

Notes & Queries.

[We present herewith a series of inquiries embracing a variety of topics of greater or less general interest. The questions are simple, it is true, but we prefer to elicit practical answers from our readers.]

1.—FUSIBLE METAL.—Is there an alloy, fusible at a lower degree of heat than brass, suitable for small molds of machinery?—J. A. C.

2.—WATERPROOFING BOOTS.—Can any of the readers of the SCIENTIFIC AMERICAN inform me with what preparation I can make boots and shoes waterproof?—C. B.

3.—REMOVING INK STAINS.—Will some reader of the SCIENTIFIC AMERICAN give me a formula for making a preparation that will remove ink from books and papers without injuring them?—B.

4.—TELEGRAPH GROUND WIRE.—How deep should a ground wire be extended to insure a current of electricity at all times of the year? Should it terminate in a mass of metal? If so, how much surface should come in contact with the earth?—T. C. G.

5.—SHRINKING IRON SLEEVES.—Recently, at Albright and Stroh's iron works, Mauch Chunk, Pa., was cast an iron shaft, weighing twelve tons, in two parts; and an internal and external sleeve was shrunk on to connect the two pieces. The sleeve weighed three tons. Can any one inform me if any heavier pieces have been shrunk on, in the United States?—T. H. S.

6.—MARBLEIZED SLATE AND IRON.—It is stated by some persons that marbleized slate and iron mantles get damaged by frost and damp, when left without a fire in a house shut up for some months, or perhaps a year or two. Will some of your readers please say if it is true?—T. G.

7.—HORSE POWER.—Can any of the correspondents of the SCIENTIFIC AMERICAN tell me how small a circle a horse can travel in, on an upright horse-power, without injury to health, or making him dizzy? The amount of power required is insignificant. And will covering the horse's eyes make any difference?—L.

8.—STEAM ENGINE POWER.—I have a steam engine that I contracted for to perform a certain amount of work with a pressure of 70 pounds of steam per square inch. But upon trial, it failed to accomplish said work with a pressure of 80 pounds; but, by detaching one fourth of the work, it drives the remaining three fourths with apparent ease with a pressure of only 45 pounds per square inch. The cylinder is 12 x 24 inches, the fly wheel 8 feet in diameter and weighs 3,100 pounds; the latter is hung on a six inch cast iron crank shaft, running at a speed of 96 revolutions per minute. The steam ports give an opening of seven square inches each, the exhaust about fourteen. It is furnished with a Jenson two and a half inch governor; the lead pipe from boiler to engine is two and a half inches inside diameter and twenty feet long. After its failure to do the work, the builders propose to replace the two and a half inch governor and valve with a three inch one, leaving on the two and a half inch steam pipe; also to put on a fly wheel ten feet in diameter, weighing 4,200 pounds. With the above alteration they claim that the difficulty will be overcome, and it will do the work allotted (about 40 horse power). Whether the builders' idea of increasing the power is correct, and the true cause of the engine not doing one fourth more work with 80 pounds of steam than it will do with 45 pounds, is what I should like to know.—J. R. L.

9.—INDELIBLE INK.—Will some one please inform me how to make an indelible ink for marking linen with a common pen?—C. T. H.

10.—SUCTION PUMP.—The theory that the pressure of the atmosphere pushes the water up the suction pump and pushes the hot air up the chimney and the like, interferes with what a friend of mine is projecting just now. Will some correspondent please inform me how I can satisfy my friend that it is not the levity of the hot air that causes it to ascend, and so give place to the cold air; and that nature's abhorrence of a vacuum does not account for the water ascending in the suction pump and the like?—P. D.

11.—BRONZE PAINT.—How can I make a surface on smooth iron, in imitation of bronze metal? Is it possible that not one of your thousands of readers who know, will respond?—R. S. B.

12.—BLUEING IRON.—I would like to ask through "Notes and Queries" how the iron work of the most highly finished guns and revolvers is blueed.—J. C. C.

Answers to Correspondents.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 100 a line, under the head of "Business and Personal."

ALL reference to back numbers must be by volume and page.

