RECENTLY PATENTED INVENTIONS. mechanical.
Lath Sawing Machine.-David S. Abbott, Olean, N. Y. This invention covers a novel
combmation and arrangement of parts in a machine combination and arrangement of parte in a machits
whereby, by reasoon of the angle of the forward bafts, the feed rollers cause the material fed to draw toward the guide. even when the suw is dull, and prevent the
tendency to draw the material the other way, preventing the ends of the lathe from being made thin
Windmill. - Edgar C. Beebe and Riley Stoner, Glen Elder, Kanas. This invention pro-
vides simple and eficient means for the automatic advides simple and efficient means for the automatic adand direction of the wind, without a vane, and for the automatic government of its work, bo that the speed
the windwheel will remain practically constant.
Lace Paper Machine. - Giuseppe Paci, New York City. Combined with a pattern wheel Pact., New York City. Combined wims a pattern means for ure two wheels having wooden rimes, with means for
bolding them in frictional contact with the pattern wheel, together with a roller having an elastic rim held on top of the pattern wheel, the machine allo having
other novel features, while the paper is pased through a box containing soaptone powder, with whic
coated that the cut strips are easily separated.

## Electrical.

Niget Signaling Apparatus.-Emil Kaseloweky, Berlin, Germany. This invention covers a means of sigualing at sea by differently colored elce-
tric lamps broupht to view singly or in ric lamps brought to view singly or in groups, the
current beinz switched to and from the lamps and a current beink switched to and from the lampe and a
supplementary resistance to produce the eignats, with spppementary retietance to produce the eignals, with stant resistance, momentary interruption and estin-
guiehment of the lamps being prevented.
Electric Clock Winding.-Heinrich Rabe, Hanau, Gcrmany. This is an electrical mechanimm for winding clocks having torsion or rotary pendulums, the mechaniem being adapted for raising the weight or resetting a spring which drives tbe clockwork, when the actuating power has
tbe apparatus working automatically.

## Metallurgical.

Zinc Furnace.-Gustaf M. Westman, New York City. Combined with a reducing furnace are regenerators connected alternately thirewith, condensers connected with the reducing furnace, coolers con-
nected with the condensers, and a blast engine conncetdedth the coolers and the regenerators, with other novel fcatures, to promote the reduction of iron or zinc res, and the manufacture of phosphor, sodium, and
Dephosphorizing Iron Ore.-Thomas F. Witherbee, Port Heary, N. Y. This is a proces which consists in mechanically separaling apatite or
phosphorus-holding compounds from iron ore, then phosphorus holding compounds from iron ore, then
diesolving the remaining small percentage of apatite with dilutc sulphuric acid, and finally wasbing the ore with water.
Hydrocarbon Burner.-Frank B. Meyers, Fort Plain, N. Y. 'This burner is provided
with a casing to the front end of which is secured a bell-mouthed tube, usually passing through secured a bell-mouthed tube, usually pasiing through the mouth
of the furnace, whereby air under pressure and atomized oil are vaporized to make a gas to produce a high hea
in the furnace, the quantity of air and oil to be mised being adjusted by a valve and regulator.

## rinchllaneous.

Cuff Holder.-Stephen V. Thomas, West Branch, Mich. The holder is adapted to fit in the
eyes or loops of a cuff button, and has an offset or eyes or loops of a cuff button, and has an offset or
shoulderthat spriisgepast the eye or loop of one button while on the opposite side of this eye or loop it has a shoulder out of alignment with the button eye or loop.
Refrigerating Tower. - Alfred R. Pechiney, Salindres, France. This invention covers a tubes through which cotd water is kept flowing for the cooling offree chlorine and vapor of hydrochloric acid, or any mixturc of these bodies in the state of gas, the invention covering various
Grain Meter.-Valentin Weber and James R. Harrison, Princeville, III. This is a device
for use in connection with an elevator of any approved construction, whereby the grain box is automatically dumped whenever a certain weight is obtained, the motion from the continuous motion of the eievato motion.
Lamp Extinguisher.-Alexander E McLeod, Hallock, Minn. This is a device of simple construction by which, when the light is extinguished, into the room, and when the extinguisher is left in closed position there will be no evaporation of oil.
Side Curtain for Buggies.-Joseph W. Thomas, Sargent, Neb. This is a curtain sonadapted for separate or united use, the sections having button holes along their upper and lowcr margine, and being made to overlap, making an effective rain curtain

Wagon Brake Lever.-William A. nd Evoch G. Haney, Media, Kansas. This lever has and Evoch G. Haney, Media, Kansas. This lever hounted thereon and pivotally connected to link, the connecting rod extending to the brake shoe providing for the application of power to the greatest
advantage at the time when the brake shoe to brought against the face of the wheel.
AxLE. - Edward M. Allen, Stafford, Md. This axle is made with connection blocks and
upper and lower shafte secared rigidiy thereto, with
other novel featares, being intended especially for as
in connaction with automatic brake devices forming the subject of former patents issaed to the same in

Clevis. - Arthur W. Rumsey, Kiowa Kansas. Combined with clevis bars or sections having extended portions lapped together, with coinciden openings, is an elongated link secured in the opening
and made to secure the sections snugly together or permit their movement apart when adjusted relativel thereto.
Gate.-Thomas Tyson, Mound City, Mo. This invention covers noves features of construc
tion and combinations of parts in a gate designed to swing outward from two sides, while the gate may be vehicle, the means for operating it being simple,durble, and readily manipulated.
Wire Fences. - Dwight H. Scott Flora, Dakota Ter. This invention provides a devic for expeditiously taking up the slack in wire fences an broken strand of wire may be united without injury to ension.
Store Order.-Charles S. Hempstead, Fairchance, Pa. This invention covers a form of orde who sell goods in small quantities that aggregate in value a limited and specified sum.
Goods Delivery.-William H. Bailey, Salford, Lancaster County, England. This inventio prepaid articles in which a revoluble cytindrical or other shaped magazine is employed to hold the goods
to be delivered, the improvement enabling the indicato to be delivered, the improvement enabling the indicator dial to be setatan oblique a
of vertically or horizontally,

Cheese Cutter. - Bernard Barry Schenectady, N. Y. This is an improved knife formed
a thin flat plate, one of whose ends is beveled to a a thin flat plate, one of whose ends is beveled to side edges of the plate is extended laterally at a rigt angle and provided with an oblique cuttingedge, th knife being especially adapted to cnt wedge-shap
slices from the body of a cheese by one movement.
Lock Hinge.-Benjainin F. Boughn of Randolpb, Neb., and William Cashner, of Pleasant
Hill, Mo. This hinge consiste of two sections connectHill, Mo. This hinge consiste of two sections connect
ed by a pintle, the knuckles of one section being exteriorly non circular in cross section has a spriug-actuated bearing plate pressin which the plate and its actuating epring or spring

