geometrical defnitions，even those which have been
accepted by generations of geometricians，are often accepted by generations of geo
weak，if not absolutely incorrect
Treatise on Patent Estate．By Thos． B．Hall．Cleveland ：Ingham，Cla
\＆Co． $1888 . \quad$ Pp． 240 ．Price $\$ 3$ ．
Although many manuals of patent law have lately been issued，yet in the little work before us a some－ what different treatment is accorded the subject than
that which is usually given it in manuals．The author＇s lan is characterized by a desire to place the subject or a logical basis．The objecte of the patent system and he incorporeal nature of patent rights are first con sidered as a basis for the work．The property rights of patents，profts，partition，and part ownership are all onsidered in considerable detail．The action for in－ aubject of a separate chapter，and the interesting sub－ ject is excellently presented．The propositions through－ ut the work are based on court decisions，and some－ mes much of the text is made up of quotations therefrom．This gives the book its standard character， and removes from it the emasculating atmosphere that is apt to be created by the study of mere manuals， from which verbal citutions of decisions are excluded．
Turning Lathes．Edited by James
Lukin，B．A．London：E．E \＆F．N．N．
Spon．1888．Pp．vi， 160 ．Price $\$ 1$.
This book is an illustrated treatise on lathe work， designed for use in technical schools．The minuteness and practical nature of the directions given，however， make it of value to amateur turners．To those wishing
to learn the art from the beginning，it would be hard to o learn the art from the beginning，it would be hard to commend a more useful book．Wood and meta hand turning is especially full．
The Cosmopolitan Magazine of New ork eny放 the way of illustration，consisting of four pages cure D．Conway＇s rather recondite article on＂The Pedigree of the Devil．＂The general contents of the magazine，besides，are above the average of those of
most of the similar monthly publications，and well cal－ most of the similar monthly publications，and well cal－
culated to make the Cosmopolitan a popular favorite． culated to make the Cormopolitan a
The subscription price is $\$ 2$ a year．
Ferns and Wild Flowers of the Rocky Mountain Region，pressed and well mounted for pre－ n，of Colorado Springs，Col．They are bound in books varying in size from 314 by 434 inches to the tandard botanical size of $111 / 2 \mathrm{by} 16 \frac{1}{6}$ inches，the prices or which range from 50 cents to $\$ 10$ each set．Some kill and good taste exhibited in their arrangement and resentation left nothing to be desired．Persons mak－ ng collections of pressed flowers，leaves，ferns，etc． will derive good information from consulting Mr． inson＇s collection of Rocky Mountain specis
Any of the above books may be purchased through this office．Send for new catalogue just publish
Address Munn \＆Co．， 361 Broadway，New York．

## numbexa

HINTS TO CORRESPONDENTS．

（1）F．J．R．writes ：I am making an induction coill $3 \times 11 /$ inches，and would like to know of iron wires is very much better than a solid iron core A．For primary use two layers No． 20 wire，and fill up with No． 34
far the best．
（2）$O$ ．K．writes：I have constructed a mple electric motor，as described in Scientific Edison light circuit，and it melts the brushes．A．You should reduce the current by introducing resistance， or what is better，place it in a shunt．By a little experi－
（3）J．C．H．－Surface tension or the attraction of cohesion is the principal reason why mer cury does not distribute iteelf all along the tubes when
thermometers are laid horizontally．In many thermo thermometers are laid horizontally．In many thermo
meters that have large tubes the mercury will separate by meters that have large tubes the mercury win tepabe will
turning them bottom end up，and in a few the tube will all solid by orerturning．Mercury expands in bulk $212^{\circ}$ Fah．Alcohol 1 to $1 \cdot 11$ ．The expansion of the solid metalsis usually expressed as linear；a rod of iron 100 feet long will expand 0.0033 in．for each degree of the following metals，the expansion for each degre Fah．will be：

| Gold．．．．．．． 0.0101 in. | Silver．．．．． 0.0127 in． |
| :---: | :---: |
| Copper．．．．．0．0115 in． | Brase．．0．0125 in． |
| Lead．．．．．． 0.019 in ． | inc．．．．． $0 \cdot 0207$ |
| 0.014 | Pl |

