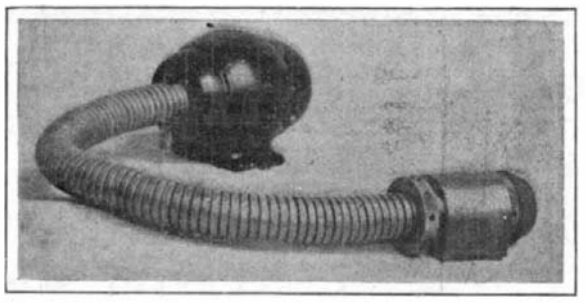
NOVELTIES

AN IMPROVED IGNITION DYNAMO.

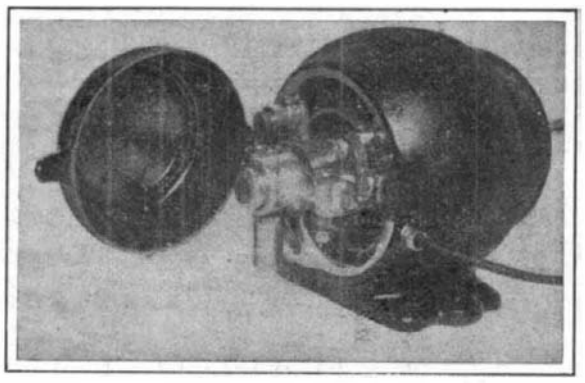
The ignition dynamo shown herewith is one of the best constructed and finished dynamos on the market to-day. Great care is taken in selecting and putting together the materials, and every armature is wound by hand. The armature cores are made up of ninety iron disks separated by fiber disks, each one 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.



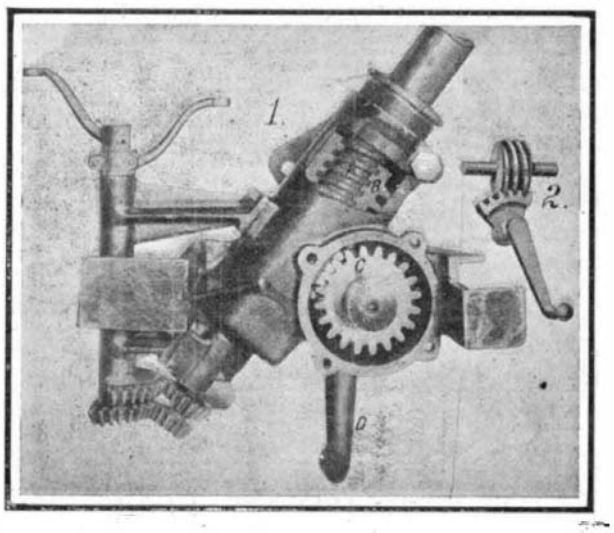
DYNAMO WITH INCLOSED BALL-BEARING FLEXIBLE SHAFT.



IMPROVED APPLE IGNITION DYNAMO.

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 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 steering 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.



TYPICAL WORM AND NUT STEERING GEAR USED ON THE AEROCAR.

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

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.*)

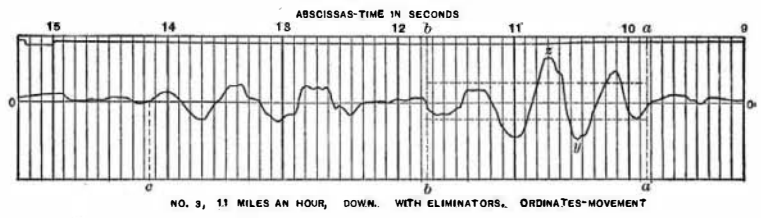


Fig. 1.—RECORD OBTAINED WITH SHOCK ELIMINATORS.

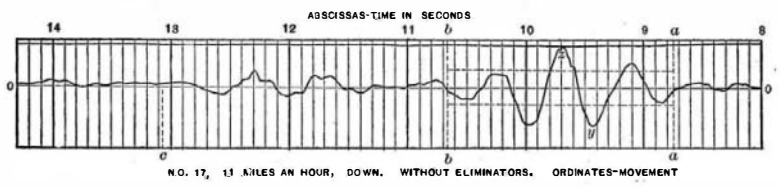


Fig. 2.—RECORD OBTAINED WITHOUT SHOCK ELIMINATORS.

