Notes & Queries

W. H. H. will find directions for preventing rust on iron on p. 169, vol. 33.—C. W., Jr., will find directions for calculating the proportions of compound gears on p. 107, vol. 34.—A. K. will find that good glue is the best material for fixing sand on belts.—W. A. G. can make and use leather pulp by following the directions on p. 105, vol. 25.—R. S. will find a description of a cold tinning process on p. 154, vol. 34.—J. R. C. should consult the makers of his fan.—E. G. A. is informed that the sand blast (see p. 195, vol. 27) has been used for cutting iron; but whether it is now in practical use for that purpose, we do not know.—C. W. L. will find directions for making artificial meerschaum (not ivory) from carrots, etc., on p. 307, vol. 34.—H. H. L. can make a good indelible ink for stamping by following the directions on p. 129, vol. 28.—H. S. can polish Britannia ware by the method described on p. 57, vol, 34.—N. S. W. will find answers to his queries as to the SCIENTIFIC AMERICAN SUPPLEMENT on p. 124, vol. 35.—H. W. C. will find a recipe for a hair stimulant on p. 188, vol. 33.—J. P. G. will find directions for tempering springs on p. 11, vol. 34.—E. H. B.'s query as to eggs is a schoolboy's problem, of no practical value.—C. E. C. can clean rust from tin by following the directions on p. 57, vol. 34.—E. W. H. will find a recipe for artificial coral on p. 307, vol. 34.—C. B. R. will find a description of phosphor bronze on p. 315, vol. 30.—C. A. will find directions for etching on glass on p. 203, vol. 33.—H. H. L. will find directions for gilding on glass on p. 313, vol. 34.—B. will find a recipe for a depilatory on p. 186, vol. 34.—J. M. will find full directions for stuffing birds on p. 159, vol. 32.—H. T. will find directions for making fulminating powder on p. 250, vol. 31.—J. D., Jr., will find directions for japanning tin ware on p. 132, vol. 24.—D. M. L. can cement glass to brass with the preparation described on p. 117, vol. 32.—R. I. G. is informed that there can be no such instrument at a needle that will point to buried gold.—F. W. S. will find a description of the underground telegraph wires in London and elsewhere on p. 294, vol. 30.—G. K., of Highgate, London, England, will find directions for nickel plating on p. 235, vol. 33.—A. F. will find directions for getting rid of fleas on p. 217, vol. 27.—C. & S. will find directions for making pickles on p. 155, vol. 31.—J. H. K. can prevent mildew on sails by the process described on p. 90, vol. 31.—A. D. L. will find a formula for calculating the centrifugal force of a body on p. 378, vol. 30.—J. O. S. can render his windows opaque by the process described on p. 264, vol. 30.—H. W. G. will find an article on chlorophyll on p. 247, vol. 29.—W. A. D. will find directions for making artificial stone on p. 124, vol. 22.—H. J. can silver brass and copper, without a battery, by using the preparation described on p. 299, vol. 31.—D. D. W.'s letter has been placed in the hands of several chemists, who may take action in the matter.—A. H., E. W. M., F. C. L., W. J. B., C. F., W. M., N. J. O., C. J. C., H. M. L., W. B. W., B. H., R. B., C. R., J. W. F., W. B., E. P., W. H. B., and others who ask us to recommend books on industrial and scientific subjects, should address the booksellers who advertise in our columns, all of whom are trustworthy firms, for catalogues.

(1) F. R. Jr. asks: How can I find the diameter of one of four equal circles inscribed in a large circle, of given diameter? A. Multiply the given diameter by 0·414213.

(2) W. H. S. says: I enclose a specimen of deposit taken from my heater reservoir, which I am unable to get rid of and which is very troublesome. The heater is 14 feet long and 22 inches in diameter, and in it are three pans 12 feet long by 14 inches wide, with partitions in middle. The cold water runs into the top pan on one side at end, and along the length of pan; it returns and fails through holes into next, and so on through, lastly falling on bottom of heater, and is then conveyed to a reservoir 6 feet deep and 22 inches in diameter. The exhaust comes up into my heater at the end at which the cold water comes in and goes out at the opposite end, so that the water gets boiling hot before it leaves the heater. I use water from the top of the reservoir, and the deposit seems to float on top, and will not mix with the water after it is precipitated. Can you suggest any means of getting rid of it? A. By the use of a surface blow, you could probably discharge the most of it. It would be still better to filter the water after leaving the reservoir. Probably a box filled with sponges would answer every purpose; and the sponges could be removed and washed, from time to time, as they become stopped up.