（4） $\mathrm{W} . \mathrm{McD}$ ．writes： 1 ．In reference to insulated wire be substituted for the shellac－covered wir
used in armature？A．Cotton－covered magnet wire ia
recommended in the article referred to．The shella insures a more perfect insulation，and at the same time serves to cement the different layers of wire together．
2．What portions of the fild magnet correspond to the 2．What portions of the field magnet correspond to the
north and south poles？A．The poles are above and north and south Dolesя A The Doles are above and
below the center of the armature．3．Is it possible to make a dynamo to run the motor？If so，would its con－ struction differ in any way from the construction of the motor？ 1 fo，what would be the changes？A．A mo． tor can be operated by a current from the dynamo．
The dynamo could be made upon the same plan as the motor by using a cast iron feld magnet and winding the armature with finer wire，say No ．20．4．Could the efficiency of the motor be increased by using finer wire C．It depends upon the quality of the current used for
running the motor．For a current of high voltage you should use finer wire． 5 ．Would not thedynamo be a much cheaper source of the electricity than the bat－ teries，provided you have the power to run it（the dy－ namo） A A．The dynamo is a cheaper source of elec－ tricity than batteries．C．Is it necessary to charge the field magnet of a dyamo when frst constructed，or is
there enough residual electricity in the iron to start the currents A．Ordinarily，there is enough mag netism resident in the cores of the field magnet to start the current，but it sometimes happens that it
ueceessary to supply the magnetism from an outside cur rent．7．I wish to have my pupils construct an elec tric motor of say $1 / 2$ horse power，also a dynamo to run It．We have the appliances of an ordinary machine shop to aid us．Have you ever published，or intend to publish soon，the details of construction of such a mo tor and dynamo？If not，where can 1 find such a de scriptions A．In Suprlement，No． 600 ，you will find
description of a aseriphon of a smail dynamo wich woula also ser garding the construction of an electric lamp（acc） You will find in the back numbers of the Supp MENT，descriptions of many forms of arc lamps． our Suppisuriv catalogue and SUPPLEMENT，NO． 65
（5）C．A．L．asks how to make and put up a mechanical telephone good for a distance of quarter of a mile．A．For an acoustic telephone use
small twisted wire cable picture cord．Stretch it be tween two diskg of thin tin or steel in thickness about No． 34 wire gange．Disks to be 3 inches diameter，fast． ened with screws between two pieces of hard wood， made as to pinch the disks all around．The wire to fastened to the center of the disks by a loop through soldered eye．The wire may rest in slings of rubber of leather attached to poles about 150 feet apart．The ire should not turn sharp corners．The disks shou maintain a strong tension upon the wire，as well as con
（6）J．C．writes：I am making an in duction coil on the general principles of one described works very well，but I would like to have a 1 the in formation，Primary coil has on it four coils of No． 24 wire．Paper tube for secondary coil measures $11 / \delta_{\text {inches }}$ outside．Must I use No． 36 wire，or will No． 32 ，or even heavier，wire answer the purpose？How many layers
will be required，keeping in view the fact that Ido not want to get it more than 3 inches in diameter，if possi ble，and what will be approximate weight of wire A．There is an advantage in using fine wire in the se the metallic core．We think you have made a mistake in making your core and primary coil of such large diameter．You
secondary wire．
（7）Ph．L．S．asks：How is soluble Prussian blue prepared A．Add a solution of ferrous sulphate to a a solution of potasium ferrocyanide，and expose the precipitate to the air till it becomes blue， and wash it till all the soluble salts are washed away．
By continuing the washing，the blue itself dissolves By continuing the washing，the blue itself cissoives，
forming deep blue solution that may be evaporated without decomposition．2．How is ink prepared that writes blue and then turns black $A$ ．See the fruna 3．How in SciEn willicic AmRRICAN SUPPLEMENT，No．157． is the dry or slaked lime the most active？A．Place the bones in a large kettle filled with ashes，and about one peck of lime to a barrel of bones．Cover with water
and boil．In twenty－four hours all the bones，with the and boil．In twenty－four hours all the bonee，with the
exception perthapy of the hard shin bones，will become so much soffluzed as to be easily pulverized by hand．
（8）W．M．M．asks the best kind of paint
ind of pain paint，or any ground uxide of iron，mixed with linseed
（9）C．R．M．asks a good cement for leather belting．A．Take of common glue and isinglass to cover them．Bring gradually to a boiling heat and add pure tannin until the whole becomes ropy or ap－ pears like the white of eggs．Buff off the surfaces to
