RECENTLY PATENTED INVENTIONS.

Engineering.

ELECTRIC STOP VALVE.—Robert Wellens, Pittsburg, Pa. This is an oscillating valve, whose stem has a weighted arm to drop and close the valve, with a catch and electro-magnets for operating it, the magnets being in the circuit of a battery whose wires extend throughout the building, with push buttons for closing contact and operating the valve.

Mechanical.

SEWING MACHINE SHUTTLE.—Charles H. Benoit, San Jose, Cal. The shuttle is enlarged at special points to receive a large bobbin and a large quantity of thread, and is of a form to pass readily through the loop, while in connection therewith a novel form of tension spring is employed.

HOISTING MACHINE.—Volney W. Mason, Providence, R. I. The hoisting drum is mounted upon eccentrics, which are operated by a lever to throw the drum alternately in and out of contact with the driving pulley and the brake shoe, the invention covering novel parts, details, and combinations, making a simple and durable machine designed to be very effective in operation.

STONE SAWING.—Ludwig Melchior and Friedrich Meyer, Wilmington, Del. This invention covers an attachment with cross bar, guides, and clamps of novel form, for machines in which a gang of saws is secured in a reciprocating frame, whereby the saws will be braced and may be operated rapidly and under considerable weight, while causing the saws to make a cleaner cut.

RASP CUTTING MACHINE.—Philip S. Stokes, Tennent, N. J. In this machine springs and cams operate upon two hammers, one preceding the other, in combination with a punch stock and punch held in the anvil frame and pivoted at or about its center, one of the hammers delivering a light blow preceding the heavy blow of the other, whereby the point of each tooth is made perfect and sharp, the invention also covering various other novel details.

LACING DRIVING BELTS.—Geo. W. Southwick, Stamford, Conn. This invention covers an eyelet or re-enforce for the lace holes, consisting of a flat U-shaped metal piece, with prongs formed on its two branches to penetrate the leather back of the eyelet, and a flange on the inner side of the bend, to form a flat bearing at one side of the eyelet hole, to prevent the lacing cord from pulling out the leather.

PRINTERS' GALLEY.—J. Hatfield Youmans, Asbury Park, N. J. This galley has a movable bar or stick therein, in combination with disks or plates pivoted eccentrically to the frame, and with curved slots and pins, whereby the bar or stick will be automatically locked against a standard measurement of type, the device being adaptable by thumb screws for different measurements.

Railway Appliances.

RAIL JOINT.—Ives and Walter T. Lynd, Troy, N. Y. A key plate is constructed to lie lengthwise between the abutting ends of a pair of rails held in a bed plate and an inclined flange of the bed plate, the key plate being wedge-shaped laterally and vertically, whereby the rails may be tightly clamped and held in their bed plate by a lateral and downward pressure of the key plate.

COUPLER ATTACHMENT.—William L. Dwyre, Albany, N. Y. This is a simple device for attachment to the ordinary pin and link car coupler, by which it can be easily set for coupling and uncoupling without the operator going between the cars, and by which it will then couple automatically, the invention covering various novel features of construction and combinations of parts.

Agricultural.

COTTON PICKER.—James W. Wallis, Birmingham, Ala. This machine is an improvement in that class of cotton harvesters in which the pickers or devices for removing the cotton from the bolls have a reciprocating movement, whereby they are caused to swing into and out of the cotton plants, the invention covering various novel features and combinations of parts.

Miscellaneous.

DISINTEGRATING FIBERS.—Sidney S. Boyce, New York City. This invention covers a process of disintegrating fibrous substances, to separate the natural fiber of the straw from gummy and resinous matters, etc., the straw being first broken and subjected to a boiling neutral soapy solution, after which the fibers are dried, rolled, and finished.

BEE HIVE.—Jonathan Beeson and John H. Hirschfeld, Saline City, Ind. This hive is made with a comb chamber having a hopper shaped bottom, formed of inclined boards having a space between them, below which is a section with sirup trough from which the bees may feed, and a reversible section with screen doors for closing the chambers formed by the bottoms, so that rain or snow cannot beat into the hive.

