add 50 parts shellac, and boil until solution is effected. Thestiffening may be applied (to the in side of the hat) by means of a brush. As soon a
this is done, the hat should be immediately imthis is done, the hat should be immediately im
mersed in very dilute oil of vitriol in order to neutralize any excess of alkali, and to properly fix the shellac.
(27) A. N. asks: Is there any danger of
lead poisoning, or other serious consequences, from the use of sugar of lead as a wash for sores? A.
The danger depends upon the strength of the solution used and the frequence of the application. Colic sometimes results from the very free use o solutions of acetate of lead. Pereira states tha
(28) J. E. K. says: You gave the following recipe for a liquid for mixing rocket stars : Alco
 the isinglass be dissolved in alcohol? A. It can not. The quan the perly incorporated with the other ingredients by maceration. Do notadd the gelatin untilall the
other ingredients have been uniformly intermixed by gentle triturationin a mortar.
(29) S. B. asks: In crushing highly sulphurous ores with Cornish rollers at 120 revolu
tions per minute, will the sulphur have any ef fect on the iron or face of the $r$
its texture? A. We think not.
(30) A. B. asts: 1. Of what is Indian ink of carefully purifed lamphlack ene ink is formed of carefully purithe with the adition of perfumes, not nemal glue, with the addition of perfumes, not ne-
cessary, however, to its use as an ink. 2 . In what substance is lampblack soluble? A. Commercial
lampblack always contains more or less resinous and tarry matters, that are soluble in oil of turp $\because$ ntine, benzine, naphtha, etc.; but the purifled lampblack (carbon) is itself insoluble in any mentruum.
(31) C. K. asks: What metal or alloy ex pands the mostand quickestat a temperature with-
in $300^{\circ}$ Fah. A. Zinc. Taken at $32^{\circ}$ Fah., a rod of zinc 25in $210^{\circ}$ of abse long will h
(32) V. C. T. says: I have a lot of thin malleable iron castings, which I am havingground, polished, and nickel plated, but they all have tell me the fault is in the casting, that the malleable iron was burnt. Can this be true? A. Malleable iron may be readily nickel plated if the work
be flrst properly finished. If the castinga are be frst properly finished. If the castings are burnt, it will be necessary to refnish then
(33) E.S. T. asks: Why do preserves, that
in perfectly airtight jars, mold? A. If the are in perfectly airtight jars, mold. A. If the serves will not mold.
(34) E. S. H. asks: How can I make colored res? A. Try the following : For light blue 61 per cent of chlorate of potash, 18 of sulphur, 23 of
strongly calcined alum. Fordark blue, 60 per cent of chlorate of potash, 16 of sulphur, 22 of carbonate of copper, 12 of alum. For deep blue, use 54 per cent of chlorate of potash, 18.5 of charcoal and 27.5 of ammoniacal sulphate of copper. It is quired in mixing these materials, and that each ingredient should be pulverized separately. For red fre use 297 parts chlorate of potash, sulphur $17 \cdot 9$, charcoal $1 \cdot 7$, nitrate of strontia $45 \cdot 7$, black sulphuret of antimony 5.7. For green, chlorate of potash $32 \cdot 7$, sulphur 9.8 , charcoal $5 \cdot 2$, nitrate of baryta $52 \cdot 3$. For yellow, sulphur $2 \cdot 6$, charcoal $3 \cdot$
(35) T. L. asks: Is a large deposit of soda ach as is generally deposited from soda spring of any value? $A$. Yes. It might be proftably
(36) R. S. asks: How should bodies of cel-
ular structure, being saturated with nitrate of lular structure, being saturated with nitrate of treated with hydrogen gas? A. Enclose in an atmosphere of pure hydrogen and heat to redness.
Solutions of copper are preferable to silver, as they are of copper are
How is the double sulphate of nickel and ammonia prepared? A. See p. 139, vol. 29.
(37) G. S. says: I have a drum head that has lettering on it, done in black. How can I take the marks off without injuring the head? A. You should have stated, if possible, the character of lowing is a list of the solvents commonly employed where this is not known : Water, ether, ether and alcohol, benzole, naphtha, chloroform, bisulphide of carbon, caustic alkalies, diluted acide, solution of cyanide of potassium. They should be applied consecutively in the order given. It must be borne in mind that many of the abovementioned solv. drum head, and care should be exercised to prevent any unnecessary contact.
(38) J. H. B. asks: How can I renovate a dampness? A. Thats has not been satisfactorily dampness? A. Ahis has not been satisfactorily
accomplished. (39) C. \& Co. ask: 1. In the manufacture of haid magnesia, to what pressure would you
charge the fountain with carbonic acid gas? A. To 12 ozs. water add $3 / 6$ oz. magnesia and add citric acid to slightly acid reaction. Such aoidlty is generally fouud more palatable than a neutral solution. Sweeten, add a few drops oil of lemon to flathe proper fluid magnesia. Many sell a spurious the proper fluid magnesia. Many sell a spurious bicarbonate flavored with lemon. 2. How is the
magnesia bottled? A. Botlle in the ordinary way, not usina the oarbonic acid apparatus.
(40) E. B. J. says: I desire to make a muical instrument, the sound being produced by varying length. Supposing the shortest strip is 4 nches long, what will be the length of the other down to 2 octaves below the note sounded by that one? What is the best material for the hammers, the relativelengths of the pieces, for an octav $\frac{1}{3}$ the natural scale, are as follows: $1, \frac{8}{y}, \frac{4}{5}, \frac{3}{4}, \frac{2}{3}, \frac{8}{5}$, $\frac{8}{5}, \frac{1}{2}$. This progression is upward, the $1 / 2$ lengt
ounding a note one octave above the 1 . Another octave upwards can be formed by halving the fig ures, thus: $\frac{4}{9}, \frac{2}{5}, \frac{3}{3}, \frac{1}{3}, \frac{3}{1}, \frac{4}{1}, \frac{1}{4}$, and so on a a long a
desired. We believe they are generally laid on raw . Wtruck with wooden hammers. Som our readers, however, may be familiar with th se of the instrument, and will correct us if in Given
Given a set of conjugate diameters of an ellipse, ow can the axes be found so that the curve cank

