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Eines, Boilers,
253, this number.
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ther wrench answers.
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W. A.'s query as to radiation does not give
sufficient data.-E. C. H. should read our answer to S. O. M., as to supposed diamonds.-J. D. G. will find full information as to the ether ice-ma-
king process on p. 228, vol. 34.-A. R.'s communi king process on p. 228, vol. 34.-A. R.'s communi-
cation is founded on a misconception. See pp 195, 228, vol. 33, as to the nature of electricity.-A. J. R. will find on p. 120, vol. 33, directions for ma king muslin uninflammable.-C. W. and other
ought to know that the only way to find buried treasure is to dig for it.-X. Y. Z. can copper his
cast iron articles by following the directions given cast iron articles by following the directions given
on pp. 90,139 , vol. 31 .-E. F. M. will find full directions for plating with nickel on p. 235, vol. 33 For plating with goid, see p. 116, vol. 33. For plat ing with silver, see $\mathbf{p}$. 362 , vol. 31.-A. B. can ebon
ize wood by following the directions 50 , vol. 33.-W. B. J. can gild his clock hands by the process described on p. 116, vol. 33.-A. G. L
should proceed in zincography exactly as in lith ography. The specimen sent appears to be a phe-
to-engraving from a pen and ink drawing.-L. M. to-engraving from a pen and ink drawing.- L. M.
M. will find full directions for electro-silvering M. will find full directions for electro-silvering
with a battery on p. 361, vol. 31.-E. D. N. can reWitha battery on p. 361, vol. 31.-E. D. N. can re-
move the rust from his sword by the method given
on p 56 , vol. 33 -W. W. should read our aricle on p. 241, vol. 33, on constructing a windmill.-J. C.
H., F. A. H., J. H. G., L. N. B., M. G., J. L., S. H. W., P. S., G. D., F. G., J. H. M., C. M., G. G.,
and others, who ask us to recommend books on industrial and sclentific subjects, should address
the booksellers who advertise in our column,s all the booksellers who advertise in our column,s al
of whom are trustworthy firms, for catalogues,
(1) B. V. P. asks: Please inform me some way to harden light common iron wire in
quantities. A. Box harden it, by the process dequantities. A. Box harden it, by the process de-
scribed in No. 5 of "Practical Mechanism," p. 69, vol. 31.
(2) H. J. W. asks: 1. I am running an oldby 48 inches stroke, cut off at half stroke. It h a balance wheel of 15 feet diameter, also a pulley attached, 11 feet in diameter. It takes steam
through about 15 feet of 3 inch pipe. The goverthrough about 15 feet of 3 inch pipe. The gover-
nor is an old-fashioned throttle. I have been runnor is an old-fashioned throttle. I have been run-
ning 48 turns per minute, and wish to increase it aing 48 turns per minute, and
about 8 turns; but $I$ think the latter is rather too much, as the brasses and journals on main sha so
are badly worn. Would it be safe to run her so fast? A. You had better not increase the speed if the bearings are worn. 2. Would it use any
more steam to speak of? A. If you run your engine faster, you will use more steam in propor tion. 3. Would I have to run the governor fast (3) O M B
(3) O. M. B., of San Juan Bautista, Mexico duce the power, unless, as you propose, you in duce the power, unless, as you propose, you in-
crease the steam pressure. It would probably be better to alter the size of the gearing, thus using
the same steam pressure and same piston speed, the same steam pressure and same piston speed,
and to decrease the speed of the rollers; whiletheir and to decrease the speed of the rollers; whiletheir
power will be proportionately increased.
(4) W. S. says, in reply to the query: How is it that minus multiplied by minus gives plus,and
plus multiplied by minus gives minus? By trigophes multiplied by minus gives minus? By trigo
nometry, the cosine of any arc divided by its sine is equal to its cotangent. Take the are of $135^{\circ}$ $\frac{-V^{\cdot 5}}{\sqrt{1 \cdot 5}}=$
That is, a minus quantity is equal to a minusquanthe secant of any arc is equal to 1 divided by thed. cosine. $\frac{1}{-V^{\cdot} \cdot 5}=-V^{2}$ Clearing of fractions, $1=$ $-V^{2 \times-V} \cdot 5$. That is, a plus quantity is equal
to a minus quantity into a minus quantity. A. This is an illustration which might possibly be admissible, if at all, only in the higher analysis, but
would be obviously out of place for establishing would be obriously out of place for establishing
the fundamental principles of elementary an-

How far is the earth from the sun, as estimated recently by the transit of Venus? A. The ob-
servers have not got that far, we imagine. Inservers have not got that far, we imagine. In-
deed, we noticed that, at the last meeting of the British Association, one of the members stated
that he thought they would be doing very well if they worked up the observations in seven years.
