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J. E. M. will find a description of the jointed boat oar on p. 343, vol. 34.-J. L. will find directions for fastening leather to iron pulleys on p. 409, vol. 33.-H. W. T. will find something on incubators on p. 273, vol. 33.-D. F. H. will find a description of the manufacture of postage stamps on pp. 208, 227, vol. 27 .-J. M. will find a description of a flour bolt on p. 117, vol. 32.-O.F. S. will find something as to acid chromate of lime on p. 28, vol. 36.-H. E. W. will find a good recipe for lacquer for brass work on p. 116, vol. 33.-C. L. C. and F. W. D. are informed that the botanical name of the garden box is buxus sempervirens .- A. B. will find directions for grinding old faucets on p. 182, vol. 1, SCIEN-TIFIC AMERICAN SUPPLEMENT.-H. A. B. will find directions for the decalcomanie process on p. 275, vol. 34 .-A. B. C. will find something on lubrication in an engine cylinder on p. 298, vol. 26,-A. A. B. will find particulars as to the opening of the Paris Exposition on May 1, 1878, on p. 376, vol. 34,-W. I. will find directions for changing cider into vinegar on p. 106, vol. 32 .- J. A. W. will find directions for making Pharaoh's serpents on p. 218, vol. 34. Ether, in a test tube held in the hand, boils by the heat of the hand. The glass does not make it boil. -J. H. W. is informed that the United States Capitol is lighted with gas, which is ignited, when necessary, by electricity .- T. R. W., Jr., will find on p. 299, vol. 35, directions for making paste.-F. W. will find a recipe for a silver polish for metals on p. 299, vol. 31.-Will A. V., who asks as to shellac varnish, state explicitly what it is that he desires to know?-T. F. T. will find something on burning petroleum in boiler furnaces on p. 165, vol. 30,-J. A. C. will find directions for galvanizing iron on p. 346, vol. 31.-V. A. S. will find directions for making indelible ink on p. 394, vol. 33 .- F. W. H. will find a description of an incubator on p. 273, vol. 33 .- P. S. T. have already been made.

will find directions for making a blackboard on p. 299. vol. 28.-D. O. will find something on the use of old silk on p. 309, vol. 31.-J. J. B. will find a recipe for a black mortar on p. 123, vol. 36.-W. S., H. W. S., J. J. T., J. D. M., W. A. M., J. A. C., A. K., A. J. W., A. J. B., H. K., J. L., W. C. F., J. T. S., and others, who ask us to recommend books on industrial and scientific subjects, should address the booksellers who advertise in our columns, all of whom are trustworthy firms, for catalogues.

(1) P. F. K. says: 1. We have a forty horse power return tubular boiler which I blew off lately for the purpose of washing itout. I blew off at 10 lbs, pressure, having previously pumped it full of water. After I had blown off all the water, I closed the blowoff cock and left it to cool off. I soon heard loud reports in the boiler, like pistol shots. I shut off the water as soon as I could, whereupon the reports died away. A. The noise was caused by sudden contraction of the heated plates when cooled by the entering water. 2. Whydo the rails on curves of a railroad last longer than those on a straight track? A. We could not answer this question satisfactorily without knowing more details.

(2) S. G. asks: 1. How is salicylic acid manufactured? A. By strongly heating for several hours a neutral alkaline carbolatein an atmosphere of carbonic acid. The residue in the retort is dissolved in hot water, and the salicylic acid is precipitated in an impure state by the addition of a mineral acid. It is purified by distillation in a current of steam. See p. 259, vol. 35. 2. Could it be used in solution, without quicklime, for preserving eggs? A. Yes, if the eggs were kept in a cool place.