STOPPER FASTENER.—Charles P. Maiser, Allegheny, Pa. This fastener is also designed to serve as a guard to protect the upper edge of a bottle or jar to which it is applied, and consists of a wire bail with eyes or loops, and a cross bar to protect one side of the bottle neck, while a lever, in connection with the stopper and eyes and loops, protects the opposite side.

BOOK SHELF.—John M. D. France, St. Joseph, Mo. This invention covers a casing with metallic horizontal mortises therein, in combination with a sliding board having metallic tongs on its ends, whereby the board will slide in the casing, making an improved shelf for the protection of record books.

TOOTH BRUSH.—William H. Smith, Florence, Mass. This brush is made with a hollow handle, in two parts hinged together and adapted to receive the brush, which is pivoted in one half the handle, whereby the brush may be inclosed when not in use and rendered readily portable.

VEHICLE WHEEL.—Horatio F. Hicks, Ashland, Oregon. Combined with the hub and rim of the wheel are two sections of curved spring spokes, the curves of the two series being oppositely arranged with respect to each other, whereby the spokes will have elasticity enough to yield when the wheel passes over a rough, uneven road.

SLEIGH BRAKE.—William R. Wilcox, Portland, Col. This is a brake which may be put on or taken off by throwing the shaft lever either forward or back with the foot or hand, while it is light and durable, and designed to yield to any obstruction encountered, but yet return to its gripping position, without communicating strain or shock to the operator.

TRICYCLE.—Francis W. Pool, Norwich, Conn. This vehicle has a right and left hand spirally grooved axle, at right angles to which is a rock shaft, while a sleeve loosely holding rings travels upon the axle, the rings having lugs entering the grooves, and a link connects the rock shaft and sleeve, whereby it is designed that the machine may be propelled at a high speed with but little exertion.

NAPHTHALINE PAPER.—Adolph Tsheppe, New York City. This is a paper having a coating of naphthaline in two or more superposed layers, the first presenting a rough appearance, while the second fills up the interstices, presenting a hard, compact, smooth surface, made by immersing paper in melted naphthaline of different temperatures.

FIBER FROM PINE NEEDLES.—William Latimer, Wilmington, N. C. The process of making the fiber is by first briefly boiling in an alkaline solution, then lowering the temperature and slowly digesting the mass for a number of hours, after which the solution is drawn off and the mass washed with pure water by successive steepings and soakings.

Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Notes & Queries

HINTS TO CORRESPONDENTS.

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.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

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

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(368) T. H. T. writes: Two years ago I had a present of a very fine cane with a buck-horn handle. From constant use, the white part of the handle became dirty, and after trying several methods to clean it, scraped it with a knife, which of course made it look worse than ever in a few weeks. A. A very perfect surface is given by scraping; the scraper may be of a razor blade, the edge of which should be rubbed upon an oil stone, holding the blade nearly upright, so as to form an edge like that of a currier's knife, and which, like it, may be sharpened by burnishing. Work, when properly scraped, is prepared for polishing. To effect this, it is first to be rubbed with a buff made of woolen cloth *perfectly free from grease;* the cloth may be fixed upon a stick, to be used by hand; but what the workmen call a *bob*, which is a wheel running in the lathe, and covered with the cloth, is much to be preferred, on account of the rapidity of the operation. The buff is to be covered either with powdered charcoal and water, or fine brick dust and water; after the work has been made as smooth as possible with this, it is followed by another buff, or *bob*, on which washed chalk or dry whiting is rubbed; the article to be polished is moistened slightly with vinegar, and the buff and whiting will produce a fine gloss, which may be completed by rubbing it with the palm of the hand and a small portion of dry whiting or rotten stone.

(369) P. H. W. asks: If the compact battery described in SCIENTIFIC AMERICAN of September 3, 1881, would be suitable for the simple electric motor, and if so, please designate the number of couples or cells that would be required? A. Yes. Use ten to twenty cells.

