Oct. 17, 1933. J. E. O. LOUETTE 1,931,200

STARTER

Filed March 3, 1932

Fig. 1.

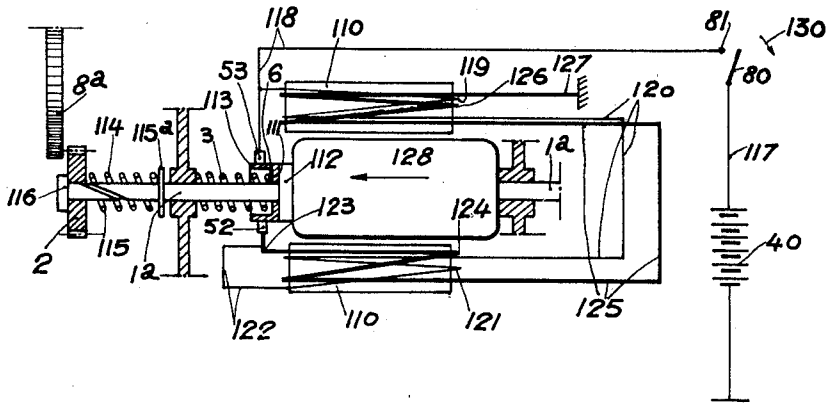
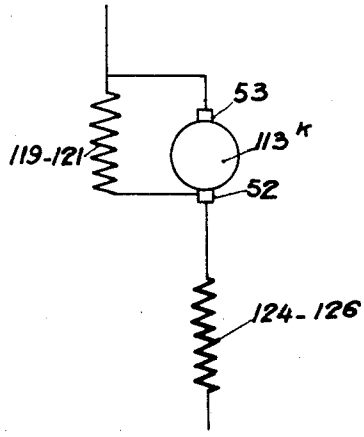


Fig. 2.



J. E. O. Louette
INVENTOR

By: Marks & Clark
Attys.

Patented Oct. 17, 1933

1,931,200

UNITED STATES PATENT OFFICE

1,931,200

STARTER

Joseph Ernest Octave Louette, Poissy, France

Application March 3, 1932, Serial No. 596,582
and in France March 14, 1931

2 Claims. (Cl. 290—38)

The present invention has for object improvements in starters of the type in which the armature is axially displaced, when at rest, relatively to its field magnets, under the action of a resilient returning member; a pinion, rigidly secured on the armature shaft, comes in engagement with the toothed wheel to be driven when the armature moves in translation and assumes the position of minimum reluctance of the magnetic circuit.

These improvements are mainly characterised by the following points applicable separately or according to any combinations:

(*a*) The collecting drum of the armature movable in translation has a conducting portion and an insulating portion so arranged that the brushes are placed, when the armature is at rest, on the insulating portion, the conducting portion of the drum of the movable armature coming in contact with these brushes, when the translation of the armature takes place.

(*b*) The armature angularly moves substantially only when its axial displacement is terminated and when the throwing in gear is effected, the circuit of the armature being closed through the brushes at the end of the axial movement of this armature.

(*c*) The driving pinion, mounted on the armature shaft, extends at least into one helical groove provided in the said armature and is subjected, in one direction, to the action of a resilient member such as a spring, so that the movement in translation of the armature, in order to effect the throwing in gear, causes the said driving pinion to be pressed against the toothed wheel to be driven, by producing, in case the teeth are not in coincidence for effecting this meshing, an angular displacement of the said driving pinion so that the latter automatically seeks the correct meshing position.

(*d*) The motor is provided with a shunt winding and a series winding which are so arranged that, during the period of translation of the armature, both windings are in series and, during the period of rotation, the shunt winding is in shunt across the armature.

(*e*) The various parts are so devised that the meshing takes place before rotation of the armature.

The invention also relates to other particular points which will appear from the following description with reference to the accompanying drawing, given by way of example only and in which:

Fig. 1 is a diagrammatic elevation, in axial section, of an improved starter according to the invention.

Fig. 2 is an explanatory diagram.

In the form of construction illustrated, an armature 1 is displaced, when at rest, relatively to its field magnets 110, under the action of a spring 3, the armature 1 comprises a drum 111 constituted by a conducting portion 112 and an insulating portion 113 on which bear, in position of rest (illustrated in the drawing) brushes 52 and 53. The starting circuit which includes the battery 40 is controlled by a switch 80.

