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ing Company, 37 and 38 Park Row, N. Y.
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## (2)

a considerable space to the answering of questions by correspondents; so useful have these labors proved that the SCIENTIFIC Americin office has become the factotum, or headquarters, to which everybody sends, who wants
specialinformation upon any particular subject. So large specialinformation upon any particular subject. So large
is the number of our correspondents, so wide the range is the number of our correspondents, so wide the range
of their inquiries, so desirous are we to meet their wants and supply correct information, that we are obliged to employ the constant assistance of a considerable staff of
experienced writers, who have the requisite knowledge or access to the latest and best sources of information. For example, questions relating to steam engines, boil-
ers, boats, locomotives, railways, etc., are considered and ers, bats, locmotives, railways, etc., are considered and
answered by a professional engineer of distinguished ability and extensive practical experience. Inquiries relating to electricity are answered by one of the most
able and prominentpractical electriciansin this country. Astronomicalqueries by a practical astronomer. Chemical inquiries by one of our most eminent and experi-
enced professors of chemistry; and so on through all the various departments. In this way we are enabled to answer the thousands of questions and furnish the
large mass of information which these correspondence large mass of information which these correspondence
columns present. The large number of questions sentthey pour in upon us from all parts of the world-rendrom the mass those that he thinks most likely to be of general interest to the readers of the Scientipic Americas. These, with the replies, are printed; the remaincan. These, with the replies, are printed; the remact.
der go into the waste basket. Many of the rejected
questions are of a primitive or personal nature, which
should be answered by mail; in fact, hundreds of cor-
respondents desire a special repls bot respondents desire a special reply by post, but very fe of them are thoughtful enough to inclose so much as a
postage stamp. We could in many cases send a brief postage stamp. We could in many cases send a brief
reply by mail if the writer were to inclose a small fee, a dollar or more, according to the nature or importance of
the case. When we cannot furnish the information, the money is promptly returned to the sender.
M. M. F. is informed that we could not recommend any steam engine or boiler as the most econ
omical.-J. G. McC. is informed he can only ascertain the carrying capacity of his balloon by experiment. No rule for dimensions can be given. We know no manu-
facturer of the kind of balloon you refer to. See reply to C. E. L.
(1) C. L. asks: 1. Can salt or sea water be so filtered through a sand beach that a well dug from one to two hundred feet from the seashore will contain
fresh water from the filtration of the seap A. The salt fresh water from the filtration of the seai A. The salt
cannot be removed from sea water by filtration. Land springs are sometimes struck close to the seashore,
which leads to the delusion. 2. Can water containing which leads to the delusion. 2 . Can water containing
coloring matter in solution be purified by filtration coloring matter in solution be purined by fitration
through sand or other material? A. The organic color ing mpletely or in great part, by filtration through sand soils, and contact with various rocks and minerals, but the complete purification of the water by these means depends much on the nature of the coloring matter and the degree of colorization. Granular animal charcoal
readily deprives most liquids of organic coloring mat(2) W. H. C. asks if beef will keep fresh and sweet treated with acetate of soda? A. The pro-
cess is an excellent one. See answer to W. E. S., on p. (3) D. W. R. asks: What kind of potash is used in melting brass? A. Potash is not used to melt
brass, but the carbonates of potash and soda are some times used as a fux.
(4) B. K. D. asks: 1. When sulphuric acid is used with manganese, to obtain its oxygen, what is
the appearance or condition of the remainder? A. the appearance or condition of the remainder? A
When separated from the undecomposed manganese d oxide in the flask, manganous sulphate is of a light pink or rose color. 2 . Is there any other method of obtain-
ing the oxygen from manganese than by mixing with ing the oxygen from manganese than by mixing with
sulphuric acid? If so, will you please inform me of the least expensive method? A. Oxygen may also be obtained from the ozide by strongly heating it in an iron
retort in a good furnace. 3. Can you inform me how much sulphuric acid is required to free the oxygen from 10 lbs . manganese? A. For the complete decomposition
of 10 lbs . of the pure dioxide, about 11.35 lbs of sulphuric acid'(specific gravity $=1.8$ ) will be requisite, but it will be better to use an excess of the acid. These
amounts will give you, if the action is completed, about 18 cubic feet of gas. 4. What are the other ingredients, or component parts of manganese, and what is the pro portion? A. Manganese proper (Mn) is a metal, man
ganese diozide, commonly called manganese, being combination of that element with oxygen-(Mn $\mathrm{O}_{2}$ ).
The proportions are: Manganese, $548 ;$ oxygen 32.0 The proportions are: Manganese, $548 ;$ oxygen $32 \%$.
With hot sulphuric acid the reaction is: $\underset{\substack{\text { Manganic } \\ \text { oxide. }}}{\mathrm{Mn} \mathrm{O}_{2}}+\underset{\substack{\text { Sulphuric } \\ \text { acid. }}}{\mathrm{H}_{2} \mathrm{SO}_{4}}=\underset{\substack{\text { Manranum! } \\ \text { gulplante. }}}{\mathrm{Mn} \mathrm{SO}_{4}}+\underset{\text { Water }}{\mathrm{H}_{2} \mathrm{O}}+\underset{\text { Oxygen. }}{\mathrm{O}}$
(5) F. A. L. asks: Can you tell me how to remove ink stains from white marble? The ink is black