joined，apply this cement warm，and clamp frmly．
（10）T．S．A．desires（1）a good recipe for lemon angar，one that will not taste too much of the
sugar，and be insipid．A．Citric acid 1 ounce，white sugar 2 pounds，essence of lemon 3 ounce；powder an keep dry for use．One dessertspoonful will make giass of lemonade．2．A recipe for old fashioned pin ger pop beer．A．See the recipes given in scisN－
TIFIC AmERICAN SUPPLEMENT，No．270，under the title
＂Efiervescing Beverages．
（11）G．A．D．writes：In the West a great deal of grain is bound with twine made from
manila．Has there ever been any effort made to manu－ facture binder twine from flax，and what success has it sects than manila twine？How should twine betreated to prevent insects from gnawing off the bandsp A the reaper．The manila twine is the cheapest．Flax
the not affected，by insects，to our knowledge．Saturating ting it．
（12）C．E．L．asks：What will drive out large black ants from a pantry？A．Red pepper，sulphur， cacious in driving ants away．
（13）O．R．R．writes：1．There is a no tion prevalent in this vicinity that．in order to have pooce well water，the well must be open so as to ex raising the water which agitates it is to be preferre How much truth is there in the abover A．Agitatio and exposure to the air is valuable as a means of de
stroying organic matter in water． 2 ．What is the rea－ stroying organic matter in water．2．What is the rea－
son that dyamite will explode by percusion，but no y fre？Would a very hot iron cause it to explode cal facte．A sudden heat applied to the wholemes might cause an explosion，while the local application （14）
（14）F．G．asks how to drill by hand a ne－balf or three－fourths inch hole through a plate of rical infuence machine．The plass disks are eightee inches in diameter，and each is to carry sixteen sectors A．Clamp over the glass disk a board having in it a
thirteen－iixteenths inch round hole，the hole to be ar－ anged exactly over the cound hole，the hole to be bra or copper tube six or eight inches long，and $\notin$ inch in diameter，secure a spool about 2 inches in diameter， naving a shoulder which will bear apon the top of the laving a shoulder which will bear upon the top of the
tube．Provide a long bow with strong catgat cord，and perate the tube like a bow drill．Keep the hole in th board supplied with coarse emery and water．
（15）G．E．T．asks：Can you give gen namo machine described in SUPPLEMENT to 24 or 3 16 candle power lamps？Does it make any material difference whether the rings of the armature are cast or wronght？How should the machine be mounted？A If you increase the di mensions one－half（隻的），the
dynamo will run from 24 to 30 lights．The rings or dynamo will run from 24 to 30 lights．The rinys of
the armatures should be of wrought iron．The machine the armatures should be of wrought iron．to be adjusta－ ble，for the purpose of tightening the belt．The belt be seamess
（16）G．W．G．asks：What will destroy roaches or drive them away？A．Use fresh borax and
Persian insect powder continuonasly until the pests are sterminated Or use a phosph paste， sere are several kinds be mixed with a litle mola ssees，andlput on bit of cardboard or paper，distributed around infested places．The practice should be kept up some time after the pests have apparently disappeared，on accouut
（17）W．C．T．asks if common putty uch as used to put in window glaseses，could be used
o make the porous cup of a galvanic battery．If not what is a good way to make one？A．Putty is useless Make it of clay or use a flower pot with the hole in it
（18）N．P．K．asks how to polish black narble．A．The process embraces five stages，begin－ ing with the use of coarse materials and fluising with Worksbop Receipts，＂，frrst series in an article entitiled ＂Marble Working．＂We can supply the book for 82 ．
（19）C．S．asks ：What will stick cellu oid to paper，wood，glass，etc．9
Gum shellac 1 ．Try the following
ounce，camphor 1 ounce，alcohol ounces．Dissolve and fller．
（20）C．S．W．asks a recipe for making compresed yeast，also called German yeast．A．It
is obtained by straining the common yeast in breweries and distilleries，until a moist mase is obtained，which is then placed in bair bags，and the rest of the wate pressed out until the mass is nearly dry．
（21）J．H．N．asks how to uake a var nish of bleached shellac to be used in the pace of the gum in small pieces，and macerate in a stopprved bottl with ether；after swelling up sufficiently the tces of
ether is poured off，and it will readily dissolve inalco－ ether is poured off，and it will readily dissolve inalco－
（22）R．C．asks（1）the proper name apply to a：person who makes insects a study．A．En tomologist．2．A recipe for an effective insect powder．
A．see＂Two Valuable Iusecticides，＂contained in Scr－ ENTIFIC Ambrican Supplement，No．218．Powdered

