

Business and Personal.

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600 New and Second-hand Portable and Stationary Engines and Boilers, Saw Mills, Wood Working Machines, Grist Mills, Lathes, Planers, Machine Tools, Yachts and Yacht Engines, Water Wheels, Steam Pumps, etc., etc., fully described in our No. 11 list, with prices annexed. Send stamp for copy, stating fully just what is wanted. Forsaith & Co., Machine dealers, Manchester, N. H.

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A. J. K., who asked as to drying sand, p. 171, vol. 36: please address Allen H. Bauman, Pittsburgh, Pa.

Glass Monuments, patented Sept. 7, 1875. The whole Patent or State rights for sale. For description and terms, address the inventor, A. Pfeiffer, 13 Ave. A., N. Y.

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Flouring Machinery Manufacturers send me Catalogues. J. K. Madden, 11 Cliff St., Jersey City Heights, N. J.

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\$3,500 buys a machine and model shop full of orders. List of tools and particulars sent on application to T. B. Jeffery, 253 Canal St., Chicago, Ill.

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

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Solid Emery Vulcanite Wheels—The Solid Original Emery Wheel—other kinds imitations and inferior. Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, New York.

Consumption Cured.—An old physician retired from active practice, having had placed in his hands by an East Indian missionary the formula of a simple vegetable remedy for the speedy and permanent cure for Consumption, Bronchitis, Catarrh, Asthma, and all Throat and Lung affections, also a positive and radical cure for Nervous Debility and all nervous complaints, after having thoroughly tested its wonderful curative powers in thousands of cases, feels it his duty to make it known to his suffering fellows. Actuated by this motive, and a conscientious desire to relieve human suffering, he will send, free of charge to all who desire it, this recipe, with full directions for preparing and successfully using. Sent by return mail by addressing with stamp, naming this paper, Dr. J. C. Stone, 32 North Fifth Street, Philadelphia, Pa.

Steel Castings from one lb. to five thousand lbs. Invaluable for strength and durability. Circulars free. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

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

Skinner Portable Engine Improved, 2 1/2 to 10 H. P. Skinner & Wood, Erie, Pa.

Emery Grinders, Emery Wheels, Best and Cheapest. Awarded Medal and Diploma by Centennial Commission. Address American Twist Drill Co., Woonsocket, R. I.

To Clean Boiler Tubes—Use National Steel Tube Cleaner, tempered and strong. Chalmers Spence Co., N. Y.

Silver Solder and Small Tubing. John Holland, Cincinnati, O.

Articles in Light Metal Work, Fine Castings in Brass-Malleable Iron, &c., Japanning, Tinning, Galvanizing, Welles' Specialty Works, Chicago, Ill.

Split-Pulleys and Split-Collars of same price, strength and appearance as Whole-Pulleys and Whole-Collars. Yocum & Son, Drinker st., below 147 North Second st., Philadelphia, Pa.

Foot Power Scroll Saws. W. E. Lewis, Cleveland, O. Wanted.—A first-class Wood Engraver. Address Engraver, P. O. Box 271, Cincinnati, O.

Wanted.—A first-class Mould Maker on Undertakers' Hardware. Address Mould Maker, P. O. Box 387, Cincinnati, O.

Shingle Heading, and Stave Machine. See advertisement of Trevor & Co., Lockport, N. Y.

