RECENTLY PATENTED INVENTIONS.

Agricultural.

POTATO DIGGER. — John W. Cook, Jefferson, Oregon. This is designed to be a simple, easily worked and inexpensive machine, in which the revolving hoe or digger is formed of a series of radial scoops having cutting and lifting blades at their outer ends and screening portions to the rear of the blades. The digger is connected to the main axle to be revolved in a direction opposite to the movement of the machine, to scoop forward and lift the dirt and potatoes up over the digger axle, sifting out the dirt and discharging the potatoes to the rear.

CULTIVATOR ATTACHMENT. — Charles A. Armstrong, Pawnee Rock, Kansas. This is an improvement in removable fenders for the protection of young plants while being cultivated, being designed to prevent dirt from being thrown upon them by the cultivator plows or teeth. The cover device or protector consists of two adjustable sections, arms projected from one end of the device and beams pivoted to the arms, while removable clamps connect the beams with the axle of the cultivator, and there is a connection between the device and the gangs of the cultivator. With this device the plows may be safely set much closer to the rows than heretofore, and the amount of earth delivered by the plows to the plants may be regulated as desired.

CORN PLANTER. — John B. Adams, Jr., Malden, N. Y. Corn may be planted in hills by this device, and fertilizer be also deposited in the hills previous to dropping the corn, the mechanism regulating the supply of fertilizer and seed acting together. Means are also provided whereby the fertilizer will be partially covered before the seed is dropped in the hill, the seed being also covered and the ground pressed down upon it. A simple and effective check attachment is connected with the implement, whereby it may be converted into a check row planter, and it may be used with a single set of boxes and drawn by a single horse, or as a double machine, drawn by a team, and operating on two hills at once.

CORN CUTTING MACHINE. — Harry Willits, New Boston, Ill. This invention relates to a former patented invention of the same inventor for a device for slicing corn ears into pieces, and provides additional features to increase the cutting capacity and general efficiency of the machine. An improved feed throat and cutting device is provided, and a novel gauge to regulate the length of corn ear subdivisions. The cutter shaft of the machine is rotated by working a treadle, the operator using both hands to thrust corn ears, piled on the table, down through the throats, and the pieces sliding through a chute away from the cutter.

Mechanical Appliances.

MINERS' AND BLASTERS' TOOL. — Richard A. McVitty, Snohomish, Washington. This is a combination tool comprising all of the implements necessary for use in the treatment of fuses or for the attachment of caps to fuses, or for inserting the capped fuse in a cartridge. It consists of two pivoted spring actuated members having cutters of different shapes and sizes adjacent to their pivoted points, with recesses in the inner faces of their head sections, one of the recesses being provided with a removable blade, while a link is adapted to close the handle sections of the members and serve as a suspension device. The tool is designed to be very simple and durable, occupying but a small space, and capable of being quickly and easily manipulated.

ROLL FOR CUTTING METAL BLANKS. —Cyrus A. Peterson, Stratton, Neb. This is a shearing roll for cutting blanks for fence posts for wire or board fences, and consists of a pair of metal rolls having indented casts or cuts therein, the pattern for the blanks covering the entire periphery of the rolls, and the patterns on the two rolls forming the cutting or shearing edges, which operate to subdivide the whole of the metal sheet into blanks with as little waste as possible. At the ends of the blank patterns are short cutting edges on the rolls to sever the blank strips into individual blanks. The sheet metal is preferably run through the rollers hot, and in the same heat used in rolling the sheet, to avoid the expense of reheating.

WIRE FEEDING DEVICE. — Joseph S. Blackburn, Salem, Ohio. This is a feed more especially designed for use on nailing machines, and is designed to be simple and durable in construction and very effective in operation. The improvement is mounted on a plate, to which two vertical parallel levers are pivoted at one end, the other ends of the levers being pivoted to two horizontal parallel movable jaws, a spring acting against the levers, while a plate serving to holding the wire in place is pivoted to and connects the jaws.

Miscellaneous.

CLOTHES LINE SUPPORT.—Robert McNab, Paterson, N. J. Combined with a horizontally swinging support secured to the outside of a window frame, is a main arm journaled on the support and having teeth on one side, a pulley head provided with a pawl sliding on the arm. The device is adapted to hold one end of a line when the opposite end is held on suitable outdoor supports, and is designed to be quickly adjusted to a desired position, so that the arm carrying the main line roller may be made to align with any outdoor support, while the device automatically adjusts itself to any decrease in the length of the line.

