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ing Company, 37 and 38 Park Row, New York.
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Shingle Heading, and Stave Machine. See advertise
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ment. Address Union Iron Mills, Pittsburgh, Pa., for
lithograph, etc. thograph, etc.
Chester Steel Castings Co. make castings twice as strong as malleable iron castings, at about
price. See their advertisement on page 157 .
Set of Mechanical Curves, as illustrated in Sci. Am Supplement, No. 50 ,
Hyatt \& Co.'s Varnishes and Japans, as to price, color purity, and durability, are cheap by comparison than any others extant. 246 Grand st., N. Y. Factory, New
N. J. Send for circular and descriptive price list. Walrus Leather and supplies for polishing Iron, Stee See Boult's Paneling, Moulding, and Dovetailing M chine at Centennial, B. 8-55. Send for pamphlet and
sample of work. B. C. Mach'y Co., Battle Creek, Mich.

## Muk

J. E. M. will find a description of the jointed boat oar on p. 343 , vol. 34 .-J. L. will find direc-
tions for fastening leather to iron pulleys on p. 409 , vol. 33.--H. W. T. will find something on meubators on 273, vol. 33.-D. F. H. will find a description of the
mannuacture of postage stamps on pp. 208,227 , vol. 27 .J. M. will find a description of a flour bolt on p . 117 , vo 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. C and F. W. D. are informed that the botanical name of the garden box is buxus sempervirens.-A. B. will find di
rections for grinding old faucets on p. 182 , vol. 1 , Screv rections for grinding old faucets on p. 18., vill i, ScIEN
tific American Supplement.-H. A. B. will find direc tions for the decalcomanie process on p. 275, vol. 34.cylinder on p. 298, vol. 26.-A. A. B. will find particular as to the opening of the Paris Exposition on May 1, 1878, on p . 376 , vol. 34.-W. I. will find directions for chang ing 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 vol. 34. Ether, in a test tube held in the hand, boils by 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 some-
thing on burning petroleum in boiler furnaces on p. 165, thing on burning petroleum in boiler furnaces on p. 165 ,
vol. 30.-J. A.C. will find directions for galvanizing iron on p .346 , vol. $31 .-\mathrm{V}$. A. S. will find directions for mank ing indelible ink on p. 394, vol. 33.-F. W. H. will find
description of an incubator on p. 273, vol. 33.-P. S. T
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.,
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
ur columns, all of whom are trustworthy firms, f catalogues.
(1) P. F. K. says: 1. We have a forty horse power return tubular boiler which I blew off lately
or the purpose of washing itout. I blew off at 10 lbs or the purpose of washing itout. I blew of at 101 b . pressure, having previously pumped it full of water. off cock and left it to cool off. I soon heard loud re-
ports in the boiler, like pistol shots. I shut off the waports in the boiler, like pistol shots. I shut off the wa-
ter as soon as I could, whereupon the reports died away. . The noise was caused by sudden contraction of the heated plates when cooled by the entering water. 2 than those on a straight track? A. We could not andetails.
(2) S. G. asks: 1. How is salicylic acid manufacturea? A. By strongly heating for several 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 puriol. 35. 2. Could it be used in solution, without quick lime, for preserving eggs? A. Yes, if the eggs were
tept in a cool place.
(3) J. N. S. says: I have concluded to paint y floor and some shelves contiguous to a small engin with tungstate of soda, as I fear that the excessive hea rom the furnace will ignite the woodwork. Will yon please give me the formula for mising the tungstate of the paint? A. Dissolve about 11 lb . of the salt in 3 or 4 gallons hot water, and apply with a brush. Dissolve 1 b. of the waterglass, in fine powder, in 1 gallon of boillittle oxide of zinc as a varnish. It may be mixed with eserve the wood, as well as render it fireproof.
(4) L. K. says: I have an achromatic teleslarge as the full moon; and I wish to know what ad ditions I can make to increase its magnifying power? . We think you want to increase its defining power intead of its magnifying power; for no good telescope less radiations of light according to the state of the at mosphere Your telescope lenses are not properly made or they are misplaced, they have too much aberration, ither spherical or chromatic, or probably both. Take piece of paper three fourths of an inch in diameter, and cover the center of the objective; then focus on an ob-
ject. Then remove the piece, and cover the outside ject. Then remove the piece, and cover the outside
portion, letting the light pass through only that part 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 large barn, and up through the center I have erecte square; this runsup to the roof. The object of thi was to erect some kind of a wind power which would do
my barn work, such as cleaning oats, cutting hay, shell ny barn work, such as cleaning oats, cutting hay, shell
ing corn, pumping water, etc. I have seen a powe rected in the form of a drum with perpendicular fan hich could be closed or opened at pleasure, 1. Ca
you give me a plan for the construction of such A. If such a form of windmill should be inclosed in evolving rectangular cupola upon your barn, the fan might be fixed stationarywithina light circular rim, and he force of the wina, when too violent, moderated by heinsertion of automatic lafer-binas in the front o the cupola. The most simple form of such a windmill,