the given conjugate diameters. From $d$ draw line perpendicular to $e b$, and make its length,
$d \mathrm{E}$, equal to $e \mathrm{O}$. Join the points, O and $\mathrm{E}, \mathrm{by}$ $d \mathbf{E}$, equal to $e \mathbf{O}$. Join the points, $\mathbf{O}$ and $\mathbf{E}$, by a
straight line, and upon $\mathbf{O} \mathrm{E}$,as a diameter; describe a circle. Draw a straight line, $d \mathrm{H}$, through $d$ and ints in the principal axes, and $G d, H d$, are the lengths of the semi-
axes, so that A B and C D are the axes required. (41) J. B. asks: How can I produce a gloss (41) J. B. asks: How can I produce a glos all respects, like any hard wood. Pumice powder
(42) E. P. J. asks: 1. What is the precise diameter of the piston of a reciprocating engine $\boldsymbol{\pi}$ the ratio of the circumference of a. Calling $\pi$ the rater, the diameter in question is equal to 2 divided by the square root of $\pi$. As, however, the value of $\pi$ cannot be precisely expressed in numors, it is impossible to give the precise diamete of such an engine with 2 foet stroke, running wit 100 lbs , boiler pressure to thesquare inch at 100 rev olutions per minute,and cutting off at 1 foot, or $1 / 2$ stroke? A.The data sent are insumiticient for an ac calculation as to the percentage of power lost by friction in the reciprocating engine? A. It varies in different engines from 10 to 40 per cent. From 20 to 25 per cent would possibly present a
fair average. 4. What would be the increase of power in the above named engine if the steam both before and after the cut-off, were always op rating at 1 foot leverage from the center of the
shaft, as it now is at the half stroke, without commencing near one dead center and losing its expansion in the other? A. The mean leverag
throughout a rerolurion is about 0.6386 of th length of the crank, and the center of the crank pin moves 1.5708 times as far as the pistonin a rev lution: so that the whole power exerted by th piston is transmitted to the crank, exeept what is
lost by friction. It would seem impossible to do norethan this, whatever the leverage might be 5. With what speed would a 1 inch square column of water, with 15 feet head, enter a vacuum, without regard to friction in the tube: A. At a rate of a little more than 56 feet per second. 6. Is it
true that air enters a vacuum at the rate of 1,300 feet per second? A. This is an average approx nate value.
(43) H. E. E. asks: 1. What is squaring equal to the area of a circle of given diameter? A. Yes. 2. If so, does not the whole trouble lie in
Anding the area of a circle? A. Yes. 3. Does not geometry demonstrate the process beyond the posibility of error? A. No.
(44) H. D. P. asks: How is the bronze made that is used for bronzing statuary, etc.? A.
Bronze statuary does not require the application of any bronze. Make your castings of : Copper 88 parts, tin 9 parts, zinc 2 parts, lead 1 part. Yo
then polish the castings to suit your taste.
(45) T. H. says: I saw in a recent issue o earth 150,000 or 200,000 years ago. Will you refer me to the evidence of the existence of pre-adamite men? A. Sir Charles Lyell's work on "The AnIquity of Man" is a complete resumé of the whol
tubject, which is too extensive for our columns.
(46) P. S. says: I saw a meteor in Kansa n December 27,1875 , and I wish to know of what teoric bodies are of two classes. Some. are comeoric bodies are of two classes. Some are com-
posed of entirely combustible, while others are of combustible and incombustible, matter. They re volve around the sun in orbits more elliptical than the orbit of the earth, so that parts of their orbits are internal and parts are external to the earth's
orbit. When the earth and the meteoric bodies rbit. When the earth and the meteoric bodie
come near enough together so as to bring thelatte within the earth's atmosphere, they are ignited by the resistance, and are either wholly or purtially consumed. If theircourse and the attraction of the earth would bring them to the earth's surface, then the combustible ones would probably be
wholly consumed before reaching it, while the Wholly consumed before reaching it, while the
