Notes & Queries

J. G. B. ought not to remove the canceling ink from postage stamps, as it may lead to fraud. —G. S. can cleanse his iron for galvanizing by using the dip described on p. 107, vol. 31.—J. P. McC. can clean shells by following the directions on p. 122, vol. 27.—J. M. C. will find directions for casehardening on p. 202, vol. 31.—F. E. can deodorize butter by following the directions on p. 119, vol. 30.—F. W. K. can use rubber varnish for making waterproof cloth. See p. 11, vol. 32.—D. H. can separate silver from lead by the method described on p. 138, vol. 32.—G. M. will find a formula for thickness of a boiler on p. 155, vol. 32. Read Camus on the "Teeth of Wheels."—R. R. B. ought to know that no instrument can possibly point out where gold, silver, lead, etc., lie buried in the earth.—J. T. C. can dissolve pure rubber in benzine, naphtha, or carbon bisulphide.—D. can remove stains of iron rust from fabrics by the method given on p. 170, vol. 27.—H. B. can fasten leather to wood with marine glue. See p. 232, vol. 31.—J. A. W. can fasten chromos on thin canvas by following the directions on p. 91, vol. 31.—A. A. will find directions for separating aluminum on pp. 91, 116, vol. 32.—R. McA. can exterminate cockroaches by using the recipe on p. 43, vol. 31.—A. K. should consult Küstel on the "Nevada and California Processes for Gold and Silver Extraction."—W. A. P. can galvanize his iron articles by the method described on p. 346, vol. 31.—I. G. will find a recipe for a hair stimulant on p. 363, vol. 31.—G. E. K. Jr. will find directions for making a black walnut stain on p. 90, vol. 32—G. C. H. can make windowglass opaque by the method described on p. 264, vol. 30.—T. H. L. can utilize old rubber by the process described on p. 349, vol. 26.—J. S. F. can fill and polish his black walnut furniture by the method described on p. 315, vol. 30, and 347, vol. 31. —W. C. can render wood fireproof by the process detailed on p. 280, vol. 28.

(1) P. C. asks: What is the chemical reaction resulting from the adding of tartaric acid after bicarbonate of potash is added to butter? A. Carbonate of potash, being an alkali, neutralizes the lactic and butyric and other acids in the rancid butter, but the excess of alkali used has a burning taste. The tartaric acid added decomposes the potash salt, liberating carbonic acid, and the resulting tartrate of potash does not offend the sense of taste.

(2) S. R. asks: 1. For what particular purpose are lime and chalk used in the composition of soda glass? A. The addition of lime to glass diminishes its fusibility, while it increases its luster, but the addition of an excess of lime is apt to make the glass milky when cold, although it may be perfectly clear while hot. 2. What is the process that has been patented by a French gentleman for adding strength and elasticity to the glass? A. The agent of M. Bastie, the inventor, lately exhibited specimens of the glass at the office of the SCIENTIFIC AMERICAN, New York, and subjected the same successfully to the most remarkable tests. The process for treating the glass has not yet been made public.

(3) H. B. W. asks: How is rubber melted so that it can be run into molds? A. The rubber is simply rendered soft by passing between rollers heated by steam, in which state it is pressed into the molds.

(4) M. H. K. asks: What are the cheapest and best chemicals known, to be mixed together for use as a freezing mixture? To what degree Fah. will they descend, and what are the proper proportions to mix and use? A. One of the best, and one of the most economical, is the solution of sulphate of soda in commercial hydrochloric acid. Pour 5 parts of the acid upon 8 parts of the salt reduced to powder; the temperature may thus be reduced from 50° to 0°.

(5) G. E. K. Jr. asks: How can I remove oil stains from marble? A. First rub with benzine or turpentine, and then cover with powdered chalk or pipe clay and keep in a warm place for some time.

(6) E. M. D. asks: What kind of clay should I use to make crucibles? A. You do not state for what purpose you intend to use your crucibles. We cannot give definite directions unless we know. In order to render crucibles capable of withstanding great variation of temperature, several substances are used: sand, flint, fragments of old crucibles, black lead, and coke are used for this purpose. The most refractory crucibles are those made with pure clay, or such as contains little or no oxide of iron and is free from calcareous matter. The best clays contain the most silica, yet crucibles of pure clay are not absolutely infusible; and in the high temperature of a blast furnace, they sometimes soften so much as actually to fall into a shapeless mass. This defect can be somewhat remedied by mixing the clay with graphite or coke; either of these substances form a kind of solid skeleton, which retains the softened clay and prevents its falling out of shape.

(7) S. F. H. & Co. say: We have some leather lined with blue cloth, such as is used for carriage curtains. The color of the cloth is blue, and it rubs off. Can the color be made so as not to come off by applying a solution to it? A. Try dipping it into a solution of india rubber in naphtha.

