SCIENCE

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THE SPRAGUE ELECTRIC-RAILWAY MOTOR.

WE publish in this issue views of the Sprague improved electric motor for street-railway work. This motor represents the experience of several years in the electric street-railway business, and it is intended to meet all the exigencies in this kind of work. In its manufacture, every detail of mechanical and electrical construction is carefully attended to, and the most recent improvements which experience could suggest have been adopted to meet the necessities of street-car service.

Only one intermediate shaft is used between the armature pinion and the main gear, and the entire reduction is about 12 to 1. All the gears and every part of the motor are made extremely strong and durable, as can be seen in the case of the gears in the engraving, where the general appearance of durability and strength is everywhere marked.

The main gears are of the split-gear pattern, so that in case of necessity they can be easily removed from the shaft without dismounting the machine. The pinion and all the bearings are also constructed so that they can be easily removed if necessary.

Great attention has been paid in this motor to obtain a machine which will require a minimum amount of care, under the unfavorable conditions which motors for street-railway work very often meet in actual practice. For this reason, all the bearings are made completely dust-proof and very durable.

The armatures are of the type which has been proved to be water-proof, and incapable of injury by moisture. In a recent test upon one of these armatures, made at the Sprague factory at Schenectady, and described in this paper a short time ago, one of these armatures was placed successively in a tub of fresh water and allowed to remain there for twenty-four hours, and in a tub of salt water and allowed to remain there for the same time. After each of these baths, the armature was placed in position in the motor, and the machine was worked to one-third above its normal load, as measured by a dynamometer, for several hours without developing any trouble whatever. These tests proved most conclusively that these machines can be relied upon under all conditions of weather, and that they cannot be harmed by moisture or by water splashing upon them from the road-bed.