French ink, and has been spilled on a white marble mantle. A. Try a strong aqueous solution of pyrophosphate of soda. If this fails, try a solution of a few
dropsof spirits of niter in a spoonful of water; apply with a feather, and wash well afterwards with water.
(6) I. H. E. says: Will you inform me how od by heat without partial d. Rubber cannot be meltrubber (caoutchouc) may be softened by boiling water so as to admit of being worked or moulded as desired. After working, the rubber is caused to combine with mall per cent of sulphur, which vulcanizes it.
(7) A. K. S. says: Can you give me a recipe for making cement, one that will hold machine
belts together? A. See Screntric American, p. 171, vol. 35. This composition is soluble in naphtha or ben zole, and the addition of a little naphtha solution of
caoutchouc is said to improve it.
(8) R. L. asks how red mottled soap is
madep A. The mottled appearance is produced by the madep A. The mottled appearance is produced by the
addition of a small quantity of an iron salt-usually
(9) J. H. C. asks: How can a strong solu tionof laundry starch and water be clarified, and the properties? A. If we understand you, this may be accomplished by boiling the starch for half an hour with slight excess of water, and straining the paste while phuric acid, it is converted first into gum (dextrin) and phuric acid, it is converted first into gum (dextrin) and acid by precipitating the latter with chalk.
(10) W. M. asks for a cement that will unite parchment paper, and will stand hot and cold water and not lose any of its adhesive properties? A. Mix
ordinary glue with about 3 per cent of potassium or ammoniumdichromate in the dark. This may be used on the paper, and after exposure to light becomes perfectly insoluble in boiling water. This glue has been very
largely nsed in Germany for joining the parchment paper envelopes of pea sausages. The strips of paper joined by this glue are dried quickly and exposed to
light till the glue changes to a brownish color; they are light till the glue changes to a brownish color; they are tracted, and then washed in water and dried.
(11) J. B. \& Co. ask: Is there any way that he aniline colors red and blue can be mixed with varA. Many of the clear varnishes and oils may be col A. Many of the clear varnishes and oils may be col-
ored directly with some of the anil ne dyes by mixing the ored directly with some of the anil ne dyes by mixing the
coloring material with the solvent used. These dyes
do not hold their colors very well at high temperatures.
(12) F. W. H. A. says: I cut down some rees in my garden last year, and wishing to get rid of
the stumps without digging up the ground, I followed your recommendation, by boring boles 12 inches deep plugging. This was done both in fall and spring, but, plugging. This was done both in fall and spring, but, Can you suggest a cause and a remedy? The trees ar (or were) fig, lilac and elder, and they seem to care as
little for the sulphuric acid as " Dan'l" did for "them (or were) fig, hlac and elder, and they seem to care as
little for the sulphuric acid as "Dan'" did tor "them
ere lions." A. The sulphuric acid treatment referred to re lions." A. The sulphuric acid treatment referred to raries presumably well informed in the matter. We had not tried the experiment, but it would seem reasonable used in the proper manner, it might effectually destroy the vitality of the roots. To our knowledge the surest method of getting rid of stumps is by mechanica means, for which purpose there are a number of excel lent devices in the market. It has been stated that the following method has been used with good success. In
the top of the stump a number of holes, each capable of the top of the stump a number of holes, each capable of
holding a pound or two of saltpeter (potassic nitrate) are bored, filled with the salt, and during the latter part alt, and the solution formed gradually passes into the roots. In the early spring the same holes are to be filled for a week or two with kerosene oil, and fnally the oilsoaked stump set fire to, when the combustion will pro ceed, aided by the oxygen of the niter, until the greater low match. How far this may be matter of fact we re unable to say, but the experiment is perhaps worth are unabl
trying.
(13)
(13) J. P. T. asks for a recipe for white metal that will melt at a low heats A. An alloy of bismuth 8 parts, lead 5 parts, tin 3 parts, will melt below
$212^{\circ}$ Fah. Bismuth 2 parts, lead 5 parts, tin 3 parts, is said to melt in boiling water. Lead 3 parts, tin 2 parts, said to melt in boiling water.
bismuth 5 parts, melts at $197^{\circ}$
(14) H. E. asks for a recipe for manufac turing a good article of paste shoe-blacking at a moder ate cost? A. Consult "Cooley's Cyclopedia of Practical Recipes," published by Lindsay and Blakiston, Phila
delphia. You can judge of cost by consulting dealersin articles you require.
(15) F. N. B. asks: 1. How can I black the inside of a tin telescope tube so that it will not rub of
or retain dusts A. Thin shellac varnish and lampblack or retain dust? A. Thin shellac varnish and lampblack
will do. It must be a dull, dead black surface. 2. How tight should a 21 sinch achromatic object glass fit in a in cell? A. Notso tight as to bend or break the lens.
(16) W. B. asks for a cheap method of galanizing iron? A. The iron is first cleaned bright by being kept for a time in sulphuric acid, then dipped in
muriate of zinc, and then plunged in a bath of molte $=$
(17) E. K. says: Can you give me the name of all the foundrymen in the United States and Canada? A. We know of no such directory.
(18) E. A. and others, who ask about carbolic soap: Take freshly prepared cocoanut oil soap 150 parts, and fuse; then add a solution of alcohol 10 parts,
carbolic acid 6 parts, caustic potassa 2 parts, oil of lemon part. Mix with stirring, and pour into moulds.
(19) W. E. asks: Will you please give me the mode of preparing the peroxide of hydrogen A .