D. Frisbie & Co. manufacture the Friction Pulley—Captain—best in the World. New Haven, Conn.



G. H. will find a table of the electric conductivities of metals on p. 107, vol. 33.—J. H. will find the proper dimensions of boats in recent numbers of the SCIENTIFIC AMERICAN SUPPLEMENT.—A. W. G. will find a good recipe for brass for small castings on p. 171, vol. 30.—E. S. B. will find directions for making a concrete pavement on p. 185, vol. 33.—A. L. B.'s query as to the manufacture of postage stamps was answered on pp. 208, 277, vol. 27.—J. I. S.'s query as to the telephone is answered on p. 191, vol. 36.—J. C. E. will find a recipe for a depilatory on p. 186, vol. 34.—W. H. J. will find on p. 344, vol. 32, a recipe for cement for marble.—C. E. will find on p. 283, vol. 30, directions for polishing marble.—C. B. will find an answer to his query as to troubles with the feet on p. 123, vol. 33.—C. B. should trace his map on cloth with a pen and Indian ink.—A. E. will find directions for lead burning on p. 167, vol. 32.—E. P. H. will find something on spring power on p. 220, vol. 31.—H. T. P. will find that a remedy for mildew on cloth is described on p. 138, vol. 27.—R. H. H. will find an article on impressions on the retina on p. 193, vol. 36.—G. H. W. can polish German silver by following the directions on p. 37, vol. 34.—J. C. C. can bleach beeswax by the method described on p. 299, vol. 31.—J. H. T. will find something on silvering glass globes on p. 267, vol. 31.—W. T. A. will find a recipe for silverplating on p. 299, vol. 31. For gold plating, see p. 116, vol. 32.—G. should try some of the boiler scale preventives advertised in our columns.—W. T. will find directions for dyeing felt hats black on p. 101, vol. 30.—A. M. P. M. will find an article on the use of compressed air as a power, for locomotive purposes, on p. 277, vol. 34.—G. E. D. will find directions for gilding picture frames on p. 90, vol. 30.—J. V. will find directions for gilding without a battery on p. 116, vol. 33.—C. E. B. will find, on p. 229, vol. 33, something about boilers for small engines. As to horse power of small engines, see p. 33, vol. 33.—J. W. C. will find directions for making soap on pp. 331, 378, vol. 31.—C. A. A. will find something on the manufacture of vinegar on p. 106, vol. 32.—N. L. R., W. C., F. J. B., C. K. W., R. B., J. F. S., J. S., W. M., J. H. N., J. F. McG., G. W. S., F. M. L., 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) H. S. asks: How can I make a platinum chain? How can I melt platinum? A. Pure platinum can only be fused by the aid of the oxyhydrogen blowpipe. Place the metal in a small cavity cut out of a piece of pure caustic lime, and cause the flame to impinge upon it strongly until fused. The hottest part of this flame is, when the gases are properly proportioned, within a quarter of an inch of the mouth of the blowpipe.

(2) C. B. says: You give directions for removing stains of smoke from marble. I have some white marble badly stained with wine and beer. How can I clean it? A. Try the following: Take 2 parts common soda (sal soda), 1 part pumicestone, and 1 part finely powdered chalk; sift it through a fine sieve, and mix it with water into a paste. Apply this to the stained parts of the marble; and, after a short time, wash clean with water.

(3) E. H. T. says: I found on the Old Millstone Hill, in Worcester, Mass., several fine specimens of fluor spar. I can find no account of its being found before in Massachusetts. A. It has been found in considerable quantities at the Southampton lead mines, and elsewhere.

(4) C. A. F. asks: How can I test a syrup (made from starch) for dextrin or gum? I want to know when the saccharification is complete. The ordinary iodine test will not apply to this case. A. The entire conversion of the dextrin into grape sugar cannot be ascertained with certainty by the iodine test, as in some cases a purple-red tint is observed, while in others there is no change. The most reliable test is that with alcohol, founded on the known insolubility of dextrin in an alcoholic menstruum. To 1 part of the solution to be tested, there are added 6 parts absolute alcohol; if no precipitate is observed, there is no dextrin remaining, and the conversion has been entire.

(5) C. C. S. asks: 1. Why is it that the day does not increase or decrease in length at both ends, by the same number of minutes? A. Taking one half of the year from January 1 to July 2 inclusive, the days increase in length 5h. 44m.; one half, 2h. 52m., is in the morning, the other in the evening. Taking it altogether, there is as much change at one end as the other; but the motion of the earth in its orbit, in combination with its diurnal motion, makes the daily variation sometimes at one end of the day, and again at the other end. 2. Why does the number of minutes added to the day's length vary so? A. They appear to have a daily fluctuation because the seconds are not taken into account. They also have a regular increase or decrease, dependent on the earth's position in its orbit.