(370) J. C. W. asks: What kind, size, and amount of wire should I use in making electro-magnets? A. We refer you for a very full article on electro-magnets to SCIENTIFIC AMERICAN SUPPLEMENT, No. 182. The size and amount of wire depends on your requirements.

(371) D. & H. ask if it would injure a watch in any way to ride on an electric motor street car? A. It may injure it, but probably will not.

(372) G. B. writes: The fishermen of this city are discussing the question, "Does water form ice on the top or on the bottom?" and cannot agree. A. Ice forms on the surface of water. Fine crystals may form and be carried down by currents and eddies, so as to become packed together into a solid mass at or near the bottom, but water forms ice on the top.

(373) W. W. V. writes: 1. In making an electro motor like the one described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 641, but only one-half the dimensions, what size wire should I use on armature and field, when the motor is to be run by gravity battery? A. Use wire three or four numbers smaller than specified for regular size. 2. How many cells of 5 × 7 crow-foot battery will be needed, and how coupled? A. The gravity battery is entirely unsuited for such work, owing to its high resistance. You will find suitable batteries described in the SCIENTIFIC AMERICAN of September 3, 1881; August 20 and December 17, 1887; and a good method of making carbon plates, issue of October 27, 1888. Use six or eight cells of large bichromate battery, or thirty of gravity arranged in five series. 3. Could soft iron wire be used for field magnets instead of sheet iron? A. Yes. 4. Does a person making a patented article for his own use infringe on the patent? And is he liable to prosecution? A. You have no right to do this, and will infringe, and be liable to prosecution if you do. 5. Would ordinary glass fruit jars do to make Leyden jars out of? A. It is doubtful, as some cheap glass is a very poor dielectric. You can determine its quality by testing it roughly for insulation.

(374) "Gold" writes: 1. I tried etching on 14 carat gold, which was rolled on silver, using muriatic acid two parts, nitric one part, and three parts of water. It etched a very little, and then a black skin seemed to spread over the unprotected gold, and it would not etch any farther. Could you explain it? A. The acid dissolved the gold, but refused to dissolve the silver, as the latter metal forms an insoluble chloride in the presence of muriatic acid, or refuses to dissolve at all. After the mixed acids act no longer, wash the metal and treat with nitric acid, when the silver will be dissolved. The acid will probably under-cut the gold. You cannot dissolve gold and silver by the same acid. Cyanide of potassium, especially if assisted by the battery, might answer your purpose. 2. Do you know of any book which treats of the action of different acids and chemicals on metals? A. Manuals of chemistry contain this information scattered through them. We can supply any you desire.

(375) F. W. asks: 1. How can indelible ink be removed from linen? A. Chloride of mercury is the best eradicator of indelible ink. 2. What size wire to wind fields and armature with, of the small dynamo described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 161, so it can be run as a motor from an Edison incandescent circuit, 110 volts; want to run from an Edison lamp socket. A. For motor see SUPPLEMENT, No. 641, which we can send you for 10 cents. Place in shunt; do not attempt to use a full Edison current on it. 3. Would the above motor run a sewing machine? A. The simple motor would run a sewing machine.

(376) A. B. M. writes: Will you inform me of the ingredients used, and how applied to canvas, as prepared by manufacturers for artist's use? A. Size it first with thin glue size, then apply moderately thick white lead paint with a palette knife and allow to dry.

(377) J. P. M. asks for a conductor for an electric current that will stand in cyanide of potassium; he often has articles to spot gild, and has been unable to find anything that would resist corrosion. A. We recommend lead wire; this will be little affected by a true cyanide solution.

(378) C. E. E. says: Will you please tell me what the liquid is that is used with bronze powder? A. Try ½ lb. linseed oil, mixed with 2 oz. gum animi, the latter powdered and gradually added to the heated oil; then boil, strain, and dilute with turpentine.

