gas well, allowing the gas to escape without closing valve at furnace, and is there a possibility of the fire coming through gasoline and setting fire to gas at the well? narily, no.

where it is heated by steam? A. Give it a coat of transparent varnish.

(17) I. H. C. writes: A steam engineer, friend of mine, is making a test gauge, and claims that a square inch when thrown into a circle the diameter would be 1.25 inches, and undertook to prove it to me by taking a strip of tin 4 inches in length and showing thatit just meets around a mandrel of that size. A. The area of a circle is found by multiplying its diameter by the decimal '7854; and conversely, the diameter will equal the area divided by '7854, In the case you mention the area of the circle is 1 square inch, and its diameter is therefore 1273 of an inch.

which the nose can be straightened? A. There is a to work them? A. About 4 cells.

What is the cause of the following? When I place a ment, and one spool on each magnet; and the answer finger over either ear so as to close it, I am able to sing long been sought. refers to the amount of wire to be used on the two sep- several notes higher and louder than usual. A. If this giving an explanation. When one ear is closed, as indicated, a given sound is greatly changed, according to the momentum of a large column of water is imparted the sensation of the one-eared listener.

> (19) D. F. H. asks: How large a battery and by a battery that could be placed in a thimble.

> (20) W. R. B. says that the sponges used

iron diaphragm be, and what diameter? A. About 100 | pretty well. Alkalies, even quite dilute, quickly clean such fibers, but are too apt to deprive them of native

- (21) A. M. W. says: 1. I have an engine with a 3% inch stroke and 3% inch bore. What size boiler, number of flues, and amount of heating surface. also diameter of flues, will it require to run it 400 revolutions, working at its full capacity? A. Make a boiler 30 inches in diameter, 4 feet high, with about 80 square feet of heating surface. Tubes 21/2 inches diameter. 2. Also what size boat would it run 8 miles an hour, drawwhat pitch would the propeller have to be? A. We doubt the practicability of realizing this speed, if, as we understand you, the propeller is to conform to the draught.
- (22) G. T. L. writes: In the use of the metric system of weights and measures in French machine shops, how are the threads of screws reckoned, at so many threads per meter, per decimeter, per centimeter, or how? A. The number of threads are referred to the example, 5 threads per diameter of 6.3 millimeters is about the same as the American proportions for a 1/4 inch thread, 20 threads per inch.
- (23) J. H. F. asks: Which will work with the least power, a2 inch crank or an eccentric, to drive No. 30 copper wire (cotton or silk insulation) is sufficient, if properly wound, to make a good electro-magnet use involves less friction than there is apt to be in the use of the eccentric. On account of its large bearing the eccentric motion is valuable in those cases (as in presses for cutting metal) where a powerful motion is required through a short distance. 2. What is the number of lbs. pressure per square inch at 50 feet and 100 feet? A. A column of water 32 feet high and 1 inch square weighs about 15 lbs.: that is, it will about balance the pressure of the atmosphere on a square inch of surface, at the level of the sea.
- (24) N. A. S. writes: 1. Can I light gas by a plate machine (frictional electricity)? A. Yes. 2. If so, about how large a plate would be required to light exhaust steam through a copper pipe to heat our liquors. about 24 burners? A. The glass plate of the machine should be about 18 inches in diameter, and its electricity should be accumulated in a Leyden jar battery of about 28 square feet of surface. 3. Are the wires over the jets left in the gas flame during the time it is burning? A. Yes. 4. How far apart should the points be? A. About 3 of an inch.
 - (25) E U. N. asks: How can I make a really good razor strop paste? A. Equal parts of jew eler's rouge, plumbago, and suet melted together and stirred until cold.

At what depth in the ocean does the water become calm in all weathers, or is the whole mass of the ocean surface? A. Water is agitated in the ocean only to a depth equal to the height of the waves.

