## zusiness ame ersoul.

The Chargefor Insertion under this head is One Dollar a linefor each insertion; about eight words to a line, Advertisements must be received at mublication office as early as Thurselay morning to appear in next issue. The publishers of this paper guarantee to adver tisers a circu
weekly issue.

Blake Crushers, all sizes, with all the best improve ments. at less than half former prices. E. S. Blake Co., Pittsburg, Pa
Comb'd Punch \& Shears: Universal Lathe Chucks. Lam
To Thrashing Machine Manufacturers.-The best cheapest, and most durable Grain Tally. Can be at
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The Friction Clutch Captain will start calender rolls or rubber, brass, or paper without shock; stop quick,
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cultural wrought Steels of every description. Write us. Read, McKee \& Co., limited, Pittsburg, Pa. For Sale.-Patent Automatic Planer Knife and Tool
Grinder. Also Patent Friction Clutch and Pulley. Adress E. S. Fernald, Saco, Me.
A Firm in Scotland, representing a New York Leather selting House, are anxious to obtain another represen Box 2701, New York.
Presses, and Dies that cut 500,000 fruit can tops with
out sharpening. Ayar Machine Works, Salem, N. J. For Sale.-One Horizontal Steam Engine, $20^{\prime \prime} \times 48^{\prime \prime}$

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Box-bell, $\$ 1$ 50. Bell, Battery, and Push Button, $\$ 3$.
All first-class. H. Thau, 128 Fulton St., N. Y. a, 128 Fulton St., N. Y
Situation Wanted--Have had ten years' experience as
mechanical superintendent of a large sewing machin mechanical superintendent of a large sewing machine
business. Understand mechanical drawing, tool making, business. Understand mechanical drawing, tool making, ress K., Bo x254, Guelph, Ontario, Canada.
The Genuine Asbestos Steam Pipe and Boiler Coverings are the most durable, effective, and economical of
any in use. H. W. Johns Manufacturing Company, 87

A Gentleman, now Foreman in a large Manufactory heoretical and practical machinist, desires to chang his present position for one in which he may have a bet er chance to employ his skill in all kinds of scientific o ndustrial machinery. Address, for ten days, F. Lam

See Staples \& Co.'s advertisem
Metalic Articles Colored in Single or Rainbow Colors New Process. High cost metals imitated in che
metals. Gardiner M' $\mathrm{f}^{\prime} \mathrm{g}$ Co., Newburyport, Mass. For best Fixtures to run Sewing Machines by P
address Jos. A. Sawyer \& Son, Worcester, Mass.
Thomas D. Stetson, 23 Murray St., New York, serves
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$\begin{array}{llll}\text { five ordinary barrows. } \$ 24 & \text { per doz. } & \text { A. B. Cohu, } 197\end{array}$
 Park Benjamin's Expert Office, Box 1009, N.
cipes and information on all ind ustrial processes. To stop leaks in boiler tubes, use Quinn's Paten Nickel Plating-Sole manufacturers cast nick odes. pure nickel salts, importers Vienna lime, crocus,
ett. Condit, Hanson \& Van Winkle, Newark, N. J., and
92 and 94 Liberty St. New York. 2 and 94 Liberty St., New York.
The Secret Key to Health. -The Science of Life, or Self-Preservation, 300 pages. Price, only \$1. Contains
fifty valuable prescriptions, either one of which is worth more than ten times the price of the book. Illustrate sample sent on receipt of 6 cents for postage. Address Dr. W. H. Parker. 4 Bulfinch St.. Boston, Mas
Wright's Patent Steam Engine, with automatic cut, off. The best engine made. For prices, a
Wright, Manufacturer, Newburgh, N. Y.
For Solid Wrought Iron Beams, etc, see ad vertise ment. Addres
lithograph, etc.
Presses, Dies, and Tools for working Sheet Metal. etc Fruit \& other can tools. Bliss \& Williams, B'klyn. N. Y.
Hydraulic Presses and Jacks, new and second hand.
athes and Machinery for Polishing and Buffing Metais. Eyon \& Co., 470 Grand St., N.
team Excavators. J. Souther \& Co., 12 P.o. Sq. Boston. Bradley's cushioned helve hammers. Seeillus. ad. p. 302 Split Pulleys at low prices, and of same strength and
appearance as Whole Pulleys. Yocom \& Son's Shafting Works, Drinker St Philays.
Noise-Quieting Nozzles for Locomotives and Steam boats. $\quad 50$ different varieties, adapted to every class of
engine. T . Shaw, 19 Ridige Avenue, Philadelphia, Pa. Stave, Barrel, Keg, and Hogshead Machinery a spe

