NOVELTIES

AN IMPROVED IGNITION DYNAMO.

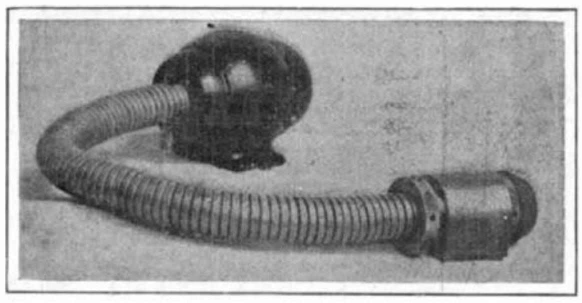
The ignition dynamo shown herewith is one of the best constructed and finished dynamos on the market to-day. Great care is taken in selecting and putting together the materials, and every armature is wound by hand. The armature cores are made up of ninety iron disks separated by fiber disks, each one of which is separately keyed to a steel sleeve that fits over the armature shaft and is keyed to the latter. The disks are compressed by hydraulic pressure into a space 2½ inches in length. After the armature has been wound, in addition to the double insulation on the wire, the whole armature is impregnated by a vacuum process with insulating material.

A new feature consists of a steel tube which completely surrounds the armature and supports the poles, holding them in place inside of the outer casing. This new construction has been found of great advantage, in that it retains ample residual magnetism to enable the machine to build up quickly, and also that it maintains the commutation point neutral, thus making it possible to run the machine in either direction with a like result, and also entirely eliminating sparking at the brushes. The commutator is made up of copper and fiber segments forced together under great hydraulic pressure, and held by two double washers and a steel tube hydraulically swaged. The bearings and armature shaft are of liberal dimensions, and each bearing is supplied with an oil cup fitted with a wick. The combination graphite and bronze-gauze brushes give the lubricating qualities of the former substance and the conductivity of the latter. The leads to the brushes are carried through watertight bushings in the casing. The dimensions of the dynamo are 6 x 6 x 10¼ inches. At 800 R. P. M. it will charge a 4-volt battery at a 3-ampere rate, and at 1,000 and 1,200 R. P. M. it will maintain the same charging rate with a 6- or an 8-volt battery.

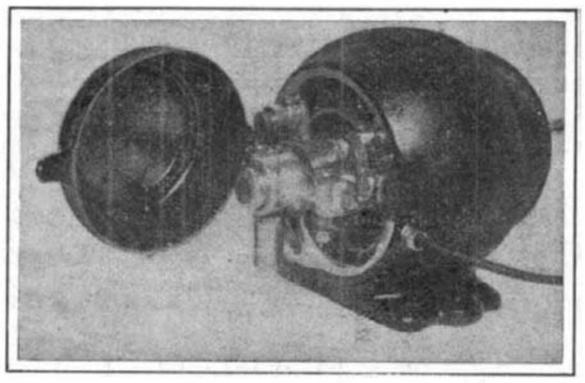
The conical bevel pulley with an automatic governor is one of the features of the Apple dynamo. The latest arrangement provides for the mounting of this pulley and its governor next to the flywheel of the engine, while connection is made with the dynamo by means of an inclosed flexible shaft running in Hess-Bright ball bearings. The dynamo can thus be placed in an accessible position, as on the running board. In connection with this arrangement the inventor has designed a combination fitting to go on the dash, consisting of a small volt and ammeter, an automatic switch, and a snap switch having several positions. By turning the latter switch the driver can see the voltage of the battery alone, or when charging. He can also have indicated on the ammeter the rate of charge and the rate of discharge. By adjusting the governor pulley so that the charging rate is the same as the rate of discharge, the battery is always kept charged and is merely floating on the dynamo circuit, which is closed by the automatic switch as soon as the dynamo comes up to speed, and opened again when it stops. With this device it is practical to run electric headlights from an 8-volt battery, and in all probability a future development will be the production of a somewhat larger dynamo, with which powerful electric searchlights can be used in place of the undependable acetylene lights of to-day.

AN IMPROVED TYPE OF STEERING GEAR.

