other object onto a table from a point remote therefrom, the object thrown having a contact portion to complete the electric circuits employed.

Pertaining to Vehicles.

HORSE-DETACHER.—H. G. Simpson, Elkhorn, W. Va. This is an attachment for the front axles of carriages and wagons for releasing poles and shafts in case of danger from a horse or team running away. More particularly it is an improvement in detachers which include sliding bolts adapted to secure pole or shaft irons, and a vertical oscillating lever with which such sliding bolts are connected by links or rods.

CARRIAGE-TOP ATTACHMENT.—W. C. Willitts, Eckford, Mich. This inventor's improvement is in that class of buggy or carriage top attachments which are removable from the carriage or buggy seat. The object is to provide an attachment which may be more easily and quickly applied and detached than heretofore and which will be held securely when so applied. It is applicable for many forms of vehicles.

CHECK ATTACHMENT TO VEHICLES.—S. L. Duckett, Goldfield, Colorado. Of the purposes in this instance one is to provide an attachment adapted for use in checking horses should they attempt to run away while being driven or when left standing and to provide a device for such purposes which will be simple and which can be brought into action while the driver still holds the reins.

CRANK-HANGER.—F. M. Osborne, Anaconda, Mont. This invention is an improvement in crank-hangers for bicycles. In carrying out the invention the sprocket wheel pulls between the bearings, and the cranks can be conveniently removed when desired without disturbing all of the parts of the hanger. The construction forms a very simple crank-hanger from which dust will be excluded and in which the cranks can be readily removed by simply turning off a nut and pulling the shaft-sections of the cranks apart.

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.

Notes and 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 This is for our information and not for publication.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.

(10440) Mr. C. D. W. asks: Is John Tyndall dead? If so, when did he die? A. John Tyndall died December 4, 1893.

(10441) S. K. S. says: Is the nebular hypothesis of Laplace still the accepted scientific theory of the cosmeogury of our castle? If not, what theory, if any, has supplemented it? A. It cannot be said that the nebular hypothesis of Laplace is held in its entirety by astronomers at the present time. The phenomena which cannot be accounted for by their conditions are too numerous. Darwin's tidal evolution hypothesis has by many been adopted as an addition or supplement to the nebular hypothesis. The large number of spiral nebulæ seem to demand a modification of the hypothesis. You will find a very recent exposition of the whole question in Moulton's "Astronomy," pp. 440-448. We can send the book for $1.25. It is the latest text book of astronomy.

(10442) W. B. K. asks for the government formula for whitewash. The following coating for rough brick walls is used by the United States government for painting lighthouses, and it effectually prevents moisture from striking through: Take of fresh Rosendale cement, 3 parts, and of clean, fine sand, 1 part; mix with fresh water thoroughly. This gives a gray or granite color, dark or light, according to the color of the cement. If brick color is desired, add enough Venetian red to the mixture to produce the color. If a very light color is desired, lime may be used with the cement and sand. Care must be taken to have all the ingredients well mixed together. In applying the wash, the wall must be wet with clean fresh water; then follow immediately with the cement wash. This prevents the bricks from absorbing the water from the wash too rapidly, and gives time for the cement to set. The wash must be well stirred during the application. The mixture is to be made as thick as can be applied conveniently with a whitewash brush. It is admirably suited for brickwork, fences, etc., but it cannot be used to advantage over paint or whitewash.

(10443) A. A. H. asks how to make javelle water. A. Javelle water proper is prepared by passing gaseous chlorine—derived from the action of hot sulphuric acid on a mixture of common salt and oxide of manganese—into a 10 per cent aqueous solution of carbonate of potash until the latter will absorb no more. It may also be made by adding a solution of carbonate of potash to a solution of chlorinated lime (bleaching powder) as long as a precipitate continues to form, the liquid being afterward decanted or filtered. Ordinarily, however, the liquid called javelle water is chlorinated soda, and not potassa.

(10444) J. K. B. asks how to make gravel and tar walks. A. Take 2 parts very dry lime rubbish and 1 part coal ashes, also very dry, and both sifted fine. In a dry place, on a dry day, mix them, and leave a hole in the middle of the heap as bricklayers do when making mortar. Into this pour boiling hot coal tar, mix, and when as stiff as mortar put in 3 inches thick where the walk is to be; the ground should be dry and beaten smooth; sprinkle over it coarse sand. When cold, pass a light roller over it; in a few days the walk will be solid and waterproof.

