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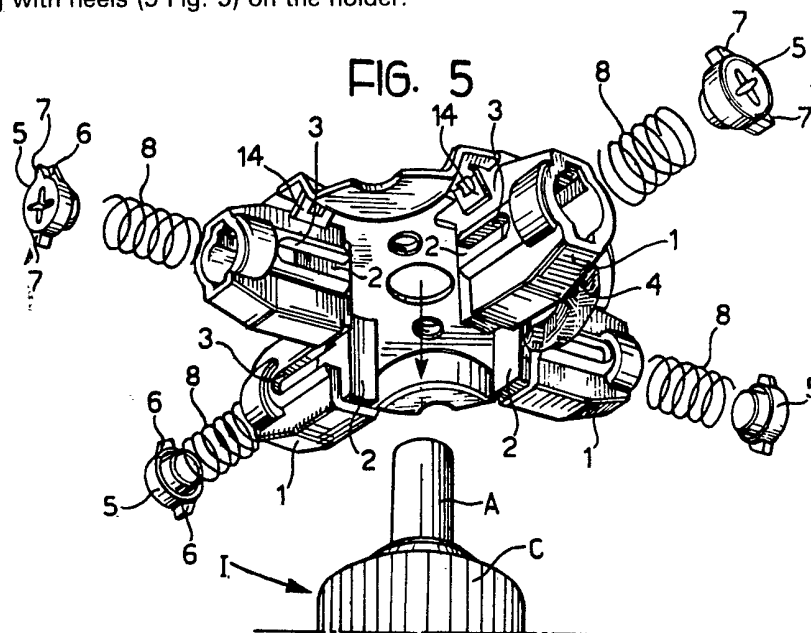
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H01R

(54) Brush holder for commutator type starter motors

(57) Brush holders, comprises a shaped retaining and guide body 1 for receiving a movable brush 2, intended to be thrust by a spring 8 towards the commutator C through a frontal passage or aperture defined by the body 1. The rear of the body 1 defines a further aperture 1b having a removable closure member 5; the said brush-biasing spring 8 is a helical spring mounted in the body 1, passing through the rear aperture and, in use, reacting at one end against the brush 2 and at the other end against the said closure member 5. The holders are retained in a metal holder disc by tabs (15 Fig. 5) and notches (14 Fig. 5) cooperating with heels (9 Fig. 5) on the holder.



