RECENTLY PATENTED INVENTIONS.

Agricultural Implements.

HOEING-MACHINE.—GEORGE W. STACY, Belmont, Miss. The invention is an improvement in machines designed for chopping cotton or for use wherever it is desired to hoe the ground or thin out a growing crop. The improvements are designed to be used in connection with any form of straddle-row cultivator and to be operated from the wheels of the cultivator.

BERRY-BOX.—HENRY C. FINLEY, 135 Main Street, Oklahoma, Oklahoma Territory. The inventor has devised an improved berry-box made of pasteboard or other thin, cheap material, which box can be packed and shipped "knocked down" or in the flat and easily and quickly struck up for use. The box is composed of two parts, a body and a bottom, the latter being supported centrally by the fastening device which secures the side of the bodies together.

Engineering Improvements.

ROTARY ENGINE.—EDWARD A. STEWART, Troy, Ohio. The piston of the engine is provided with a number of peripheral buckets. Around the cylinder a number of steam-chests are grouped, each being connected by an admission-port and an exhaust-port with the cylinder. A valve is mounted to turn in each steam-chest to control the admission and exhaust of the steam to and from the cylinder and the buckets of the piston. These valves are so arranged that one of the buckets is always under continuous pressure of steam from an admission-port. The steam can be used expansively in high or low-pressure cylinders.

TABLE FOR CUTTING CLAY FENCE-POSTS, ETC.—ARPHAD SNELL, Tice, Ill. In the SCIENTIFIC AMERICAN for January 7, 1899, an illustrated article appeared on a clay-cutting table invented by Mr. Snell. The purpose of the present invention is to simplify the general construction of that table. A fixed and a rotary conveyor-table are mounted upon the same carriage. Mechanism is provided to move the carriage to and from the mold or shaping machine, limiting the movement of the carriage at such time. The rotary conveyor-table can be turned by a simple mechanism and temporarily locked in the desired position. The table is provided with a series of belts upon which the molded article is received. Fingers, operating simultaneously with the cutting mechanism, serve to make depressions in a molded fence-post at desired intervals apart. The depressions thus formed are intended to receive fence-wires.

METHOD OF SHRINKING AND FINISHING LINENS, COTTONS OR OTHER FABRICS.—WILLIAM HEBDON, Brooklyn, New York city. The method consists in saturating a piece of cloth, then subjecting it to pressure to squeeze out surplus moisture. The wet piece is rolled in a dry piece to moisten the latter. Both pieces are then heated and dried in open width and finally pressed in open width. In order to carry out this process an apparatus is employed which is described in the patent.

WAVE-POWER.—ISAAC A. BRADDOCK, Haddonfield, N. J. The invention is an improvement in machines actuated by incoming or outgoing waves to compress and store air to be used in driving machinery. A hollow float is pivoted to an anchor. On the shore, a cylinder is mounted, the piston of which is connected with the float. A pipe connection extends between the cylinder and the float. The float is likewise connected by a pipe with a storage vessel for air. By reason of this arrangement the cylinders move toward and from the water to accommodate the device to the rise and fall of the tides and to storms and calms which influence the height of the water.

SWITCH-LOCKING DEVICE.—WALTER E. EMERY, West Chicago, Ill. A bracket is attached to the switch-point, and to a switch-rod which passes under the main rail. An arm is carried by the main rail and a lock is sustained on the arm. By these means the switch is securely held in either open or closed position.

Miscellaneous Inventions.

HORSE-HITCHING DEVICE.—IDA W. and HENRY CASSER, Colorado Springs, Colo. The device is to be attached to a vehicle and is so connected with the bridle-bit that, should the horse start forward, the bit connection will be wound in such a manner as to draw the horse's head down or back and stop him. Thus the usual hitching posts, weights or the like are dispensed with.

METAL PRINTING-WHEEL.—EDWARD FUCHS, Manhattan, New York city. The invention relates to printing telegraph and other machines using a printing-wheel for printing type-characters on tape, paper sheets and the like. This new wheel is cheap in construction and is arranged to permit convenient renewal of worn or injured type-characters on the body of the wheel.

DRYING DEVICE FOR CEMENT-KILNS.—HARRY STEHMANN, Hoboken, N. J. It is one of the functions of this invention to utilize the waste gases to dry the material before it is admitted into the kiln. A draft is produced in the kiln in such a manner as to obtain a product of superior quality at a relatively small cost, and to keep the kiln in a working condition so that few repairs will be necessary.

