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##  <br> . D. should consult a florist.-J. W. W.

 an find directions for making nitro-glycerin on to grate bars in Trowbridge's "Heat and Steam Engines."-E. J. H. is informed that there is no rule for determining the horse power of a boiler. -Q. K.N. Will find full information as to the rub-ber horse shoe on p . 166 , vol. 31 . - M. M. W. will ber horse shoe on p. 166, vol. 31.-M. M. W. Will
find a recipe for baking powder on p. 123, vol. 31.--T. W. will find directions for hardening needles, etc., on p. 347, vol. 31.-I. C. F., W. R. M., and many others are informed that water glass is silicate of
soda, advertised regularly in our columns.-J. L.S. can preserve his canvas tent by usingthe preparation described on p. 347, vol. 31.-B. C.S. can scour
his castings by the process given on p. 139, vol. 31 .
(1) W. H. B. asks: Will steam destroy the temper of spring steel kept constantly in it? A.
The springs, if properly tempered, will continue erviceable for a long time unless the steam press-
(2) F. L. asks: How much coal and water
re needed to propel a freight train of 30 cars for are needed to propel a freight train of 30 cars for
100 miles at the usual speed? A. These elements 100 miles at the usual speed? A. These elements
vary greatly. We find, from an inspection of loco motive returns, that a tun of coal will move an ordinary freight train a distance varying from 35 to 62 miles.
(3) S. F.S. asks: Can you tell me how to file circular saw for sawing cord wood into stove


The point would be liable to break or bend in ver hard wood or in knots. No. 2 will stand to saw
the hardest timber or knots, but will not cut as easily as No. 1. No. 3 is a form of point generally used for promiscuous sawing of both hard and
soft wood. The shapes of saw teeth should be varied to suit the kind of wood to be sawn. The set must be wide enough to clear the plate. In
sawing very hard wood, less set is required than in sawing wood that is soft and fibrous.-J. E. E., of (4) B. M. M. and others ask: What study
would be best for a machinist to take up? A. It would be well to begin with geometry, drawing, and natural philosophy. We can recommend Minifle's
"Mechanical Drawing," Robinson's or Loomis' "Mechanical Drawing," Robinson's or Loomis'
"Geometry," and Silliman's,Ganot's,or Deschanel's "Physics."
(5) F. E. H. says : I wish to make two large wooden troughs to hold a silver and copper solu-
tion, for electroplating. Please give me a recipe tion, for electroplating. Please give me a recipe
for varnish that will stand the cyanides. A. Coat marine glue
(6) F. R. G. asks: I am engaged in constructing a reflecting telescope, which I wish to be
a Gregorian. The mirror is 7 inches in diameter Gregorian. The mirror is 7 inches in diameter
and of 6 feet focus. What should be the focus of the of 6 feet focus. What mirror, and where along the tube should it be placed so as to give the best effect? A. Focus of small convex mirror, Cassegrain, 8 inches, 64
inches from speculum. A Cassegrainian wouldbe inches from speculum. A Cassegrainian wouldbe
much better. The small convex mirror corrects much better. The small convex mirror corrects $t$ is placed at its own negative focal length inside he focus of the large mirror
(7) W. L. W. asks: Is musk such as is used for perfumery, extracted from the common
musk rat? A. It is prepared from the musk root, the East) The root itself has long been used in India and Persia as a medicine, a perfume, and for incense. It has a pleasant, musk-like odor, and acts as a powerful stimulant on the nervous sys-
(8) A. W. R. asks: Can you give me any
nformation as to the saw here shown? The engraving shows the shape of the fleam or lancet

## $\mathrm{t}_{\text {oothed saw. }} a$ shows the form of tooth of full $\mathrm{s}_{\text {ize }}$, and $b$, the position for holding the saw. The $8_{\text {ize, }}$ and $b$, the position for holding the saw. The $\mathrm{s}_{\text {aw }}$ is held flat on the bench, and one side is


ished before the saw is turned over. No setting is needed, and the plate should be thin and of the
best quality and temper. A. We have never used this particular shape of tooth. For very fine
smooth sawing, this form of tooth would undoubtedly work well; but must be filed by an expert workman.-J. E. E., of Pa
(9) S. M. asks: 1. How are galvanometers made? A. A magnetized needle is placed in the center of a coil of insulated copper wire, the
needle being suspended by a thread, or resting on needle being suspended by a thread, or resting on
a pivot. 2. I have a magneto-electric machine for medical purposes. It has always worked well un-
til lately, and now I cannot get a hard shock though I put on all the force I can. The induc
the tion coilis all right,but $I$ can only get a very feeble current through the secondary coil, and that at very irregular intervals. It is driven by a revolv-
ing armature between the plates of a small elecing armature between the plates of a small elec-
tromagnet; the circuit is broken and connected by two small silver springs, which press upon an arrangement on the shaft of the apmature. The Probably the coating or insulation of the wire of the secondary coil is destroyed, and thus prevents
the secondary current from traversing the entire length of the wire.
(10) K. A. asks: How can I separate silver from copper in blocks of mixed metal? A. Dissolve the mixed metal in aquafortis of $1 \cdot 2$ gravtion of salt, and reduce the chloride with zinc and dilute sulphuric acid. Evaporate the remainder the acid, and reduce the metal in crucible or the acid, and reduce the metal in crucibla
cipitate the copper in solution by iron.
(11) D. C. M. asks: Where can a mineral rod be obtained? A. If you mean by a minera rod a divining rod, we cannot say, because they
are only sold by quacks and used by ignorant per are
sons.
(12) B. P. M. asks: When did the first land plants make their appearance? A. In certain
shales and other deposits, belonging to the Devonian formation.

