Sept. 9, 1958 E. L. HALL 2,851,622

ELECTRIC MOTOR

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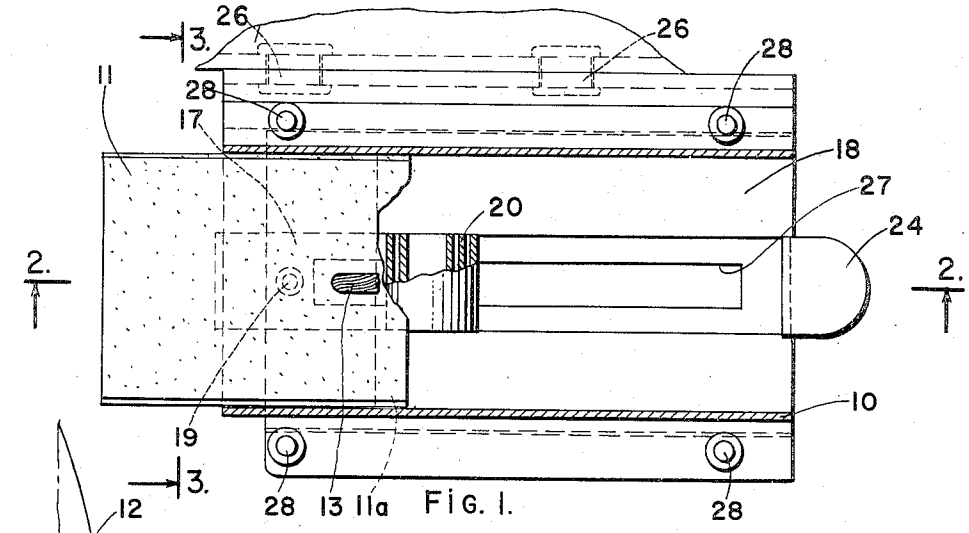


Fig. 1.

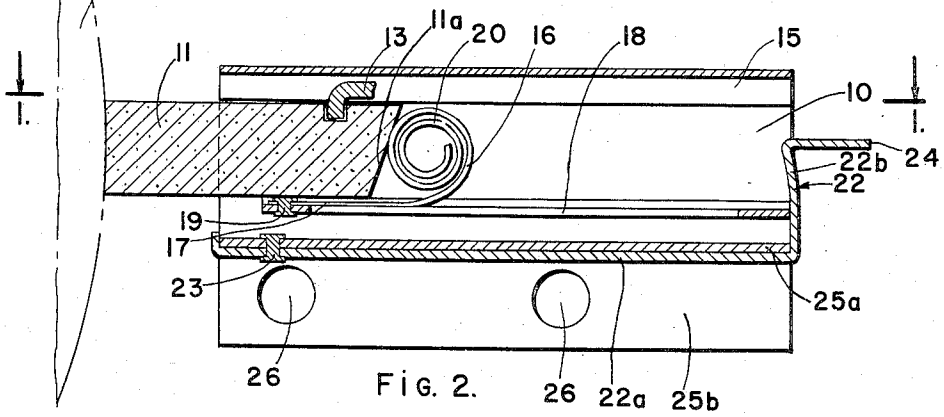


Fig. 2.

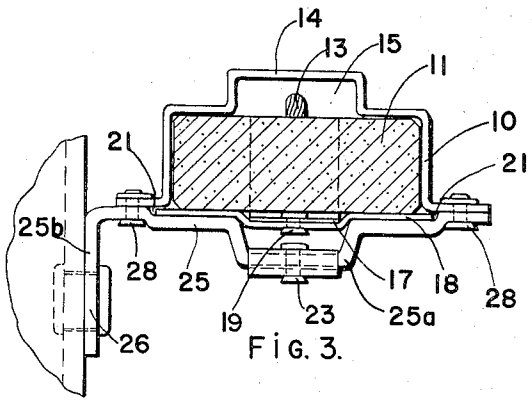


Fig. 3.

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ELECTRIC MOTOR

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1 Claim. (Cl. 310—246)

This invention relates to electric motors and, more particularly, to a brush holder therefor.

The improved brush holder of this invention employs a coil spring of small radius having the coil or volute portion bearing against one end of the brush to urge it toward the motor's commutator. The spring includes a flat, elongated spring metal strip having the outer end anchored with the other end coiled into a self-rewinding volute. This volute bears against the end of the brush that is opposite to the commutator to urge the brush toward the commutator. Thus, the spring keeps the brush in contact with the commutator as the brush wears away. In such a holder, the brush must be replaced from time to time due to wear. In the past such replacement required removal of the entire brush holder from its mounting on the motor, as the brush could only be removed from the commutator end of the brush holder. This was laborious and time-consuming.

