ENGINEERING INVENTIONS.

A stuffing box has been patented by Messrs. William Dingle and William Jenkins, of Lake Mahopac, N. Y. It is made in two parts, with a smooth inner surface, its bolt-receiving lugs being perforated to receive the perforated heads of the gland fastening bolts, and having a gland made in two parts with smooth outer surface, and overlapping lugs perforated to receive the fastening bolts, so the gland can be secured in the stuffing box by exterior bolts and nuts, and can be readily applied and removed.

MECHANICAL INVENTIONS.

A bench stop has been patented by Mr. John Adams, of Hancock, N. Y. The casing has a post with a lateral stop or arm capable of rotary movement and carrying a clamp, with its jaw adapted with said stop or arm to effect the clamping operation, making a bench stop adapted for universal use.

A screw driver has been patented by Mr. Willis B. Gilmore, of Minneapolis, Minn. The bit has an annular recess to contain a loose spring, with one end entering an aperture or connected with a surrounding sleeve fitted upon the bit of the driver, making an improved device for holding the screw on the end of the bit, with other novel features.

An apparatus for striking moulds for hand rails has been patented by Mr. Frederick R. Bodley, of Denver, Colo. This is a mould striker of novel construction to produce moulds for rails of any required pitch, size, and shape, without requiring special skill for its operation, and so the most difficult mould can be struck out on the mould board as easily as simple forms.

A power transmitting pulley has been patented by Mr. John T. La Turno, of Armstrong, Mo. It is made in two sections placed loosely on a driving shaft, with interior lugs and springs between them, one of the pulley sections carrying the pulley rim or face, and the other section a clutch device, in combination with a clutch splined to the driving shaft, giving a gradual strain between driving and transmitting power gears in starting.

AGRICULTURAL INVENTIONS.

A sorghum and corn cutter has been patented by Mr. Charles E. Coe, of Leesburg, Kansas. It consists of a shearing mechanism, with means for advancing it upon the ground to cut the stalks, laying them to form a bunch, holding the bunch till it is large enough, and dropping it at the will of the operator.

A baling box has been patented by Mr. Oliver Bulkeley, of Dexter, Texas. Fixed standards reach above the end board, and there are hinged side boards, so the bale cords can be placed in the box with their ends reaching over the upper edges, when the bale cloth can be put in, and the cotton or other material to be baled packed therein, and the whole tied by the cords. It is particularly intended for the cotton field, as it only weighs 100 pounds, or it may be of use to small farmers in baling hay.

MISCELLANEOUS INVENTIONS.

An axle skein has been patented by Mr. Edmund N. Hatcher, of Columbus, O. Combined with an axle and its skein, the hood, band, and bolts are all formed in one piece, thus strengthening the parts at the points usually the weakest.

A spool holder has been patented by Mr. Amos W. Judd, of Chattanooga, Tenn. It consists of a spiral spring of small diameter for holding the spool, and in a fastener fixed to the ends of the spring and capable of being attached to the clothing of the user.

A pump has been patented by Mr. James E. Sinclair, of Waverly, Md. The water cylinder is combined with a hood arranged on the outside of the casing for collecting escaping gases, whereby they may be destroyed to prevent the spreading of noxious vapors.

A beehive has been patented by Mr. Martin Van Ensley, of McMinnville, O. The bottom is made double, with passage and ventilating openings, and there are other novel features, covering improvements on a former patented invention of the same inventor.

An elevator has been patented by Mr. Chas. W. Hays, of Orange, N. J. It is constructed with an arm attached to the well door to engage with the carriage when the door is open, and prevent the carriage from moving up or down before the door is closed, thus locking the carriage in place when the door is open.

A draught equalizer has been patented by Mr. Oliver C. Beck, of Rickreal, Oregon. The invention covers a combination of single trees, a double tree, and a treble tree, so as to equalize the draught of one horse drawing at one end of a tree or cross bar by two horses drawing at the other end of the same tree.

A hydraulic dredge has been patented by Mr. John H. Anderson, of Shelby, Neb. It is a sectional dredging vessel comprising a main boat and supplementary boats, with dredge tubes for cutting either a narrow or wide channel, the invention being an improvement on a former patented invention of the same inventor.

An apparatus for working electric bells has been patented by Mr. Wilbur F. Horn, of Carlisle, Pa. The bell is rung or other electrical effects produced by the immersion of one of the battery plates into the exciting fluid, by a novel device, one plate being permanently immersed and the other normally out of contact with the exciting fluid.