GB 2 178 248 A

FIG. 1

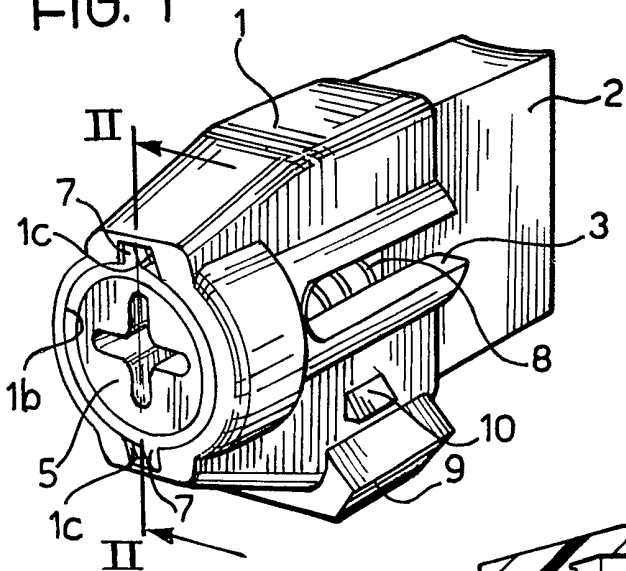


FIG. 2

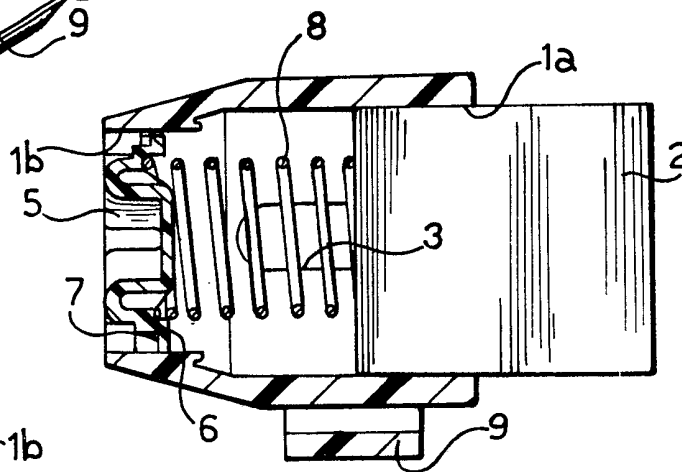


FIG. 3

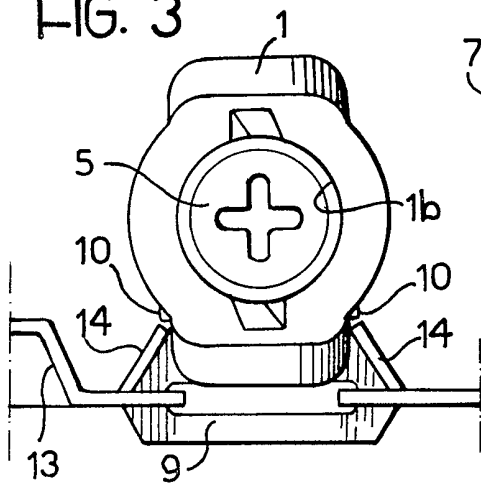


FIG. 7

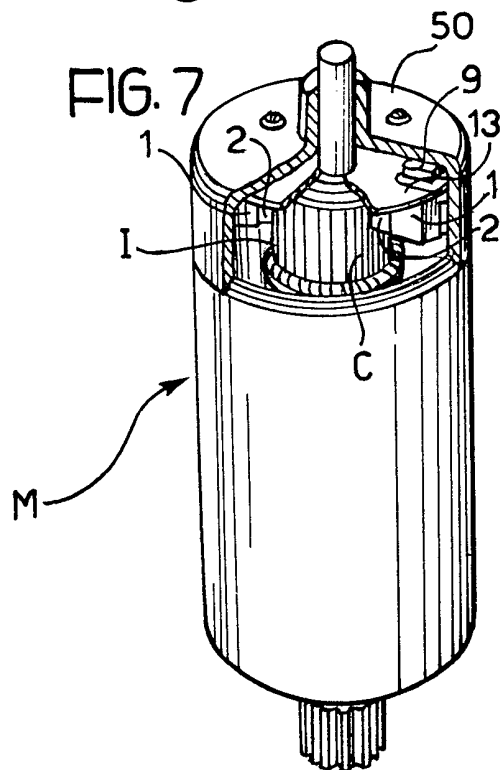


FIG. 6

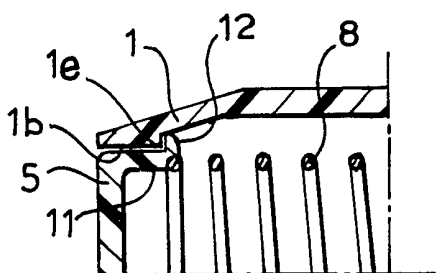


FIG. 4

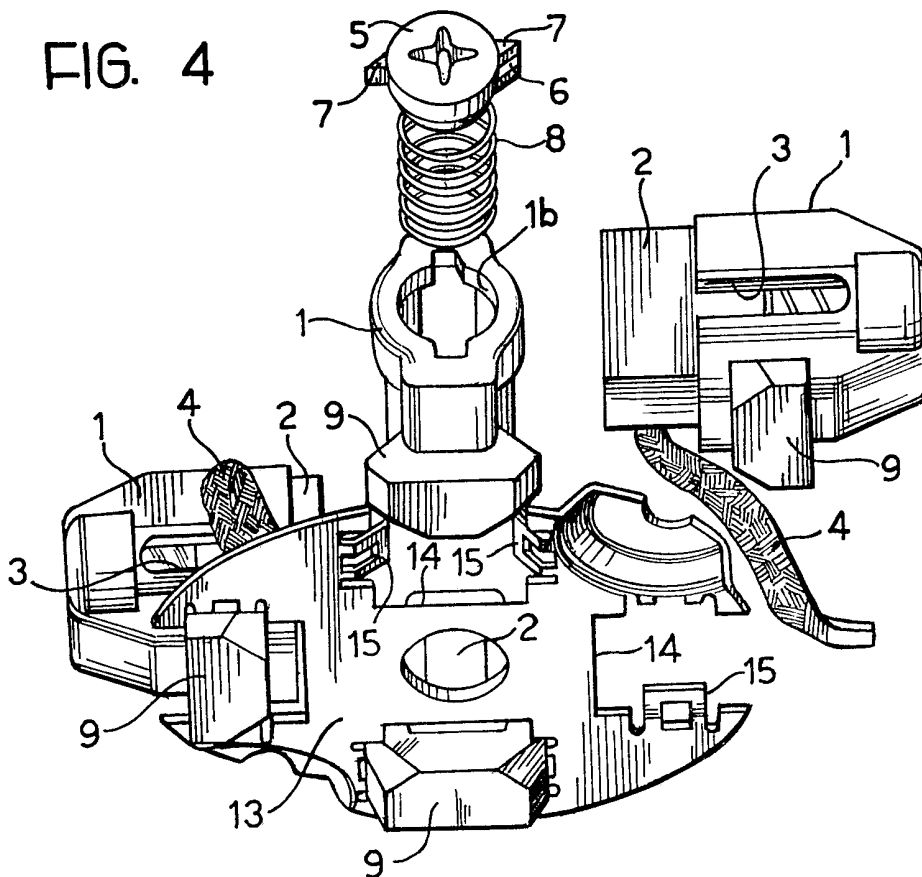