It is prepared by decomposing the peroxide of barium with as much very cold solution of hydrofiuoric or hosphoric acid as will exactly saturate the base. The baryta salt then precipitates, leaving the hydrogen per-
xide dissolved in the water. The filtered solution is side dissolved in the water. The filtered solution is
then concentrated in vacuoby the aid of the absorbing pen concentrated in vacuo by the aid of the absorbing
pow strong sulphuric acid in an adjoining con-
(20) F. S. T. asks: What is the best methdith a sufficient quantity osp A. Putthem together stoppered vessel, and shake the whole occasionally with alternate rest. If on removing the gloves there remain any spots, rub them out with a soft cloth moistened
with ether or benzole. Dry the gloves by exposure to with ether or benzole. Dry the gloves by exposure to
the air, and then place smoothly betweenglass plates at the temperature of boiling water until the last traces of benzine are expelled. They may then be folded and
pressed between paper with a warm iron. Another way is to use a strong solution of pure soap in hot milk eaten up with the yolk of one egg to a pini of the s with
ion. Put the glove on the hand and rub it gently with the paste, to which a little ether may be added, then carefully lay by to dry. White gloves are not discol-
ored by this treatment, and the leather will be made hereby cleanand soft as when new.
(21) P. J. K. asks: Is there any way of flass by means of a thread or fine string. I have broken alarge amount of glass in trying to bore a small
hole in it, but have not succeeded. A. Use turpentine, hole in it, but have not succeeded. A. Use turpentine, and take care when the drill is about to break its way
(22) E. C. H. says: You answer that my difficulty in pouring Babbitt metal boxes is in the vent; this is not the case, as I have left one side of the box
entirely open, and then I failed to get the box solid, the entirely open, and then I failed to get the box solid, the
metal seeming to chill too quickly. A. Try heating the metal seeming to chill too quickly. A. Try
Are the wrinkles or ridges that intended to beautify or make more frm the vessel, or
are both these objects intended? A. The principal use is to strengthen the vessels; although sometimes orna mentation is only desired.
Is an oscillating engine properly constructed as good
as one with guides, connecting rod, etc., for all puras one with guides, connecting rod, etc., for all pur-
poses? A. One great defect is that there is more poses? A. One great defect is that there is more wear in the parts oftheoscillating, as usually made, than
in the reciprocating. Where fat surfaces work in the reciprocating. Where fat surfaces work upon in keeping them to wear equally, and consequently to keep them packed steamtight.
Can the edge of a razor, whetted to the keenest edge,
be magnified? A. We presume it could be magniffed.
(23) J. M. says: I have several small pieces of walnut $1 / 4 \mathrm{inch}$ in thickness, which have become
warped. How can I make them recover and retain their proper shape? A. Steam them so as to soften them, to retain.
(24) H. B. P. asks: Can you inform me whether you published during the Centennial any acA. See Solentific American Supplement, No. 60, p.
(25) E. L. M. says: A friend claims it will take no stronger dam to hold a pond of 100 acres, 10
feet deep, than one of 1 acre, 10 feet deep. I claim feet deep, than one of 1 acre, 10 feet deep. I claim peesses in all directions and the dam has a pressure on it, more or less, according to its length, supposing it to
be the same depth in every place in both cases. A. Your friend is right, you are wrong.
He claims that gold sinks in quicksilver because the
silver adheres to it. I say it is because the gold is
(26) H. W. asks: 1. What kind of wheel and stone does the scissor and razor grinder use? A.
Any free cutting grindstone will answer. The diameter from 4 to 12 inches is generally used, and from 2 to 4 inches thick. 2. What kind of an cilstone to finish the
razors? A. You can obtain suitable oilstones from razors? A. You can obtain suitable oilstones from
dealers. 3. The name of a good book for the amateur dealers. 3. The name of a good book for the amateur
machinist and jobber? A. Address H. C. Baird \& Co., 810 Walnut street, Philadelphia, Pa.
(27) B. A. W. asks how to make shellac
arnish? A. Take shellac, any quantity, put it in a varnish? A. Take shellac, any quantity, put it in a
glass jar or tin vessel, and add alcohol to just cover the glass jar or tin vessel, and add alcohol to just cover the
shellac. Set in a warm place, beside a stove or even in the sunshine, and in two or three days it is fit for use.
If too thick add alcohol. It is If too thick add alcohol. It is not necessary to strain,
as impurities will settle to the bottom of the vessel. as impurities will settle to the bottom of the vessel.
Keep covered to keep out dust. Ifclosely corked, evapKeep covered to keep out dust. Ifclosely corked, evap-
oration of the alcohol will be very small. It can be oration of the alcohol will be very stc. Experience will eterm
(28) I. F. B. asks how to make straw board mpervious to water? A. Try soaking in linseed oil and (29) W. E. B. A. Co. say: Can you tell us by means of a cold chisel and filing tolength? A. If you have an engine lathe in your factory, run a circular saw, at a proper speed, between centers, arrange some
method to hold the rods in the tool post, and cut them gauge the proper length.
(30) H. C. McG. asks: Which way is the torpedo most destructive? Does it blow the vessel out
of the water, burst it in pieces, or blow holes in the bottom? A. The torpedo, upon being exploded in contact with the side of the vessel, is
(31) G. E. S. asks: How are glass water gauges cut off to proper lengths without breaking? A.
Onemethod employed by mechanics is to break off the end of a round file, say $1 / 4$ inch, so as to obtain a sharp edge, then with it scratch a circle on the inside of the
gauge, at the proper length, and it will readily snap off where the scratch is made.
(32) V. A. S. asks for a recipe for making tooth paste? A. Take sugar of milk 100 parts, pure
