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For best Presses, Dies, and Fruit Can Tools, Bliss & Williams, cor. of Plymouth and Jay, Brooklyn, N. Y.

For Solid Wrought-iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph &c.

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For Solid Emery Wheels and Machinery, send to the Union Stone Co., Boston, Mass., for circular.

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Spinning Rings of a Superior Quality—Whitinsville Spinning Ring Co., Whitinsville, Mass.

For best Bolt Cutter, at greatly reduced prices, address H. B. Brown & Co., New Haven Conn.

Diamond Tools—J. Dickinson, 64 Nassau St., N. Y. Temples and Oilcans. Draper, Hopedale, Mass.



X. is informed that no one is entitled to make, for his own use, an article that is patented. The right to sell patented articles in a certain territory depends on the agreement which the agent has made with the patentee.—J. F. W. will find a recipe for lemon sugar on p. 378, vol. 30.—R. B. will find good directions for making an aquarium on p. 80, vol. 31.—N. F. will find a recipe for gutta serena varnish on p. 379, vol. 30.—J. N. will find a description of the physiological and pathological properties of alcohol on p. 91, vol. 31.—W. H. K. will find an illustrated description of the gyroscope on p. 91, vol. 31.—W. M. will find good directions for building a cistern on p. 91, vol. 31.—F. W. can straighten his gun barrel by the process described on p. 107, vol. 31.—N. S. B. & Co. will find, on p. 43, vol. 33, a good recipe for aquarium cement.—R. K. will find a good recipe for preserving timber on p. 285, vol. 33.—G. G. B. will find a good recipe for blacking for patterns on p. 409, vol. 33.—J. C. L. is informed that his queries as to currency are not in our line. Many saws are made entirely in this country; some very large ones are made from steel plates made and forged in England.—A. D. will find directions for preserving eggs on p. 219, vol. 31.—E. T. A. will

find directions for producing verde bronze on brass on p. 283, vol. 31, and for an Etruscan color on jewelry on p. 383, vol. 33.—C. W. E. will find a prescription for boils on p. 379, vol. 24.—S. Z. R. will find a description of a method of wire transportation on p. 370, vol. 31.—L. D. will find directions for black enamel on iron on p. 208, vol. 26.—A. R. S. will find directions for melting brass in small quantities on p. 283, vol. 33. An average brass melts at 1750° Fah.—S. S. B. will find directions for staining common wood in imitation of black walnut on p. 337, vol. 33.

(1) A. B. H. asks: What will cause aniline colors to penetrate furs, felt, etc.? A. The great affinity that woolen materials have for all the aniline colors, we should think, would render the dyeing of even very fine felt a not difficult matter, if properly managed. Where a delicate shade is required, the fibers are sometimes dyed before matting. In any case the material should first be properly cleansed.

(2) W. S. W. says: I have read of drowned persons being found by putting mercury in pieces of bread and letting them float on the water in which the bodies were supposed to be. The bread floated till it came over the bodies and then sank, it being supposed that the mercury was attracted by articles of gold jewelry on the bodies. Is this so? A. The statement is not true. The most delicate instruments have failed to determine the existence of any attraction between the two metals, save the force of chemical affinity which acts between the molecules at extremely minute distances. This also answers several other correspondents.

(3) T. Y. asks: What liquids (besides acids) will absorb or dissolve sal ammoniac in crystals? A. Water.

(4) G. W. D. says: In the manufacture of raisins by artificial processes, the grapes are dipped in a strong, hot solution of concentrated lye, which opens the pores, or cuts the skin, so that the moisture can pass off freely in the evaporating chamber. Such preparatory treatment, however, leaves on the raisins an alkaline taste, which is objectionable. Can you suggest some other method by which the skin of the grape can be opened or softened for the purposes named, without injury to the flavor? A. In the preparation of raisins for the market, this and similar processes seem to be employed almost universally. In cases such as you mention, where the taste of the raisin has been impaired by such treatment, we should recommend the trial of some method that will tend to neutralize or destroy the objectionable flavor, such as dipping for a few moments into a solution of citric or tartaric acid in water, washing in clean water, and finally re-drying.

How can I remove the oil from salmon, preparatory to drying same, so as to overcome the tendency to rancidity? A. We do not know of any method by which all the oil may be removed and the fish remain intact. The tendency to rancidity might be overcome by steeping the fish for a short time in a solution of some harmless disinfectant, such as salicylic acid or iodate of calcium.

(5) C. P. says: I poured some clean water in a tumbler, and then some kerosene oil, when the water remained on the bottom. On adding common whitewash and stirring the whole mixture, the lime sunk to the bottom, then came a layer of water, then a layer of spawn like matter, then clear kerosene. What was the spawn-like matter? A. Probably a mixture of water and oil, in which case, if allowed to remain quiet for a short time, it would separate, and a distinct line would mark the surface of contact between the two liquids. You should have stated what, besides lime and water, the whitewash contained, if anything.

