## Engineering inventions

A car coupling designed for freight cars has been recentil patented by Mesprs. Thomas R. Mor-
gan, Guy Rufis, and David Dyvis gan, Guy Ruf, and David Davis, of Jackson, O., in the to allow tle link (in this case a hook) to drop out of position when cars are to be run together without coup. ling. The hook is pivoted and is attached to a bell
crank lever by which it may be raised by a rod at the top of the car or by one at the side of the car.
Mr. Nathan M. George, of Danbury, Conn., has patented a device for preventing dust from
enteriug the axle boxes of railroad car and engine enteriug the axle boxes of railroad car and engine
axle bearings, and inducing heating and producing wear. The contrivance is composed of a gland of wood, nd two of leather embracing a packing of felt. Vulcanized fiber: or similar material may be used instead
of leather; a spring is used to hold the protector in place. This device may be
Messrs. Henry w. Robie, of Portsmouth, Va., and William H. Lyons, of Berkeley, Va., have invented an apparatus for utlizing the exhaust steam of ion side of the pump, to utilize the atmospheric pressure gained by condensing the exhaust steam, and to condense the steam for returuing the heat of it, or
most of the heat, to the boiler, the said arrangement most of the heat, to the boiler, the said arrangement
consisting of a branched exhaust pipe connecting with both ends of a douhle acting pump, and each branch having a check valve to prevent reaction on the steam An automatic switch and crossing signal for railroads has been patented by Mr. Dariel H. Applegate, of Red Bank, N. J. It is intended to be work electric light to be lighted and extinguished by a pass-
ing train. 'The covering of the light is made by two semicircular plates hinged so as to fall by their own weight and arranged to be raised when electrical contact is made by the wheels of the train. The outside
surface of these disks are covered with illuminating paint to make them conspicuous, and to prevent the necessity of a
not exposed.

## MECHANICAL INVENTIONS.

An improved welding, swaging, and forming die for making chain links is the invention of Mr.
Henry A. Iddings, of Warren, 0 . The invention is to form a longer lap weld than usual, and to thicken those portions of the link-the ends-which are exposed to the greatest amount of wear. These results are ac-
complished by means of divided dies, the parts being made movable.
Mr. Leonidas A. Roberts, of Monticelln, Ga., has patented an improved method of securing the ends or joints of rubber belts by re-enforcing the ends cover the face of the belt, and pass under it on each side. The entire joint is made either by lacing or
rivets, or metallic books passed through, bent, and rivets, or metallic books passed through, bent, and
clinched. The method demands no skilled laboror
Messrs. Stephen J. Swarze and John C. Lane, of Sag Harbor, N. Y., have invented an automatic railroad signal intended to provide a signal adapted to be automatically set by the tread or fange of the wheel of the locomotive or car, or any device attached
to the engine or car, and toautomatically and gradually recede into its inclosure in a given length of time; and this length of time may be governed sothat the device Mr. William P. Badger, of Muscotah, Kas. has patented an improved wind wheel that by mean of the reciprocating action of springs and the centrifuu-
gal velocity of the wheel, opens and closes antomatigal velocity of the wheel, opens and closes antomatically the fans or wings of the whcel, to produce a uniform velocity under all circumstances of the force of
the wind. A widd chamber is also provided to increase the number of square feet of wind pressure on the

A machine for forming earthenware vessels has been invented by Mr. Cerbeleon Martinez Ribon, of Mompos, Bolivar, United States of Colombia, by
which the clay is placed in a sectional monld which is which the clay is placed in a sectional monld which is
secured to the plate of a potter's wheel, or a " jigger," and while being revolved a knife, the edge of which sel to be made, is inserted by foot or hand power, and the clay is rapidly made to the desired internal shape.
Mr. John D. Waldran, of Memphis, Tenn., has invented a handy valve grinder which consists of a
contrivance for attachment to the wheel of a glohe
valve for rotating it backward and forward on its seat valve for rotating it backward and forward on its sea
by means of a spiral shaft that is operated by means of a reciprocating nut. which is operated by one hand, while the guide for the nut and support is held by the
other hand, making a simple contrivance by which such valves may be ground quickly and efficiently with-
out being disconnected from the pipes.
Mr. Jackson Taylor, of New berry, S. C., has patented au improved side spring for carriages by
which the springs are resistant to side shocks and lateral movements. The sprinss are also re-enforced
by bent U-shaped inner springs that make the central by bent U -shaped inner springs that make the central
portion of the spring very rigid and yet give elasticity to their ends. The ends of the springs are connected to which the action of the springs under a load is rendered Mr. John Henry Nute, of New Glasgow,
Nova Scotia, Canada, has invented a machine for serving rope which can be operated by hand to serve rope
or other materials with yarn or twine, the operation be ing automatic, and the feed regalated to suit the size of the yarn used, so that by steadying the machine with
oue hand and turning the Criving wheel with the other the spool frame is rotated around the rope to be served, the serving yarn unwinding from the spool and wind ingaround
and speed.