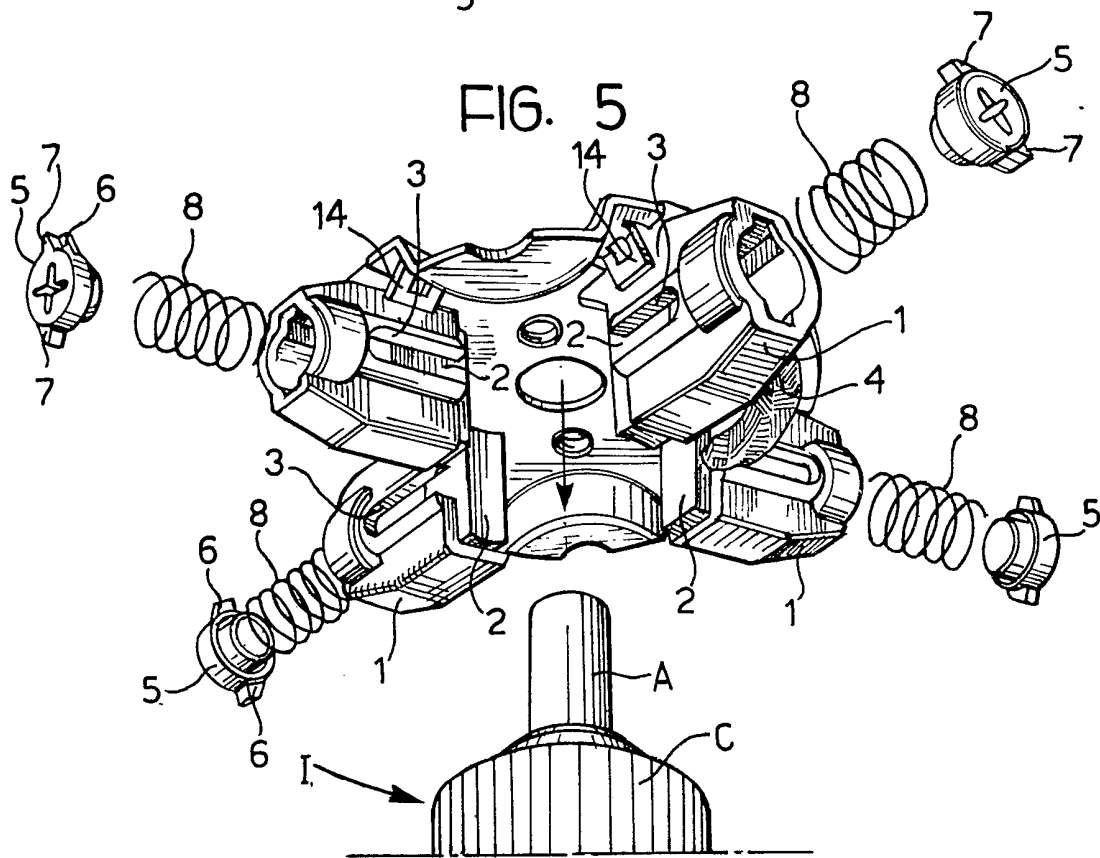


FIG. 5



SPECIFICATION

Improvements in brush holders for electrical apparatus with commutators particularly for starter motors

The present invention relates to brush holders for electrical apparatus with commutators, and particularly for starter motors for motor vehicles.