CLOTHES PIN. — Theodore Garrison, Hazleton, Pa. This device consists of a single piece of wire formed into a nearly rectangular frame having clamping tongues integral with and bearing upon it, and coiled spring suspending eyes, the device being normally attached to the line, and clasping and holding the clothes, which are not clamped directly to the line.

CLOTHES DRIER. — John McKinnon, Moscow, Idaho. A reel is supported upon a post in such manner that a number of lines may be attached to the reel arms, and the lines be readily brought within easy reach to attach the clothes thereto. The drier will carry a large quantity of clothes in proportion to its size, and when the reel is brought to a horizontal position it turns easily, so that the clothes will be freely exposed to the wind and sun to facilitate their drying rapidly.

ADJUSTABLE POLE.—Stephen A. Bartlett, South Amboy, N. J. This invention provides an improved construction of poles for use as measuring rods, clothes poles, etc., a sliding connection being provided for the members whereby the pole may be lengthened or shortened as desired. An anti-friction roller is mounted in one of the guides and a cam lever in the other guide, to clamp the members together, the cam bearing against a movable wear plate, while a rubber block is pivoted to the inner face of one member to contact with the opposite member under the pressure of the cam lever.

COFFIN LID AND HINGE.—William J. Collinson, Hazleton, Pa. This invention provides a lid and hinge enabling the lid to be easily raised or pushed to one side, to lie flatwise on the coffin, the peculiar formation of the hinge serving to hold the lid in place as well as to operate as an ordinary hinge. The improvement is also adapted for use on any kind of a receptacle.

CAR WHEEL CHILL. — Ferdinand E. Canda, New York City. This is an improvement on a former patented invention of the same inventor, by means of which the chill is so constructed that each segment of the chilling face will be supported at two points instead of one, preventing it from warping or twisting out of shape, so that the periphery of a wheel formed on the chill will be truly circular. The chill consists of a support formed of three or more parallel rings, two series of webs projecting inwardly from the rings toward the center of the chill, the webs of one series alternating with those of the other series, one series of webs being supported by one outer ring and an inner ring, and the other series of webs being supported by the other outer ring and an inner ring, while chilling faces are formed on the inner ends of the webs, the chilling faces, the webs, and the rings being formed integrally in a single casting.

TABLE LEAF SUPPORT. — Charles K. Olson, Red Wing, Minn. Combined with a curved and pivoted brace having a transverse recess in its outer end is a bracket having a longitudinal slot to receive the brace, while a bodily movable locking key having headed ends fits loosely in the transverse slot of the bracket above the brace, with other novel features, the improvement being very simple in construction, and forming a support for the drop leaves of tables which is very easy of adjustment and holds the table leaf in such a manner that it cannot possibly become loose by accident, while it may be easily released so that the leaf will drop when necessary.

MUSIC LEAF TURNER. — Evander B. Newcomb, Parsons, Kansas. This is a simple, durable and ornamental device, which may be readily attached to or detached from the music rack of an instrument, to facilitate turning over the leaves of the music. Combined with arms adapted for engagement with the leaves, and capable of lateral movement, is an actuating mechanism having connected finger blocks, the latter being adjustable to and from the mechanism.

SAFETY ENVELOPE. — James Malone, Louisville, Ky. This invention relates to envelopes used for holding money bonds, or other valuables, providing an envelope which, when sealed and folded, cannot be opened by steaming, while the contents cannot be reached by instruments inserted through the joints or seams without obvious mutilation. The blank is of novel form, and is designed to be so folded that all the edges of the envelope are of double thickness and all the corners of quadruple thickness, thereby making a strong and durable as well as a safe envelope.

ARTIFICIAL FRUIT. — Caroline Hyde, Stonington, Conn. The skin portion of the fruit to be made, according to this invention, consists of silk or other suitable fabric, which will admit of being painted to represent the fruit, and a straight piece is puckered or ruffled along two edges, the ruffles on each edge being united by a thread. One of these threads is then drawn to close one ruffled edge, and the ends of the cloth are united to form a bag, into which any suitable absorbent and penetrable, referably flocculent, material, is inserted as a filling, a wire thread or cord being run up through the filling, and virtually forming the stem of the fruit.

INVALID BEDSTEAD.—William Coughlin, New York City. The bottom of this bedstead is made in two sections, of which one is fixed and the other is hinged to the rails of the bedstead, to permit of conveniently placing a patient in an inclined position without touching him. The mattress and other parts of the bed resting on the fixed and movable parts of the bottom are sufficiently flexible to readily adapt themselves to different positions of the movable part.