Mr. Brock Woodruff, of Albert Lea, Minn invented an improved process of treating iron in welding heat, then rolled in sand, reheated to a some what higber temperature than before, again rolled in sand, and again reheated to a welding heat, when it is
immediately immersed in water to which has been immediately immersed in water to which has bee
added common salt in the proportion of one gallou of added common salt in the proportion of one gallou of
salt to twelve or fifteen of water, more or less. Iron made by this process may be heated, worked, welded properties imparted to it in the process named. The iron is very hard and tough, and is far superior to

Mr. Oswald Fachmon, of Lindsey, Ohio, sisting of a cam contrivance for working the saw, lever device for raising and lowering the saw, a power
apparatus for rolling the logs to the ways to be sawed, a lever contrivance to feed the logs to the saw, and a guide attachment for the saw, all contrived for the ap-
plication of power to the driving of the saw, so as plication of power to the driving of the saw, so as
to have steadier motion of the saw, and so as to avoid the back thr ust that the drag of the saw causes, which and the log rolling and feeding and saw adjusting devices are contrived with especial arrangement for
convenience in manipulating them by the attendant.

## AGRICULTURAL INVENTIONS.

A cotton harvesting machine bas been paPanted by Messrs. John Myers and John Edward Myer $\dot{\text { series of long and short toothed belts arranged side by }}$ side alternately, and adapted to pass over and through the stands of cotton. By fixed appliances in front o the machine any bent or broken branches of the cotton
plant are raised to connection with the toothed belts. Their load is relieved and deposited in the wagon by a
Mr. Knis
Mr. Knight K. Parker, of Circleville, O. from a thrasher and stacking it into a longitudinal rick, making the rick of uniform sides and even height.
The stacker is an appendage to the thrashing machine and is run bythe same power; when not in use it may be folded back on the top of the thrashing machine and be carried from place to place. One-half interest in Circleviile.
Mr. Walter F. Drew, of Sacramento, Cal., has invented a rake head for rakes with wire teeth, by
which a broken tooth may be readily removed and easily replaced by a new tooth. In this invention a single tooth is bent at right angles at its upper end, the bent portion resting in a groove; or, a double tooth is used that has its horizontal upper portion likewise em-
bedded. When put in, the teeth are straight, but once in, they are bent to a curve, the offset thas made help. $\mathbf{M r}$ them seated in place.
Mr. Charles T. Mason, Jr., of Sumter, C., has invented a cotton harvester which is intend
ed to reduce the expense of the present method of picking cotton by hand. The picking is done by ser rated disks of brass or other non-corrodible metal, pro-
tected by shields of wood from unnecessary wear and abrasion. The disks are suspended on vertical stem and are rotated by bevel gears on a frame carried by chains and pulleys, so that the pickers rise and lowe
without disturbing the plants or breaking off the hard wooded portions.