1. Is the school started by Agassiz still open, and is it the best school of its class? A. It is still open,
and is the best. For further information, address and is the best. For further information, addres
the officers. 2. Do medical colleges admit students whe officers. 2. Do medical colleges admit students
who anatomy? A. Not as a general rule.
(13) W. D. S. asks: 1. What substance will dissolve in water at its natural temperature ?
A. Most of the salts of the alkalies and metals. 2 A. Most of the saltsof the alkalies and metals. 2
What substance will dissolve in water only when heated to $200^{\circ}$ or $212^{\circ}$ Fah.? What substance will dissolve in water heated (under pressure) to $500^{\circ}$
or $700^{\circ}$ Fah.? A. Substances which dissolve under these circumstances will also dissolve, although not to so great an extent, at lower temperatures.
I drop a piece of copper into nitric acid; power I drop a piece of copper into nitric acid; power
ful analytic and synthetic action ensues, and there rises a murky, yellowish, brown
this vapor? A. Hyponitric acid.
(14) A. S. asks: What degree of heat is re quired to melt nickel? A. Nickel has remarkable magnetic properties, which it loses on being heated
to $6_{50} 0^{\circ}$ Fah. The standard authorities do not state the melting point of nickel further than it is very high and near that of iron.
(15) F. E. asks: How can I line a tin can with lead? A. Tin lined lead pipes are now com-
mon, and a compound sheet of the two metals might be used for your purpose.
(16) T. H. W. asks: 1. How can I coat castings with copper? A. The article should first be
rendered free from rust by rubbing with an emery rendered free from rust by rubbing with an emery
cloth, or by dipping into a pickle composed of sulphuric acid 2 ozs., hydrochloric acid 1 oz., water 1 gallon. After the article has remained some time in this pickle, it should be taken out and the rust
removed by a brush and some wet sand; if the oxremoved by a brush and some wet sand; if the ox
ide cannot be easily cleaned off, it must be returned to the pickle. As soon as the article is ren soda or potash, for the purpose of removing al grease. Lastly it is well rinsed in hot water, and immediately placed in a concentrated solution of sulphate of copper, to which a little sulphuric $\varepsilon$ cid to be coated with an even covering of metallic copper. 3. How can I blue wire cloth, such as is ed for dish covers? A. See p. 266, vol. 30.
(17) W.R. asks: 1 . Can you give me a re-
cipe for a dye that will change a set of wooden white chessmen to a pretty red color? A. To 2 lbs genuine Brazil dust add 4 gallons water. Place the articles, immersed in this liquid, in a suitable
vessel, boil them for three hours and let them cool, then add 2 ozs. each of alum and aquafortis, obtained lukewarm until the required shade is at which a brilliant light would appear to stand over and so designate a particular house? A. We
do not fully understand your question. The magdo not fully understand your question. The mag-
nesium light has been distinctly seen at sea, when

