## Essence of Lemon.

A few notes on the manufacture of essence of lemon will, I hope, be acceptable. In the first place, we all learn in England that essence of lemon is made with an ecuelle. Every book I can find says so, and on coming out here I was not a little surprised when I could not find a single one. The principle on which the extraction of the essence is carried on may be illustrated in this way: If you hold a piece of lemon peel up to the light and turn it inside out, a fine shower of mist will be seen to be forcibly ejected. This is not all oil, but a mixture of oil and water. Most people are unpleasantly acquainted with this phenomenon, though many have not actually seen it, for in peeling a lemon or orange with the fingers a little of the oil is often ejected into the eye, causing a considerable amount of pain. By turning the lemon peel inside out, almost the whole of the essence is removed from the peel, for each little globule of oil appears to be surrounded by water, and the liquid which remains adherent to the peel consists principally of water. As it is impossible to turn every piece of peel actually inside out, the following method is adopted :
One man takes a lemon in $h$ is hand, and with three rapid strokes with a large knife cuts off nearly all the peel in three slices. The central portion, which is left, consists of most of the pulp with a little of the peeltop and bottom. This is simply pressed for making lemon juice. The slices pass to a second workman, who sits on a low chair, with an ordinary common quality bath sponge, worth about 6d., in one hand. With the other he presses the slice of peel against the sponge, pressing the edges of the peel only with his fingers, the object being to press the convex piece of
lemon peel as nearly flat as possible. The amount of lemon peel as nearly flat as possible. The amount of incredible that the oil globules can have been broken, but if you try the experiment of turning this exh austed peel inside out, nothing more can be extracted. The peel inside out, nothing more can be extracted. The
sponge is periodically squeezed. One man working in this way can extract about $11 / 2$ pounds (English) essence of lemon per day. To insure the cells being fully charged with moisture, it is usual to allow the lemons to stand in water for a short time; and I myself propose washing the lemons in a stream of running water. A second method, which, so far as I know, has not yet been published in England, originated in a clever fraud; but it is now, I believe, a thoroughly well understood business

Pharmaceatical Conference Proceedings.