thers fall in the form of iron, etc. At times they oners fall in the form of iron, etc. At times they
only pass through the upper portion of the atmo sphere, and, after receiving a very warm recep not in their old paths.
(47) J. C. C. asks: What are the ingredi spers for taking impressions of type? A. Yellow beeswax will do very well.
(48) L. \& G. M. Co. ask: What preparation can be applied, with a pen, to mark numbers on can be applied, with a pen, to mare numbers on
the surface of tin plate? A. Squeeze the juice o a lemon into a cup, and put in a bit of copper, of
the size of a cent. Let it stand for a day or two the size of a cent. Let it stand for a day or two (40) J with a quill pen.
(49) J. H. says: I have a material containing free sulphur. By applying heat I drive the sulphur off in the form of gas. How can condense those fumes, 60 as to obtain flowers o
sulphur? A. It is necessary that the sulphur vapor should not come in contact with the air, other wise a portion of it will be oxidized and converted into sulphurous acid gas. Sulphur may be volatilized nr sublimed at a temperature of $792^{\circ} \mathrm{Fah}$. If it then be condensed in suitable vessels, we hav the substance commonly known as flowers of sul
phur. This is done, says the United States Dis phursatory, by allowing the fumes to Sondes Di the walls of a brick chamber
(50) R. E. says: J. H. P. states on p. 114 , current volume, that no chimney burners are safe on account of the shortness of the wick tube, and
he expects to do better with a tube 4 inches long instead of 1\%. He is certanly mistaken. Ever coal oil burner shoula, and most of them do, contuin a little flat tube, which serves for the escape
of gas formed by heated oil. With this tube a noburner with chimper as saps with chimners a great deal hotter than those without, for two reasons: The chimney, producing a better draft causes a more perfect combustion of the oil, and consequently a whiter light and more heat from the being always near the flame, gets a great deal hot
ter than the constantly changing air would without a chimney, and will consequently radiate heat to all the surrounding objecta, of which the oil reser voir gets its share. If J. H. P. wants to use a wick
tube $2 \not / y$ inches longer than generally used, he will Ind that oil of 150 gravity, as the law now require n most of the States, will not rise at all so high in ufficient quantity to feed the flame: his wick will burn lighter oil, and so increase the danger of ex plosion
(51) J. M. S. says : In a recent issue you the window sash for the purpose of ventilation. have used the same, but for applying or removing
expeditiously I hinged them at the center, and expeditiously I hinged them at the center, and
overed them aboveand below with felting or ruber to keep out the cold
(52) M. W. L. says, in reply to C., who asks
as to the weight of the 20 and 15 inch guns: They as to the weight of the 20 and 15 inch guns
weigh respectively 115,200 and $49,100 \mathrm{lbs}$.
(53) J. J. B. says, in answer to a correspond at who complained of heating of millstones: T void hot grinding, reduce the speed of your mill putin a piece of writing paper, and let the stone be Just so tightly fixed that the paper will slip ou under the staff, near the eye of the stone.
(54) J.J. B. says: Tooil a mill spindle at th in bush, next to spindle. Take a piece of $9 / 8$ inch ron gas pipe, bend, and insert it, bringing unde the stone up through the floor, outside of the curb. Let the outside end be the higheat. Use castor oil in oiling, as it never congeals, and you need never have any
(55) W. L. S. says, in reply to an inquiry bll of a telegraph sounder connected with th rapher knows thata a uick tap on the key, no matter how hard, will not affect the sounder, it does not give time for the magnet to work. The stroke of the alarm striker is exactly of this na-
ture, and therefore cannot repeat itself on the sounder.
(56) J. C. s4ys, in reply to L. S. C.'s queries to the effect of dampness on unused boiler fur naces: Into a closed vessel place 5 to 10 gallons