(5) R. S. N. says: 1. I have a turning lathe operated by a treadle attached to the shaft of a 36
inch wheel of 4 inches face. The treadle cranks inch wheel of 4 inches face. The treadle cranks
make 6 inches sweep; the bearings are $7 / / \times 2144$ A. Such a lathe will require about $1 / 3$ horse power. 2. What do you think of this arrangement? A.
It is a powerful lathe to be worked by the foot. (6) S. M. says: 1. A line joins two fixed pointson the earth's surface. Presuming thatno earthquake or any other convulsion has affected
these points, will time produce any change in the these points, will time produce any change in the
direction of this line? Can it point due north today, and $1^{\circ}$ or $2^{\circ}$ east or west of north a few years
hence? A. No. 2. In other words, if two surveyhence? A. No. 2. In other words, if two survey-
ors state its direction differently, an interval of time intervening, can you predicate error of either or both? A. If we knew by what method the sur-
veyors determined the astronomical meridian and
applied it to the line above spoken of, we should applied it to the line above spoken of, we should
probably be able to predicate the error of one or both.
(7) B. K. A. asks: Will you let us know Whatis the difference between a high pressure and a low pressure engine? A. A high pressure en-
gine exhausts the steam when the piston has arrived at the end of the stroke. A low pressure
engine condenses the steam, and thus has live engine condenses the steam, and thus has live
steam on one side, and a partial vacuum on the steam on one side, and a
other side, of the piston.
(8) E. R. says: I propose to build a yacht
90 feet loug and of 18 feet beam, to draw 12 inches 90 feet loug and of 18 feet beam, to draw 12 inches with all machinery and 6 tuns of coal on board. I intend to use two engines $8 x 10$ inches (to work quartering), two uprightboilers of 36 inches diam-
eter, with 75 tubes, $13 / 4$ inches in diameter and eter, with 75 tubes, $13 / 4$ inches in diameter and 4
feetlong. Fire grate surface is $23 / 2$ feet $x 31 / 2$ feet in each boiler. I will use the best propeller I can find, and fully submerge the same under the of a sea boat will she be? A. We do not think and for smooth water it might be advisable to use side wheels.
(9) M. M. C. says: We are putting in a 50 horse power engine which will run at 85 revolu-
tions of the crank per minute. The drive pulle is 4 feet ine crank per minute. The drive pulley feet. What should be the width of the leather (10) A. A. About 14 inche
(10) A. C. asks: How many times more waer will go through a 3 inch pipe than would through a 1 inch pipe? A. The question is too in city in each pipe is the same, the discharge will be in proportion to the squares of $t$ he diameters. If the head is the same for both pipes, and the pipes bave the same length,the velocities will be different and the discharge will vary as the products of the velocites by he squares of the diameters. Wt give below Weissbach's rule for determining the
velocity: Let $l=$ length of pipe in feet $d=$ diame ver of pipe in feet, $v=$ velocity of flow in feet pe second, and $h=$ head of water in feet. Then $v=$ $8.02 \times v^{\prime} h+V^{1} 505+\left(0.01439+\frac{0.017155}{V^{v}}\right) \times \frac{}{d}$
(11) J. W. G. asks: What is used in the navy for blacking boilers? A Paint made of
common charcoal ground in oil is an excellent ar ticle for the purpose.
(12) T. W. R. asks : 1. Will steam after hating builang,return to the boiler, no matte how much pressure you may bave in the boiler,
that is, will steam return against 20,40 , 60 lbs steam? A. It can be made to return, by the use of a suitable trap. 2. Is the pressure equal on all sides of a boiler? A. The pressure is greatest on the bottom, on account of the weight of water in the boiler. 3. In low pressure boilers, could no the return be run half way below the waterline rangement of this kind is not uncommon.