(3) A. O. says: I have an engine of the following dimensions: Cylinder 3 inches in diameter, stroke 6 inches. The boiler is 5 feet long by 2½ feet in diameter, made of ¼ inch boiler iron, single riveted. It is to run, if possible, at about 200 revolutions per minute. Is it big enough to run a cylinder journal printing press, generally run by hand power, and a printing press run by foot power? Is the boiler big enough to generate steam enough to run the engine and heat a building of 30 x 60 feet? A. We think the machinery will answer, and that you can heat the building with the exhaust steam. It must be evident to you, however, that an opinion, based on the data you have sent, cannot be of any great value. It only amounts to saying that if the machinery is properly designed, constructed, and set, it will give satisfaction.

(4) J. H. B. asks: What should be the diameter of a propeller shaft, to transmit with safety an actual thrust of 10 tuns, the strain to be a pulling instead of a pushing one, as is generally the case? Length of shaft after leaving propeller boss to connection with engines is only 4 feet. Propeller is supposed to revolve in water constantly, never to be thrown out of it and thus subjected to the undue strains of racing on its return. Material is to be steel. A. A shaft 2 inches in diameter will answer for the conditions stated.

Suppose cold water to be kept in constant circulation on the exterior of a cylinder with shell 1½ inches thick. What is about the highest temperature to which the interior may be exposed as long of that of the interior circumference of shell does not exceed 700° Fah.? A. There is no limit to the temperature, if, as we understand you, it is assumed that the temperature of the iron can be kept at or below 700°

(5) P. R. asks: Please give me a simple rule for calculating how much weight a horizontal spruce beam will bear. A. If the beam is rectangular, and supported at both ends, the breaking weight, applied at the middle, will be:

$$\frac{(\text{Depth in inches})^2 \times (\text{breadth in inches}) \times 400.}{\text{Length between supports in feet.}}$$

If the load is uniformly distributed over the beam, it can be twice as great as the above.

(6) C. C. asks: How can I make a dark colored chalk, suitable for lining purposes on light colored wood, having the same cohesion as the common white chalk used for that purpose? A. Grind the pigment into an impalpable powder, thoroughly moisten with a little dilute solution of dextrin in hot water, knead the mixture well, and dry thoroughly at a gentle heat.

(7) T. M. H. asks: Can any use be made of dross from tin and lead? A. If there is any considerable quantity of the material it would probably pay to treat it for the recovery of the metals in the following manner: Mix thoroughly with almost an equal weight of anthracite coal, spread evenly on the bed of a small reverberatory furnace, and smelt, with a gradually increasing temperature, until the reduction of the metal has begun. Then throw in a little lime, increase the temperature for a short time, draw off the reduced metal into a large iron vessel, and stir with a piece of wet wood to raise the impurities to the surface; remove these by skimming and pour the metal into a stone or iron mold to cool.

(8) C. G. L. asks: Is there any way of getting a press copy from thin writing ink, or from writing too old to copy from moisture only? A. Try the following: In a half pint of water dissolve about a tablespoonful of white sugar, and to the solution add a sufficient quantity of the ferrocyanide of potassium to distinctly color it, also about half a gill of pure muriatic acid (free from iron). Moisten white tissue paper with this, partially dry it with a blotter, place the writing to be copied in contact with it, and keep under pressure for about five minutes. With most inks this recipe will give very good results.

(9) H. A. P. L. says: Would an electrical machine with one glass cylinder and two round silk cushions, electricity being conducted to a Leyden jar or a prime conductor, be powerful enough for experiments? A. As far as we may judge from your description, the machine is properly constructed; but to obtain good results, it will be necessary to rub on the cushions an amalgam, which may be prepared as follows: Melt together in a crucible 2 ozs. zinc and 1 oz. tin; when fused, pour the alloy into a cold crucible containing 4 drachms dry mercury; when cold the amalgam is ready for use. Before applying the above amalgam, the cushion should be rubbed over with a mixture of tallow and beeswax. In pouring the fused metals into the cold mercury, do not inhale the mercurial vapors that may be formed, as they are very poisonous.

