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(71) Applicants
Robert Bosch GmbH,
7000, Stuttgart 1,
Germany.
(72) Inventors
Ulrich Kemmner,
Peter Ringwald.
(74) Agents
A. A. Thornton and Co.,
Northumberland House,
303/306, High Holborn,
London, WC1V 7LE.

(54) **Electric motor comprising
brushes and commutator**

(57) An electric motor (eg for driving a pump) comprises brushes urged against the commutator by spring elements 16 formed by an extension of the respective choke coils associated with the brushes. A metal coating may be applied where insulation is removed from the wire of the choke/spring at curve 19 and eye 26.

GB 2 095 918 A

FIG. 1

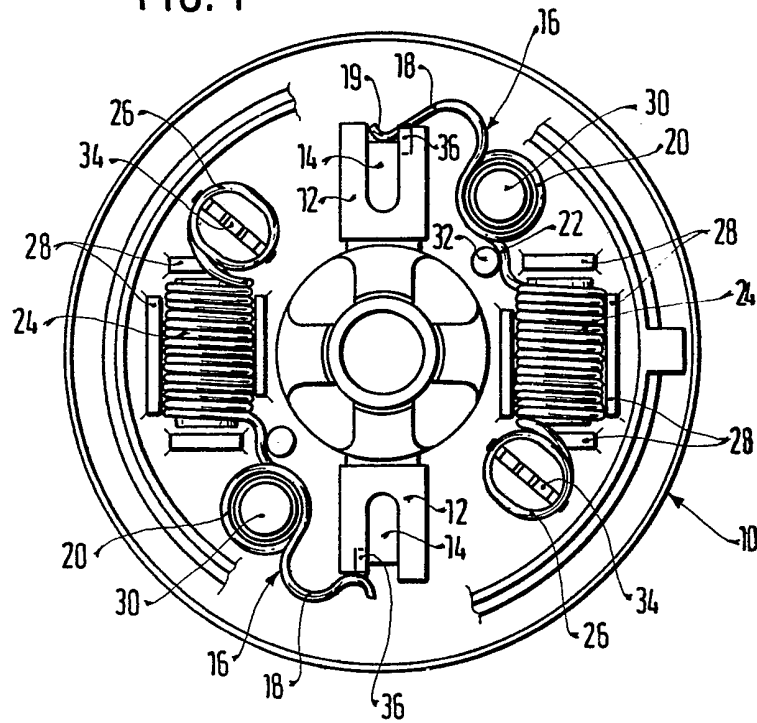


FIG. 2

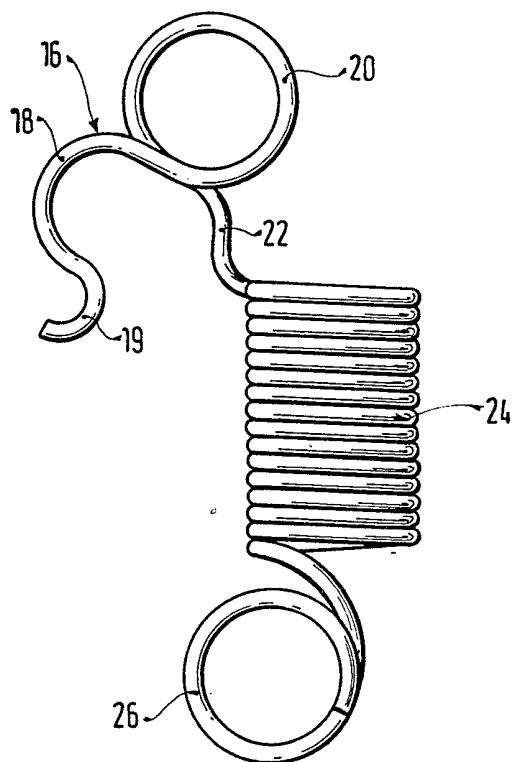
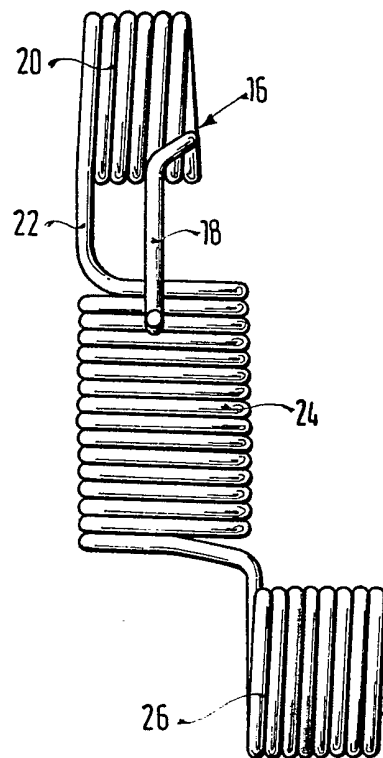


FIG. 3



SPECIFICATION

An electric motor comprising a commutator and brushes cooperating with the commutator

5

State of the art

The invention originates from an electric motor, for example a small power electric motor, according to the preamble to the main claim. Such a motor is already known in which each brush is connected through a strand to the choke coil and the latter is then connected through a coil limb to an electrical terminal element. This involves wage intensive soldering joints. Also, a spiral spring is associated with each brush for pressing the brush against the commutator and which must be specially produced, mounted and fixed by means of a device.

