

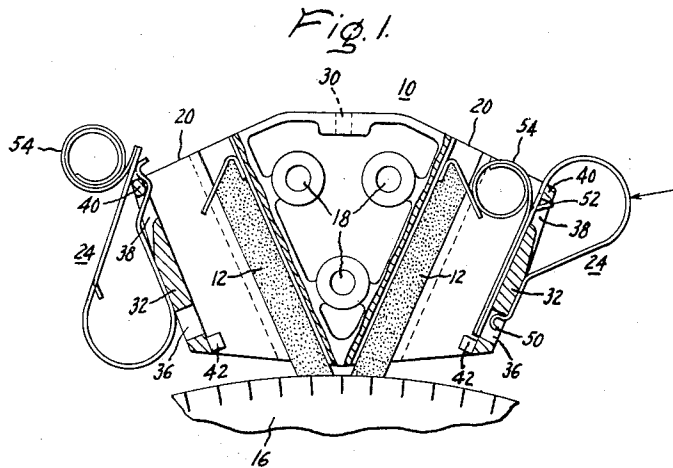
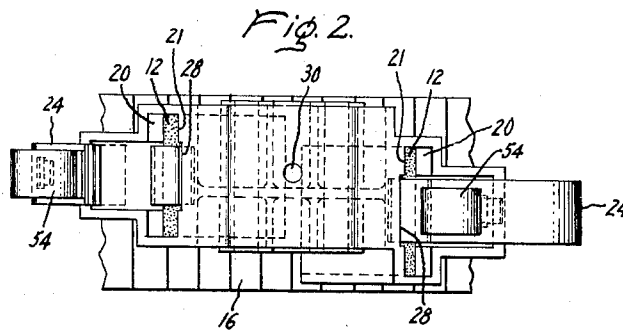
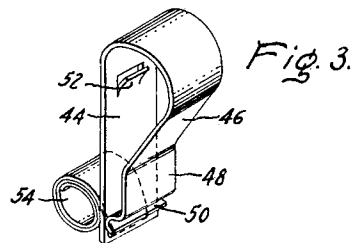
June 24, 1958

R. J. HANSON

2,840,733

BRUSH HOLDER AND SPRING ASSEMBLY

Filed Sept. 4, 1956



Inventor:
Richard J. Hanson,
by Vernon J. Kalb
His Attorney.

1

2,840,733

BRUSH HOLDER AND SPRING ASSEMBLY

Richard J. Hanson, Erie, Pa., assignor to General Electric Company, a corporation of New York

Application September 4, 1956, Serial No. 607,734

5 Claims. (Cl. 310-246)

The invention described herein relates to dynamoelectric machines and more particularly to a brush holder and spring assembly, and has for its object the provision of an improved brush supporting structure and spring assembly characterized by their ability to permit rapid renewal of a carbon brush while retaining the spring assembly captive on the brush holder during the renewal process.

Brush holders of the cast segmented type have been provided with involved spring arrangements in an attempt to create a predetermined pressure on a carbon brush throughout its life and to facilitate renewal thereof in a brush holder. The structure employed in such brush holders requires spring mountings which make brush renewal a time consuming process requiring the exercise of care to prevent loss of the various spring parts when effecting such renewal. In known brush holders, other than those described in the applications hereinafter mentioned, there is no provision for keeping the spring assembly captive on the holder when it is in an inoperative position; that is, when the biasing spring of the assembly is removed from its channel in the holder box and is not urging the brush into contact with the commutator. Further, such spring assemblies are designed in a manner requiring supplemental parts for attaching the spring assembly on the brush holder so as to positively preclude loosening or ejection of the spring from the holder when the machine is operating under unusual conditions.

In carrying out my invention, I eliminate the above-described deficiencies by providing a pair of spaced openings in a wall of the brush holder box designed for engagement by projections on a spring assembly for firmly anchoring the assembly in position and for holding the assembly captive on the holder during a time when a brush is being renewed therein. The coating effect of such projections in the openings is such to permit movement of the assembly to an inoperative position by merely pressing inwardly on the assembly to move the projections out of the openings thereby eliminating the necessity for taking precautions necessary in preventing loss of parts when engaged in renewing a brush in the holder.