25 miles distant, and the lime, "Drummond," or
"calcium," light at a distance of fully 100 mile calcium," light at a distance of fully 100 miles.
(18) H. M. asks: Can you tell me of a varnish which is perfectly transparent, for polished silver ware? A. We think the following recipe
will answer your purpose. Take gum mastic 6 ozs., turpentine 14 ozs., place them together in a
large bottle, and shake for some time without the large bottle, and shake for some time without the
application of heat. When dissolved, strain it application of heat. When dissolved, strain it
through a piece of calico, and place it, in a bottle tightly corked, so that the sun may strike it for several weeks, which will cause a mucilaginous precipitate, leaving the remainder as transparent as water. It may then be decanted into another
bottle, and put by for use bottle, and put by for use.
(19) H. W. J. says: I have a camera obscura, but the lenses are gone. It will take a pic-
tureabout 3 inches square. What kind of lens tureabout 3 inches square. What kind of lens
would be best to get? A. Try a meniscus, 1 inch in diameter, of 5 inches focus, or buy a quarter ve view tube
(20) E. B. I. asks : 1 . How can I make para-
boloid chucks to grind glass specula by mean boloid chucks to grind glass specula by means of a
common lathe? A. Keep the mirror spherical until polished, then polish out the center until the focus of marginal and center rays is the same
when you read the Sctentific Maerican at 50 yards distance. 2. If cast, how are the molds constructed? A. Cast a pair, tap for lathe spindle, turn to template of correct radius, then grind together with emery. 3. After the speculum is ground and polished, how can it be tested for miA. The parabolic mirror bas twice the longitudinal aberration of the spherical one. That of the spherical one is equal to the square of half the aperture divided by eight times the principal focal length. The mirror is mounted on wooden cleats and viewed at the center of curvature: 1 , with an eyepiece mounted on a graduated table close to an artificial star, a lamp with two pinholes in its opaque screen. If spherical, the image is sharply
defined, and surrounded by interference rings. 2. By moving an opaque screen across the cone of By moving an opaque screen across the cone of
rays in front of the pupil of the eye. If the mir(21) H. Z. E. asks: 1. Does the earth in its ath round thesunalwa shape of the earth's orbit? A. No. 2. What is the shape of the earth's orbit?
A. An ellipse. The eccentricity is ${ }_{6}^{1} \%$. In 24,000 years it will diminish to 0.0033 and commence to inyears it
crease.
(22) D. B. \& D. H. B. say: We have an en-
gineer running our engine; he sometimes runs with 30 lbs. of pressure at other times as high as 75 or 80 lbs. He contends that low pressure is as sood as high pressure in regard to economy. We say that low pressure takes more fuel, more wa-
ter, and more steam. Which is right? A. The difference is in general considerably in favor of high pressure, but not always, however. We could not give an estimate of the difference in your case without knowing more particulars.
(23) E. O. G. says: 1. I state that, at the depth of 1 mile in the sea, a human body will, by the pressure, be rendered unrecognizable, at
miles torn and pressed out of shape, and at $\boldsymbol{i}$ miles torn to pieces. Am I correct? A. We do not know. 2. At what depth is there a pressure of a thousand
(24) $N$. R. says: I have a well 80 feet deep, which is
ter up through pipe, 90 feet high from bottom of well, with 70 lbs. steam? A. Yes.
(25) P. P. says: I read that, in warming buildings by steam pipes,each square foot of sur-
face will heat 200 cubicfeet of the surrounding air face will heat 200 cubicfeet of the surrounding air
to $75^{\circ}$, and will require 170 cubic inches of boiler capacity for its supply. 1. Is this a good standard to go by in estimating the quantity of pipe needed tor all kinds of buildings. 2. What increases and diminishes the weight of air, and what increases and diminishes the density of air? A. Cold or compression increases the weight of a
Heat or expansion diminishesit.
(26) J. H. says: 1. We have a boat 16 feet long by 3 feet wide, flat-bottomed, pointed at bow fast by a propeller as by one pair of oars? A.The oars will answer best. 2 . On p. 43, vol 32 in your answer to J. H., you speak of pitch and gutta percha not being attacked by water. Would this be good for painting the outside of a boat with, to
prevent the water soaking into the wood? $\Lambda$. Yes.
(27) A. B. asks: What is meant by the area of a piston? A. The number of units of square
measure, such as square inches or square feet, in measure, such as square inches or square feet, in
the cross section. I have a rose bush that seems to be full of small eptiles resembling snakes. How can I kill them
without killing the rosebush? A. Apply to a nurseryman.
Whatismeant by the frogling box of a locomo-
tive? A. The term is new to us. Perhaps some of our readers
(28) A. L. M. asks: What is the best plan of seasoning green dogwood or other small woods
o avoid cracking? We are putting it in a tight box and turning on live steam, and intend piling will this room (heated by steam) afterwa doubt this plan will answer if it is thoroughly steamed, and it will dry in a few days.