A scraper and elevator has been patented by Mr. Titus H. Apple, of Meadville, Pa. It is for loading snow, earth, sand, sawdust, stones, or such materials into carts, wagons, or other vehicles, for which the parts are novel in detail of combination, and the apparatus can be thrown into and out of operation very easily and rapidly.

An electric lock has been patented by Mr. Hilborne L. Roosevelt, of New York city. The armature of the magnet is combined with a swinging plate, spring, and bolt, and a trip plate is interposed between the armature and swinging plate, with other novel features, the invention being an improvement on a former patented invention of the same patentee.

A machine for making horseshoes has been patented by Messrs. Joseph Rigby and John W. Gorsuch, of Ottawa, Kansas. A former is fixed on an iron casting fastened on a block, and around it the shoe blank is bent by hand levers, the invention affording an improved device for bending straight blanks into the form of horseshoes by hand.

A saw jointer and set has been patented by Mr. James K. Bridges, of Woodstock, Ill. This invention covers a simple device to joint the teeth of crowning saws or straight ones, to joint the raking teeth and set the teeth of thick or thin saws, and to gauge the set of the teeth to ascertain any irregularities of the set and enable them to be corrected.

A windmill has been patented by Mr. Joshua G. Benster, of Duncan, Neb. This invention covers improvements in the construction and arrangement of the supporting apparatus for the wheel supporting frame, the frame itself, the wheel, and transmitting apparatus, and the apparatus for mounting and operating the tail vane, all intended to provide a simple, substantial, and durable mill.

A machine for spinning and winding yarn, thread, etc., has been patented by Messrs. Oscar Hanna and Hiram W. T. Earnshaw, of Dover, Ky. This is a device which may be attached direct to the condenser card, to the jack frame, or to the twister frame, when used as a doubler and twister, and is particularly adapted to the spinning of roving as it comes from the condenser.

A wagon end gate has been patented by Mr. Charles P. Krenson, of Munster, Ill. The end gate is fastened in place in the wagon box by hinged rods and levers, the rods being hinged to one side of the box and adapted to be engaged with levers pivoted to the other side of the box, the levers being held and locked by suitable devices, and the lock bars engaging with the hinged rods to hold the gate from working up.

A copy case has been patented by Mr. Myron A. Sherman, of Grant Fork, Ill. It is made with a sheet metal body with the upper parts of its sides bent outward, upward, and inward, forming grooves, and having a cover with a glass plate in a sheet metal frame to slide in said grooves, the cover sliding on and off at either end of the case, and so the edges will not tear or scratch the copy.

A device for holding photographic plates in developing trays has been patented by Mr. Samuel B. Pratt, of Boston, Mass. In combination with a developing tray is a sliding plate arranged to hold one end of a photographic plate, and adapted to be raised for lifting one end thereof out of the liquid, so the photographic plates may be easily held in and removed from the liquid without immersing the fingers.

A hay press has been patented by Mr. Herman L. Whitehead, of Island City, Oregon. There are improved contrivances for working two followers from opposite directions toward each other in a horizontal case by means of a single or double lever arrangement with power applied by a windlass by horse power, making a simple device for applying great force in a low down case, while the pressed bales may also be lifted out by one of the levers.

NEW BOOKS AND PUBLICATIONS.

MAGNETO-ELECTRIC AND DYNAMO-ELECTRIC MACHINES. By Dr. H. Schellen. Translated and enlarged by Nathaniel S. Keith. Vol. I. D. Van Nostrand, New York.

The work of Dr. Schellen, who had previously been a publicist of considerable mark in several departments of physics, was deservedly popular in Germany, and had reached its third edition before the close of last year. Taking this book as a foundation, Mr. Keith proceeds to add descriptions of dynamos and allied apparatus made and used in this country, the plan of the work being designed to cover everything of practical value or special interest experimentally which has been done in this field up to the present time. Mr. Keith has heretofore written much, and made many valuable original investigations on applications of electricity to practical ends, so that he comes to this task amply equipped with all the qualifications necessary to present the public with a work of standard value in the two volumes of which the first is just issued.

ILLUSTRAZIONI DELLA FERROVIA METROPOLITANA E CAMPI FLEGREI, Naples, Italy.

This is a book of illustrations showing an elaborate scheme for the improvement of the city of Naples, to which Mr. Lamont Young has devoted the last ten years. He has also had the assistance, in this task, of Mr. A. Caprani, founder of the Royal Hotel in that city. This wonderfully beautiful city of southern Italy seems now fairly in the way of having our modern street railways, spacious boulevards, etc.

STEAM BOILER INCRUSTATION. By Charles T. Davis. Industrial Publishing Company, Washington, D. C.