## （23）A．H．T．asks ：1．What chemica

 action takes place when milk sours，and why？A．Themilk sugar which it contains decomposes into lactic cid．This process is known as lactic fermentation See the article on fermentation in any cyclopedia． 2.
How to prevent milk from sooring．A．Milk is beet preserved by the addition of a few grains or carbon ate of
bottle．
（24）N．A．E．asks how to make rose perfume or rose water．A．Dibsolve attar of roses， 6 pint；throw the solution into 12 gallo carboy mper ed 10 gallons pure distillled water at $180^{\circ}-185^{\circ}$ Fab once cork the carboy，at first loosely，and agitate the whole briskly，although at Arrst cautiously，till quite cold
 you with the Manufacture of Perfumes，by Snively． Price 8.
（25）L．L．U．asks：How much coal will it take to melt 3,000 pounds of light scrap iron in a
cupola 20 inches diameter？A．From 700 to 1,000
（26）A．F．M．desires a receipt for taking the rust off drawing instruments without injuring hem．A．Mix 10 parts of tin putty， 8 or prepared buck＇s articles with this，and finally rub with soft botting
paper． paper．

## TO INVENTORS．

An experience of forty yeurs，and the preparation of
more than one hundred thousand applications for pa－ ents at home and abroad，enable us to understand the aws and practice on both continents，and to possess un－ syopsis of the patent laws of the United States and all oreign countries may be had on application，and persons broad，are invited to write to this office for prices，
bich are low，in aocordance with the tines and our ex． tensive facilities for conducting the business．Address
MUNN $\&$ CO．．office ScIENTIPIC AMERICAN， 961 Broad． MUNN \＆CO．．offict

INDEX OF INVENTIONS
For which Letters Patent or the
United States were Granted
June 12，1888，
AND EACH BEARING THAT DATE．
Adding and writing machine，A．C．Ludlum
djusta ble joint，machine，A．C．Ludlum
Air compressor，W．T．Forste
Alarm．See T＇ime alarm

## 384,373 384,297

nimal trap，P．T．Beach．

Blaughtered，E．Ek ker．．．．．．．．．．．．．．．．．．．．．．．．．．．．． 384,433
Anunciator，electrical，H．S．Downerd．．．．．．．． 384,430

Axle boxes，dust $\begin{aligned} & \text { zuard for car，P．M．Kling．．．．．．．．．．．}\end{aligned}$
Back band loop，E．R．Cahoone
Bag．See Hand bag．
Bag holder，W．F．Lewis．
Baling press，E．C．Sooy
Baling press，E．C．Sooy．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．． 384,294

Satteries，regulating commutator for secondary，
E．Julien．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．． 384,417