(10) C. A. R. asks: Is there a cement or fluid which will fasten together two straps of sole leather a yard long, which will not be affected by moisture? A. Melt together equal parts of pitch and gutta percha. Apply hot.

What will remove stains from a shirt bosom? A. Try touching the spots with a little benzole, and afterwards pressing for several hours with warm pipe clay.

(11) A. B. says: Some plumbers use muriatic acid with no zinc in it. I would like to know what effect this acid has on iron and brass. A. Dilute muriatic acid will answer, but a strong acid solution of chloride of zinc is much better, as it not only cleans the metallic surfaces but protects them, by the formation of a coating of the fused chloride, which excludes the air.

(12) J. S. M. asks: How large a pipe will it take to give sufficient blast to a cupola 22 inches in diameter, distant 80 feet from a common fan? A. About 2 or 2½ inches in diameter.

(13) A. F. J. asks: Can water be raised by an ordinary suction pump below a level of 33 feet by the aid of check valves placed below the suction? If so, how far? A. If, as we understand it, reference is made to the hight to which water can be raised by atmospheric pressure, 33 feet is about the practical limit, and one which is seldom reached by ordinary pumps.

(14) J. F. asks: What is the rule fo ascertaining the proper amount and form of space underneath and at the back end of the boiler? A. There is no definite rule for this proportion, so far as we know.

(15) C. & T. ask: If you found that the piston of your engine was striking the bottom or top of the cylinder, what would you do to stop the pounding? A. If the pound were serious, we would put linings in one of the connecting rod boxes. In case it was not possible to stop, we would work the engine slowly, and cushion the steam, if any means for so doing were available.

(16) R. asks: How can I coat, easily and cheaply, the inside of an iron pipe so that the water passing through may not be affected by the metal? A. Try melted paraffin.

(17) P. V. T. and others.—There is no specific for catarrh. Temperament, habits, etc., must be taken into account, for which reason a course of treatment suitable to one person would be entirely unsuited to another. We cannot advise anything but continuance under the care of a regular practitioner.

(18) J. G. Q. asks: In what non-freezing liquid can phosphorus be kept from combustion? A. In naphtha.

(19) S, W. T. says: How can I make a first class waterproof blacking, that does not require brushing? A. Vinegar 1 quart, ivory black and molasses, each 6 ozs., oil of vitriol and spermaceti, each 1½ ozs. Mix the acid and spermaceti first, and then add the other ingredients.

What is the best way to clean a copper boiler? It is used in a kitchen; the boiler is 18 inches diameter and 5 feet high, the burnish on the outside gets dull and of a mauve color. A. Clean with a little dilute oxalic acid solution, wash, dry, and polish with a little tripoli.

How can I make soap bubbles so that they will last long, or at least not break so soon as those made with soap and a pipe in the ordinary way? A. Use a fatty soap, preferably one made with fish oil, and to the solution add a little glycerin.

How can I find a number which, multiplied by its half, will make 20? A. Let x = the number; then $(\frac{1}{2}x)x = \frac{x^2}{2}$. $\frac{x^2}{2} = 20$, $x^2 = 40$, $x = 6{\cdot}32455$, $\frac{1}{2}x = 3{\cdot}16228$, $x \times \frac{1}{2}x = 19{\cdot}99999719$. If you carry out the square root of 40 until you obtain the root complete, and multiply this number by one half itself, then the result will be 20 instead of the result given.

How can I darken my hair, which is a light red, without using a dye? A. You cannot.

What is a good substitute for gum arabic for sticking on labels? A. Use a boiled solution of dextrin in water.

Is there anything that will keep the snow from lying on the ground in winter? It is a patch 40 yards square that is required to be kept clear. A. No.