A large trade has already been done here in lemon peel packed in brine, which has been exported for the manufacture of candied peel. Formerly the peels were about the natural state. They are noweved. This is accomplished as follows: The lemon, instead of being cut as before described, is cut in two, lengthwise. Should there be any defect in the lemon, the workman contrives to cut it in such a way that, by removing a thin slice, the defect is cut a way and two half lemons remain, both free from blemish, and only a thin piece wasted. The pulp and a little of the white is then cut out with a kind of spoon, care being taken not to rup-
ture theoil vessels of the peel. Another workman then ture the oil vessels of the peel. Another workman then
presses the half lemon in various directions against sponge, and, though it is evident that the sponge process is rather at a disadvantage, he manages to extract about three-fourths of the total amount. The quantity of essence obtained in this way is considerable. As a consumer of candied peel, I should be inclined to condemn this process ; though, as I have not seen the product and compared it with that made with the oil, I cannot say that it is inferior. It is stoutly maintained that if the essence were not removed it
would be destroyed by the brine; and it is possible that there is some truth in this. As the essence made in this way is of superior quality, being made from the finest fruit, I hope it may be so.
This brings me to another point. It is generally as sumed in England that all pure essence of lemon is good. Th is is far from being the case, and I have my-
self seen essence of lemon containing 15 per cent of turpentine which was really superior to essence of lemon made the same day in my presence, and absolutely pure. This results from the extraordinary variation in
the quality of the essence made in the various months the quality of the essence made in the various months.
This difference is not noticed much in England, even the best exporters having to make an average sample which they can supply all the year round. Turpentine is in large use, and is purified in a peculiar way, which I have not discovered, so as to have very little smell. One exporter is said touse ten tons per annum. Strange to say, the worst qualities of essence all go to London, Manchester, and Glasgow. English wholesale druggists in particular have an unenviable reputation here
for buying low qualities. One Sicilian dealer thinks that the climate has something to do with the inability of Englishmen to distinguish between turpentine and essence. In addition to the difference depending upon Experienced buyers claim to be able to distinguish the
district and village in which an essence has been made simply by smell and inspection.
Testing is carried out as follows : A sample is poured out into a tumbler and shaken up after placing the hand on top. Great attention is then paid to the duration and size of the bubbles and froth, the color is ration and size of one smell is taken with the glass full and notether after emptying it. Turpentine will certainly be detected in this way if over five per cent is present. Conducted in this way the purchase of essence of lemon is a matter requiring great judgment, and most of it being sold by peasants in small quantities, dealers can not avoid sometimes buying a bad lot. If you make essence in your own works, the difficulties are not re moved, only changed the substitution of turpentine for essence by the workmen being frequent and so contrived as to be very difficult to detect. A favorite means of bringing turpentine into the works is by means of a bladder and tube, which is carried as near as possible to the bladder with which we all are pro vided. It is a very easy matter to empty th is and at tend to the calls of nature without exciting suspicion.
The following inferior qualities of essence of lemon re distinguished here
Sacotte.-As soon as the essence is madeit is allowed to deposit and the clear portion poured off. There remains a deposit in the bottom which is pressed in a small bag (sac). The essence thus obtained is consid erably inferior to the bulk, and in those places where only small quantities of essence are made, and the de posits are left for some time to accumulate, the quality is extraordinarily bad. The cake which is left after expression is distilled in a very rough way, yielding lambicato or distilled oil of lemon. The whole of the distilled essence of lemon which was made in Sicily is now made in this way. Often enough the dregs have commenced to ferment, and in some cases have lost thc whole of the lemon smell before being distilled
Essence of lemon made from the rejected fruit from the warehouses.-In November and December a large amount of fruit is cut and packed, but instead of being at once sent abroad, it is stored in warehouses-fruit gathered at this season having qualities which enable it to be kept longer than any other. Before sending it abroad it is all repacked, the bad and doubtful fruit being used for essence making. This essence never ha wood (di legno), which is easily recognized.

According to the last census there are 33,163 lawyers in the United States.

## RECENTLY PATENTED INVENTIONS.

## Railway Appliances.

Car Coupling.-Thomas Courser, Luke City, Fla. This device has a knuckle with a
coupling hook connected therewith, and is provided also with an auxiliary pivoted coupling hook, the latter being concealed when the main hook is in use. The knuckle is adapted to be emp.oyed in the same manner as such con pling devices are ordinarily used, while the ausiliary device may be used in connection with an opposing drawhead of the link and pin type, or it will
be employed if any accident happens to the hook of the employed if any accident happens to the hook
the knuckle. The device is very simple and easily he knuck
Snow Plow.-Patrick H. Craddock Leadville, Col. This is a plow adapted to be secured such that it will automatically ad just itself vertically or laterally should an obstruction be met with on
the track. By an operative mechanism connected with a storage reservoir of compressed air the engineer may elevate or lower the plow as desired. The plow consists or a clearing board or fender in the shape of two sides of a triangle, a cutter being centrally formed to engage with the treads of the rails.

## Mechanical.

Balance Wheel.-Hiram Bouck and Julius H. Lovendale, Salt Lake City, Utah Ter. This is a wheel having radial and circumferential slota, holes
extending throueh the wall of the wheel being connected with the slote, while screws and nuts may be en ered in the holes and fastened in the whereby an adjustment may be readily made withou adjusted to come more or less on one side of the cener as desired.
Saw Handle Attachment.-Mitchell Pyper, New York City. Secured to the blade of a
handsaw, immedately in front of the handle, are sidepieces forming abatments for a swinging square arm and bevel arms, whereby the saw may be conveniently used as a square and bevel. The swinging arm is pivoted and held by a thnmb screw in acy desired position, and held to straddle the saw blade