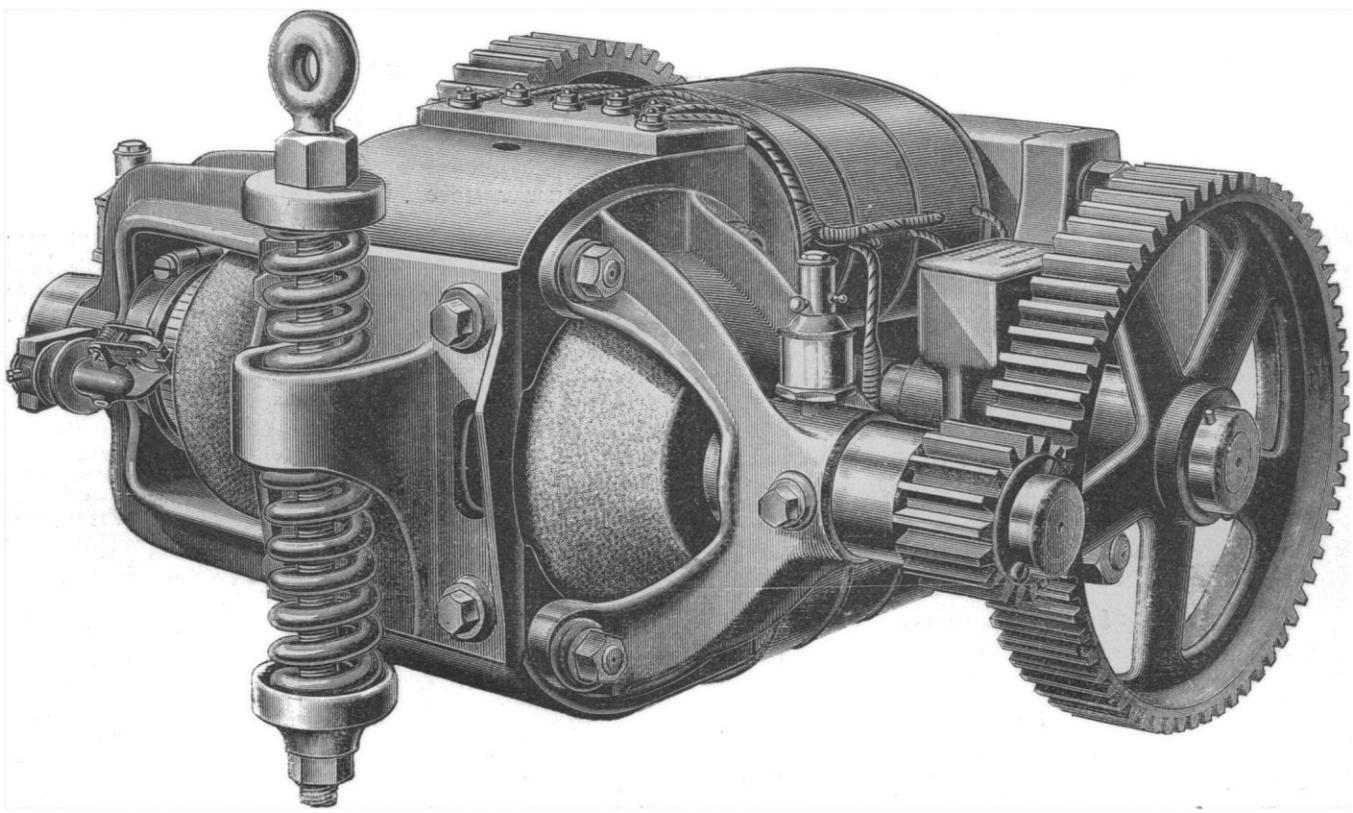

FIG. 1.—NEW SPRAGUE ELECTRIC-RAILWAY MOTOR.

Another important improvement which has been adopted in this machine is that the field-magnet coils are completely incased in covers, as shown in the engravings, which fully protect the wire from all outside damage. These casings are hermetically closed, so that it is impossible for moisture to affect the coils in any way.

The style of brushes used upon these motors is of a new type, which has been shown to give excellent results in this kind of work.

The Sprague method of flexibly suspending the motors, and of controlling the speed of the motor without the use of any wasteful resistances, is also in use with these motors upon all the roads installed by the Sprague Electric Railway and Motor Company.

A great deal of attention has been paid in the design of this motor, while great care has been taken in regard to durability and strength, to reducing the weight to a minimum. For this purpose, and with this object in view, cast iron has been dispensed with in the cores and yoke of the field-magnets, and wrought iron substituted.

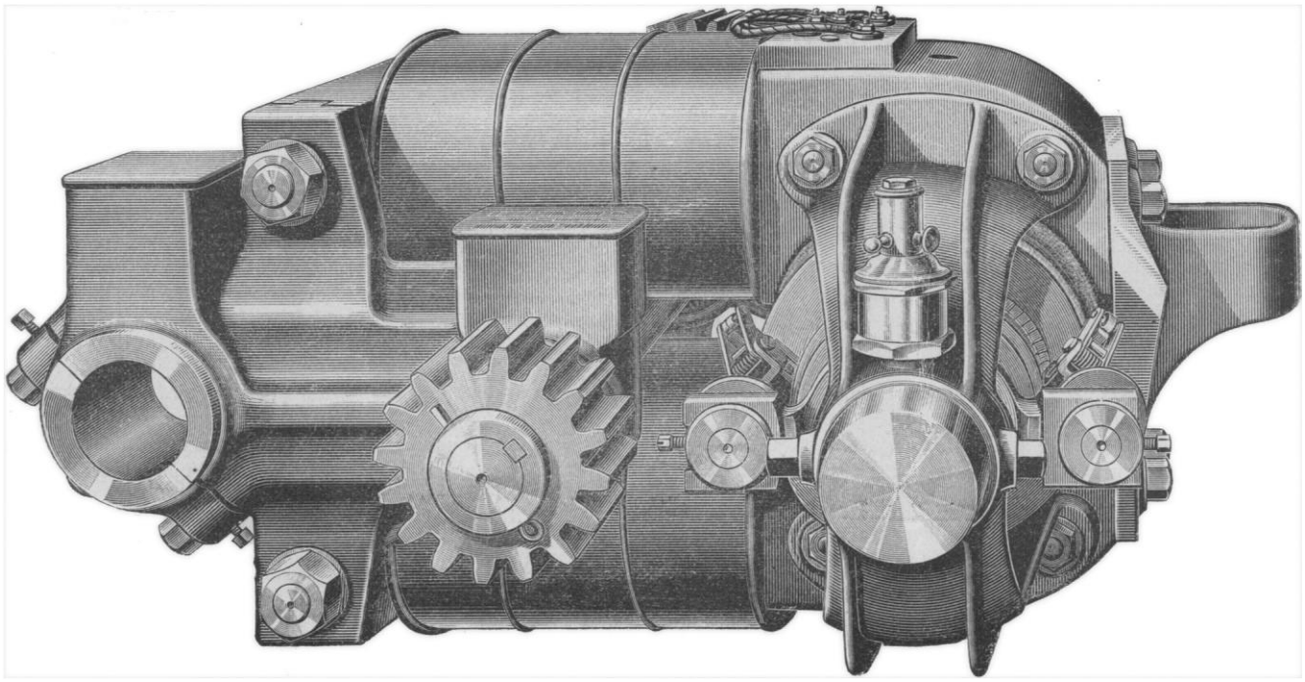

FIG. 2.—NEW SPRAGUE ELECTRIC-RAILWAY MOTOR.