(379) T. L. C. writes: Please tell us the precise time from new moon to new moon, or is there any regular time? Comstock's Philosophy says 29 days 12 hours and 44 minutes, but almanacs differ as much as three hours. A. The mean solar revolution of the moon is 29 days 12 hours and 44 minutes. The ellipticity of its orbit makes a variation of nearly one hour. The time of new moon also varies with the geographical distances in longitude from the meridian at the moment of the new moon. For instance, if new moon should take place at the meridian of Washington at noon, all places west would have morning time, and all places east would have afternoon time, according to their difference of longitude, allowing one hour for each 15 degrees; to which a correction must be made for the moon's orbital variation.

(380) L. F. L. asks: 1. How to filter wintergreen, cedar, and like essential oils to effectually cleanse them? And how to reclean the filter without a waste of oil? A. You may use any filtering material, such as cotton wool, and wash it out afterward with benzine. You will inevitably lose some of the oil, unless it is a non-volatile oil, when it can be recovered. If volatile, you may save most of it by forcing steam through the filter. 2. Is there such an oil as laurel oil? If so, is it an expensive oil? And what is it used for?

A. There are several laurel oils: one is made by distilling with water the berries of the sweet laurel (*Laurus nobilis*); the product is often called bay oil, and is used for making toilet preparations. It is expensive. The specimen you speak of did not reach us with your letter. 3. What effectual means can I use to cleanse a flue which cannot be reached by a sweeper? Have always burnt wood. A. Explode a small amount of gunpowder at the bottom, and if there is danger of the chimney catching fire, burn a little sulphur held well within it.

(381) A. K. asks how to make the modeling wax that is used by artists. A. Melt carefully 100 parts yellow wax, add 13 parts Venetian turpentine, 6½ parts lard, and 72½ parts elutriated bole or other inert powder; mix thoroughly, pour off, and knead as it cools. The wax must be melted at a low temperature.

(382) W. C. B. writes: Please inform me how to find the exact focus of my camera lens. The focus of a camera lens and the distance from that lens to the object to be photographed being known, is there any rule by which I can tell what distance the negative plate should be from the lens, thereby substituting instrumental focusing for visual focusing? A. The focus of a camera lens depends upon the distance of the object from the camera, there being an exact focus for every given distance. If the camera has a solid box or a fixed position for the plate, the focus can be adjusted for varying distances and marked upon the slide. This would be reliable for the distance, but would not take in the variation for effect with various kinds of objects, as between landscapes and portraits or other objects. In portraiture there is a little variation required for different faces that the eye only can appreciate. We do not think that index focusing will give the best results, except for copying, by which the focus and distance of the object become exact exponents.

(383) F. D. P. writes: I inclose herewith a problem for your correspondence column. It was given by a man at our school and there was quite a diversity of opinion in regard to it. A solution from you will greatly oblige. I would also like a little information on another matter which I also inclose. Have been greatly entertained by some of the questions in your paper. 1. A tank 10 feet inside diameter, 232 feet high, made of 4 inch staves, is hooped with 6 inch iron hoops 12 inches apart. What is the pressure per square inch on third hoop from bottom, allowing 2·03 feet to equal one pound? A. The pressure against the sides of the tank at the third hoop is equal to 230 feet hydrostatic pressure, or 100 pounds per square inch. To get the pressure or strain on the third hoop, multiply the pressure by one-half the diameter in inches, which we make 6,000 pounds for one inch height. Now, as you say that the hoops are 1 foot apart and 6 inches wide, this makes 18 inches in height between the centers of the spaces for each hoop to hold—6,000×18=108,000 pounds strain upon the hoop. Now if the hoops are half an inch thick, there will be but three square inches of metal, and as iron hoops should not be trusted for more than 20,000 to the square inch in any case, you have 3×20,000=60,000 pounds safe resistance against 108,000 pounds strain. Such a tank could not be filled with safety. 2. What metal possesses the quality of expanding and contracting in the greatest degree with temperature from 40° to 80° Fah.? A. Zinc has the greatest range of expansion and contraction of the solid metals, being eight-tenths of an inch in 100 feet for a difference of 40° Fah. 3. How much does an iron rod ⅛ inch by ¼ inch, 2 feet long, expand in length for a change of temperature from 40° to 80° Fah.? A. For the iron rod 2 feet long, the change of length would be equal to 64 ten thousandths of an inch for a change of temperature of 40° Fah.