This treatise is largely devoted to methods for preventing corrosion and the forming of scale, determining the constituents of water and their effects on boilers, compounds and apparatus for purifying it, apparatus for feeding chemicals with the water, etc.

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The Cyclone Steam Flue Cleaner on 30 days' trial to reliable parties. Crescent Mfg. Co., Cleveland, O.

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If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, $40. Various other foreign patents may also be obtained. For instructions address Munn & Co., SCIENTIFIC AMERICAN Patent agency, 361 Broadway, New York.

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Curtis Pressure Regulator and Steam Trap. See p. 222.

Woodwork'g Mach'y. Rollstone Mach. Co. Adv., p. 222.

Drop Forgings. Billings & Spencer Co., Hartford, Conn.

Brass & Copper in sheets, wire & blanks. See ad. p. 222.

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Electrical Alarms, Bells, Batteries. See Workshop Receipts, v. 3, $2.00. E. & F. N. Spon, 35 Murray St., N. Y.

Knurling Tool, self-centering, for lathe use. Pratt & Whitney Co., Hartford, Conn.

Notes & Queries

HINTS TO CORRESPONDENTS.

Name 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 mail, each must take his turn.

Special Information requests on matters of personal rather than general interest, and requests for **Prompt Answers by Letter**, should be accompanied with remittance of $1 to $5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Minerals sent for examination should be distinctly marked or labeled.

(1) Reader desires to know which of the following contains the most nutriment—rice, beans, peas, or oats? A. Peas contain 93 per cent of nutriment; rice, 88 per cent; beans, 87 per cent; oatmeal, 74 per cent.

(2) C. E. B. asks: What amount of salicylic acid per gallon will prevent the fermentation of cider, or other liquid of similar nature? A. Add one oz. salicylic acid to each forty gallons immediately after the cider has left the press, and no fermentation will take place.

(3) C. B. S. asks how to make a glue suitable for gluing sea shells together, one that will set quick, and be stiff after set, and yet not crackle or break easily. A. Use the following:

Starch	2 drachms.
White sugar	1 ounce.
Gum arabic	2 drachms.
Water	q. s.

Dissolve the gum, add the sugar, and boil until the starch is cooked.

(4) C. S. R. asks: What material will mix with anthracite coal ashes, to make a walk that will be firm and smooth both in wet and dry weather? A. Mix with Portland cement one part, ashes two parts; make into a mortar quickly, spread on path and smooth with shovel or trowel.

(5) B. T. S. writes: It is said that about one-twentieth of water is air; now if I convert the water into steam and then condense it back to water, and take that water direct out of a vacuum back into the boiler, and use it over and over without its coming in contact with the air, what proportion of air will there be, if any, still left in that water? A. Practically no air; but any fresh water that may be pumped into the boiler contains air, which will mix with the steam and enter the condenser.

(6) E. P. M. asks: 1. Is it practicable, by any known plan, to manufacture, in glass, frusta of hollow cones about four inches high, whose shells shall be about a quarter of an inch thick, tapering in interior diameters from $4\frac{3}{4}$ inches to $3\frac{1}{2}$ inches; the interior section to be circular to within $\frac{1}{32}$ of an inch, it being allowable to strengthen or stiffen the shell by exterior flanges as desired? A. Yes, make a model of your cone in wood or any other material. Send it to a glass house and have cones blown, or if they are to be exact have them pressed in a mould, which the glass blower can have made to suit your pattern. 2. In the conversion of rectilinear reciprocal to rotary motion, what per cent of power is lost by the imperfections of the ordinary crank in the varying force exerted at different points in the circle described by the pin? A. The crank value is 0·63 of the direct pressure.

(7) Upsilon desires to know recipe for acid compound that will restore worn or blunt files to utility. A. Clean the files by brushing them clean of dirt and grease as well as any foreign metal sticking in the teeth; then dip in a strong alkali for a few minutes to remove all traces of grease from the bottom of the teeth; rinse in clean water, then dip a solution of 1 part nitric acid, 3 parts sulphuric acid, to 7 parts water. Time 5 seconds to 5 minutes, according to cut and wear. Rinse in warm lime water, dry, and oil slightly. Finally brush with powdered charcoal to take off excess of oil and give them the peculiar look of new files.

(8) H. B. asks the process for making counter dies for the ordinary seal press and metal used, to give the best result. A. Cast the counter die upon the face of the die in type metal, and solder it to the brass backing piece while in the press in order to get a good register. 2. Formula for making ink to print on tin with a rubber stamp? A. Use a little varnish rubbed up with the ordinary printing inks.