(8) A. C. J. asks: Are the numerals and punctuation marks commonly used in telegraphy? A. The numerals are, but punctuation marks are not very generally used, except the full stop.

(9) S. S. W. asks: How long should locust seeds be boiled before planting? A. Take three times as much water as you have seed, by measure. Boil the water, and pour it boiling hot over the seeds and let them soak till the next day: then plant them. The plants are as tender as melons, and the least frost will kill them, so do not plant too early. Some of the plants will have thorns, and some not; save the thornless ones to plant for shade trees; the rest you can use for hedges or throw away, for they are too disagreeable to keep in a civilized community. Both the thorny and thornless plants are perfectly hardy, require no shelter after the first start, and are about the safest tree to transplant (at any age) that grows in this latitude; while their foliage and peculiar growth render them almost indispensable where variety is desirable.—H. H.

(10) W. Y. asks: What tools does a man need to run a small engine with? A. A hammer, an assortment of files, a flat chisel, a cape chisel, scrapers (¼ round and flat), a straight edge, an assortment of wrenches, a screw driver, and a belt punch.

(11) F. W. asks: In manufacturing our common red brick, is there any way of coloring them, either by glazing or mixing, to produce some pleasing tint, without adding materially to the expense? A. This can be done by facing them with a coloring preparation, as is now done in the case of encaustic floor tiles, but not without considerably enhancing the price.

(12) W. R. H. asks: How much greater is the resistance of the ordinary railroad rail, made of wrought iron, than that of a rail of the same size and length of Bessemer steel and of malleable cast iron, respectively, in respect to resisting the shocks or strains of locomotive or car wheels when in motion? A. The steel rail is about 1·5 times as strong as the wrought iron one, within the limit of elasticity. Malleable cast iron is not well suited to resist shocks.

(13) H. R. T. asks: Which is correct, "buhr stone" or "burr stone?" A. Both are correct, but "buhr stone" is the more usual way of writing it.

(14) R. C. M. says: I am putting in two 8x10 engines, to run together, and I wish to use cistern water. If I exhaust into a four inch pipe, extending from the cistern upward, and keep a small stream of cold water running through it from the second story, 10 feet above the engines, will it condense the most of the steam? A. This plan will not answer. Your best plan would be to use a proper condenser. 2. How will I get most power out of two 8x10 cylinders, coupled rigidly together or run independently and connected with one line shaft with belts? Part of the time I shall use only one cylinder for light work. A. It would no doubt be better to run them independently.

How can I ascertain the number and claims of a patent? A. Either by making a search of the records, or engaging some one to do it for you.

(15) A. A. asks: I have a steam heater of the following capacity, and desire to know what pressure it will stand without bursting. It is 18 inches long, 14 inches wide, 2½ inches deep and ½ inch thickness of the iron. The boiler pressure is 45 lbs. The pipe that connects with the heater is ⅜ of an inch in diameter, and is about 60 feet in length. The exhaust pipe is ½ inch in diameter, and is not quite free. A. Under the conditions stated, the heater will have sufficient strength.

(16) D. asks: Can the area of an octagon inside of a circle be ascertained with mathematical exactitude, if the diameter of the circle be known? A. Yes. It is composed of eight equal isosceles triangles, of which two sides and the included angle are known. The two equal sides are each equal to the radius of the circumscribing circle, and the included angle is ⅛ of 360°, or 45°.

(17) C. C. asks: In your issue of April 17, 1875, in answer to the following question: "At what power would you rate an engine that is 8 inches bore and 15 inches stroke, running at a speed of 20 revolutions with 80 lbs. steam": you say: At about 12 horse power. By what formula do you calculate this? Do you mean that thereal effective power of an engine under these conditions is 12 horse power? According to Roper's formula, as well as Haswell's, I should figure it at 36 horse power, with (say) 10 per cent off for friction, making about 32 horse power. A. We do not consider that either of these rules gives very correct results. Our answer was based on a personal knowledge of the actual performance of such engines. The answer referred to effective horse power. It is quite true that the rules you mention will give you true results, if they represent the conditions of actual practice; but in general they do not.

(18) J. W. asks: How many inches from the fulcrum must a ball of 12½ lbs. weight hang to give 30 lbs. pressure on the square inch on a safety valve $1\frac{3}{16}$ inches in diameter, the valve being between the fulcrum and the ball, with its center 1⅝ inches from the fulcrum? A. You can work it out for yourself by the aid of the following rule: Multiply together: (1) The pressure of steam, the area of valve, and the distance of center of valve from fulcrum. (2) The weight of the valve, and the distance of its center from the fulcrum. (3) The weight of the lever, and the distance of its center of gravity from the fulcrum. (4) Add together the products obtained by (2) and (3), and subtract the sum from the product obtained by (1). (5) Divide the difference by the weight of the ball.