THERAPEUTIC ELECTRIC BATTERY.—John A. Crisp, Jefferson, Ohio. This is a simple battery which may be readily carried in the pocket or on the body and quickly adjusted to give the desired current. It consists of a series of cells of copper and zinc plates with an interposed absorbent material, the copper plates having projecting ears and the zinc plate of one of the cells a socket, the ears projecting through a waterproof pocket which receives the battery, while conducting wires have fingers which engage the socket and one of the ears.

VAPOR BATH APPLIANCE. — Clark Cady, Waldron, Mich. This is a rapid steam generator adapted for use with an ordinary cooking stove, and connected by tubing with a closed box in which a vapor bath may be taken. The device is under the control of the operator, who can regulate the generating of the steam to suit himself, and provision is made for cooling the steam if desired before passing it to the bathing apparatus.

WASHING MACHINE. — Randison Newell, Kenton, Tenn. This invention relates more particularly to an improved machine which combines features of those classes of machines known as "roller and bed" and "reciprocating rubber" machines. The invention is designed to provide a machine of cheap and simple construction, easy and convenient to operate, and thoroughly efficient in cleansing the clothes rapidly without injuring them. The construction is such that each article is cleansed in a separate water.

MEASURING TANK. — Charles W. Proctor, Lake Forest, Ill. This device consists of a revoluble tank, to an inner wall of which is secured a basin with which is connected a gauge glass, and from which leads an outlet pipe. The tank is especially adapted for holding oil and similar liquids in such a manner that the contents cannot be easily spilled, while the liquid may be quickly and accurately measured, so that any desired quantity may be drawn from the tank.

HORSE CLEANER. — William W. Cole, Eudora, Kansas. This is an implement to be used in place of the usual curry comb. It consists of a frame carrying wires under adjustable tension and provided with a suitable handle by means of which the implement may be applied to a horse. In doing this the handle is grasped by both hands, and the wires rubbed along the skin in one or both directions.

FIGURE TOY. — George Y. S. Wada, San Francisco, Cal. This toy is so constructed that two jointed figures, representing prize fighters, may be caused, by the working of certain levers, to make the movements of actual prize fighters engaged in a contest with one another. Means are also provided whereby one of the men represented as fighting may be forced suddenly downward, as though he had been knocked down by a blow from his opponent.

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Notes & Queries

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Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication.
References to former articles or answers should give date of paper and page or number of question.
Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.
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(3706) M. S. says: I am running a saw mill and am greatly troubled by my mill roof catching fire from sparks. Can you tell me if there is any paint or composition that will render it fireproof (against sparks), and if so, how to make it, and how to apply it? A. A wash for your roof that is fairly fireproof may be made of Portland cement, borax, and sal ammoniac. In each pail of water dissolve ¼ pound borax and ¾ pound of sal ammoniac. Then add cement enough to make the water creamy, so that it will spread with a whitewash brush. Slush the roof with the wash, so that every crevice where sparks may lodge may have a coating of the cement.

(3707) M. B. asks: What is the difference in the power required to move a load mounted on wheels 4 feet in diameter, and the same load on wheels 2 feet in diameter? Which will move the easier, and why, on iron rails? A. The larger wheels will move slightly the easiest, from the increased leverage between the radius of the wheel and the radius of the axle.

(3708) P. Y. C. asks: Why does the moon appear to be convex, that is, after leaving full appear to have one side cut off, and as the line nears the center it becomes straight, when it again assumes a curved line, this time concave? Why does it not remain convex until new moon again? A. The phases of the moon are the same between the new moon and the full moon as they are between the full moon and new moon, only that they are reversed in position. This you can readily illustrate and prove by holding a white ball at arm's length and watch the phases as you turn round at a short distance from a strong light.

(3709) A. T. C. asks: Will you please give me a composition that will cause small stones, etc., to adhere, for about two months at least, to a wooden surface, and be able to stand some friction? A. There are several cements. Plaster of Paris makes a quick setting cement for stones. Easily applied. Asphalt is much used, but requires to be applied hot. Portland cement is also good, but does not set as quickly as plaster of Paris.

(3710) G. M. G. says: Will you give me a formula of paint for a tank (both wood and metallic) that will be durable and one that will not injure the water for house use? Also does galvanizing iron tank injure water for domestic use? A. Oxide of iron paint mixed with boiled linseed oil is the only suitable paint for water tanks, wood or iron. For iron tanks there should be not less than two coats, the first well dried before the second is put on. Use no turpentine. For wooden tanks a coat of boiled oil should be put on before the paint, and well dried. Water standing in galvanized iron tanks becomes impregnated with and tastes of the zinc. Such tanks should be painted with the oxide of iron paint.