tannin 15 parts, lake 10 parts, oils of mint, aniseed, and tannin 15 parts, lake 10 parts, oils of mint, aniseed, and
orange flowers, sufficient quantity. Rub together the lake and tannin, gradually add the sugar of milk, and
(33) H. G. H. asks for a recipe for making boot blacking. A. Ivory black 1 part, molasses $1 / 2$ part,
sweet oil $1 / 6$ part. Mix and stir in hydrochloric acid $1 / 6$ part, and oil of vitriol $1 / 4$ part. Dilute $t_{i} \mathrm{e}$ acid with twice its weight of water before mixing. Another re-
cipe is to take ivory black 4 lbs ., molasses 2 lbs., siweet 1 lb ., oil of vitriol 8 lbs . Mix and put in boxes. (34) E. R.-The material of which you ask information is chloride of silver, and when found native is called horn silver. It is procured as a dense white
nocculent precipitate on adding hydrochloric acid orthe lution of any chloride to a soluble salt of silver.
(35) G. W.-The disease and remedy may depend much on the physiological condition
dividual. Apply to your family physician.
(36) F. W. F. says: Send me instructions for the building of a cheap single scull shell to be made
of canvas. Length about 18 feet. A. See Nos. 25, 26 , of canva3. Length about 18 feet. A. See Nos. 25, 26,
$29,30,32,36,37,39$, and 42 of the ScIENTIFIC AMERICAN SUPPIEMENT, which give illustrations, descriptions, finite, we can give no exact rules for your guidance. inite, we can give no exact rules for your guidance.
We presume a perusal of the papers referred to will give itable instruction.
(37) D. H. asks: How is citric acid manufactured? What machinery is required to operate a
factory on a small scale? A. Citric acid is generally
manufactured from lemon juice, which is imported in a concentrated state, produced by evaporation by a agentle heat. It consists of citric acid 6 to 7 per cent, alcohol 5
to 6 , and the remainder water, inorganic salts, etc. By to 6, and the remainder water, inorganic salts, etc. By
some manufacturers it is allowed to partially ferment for the purpose of evaporating the clear liquor from the the use of albumen in the form of the white of an egg. Carbonate of lime in fine powder is then gradually addCitrate of lime forms, and after being separated by drawing off the watery liquor is well washed with warm water. It is then intimately mixed with strong sulphuric acid diluted with 6 parts of water. After some hours the citrate is decomposed, the sulphuric acid havphg taken up the lime and formed an insoluble sul-
phatting the citric acid free. This, separated by decanting and filtering, is evaporated in leaden pans till afterward continif gravity $1 \cdot 13$. The evaporation is liquor begins to be syrupy, or to be covered with a thin pellicle. It is then removed from the fre, and put
aside to crystalize, the mother liquor after a few days be-
ing evaporated as above, and again set to crystalize, and so on as long as clear crystals are obtained. To obtain
pure citric acid, all the crystals should be redissolved pure citric acid, all the crystals should be redissolved
and recrystalized, it may be several times, and the soluand recrystalized, it may be several times, and the solu-
tiondigested with bone black. A gallon of lemon juice should make about eight ounces of crystals. Limes is generally made, yet it may be extracted from oranges currants, gooseberries, raspberries, tamarinds, etc. The machinery and cost of manufacture will depend upon circumstances which anyone about to go into the busi-
(38) D. B. K.-Your inquiry was answered last week. To clean moss from trees, wash them with
lye made by leaching wood ashes. To clean marble, wash with quicklime, clean, rub with fine putty powder nd olive oil.
(39) Constant Reader is informed that there are many works on steam boilers and their management. He had bette
(40) W. F. B. asks for a book that describes the locomotive. He had bett
(41) R. S. N. asks how to thin down print ers' ink which will answer to print stencils made by a sharp needle, such, for instance, as the stencils made by
an electric pen? A. You can thin ordinary printing ink with linseed oil or with kerosene.
(42) G. A. S. asks: How much water is contained in 1 cubic foot of steam at 30 lbs. pressure . Weight of a cubic foot of steam, at 30 lbs . pressur
gauge, about $0 \cdot 1079 \mathrm{lbs}$
(43) M. M. McP. asks: Can a dirt road engine be made to run in our Texas land successfully? If you know or any, please give me the address. A. In sert a notice in our "Business and Personal"
which is especially designed for such inquiries.
(44) I. T. W. says: I am making an engine, he cylinder being $21 / 9$ inches in diameter, and 5 inches long. Thave a smaler one $\frac{1}{16}$ inch diameter and 5 inch ixches long. Please let me know what horse power quired? A See pp 33, 225, vol. 33
(45) W. B. B. says: Suppose two rifies are socharged that they will send their bullets exactly the would send its ball to a given point the quickest, if one rail car going at the rate of 60 miles an hour, both rifles fired simultaneously and of course at an equal distance rom the mark, an fired in the direction the rail car is
(46) I. T. C. says: I am running an $11 \times 20$ inch stationary engine, with one 40 inch two flue boiler 14 feet long. The boiler is good but not large enough
for the engine. I have a good 14 inch flue. If I connect for the engine. I have a good 14 inch flue. If I connect
it to my boiler lengthways on top, and use it as a steam it to my boiler lengthways on top, and use it as a steam
drum, would it not add considerably to my boiler power? A. As we understand the proposed mode of steaming capacity of the boiler.
(47) A. M. H. asks: Can I use an engine as large as 60 inches in diameter and 12 feet stroke, and Lighthall's or some other good make, and whether I can make as much vacuum as $I$ could form with a jet, alsoif a jet condenser works well with water that is muddy like our western rivers? A. Generally, surface condensers do not make quite as good a vacuum as jet con-