Solid Emery Vulcanite Wheels-The Solid Original Emery Wheel -other kinds imitations and inferior.
Caution.-Our name is stamped in full on all our best Standard Belting. Packing, and Hose. Buy that only.
The best is the cheapest. New York Belting and Yackng Company, 37 and 38 Pak Row N. Y.
For best low price Planer and Matcher, and late descriptive catalogue to Rowley \& Hermance, Williams

Eclipse Portable Engme. See illustrated adv., p. 318. Special Wood-Working Machinery of every variety. Sheet Metal Presses, Ferracute Co., Bridgeton, N. J. Latest improved methods for working hard or soft metals, grinding long knives, tools, etc. Portable Chuck Drill Co., Woonsocket, R. I.
For best Portable Forges and Blacksmiths' Hand Diamond Planers. J. Dickinsompany, Buffalo, N. Y. steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St.. New York. Sawyer's Own Book, Illustrated. Qver 100 pages of
valuable information. How to straighten saws etc. Sent free by mail to any part of the world. Send you Eagle Anvils, 9 cents per pound. Fully warranted. Repairs to Corliss Engines a specialty. L. B. Flan

Tight and Slack Barrel machinery a specialty. John Elevators, Freight and Passenger, Shafting, Pulleys. The Horton Lathe Chucks; prices reduced 30 percent The Horton Lathe Chucks; prices reduced 30 per cent.
Address The E.Horton \& Son Co., Windsor Locks, Conn $\$ 400$ Vertical Engine, 30 H. P. See page 350.
No gum! No grit! No acid! Anti-Corrosive Cylinonly oil that perfectly lubricates a railroad loco-
motive cylinder. doing it with half the quantity motive cylinder, doing it with half the quantity
required of best lard or tallow, giving increased
power and less wear to machinery, with entire free power and less wear to m it is equally superior for all steam cylinders or heary work where body or cooling qualities are
indispensable. A fair trial insures its continued use. Address E. H. Kellogg, sole manufacturer, 17
Cedar St., New York.
Emery Wheels for various purposes, and Machines at
educed prices. Lehigh Valley Emery Wheel Company,
Machine Knives Sinders, and Paper Mills. Large knife worka specialty. Also manufacturers of Soloman's Parallel Vise. Taylor,
Stiles \& Co., Riegelsville N. $\mathbf{J}$ Magic Lanterus and Stereopticons of all prices. View able business for a man with small capital. Send stam or 80 page illustrated catalogue. Mc Allister, Manufac turing Optician, 49 Nassau St., New York.
Patent Steam Cranes. See illus. ad v., page 3

## atent Steam Cranes. See illus. ad v., pagé 353

National Steam Pump. Simple, reliable, durable.
Send for catalogue. W.E. Kelly, New Brunswick, N.J. Send for catalogue. W. E. Kelly, New Brunswick, N.J.
Renshaw's Ratchet (short spindle) uses taper and quare shank drills. Electro-Bronzing on Iron. Philadelphia Smelting Improved Steel Castings; stiff and durable; as sof ess than 65.000 lbs . to sq. in. Circulars free. Pittsburg teel Casting Company, Pittsburg, Pa.
Mineral Lands Prospected, Artesian Wells Bored, by
Pa. Diamond Drill Co. Box 423 , Pottsville, Pa. See p. 349. Rue's New "Little Giant" Injector is much praise or its capacity, reliability, and long use without repairs. C
Catechism of the Locomotive, 625 pages, 250 engra ings. The most accurate, complete and easily under-
stood book on the Locomotive. Price 82.50 . Send for a catalogue of rallroad books. The Railroad Gazette, 73 Broad way, New York
The only economical and practical Gas Engine in the market is the new "Otto" Silent, built by Schleiche
Schumm \& Co., Philadelphia, Pa. Send for circular Steam Engines, Automatic and Slide Valve; also Boilillustrated advertisement, page 285 .
Mieroscoppes, Optical Instrm's, etc. G. S. Woolman,
SFulton St., N