W. S., of Iowa.—The mineral you send is mica, but is an inelastic variety, and of no use in the arts.

BÉTON-COIGNET.—If J. H., query No. 2, January 1, read his SCIENTIFIC AMERICAN regularly, he would remember a full account of this artificial stone, given on page 248, Vol. XXIV.—D. B., of N. Y.

GUN SCATTERING SHOT.—H. W., query No. 3, January 1st, should make his powder and shot into hard, well packed cartridges.—D. B., of N. Y.

CEMENTING LEATHER TO IRON.—E. A., query No. 4, January 1st, can fasten leather to iron by putting pulverized resin on the flesh side of the leather, and applying it to the heated iron.—D. B., of N. Y.

ATTACHING LEATHER TO IRON.—Can you inform me, through your valuable paper, how to cover the iron pulleys with leather without going to the trouble of riveting? I tried cementing with cement made of glycerin and litharge, but did not succeed.—L. P.—Answer: See No. 4 in this column.

SALT AND ICE.—M. A. wishes to know why salt is mixed with ice to freeze ice cream, while in winter we put salt in our pumps to keep them from freezing. The reason is as follows: The salt has a great attraction for water, and when mixed with ice, it tears down the crystalline architecture of the latter. At the same time the salt itself is dissolved, and both are reduced to the liquid state; but this cannot take place without heat, as it is a thoroughly established theory that matter cannot pass from the solid to the liquid state without absorbing heat; but where does the heat come from? From surrounding bodies, and that is why it freezes the ice cream, which is one of the surrounding bodies. When salt is put into a pump in which the water is frozen, the heat is abstracted from the surrounding pump barrel to melt the ice.—C. E. S., of N. H.

CASTING HOLED PATTERNS.—D. W. W., January 1st, asks what is the best method of making a casting with a hole 10 or 12 inches long, $\frac{1}{2}$ or $\frac{3}{4}$ inch cross section? If it is possible to make the mold so that the core will stand vertically, a common dry sand core will answer; but if not convenient to do so, I would take a piece of $\frac{3}{4}$ inch iron, the proper length, including core prints; take some melted tallow and draw two streaks, one on each side of the rod, dip it in clay wash, then cover with core sand to the proper shape and dry it; and as it dries, the tallow melts out, leaving two small vents to take the air off the core. I think a core made in this manner will be strong and safe, and will not blow.—R. J. McI., of N. Y.

TEST FOR CALOMEL.—F. D. H., query No. 1, January 1, will have some difficulty in detecting the presence of calomel, as distinguished from other salts of mercury. If he merely wishes to ascertain whether mercury in any form exists in his preparation, let him mix a little, of the compound to be tested, with ether, and rub it on a bright surface of copper. The amalgamation of the metals will produce a white film on the copper. Calomel is the sublimiate of mercury, and to distinguish it, from corrosive sublimate (bichloride of mercury) or other mercurial salts, will require an investigation by an experienced analyst.—D. B., of N. Y.

BLACK INK.—Some time ago a querist asked how to make Arnold's writing fluid black when first written. I have not seen the question answered. Having written to the manufacturers about it, they reply: "It is impossible to manufacture our fluid so as to write black at first, without destroying the specialty of the ink altogether." But by mixing with Rhodes' (London) or Blackwood's (London) ink, it may be made quite dark when first used.—A. F. S.

ANNEALING LAMP CHIMNEYS.—R. L. B. asks if there is any simple process for annealing lamp chimneys. If he will put his chimneys into a kettle of cold water, and gradually heat it until it boils, and then let it as gradually cool, the chimneys will not be broken by the ordinary fluctuation of the flame of the lamp.—C. E. S., of N. H.

PLOW HANDLES.—Query No. 14, January 1st.—I have seen this thing done with entire success, but cannot explain without writing at length and using cuts. The main idea is, however, clamping a strip of band iron on the outer surface of the handle while bending, so as to prevent slivers from starting, or the grain of the wood breaking. The band to remain till the wood is cold.—R. S. B.

DETECTION OF CALOMEL.—Answer to F. D. H.—Place upon a piece of clean, bright copper one drop of any liquid suspected of containing any mercurial preparation, then add a few grains of iodide of potassium; upon stirring the liquid with the point of a steel blade, the mercury (if any be present) will be precipitated, forming a silver white spot. If pills are operated with, make a paste with water, and proceed as above.—C. D. S., of O.