1. What should be the size of a crank pin for a 45 horse power engine? A. The question is too inI tighten a loose crank on shaft? A. It should be ushed and refitted.
(29) L A. T. says: 1. On p. 19, vol. 32, un
der head of "Britiss Naval Guns," we find the ollowing: "Thelatter was proved capable of penetrating wrought iron plates 14 inches thick, as
well as a backing of 18 inches of timber and a skdn
of $11 / 4$ inches plates," etc. We wish to know if the projectile will pierce the above mentioned in one
body? In other through a total of words, will it (the gun) shoot shot? A. Yes. 2. Can a ball be made to go through be made to float on water with that amount of iron on it? A. Yes. 4. "It penetrated 12 inches
armor." What is meant by armor? A. The plating on the vessel's side.
(30) L. H. H. asks: What can I use on belts that have become glazed and hard? A. We be-
lieve castor oil and neatsfoot oil to be among the best preparations. We know, however, that engi-
neers have a variety of materials which they think very well of; and as the matter is one of in-
(31) C. E. P. asks: Please give me a good practical recipe for coloring raw wool with a logwood blue. A. Use 1036 lbs. logwood, $11 / 4$ lbs. prussiate of potash, $31 / 2 \mathrm{lbs}$. supersulphate of tartar
$21 / 4$ quarts muriatic acid, $11 / 4 \mathrm{lbs}$. nitric acid, 121 lbs $21 / 4$ quarts muria
muriate of tin .
With an engine 9x18, how can I getthe most on engine shaft and a large belt to drive line
shaft with, or by coupling the line shaft to the engine shaft and drive each machine with a smal ond way.
(32) F. H. H. asks: 1. Can oil or grease be
extracted from bones, leather, etc., by the use of extracted from bones, leather, etc., by the use of
bisulphide of carbon? A. Yes. It is used in large quantities for this purpose. 2. How can th grease be recovered or separated from the carbon?
A. By distillation, using a retort connected with a ment to the apparatus used in the distillation of light oils.
(33) C. C. asks: How can I construct a furscale? A. It would require a whole treatise to give you the desired information, and we advise youto
consult standard works on the subject, if the serconsult standard works on the subject, if the
vices of a practical man cannot be obtained.
(34) C. F. says : I wish to condense about 7 cubic feet oxygen into a cylinder 7 inches in diameter and 18 inches long, and about 10 feet hydrogen
into one of the same size. What will the pressure per square inch be on each cylinder? A. The pressure will vary inversely as the volume. Thus,
if 10 cubic feet of hydrogen,at a pressure of 15 lbs . per square inch, are compressed so as only to cupy a space of 1 cubic foot, the pressure will be thickness will answer forthe cylinders. Yion in find rules relating to gases in Ganot's or Deschan(8)
(3is) E. H. M. asks: What would be the best packing to use in a cooking vessel to prevent
the escape of steam? A. It would probably be well to give the cooker such a form that you can
getin a packingring, and clamp the two parts to-
gether.
(36) J. M. T. asks: At what speed will an engine $5 \times 6$ and a boiler 5 feet high $x 36$ inches in
diameter, with $\tilde{0} 0$ lbs. of steam, drive a propeller diameter, with $\pi 0 \mathrm{lbs}$. of steam, drive a propeller
screw 36 inches in diameter in a tank of water, the screw 36 inches in diameter in a tank of water, the
wheel to be stationary? A. At about 300 revolutions a minute, if the wheel were completely im-
How high will a pound of steam raise a column of mercury: A. About $24 \frac{4}{10}$ inches. $^{1}$. Is there any 1. Is there any back pressure on a high pressure
cylinder of a compound engine? A. Yes. 2. Are the cranks of such an engine set at right angles or opposite each other? A. In both ways, and at in-
termediate angles. 3. Would a three-cylinder engine on the compound principle, having cylinders for three pressures from high to low, be practicafor three pressures from high to
ble? A. Yes. It has been done.
(37) G. S. asks: The diameter and length of a hydraulic cylinder being given, how can I find
the thickness of metal to withstand any pressure the thickness of metal to withstand any pressure
per square inch ? A. It is customary tostrengthen
such cylinders with bands or other devices, when such cylinders with bands or other devices, when
the pressure is very great. But for an ordinary the pressure is very great. But for an ordinary
thick cylinder, made of cast iron, the following rule will answer: Safe strain in los. per square
$4,000 \times$ thickness of cylinder in inches.
$=$ internal radius in inches+thlckness in inches.
(38) A. B. asks: What is the milk of lime
that distillers use for cleaning vats, etc.? A. Cream or milk of lime is a thick mixture of the hydrate of lime with water. It is readily obtained
by first slacking the lime properly, and then mixing it with water until of the consistence of thin ing it with
whitewash.
(39) J. L. asks: What is the difference in strength of a 14 inch and 16 inch boiler flue against external pressure? What is the variation of inch-
esin diameter to base calculation on, for external and internal pressure, or how much additional thickness of iron would be required to make following empirical rule will enable you to make the desired calculation: The resistance to collapse, in lbs. per square inch of surface, is found by multiplying the square of the thickness in inches by 806,000 , and dividing the product by the product
of the diameter of the flue in inches and the length in feet. Let $F=$ thickness of flue in inches, $\mathrm{D}=$ diameter of flue in inches, $\mathrm{L}=$ length of flue in feet, $P=$ resistance of flue to colla
per square inch. Then $P=\frac{800,000 \times T^{2}}{D \times L}$
(40) W. K., of Lippe, Germany, says: Since
discovering that the following method of hardening picks for $b$ it into use at several places, and all the millers
who use it will have no other method: Have the pick made of the best tool steel, with a stout edge to it, both sides being similarly shaped; let the
tool be about one inch and a half wide. Heat the
edge to a cherry red and dip it into clear, cool wa
ter, not further than one tenth of an inch. In do ing this, let your arm rest on something firm, $t$ enable you to hold it quite steadily. As soon as
the tool is sufficiently cooled off, it is ready for use. The advantage of this method is that you obtained by the soft steel behind it.
(41) H. P. asks: How can monograms, etc.,
be erased from china ware? Will hydrofluoric e erased from china ware? Will hydrofluoric acid do it, without making a spot? A. Stop out
he part of the vessel which you do not wish to haveattacked with a dam of wax or melted paraffin, and allow the liquid hydrofluoric acid to remain in contact until the surface is sufficiently at-
tacked. But it would be a very troublesome and tacked. But it would be a very troublesome and
difficult operation. There is no other solvent so owerful as this.
(42) L. G. S. asks: Can you tell me what solution or preparation is used for dipping plain ooden crosses in, so that they are covered with $1 / 8$ inch in diameter and $1 / 4$ inch long? A. Try coloring a saturated solution of saltpeter or alum with aniline red, and continue dipping until a suf-
ficient thickness has crystallized. Or use a solution ficient thickness has crystallized. Or use a solution
of bichromate of potash or red prussiate of potash.
(43) J. S. F. asks: Is there any such an art
(throwing the voice? Several persons have told as throwing the voice? Several persons have told me that ventriloquists can throw their voices in any
direction, and at any desired distance. I contend that it is mostly deception, for it does not look separate from the body. A. Your view of the matter is correct. The deception consists in so working upon the imagination that an audience
readily believes the sound to come from a disreadily believes the sound to come from a dis-
tance. (44) J. L. D. says: There is a curious com-
ination of gear wheels called Ferguson's mechanical paradox. It consisted of 3 pinions connected to one spur wheel, one of which runs in opposite
direction to the spur, one in the same direction!