## Miscellaneous.

Treating Gold Ores.-Louis C. Daumas, Paris, France. This invention covers a pro-
cess and apparatus for extracting gold from the ore. Protochloride of sulphur saturated with dry chlorine is used to dissolve gold at about $130^{\circ}$ Centigrade, a
double chloride of gold and sulphur being formed, double chloride of gold and sulphar being formed,
while if the ore contains other metals they are transformed into oxide by roasting. The apparatus com-
coil, cross pipes extending through the receptacle
 Titzel, Glenshaw, Pa. This invention relates to an mproved process of coating or saturating electric hard and soft wood, terra cotta, etc., rendering the ar hard and soft wood, terra cotta, etc., rendering the ar-
ticles treated waterproof and preventing decay. The articles are first subjected to heat, to expand the air and fluids in the pores, and then immersed in a coating or saturating liquid, at a lower temperature, causing or satura
the tiqui
article.

Centrifugal Honex Extractor.Charles W. Metcalf, Santa Paula, Cal. This is a device in which a rotating frame supports swinging holders or honey in the outer half of the combs to be ejected, the baskets then being reversed so that the comb holders change their position and the remainder of the honey is extracted, after which the comb-holding baskets can be readily removed and the holders refillea.
Window Washer.-David Mendelson, New York City. This is a simple and cheup apparatus with which a person may stand in a room and readily wash the outside of a window, the apparatus
also facilitating the cleaning of the inside of the winalso facilitating the cleanng of the inside of the win-
dow, or the washing of a wall or ceiling. It consists of dow, or the washing of a wall or ceiling. It consists of
a telescopic main handle in hinged sections, fastening devices fixing the position of the sections, and a fixed jaw and a spring-pressed jaw being carried at the upper
end of the handle. The jaws carry a wet swab at one WIndry cloth at the other.
Window Sash Jack.-Valentine Schir mer, New York City. This is an improvement on a for mer patented invention of the same inventor, provid-
ing a swinging support for sashes to facilitate cleaning them. The improved jack is lightand cheap, and is adjustable to engage fixtures on different windows. The improvement was ou exhibition at the late fair of the American Institute, New York City, its simple construction admitting of the window sashes being swung inwardly, either right or left, for the purpose of ventila-
tion or cleaning. One swinging jack or skeleton bracket is sufficien for a building, its weight not ex fonr ponide
Coin Wrapper.-Ferdinand A. Jaekel, Memphis, Tenn. This improvement provides
an oblong wrapper, properly marked for different values and gummed at one end, and having also a central longitudinal line of perforations, in which coin may
be neat.. wrapped in specific amounts, and the package quickly separated into Twine Ho
Twine Holder.-Walter T. Hanson, Macon, Ga. This device has a base plate provided with a conical friction plag or spindle to enter the core of a
bali of twine, in connection with a stationary angled arm having a suspension eje and goide eyes through arm having a suspension eye and guide eyes through
which the cord is passed. The holder may be con-
veniently attached to an overhead support, to a conn-
ter, or be suspended in any position, holding the ball
in such manner that the cord may be readily anwound
Bag Holder.-Michael Fortin, Still water, Minn. This holder is provided with a fram with a board held in inclined position on which the bag rests, and the holder, made of a sungle piece of wire
bent to form connected loops engaging staples in the board, has curved arms at right angles to the loops, and having a sliding conuection at their ends. The de ing, and arranged to expand and open the bag whe
Lock for Bags, Purses, etc.-Fred rick R. Deck, Brooklyn, N. Y. This lock comprise two leaves placed back to buck and having interlocking a pivot pin passing through the knuckles of both leaves while a spring coiled on the pivot pin exerts tension deson the flunges of the leaves. The improvement is designed especially for double frames for double being controlled by the same spindle and spring, but ach leaf being operated independently.
Cash and Parcel Carrier.-Samuel J. Besthoff, New York City. This improvement provides a car which may be placed upon a cable and car-
rees its own driving mechanism of a simple, durable and inexpensive character. The car has a aimple automaticlocking device to hold it upon the cable, and the opening of the door of the cash compartment whe the port goods with the cash, may or may not be used, as desired, in connection with the cash car.
Pick.-Kenneth J. Morrison and Michael McLellan, Stellarton, Cunada. This patent is
for a pick head having transverse slots to hold removable points, air passages leading from the slots into the eye, this improvement preventing the broken or "cracked "sound so often made in using picks having
Design for Book Rest and Umbrella Holder.-Charles Pegler, Elgin. Ill. Thoss is a combined hook rest and cane and mbrella holder exhibiting a novel configuration or parts of bracket-ike an angle.
Drawing Instrument.-Charles L. pass deagned York City. This is a draughtsman's com spiral lines, ova:s, ellipses, and other curvillnear geometrical lines and figures. The improvement is included in a simple and duraole construction, and the invention consists principaly of a cord connected with one of thelegs of the compass and adapted to wind on the other leg at the joint of both vegs.
Note.-Copies ot any of the above patents will be send name of the patentee, title of invention, and date of this paper.