densers. If the water is very muddy, there might be densers. If the water is very muddy, there might be
some trouble in keeping the plunger of the air pump
(48) L. E. N. asks: Would water, if deep (48) L. E. N. asks: Would water, if deep
enough, be so compressed that an iron ball would cease enough, be so compressed that an iron
to sink ? A. No. See p. 208, vol. 33 .
(49) H. M. W. asks: 1 . Why is the moon said to be viewed at
Please give me the names of the metalsas regards pansible? A. The principal metals are arranged, in the onder of expansibility, as follows; Platinum tempered steel, antimony, iron, bismuth, gold, copper, brass, silver, tin, lead, zinc.
Would a peg driven horizontally in an upright post at the equator, throw the same length shadow at noon as at o'clock A.M. and P.M. 9 A. Yee.
Whatwould be the relative time of the passing of a railroad train a point, say the edse of a building situated 300 feet from the point of observation, the train being a
mile away, and that point being any other distance? A. Please send a sketch, to make your meaning plainer.
(50) D. F. H. says: M. says that the proper way to set carriage axles is to set them forward. I ciaim that an axle to run easy should be set straight, so there A. You have the right idea, as we understandyour ques-
(51) B. says: In an argument with a friend on the subject of "Revolutions of a wheel," he claims that the hub goes faster than the rim or oatward part of the whecl, on the ground that the hub receives the first
of the power of motion. On the other hand, I claim of the power of motion. On the other hand, I claim that there is no distinction, that when one part moves
or receives motion, the whole does. A. It is a question or receives motion, the whole does. A. It is a question
of terus. As the outer portion of the wheel makes as of terus. As the outer portion of the wheel makes as
many revolutions as the hub, it necessarily goes through
(52) A. Y. asks: What is meant by a circuar inch? Is it 1 inch in diameter? Why divide by the ecimal 07854 to get the area? How is this decimal got Youshould consult some elementary work on geometry.
(53) Southern Subscriber asks: What must tobacco leaf be sprinkled with before being cut, and ceptable flavor? A The flavoring ingredients are a matter of taste. Molasses, glycerin, cascarilla bark, and anise seed are some of the materials employed.
(54) W. H. C. says: Can you tell me what will kill weeds, such as plantain, that grow around a
well where it is wet and marshy? A. Perhaps the best plan would be to drain the land around the well, and $1 l$ in with st
(55) I. W. W. asks: What pressure or re per square inch m. A. The pressure of the mercury vapor ows different temperatures is approximately as fol lows;
inch.
(56) R. H. McN. says: R. B. G. asks what the pressure against the collar of a horse is, travel-
ing at the rate of 3 miles an hour, to raise 33,000 lbs, a ing at the rate of 3 miles an hour, to raise 33,000 lbs. a end of a lever.) It makes no difference what lever he pulls at, as the rate of travel is given, and the amount of resistance. The rate of speed is 3 miles per hour $=$
15,840 feet, to raise 33,000 lbs. at the rate of 1 foot per minute $=1,980,000$ foot Ibs. per hour, which if divided by 15,840 feet (the speed of the horse) gives 125 los. of resistanceor pressure against the collar. A. We accept the correction with thanks.
apacity in the world, and all thes, length, surace, an what means conda, and all the weights, were lost, by exactly with those we now have?" The standard yard of the State of New York is a brass rod, which bears to a pendulum beating seconds in vacuo, in Columisia College, the relation of $1,000,000$ to $1,086,141$ at a tempera ture of $32^{\circ}$ Fah. One third of a yard equare of purewater at $60^{\circ}$ Fah. weighs $621 / \mathrm{lbs}$. We could therefore get our weights and measures perfectly. A. The restora-
tion of the British standard of length, that is, the reproduction of the one that was burnt, was found to be standard and all copies of it are lost, it cannot be exact ly reproduced. The weight of a defnite volume of pure water has never been exactly determined, that is, the weights used as standards by different nations, when eferred to water, do not exactly agree
(57) S. R. H. asks: What can I use for fill cheap varnish wefore using shellac? A. Almost any The object is to fill the pores of the wood.
(58) J. W. G. asks for a solder to solde nd applymuriate of zinc as a flux.
Minerals, etc.-Specimens have been re ceived from the following correspondents, and examined, with the results stated:
A. R. McC.-It appears to be calamine-silicate of zinc.-W. A. N.-No. 1 is a limestone. No. 2 is clay
slate. No. 3 is bitumen mised with clay and sand. If distilled in a close retort it will yield rich illuminating Nas and various oils. It may be used also as a fuel. M. It is pyrites. See p. 7, vol. 36.-K. R. F.-It con-
tains iron, lime, magnesia, and silica-it is called augite.-Packagemarked Newburyport contains a piece fo. cinder and a small fragment of mica schist.-W. W. -No. 1 docs not contain copper. No. 2 is jamesonitesulphide of antimony and lead. No. 3 is crystalized
lime carbonate. No. 4 is quartz crystals. No. 5 con tains only a trace of lead and no silver. No. 6 contains bismuth sulphide-bismuthine, also copper. No. 7.Neither rock nor flux contains silver-the bright specks are mica. No. 8.-The rock may contain silver; the sample does not. No.9. The metal-like particles in the rock are iron pyrites. No. 10 is gray ore of antimony -G. N.-There seems to be no patent on rose-leaf beads F. A. D.-Please send more of the ore.-I. R. B.-The box marked F. G. seem to be a mixture of chalk and magnesia, with flour and other organic matters.-J. M F.-It is a variety of bituminous coal, yielding constaerable ash. You should have sent a specimen of more
recent mining.-D J. M.-It is an impure clay. It migh be used for brick making, pottery, and similar pur poses.-I. W. D.-It is arrazonito-a pure l.me carbo nate. If in large quantities
of carbonic acid and lime.