In place of the usual type of worm and sector steering gear (shown in Fig. 2 in the accompanying cut) the Aero Car Company has adopted an improved type known as the worm and nut system. This consists of a worm thread cut upon the shaft, *A*, of the steering column, and being surrounded by a

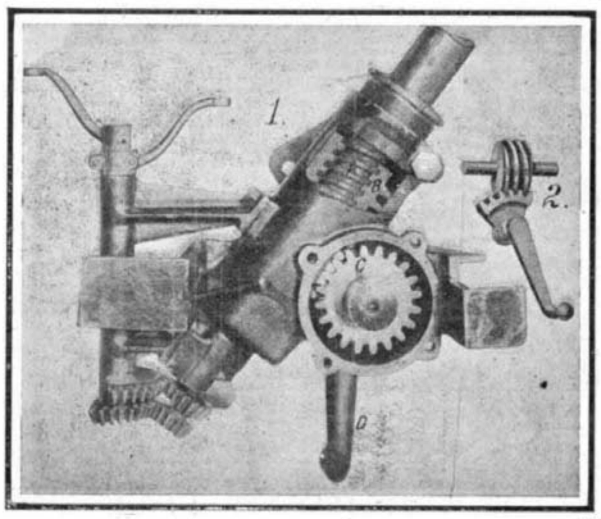


DYNAMO WITH INCLOSED BALL-BEARING FLEXIBLE SHAFT.



IMPROVED APPLE IGNITION DYNAMO.

threaded nut, *B*, that has on its lower surface a rack. This rack meshes with a pinion, *C*, which is mounted on a horizontal transverse shaft that carries the steer-



TYPICAL WORM AND NUT STEERING GEAR USED ON THE AEROCAR.

Nos. 1 and 2. New and old-type worm steering gear.

ing lever arm. As the nut *B* is of considerable length, and engages many more threads on the steering column than does the sector shown in Fig. 2, the wear of the threads is inappreciable and never needs adjustment. The same is the case with regard to the rack and pinion. The whole device is incased and runs in oil, while the horizontal shaft carrying the pinion is mounted on roller bearings.

The arrangement for operating the throttle and spark advance levers, by means of bevel pinions on the ends of hollow and solid rods that pass up through the steering columns to the steering wheel, is apparent in the illustration. These bevel pinions mesh with bevel sectors on the bottom of the vertical shafts that carry the lever connections to the throttle and timer.

AN INSTRUMENT FOR TESTING SHOCK ABSORBERS.

For the purpose of determining the relative merits of shock absorbers, the students of the Massachusetts Institute of Technology have made use of a special apparatus, which has been adapted from a device originally designed for determining the variations of load on the driving springs of a locomotive. It is the function of the instrument to determine the motion between the car body and the axle, and the time during which the motion occurs.

The apparatus consists of two rolls, *A* and *B*, carrying metallic-faced paper. The paper is unwound from the roll *A* to the roll *B* over a curved plate by means of an electric motor *C*, which drives the worm and wheel *D*, connected with the roll *B*. The apparatus is intended to be bolted to the floor of a car directly over the rear axle. The vertical slide *E* is connected with the middle point of the rear axle through a reducing motion and two universal joints. A lever *K O*, pivoted at *O*, is embraced by the guide members *N*, and also is connected at its middle point with the slide *E*, through the link *M*. The axle of the car is embraced by the clamp *J*. At each end of the connecting link *L* are universal joints *K K*. This system reduces the motion one-half.

In order to obtain a record upon the metallic-faced paper, three styli are employed. A metallic tracing point, *F*, records the vertical motion of the car body relatively to the axle, and draws merely a horizontal line if there are no vibrations. The metallic point *H* draws a zero or datum line. Since the paper is driven at some speed, and the point *F* moves up and down upon it, it follows that a curve is drawn which indicates movement, while the abscissas indicate time. But inasmuch as the speed of the paper is not constant, such a record would not be sufficiently exact. A tracing point *G*, or rather a perforator, is therefore employed, which is carried at the end of an electromagnetic arm, and which, in response to the regularly-timed impulses of a circuit controlled by a clock, perforates the paper at every fifteen seconds. A storage battery (Fig. 5) is used to drive both the motor and the clock.