## NEW BOOKS AND PUBLICATIONS.

metal Coloring and Bronzing. By Arthur
New York Macmillan \& Condon and 1892. New York: Macmilian
Pp. xv, 328 .
Price $\$ 1.10 . ~$
The coloring of metals for the production of bronzes nd other color effects is every day exciting more athe differe present work quite exhaustively treats of different metals. Numeroas formulæ are given.
a Practical Treatise on the Mand FACTURE OF PERFUMERY. Com-
prising directions for making all prising directions for making all kinds of perfumes, sachet powders, osmetics, etc. By Dr. C. Deite, as sisted by Borchert, Eichbaum, E
Kugler and H. Toefner. Translated
of W. T. Brannt. Philadelphia: If. C. Baird \& Co. 1892. 12mo. Pp ${ }^{\text {P }}$.
358. Illustrated. Cloth. Price $\$ 3$. This work also contains a full account of the volatile oils, balsame, resins, and other materials used in the
manufacture of perfumes. This book gives more details manufacture of perfumes. This book gives more details of manufacturing perfumes and toilet specialties on a
commercial scale than any work on the subject which has come under our notice. The section relating to hair preparations is excellent and the chapter on cosmetics seems to be well up to date. Fruit ethers receive a fair share of attention. The number of receipls THe Pract is large. e Practical Brass AND Iron
Founders Guide. By James Lar-
kin. Philadelphia: H. C. Baird \& Co.
1892. 12mo. Pp. $394 . \quad$ Illustrated.
Cloth. Price $\$ 2.50$.

This \& a new and enlarged edition of Larkin's well up to date, so as to include Mitis castings, steel castings, bell founding, bronze casting, chill castirg, casting withouta core, casting on other metals, casting upon inflummable materials, etc. Many
work bave been entirely rewritten.
The Manufacture of Ine. Compris-
ing the raw materials, and the preing the raw materials, and the pre-
paration of writing, copying, and paration of writing, copying, and hektograph inks, ink extracts and
powders, colored inks, solid inks,
ithoyraphic inks and crayons, etc. By Sigmund Lehn and crayons, etc. Translated by
B. Brannt. Philadelphia H. C. Baird \& Co. 1892. 12mo. Pp.
P29. Illustrated. Cloth. Price $\$ 2$. The present work is founded on "Die Tinten-Fabrlkation." A careful consideration is given to the raw
materials, their selection and preparation. A large number of receipts is given, embracing nearly every kind of ink, and the author states that most of there-
cerpta have been teated. Great attention is paid to
 while the important subject of printing ink is fully treated．Preservingapents for ink，the change of color in old documents and the metuous of making faded
writing ink leeible come in for their full share of at tention．This is the only treatise devoted entirely to the eabject in print in the English language and is a important addition to technical literature．
The Hardwood Finisher．With rules and directions for finishing in na hogany，cherry，birch，walnut，oak ash，redwood，sycamore，pine，and and edited by Fred T．Hoopgson．
New York：The Industrial Publica－ tion Company．1892．Pp．94．Pric $\$ 1$.
This excellent work，with its very practical aspect neglected．It is exceedingly practical，and with numer ous formule for all kinds of stains and wood dyes，a well as finishes，is one that is to be found of value $t$ many operatives．
Le Cha uffage et les Applications de la Chaleur dans l＇Industrie
et leconomie Domestique．Par Julien Leferre，Professeur Suppleant Julien Leferre，Professeur Suppleant
a l＇Ecole de Medecine de Nantes，Pro fesseur a l＇Ecole des Sciences．Avec ${ }^{188}$ figures intercalees dans e texte