Advantages of the invention

As opposed to this, the electric motor in accordance with the invention comprising the characterising features of the main claim has the advantage that the pressure spring for the carbon brush is mounted and held together with the fixing of the choke coil. Special working operations can be omitted. Due to the omission of soldered joints, the operational reliability of the motor is increased.

Advantageous further developments and improvements of the small power electric motor set forth in the main claim are made possible by the measures set forth in the sub-claims.

Drawing

An embodiment of the invention is illustrated in the drawing and is described in detail in the following specification. Figure 1 shows a plan view of a brush carrier plate of a small power electric motor provided with carbon brushes and choke coils, Figure 2 is a plan view of one choke coil, on which are formed a coiled spring and a terminal eye, on an enlarged scale and Figure 3 is a side view of a component illustrated in Figure 2.

Description of the embodiment

A carrier 10 forming part of a small power electric motor (not illustrated in detail) is represented in Figure 1. Two box-like brush guides 12 are arranged opposite one another on one of its surfaces and in each of which is displaceably arranged a carbon brush 14. So that during operation of the electric motor, the carbon brushes 14 are properly applied to the commutator forming part of the electric motor (not illustrated) the carrier 10 has coiled springs 16 associated with the carbon brushes 14, a limb 18 of which presses in a pretensioned manner against the end of the brush 14 remote from the commutator. The free end of the limb 18 is provided with a bend 19 the outer radius of which is less than half of the full width of the box-like brush guide 12. A plurality of windings 20 extend from the limb 18 of the coiled spring 16 and which then change into the other limb 22 of the coiled spring 16 (Figures 2 and 3). The limb 22 of the coiled spring 16 changes integrally into a choke coil 24 to which is connected, likewise integrally with the choke coil, an eye 26 consisting of a

plurality of windings. Thus, the coiled spring 16 and the eye 26 are arranged at the two end regions of a component in the form of a tension spring the control portion of which forms the choke coil 24. The component is first of all wound from an insulated wire whereafter the coiled spring 16 and the eye 26 are bent away. Then the curve 19 arranged on the limb 18 of the coiled spring 16 and the eye 26 are made electrically conductive. Thus, the insulation is removed and if necessary a metal coating is also applied. As Figure 1 further shows, the carrier 10 has wall-like mounting aids 28 for locating the choke coil 24. So that the coiled spring 16 can be fixed with a proper pretension, the carrier 10 also has a pin-like extension 30 for each coiled spring 16 and onto which the windings 20 of the coiled spring are mounted. Moreover, the other limb 22 of the coiled spring 16 is supported on an abutment 32 which is also arranged on the carrier 10. The eye 26 is located over an electrical terminal element 34 which passes through the carrier 10 and serves for connecting the electric motor to a working current source.

As Figure 1 also shows, each brush guide 12 is provided with a cut-out lug 36 bent away from the guide duct, which serves as an assembly aid when the choke coil together with the coiled spring is mounted and the brush 14 is to be inserted in the brush guide 12.

The arrangement in accordance with the invention has no soldered joints which contributes to a simplification of the assembly and on the other hand increases the operational reliability of the electric motor because no breakdowns can occur due to bad soldered joints. Moreover, the use is possible of brushes which are provided without copper strands and are therefore relatively cheap. Also the mounting of the choke coil 24, into which the choke core is loosely inserted, is simple. The same applies to the locating of the eye 26 over the terminal element 34. Thus, the current flows from the terminal element 34 through the eye 26 to the choke coil 24 and through the latter and the coiled spring 16 to the brush 14.

In the embodiment, the carrier 10 is a housing cover of a fuel delivery pump. However, it is quite conceivable to exercise the arrangement in accordance with the invention even when the brush guides are mounted on so-called brush carrier plates.

CLAIMS

115

1. An electric motor comprising a commutator and brushes cooperating with the commutator, which are urged against the commutator by means of a spring element and choke coils associated with each brush, characterised in that, the spring element is integrally connected to the choke coil.

2. An electric motor according to claim 1, characterised in that, the spring element is a coiled spring formed at one end of the choke coil.

3. An electric motor according to claim 2, characterised in that, the coiled spring has a plurality of windings between the limbs.

4. An electric motor according to claim 3, wherein the choke coil is arranged on a carrier provided with guides for the brushes, characterised in that,

130

the carrier has a projection (30) for fixing the coiled spring.

5. An electric motor according to claim 4, characterised in that, the windings of the coiled spring are mounted on the projection.

6. An electric motor according to one of claims 4 or 5, characterised in that, the spring limb arranged remotely from the choke coil is provided with a curve the outer radius of which is preferably less than half the full width of the box-like brush guide.

7. An electric motor according to one of claims 2 to 6, characterised in that, the curvature of the spring limb has an electrically conducting surface and is preferably provided with a metal coating.

8. An electric motor according to one of claims 2 to 7, characterised in that, an eye is formed at the end of the choke coil remote from the coiled spring.

9. An electric motor according to claim 8, characterised in that, the eye can be mounted on, preferably retained on a terminal element projecting from the carrier and forming part of the working current circuit of the motor.

10. An electric motor according to one of claims 6 to 9, characterised in that, the box-like brush guide has a preferably cut out lug directed away from the guide duct.

11. An electric motor according to one of claims 1 to 10, characterised in that, the coiled spring and the eye are arranged at the two end regions of a component forming a tension spring the central portion of which forms the choke coil.

12. An electric motor according to one of claims 1 to 11, characterised in that, the carrier is formed as the cover of a housing provided with a fuel delivery pump.

13. An electric motor substantially as herein described with reference to the accompanying drawings.