Advertising Device.-Andrew Dahlstrom, Ashton, Micn. Tbisis a display device con sisting of a cylindrical body baving a series of opening and a tape or ribbon npon which are printed advertise alignme placed upon the ribbon as to be alvay revolved, one roller unwinding while an opposite roll winds up the ribbon.
Dental Matrix.-Christ. A. Meister Allentown, Pa. This is a matrix for teeth, consisting of a band having a body for engaging a tooth, and in
tegral extension of the band consisting of slotte eegral extension of the band consisting of slotted inclined side pieces, a crosshead engaged in the slots of
the sides, with means for actuating the crosshead, to the sides, with means for actuating the
be used on a tooth whule it is being filled.
Speculum. - William Molesworth Brooklyn, N. Y. This invention provides an imple-
ment by means of which the wall of a passage or cavity ment by means of which the wall of a passage or cavity
may be dilated and access had to any port:on of the may be dilated and access had to any portion of the
wall while the paseage or cavity is held in dilated wall while
position.
Insect Trap.-Jennie G. F. Johnson, Monnt Vernon, N. Y. Tbis invention covers a bait bo or receptacle having a surrounding trough adapted to
receive a poisonous substance, over which insects receive a poisonous substance, over which insects
cannot readily pass, the whole being inclosed in structure having an overhanging hood, the
Extracting Copper from Pirites EXTRACTING COPPER FROM PXRITES.
Josef Perino, Chariottenburg, near Berlin, Germany. his invention covers a process of obtaining copper nitric salts of iron to a temperature of about $200^{\circ}$ Cent grade, whereby sulpbate is produced, lixiviating th

Ore Roas'rer. - Charles J Fende Anaconda, Montana Ter. This roaster has an outer and an inner cylinder connected by tubes, with imperforate passages on both cylinders, the tubes alternately connecting the forward end of a passage on one cylinder with the rear end of a passage on the other cylinder,
and the forward end of the latter passage with the rear and the forward end of the latter passage with the rea
end of the next one ou the frest cylinder, whereby end of the next one ou the frst cylinder, whereby
continnous serpentine passage is formed, making continnous serpentine passage is formed, making
roaster designed to economically calcine the most re fractory ores.
Pile Driver.-Thomas J. Harriman, New Paris, Ind. This is an apparatus for driving pipes, iles, and fence posts. Lhe invention providing and effectively manipulated, and which is so designed that the hammer will at all times strike the pile squarely pon the top, and not mise a stroke by resson of the pile getting out of line.
Tank Valve. - Nathaniel W. Krouse, Washington, Pa . This is a cut-off valve especially dapted for oll tanks, and serving to close the valve in drawn off into the pipe line with which the tank is connected, a spring-pressed valve being located in the pipe line, a bolt engaging the stem of the valve, and a float operating on the bolt to withdraw it when the oil in he tank reaches a low level.
Gasoline Stove.-William P. Dun-
constrnction and combination of parts in an impled
gasoline stove, particularly with reference to thity
valive shaft lever and connection piece, whereby the latter will not slip when prope
being simple and effective
Froit Drier. - Frederick Altman, an Jose, Cal. Tho drying chamber has a ventilating fine with damper at its top, a central vertical air pipe th apertures opening into the drying chamber, the on air supply pipe having a regulating valve, a furnace at one side of the drying chamber, in which is a circular ot arr flue, with a rotary fruit tray rack located above

Vignetting Attachmenil. - Joseph R. Tewksbary, Fort Madison, lowa. This is an attach ment for photographic printing frames, in which an in ependent frame secured to the face of the printing rame is provided with maske of cardboard or othe thin material, certain of which are adjustable in rela be broken or aftened, a variety of changes bingmad in an easy and simple manner.
Dyeing Vat. - James W. Greaves Providence, R. I. Combined with a stationary vat is a
perforated basket, with a pressure pipe extending from perforated basket, with a pressure pipe extending from
the bottom to the top of the basket, through which the dyeing liquid is forced by steam or pump pressure, the pparatus being adapted for dyeing woo,
Well Curb.--John T. Lenoir, Columbia, Miss. This invention provides an atta!bment
designed for use in connection with any well curb, whereby the water drawn may be delivered without spilling, while the well bucket and rope need not b andled in drawing and delivering the water to a pail and whereby the well ma
cover locked in position.

## SCIENTIFIC AMERICAN

## buildina edition

## APRIW NUMBER.-(No. 42.)

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A cottage at East Orange, N. J. Plans and perPage engraving of a stairway in the Chateaud Page engraving of a stairway
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10. A cottage at Roseville, New Jersey, costing seven
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13. Perspective view of the new Trinity Methodid Perspective view of the new Trinit
Episcopal Churcb: Dcnver, Colorado.
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signed by G. A. Audsley. Arabceque panel decorations, paper for staircases, designed by Lewis
F. Day F. Day.
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The Scientifc American Architects and Builder
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stand.
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xtend an invitation to our friends, customers, and xtend an invitation to our friends, customers,
ond iners interested to give us a call on that day and pect our plant at our new
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dress Indiana Machine Works, Fort Wayne, Ind. For best casehardening material, address The Rogers For best casehardening material, address
Hubburd Co., Middletown. Conn. Sead for eireular. Water purification for cities, manufacturers, and rivate users. The only successful legitimate 8ystem.
Hyatt Pure Water Co., $16,18 \& 20$ Cortlandt St., New York.
 For the best Hoisting Engine for all kinds of work, Presses \& Dies. Ferracute Mach. Co., Bridgeton, N. J. Perforated metals of all kinds for all purposes. The Robert Aitchison Perforated Metal Co., Chicaro, Itl. The Holly Manufacturing Co., of Lockport, N. Y., will send their pamphlet, describink water works ma-
chinery, and containing reports of tests, on a polication. No. 11 planer and matcher. All kinds of woodworking chinery. C. B. hozer \& Co, No
C. E. Billings' Patent Surface Gauge. Drop Forgings. St Steam Hammers, ImprovedHydraulic Jacke, and 'Fube Friction Clutch Pulleys. TheD. Frisbie Co., N.Y.city. "How to Keep Boilers Clean." Send your address Theb, The best Coffe roaters, coojers, stoners, separators, polishers, scourers, alossing apparatus, milling and
peaberry machines; also rice and macaroni machinery, are built by The Hungerford Co., 65 Cortlandt $8 t$. N. Y . Lathes for cutting irregular forms. Handle and spoke lathes. I. E. Merritt Co., Loekport, N. Y.
Automatic taper lathes. Heading and box board machines. Rollstone Machine Co., Fitchburk, Mass.
Split Pulleys at low prices, and of same strength and
appearance as Whole Pulley日. Yocom \& Bon's Shafting appearance as Whole Pullegs. Yocom \& Bon's Shafting