The French aspect of this book is evident in the title， and the very large ground which it．undertakee to cove
is largely devoted to domestic heating although is largely devoted to domestic heating，although
other heating finds a place in it，and its numerous il other heating finds a place in it，and its numerous i1－
lustrations and excellent arrangement of pictures indi－ cate good judgment on the part of the editor and pub lishers．
REP Any of the above books may be purchased through this ofice．Send for new book catalogue just pub－
liehed．MUNN \＆Co．， 361 Broadway，New York．

## SCIENTIFIC AMERICAN

BUILDINGEDITION DECEMBER NUMBER．－（No．86．）

## TABLE OF CONTENTS．

1．Elegant plate in colors，showing a very attractive of $\$ 4,150$ complete．Floor plans and two perspec tive elevations．John Robinson，architect，Get nantown，Pa．
2．Plate in colors showing a residence at Springfield Mass．Perspective views and floor plans．Cost
$\$ 12,000$ complete．Mr．Guy Kirkham，architect Springfield，Mass．An excellent design．
3．A colonial residence at Newton Highlands，Mass． erspective view and floor plans．J．W．Beak 4．A pretty cottage erected at Bridgeport，Conn．， A．M．Jenks，arciitect，Bridgeport，Conn．
3．A dwelling house erected at Warberth Park，Pa lane，architect，same place．A model design Floor plans and perspective
6．A＂Queen Anne＂cottage erected at St．David＂ Pa．．at a cost of $\$ 5,500$ complete．A uniquc design Perspective elevation and floor plan
W．L．Price，arcnitects，Philadelphia．
7．A residence in the＂Colonial＂style of architecture，
erected at St．David＇s，Pa．Perspective view and loor plans．Cost complete $\$ 5.800$ ．F．L．\＆W L．Price，Philadelphia，architect
8．A residence on Golden Hill，at Bridgeport，Conn．
Perspective elevation ard floor plans．D．R erspective elevation ard floor plans．D．R． Brown，architect，New Haven，Conn．An excel
lent design．
9．A residence recently erected at Springfield，Maes． Floor plans and perspective elevation．Cost
$\$ 2.490$ complete．Mr．A．B．Root，architect，same place．A pleasing design．
10．Picture of Aldworth，Sussex the home of Lor Tennyson．Portrait of Lord Tennyson．
．Sketch for a cottage at Saucelito，
2．Design for a thirty－story building．
13．Sketch of residence of Mr．Howard Bell，Atlanta， Ga．
4．Miscellaneous contents：Some of the merits．－Water fight cellars．－Read this with care．－Improve your property．－How to catch contracts．－The buildinge．－Concave sounding boards．－A high railway bridge．－A complete steel house front， illustrated．－An improved woodworking ma－ chine．－Finely carved woodwork，illustrated．－ Steam and hot water radiators，illustrated．－
Plaster of Paris．－Disinfection by means of sul－ Plaster of Paris．－Disinfection by means of sul－ celling in an art gallery．
The Scientific American Architects and Builders Edition is issued monthly．$\$ 2.50$ a year．Single copies， 25 cents．Forty large quarto pages，equal to aboui
two hundred ordinary book pages ；forming，practi－ cally，a large and splendid Magazine of architec－ TURE．richly adorned with elegant plates in colors and with fine engravinge，illustrating the most interesting examples of Mo
allied subjects．
The Fullness，Richnese，Cheapness，and Convenience of this work have won for it the Largest circulation of any Architectural publication in the world．Sold by all newsdealers．
muNN \＆CO．，Publibhers，
201 Broadway，New York