## COMMUNICATIONS RECEIVED.

with much pleasure the receipt of original contributions upon the following subjects:
On a Safe Filling. By C.W.
On the Telegraph. By T. G. G.
On the Telegraph. By T. G. G.
On a Mathematical Problem. B r. A.
On Solutions of Indeterminate Problems. By H. M On the Questions of Bacterial Origin.
On the Great Strike, etc. By I.S.C.
On a Mechanic's Incog. By W. P. T.
W. A. D.-B. J. H.-G. W.-G. W. P.-J. S. A. B

HINTS TO CORRESPONDENTS.
We renew our request that correspondents, in referring former answers or articles, will be kind enough to of the question.
Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude
that, for good reasons, the Editor declines them. The Inguiries relating to
Inquiries relating to patents, or to the patentability inventions, assignments, etc., will not be publishe are. Anrown into the waste basket, as it would fill half our paper to print them all; but we generally take pleasis given.
Hundreds of inquiries analogous to the followin are sent: "Who publishes books on bricklayers, etc. Who publishes books suitable for amateur mechanics? Who makes a small, good, portable steam engine Where can springlevels be obtained? Who nakes an sells egg incabators" An sachpersonalinquiries ar and Persunal," which is specially set apart for that purthat column. Almost any desired information can in this way be expeditionsly obtained.

NDEX OF INVENTIONS
Letters Patent of the United States wer
Granted in the Week Ending
July 10, 1877 ,
AND EACH BEARING THAT DATE.
complete copy of any patent in the annexed list
ncluding both the specifcations and drawings, will be furnished from this office for one dollar. In ordering alease state the number and date of the patent desired,
Agricultural boiler, H Henley.