however, would be that in which the sails or fans are et horizontal, and the shaft horizontal and with bea ings near the floor of the cupola, in which case only the apper 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 in ormation concerning the building of a Vienna bake Vienna Bakery depends not upon any peculiarity in the ven for its alleged superiority, but upon the yeast an he method used in the manufacture. The ovens a fashioned brick ovens which were used before the in roduction of stoves and ranges, but on a much larger cale. There are six of these, each twelve feet long ane at the broadest part nine feet wide, the shape being oval. roaring fire of wood is made in one of these ovens, nd kept until three feet of masonry underneath it ar eated through. The ashes are then carefully swe out, and the bread is baked on the hot tiles which forn
he oven floor. Steam pipes pass through these ovens, he oven floor. Steam pipes pass through these oven 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.
(7) S. G. asks: What is the greatest num ations allowe to a steam minute? A. It depends on the form of the fan, pressure nswer your question properly, but you will find much formation in the
(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
have already been made.
(9) O. C. L. says: I wish to move a lever pate of about 80 strokes each way 12 lbs., and at the of a weight having a fall of 6 feet. How heavy a
weight shall I use, and how shall I arrange it to work a heabovespeed? Howlong will it run? A. You do not sen sufficient data. You can make the calculation for yourself from the following considerations: Theoretically, $12 \times$ length of stroke, so that if the weight move in 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 will run for 12 minutes. A set of gear wheels, with a
clock escapement, or some similar contrivance to regulat the movement, will answer very well.
(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 amountof work on the cylinder and crank to do a given amountof work on the cylinder and crank
movement, cutting off at half stroke, with a piston movement, cutting off at half stroke, with a piston
traveling 300 feet per minute, how much coal would it traveling 300 feet per minute, how much coal would
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 di (11) p. 21, vol. 31
(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 re-
quired with 25 or 30 lbs. pressure? A. It quired 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 ment.
(12) J. C. D. asks: What is the best way of esting a boiler in order to ascertain its economy in fuel? A. Measure the coal burned and
(13) G. W. K. says: 1 . Which is the best way 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 dificult to keep an 8 nch belt from running off of pulleys on upright shaft 10 feet apartt A. Flanged pulleys are often used on
vertical shafts, but are not necessary if the shafts are vertical shafts, but are not necessary if
(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? always weighing 1,000 tons complete) to displace more r less than 1,000 tons? $A$. The weight of water placed 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; pute 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 en gine, a little time each day, by compressed air, using a
boiler 40 inches x 20 feet for a reservoir, and a wind mill 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 coolnecessary to use a water jacket, or some device for cool-
ing the air, if the compression is considerable, unless
(16) M. A. K. says: There are five machines run by compressed air. The compresser stands un by steam, it takes 65 lbs . pressure to run them. will not run well. But if one of them stops, the others run all right; and the air escapes from the five machin are attached as it does when only four are running. claim that they do not raise pressure enough; anotherman claims they are making more than the machines neea, while. A. According to your account, we agree with
(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 di-
ameter; and in the application of square root, employed ameter; and in the application of square root, employed to find distance of foci from center, I make use of a
contraction, ass follows: To find the difference between the squares of two numbers, multiply their sum by their therence. Example: What is the difference between
the squares of 7 and 9 ? A. $9+7=16 . \quad 9-7=2 . \quad 2 \times 16=$ 32. Proof: $7^{2}=49,9^{2}=81 . \quad 81-49=32$. A. This is a
well known principle, to be found in nearly every treatise 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 diving wheels is not affected by change of load.
(19) O. G. S. asks: Will a certain quantity of ice placed in anairtight glass box and suspended in water give a greater amount of cold to the water than
the ice were first placed in contact with the water? A A given quantity of ice at $32^{\circ}$ Fah., unless acted upo 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 time consumed in the act, will be the same under envelope will. Surrounding the the refrigeration of the surrounding body of water. The degree of refrigeration
of the water is dependent only upon the exclusion of