## NEW BOOKS AND PUBLICATIONS

Van Nostrand's Science
York: D. Van Nostrand.
Prices. 50 cents.
Numbers 45 and 46 of these reprints are respectively Thermodynamics by Henry T. Eddy, C.E. Ph. D., the University of Cincinnati; and Ice Making Machines, translated from the French of M. Ledoux, mining engineer. The former aims to give a brief and logical exposiion of the fundamental and simplest applications conditions of effective working of the threeclasses the ice-making machines
Kesume of Yellow Fever. (Quarantine
and Home Sanitation.) By A. Clen
and Home Sanitation.) By A. Clen
dinen, M.D.
Abstract of report ly Dr. Clendinen, as chairman of Committee of Intelligence, District Society of Bergen the State Medical society. The author has brought to gether a good many facts in the history of yellow fever, which he finds well described by Hippocrates, 2,240
years ago. He does not believe that the disease is always imported, and denies the efficacy of quarantine o prevent its occurrence when local conditions are far
orable.
Catechism of the Marine
aine. By Emory Edwards. Illustrated. GINE. Bv Emory Edwards. Illustrated.
Philad elphia: Henry Carey Baird \& Co.

Offered as a practical work for practical men, espe
and fremen, who wish to adopt marine engineering as a
proflestion. For such men it is likely to prove very ser
viceable. They will at least find no trouble in unde viceable. They will at least find no trouble in under
standing what the author has to say, his language being admirably simple, direct,
or scientific affectation