(20) H. A. G. says: I have a coat which was originally of a dark blue color; but owing to exposure to the sun's rays, it has faded to a reddish hue. How can I restore the original dark blue color? A. Try treating the fabric with strong ammonia water for a few minutes, and then wash thoroughly with clean water. If this does not suffice, it will be necessary to have the material re-dyed.

(21) W. C. W. says: You published a recipe for making black varnish by mixing oil of turpentine and sulphuric acid. I tried the experiment, which cost me a loss of some clothes, nearly the loss of an eye, and about two weeks' labor, brought about by an explosion which burnt my face severely. I purchased what a druggist said was oil of turpentine (spirits of turpentine). I mixed the ingredients in various ways, with no results as predicted; and then, having a phial partially full of each, I poured one into the other, and then shook the mixture, when an explosion took place. What was the matter? A. The recipe, as given, is perfectly correct; and if you had closely and carefully followed its directions, all would have been well. Instead of dropping the sulphuric acid into the turpentine, it would, perhaps, be better to slowly drop the turpentine into the strong acid. The only precautions necessary are to mix the reagents slowly, so as to avoid a too rapid rise in the temperature of the mixture, and to keep the mixture cool by surrounding the vessel with cold water during the operation. The viscous and dark red body obtained consists principally of a mixture of terebene and colophene. The proper proportions are about 1 part of strong sulphuric acid to 20 of oil of turpentine.

(22) I. N. R. R. says: I have charge of some coal mines, in which there is a great deal of gas. In one part of the pit the gas shows a blue flame on the safety lamp gauze; and in another part there is a fault in the coal, and the gas shows the blue flame, and on the top of the blue flame a white flame. Please explain this. A. It may be due to some peculiarity in the oil, an unusual quantity of carbonaceous matter in the atmosphere, or to the fire damp itself becoming intermixed with some higher carburet of hydrogen. You do not furnish sufficient data to enable us to answer the question more positively. In case the latter suggestion should prove the correct one, and, inadvertently, the mixture should become ignited, the explosion that would follow would be very severe, much more so than that of ordinary fire damp.

(23) A. K. says: We have a small stage and want to supply it with gas, using 4 cubic feet per hour. How large a pot would it take to produce this amount, and how much coal would it take to produce 4 cubic feet per hour for three hours without refilling the pot? Can the gas be led to the purifier and from that right to the burners? A. This is not practicable, as, when the temperature reaches a certain point, the gas comes over quite rapidly and not at all uniformly. It will be necessary to pass the purified gas to a reservoir (a large gas bag will answer your purpose) that will adapt itself to the volume of the gas and maintain a steady pressure. In order to avoid reducing the luminosity of the gas, it is requisite that the distillation should not proceed under pressure.

(24) R. F. asks. What is the best, cheapest, and most effectual means of removing salt water rust from boiler plate iron? A. Steep it in a weak pickle of oil of vitriol in water, and dry immediately with sawdust. It is better before placing it in pickle to go carefully over the surface with a good stiff wire brush, so as to remove as much of the oxide as possible. Brushing after removal from the acid is, in some cases, also advisable.

(25) S. D. asks: What will clarify a solution of 5 lbs. of Irish moss, boiled in 20 gallons of water, long enough to extract the gelatin? I want to get rid of the small particles, which give it a cloudy appearance. A. Mix with clean paper pulp, place in a fine linen bag, and strain. The paper and gelatin should be mixed and well stirred together while the gelatin is hot and as liquid as possible.

(26) H. S. S. C. asks: Will a house 30 feet by 30, covered with tin and having a water conductor at each corner connected with the roof, each conductor being connected with the ground by a copper wire, be sufficiently protected against lightning without a lightning rod? A. The water conductors, not being in the form of a compact body of metal, would hardly be so good as a rod: but, if provided with a pointed rod at top in connection with each, extending about three feet high above the roof, and a like rod extending some distance into the ground at the bottom, they might be considered safe.

(27) O. A. W. asks: Is there a chemical that, when rubbed on the hand, enables one to handle red hot iron or melted lead with impunity? A. No; but if the hand be damp with perspiration, or slightly moistened, it may for an instant be dipped in melted lead or white hot melted iron without burning or discomfort. The moisture is thrown into the spheroidal condition, and presents an effectual barrier against the intense heat.