(10445) B. L. W. asks how to make Pharaoh's serpents. A. These are little cones of sulphocyanide of mercury which, when lighted, give forth a long, serpent-like, yellowish brown body. Prepare nitrate of mercury by dissolving mercury dioxide in strong nitric acid as long as it is taken up. Prepare also sulphocyanide of ammonium by mixing 1 volume sulphide of carbon, 4 strong solution of ammonia, and 4 alcohol. This mixture is to be frequently shaken. In the course of about two hours, the bisulphide will have been dissolved, forming a deep red solution. Boil this until the red color disappears and the solution becomes of a light yellow color. This is to be evaporated at about 80 deg. F., until it crystallizes. Add little by little the sulphocyanide to the mercury solution. The sulphocyanide of mercury will precipitate; the supernatant liquid may be poured off, and the mass made into cones of about ½ inch in height. The powder of the sulphocyanide is very irritating to the air passages, and the vapor from the burning cones should be avoided as much as possible. To ignite them set them on a plate or the like, and light them at the apex of the cone.

(10446) H. N. M. asks how to prepare skins for fur. A. Mix bran and soft water sufficient to cover the skins. Immerse the latter and keep them covered for twenty-four hours; then remove, wash clean, and carefully scrape off all flesh. To 1 gallon of water (hot) add 1 pound of alum and ¼ pound of salt. When dissolved and cool enough to admit entrance of the hand, immerse the skins for twenty-four hours, dry in the shade, and rub. Stir the liquor again, immerse the skins for twenty-four hours, dry, and rub as before; immerse for twenty-four hours in oatmeal and warm water, partially dry in the shade, and finally rub until entirely dry. This leaves the skin like white leather, and fit for immediate use.

(10447) A. C. N. asks how to lay sheet lead. A. In laying sheet lead for a flat roof, the joints between the sheets are made either by rolls, overlaps or soldering. In joining by rolls, a long strip of wood two inches square, flat at the base and rounding above, is placed at each seam; the edge of one sheet is folded round the rod and beaten down close, and then the corresponding edge of the next sheet is folded over the other. In over-lapping, the adjacent edges of the two sheets are turned up side by side, folded over each other and closely beaten down. Soldering is not adopted when the other plans can be carried out.

(10448) H. J. N. asks how putz pomade is made. A. 1. In 100 pounds common yellow vaseline, melted, stir 20 pounds of fine colcothar. 2. Same as above, only using lard instead of vaseline. 3. Twenty pounds of Am. mineral oil and 5 pounds of lard are melted and 25 pounds of fine colcothar are stirred in. 4. The following is given as the formula for genuine putz pomade: Oxalic acid, 1 part; oxide of iron, 25 parts; rottenstone, 20 parts; palm oil, 60 parts; vaseline, 4 parts. The oxide of iron may be Venetian red. Both it and the rottenstone must be absolutely free from grit. Oxalic acid is poisonous.

(10449) M. B. W. asks how to make dextrine paste. A. In hot water dissolve a sufficient quantity of dextrine to bring it to the consistency of honey. This forms a strong adhesive paste that will keep a long time unchanged, if the water is not allowed to evaporate. Sheets of paper may be prepared for extempore labels coating one side with the paste and allowing it to dry; when to be used, by slightly wetting the gummed side, it will adhere to glass. This paste is very useful in the office or laboratory.

(10450) H. P. W. asks how to join rubber. A. Rubber is easily joined and made as strong as an original fabric, by softening before a fire, laying the edges carefully together, without dust, dirt, or moisture between. The edges so joined must be freshly cut in the beginning. Tubing can be united by joining the edges around a glass cylinder, which has previously been rolled with paper. After the glass is withdrawn the paper is easily removed. Sift flour or powdered soapstone through the tube to prevent the sides from adhering from accidental contact.

(10451) C. N. asks for a formula for ground glass. A. Sandarac, 90 grains; mastic, 20 grains; ether, 2 ounces; benzole, ½ to 1½ ounce. The proportion of the benzole added determines the nature of the matt obtained.