The brush holder of this invention successfully solves the above problem of providing substantially uniform pressure on the brush yet permitting easy replacement of the brush. In this invention the brush holder is constructed with a removable base member. The coil spring is attached to this base member and means are provided for removably locking the base member in the holder. Thus, when a worn brush must be replaced, it is not necessary to remove the entire holder from its mounting. All that need be done is to release the base member and remove it and the worn brush. The new brush is then inserted and the base member replaced or both may be inserted simultaneously.

The brush holder of this invention will be described as related to the embodiment shown in the accompanying drawings. Of the drawings:

Fig. 1 is a sectional view through a brush holder of this invention taken substantially along line 1—1 of Fig. 2.

Fig. 2 is a sectional view taken substantially along line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken substantially along line 3—3 of Fig. 1.

The brush holder of this invention comprises an elongated casing **10** open at its opposite ends in which is positioned a brush **11** to make contact with a commutator **12** shown in part diagrammatically in Fig. 2. A pigtail connection **13** of copper wire or the like is attached to the brush **11** by any means desired. One side of the casing **10** has a raised portion **15** which defines a channel extending from end to end of the casing in which the connection **13** is located. A coil spring **16** is provided comprising a flat, elongated metal strip **17** secured at its outer end to a movable base member **18** as by a rivet **19**. This sheet metal base member is normally located on the interior of the casing **10** on the side opposite to the channel **15**. The other end of the spring **16** is coiled into a self-rewinding volute **20**. This volute bears against the end of the brush **11** opposite to the commutator **12** and thus urges the brush toward the commutator.

The movable base member **18** is positioned in the casing **10** on one side of the brush in a slot **21** as shown in Fig. 3. This slot is defined on its outer side by a side **25** of the casing **10** which is bent to form the slot. The base member **18** and the attached spring **16** may be removed from the casing **10** by sliding it out of the slot **21** to the right as viewed in Figs. 1 and 2.

The movable base member **18** is normally held in position in the casing **10** by means of a metal clip **22**. The clip **22** is secured to the casing **10** at the commutator end by a rivet **23** and is mounted on an outwardly-extending central part **25***a* of the casing side **25**. The clip **22** tends to remain in the position shown in Fig. 2 because of the spring-like quality of its long arm **22***a*. The clip **22** is provided with a tab **24**. By applying a downward force on the tab **24** clip **22** will be deflected in a downward direction, thus, clearing the barrier part **22***b* of the clip from the movable base member **18** so that the base member, spring **16** and worn brush **11** may be removed through the end of the casing **10** that is opposite to the commutator. If the worn brush fails to come out readily after the base plate **18** has been removed, it may easily be withdrawn by using the pigtail connection **13** to pull it free. A new brush **11** is inserted and the movable base member **18** is slid back into the casing **10**. If desired, the new brush and base member may be inserted simultaneously. The clip **22**, when released, springs back to the locked position to hold the base member and thus the spring and brush in position as shown in the drawings.

The side **25** of the casing **10** is also provided with an extended flange **25***b* containing holes **26**. The brush holder may be secured to the motor by means of rivets or bolts through the holes **26** in the customary manner.

The spring **16** is prestressed in such a manner that it takes a cross-sectional camber when any portion is unwound. This camber tends to cause the unwound portion to press the brush **11** tightly against the brush holder **10** and, thus, aid in preventing the brush from chattering. A slot opening **27** is cut in the movable base member **18** to allow the cambered spring to sink slightly into the removable base member.

The outer end of the brush **11** is sloped as shown at **11***a* in Fig. 2. Thus, the coiled volute **30** tends to urge the brush toward the inner surface of the side of the casing **10** that is opposite to the base plate **18** and also tends to prevent chattering.

The casing **10** is constructed in an upper and lower section. These sections are fimly held together by rivets **28**.

Having described my invention as related to the embodiment shown in the accompanying drawings, it is my intention that the invention be not limited by any of the details of description unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the accompanying claim.

I claim:

A brush holder for a motor having a commutator and a brush, comprising: a brush casing; a removable base member positioned in said casing at one side thereof; a brush movably positioned in said casing having one side adjacent to said base member, said casing having the brush receiving portion arranged substantially radially of said commutator and open at both ends and approximately corresponding in cross-sectional size and shape to the cross-sectional size and shape of said brush; a coil spring including an elongated metal strip having one end secured to said movable base member and lying therealong and its other end coiled into a self-rewinding volute, said volute bearing against the end of said brush opposite to the commutator to urge the brush toward said commutator, the end surface of the brush contacted by said volute being inclined toward said volute so that the

pressure of the volute on said surface urges the brush toward the opposite side of the casing from said base member; and a displaceable clip attached to the casing having a barrier part at the end of said casing opposite to the commutator for retaining said base member in said casing.

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