In starter motors the brushes are mounted for movement in respective metal brush holders which are made from blanked and bent sheet metal and are then fixed to a metal brush holder ring or disc by, for example, a rivet. The metal brush holders for the positive brushes must be insulated electrically from the brush holder disc by the interposition of a sheet of insulating material, for example bakelite. Each brush is thrust radially towards the commutator by means of a spring supported by the brush holder disc, generally a flat spiral spring having one end reacting against the rear face of the brush, through the brush holder. The load of these springs is normally very high.

The assembly of these brush holder devices on the armature is thus rather difficult. It is necessary to hold the brushes open, that is, in a withdrawn position, against the action of the respective springs.

The object of the present invention is to provide a brush holder which enables the brush holder disc to be assembled more easily on the armature and which radically simplifies the structure and assembly of the brush holder device as a whole.

In order to achieve this object, according to the invention there is provided a brush holder comprising a shaped retaining and guide body for receiving a movable brush, intended to be thrust by a spring towards the commutator through a frontal passage or opening defined by the body, characterised in that the rear of the body defines a further aperture having a removable closure member; the brush biasing spring being a helical spring mounted in the body through the rear aperture and, in use, reacting at one end against the brush and at the other end against the closure member.

According to a further characteristic, the closure member has rapid engagement means of the bayonet type for coupling with the rear aperture of the brush holder body.

Conveniently, the body of the brush holder has shaped retaining and guide surfaces for releasable engagement with corresponding members of the brush holder disc. For this purpose, according to a further characteristic of the invention, the brush holder body has a dovetailshaped heel for cooperating with complementary retaining means of a brush holder ring or disc. Conveniently, the body of the brush holder is of moulded plastics material and is thus electrically insulating so as to en-

sure the necessary insulation of the positive brushes from the metal brush holder disc.

Further characteristics and advantages of the invention will become apparent from the detailed description which follows with reference to the appended drawings, provided purely by way of non-limiting example, in which:

Figure 1 is a perspective view of a brush holder according to the invention,

Figure 2 is a partially-sectioned side view taken on the line II-II of Figure 1,

Figure 3 is a rear view of the brush holder according to the invention,

Figure 4 is a perspective view showing a brush holder disc provided with a brush holder according to the invention,

Figure 5 is a perspective view showing the brush holder device of Figure 4 in the condition in which it may be easily mounted on the armature of a motor,

Figure 6 is a sectioned side elevational view of a brush holder according to the invention, similar to Figure 2, and

Figure 7 is a perspective view of an electric starter motor for motor vehicles provided with a brush holder device according to the invention.

With reference to the drawings, a brush holder according to the invention comprises a hollow body 1 of moulded plastics material, in which a respective brush 2 is mounted for translational movement. As shown in particular in Figure 2, the body 1 has a frontal or front aperture through which the brush extends, and a rear aperture 1b of smaller dimensions. Parallel cuts, indicated 3, are formed in the side walls of the body 1 starting from the longer sides of the aperture 1a, and allow the passage and movement of the brush 2 together with the copper braid 4 connected thereto (Figures 4 and 5).

A closure stopper 5, preferably of plastics material such as polyamide, is associated with the rear aperture 1b of the body 1. This stopper, as shown in the drawings, is essentially circular and has retaining teeth 6 and adjacent stop teeth 7 on opposite sides. The retaining teeth 6 are formed adjacent the face of the stopper intended to face the brush 2, while the stop teeth 7, which are angularly staggered with respect to the other teeth, are formed adjacent the face of the stopper which will face outwardly.

The stopper 5 may be inserted in the rear aperture 1b of the brush holder with the teeth 6, 7 inserted in the notches 1c: the retaining teeth 6 extend beyond the thickness of the rear wall of the body 1. The stopper 5 may thus be rotated so that the retaining teeth 6 bear against the inner surface of the rear wall of the brush holder; the stop teeth 7, coming to bear against corresponding lateral edges of the notches 1c limit the degree of rotation of the stopper 5 relative to the brush holder.

The size of the aperture 1b is sufficient to

allow the introduction of a helical spring 8 into the body 1 to act as a brush biasing spring.

Instead of the retaining teeth 6, the stopper 5 could, as shown in Figure 6, have integral sprung arms 11 provided with small end retaining teeth 12 for snap-engaging corresponding retaining projections 1e within the body 1.

As is particularly apparent in Figures 1 and 3, the body 1 of the brush holder has an integral heel 9 beneath it having an essentially dovetail shape with the lateral inclined tails extending parallel to the direction of movement of the brush. The body 1 has projections 10 adjacent the upper edges of the inclined tails.

