

(26) J. E. L. asks: How many revolutions per minute, and what particular way of filing a circular saw will enable us to cut 3/4 inch dry, straight grained, black walnut boards into 1/2 inch strips, smoothly, so as to dispense with planing afterward? A. Make the saw about 6 inches in diameter, of No. 19 gage, 6 teeth to the inch, each alternate tooth to be filed to a very flaring (beveling) edge on the front side. Twist each alternate tooth a very little for the set. Use a fine oilstone on the front part of each tooth after filing, so as to present a wide and very sharp cutting edge to plane the sides of the kerf. File the tops of the teeth square across.—J. E. E., of Pa.

(27) J. L. B. asks: I have three wheels, two of 40 and one of 48 inches in diameter, all of which weigh 38 lbs. Please give me the dimensions for making a tricycle, using said wheels. A. The ordinary method is to have the driving wheel in front, the standard in which it is hung being capable of turning in any direction, at the will of the rider. If your driving wheel would not stand erect, the bearing must have been very short, or the workmanship very poor.

(28) P. B. G. says: I am running a steam pump located 18 feet above the river, and draw the water through 200 feet of suction, and force the water 25 feet above the pump. The suction pipe is 1 1/4 inches in diameter, which is rather small for the pump. When running, the valves and piston thump heavily. I use a foot valve. I would like to know if I can remedy the matter by putting a vacuum chamber on the suction? A. We do not imagine that you will find any remedy other than the use of a larger pipe very efficacious.

(29) G. F. B. says: 1. I am using a foot power lathe for wood turning, and I would like to know what part of 1 horse power I exert in treading said lathe? A. Probably not more than 1/4 or 1/5. 2. Of what diameter and stroke should a small engine be to successfully run said lathe? A. Diameter 1 1/2 inches, stroke 3 inches. 3. What horse power does it require to run a circular saw so as to cut up 1 inch hard wood boards to good advantage? A. From 1 to 1 1/2.

(30) W. T. says: I have a 9 inch circular saw, and in the room below a 4 feet 6 inch drive wheel with crank, with a leather belt round the wheel and pulley of mandrel; it is extremely hard work, turning by hand, even to cut thin pine. How can I remedy that or make it easier? A. It will be very hard work turning such a machine by hand. Power stored up in a heavy balance wheel when the saw is not in actual use will assist greatly in making each cut.

I have also a home made machine for teasing hair or wool. It consists of a frame and 2 drums, one about 15 inches, the other 6 inches diameter, with teeth in each. They are made to revolve in opposite ways by a strap over a pulley at the end of each drum, with a crank on the larger one. The hair wraps round the drums and clogs it without getting teased. How can I remedy it? A. I am of opinion that you cannot obviate the difficulty, and that a back and forward or reciprocating motion over a stationary toothed bed would be preferable.—J. E. E., of Pa.

(31) W. H. says: Is there any difference between concussion and weight? If I break a block of iron by dropping a 2 tun weight from a height that gives it a striking force of 120 tuns, could I break a similar block by placing upon the same space covered by drop weight (about 3 inches in diameter) the same weight, 120 tuns? If not, why? I have broken an anvil block by the above weight. Practical men say that 500 tuns laid on same space would not tear the block. Weight of block, 12 tuns. A. The sudden application of a load, as in the first case, ordinarily has a greater effect than its gradual action, as in the second. One reason for this seems to be that, when a force is suddenly applied, there may not be time to communicate the shock all over the struck body, so as to allow it to offer the maximum resistance before rupture takes place.

(32) E. E. asks: How does an injector compare with an old-fashioned plunger pump for forcing water through a good heater? A. There is a difference of opinion on this subject, the majority inclining to allow a little superior economy to the injector.

(33) L. H. E. asks: In grinding lathe and planer tools, chisels, etc., should the stone run to or from the grinder? A. Towards the operator.

(34) G. T. P. says: We are running a 20 horse engine. The pump would not work to satisfy us, so we blew out steam and water, after taking all the fire out. Three hours after, we commenced refilling by hand pump, letting water in at the safety valve. After the water had been pouring in about 15 minutes, there was a loud noise in the boiler, as though it had been struck with a heavy sledgehammer. Upon examination we found a crack 14 inches long across the crown sheet. Can you tell us the cause? A. Your boiler was probably warm, and the contraction due to putting in cold water produced a strain, causing both the crack and the noise.

(35) J. K. Jr. asks: What is the horse power of the following stream of water? The stream is 7 inches square, flows at the rate of 3 feet per second, and runs on to an overshot wheel whose diameter is 18 feet. A. Find the cubic feet of water that falls per second, multiply this by the weight of a cubic foot of water in lbs., and by the fall in feet, and divide the product by 550. The resulting power is quite small, and possibly some of your data may be incorrect.