(3) J. N. S. says: I have concluded to paint my floor and some shelves contiguous to a small engine with tungstate of soda, as I fear that the excessive heat from the furnace will ignite the woodwork. Will you please give me the formula for mixing the tungstate of soda and water, and the tungstate with the silicate, for the paint? A. Dissolve about 1 lb. of the salt in 3 or 4 gallons hot water, and apply with a brush. Dissolve 1 lb. of the waterglass, in fine powder, in 1 gallon of boilingwater and apply as a varnish. It may be mixed with a little oxide of zinc, well agitated when using. It will preserve the wood, as well as render it fireproof.

(4) L. K. says: I have an achromatic telecope which makes stars of the first magnitude appear as large as the full moon; and I wish to know what additions I can make to increase its magnifying power? A. We think you want to increase its defining power instead of its magnifying power; for no good telescope will show stars to be anything but a point with more or less radiations of light according to the state of the atmosphere. Your telescope lenses are not properly made or they are misplaced, they have too much aberration, either spherical or chromatic, or prohably both. Take a piece of paper three fourths of an inch in diameter, and cover the center of the objective; then focus on an object. Then remove the piece, and cover the outside portion, letting the light pass through only that part which was covered in the first instance. Then focus on the same object, and note the difference of the two. These will agree if the glass is of the proper curves. If the edge is the shortest focus, then that part of the lens between the center and edge will require flattening by polishing, and vice versa.

(5) W. W. M. says: I have just completed a large barn, and up through the center I have erected from a solid foundation, a strong framework of 8 feet square; this runsup to the roof. The object of this was to erect some kind of a wind power which would do my barn work, such as cleaning oats, cutting hay, shelling corn, pumping water, etc. I have seen a power erected in the form of a drum with perpendicular fans which could be closed or opened at pleasure, 1. Can you give me a plan for the construction of such a power? A. If such a form of windmill should be inclosed in a revolving rectangular cupola upon your barn, the fans might be fixed stationary within a light circular rim, and the force of the wind, when too violent, moderated by the insertion of automatic luffer-blinds in the front of the cupola. The most simple form of such a windmill, however, would be that in which the sails or fans are set horizontal, and the shaft horizontal and with bearings near the floor of the cupola, in which case only the upper half of the mill wheel is exposed to the wind. 2. Would it be practicable to have a power of this kind worked on the principle of the turbine wheel? A. We think not, as in the case of the turbine the weight of the water is an element that would not apply here

(6) G. B. M. asks: Can you give me any information concerning the building of a Vienna bake ven? A. We have been informed that the bread of the Vienna Bakery depends, not upon any peculiarity in the oven for its alleged superiority, but upon the yeast and the method used in the manufacture. The ovens are said to be constructed as follows: They are like the oldfashioned brick ovens which were used before the introduction of stoves and ranges, but on a much larger scale. There are six of these, each twelve feet long and at the broadest part nine feet wide, the shape being oval. A roaring fire of wood is made in one of these ovens. and kept until three feet of masonry underneath it are heated through. The ashes are then carefully swept out, and the bread is baked on the hot tiles which form the oven floor. Steam pipes pass through these ovens but these are heated onlywhile the baking is in progress in order to maintain an even temperature. It is necessary to make a new fire in an oven only once or twice in three days, according to the amount of baking required.

up and down with a force of about 12 lbs., and at the rate of about 80 strokes each way per minute, by means of a weight having a fall of 6 feet. How heavy a weight shall I use, and how shall I arrange it to work at theabovespeed? How long will it run? A. You do not send sufficient data. You can make the calculation for yourself from the following considerations: Theoretically, weight×(distance it moves while lever makes a stroke) = 12×length of stroke; so that, if the weight moves $\frac{1}{12}$ as fast as the lever, it must be 144 lbs.; and if the distance moved by the lever per minute is 6 feet, the contrivance will run for 12 minutes. A set of gear wheels, with a clock escapement, or some similar contrivance to regulate

(10) J. C. T. asks: What is the loss of power on the crank motion compared with the power applied at a tangent? In other words, if it takes 1 ton of coal to do a given amount of work on the cylinder and crank movement, cutting off at half stroke, with a piston traveling 300 feet per minute, how much coal would it. take to do a like amount of work if power were applied at therim of a wheel of the same size as the crank, and cutting off so as to work steam down to atmospheric pressure, the rim of the wheel traveling the same number of feet perminute as the piston does? A. There is no loss of power. You will find this point fully discussed on p. 121, vol. 31.

the movement, will answer very well.