(3711) H. L. says: I have an assorted lot of watch hair springs, that I have wrapped in paraffined paper, put that in a tin box (small) and that again in an impervious box. Still they have a tendency to rust. Is there anything in the paper (paraffine)? and could you give me a better way to keep them? A. If the paper is white, it may have been from stock bleached with acids or chlorine. Use tissue paper slightly moistened with watch oil, and put a small piece of quicklime in the box.

(3712) B. W. H writes: 1. I would like to ask in regard to 3577: What is the acid of cider other than acetic. Is it phosphoric or malic, as some old books give? A. Malic and phosphoric acid are both present in cider. The latter is probably combined with some base. 2. As to 3483, 3484, is there any direct connection between the velocity of electricity and conductivity? A. There is no direct relation. It is probable that when an electric current is started, a portion of its energy is transmitted with the speed of light, but it may take many minutes for the entire current strength to be felt at the end of a long line of high capacity. 3. Several years ago the SCIENTIFIC AMERICAN gave some elaborate details of bicycles (velocipedes). Have there been any recent articles on the modern machines? A. We refer you to our SUPPLEMENT, Nos. 691, 743; also, SCIENTIFIC AMERICAN, No. 18, vol. 64. 4. Is the difficulty of soldering aluminum with the solder or the flux? A. It is probably with the flux, although the actions are so interdependent that it can only be attributed to both. 5. What is the lowest temperature at which a "real" enamel will set, and composition of same? A. A mixture of 12 parts white fluorspar, 12 parts of unburned gypsum, and 1 part of borax gives a fusible enamel. There are many other formulas. The temperature you ask for cannot well be given, as it is rather indefinite.

(3713) A. B. C. asks: What are the proper ingredients required in mixing concrete to be used in building a small solid concrete house? Will ordinary stone lime be good enough to make the walls so that they will never crumble? Stone lime and lake shore gravel are both cheap here. Kindly give full directions for mixing so as to insure success. A. You cannot use lime to make concrete suitable for house walls or foundations with beach sand or gravel. Use hydraulic cement. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 285, "How to Build Concrete Walls," and No. 119, illustrating a concrete dwelling.

(3714) D. W. B. asks for the rule for finding the horse power of any steam engine, whether marine or stationary, and whether single acting, compound or triple expansion. A. The rules for computing the horse power of all kinds of engines will occupy more space and illustration than can be given in notes and queries. We refer you to the "Practical Engineers' Hand Book," by Hutton, $7, or "Roper's Engineers' Handy Book," $3.50.

(3715) E. B. S. asks what creameries or butter or cheese factories use to keep the odor and the taste of the wood from impregnating the butter or cheese. It occurs to me that a coating of tasteless paraffine wax would be a valuable aid in a case of this kind. A. Butter tubs are only washed with salt water and cheese boxes have no preparation. Should judge your suggestion a good one.

(3716) C. W. P. asks how to make a cement that will stand kerosene oil, and not leak or sweat through. A. Cement particularly adapted for attaching the brasswork to petroleum lamps is made Puscher, by boiling 3 parts resin with 1 part of caustic soda and 5 parts of water. The composition is then mixed with half its weight of plaster of Paris, and sets firmly in half to three-quarters of an hour. It is of great adhesive power, and not permeable to petroleum, a low conductor of heat, and but superficially attacked by hot water. Zinc white, white lead, or precipitated chalk may be substituted for plaster, but hardens more slowly.

(3717) S. R. S. asks if there is a mixture or composition that can be used on very fine cut crystals to give them the true luster, fire and sparkle of the real diamond. If it is a chemical liquid or compound, and how to apply, so as to give a lasting effect. Also what the composition is of the paste (so called) used to back cheap stones by the jewelry trade. A. There is no mixture or composition that can be applied to crystal of glass of any kind to impart to it the true luster or fire of the real diamond. It is said that some parties pretend to apply to glass a solution of diamond. In the first place it is impossible to dissolve the diamond to make a solution, hence it cannot be applied. In the second place many of these stones were not cut out of quartz crystals, but were common French paste, in other words lead glass, which may show some of the fire of the diamond, but has no durability, owing to its hardness not being greater than that of ordinary glass. There is no composition or paste that is called paste that is used to back cheap stones. The stones themselves are called paste. Pastes are frequently backed by means of small metallic caps containing mercury or they are coated with mercury amalgam, so as to impart to them a mirror like reflection.