The heel 9 facilitates the assembly of the brush holder on a brush holder ring or disc as illustrated in particular in Figure 4. In this Figure, a metal brush holder disc, indicated 13, is formed by blanking, pressing and bending, and has a peripheral notch 14 for each brush holder, from the lateral edges of which extend bent tabs or appendages 15 which face each other. These tabs are arranged to guide and retain the heel 9 of the brush holder by cooperating with the lateral tails of these heels and with the projections 10, as shown in particular in Figure 3.

As experts in the art will appreciate, the anchoring of each individual brush holder to the disc 13 is extremely simple and quick and does not require the use of rivets or like means. Moreover, since the body 1 of the brush holder is of electrically insulating material, it does not necessitate the interposition of any insulating plate between the disc 13 and the brush holder for the positive brushes.

Figure 5 gives an appreciation of how easily the brush holder disc 13 can be assembled on the shaft A of the armature I of a motor: the brush holders 1 are inserted in the disc 13 without the respective rear stoppers 5 and without the brush biasing springs 8. Only the brushes 2 are inserted in these bodies so as practically to disappear and so that the disc 13 may be disposed around the shaft A without the brushes interfering with the commutator C. Once the disc 13 is positioned around the shaft A, the respective spring 8 may be introduced into each individual brush holder through its rear aperture, and this aperture then closed by the respective stopper 5.

The assembly of the brush holder disc 13 on the armature is thus extremely simple.

Figure 7 shows a starter motor M provided with a brush holder device according to the invention. As may be seen from this Figure, the end cover 50 of the motor casing is applied above the brush holder disc 13 so that its inner part bears against the heels 9 of the brush holder 1, helping to keep this firmly in the working position.

Naturally, the principle of the invention remaining the same, the forms of embodiment

and details of realisation may be varied widely with respect to that described and illustrated purely by way of non-limiting example, without thereby departing from the scope of protection of the present model.

CLAIMS

1. Brush holder for electrical apparatus with commutators, particularly for starter motors (M) for motor vehicles, comprising a shaped retaining and guide body (1) for receiving a movable brush (2), intended to be thrust by a spring (8) towards the commutator (C) through a frontal passage or aperture (1a) defined by the body (1), characterised in that the rear of the body (1) defines a further aperture (1b) having a removable closure member (5); the said brush-biasing spring (8) being a helical spring mounted in the body (1), passing through the rear aperture (1b) and, in use, reacting at one end against the brush (2) and at the other end against the said closure member (5).

2. Brush holder according to Claim 1, characterised in that the closure member (5) has bayonet type engagement means (6) for coupling with the rear aperture (1b).

3. Brush holder according to Claim 1, characterised in that the closure member (5) has hooked teeth (12) for snap engagement in corresponding retaining seats or members (1e) provided in the body (1) adjacent the rear aperture (1b).

4. Brush holder according to any one of the preceding claims, characterised in that the body (1) has shaped retaining and guide surfaces (9) for engagement in a removable manner with corresponding members (15) of a brush holder ring or disc (13).

5. Brush holder according to Claim 4, characterised in that the body (1) has a dove-tail shaped heel (9) for cooperating with complementary retaining means (15) of a brush holder ring or disc (13).

6. Brush holder according to any one of the preceding claims, characterised in that the body (1) is of moulded plastics material.

7. Brush holder according to any one of the preceding claims, characterised in that the closure member (5) is of moulded plastics material, preferably polyamide.

8. Brush holder according to any one of the preceding claims, characterised in that the closure member (5) has a recess in its outwardly facing surface for engagement by a screw driver or like tool for attaching and disengaging the closure member (5).

9. Brush holder device for electrical apparatus with commutators, particularly for starter motors for motor vehicles, characterised in that it includes a plurality of brush holders (1) according to one or more of the preceding claims.

10. Brush holder device according to Claim 9, including a plurality of brush holders (1)

- according to Claims 4 and 5, connected to a brush holder ring or disc (13) of metal, characterised in that the ring or disc (13) for each brush holder has a radial recess (14) from the
- 5 opposite sides of which extend appendages or tabs (15) which are bent, inclined and face each other and are intended to guide and retain the dove-tail heel (9) of a respective brush holder.
- 10 11. Electrical apparatus with a commutator, particularly a starter motor for motor vehicles, characterised in that it includes a plurality of brush holders (1) according to one or more of Claims 1 to 8.
- 15 12. Electrical apparatus with a commutator, particularly a starter motor for motor vehicles, characterised in that it includes a brush holder device (1 to 15) according to Claims 9 or 10.
- 20 The whole substantially as described and illustrated and for the purposes specified.

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