What is the greatest extent to which air (atmospheric) has been compressed, and was any effect observable beyond diminution in bulk? A. It has been compressed to several hundred atmospheres without apparent

- (26) I. H. B. asks (1) how the telephone is made, and what paper has a cut of it? A. The telephone is described in our issue of the Scientific Amer-ICAN of October 6, 1877. 2. How do you prepare insulated wire? A. The wire is covered with silk or cotton, by means of a machine shown on p. 130, Fig. 4, of our issue of September 1, 1877.
- (27) H. G. E. asks: 1. What is the difference between No. 1 and No. 2 pig iron? A. No. 2 is the hardest. 2. How can you tell the difference? A. No. 2 is closer grained than No. 1. 3. What is meant by the term hot iron? A. We presume it refers to iron made by the hot blast. 4. What is "gray forge iron" and how told? A. It is a grade of gray iron suitable for conversion into malleable iron, and is distinguished by the color of the fracture.
- (28) I. G. writes: 1. I am making a telegraph sounder; the cores are 2 inches long and 3/4 inch in diameter. On one end of each core there is 1/4 inch with a thread on to fasten to back armature; said arma-How can I prevent polished brass from coloring ture is % inch thick. I intend to put a piece of gutta percha 1/2 inch thick against armature and one of same size at top of core, which will leave 1½ inch for wire to be wrapped on. I want an instrument so that I can use it on lines of 1 to 15 miles, also to give strong clicks. Please inform me what sized wire I shall use, how much on each spool, and kind of insulation? A. Wrap the core with one layer of paper, and on this wind covered copper wire of about No. 27 Brown and Sharp's gauge, until the spool is about 11/6 inch in diameter. 2. Shall I wind both magnets to the right, or both to the left, or one to the right and the other to the left? A. Wind both spools the same way. 3. Shall I strip the end of wire for a couple of wraps on core? A. No. 4. If four such as the above instruments were on a line of 100 (18) C. G. asks: Is there any machine by yards, how many cells of gravity battery would it take
 - (29) P. R. asks. Would it be of value to of tin, or sheet metal generally? A. A cheap method of making such curves (especially for lead traps) has
- (30) H. L. asks: On what principle does on the same principle as the hydraulic ram, whereby to a smaller one. A column of steam moving at a high rate of speed is condensed by cold, so as to have a what kind is used in transmitting messages by the Atmuch smaller diameter, and, having the full momentum lantic cable? A. The Atlantic cable may be operated of the original (continuous) column of steam, has more penetrative power, so to speak, and carries the water into the boiler by the friction of its column against the water with which it is surrounded.
 - (31) I. G. writes: I have made a tap two inches in diameter from what I supposed to be tool