(9) Brazoria asks if there is any device for measuring distance, close or far, without the use of rods or chains. How is distance measured? A. You cannot measure a distance without a measure of some kind to begin with. Long distances are obtained by triangulation, for which an accurately measured base is necessary. See any book on trigonometry.

(10) G. R. H. writes: Can you explain how it is that although water expands in freezing, a piece of wet board when frozen is smaller than at any other time? That it is so I have proved repeatedly, although I have heard the fact disputed. A. The expansion of water ceases at the moment of congelation. Ice contracts by cold more than wood.

(11) J. N. asks the most extensive place in the manufacture of cutlery—Sheffield, England, or Turner's Falls, Mass.? A. Sheffield, England.

(12) G. A. D. writes: Will you please inform me what kind of shoe blacking that is which some private valets use for blacking their masters' shoes and where it can be bought? It is said to keep the leather soft and give a good polish, A. All blacking which gives a good polish on shoes is in its nature non-beneficial to the leather, and many of the best polishes contain acids which are injurious. The leather, however, may be kept in fairly good condition by using the blacking sparingly and occasionally sponging off, when a slight application of neatsfoot oil and tallow will help restore the life to the leather. There are too many good blackings in the market for us to particularize here, but more depends upon their use and the care taken of the leather than in the differences in their quality.

(13) J. F. M., of Ohio.—The signing of the patents by the Acting Secretary is lawful, and such patents are perfectly valid. This has been so held by decision of the United States Court.

(14) E. L. L asks: What substance loosens printer's ink so that newspaper pictures can be transferred to other paper? A. The liquid to be used is made by dissolving 1½ drachms common yellow soap in 1 pint hot water, adding when nearly cold 3¼ fl. oz. spirit of turpentine, and shaking thoroughly together. This fluid is applied liberally to the surface of the printed matter with a soft brush or sponge (being careful not to smear the ink, which soon becomes softened), and allow it to soak for a few minutes; then well damp the plain paper on which the transfer is to be made, place it upon the engraving, and subject the whole to moderate pressure for about one minute. On separating them a reversed transfer will be found on the paper. This transfer will not be equal to the

original, as only a part of the printer's ink is removed. If the printing be very old, a longer soaking and more pressure may be necessary.

(15) C. H. K.—Starr died in 1847, when about 25 years old. He was interested in the first patent mentioning incandescent carbons. He employed, in 1845, carbons heated to a white heat by the passage of the electric current, recommending platinum as the best metal for the purpose, and the best carbon that of gas retorts. He made an electric candelabrum with twenty-six lights symbolizing the twenty-six States of the Union, which Faraday is said to have greatly admired.

(16) A. B. asks: Which nation stands, statistically, as the first in the matter of inventions? A. England stands first in respect to the early development and grant of patents for inventions. The United States ranks first in the number of patented inventions.

(17) H. B. V. asks the earliest date of the round piston valve engine. A. The earliest rotary valves for steam engines were those of Marquis of Worcester, Savery, and Newcomen, about 150 years ago.

(18) E. A. S. asks the best way to remove from cloth, paper, or ivory the stains from the purple aniline pencils now so often used, and from the aniline ink, which has driven out of the market almost every other variety. I find that hypochlorous acid will take out the greater part of the stain from an ivory paper cutter, but traces of the spots still remain. A. We would recommend you to try hydrogen peroxide. Its use for bleaching ivory is unexcelled. Follow it up by treatment with alcohol. A description of its application to ivory is given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 339.

(19) F. A. W. asks: How can I make water dissolve the largest amount of bicarbonate of soda? That is, can I dissolve more to a gallon of water, and have it stay in solution, than by simply adding the soda to cold water? A. The bicarbonate of soda is soluble in 13 parts of cold water, and is decomposed by boiling water. Therefore it is most soluble at just about 158° Fah. (70° C.), where 14·64 parts of the theoretical anhydrous salt becomes soluble in 100 parts of water, and 16·69 parts of the crystalline salt are soluble in the same amount of water.

(20) J. C. H. writes: I saw in one of your numbers a recipe for a hektograph or copying pad consisting of 100 parts good or common glue, 25 parts baric sulphate or kaolin, and 375 parts water. I took of the glue 4 ounces, kaolin 1 ounce, and 15 ounces water. When first made it stuck to the paper and peeled up with it; after it got harder it did not take up enough ink to make a good copy. The ink used was a concentrated solution of Paris violet aniline, as called for by the recipe. A. The formula originally given you is the one used by the French government, and is for several reasons considered superior to any other. The following may prove more satisfactory, and we suggest its trial: Take good carpenter's glue 4 ounces, soften it in very cold water by soaking an hour or two, remove when entirely soft, then heat four ounces by weight of glycerine till vapor arises from it, then add the glue to the hot glycerine, and stir till dissolved; then keep the vessel in a water bath for several hours till the excess of water is evaporated.