(3718) J. A. S. asks: Will metallic zinc precipitate metallic iron in a solution of chloride and in a solution of protochloride of iron? A. It will not.

(3719) J. E. asks how to dissolve celluloid into a liquid? A. Amyl acetate is a well known solvent. A mixture of alcohol and ether, and many other substances, may also be used.

(3720) S. G. H. writes: A, B and C draw lots to see which shall do a certain piece of work. A and B draw first. A wins and retires, leaving B to draw with C, who loses and does the work. What was the chance of each in such a scheme? Is the following problem similar to above: A, B and C have equal claim to a prize. A says to B, you and I will draw lots and the winner shall draw lots with C for the prize. The answer as given for this is A ¼, B ¼ and C ½. A. In the first case, in the actual drawing, B has twice the chance that A has, as he draws twice against a single competitor. The answer might be put: A=⅙, C=1, B=1. Originally the chances of A and B are even and each has one-half the chance of doing the work that C has. This would give A=1, B=1, C=2. This answer corresponds with that of the second problem. They are really identical.

(3721) W. E. asks the meaning of the initials J. B. L. on the face of each twenty dollar gold coin. A. The small letters seen sometimes on coins are often the initials of the die cutter. Thus on the silver dollar a very minute M is to be seen on the base of the neck, which indicates "Morgan." The initials J. B. L. which you speak of are undoubtedly those of J. B. Longacre, who some years ago was United States mint engraver attached to the Philadelphia mint. Sometimes the small letters denote the mint at which the coin was struck.

(3722) T. A. A. asks how many (or about) cubic feet of gas it will require to lift one hundred pounds, and whether hot air has the same buoyancy as gas. A. Pure hydrogen gas will lift about 70 lb. to 1,000 cubic feet, or 100 lb. to 1,429 cubic feet; street gas will lift about half as much. Hot air as used in balloons has less lifting power on the average.

(3723) C. M. S. asks: 1. Will you please tell me how the torpedoes used by children on the Fourth of July are made—what the chemicals are, etc.? A. They consist of a minute quantity of fulminate of mercury mixed with gravel and twisted up in thin paper. 2. Will you please tell me of some book like a dictionary, that tells how the different chemicals are made? A. We can only refer you to general chemistries, such as Fowne's or Roscoe's chemistry. All such we can supply by mail.

(3724) J. B. T. writes: Having been a soldier for twelve years and over, I have tried to discover some preparation that would give leather a black, shiny gloss or varnish, something that would last for a while without requiring continual working. Can you give a receipt for it? A. The only effectual way is to regularly japan the leather, making what is known as patent leather. A solution of shellac in ammonia is sometimes used for leather. This might be mixed with a good black pigment. Long standing is required to effect the solution.

(3725) B. W. J. asks: 1. How can a watch be demagnetized by means of a dynamo? A. A watch can be demagnetized by tying it to a string, twisting the string, allowing the watch to be whirled by means of the string as it is moved forward toward the poles of the field magnet, and then withdrawn. 2. Could a Rhumkorf coil be made to run incandescent lights? Please give directions for one that would run about 3 sixteen candle power lamps. Could you attach it to an incandescent circuit? To settle a discussion, would one thus connected require as much current (by meter) to run three lamps as the lamps would if connected direct? A. Incandescent lamps cannot be operated by means of the Rhumkorf coil. The coil can be operated by connection with an incandescent circuit. As the lamp cannot be run in this way, the latter part of this question does not admit of an answer. 3. What would you advise a young man to study for, either electrical or mechanical engineer? A. A knowledge of either electrical or mechanical engineering should be acquired by a course in some school of good standing. If you mean to ask which of the two professions is preferable, we would reply, choose the one most in accord with your natural inclinations.

(3726) C. J. R. asks: 1. How many candle power of incandescent light would it take to light a room 8 feet long, 8 feet wide and 6 feet high? A. A 10 candle power lamp would answer for a room of the size mentioned. 2. How many cells of battery would it take to run that number of candle power lamp? A. It will require about six cells of large Bunsen battery to run such a lamp. 3. How often would it be necessary to refill the cells, providing I use the light an average of three hours a day? A. The Bunsen battery requires renewal once a week. 4. What substances shall I use to make the solution for the cells? A. Use a bichromate solution. Consult any work on batteries, or SUPPLEMENT, Nos. 157, 158, 159, and 792 for information on batteries. 5. What is the best kind of wire to use between the batteries and the lamps? A. No. 18 office wire will answer for the leads.