No attention will be paid to communications unless
accompanied with the full name and address of the writer.
Namesand addre
given to inquirers.
W erenew our request that correspondents in referin former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.
Correspondents whose inquiries do not appear after
a reasonable time should repeat them. If not then pubished, they may conclude that, for good reasons, the Editor declines them
Persons desiring
Persons desiring special information which is purel should remit from $\$ 1$ to $\$ 5$, according to the subject, as we cannol be expected to spend time and labor obtain such information without remuneration.
Any numbers of the Scientific American SuppleIENT referred to in these columns may be had at this flea. Price 10 cents each.
(1) O. R. writes: Your recipe on shoe dressing is very good. I find that the different ingredients give a good black liquid. which makes the leather smooth, soft, and black, but without gloss. Can you
inform me how to obtain a gloss? A. Increase the perinform me how to obtain a gloss?
(2) H. C. asks how much fall would b required in a ditch to carry the water three miles a hour, provided the ditch is straight. A. The flow
water in the ditch would depend upon the character he soil and smoothness of the surface. 2 Could you refer me to some reliable work that treats on running water and ditching, etc.? A. "Fanning on Water Supply Engineering "is a good work.
(3) "Atlas" asks how to mount maps on cloth, and best kind of paste and fabrics for purpose.
A. Stretch smooih factory cloth upon a frame and coat it with glue size. Before this dries, apply a strong flou paste to the back of the map and lay it smoothly on the cloth. Let it remain until perfectly dry. If the map is to be varnished, apply two or three coats of isinglass
size, and after it becomes thoroughly dry flow on a size, and after it becomes thoroughly dry flow on a
coat of varnish consistimg of balsam of fir diluted to he proper consistency with turpentine.
(4) J. P. asks: 1. Can a current of elecricity be generated by an electro-dynamic machine, nets to charge the machine with? A. Yes; see Suppleuent, No 161. 2. What is the electromotive force of he Grenet battery when first connected? How long afte it is put in action will it mamtain its strength, and to what extent will the force of current ecrease? A. 1.095 volt. The strength of the current diminishes quite
rapidly if the battery isallowed to remain in action any considerable length of time continuously. It is not adapted for a continued use, but where a strong current is required occasionally for a few minutes at a time
3. What form of battery it answers a good purpose. 3. What form of battery
best combines strength of current, constancy, and nomy? A. Bunsen's, or some of its modifications.
(5) E. M. C. asks: Is there an easy way other sizes of books, by those not practical printers other sizes of books, by those not practical printers,
and what is it? A. Count the pages between printers (6) O. M. S. asks: Is a lightning rod supported upon large insulators and having no ground conknow of? A. No.
(7) J. S. B. writes: The yachts in use here of which there are many, are built on a flat model. They are very broad beam, the beam in some cases being about
$2-5$ of the length, and usually light draught. They are without keels, but furnished with center boards. Now, am thinking of building a yacht, upon a deeper and na ower model, withkeel. How will the two compare for model in whole or part of iron, heavy enough so that ordinarily no other ballast will be needed? My object in this is to bring the center of gravity as much below the water
ine as possible, as it seems to me that by so doing we would be able to sailcloser to the wind without going Ver. Would my plan have that effect? A. The mere form of midship section does not determine the best
model. What you propose would probably be fastest in model. What you propose would probably be fastest est in light winds. The iron keel is good and should be
eavy; do not make your cross section too full below.
(8) F. M. D. asks what is the horse power of an engine of 612 inch cylinder, 14 inch stroke,
pressure, 180 revolutions. I am running an engine of pressure, 180 revolutions. I am running an engine of mansaid it was a four horse, another said 20 . I think it about an 8 horse. A. If you are working 70 lb . pressure on the piston, whole stroke, the available power is
about 24 horse power. By actual calculation it is 32 horse power; deducting 25 per cent for friction and other
(9) "Inventor" writes: I want to connect an engine or engines to a shaft running 390 or 400 revolutions per minute; how small ought the cylinders to be to give me 8 or 9 horse power, and what size upright tubular boiler will furnish steam? Can 1 run the engines with success? How many engtes are give you the A 6 inch cylinder and 8 inch stroke will give you the
power you want. A vertical tubular boiler should have at least 220 feet heating surface. To run at such high
speed succusof:ily, everything must be well aropor
tioned and nicely fitted. ioned and nicely fitted
(10) J. F. asks: What is the best method of easily and economically separating in large quantities
of salt water, the calcium magnesia. etc., so that the salt will remain pnre? A. There are three methods employed for separating salt from calcium magnesia, etc.: $a$, by evaporation of the water by aid of the sun's heat;
$b$, in winter by freezing; $c$, by artificial evaporation. The $b$, in winter by freezing; $c$, by artificial evaporation. The
first method is generally used on the coast lines of southern Europe. The arrangement of the salimes or salt gardens is as follows: On a level sea shore is constructed a large reservoir, which by a short canal communicates with the sea, care being taken to afford protection against the inroads of high tides. The depth of water in these reservoirs varies from 0.3 to 2 meters. The sea water
is kept in the reservoir until the suspended matter has been deposited, and is then conveyed by a wooden chan-
nel into smaller reservoirs, from which it is conducted by underground pipes to ditches surroundingthe salines,
where the salt is separated from the water. The salt is where the salt is separated from the water. The salt is collected, placed in heaps on the narrow strips of land
which separate the ditches from each other, and shelwhich separate the ditches from each other, and shel-
tered. As these heaps are left for some time, the delitered. As these heaps are left for some time, the deli-
quescent chlorides of magnesium and calcium are absorbed in the soil, consequently the salt is comparaor springs, the brine is immediately boiled down. This boiling generally requires several weeks, the scum being removed and the soda and calcium sulphates deposited removed with perforateu ladles. As soon as a crust of salt is formed on the surface of the liquid a temperature of $50^{\circ} \mathrm{C}$. is maintained. At this stage the
salt is gradually deposited at the bottom of the pan in salt is gradually deposited at the bottom of the pan in
small crystals, and being removed, is put into conical small crystals, and being removed, is put into conical
willow baskets, which are hung on a wooden support over the pan to admit of the mother liqnor ;which contains the greater part of the magnesium and calcium chlorides) being returned to it. Finally, the salt is (11)
(11) G. S. T. writes: A reservoir is $\mathbf{6 0}$ rods distant, descent 40 feet. One pipe of $1 \%$ inch bore con
tracted to $3 / 4$ inch just at the lower nozzle, the other pipe of $11 / 2$ inch bore for 20 rods, 1 inch bore for the next 20 , and the last 20 rods of 33 bore. Which of the contracted just at the outlet the friction will be least.
(12) T. M. J. asks: 1. Will the water, if conveyed tothe boiler in a 2 inch pipe, force itself into the boiler against a greater steam pressure than (say) in
a/d inch pipe? A. No. 2. In "Peck's Natural Philoa $\sqrt{2}$ inch pipe? A. No. 2. In "Peck's Natural Philo-
sophy" there is an illustration of how a cask was bursted by filling the cask with water from the top of a tube 34 feet long. Will the heavier weight of water in a large pipe not add materially to pressure per square inch at the lower end of the pipe? A. No. 3. Could I overcome any resistance in the boiler by letting the water into the ooiler through a funnel or a small hole on the principle of an
jector.
(13) J. R. H. asks: 1. Can exhausted steam be used to heat up a workshop? A. Yes. 2. In what
way does it affect the working of an engine? A. Pro way does it affect the working of ander A. Proper cent of power is lost between exhausting through a pipe 20 feet long, and one 120 feet long? A. Difference is not appreciable if pipe is large.
(14) G. E. T.-You will find directions for 159.
(15) W. H. B. asks, Does the microphone strictly magnify the sound or only transmit it? A. It
(16) C. K. M. asks: 1 . What is the best method of magnetizing a rat tail file $15 \times 1 / 2$ ? A. Inclose the file in a helix made of about 50 feet of No. 16 insulated wire, and connect the helix with 4 or 6 cells of car-
bon battery. 2. Can I magnetize it with an ordinary Daniells battery, by wrapping it with insulated copper (17) S. G McM. asks: 1. Will a etlephone that is constructed as described in Supplement, No. 142 , work when thecoil is made of No. 30 wire? If not,
will it with No. 32 A. No. 30 wire is too coarse. No. 32 might answer, but the resultswould not be satisfacwire be if modeof copper? A. No 18 will do
(18) A. S. B. asks: How can I take grease out of marble? A. Mix sal-soda with two parts of quick-
ime in powder, moisten the mixture with soft cold water, coatthemarble with this, and letith sort coll cessary.
(19) J. D. asks: How can I make an alloy of copper which will attach itself to glass, metal, or porby reduction of 30 parts finely blen hydrogen or precipitation from solution of its sulphate with $z \mathrm{inc}$ ) are made into a paste with oil of vitriol. To this add 70
parts of mercury and triturate well then wash out the parts of mercury and triturate well; then wash out the
acid with boiling water and allow the compound to cool. In ten or twelve hours it becomes sufficiently hard to receive a brilliantpolish and to scratch the surface of in or gold. When heated it becomes plastic, but does not contract on cooling.
(20) A. L. C. asks why a piece of paper cannot be blown off the end of a tube if it is simply placed over the tube at one end with nothing to fasten
it. A. This phenomenon occurs only when the tube has flange or its eqnivalent around the discharge opening. The adherence of the paper to the end of the tube is due lateral discharge of air. This subject is fully treated in (21) A. H. asks: Where on the globe will New Zealand most probably; possibly a little earlier at some Englishmissionary station in Polynesia. Eastrn Siberia is ruled out of the reckoning by the Rusian calendar; and our Alaskan islands by their taking their time from San Francisco.