(36) J. B. says: A person wishing to build a butcher shop with double board walls thinks that, by leaving between the walls nothing but air, he will do best, while I think that, if he would fill the space up with sawdust, it would be cooler. The walls will be about 6 inches apart. Am I

right? A. If the space in the wall could be made perfectly airtight, so that the cool air could not escape and warm air take its place, the air alone would be better than sawdust; but as this is impracticable in your case, you had better fill in with the latter.

(37) C. M. A. says: We are building a three-story school house, with two rooms on each floor; each room is 28x28 feet, and 12 feet high. We are to have one ventilating flue for all four rooms; each room is to seat 60 scholars. How large should the ventilating flue be, and how large and what should be the position of the registers? Each room is heated with a wood stove. A. Build a brick flue, 24x44 inches, between the two rooms in each story, and run up through the center of it a 20 inch diameter heavy sheet iron smoke pipe, kept in place by means of a 4 inch brick cross partition, from the middle of each side, dividing the large flue into 4 shafts or smaller flues, averaging about 10 by 16 inches each. The latter will give you a separate ventilation flue for each room, the air in which will have a constant upward current by means of the heat imparted to it by the central smoke pipe. This pipe should also be divided into 4 parts, to afford a separate smoke flue for each stove. Put in two 14x22 inch registers in each room, one near the floor and one near the ceiling; by these you can grade the ventilation to suit circumstances.

(38) B. D. asks: 1. I have a piece of gold, which has been polished with mercury. What will remove the mercury? A. Heat it strongly over a flame until the mercury has all been driven off. Do not inhale the vapor. 2. Will mercury injure gold? A. Yes. It forms with it a soft amalgam.

(39) E. W. V. asks: Do you know of anything that will take mud off paper? We had a flood in Dubuque, and the water got in our house. Two volumes of SCIENTIFIC AMERICAN and Picture-cube America got wet and full of mud. A. Try the following: Moisten the paper thoroughly and then dry under considerable pressure. When perfectly dry (which will probably require a week or more) the greater part of the clay may be removed by means of a good stiff brush; it will not, however, be practicable to remove, completely, all of the stains.

(40) P. asks: Will water have any mechanical effect on a diamond, falling on it drop by drop, time not being limited? A. Yes.

(41) J. H. asks: What test can be applied to the colors of two samples of woolen fabric to indicate their comparative ability to withstand such exposure to light, heat, etc., as the furniture of an ordinary sitting room is subject to? A. This could best be determined by an analysis of the coloring matter of each.

(42) C. H. asks: How can we purify our cistern water? It has thousands of little semi-transparent "mites" in it. A. Try the addition of several bushels of finely ground well burnt charcoal. It is probable that the pump tube has contaminated the water by decay.

(43) J. S. P. says: The walls of the room in which cotton lint is thrown from the gin are quite rough, and long locks of lint hang from the walls and ceilings. If the gin strikes fire (which sometimes happens) the house is burnt. Would a coating of 1 part liquid sal ammoniac 2 parts sulphate of lime, as given on p. 405, of your vol. 34, or so-called soluble glass, be the best or cheapest for making the room fireproof? A. The recipe is a good one, and we think would offer no little protection from fire. The parts are by weight. By sulphate of lime, plaster of Paris is to be understood.

(44) W. B. asks: 1. Is there any truth in the statement that a French chemist has discovered a means of producing a gas 9 times lighter than hydrogen, and non-combustible? A. There is no truth in the statement. 2. Would hydrogen or coal gas preserve or lose its buoyancy if bottled or kept from contact with air? A. It would suffer no change. 3. What would be the size of a sphere of copper filled with hydrogen, made thick and solid enough for safety in ballooning, with a lifting capacity of 300 lbs.? A. If made of copper, it would require a sphere of about 150 feet in diameter. On account of the great weight of the material used, the balloon would be little, if any, stronger in proportion than one of smaller dimension, of lighter fabric, but having a like surplus buoyancy.

(45) W. A. T. asks: Reading in the SCIENTIFIC AMERICAN, of March 25, an account of the aqueduct of La Vanne, France, being built of sand, gravel, and cement, it struck me that, if not too costly, such a composition would do in the southern part of California for fencing, as it is very expensive fencing with boards. Do you think, to make walls from 4 to 6 feet high, of the proper thickness, that a less proportion of cement would do? And would it be necessary to put it through a mill? A. Adobe fences are in use in New Mexico, and might be adopted in Southern California. They are built of sun-dried bricks, composed generally of clay and a little straw. Of course a much more permanent fence could be made of cement concrete. No specially skilled labor would be required in its construction, nor any very elaborate machinery. To 1 barrel of cement or good hydraulic lime, 3 barrels of clean sand and 2 barrels of broken stone might be used; the whole should be well mixed together.