(384) W. L. S. writes: Please state through the columns of your paper. 1. The cause of shooting stars and velocity of same. A. You will find complete illustrated articles on meteors or shooting stars—history, theory, speed, and distances, as far as known—in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 532 and 667. 2. The simplest way of boring a hole in glass, excluding the use of a drill? A. The simplest and safest way to bore holes in glass is to use a copper or brass tube, quite thin, of the size of the hole. Bore a hole in a small block of wood about ¼ inch thick. Hole to fit the tube loosely. Fasten the block to the glass with beeswax, so that the hole corresponds with the required hole in the glass. Insert the tube in the hole and pour emery (No. 90) and water into the tube with a spoon and turn the tube back and forth with the fingers, or a little grooved pulley may be put on the tube to work with a string, in which case a center should be placed at upper end to guide the tube. In this way a hole of any size from ⅛ inch to an inch or more may be cut through ordinary window glass in a few minutes.

(385) J. B., Fire Department, writes: Will you please answer the following: What should be the size of the steam ports for whistles with cylinders 9 inches by 18 inches, 6 inches by 18 inches, 6 inches by 24 inches, pressure 60 to 80 pounds? Must ports be increased according to size of cylinder? What distance should cylinder be from port to give a deep vibrating tone? Should port be exactly the same diameter as the inside of cylinder? Are whistles sounded any other way than a circular groove or port? If so, which gives best results for fire alarm? A. The opening in the ports of steam whistles of cylindrical form or bell for the sizes above should be one thirty-second of an inch for the 6 inch cylinders and a sixty-fourth of an inch wider for a 9 inch whistle, for the above pressure. As a general rule, the ports should increase in width with the diameter of the cylinder and be made of the same diameter as inside of cylinder or bell. The thickness and length of the bell controls the tone and the distance of the edge of the bell from the ports generally fixes the volume of tone. The distance of the rim from the ports is adjustable, and may vary from 1½ to 2½ inches in large whistles, and is the only adjustment in the hands of the engineer for bringing out the full volume to meet variable pressures of steam and any imperfection of the workmen in sizing the ports. The cylindrical whistles with annular ports are the most powerful and compact, and are in general use.

(386) G. F. M. writes: Please inform us, through your valuable paper, the most economical lacquer for chandelier work. What is the best mixture to apply to the ends of metal spinners' wooden chucks to keep them for cracking? A. Lacquers are generally made with shellac and alcohol, with a little gum coloring from dragon's blood or turmeric. See "Techno-Chemical Receipt Book," which has a variety of receipts or processes for lacquering, varnishing, and bronzing of metals. We can mail it for the price, $2.00. Chucks for spinning should be thoroughly seasoned before use. Dipping in hot linseed oil and drying in a warm oven after the chuck has been shaped may answer your purpose.

(387) E. J. S. asks (1) for the component parts of the Disque Leclanche battery. A. The porous cup contains a carbon prism embedded in clear graphite and binoxide of manganese mixed in about equal parts. The outer cell contains an unamalgamated zinc rod. Sal-ammoniac dissolved in water is the exciting fluid. 2. How to make a battery of uncoppered electric light carbons, using sal-ammoniac for the exciting fluid? A. See SCIENTIFIC AMERICAN, December 17, 1887, and October 27, 1888. 3. How to make an electric gas lighting coil for two or three burners? A. Wind 5 pounds No. 18 wire on a bundle of iron wires, the bundle to be 6 inches long and 1 inch thick. 4. What kind of battery is best to use in connection with it? A. A Leclanche battery is excellent or the battery shown in first named SCIENTIFIC AMERICAN, using only one zinc rod, and using sal-ammoniac and water as the solution.

(388) P. W. W. asks for the ingredients used in the making of British gum. A. British gum or dextrine is prepared by the artificial roasting of dry starch at a temperature between 413° and 482° Fah. It is also made by an acid process, in which the dry starch is moistened with dilute nitric or hydrochloric acid and heated to a temperature between 212° and 248° Fah., and may also be made direct from potatoes. For the illustrated details of its manufacture see Spons' "Encyclopedia of the Industrial Arts."