## MISCELLANEOUS INVENTIONS.

A handy folding table has been patented y Mr. Frederick Gesking, of Grand Rapids, Mich., that can be taken down and put up with little trouble
and im little time. When folded it occupies scarcely and m little time. When folded it occupies scarcely
any more space than the board top alone, and when erecte

An improved form of truss pad has recently eeen patented by Mr. Elias Thompson, of Commercia Point, $O$., the construction or rather the form of which
is intended to give better protection to a rupture im the For this form of abdomen than the pads now in use ance is felt by different posturings and that the sac annot possibly escape from its confinement.
Mr. William Klahr, of Myerstown, Pa., has patented an improved bicycle to be driven by pe and lever. The small wheel is in front on this bicycle and the rider sits in front of the top of the large wheel,
a position that gives him unusual power over the driva position that gives him unusual power over the driv-
ing mechanism, the pedals being considerably in ad ance of the hubs of the large wheel.
A clamp for dumb waiters and similar con Avances has been patented by Mr. Edward Lange, of
Poughkeepsie, $\mathbf{N}$. Y.. which is intended to save the elevating rope from wear and to be self-releasing as jaws or clamps that embrace the rope are lined with rubber or leather or some other gradually resisting ma
terial, and cannot wear the rope or make any noise in peration.
A bandy book rest for supporting the hand at hand, has, been patented by Mr. Charles B. Metz, of Utica, N. Y. It may be attached to any brok, whateve proper, is a thin sheet of metal, a thin wood board, or a proper, is a thin sheet. of metal, a thin wood board, or a
book. John Owen Kilroy, of Albany, N. Y Mr. Jobed on improved tobacco pine which is so con structed that the nicotine cannot pass into the mouth and the smoke canuot burn or bite the mouth and tongue of the smoker, and thus renders smoking very
agreeable. The several parts can easily be detached and removed for the purpose of cleaning them, so tha the smoke will always taste fresh and sweet. The

A combination railroad ticket, use ful for outes by different roads, and containing in itself the recently patented by Mr. James W. Womeldorf, of Mid dleport, $\mathbf{O}$. The ticket may be used for more than one
person simultaneously, and may be used, also for diferent roads and different stations, the conductors each having their distinctive stubs, and furnisning the basis
Messrs
Messrs. Lorenzo D. C. Wood, of Newark N. J. and Thomas B. Dorrell, of Brooklyn, N. Y.,
have patented a new package fire kindler, which comprises in one a package a paper bag, box, or wrapper, which forms a component part of the kindler, kindling wood in detached pieces, and a highly combustible cheap, The paper wrapper and its contents constinte pact package form, and makes a new article of manu
facture, trade, or commerce, each package consisting of facture, trade, or commerce, each pack
Mr. John Walter, of Nash ville, Tenu., has invented a convenient clasp, or coupling, for stove and
heat pipes made or tbin metal, that obviates the neces ity of forming the ends, or joints so that they slip ne within the other, or of permamently riveting sec corrugated and an open corrugated band fits around them, the ends being locked by a key of sheet metal, the edges of which are recurved to embrace the end
corragationson the band. By this device sections of corrugations on the band. By this device
Mr. John C. Jessup, of New York city, has invented an improvement in color cans, the object
of which is to facilitate the discharge of prepared color or caint from cans. The invention consists in a color can constructed with a central discharge opening and provided with a swiveled right and left screw and two
pressure disks moving from the ends of the can toward its center, so that all the color can be discharged from e can, the disks gradually app the right and left hand screw is turned and a meeting

Mr. Moses Humber, of Callinpe, Iowa, has nvented a combined horse collar and hames with a view to prevent galling. chafing, pressure on the wind pipe of the horse, and to put the load of the draught on
that portion of the animal most able to bear it. 'The collar proper is of wood worked to fit the horse's neck, alar proper is of wood worked to ift he horsered by steel plate connected at top and bottom by anjust le plates. The loops for the tugs are turned at righ ngles to the collar, by which a portion of the load is
orne by the flat of the neck, permitting the shoulers of the animal to move freely.
Mr. George N. Buck, of Mattoon, III., has nvented a tag fastener which consists of a single prece of wire or other suitable material, which is doubled upthen has its extreme ends, which are pointed, bent a in the same direction with earh other, and in a direction
at right angles with the plane of its body or prongs, to at right angles with the plane of its body or prongs, to
form catches for holding the fastener in place. The prongs, which incline ontwardly at the ends, are thus adapted to be inserted between the folds of cloth e roll until the back of the tag is inclined toward g, any rol; andas the ends are foren will caus the eaid ends to sink into the adjacent fold or folds of the cloth and prevent its accidental withdrawal.