Pusiness and ゆersonal．
for cach insertion ，about eight words to a line．Adver
for tisements must be received at pubication office as earlv a
a Acme engine， 1 to 5．H．P．See adv．next issue． ＂U．S．＂metal polish．Indianapolis．Samples free． Presses \＆Dies．Ferracute Mach．Co．，Bridgeton，N． Shingle machinery．Trevor Mfg．Con，Lockport，N． Open－Side Planing and Shaping M
Pedrick \＆Ayer，Philadelphia，Pa． Wm．Jessop \＆Sons，the celebrated steel m
serve the centennial of their firm next year． Steam Hammers，1mproved Hydraulic Jacks，and Tub xpanders．R．Dudgeon， 24 Colum bia St．，New York． Stow flexible shaft．Invented and manufactured
Stow Mfg．Co．，Binghamton，N．Y．See adv．，page 254 ． \＄200 buys outright a patent on a novel kitchen devic
ddress C．A．B．，P．O．box No． 495 ，Wakefeld，Mass
 The Garvin Mach．Co．，Lairht and Canal Sts．，New Yor Centrifugal Pumps for paper and pulp mills．Irrigati nd sand pumping plants．Irvin Van Wie，Syracuse，N． Portable engines and boilers．Yacht engines and
oilers．B．W．Payne $\&$ Sons，Elmira，N．Y．，and 41 De boilers．B．W．Pa
Stret，New York．
Wanted－A firm to undertake sale of well－selling box 73，New York．
To Let－A suite of desirable offfces，adjacent to the pply to Munn \＆Co．， 361 Broadway，New York． Fine Castings in Brass，Bronze，Composition（Gu
Metal），German Silver．Unequaled facilities Jas． McKenna \＆Bro．， 424 and 426 East 23d St．，New York． For the original Bogardus Universal Eccentric Mill， oot and Power Presses，Drills，Shears，etc．，address The best book for electricians and beginners in elec trictty is＂Experimental Science，＂by Geo．M．Hopkine
By mail，$\$ 4$ ；Munn \＆Co．publishers， 361 Broadway N． Canning machinery outfts complete oil burner soldering，air pumps，can wipers，can teaters，labeling soldering，air pumps，cand

Competent persons who desire agencies for a new opularbook．of ready sale，with handsome proft，ma
pply to Munn $\&$ Co．，Scientific American office， 36 Broadway，New York．
Wanted－Engineers and pilots．Twenty licensed en－
ineers and pilots to run small passenger steamers f he summer months of 1893，in connection witb th World＇s Fair．Sober，steady men are invited to write u
or further information．Chas．P．Willard \＆Co．，Cly or further information．Chas．P．Will Southport A ves．，Chicago，ill．
Send for new and complete catalogue of Scientific New York．Free on application．