(13) R. S. Jr. asks: Will my engine, th ylroke, of which is 254 inches engine lathe of inches swing and $51 / 2$ feet bed? A. Your engin and boiter are both rather too small for the pur-
(14) J. \& C. say: We have a stationary engine of 16 inches diameter,5 feet stroke, using steam
from 90 to 100 lbs , and cutting off at 10 to 12 inchfrom 90 to 100 lbs ., and cutting off at 10 to 12 inchwheel is 20 feet in diameter requires. The fiy wheel is 20 feet in diameter, weighing $18,000 \mathrm{lbs}$.
made in 8 sections and held together at peripher with wrought iron key and links. The center is held by two flanges bolted together through the arms. Would it be safe and economical to run the engine at 35 revolutions per minute? A. Yes,
if the bearing surfaces of your engine are suffiif the bearing surfaces of your engine are sufticiently
tear.
(15) W. E. P. says: For extinguishing kerosene flames, I would recommend ashes from the stove. When the flames were 4 feet high, cold
ashes from the stove extinguished them immediashes
ately.
(16) A. M. T. asks: 1. Has the pump, used on locomotive engines, suction? A. Yes. 2. Are
the air pumps, used on ocean steamers, ever made of brass or steel? A. Brass.
(17) W. T. H. asks: Why is it darkest just
efore dawn? A. The statement to this effect is without foundation.
(18) S. asks: Does cast iron contract or exacts very much, in this respect, like water. Solid iron floats upon the molten metal and is consequently lighter. As molten iron cools, within certain limits, it gradually expands; but when it has reached a certain temperature, it begins to con-
tract, and this it continues to do however low the temperatures may be carried. It is for this reason iron copies so accurately the molds into which it is poured while in a molten condition, and allowed to gradually cool.
(19) J. McC. asks: How are pictures pro duced on white porcelain glass cone shades? A
They are for the most part put on by the decalco

What is the coloring principle in ruby-stained indow glass? A. Purple of Cassiu
(20) J. A. G. asks: What can I use on or in a rubber hose to prevent kerosene oil from rotting it, or what flexible material can I use in place of There are several methods by which the tube mas be protected completely or in part; but we should recommend, as liable to give the best satisfaction, the use of a good tube of leather of sufficient
suppleness to avoid the objectionable tendency
to close the duct by creasing, when bentata moderate angle.
What is the best material to use on boots that are exposed in water a great deal? A. Try a so
tion of india rubber in bisulphide of carbon.
(21) J. W. says: I had occasion to remove a piece of mica from a stove, and noticed that, on
being crushed, itgave out flashes similar to those noticed on scooping hard sugar with a metal instrument. Can you give an explanation? A. The lashes of light are due to the electrical disturbance consequent upon the forcible disruption of
contiguous laminæ. It is a well known phenomenon.
(22) P. asks: What will prevent the pig ent permanent white from scaling off parchment? A. Try the following: Reduce to powder gum tragacanth. There must be sufficient water oo give to the diluted gum the consistence of a baryta), and, after finishing the work, spray with baryta), and, after finishing the work, spray with sometime a quantity of caoutchouc. The naphtha will soon evaporate, leaving behind the caout chouc asan extremely thin and adhesive, but perectly transparent, film.
(23) A. L. E. says: A friend of mine states that, to be able to run an engine in a small build-
ing in New York city, the engineer must have ing in New York city, the engineer must have a certiffcate showing that he has the ability to run
the engine. I say that he does not need it. Which the engine. I say that he does not need it. Which
is right? A. Your friend's statement is correct.
(24) A. C. McK. asks : 1. Is tellurium valu able? A. Yes. 2 Is it difficult to extract? A. ery. 3. Is there any market forthe ore or th be made, since, owing to the scarcity of the metal it has as yet been little employed in the arts. 4. What is the probable cost of extraction per tun? A. The cost will have to be determined by trial.
(25) R. J. P. asks: Can ordinary Indian ink
ave anything added to it to make it indelible? have anything added to it to make it indelible?
A. Try the addition of a little nitrate of silver A. Try the additi
just before using.