- (32) I. P. H. asks how to manufacture the gas and inflate some 3 or 4 dozen rubber toy balloons? A. Place a few ounces of clean scrap zinc in a stout half gallon bottle and pour over it a cooled mixture of 1 part oil of vitriol and 5 parts water. Stop the mouth of the bottle with a rubber stopper through which has been fixed a short piece of glass tubing of size suited to fit the mouth of the balloon. Exhaust the bag of air and tie it on the glass tube. When sufficiently dilated tie the mouth with thread and flow the dilated bag with a thin alcoholic solution of colored wax, collodion, or
- (33) E. J. S. asks how to preserve the feet and external parts of stuffed animals? A. Dissolve about 1/2 oz. corrosive sublimate in 1 pint alcohol and apply with a soft brush. If it leaves a white precipitate dilute with alcohol until it does not. A correspondent strongly recommends this recipe.
- (34) H. L. W. writes: You say apply muriatic acid diluted with 5 or 6 times its quantity of water, and after a minute or two wash with clean water. I have tried it and could not make it work. How shall I apply it so it will? A. The recipe referred to the common-gallo-tannic iron-inks. Inks containing Prussian blue, indigo, logwood, chromium salts, and coal tar dyes are more or less indelible. You may try the following solvents in the order named: Water, alcohol riatic acid, strong muriatic acid, strong water of ammonia, solution of potassium ferrocyanide, strong chlorine water or hydrogen peroxide, solution of potassium cyanide. The liquids are traced on with a glass pen, and here. All such questions, when initials only are given, after standing a sufficient time, it is covered with warm (dry)tripoli powder (infusorial silica) or pipe clay, which our paper to print them all; but we generally take pleasabsorbs the liquid or ink solution. 2. You also say a solution of oxalic acid, citric acid, and tartaric acid: is given. may be applied where there is printing, as it will not attack the printed text. Do you mean all the acids equally, or either one reduced with water? A. The solid organic acids-citric, tartaric, oxalic, etc.-are dissolved in a small quantity of warm water.
- (35) N. L. gives the following method of truing an emery wheel without a diamond: Hold a piece of white chalk against the wheel while in motion. This will show you the high places. Then take a pick of the kind used to dress millstones, or make one of a | tisement in the column specified, by parties able to supfile about five inches long, wedged in a stick like a mill- ply their wants: er's pick. Hack the chalked places and keep chalking and hacking, rubbing over with an old file each time before chalking, until the wheel is true and the chalk
- (36) E.P.O. asks (1) the mode of constructing an electric engine of 3 horse power? A. You will find a description of an electric engine on p. 184 of our issue of September 22, 1877. 2. How many cells of Daniell's battery, also how many plates of Smee's battery, would be required to run the engine so constructed? A. The amount of battery power required will depend on so many details that we cannot give an opinion. 3. What sized wire and how long must I have for helix? A. If you make an engine on a scale six times the size of the cut Fig. 1-then about 30 lbs. of No, 16 copper wire, cotton-covered, would be a good size and quantity to wind on the iron cores, D, and 40 lbs. of No. 12 copper wire, cotton-covered, for the cores A A. Let the width of the engine (as seen by a plam view) be such that the wire may be disposed so as to occupy about the same relative space as it does in the cut.
- (37) M. A. N. sends the following problem: A heavy stick of timber is to be carried by three men. One man is to carry one end, and two men are to use a lever at a certain distance from the other end. Atwhat distance from the shorter end must the lever be placed that each man may carry an equal part of the weight, no allowance being made for the weight of the lever? A. Supposing the stick to be uniform in section, the man at the end applies his force at the end of a lever equal to half the length of the stick: and as the other two men apply twice as much force they must apply it at the end of a lever one half as long as the preceding. or at one fourth the length of the stick from the other
- (38) E. C. N. asks: If I should wind a few feet of wire around a strong magnet, can I geta current of electricity so I could run a relay? The other night while I was testing some electro-magnets I received a very sharp shock by taking up one of the wires of my battery while the other wire was at least 10 feet from me on the brick floor. A. Not unless you open and close the magnetic circuit by means of an armature, or in some way continually disturb the relative position of the magnetic field of the permanent magnet, on which thewire is wound. The shock you received is frequently felt under similar circumstances by the battery men who have the care of a large number of cells, used for the purpose of supplying the telegraphic lines with gal-
- (39) A correspondent sends a recipe for a gold lacouer for brass: Dissolve in about 12 ozs. alcohol 1/4 oz. shellac. 1 drachm dragon's blood, and 1/4 turmeric root. It is sometimes necessary to filter the varnish. It is applied as usual. At first the varnish will seem to be a failure, but in a short time it will have a beautiful gold color.
- (40) J. S. H. asks how to prepare a jet black enamel? A. Black enamel is thus made: Peroxide of manganese 3 parts, zaffre 1 part. Mix and add as required to white enamel, which is: Washed diaphoretic antimony 1 part, fine glass, free from lead, 3 parts. Mix wet, pour into water, powder, melt again, and repeat this three or four times.
- (41) W. E. A. incloses a piece of "magic paper," and asks its composition. On being touched with fire it entirely disappears, ashes and all. A. It appears to be nitro-celludin-made directly from a pulp of gun cotton, or converted after coming from the papermachine by digestion for a few minutes in a mixture composed of equal parts of fuming nitric and fuming sulphuric acids, or fuming sulphuric acid mixed with pure dry saltpeter, and washing in water made slightly alkaline with sods. It is a dangerous article to keep in store.

ceived from the following correspondents, and Flo examined, with the results stated:

J. G. P.-No. 1 contains ferric sulphides and a trace of gold—tellurides not present in sample. No. 2 is a quartzite containing magnetic pyrites, but no silver or Ga bismuth. No.3 will probably prove a rich silver ore the sample contains argentiferous galenite and a little

COMMUNICATIONS RECEIVED.

The Editor of the Scientific American acknowledges with much pleasure, the receipt of original papers and contributions upon the following subjects:

- On the Progress of Engineering.
- On Drawing on the Blackboard, On Telephonic Communications, By T. F. W.
- On the Calendar.
- On Golden Relics. By C. F. R.

On the Manufacture of Surface Plates. By O. C. G. H

HINTS TO CORRESPONDENTS. We renew our request that correspondents, in referring to former answers or articles, will be kind enough to H name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude (hot and cold), citric acid, oxalic acid, dilute (pure) mu. that, for good reasons, the Editor declines them. The address of the writer should always be given.

Inquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published are thrown into the waste basket, as it would fill half of ure in answering briefly by mail, if the writer's address

WANTS AND BUSINESS INQUIRIES.

Almost any desired information, and that of a busi- Lo ness nature especially, can be expeditiously obtained Loby advertising in the column of "Business and Per- | Lo sonal," which is set apart for that purpose subject to the charge mentioned at its head.

We have received this week the following inquiries, particulars, etc., regarding which can probably be elicited from the writers by the insertion of a small adver-

Who makes hand presses for toilet soap? Who makes musical bells for parlor use, chimed to

give notes and half notes? Who makes machinery for kiln-drying corn?

Who makes surveyor's instruments, graded according to metrical measurement? Who sells cuca leaves?

OFFICIAL.

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were
Granted in the Week Ending

December 4, 1877, AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]

i	[Those marked (r) are ressued patents.]	Pill machine, J. Hill		1
l	A complete copy of any patent in the annexed list,	Pin fastening, breast, C. E. Smith]
	including both the specifications and drawings, will be	Pitman, H. Essex		
	•	Planter, blind slat, R. S. Griffin		١.,
t	furnished from this office for one dollar. In ordering,	Plow, H. Wiard		Ŀ
,	please state the number and date of the patent desired	Plows, sand mould for, Yeargin & Wells		Ι.
1	and remit to Munn & Co., 37 Park Row, New York city.	Pocket, safety, B. Nunamacker		١.
i	Animal black, artificial, P. G. L. G. Designolle 197,834	Potato drill and planter, J. M. Spickler		
ľ	Bale tie, Bull & Koch	Pottery decoration, easel for, W. H. Brownell		:
	Bale tie, W. M. Seaman 197,802	Printing press, plate, J. Lister		ŀ
1	Baling cotton, L. Belden 197,817	Pulley block, Edson & Haynes	197,769	į
ı	Bee hive, J. N. Becker 197,814	Pulverizer and cultivator, Ludlow & Pruitt		:
i	Belt fastener, W. Ferguson 197,726	Pump, double acting, J. S. Adams		
ł	Belt shifter, T. N. Egery	Pump, double acting, W. Teter		ì
i	Berth for vessels, self-leveling, D. Parks 197,886	Pump, double action, L. J. Russell		
i	Binder for letters, etc., H. H. Hall	Pump, lift, J. S. Baker		
Ì	Blanket case and shelter tent, O. E. Michaelis 197,878 Book support, A. Clarke 197,763	Pump, spring or weight, A. L. Hunsaker Radiator, steam, W. B. Snow		
	Boot and shoe, W. W. Whitcomb	Rail joint, W. B. Chisholm		
	Bottle stopper, F. W. Perry	Rail joint, S., Sr., & J. R. Hipsley		
Ì	Brake, car, S. Williams 197,919	Railroad switch, W. Wharton, Jr		
1	Brake, wagon, A. Hart 197,778	Rake, hand, T. I. Campbell		
	Broom, H. M. Jenkins 197,858	Refrigerator, D. A. Simons		. '
1	Buckle and hook, combined, T. L. Wiswell 197,808	Safety damper regulator, A. W. Cram		
	Bugs from vines, collecting, Scotland & Simpson. 197,903	Sad iron, Dolsen & Sherwood	197,768	
	Burglar alarm, W. H. Reiff 197,895	Sash fastener, W. M. Griscom		