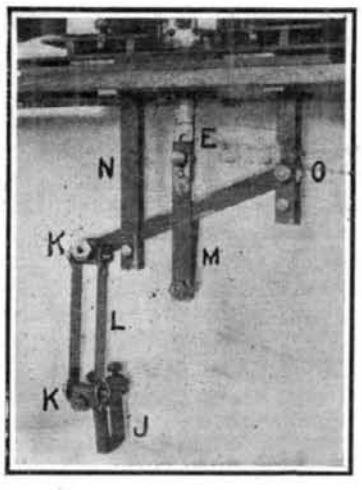


Fig. 3.—THE REDUCING MOTION.

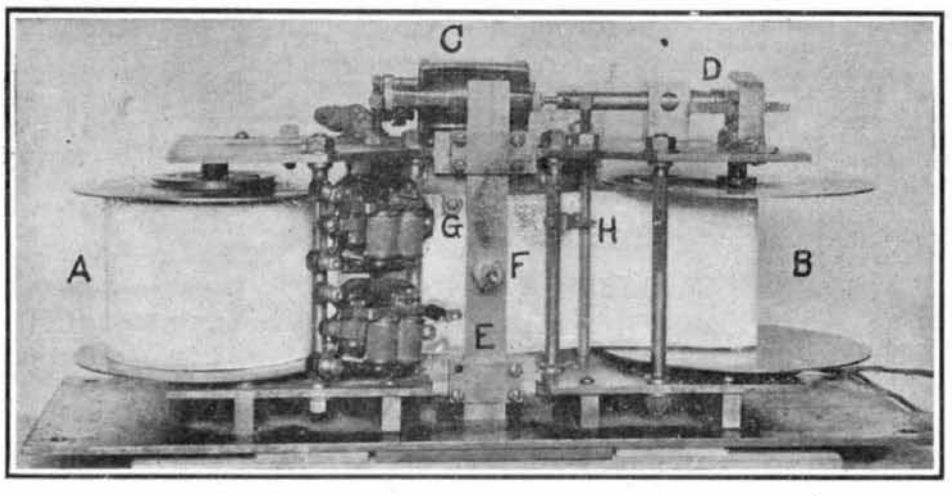


Fig. 4.—THE RECORDING INSTRUMENT.

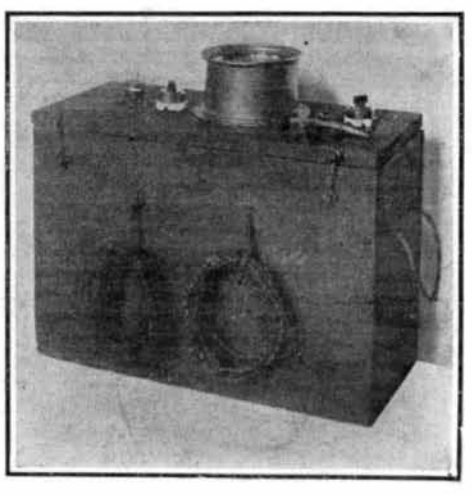
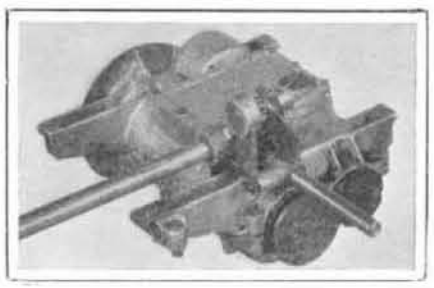


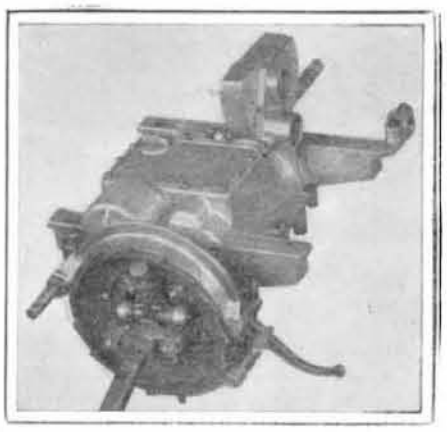
Fig. 5.—THE STORAGE BATTERY.