(10452) A. M. C. asks: I have a system of wires which I use for receiving wireless messages. They are horizontal, and run nearly parallel to the elevated structure of the Long Island Railroad, which is equipped with the third-rail system. I have noticed that unless the weather is damp, whenever a *steam* engine passes on the structure, I get sparks about ⅛ inch long from the wires. There are four wires, each 180 feet long. They run at an angle of about 15 deg. to the tracks, and are about 40 feet off ground. Between the wires and parallel to the tracks is a two-phase 2200-volt alternating line, about the same height as the wires. The least distance from the wires to tracks is about 125 feet. No smoke or steam from engine reaches the wires. The sparks are very heavy, and apparently of an oscillatory nature, not the ordinary static sparks obtained from high wires. At no other times except during thunderstorms can I get sparks from the wires which amount to anything. A. There would seem to be no doubt that the sparks from the receiving wires of the wireless station are due to the induction of the great mass of metal in the steam engine, passing through a field in which heavy currents are already flowing, that of the alternating current. We have not met with just this case before, but it would seem that this cause would be sufficient to account for the effect produced.

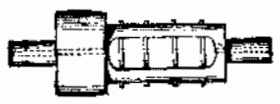
(10453) K. S. B. writes: In regard to the recent wreck of the electric train on the New York Central, I see by your paper that the spikes holding the outer rail were sheared, showing a much greater stress on the outer rail at a given speed than for a steam locomotive of the same weight. As for the reasons for this: Besides the concentration and the low height of the load, would not the gyroscopic effect of the rotating parts of the motors play an important part? As the wheels (drivers) are comparatively small, the speed of rotation is large. Then to change the direction of the axis of revolution of these heavy, rapidly-revolving parts would take a considerable force, which was probably not taken into account by the engineers, who elevated the outer rail to counteract the inertia of the train only. This so-called "gyroscopic action" enters as a large factor in other problems of a similar nature, and it seems to me that it would in this particular case also. It also seems to me that this action of the motors would have to be taken into account on heavy motors at high speeds. I presume that lighter parts, also lower speeds in general, is what has kept electric trains from experiencing this difficulty heretofore. A. Your suggestion of a gyroscopic action in the rapidly rotating wheels of an electric train is doubtless correct. Just how great a force is produced we have not calculated. It would be variable, and would increase very rapidly with the increase of speed.

(10454) E. S. D. writes: Will you kindly answer me through your Notes and Queries what would be the normal height of the barometer at an elevation of 5548 feet above the level of the sea? A. Normal barometer at an altitude of 5,548 feet will be about 24½ inches.

(10455) J. B. W. asks how to color brass a deep blue. A. A cold method of coloring brass a deep blue is as follows: 100 grammes of carbonate of copper and 750 grammes of ammonia are introduced in a decanter, well corked, and shaken until dissolution is effected. There are then added 150 cubic centimeters of distilled water. The mixture is shaken once more, shortly after which it is ready for use. The liquid should be kept in a cool place, in firmly closed bottles or in glass vessels, with a large opening, the edges of which have been subjected to emery friction and covered by plates of greased glass. When the liquid has lost its strength it can be recuperated by the addition of a little ammonia. The articles to be colored should be perfectly clean; especial care should be taken to clear them of all trace of grease. They are then suspended by a brass wire in the liquid, in which they are entirely immersed, and a to-and-fro movement is communicated to them. After the expiration of two or three minutes, they are taken from the bath, washed in clean water, and dried in sawdust. It is necessary that the operation be conducted with as little exposure to the air as possible. Handsome shades are only obtained in the case of brass and tombac—that is to say, copper and zinc alloys. The bath cannot be utilized for coloring bronze (copper-tin), argentine, and other metallic alloys.

(10456) A. D. M. asks for a dressing for linoleum. A. A weak solution of beeswax in spirits of turpentine has been recommended for brightening the appearance of linoleum. Here are some other formulas: 1. Palm oil, 1 ounce; paraffine, 18 ounces; kerosene, 4 ounces. Melt the paraffine and oil, remove from the fire and incorporate the kerosene. Polish.—2. Yellow wax, 1 ounce; carnauba wax, 2 ounces; oil turpentine, 10 ounces; benzine, 10 ounces. Melt the waxes carefully, add the oil and benzine, and stir until cold. 3. Yellow wax, 5 ounces; oil turpentine, 11 ounces; amber varnish, 5 ounces. Melt the wax, add the oil, and then the varnish. Apply with a rag.