(26) A. C. McK. asks: How can I extract
ellurium from its ore? A. Professor von Schroetellurium from its ore? A. Professor von Schroet er has lately published the following method of eparating tellurium in its free state: The finely
rushed ore is first digested with strong hydro chloric acid (in order to decompose or dissolve the ulphides of arsenic, antimony, lead, etc.), and separated from the insoluble residue, which is then treated with aqua regia, when gold and tellurium are dissolved, and thus separated from silver From the solution thus obtained the gold is precipitated by protosulpbate of iron, and the tellu
rium by metallic zinc. The gold is melted in graphite crucible with borax, and the tellurium in a iron pot, when both metals are obtained in pure state, the latter being a white metal of from $6^{\circ} \cdot 0$ to $6^{\circ} 4$ specific gravity and of great fusibility The present value of tellurian) is about 200 per W. .
(27) W. L. S. asks: Can you tell me of a safe way of preventing mildew in cotton duck
sails, etc. A. We flind the following recorded as a good preventive of mildew: Boil the fabric for several hours in a solution consisting of 50 parts common salt, 4 parts lime, and 1 part alum, dissolved in a suitable quantity of clear water
(28) A. B. O. says: I find the following al chests, valves, etc., which have been eaten out and honeycombed by the use of impure suet, tallow, and other bad oils: First make molds of Russian heet iron, bent at right angles where surfaces or er's clay or plaster. Clean the surfaces: and if there is no hold for the alloy, small holes must be drilled in the iron to secure the casting in place.
The alloy consists of $21 / 2$ parts copper, $11 / 2$ parts antimony, and 6 parts tin. Heat the casting in a common ladle to dull red, and file the mold. The alloy cannot be worked down with anything but
fle and scraper. I have saved with this alloy a to renew in a short time.
(29) T. H. W. asks: Is there any instrument, similar to a thermometer, for indicating the
degree of purity of the air? A. This desirable little instrument has not yet been invented; and from the numerous obstacles to be overcome, it is
not probable that anything of practical utility in not probable that anything of
this line will ever be devised.
(30) M. R. asks: How can I make ink to
and blue, and afterwards turn black? A. For Write blue, and afterwards turn black? A. For
blue ink changiug to black, take $3 / 4 \mathrm{l}$. finely powdered nutgalls, and digest for 2 or 3 days in 1 galfinely powdered copperas, gum arabic, eand of Anely powdered copperas, gum arabic, and sul-
phate of indigo(chemic or Saxony blue). Heat the whole to the boiling point, and allow to stand with occasional stirring for several days in a warm place. Then filter through a fine linen cloth, add
a few cloves, and bottle for use. To make the socalled sulphate of indigo (Saxony blue) : Dissolve well sifted indigo in 5 times its weight of strong oil of vitriol, previousl 5 heated over a water bats tious additions of carbonate of potassa in the form ane powaer. Collect and ary the precipi-
(81) M. C. asks: How can I dress Arkansas
diamonds? A. With copper wheels, and emery or corundum.
(32) C. asks: Which is the best soap for he toilet, and which for washing clothes? A. Use for the toilet a good variety of glycerin soap. The laundry purposes.

1. Is there an alloy that resembles gold, and is
as hard as 14 carat gold after it is annealed? $A$

Try the following: Copper $88 \cdot 4$ parts, zinc $12 \cdot 2$ add the other metals. 2 Is there a brass solder that will fuse as easily as 12 carat gold solder? A. Try 1 part silverand 2 parts brass.
(33) L. L. L. asks: Has the author of arti-
cles, which have been published in and paid for cles, which have been published in and paid for
by literary periodicals, a right to publish the same in book form? Or does the property in said arti cles vest in the publishers of the periodicals, ma sion from them to publish such obtain permis right to republish articles in book form depend on the agreement between the author and the publisher.
(34) C. F. asks: Can common red earthen ware be, by any process, glazed white either be fre or after the lead glazing? A. Fabrics of pot ter's clay are too fusible to admit of being enam 10 parts, red lead 60 parts, calcined tin (putty powand calcine and powder the composition threm, and calcine and powder the composition three or manner of a paint, and placeagainin the oven.