LEATHER BELTING.—Dry or damp air will not affect belts if they are properly cared for. Thirty years experience in a woolen factory has taught me that leather belts should be filled with currier's oil, and should be slipped off and remain so during each night. Belts kept in that way do not require to be kept so tight as those which are used dry, to do the same work, thus saving friction and wear. I have in my mind now a belt which I put together twenty-five years ago—two, in fact—eight inches wide and thirty feet long, that, when made, I literally filled with oil, and they are doing good service now.—R. S. B.

BACK PRESSURE IN EXHAUST PIPE.—For the benefit of R. K., Vol. XXVI., page 9, I would say that: if the exhaust from an engine 12 by 22 inches, making 65 revolutions per minute, pressure of steam 80 pounds, cut off at 15 inches, passing through 18 feet of 4 inch pipe to a large tank or heater, then through 220 feet of 4 inch pipe with 11 elbows to a T, then through two lines of 3 inch pipe, one 210 feet long with 18 return bends and 10 elbows, the other 225 feet long with one return bend and 10 elbows: the back pressure at the engine is $1\frac{1}{2}$ pounds, which is imperceptible in the working of the engine. The exhaust is the most economical.—E. P. D., of Me.

FLOW OF WATER AGAINST ATMOSPHERIC PRESSURE.—There is a reservoir 500 feet square, situated on the top of a hill, 80 feet above a city. What would be the effect if an airtight head could be put in that reservoir? Could water be drawn from that reservoir? What would be the effect if an air pump were applied and all the air exhausted from the reservoir?—G. M., of Mass. Answer: If a vacuum be created above the water, the latter would flow till the pressure of the atmosphere on the outlet was exactly balanced. If there be some air above the water, the weight of that air would cause a corresponding additional quantity of water to flow before the equilibrium was arrived at.

REVOLUTION OF BODIES.—In answer to R. O. H.'s squirrel problem (query 18, December 16th), I would say that a person cannot pass round an object without passing all sides of said object. It seems to me, therefore, that the man does not go round the squirrel, from the simple fact that he is continually on the same side of the little animal. The man goes round every fixed object within the circle which he describes, but not round any object which may be moving in the same line of radius with himself. If myself and friend walk side by side round a circle—he being nearest the center—I cannot see how I can be said to go round my friend. The circle may be as large as a race course or as small as a few feet in diameter. I therefore conclude that the man does not go round the squirrel, but that man and squirrel both go round the tree.—H. L., of N. Y.

Declined.

Communications upon the following subjects have been received and examined by the Editor, but their publication is respectfully declined:

CENTRIFUGAL FORCE.—G. W. T.

FIREPROOF BUILDINGS.—B. A. J.

FIREPROOF SAFES.—R. S. S.

FLIGHT OF BIRDS.—S.

FUZEE vs. GOING BARREL.—J. M.

MINERAL PAINT.—E. B. H.

PSYCHIC FORCE.—J. A. S.—P. J. C.

TRACTION ENGINES.—W. C. O.

WATER IN ICE HOUSES.—E. H. B.

ANSWERS TO CORRESPONDENTS.—L. N. L.—M. B.—W. H. R.

—H. A. W.—S. C.—A. S. A.

QUERIES. C. H. J. C. P.—G. G.—J. E. R.—G. S.—E. R.—

J. F. B.—N. S.—J. N. J.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

ADVERTISING ALBUMS.—William S. Gavan, of Savannah, Ga.—This invention relates to a new construction of a book for receiving pictorial decorations and advertisements, and has for its object to permit the cards, sheets, or pictures to be properly embedded in the leaves of the book, and to make said leaves strong and durable at the edges. The invention consists in making the leaves of blotting paper sufficiently soft to enable the cards to be embedded, and in binding the edges of the leaves with thin sheet metal, which is fastened in place by sewing.

DENTAL FORCEPS.—Leonard George Haskins, of Newport, N. Y.—This is an improvement which consists mainly in reversible jaws, constructed and arranged to operate in combination with the handles of dental forceps. By making the jaws thus detachable and reversible, a single pair may be adapted to most dental purposes; but a variety of jaws suited for all the purposes for which dental forceps are used may be fitted and made reversible in a single pair of handles.