(10457) J. W. H. asks for a tool for straightening wire. A. Such a tool is shown in the accompanying cut. It consists of a casting about 10 inches in length, having



on each end a bearing which may be supported in suitable boxes. The pulley is a part of the casting, and is 3 inches in diameter and 2 inches wide. Four steel pins are inserted 1 inch apart and a little to one side of a central longitudinal line. A hole a little larger than the wire to be straightened is drilled axially through the bearing. The wire passes through the tool over and under the steel pins. It is well lubricated and is pulled through as the tool revolves rapidly.

(10458) C. N. asks how to do annealing. A. For a small quantity, heat the steel a cherry red in a charcoal fire, then bury it in sawdust, in an iron box, covering the sawdust with ashes. Let it stay until cold. For a larger quantity, and when it is required to be very soft, pack the steel with cast iron (lathe or planer) chips in an iron box as follows: Having at least half or three-quarters of an inch in depth of chips in the bottom of the box put in a layer of steel, then more chips to fill spaces between the steel and also the half or three-quarters of an inch space between the sides of the box and steel, then more steel; and lastly, at least one inch in depth of chips, well rammed down on top of the steel. Heat the whole to and keep at a red heat for from two to four hours. Do not disturb the box until cold.

(10459) B. W. F. asks how to clean paint. A. To clean paint, provide a plate with some of the best whiting to be had; have ready some clean warm water and a piece of flannel, which dip into the water and squeeze nearly dry; then take as much whiting as will adhere to it, and apply it to the painted surface, when a little rubbing will instantly remove any dirt or grease. After which, wash the part well with clean water, rubbing it dry with a soft chamois. Paint thus cleaned looks as well as when first laid on, without any injury to the most delicate colors. It is far better than using soap, and does not require more than half the time and labor.

(10460) C. D. asks how to make grape syrup. A. 1. Half pint brandy, 1 ounce tincture of lemon, 1 gallon simple syrup, tincture red sanders, 1 quart. 2. Brandy, ½ pint; spirits of lemon, ¼ ounce; tincture of red sanders, 2 ounces; simple syrup, 1 gallon. 3. A grape syrup, not an artificial syrup, or one for fountain use, but a syrup from the fruit, for domestic or table use, etc. Take 20 pounds ripe freshly picked and selected tame grapes, put them into a stone jar, and pour over them 6 quarts of boiling soft water; when sufficiently cool to allow it, well squeeze them thoroughly with the hand, after which allow them to stand 3 days on the furnace with a cloth thrown over the jar, then squeeze out the juice and add 10 pounds of crushed sugar; let it remain a week longer in the jar; then take off the scum, strain and bottle, leaving a vent until done fermenting, when strain again and bottle tight, and lay the bottles on the side in a cool place.

(10461) B. J. asks how to waterproof canvas. A. A solution containing equal parts by weight of gelatine and chrome alum. It is not advisable to mix more of the solution at once than is sufficient to give the canvas one coat, as, if the mixture once sets, it cannot be reliquefied like a plain solution of gelatine, and hence, if the quantity of canvas to be waterproofed is but small, it would, perhaps, be preferable to coat with plain gelatine solution until quite impervious to cold water, and then to thoroughly soak for, say, twenty-four hours in a strong solution of chrome alum.

NEW BOOKS, ETC.

The Naval Pocket-Book. Founded by Sir W. Laird Clowes. Edited by Goeffrey S. Laird Clowes. London: W. Thacker & Co., 1906. Pocket size; pp. 965. Price, $3.

The present edition of this well-known, compact, and very convenient little work is fully up to the high quality of its predecessors. It opens with a calendar in which the leading events of naval history on each particular date are recorded; and this is followed by a comparative summary of the fighting fleets of the world arranged under a new system of notation. Then in tabular form is given the statement of the various world's navies, tables and descriptions of the naval guns and small arms, a list of drydocks, giving dimensions and capacities, and at the close of the book are diagrams of the leading types of ship of each navy, showing the disposition of guns and armor with the sizes and thicknesses of each.