## NEW BOOKS AND PUBLICATIONS.

Cards. By W. B. Dick. Illustrated. Dick \& Fitzgerald, New York.
The book contains rules for playing
Design in Textile Fabrics. By Thomas R. Ashenhurst, Head Master, Textile De partment, Bradford Technical College Loud on, Paris, and New York.
This admirable work contains, in a convenient form, mass o useful placts, and over one hundred diagrams The author says: "The practice of paying little or no attention to the proper structure of the fabric, and its
suitability for the purposes to which it is to be applied, suitability for the purposes to which it is to be applied, is the cause of considerable waste in manufacture. The object of this manual is to snggest patterns and show means of producing new ones by modification, in
the loom mechanism, and preparation of the warp or the loom mechanism, and preparation of the warp or
woof. The book will be of value to all who are interested in the progress and perfection of textile indus-

Workshop Receipts (Second Shries). By Robert Haldane. E. \& F. N. Spon, Lon-
don; 35 Murray Street, New York. Price don, 00.
The success of the original "Workshop Receipts" in the same this second series afte the same pattern. There are many subjects in all
branches of applied science which are not treated of in the great industrial encyclopoedias, and yet are of considerable interest to scientific amateurs and mauueach eubject is treated exhaustively and in such a man ner that the information sought can be readily ob-
tained. For instance, the topic of boiler incrusty tained. For instance, the topic of boiler incrustations is opened by numerous analyses of feed water from
rivers, lakes, wells, town supply, rain, canals, pits, rivers, lakes, wells, town supply, rain, canals, pits,
springs, and the sea, with analyses of the incrustations produced by them, and a critical cxams and of processes for preventivg boiler corrosion. In this way are treated, among many others, albumen, bleaching, cements and lutes, cleansing, confectionery, copying,
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tine, glue and size, glycerine, leather, paper, pigments paint. and painting. The subdivisions of each head are arranged alphabetically. The language of the book is

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Pa. Diamond Drill Co. Box 423 . Pottgville, Pa. See p. 206 . Drop Forgings. Billings \& spencer Co. See adv., p. 189 Woodwork'g Mach'y. Rollstone Mach. Co. Adv., p. 22: . C. B. Rogers \& Co.. Norwich, Conn.. Wood Working Lightning Screw Plates, Labor-saving Tools, Lightning Screw Plates, Labor-saving Tools, p. 220.
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HINTS 'TO CORRESPUNDENTS.
No attention will be paid to communcations unless accompanied with the full name and address of the
writer. Namesand addre
given to inquirers.
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We renew our request that correspondents, in referring to formeranswers or articles, will be kind enough : name the date of the paper and thepage, or the number of the question.
Correspondents whose inquiries do nol appear after
a reasonable timestiould repeat them. If not then puba reasonable timeshould repeat them. If not then pub-
lished, they may conclude that, for gool reasons, the Editor declines them.
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Any numbers of the Scientiric American SupplegmENT referred to in these columns may be had at the
office. Price 10 cents each office. Price 10 cents each
for examination, should b samples of minerals, etc for examination, shonld be careful to distinctly mark or fication.
(1) H. H. writes: I see in your reference book that $403^{\circ}$ of heat give 240 pounds pressure. Will
be pleased to know the degrees of heat with the presbe pleased to know the degrees of heat with the pres-
sure (steam) at 300 , 400,500 , and 600 pounds. A. At
300 pounds total pressure or 285 pounds by gauge, temperature $4175^{\circ}$; at 400 pounds total pressure, $445^{\circ}$ Fall. at 500 pounds total pressure, $4677^{\circ}$ Fah.; a at 600 pounds