(6) E. A. asks: In what position between the lenses which constitute the eyepiece should the diaphragm be placed? A. In the combination at the eye end, it should be in the focus of the eye lens; in the other combination, Fraunhofer placed it in the middle. The French opticians place it about six tenths of the distance between the two lenses, toward the eye end.

(7) C. E. A. asks: Can a person receive a cold from another, under ordinary circumstances, by being in the same room? A. Probably not.

(8) R. W. S. asks: 1. What cheap chemical can be used to change ink to a deep or jet black? A. Try a little solution of extract of logwood. 2. Can aqueduct water be used in place of rain water for making ink? A. Such water may be used if it is clear and not too hard.

(9) J. McC. asks: Is there anything that would answer for a condensing coil in a distillery that would be cheaper than copper, and at the same time be as durable? A. No; copper is best.

(10) A. R. T. asks: Can a drive well be driven in rock? A. Yes.

Is sulphur injurious to leather? A. Sulphur alone is not injurious.

A friend says that the saw does not possess any of the mechanical powers. I say that each tooth acts on the principle of the inclined plane. A. You are right.

(11) D. H. E. says: 1. Professor Silliman, in his "Chemistry," says: Put bicarbonate of soda and water in one end of a strong cylindrical vessel; and in a tube in the other end put sulphuric acid. The arrangement is such that, when the vessel is inverted, the contents mix, and carbonic acid gas is produced. Would it keep therein six months under high pressure? A. Yes. 2. Could a small vessel be made to hold it so long, with rubber or leather packing under the cap screwed on? A. Yes.

(12) C. B. says: Will goldfish live in the water of a fountain, rain or cistern water being used? A. Yes. Sprinkle a few bread crumbs in the water every day.

(13) C. K. asks: 1. Is it injurious to health to sleep in a room containing a rather large amount of green fruit? A. If the room is properly ventilated, you will experience no injurious effects. 2. Does the fruit exhale carbonic acid at night? A. Very little.

(14) J. C. K. asks: What is the diameter of a circle whose area is 1 inch? A. 1.184 inches.

Is there a dictionary of mechanical and chemical words? A. Yes; but as new names are very often coined for new articles or ideas, it is not probable that dictionaries which have been published for some years will have them all.

Why does a circular saw make marks in the lumber at every revolution? A. Because some of the teeth are set wider than the others.

(15) C. R. asks: What is the difference in temperature between the steam and the water in a boiler, under 70 lbs. pressure? A. The difference, in general, is not more than 5° or 6° Fah.

(16) W. T. says: 1. I understand that, if the safety valve of a boiler be raised when the steam pressure is high and the water low, there would be danger of an explosion. If this be so, will you have the kindness to tell me why? A. A sudden escape of steam might carry up some of the water into contact with the overheated plates. 2. In a small yacht boiler, would it be injurious to keep steam down by throwing small quantities of water into the furnace? A. It would be better to use a damper and cover the fire. 3. It is recommended to raise the safety valve to let the air out of the boiler when getting up steam. If this is not done, what would be the consequences? A. The pipes and connections fill with air, which sometimes is troublesome to expel. Considerable instruction as to the duties of an engineer is scattered throughout treatises on the steam engine, as well as through the pages of the SCIENTIFIC AMERICAN.

(17) R. H. T. says: I am running an engine of 62 horse power in connection with three breast wheels of 100 horse power. Owing to back water on the wheels, they are not able to do their work. The regulator of the wheels is disconnected, and the engine does the regulating. How much of the work ought the engine to do, to do the regulating? I claim that the engine ought to hold the balance of power. Am I right? I also contend that, if the engine and the wheels are regulated at 40 lbs. pressure, and the steam goes up to 65 lbs., it is the same as putting more back water on the wheels? Am I correct? After the engine and the wheels are regulated at a pressure of 65 lbs. (this is the amount of steam that she is intended to carry if the steam drops down to 50 lbs.), can she do her work without more water on the wheels? A. Your views, as we understand them, are generally correct. Suppose the whole power is 150, of which the wheels at most do 100, and the engine 50—but that at times the work of the wheels falls off to 88—then, in order that the power may be uniform, the engine must exert 62; and the engine will do the regulating if it can change its power promptly, within the limits of the variation in the power of the wheels.