(11) G. A. D. asks: Is it more economical to carry a steam pressure of 60 or 65 lbs. on boiler than it is 40 or 45 lbs., the engine easily doing the work required with 25 or 30 lbs. pressure? A. It depends on the engine. If the pressure is reduced by throttling, it will be rather a disadvantage to use high pressure steam. If the engine has an automatic cut-off, there may be considerable economy in using the increased pressure. You can readily settle the matter by experiment.

testing a boiler in order to ascertain its economy in fuel? | mill use, furnish as much power as one of the same size A. Measure the coal burned and water evaporated, and also test the quality of the steam.

(13) G. W. K. says: 1. Which is the best vay to drive a burr, with belt pulley on spindle, or with bevel gear? A. Unless you use cut gears, the belt will be rather more efficient. 2. Will it be difficult to keep an 8 inch belt from running off of pulleys on upright shafts 10 feet apart? A. Flanged pulleys are often used on vertical shafts, but are not necessary if the shafts are accurately lined and the pulleys crowned.

(14) C. W. N. asks: 1. If a vessel and her cargo weigh 1,000 tons, will she displace 1,000 tons of water, or more or less? Can the hull be modeled so as (always weighing 1,000 tons complete) to displace more or less than 1,000 tons? A. The weight of water displaced will always be equal to the weight of vessel and cargo, whatever the models, it being understood, of course, that the vessel floats, 2, A butcher has stated positively to me that, if a creature were put on the scales, weighed, and then killed in his tracks, that he would weigh more dead than alive. I disputed this; was I right? A. We should have been inclined to dispute it too, unless your friend had produced some indisputable evidence in support of his assertion.

(15) J. B. says: I wish to run a small engine, a little time each day, by compressed air, using a boiler 40 inches x 20 feet for a reservoir, and a windmill to force air into the boiler. Can I force the air in with a common force pump, such as is usually used for forcing water into steam boilers? A. It will probably be necessary to use a water jacket, or some device for cooling the air, if the compression is considerable, unless the pump is new.

(16) M. A. K. says: There are five machines run by compressed air. The compresser stands half a mile from the work. When the compressers are run by steam, it takes 65 lbs. pressure to run them. When there is 55 lbs. on the engine, all the machines will not run well. But if one of them stops, the others run all right; and the air escapes from the escape valve on the compresser just as much when the five machines are attached as it does when only four are running. I claim that they do not raise pressure enough; another man claims they are making more than the machines need; for, he says, it is blowing out of the escape valve all the while. A. According to your account, we agree with you that it would be better to increase the pressure

(17) W. J. McG. asks: In an ellipse the semi-conjugate diameter is equal to the distance from one of the foci to another and of a semi-transverse diameter; and in the application of square root, employed to find distance of foci from center, I make use of a contraction, as follows: To find the difference between the squares of two numbers, multiply their sum by their difference. Example: What is the difference between the squares of 7 and 9? A. 9+7=16. 9-7=2. $2\times 16=$ 32. Proof: 7²=49, 9²=81. 81-49=32. A. This is a own principle, to be found in nearly

(9) O. C. L. says: I wish to move a lever exterior heat, the quantity of ice liquefied, and the time consumed in the act of liquefaction. See answer to J. S., p. 91, vol. 36.

> (20) B. F. M. asks: Is there a cement that will fasten the butt ends of a rope together, and do it quickly? A. We do not think it probable that you will succeed very well in this. One of the strongest cements adaptable to this purpose consists of a solution of hest glue in strong, hot, acetic acid. Even this, however, does not dry immediately. A fused mixture of equal parts of asphalte and gutta perchais also recommended.