## NEW BOOKS AND PUBLICATIONS

Publications of the Lick ObservaTORY OF The UNIVERSITY OF CALI-
FORNIA. Edward S. Holden, LL.D. Vol. I. 1887. Sacrainento: State
Printing Offce. 1887. Pp. 312 . With Printing Offic
Tbis elegant quarto brings the story of the work of he Lick Observatory up to a recent date and lcavcs the ground clear for annual publications that shall keep
to achievemente more promptly on record. It givea the history of the fonnding aud building of the observatory. thedescription of its buildings and instrumente, and detals of the work done from 1880 ,o 1885. The large elescope is of course uot included, the contract for its construction only being given. Among the meteoro-
logical instruments illugtrated, we notice the counterogical instrumenta illustrated, we notice the counterpart of the Scientific Americansegiatering barometcr. The early observations, astronomical aud meteorologients. The instruments described arc ill ustrated by a number of well cxecuted cuts, and a view of Mount Hamilton forms the frontispiece. The publication eflects much credit on Prof cseor Holden, who edited it, and is a happy augury for the future.


HINTS TO CORRESPONDENTS.
Namen and Addrese must accompany als letters,
or no attention will be paid thereto. This is for our
information, and not for publication. Rererences to former articies or answers should
givedate of paper and page or number of question. nquirlos not answered in reasonable time should be repeated; correspondents will bear in mind that though we endeavor to reply to all, either by le
or in this department, cach must take his turn. 3icelal WUritten Information on matters of
personal rather than gemeral interest cannot be
expected without remuneration. Scionilitc Americant Sujplementes referred
to may be bad at the ofice. Price 10 cents each. Books referred to promptly supplied on receipt of Winerals sent for examination shoald be distinctly
marked or labeled.
(705) R. M. P. asks: 1. Can you tell me bon w on will dissolve snlphur and paraflnes A. You can use as solvents fixed oils, snch as olive oil, petroleum,
turpentine, and benzole. The sulphur will be apt to
separate out at ordinary temperatures, however, from
solation in flxed oils. 2 Can you direct me to good dust arresters or separatorf? A. Dust can be separated
by passing the air or fumes through fines of large area, or into laree chambers, or by drawing them through muslin bage, asin zid. white factories. For electrical Entifie Ancricas, vol. liv., pages 225 and 389 . 3. Will sulphur combine with any oils? A. Sulphur com ines with olive oil, on heating, producing a decomposi tion product formerly used in medicine:and called oil of snlphur. You will find it described in the United States Dispensatory. 4. In what does paraffine oil differ from olid paraffine? A. In chemical composition; the containg
parafine.
(706) W. L. P. asks for the most approved receipt or formula for germinating the alcoholic yeast plant. A. The plant is called saccharomyces
cereoisic. A sample of yeast must be procured which examined microscopically shows a fair proportion of he characteristic cells. A quautity of brewer's wort is sterilized by boiling, aud to test its steri ity is allowed to aentation occurs, a speck of the yeast is introduced platinum wire into wort prepared as abo and th flask is at once closed. This gives a new growth of cells, and the process is repeated with Presh sterilized
wort, the new growth being used for inoculation. The proccss can be repeated a number of times, each time conducing to purity. The process was devised by Pas teur, and can only be carried out by careful atteution to
all the precautions used by bacteriologista. A temperture ranging from $70^{\circ}$ to $80^{\circ} \mathrm{F}$, should be malntained during the experiment.
(707) H. F. S. - Your hydroquinone eveloper prepared ab fo
Sulphite sodium.............. 400 grains.
Distilled water............... 10 oz.
Hydroquinone............... 100 grains.
Carbonate of potash........... 300 grains.
turns dark because of the oxidation by contact with the air and theypresence of the potash. The developer will potash separately and keep it in another bottle. Dis potash separately and keep it in another bottle. Dis-
solve 300 grains of potash in 10 ounces of water. To develop, take one ounce of the hydroquinone and sui. hite solution and one ounce of the potash.
(708) H. R. S. asks for a toning soluion.

Chloride of gold.................. 15 grains Acetate of soda
Distilled water. 1 oz.
15 oz.
One ounce of the above will tone one sbeet of paper 18 by 22, and the solution should be prepared one week
before required. Wben diluted for use, it should be before required. Wben diluted for use, it should be used immediately, as it will not tone more than once
Refore putting the print in the solution, pasi it through a weak solution of plain carbonate of soda and water
which removes any acid in the paper, and allows the oning to proceed rapidly. For blue prints. Prepare

A ft mmonis citrate of iron ....
B $\left\{\begin{array}{l}\text { Ferrid_c } \\ \text { Water... }\end{array}\right.$
Mix equal parts of $A$ and $B$, filter, and coat the shee of paper with a broad camel's hair brush. The film should be quickly dried. After printing, immerse in
water for a few minutes, which will fix the print. To prevent cockling of prints, nee the following mounting solution:

## Valson's No. 1 photo gelatine <br> Water..... Glycerine <br> Methylated alcobol

and lastly the spirit.
(709) B. E. K.-A very good ename
 Ether.... $3 / 302$.
$\mathrm{g}=\mathrm{s}$.
No castor oil need be added. If the plate is rubbed over with considerable French chalk, and the latter rubbed off, and the coilodion fiowed on, it wil
readily strip whendry. Aftcrthe collodion is set, th printshould be pressed down upon it. When dry, it will strip off from the glass. No gelatine solution is required. For additional particulars write to the East
man Dry Plate and Film Company, Rochester, N. Y. It is better to mount the print on a thin card frat, the mount all on the regular monnt.
(710) E. W. G.-To tone blue prints an olive green on brown color, after washing immersa
them in a bath made as follows: Borax...
$2 \frac{1}{2} \mathrm{oz}$.
38 oz.
Hot w
38 oz.
Acidify with aulpharic acid until blue litmne paper
turne red, then make the solution alkaline again by turng red, then make the solution alkaline again by
adding liquor ammonia until red litmus paper turns blne. Finally add 150 grains of gum catechu, occasionPor any lengthil it is Toneuntil the color is right by reflected ligbt
(711) G. J. B.-See the "Amateur Phoon "Pbotographic Emulsions," \$1, which can be had
(712) A. H. W. asks whether an ocean steamship can remove her propeller shaft and replace
it by an entirely new shaft (provided she had an extra shaft on board) while at sea. A. It is possible, but we never heard of its having been doue.
(713) C. C. R. asks: What liquid will be converted into vapor with the least heat, or, in other
words, if economy was not taken into account, what Anid or liquid would do the most work with the same heat used in a boiler and engine? A. There
little difference in the latent heat of vaporization water and other liquids referred to equal volumes of
vapor. Economy is to be found in working in accord vapor. Economy is to be found in working in accord-
ance with the accond law of thermo-dynamics, by having
as great a difference as possible between the lowest
and highest temperature of the liquid used and of its (714) A. T. C. writes: I wish to know which book explains the indicator card and the indicator, and the cost of the latest improved indicator? A.
We can supply you with "Twenty Yeara with the IndiWe can supply you with "Twenty Yeara with the Indicator," by Thomas Pray, Jr... in two volumes. Price
83. Also "Indicator Practice and Steam Engine Economy," by Hemengway. Price \$2. For dealers
in indicators, gauges, etc., consult our advertising
(715) W. J. K. asks: 1. In making the simpleelectricmotor described in Scientifio AmerrCANSOPPLEMENT, No. 641, I only put 11 coils on the The machine will run, but not to advantage. 2. Will soft Swedish iron wire do for the armature cores A.
It will answer, but not as well as soft iron wire. 8 . With what nnmber of wire whould it be wound to adapt it to the Fuller bichromate battery? A. The winding is right for the Faller battery, provided the battery quantity. 4. How many cells of the Fuller batters quantity. 4. How many cells of the Fuller battery quire about 18 cells. 5. How mans to develop the full power of motor? A. Probably double the above number. 6. How should the cells be connected? A. Two
in parallel and nine in series. 7. In the eight-light dynamo described in No. coo, Scientific American Supplement, bow is the machine attached to the
baser A. By tap boits ranning up through the base? A. By tap bolts ranning up through the base
into the poles of the magnet. 8. If $I$ wish to use it into the poles of the magnet. 8. If wish to use
always to run incandescent lights, how should it be Wound to give the best results? A. It should be com-
pound wound series and long shunt. (See diagrams in the article describing the dynamo.) 9. Could say Pour of the lights be burned at one house and four others at another house a quarter of a mile away? If
so,what size wire ehould I use to convey the electricity? A. It would be impracticable to usethis dynamo in that way. 10. Cau cast irou washers be used on the armature cores. If so, how thick should they be to give best
resultes A. Cast iron washers will not be satisfactors. Refer to the article deacribing the dynamo. 12 . Wh would be the beat battery to run the above as a motor . Pytably the plunging bicbromate battery.
16) C. J. M. writes: 1. How can I light-giving power of different grades of kerosene? A. Place a rod vertically on a table, with a smooth white
sheet of paper on the table in front of it. Place two lamps identical in construction, each with sample of one of the oils in it, back of the rod and about one foot apart.
They will cast two shadows of the rod. Move one or the They will cast two shadows of the rod. Move one or the
other back and forth until both shadows appear of equal other back and forth until both shadows appear of equal
intensity. Then the light given by each lamp will be in The oil consumed should be so sdjusted sa to be the eame in each lamp. The best you can do is to weigh each lamp before and after the experiment, and thus determine the true consumption, and correct by inverse Droportion, with allowance for specific gravity; but for any accuracy the consumption by measure must be
identical, as this correction is only approximate. O course you can measure the oil instead of weighing it Also the flashing point. A. For flashing point heat containing water. Suspend an accurate or ther vessel containing water. Suapend an accurate thermometes
with ite bulb immersed in the oil. Gradually heat the water, and from time to time sweep a minute flame over the surface of the oil. When a flash is produced, note the thermometer. The beat flame is a gas flame burning from a fine aperture at the end of a glase or other
tube. Broom straws may also be used, or fine splinters of wood. You will find this test easier than the determination of cande power
(717) J. S. writes: In casting pots and other hollow ware, it happens now and then that the
iron cuts into the sand of the core and throws it against the cheeks or cope of the flask, and the pot or casting will show a lump on the inside and a corresponding
depression on the outside. Of course, the casting is redepression on the outside. Of course, the casting ise
jected. Now, what is the cause of this "scah"? Is it the sands Sometimes for monthe nota scab appears, If at once all the workmen are annoyed by them. A is called "weak sand," or sand that has been used too long without adding new sand. It may also be caused
by the: sand being too wet or rammed too hard. It genby the sand being too wet or rammed too hard. It gen-
ally occurs where the metal Etrikes the sand as it leaves the gate, the acab floating against the cope side. Sometimes too hot metal will cause scabs. Hard ramming
confines the steam in the sand, against which the hot metal impinges, causing a acab to buret away and float
(718) B. B. L. writes: Will you please form me what is the best solution for hand grenades
e extinguish fires? A. Use bicarbonate of ammonia and sulphate of soda in strong solution.
(719) A. S. R.-Wrought iron expands There is no perceptible difference in expansion with across the grain. Platinum expands the least of the well known metals, by heat.
(720) E. F. S. asks : 1 . Will the simple electric motor debcribed in Sale witivic American Sup. plement, No. 641, April 14, 1888, be large enough to run
a boat fifteenfeet long, 42 inches wide,drawing 10 inches of water when loadeds A. The motor will run a boat
of that length. 2. Howlarge should acrew be forboat ize of above? Should it be three or four blades? A se a two bladed
(721) S. E. K.-The magnetic variation the needle for any given place varies from year to year; new surveys requi re correction for compass bear-
nga. For western New York the annual variatiog/B ncreasing and
(722) M. L.-You can obtain better small quantity of magnesium powdernpward through small quantity of magnesium powdernpward through
flame of alcohol than by mixing the powder with
ther compounds. The maenesiam Is more actinic
b-n any substance fon can mix with it, and will flash rapidls. If you have difficulty in flashing quick enough, make one or two preliminary flashes until you sitters become accastomed to the light. The effect o
cosed eyes is due to the reliection of the light from the yeballe.
(723) "Courier" writes: Can you tell usof any preparation of paste which will make labels dhere to tin' A. (a) Use a freshly made sointion of gum ragacanth in water. (b) Make a paste of rye flour and glue, and to each pint add $3 / 2$ ounceeach of linseed oil
and turpentine. (c) Soak 5 parts glue in 20 parts of water for a day, add 20 parts rock candy and 3 part (724) G. R. asks for the recipe for mak ing paste for bill posters' use. A. Use rye four added ittle at a time to boilng water to a good workin or extra adhesiveness a handful of give may be added o each pailful while still hot. The heating must be done carefully, to avoid burning.