[December 6, 1879.
(22) L. P. B. writes: I wish to know what gives the kind of ink used with the hectograph the
peculiar bronze luster? A. The ink consists of a strong peculiar bronze luster? A. The ink consists of a strong
andution of aniline violet, which crystallizes on the paper alution o
in drying
(23) W. C. B. asks what will remove iodine rom marble. A. Try strong aqua ammonia.
(24) A. B.-Laboulbène recommends for thepreservation of insects in a fresh state plunging an excess of arsenious acid in fragments; $11 / 2$ pin alcohol will take about 14 troy grains of arsenic. The living insect, put into this preparation, absorbs about and dried, it will be safe from the ravages of moths Anthrenus or Dermestes. This liquid will not change the colors of blue, green or red beetles if dried afte soaking from twelve to twenty-four hours. Hemiptera and Orthoptera can be treated in the same way. The nests, cocoons, and chrysalids of insects may be pre-
served from injury from other insects by being soaked served from injury from other insects by being soake
in the arseniated alcohol, or dipped into benzine or in the arseniated alcohol, or dipped
solution of carbolic acid or creosote.
(25) W. H. M. asks (1) whether methyl chloride is an article of commerce and whether it is ex peratures and pressure; it is condensable to a liquid peratures and pressure; it is condensable to a liqui
at minus $22^{\circ} \mathrm{C}$. To keep it in the liquid form it mustbestored in very strong and hermetically sealed vessels. 2. Would it be necessary to produce pressure
with the article, before ecaporating, to produce a low with the article, before evaporating, to produce a low temperature? If so, how much; if not, how low might the temperature be reduced by the use of an air pump to produce a vacuum and beginning at normal temperature
and pressure? A. Exposed to the air it (the liquid) evaporates with great rapidity, its temperature falling below $0^{\circ} \mathrm{F}$.; in vacuo this evaporation of course proceeds more rapidly than in air, and hence the reduction of temperature is greater. The greater the amount of liquid evaporated in a given time the lower the tempera-
ture attainable. 3. How large a quantity of methyl ture attainable. 3. How large a quantity of methyl
chloride should be used to produce appreciable results? chloride should
A. Six ounces.