(389) E. F. L. writes: Please give a simple and practical way to purify resin and precipitate its impurities. A. Melt and allow to settle, and if necessary, strain through sacking.

(390) P. L. M. writes: I am in search of a recipe to make what is called "compressed Chinese sheet bluing." It is a very nice article of bluing, that is sold to families by agents in small sheets of about the size of playing cards. A. The preparation may be paper saturated with a strong solution of Prussian blue in water containing ferrocyanide of potassium.

(391) A. H. S. writes: What can I use to rub upon or cover a bony substance so that it will become a conductor of electricity, that will enable me to plate it with gold, silver, or nickel, etc., so that it will adhere to the surface with tenacity and durability? A. Coat it with plumbago of good quality, applying it with a brush, as polishing a stone. The adherence to the surface will not be very great, but the model, if under cut, will hold it with great tenacity.

(392) G. E. W. asks for the surface of the zinc and copper and the number of cells of gravity sufficient to run a Sawyer-Man 19 volt 12 candle power incandescent lamp. A. Use carbon zinc couples excited by electropoion (bichromate and sulphuric acid) fluid. Twenty cells, each having eight square inches of zinc and copper facing each other, will answer.

(393) D. E. W. asks how to prepare the surface of glass so that it may be drawn on with India ink (the purpose being to make lantern slides). A. Try the following: Shake white of egg with twice its volume of water, and ten drops of ammonia, pour off the froth, and flow the plate with the clear solution and allow to dry, and heat slightly in an oven. Mix a little ox gall with your pigment. You can use thick India ink directly upon the glass.

(394) R. H. S. asks: Please tell me how to construct a glass melting apparatus, such as is used by amateur glass blowers. A. We refer you to Shenstone on Glass Blowing, which we can supply for 80 cents, for full description of glass blowing processes.

(395) B. A. asks: 1. What preparation would be the best to fasten cue tips to cues? A. Use carpenter's glue. 2. Please let me also know the way to make pool balls. A. The best are turned out of ivory, various compositions are used for inferior ones, into which celluloid or analogous substances enter. 3. The balls I now have are more or less disfigured by use. Will you please let me know what compound I can use to repair them? A. Have them turned down. We doubt if you can repair them.

(396) G. I. writes: Can you tell me through your paper how water can be sucked up a hill, 50 or 60 rods long with an elevation of 60 feet by the use of a windmill, without triangles and have the mill above the spring? A. You cannot draw the water higher than from 20 to 25 feet with certainty. You may place a windmill and pump above the spring so as not to lift over 25 feet and force the water to the required height. This, with a windmill of moderate height, should give a fair working power for ordinary uses, and is preferable to the bell crank connections for any considerable distance.

(397) A. G., Patras, Greece, writes: As a subscriber I take the liberty of asking you to reply through the columns of your paper as to which is the best method of polishing hippopotamus hide? I have a strip of the said hide which I wish to convert into a riding switch, and am told that it admits of a very high polish. A. Hippopotamus hide, if tanned, can be polished by preparing the surface by planing or cutting to the required shape and scraping with broken glass, so as to obtain as smooth and fine surface as possible. Then rub the surface with paraffine and polish with a woolen cloth or wool buff.

(398) E. U. asks: Can you give me directions for making porous cups for battery purposes? A. They are made of porous clay, baked in a kiln. You may have to mix a little sand with the clay to prevent it from cracking, and you should have enough heat in an ordinary stove for firing them.

(399) J. J. B. asks (1) if the motor described in your paper can be made so as to run by a Westinghouse alternating current. If so, please inform me what change should be made? A. It is not adapted. 2. What is the easiest way to make a storage battery? A. There is no easy way. Consult our index to SUPPLEMENTS. 3. Can the field magnet in the motor be cast out of brass? A. No.