(3727) G. S. P.—Harness polish is made by breaking 4 ounces of glue in pieces and pouring over it 1 pint of vinegar. This is allowed to remain until perfectly soft, then make another solution of 2 ounces of gum arabic and half a pint of black ink. To mix add another half pint of vinegar to the glue solution over a moderate fire, but do not let it boil. When it is dissolved add the gum solution, keep at a temperature of 180° Fah., and further add 2 drachms of isinglass in a little water, then remove from the fire and draw off for use. It is to be applied by a sponge, and a very thin coat given, allowing to dry quick, which gives a better polish.

(3728) W. H. R. asks: 1. Will an alternating current do as well as a continuous current for lighting incandescent lamps? And what is the difference, if any? A. The alternating current is extensively used for incandescent lighting. 2. Which is the more saving in carbons in the arc lamp, the alternating or continuous current? A. There is practically no difference. 3. What is the principle of the multiphase dynamo, or generator, used at Lauffen, which sends the current to Frankfort? And also the multiphase or rotary current motor? A. These are described in SUPPLEMENT, No. 825.

(3729) W. G. says: 1. Can you tell me how to make a paint for barrel heads, bright and glassy? A. Mix the colors with quick drying varnish. 2. Can I make a mould of a china ornament to cast from again, and how and of what material? A. You can mould the ornament in fine loam, such as used by brass founders; or if you want to make a pattern from the ornament, oil it and make a mould of plaster of Paris, in which you can cast a pattern with type metal. 3. Receipt for good heavy whitewash. A. For a brilliant whitewash. To a half bushel of best lime slaked in hot water, add 8 quarts of salt dissolved in hot water, 2½ pounds ground rice boiled to a thin paste, stirred in boiling hot, also 1 pound clean glue dissolved in hot water, and ½ ponnd fine whiting, with hot water enough to make the whitewash spread properly with a brush. Let it lie for a day or two and then apply hot.

(3730) J. J. M. asks: What hydrometer is the best to test silver sclution with and what is the standard on same? Also a receipt of a good tin oxidizer, also a receipt of a nickel oxidizer? A. Baume's hydrometer is the best. Silver solutions vary by the use of the bath. You will have to gauge the condition of the bath by trial. Tin and nickel do not make oxidizing surfaces. To oxidize they must have a thin deposit of silver and the silver must be oxidized by sulphide of sodium bath.

(3731) J. T. N. asks: Can a force pump be placed at my house, 88 yards from and 22 feet above the level of my spring, connected with spring by a pipe and draw water from it? I am afraid my spring is not strong enough for a ram, and see no other way to get the water. Can you advise me? A. You can pull the water the distance and height named, if you cut a ditch a few feet deep into a recess in the ground at the pump, so as to use a subchamber pump, and lessen the height of lift say to 17 or 18 feet, you will have little or no trouble in keeping the pump charged. Suction pipe should be perfectly tight, with a foot valve at the spring.

(3732) T. A. B. asks: What material can be applied to cement floors now laid to make them absolutely waterproof and proof against sewer and other gases working through them, and not act injuriously on the cement? What material can be mixed with cement, or other material, to accomplish same result in laying new floors? Material must be capable of withstanding as much wear as ordinary cement floor and be comparatively inexpensive. A. There is nothing cheaper or better than coal tar applied to the cement floor to make it water and gas proof. Make the coal tar thin with turpentine, o that it will not only strike into the cement, but may be easily brushed on with a large brush (whitewash brush). Apply 2 or 3 coats, letting each dry before the next coat is applied. We recommend the same for new floors to be made of Portland cement. When worn a fresh coat can be put on.

(3733) E. B. U. says: A few days ago we accidentally overturned a kerosene oil lamp on a figured Brussels carpet. Can you tell me through your query column in the SCIENTIFIC AMERICAN of any receipt which will take out, if not all of it, at least some of the kerosene, and not take out the colors in the carpet? I find that your receipts in that column are very useful, and have a note book into which I copy most of them. A. Expose the carpet to heat. For example, hang the carpet before a grate fire, as close as possible without burning, until the oil is evaporated. This is an effectual method.

(3734) S. M. writes: Do you know of substance which will make silicate of soda insoluble in water? I wish to use a water solution of silicate of soda with asbestos, the former to be the binder, but after drying and pressing the mixture, water will again act on the silicate of soda. A. You cannot make it completely insoluble. By baking you can make it less soluble than it normally would be, but complete insolubility cannot be imparted to it.