(28) W. M. M. asks: How is a bichromate battery made? A. It consists usually of a large glass jar having within it a cup of porous unglazed porcelain. The intermediate space, between the sides of the vessels, is filled with dilute sulphuric acid (1 to 20), and contains a sheet of zinc shaped so as to conform to the curve of the inner cup, which it completely surrounds. A stick of gas carbon is placed in the porous cup, and surrounded with a fluid made by adding strong sulphuric acid to a saturated aqueous solution of bichromate of potassa until the chromic acid begins to separate in flakes, it is afterwards diluted a very little in order to redissolve the precipitate. The proportion of the several ingredients in this mixture should be about as follows: to about 10 ozs. of bichromate of potassa in 1 gallon of water, add 1 pint of strong oil of vitriol.

(29) S. asks: Is the common arsenic of the drug stores the kind that can be fused with block tin? A. No, use metallic arsenic.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

W. Z. J.—No. 1 is blue clay. No. 3 is a piece of slate. No. 4 is a variety of steatite. No. 5 is basalt. No. 6 is a piece of bituminous shale. No. 7 is chalcopyrite (sulphide of copper). A smaller specimen numbered 6 is an agate. No. 2 did not arrive.—P. & B.—It is nodular iron pyrites.—B. M. R.—No. 1 is a limestone fossil, but has been so badly damaged that we cannot classify it. No. 2 is a piece of shale.—S. S.—It is a broken quartz crystal.—S. L.—It is partially reduced oxide of copper.—W. E.—The color on the window blind does not contain arsenic. It is an organic pigment.—C. C.—They are garnets, of considerable value when large and perfect.—J. A. C.—It is a bituminous shale, and might be used for heating purposes.—S. J.—The sand might, if properly screened, find a limited employment for scouring, grinding, and polishing purposes, as well as in the manufacture of glass and glazes.

S. G. C. asks: Is there anything which will restore drawing paper, which has become soft from age and use so that ink runs on it, sufficiently to ink on a few lines at a time when necessary?—O. S. says: Can you inform me what is the yield of oil to the bushel of peanuts, and what are the means of extracting the oil?—J. L. R. Jr asks: Please tell me where the character $ came from originally.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

On Weight on and in the Earth. By E. B. W.

On the Polarity of the Compass Needle. By D. Y. M.

On a Rope Swing. By J. S. P.

On the Monjolo. By C. J. W.

Also inquiries and answers from the following:

A. S.—J. R.—J. A. P.—J H. E.—C. C.—G. T. D.—J. M.—T. J. B.—J. McC.—W. B. P.—C. H. P.—H. H—T. I. H.

HINTS TO CORRESPONDENTS.

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 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 initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who makes machines for pressing stove blacking? Who sells electric telegraph apparatus? Who sells propeller wheels? Who makes cast steel bells? Who makes labeling machines?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending

August 8, 1876,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired, and remit to Munn & Co., 37 Park Row, New York city.

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Marble-polishing machine, K. J. Ensminger ... 180,707
Mat, wood, S. Lewis ... 180,771
Molding flask, J. J. Lebeau ... 180,721
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Nut lock, A. J. Potter ... 180,922
Oleaginous seeds, crushing, A. B. Lawther ... 180,770
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Pail and lantern, dinner, D. T. Platt ... 180,918
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Paper pulp, making pails from, E. Hubbard ... 180,882
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Seed drill fertilizer distributer, L. W. Shepard ... 180,945
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Sheet metal elbow, A. Syverson ... 180,736
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Silks, etc., boiling and dyeing, L. Leigh ... 180,895
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Stone-sawing machine, J. Pepler ... 180,916
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Wire-bending machine, E. I. Braddock ... 180,745
Wringer, R. C. Browning ... 180,837
Yoke, neck, C. F. Whipple ... 180,812

DESIGNS PATENTED.

9,433.—TYPE.—J. M. Conner, New York city.
9,434.—BRACELETS.—I. Rice, New York city.
9,435.—ASH BOXES.—A. Schmitt, Williamsburg, N. Y.
9,436.—FINGER RING.—A. V. Moore, Hackensack, N. J.

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