(4485) C. C. and G. W. say: Please explain the objects and purposes of fly wheels on me-chanical devices. Are they intended to give certain velocity of speed, or are they only intended to control vclocity? A. Fly wheels are mainly regulators of speed during a revolution by absorbing the power in momentum during the high pressure part of the stroke and giving out power by its momentum during the expansion period and the passage of the centers in power engines. In other applications, as in punching, shearing and pressing machines, it becomes an accumulator of power, by which a small constant power is made to do a vastly larger instantaneous work by the momentum of a fly wheel under continuous motion. In general terms the fly wheel is a regulator of speed during a revolution, but does not control the number of revolutions per minute, as this is due to the relation of the power to the work. In this sense it acts as an accumulator and transmitter of power through the momentum of a heavy weight revolving with a variable velocity.

(4486) W. W. S. says: A party says a level is a surface or line every part of which is equally distant from the earth's center. Second party says it is not, holding that as you descend or ascend from the surface of the ocean, you do not then have a true level. Is a mechanical level or a scientific level, used for engineering or other purposes, a curved line? All leveling in engineering and surveying is done by straight! lines. There are no instrumental curves. A geodetic level is a curved line following the earth's surface at the mean level of the sea as a datum. In engineering surveys of a long line, the series of levels are straight lines, which are reduced by computation to form a polygonal figure corresponding with the curvature of the

(4487) G. B. B. asks whether there is any instrument made to determine altitude. Or, describe the general plan of determining heights above sea level. A. The barometer (aneroid) is the usual instrument for determining elevations above the sea. The temperature of boiling water is also used. Triangulation and leveling from tide water is the most accurate. when the distance is not too great, yet very accurate work may be done in this way, even across the continent. You will find the details in works on surveying. The United States geodetic survey is progressing on the method of triangulation.

(4488) J. N. R. writes: Please let me know how many gravity cells (Crowfoot) are needed to run a fan about 5 inches in diameter. How should I charge them, how much bluestone, how often, when fan is run 5 hours a day? A. The number of cells required to run the fan depends upon its resistance and the velocity of the fan. You will be obliged to use a sufficient number of cells to overcome the resistance, and then you will have to add cells in parallel until you get the power you need. Gravity batteries when first charged should be filled one-third full of crystals of copper sulphate; the cells should then be filled to a point just above the zinc with a weak solution of sulphate of zinc or Glauber's salt. It should then stand on a closed circuit for a few hours, the circuit to include resistance a little greater than the total resistance of the battery cells.

(4489) H. H. R. asks: Howcan I prevent the zincs from corroding in a battery composed of sulphuric acid and water in the glass jar and a solution of common salt and water in the porous cup? A. To prevent the rapid corrosion of your zincs you should thoroughly amalgamate them. This you can accomplish by dipping them in dilute suiphuric acid, sprinkling them with a few small drops of mercury and rubbing them on the surface plate until the plate is per-

(4490) J. L. M. writes: Every man owning a horse should know how a horse should be shod; instructing a smith how you want it done as a general thing will not do. One must stand by and see it done properly. A smith should never be allowed to cut the frog under any circumstances. If it is diseased and requires cutting it should be done by a competent farrier. The outside of the hoof should not be rasped, not even under the nail clinch. Shoes that confine the edges of the boof are extremely injurious. Also in regard to erysipelas, he writes that he has found painting the affected spot with tincture of jodine and then covering it with collodion effects a cure.

(4491) J. H. asks: 1. How are the copper strips of the commutator brushes joined in the motor, SUPPLEMENT, No. 641? A. The copper strips are joined by soft solder at the outer ends. 2. Where could I get description of a battery that would run the motor, and what kind would be the best? A. You will find a description of such a battery as you require in Supplement, No. 792.

(4492) H. H. writes: Why in winding to commutator the outside end of coil to inside end of next coil, etc.? Why not make a loop instead of cutting the wire, and cut the insulation, and solder the wire at end of loop. A. It would be difficult to form a loop of exactly the right length. There is no objection to the loop, but it does not appear to have any advantage.

(4493) A. H. asks: Will it hurt a shunt motor to run it empty any length of time? A. A shunt motor will not be injured by running idle, as no current of any amount is generated unless the external circuit

(4494) W. R., Zurich, asks: Can you through the Notes and Queries column of your valuable paper tell me the flashing point of naphtha which has a specific gravity of 0.68? Can you tell me if naphtha of 0.68 can light itself in tropical heat if exposed to sunshine in an open basin? A. Naphtha as light as you state cannot be trusted at any temperature above congelation which is below 0° Fah. Its va por is the most inflammable of all the hydrocarbons It will flash at all atmospheric temperatures. It will not flash under the direct rays of the sun, tropical or otherwise, but will evaporate very fast under the action of the sun in open vessels.

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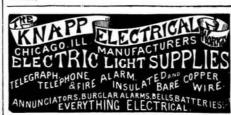
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