(3735) A. A. U. writes: My house has been recently shingled with (white) cedar shingles, and the cistern water is about the color of good coffee. It is very disagreeable to use and is coloring the clothes. Is there anything I can put in to take out the color? We have had a big rain and have a winter's supply. A. Nothing can be done. After a time the shingles will cease coloring the water. Empty the cistern and the next supply will not be so bad. It will not be clear for several months.

(3736) W. A. H. asks for a formula for making an explosive that is mild in power and loud in report when not confined. Wish to use same on light tapers, cigar lighters. A. Fulminate of silver explodes by heat, it can be used on trick matches, but it is very dangerous and is exceedingly powerful. Iodide of nitrogen answers your description better, but is almost spontaneously explosive. The combination you ask for is unattainable.

(3737) J. W. A. asks: Can water be heated above 212° Fah.? A. Water cannot be heated above 212° Fah. in an open vessel, but in a closed steam boiler the water may be heated much higher. For example, in a locomotive boiler at 150 pounds pressure the water has a temperature of about 363° Fah.

(3738) G. W. T., Jr., says: I am constructing a gas generator on a small scale and intend to use a dentist's gas blow pipe. Will you oblige me by answering or giving me any information in regard to the following: 1. Can gasoline gas generated by forcing air through the liquid and pumped into a gasometer be used the same as artificial gas used in cities (coal gas)? 2. Has it the same degree of heat? If not, can it be used successfully with a blow pipe to solder 20 carat gold? 3. Would heating the gasoline by setting it in hot water aid its combustibility? 4. Will gasoline gas remain unchanged for an indefinite time, if kept in a gasometer surrounded by water? A. Gasoline vapor and air should not be stored in a tank. There are possibilities of disastrous explosion. By passing air from holder through a small vaporizing pan with a large evaporating surface, so that there will be an excess of gasoline vapor, there will be less danger, as this method is used for lighting. A saturated vapor will operate with a blow pipe for the purpose desired, but will be more smoky and give more trouble than an oil lamp. Hot water will facilitate evaporation, but the excess will condense in the cold pipes and cause trouble. For ordinary dental purposes there is nothing better or safer than an alcohol lamp and blow pipe where there is no gas.

(3739) D. E. S. says: 1. On page 119 of SCIENTIFIC AMERICAN of February 21, 1891, it speaks in an article of a Serpollet generator. Please explain them and the principle involved. Are any made in this country and where? A. The Serpollet generator is an iron pipe flattened and coiled. The water is injected into the coil only as fast as wanted for steam. The walls of the coil are so close that the water does not enter into the spheroidal state. They are described and illustrated in our SUPPLEMENT, Nos. 732, 746, and 751. They are made in France. 2. What is a naphtha engine and how does it differ from a gas or gasoline engine? A. A naphtha engine uses vaporized naphtha instead of steam, which is condensed by exhausting into a surface condenser and returned to the boiler. 3. How is the steam condensed in a condensing engine? A. In a condensing engine the steam is exhausted into a condenser or chamber, meeting a jet of cold water, the water and air being pumped out. 4. Has either a gas, naphtha, or steam engine been described with a view of amateurs building them? A. We can mail "Model Engine Making," by Pocock, $1, and "Gas Engines," by Clark, $2.50. 5. Could double the amount of power be got out of a given amount of steam by having two pistons in a cylinder, one at each end? What would be the result of such an arrangement on a gas engine? A. You cannot add to the power of a given amount of steam or gas by using double pistons.

(3740) A. R. L. asks: 1. I have precipitated the gold from several toning solutions with $FeSO_4$ and afterward dissolved with nitro-muriatic acid. Immediately upon adding some of the solution after being evaporated and redissolved, a yellow precipitate was formed and the prints would not tone. The baths used contained some sodium salts. A. The trouble was probably in the evaporating. Evaporation to dryness partly decomposes gold chloride. Evaporate repeatedly with successive additions of water, to sirupy consistency only and on a water bath, not directly over the flame. The object of this treatment is to expel all acid. 2. Would also like to know of an easy way in which the skin and flesh can be removed from a cat's head, to obtain a good skull. A. The approved method is by soaking for several weeks in water, washing in warm water until perfectly clean and bleaching in chloride of lime water. One teaspoonful of the salt to a pail is enough. This is slow and very disagreeable. You may instead boil the head until the flesh all comes away; after drying, soak in weak lye, wash, and bleach with chloride of lime water. The time of boiling and of bleaching depends on the specimen. Use judgment.