Bed bottom，spring，w．K．Pennck．．．．．．．．．．．．．．．
Bed inflating and heating apparatus combined，in－
valid，R．K．Pelton．．．．．．．．．．．．．．．．．．．．．．．
Valid，R．K．Pelton．．．．．．．．
Belt fastener，H．Elmblad．．
Belting，machine for manufacturing rubber， Murphy（r）．．．．．．．．．．．．． Bicycle，A．F．Price．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．． 384,906 lacking box holder，W．Taylor．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．344，333 Board．See Gang board．

## Boiler．Sor hot water heaters，Neil \＆Morrison．．．．．384，461

 Bolt，C．Die bold．．．．．．．．．．．．．
 Bottle necks．machine for fllishing，H．Semple．．．． 344,290


Box．See Letter box．Stuffing box．
racket．See Gas bracket．
Bracket．See Gas bracket．
Brake．See Car brake．Sled brake．
Brick kiln frame，E．M．Pike et al．．．．．．．．．．．．．．．．．．．．．384，469
Bridle and halter，combined，J．O．Walton．．．．．．．． 384,407
Brush，shoe and other，R．Nicol，Jr．．．．．．．．．．．．． 344,462 Buckle frames，manufacture of，G．R．Kelsey．．．．．． 334449
Building block，H．S．Palmer．．．．．．．．．．．．．．．．．．．．．． 384,541 Bung bushing，R．Pentlarge．．．．．．．．．．．．．．．．．．．．．．．．384，387
Burner．See Oil burner．Stove burner． Bustle，F．J．Brand ．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．384，557
Butter mould，F．P．A yer．．．．．．．．．．．．．． Button，Anderson \＆Pattison．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．344，273 Calculator，interest，C．M．Dunham．．．．．．．．．．．．．．．．．．． 3344.431
Calendar，memorandum，A．H．Isbell．．．．．．．．．．．．．．38456
 Car coupling，P．C．Green
Car coupling，E．Houtz．．
Car coupling，J．Scott．．．．．．．．．．．．．．．．．
Car，electric railmay，E．Julien．．．．．
Car heating apparatus，W．F．Steele
ar heating apparatus，railway，E．A．Leland．．．．．．．．．．． 384,401452


liams．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．． 384,483
ard rack，A．S．Green wood．．．．．．．．．．．．．
Carpet stretcher，B．Manning．．．．．．．．．．．．．．．．．．．．．．．．．．384，456
Carriage，baby，Q．H．Baker．．．．．．．．．．．．．．．．．．．．．． 344,44
carriages，wheel fender for，Rogers \＆Stenz．．．．． 334,335
Carrier．See Package carrier．
Cart，road，W．M．McCro．．．．．．．．．．．
Cart，road，A．M．Wilsons．．．．．．．
Case．See Map case．Watch case．
Cash register and indicator，W．W．Wythe
Cash tills，recorder for，G．R．Stokes et al．
ton．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．384，4555
Cement，munufacture of articles from hydraulic，
J．W．Stockwell．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．． 384,295

halk line holder，B．Howard．．．．．．．．．．．．．．．．．．．．．．．．．．．354，444 Change receiver，J．A．Kimball．．．．．．．．．．．．．．．．．．．．．．．．334，583 | Check register or tally，A．B．Gill ．．．．．．．．．．．．．．．．．．．． 3344488 |
| :--- |
| Checkrein，B．Miller．．．．．．．．．．．．．．．．．．．．．． 38460 | Chopper．See Cotton chopper．

Churn，C．E．Gale．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．384，518
Cigar bunching machine，Boehm \＆Reed．．．．．
Clamp．See Can clamp．Rubber dam clamp．
Clamp．See Can clamp．
Clasp．See Shoe clasp．
Clay disintegrator，G．Potts．．．．．．．．．．．．．．．．．．．．．．．．．． 364,278
Clock，electric pendulum，A．L．Parcelle．．．．．．．．． 384,271
Reams．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．384，472
Clothes washer，atmospheric，H．T．Lemon．．．．．43
384,288
Clothes washer，atmospheric， $\mathbf{H}$ ．．．．．．．．．．．．．．．．．．
Cocoantriction，A．Nelson．．．．．．．．．．．
tholomem．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．