(725) Amateur Photographer.-Thecompound will not produce a photographic ligbt. The sim
plest device is to blow 15 grains magncsium powder up ward through a name of alcohol. There are nivera amps on the market for this purpose.
(726) L. M.-The lowest fluid temperature ainoy made from metals that are solid at ordinary 12 parts tin, 25 parts lead, 50 parte bismuth, 13 parts cadmium. This melting po
by adding 2 parts mercury.
(727) J. M. W. asks how many lamps of eight-candle power would simple electric motor run ir turned in
or two.
(728) E. G. H. asks how the phosphorphosphorus is prepared ander the name of Canton' ing upon or referring to phosphorcscence, stating where
said books may be procured. A. You will find the subsaid books may be procured. A. You will find the sub-
ject of phosphorescence treated in the manuals of physics and in treatises on jight. We also give you as references the foliowing: Scientific American Sopple
meyt, Nos. 229, 497, 539.249 . Canton's phosphorus wa mEVYT, Nos. 29,497 , 53.249 . Canton's phosphorus wa
made by igniting in a covered crucible at a strong heat解
(729) A. M. asks: 1. What is a prime an electric machine which receives the charge from the generator. 2. Can a motor be driven by a current de ived from an electric Leyden jar? A. Static,electricity is not adapted to the driving of motors. Rotary mo-
tion may be produced by the static discharge, butthe tion may be produced by the static discharge, but the
power developed is very slight. 3. Could a discharge be derived from a Leyden jar coased with silver or gold leaf instead of tinfoil, and would the electricity be stronger by so coating? A. A discharge would b
obtained. The material of the coating has little effec upon the charge.
(730) T. J. F. writes: 1. What is the liguid gold solution? I have tried copal, shellac, and
and sandarac and mastic in methylated spirit, but in a shor Whine verdigris appears and spoils the mizture. I want
to keep it bottled np ready for use. A. For bronze powder varnish, see answer to query 378 , in Scientific American of February 23. 1889. 2. How can I harde and temper small thin circular saws, from an inch
diameter, so as to keep them perfectly flat? A. The plates are hcated to a light cherry red and plunged into a bath of whale oil, resin, taliow, and beeswax. They are rubbed off with sawdust, and are very brittle and
full of buckles. They are placed between tempering full of buckles. They are placed between tempering
dies, hot plates pressed together by hydranlic pressure and fattened while thus heated until the temper is drawn tu a blue. This Hattens them permanently, but
after this they are generally hammered to equalize the after this they are generally hammered to equalize the
tension. The operation is described in the manuals. tension. The operation is defcriber as "Grimshaw on Saws." \$4.
(731) T. A. asks whether all manufac turers of dynamos use double-covered copper wire or
single, and why. A. Both kinds are used. The double-covered is preferable in mos
covering prevents short-circuiting.
(732) G. T. B. asks: 1. What is the spe cificgravity of kerosene oil? A. $0 \cdot 730$ to $0 \cdot 650$. 2. Wha immersed for a considerable lentth of time in eith A. Oil will have but hittle effect. If a vegetable oil may tend to corrode steel a little. Water will oxidize steel, but will not affect brass.
(733) W. N. asks for the best composi Use glue, water, and molasses made up as for printers
(734) A. M. K. asks: What ingredients (734) A. M. K. asks: What ingredients Mix 1 pound olive oil, 1 pound oil of amber, 1 ounce
(735) T. H. L. asks: Are aniline inks imple solutions of the desired color, or is gum or any added to a quart of water to makea good ink? A. They are simple aqueous solutions: 1 part of the desired aniline color is enough for 80 to 200 parts of water, differentcolors baving different intensities. If desired, 1 part
of dextrine may be added to 100 parts of the fluid. Do of dextrine may be added to 100 parts of the fluid. Do
(786) G. A. F. asks for a recipe with crrect proportions of ingredients for making a good iq uid glue such as book binders use in the manufacture
of tablets. A. For 50 lb . of tbe best glue (dry) take 9 lb. glycerine. Soak the glue for ten minutes and heat
to solution and add the glycerine. If too thick, add water. Color with anline dissolved in alcohol.
(737) J. M. W. asks how to take a stain bripht epot out of a carpet, made by spilling sal soda
eveloping pictures, and when we tried to wash it out,
became brighter. A. We fear the stain is ineradicale. Possibly vinegar might restore it. All depends on hat he dye was which was afrected, and no remeds (738) J. W. E. writes : 1. Will you inform me whether there is any way of ascertaining tho weight of cold air in a small space, say 1 in . square? A.
o make the determination directly reguires very elicate apparatus and considcrable manipulative okill. wigh $30 \cdot 035$ grsins 2 . Also the difference in weight between hot and cold air, if any, and the weight of each in the above space9 A. As a gas is increased in tem. perature it expands at of its volume at $32^{\circ} \mathrm{F}$, for each degree of elevation, and hencc a given volume weighs less as the temperature rises, if the pressure is con-
stant. Thus a cubic inch of air at $32^{\circ} \mathrm{F}$. would weigh stant. Thus a cub
(739) E. L. W. asks: 1. In making a plunge battery as described in Sopplement, No. 157, to ee used for a small electrotyping onfit, which pates
ould give the bcat results-the silver or carbon? A. would give the bcts results-the silver or carbon? A. Carbon is the best for a plunging battery, but we would not recommend a plunging battery for electrotyping.
Better use a large Bunsen battery. 2. Should the carbon Better use a large Bunsen battery. 2. Should the carbon
of one cell be connected with the zinc of the other, and so on? A. Should you determine to use the plunging battery for electrotyping, it would probably be better
o connect all the zincs together and all the carbons toether.
(740) C. F. W.-A galvanometer is of ittle value in measnring secondary currents of high intensity. Probably the best way to ascertain the of the space it is able to leap acrose
(74) F. P.-The years 1700, 1800, and 1900 are not leap years, as arranged in the Gregorian calendar. This arrangement makes the integral day
ivision of the year through the centuries with the division of the year through the centuries with the
(742) H. L. asks : Of what kind of iron re the rings of the armature core in the 8 .light dynamo made? Are the pins that secure the series of rings and wooden core to the shaft insulated, and how, or are
they wood? A. The rings of the armature are made of hey wood? A. The rings of the armature are made of
wrought iron. It is not necessary to insulate the pins. wrought iron. It is not necessary to insulate the pins. They are $p$
the shaft.
(743) H. B. M. asks how to kill blue Wash the bricks with salt watcr or strong solution of
(744) F. A. writes: In making electric motor as described iu Screntific American, March 7,
1888, No. 18 cotton-covered wire is rather hard to work; would not the ordinary offle wire be sufficient. If not lease state for what reason. A. You may use No. 18 you prefer to do so. Office wire will not answer on ccount of the thickness of its insulation. It will not admit of winding the required amount of wire in the (75)
(745) G. B. asks: 1. If better results ould be obtained by using two wires wrapped side by
ide in the primary coil of an induction coill A. The econd wire would not improve the results. 2 . Does
ene heintensity of the secondary current depend on theerient to which the core is magnetized? A. Partly uponthe magnetism of the core, and partly upon thelength of the secondary. 3. Could the current produced by a mag neto-electric machine be utilized in running auothe nachine of nearly the same size and construction? A This could be accomplished by using a commutator to
convert the current from an altcrnating to a direct convert the current from an altcrnating to a direc
current. 4. What is the best and cheapest way to conatruct an induction coil to give a apark an inch and a half in length: A. For information on the construction of induction coils, consult Sopplement, No. 160.
(746) R. H. S. asks how he can make iquid hydrofluoric acid, and what is there hecan rub ver the etching so as to make it moredistinct? A phuric acid in a lead retort, collecting the distillate in water. It may be concentrated by distiliation from a platinum retort; water first comes off, and a fterward th tronger acid. It must not touch glass or silica. To nake etches marks more distinct. dry cinnabaror Venetian red and polish with a dry cloth.
It is a very dar:gerous material to work with, and it is better to buy it ready made.
(747) C. F. H. writes: Will you kindly inform me through your paper how I can eoften a hair