Wheel, $A$, is secured to the pin, $D$, about which the arm, $B$, revolves. There are two pins, $F, G$, se-
cured to the arm. The wheel, $E$, is loose upon $F$, and gears with A. The three pinions, $\mathrm{H}, \mathrm{I}, \mathrm{K}$, are
loose upon the pin, G. I has as many teeth as A: H , one more, and K , one less.
(45) C. W. J." asks: What is Burnetized lumber for buildingpurposes? A. Lumber treated
with Burnett's disinfecting fluid, which is largey used as an antiseptic; and this fluid is a solution of chloride of zinc.

1. What is the fertilizing principle of cotton
seed? A. It is probably due to the potash contained in the seed. 2. Would not the seed of the of necessity, a matter of experiment with you; we
know of no recorded comparisons between the mos
How can I make red and green ink for ruling? A. Red ink: Digest powdered cochineal 16 parts,
oxalic acid 2 parts, dilute acetic acid 80 parts, disoxalic acid 2 parts, dilute acetic acid 80 parts, dis-
tilled water 40 parts, for 36 hours; then add powdered alum 1 part, gum arabic 1 to 10 ; shake up, let tand for 12 hours, and strain. Green ink : To powporcelain dish, add oil of vitriol 8 parts, previously
diluted with 64 parts water; then heat, and, while evaporating, add gradually 24 parts of alcohol, and reduce to 56 parts, which filter, and
clear liquor dissolve 8 parts of gum arabic.
(46) J. I. W. says: You say: "Never allow rinking water to be drawn from a cistern supplying a water closet." Why not? A. Because the cistern is often so connected with the water closet that there is danger of the gases passing from one noxious other, or the water, which readny absorbs