Minerals, etc.-Specimens have been re ceived from the following correspondents, and examined, with the results stated:
C. W.-The substances you send for examination denbergite. 4. Artificial. 5. Red granite 6. Graphite in calcite. 7. Epidote. 8. Satin spar in dolomite. 9. Coccolite. 10. Dolomite. 11. Quartzite. 12. Hornblende. 13. Clinochlore. 14. Chlorite. 15. Natrolite.
16. Spodumene. 17. Calcite. 18. Iceland spar. 19. Limonite. 20. Decomposing feldspar.-O. E. C.-The from the alum used in its manufacture) - N alumin from the alum used in its manufacture). $-\mathbf{N}$. C.-Th copper and iron sulphurets (chalcopyrite and pyrite).E. E.-The rock is a talcose slate. Some of it would
doubtless answer very well for furnace linings if it can be worked economically.-H. S.-Amygdaloid trap semi-decomposed-it contains opal quartz.-R. G. V.-
No. 1 is rutile-titanic acid $=$ oxygen 39 , titanium $61-100$. No. 2. Titaniferous sand, mennoconite. No. 3. Ferrugi nous quartz containing crystals of rutile and iron pyrites, also probably gold.-W. K.-The quartz contains
nothing of value.-G. W. K.-It is clear quartz rock. Useful for glass making.-O. B.-The iron ore is hema ime sulphate. No. 2. Calcite, lime carbonate. No. Malachite and azurite, carries traces of silver. No. ontains clay, sand, and lime phosphate.-J. M. F.Southern States.

## COMMUNICATIONS RECEIVED.

On Ice Yachts. By J. E. K.
On Improvements in Telephones. By T. L. W.
On Measuring the Uneclipsed Portion of the Sun's Diameter. By L. L.
On a Curious Bone Formation. By E. L. W.
On the Great Wheat Belt of the United States. By J
On Patent Temperance Reform. By L. J. F. On New Motive Power. By W. M. M.
A Theory of the Tides. By W. B. Jr.
On Sailing Ice Boats. By H. R. B
On Paraffine in Oil Wells. By D On the Velocity of Ice Boats. By P.F.
On Small Steamers. ByJ. A. W. On Small Steamers. ByJ. A. W.
The Law of Dust Explosions. By On the Speed of Icepoats. By T. S. S. On the Speed of Yee Boats. By C. S.
On Making Copying Ink. By C. F. L.
On Explosion of Dynamite. By N. . On Explosion of Dynamite. By N. .
[OFFICIAL.]
INDEX OF INVENTIONS for which
Letters Patent of the United States
Granted in the Week Ending
November 4, 1879 ,
AND EACH BEARING THAT DATE.
[Those marked (r) are reissued patents.]
A complete copy of any patent in the annexed list,inurnished from this office for one dollar. In ordering lease state the number and date of the patent desired, and remit to Munn \& Co., 37 Park Row, New York city.
Accordion and fute, combined. c. Bernharat. .... 221,148
Acid, making tartaric, H. Goldenberg ......... 21,297 Aging and purifying liquors, apparatus for, Jaco \& Lo chner.
Air
Air compressor, w. Johnst...........
Animal trap, J. M. Hawkins
Animal trap, J. M. Hawk
Animal trap, J. M. Keep
Animal trap, J. M. Keep .....
Animal trap, G. W. Lewthwa
Anvil, horseshoe calk welding, E. J. Parker.