brusb which I have, and which is too stiff for use? It being a very good one, I thought I might be able to being a very good one, 1 thought 1 mighe it instead of going to tbe expense of another
of A. Try washing it in water containing 10 to 25 per cen
(748) E. G. asks: 1. Will a parafinined (748) E. G. asks : 1. Will a parafnned
wooden tub do for outer vessel in Supplement, No. 49. batterys A. We recommend porcclaiu or glase. 2
 arplezents on 187 for calling mechanism.
(749) H. P. asks: 1. If quicksilver is compressed, and confined securely in a $1-16$ inch thick to a white heat, would the mercury expand sufliciently to fracture the shell? A. It would amalgamate with the brass and destroy it without the application of
heat. If steel, iron. or platinum were used, with which mercury does not easily amalgamate, it would burst the envelope unless it were exceedingly thick. The force exerted by a solid or a liquid in expanding is almost green gooseberine of the acids is it that is found in largely citric acid. 3. What quantity of chlorine would I require to bleach about 14 lb . of ehellac at a limey Would it be as cheap to purchase the chlorine as
o make it; I have stills and apparatus for all purposes A. Rub 2 lb . bleaching powder to a paste with water
water．To filtrate and washings add a solution 1 part Biter． siter．Two pounds of the sheilac must previously
have beendigested in one gallon of strong alcohol．To this add，with constant stirriug，the bleuching solution． After half an hour＇s standing add enough hydrochloric acid to give an acid reaction．The shellac is precipi－ until the water passes off clear．It is then dried in tid air．The flltrate may be neutralized by addition of air．The filtrate may be neutralized by addition of
caustic soda，and the alcohol may be recovered from it by distillation．4．What wood is methyl alcohol madc from which is used for polluting spirit into methyl． sted spirits？A．Oak wood gives good results，though
any wood may be ueed，5．Does not the clectric cur－ any wood may be used．5．Does not the clectric cur－
rent，when passing a long acopper wire，pass through the rent，when passing a long a copper wire，pass through the
exterior of the wire for its course in prefereuce to the core of the wire，or equally throughout the wire？A． throughout the wire．6．Has it ever been decided that the electric current dows only in one direction what complete circnit，and that it is from negativeto positive pole？A．No．There is no flow except as a matter of convenience in nomenclature．7．Wculd a new depar－ ture in carhons（for street lamps）．which would yield
twice the amount of light given by those now in use twice the amount of light given by those now in use
（with the same dynamo power），be advisahle，even though such new make of carbons lasted only half time tt mightseem doubtrab hame the same $A$ ， is to have carbons last a long time．But the line indi－ cated secms so hopeful a one that it would probably well repay work and invcstigation．8．I notice sheets of［mica are nevcr used for photographic plates for negatives：is there any good reason that unfits them for preparation for that purposes A．They are rarely clear enough，and if large are very expelsive，and are also
friable．9．How conld I silver fluted ind convoluted Priable．9．How conld I silver fluted and convoluted
glass articles with quickilver！I manage sheet glass all glass articles with quickiliver？ 1 manage sheet glass ant
right after the old method，but fall with irregular sur－ right after the old method，but fail with irregular sur－
faces；is there any way of brushing it on to the glass in the shape of a sort of mercury paint！A．Sec query 438，Scientific American，March 16，1889．10．I wish tocut orturn a hole with radiated grooves through block of boxwood，not a screwworm hole，but a sort or
ratchct cycle groove，each groove to be uni form．How
could I do so？A．This you might do with a hand tool， could I do so？A．This you might do with a hand tool， groove by groove，or cut a special cbaser with straight
cross．cut teeth．11．What is the rule followed for cross．cut teeth．11．What is the rule followed for
eightingrifes？I have two of different makes：the fore－ cight on one is merely a pin＇s head and the back sight aight is a semi．disk standing up quite an inch，with a back sight also very higb．I can score equally as well with either，at 200 yards．A．The shape of rifle sights Is largely a matter of personal preference．Certain
forms are generally considered more accurate than forms are generally considercd more accurate than
others，and aometimes may be＂barred＂or disallowed others，and
in matches．
（750）G．S．－The soldering liquids are cor making a perfect contact of the metals and their melting the tin and flowing it upon the surface．
（751）A．B．asks：Is there any way to prevent the corrosion of the connections of the carbons of a Grenet battery？A．Heat the cods of your carbons and apply paraffine，allowing it to soak well into the carbon．This will prevent the solution from reaching
the elcetric connection of the carbon．Care should be taken to prevent the paraffine from reaching the por
（752）B．F．A．asks：When a weak olution（say 1 to 2 per cent）of copperas，protosulphate of iron，is mized with decaying vegetable or animal
matter，what arc the principal reactions that take place？ matter，what arc the principal reactions that take place？
i natice that copperas is an effective deod orizer，but do not uuderstand its action．A．Your question is a diff－ and low forms of bacterial life．Copperas is poisonous for these organisms，and so prevents decay．
（753）H．W．D．－So many young men are entering the field of electrical engineering，that you be willing to take any place that is in the electrical de－ partment，even if it is merely in charge of lamps or in the dynamo room．Wages will be low，work perhaps
tlisagreeable to you，and the working up process will lisagreeable to you，and the working up process will
depend partly on your own activity and knowledge of depend partly on your own activity and knowledge of
the science and partly on opportanity．You will be in the science and partly on opportanity．You wild be in
competition，morcover，with technically educated men Having secured a place with some company，you should cad and atiady assiduously．The addrcsses of com tising pages．
（754）A．E．S．－Make your magnet cores of soft iron threc－eighths of an inch in diamcter and the depth of the diameter of the core with No． 24 wire We thiuk that with a magnet of this kind you will have no further trouble with the bell．
（755）R．M．asks ：1．Will the dynamo explained in the Scientific American Supplement
No． 161 ，run iucandescent＇lamps？ of what power？A．It will run three five－candle powe lamps of low resistance．2．Would the current running through a one－eighth inch bare wire on a circuit of $13 / 8$ miles，lighting a bout 200 Edison 16 candie power incan－ person shonld take hold of one of those wires？A Probably not，hut we would notad vise the handling of uch wires
（756）W．N．B．writes：In producing an electric light of $1 / 8$ to 1 candle power，would it not be
lessexpensive at the end of alyear to use an induction coil with one or two good cells of battery than to nse a large power of battery alone？I wish to prodnce enough light to inuminate the front of a sare jast so it nothing in economy by the nee of an Induction coil in themanner proposed．The only advantage of an induc－ tion coil in electric lighting is in the distribution of the current．It permits of using a current of high potenial
on the line wires，and of reducing it at the point of use on the line wires，and of reducing it at the point of use
lighting．We think it would he better if you were to employ a few cells of gravity battery aud a storage bat
tery．
（757）H L．H．－For making emery 125．2．For prcscrving pasteadd a fittle alum water， 3 per cent，or a few drops of carbolic actd．Salicylic
acid isalso an excelleut preservative．3．For black dye for leather：Boil 3 pound logwood chips， 3 to to pound ustic shavings，in $1 / 3 /$ gallons water；boil，filter，and ap ply to the surface of the leather．Then apply a wash oil or varus sulphate of iron．Dress the leather with oil or varuish as required．4．For a quick－drying clear
varnish use mastic dissolved in ether，or to make your shellac varnish clear，dissolve fine shellac in wood ulcohol and allow it to settle in a bottle and decant the clear varnish．The muddy varnish is too thick for lac－ quer work．It is made for painters＇use．
（758）L．J．writes：A ball falls 64 feet rom the mast of a moving ship to the deck．During the time of the fall，the ship moved 24 feet．Represent ball will fall vertically from the mast to the deck，as a plumb line would hang，save variation by thewind．In relation to a stationary vertical line，the path of the ball
would be parabolic，having the would be parabolic．having the vertical line at the moment of starting as the axis，with the accelcration of
fall and the motion of the shyp as co－ordinstes working the motion of the ship as co－ordinates．By will obtain the true length of the carve．
Books or other publications referred to ahove Scientific American office，Munn \＆Co．， 361 Broge way，New York．