## 

HINTS TO CORRESPONDENTS． Names and Address must accompany all letters，
or no attention will be paid thereto．This is for our
infor information and not for publication．
References to former articies or answers should
give date of paper and patior number of question．
Inquiries not answered in reasonable time should give date of paper and puge or number of question．
Inquiries not answed in reasonable time ehoold
be repeated；correspondents will bear in mind that be repeated；correspondents will bear in mind that
Bome ansers require not a little research，and，
though weendeavorto reply to all either by letter or in this department．each must take his turn．
specino riten hiformazion on maters of
personal rather than general interest cannot be be personal rather than general interest cannot be
expected without remuneration．
cientifle imerican Supplements referred Sclentific American Supplements referred
tomay be had at the office．Price 10 cents each
Books referred to prompty supplied on receipt of Winerals sent for examination should be distinctly
marked or labeled．
（4604）O．C．asks： 1 ．What speed can be had with a 1 f foot boat， 4 feet beam，using an engine
$21 / 2$ inches hore， 3 inches stroke at about 60 pound team pressure：A．You should be able to run the boat 6 miles per hour．2．What should be the diame－ ter，pitch，and speed of the propeller to give best re－
sults？A．Propeller wheel shonld be 18 inches diame－ ter， 36 inches pitch and make 250 turns per minute． three－blade wheel is preferred 4．What size boil would be required and would the pipe boiler described in the Scientific Amricican Supplement be suitable？ A．A vertical tubular boiier having 20 square feet of actual heating surface with shell 22 inches diameter by 36 inches in height， 33 tubes $11 / 2$ inch，will give all the
steam required．The No． 3 pipe boiler deecribed in Scientific American Supplement，No．702，with 8 ncher addition to the length，will make a safe boiler
in which you carry 100 pounds steam pressure if de－ ired，and large enough for the above speed．
（4605）R．T．McK．writes：Will you please answer me through your columns why it is that
you can pump up a higher air pressure than your stegm pressure by the gauge on a double acting air pump，the steam and air cylinders being of the same diameter and the pistons operating on the same piston rod？ The difference between the initial pressure in the steam cylinder and final pressure in the air－compressing cylinder is due to the difference in the mean preasure
or the expansion of steam and the mean pressure for or the expansion of steam and the mean pressure to
the compression of air．This is at once apparent to the eye when examining the indicator cards of equal sized steam and air compressing cylinders．The mean engine preesure for 70 pounds at $1 / 8$ cut－off is theoreti－ cally 52 ponnds per square inch．The mean adiabatic pounds pressure is 50 pound while the or air at 100 mal pressure is but 30 pounds． mal pressure is but 30 pounds．The absorption of the
heat of compression by water injection or jacket cool－ ing brings the extremes to a mean，which，if $1 /$ is ab－ sorbed，will make the mean pressure of the air cylinder about 43 pounds per square inch，with 9 pounds as the margin tor compressor friction．
（4606）R．M．asks： 1 ．Is smoke a wet watery）or dry vaporp A．Smoke 18 more or less mixed
with the vapor of water，part of which is derived from We moisture in the fuel and an which is derived from xidation of the hydrogen forming part of the fuel． 2 What weight would a ball 100 pounds indicate on weight multiplied by the fall is equal to 10,000 foot ounds．If the balance arrests the fall of the ball in 6 inches after contact，the average impact force is 20,000 pounde．See Scientific american Supplement，No 82，on impact or the foree or percuseion．
（4607）G．C．W．asks how to bleach he hair of an animal．A．Gaseous chlorine and hydr－ en peroxide are effectual agents in bleaching hair The hair shonld be thoroughly cleaned，with a war it is put into a jar and chlorine gas introduced moist is put into a jar and chlorise ana in it wenty－four hours，and if necessary repest．
（4608）T．H．says ：1．It is proposed to deliver water in an inch pipe one mile distant ove elevation 120 feet high，the point of delivery is 2
feet lower than the starting point．It is asserted that it would require 75 per cent more force power todeliver at the summit and let it go down bygravity thanto con－ nue the pipe the whole distance．Can you throw ight on it？A．It will require 52 pounds pressure and theadditional pressure due to friction to deliver the water at the summit of the siphon．The down leg ca only relieve the pump pressure to the aumount of riction in the down leg of the siphon．The difference in length of the two legg of the siphon may make trifing difference only，whether delivery is through the whole length or discharged at the top．2．Suppose
thata shell made of strong steel $11 / 2$ feet in diameter with shell made of strong steel 1 Y／2 feet in diameter Whe a cavity in the center large enongh to hold 2 to admit the smallest possible wire that would conduct electric fluid，had electricity applied，would the powder ignite？Would there be an explosion，or what would here be？A．The powder would explode and create pressure of probably 40,000 pounds per equare inch， which would fizzle oat throngh the vent and burn out the wire．

## TO INVENTORS．

An experience of forty years，and the preparation of
more than one hundred thousand applications for tents at home and abroad，enable us to understand the laws and practice on both continents，and to possess un－ qualed facilities for procuring patents everywhere．A foreign countries may be bed anplication and and contemplating the securing of patents，either at home or abroad，are invited to write to this offfee for prices which are low，in accordance with the times and our ex－
tensive facilities for conducting the business．Address tensive facilities for conducting the business．Address
MUNN \＆CO．，office SCIENTIFIC A MERICAN， 361 Broad－ way，New York．

INDEX OF INVENTIONS

## For which Letters Patent of the

 United States were GrantedNovember 29，1892，
AND EAGH HEARING THAT DATE． ［See note at end of list about copies of these patents．］




뿡