(21) L. M. J. writes: In the process of pasting the photograph on the glass, in doing electograph, artograph, and photo painting, is there anything combined with the starch paste to prevent blisters and peeling off the glass when dry? A. We presume you use the starch too thick; thin it by adding more hot water. It is also essential that the glass should be thoroughly cleaned. The paste consists of nothing but starch.

(22) L. R. G. writes: Will you be good enough to give sufficient directions for the preparation and subsequent treatment of the photographic copying papers giving the following results: White lines on blue ground, blue lines on white ground, and black lines on white ground, on first impression? A. The blue process, giving white lines on blue paper, is described on page 52 of the SCIENTIFIC AMERICAN for July 28, 1883. The reversed blue process is as follows: Well sized paper is painted over with a brush with the following solution, freshly prepared: 30 volumes of gum arabic solution (1 to 5), 8 volumes solution of citrate of iron and ammonia (1 to 2), and 5 volumes of iron perchloride (1 to 2). The mixture appears limpid at first, but soon grows thicker. The paper is dried in the dark, then exposed for a few minutes under a negative or drawing, and developed with a solution of 1 part potassium ferrocyanide in 5 parts of water applied with a brush. It is fixed with dilute hydrochloric acid 1 to 10, washed thoroughly, and dried. For black lines on white ground the paper is immersed in the following solution: 25 ounces gum, 3 ounces sodium chloride, 10 ounces iron perchloride, 45° B., 5 ounces iron sulphate, 4 ounces tartaric acid, and 47 ounces water. The developing bath is a solution of potassium ferricyanide or potassium ferrocyanide, neutral, alkaline, or acid. After being exposed, the positive is dipped in this bath, and the parts which did not receive the light take a dark green color; the other parts do not change. It is then washed with water in order to remove the excess of the cyanide, and dipped into a bath containing acetic, hydrochloric, or sulphuric acid, when all the substances which could affect the whiteness of the paper are removed. The lines have now an indigo black color. Wash in water and dry.

(23) J. B. asks for a preparation for nickel plating without a battery. A. The process is described in answer to query No. 28 in SCIENTIFIC AMERICAN for May 24, 1884. 2. Also a receipt for making scarlet ink? A. Half a drachm of powdered lake and 18 grains of powdered gum arabic dissolved in 3 ounces ammonia water makes one of the finest red or carmine inks. 3. A receipt for making ink for stylographic pens? A. 20 grains of brown shellac are dissolved in a warm solution of 30 grains of borax in 300 to 400 grains of water and filtered hot; to the filtrate is added a solution containing 7·5 to 10 grains of water. Soluble nigrosine, 0·3 grain tannin, 0·1 grain picric, 15 grains ammonia water, and 7 grains water. 4. How to make printing ink dry quickly, if there is a mixture, and what? A. Printing ink is composed essentially of lampblack and varnish. A quick drying varnish can be used in the preparation of the ink. Borate of manganese and lead salts, such as litharge and lead acetate, can be added to the varnish to increase its drying qualities. But all good inks require time to dry.

(24) M. B. P. writes: I am troubled a great deal with red ants. Can you inform me of any receipt for destroying them? A. If powdered cloves are scattered around where the ants are, it will be found very effectual in driving them away. The better quality of Persian insect powder is excellent.

(25) W. S. P.—Hammered brass work is a very old art revived. It consists of making the surface of ornamental articles in brass or other metals appear as if indented in concave facets, which is done with polished hammers or sets driven with a hammer. The thickness of brass to be used depends on size of the article and fineness of the work.

(26) M. H. writes: 1. I have a field glass about 2½ feet long, and have tried to look at the sun with it by putting a piece of smoked glass outside over the large glass, but could not see the sun at all. How shall I proceed? A. Place a piece of paper or white card 6 to 8 inches from the eye end of the telescope, and properly focusing the image of the sun upon it you will have the most acceptable view of the sun. If you pass the object end through a dark curtain in an open window that commands a view of the sun, and darken the room, you may make a very satisfactory view to a number of persons at the same time, without in any way injuring the eyes. You may make a wire frame that will hold the paper screen attached to the telescope, so that, in moving the telescope to follow the sun, the screen will move with it. 2. Is there any other kind of faucets that can be used for cider besides the wooden ones? A. There is nothing better than maple faucets for cider.