GAME-TABLE.—CHARLES W. STROUD, Joplin, Mo. The table is to be used in card-games. The essential feature is a table having rotary parts or carriers provided with pockets to receive the cards which are to be dealt to the players. By means of this device a fair distribution is secured. There are fifty-four pockets in all. Hence it will be necessary to take two cards from another pack, a deuce and a tray, for example, and give them a certain value such as honors. When the pockets on the carriers are alined, there will be nine slots in front of each player. From the slots, the five cards of a hand are selected. Should the player wish to discard, he lays his discards to one side and takes other cards from the remaining series of four pockets. Other methods of drawing the cards can be employed. The table is a simple and very efficient and fair card-dealer.

TIMBER-HOOK.—GEORGE H. HITCHINGS, Hoquiam, Wash. The drag device carries a joint-plate which is pivotally connected by straps with the hook-bars. The drag device when drawn upon pulls the joint-plate which operates to draw the hook-bars firmly together and force their prongs into the timber. The drag device swings freely from side to side, independently of the hook-bars, and being connected with the joint-plate pulls thereon and then on the connecting straps. Thus traction is exerted whether the drag device is in line with the joint or hook-bars or stands on either side of the joint, as most frequently happens. All twisting at the joints is avoided. The parts of the hooks are maintained and braced in the desired positions.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.

NEW BOOKS, ETC.

DOMESTIC SERVICE. By Lucy Maynard Salmon. New York: The Macmillan Company. 1901. 338 pp. Price $2.

This most helpful book on the "servant question" was written after a thorough scientific investigation of the problem by Miss Salmon. Five thousand blanks containing pertinent questions were sent out to employers and employees throughout the country; and the statistics found in the book were compiled from the returns. The deductions and conclusions therefrom are found in several interesting chapters. A chapter throwing much light on domestic service abroad has been added to this, the second edition.

THE THEORY OF NUMBERS. By Richard Dedekind. Translated from the German by Prof. W. W. Beman. Chicago: The Open Court Publishing Company. 1901. 115 pp. Price 75 cents.

Two interesting essays on Continuity and Irrational Numbers and The Nature and Meaning of Numbers, respectively, are contained in this little book. The essays contain much stimulating thought, and are well worth the perusal of all who are interested in higher mathematics.

THE TINSMITH'S PATTERN MANUAL. By Joe K. Little, C.E. Chicago: The American Artisan Press. 1901. 248 pp., 100 diagrams. Price $3.50.

This book will be found of incalculable value to tinners and all sheet metal workers. In it are laid down general geometrical principles which, when mastered, will enable the user to draw a number of different patterns whose construction is essentially the same; and to develop the surface of any article with much greater ease and rapidity than by following the methods in general use. The book is entirely practical, and its popularity is shown by the fact that a second edition, brought thoroughly up to date, has just been issued.

THE STANDARD GUIDE TO THE CITY OF MEXICO. By Robert S. Barrett. City of Mexico: Modern Mexico Publishing Company. 1901. 152 pp. Price 50 cents.

This guide will be found invaluable to Americans about to visit Mexico. It furnishes a complete description of the city and its environs, and is copiously illustrated with fine half-tone engravings. It is prefaced by an interesting historical note, and all the buildings are described with full notice of their historical interest.

ROAD MAKING AND MAINTENANCE. A Practical Treatise for Engineers, Surveyors and Others. With an Historical Sketch of Ancient and Modern Practice. By Thomas Aitken. With Numerous Plates and Illustrations. London: Charles Griffen & Company, Limited. Philadelphia: J. B. Lippincott Company. 1900. Pp. 440. Price $6.

The author describes the modern methods at present employed in England, which make use of all the recently developed road-making machinery. The book is comprehensive, and treats of the subject in detail from the quarrying of road material or metal to the completion and keeping in repair of the road. The cost of the various operations based on actual road-building experience is given also. The latter half of the book is devoted to the description of carriageways and footpaths and the materials employed in their construction. Some novel suggestions for relieving overcrowding of the traffic in large cities are also given. The book is a valuable one for all persons engaged or interested in improving the roads of our country.

