

N. R. SIMPSON.
 ELECTRIC STARTER FOR AUTOMOBILES.
 APPLICATION FILED DEC. 22, 1916.

1,292,110.

Patented Jan. 21, 1919.
 2 SHEETS—SHEET 1.

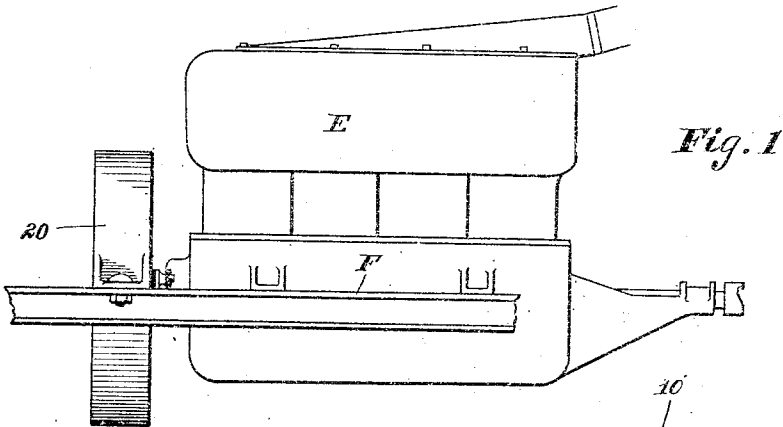


Fig. 1

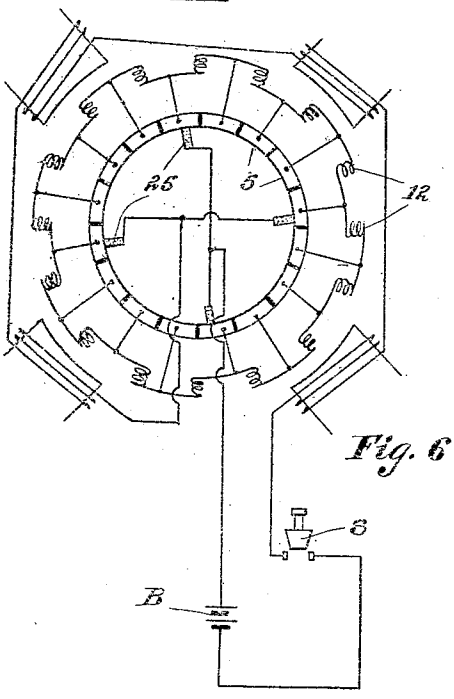


Fig. 6

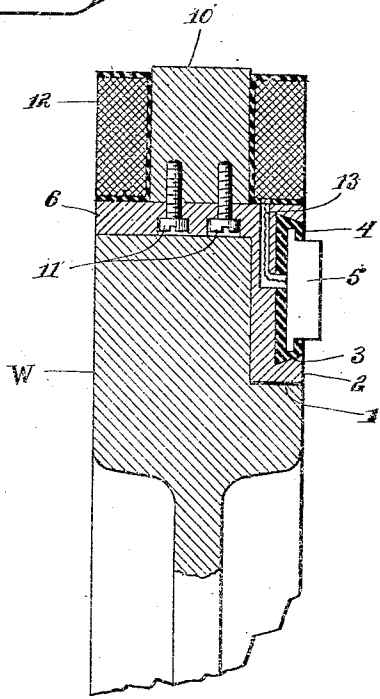


Fig. 4

WITNESSES

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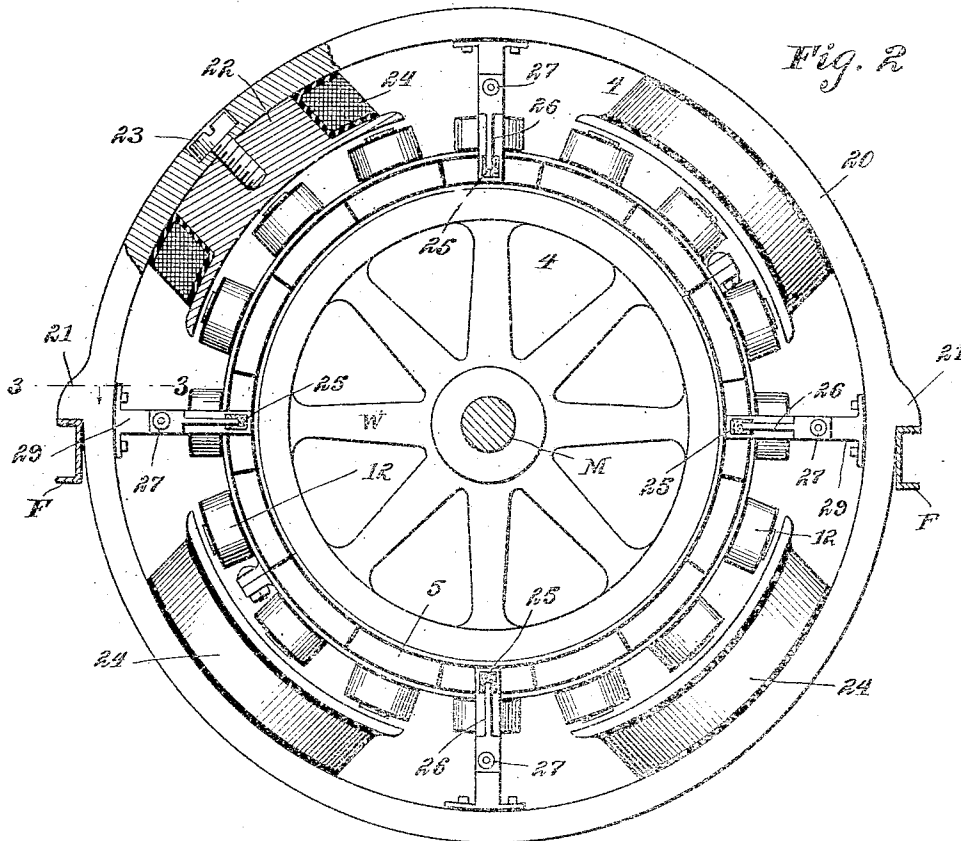


Fig. 2

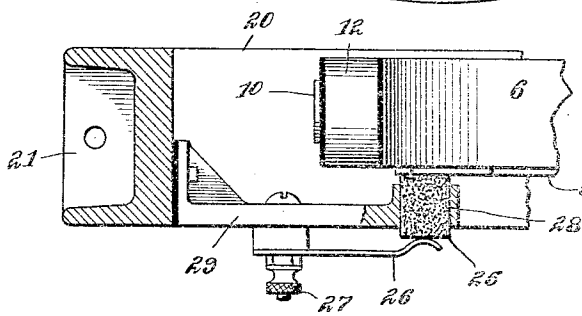


Fig. 3

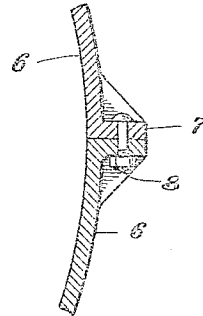


Fig. 5

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UNITED STATES PATENT OFFICE.

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ELECTRIC STARTER FOR AUTOMOBILES.

1,292,110.

Specification of Letters Patent.

Patented Jan. 21, 1919.

Application filed December 22, 1916. Serial No. 138,448.

To all whom it may concern:

Be it known that I, NORMAN R. SIMPSON, a citizen of the United States, residing at Elizabeth City, in the county of Pasquotank and State of North Carolina, have invented new and useful Improvements in Electric Starters for Automobiles, of which the following is a specification.

This invention relates to internal combustion engines, and more especially to starting devices; and the object of the same is to provide the fly wheel of an engine of this kind with an electric motor by means of which the fly wheel can be rotated and the engine started when desired, by closing a circuit through a battery carried somewhere on the vehicle. After the engine is running, the motor generates electricity which recharges the battery in a manner which will be clear.

Details of construction are set forth in the following specification and illustrated in the accompanying drawings wherein—

Figure 1 is a general side elevation of the engine of a motor vehicle and the fly wheel thereof containing the starter.

Fig. 2 is an enlarged elevation of the fly wheel, partly in section, and

