(4485) C. C. and G. W. say: Please explain the objects and purposes of fly wheels on mechanical devices. Are they intended to give certain velocity of speed, or are they only intended to control velocity? 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 earth.

(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: How can 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 sulphuric acid, sprinkling them with a few small drops of mercury and rubbing them on the surface plate until the plate is perfectly covered.

(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 hoof are extremely injurious. Also in regard to erysipelas, he writes that he has found painting the affected spot with tincture of iodine 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 an armature do you always say cut and afterward solder 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 is closed.

(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 vapor 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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Stopper. See Bottle stopper.
Stove base, auxiliary, J. D. Rasey 480,212
Stove broiler attachment, T. P. Dunne 480,076
Stovepipe fastener, C. Rusch 479,844
Stovepipes, elbow for facilitating the cleaning of, O. G. Cranston 480,173
Strawberry vine cutter, W. H. Starks 479,996
Stump or rock extractor, O. S. Dietrich 479,974
Sulphur, carbonate of soda, and iron oxide, recovering, Lunge & Dewar 480,109
Surgical instrument, S. V. Bates 480,165
Swaging machine, J. Berry 480,228
Sweeping machine, C. Bruso 480,231
Swinging gate, J. D. White 479,905
Switch. See Electric switch.
Switch and signal rods, deflection stand for, H. Williams 479,906
Telegraph indicator, fire alarm, F. F. Loomis 479,950
Telegraph instrument, mechanical, B. F. Butler 479,782
Telegraph key, A. F. Tucker 479,859
Thermostat, T. W. Shepherd 479,849
Thill coupling, S. A. Whitfield 480,052
Thill, vehicle, Patterson & Swenson 480,129
Tie. See Bale tie.
Tire, spring, W. C. Smith 479,851
Tobacco casing machine, J. T. Carter 480,070
Tobacco pipe, A. Osterloh 480,209
Toe weight, C. M. McMillan 479,831
Torpedo, railway, E. N. Hill 479,879
Towel grip, G. S. Chamberlin 479,934
Toy, S. M. Boyd 480,065
Traction engine, P. T. Neumann 479,832
Trap. See Sporting trap.
Tray, jeweler's, H. B. Sommer 480,045
Trousers, J. Bernstein 480,060
Trousers stretcher, G. S. Macdonald 480,199
Tubes, manufacturing, F. E. & A. S. Elmore 480,186
Tug loop, H. Arnbruster 480,003
Turn table, Thillman & Firme 479,858
Umbrella stick, G. C. Wolfe 479,929
Valve, air brake, W. M. Gilmore 479,978
Valve controller, C. L. Portier 479,795
Valve for radiators, automatic relief, A. S. Hodge 479,806
Valve, steam-actuated, W. H. Blake 480,167
Vehicle seat, J. E. Scott 480,144
Vehicle tops, storm curtain for, P. Lugenbell 479,910
Vehicle wheel, W. E. Baker 480,162
Vehicle wheel, E. G. Latta 479,946
Velocipede, W. A. W. Eager 479,792
Velocipede, J. Pfleger 479,839
Velocipede saddle, Wright & Berry 479,969
Velocipede wheels, spring rim for, W. J. Pizzey 480,030
Wagon bodies or seats, corner iron for, E. Finn 480,187
Waist, A. Bouchard 480,062
Wall or ceiling covering, J. P. McMurray 480,120
Wantage rod, J. F. Barker 480,058
Washing machine, J. Flynn 480,083
Washing machine, F. A. Lapham 480,105
Washing machine, J. W. Spangler 480,214
Washing machine, J. W. Waynick 479,863
Washing machine attachment, Rowe & McDonald 480,037
Watch case pendant, E. J. Arrick 479,930
Watch movement, E. E. Thiel 479,923
Watch, stop, W. Piguet 479,900
Water boiler, sectional, T. Doherty 479,878