exterior heat, the quantity of ice liquefied, and the time 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 20 it quickly? A. We do not think it probable that you will adaptable to this purpose consists of a solution of best glue in strong, hot, acetic acid. Even this, however, parts of asphalte and (21) D. H. says: In a recent issue of your journal, you advised blue colored lamp chimneys to be I color my lamp chimneys? A. You cannot How can 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 his novel device the vapors of petroleum mixed with 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? wrought iron within 10 minutes' time." Is this possible? taken with some grains of allowance, but the result given does not seem impossible.
(23) H. B. asks: 1. Is a short stroke engine 10 x 16 or 18 inch engine better, and will it furnish more power and more quickly than a $10 \times 20$ 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 dewhich may be an advantage or not, according to the de-
sign and construction of the engine. For the same numsign and construction of the engine. For the same num-
ber of revolutions in each case, however, the long stroke engine will develop the most power. 2. Will a portable engine and boiler, say of 25 horse power, for saw-
mill use, furnish as much power as one of the same size mill use,furnish as much power as one of the same size
stationary? A. Yes, if the machinery has the same
(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 In practice, however the conditions you have stated ones, and frequently run proportionately faster and with larger feeds and deeper cuts; so that generally (25) G. H. E. T. asks: What sized fan lower, and what number of revolutions of such, would be required to fill an iron tank which is $2 \Sigma 1 \times 2$ feet in
2 minutes of time to 5 lbs . pressure? A. You will find 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 deliver a given quantity of air at a fixed velocity, or the velocity required to deliverthis quantity with a fixed delivery per stroke.
(26) G. T. asks: Our engine room is of mer. I think it could be much improved by proper ven tilation, but do not know exactly how to proceed. I hought of putting a large air shaft, say $2 \times 4$ feet, above the boilers to extend above the roof. Do you thirik that but the dome, cylinder, and heater are not jacketed, and they radiate a great deal of heat. A. From the description, we judge that there is considerable radiation of heat that might be prevented with advantage both as rehe ous economy and comfort. Then you should admit tilating wheel, and provide a shaft to allow the heated
(27) T. W. D. asks: How may a novice re fine bookbinders' gold rags on a blacksmith's forge? small quantity of carbonate of soda, place loosely in 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 inct as a small button in the bottom of the crucisoda 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 com-
position, 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 rong? A. Heat the metal in the same . 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 sewens open, or under the water at all tides $\begin{aligned} & \text { A. Some of the } \\ & \text { are partly open at low water. 3. What are the maximum }\end{aligned}$ 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 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 cust be, 1 think? A. There is a slight grade even in
Canal street. 5. Are the inlets from the streets open, or have thes 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 reair Is there any difficulty in keeping any of the sewers from accumulating sediment ${ }^{\circ}$ A. Yes. 7. Is any expenseincurred 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 of great expense.
(30) S. H. B. asks: Can aniline ink stains
movng ink stains refer to iron inks. A. First try a little
strong alcoho', and if this fails, moisten with very di lute sulphuric acid, then with a strong solution of chlor he of lime, espose for an hour to bright sunlight and wash well with clean hot water
(31) M. A. F. says: 1. I want to make oiler 8 inches in diameter and 20 inches long. If made of $\frac{1}{5}$ inch copper, 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 10 los. per square inch with a copper boiler. 2. Will wrought iron boiler of the same size stand as much tand 140 lbs . Allow a space between the tubes of from / $203 / 4 \mathrm{inch}$. 3 . Will the iron boiler do to runanen ine $1, \underline{m} \times 3$ 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, runaing at the rate of 3,000 revolutions per minute. Does tmake any difference in the hardness of iron, if the Within the ordinary limitsof a foundry, the position he blower will not make any materi
(33) E. C. B. asks: I hold that if 1 ton arse be applied to the phunger of a hydrostatic inch ram connected therewith will the pressure on ardless of size of connecting pipe, if the later is $f$, $f$ water. My friend asserts that the hole in the conecting pipe gives the pressure, and the increase will be its area differs from the area of
ight? A. You have the correct idea.
(34) S. H. B says: One of your correspon ents recently asked for the correct name of what is alled the blue hawk. I find, by Cone's "Key to North
American Birds," that it is the peregrine falcon (falco стиі
(35) S. H. B. says: I had occasion to test oue of your answers a short time since as to silverin lass, and had good success, except that I do better with ut warmingthe so
(36) J. A. H. says: I have a hard black rub der ornament that $I$ wish to fasten to a piece of har wool. How can I do it? A. Try glycerin and whit
We use plumbago, etc., and that, with iron and stee filingsand otherdirt, gets ground into my hands so that takes a greatdeal of time and labor to cean them. an you give me a recipe for something that will tak the oil and dirt off thoroughly and quickly? A. Was your hands first with oil and sand and then with soa