(27) W. A asks a formula for a liquid shoe polish that will not injure and crack the leather, but is a leather preservative; people complain of the polishes as sold as spoiling and cracking the leather. A. Put a half pound gum shellac, broken up in small pieces, into a quart bottle or jug, cover it with alcohol, cork it tight, and put it on a shelf in a warm place; shake it well several times a day, then add a piece of camphor as large as a hen's egg, shake it well, and in a few hours shake it again and add 1 ounce lampblack. If the alcohol is good, it will all be dissolved in two days; then shake and use. If the materials are all good, it will dry in about five minutes, giving a gloss equal to patent leather, and will be removed only by wearing it off. This will make perhaps one of the least harmful of liquid shoe polishes, which are in general no way leather preservatives, except as they afford a coating preventing wear. 2. What composes the liquid glue that is advertised to mend or cement wood, glass, china, and leather, etc? A. Take a wide mouth bottle and dissolve in it 8 ounces best glue in half a pint water by setting it in a vessel of water and heating until dissolved. Then add slowly 2½ ounces nitric acid 36° Baume, stirring all the while. Effervescence takes place under generation of nitrous gas. When all the acid has been added, the liquid is allowed to cool. Keep it well corked, and it will be ready for use at any moment. 3. What is the best exterminator for moths, especially carpet moths? I have tried black pepper, camphor, etc., but it does not kill. Can you give me a good recipe of one that will kill them? A. The genuine Persian powder is considered the best preventive for moths, but once they have taken possession, their removal is best effected by beating, etc.

(28) A. V. R.—A very satisfactory method of producing an insoluble glue is effected by adding a little potassium bichromate to the glue when it is dissolved for use, and then to expose the glued part to the light. The proportion of bichromate will vary with circumstances; but for most purposes about one-fiftieth of the amount of glue will suffice. By this means even hot water has no effect upon the glue.

(29) J. W. A. writes: Please state the cause of small warts appearing through the hair on the scalp, also cure for same. A. The warts are probably due to some irritation of the scalp produced by causes we cannot determine. Dichloracetic acid or anhydrous chromic acid will remove these; in using the first mentioned compound, it is best to grease the portion of the scalp adjacent to the wart, thereby preventing any pernicious effect on the skin.

(30) H. E. K. wishes a good recipe for removing pimples, freckles, and small running sores, and also a greasy look from the skin; something that will not harm the skin, but will make it soft and white. A. Pimples and running sores may be caused by so many different things and are of such variety that it would be best to consult a physician in regard to them. Freckles can be removed by washing with borax, and the greasy look of the skin will disappear on washing with soap.

(31) J. H. M. asks: What composition is used for tinning knives, and how is it put on to make it look smooth, also how to prepare the knives previous to tinning? A. Pure block tin is used for tinning knives and iron spoons. The articles are thoroughly cleaned from oil or grease in a hot alkali bath; then if free from scale dip in a solution of muriate of zinc to which has been added a small piece of sal ammoniac, dry quickly over a hot plate of iron, or furnace, and immerse in a bath of melted tin for a few seconds. Have the surface of the melted tin kept clean by skimming and sprinkling with a little powdered resin.

(32) J. G. O. writes: I get the water for an engine from a pond about 12 feet below the boiler, and distant 290 feet, with four elbows. I put an inspirator up connected to the feed, and the discharge pipes are 1¼ inch diameter each, steam pipe ¾ inch, but it would not work more than 2 or 3 minutes at first. Three engineers gave different opinions as to the failure. What shall I do about it? A. There is great difficulty in making an injector work reliably on as long a suction pipe as you describe. We do not think that your connection pipes are at fault, nor the water at 80° Fah. too warm. Put a leather seated suction or foot valve below the water on end of pipe at pond. Have the pipe pitch all the way upward toward the injector, so that the air will rise naturally when the pipe is filled; place the injector as low as possible, even to digging a pit for it. Place a vertical pipe from the highest part of the main near the injector, projecting above the level of the injector, with a cap that can be made perfectly tight. Start the injector, and get all of the air out of the pipe if possible. If the injector continues to work, all right. If not, there is probably air in the pipe or a leak, in which case take off the cap of the stand pipe and fill with water, closing the valve at the injector. If there is a leak in the pipe, it should show by the water falling in the stand pipe. You will know what to do in this case.

(33) P. F. asks (1) a receipt for a good fireproof paint for boilers and smoke stack to portable engines. A. For paint for boiler and smoke stack use coal tar and asbestos or a good asbestos paint. 2. A preparation for taking the grease off an engine so it can be painted again? A. Use strong solution of caustic soda to remove old paint and grease. 3. A preparation to clean brasses and steel work on an engine? A. For cleaning brasses use pulverized pumice stone and kerosene oil, and polish with dry rotten stone on leather. For removing rusty spots on the finished iron work use fine emery paper or emery cloth.