(46) A. J. asks: 1. How big a box will just contain 20 bushels of charcoal? A. The bushel contains 2150 1/4 cubic inches, nearly; therefore, $\sqrt[3]{2150 1/4 \times 20}$ = the dimensions of the box required. 2. Is it right to heap such a box? A. No. 3. What is the legal weight of a bushel of charcoal? A. There is no legal weight for charcoal: it varies greatly in weight, owing to the absorption of moisture and incomplete charring.

(47) F. Mc. M. asks: How can I take nitric acid out of a mixture, and leave the mixture unaltered? A. You must state the other constituents of the mixture. It is not possible to answer your question without knowing them.

(48) G. A. B. asks: 1. Will common sheet zinc do to put in muriatic acid for soldering fluid, or is a purer quality necessary? A. Sheet zinc will answer perfectly. 2. What is indicated when small, black, irregularly shaped lumps appear floating in the acid after the zinc is dissolved? A. These are the impurities of iron and carbon contained in the metal.

(49) I. H. T. asks: Is there anything that will remove violet ink from woolen goods? A. We do not think you will be able to remove it completely without injury to the fabric. Try hot alcohol and water.

(50) P. M. asks: 1. Where is the proper place to put a ventilating register in a sleeping room, right above the hot air register or about 18 inches down from ceiling downward? A. A ventilating register should not be placed too near a hot air register, as the warm air in that case will have a tendency to pass direct from the one to the other without circulating in the room. A desirable place is on the opposite side of the room, near the floor. It is better, however, to have two registers in the flue, one at bottom and one at top, and graduate the extent of their opening by experiment. 2. What are the right proportions for an ellipse? I generally make one 9 inches in height for every foot in width; but I do not know the right proportion. A. Ellipses may be constructed of any proportion in harmony with their use. The proportion you have adopted is a good one for ordinary purposes.

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

S. E. E.—It is black oxide of manganese, containing a large percentage of sesquioxide of iron.—N. T. W.—It is galena or sulphide of lead.—H. K. (June 27) It is iron pyrites and chalcopyrite.—J. H. T.—No. 1 is a piece of hornblende. No. 2 is an iron ocher.—J. F. F.—It is a kind of Tripoli powder, used for polishing purposes.—M. F. T.—One is iron pyrites, the other quartz rock and mica.—J. S. H.—It does not contain lead nor silver. A complete analysis would be necessary to determine all of its constituents.—H. E. F.—It is black mica.—W. W. E.—It is galena or sulphide of lead. If in large quantities, it is a valuable ore.—We have received some minerals in a match box, with no letter. No. 1 is a piece of trap rock. No. 2 is a partially decomposed granite, containing iron pyrites. No. 3 is red sandstone. No. 4 is a piece of glass.—H. K. (July 5).—It is decomposed sandstone, not valuable.—E. L. S.—It is a piece of slate, with a little iron ocher adhering.—We are in receipt of a small section of brass pipe, the thread on the outer surface of which is much and deeply corroded. It is labelled "Oneida Community." There is no letter with it.—W. W. N.—Iron pyrites (sulphide of iron).—B. McD.—No. 1 is magnesian limestone, containing crystals of iron pyrites. No. 2 contains silica, alumina, lime, magnesia, and iron.—C. S. B.—The specimen consists of partially decomposed sulphide of iron. We do not think it is of meteoric origin.

E. E. asks: What are the colored fluids put in bottles for display in druggists' windows?—B. C. asks: How can I make a soap for extracting grease and dirt from woolen cloth, without injuring the texture?—C. J. J. asks: How can I polish and color wooden smoking pipes?—W. J. B. asks: What is the best mocking bird food?—T. C. D. asks: What is the lowest point marked by the thermometer in any of the polar expeditions?

COMMUNICATIONS RECEIVED.

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

- On the Meteor of July 8. By J. M. D.
On a National Monument. By L. S. B.
On a Little Brag. By Y.
On Irrigation. By F. C.
On Oracles. By A. M. S.
Also inquiries and answers from the following:
E. L. C.—F. W. W.—C. J. G.—C. F. S.—H. W. C.—A. R. F.—S. J. B.—A. M. S.—J. B. L.—J. S. L.—F. G. B.

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.

Inquiries 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 buys white soapstone? Who buys corundum? Who makes the best brass wire? Who sells barometer tubes? Who manufactures Yankee "notions"? Whose is the best rotary engine? Who sells spectrosopes? Who makes the best propeller wheels for steam yachts? Who makes wind wheels? Whose is the best elevator for raising water? Who makes the best flexible hose for conveying water? Whose is the best steam fire engine?" 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 July 11, 1876, AND EACH BEARING THAT DATE. [These 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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