(6) F. X. M. says: 1. It is said that muddy water will freeze into clear ice. If that is the case, at what point does the clarification commence? It is evident that water may be very cold, and yet remain muddy, so that it must be at the freezing point: it is certainly not after the ice has formed. A. Water, on freezing, does purify itself from all foreign matter provided the latter be not in too great excess, in which case the rejected impurities may become entangled between the fast forming crystals. This self-purification probably takes place at the moment of crystallization. 2. In building an ice house, what cheap substance is best for filling between the walls? A. Use good charcoal, finely crushed. 3. What advantage is it to a cooking stove to feed the fire with air heated to 300° instead of supplying it directly from the apartment, at 50° to 70°? A. A slight saving in fuel.

(7) J. W. S. says: Please give me a good recipe for making green paint for window blinds. A. An excellent pigment for this purpose consists of chrome green (hydrated oxide of chromium) ground in oil and tempered with white lead and sometimes barytes (sulphate of baryta).

(8) E. R. says: I am making a pulse tester. I have a very light glass tube, with a ball at one end. It is half filled with alcohol; and in order to expel the air, I boiled the alcohol, and then closed the tube by the spirit lamp, but it does not work satisfactorily. If I mix a little liquid carbonic acid with the alcohol, would there be any danger of explosion in case the tube should break? A. It requires some care and practice, as well as some previous knowledge of the requirements of the case, in order to satisfactorily construct these little instruments. Carbonic acid is not suitable for the purpose, and there is danger in using it.

(9) H. S. asks: How much would a steam boiler, made of copper 1/2 inch thick, of a cylindrical form, 18 inches in diameter, and 13 inches deep, stand? A. About 15 lbs. 2. What part of a horse power would such a boiler give, if kept boiling? A. We cannot tell you, as there is no rule for it.

(10) A. E. R. says: In warming a shop with exhaust steam, shall we get more heat by closing the drip pipe cocks so far that nothing but water will come out, thereby letting about half the exhaust steam into the air through the exhaust pipe, or by opening the drip pipe cocks and letting all the exhaust steam through the heating pipes? A. By the latter method, as we understand the question.

(11) W. W. L. says: I wish to build a boat to go up the rivers of Texas. There will be four men, with the necessary baggage for a hunting expedition. We want a small cabin, and the boat should be so constructed as to run about 5 miles an hour. What should be the dimensions and shape? What power of engine will be required? What should be the size and pitch of propeller? Would side wheels do as well as a screw? She should not draw over 1 foot of water. A. You can make a boat 30 feet long, and 5 or 7 feet wide, and use an engine 5x6 inches, and a propeller 32 inches in diameter and of 4 feet pitch.

(12) J. E. H. says: 1. Given a small steam boiler containing naphtha instead of water. If heat is applied, will the hydrocarbon vapor that is formed have the same behavior as steam, and will a steam gage indicate the pressure in the boiler as if it were steam? A. Yes, unless the naphtha is more volatile than water. 2. If naphtha be used for sometime, as in the above case, will there not be a thickish deposit in the boiler, which will be require to be cleaned from time to time? A. Generally, yes.

(13) J. B. W. says: I put a lightning rod on my dwelling; area of roof is 2,000 feet. Rod is made of copper about 1/2 inches in diameter. I led the end of it into a bed of about half a barrel of iron turnings, not spread out into large surface but tumbled into an excavation made for the purpose, and so arranged that the bottom of the mass of turnings was about 3 feet below the surface of the ground, and the top about 1 foot below, the rod running through the mass and some 5 feet into the ground. Now what I want to know is, if this conducting material and the manner of placing it is in accordance with your views of safety? If not, what can I do to remedy it? A. Your method of arrangement of rod within the conducting material at the terminal is correct; but your rod has the common defect, namely, its terminal in the ground is insufficient. You have 10 feet conducting terminal. You should have 2,000 feet. The rule for dry soils is to have for the terminal of the rod, underground, an area of conducting surface equal to the roof area. Your roof area is 2,000 surface feet. You should therefore have a conducting surface of 2,000 feet for your rod terminal. Charcoal is an economical material for the purpose. A trench 400 feet long, 18 inches wide, 5 feet deep, with a layer of charcoal on the bottom 9 inches deep, firmly compacted, and the rod extended along the whole length of the trench, in the center of the charcoal, will give you a reliable terminal. The joints of the rod should be welded, or soldered and firmly bound, so as to make the rod, practically, one continuous piece of metal.