> (21) D. H. says: In a recent issue of your journal, you advised blue colored lamp chimneys to be used by persons reading a great deal at night. How can I color my lamp chimneys? A. You cannot stain them satisfactorily, but may purchase suitable chimneys of blue glass.

> (22) C. M. says: A German paper gives the following: "Lamp chimney and blowpipe combined. In this novel device the vapors of petroleum mixed with hot air produce a high degree of heat, on a small scale, the whole apparatus being of the size of a common lamp, and an experimenter can melt in this way, in a small crucible, 4 ozs, of copper or nickel, or 3 ozs, of wrought iron within 10 minutes' time." Is this possible? A. Popular accounts like the above are usually to be taken with some grains of allowance, but the result given does not seem impossible.

(23) H. B. asks: 1. Is a short stroke engine better than a long one for sawmill use? For instance, is a 10 x 16 or 18 inch engine better, and will it furnish more power and more quickly than a 10 x 20 inch one? A. For the same piston speed, the short stroke engine will make more revolutions per minute than the other, which may be an advantage or not, according to the design and construction of the engine. For the same number of revolutions in each case, however, the long stroke engine will develop the most power. 2. Will a port-(12) J. C. D. asks: What is the best way of able engine and boiler, say of 25 horse power, for sawstationary? A. Yes, if the machinery has the same general proportions and design.

> (24) N. E. L. says: Which takes the most power, a large or a small circular saw, both having the same surface speed and the same number of teeth to the inch, and cutting the same kerf? A. If one saw has twice the diameter of the other, and cuts at the same rate of speed, it only makes half as many revolutions in a given time, and hence does not require any more power to drive it, under the conditions you have stated. In practice, however, large saws are thicker than small ones, and frequently run proportionately faster and with larger feeds and deeper cuts; so that generally large saws take more power than small ones.

> (25) G. H. E. T. asks: What sized fan blower, and what number of revolutions of such, would be required to fill an iron tank which is 2 x 1 x 2 feet in 2 minutes of time to 5 lbs. pressure? A. You will find it difficult, if not impossible, to produce such a pressure with a fan blower; and if you use a positive action or displacement blower, you can calculate its size to de-liver a given quantity of air at a fixed velocity, or the velocity required to deliver this quantity with a fixed delivery per stroke.

> (26) G. T. asks: Our engine room is of stone, two stories high, and is excessively hot in summer. I think it could be much improved by proper ventilation, but do not know exactly how to proceed. I thought of putting a large air shaft, say 2 x 4 feet, above the boilers to extend above the roof. Do you think that would improve it? The boilers are covered with brick, but the dome, cylinder, and heater are not jacketed, and they radiate a great deal of heat. A. From the descrip-tion, we judge that there is considerable radiation of heat that might be prevented with advantage both as regards economy and comfort. Then you should admit the outside air, either by means of a wind sail or ventilating wheel, and provide a shaft to allow the heated air to escape.

> (27) T. W. D. asks: How may a novice refine bookbinders' gold rags on a blacksmith's forge? A. Cut the rags into very small pieces, mix them with a small quantity of carbonate of soda, place loosely in a small, covered, black lead crucible. Heat the crucible at first moderately and when the cloths are all carbonized raise the temperature to bright redness. The fused gold will collect as a small button in the bottom of the crucible, and when cold may be removed and freed from the soda by a little sulphuric acid.

(28) F. L. asks: In your issue of February 3 there is an article on bronzing. I have tried the composition, but there is something wrong about it. My method of applying it is to cover the article I wish to bronze, and let it dry, and then brush it off. What is wrong? A. Heat the metal in the same manner as when applying a lacquer. The preparation is intended more particularly for articles of brass.