heavy oil (petroleum paraffin); place the vessel at heavy oil (petroleum paratin); place the vessel a
a safe distance, with a pipe to lead the vapor o the oil under the boilers. Close up every crack or crevice by luting, put a fire under the vessel, and
evaporate the oil. The whole of the fire surface, and even where the brick is in contact with the boiler, will be sweated or covered with the con densed vapor of the oil. To protect the inside of
the boller, Arst dry it by a very ligbt fre under it: then put a few gallons petroleum in each boller and evaporate it by a light fre under the boiler As the ofl vapor condenses, the whole inside of the boiler will be coated with a rust-proof coat of
(57,".D. F. J.' says, in reply to J. A. H., who says that the carrying boards of his reels are flat,
and that the flour sticks on them: If yougive your carrying boards enough pitch, keep your stones in good order, and do not grind hot, you will nothav any further trouble in that line. Sa
boards and then put shellac on them.
(58; J. B. J. ssys, in reply to H. M.'s query latitude and longitude of the piace are not given, heses: 1. The line may be in Maine or thereabouts here the declination of the magnetic needle from the meridian has varied from $14^{\circ}$ to $17^{\circ}$ during the
2. It may be in some of the West ra Slates, where an equal declination, but oppo ite in direction, has existed during the same pe iod. If the first supposition be true, then the arst surveyor made due allowance for the declin ation, and located substantially a true meridian The subsequent surveyors, neglecting the declin ation, located a magnetic meridian, which is constantly and indefinitely fluctuating. If the line in
question is west of the Alleghanies, it would seem that the first surveyor ran the line parallel with this needle, disregarding declination: bence it would not be a true meridian, the two subsequen survesors being in this case approximately cor-
ect. The amount and direction of the discrepect. The amount and direction of the diecrep-
ncy between these two latter appear to favo the first hypothesis: it is readily accounted for magnetic needle from the true meridian is a constantly varsing quantity.
(59) D.C. R. says: S. H. B. and many others desire information as to building boats. In the bout 114 inches thick and 4 inches wide, with rabbet to receive the edge of garboard strake Put on stem and stern as required, and fasten foor ; thene good support about 2 feet from about 5 sections, across the keel and secure them and cut the first strake to fit keel and stem and stern. Nail on, and conlinue to cut and nail on antil of the depth required; then bend in ribs
and put in seats and other inside finish.
Minrrals, etc.-Specimens have been re ramined, with the reaplts stated:
J. M. M. - It is ramie iber.-T. T. R.-It is sulphide of lead (galena) accompanied by sulphate
of baryta (heary spar).-W. P. T.-It is sulphure f iron ta is iron pyrites, at present not of much conimercia value.-N. A.J.ing metalis perance is due-G D. M-It mpossible to make an analysis of any value on 2 ozs. of water. One gallon is needed, carefully sealed up in a perfectly clean bottle of white glass. -G. J.-No. 1 is alunogen, a variety of native little iron, etc. It may be purified by solution in water, and then, by saturation with alsali and rystallization, be converted into common alum 0.2 is blende or sulphide of zinc. No. 3 is black rgilaceous shale. No. 4 is ferruginous quartz.York for sand of this character which has to be ransported any distance.-J. R. M.-It is calcit or crystallized carbonate of lime.-C. E. G.-The inica.)
J. W. S. says: I am taking a carbolate lothese inhalant for catarra, and a scents m of something to mix with it to produce a pleazan odor ?-W. McD. says: How can I get a smooth
surface on planished copper plates?-T. J. asks surface on planished copper plates?-T. J. asks
How are the inches, etc., put on wooden rules?How are the inches, etc., put on wooden rules ?
W. S. says: R. W. R. states that he is carrying 20 orsepowerby a cottonrope. How does he main tain the
weather?