WATERING DEVICE FOR RAILROADS.—Danforth Cheney, of Brookfield, Miss.—This invention relates to a new water crane for supplying locomotives on railroad tracks, and consists in an novel arrangement of parts whereby the discharge pipe is double jointed and extensible. The crane is to be set up between two tracks, and can be swung to either side to be used. The invention consists in a new construction of universal joint for the weighted discharge pipe, and in a new manner of making said pipe extensible, and packing the joint; also, in a new general combination of parts, calculated to render the crane more convenient in use than others hitherto employed.

PAPER FOR PACKING.—Albert L. Jones, of New York city.—The object of this invention is to provide means for securely packing vials and bottles with a single thickness of the packing material between the surfaces of the articles packed. It consists in paper, card board, or other suitable material corrugated, crimped, or bossed, so as to present an elastic surface by reason of such corrugated, crimped, or bossed surface, which is a protection to the vial, and more effective to prevent breaking than many thicknesses of the same material would be if in a smooth state like ordinary packing paper. Instead of wrapping the vials or bottles with the corrugated material, the latter may be made into packing boxes, so that the vial or bottle may be surrounded by the same elastic surface. This packing may be used to advantage for various purposes, and any material or substance, besides paper and past board, which can be corrugated for this purpose, may be used.

ROTARY ENGINE.—Truckson S. La France, of Elmira, N. Y.—This invention consists in an improved arrangement of packing for rotary engines, in which a pair of toothed wheels meshing with each other is employed, the packing being a concave plate for each wheel set into the case to act against the ends of the teeth and prevent the escape of steam from the receiving port over the teeth, the said pieces being arranged to be held against the said teeth by the elastic pressure of steam or springs.

APPARATUS FOR DISTILLING SPIRITS.—Gott-hard Kleiner, of Georgetown, Mo.—This invention relates to a new and important improvement in apparatus for distilling alcoholic liquors; and consists in a series of chambers, analyzers, and condensers, with the parts connected therewith and attached thereto arranged to operate as described, for which the inventor claims advantages as follows: "First, I can make stronger by first distillation than by the ordinary apparatus. Second, I therefore save much cooperation, which is expensive. Third, I further save a large amount of warehousing, which is a heavy item. Fourth, I further save, daily, gaugers' fees and warehouse stamps. Fifth, I am not troubled with low wines, which would require tubs, pumps, etc. Sixth, I can distill twice as much beer in the same time as by the ordinary method. Seventh, there will only one meter be needed, which also is a great saving. Eighth, I save money in handling a less number of barrels than would be required for a lower proof spirit. Ninth, I thus save freight in shipping. Tenth, it will be a benefit to the government, as more spirits can be manufactured. Eleventh, I can sell my spirits at the same price as other distillers can and make greater profits. Twelfth, it is much easier and pleasanter for the distillers to work this improved apparatus than the old."

WASHING MACHINE.—James F. Cheesebro, of Trenton, N. J.—This machine is of the class in which a dasher is made to rotate vertically several times in one direction and then reverse its motion. The inventor claims great results, by his arrangement of the several parts of the machine, which are covered by four claims.

MANUFACTURE OF BARN FORKS.—Calvin T. Beebe, of Jackson, Mich., assignor of one half his right to Elihu Cooley, of same place.—The object of this invention is to produce a four tined hay fork from a suitable piece of steel, so that the fork shall have a solid shank and the tines be arranged so as to render the barn fork more convenient and more durable than it has hitherto been.

MACHINE FOR SAWING MARBLE DIAGONALLY.—Henry S. Gillette, New Preston, Conn.—This is an improvement in that class of marble sawing machines which created such a sensation among inventors several years ago by a reward of \$10,000, offered by a Vermont quarryman, for a machine for accomplishing what this is alleged to perform, namely, the sawing of a block of stone or marble on both sides at once, the cuttings being oblique or parallel to each other as may be desired, each saw being independent of the other in its adjustment.