noticed that if one of the rear springs rises over an obstruction, the rear platform spring serves as an equalizing lever, depressing the spring on the opposite side an equal amount. The center, or pivotal point, on the platform spring is not raised, as it remains neutral, and thus no shock is imparted to the body or passengers. With this construction it is claimed that the passengers in the rear seats ride as comfortably as those in the front seats of the car. The rear side springs are 60 inches in length, and serve a twofold purpose as springs and strut rods. These springs, owing to their length, render a support to the frame at points which are well forward and under the load which the car is designed to carry. The wheel base is short considering the high power of the engine, and the turning radius is extremely short, thus making the car very easy to drive through crowded traffic and narrow streets.

The gas lamps are placed on top of the front fenders for the following reasons, which have been worked out and demonstrated in practice: (1) The lamps



FRONT OF ROYAL TRANSMISSION, SHOWING PINION AND SECTOR FOR SHIFTING GEARS.



REAR OF ROYAL TRANSMISSION, SHOWING BRAKE, SAFETY RATCHET RING, AND UNIVERSAL JOINT OF PROPELLER SHAFT.

are removed from the point where they are in danger of being smashed in traffic and in collision. (2) The focal plane is materially raised, thus throwing a better diffused light and eliminating long shadows on a rough road, which would be made most apparent with lamps in a lower position. (3) The direct line of travel of the wheels is lighted. (4) The lamps being placed at the outside edge of the car, at once establish to the other driver the clearance that is necessary in passing. (5) The lamps are thus removed from being in close proximity to the starting arrangement, which gives ample room to take care of the initial start of the car.

SOME INTERESTING MECHANICAL LUBRICATORS.

(*Continued from page 36.*)

ing in the cover of the lubricator. In this shank is the stud which bears against the cam, and it may be adjusted by means of thumb nuts to vary the stroke of the piston. The pistons are formed with slots at each side which are not directly opposed. While the piston is being drawn upward, it is rotated to bring one of the slots into engagement with the suction port. This draws oil into the bottom of the cylinder. On the downward stroke, the piston is rotated to bring the opposite slot into registry with the delivery port, so that the oil in the cylinder is then forced out to the points of application.

AN INSTRUMENT FOR TESTING SHOCK ABSORBERS.

(*Continued from page 38.*)

it may be stated that the second line, No. 10 of Fig. 2 corresponds very nearly with the second line No. 9 of Fig. 1. For the portion of the diagram between *a* and *b* the average motion of the car body toward the axle for the diagram of Fig. 2 is 1.12 inches, against the average of the similar motion for diagram Fig. 1 of 0.94 inches. In other words, the average motion toward the axle has been reduced 16.1 per cent. The average motion away from the axle for the same portion of the diagram in Fig. 2 is 1.02 inch, against an average of 0.71 inch in Fig. 1, giving a reduction in the average motion away from the axle of 30.4 per cent.

The total average motion of the car body relative to the axle without eliminators for this portion of the diagram (Fig. 2) is 1.12 + 1.02, or 2.14 inches; while the total average of the same motion when the shock eliminators were applied is 0.94 + 0.71, or 1.65 inches, which gives a reduction of the average motion of the car body while passing over this crosswalk of 22.9 per cent.

The maximum motion of the body toward the axle *Z* in the diagram Fig. 2 is 2.58 inches, against the similar motion *Z* in the diagram Fig. 1 of 2.22 inches, or the maximum downward movement of the body was reduced 0.36 inch, or 14.0 per cent. The maximum motion toward the axle *Y* in Fig. 2 is 2.40 inches, against 1.52 inch in Fig. 1 or the upward motion of the body was reduced 0.88 inch, or 36.7 per cent. The maximum vibration, then, without the eliminators, Fig. 2, was 2.58 + 2.40, or 4.98 inches, against 2.22 + 1.52, or 3.74 inches, in Fig. 1, with the eliminators applied, which gives a reduction in the maximum vibration of the body by the use of the eliminators of 1.24 inches, or 24.9 per cent.

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