## COMMUNICATJONS RECEIVED

 The Editor of the SCirntific Amrrican ac nowledges, with much pleasure, the recelpt original papeng subjects:
On Thermometrical Tables. ByJ. B. G.
On the Sargasso Sea, etc. By
On Bored Wells. By L. L.
On Windmills. By A. McL
On a Registering Barometer. By W. A. B.
On Projectiles. By R. H.
On Spacing Circles. By G. B. F.
Also inquiries and answers from the following:
H.C.N.-J.D.M.-U.A.-C. F. E.-E. W.-L. H. Q.
H.C.N.-J. D.M.-U.A.-C. F. E.-E. W.-L. H. Q

- L. D.D.-A. N.W.-W. M. R.-W. S. R.-J. M.-
D. M. H.-A. G.-A. W.-C. M.-F. B.-J. E.-F. W


## HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fall to appear
hould repeat them. If not then published, they may conclude the for good reasons, the Edito ieclines them. The address of the writer should ways be given.
Enquiries relating to patents, or to the patenta published here. All such questions, when initial only are given, are thrown tnto tne waste baake as it would fill half of our paper to print them all;
butwe generally cake pleasure in answering brielly butwe generally cake pleasure in answer
by mail, if the writer's address is given.
Hundreds of inquirises address is given.
Hundreds of inquiries analogous to the follown Who sells incubators? Who makes for wheat blasting? Who makes small copper tubing? Wh sells crushers for treating copper ores? Who sell railroad spike machines? Who sells ear trumpets?
Who makeselectrical nausical reporters?" All such
personal inquiries are printed, as will be observed, In the column of "Business and Personal," Which the charge mentioned at the head of that column. almost any desired information can in this way be expeditiously obtained.

## [OFFICIAL.]

INDEX OF INVENTIONS
Letters Patent of the United States were Granted in the Week Euding February 22, 1876, AND EACH BEARING THAT DATE.


Game apparatus, T. Stevens...............
Gas apparatus, D.L. Westcott
Gas, manufacturing coas M. M. W. Kidde
Gas retorts, closing, N. Jamin.
Gaseller, drop light, C. Deava
Gaselter, drop Hght, c. Deav
Gate, V. R. Cole
Gate, ,. R. Cole....
Gate, J. S. Wingor.
Grain drill, B. $\bullet$ wen
Grate, W. Morand............................
Grating apparatus, $F$. W. and W. F: Graeve, $J$.