(35) J. M. says: I am using a cast iron pot in galvanizing, and have been told tbat thezinc in slag by galvanic action than a wrought iron pot
(36) F. P. asks: 1. Can the color of coal tar be changed conveniently to a red or brown, or any other color that would be suitable to pain
farm buildings, without changing its nature? A farm buildings, without changing its nature? A.
No. Use red ocher or red lead. 2.How can coal tar be thinned? A. Use naphtha.
(37) E. D. says: I have a pack of playing heat of the hand, and seem to get dirty ver huickly. Can you inform me of any preparation to prevent their sticking and to give them a gloss?
A. The trouble is due to the inferiority of the A. The trouble is due to the inferiority of the
glazing with which the cards are enameled. We glazing with which the cards are enameled. We
donot think you can overcome the objection without the expenditure of too much time and labor
(38) J. G. M. \& Co. say : In cooking fish for canning, we need a greater heat than $212^{\circ}$ Fah
gives us. We have used salt, and then chloride o gives us. We have used salt, and then chloride of
calcium, heating the water by steam. But the oil from salmon, mixing with the calcium, is hard to clean off the cans after cooking. Can you tell us of some cheap preparation which we can heat
(with steam coils) to $240^{\circ}$ Fah.? A. It would be better to heat the water to the requisite temperaThe temperature of the boiling point might the be arranged to suit sour convenience, and by suitable valves caused to remain constant. Satu rated saline solutions are objectionable.
(39) J. M. A. and others.-It is a popular
idea that the sunflower will prevent disease, but idea that the sunflower will prevent disease, but
we have no reliable authority for the statement. It is not used in medicine.
(40) H. W. H. asks: Is it possible to blow glassin the shape of a cylinder, with a very small opening along one side? A. Yes; it is readily
done. The molten glass, as it is drawn from the pot, adhering to the end of the punta tube is blown into a pear shape, elongated by swinging, rolled on a steel slab into the cylindrical form, and slit through length ${ }^{2}$ ise, and the cone-shaped bases at both ends remo
the annealing furnace.
(41) M.F., of Gaggenau, Germany, asks: Is there a good gas tight membrane, not affected by
heat or water, or by the impurities (acids, etc) heat or water, or by the impurities (acids, etc.)
contained in the gas? A.This desirable invention contained in the gas? A.This desirable inve.
has as yet been very imperfectly realized.
(42) M. W. asks: How are rain gages gen-
rally constructed? If a vessel 12 inchesin diamerally constructed? If a vesseliz inchesin diaminches deep, should be filled with rain water to depth of 3 inches, would 3 inches really have fallen, or more? A. Less. If the vessel employed as the receiver is not a uniform tube, it should be
carefully graduated before using.
What will remove the marks of so-called indeli-
ble ink from linen? A. Use a strong solution of cyanide of potassium in water. As the cyanide is very poisonous, it is necessary to avoid contact with sores or cuts in the flesh.
Do the crossheads of a locomotive make a re-
trograde trograde movement when the engine is going
either forward or backward, unless the driving wheels slip? A. No.
(43) H. J. asks: Will oil evaporate into the ter or not? Can water evaporate into the air ter or not? Can water evaporate into the air
when its surface is covered with oil? A. The application of a fllm of any of the fatty non-drying
oils to the surface of water will prevent its evapoils to the surface of water will prevent
oration. The oil itself is not volatile.
(44) F. N. B. says: I have been trying to
make a friction match composition by a formula make a friction match composition by a formula niter spoils the composition; the matches are good when first dried, but an exposure to damp placed in a cellar they will in 24 hours stick to my fingers like tacks to a magnet. When kept in a dry place, the phosphorus slowly burns off, filling
the room with a strong garlic odor, and thematches are worthless. What is the matter? A. Afte preparing the matches, and while dry, dip the tips and allow to dry. This will form a thin protect ing film over the friction composition. This film is not affected by moisture or other atmospheri influences, and does not interfere with the ready ignition of the match when required. as the sligh abrading influence of the friction is sufficient $t$ remove the film, while in itself itis a very inflam mabstion, the ignition of plint.