Fig. 3 is a still further enlarged detail taken on the line 3—3 of Fig. 2, while

Fig. 4 is a radial section taken on about the line 4—4 of Fig. 2.

Fig. 5 is a sectional detail showing how the ends of the ring-parts may be brought together and fastened.

Fig. 6 is a diagram showing the wiring.

The engine is broadly designated by the letter E in Fig. 1 and the frame by the letter F, the fly wheel W being here mounted on the main shaft M in the rear of the engine as usual. Referring now to Fig. 4, the rim of the fly wheel W is rabbeted around its front corner as at 1, and within the rabbet is fixed a ring 2 provided with a dove-tailed channel 3 in which is seated a ring 4 of insulation material such as hard rubber. In this ring at intervals are placed commutator segments 5 which project beyond the front face of the wheel-rim. In the illustration herewith there are sixteen of these segments as best seen in Fig. 2, and I prefer to use about that number when there are four pole pieces in the field as hereinafter de-

scribed. However, I do not wish to be limited in this particular. Around the periphery of the wheel is a two-part ring 6, the ends of the two parts being shown in Fig. 5 as having outturned ears 7 connected by a bolt or rivet 8, and the entire ring being detachably mounted on the rim of the wheel by tightening up on said bolts 8, although when they are loosened of course the ring can be removed. Carried by said ring at intervals corresponding to the spacing of the segments 5 are pole pieces 10, each preferably removably secured to the ring by means such as the screws 11 in Fig. 4; and in the same view the numeral 12 designates the winding of the coil, while 13 is the terminal wire leading from such coil to the segment 5. So much of the mechanism as has been described is carried by and rotated with the fly wheel.