(34) H. B. B.—Carp culture has met with such success, and assumed such importance that the American Association, Philadelphia, proposes publishing a monthly in its interest. We consider the fish, however, coarse and tasteless and not worthy of culture in waters that can be used for a better class of fish.

(35) L. K.—We do not know the composition of the special oils you mention. Paint your shade for green with a mixture of chrome yellow and indigo blue in oil. We have had one in use several years so painted.

(36) R. S. D. asks: 1. Does the microphone, Fig. 4, SUPPLEMENT, No. 163, require an induction coil same as the Blake transmitter? A. It may be used either with or without an induction coil. 2. Please give directions, that is, size and amount of wire necessary to make such an induction coil. Will the ordinary annealed Bessemer steel wire answer to make the core of? I mean such as is used as binding wire. A. Make the spool about three inches long, to contain a core of fine, very soft iron wires, the core being about five-sixteenths of an inch in diameter; wind upon the spool three layers of No. 18 wire; cover this with one thickness of ordinary writing paper, and wind upon this about ten layers of No. 36 copper wire. Bessemer steel will not answer well for the core of an induction coil. 3. Is the call in the telephones in use through the country electric or magnetic? If electric, is the same induction coil used as the transmitter uses? A. The calls generally used are magneto-electric machines; induction coils are seldom or never used for calling purposes.

(37) A. D. S. asks: Is there any known thing that will be a conductor of electricity only when light strikes it? A. We think selenium will meet our wants.

(38) H. L. C. writes: In SCIENTIFIC AMERICAN, No. 5, vol. xlviii., are directions for an electrical machine. 1. Should the plates be varnished on both sides? A. They may be varnished on both sides. 2. Should the scales be cemented before or after the varnish is applied, and what cement is the best? A. Afterward. The varnish itself will form a very good cement. 3. Will white shellac do to varnish with, and how many coats? A. One coat of white shellac varnish will answer.

(39) G. A. H. writes: 1. I am making an electric induction machine, of the Von Holtz type, and I would like to know if these are good dimensions for same, and what size spark can we expect of same, if carefully made? The plates are of thinnest French plate glass, 14 and 16 inches in diameter. The tinfoil disks are two inches in diameter. I am using lead button on same, fastened with shellac varnish; will that do? For Leyden jars, I am using two battery jars 5x7 inches. Are these too large? What should be the distance of revolving plate from stationary plate? Is three-sixteenths inch a good distance for this size plate? A. Lead buttons will not answer as well as buttons of brass, because the lead will wear rapidly, and the particles of it may become scattered over the glass plates. The proportions of your plates are about correct. If your machine is properly made, you may expect to get a spark from six to seven inches long. Your jars are too large; jars two inches in diameter would be large enough. The distance between the stationary and movable plate may vary from three-sixteenths to three-eighths of an inch. 2. I am also making a Whinhurst induction machine, with a pair of 12 inch plates. What is the proper size of the tinfoil pieces for 12 inch plate? By making the pieces larger, and less numerous, would that increase size of spark, or would narrow and more pieces of tinfoil increase spark? Also will I get a larger spark by using Leyden jars? A. Divide your plates into 24 equal spaces, and make your tinfoil pieces to fill the alternate spaces, leaving an inch and a half at each end of each piece. We do not think it would be advantageous to make the pieces larger. Leyden jars will increase the size of the spark.

(40) C. C. C. writes: I have made a Daniell's battery, using a bladder instead of a porous cell, and tinned copper, as I could get no other kind; but the battery is exceedingly weak. Please tell me wherein the trouble lies. Where can I can get a porous cell for a Daniell's battery? A. The tinned copper will answer as well as any for battery, provided you put the copper side in. We think your battery would work better with a porous cell; but a single cell of Daniell's battery is not very strong in any case. You can procure porous cells for Daniell's battery from any of our dealers in electrical supplies.