BERICHT DES COMITÉS DER MECHANISCHEN KUENSTE UEBER DIE ARBEITEN DES HERRN ALBERT COLLET. Die Sicherung der Schienenbefestigungen betreffend, Abgefasst von Herrn E. Sauvage. Paris, Rue de Rennes 14.

BERICHT UEBER DIE SICHERUNG UND BEFESTIGUNG DER SCHIENEN AUF HOLZWELLEN VERMITTELST EINSCHRAUBBARER HOLZDUEREL (trénail). System Albert Collet. Von M. Cartault. Paris: Veuve Ch. Dunod.

DIE EISENKONSTRUKTIONEN DER INGENIEUR-HOCHBAUTEN. Ein Lehrbuch zum Gebrauche an technischen Hochschulen und in der Praxis. Von Max Foerster. IV. Lieferung. Fortsetzung des III. Abschnittes. Kuppeldächer, Zeltdächer, Walmdächer, und Föpplsche Tonnenfiechtwerkdächer. 97 illustrations and one plate. Leipzig: Wilhelm Engelman. 1901. Large octavo. Pp. 257-320.

The fourth instalment of this admirable work, which we have had previously occasion to comment upon favorably, continues the discussion of roofs begun in the previous instalment. The explanations and illustrations are singularly clear. Excellent use has been made of the graphic system of estimating strains in framed structures.

KNOWLEDGE DIARY AND SCIENTIFIC HANDBOOK FOR 1901. London: Knowledge Office. 1900. 8vo. Pp. 528. Price, $1.20.

The volume will prove a most useful adjunct to the libraries of all astronomical workers, as it contains a historical summary of the advance of that science in the nineteenth century, with astronomical notes and tables and an account of the astronomical phenomena of the year, and twelve star maps showing the night sky for every night in the year, with full descriptive account of the constellations and principal stars, together with a calendar of notable events, table of principal observatories in the world and monthly astro-ephemeris. The pages devoted to the Diary, which form the bulk of the book, are of large size, and a page is provided for each day. While the scope of the work is mainly astronomical, its usefulness is not confined entirely to that science, and the diary alone is worth the moderate price asked for the entire book.

TEXTBOOK OF IMPORTANT MINERALS AND ROCKS WITH TABLES FOR THE DETERMINATION OF MINERALS. By S. E. Tillman. New York: John Wiley & Sons. 1900. 8vo. Pp. 176. Price $2.

This book is the slow outgrowth of the efforts to meet the necessities of the United States Military Academy for a convenient textbook of important minerals and rocks. The author has performed a great task in a very acceptable manner. The tables are excellent and tend to afford a ready determination of the rocks.

THE RUSSIAN JOURNAL OF FINANCIAL STATISTICS. February, 1901. St. Petersburg: The Russian Journal, 23 Millionnai. 8vo. Pp. 740. Price $5 per annum.

This is a very extraordinary publication. The publishers state that copies of two specimen numbers will be mailed on receipt of postal expense. The portly volume is brimful of information relating to Russia. It seems to be a careful compilation, and will undoubtedly be welcomed by all those who have any trade with Russia.

THE OCTOPUS. A Story of California. By Frank Norris. New York: Doubleday, Page & Co. 1901. 12mo. Pp. 652. Price $1.50.

This novel deals with the wheat growers of San Joaquin Valley, who came into actual conflict with the railroad, which they believe is trying to defraud them of their lands. It is the first volume of a trilogy entitled "The Epic of the Wheat." The first book deals with the war between the wheat grower and the railroad trusts; the second, "The Pit," will be the fictitious narrative of a "deal" in the Chicago wheat pit; the third, "The Wolf," will probably have for its pivotal episode the relieving of a famine in an old world community. Among the interesting features of the present novel are a map of the locality and a list of the principal characters in it. With the modern psychological work of fiction this last innovation is especially commended.

ELEMENTARY TEXTBOOK OF COAL MINING. By Robert Peel. London: Blackie & Son. Philadelphia and New York: J. B. Lippincott Company. 1901. 16mo. Pp. 300. Price $1.

This book is intended mainly as a textbook for those who are first-year elementary students of coal mining, attending classes in connection with the Science and Art Department, or the lectures which are now given at most mining centers in England under the technical education scheme. This, of course, greatly curtails its usefulness for American readers. Fortunately we have nothing like the Science and Art Department in this country to hamper our students. To those who wish a general knowledge of coal mining the book will perhaps prove of value.