(3741) I. F. C. says: This town has waterworks. I do not know what style to call them, only the water is forced direct from a large spring at lowest part of city. There is no water tower, standpipe nor anything of that kind. There is a reservoir used in case of fires. Now, here is the trouble: When pressure is applied on the pumping apparatus, above what is usual, there is a great knocking and pounding of pipes in dwellings and business houses, at every revolution of the pumping machinery, which is very annoying, and I wish to know if there is not some way of stopping the nuisance. All you can get out of our city authorities is, "It's air in the pipes." If that be the case, cannot it be remedied, and is it not ignorance on the part of the engineer or water works management? A. We should judge that there is want of air in the right place. With proper air chambers at the pumps, on both suction and force pipes and small air chambers at the ends of the pipes and above the bibbs in buildings, there should be no noise at any time. If there are invert siphons in the mains, there should be taps to draw off air at such places.

(3742) E. B.—To reduce over-dense negatives make a solution of hyposulphite of soda, 10 grains to the ounce of water, and dissolve therein from 10 to 30 grains of ferridcyanide of potassium. Use at once, as the solution deteriorates rapidly. Retouching varnish is made as follows:

Alcohol	300 parts.
Sandarac	18 "
Camphor	5 "
Castor oil	10 "
Venetian turpentine	5 "

(3743) J. H. S. asks how to dye or stain bone and horn black. A. Apply a solution of nitrate of silver and expose to the sun. The solution is applied several times to the article to be stained, but it is necessary the first coat should be dry before another is applied.

(3744) R. J. G.—Diamond ink is made by mixing with hydrofluoric acid enough barium sulphate to give it consistency, so that it will not spread, and show well on the glass. Ammonium fluoride may also be added. After the writing has stood some time it is washed or dusted off, and the etching appears. The materials are easily obtained of any dealer in chemicals. Hydrofluoric acid is poisonous and the fumes should be avoided. It should be kept in a lead or gutta percha bottle.

(3745) A. B. asks: 1. What is meant by equivalent focus and back focus? A. Equivalent focus is the focus due to the distance of the object focalized, and usually called the conjugate focus. The back focus is only another name for the conjugate focus, all being beyond the principal or focus for parallel rays. 2. Give formula for good toning solution.

A. Chloride of gold	1 gr.
Acetate of soda	30 "
Water	8 oz.

3. What is the use of French azotate? A. It takes the place of acetate of soda in the toning bath. 4. In what number of SUPPLEMENT or regular edition will I find best directions for making camera for 2½×2½ inch plates? A. For illustrated description of camera bellows, see SCIENTIFIC AMERICAN SUPPLEMENT, No. 625, also SCIENTIFIC AMERICAN of October 13, 1888, page 231. 5. What is size in fraction of inch of $\frac{f}{32}$ stop? A. The size of the stop is the focus in inches divided by 32; for instance, if the focus is 8 inches, then $\frac{8}{32}$ is 0·25, or a ¼ inch stop.

(3746) Enquirer asks: If galvanized iron roofs are suitable for a foundry, are such roofs liable to oxidize from condensation, coming from the heated gases and steam in the foundry? A. Iron roofs are in use for foundries. If well painted on the under side, they do not oxidize more than for other buildings. Galvanized sheet iron is largely used for covering. It wears

well. but as the fault of condensing steam or moisture on the under side in cold weather and interferes with the moulding and pouring by dropping water where it is not wanted. We recommend slate on iron frames as best and safest.

Replies to Enquiries.

The following replies relate to enquiries recently published in SCIENTIFIC AMERICAN, and to the number therein given:

(3627) A. T. writes in answer to H. D. G. I use 11 cells Julien 5 S type storage and charge with 44 cells gravity, all in series. Have four 16 candle power and three 12 candle power 20 volt Edison lamps. Conductors No. 10 and 12 B. and S. gauge wire. Have not been very successful, owing to great consumption of bluestone and large deposit on zincs. I tried the forms of gravity now sold with porous cups and found them a great improvement, but charging current is so low, could only burn one 16 candle power lamp for three or four hours, or say 18 to 20 hour charging. [The deposit of copper on the zincs, if occurring while charging, is due to insufficient current. If you had 52 gravity cells in two parallel series, the result would be much better, as nearly twice the current would pass. This is on the assumption that the deposition of copper occurs during the charging. If, however, your battery stands long on open circuit, the trouble will inevitably occur. Only plan would be to have some arrangement for drawing off the upper two inches of solutio from the cells when not charging. Forty-four gravity cells on 11 storage cells gives an unnecessarily high voltage. To use that number, place 8 cells in series and place the other 36 in 2 in parallel and 18 in series.—ED.]

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