(29) A. S. asks: 1. Would a plan for cleaning out or scouring sewers be patentable? A. Yes, if novel. 2. Are the mouths of sewers in New York city open, or under the water at all tides? A. Some of them are partly open at low water. 3. What are the maximum and what the minimum grades given to sewers? A. The maximum is that of the steepest streets, which in some cases is considerable, although we have not the data to name either that or the minimum. The latter is very low indeed-in some streets not sufficient to prevent the water from backing up into the drains during the prevalence of showers. 4. Are any with only the grade caused by the fall of the tide, such as the Canal street sewer must be, I think? A. There is a slight grade even in Canal street. 5. Are the inlets from the streets open, or have they traps? A. They have culverts which form a trap: these, however, are easily punched through in cleaning them out, and are not always kept in repair. 6. Is there any difficulty in keeping any of the sewers from accumulating sediment? A. Yes. 7. Is any expense incurred yearly in removing sediment, and is it heavy? A. A contract is made to remove the sediment in the sewers by the load, and that in the culverts by the year. It is a source of great expense.

(7) S. G. asks: What is the greatest number of revolutions allowed to a steam fan blower per minute? A. It depends on the form of the fan, pressure of blast, etc. It would require a considerable treatise to answer your question properly, but you will find much information in the catalogues of manufacturers.

(8) T. R. V. asks: Does pouring hot water on a frozen lead water pipe cause it to burst? A. We imagine that the hot water only reveals the cracks that

on algebra.

(18) J. H. D. asks: Is a locomotive any heavier on the track when drawing a heavy load than she is running light or drawing a light load? If she is, how much, and why? A. If, as is usual, the locomotive is attached to the load in such a manner that it only draws and does not exert any lifting force, the weight on the driving wheels is not affected by change of load.

(19) O. G. S. asks: Will a certain quantity of ice placed in an airtight glass hox and suspended in water give a greater amount of cold to the water than if the ice were first placed in contact with the water? A. A given quantity of ice at 32° Fah., unless acted upon by some hygroscopic salt which determines its rapid liquefaction, cannot be made to reduce the temperature of a surrounding body of water more than a certain number of degrees in a given time. The total and ultimate quantity of heat absorbed or rendered latent by the ice, in the process of liquefaction, regardless of the time consumed in the act, will be the same under any conditions. Surrounding the block of ice by a glass envelope will somewhat retard the refrigeration of the surrounding body of water. The degree of refrigeration

of the water is dependent only upon the exclusion of

(30) S. H. B. asks: Can aniline ink stains be easily removed from clothing? Most recipes for re-

Scientific American.

moving ink stains refer to iron inks. A. First try a little Bedstead, invalid. W. Spanner. strong alcoho¹, and, if this fails, moisten with very dilute sulphuric acid, then with a strong solution of chloride of lime, expose for an hour to bright sunlight and wash well with clean hot water.

(31) M. A. F. says: 1. I want to make a boiler 8 inches in diameter and 20 inches long. If made of ± inchcopper, how many lbs. pressure will it stand per square inch, and how many tubes of 1 inch diameter shall I put in? A. You can carry a pressure of 100 lbs. per square inch with a copper boiler, 2. Will a wrought iron boiler of the same size stand as much pressure as the copper one? A. The iron boiler will stand 140 lbs. Allow a space between the tubes of from 1/2 to 3/4 inch. 3. Will the iron boiler do to run an engine 1) x 3 inches? A. The boiler is rather small, if you desire to work the engine up to full capacity.

(32) T & D. say: We have a blower, running at the rate of 3,000 revolutions per minute. Does it make any difference in the hardness of iron, if the blower is near the cupola or some distance from it? A, Within the ordinary limits of a foundry, the position of the blower will not make any material difference.

(33) E. C. B. asks: I hold that if 1 ton pressure be applied to the plunger of a hydrostatic pump, which is 1 square inch in area, the pressure on a 6 inch ram connected therewith will be $28\frac{27}{200}$ tons, re-gardless of size of connecting pipe, if the latter is full as its area differs from the area of the ram. Who is right? A. You have the correct idea.