(400) M. A. N. asks: How many Bunsen cells would be required to produce a light to study by, and illuminate a room 14 ft. square? What would be the cost of getting cells and light ready and the running expenses? A. Twenty or thirty quart cells; they will cost about $1.50 each; the lamps and connections, $2; they will cost to run not far from 25 cents an hour.

(401) H. E. M. asks: Does resistance of wire decrease the number of volts or amperes of current? A. It decreases the amperes only, and does not necessarily affect the volts.

(402) Inquirer writes: 1. Will a current of electricity instantly applied to and instantly broken from a very tightly stretched wire make it vibrate enough to produce sound? A. No. 2. Can it be said of a battery that it collects electricity or that it sets it free by chemical action? A. The second statement approaches the truth. In a battery, chemical energy is transformed into electric energy. 3. Is the present open winter accounted for upon any astronomical basis? If so, what is it, and how does it affect the earth's atmosphere? A. No tangible basis can be assigned.

Enquiries to be Answered.

The following enquiries have been sent in by some of our subscribers, and doubtless others of our readers will take pleasure in answering them. The *number* of the enquiry should head the reply.

(403) T. H. DeS. writes: 1. Is a steam radiator more effective under 15 pounds of steam than under, say 2 pounds, or is the temperature of the radiator unaffected by the rise in the temperature of the steam due to the increased pressure? I have seen it stated that the pipes of a radiator could not be made hotter than 212°, and cannot help thinking that it must be a mistake. 2. What is the relative efficiency of the following coals for making steam under the ordinary return tubular boiler, without blast? (*a*) The bituminous coal mined from Jelico Mountain, Tenn., having streaks of cannel through it occasionally. (*b*) Pure cannel mined in North Alabama. (*c*) Semi-cannel mined in North Alabama. (*d*) Semi-anthracite mined in North Alabama. If you are not familiar with these special coals, give values generally, based upon the kinds of coals named. 3. For deep well pumping, which is the best, in your judgment, to have, a vertical steam cylinder, etc., such as Knowles steam pump works make, and the Deanes also, placed over the mill with the piston rod in direct connection with the sucker rods, or to have an ordinary horizontal engine with a small pulley on a shaft belted to a large wheel, pulley say 8 feet in diameter, having a crank pin 2 feet from center, said crank pin to be connected to the sucker rods through a cross head and connecting rod? Which will work the smoothest over the ends of the stroke? 4. Will bones thrown in the retort with coal enrich the candle power of gas? If so, why?

(404) H. R. writes: 1. What is the rule for estimating the horse power of water powers? 2. Which will last the longer, a post set top or butt down? 3. With bark on or off, dry or green? 4. What is the difference in the lasting of posts charred and uncharred? 5. Does the time of year in which a post is cut make any difference in its lasting qualities?

(405) C. A. A. writes: Is water collected from a galvanized iron roof in a cistern safe to use for drinking, and is it safe to use galvanized pipes to convey drinking water? Which makes the best roof, tin or galvanized iron? Will water from a painted roof be fit and safe for drinking?

NEW BOOKS AND PUBLICATIONS.

LES INDUSTRIES D'AMATEURS. Le Papier et la Toile. La Terre, pa Cire, le Verre et la Porcelaine. Le Bois, les Metaux. By Henry de Graffigny. 395 drawings. Bailliere et Fils, Paris.

A field which seems to be expanding more and more and which is constantly growing in popularity is the subject of amateur mechanics. Every few months brings out some new work on the subject. It is a refreshing symptom that there are large classes whose recreations are improving in their nature and who find that labor and pleasure may be combined. The above work, which is in French, is the latest production of this character. It treats of the various subjects mentioned in the sub-title. For instance, under the head paper it treats of filtering and tracing paper, impermeable and luminous paper and the methods of preparing them. Then it shows a number of toys, boxes, etc., that may be made of paper. Then the subject of binding is taken up. Then paper flowers, kites, and fireworks made of paper are treated of. The other subjects mentioned are treated in the same manner, the course taken being the steps necessary in progressing from the simplest to more advanced stages of the arts.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

February 5, 1889,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Agricultural heater, C. A. Masterson 397,195
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