Referring now to Fig. 2, the numeral 20 designates a ring considerably larger than the fly wheel and entirely surrounding and spaced from the same, and this ring has lugs 21 at opposite points by means of which it may be supported from the frame F. This ring carries four field magnets, one of which is shown in section in this view. The numeral 22 designates a fixed pole or block held to the ring by suitable means such as a screw 23, and 24 is the coil surrounding this block. Disposed between these pole pieces are the brushes herein shown as consisting of carbon blocks 25 resting against the commutator segments 5 as the latter revolve, the blocks being borne inward by suitable means as spring contacts 26 connected with binding posts 27 as seen in Fig. 3. By preference each block moves in a guide 28 at the inner end of a bracket 29 which is mounted on the rings 20, and when the block 25 becomes worn it may be taken out of the guide and replaced by another. It will not be necessary for the purposes of this specification to amplify the wiring further than as illustrated in diagram in Fig. 6 wherein B designates a battery on the body of the car, and S a circuit closer or switch of the usual type.

With this improved electric motor constructed in substantially the manner described and mounted on the fly wheel of an internal combustion engine, when it is desired to start the same, the operator has but to close the switch S and complete the cir-

5 cuit from the battery B to the motor so that
 the latter starts at once and quickly, silently,
 and powerfully turns the fly wheel W and
 the main shaft M of the engine E, until the
 10 latter commences to run on its own energy;
 and then the operator opens the switch and
 cuts out the motor. It is quite possible, how-
 ever, to arrange the wiring in such manner
 that this switch may be left closed or may
 15 be thrown onto a shunt winding so that after
 the engine is running the rotation of the fly
 wheel and motor will recharge the battery
 B; but as this forms no part of the present
 invention I have not illustrated the details
 20 thereof. Nor have I shown the battery ex-
 cept in diagram at B in Fig. 6, but it is clear
 that this battery must be of sufficient size
 and power to generate enough energy in the
 motor to turn over the main shaft M against
 25 the resistance set up by the compression in
 the cylinders of the engine. However, with
 my motor built into a fly wheel of the usual
 size on automobiles, it will ordinarily have
 sufficient pulling power to start an engine
 30 where the compression is not excessive.
 While I propose to build this starter as part
 of the equipment of automobiles when made
 in the factory, it is quite possible to apply it
 to an automobile already on the market
 35 and in use. In that case, however, it would
 doubtless be preferable to omit the rabbet 1
 and attach the ring 2 directly to the forward
 side of the rim W of the wheel by some other
 means such as will readily suggest them-
 selves. The ring 6 of course being made in
 two parts can be slipped over the flat periph-
 ery of the rim W and drawn tightly
 thereon by setting up the bolts 8. In some
 makes of automobiles there is a hood or

40 drum surrounding the fly wheel, and this of
 course will have to be removed or enlarged
 sufficiently to permit the entry of the ring
 20 and the parts carried thereby. Otherwise
 there is no change to the structure of the au-
 tomobile or the engine, and this starter may
 45 be applied and used without the introduc-
 tion of any gearing or belting, chains or
 clutches, levers or controls, except the or-
 dinary battery B and switch S.

What is claimed as new is:—

50 1. In a motor for use as an engine starter,
 a rotor comprising a revolving element and
 a ring mounted thereon, said ring being se-
 cured upon the periphery of said revolving
 element and comprising two parts adapted
 55 to be clamped thereon, the extremity of each
 part being formed with outturned ears, the
 ears at the abutting ends of the parts being
 arranged adjacent each other, and bolts en-
 gaging the contacting ears for drawing the
 60 ring into holding contact with the periph-
 ery of the revolving element.

2. In a motor for use as an engine starter,
 a revolving element rabbeted in its front
 face, a ring set into said rabbet and formed
 65 with a dovetailed channel, insulation within
 said channel, commutator segments held
 within the channel and against the ring by
 the insulation, said ring having a laterally
 extending portion comprising two parts to
 70 engage the periphery of the revolving ele-
 ment, and means for clamping said parts to
 secure them on the element.

In testimony whereof I affix my signature.
 NORMAN R. SIMPSON.

Witnesses:

N. L. COLLAMER,
 BENNETT S. JONES.