(45) W. S. H. asks: Is it possible to beout a tutor, to enable one to complete the study in a short time under instruction? A. It is neces-
sary to take an extended course of study in the office of an architect of experience, where you will have access to his library
(46) S. M. O. and others.-The diamond oc
urs in the form of rounded pebbles covered with curs in the form of rounded pebbles covered with brownish crust. Its crystals are in the form of little convex. It has the most remarkable re ractive and dispersive action upon light is a non conductor of electricity, and is not acted uponby acids or alkalies. If the stone is a diamond, it will easily scratch corundum and quartz, and wil have a specific gravity of from 3.52 to 355 . Th peciffc gravity of quartz crystals is from 250 to
2.66, while that of corundum, true sapphire, etc is from 39 to $4 \cdot 16$. A diamond dealer alone could give a valuation, based on personal examina-
(47) F. S. \& S. ask: What is the best mode of cleansing the feathers of an eagle, which are prepared lime water. It may require several ap plications and an exposure of several days to per ectly cleanse the eathers
(48) A. H. S. asks: Does nitro-glycerin lose any of its explosive force when combined with
earth to form dynamite? A. The nitro-g!ycerin earth to form dynamite? A. The nitro-g!ycerin
itself remains unaltered in the mixture, but, a melf remains unaltered in the mixture, but, er explos
glycerin.
(49) A. H. asks: Will it injure the burning ess explosive, to filter it throue it any more lous paper to remove sediment? A. It will al ter neither its illuminating nor its explosive qual
ities.
(50) C. B. F. W. asks: How can I test laun of soda, for adulterations, such as silex, silica of soda, soapstone, etc.? A. Dissolve a smal
quantity of the soap completely in a large excest of boiling water, and filter through clean whit filtering paper. Observe whether or not any in soluble inorganic residue remains behind on the filter; if so, examine it with a strong magnifying glass, and, if the particles appear to be homogene ous in character and transparent or translucen of quartz sand. If ely be presumed to consis dark color, it is probable that the material con sists of tale, chalk, soapstone, barytes, or some of the other numerous and common adulterants. In order to be sure that part, at least, of the residue does not consist of resinous or other organic mat erials, theresidueshoula be heated to origntred ness for some time before examination with the
glass. To test for the presence of water add (to the filtrate from the above experiment) small quantity of muriatic acid, heat to boiling and allow to stand for some time. If a precipitate forms, wash it several times with clean water,hea , and examine lt as betore.
(51) G. J. B. says: What effect on the
acoustic qualities of a room woulda cove in a ceiling have, the room being $90 \times 47$ feet, and 27 feet A. Itis not likels theet out from the side walls. the acoustic qualities of the room
(52) F. P. says: I read that Governor Bagey, of Michigan, suggests that all land owners What kind of tree would be most suitable as a shade and ornament tree, an evergreen being preferred? A. The Norway spruce fir is a good evergreen for this purpose; the scarlet maple or the
sugar maple is a good ornamental shade tree among the class not evergreen. The elm i
(53) F. R. asks: How many Bunsen ce ter, with moderate rapidity? A Two or wacells will evolve has readily from acidulated wa-
(54) C. K. M. asks: 1 . Will th lb. No. 16 cotton-covered copper wire, for a primary coil,
and 1 lb . No. 23 cotton-covered wire for the secondary coil, and 1 cup of Callaud battery, do for giving electric shocks? A. Yes. Stronger shocks would be obtained if smaller wire were used for
the secondary. 2. How thick ought the bundle of iron wires to be for such a coil? A. About inch.
(55) J. L. W. asks: In taking a gun barrel pass, holding it on the side of the same and lowering it to the breech, the needle will suddenly reverse when lowered about half way; and on raising, it will again reverse at about the same place.
What is the cause of this change? A. In such a position the gun barrel is almost in the line of the dip, consequently it will become magnetic from
the inductive action of the earth. The lower end will be a south pole, the upper a north pole.
(56) W. H. G. says: I have made an induchalf inch core of iron wires, using 2 turns of No. 22 cotton insulated cooper wire for the primary, and about 25 turns of No. 32 cotton insulaed copper wire for the secondary coil, making the latter about 20 times as long as the primary. The I have insulated the two coils from each other ith 3 sheets of paper varnished with shellac, and urns of the sarnished paper whe with the above I only get feeble shocks on holding the two ends of the secondary wire on my tongue, using 7 cells of the gravity battery in connection with the primary A. It is quite likely that different convolutions of the greater part of the action is cut off.