(18) A. S. asks: What ingredients and proportions are used to produce the different shades of light so often used in theaters? A. We give below a table of the composition of the mixtures commonly employed for colored fires in tableaux, etc. These fires, however, should never be used within doors, as the gaseous products of some of them are extremely poisonous (see articles on pp. 84 and 171, vol. 36). The lime light lanterns and lenses of suitably colored glass have now been generally substituted for these fires, and give much better results.

| | a | b | c | d | e |
|---------------------------------------|-------|------|--------|------|-------|
| | Green | Red | Yellow | Blue | White |
| Chlorate of potash . . . | 32.7 | 29.7 | | 54.5 | |
| Sulphur | 9.8 | 17.2 | 23.6 | | 20 |
| Charcoal | 5.2 | 1.7 | 3.8 | 18.1 | |
| Nitrate of baryta . . . | 52.3 | | | | |
| “ “ strontia | | 45.7 | | | |
| “ “ soda | | | 9.8 | | |
| Ammonium sulphate of copper | | | | 27.4 | |
| Saltpeter | | | 62.8 | | 60 |
| Black sulphide of antimony | | 5.7 | | | 5 |
| Floury gunpowder . . . | | | | | 15 |

It is hardly necessary to mention that great care is required in mixing these materials, and that each should be pulverized separately.

(19) R. A. asks: Does the Dipper revolve around the North Star? A. No. The Dipper and North Star are on opposite sides of the pole, and as regards each other are very nearly stationary. They both have

two apparent revolutions around the pole, one every day, which is due to the diurnal revolution of the earth on its axis, the other once a year, which is due to the annual motion of the earth in its orbit around the sun.

(20) R. N. says, in answer to H. M. C., who asked: If the three sides of a triangle be given, what is its area? Consider the longest side the base; from the square of the base take the product of the sum and difference of the other sides, and divide the remainder by twice the base; multiply the square of the base by the product of the sum and difference of the shortest side and the quotient; half the square root of the result will be the area. Example: Let the sides be 10, 7, and 5; $\frac{100 - (12 \times 2)}{20} = 3.8$, and $\frac{1}{2} \sqrt{100 \times 8 \times 1.2} = \frac{1}{2} \sqrt{1056} = 11.441+$, for the area.

(21) C. asks: What is the best cement for rubber bags, to be used for hot water? A. Dissolve caoutchouc, cut into small fragments, in naphtha, by heat and agitation. Strain this solution through a linen cloth and concentrate to the consistency of a thin paste. The cement is best applied slightly warm, and the joint strongly clamped between strips of wood for 24 hours before using.

(22) G. S. asks: What will take the smell out of porpoise oil? A. Agitate the oil with about 3 per cent of sulphuric acid, and then with 10 per cent of chloride of lime (hypochlorite of lime) while moderately hot. Finally wash thoroughly with hot water and allow to settle. This treatment will not completely deodorize the oil, but it will correct all rancidity.

(23) L. H. says: 1. I have an engine of 1/2 horse power, which I would like to put into a boat 30 feet long of 5 feet beam. Is it powerful enough to propel said boat at the rate of 8 miles an hour? A. No. 2. How can I learn the signals of the steamboat whistle, such as the pilots use? A. We advise you to interview a boatman.

(24) S. S. C. asks: 1. In a silver-plating bath, should the surface of anode immersed equal the surface of cathode? A. They should be about alike. 2. Is there any way of testing the amount of free cyanide in a plating solution? A. Yes. See Sprague's "Electricity; its Theory, Sources, and Applications." 3. In a nickel ammonia sulphate solution, does the ammonia or acid act upon the nickel anode to keep the strength of the solution up? A. The acid.

