



# UNITED STATES PATENT OFFICE

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## BRUSH HOLDER ASSEMBLY

Glenn D. Stapleton, Fort Wayne, Ind., assignor  
to General Electric Company, a corporation of  
New York

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My invention relates to holders for current collector contact members and particularly to cartridge type brush holders with longitudinally movable contact members therein.

In holders for current collector contact members, brush holders and brush holder assemblies of the type commonly used on small electric motors it is desirable to reduce the cost of the component parts and to expedite and simplify replacement of the parts most subject to wear, namely the contact members. In previously used cartridge type brush holders, it has been customary to employ at least two cooperating screw-threaded parts to hold the end cap in assembled relationship with the brush holder. These structures have been satisfactory except that screw threads are relatively expensive to manufacture and the screw threaded fastenings require a time consuming number of revolutions in assembly to bring them into the completely assembled position.

It is therefore an object of my invention to provide a cartridge type brush holder assembly in which screw threaded fastenings are unnecessary.

It is a further object of my invention to provide a simplified low cost brush holder assembly wherein the brush holder cap member need not be rotated more than one-quarter of a turn as it is assembled.

It is yet a further object of my invention to provide an improved brush holder assembly wherein the force of a resilient member used to bias the contact member is also used to hold the cap member in assembled relationship within said brush holder assembly.

A still further object of my invention is the provision of a brush holder assembly which will allow faster assembly and disassembly.

In its broad aspects, my invention consists of a cartridge type brush holder assembly wherein the end cap is fastened in place by the use of a "bayonet" structure and wherein wings on the end cap engage with grooves in the brush holder body by a one-quarter turn of rotation after insertion of the end cap, the end cap being thereafter held in position by a resilient contact biasing member.

Referring to the drawing, Fig. 1 is a side elevational view, partly in section, illustrating the improved brush holder assembly of this invention and Fig. 2 is an exploded view illustrating, in perspective, the various components of this improved brush holder assembly.

Referring now to Fig. 1, there is shown a por-

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tion of the stationary frame 1 of a dynamoelectric machine having a brush tube-receiving opening 2 formed therein. A brush holder tube 3 of the cartridge type is inserted in a resilient insulating sleeve 4, formed of any convenient material such as rubber or neoprene, which in turn is positioned in the opening 2 of the stationary frame member 1. Holder 3, as shown in Fig. 2, is provided with a longitudinally extending contact member slot 5 therein which is of a rectangular cross-section, the linear dimension of two of the sides of the rectangular cross-section being approximately twice the linear dimension of the other two. Longitudinal grooves 6 are provided in the longest sides of the contact member slot. These grooves are arcuate in shape in order that the slot may better accommodate a resilient compression coil spring 7 in the completed assembly which is more fully described below.

A contact member 8 of any suitable material, such as carbon, is arranged for longitudinal movement in the slot 5 and is adapted to be biased longitudinally of the brush holder by spring 7 toward one end thereof for contact with a current collector 9, which is part of the rotating armature structure of the dynamoelectric machine. Spring 7 is held in compression by engagement with the under side of a cap assembly 10 which engages the upper end of the holder 3. Cap assembly 10 comprises terminal pin 11 and wing washer 12 which are riveted together as shown at 13 in Fig. 1 to form a unitary end cap structure. These parts are fabricated separately and assembled in this way for reasons of economy. Wing washer 12 is provided with wings 14 which together have an outline similar to the section of contact member 8 so that they fit easily into contact member slot 5 for longitudinal movement therein. Transverse slots 15 are cut into the brush holder 3 extending radially inwardly into grooves 6 and through the longest sides of the rectangular section of contact member slot 5. These transverse slots 15 accommodate wings 14 on washer 12 when the cap assembly has been inserted into the contact member slot 5 and rotated. It will be seen that wings 14 contain small ribs or protrusions 16 in their upper surfaces. These ribs engage depressions 17 provided in the upper edges of transverse slots 15.

Prior to final assembly, a subassembly is made consisting of cap assembly 10, resilient coil spring 7 and contact member 8 held together by a current conductive braided pigtail 18 which is embedded at one end in contact member 8 and

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firmly conductively connected at the other end to cap assembly 10 by a suitable method such as soldering, or welding. The brush holder cart-ridge 3 may be separately assembled with resilient insulating sleeve 4 within opening 2 of the stationary frame member 1.

The subassembly above described, may then be inserted into the contact member slot 5, contact member 8 being inserted first. Contact member 8 is pushed down through the slot until it is biased against current collector 9 and cap 10 is further depressed compressing spring 7 until the wings 14 have entered slot 5 sufficiently to come opposite slots 15, at which time cap 10 is revolved one-quarter of a turn and wings 14 engage the upper walls of slot 15, and ribs 16 of wings 14 seat in detents 17 of slots 15. Cap assembly 10 is thereafter biased upwardly by spring 7, retaining the cap member firmly in position. Spring 7 therefore serves two purposes—biasing contact member 8 downwardly and biasing cap member 10 upwardly to thereby maintain each in the desired position. The interconnection structure between cap member 10 and brush holder tube 3 including the cap member wings 14 and the cooperating brush holder tube slots 15 may be referred to as a "bayonet" structure.

It will be seen that cap member 10 is adapted to receive means such as terminal screw 19 whereby an electrical connection may be made by an incoming lead wire to said cap member.

While I have described and illustrated a preferred embodiment of my invention, I wish it to be understood that I do not intend to be restricted solely thereto but that I do intend to cover all modifications thereof which would be apparent to one skilled in the art and which come within the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a brush holder assembly adapted to be arranged in an opening in the stationary shell of a dynamo-electric machine, a brush holder tube having a longitudinal slot for supporting a brush in contact with the current collector of the machine, a spring member for biasing the brush toward the current collector, and a cap member having radially extending wings adapted to be

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inserted axially into said longitudinal slot for compressing said spring member, the outer surface of said cap member being substantially flush with the outer surface of the stationary shell when assembled; the walls of said brush holder having transverse slots communicating with said longitudinal slot at the end thereof adjacent the outer surface of said stationary shell, said radially extending wings adapted to be rotated to engage the transverse slots of the brush holder tube and to be retained therein by the force of said spring member on said cap member.

2. In a brush holder assembly adapted to be arranged in an opening in the stationary shell of a dynamo-electric machine, a brush holder tube having a longitudinal slot for movably supporting a brush in contact with the current collector of said machine, a spring for biasing the brush toward said current collector, and a cap member adapted to be inserted axially into said brush holder tube for compressing said spring, the outer surface of said cap member being substantially flush with the outer surface of said stationary shell when assembled; the walls of said brush holder having a pair of diametrically opposed transverse slots communicating with said longitudinal slot adjacent the outer end of said brush holder, said cap member having a pair of radially extending wings proportioned to enter said longitudinal slot and upon rotation to enter said transverse slots respectively, a detent positioned on the upper wall of each of said transverse slots, and a rib on the upper surface of each of said wings adapted to engage respectively with said detents, said ribs being held in such engagement by the force of said spring on said cap member.

GLENN D. STAPLETON.

#### REFERENCES CITED

The following references are of record in the file of this patent:

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