

eight dwt. of chloride of silver? A. Not long; it depends on resistance of circuit. 5. About what part of a horse power is 25 volts and 4 amperes equal to? A. Nearly one-seventh.

(2183) Sydney asks: 1. If sirup for cordial be made with cold water, is it more likely to ferment than if it were boiled? A. Yes. 2. The best way to prepare charcoal for refining spirit, and whether any particular wood should be used. If the charcoal were merely placed in a cask of spirit, would it absorb the injurious matter and have the same effect as if it were filtered? A. Animal charcoal is most efficient. 3. The best mode for filtration of small quantities of spirits of about 30 gallons at a time. A. Use a percolator, and pack in the charcoal solidly. 4. The best publication on mode of preparation of American drinks, and price, including postage to Sydney? A. Jerry Thomas' "How to Mix Drinks, or the Bartender's Guide," 75 cents. 5. Has the aerating of wines been tried in America, and with what success, also the price of such aerating machine? A. Not to any extent with fine wines. Cider can be thus treated. 6. Best mode of preparation of raisin wine. A. We refer you to the SCIENTIFIC AMERICAN, December 8, 1888, page 356, for an article on the subject by U. S. Consul E. Johnson, Kehl, Germany.

(2184) H. C. K. asks: 1. What is the theory of the Tesla motor, and what is gained by the two independent circuits as shown in your SUPPLEMENT, No. 692? A. The two independent coils are connected in series. The whole is so proportioned that there is a constant difference of one-quarter phase between the two, owing to hysteresis or "magnetic lag." This causes the axis of north and south polarity to constantly vary, rotating always in the same direction. The armature induced itself keeps trying to "keep up," and hence rotates. 2. In SUPPLEMENT, No. 718 or 734, what is meant by the Carpenter bobbin (type 600 francs)? Is it an addition to, or is it the Ruhmkorff coil that is meant in the article "On M. H. Hertz' Experiments." A. The Ruhmkorff coil is indicated.

(2185) E. A. C. writes: I have noticed that many brass castings when taken from the sand are perfectly clean and of a uniform, almost golden color. How is this obtained? A. The golden-colored castings are made from clean metal, without iron: Copper 16 ounces, tin 1 ounce, zinc 1 ounce. The flasks should be opened quickly, in from 5 to 15 minutes after pouring, according to size of pieces, and the gate of work raised, sand rapped off, and plunged in water to check oxidation. A little practice will give proper manipulation. Should only have a quick dip, so that the heat of the castings will dry them. 2. Is there any constant battery of higher E. M. F. than the gravity battery? If so, what and how prepared? A. No practical battery. 3. Why will not the gravity battery run an induction coil? A. It can be so used.

(2186) V. R. asks: What causes the report and the recoil of a gun when a charge is fired? Are the recoil and report caused by air rushing into the barrel after the bullet has left the muzzle? Is there a vacuum formed in the barrel while the bullet is leaving it? Has the vacuum (if formed) anything to do with the report and recoil? A. The report is the vibration of the air, due to the instantaneous explosion. The recoil is the result of the sudden pressure generated within the gun pushing the gun in the opposite direction from that of the ball. There is no vacuum formed, but a large volume of gas is generated by the combustion of the powder, producing a great pressure upon gun and ball, sending them in opposite directions.

(2187) C. C. asks: Will a piece of timber ready to use in a mechanical way, ordinary dry timber, shrink endways? For instance: A piece of oak timber 6 inches by 6 inches square, 5 feet long, would the decrease in length be perceptible, and is it not an ordinary expression that timber does not shrink endways? A. Timber in drying has a very small shrinkage endwise. After it is seasoned, the permanent shrinkage becomes imperceptible, but changes in temperature, and the dry and wet seasons, may make slight variation in length. In architecture endwise shrinkage is not taken into account.

(2188) J. S. S. writes: In performing the experiment of putting an iron bar in the plane of dip and striking it a few blows with a hammer, I noticed this phenomenon, viz., both ends of the bar repelled the north and attracted the south poles of a compass. Why is this? Where were the consequent points? Must there not have been one of them missing in the chain? A. You have at least two consequent south poles in the middle portions of your bar. If you saw it in two, you may succeed in finding them.

(2189) W. B. J. asks: If the governing arrangement of an engine could be made so perfect that the least perceptible change in speed would regulate the supply of steam instantly from 0 to its full capacity, or just enough to insure an even and steady speed, could the flywheel of the engine be dispensed with? Is there a governor in use that regulates the engine in such a way that the same speed is maintained when working under a heavy or light load, provided there is steam enough to overcome the load? A. The automatic system of governing engines, as now in use, is probably as nearly perfect as the mechanical difficulties will allow. We see many difficulties in dispensing with the flywheel on a reciprocating engine, from the peculiar conditions of the application of pressure upon the piston. Uniform tangential pressure on the crank pin through its entire circle is one condition for dispensing with a flywheel.

(2190) B. H. S. asks: Can you give me a good receipt for waterproofing canvas, such as is used for canvas canoes? An elastic coating is preferable, so that the canvas may be folded. A. The best advice we can give is to have your canvas coated with India-rubber. You may waterproof it by treating with a solution of 1 part gutta percha in 10 parts turpentine mixed with 10 parts linseed oil, or with 125 parts soluble gun cotton dissolved in 425 parts ether, mixed with 375 parts castor oil and 25 parts amber or the pigment. When the canvas is not to be disturbed, painting or varnishing is the best treatment. For all cases the canvas should be perfectly dry.

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AND EACH BEARING THAT DATE.

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