(25) D. A. R. says, in answer to E. L., who asked of what diameter should drills be to fit 1/2, 3/4, etc., pipe taps, I send you a table and rule for computation. The outside diameters are from Morris and Tasker's table of standard sizes.

| Inside diameter. | Outside diameter. | Outside allowing for the taper. | Diameter at bottom of thread = size of drill in inches. |
|------------------|-------------------|---------------------------------|---|
| 1/8 | .405 | .362 | .298 |
| 3/16 | .54 | .497 | .401 |
| 1/4 | .675 | .632 | .509 |
| 5/16 | .84 | .777 | .654 |
| 3/8 | 1.05 | .987 | .837 |
| 1/2 | 1.315 | 1.252 | 1.102 |
| 5/8 | 1.66 | 1.586 | 1.436 |
| 3/4 | 1.9 | 1.826 | 1.676 |
| 7/8 | 2.375 | 2.301 | 2.085 |
| 1 | 2.875 | 2.788 | 2.559 |
| 1 1/8 | 3.5 | 3.399 | 3.189 |
| 1 1/4 | 4 | 3.888 | 3.683 |
| 1 1/2 | 4.5 | 4.388 | 4.188 |

The taper used in calculating is that given by Pratt and Whitney, 1 inch to foot and the length of threads on 1/2 to 3/8 is 1/2 inch, 1/2 to 1 is 3/4, 1/2 to 2 is 1, and 1/2 to 4 inches is 1 1/4 inches. The rule for computing size of drills is: Subtract from the outside diameter (after allowing for the taper) the product of the pitch by 1.732, which gives the diameter at the bottom of the thread, or the size of the required drill.

(26) M. C. H. says: I am building a time regulator and want to make a mercurial compensating pendulum to beat seconds. The rod is to be of steel, and the bob a glass tube filled with mercury. At what height must the mercury stand in the tube to compensate correctly? A. You will have to determine the exact height by experiment. It will probably be between 6 1/2 and 6 3/4 inches.

(27) G. W. J. says: I have been making a plain cylindrical boiler, without flues. It is 9 inches in diameter and 20 inches long, of No. 18 galvanized iron. The seam is lapped 1 1/4 inches, and riveted with 2 rows of iron rivets, 1/2 of an inch in diameter, 35 in each row, and the rows are 1/2 inch apart; the edges of the iron are soldered inside and out. The heads are of cast iron 1/2 inch thick, with flange 1/4 inch thick and 3/8 inch wide, to receive rivets. Each is riveted with 56 iron rivets 3/8 inch in diameter. Where is the weakest point, and at what pressure would it be safe to run it for a small engine? A. The heads are probably the weakest parts. Working pressure, 20 lbs. per square inch.

(28) J. R. S. says: I claim that, when the gauge on a steam boiler shows a pressure of 10 lbs. or upwards to the square inch, that the pressure is equal on all parts of the boiler. A friend claims that it is not. Who is right? A. The one who claims that the pressure is not the same on all parts of the boiler, is correct.

(29) J. W. P. asks: 1. If a wind wheel be put at the mouth of a bellows, will it not have power enough to replace more air into the bellows than it takes to turn the wheel? A. No. 2. If the wheel is to be 2 feet in diameter and a pulley on its axle be 6 inches in diameter, will it not run the lever to work the bellows? A. No.

(30) I. says: An inventor of a steam boiler states that he has used his boiler for eighteen months with muddy water, and that on inspection he finds no scale or sediment, although the boiler has never been blown off. He claims that all sediment and scale-forming impurities of the water pass off with the steam into the cylinder of the engine. He states that his boiler primes less than two per cent. What experience have you that makes it credible that a boiler that will not prime will carry the sediment into the cylinder? A chemist has told him that the scale-forming impurities, both of salt and fresh water, will not injure the cylinder, but will act as lubricators. Is this true of all scale-forming impurities? A. These statements are not verified, in general, by experience.

(31) S. U. says: We have a cast iron sectional steam boiler, for heating. As soon as the steam gauge commences to indicate pressure, the water leaves the boiler and goes off in the supply pipes. Can you tell us how to remedy this? A. As we understand you, the water goes from the boiler to the heating pipes, and then returns. We presume this is what is intended. If not, it is probable that the insertion of a valve will prevent the escape of the water.