(19) C. H. D. asks: I enclose you a photograph of a windmill which is erected on an eminence near York, Pa. It was built in 1870 by an ingenious German, and has been regarded as a curiosity, being the only windmill for many miles around. The sails are not constructed on the principle put forth in your recent article on windmills, but have a uniform inclination to the plane of revolution. They seem, however, to be very efficient, and I am informed that the power varies from 5 to 10 horse power, according to the velocity of the wind, the sails being 3 feet wide, and the diameter of the wheel 25 feet. The shaft is inclined to the plane of the horizon at an angle of about 6° and is arranged to swing around a vertical shaft, when the wheel is shifted to face the wind. The power is transmitted by a pair of bevel wheels, and is utilized for crunching bones. This windmill is a model of workmanship and utilizes a power which is certainly cheap. A. We have no doubt our readers will be interested in this account; for while it is probable that a wheel constructed with the proportions noted in our recent article would be somewhat more efficient, this is a little simpler to construct.

(20) P. F. asks: In a cylinder 6 feet high containing 6 cubic feet of air, how many lbs. pressure on the piston will be required to compress the air into 1, 2, 3, 4, 5 feet of volume respectively? A, If the temperature is constant, the pressure varies inversely as the volume.

(21) L. H. R. asks: 1. Can you explain the principle of the gyroscope? A: It may be explained generally on the principle that, though the force of gravity is constantly acting downwards, there are other forces with which the force of gravity is resolved. See p. 91, vol. 31. 2. Was there a marine governor built some time ago upon that principle? A. There have been several.

If a locomotive engineer be called upon to stop his engine as soon as possible, would it be advisable to shift the eccentric, thereby causing great resistance at every stroke, until the engine has stopped? A. It would be better to shut off the steam, and apply the brakes.

(22) J. W. H. asks: What is the difference in strength between an iron and a steel shaft, 4⅞ inches in diameter? How far will it spring without breaking, being 3 feet long between boxes? A. The steel axle will be about twice as strong. It would not be advisable to strain the shaft so as to spring it sensibly; and, though it might not break at once, it would take a constantly increasing set.

(23) M. P. S. says: We have a 60 horse power horizontal return tubular boiler, set in brick in the usual way. Length is 15 feet, diameter 54 inches, and there are 56 three inch tubes. At rear of boiler is a combustion chamber, 3x5 feet, and the chimney is on one side, at front of boiler. The heat passes under the boiler, returns through tubes, and passes through a square flue, 12x12 inches, into the round iron stack, 48 inches in diameter and 36 feet high. This stack is lined with brick for about 20 feet up, reducing the area to about 40 inches. The draft is sluggish, and the cast iron covering of the rear combustion chamber has given way with the excessive heat. A. We think the stack is too large, and you might improve matters by contracting it at the bottom.

(24) P. A. asks: What is the correct rule for getting an engine into line and squaring the shaft? A. Set up two lines, one parallel to the axis of the cylinder or through the cylinder, if possible, and the other perpendicular to the first, in the same plane. These are reference lines to measure from, to bring the shaft and guide into line.

(25) B. & C. say: 1. We are building a boat about 60 feet long and 20 feet wide, with a flat bottom and a light top, to be used as a trading boat on a small river. What engine power will be necessary? A, The boat is of a very bad model, and will probably require an engine of from 15 to 20 horse power. 2. Can the motion of a vertical engine be reversed? A. A vertical engine can be reversed by being fitted with a link, or with two eccentrics and hooks. 3. Can a propeller be used on a flat-bottomed boat to advantage? A. If you build such a boat, it would be better to propel it with a stem wheel.

(26) R. B. W. asks: Would a 12 horse power engine be sufficient to run a 65 saw cotton gin and a 30 inch grist mill? A. Not if they were driven up to their full capacity.

(27) D. S. S. says: I have a steel spring, 4 feet long, 1½ inches wide, and ⅜ inch thick, which was bent to its utmost for a period of 1 week, at the rate of 100 times a day. I find that it now retains a bend which weakens it. Is it impossible to make one that will always retain its natural straight position when left alone? A. All springs, however good, take a set in time.

(28) J. B. K. says: I claim that a balance wheel on an engine does not give additional power to the engine, but only regulates it and gives a steady motion. My opponent claims that the balance wheel gives the engine additional power. Who wins? A. You do. Your opponent appears to assert that the fly wheel has more power than the machine which moves it. If this were the case, it would be a very desirable kind of perpetual motion.