PISTON FOR PRINTING PRESS.—Calvert B. Cottrell, Westerly, R. I.—This invention consists in improving the construction of pistons which are reciprocated in cylinders, and employed to form air cushions to arrest, at each movement, the reciprocating table of a printing press bed. The object is to prevent stoppage by paper setting between the piston and cylinder, and to allow the piston to be wholly withdrawn from the cylinder, and yet readily re-entered. Thus it will be easily relieved of any obstruction. A flexible packing is clamped between disks and expanded by a flat spring coiled around one of the disks, the flat spring being controlled by the spring pins and auxiliary springs, combined and applied together as and for the purpose set forth.

SASH HOLDER.—Thomas R. Hubbard and William L. Hubbard, Brooklyn, N. Y.—To a screw plate, of rectangular or oblong form, designed to be secured to the window frame or casing, a hollow cylinder or tubular socket is attached, in a diagonal position. This cylinder is closed at its upper end, open at its lower end, and provided with a straight, longitudinal slot, which permits the application of the finger to move the ball upward out of contact with the sash when it is desired to lower the latter, and is yet sufficiently narrow to prevent escape of the ball. The lower end of the cylinder being cut diagonally or straight with the screw plate, the lower side thereof forms a rest for the ball when allowed to come into frictional contact with the sash, which, in turn, serves to prevent the escape of the ball from the socket so that, while the sash may be raised at any time without hindrance from the ball, it cannot be lowered until the ball be moved upward in the socket.

CLAMP FOR HOLDING TIMBER.—Peter Scholl, Cashtown, Pa.—This invention is a new and convenient device for holding timber to be sawed, tenoned, hewed, or otherwise shaped or prepared for use in fences or other purposes; it consists in the arrangement of a hinged jaw on a fixed post, and in the connection therewith of a lever for setting the jaw.

CHIMES FOR REED AND PIPE ORGANS.—Carl Lehnert, Boston, Mass.—This invention consists in having the steel bars or plates used for chiming in pipe and reed organs and other instruments flanged at each edge to improve and strengthen the tones of said plates, which have heretofore been only used in plane flat form.

PROPULSION OF CANAL BOAT.—Thomas James Burke, Virginia, Ill.—This invention is an improvement in the class of canal boats propelled by apparatus consisting of endless chains carrying vertical buckets, and running from end to end over the deck and under the bottom. The improvement pertains particularly to the means of imparting motion to such propelling apparatus; and to this end consists in the arrangement of a pair of rollers and chains thereon (the latter being provided with projections), in relation to the bucket chains. It is claimed to constitute a very simple, durable, strong, and efficient mechanism.

PITMAN CONNECTION FOR HARVESTER.—Amos Ketchum, Estherville, Iowa.—The object of this invention is to provide a pitman connection for harvesters and other machinery which will be positive in its action and cannot work loose. The crank pitman is provided with prongs and pointed screws at one end, and a bolt and tube at the other, combined with the sickle bar and crank wheel, all being constructed and arranged so as to operate in the positive manner claimed.

COMBINED FRICTION AND RATCHET CLUTCH.—Abijah Whitney Hall, Northfield, Vt.—The inner surface of the projecting rim of a pulley is made slightly conical to receive the slightly conical face of the head of a clutch. The clutch is connected with the shaft by a tongue and groove, so that it may be moved longitudinally upon the shaft; but both clutch and shaft must revolve together. The outer end of the clutch is grooved to receive the end of the lever by which it is moved. To the inner surface of the outer edge of the projecting rim of the pulley are attached two (more or less) lugs or ratchet teeth, upon which an equal number of lugs or ratchet teeth, formed upon the outer side of the head of the clutch, take hold.

HASP LOCK FOR CAR.—William D. Heister, Newton Hamilton, Pa.—This invention relates to the manufacture of car locks in which, by a combination of circular and vibrating tumblers, the lock is claimed to be made very safe, so that it cannot be opened by the ordinary fraudulent means.

BEE HIVE.—Wiley W. Dodson and John B. Bray, of Lynnville, Tenn.—The object of this invention is to simplify the construction of bee hives, and while adapting them to the habits of the honey bee, and rendering them convenient for the management of the bees, to greatly reduce cost in labor and material. This hive is very simple in all its parts, and may be constructed at slight expense by any one acquainted with the use of joiners' tools. The principal feature of the invention is a peculiar lever platform applied to a bee hive, for the purpose specified.