(32) M. M. C. asks: 1. Which is best for annealing cast iron—charcoal or bituminous coal, and why? A. Charcoal, generally, as it contains less impurities. 2. What is the formula for calculating the tensile strain on the iron of a boiler shell, diameter of boiler, thickness of shell, and pressure of steam being given? A. See Van Buren on the "Strength of the Iron Parts of Steam Machinery." 3. How many square feet of heating surface in a boiler are generally required for a horse power? A. We do not know what is meant by the horse power of a boiler. 4. Is an oblique cone, that is, a cone whose axis is inclined to the plane of its base, measured by the area of its base into 1/2 the perpendicular height? A. Yes. 5. What is the formula for finding the volume of a cylinder? A. Area of base multiplied by altitude.

(33) G. T. P. says: 1. I have a glass tube 1/4 inch inside diameter. How many inches shall I have to raise the mercury in it to equal 1 lb. pressure? A. Height of column 2 1/2 inches. 2. How much mercury shall I use? A. Volume of mercury, about 1/16 of a cubic inch.

(34) F. L. asks: 1. Could I boil about 45 gallons of linseed oil in a large copper vessel, by having the steam and the steam pipe running into the oil, or would the water from the condensed steam affect the oil? A. No; some of the steam would condense in the oil. 2. Do you think it would take any more than one or two barrels of oil (of 45 gallons each) to varnish a 40 foot balloon, giving it three or four coats of the varnish? A. The quantity would be amply sufficient. 3. Would linseed oil, that is sold already boiled, do for a balloon varnish, just by painting it on the balloon when it is cold, or should I warm it up to some degree? A. No. 4. Do you think it improves linseed oil varnish to put beeswax in it when boiling, say about 1 1/2 ozs. to the gallon? A. No. Boil the oil with the addition of 1/2 lb. of borate of manganese (in powder), and about 5 lbs. of beeswax to the barrel, and apply to the cloth slightly warm. 5. Is it best to varnish the muslin once before it is cut, and once after the balloon is made, to cover the needle holes, or to put no oil on the muslin until it is all made up? A. Give it one coat before and one or two afterward. 6. Would the black gum waterproofs, that the ladies wear in damp weather, do for making balloons? A. The material will not answer.

(35) N. V. says: I have been trying to make ink according to the recipe on p. 250, vol. 34, SCIENTIFIC AMERICAN, and found that it washed off. I thought that perhaps there was too much of the sulphate of indigo, and I increased the quantities of nutgalls and copperas one half; but it still washes off. What is the difficulty? A. If we understand you, the ink in question was not intended to stand washing with water. Judging from your letter, you have nothing to complain of, as the ink as made by you from the recipe mentioned compares very favorably with the best inks of this character in the market.

(36) W. S. asks: In building a residence, is there anything that is of value as preventing conflagration from sparks on shingle roofs? A. There is an asbestos paint that is said to answer the purpose very well.

(37) A. E. R. says: 1. I desire to burn some of the old style burning fluid. How can I make it? A. Use alcohol mixed with one fifth of turpentine or benzine. 2. Will it be dangerous to use with a blow-pipe? A. It is not dangerous when used in suitably constructed blowpipe lamps.

(38) G. H., Jr., asks: 1. How would hard blue burnt brick, set endwise in cement mortar, answer for a public street with heavy traffic, if the brick resists a crushing power of 5,000 lbs. to the square inch? A. It is not resistance to crushing so much as resistance to impact that is required in a good paving material, and the latter quality is not possessed even by the hardest brick. The hammering process that the pavement of a busy thoroughfare undergoes would be fatal to the permanency of brick construction—the effect upon the brick being to pulverize its surface. 2. What effect would the hot and cold weather have on a layer of cement 1 inch thick under the brick, and 1/4 inch all round the sides of them, built in arch shape? A. When the cement is once set, it would not be materially affected by temperature.

(39) R. C. asks: How many degrees of Fahrenheit does it require to hatch chickens' eggs? A. From 104° to 106° Fah. is the proper temperature. You will find an article on this subject on p. 849 of SCIENTIFIC AMERICAN SUPPLEMENT, No. 54.