## ith them.

(4i) E. L. asks: Of what is carbolate of come inhalant made? A. The mono- and di-odated ovolution of hydrochloric acid, by the action of
end chloride of iodine on phenol. The solution of the residue in soda ley yields, on addition of hydro-
chloric acid, a grayish white, viscid body, which, When heated under the ordinary atmospheric pressure, is resolved into a large quantity of
iodine and rosolic acid; but when distilled in a vacuum, it yields liquid mono- and di-iodophenol,containing a small quantity of rosolic acid. Mono-iodophenol, $\mathrm{C}_{6} \mathrm{H}_{6} \mathrm{IO}$, is a colorless, sirupy liquid, insoluble in water, soluble in alcohol and ether; and
t forms, with alkalies, crysta:lizable salts which are soluble in pure water, but insoluble in strong
potash ley. Di-iodophenol, $\mathrm{C}_{6} \mathrm{H}_{4} \mathrm{I}_{2} \mathrm{O}$, is a colorless
solid, which melts at about $10^{\circ}$, dissolves sparingly in water, and crystallizes from hot dilute alcohol
in slender flattenedneedles. It dissolvesin alcohol in slender flattenedneedles. It dissolvesin alcohol
and ether, and in alkalies, forming with the latter and ether, and in alkalies, forming with the latter
compounds which are soluble in water but insoluble in strong potash ley. When heated it gives off iodine, and lea ves rosolic acid.
Why is it that the dead are alway
the head to the west? A. Are they?
I have a microscope and telescope, both of which are achromatic; the object glass of the latter is 24 inches in diameter, its focal length about 54 the lenses of the microscope and use them for an eyepiece in the telescope to increase the power of he latter? A. No.
What would be the effect of black pepper winter and summer use? A. It would probably
be of no advantage.
What effect would saleratus or bicarbonate of potash have, if added to the brine in packing and would not preventspoiling.
What is paraffin? A. It is a white solid,
(48) M. W. H. asks: Is cherry tree gum
any value for mucilage? A. We tree gum of mentioned as of any value. A good mucilage is water following: Dissolve clear gum arabic in ho quinin The later ef quantity of suls the mucilage from becoming moldy, and replaces the poisonous creasote, corrosive sub
quently used to remedy this evil.
Are there any lead mines that have no silver in he orh is the. The galena, or sulphore lead mall percentage of silver.
What is the value of pure gold per ounce?
(49) J. S. says: 1. I have a well, the wate in which is hard, and there is a chain pump in it, the chain being covered with zinc. Is it unhealthy
to use the wate:? A. Generally speaking, no. 2. How does zinc poison affect the system? Does it ever injure the eyesight in any way valent vomiting, burning pain in the stomach violent voming, burning pain in the stomach Death seldom ensues, in consequence of the emetic effects.
(50) D. D. N. says: We found that our lamp burnt with a low flame for about 10 minutes, when
suddenly the flame would dart up to about 15 inch es in hight. The oil would trickle down, and the blaze descend below the chimney holder. Wha was the matter with it? A. Your trouble was
probably due to the use of too light an oil, the probably due to the use of too light an oil, the
vapor of which soon partially flled the inner chamber, and, owing to the warmth of the room, the remedy is to use an oil of a greater specific gravity.
(51) L. K. L. asks: 1 . Which flame is best metal, gas or alcohol? A. Either will do. 2. How can I make a white metal so
find a recipe on p. 123 , vol. 32 .
(52) J. A. D. asks : What acid or combina-
tion of acids will separate the cotton and the wool tion of acids will separate the cotton and the wool
in a mixed fabric? A. A solution of ammoniacal oxide of copper in excess of ammonia dissolves
cotton, but not wool. To remove the wool from cotton, but not wool. To remove the wool from
the cotton, steep in a concentrated solution of potash, when the wool is absorbed, leaving the cot-
ton.
(53) A. F. asks: 1. Will boiling or steam ing timber injure its solidity? A. The pores of
the wood will become filled with liquid, and some of the substances soluble in water will be ex-
tracted. 2. Are there any chemicals that will im prove it? A. It is sometimes treated with chlor ide of zinc, or chloride of mercury, or tungstate of soda.
(54) J. H. says: I wish to make a light gar-
den hose out of cotton drill or cotton duck, by using two thicknesses of the materials. What kind of cement, that is insoluble in water. can I use to stick the two layers of cloth together? A. Dishot benzine.
( 5 J ) L. S. asks: What cement is used for Generally what is known as rice glue. It is made by intimately mixing rice flour with cold water and then gently boiling it; it is beautifully white, and dries almost transparent. Papers pasted to gether with this cement will sooner separate in
(56) H. S. M. asks: What is the shortest alyes are difficult, and cen be made only by chemists. 2. What is the best way 10 find if the As a general rule, when a bottle is half filled with As a general rule, when a bottle is half inled with
the water to be examined, set aside in a warm place, and after a few days (on opening the bottle) is found to have a bad smell, taste, and color, iti not wholesome.
Has oxygen been found to be a compound, as What is the lately? A. No.
What is the latest system of symbols in chemistry, and what is taken for the unit? A. The weight
of the hydrogen atom is the unit. The system of the hydrogen atom is the unit. The
described in Cooke's "Chemical Physics."
(57) T. F. R. asks: What is it that causes the phenomena which we see after a person has
imbibed drink of any kind that will intoxicate? A. "The effects of ardent spirits may be divided in to three stages. First, excitement of the vascular and nervous systems. The pulse is increased, the
face flushed, the eyes animated and perhaps red . the intellectual functions are powerfully excited the individual is more disposed to joy and pleas
ure, cares disappear, the ideas flow more easily
and are more brilliant. Second, intoxication or drunkenness, which is a disordered condition of
the intellectual functions and volition, manifested by delirium, varying in its character in different by delirium, varying in its character in different
individuals, and by an incapability of governing indivicuals, and by an incapability of governing
the action of the voluntary muscles. This state is accompanied with excitement of the vascular system, and frequently with nausea and vomiting; it
is followed by an irresistible desire for sleep, which is followed by an irresistible desire for sleep, which
usually continues for several hours, and is attendusually continues for several hours, and is attend-
ed with coptous perspiration. When the patient ed with coptous perspiration. When the patient
awakes he complains of headache, loathing of food, great thirst, and lassitude; the tongueis furred, and the mouth claminy. Third, coma or true apo-
plexy, which is usually observed when excessive quantities of spirit have been swallowed in a short time. The pulse is generally slow, the pupils are usually dilated, and the breathing is for the most part slow; but exceptions exist to all of
these statements. In some cases actual apoplexy with or without sanguineous extravasation) is prought on. The immediate cause of death apration, or closure of the glottis. The effects of spirit agree in a considerablc number effers stances, with those of wine, but present some pe-
culiarities. Spirit more readily induces excite ent, ingmore rapidly followed by collapse, relaxation or debility. Death is by no means an unfrequent Pereira.
(58) W. H. S. asks: 1. How can I cast plas ter of Paris molds without getting airholes in
them? A. Make your plaster of the consistence om thick cream. For hardness, use a strong soluion of alum, instead of pure water. 2. What kind of varnish should I use for a child's carriage?
A. Copal. 3. What is a good varnish for plaster of A. Copal. 3. What is a good varnish for plaster of
Paris patterns, to flll up the pores? A. Try parafParis patte
fin varnish.