	Buttons, manufacture of glass, I. Lehmann 197,869	Sashes and doors, guide for, J. H. Beard		
	Can, air-tight paint mixing, I. Banister 197,755	Saw filing machine, P, O'Neill		
	Carcoupling, J. A. Hinson	Scoop, N. Waterbury		
	Car coupling, W. Montfort	Screw fastening for joints, G. W. Cornell		
	Car, steam street. J. Noble	Sewer and other traps, W. F. Downey		
	Cartridge shell, metallic, J. H. Bullard 197,823	Signal for freight trains, C. E. Marsh		
	Casting wheel tires, mould for, N. Washburn 197,753	Snow, melting, H. Sinclair		
	Chair, opera, C. B. Demarest	Sounding machine, F. E. Schrom		
	Churn, Haptonstall & Preston 197,777	Spring, platform, F. Kocher		
	Churn, W. McMurry 197,786	Sprinkler, lawn, W. A. & D. M. Kirby	197,783	1
	Churn, reciprocating, L. C. Roberts 197,898	Station indicator, G. M. Guild	197,728	-
	Clock and gas regulator mechanism, G. P. Ganster 197,771	Steam trap, T. Kieley	197,782	
	Clock, pendulum, H. J. & W. D. Davies 197,832	Steering gear for vessels, J. P. Manton	197,874	1
	Clothes wringer, N. B. Phelps. 197,893 Cock, compression, W. Doda. 197,837	Stocking protector, C. F. Langford	197,868	1
	Coffee mill, A. Reynolds	Stove, cooking, G. A. McFadden	197,100	
	Coffee roaster, F. Kasiske	Stove, heating, N. A. Boynton	197,725	
	Collar, W. Wilson	Stoves, etc., air feeder for, G. C. Palm	197,794	.
	Corset, I. D. Warner	Stump burner, Armstrong et al	197,810	ıĮ.
	Culinary apparatus, Lightfoot & Hawk 197,871	Tenoning machine, S. M. Redfield	197,797	į
;	Cultivator, I. S. Krick 197,967	Thrashing machine, W. Carr	197,719	1
,	Cup or can, sheet metal, G. W. Knapp 197,865	Thrashing machine, G. W. Tate	197,909	'
	Digesting fibers, W. W. Harding 197.850	Tile machine, H. B. Camp	197,718	
	Door check, A. Kehl	Time lock, electro-magnetic, C. E. Chinnock	197,826	i
	Dovetailing and grooving machine. J. Dill 197,835	Tobacco box. L. T. Brewer		
t.	Draw-heads, manufacture of, A. P. Lindsay 197,872	Tobacco, manufacture of plug, D.W.De Forest	197,722	
	Drill ratchet, W. H. Richards	Tobacco plants, suckering, R. B. Jameson	107,007	İ١
	Earthenware vessels, M. J. Housel	Tobacconist's gauge, R. H. Edmunds, Jr Trace carrier, W. E. Dippert		
,	Earthenware vessels. Kent & Baldwin	Trace fastening, F. W. Beckwith	197 815	
ı	Elevator bucket, water, 1 Coppock	Type writers, sound deadening case, P. Deming		
t	Fabrics, machine for cutting, D. P. Sargent 197,901	Valve gear, W. H. Pierce		
)	Fence, C. S. S. Griffing	Valve gear for steam engines, J. D. Hazlet		
_	Fence, A. J. Marks 197,875	Ventilator, R. S. Grigsby	197,775	•
_	Fence, J. Walter	Wagon body, J. P. Gordon	197,844	ŀ,
_	Fence wire, barbed, G. G. Hunt	Wagon, buckboard, C. D. Le Grand		
1	Fences, barb for wire, F. L. Bestor.	Wagon end gate, J. M. & J. H. King		
ė	Fifth wheel for vehicles, W. J. Elsom (r)		197,758	
0	Fire arm, breech-loading, G. D. Goodell	Wagons, platform gear for. B. F. Rix		
	Fire arm, breech-loading, Schudt & Schhuch 197,742	Washstand, N. O. Bond	197.714	. '
	5,			