(40) B. A. asks: Can you tell us the best method of making concentrated lye from ashes? A. Collect the ashes of well burnt wood, place them in a suitable vessel, and leach with water for several days, with occasional stirring. Then transfer the clear liquid to a suitable clean iron vessel, and boil off the water. Collect the impure carbonate of potash thus obtained, mix it with half its weight of slaked lime and 15 parts of warm water, stir for a few minutes, allow to settle, and pour off the liquid. This liquid constitutes common caustic lye. A lye may also be obtained by treating ordinary pearl ash or carbonate of soda (sal soda) with lime and water, as stated.

(41) J. A. L. asks: How can I make a photographic camera? A. The simplest form is a box with a pinhole in one end and the photographic plate at the other. The next higher order is to insert a convex lens in the end (where the pinhole is) with a focus equal to the length of the box. From this to as many as six lenses are used to constitute the optical part, these being arranged with diaphragms, rack and pinion, etc. The boxes (from the above simple form) have an endless variety of forms: the bellows, the swing front, the elevating front, the swing back in several varieties, then the multiplying box, in which from one to one dozen pictures

may be made at one sitting; and the shield which holds the plate has many modern improvements.

(42) E. D. F. says: I am constructing a filter of 11 pipes, made of cedar wood, packed very solidly with fine powdered charcoal, sand, and gravel. The water passes through 121 feet of filtering material which is arranged in sections which can be cleaned or renewed every month. Our river water is the worst in the United States, extremely muddy for six months in the year; but it comes through the charcoal as clear as from a mountain spring. I want to put a tank above the filter, square or oblong in shape. What metal shall I line it with, or of what material shall I make it? A. A cast iron tank would answer your purpose. Plates 18 by 18 inches and 18 by 9 inches are kept in stock for this purpose; they are provided with flanges around their edges, by means of which they are put together with bolts.

(43) S. G. says: Why is it that sewer gas finds its way through the traps into houses? Is it because the traps siphon? If so, what is it that causes the trap to siphon? Or does the pressure of the sewer gas force the water out of the trap, or forces its way past or through the water? A. To remedy the pressure of sewer gas, which forces itself through the water in the traps into the rooms of your house, let the main waste pipe extend without obstruction from the sewer up through the roof to discharge its surplus air into the atmosphere there. Then let the several articles of plumbing have branch waste pipes, and each one be trapped as near to its opening as possible. The upper part of said main waste pipe being only an air pipe, may be of much less diameter than the lower part, which it is necessary to have of larger dimensions.

(44) T. B. says: I recently had to put on a false valve seat on a locomotive. There had been one on before, but I put the new one on differently, leaving three of the old holes in the cylinder. I filled these with Babbitt metal hammered carefully; and I made the metal flush with the surface, put on the seat, and took all precautions to make a good job. When the engine went on the road she "blowed" badly, and continued to get worse, so much so that I had to take the seat off again; and when off, I found the Babbitt metal raised above the surface of the old seat fully 1/2 of an inch. Two of the old holes were between set screws 4 1/2 inches apart, and one between screws 2 1/2 inches apart, and the two were considerably higher than the one. Is it possible for the metal to expand so much as to cause that seat to leak? A. No doubt the leak was caused by the expansion of the Babbitt metal.

(45) R. M. says: I wish to sink a well in order to provide myself with wholesome water. At what distance must I keep from a privy well in rear of my house? The soil is very stiff clay, and I dug my privy well 16 feet deep to secure good soakage. A. Locate the well as far as possible from the cesspool, at least 50 feet from it. Let the well be 3 feet diameter in the clear after it is stoned up, and provide at the top two lengths of well-curb, 3 feet high each, to keep out the surface water. The depth of the well will depend upon the depth at which clear water runs in the ground in your locality. You had better employ a professed well-digger, who will contract to dig your well and stone it up at a certain price per foot in depth. The cucumber pump is highly spoken of.