Harness trimming, W. Dav
Harrow. W. s. ©'Brien (1)
Harrow. W. S. © © Brlen
Harrow, G. M. Ttuas
Harrow and seed sower, wheel, E. R. Powell. Harrow, revolving, W. H. Culver..............
narvesters, w. . Cochrane $153,899,173,900,13,90$ Harvester, guard plate, w. F. Co..............
Hat frames etc., Dinding, M. H. Aghakhan.
Heater, feed water, T. W
Heater, tire, H. B. Sloe
Heater, trre, H. B. Sloe...
Heel-burnlshlng machlne
Hog scraper, P. Johnson....
IIotsting apparatus I. Borma
Horse collar guard. Bosden \& Van Nest.....
Horsees, device for detaching, J. T. Whilis.
Horse's foot weight. Strawbridge $\&$ Steve
Horses, Interfering pad for, H. G. White.
Horseeshoes, manufacture of T. Dollard. Horseshoes, manufacture
Hydrant, J. P. Kenyon.....................
Hydrant, ire and drinking, D. C. Cregler. Iron, melting and purifyling,
Jack, ufting, G. W. Hunter.
Key ring, P. Brooks.
Ladder, Areman's, $\mathbb{W}$. B. Crane... .........
Lamp chimneys. crlmplng, w. H. Maswell. Lamp, street, C. K. Deutsch. Lamp shadeholder, etc., E. Steven Latch, knob, W. W. Gardiner..........
Leather, etc., unttig, G. V. Shefleld. Leg, arttitclal, J. B. Warner.
Level, plumb, T. - Hagan... Llghting lamps, etc.,J. W. © Donne..... Lghtning rods, H. L. Coe.
Lock for prisondoors, S. A. Dento Loom pick mechanism, G. B. Sandford...
Loom, Jacquard mechanism, G F. Eisenha Lubricating compound, G. H. Wiasor. Main spring, safety, J. J. Thornt Matches, packing, J. Kayser.
Mechanical movement, J. R. Mechanical movement, J. R. Finney...
Mercurs condenser for, C. B. Dahlgren
Metal bars, straightentug, Howells Mill, fulling, R. Elckemeyer.
Mill, grinding, J. M. Collier. Millstones, dreesing, w. J. Merritt. Moth-proor composition, Hall \& Kennell..
Mowing machine, L. A. Haines............ Nall plate, J. R. Flnney.
Navigation problems, solving, T. Hill Nut blank machine,
Nut lock, H. Carilie.
ut lock, G. P. Fulle
Package, shlpping, A. M.
Padlock, M. Foehner....
Paper collar, E. E. Mack
Paper collar, E. E. Mack.........................
Paper-folddng machine, Brald wood and Franclis.
Planofortes, etc,
Pla
Planos, organe, etc., $k$ key for, M. Pratt
Pipes, leader, G. Hayes ...........
Pipes, box for cocks in, W. J. Smith
Plpe Joint, W. H. Vick.......
Plpe, stopcock, J. T. Brown
Plaiting machine, Anderson \& Ro
Planter and cultivator, Seabrook \& Hetne
Planter, corn and pumpkin, J. R. Stoll
Planter, corn, T. B. Wickham...........
Planter, cotton and corn, S. T. Stout
Plow, H. D. Stralght
Pneumatic algnal, W. E. Prall.
Pot cover, G. Clements.............
Potato beeties, destroylng, A. Isk
Press, G. Merrill.
Pres, baling, G. F
Press, tobacco, S. B. Minntch
Printer's Imposing table, J. Polhemus. Printingpress, G. P. Gordon (r)... Prints, etc., enlarging,
rivy Beat, J. Pennoyer
Pump bucket, chain, w. C. Barker Pump valve, B. G. Marcy.
Rallway frog, W. J. Morden
Ratlway gate, H. A. Stearns..
Rallway rall chair, w. $\quad$ nlons
sallway rail jon ,
Rallway signal, electric, G. whyte.
Rallway signal, electric,
Rallway track, L. Hall...
ake, horse, A. Rickart
Raker and tedder, D. A. Calkins.
Reaperand mower, M. W. Fre...........
Reaplng machine, etc., W. N. Whitcle Reaplngmachine dropper etc., W. B. Krelghb Refrigerator. E. K.. Howes.
Roof, tile, J. Smith...
Saddier's horse, H. H. Huntin
Sash holder, J. E. J. Talbott
Satchel staple, etc., W. Ro
Saw fle gulde, E. Roth
awmill dog, L. Buzzen
sawmill gulde. J. Collins..
Sawnill gulde, W. M. Ferry.
Sawing machine, band, Lovewell and Lam
Sawing machine, stave, Cornish and Hunt
cow, dumping, D. Dalley.


173,824
174,039
173,730
173,959
173,773
1133,96
173,839
173,89
173,805
173,911
174

| . 39 |
| :---: |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

Sewer trap, A. Ely
Sewing machine, J. Kelth. Keth.
Sewingmachine threader, Sewing machine, wax thread Wheeler 4 . Shafting, securing wheels upon, J. F. Crawford Shnngle, c. Inman.
Shoes, etc., wooden, E. W. Shlppen
Shovel, tire. J. Edgar
Shovel, tire. J. Edrar.