(59) W. M. says: You recently published a recipe for coloring hair dark brown. I tried it aoeddish brown dions, and all it did was to leave ff as soon as dry. What is the matter? A. You robably did not remove all the oil or grease from inds will only inds will only act effectively and satisfactorily slightest contamination of oily or greasy matter will arrest or greatly lessen their action, and render it unequal in different parts. Hence the hair, in all cases, should be first thoroughly washed ater, and lastly wiped dry, previous to their aplication. A few grains of soda or salts of tartar, dded to the first water, will facilitate its deternt action.
(60) R. D. asks: 1. What acids or fluids mixed with hydrofluoric acid, will etch a clear
ground on glass? A. Did you use a ground on glass? A. Did you use a solution of
hydrofluoric acid or hydrofluoric acid gas? 2 . How can I prepare what is termed by etchers White acid? A. We do not know of any acid by this name. 3. What acid or mixture of acids, applied to glass and covered with felspar, will pro-
duce a frosted appearance? A. Sulphuric acid. The better method isto place fluor spar or felspar n a shallow leaden dish, and cover it with sulphuric acid. The glass plate may be placed to
cover the pan, and as the hydrofluoric acid gas is enerated it will attack the under side of the glass plate. 4. What clear varnish is used by sign painters as a finishing protection to gilding on nseed oil an equal weight of either copal or amer. This is to be diluted to the proper consist-
(61) J. E. S. says: In your last issue you gave the following formula for imitation gold
100 parts copper, 7 parts tin, 3 parts magnesia, $3 \cdot 6$ parts sal ammoniac, $1 \cdot 8$ parts quicklime, and 9 parts ia in this? A. The recipe wasoriginally published by two French authors, MM. Mourier and Valent, who claimed for it the advantages mentioned, ut did not state their reasons for adding the mag-
(62) M. M. M. asks: Are trichinæ found in the fat or lean meat of the hog? A. In both, and (63) W. Y. asks: Can the nerves of the teeth be killed? A. Yes. The employment of ar-
enious acid for the purpose originated with Dr. Spooner, of Montreal. "The use of the actual cauery may be often successful; but inasmuch as it esting and alveolar membranes, it should never ee recommended. Nitrate of silver seldom succeeds, and usually increases the pain. The em-
ployment of arsenic, if applied directly to the nerve, will always succeed. The pain, it is true, will be removed by the destruction of the nerve; but sogreat a portion of the vitality of the tooth at the same time destroyed that the organ is apt, the surrounding parts. The propriety, therefore, of the employment of remedies of any kind for this purpose, except to a front tooth, may be
looked upon as exceedingly questionable. It is rue, the vascular and nervous connection kept up etween the investing membrane and the outer cially if it be an incisor or cuspidatus, prevent it rom exerting any marked injurious effect; but in he majority of cases, the vitality even here is so much weakened as, eventually, to render it pro-
ductive of more 6 r less irritation. The effect of arsenic cannot always be confined to the lining membrane; it of tenextends to the investing, and of the pulp with an instrument, if the tooth have but one root, as by far the preferable method of treatment. But this operation cannot always be performed with certainty of success on a molaris
(64) J. M. says. on the question of size of on to the suction pipe to the pump,as suggested by N. E. L.; and while the speed of the pump could be Increased somewhat, the results were not near as
good as prophesied by N.E. L. I manow convinced chat, where elbows or bends are used in the supply pipe to a pump, the diameter of the pipe should be much increased : this applies also to long pipes, and if the manufacturers of pumps would make their machines to receive pipes equal to the diameter of the pump cylinder, much better resulta
would be obtained than are now accomplished. I am now putting up a pump exactly like the pump pump is for a pipe sixinches in diameter; but I in tend to use a pipe elght inchesin diameter to a poin as near the pump as possible, and expect thereby to be able to run the pump faster and show better resulte than I have been able to with the pump on
which I used the six inch pipe for the whole diswhich I used the six inch pipe for the whole dis
tance. My experience showsthat it is not safe to be governed closely by the rules set down in th books on hydraulics. As no allowance is made for which retard the flow of water much more than in cenerally imagined, the only sure way that know of is to use pipes large enough to furnish sufficient supply. In testinf a fire pump recently, I found that the lining in a rubber-lined hose wa torn in a few places, and hindered the flow of wa-
ter so much that the power of the pump was di ter so much that the power of the pump was diminished fully one quarter. The chamber of whic much less use on a pump which takes in water at both strokes of the plunger or piston than on a single acting pump, as in the latter case this cham ber haq achance to fill while the pump is making
one stroke. [If this writer errs at all, it is certainone atroke. [If this writer
ly on the safe side.-Eps.]
(65) S. N. M. says, in reply to F. D. N.,who asks: What is the rule by which paper can be cut so as to cover a globe? A globe can be covered
with spindle-shaped slips, each in length equal to half the circumference, laid from pole to pole; the narrower the slips the more neatly they will fit width. Dide at the cight line equal to 15 the linear circumference, and bisect it. Throuyb the linea point draw a perpendicular indefinitely on each at a distance from the central point, equal to $1 / 2$ the linear width of the slips. Through these two points
and the ends of the first line, draw ares of a circle The figure thus drawn is the exact pattern of the required slips. To find the diameter of the circle
on which these arcs are to be drawn, divide the square of $1 / 4$ the oircumference of the gide the $1 / 2$ the linear width of the slips; add the quotien to the divisor, and the sura will be the required di ameter. Example.-Let the diameter of the alobe be 12 inches; its $1 / 2$ circumference will be $18 \cdot 849$ inch es. Let the slips be $10^{\circ}$, and their linear width will be $1 \cdot 04$ inches. The diameter of the required cir
cle will be 14 feet, $2: 17$ inches; radius if feet, 1.08 cle will be 14 feet, $2 \cdot 17$ inches; radius 7 feet, $1 \cdot 0$ an awl for a center pirot, and a small sharp-pointe knife at the other end to cut out the sHps.
Minerals, etc.-Specimens have been re ceived from the following correspondente, and examined, with the results stated
J. E.-It is litharge or the oxide of lead, und is formed whenever melted lead comes in contact with the oxygen of the air. It can be reduced to
metal again. Argentiferous galena is sulphuret of lead containing a small percentage of silver.-E P. C.-It is quartz, and has no especial value.-W McC.-No. 1 is a calcareous earth, containing the
remnants of fosell shells and a small emount of organic matter. On certain kinds of land, it migh be used with benefit. No. 2 is clay and earth im pregnated with bitumen, which could be obtained by proper treatment, and used for heating and il luminating purposes.-R. T. P.-They aro earth
magnesian limeatones, one of them containing considerable percentage of bituminous matter; an other is colored by a green earth.-O. s.-The bril liant metallic particles are pyrites, not gold, of which there are no external indications; although it is possible that,if the rock were properly crushed and assaged, it might be found to be auriferous
S. W.-It is tluoride of calcium, or fluorspar. - I fuses readily in a blowpipe flame, and is faintly fuses readily in a blowpipe flame, and is faintly
tluorescent. Its specific gravity is $3 . c 5$. By further search, you will probably find well formed cubical crystals, of which we should be glad to have speci-mens.-W. S. V.-Send pieces large enough, and
we will determine them. minute.
H. L. N. asks : How can I clean a knife from rust formed by perspiration, so as to make the works?-W. H. B. asks: From what point doe steam press equally in all directions? Does it no press equally in all directions from a certain cenof the vessel in which it is, of whatever shape the vessel may be?