These motors are already in operation at Wichita (Kan.), Marlborough (Mass.), Cleveland (O.), Cincinnati (O.), Erie (Penn.), Atlantic City (N.J.), and at one or two other places where they have been installed. They have been shown to give very good results, and in the future this type of motor will be used in all of the Sprague electric-railway installations.

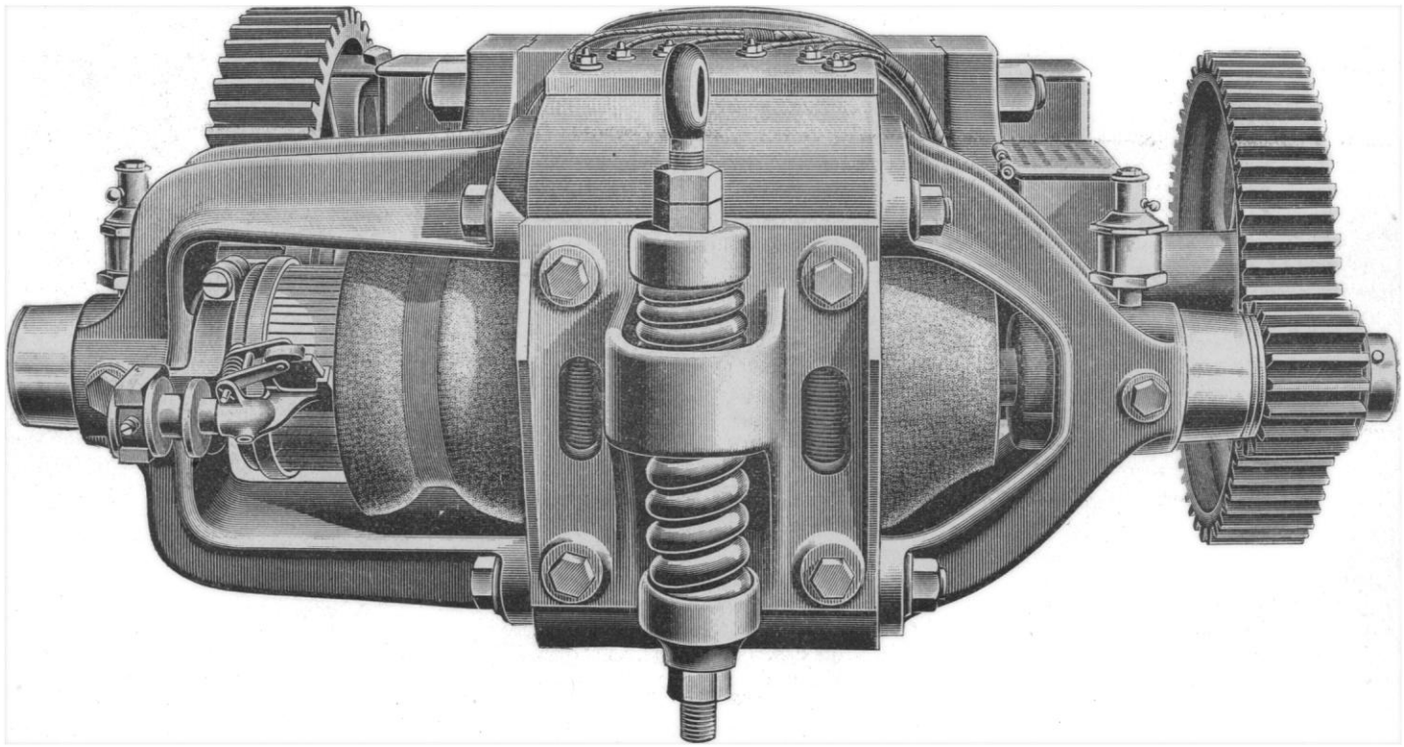

FIG. 3.—NEW SPRAGUE ELECTRIC-RAILWAY MOTOR.

GIRDLING TREES TO IMPROVE FRUITFULNESS.

IN many sections where the soil is moist and rich, fruit-trees grow largely to wood and foliage, and fail to produce fruit until they reach considerable age and size. To discover some means of hastening the fruiting of such trees, the following experiments were made at the Hatch Experiment Station of the Massachusetts Agricultural College. A row of crabapple-trees of about the same size and condition of growth were selected, and treated as follows: 1st, Three trees were girdled by cutting out a ring of bark $\frac{1}{8}$, $\frac{1}{4}$, and $\frac{1}{2}$ inch wide at the ground, July 12, 21, and 29; 2d, Three trees were girdled just below the main branches with the three widths of girdle as in 1st, July 12, 21, and 29; 3d, The same as above was