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more than one hundred thousand applications for pa tents at home and abroad，enable us to understand the
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way，New York．

## INDEX OF INVENTIONS

# h Lettera Patent of the 

April 9，1889，
AND EACH BEARING THAT DATE．
［See note at end of list about coples of these patents．］


Agricultural implement，R．Owen
Armature ${ }^{\text {f }}$ Thomson
Armature for
Armature for electro－maknets，J．Geary．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．
Auger，pust hole，N．Nemman．
Automatic gate．W．H．Miller
Automatic gate．W．H．Mill
Automatic gate，J．C．Rock
Awnine frame，C．M．Ashby．
Axle，car wheel，G．W．Jones．
Baby jumper，A．W．Gray．．．．．．．．
Back and lee brace．J．H．Smith
Bag．See Feed bag．
Baling press，W．H．Hefley
Baling press，W．H．Hefley．．．
Baling press．W．J．H．Knappe
Baling press，W．J．H．
Baling press，J．La Dow．
Bar．See Pinch bar．
Bars or rounds of steel or iron，manufacture of，

Battery．
tery
Bed bot
Bell
Bed bottom，spring．J．M．Davis．．．．．．．．．．．．．．．．．．．．．．400，900
Bell，electrical call，J．G．Noyes．．．．．．．．．．．．．．．40，2，4
Bell
Belt fastener．J．B．
Bicycle．D．A．Babe
Bin．See Elour bin
Wine bin．
Pres feeding apparatus for，N．IA．
Block．See Paving hlock．Tackle hlock．
Board．See Wash board．
Boller for heating purposes．1．B．Potts
Book and hook cover，1．Reed
Book case，R．W．Lovering
Book case，R．W．Lovering．．．．．．．．
Book support，J．W．Coultas．
Boot or shoe，B．A．Pillow．．．．．．．．．．．．
Bosom form，J．W．Greene．．．．．．．．．．．．．．．．．．．．．．．．．．．
Bottle necks，tool for forming，W．A．Caswell．
Bottle stopper，S．Marks．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．
Bottles，means for facilitating the openlng of
ternally stoppered，Barrett \＆
Box．See Paper box．Work box．
Brace．See Back and leg brace．Drill brace．
Brake．See Car brake．Vehicle brake．Wage
brake．
Brake hande，S．A．Burns．
Bread raiser and kitchen safe．combined．．．．．．．．．．．．．．．．．．．．．． Brick，T．Thorn
Brick．incrusting，J．C．Anderso
Brick kiln furnace，C．M．Keep．
ricks．etc．，incrusted with metal．J．C．Ander．．．．．．．401，172
Buckle，D．B．Baker．
Building blocks or p
Belden．．
Bundle carri
Burner sarrier．F．Hickmann．．．．．．．．．．．．．．．．．．．．．．．401，032
Burner．Se
burner．
Butter moul
Butter mould，H．I．Carve
Button，G．H．Thomas．
Button，campalkn．Winterdorf \＆Reymond
Cable，wire．Batchelor \＆Latch．．
Calorimeter．steam，G．H．Barrus
Cam．A．D．Woodmanse
Car brake，H．N．Coffin