## Amalgamator, A. B. Paul

xle box, W, G Beattie
Bag fastening, T. B. Jackson
Bake pan, C. Roberts.
Bale tie, R. De Gray..
Bale tie, C. H. Victory
Basket, J. H. Van Arnum
Beer, device for tapping, J. Felbel
Beverage, table, J. J. Roger
Billiard cushion, J. S. Mansur
Billarar register, R. M. Hoe...
Binder, temporary, I. Reynolds...
Blotter and ruler, L. P. McElhinn
Boilers, G. Steele.
Book and cover, I. Reynolds.
Book binding, I. Reynolds Books, line indicator for, I. Lopez........ Boot cleaner, D. F. Bell ...
Box, E. G. Gollner..........
Box fastener, J. C. Millard
Box fastener, J. C. Millard.
Box, wooden, W. P. Coburn
Brake, wagon, Seivert, Dietzen \& Stoetzel
Brake lever, E J A,
Brake lever, E. J. Anderson..
Brake, vehicle, W. P. Pickard
Brake, vehicle, W. P. Pickal
Brake, wagon, W. F. Ely...
Breech-loading frearm, Wesson \& Cutte
Breech-loading ordnance, A. Schroeder
Brick, Greenawalt \& $\Lambda$ nderson.
Brush. Lawrence \& Holmes.
Bullet, rine, B. B. Hotchkiss.
Bullet, rime, B. B. Hotch
Burial caskct, J. Maxwell ...
Butter, dish, C. Van Skelline
Can for Ruids, W. Maclave..
Car axle box, G. Wiliams...
Car coupliug, F. Heavencr......
Car couping, J. Johnston......
Car mover, Heshuysen \& Burn
Car, sleeping, C. E. Lucas.
Car starter, S. Graham.........
Cars, propelling, J. B. Thbits
Carbureting air, R. P. Hanglite
Carbureting machine, C. II. Pierso
Castanet, W. Hutchings.
Caster, sewing machine, G. K. Proctor...
Chair, T. Tostevin.
heese, manufacture of, Baltz \& Prindle.
Churn, J. A. Cubitt
Churn, C. Isbell .
loth measuring machine, G. P. Baker
Coffee pot, W. H. Sherwood ......
Composition articles, w. H. Dibble
Confectionery, stay, M. P. Bray.
Cot
Cotton cleaner, Thomas \& Robertson
Cultivator, S. N. Hench..
Cultivator, H. P.
Cultivator, H. P. Kynett.
Cultivator, w. C. Ward
Curry comb, C. A. Hotchkis
Curtain cord tightener, E. B. Byam
Dish warmer, J. H. Wright
Door check, J. Alexander ...
Drop light, C. Henry . ....... Drop priss, W. C. 11
Electrical apparatus, J. Forbes.
Engraving machine, A. E. Ellin wood
Exercising machine, I. W. Mctaffer
Exterminator, ground squirrel. H. Dryer
Fence post, N. T. Dye ................
Fence, post, portable, S, R. Beam.
Fence wire stretcher, w. W. S. Kime
Fifth wheel, S. P. Stillman ........
Firearm, sight for, M. B. White.
Fire escape, C. Henry......
Fire escape, T. K. Ricketts
Fire extinguisher. W. W. Cr
Fire place, C. S. . Rankin (r) ...
Fisherman's apron, A. J. Towe

Flour, process, etc., C. M. Robert
Forge, Canedy \& Larson........
Forks and spoons, H. E. Fowle
Gas process, A. W. Wilkinson.
Gas retorts, D. R. Shiras
Gas retorts, , , Ubil
Gate, J. Bundy......
Gate, H. A. Stearns
Glue, apparatus for drying, s.
Glue pot kettle, J. F. Lucas.
Governor, G. Steele ............
Grain separator, J. E. Smith
Grate, G. B. Mershon....
Grate cleaner, C. E. Mur
Grinder for harvest knives, .
Gun carriage, B. B. Hotchkiss
Hame fastener, A. B. Woodard
Hame tug, W. S. Thayer..
Harrow, W. G. P. Sharp
Harrow, W. G. P. Sharp.
Hat and bonnet stand, E. H. Bart
Hay rake and loader, W. Ingledue.
Heating apparatus, H. B. Smith...
Heating purposes, T. F. Ruwland.
log hanger and carrier, J. Mey
Hog trap, C. R. \& J. W. Rutledg
Hoisting machine, H. Batt.....

Hoisting machine, N. P. Otis.........
Hook, balance spring, E. Blackman Hook, balance spring, E. B
Hoop poles, J. A. Peoples.
Hoops, B. L. Bitting.........................
Hop yards, twine holder, G. E. Pierce Horses' feet, sponge holder for, T. T. Furlong Hose nozzle and sprinkler, P. H. Ryon.
Hot air furnace, C. Marchand .......... Hot air furnace, J. F. Pease.