According to one of the features of the invention, a driving gear 2, mounted on the shaft 1^a of the armature, can receive, relatively to the latter, a helical movement owing to a helical groove 114 provided in this shaft 1^a. A spring 115 bearing at one of its ends on a flange 115^a rigid with the shaft 1^a; axially acts on the gear 2 in one direction, for pressing it, in position of rest, against an abutment 116 provided at one of the ends of the shaft 1^a.

The operation of the starter previously described is as follows:

The user moves the switch 80 onto the corresponding contact-piece 81, this causing the closing of the following circuit:

—battery 40—wire 117—switch 80—contact piece 81—wire 118—winding 119—wire 120—winding 121—wire 122—wire 123—winding 124—wire 125—winding 126—wire 127—body.

The closing of this first circuit causes the axial displacement of the armature in the direction of the arrow 128.

The driving gear 2 comes against the gear 8^a and meshes with the latter if the teeth are in a correct meshing position. In the reverse case, the gear 2 is held stationary in translation against the gear 8^a, but owing to the axial displacement of the armature in the direction of the arrow 123, of the inherent inertia of this armature, and of the helical incline 114, this gear 2 angularly moves and seeks its correct meshing position. The incline 114 is obviously devised to allow the rotation of the gear 2 to the extent of one tooth for instance. When the gear 2 has automatically placed itself in the correct position, it easily meshes under the action of the spring 115, which has been previously compressed. These searching and meshing operations are very rapidly effected.

This arrangement prevents shocks between the gears under the action of the movement of the armature.

During the meshing operation, the conducting

portion 112 of the drum 111 has come in contact with the brushes 52 and 53, effecting the closing of the following circuit:

—battery 40—wire 117—switch 80—contact piece 81—wire 118—brush 53—drum 112—brush 52—wire 123—winding 124—wire 125—winding 126—wire 127—body.

The shunt winding 119—121 is then in shunt across the armature.

The armature is caused to rotate, ensuring the setting in operation of the motor.

The various parts automatically return to their initial positions as soon as the starting circuit is opened by moving the switch 80 in the direction of the arrow 130.

Fig. 2 diagrammatically illustrates the mode of assemblage adopted, the drum 113 is indicated at 113*k* and the brushes at 52 and 53. The shunt winding is indicated at 119—121 and the series winding at 124—126. When the brushes 52, 53 are electrically connected, the shunt winding is automatically placed in shunt across the armature.

It will also be noted that the rotation of the armature begins only when the brushes are entirely in contact with the conducting portion of the drum 112. Use can also be made of a pinion 2 having a sufficient width for effecting the meshing notwithstanding the important displacement in translation of the armature.

It is obvious that the form of construction described and illustrated is only a simple example capable of receiving numerous modifications which, as long as they do not alter in any way the main features above set forth and the desired result, remain included in the scope of the present invention.

Moreover, it will be noted that the searching device (helical groove 114, pinion 2) might be used on any starter, the armature of which would be fixed in translation. In this case, the pinion 2, or an assembly carrying the latter, might be moved in translation, either mechanically, or by means of any suitable electric devices.

What I claim as my invention and desire to secure by Letters Patent is:

1. In an electric starter motor, a field magnet pole piece, a shaft carried armature mounted to rotate and move axially, means normally tending to move the armature axially away from the pole piece, series connected main and auxiliary magnet windings, and means to shunt out the auxiliary winding, said means including brushes connected to the opposite ends of the auxiliary winding and normally insulated from each other, and means cooperating with said brushes upon axial movement of the armature to electrically connect said brushes.

2. In an electric starter motor, a field magnet pole piece, a shaft carried armature mounted to rotate and move axially, means normally tending to move the armature axially away from the pole piece, series connected main and auxiliary magnet windings, and means to shunt out the auxiliary winding, said means including brushes connected to the opposite ends of the auxiliary winding and normally insulated from each other, and a sleeve mounted on the shaft of the armature including an insulating part and a conductive part, the insulating part operating to separate the brushes when the armature is moved away from the pole piece and the conductive part operating to electrically connect the brushes when the armature is moved toward the pole piece.

JOSEPH ERNEST OCTAVE LOUETTE.