Inquiry No. 970.—For parties to manufacture an all-metal vehicle wheel,

Inquiry No. 971.— For manufacturers of wheels used in small glass cutters.

Inquiry No. 972.—For manufacturers of tubular leather punches, as used by harness makers.

Inquiry No. 973.—For manufacturers of aluminium coated metal.

Inquiry No. 974.—For manufacturers of a flexible metal hose for steam or compressed air.

Inquiry No. 975.—For manufacturers of lathes or machines for turning special forms of shoe lasts.

Inquiry No. 976.—For parties making a novelty for photographers' use that can be sent through the mail, and selling for $1 or less.

Inquiry No. 977.—For manufacturers of tapered aluminium tubing.

Inquiry No. 978.—Wanted the name and address of a manufacturer of water motors; answer stating different sizes made.

Inquiry No. 979.—Wanted the name and address of a manufacturer of a successful cow milking machine.

Inquiry No. 980.—Wanted the name and address of a manufacturer of machinery for shaving off the bark on a special foreign tree (name not given).

Inquiry No. 981.—For manufacturers of monuments other than stone.

Inquiry No. 982.—For manufacturers of appliances for light mining, such as gold pans, portable smelters, etc.

Inquiry No. 983.—For manufacturers of cheap efficient writing duplicators.

Inquiry No. 984.—For manufacturers of coffee roasters and mills,

Inquiry No. 985.—For manufacturers of hoisting machinery and tools suitable for building purposes.

Inquiry No. 986.—For manufacturers of steel riveted masts for vessels.

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.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

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.

(8233) F. H. B. writes: Please explain what metals, minerals or ores draw lightning the most. We have a piece of about 20 acres on which lightning always strikes during a thunder shower. Land slopes to the west with higher land farther east, on which lightning seldom strikes, that is, comparatively seldom. Rock near surface, sometimes cropping out, of a light gray color, looks like bastard slate, but will seldom split. Land covered with young timber, hemlock, pine, white oak, red oak, maple and hickory. I think full 90 per cent of the hemlocks have been struck by lightning, while a large per cent of the other trees have also been struck. Out of 116 hemlocks which measured 6 inches 20 feet above the ground, 112 showed lightning marks. Near one end of the tract is a depression, at the bottom of which almost every tree has been struck by lightning. Live stock and game shun the tract, but not the land around it. The surface rock overlies a soft slate, which, judging from the dip, must be 300 feet below the surface. Near the upper edge of the slate is a spring, where, when the water is low, an oil collects, which, when collected on a woolen cloth, burns. I have never been able to collect enough to send you for a test, as it flows off with the water, and being transparent, is hard to find. Only when the spring is so low that no water runs away have I collected it on woolen cloth. A. Such instances are difficult to discuss. Many such have been reported, but the officers of the Weather Bureau are thought to be of the opinion that one sort of a tree is no more likely to be struck by lightning than another. We do not think any ores or metals under the ground would *draw* the lightning any more readily than water would do it. Nor would the mineral oil seem to account for the phenomena. The proportion of hemlocks marred by the lightning is certainly very large.

(8234) M. E. P. asks: 1. I am operating a single-phase light plant with about 800 lights. My transformer and liner are nearly all overloaded. Could I raise the voltage from 1,000 to 2,000 volts and use 200-volt lamps in place of 100-volt, or would it be better to parallel the secondary coils in the transformer and still run 100-volt lamps and change the generator to 2,000 volts? A. An additional generator to relieve the overload is a more natural solution of your difficulty than to change all your lamps and transformers, since 2,000 volts is a much greater strain on the insulation everywhere than 1,000 volts is. 2. What voltage is required to make a 15-inch spark, such as is given by a static machine? A. We have not exact data at hand for the voltage required to force a spark through 15 inches of dry air under all circumstances. A paper read before the American Institute of Electrical Engineers showed that 150,000 volts were required to force a discharge between points, and that a different pressure was necessary if spheres, disks, etc., were employed. We have from time to time published valuable papers concerning the work of Prof. Trowbridge, of Harvard University, in this direction. These can be had for ten cents each. 3. Is the current or discharge from a static machine giving 15-inch spark, such as is used in X-ray work, dangerous? Will it produce death? A. A discharge through 15 inches of air is a very dangerous current to encounter. Any discharge from a coil capable of giving such a spark should be avoided. The only safe rule is not to touch the secondary while the coil is active; and if necessary to touch any part of the apparatus, to place the hand not in use behind the back. No circuit can then be made through the body from arm to arm. 4. Will the 200-volt lamp last as long as the 100-volt? A. One of the largest lamp makers says of 200-volt lamps: "Owing to the increased strain to which the carbons or filaments are subjected by the high voltage, these lamps are uncommercial except in the lower efficiencies. The efficiency of our regular product is 4 watts per candle, and in its average life and maintenance of candle power it corresponds to our standard 100 to 125-volt 3.1-watt lamp." This shows that it will cost more to run a 200-volt lamp than a 100-volt lamp for the same candle power.