## Shutter, metaylic, G. Hayes Sutter worker, A. Blahop <br> Shutter worker, A. Bishop..... Shutter, , plate metal, G. Hayee.

 inge stick and quoin, C. W. P Soap composition, J. McEvoy. Sole-channelling machine, A. E. ChickertnSole-channeling machine, J. E. Wheeler Sole edges, trimming, N. S. Thompson Sole edges, trutsher, J. G. May
Spark extingulbher
Spald Spool and bobbin, J. Bald
Stamp, hand, J. Sigwalt. J Staples, making. Coutz and Rennard
Stave-crozing machine, I. Graves. Stave-8awing machine, Co
Stay end cllp, D. Wicox. Steam brake, etc., G. Westinghouse, ,
Stencll-cutting machine, S . Matthew tencll-cutting machine, S. Mat thew
Stereotype plates, etc., shaving, E. T. Stove, D. L. Stles................
Stove, cooking, W. P. Abendroth
tove, gas, Gleason and Bowler Stove, gas, Gleason and Bowle
Stove, gas, A. W. Morton ..... Strew cutter, I. S. Bunnell...
Straw cutter, w. H. Harrison. Straw cutter, W. H. Harrison.........
Sugar-cutting machine, w. Doscher Syrlnge, R. V. Emde...................
Table leaf support, P. J. Liljeholm. Tea pot, J. W. Brewster.. Telegraph, automatic, C. Batchelor.
Telegraph, printing, G. L. Anders. Telegraphy, automatic, T. A. Ediso Tire heater, H. B. Sloe....
Tobacco press, S. B. Minnleh Tongue support, J. A. Busbert.
Trace gearing, E. B. Winslow. Track clearer, 1. H. Schell
rap,an1mal, A. J. Larson Tubing and lightning rod coupling, I. Johnson Vmbrells runner, J. J. Eubank. Vehicle hub, J. C. Wands.......
Vehtcle spring, A. T. Freeman. Veneers, machine for cutting. C. Munn. Venetian shade, c. Widemann (r)
Ventllating cap, J. H. Irwin..... Wagon brake, R. T. Lewls Wason top, folding. C. Chenette Washing machine, H. K. Pieree, ..........
Washing machine and wringer, G. Wison Watch charmand key, comblned, P. Deve Water closet, J. P. Hyll Water closet plug, W. S. Blunt.
Water wheel, J. L. Helmer..... Water wheel, s . Teachout ( r ) Wheel, sectlonal, W. H. Harriso
 Whiffetree, J. Zimmerman.......
Whip socket, Hughes and Alexauder Wind wheel, M. J. Althouse.


Window shades, ornamenting, J. C. C. Hamm
Windows and doors, guard for, P. H. Mahe Windows and doors, guard for, P. H. Mah Wrench, plpe, E. G. Cllinch.
Wringer, J. K.
designs patented.
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 017, 9,018. -CAbaimereb - W. Bürger, Utica, N ,019 to 9,044.-CABPETb.-©. HelnIgke, New Utrecht
N. $\mathbf{Y}$.
9.045 to 9.057 .-Carpets.-H. Horan, East ©range. N. J.
 ,067.-Oil Cloth.-G. A. Lewis, Philadelphia, Pa.
,O68.-Trim Ming.-C. Lindenthal, New York cty.
9069 to 9,078 - -Carpets.-L. G. Malkin, New York
 9.096 to 9.100.-Carpets.-J. H. Smith, Enfield, Conn.
.101, $9,102$. Carpets.-W. H. Smith, Enfield, Conn. 9,101, 9,102.-CARPETb.-W. H. Smith, Entield, Co
9,103.-CARPATs.-J. H. Smith, Enfeld, Conn.
9,104.-CARPRTs.-F. C. Swann, Lowell, Mass. ,105 to 9,107.-Locket.-G. W. Gill, Philadelphia, Pa. 9,108.-BAdag.-H. Guenther, Philadelphta, Pa.
9,109.-Incestand BABE, ETC.-J Kintz et al., Weast Mert

8CHEDULE OF PATENT FEES. on each Caveat....
 on issulng each original Patent.... n appeal to Examiners-In-Chlef.... -n application for Relse
-n fillng a Disclaimer.................... n application for Destgn ( 7 years).

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