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

G. H. M.—It contains pyrolusite (oxide of manganese).—H. B.—It is clay slate.—H. M. A.—It appears to consist principally of wood pulp, chalk, a little Vandyke brown, and glue.—J. F. I.—It consists principally of copper with some zinc. You should send larger specimens.—J. L. R., Jr.—It is marmolite, a variety of serpentine. It contains silicate of magnesia, magnesia, a trace of iron, and water. It is of common occurrence. It has been employed in the manufacture of Epsom salts, and, when in large, perfect pieces, as material for ornamental vases.—W. H. C.—It is galena—sulphide of lead—a valuable lead ore. It contains about 80 per cent of available metal.

COMMUNICATIONS RECEIVED.

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

- On Micro-Photographs, etc. By C. M.
On Combustion in Lamps. By A. K. S.
On Aerial Propulsion. By L. C.
On Squares and Cubes. By E. H. B.
On Lightning Rods. By J. M. M.
On the Ball and Jet Puzzle. By H. G. W.
On Kerosene Lamps. By E. B. H.
On Boiler Explosions. By D. R., and by G. B. B.
On Mountains in the Moon. By P. E. S.
On Steam Engine Economy. By W. A. M.
On the Gyroscope. By J. M. A.

Also inquiries and answers from the following: H. M.—P. W. C.—E. P. S. A.—W. H.—J. C. S., Jr.—C. J. K.—G. C.—G. M.—C. M.—F. R. N.—A. J.—N. J.—A. B. C.

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 rolls thin plates of spring steel, of large size and without flaws? Who makes castings to order? Whose is the best theodolite? Who makes the best recording pressure gauge? Who makes the best steam engine for running small machines? Who sells horsepower pumps?" 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
March 20, 1877,
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.

Table listing inventions with names and patent numbers. Includes: Alarm and register, J. Corbett... 138,587; Album, A. Foerster... 138,507; Asphaltum liquid, A. K. Lee... 138,646; Bag fastener, H. Redden... 138,673; Baggage check, R. F. Livermore... 138,522; Bailear, bucket, C. D. Seys... 138,682; Bail ear for pails, etc., P. Miles... 138,532; Bale ties, S. N. Drake... 138,608; Bale tie, J. S. Durning... 138,610; Bale tie, J. H. Fisher... 138,506; Bale tie, J. M. Pollard... 138,669; Bale tie, cotton, W. M. Smith... 138,548; Baling press, W. S. Coates... 138,591; Barrels, head lining for, L. Reed... 138,483; Bed bottom, spring, Ogborn & Kendrick... 138,478; Bedstead, sofa, F. A. Coleman... 138,593; Bedstead, invalid, J. P. Beaman... 138,568; Bench plane, Traut & Richards (r)... 7,565; Billie, C. C. Chamberlain... 138,588; Binder, temporary, L. Richoux... 138,674; Blacksmith's machine, J. C. Tobin... 138,686; Blast furnaces, charging, C. Himrod... 138,632; Blue glass sun bath, H. M. 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Table listing inventions with names and patent numbers. Includes: Lamp burner, A. Angell... 138,490; Lamp chimneys, crimping, A. Harcum... 138,626; Lamp fountain, W. A. Butler... 138,584; Lamp, miner's, J. J. Weibel... 138,705; Land roller, L. M. Stegner... 138,494; Lapping machines, J. Batty... 138,485; Lawn sprinkler, J. S. Heacock... 138,628; Lever clamp, V. Yantis... 138,718; Lifting jack, carriage, etc., G. S. Jones... 138,467; Light house signal, C. G. Van Otter... 138,700; Line fastener, J. Thomas... 138,485; Lock and chain fastening, C. Parham... 138,664; Loom shuttle, C. W. Anderson... 138,460; Loom shuttle, A. Wright... 138,489; Loom temple, Porter & Clark... 138,538; Loomshuttle box motion, J. Long, Jr... 138,523; Lounges, J. J. Coburn... 138,592; Lubricating compound, P. M. Papin... 138,479; Magazine fire arm, J. W. Keene... 138,468; Mangle, H. E. Smith... 138,685; Mechanical movements, J. A. House... 138,464; Metal working machine, R. 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