(34) S. H. B says: One of your correspondents recently asked for the correct name of what is called the blue hawk. I find, by Cone's "Key to North American Birds," that it is the peregrine falcon (falco communis).

(35) S. H. B. says: I had occasion to test one of your answers a short time since as to silvering glass, and had good success, except that I do better without warming the solutions, and by cleaning glass as a photographer does.

(36) J. A. H. says: I have a hard black rub ber ornament that I wish to fasten to a piece of hard wool. How can I do it? A. Try glycerin and white lead.

We use plumbago, etc., and that, with iron and steel filings and otherdirt, gets ground into my hands so that it takes a great deal of time and labor to clean them. Can you give me a recipe for something that will take the oil and dirt off thoroughly and quickly? A. Wash your hands first with oil and sand and then with soap and water and pumicestone.

COMMUNICATIONS RECEIVED.

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

On Separating Cobalt from Nickel. By L. S. On Reapers. By G. H. R. On Instinct. By E. H. R. On the Supposed Planet Vulcan. By P. On Poisonous Fireworks. By D., S., & Co. On Boiler Explosions. By C. W. Y. On Milking Cows. By A. E. U. On Force Analyzed, etc. By T. D. Also inquiries and answers from the following: P. H. & C. F.-J. E. G.-J. C. W.-D. D. J.-E. G. M

H NTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude 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 here. All such questions, when initials only are given. are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who makes machinery for spinning cotton twine ? Who sells acid chromate of lime? Who sells cedar board for boat-building? Who sells hair-heading machines? Where can sunflower seed be bought? Who sells machines for cutting cards? Where can railway ticket-printing machines be bought?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart tor that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

OFFICIAL.

INDEX OF INVENTIONS

Bedstead, wardrobe, W. McNaughton..... Beehive, H. Hatfield..... Bell toy, E. C. Barton..... 186,744 186.728 186,705 Bessemer steel scrap, piling, P. & W. R. Hayden. 186,836 Binder for books, metallic, E. H. Edwards..... 186,815 Birdcage screen, G. W. Chapin. Blank book, F. Bowman. 186.791 186,709 Bobbin winder, A. C. Carey..... Boiler. Selden & Nagle... 186.762 Bolster and step, Nealon, **H**iggins & Knott..... Book clamp, G. T. Wood..... 186,749 186,915 Boot attachment, J. T Johnson Boots, moulding soles of, J. H. Walker..... Boots, etc., sandpaper roll for, N M. Seelye Bottle tops, cover for, F M. Piper.... Bottling machine, A. Christin. Brau treating process, E O. Pease 186,871 Breech-loading fire arm, R. F Cook (r). Car heater, J. S. Linsley..... 186,739 Car starter, S. S. Vollum..... Cars, draw bar for street, M. Osborn..... Chair, barber's and dentist's, L. M. Angle 186,782 Churn, J. F. Hennessy..... 186,837 Churn, J. Higgins...... 186,731
 Coin wrapper, E. A. Scott.
 186,886

 Corn planter, J. Clarriege.
 186,896

 Corn planter, J. Clarriege.
 186,896

 Corn planter, F. J. Ones.
 186,859

 Corn planter, S. P. Loyd.
 186,859

 Corn planter, J. G. & J. H. Stokesbary.
 196,766

 Corn sheller, G. Goddard.
 186,882

 Cotron gin, P. C. Sawyer.
 186,882

 Cotton gin, P. C. Sawyer.
 186,892

 Cotton gin feeder, Coons & Van Winkle.
 186,891

 Cotton gin feeder, Loraridge.
 186,890

 Cotton gin feeder, J. Clarridge.
 186,700

 Cradle, J. A. Kirchner.
 186,737
 Cradle, J. A. Kirchner..... 186,737 Cultivator and corn planter, J. F. Poole..... 183,873 Fellies, making metal, R. W. Davis..... 186,813 Gas regulator, G. E. Bingham..... 186,789 Gasoline burner, J. **E**. Bean. 186,784 Gate, J. Coffits..... 186,662 Harness saddle, S. E. Tompkins...... 186,772 Harrow, A. F. Davis...... 186,664

