May 27, 1958 H. A. GILLIE 2,836,745

BRUSH HOLDER FOR DYNAMOELECTRIC MACHINES

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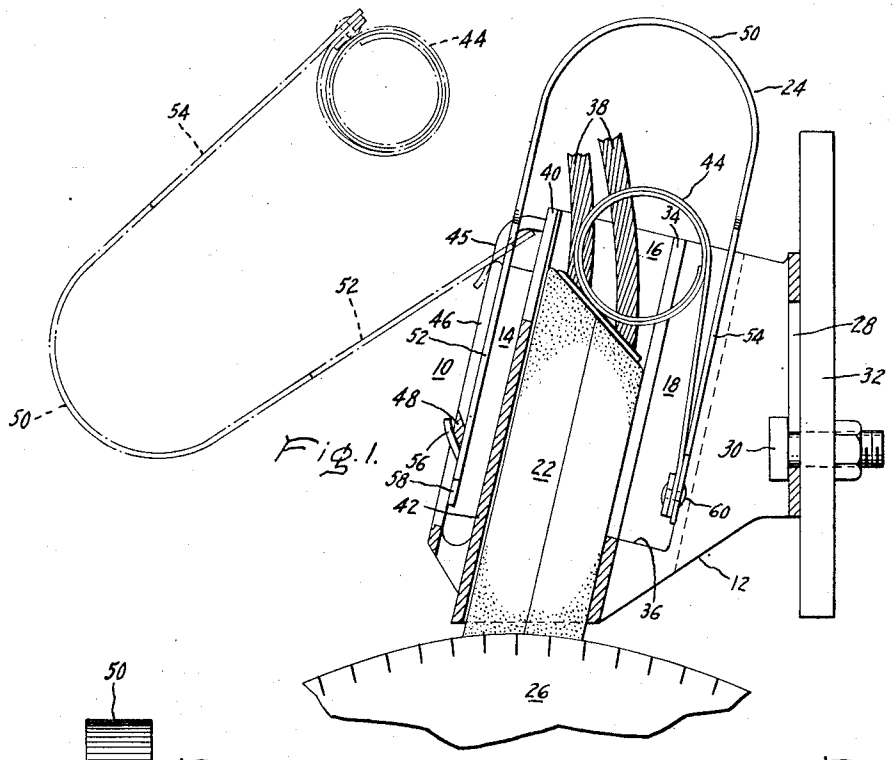

Fig. 1.

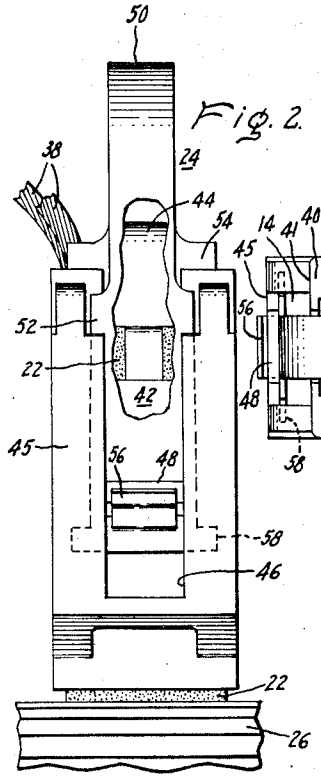

Fig. 2.

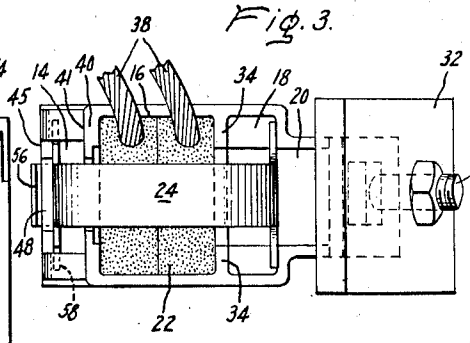

Fig. 3.

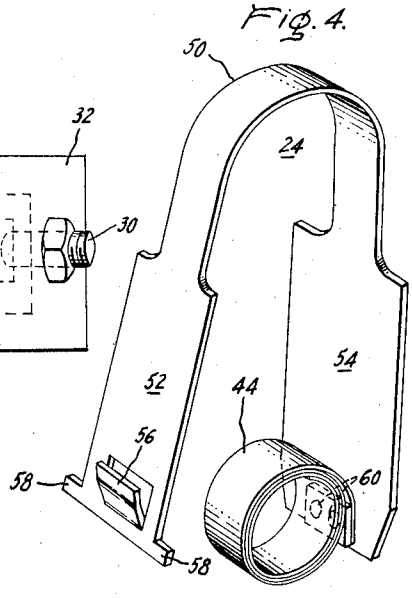

Fig. 4.