(41) J. M. writes: In filling a barometer tube without heat, or without vacuum produced on cistern, I held the tube perpendicular (open end up), put on my cistern, and filled the cistern full; the end of the tube was even with the surface of the mercury. Then I put on my leather and cover and turned the tube to its proper position, but the tube still remained full to the extreme upper end. How can I lower the mercury in the tube to correspond to the inches on the dial of the barometer? A. You can produce a barometer in the manner described by you, but it will not be absolutely perfect, for there is always a film of air adhering to the inner surface of glass tubes which must be expelled by boiling the mercury. Your best way to graduate your dial would be to compare your barometer with a standard instrument. 2. How much mercury is required in the cistern to make the barometer work well? A. The cistern of the barometer must contain sufficient mercury to supply the tube when the mercury is at its greatest height, and cover the lower end of the tube sufficiently to prevent the entrance of air. 3. What is the reason all barometer tubes are 33 inches long? A. Because that is about the length of a column of mercury sustained by ordinary air pressure. 4. Why will not any length do, say from 24 inches up to 33 inches? A. See answer to No. 3. 5. How many degrees Fah. represent the boiling point of water? A. 212° under ordinary circumstances. 6. How many the boiling point of mercury? A. 644°. 7. Where can I get barometer tubes, and what is the cost of them? A. Address any dealer in glass tubes or chemical apparatus in this city. 8. Tell me simple formula used to find the cubic feet in a round spar 24 inches diameter in the big end and 18 inches in the small end, 90 feet long. A. Find the square root of the product of the areas of the two ends; to this add the two areas, and multiply this sum by one-third the length. 9. Tell me the philosophy of the working of an inspirator. A. Consult article on Giffard injector in SUPPLEMENT, No. 212; see also articles on injectors in SUPPLEMENT, Nos. 42, 153, 112, 57, and 356.

(42) H. F. C. asks whether chickens hatched in incubators differ in any way whatever from those hatched by the natural process. A. There is no difference between chickens hatched in incubators and those hatched in the natural way.

(43) C. M. L. asks how the smallest possible electrical battery can be made, or where purchased, as there is said to be a battery used in surgical operations, which can be fastened to the lapel of the operator's coat. A. By using plates of carbon and zinc, and employing bichromate solution as the exciting fluid, you can make a very small battery which will deliver a large current for a short time.

(44) B. F. P. asks: If a stamp on a steel tool has been obliterated by hammering, can it be renewed so as to render it legible? A. If the stamp has not been absolutely as well as apparently obliterated, it may be made plain enough for identification by grinding the place and heating over an open fire sufficient to color the steel. The stamped portions of the steel will show a different shade from the other portions.

(45) R. asks: Can I learn or be able to analyze or assay, for my own pleasure, ores and minerals, through the instruction of some work on the subject? Theoretically, I have a fair knowledge of the science, but have only a limited idea of the working example and apparatus. A. It is possible for one to acquire such a knowledge as you desire. Of course, a few lessons from one familiar with the subject are very desirable, but a satisfactory knowledge can be acquired from books. In blowpiping, besides the work you mention, Professor H. B. Cornwall's Manual of Blowpipe Analysis ($2.50) and Plattner's Manual of Qualitative and Quantitive Analysis of the Blowpipe ($5.00), and Elderhurst's Blowpipe Analysis and Determinative Mineralogy ($2.50) are excellent guides. For assaying, Rickett's Notes on Assaying is probably the best book to get.

(46) F. S. asks an easy test for glucose in honey—a qualitative test rather than a quantitative. A. The readiest means of detection is as follows: A solution of 20 parts of honey in 60 parts of water, when mixed with alcohol, gives a heavy white precipitate of dextrine if glucose has been added, while natural honey only becomes milky under the same circumstances. Glucose gives a red precipitate with Fehling's solution. The United States Dispensatory will give you the information necessary for the proper manipulation of this test. It can also be applied quantitatively as well.

(47) F. B. B. writes: With a solution of perchloride of iron and gallic acid, I get a purple ink. How can I wash the writing in to make it jet black? A. There is nothing that you can use that will improve the color of the ink when once it has been written with. We think, however, that as the writing ages it will darken.

(48) S. T. G. asks a recipe for mending lamp tops. A. Use a cement prepared by boiling 3 parts of resin and 1 of caustic soda in 5 of water. This composition forms a soap, which when mixed with half its weight of plaster of Paris sets firmly in about three-quarters of an hour. It is said to be of great adhesive power, not permeable by kerosene, a low conductor of heat, and but superficially attacked by hot water.

(49) W. G. F. asks how calcium sulphide is used to remove surplus hair from the face without injuring the complexion. A. Apply a light coating of the calcium sulphide made into a paste with warm water and starch. Sometimes soap lye is used instead of water. The paste is spread on paper and applied like a plaster.

(50) H. E. W. asks: 1. If ground connections for telephones are attached to lead water pipes, will any galvanic action take place, to injure the solder on brass connections, etc.? A. We think not. 2. What can be used to remove the grease, etc., from waste pipes from sinks and wash basins, that will not injure lead pipes? A. Use a strong solution of caustic potash.

(51) F. S. B. asks: What will clean zinc and make it look bright? A. Whiting or refined chalk in water; finish dry.