 Harvester, Lomont & Brown.
 186,858

 Hat rack, L. F. Gehr.
 186,825

186,694

 Oiler, J. E. Bertram.
 196,658

 Organ coupler, reed, Kelly & Arno.
 196,846

 Organ, reed, G. B. Kelly.
 196,846

 Organ, reed, G. B. Kelly.
 196,846

186,711 | Organ, reed, Kelly & Rand...... 186,849
 186,843
 Pen, fountain, P. Goehring.
 186,723

 186,843
 Pen, fountain, P. Goehring.
 186,723

 186,709
 Pencil sharpener and protector, J. Watrous.
 186,777

 186,761
 Piano action, H. V. Boehme.
 186,778

 186,909
 Peiment base, making, H. Knight.
 186,789
 Sad iron, C. H. Westphal..... 186,697 Sawing machine, crosscut, H. M. Blohm..... 186,790 Screw threaded stock, making, S. Vanstone...... 186,906 Screws, making wood, E. E. Quimby...... 186,754 Stamp, hand, H. S. Blunt. Steam boiler circulater, J. T. Wainwright..... 186,774
 Steam trap and Doiler reset, E. FOL.
 100,020

 Steam whistle, J. Einig.
 186,713

 Stencil copying press, A. E. Hix.
 186,733

 Stirrup, H. H. Knight.
 186,841

 Store, coal oil, J. VV. Underwood.
 186,903

 Store, sweeper, W. H. Gunnell.
 186,703

 Struct sweeper, W. H. Gunnell.
 186,703
 Testgage, O. D. Thayer. 186,770 Tire heating device, C. O. Gause. 186,721 Tobacco curing apparatus, A. Fenn. 186,669
 Tobacco label, etc., C. R. Mengel et al.
 186,745

 Toy horse and carriage, A. Q. Ross.
 186,840

 Tripod for rock drills, J. B. Johnson.
 186,842
 Washing machine. C. S. Clark...... 186,801 DESIGNS PATENTED.

[March 10, 1877.

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AND EACH BEARING THAT DATE.	Torsonowor Phodos & Toldon 196 979	[A copy of any of the above patents may be had by	
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	Hose to coupling, attaching, E. A. Leland 186,855		the reasons for the breakage; with practical directions
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please state the number and date of the patent desired,	Lamp, H inrichs & Reistle 186,732	Inside Page, each insertion 75 cents a line.	Water Wheels.
	Lump, (). Succification and the second second		
	Lamps, heater attachment for, C. A. Howard 186,839	Engravings may head advertisements at the same rate	More than four times as
	Lap board, G. L. Price 186,875	per line, by measurement, as the letter press. Ad- vertisements must be received at publication office as	many of Jas. Lefell's im- proved Double Turbine
Animal trap, W. P. Cox 186,806	Lath sawing machine, J. W. Calkins 186,795	early as Friday marning to appear in next issue.	WaterWheelsin operation
Animal trap, S. Friend 186,671	Lathe for irregularbodies, F. Arbey 186,701	carry as 2 roway new here, to appear the next topic.	than any other kind. 24
	Lightning rod coupling, Reyburn & Martin 186,877		sizes made, ranging from 5 34 to 96 in, diam, under
	Line fastener, D. S. Coonrad 186,667		heads from 1 to 240 ft. Suc-
Bag machine, M. & R. W. Murphy 186,866	Loom, A. Gartenmann 186,824	of special value to Chain Makes or parties producing	cessful for every purpose.
Bail and ear for buckets, A. Miller (r). 7.483	Loom shuttle, A. Hallowell. 186 674	Cabinet Makers' or Builders' Hardware. The articles	Large new pamphlet, the
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