## (2) H. B. S. writes: Will you please let me

 know about what power will be required to force a steelshaft 2 inches diameter into block of cast iron 4 inches square, bored theproper size to make a very tight fit These blocks of iron are 24 inches long, and the shaft goesthrough, having a bearing at each end of about inches; if the shaft is turned 2 inches diameter, what
should the bore be? Or, in other words, what should the difference be between the shaft and the bore? A. case you of no experim only be determined by experi ment. The following case of actual practice may be a guide: Iron shaft or pin 3 inches diameter and inches length of bearing; allowance for difference of inside and outside diameters one-sixty-fourth inch pressure required to force together, 600 to 800 pounds
per square inch; the former if the hole be rough bored. per square inch; the former if the hole be rough bored,
and the latter when the surfaces are very true and and the latter when the surfaces are very true and
smooth. Another case from actual practice is upon a inch diameter shaft, an allowance of one one-hun
(3) A. S. writes: Please give me a receip for type metal and black printer's ink. A. Lead 3 pounds, antimony 1 pound; or lead 9 pounds, antimony
2 pounds, bismuta 1 pound. 2 . Boil 13/2 gallons linseed oil to a thick varnish; while hot stir into it 6 pounds powdered rosin, 134 pounds dry brown soap in shav-
ings, then 216 ounces indigo, $21 / 2$ ounces Paris blue, and 5 ings, then 236 ounces indigo $21 / 2$ ounces Paris blue,and 5
pounds best lamp black. Let it stand a week. There pounds best lamp black. Let it stand a week. There
is considerable danger of fire in boiling the linseed oil. very ink factory has its own secret
(4) E. S. M. asks: What sized engine would be required to run a boat 15 feet long and 4 feet
wide, and how many miles per nour would it run? A. wide, and how many miles per nour would it run? A
For a propeller yacht, engine 3 inches cylinder by $3>$, inches or 4 inches stroke. Boiler with about 40 feet flre get a speed of about 6 miles per hour.
(5) J.M. E. asks: 1. How can I ebonize pine or poplar for cheap furniture? A. Dissolve copperas in cold water by shaking; paint the wood with it two or three times. After it has dried apply two or three
coats of a strong decoction of logwood. When this too has dried wash off the wood, and when dry oil and polish it. $\approx$. Give directions for making walnut stain A. (a) 1 quart water, $11 / 2$ ounces washing soda, $21 /$
ounces Vandyke brown, one-quarter ounce oichromate of potash. Boil for ten minutes and apply with a
brush either hot or cold. (b) Permanganate of potash brush either hot or cold. (b) Permanganate of potash
dissolved in water givesa good brown stain.
(3) D. S. writes: Will you please advise me whether "storm glasses" (camphor and nitrate of
potash) should be hermetically closed or not? Some potash) should be hermetically closed or not? Some
authorities close hermetically with plaster of Paris, others with cork, perforated. A. They should have a very fine aperture in their tops for admission of air.
Plaster of Paris alone will not close hermetically, as it Plaster of
(7) P. D. writes: Will you please tell me what flavor is used in flavoring the ordinary bottled
soda water or "pop." the proportions, and the pro
cess? A. Various fiavors are used, principally lemon
and sarsaparilla. For the first a lemon sirup is made a follows: Simple sirup, 1 gallon; extract of lemon, hal
an ounce; fruit acid, 1 ounce. For sarsaparilla the following is the formula: Oil of anise, 15 drops; o of wintergreen, 15 drops; oil of sassafras, 15 drops fuid extract sarsaparilla, 2 ounces; simple sirup, pints; powdered extract licorice, half an ounce. A
sufficiency of the sirup is mixed with the water and the sufficiency of the sirup is mixed
(8) J. A. K. writes: I have a telephone line, 50 rods. Instruments are intended to work withou with hands, put up as directed D, please tell me through your valuable paper if the dis tance is too great, or what is wrong? A If you are using a magneto telephone similar to Bell's, we are unable to say-without further particulars-where the trouble is; but if your instrument is an acoustic or me-