(8235) C. D. asks: 1. What point below the freezing point do air, hydrogen, nitrogen oxygen, become liquid? A. These temperature points are very nearly as follows in Fahr. degrees, below zero: Air, 312; hydrogen, 422; nitrogen, 317; oxygen, 297. 2. Please give me the address of a reliable company that sells chemicals and chemical apparatus. A. You would better deal with a firm in the city near your home than to buy at a distance and pay transportation charges. Our advertising columns very often contain the advertisements of these dealers. We do not advertise dealers in the Notes and Queries column. 3. Where can I get some books on argon, helium, neon, krypton and xenon, and give me the prices of them? A. We can send you many valuable papers on the rare gases of the atmosphere which have appeared in the Supplement. Among them are argon, Nos. 1000, 1001, 1002, and others, price ten cents each; helium, Nos. 1056, 1057, price ten cents each. 4. What kind of chemical books, as organic chemistry, etc., so I can find liquid formene? What is formene? A. Formene is a tetrachloride of carbon, CCl_4. Its preparation can be found in the Dispensatory. Its properties are those of an anæsthetic, similar to those of chloroform, soothing the pain of neuralgia and even causing insensibility. As it has been the cause of death also, it is not used by physicians. It is not a substance for an amateur to meddle with. 5. What are the uses of liquid air? A. At present liquid air is not put to any commercial use.

(8236) C. J. K. asks: I beg to inquire if you can suggest anything that I can use for a reflector in place of plate glass where the size required, 10 feet x 12 feet, makes plate glass impracticable to handle? A. Glass is the best material for a reflector, since it does not tarnish with exposure to moisture and can be easily cleaned. It would not seem to be necessary to have a single piece of glass for a reflector 10 x 12 feet. The difference could not be told if there were a large number of pieces of glass set edge to edge in the frame, making a total area as great as desired. This has been done in the various solar engines which have been built. We do not think any artificial glass would answer your purpose.

(8237) J. R. H. asks: Do you have a Supplement that treats of intercommunicating telephones and setting up and construction of same? A. We have no article giving practical details on this point. You can find various systems described in Miller's "American Telephone Practice," price $3 by mail.

(8238) J. T. R. writes: I have a primary battery of eighteen cells; two series of nine connected in multiple, i.e., two positive and two negative wires connected. These are used to charge a secondary battery of three cells of chloride accumulator. The voltmeter indicates 6.6 volts at storage battery and 6.5 volts at terminals of primary battery. Is my primary battery large enough, and what should be the potential of the charging plant described above? A. A storage battery should have a charging current with a pressure of 2½ volts per cell. Three cells require 7½ volts. The maximum charging rate should be 6½ amperes per square foot of surface of positive plate, reckoning both sides. You probably fall short in both pressure and current.

(8239) C. J. H. asks: What is the most desirable formula for making soap bubbles? I am in doubt in regard to the amount of glycerine and soft soap to use and as to whether there were any other ingredients that could be added to advantage. A. A good soap bubble solution is not to be obtained by simply mixing soft soap and glycerine. It is very difficult to secure a good solution. Only the purest oleate of soda, or the best white soap, white Castile for example, can be used. Only the best glycerine can be used. Price's glycerine is reliable. The manipulation is tedious. If, however, you wish to undertake it, proceed as follows: Take the purest caustic soda 1 part, and dissolve in distilled water 40 to 50 parts. All parts by weight, of course. Take pure oleic acid. Set it for a few days in a refrigerator and decant the clear fluid, if a separation takes place. Of this take 7 parts, and mix with the soda solution. Shake till the reaction is complete. Now add water up to 350 parts with the previous water. To two measures of the oleate of soda add one measure of Price's glycerine. Run no risk with poor glycerine. Let this stand a few days in a cool place, and siphon off the clear solution, which is to be used for soap bubbles. Some add a little ammonia to this, but it works well as we have given it.