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which I regard as my invention, it is believed the invention will be better understood from the following description taken in connection with the accompanying drawing in which:

Figure 1 is a view in elevation, partly in section, showing a brush holder and a pair of spring assemblies, one of the assemblies being shown in an operative position while the other is illustrated as being in an inoperative position;

Figure 2 is a plan view of the brush holder shown in Figure 1; and

Figure 3 is a perspective view of an improved spring assembly provided by this invention.

Referring now to the drawings wherein like reference characters designate like or corresponding parts through-

2

out the several views, there is shown in Figures 1 and 2 a cast segmented brush holder 10 made of bronze or other highly conductive material, formed in the shape of a V, for receiving a pair of brushes 12 arranged for contact with a commutator 16 on a dynamoelectric machine (not shown). The center portion of the brush holder is provided with a plurality of openings 18 designed to extend transversely through the holder and being of a size to accept mounting bolts utilized in adjusting the brush holder relative to the commutator 16 in a well known manner. Each side of the brush holder 10 is designed to form a box 20 of T-shape configuration providing a pair of channels in each side for respectively receiving the brushes 12 and spring assemblies 24. Each box 20 is provided with a reaction surface 21 against which the brushes are adapted to rest, and in order to assure positive flatness in the reaction surface for good brush stability. The holder is cast with slots 28 for decreasing the area of contact for the brushes. As illustrated in Figure 2, each of the boxes 20 is offset slightly from one another and from a plane passing through the center of the brush holder body. A drilled and tapped opening 30 is provided for reception of a wire shunt on the carbon brushes positioned within the brush holder.

Referring now to the improvement residing in the outermost sides of the brush holder, it will be seen that the oppositely disposed sides or walls 32 are equipped with openings 36 arranged to extend substantially the entire depth of the brush holder 10. A second opening 38, also located within the walls 32 and shaped in the manner shown, is designed to provide a member 40 serving a dual function as hereinafter described. The bottom of each of the brush containing channels provided in boxes 20 is equipped with a stop member 42 for preventing movement of the spring assemblies 24 into an area where it could contact the commutator of the machine.

Referring now to the spring assembly particularly shown in Figure 3, it will be noted that it consists of a retainer 44 turned back on itself to form a spring 46 having a flat portion 48 and a spoon-like member 50 formed on the bottom end thereof. A projecting lug 52 is bent inwardly from the retainer 44 and is arranged to engage member 40 when the spring assembly is locked in a fixed position. Attached to the bottom end of retainer 44 and on the side opposite from spring 46, is a second spring element 54 of a type wound into a free tight volute and being constructed in a manner capable of exerting a predetermined force on a carbon brush throughout the life thereof. This spring assembly is somewhat similar to that disclosed and claimed in the copending application of John F. Nottelmann and Carl E. Spaeder filed concurrently herewith and entitled "Spring Assembly for Carbon Brush Holder."

In operation, after the carbon brushes have been inserted in the brush holder 10, the spring assembly is installed by merely pulling the spring member 46 outwardly and permitting the assembly to slide on to the outer wall 32 to assume a fixed position as in the manner shown on the right side of Figure 1. With the spring assembly in an operative position, i. e., the position illustrated, the projecting lug 52 is caused to contact the bottom side of member 40 while the spoon 50 is locked in opening 36 by firm engagement with the under surface of side 32. The spring 46 is constructed to exert a pressure against retainer 44 in the neighborhood of 2 p. s. i. when initially constructed and this pressure is effective in maintaining the spring assembly on wall 32. The action of spring 54 against the uppermost part of the carbon brush also serves to exert a force in a direction causing the projecting lug 52 to engage the member 40 and thereby preclude disengagement of the spring

assembly from the brush holder during all conditions of operation.