chanical telephone, your wire is too large and its tension chanical telephone, your wire is too large and its tension
is too great. Use a fine twisted wire cable cord and uspend it with strings, so that it will be free to vibrat ndwise
(9) S. T. N. writes: Would you please state in your paper what will prevent white cast iron from
biowing when poured around wrought iron? A. To blowing when poured around wrought iron? A. To
prevent cast iron from blowing when poured around rought iron: Clean the wrought iron free from scale with muriatic acid, wash free from acid and heat to $300^{\circ}$, at in the mould hot and pour at once.
(10) V. E. St. C. writes: Will you please nswer the following in the Scientific American? When there is 100 pounds steam pressure in a boiler, is shell? A. The pressure is not quite even at the top and bottom of a boiler at any pressure; the diff rence is due to the weight of the water, which amounts to one pound in 27 inches from the water line down.
(11) S. C. writes: 1. Please iuform me if possible about what height the common 1 pound and pound rockets attain. A. Rockets are very variable in a height of from 300 to 500 feet, a 2 pound rocket from 400 to 800 ; much depends upon the clean finish and shape of head and stick. 2. What plan would you sug. gest for increasing the warmth of a country house,
built of wood? 1 have been advised to take off the ontside boards, and cover the honse with tar paper, and of tar through the house in summer? A. For making of tar through the house in summer? A. For making moistare, take off the clapboards, fill in between the studding with brick, flat or edge as convenient, tight laid with mortar, then cover the studding with felt. paper well lapped, and clapboard. If the paper is
lightly tarred, it will give off a little odor the first year lighty tarred, it will give off a little odor the first year
and will be waterproof, but not warmer than the felt and will be waterproof, but not
paper. The tar odor is healthy.
(12) E. L. P. asks how to make a solution of oxide of copper for depositing iridescent colorz on it practical to solder aluminum? If so, what is the best hide of arsenic is said to be used for the purpose, prohide of arsenic is said to be used for the purpose, propplied by heat. 2. Many alloys are given for aluminum solder. They range as follows: Zinc, 80-94parts; copper, $2-8$ parts; aluminum, 4-12 parts. Themore zinc the less of the other metals is required. For flux use parts copaiba balsam, and 1 part Venice turpentine. he operation is the same as that of brazing
(13) D. D. S. asks what is the best kind of wire to use for an acoustic telephone, with a rawhide of about 200 feet. Have tried copper, but it stretches in few days, so that it does not work well? A. Twisted ron or steel cable cord is the best for this purpose. It does not continue to stretch ike co
from the "ring " of a single wire.
(14) F. H. W. asks for a receipt for nickel plating. A. Use the double cyanide of nickel and potassium; plate the article in a bath of the double salt, usiug a battery; for positive electrode a plate of nickel melt. There are many practical points in all arectro melt. There are many practical points in all ele
(15) M J B asks. What will take blackoffand clean a copper pan, suchas is used in boiling sorghum molasses? A. If scrubbing it with sand might be recommended, but is a vioient poison.
(16) C. T. J. writes for a receipt for an alloy that is fusible by steam. A. 3 parts by weight of cadmium, 4 parts tin, 8 parts lead, 15 parts bismuth
melts far below the temperature of boiling water. (17) C. K. asks how to ubtain the extrac from sumac; and what is the cheapest way, and at the
same time will give greatest percentage of Soak it out with successive additions of very hot water, pouring off after each addition and finally flltering the nited decantations.
(18) C. A. R. asks how to determine the mount of soda ash in a gallon of (soda ash) liquor of any given degree; or some work on the subject. A. istries and cyclopedias. Ybur best plan is to have a chemist give yon practical instruction in the process. all chemical operations practice is most essential.