l	Fire escape, S. Root	197,899 197,781
	Flower pot, J. A. Conway. Furnace, steam boiler, J. Pohlig	197,765
ŀ	Gas governor, W. Foulis	197,842
	Gas-lighting apparatus, R. R. Moffatt	197,712
,	Gas, raising and lowering, G. P. Ganster Gate, J. W. Clark	
	Gate, G. W. Gordon	197,845
	Glove wrist clasp, N. Vrooman	197,751 197,888
	Grain arill, R. Montfort	197,880
	Grubber and stump extractor, J. Motheral	
	Hame fastener, Basiger & Feely Harvester, R. Emerson (r)	7,976
	Hat, Diamant & Tobias Hay rake, horse, J. F. Thomas	197,767 197,747
	Health lift, E. A. Tuttle Heater, Thorne & Farnsworth	197,750
•	Heater, portable, G. L. Thorne	197,749
5	Hides or skins, bating, W. McMurtrie	197,801
	Hoe, combination, D. A. Nelson Hop vine stripper and separator, M. C. Smith	197,744
	Horseshoe calf sharpener, M. Colton	197,829
ا •	Hose to couplings, securing, J. A. Caldwell	197,716
9	Ice cutting machine, C. C. Springer Ironing machine, P. O'Thayne	197,884
,	Ironing table, J. R. McBrayer	197,887
l	Keyfor locks, W. M. Griscom Ladder, adjustable, G. Crawford	197,847
ľ	Lamp burner, Brintnall & Weilbacher Lamp chimney, S. B. Inglis	197,715
3	Lamp wick, H. C. Scott	197,902
	Lard, self-raising, T. H. Rosser (r)	7,979
	Letter box, R. Hale	
-	Lock, drawer, W. H. Taylor Locomotive engines, exhaust, J. T. Clark	197.910
	Locomotives, air-feeding, W. S. Hutchinson	197,730
)	Loom for weaving hair cloth, M. R. Kenyon	197,732
•	Malt and grain dryer, A. Palmer	
-	Millstone driver, W. E. Sergeant (r)	7,980 197,734
•	Motor, E. E. G. Bozerian	197,759
	Mower, W. N. Whiteley	197,916
)	Mowing machine, M. L. Wood Nut lock, M. Calhoun	197,762
	Nut lock, A. Woodward Oil wells, spear for, F. J. Fox	197,920 197,841
	Oil wells, pitman, J. Sharp	
	Ores, roasting, W. L. Imlay Ornamenting metallic articles, F. W. Mix	197,855
	Padlock, J. J. Turner Pail, milk, H. Dodge	197 011
	Pantograph, P. L. Page	197,885
,	Paper bag machine, W. Liddell	197,764
	Pavement, H. B. Walbridge	197,752 197,713
	Pen holder, fountain, E. E. Brailly	197,820
	Picture frame, C. Lippe	197,738
,	Pin fastening, breast, C. E. Smith	197,745
е	Pitman, H. Essex Planter, blind slat, R. S. Griffin	
,	Planter, corn, Bering & Barnes Plow, H. Wiard	197,918
•	Plows, sand mould for, Yeargin & Wells Pocket, safety, B. Nunamacker	197,922
4	Potato drill and planter, J. M. Spickler	197,908
2 7	Printing press, plate, J. Lister	197,873
4	Pulverizer and cultivator, Ludlow & Pruitt	197,784
6 0	Pump, double acting, J. S. Adams Pump, double acting, W. Teter	197,804
6 6	Pump, double action, L. J. Russell Pump, lift, J. S. Baker	197,811
8	Pump, spring or weight, A. L. Hunsaker Radiator, steam, W. B. Snow	197,854 197,907
7	Rail joint, W. B. Chisholm	197,827
9	Railroad switch, W. Wharton, Jr	197,915
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8	Sad iron, Dolsen & Sherwood	197,768
5 9	Sash fastener, W. M. Griscom	197,848
5	Saw filing machine, P, O'Neill Scoop, N. Waterbury	197,793
8	Screw fastening for joints, G. W. Cornell	197,721
1	Shoe soles, buffing, J. B. Johnson	197,860
3	Snow, melting, H. Sinclair	197,905
3 7	Sounding machine, F. E. Schrom Spring, platform, F. Kocher	197,800 197,866
86 98	Sprinkler, lawn, W. A. & D. M. Kirby	197,783
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52)7	Stove, oil, L. S. Enos	197,725
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37	Thrashing machine W Carr	. 197,719
55 50	Thrashing machine, G. W. Tate	131,505
3 35	Tobacco box. L. T. Brewer	197,760
72 96	Tobacco, manufacture of plug, D.W.De Forest	197,722
61 53	Tobacconist's gauge, R. H. Edmunds, Jr	. 197,839
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06 29	Wagon body, J. P. Gordon	197,844
57 77	Wagon end gate, J. M. & J. H. King	. 197,783
78	Wagons, platform gear for. B. F. Rix	. 197.799
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Washing machine, Mulhollen &	Goldsmith 197,791
Washing machine, J. C. Smith.	197,803
Water, raising. S. Lindsey	197,737
Water meter. J. Johnson	197,859
Weather strip, M. & J. Frink	197,843
Weeder, garden, M. Johnson	
Windmill, J. J. Reed	197,796
Wire-coiling machine, W. F. M	loody 197,789
Wool-combing machine, R. S. 3	B. Thornton 197,805
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