Inventor:
Harmon A. Gillie,
by Harmon A. Kalb
His Attorney.

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BRUSH HOLDER FOR DYNAMOELECTRIC MACHINES

Harmon A. Gillie, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York

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3 Claims. (Cl. 310—246)

The invention described herein relates to dynamoelectric machines and more particularly to an improved brush holder of the type utilizing a coiled spring designed for applying a constant predetermined pressure on a carbon brush regardless of the state of brush wear.

The brush holders currently used with large dynamoelectric machines are of the torsion spring type wherein a free end or arm of the spring is engageable with a lever arm arranged for applying pressure to the brush during machine operation. In order to maintain constant pressure while compensating for brush wear, the free arm of the spring is progressively moved into notches provided on the lever arm body. Thus, as wear increases, the spring is wound in incremental amounts and therefore compensates for the greater distance the lever arm must act through to provide the necessary pressure for urging the brush face into contact with the commutator.

The principal disadvantage of the above-described structure is that the application of a constant pressure on the brush throughout its life is not obtainable. As a result, pressures less than optimum values may cause uneven brush wear and produce chattering and sparking at the commutator while pressures too great, accelerate wear of the brush at unreasonable rates. The problem of maintenance posed by the construction is evident since continual verification must be made of brush pressures to keep them within acceptable limits. Further, an excessive number of parts of various sizes and shapes are required in the prior construction and since different size brush holders are used for various machines, an unusually large inventory of individual parts must constantly be maintained in stock.

Therefore, an object of the present invention is to provide a brush holder capable of eliminating the above-described deficiencies while further permitting safe and speedy replacement of a brush without resorting to the use of tools or removing any parts from the brush holder assembly.

In carrying out the object of my invention, I have designed the brush holder in the shape of a substantially rectangular box provided with open ends and having a plurality of spaced parallel channels therein. A brush is inserted through the top open end into one of the channels and protrudes at the opposite open end in a direction for contacting the commutator of the machine. A pair of channels are incorporated in the box on opposite sides of the brush channel and are of a size to accept arms of an assembly supporting a constant pressure spring arranged for pressing the brush into firm contact with the commutator. The remaining channel is utilized for securing the brush holder to a supporting yoke adapted for positioning on a frame of the machine.

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, with parts broken away to show details of the brush holder body;

Figure 2 is an end view of the brush holder shown in Figure 1;

Figure 3 is a top view; and

Figure 4 illustrates a constant pressure spring designed for coaction with the brush holder for urging the brush into contact with a commutator.

Referring now to the drawing wherein like reference characters designate like or corresponding parts throughout the several views, there is shown a brush holder **10** of general rectangular configuration made of bronze or other material and being capable of supporting brushes in the usual manner. The brush holder consists of a box **12** having generally flat sides, open at its top and bottom ends, and of a design permitting attachment to a yoke provided on the machine. A plurality of parallel channels or passageways **14**, **16**, **18** and **20** extend vertically along its length for receiving a carbon brush **22** and spring assembly **24** designed to urge the brush into firm contact with a commutator **26**.

Referring now to the box **12**, the spaced channels **14**, **16**, **18** and **20** are positioned in line with one another with the larger of the channels **16** being utilized for receiving carbon brush **22**. The channel **20** shown at the extreme right of the box **12** is formed by the walls of the box and is equipped with an elongated slot **28** through which a bolt **30** is adapted to extend for attaching the box to a yoke **32** affixed on a side of the machine. Channel **18** positioned adjacent thereto is formed by a pair of oppositely disposed but inwardly directed flanges **34**, the bottom of the channel terminating in a stop member **36** for limiting the extent of downward movement of spring assembly **24** and thereby precluding inadvertent contact with the commutator.

As shown in Figure 3, a second pair of inwardly directed flanges **40** coact with flanges **34** in forming the channel **16** which is of a size for receiving the brushes **22**. Wire shunts **38** extend from the brushes in the usual manner. The flanges **40** merge into a solid wall **42** which serves as a reaction surface for the brushes during machine operation, while the opposite flanges **34** extend substantially to the bottom of the box **12** and the space between the latter flanges is employed for permitting unobstructed downward movement of constant pressure spring **44** as it follows the brushes as they wear from use in the machine. It has been found that the coacting effect between the reaction surface, brush and spring imparts excellent stability to the brush when in contact with the rotating commutator.