INDEX OF INVEINTIONS For which Letters Patent of the United October 2, 1883.
AND EACH BEARING THAT DATEC [See note at end of list about copies of these patents.]

Axle, carriage, W. Jones.........
Axle, lubricator, car, J. F. Webb.
Axle nut. carriage, D.
Bag. See Feed bag.
Bag fastener. F. H. Ludington..
Bake pan and steamer, A. C. Ka Bake pan and steame
Bale tie. wire, J. R. As
Bar. See Grate bar.
Bar. See Grate bar.
Battery. See Secondary battery
Bell for bicycles, alarm,
 Bicycle saddle. H. B. Hart
Block. See Pulley Block.

## Boat. See Follang boat. Boiler. See Steam boile

## Bolt cutter, E. Amelotte



Book, hymn and music, R. D. Robertson.
Bottle wrapper and cushion, E. O. B
Box. See Butter box. Miter box.
Brake. See Car brake.
Broiler, O. Whyte....
Buter box, A. Sweat

Butter mould, D. C. Spitzer...
Butter package, II. P. Barbe
Butter package, II. P. Barber.... .........
Button press, G. O. Schneller..............
Button setting instrument, J. F. Atwood
Buttons, etc.., al tachi
Can. See Color can
Can. See Color can.
Car brake. automatic, Fuller \& Salvadge
Car coupling, W. B. Bessey...
Car coupling, K. s. Blanchard
Car coupling, L. G. Hedlund.
Car coupling, L. Herrman.
Car coupling, I. J. Merrick.
Car coupling, I. J. Merrick.
Car coupling, Morgan et al.
Carcoupling, R. T. Payne
Car coupling, C. P. Searles.

Car guard, J. Craig..... ...
Car, sleeping, H.
Car spring T. Hale..
Car wheel and axle, J. Findlay
Car wheel and axle, J. Findlay .
Carding machine, J. Potter........
Carriage, child's, C. S. Strowbrid

Ring \& Bradshaw................... .....
Cartridges, holder for packing, J. Gardner ..
Cartridges, machine for greasing, E. Parker. Cash carrier systems, stop or brake mechan and wire support for, J. R. H. Hi
Cement, fluid, T. J. Mayall.
Cement for the manufacture of memora
blocks and tablets, rubber. W. E. Doud
Clocks and tablets, rubber. W. E. D
Check registering and printing
dall \& Kruse
Checks and othe
H. Uhler.....
Cheese vat. s. B.
Chill, H . R. Allen........ ..............................
Churn aud like apparatus for use in the manufac
thre of artelcrat buttere cte
Chrre ofartitcrat butter, ctece; \%. H. Cochrar...
artificial butter, etc., S. H. Cochran.
Cistern cover. T. Cubbins...
Clamp. See Stonework cla
Clamp for hand power dumb-waiters and otber
purposes. E. Lange..
Clevis, R. A. Rouse
Clevis. plow, E. L. Bracken
Closet. See Water closet
Cloth, machine for applying cement and flock to
T. J. Mayall... ........ ... .........

Clutch for elevators, friction, w. Winkless
Clutch, friction, R. wels.
Coal, apparatus for loading, w. G. Barnard
Cock, compression. J. S. Bar
Coffee pot. J. Cochran.
Coffee pot. J. Cochran. ......
Collar and hame, combined. M. Humber
Colieries, method of and apparatus for the treat
ment of spoil heaps of, L. H. Armour.
Color can, J. C. Jessup.
Colter. caster, B. C. Bradiey
Concentrator, G. A. Metcalf
Condenser. jet, E. Körting.... ...............
Condenser, steam jet, Schutte
Goehring
Condensing steam and heating fluids, apparatus
for. E. Theisen
for. e. Theisen ... ...............
Coupling. See Car coupling. Thill coupling.
Coupling. See Car coupling.
Cultivator, wbeel, L. . Chapin
Curtain roiler, H. Lobdell... ...
Curtain roller, H. Lobdell...
Curtain roller attachment, H. Lobdell
Curtains, window pole for, W. J. Flickinger
cut-off valve, T. W. Heermans.
Cutter. See Bolt cutter. Vegetable cutter.
Door hanger. L. A. Smitb
Draw plate, J. Holland.
Dredging machines, etc., friction compressor for
Drier. See Fruit drier
Grying sugar and other substances, machine for,
G. M. Newnall
Dumping platform, Savage \& Love (r)
Elistic fabric for goring. T. J. Mayall.
Elistic fabric for goring. T. J. Mayall............
Wiswall...


## Electric cut-off, J. A. Tupper.

Electric motor. C. J. Van Depoele .................
Electric switch. W. Adams....................
Electricill conductor for oil tanks, H. W. Spang
Electrical or galvanic currents to beds, couches,
Elevating and carry sti well....... ...........
Elevatiog and carry ing apparatus, I. Bishop.
Elevator. See Hod elevator. Ice elevator.
Elevator. C. H. Bidwell

Engine. See Gas engine. Oscillating steam en
gine. Road engine. Rotary steam engine.
Steam engine.
for, M. J. O'lonnor
abric. See Elastic for
Fabric. See Elastic fabri
Farm Eate, W. B. Miller
Feed bag for horses, bey \& Verdin