In the event it is desired to replace a carbon brush in the holder, the spring assembly is pressed inwardly at a point indicated by the arrow, simultaneously moving the projecting lug 52 out of engagement with member 48 and spoon 50 out of the opening 36 provided in the bottom of holder wall 32. An upward pull on the assembly at this time permits ready removal of the spring assembly from its operative position, and as the spoon 50 slides over wall 32, the pressure in spring 46 remains active causing the spoon to engage retainer 44 thereby maintaining the assembly captive on the holder 10. At this time the spring assembly can be rotated to an inoperative position such as that shown in the left-hand portion of Figure 1 in the drawing.

In view of the above, it will be evident that many modifications and variations are possible in light of the above teachings. For example, the wall 32 does not have to assume the specific configuration shown and neither do the openings have to appear in the spaced relationship indicated in the drawing. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

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

1. An improved brush holder and spring assembly comprising a holder having a box for supporting a carbon brush and a spring assembly adapted for urging the brush into contact with a commutator, said spring assembly comprising a pair of spring elements affixed to each other in back to back relationship, one of said spring elements arranged to contact said brush and exert a predetermined pressure thereon during the life of said brush, means on the other element engaging an indentation in a wall of said box for locking said spring assembly on said holder in an operative position and causing it to remain captive thereon when moved to an inoperative position.

2. An improved brush holder and spring assembly comprising a holder having a box for supporting a carbon brush and a spring assembly adapted for urging the brush into contact with a commutator, said spring assembly comprising a pair of spring elements connected with one another, the first of said spring elements comprising a pre-stressed spring designed to exert predetermined force on said brush for urging the latter into contact with a commutator, the other of said spring elements comprising a reversely bent second spring biased in a direction towards said first spring and provided with an engaging member positioned in a manner to contact means on a wall of said box for maintaining said spring assembly in a fixed position and for retaining said assembly in a captive position when moved outwardly from said holder.

3. An improved brush holder and spring assembly

comprising a holder having a box for supporting a carbon brush and a spring assembly adapted for urging the brush into contact with a commutator, said spring assembly comprising a first pre-stressed spring element arranged for positioning in said brush holder and for engaging said carbon brush to exert a predetermined force thereagainst, a second spring element including a retainer permanently affixed to said first spring element and being designed to terminate in a second spring having a free end arranged for exerting a predetermined force against said retainer, a locking member in the shape of a spoon formed on said end arranged for coaction with an indentation in a wall of said box for locking said spring assembly on said holder in an operative position and for maintaining said assembly captive on said holder when a brush is being renewed in said holder.

4. An improved brush holder and spring assembly comprising a holder having a box for supporting a carbon brush and a spring assembly adapted for urging the brush into contact with a commutator, indentation means formed in a side wall of said box, said spring assembly comprising a retainer having a first spring permanently attached thereto adapted for urging said brush into contact with said commutator, a second spring integrally formed with said retainer and being reversely bent to terminate in a projection designed to engage said indentation means, a second projection on said retainer arranged to engage said indentation means for locking said assembly on said holder when said first spring is urging said brush into contact with said commutator, the end of said second spring being under compression to an extent that when said second projection is disengaged from said indentation means, said second projection engages said retainer when moved in an outward direction thereby maintaining said assembly captive on said holder when said assembly is moved to an inoperative position.

5. An improved brush holder and spring assembly comprising a holder having a box for supporting a carbon brush and a spring assembly adapted for urging the brush into contact with a commutator, a side of said box having a pair of openings respectively formed in the upper and lower ends thereof for receiving said spring assembly, said spring assembly comprising a retainer having a spring attached to one side thereof for urging said brush against said commutator, a reversely bent second spring element integrally formed with said retainer and being provided with an end shaped in the form of a spoon engaging said lower opening, and a projection on said retainer arranged to fit within said upper opening when said assembly is mounted on said holder in an operative position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,602,100 McDonald _____ July 1, 1952