(8240) W. J. B. asks: Is it preferable to have all south poles on one side and all north poles on the other to work independent armatures suspended above them, or will alternate polarity, north and south, give as good results? A. We do not see that it makes any difference in which way the several armatures are connected up, so long as each magnet works by itself, as your sketch shows that it does. It is more symmetrical to connect all the same, and then in any repair you will know from what point each wire comes.

(8241) F. S. asks: 1. Is there any destructive local action in a storage battery between the oxide filling and the lead alloy of the plates? A. No. 2. Will the presence of a saturated wooden diaphragm increase or diminish the resistance to a current passing through a liquid? A. It increases the internal resistance.

(8242) B. W. L. asks: If a bridged, grounded telephone wire came in contact with one wire of a lighting circuit carrying 5,000 volts, would there be any disastrous effects to either? A. It would be very bad for the telephone. You would need to put in a new one, since there would not be much left of the old. 2. If one wire of this lighting line were to break and fall across the telephone wire, what would be the probable effect? A. If these wires were bare, the best course would be to call out the fire department immediately. In the description which you give of what took place in your case, we judge that there was no contact of bare wires, and perhaps no wires came into contact at all. The swinging of the light wire near your telephone wire would produce all the phenomena you describe; while the fact that you could get no circuit from the ground showed that the wire had not broken and fallen anywhere along the line.

(8243) T. D. asks: In a perfect compound dynamo, would the neutral points vary with the load? A. Yes.

(8244) H. E. T. asks: 1. Is there an alloy approximately as soft as lead, and as tenacious, malleable and ductile as copper? If so, what are the properties of the alloy? A. There is no alloy known to us that is as soft as lead and as tenacious as copper. The alloys of lead and copper have no commercial value as a metal and are not in use. We do not know the properties of such alloys. 2. Is there any need (commercially speaking) now of a telephone repeater, since Dr. Pupin's invention? In other words, could a telephone repeater have any other use than to increase the distance at which speech may be transmitted? A. There is the same need that there has always been. If such an instrument can be invented, it will enable speech to be transmitted not only to greater distances, but at a much less cost than the system to which you refer.

(8245) J. M. S. writes: I have a small electric mouth lamp that when connected up with an alternating 104-volt current, by means of a rheostat, requires from 3½ to 4 volts to light it. Now what I want is to make a rheostat by covering either a piece of wood or iron with asbestos, and then placing same in a lathe and winding it with German silver wire, so as to be able to cut the 104 volts down and not burn out my lamp. Can you inform me what gage wire and how much of it will take to accomplish the desired results? A. We cannot give exact data for a coil such as you require, since we do not know what the current is which you use. But you can proceed as follows: Take 24 B. & S. German silver wire, which has 3 feet to the ohm. Provide 375 feet, and wind into the coil as you propose. You can arrange a switch so that the current may be adjusted; that is, make a variable rheostat; or you can by testing find what amount will be needed to have the light burn properly. You are probably aware that the more economical way is to have a small transformer for your lamps. Such lamps can be run with a battery also.

(8246) M. McC. writes: A positive remedy for carbon brushes sparking is to soak the brushes for 24 hours in ordinary machine oil. Complaints I have read in columns of the Scientific American prompts the above and should be generally known. I had the same trouble and it occurred to me to try above remedy, and I find it does avoid sparking positively. A. We are not able to indorse this as a sovereign remedy for all diseases of dynamos which show themselves by the symptom called sparking. Machine oil can only act as a lubricator, and sparking may be due to a cause deeper than the surface of the armature.

(8247) F. H. asks: Will you please tell me what kind of metal to use on contact points on a gasoline engine electric igniter, and where to purchase the same? A. Always use platinum at the contact points for breaking a circuit where there will be a strong spark. Any dealer in gasoline engines who advertises in our columns can furnish the article. So also can dealers in electric materials.