Car couphan，M．R．I．Carmota
Carcoupling，C．A．McDouka
Car coupling，J．L．Monasmith
Car heater，Mead
Car partitions，chain forstock．B．C．Hicks．．．．．．．．．．．．．．．．．．
Car，stnck．J．R Wilson ．．．c．


Cars，heatink street，W．H．Pation
Willip ams et al．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．
Carrier．See Bundle carrier．Harvester sheaf car，
Case．See
Caster，
Casting
Chain
Mau
Chair．
Chute
Cigar
Cigar
Cikar
Cigar
Cligar
Circuit
Cleaner
Clevis，
Clocks，
Rab
Clother
Casting S－straps，core for．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．
Chaiford and uncouphng device therefor，door，
Maul ．．．．．．．．．．．．．
Mair．See Oscillating chair．Smitch rail．chair
Chute fndicator，coal，J．Elder．．．．．．．．．．．．．
Cigar bunching machine，S．A．Shepard．．．
Cigar bunching machine．J．R．Williams．
Cigar cutter and support，P．Kern．．．
Circuit connecting device，J．C．Reilly．．．．．．．．．．．．．．．
Cleaner．See Cotton cleaner．Window cleaner
Clevis，amning，W．M．Brown．．．．．．．．．．．．．．．．．．．．．．
Clocks，electric winding for torsion pendulum，
lother drier，C．D．Fuller．．
Clutch and tension maschine，automatic．J．C．Bi．．．．．．
Clutch．friction，King \＆Barnart
Cocks．floor key for．J．Powell．
Cocoa，preparing 8oluble，H．
Coffin plate，J．H．spicer．．．．
Coffins，frame for the pillows of， C ．
Commutator bars，fiting，F．Bailley
Condults，leading－in apparatus for，J．A．Seely．．．．
Cone dnater for flbrous substances，F．G．Sargent Cooking apparatus，porta
Cooler．See Water cooler．
Copper from copper pyrites，extracting，J．Perino Corset， F ．E．Denzel．
Cotton cleane
Cotton cleaner．seed．W．M．Whison．．．．．．．．．．．．．．．．．401．02
Cotton gins，brush crlinder，I．F．Brown．．．．．．．．．．401．12
Cotton picking machine，T．J．Gray ．．．．．．．．．．．． 401.2
Coupling．See Car coupling．Pipe coupling．

## Coupling．See Car coupling．Pipe coupling． Thill coupling． Crusher．See Ore crusher．

Cultivator．：B． F ．Berger．
Cultivator for listed，corn，H．B．King．．．．．．．．．．．．．．．．．
Cutivator，plow，etc．，combined，\＆．B．McBride．
Cup．Boe Sponge cup．
Cuspidor，D．H．Murphy

Tube cutte
Desk or cabinet．W．H．Travit
Digger．See Potato digrer．
Door spring．J．II．W．jliama
Door spring．J．II．Williams．
Dredplng bucket，C．A．Morr
Dress form，A．MCDDwell
Drier．See Clothes drie．
Drill．See Grain drill．
Drill brace．T．C．Masey
Dropper epout，S．P．Den
Dye，yellow．E．Frank．．．
Dyeing．vat，J．W．Greave
Educational apparatus．A．
EgR beater，C．w．Pfau．
Ekg beater，C．f．Pfau．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．
Electric circuit testing device，M．Robinson．．．．
Electric enfine system．＇reciprocating， $\mathbf{C}$ ．J．Va
Ing，Russell \＆Drake．．．．．．．．．．．．．．．．．．．．．．．．．．．． Electric machine，dynamo．E．Weston．．．．．．．．．．．． Depoele ．．．．．．．．．．．．．．．．．．．．．．．．．
Electric meter，W．F．Smith．．．．．．．．．．．．．．．．．．．．．．．．．．
Electric motor，alternating current，E．Thomson．
Electric motors，requlation of，F．Bain ．．．．．．．．．．．
Electric motors，reeulation or，F．Bain．．．．．．．．．．．．．
Electrical conductors，apparatus for laying，W．
Smith



Elevator safety device，P．G．Backman
Embroidering machine frame，J．Frey．．
Embroce．See Steam engine．
Engines，reverse link foris．
Engines，reverse link forsteam，Soyder \＆De
Envelope and stamp moistener．A．J．Elias．．．
Evaporating saccharine or
Evaporating saccharine or other hquids，app
tus for，A．Youn
Exte．．．．．．．．．．．．．．．．．．．．．．．．
Extractor．8ee Nail extractor．
Eye bars，die for upseting，W．R．Webster

Feed bag，W．M．Brooke ．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．
Feed regulator for roller mills，J．W．Wilson
Feed trough．G．D．Burton．．
Feeder，calf，w．．．Spencer．
Fence fabric，wire，B．Searle
Fence making machine，Parker a Landers．．．．．．．．．．．．
Fences，凤uard for barbed wire，M．B．Chappell．．．
File，portable scrap，C．w．Taylor
File，portable scrap，c．w．Taylor
Fitering apparatus，B．
Hire alarms，thermal circnlt closer for，A
Firearm，breech＿loading，w．Anson．

Flour bin and sifter．T．F．Crary．．．．．．．．．．．．．．．．．．．．
Flusbing urinals．etc．，apparatus for，S．
Wright．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．
Frame．See A wing frame．Embroldering ma－
chine frame．Harvester frame．Spectacle
chine frame．Harvester frame．Spectacle
frame．Spectacle or eyeglass frame．Spin ning frame．
Frult drier，F．Altman
Fuel magazine，Greene i Treman．．．．．．．．．．．．．．．．．．．．．．．
Galvanic battery．J．H．Phalan．．．．．．．．．．．．．．．．．．．．
Galvanometer，standard tangent，E．Weston．
Gaivanometer，standard tankent．
Game apparatus H．L．．Smith．．