Figs. 1 and 2 are reproductions of records which have been obtained with this device, the one without, the other with Kilgore shock eliminators fitted to a Thomas car. The undulating line which passes above and below the horizontal zero or datum line indicates the amount of movement of the car body from or toward the axle. Distances above the zero line show the motion toward the axle, and distances below the line show the motion away from the axle. In Figs. 1 and 2 the distance *Z Y* represents the maximum motion of the car body under each of the two tests recorded, which distance is the sum of the maximum motion toward the axle and the maximum motion away from the axle. The abscissas divided by ordinates into tenths of a second (the entire seconds being marked by heavier lines) indicate the time in which the movements took place. Thus, the point *Y* in Fig. 2 is at 9.45 seconds, while *X* is at 9.68 seconds. Hence, the movement recorded in Fig. 2 by the curve *Z Y* occurred in 0.23 second. Comparing records of Figs. 1 and 2,

(*Continued on page 56.*)

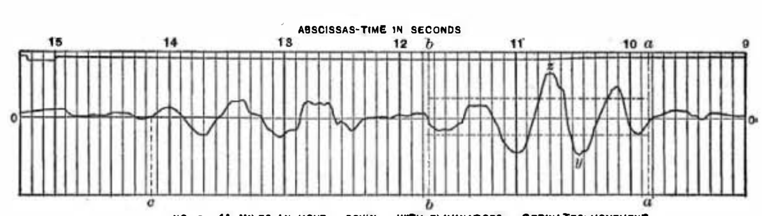


Fig. 1.—RECORD OBTAINED WITH SHOCK ELIMINATORS.

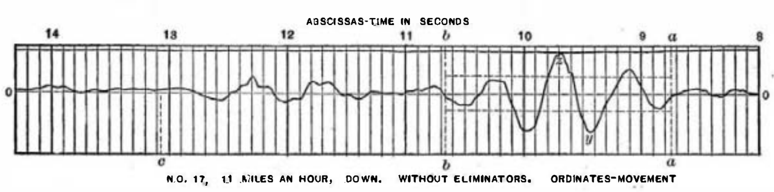


Fig. 2.—RECORD OBTAINED WITHOUT SHOCK ELIMINATORS.

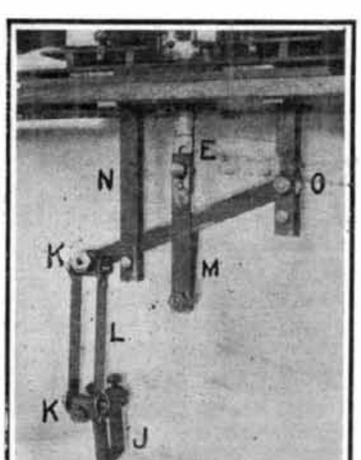


Fig. 3.—THE REDUCING MOTION.

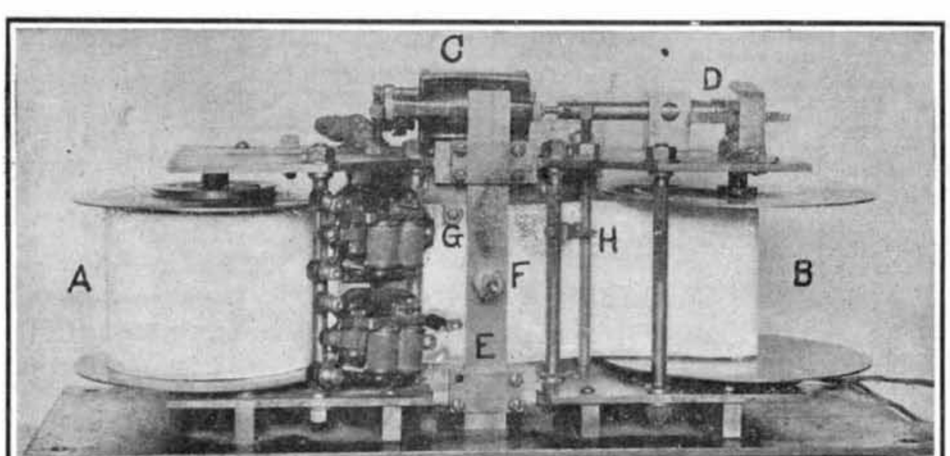


Fig. 4.—THE RECORDING INSTRUMENT.

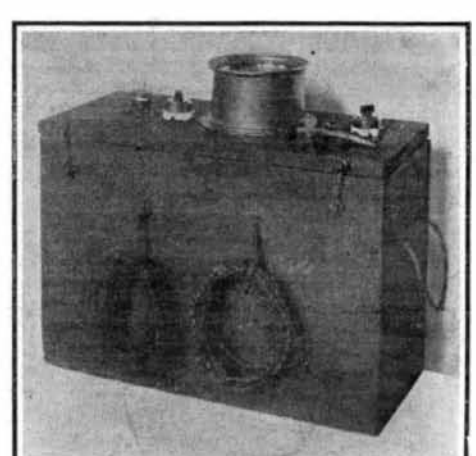


Fig. 5.—THE STORAGE BATTERY.