(8248) A. S. asks: 1. Would ten cells be sufficient to run a six-candle lamp (10 volts, 1.5 amperes)? If not, how many would be required? A. No. Your lamp requires 1.5 amperes. This battery furnishes 30-1000 of an ampere, or about one-fiftieth as much current as is needed for the lamp. 3. How shall I prepare the pastes used in the upper and lower spirals? A. This battery is useful for testing purposes only, as the description states. The paste is prepared by mixing the solid minium or litharge into a paste with dilute sulphuric acid. This is the method in all storage batteries using such pastes. 3. What is used as the electrolyte, and how is it made? A. Dilute sulphuric acid. You will have to buy the acid. You cannot very well make it. 4. Where could I get the battery charged? A. Charge the battery with a primary battery. A gravity battery is as good as any for the purpose.

(8249) N. D. writes: In your issue of April 13 you mention sulphides of barium and calcium, and state "when properly prepared." Are there any special directions for preparation, and how? A. To prepare a phosphorescent calcium sulphide, calcine clean oyster shells in order to burn out all but the calcium carbonate. Then reduce the shells to a fine powder by pounding or grinding. Place this powder in layers in a crucible with flowers of sulphur. Cover the crucible to shut out the air, and heat to dull redness for half an hour. Let the whole cool while still covered, and transfer the calcium sulphide formed to a glass bottle, which cork tight to prevent the accession of moisture. Barium sulphide should be formed from witherite and sulphur by heating in a crucible in the same manner.

(8250) W. M. R. writes: I made some little time back the eight-light dynamo described in your valuable paper, designed by Hopkins some twelve years ago, or so. Having studied electricity at University College, London, I made some alterations in the design of armature which I think have made material improvement in dynamo. The alterations were these: Instead of using the washers as suggested, I cut washers out of 20-gage charcoal iron, using varnish for insulation. These I fastened on to the armature by thick-end washers engaging a screw on armature shaft. After getting all firmly screwed up, I put into lathe and slotted out 24 grooves the breadth of 4 wires and 8 wires deep, and in these I wound the wire very carefully. By this arrangement I was enabled to run the armature with iron 1-16 inch distant from cheeks of field magnet. I turned the field magnet upside down, with yokes firmly bolted to base plate, from which rose two pedestals (hollow) forming bearings for the ends of armature. I arranged the bearings with an endless chain dipping six inches into oil chamber, with the result that I can light up 50-volt lamps to full brilliancy at a speed of 1660, instead of 2200, the speed mentioned in your article. I have had the machine lighting up my house, driven by a Pelton wheel, for several months, and the bearings have not an atom of shake and have only been filled up with oil once, as it circulates and runs back again. I thought possibly some of your readers would like to hear of my results. I would advise anyone attempting to make the machine to get the segments for commutator cast separate. I tried both ways and found the latter preferable. I made the commutator much larger than the design. A. Of course, the iron-clad armature is an improvement over the old form of a dozen years ago. The results of the alterations are very satisfactory.

(8251) J. M. S. asks: 1. What size German silver wire and how long a piece should I use to wind a rheostat to reduce an alternating current 7200 amperes, 104 volts, down to 2 volts? Also size and amount of iron wire for above results? A. The use of a choke coil is not the most economical way to reduce from 104 volts to 2. A simple mode of getting the result would be to put a wire in series with an incandescent lamp, and take a shunt from the wire at two points which have a resistance between them equal to about one-fiftieth of the resistance of the lamp. The best way, however, is to obtain a transformer from the company supplying the current, which will give you this rate of transformation. If your current should happen to be transformed from 2000 volts to 104 a second transformer like the first would carry it down to about 5 volts, which perhaps is near enough to your limit for your use. 2. How shall I proceed to construct an appliance for heating say a glass of water, using same current, amount, size and kind of wire? A. This you can do by means of a small coil of wire in series with a lamp. An arc lamp would give a quicker result. With an arc lamp use 12 or 14 B. & S. German silver wire. With an incandescent lamp use 18 or 20 wire.

(8252) H. S. asks: Will you kindly tell me through your Notes and Queries column what editions of the Scientific American or Supplement (if any) contain drawings for the building of a 110-volt dynamo for lighting purposes. A See Supplements 844 and 865, price ten cents each.