(14) H. F. K. asks: I am desirous of heating my shop by live steam. Can you give a rule by which I can know the boiler capacity requisite for every 100 feet of radiating surface in my pipes? I wish to rate the boiler low enough to secure a fair economy of fuel. A. You do not send sufficient data; but by applying to a reliable boiler maker, and giving him full particulars, you can doubtless ascertain the proper proportions.

(15) A. M. says: My flouring burrs are running on very hard spring wheat; and they sweat badly and gum up everything near them with dough. How can I prevent this? A. We do not know of any remedy except waiting for the wheat to dry, if your stones are properly dressed. If any of our readers can aid you, we would be glad to hear from them.

(16) W. R. C. asks: 1. Can I locate a boiler 100 yards from the building containing the engine, and can I, by laying underground a tube, properly protected, run the engine? Will there be much loss of steam? A. Lay the pipe in a box and pack sawdust or other non-conducting material around it; and put in a good trap to carry off the condensed water.

(17) W. I. Co. say: We have a large vein of magnetic iron ore, but it has an access of top water. By making a cross cut tunnel or adit, 600 feet in length through soft ground (which requires timbering), we can cut the vein at 50 feet under the surface for a water adit, and save the pumping of the water to the surface from that depth. What is the customary adit grade in Cornwall and other parts of Europe, and in America? Of what grade are the railroad tunnels in America and in the Alps, that carry off their top water? A. The grades vary considerably, from 0.67 feet in 1,000, where a very slow current is desired, to 1 in 400.

(18) W. M. D. says: I am building a small engine, 2 1/2 by 5 inches stroke. My boiler is 30 inches long, internal diameter 17 inches, made of boiler plate 1/2 inch thick. Would cast iron heads do? Of what thickness should they be? Will 6 one inch flues be sufficient? What pressure will it be able to carry? A. It would be better to use wrought iron heads. Get in as many tubes as you can without corroding. If your boiler is well built, it should sustain from 130 to 140 lbs. per square inch with safety.

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

J. A. B.—A variety of magnetic oxide of iron.—W. H. G.—It is decomposed spar, and consists of siliceous alumina, and carbonate of lime, which constitute the chief part. It does not necessar-

ly indicate the presence of metal. There are many localities of tin ore in the United States, but no genuine tinmines. Tin is usually associated with fluor, apatite, topaz, blende, wolfram, etc.—N. W. D.—No. 1 is a rock composed of calcite, chondrodite in grains, and traces of serpentine. There is no reason for rejecting the determinations of the professional assayer. No. 2 consists of hornblende, quartz, feldspar, and muscovite, and the silver may be taken as the assayer has determined.

J. R. A. asks: How can I cure and prevent cracked heels in horses?—J. L. asks: How is oatmeal manufactured?—R. H. B. says: The general impression is that the rainbow is literally a bow. Has any one ever seen the complete circle of a rainbow, which of course can only be seen from a balloon?—B. B. asks: Will it damage flax straw for manufacturing purposes to thrash it with a common spike cylinder thrashing machine?

COMMUNICATIONS RECEIVED.

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

On Chemistry on a Mathematical Basis. By E. V.

On the SCIENTIFIC AMERICAN'S Publications. By J. M. R.

On Mr. Edison's Discovery. By N. P.

On a New Form of Chair. By C. M. A.

On the Hydro-Pneumatic Puzzle. By W. H. C.

On the Speed of Pulleys. By J. B.

Also inquiries and answers from the following:

F. B. S.—R. B.—J. T.—S. N.—F. H.—C. E. H. Jr.—P. S.—W. H.—W. S. D.—C. B. L.—R. Y.—J. G.—A. A. E. R. McG.—A. A. M.—A. J. C.—R. C.—W. L. G.—E. H.—A. J. M.—J. H. H.—W. D.—A. S. C.—B. P.—J. D.—H. B. P.—C. J. T.

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 sells the best permanent magnets? Who makes the best traction engines? Who is the best machine for mitering picture frames?" 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 December 21, 1875. AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]

Table listing inventions and their patent numbers, including items like Anti-incrustation compound, Axles, setting metal, Bale tie, Barrel, Barrel headings, Bee hive, Belt tightener, Bird cage feed cup, Bit stock, Boiler, Book and music support, Book-backing machine, Boot-nailing machine, Boot-pegging machine, Boot jack, Bottle stopper, Bottle stopper, Botting mineral water, Boxes, corner joint for, Braces and suspenders, Bracket for shelves, Brick machine, Bridge, iron truss, Buck board, Burner and generator, But on, sleeve, Buttons, manufacture of glass, Calendar, Can opener, Can powder, Can receptacle, Candy heater, Car brake and starter, Car coupling, Car coupling, Car dumping apparatus, Car sleeping, Carpet linings, Carpet stretcher, Carriage, child's, Carriage wheel, Carriage stay end die, Cartridge, blasting, Chair, dental, Chair, folding, Chair seat, Check box and cash indicator, Churn.