The outermost channel **14** is provided with a smooth outer wall **45** having a slot **46** bridged near the bottom with a horizontal bar **48** for a purpose hereinafter described. The upper ends of the wall **45** on opposite sides of slot **46** are bent over to engage the flanges **40** at **41**.

The spring assembly shown in Figure 4 consists of a U-shaped member **50** having legs **52** and **54** which are respectively provided with an outwardly directed projection **56** and lugs **58**, and a spring **44** attached to an inner portion of leg **54**, as by rivets **60**. As indicated above, the spring **44** is of a constant pressure type capable of exerting a predetermined pressure on the brushes regardless of the size or state of wear thereby assuring firm contact with the commutator during their useful life. The U-shaped member is made of spring metal with the legs **52** and **54** being spaced a distance slightly greater than the position they assume when the spring assembly is set in the brush holder.

In operation, after the box **12** has been rigidly attached to the yoke **32** and the brushes **22** inserted therein, the legs **52** and **54** are pressed inwardly and respectively in-

serted in channels 14 and 18 provided in the box. By pressing downwardly on the U-shaped member 50, the spring 44 is caused to unwind as it contacts the top of the brushes 22. Simultaneously, the legs 52 and 54 frictionally engage the walls of their respective channels and when the assembly assumes its final position, leg 54 is held in the channel only by friction of the leg against the inner wall surface. Leg 52 on the other hand, moves against the inner surface of wall 45 until projection 56 slides over the horizontal bar 48 and subsequently snaps outwardly thereby locking the spring assembly in position when downward pressure thereon is removed and the projection 56 permitted to lock itself on the horizontal bar 48. It will be evident that at this time, the upper ends of wall 45 are bent over to contact flanges 40 at 41.

When removal or replacement of the brushes is necessary, downward pressure need only be exerted on the top of U-shaped member 50 by one hand of an operator, such pressure being effective to move the projection 56 out of contact with bar 48. With the parts in this position, removal of the pressure permits the constant pressure spring 44 to move the spring assembly in an upward direction and out of the box 12. Since the top ends of side 45 have been turned over against the flanges 40 at 41, the lugs 58 on leg 52 will hang up at this point thereby maintaining the spring assembly captive on the brush holder.

Reflection on the structure described above will show that only three parts are incorporated in this improved brush holder, namely, the U-shaped member 50, spring 44 and box 12, whereas a multitude of parts are required in prior structures. Further, the process of brush removal is simplified to a single step wherein only a single downward movement of the spring assembly is necessary to effect disengagement from the operative position, and the assembly remains captive on the holder during the brush removal and replacement operation.

Obviously, many modifications and variations are possible in light of the above teachings. It therefore is 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. A brush holder for use with a dynamoelectric machine comprising a box of generally rectangular configuration having sides and open ends, a spring assembly, a plurality of channels formed by partitions in said box for respectively receiving a carbon brush and the legs of said spring assembly utilized in urging the brush into firm contact with a commutator, a coiled spring attached

to one of said legs and a cut out portion in one of said walls of a size sufficient to permit said spring to extend therethrough and thereby follow the brush as it wears during use, a stop in one of said channels for preventing said spring assembly from accidentally contacting said commutator, retaining means in the other of said channels arranged for coaction with said spring assembly for holding the latter in said box against the action of said spring, and captive means on said box effective in retaining said spring assembly on said box when moved to an inoperative position.

2. A brush holder for use with a dynamoelectric machine comprising a box of generally rectangular configuration having a channel for receiving a carbon brush, a narrow channel on each side of the brush channel, a spring assembly comprising a U-shaped member having a projection on one end and a constant pressure spring attached to its other end, the ends of said U-shaped member being of a size to permit reception by said narrow channels and arranged in a manner whereby said spring overlies said brush, a bridging member in a wall of said box adjacent one of said channels positioned for coaction with said projection for locking said spring assembly in said holder against the action of said spring, and captive means on said box arranged for engagement by said spring assembly for retaining the latter thereon when moved to an inoperative position.

3. A brush holder for use with a dynamoelectric machine comprising a box having a first channel for receiving a carbon brush, second and third channels on opposite sides of said first channel designed for respectively accepting spaced legs of a U-shaped spring assembly, a coiled spring mounted on one of said legs, stop means in said second channel limiting the lowermost position of one of said legs, and an open area in a wall separating said first and second channels thereby permitting said coiled spring to move downwardly on a brush as the latter wears from use, said third channel having stop means provided in a wall thereof adapted for engagement by a coacting projection on the other of said legs effective in locking said spring assembly in said box, and captive means on said box for retaining said spring assembly when moved to an unlocked position.

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