Bag and sack fastener, C. R. Elliott ...
Bag holder, M. Pomroy
Ball trap, W. C. Hinman ............... Bed attachment, invalid, R. O'Donnell
Bed bottom, spring, S. H. Reves......
Bed orbed bottom, spring, E. A. Jeffery
Bedstead, wardrobe, F. R. Wolfinger... Bell fastener, T. O. Potter Billiard cue chalk block, C. A. Fa
Blacking box holder, H. Weston. Boot and shoe buffing machine, J. I. Copp Boring machine, log, Bartlett \& Evans.... Boring machine, rock, W. W. Graham. Bottle stopper, L. Kutscher..
Bridge, R. Long (r)...
Bride, M. R. Thurber
Brushicleaner, A. Hopfe
Buildings, construction of, $\mathbf{F}$. Ealtwasser
button and stud, E. A. Robin
Button card, C. A. Righter...
Button, separable, C. F. Quinley
Cabinet, toilet, F. C. Zanetti....
Calculator, mechan
C. McNally
Can for hermetically sealed goods, C. C. Lane
Car brake, automatic, O'Donnell \& Dever
Car coupling, C. B. Santee ....
Car, freight, T. R. Hutton ...
Car propeller, N. A. Gaston .
Car roof, railway, H. Aldridge.................
Cars, pipe coupling for railway, J. E. Chapin
Cash register and indicator, J. \& J. Ritty.
Chain, ornamental, A. Horst.
Cigar box lock, L. F. Mergott
Clock escapement, C. E. Lord....
Clock movement, A. E. Hotchkis
Clock pendulum, H. Camp.....
Clock, striking, D. W. Bradley
Clothes pounder, C. W. Robinso
 Creaming can, J. S. Farley
Cultivator, J. Dierdorff..
Gillingham bottles, lock stopper for, H. B...........................
dental drill, A. Hartman ( r )
Deodorizing and disinfecting, process and appa
atus for. J. M. Hirsh.. .,
Draught equalizer. . L. O. Brekke.
Drawer support, J. C. Hirsch
Dust pan, G. H. Howe.
Dyestuffs, preparation of, M. Wi......
Earring, W. A. L. Miller..
Electric machine, dynamo, G. Eeceo.......
Electro-magnetic machine,. Drescher.
Elevator bucket, w. G. A very.....
Envelopes, cutting instrument for, I. W. England
Equalizer, three horse, R. Scott
Fence, barbed, E. M. Crandal.
Fence wire, barbed, S. H. Gregg...................
Fibers, machine for cleaning and extracting,
File and holder............................
Filter, water, T. Tripp.....
Firearm, magazine, J. Lee......
Firearm, revoiving, A. Hyde
Fire escape, F. P. Mankin.
Furnaces, the gases from coking coal, process and apparatus for utlizing in. L. Steven
Gleaner and binder. E. W.Jen kins....................
gamating, J Patterson ....
overnor, steam engine, F. Fosdic.
Grinding mill, J. Stevens............
Hair spring stud, Monday d Doherty.
Hame, sheet metal, J.
Harness, C. H. Cooley.
 Hat and cap, e. P. Hoyt.
Hay loader. W. \& B. F. Bader.
Heating and cooking furnace, gas, H. Q. Hawley.
Hides, machinery for stocking, unhairing, and
softening, R. Middleton
Hinge, gate. J. A. Grove.
Hinge, spring, W. Gillilan
Hinge, stop, J. M. Dodge.
Hoe, T. B. Lockwood............................
Honey box for beehives, C. H. Connolly
Hoop machine, R. H. Nogar.
Horse power jack, A. Wissler



W. King .....................

Incubator, J. I. Campbell.
Indicator, W. L. Brownell.
Kettle G. w. Fisher
King bolt, clip, L. Pentz.............
Kneader, dough, J. W. \& A. Ruger
Knit mittens, manufacturing, E. B. Pearson
Latch, A. Wimmer..............