(57) J.B.J. says, in answer to several corres ondents who ask as to how the rariation of the change, increasing or diminiching the declination rom $1^{\prime}$ to $7^{\prime}$, annually, according to locality. There is an annual change, affectivg the needle about avice as unch in summer as in winter. There a diurnal change, during which the declination at
tains its maximum or minimum about 2 P. M., ac cording as itis $\mathbf{W}$. or E.; and there are also irregular changes, depenaing upon the condition of the atmosphere, magnetic storms, etc., as well as local
attraction, proximity of iron, ore, steel, etc. It attraction, proximity of iron, ore, steel, etc. It
must be evident to any one conversant with the must be evident to any one conversant with the
subject that it is practically impossible definitely to locate a line with a given bearing from the me ridian, with a surveyor's instrument, unaided by some external object. The only reliable method of determining the angle, if any, between the line in question and a true meridian, would be to se op a surveyor's instrument over,say, the south eve elongation, and drive a stake in the range thu ound as far off as can be observed convenientls, ongation the process for the extreme rue meridian from the instrument. The distance from the midway point to the line in dispute, di vided by the distance from that point to the in the line and true meridian. As the operation will doubtles berformed after sunet thant crosshairs of the instrument will need to be illuminated by light of lamp reflected upon them from a white object. A lamp or candle may be
(58) W. M. R. says, in reply to P. A. K who asks who invented the firstrailroad sleepin ar: In 1838, when I was chief engineer of the nd Cand $a l$ nd Chambersburgh, Pa., we had sleeping car car was arranged in the ordinary way, with day seats; the other end was fitted up with eighteen leeping berths, forthe night,which were changed or the day's running, so as to make omnibus seat on each side of the car. There were three length in bertbs and three tiers on each side. The to by ropesupports to the ceiling of the car. Th middle tier consisted of the back of the omnibu eat, hinged and supported in the same manne The lower tier was the day seat along the side o he car. At that period, there were two coac loads of passengers arriving by turnpike roa o have the beneft of the sleeper during the fou hours then occupied betwen Chambersburgh an Harrisburgh, on the old plate rail. There was n harge for sleeping accommodations.
(59) A. H. says, in answer to C. E. A.'s
uery as to a difficulty with his alarm bell: I think it arises principally on account of the brev ity of the contact between the hammer and bell If so, he can ascertain the fact by pressing th mature ought to respond. In such case, the rem edy would be to place the wire now attached to the bell in contact with a piece of metal, so ar at each vibration, a length of time sufficient $f$ o
J.S. J. says: Water is forced into all parts of our building by its own pressure, through noise like air escaping is heard a loud singing is opened and the water runs freely, the noise continuesabout a minute. What is the noise?-E M. H. asks: I nave an open buggy of 5 feet track, 4 feet 1 inch. What is the necessary urder ave?

## COMMUNICATIONS RECEIVED.

The Editor of the SCiENTific American ac original papers and contributions upon the follow ing subjects
On the Aeroscope. By W. S. H.
On French Apartment Houses. By N. L. D.
On a Te and Blood. By J. F. G. M.
On a Book on Geology. By E. K.
On the Hidden Forces of Nature. By H. F. G. On Public Works. By J. C. W.
On the Financial Question. By W. H.
Also inquiries and answers from the following:为

## HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appea mould repeat them. If not then published, they may conclude that, for good reasons, the Editor
declines them. The address of the writer should always be given.
Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initiale only are given, are thrown into tne waste basket.
as it would fill half of our paper to print them all; by mail, if the writer's address is given.
Hundreds of incuiries analogous to the following are sent: "Whose is the best brick-making ma-
chine, and what is its price? Who makes coiled springs to order? Who buys sulphate of lead? Who sells wire-straightening machines? Who
makes vegetable parchment? Who are the principal lumber dealers in New York city? Who makes bung machines?" All such personal inquir
ies are printed, as will be observed, in the column of "Business and Personal," which is specially sit apart for that purpose, subject tothe charge men Honed at the head of that column. Almost any deaired information
tioualy obtained.
[OFFICIAL.]

## INDEX OF INVENTIONS

Granted in the Weet Ending March 14, 1876

A complete copy of any patent in the annexed list,
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