COMMONICATIONS RECEIVED. The Editor of the scterminc American aclginal papers and contributions upon the following subjects:

On Steam Boiler Explosions. By M.
On Steam Boner Explosions. By
On Honing Razors. By e. W.D.
On Exhaust Stoam. By J. F. S. On Combustion. By C. W On Ants. By H. L. A. C.
On a Calculating Machine. By E. K. W.
On a Phenomenon Explained. By A. S. On a Phenomenon Explained. By A. S. $\boldsymbol{H}$ On the Tranit of Venus. By D.
On Flying Machines. By A. B. B. On Counting Money. By J. W.C. On a Man-Eating Tree. B.j F. H. H.
On Finding Lost Property. By H. W On Finding Lost Property. By H. W.S.
On Shifting Passengers from Cara. By B. F

On the Occult Sciences. By J. B.
On Amalgam Fillings. By F. H. H. On the Sewing Machine Monopoly. By L. M. H. On Boulders. By D.

## Also enquiries and answers from the following:

R. L. R.-A. B. H.-W.S.-D. M.-A. W.-J, H. S.
A. B. C. - J. H. H.-J. R. S. - H.-R. L.-W.L-E.

## . H. H.-S. L. F.-A. O. C

HINTS TO CORRESPONDENTS.
Correspondents whose inquries fall to appear hould repeat them. If not then published, they cinnes them. The addrees of the writer should always be given.
Enquiries rel
Enquiries relating to patenta, or to the patentability of inventions, assignmenta, etc., will not be published here. All such questions, when initials twould fll half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's addrese is given.
Hundreds of enquiries analogous to the following are sent: "Who makes picture frame mitering machines? Who makes engineers' and surseyor's nstruments? Who publishes a book containing a ist of all the mines in the United States? Who buys black walnut knots. etc.?" All such personcolumn of "Business and Personal." which is spe cially set apart for that purpose, subject to the charge mentioned at the head of that column. Almostany desired information can in this way be expeditiously obtained.
[OFFICIAL.]
index of inventions Letters Patent of the United States wr Granted in the Week ending February 2, 1875,
AND EACH BEARING THAT DATE.
[Those marked (r) are retssued patents.]
Alamn, electric burglar, H. E. Falt
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ak or box fastening, C. Fogellerg.
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Ditching machine, ,
Door knob fastening, J. B. Well
Drawing hook, A. Forbriger (r).........
Drillingmachine, metal, c. Van Haagen
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Elevator, hay, Martln and Moor
Eingine governor, steam, F. M. Brown....


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Faucet, self -closing, Faucet, self -closing, J. W. Traft
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Hook, M. Mattion.........
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Nu machine, P. L. Fitrer
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Planter, corn, A. Roark.
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Plow, S. S. Aughe.
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Stove日, ash alfter for, J. H. Goodfellow.
Straw atacker, G. Sanders...




## CANADIAN PATENTS

libt of Patents Girantrd in Canad
Jancary 28 to February 3, 1874.
4,927.-H. Folliott, Temperanceville, York counts, ou and .J. W. Fohinot, Bolso ver, Victorla countr, ont. Roller." Jan. 28, 1875 . Improvements on water meters, aucl which improvp,
ments are also applicable to water motors, called
"Lewa Water Metcr and Water Motor." Jan. 1875. Wim. I. Doremus, New York city, E. S. It
 , $3 ; 0$-I. Elnney, London, Mdddlesex connty. Ont. In.
provementa on lock and key guards, called "Kinney',

 Bi22.-L. Kimball, Jr., Bolton, Vt., U. S. Improve-
ments in the form of trays for chopping meat and other substances, called "Kimball's Chopplng Tray." Jan,
zay, $18 \pi 5$.
 "Satterlee's Improved Heating Apparatus." .Jan. SU,
18i5.
, $34 .-\mathrm{C}$. B. Sheldon, New York city, N. S.. I. s. Iu.
 P95.-H. P. Garland and A. J. Gove, San Prancist
San Francisco county, Cal., i. S. Improvement, on
sewing machines for sewing sacks or haga, carpet, etc sewing machines for sewing sacks or haga, carpets,etc.
called "Garland and Gove's Bag-Sewing Machine.

 B37.-G. B. Tluker, Beebe Platn, Stanstend county, P.
Q. Aspignee, E. N. Bacon, Chelsen, Oranke county, Q. Aspignee, E. N. Bacon, Chelsea, Orange county,
V.t., ©. S. Improvements on ox-bow fagteners and
guard, guards, called
Feb. 1, 1875. R38.-D. C. Morency, Lévis, P. Q. Line machine pour
fournir un conrant dair continn, dit "Machine soup. fournir un conrant d'air continn, dit Machine soup current of air. Feh. 1, 1875. s39.-G. McEwan and C. O. GIbson, Rock Island, stuln-
atead county, P. Q. Asignee, G. Bachelder, of same place. Improvementa on milk pana, called
nd Gibson's NMik Pan." F Fb. 1, 18i5,