Plumer \& Kerans.................
Letterpackage clasp, J. W. Ripley
Level, pendulum, I. S. Winter........
Lid or coverf for vessels, J. C. Boyle
Lifting jack for vehicles,
Lifting jack for vehicles, L. Haverstic
Loom, J. w. Drummond (r)......
Loom, J. W. Drummond (r)..........
Loom drop shuttle boxes, mechanism for opera-
ting, L. J. Knowles......221,237, 221,238,
Loom harness motion, ....... Kenison.....
Loom shuttle spindle. O. P. Richardson. Loom temple, W. H. Burns (r).
Lubricator, J. G. Barrington .
Measuring liquids, automatic apparatus for, H. F .
Marchand
Meat mincing
 Meats, curing, J. M. Reld..............
Metal, galvanizing, Wahl © Eltonhead



Planter, corn and cotton seed, Z. T. Lee.......................................................................

Pulp screen. revolving. W. L. Longley.
Pulp screen. revolving.
Pump, W. Garvens.....
Pump, M. W. McCortney
Pumpfor compressing airand.....................
Pump hande ate attachment, A. A Lamb
Pumps, cylinder lining for, H. Epping
Pumps, cylinder lining for,
Ranlwaysignal, $F$ B. Aspinwall.
Railway switch,
Railway switch, H. D. Sprague ....,
Razors, manufacture of, C. F. Plue
Refricerating apparatus, T. Elkins..........
Refrigerating apparatus, J. A. Whitney (r).
Refrigerator, H. M. Diggins...
Refrigerator. H. M. Diggins ......
Rope clamping hook, J. Rob
Sash balance, w. Milner ..
Saw mill buffer, reciprocating, J. D. Wil............
Saw mill dog, J. Little............................
Saws, machine for making scroll, J. F. C. Bide
Scale beam, Bidwell \& Linen...
Scraper, road, H. W. Wall...................
Sewing machine shuttle, Miller \& Diehl.
Shiping case and can. T. Allen.
Shirt, T. M. \& E. Denhem........

Perry.................... ..................
spooling machines, etc., thread guide for, J. E.
Atwood.............
Atwood..... .............................
Steam engine, A. Ehret..... ..............
Steel, manufacture of chrome, R. Brown
tereotype plates.machine for shaving and trin
ming, w . Scott ..........................
ery, IW. Scott................
Stove. coal oil, J. M. Adams
Stove, heating, McCaw \& Brown
Stove or furnace, W. P. Miller.
Stove or furnace, W. P.
stove, vapor. F. Zugg.
Stringe, vapor, F. Zugg........... .......... ......
Suspenders, L. \& O. Oppenheimer.
Tag fastener, W. T. Barr
Tanning, M. L. Doty.
Tanning, M. L. Doty.....................
Tapfortin cans, etc, Cooper \& Wagner ...........
Telegraph repeater, fre alarm, A. W. Gray..
Telephone transmitter, C. A. Randall .......
Telephonic conductor, Holmes $\&$ Greenfiel
Telephonic conductor, Holmes \& Greenfield
Thill coupling, W. .s. Layard ........
Thill coupling, T. W. \& H. K. Porte
Thin coupling and support. W. J. Morgan....
Thrashing machine spikes. die for, F. Transu Toy gun, D. F Hale.
Traction engine, J. E. Praus
Trumpet for railway heads, P. c. Daw......
Tug link, H. J. Moreland............................
Universa: Joint coupling, J. Walker............
Valve mechanism for direct acting eng:nes,
Dow .
Valve, saf
Valve, safety, F. B. ...............
Vehicle. spring, J. J.
Velocipede, R, Stee
ise, F. C,
Velocipede, R. Stee
Vise, $\mathbf{F}$. C. Zanetti.
Wagon brake, E. W. Pritchet
Wagon gear, E. P. Joslyn
Wagon gear, E. P. Joslyn .....................
Wash bench or stand, folding, M.
Watch case, Colby \& Johnson.......
Water closet, hopper, J. Demarest.
Water meter, piston, Barton \& West.
Water motnr, W.F. Eyster..........................
Edeler....................................
Edelen.

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Window shade attachment, E. Metcalf
Window shade attachment, E. Metcalf..
Window shade cloth, making. B. Birnbai
Window shade cloth, making. B. Birnba
Wire cloth, fastening for. M. Kennedy.
Wire
Wood, compound for filling the pores of, T. G
Hojer
Hojer.... ...........
Wrench, W. A. Heath
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beeco, S . Jacoby \& Co.
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