## COMMUNICATIONS RECEIVED

The Editor of the Scientific American acknowledges ith much pleasure, the receipt of orignal papers an
On Separating Cobalt from Nial
On Reapers. ByG. H. R.
On the Supp E H. R
On Poisonous Fireworks. By. 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 hat, for cood reasons, the Editor declines them ddress 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 thrown into the waste basket, as it would fill half of ur paper to print them all; but we generally take plea sure in answ
is given.
Hundreds of inquiries analogous to the following are ent: "Who makes machinery for spinning cotton edar board for boat-building? Who sells hair-head ing machines? Where can sunflower seed be bought Who sells machines for cutting cards? Where can rail way ticket-printing machines be bought?" All such per column of "Business and Prriual" which is, in the et apart tor that purpose, subject to the charge men loned at the head of that column. Almost any desire information can in this way be expeditiously obtained.

## official.

## INDEX OF INVENTIONS

## etters Patent of the United States January 30, 1877 ,

AND EACH BEARING THAT DATE.

## [Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list,
actuding boththe specif cations and drawings, will be urnished from this office for one dollar. In orderin case state the number and date of the patent desired

## lloy, composition, F. Raymond

nimal trap, W. P. Cox
nimal trap, S. T. Stou
Axle boxes, making, T. V. Le Roy
Bag machine, M. \& R. W. Murphy.
Bail and ear for buckets, A. Miller
ale tie, A. A. Goldsmith
Bale tie, A. J. Hanso
Bale tie, P. Hayden..
Barbed fence wire, A. C. Decker....
Bed bottom cover, spring, K. K. Pe