Iron and steel, reflning, Smyth \& Simpson
roning apparatus. H. Monk
Knife scourer, C. V. Hadey
Knife scourer, C. V. Hadley.........
Labels, tobacco, C. W. Van Alstine

## Lamp, W. McCarthy ...

 Lamptrimmer, E. Stone
Lap link, L. E. Burdin..
Latch for gates and doors, A. L. Beardsley.
Latch, gate, C. E. \& M. S. Austin
Latch, gate, C. . \& \& M. S. Austin
Latch, locking, J. Haptonstall.... Leather-skiving machine, C. F. P
Life preserver, D. Kahnweiler...
Lifting jack, T. J. Jenne .........
Lighting gas, w. W. Batchelder.
Loading vessels, etc. s . Marsden
Loading vessels, etc., s. Marsden
Locomotive wheel, J.Larmanjat. Locomotive wheel, J.Larmanjat..................
Loom shedaling mechanism, W. R. Andrews.
Loom temple, W. H. Burns............. Lubricator, H. Winter
Mallet, A. Holbrook ..
Mask for horses and cattle, A. H. Trueblood
Milk cooler, L. T. T. Reed.
Mill pick, W. B. Morris.
Mop, E. S. Ellis..
Needle machine, Payne \& Geoton $192,023,192,024$,
Nut, F. A. Aradley.
Oil can, T. W. McN
Oit can, T. W. McNally. ..... .... ...
Paddle wheel, I. A. \& E. E. Kilmer.
Paddle wheel, D. Lindsay... .......... Paddle wheel, D. Lindsay
Padlock, W. H. Taylor..
Paper box, w. H. Swift.
Paper box, w. H. Swift...............
Pevement. wood, H. M. Stow....
Pen and pencil case, R. M. Collard.
Pen and pencil case, R. M. Collard.
Pencil, lead, H. T. Cushman .........
Photographic apparatus, G. W. Bake
Photographic apparatus, G. W.
Piano lids, , hinge for, J. D. People
Plaiting machine, J. H. Brown.
Plaiting machine, J. H. Brown
Plow, stump, W. Painter...
Posta card, C. K. Marshall.
Pottery, R. Gracey.... ....
Powder fask, J. Covode......................................
Pulley block, E U. \&
Pump, A. M. Searls...
Pump, J. J. Luberter..
Pump, T. B. Swan....
Pump, J. W. Douglas
Pump, J v. Pearce..
Pump, J W. N. Wearce...............................................................................
Punching and shearing maching
Quilting frame, R. W. Burk...
Railroad crossing, J. S. Wing switch, E. Hugron.
Railroad track, A. D.
Railway, E. Frere............
Liilway erossing, J. S. Williams
Saddler's trimming tool, M. M.
Sash fastener, J. Andrews......
Sash fastener, W. H. Brow
ash fastener, F. J. Hoyt.
Sausage stuffer, I. W. Heysing.....
Saw mill, J. R. Hoffman.... ......
Saw mill, J. R. Hortman
Saw mill, O. L. Jenks

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Saw mill dog, A. Cunningham
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Saw set, C. Heinen...
saw tooth adjuster
Saw tooth adjuster, J. F. Damon
Sawing machine scroll, W. H. Tu
school desk, Walgrain \&
scoop. W. J. Griftith
screw-cutting dies, J. J. Grant.
screw-cutting dies, J. J. Gran
Screw driver, A. J. Curtis...
sewing machines, C. H. Warner
Shovel, C. H. Victory .........
Show case, Bartlett \& Bickf
Shutter worker, H. Smith..
Sign, street, P. A. La France.
Soap and shaving box, combined................
Soldering machine, Brooks \& Gornall.
Soapand shaving box, combing machine, Brooks \& $G$
Spark arrester, W. 1zu shton.
pool case, B. R. Hamilton.
Stamp, postage, D. G. Beaumont
Stamp, postage, D. G. Beaumont
Stamp, postage. W. W. Bierce....
tation indicator, J. W. Gray
tirrup, W. B. Conwa
Stock feeder, A. W. Prathe
stock feeder, A. W. Prather................................ 192,87
Store reacher, Rutherford \& Mitchell......... 192,87
Stove, C. Lyman ..............
stove grates, E. A. C. Fox
Stove grates, E. A. C. Fox..
Stove, E. A. C. Fox ........
Stove register, B. F. Cleme
Straw cutter, S. Mepham..
Tag, o. T. Smith ..................
Telegraphic circuit, S. J. M. Bear ................
Tile-laping machine, W. J. \& J. I. Mettler.
Toilet articles, J. Vernon.......
Toy Noah's ark, G. H. Ireland.
Toy pistol, J. Barry....
roy pistol, J. Barry......
Tramways, T. н. Day....
Umbrella, R. S. Galbraith...
Umbrella tip cup, H. S. Frost
Vehicle body, T. Tostevin....
$\nabla$ ehicle spring, A. B. Bishop.
Vehicle wheel, M. J. Racer
Vehicle, G. M. Peters (r)
Wagon, C. s. Bateman.
Wagon, C. S. Bateman..................

Water and wine cooler, D. K. Enright. $193,010,192,1010$
Water meter, H. B. Hayes ............
Wind wheel, J. P. Preston.
Wind wheel, J. P. Presto
Window light, P E. Sloan.
Window screen, F. A. Gilbert.
Windowscreen, E. P. Pomeroy ..........
Wood molding machine, M. Bostwick
Wrench, B. F. Joslyn
DESIGNS PATENTED.
10,091.-CASSIMERRS.-O. F. Chase, Thompson, Conn.
10.0. PAROR TABLES.-P. P. Kuehborth, Buffalo,N. Y.

10,094.-CLock CAsEs.-H. J. Muller, New Yorks city.
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