Bedstead, invalid, W. Spanner Beehive, H. Hardrobe,
Bell toy. E. C. Bard..
Bessemer steel scrap, piling, $\mathbf{P}$ \& w. R. Hayde
Binder for books, metallic, $\mathbf{F}$. $\mathbf{H}$. Edwards Blank book, F. Bowman.. Bobbin wnder, A. C. Care olster and sten Nealo
Book clamp, G. T. Wood...... Boots, moulding soles of, J. H. Walker oots, etc.. sandpaper roll for, $\mathbf{N} \mathbf{M}$. Seel Bottling machine, A. Christin. Bran treating process, E O. Pease. Breech-loading fre arm, R. Broom. A. C. Jacques...... ..........
Brooms, bunching, D. Van Wicklen Brush, making, J. M. Patterson.......
Butter worker, E. D. \& E W. Kitchen. Camel for raising vessels, J. S Dowdle
Can, sheet metal, A. E. Lelan
Car brake, street, Kimpel $\boldsymbol{A}$ Forchland Car coupling, C. H. Knowlton Car starter, S. S. Vollum. Cars, draw bar for street, M. Osbor
Carpeepers, A. W. stewart...
$\qquad$ Carving attachment for lathes, F. Arbey.. Chair, F. L. Patch. ©......................... Churn, J. F. Hennessy.

## Churn, J. Higgins

Churn dasher, C. J. Syme
Cigars, mouth piece for, J. L. Grose
Clay picking machine, R. W. Stieneker
Cloth measuring machine, A. Brown
Cothees sprinkler, Maas $\&$ Schnelke.
Coffee mill, A. Shepard...
Corn planter, J. Clarridge
Corn planter,
Corn planter, H. Jones.
Corn planter, J. G. \& J. H. Stokesbary
Corset, E. S. Reed
Cotton gin, P. C. ........
Cotton gin feeder, Coons \& Van Winkle
Cotton seed planter, J,
ultivator and corn planter, J. F. Poole
Cup, s. s. Newton
Dental instrument case, E. P. Brown
Dental purposeses, gold foil for, R. S. Williams
Desk, advertising, F. Vornbrock.
Die for making hoes, J. C. Klein.............
Dough-kneading machine, E. L. Edwards
Earth auger, G. Fletcher..
Egg poaching utensil, Townsend et al
Electric telegraphy, A. G. Bell.......
Engine, rotary. J. C.Thomas...........
Eraser and pencil combined, $\mathbf{P}$. Schrag.
Evaporating alkalies, Keen $\&$ Burgess
Evaporating alkalies, Keen \& Burgess
Eyelet, S. W. Young
Faucetfor baths, etc., double, H. ............. Meyer.
Fence, D. R. $\bullet$ strander
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Fire kindler, G. W. Greenwo
Fireproof curtain, W. D. Bake
Fireproof express chest, Glover \& Morris.
Fliavoring powder, W. P. Clotworthy...
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Furnace, etc., smolre consuming, K. M. Jarvi
Furnaces, heat fender for, J. B. Chandler....
ame apparatus, Pitman $\&$ J Jacobson..
Gas extinguisher, automatic, T. T. Fryer
Gas from petroleum, etc., J. Rigby
aas puriner, P. Mulator, G. E. Binger...
Gas regulator, G. E. Bingham
Gasoline burner, J.
H. Bean..
Gate, J. Cofflts.......
Gates, operating, A. R. Sherman.................
Grocer's scoop, W. T. Sherer
Harness pad skirt loop, J. R. Stone
Harness saddle, S. E. Tomplo
Larness saddle, S. E. Tompkins
Harrow, A. F. Davis
Harrow, W. C. Moore...................
Hat rack, L. F. Gehr
Heater. J. Guardiola
Eeater, portable, M. Waterbury.
Heating soldering irons, etc.,J. S. Hull Hollow auger, G. N. Stearns (r)
Honey box, H. N. Tennant..
Horse hay rake, B, Owen,.......
Hose to coupling, attaching, E. A. Lela
Hydraulic elevator valve, T. Meikle
Hdraulic motor, W. J. Lane...
ce elevator, L. Zistel.
Lamp, Hinrichs\& Reist
Lamps, heater attachment for, C. A. Howar
Tap board, $G$. L. Price.
Lath sawing machine, J. W. Calkin
Lathe for irregularbodies, F. Arbey
Lightning rod coupling, Reyburn \& Martin.
Line fastener, D. S. Coonrad.
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