Aug. 23, 1960 W. G. NOLTE 2,950,404

BRUSH HOLDER ASSEMBLY

Filed Dec. 12, 1958

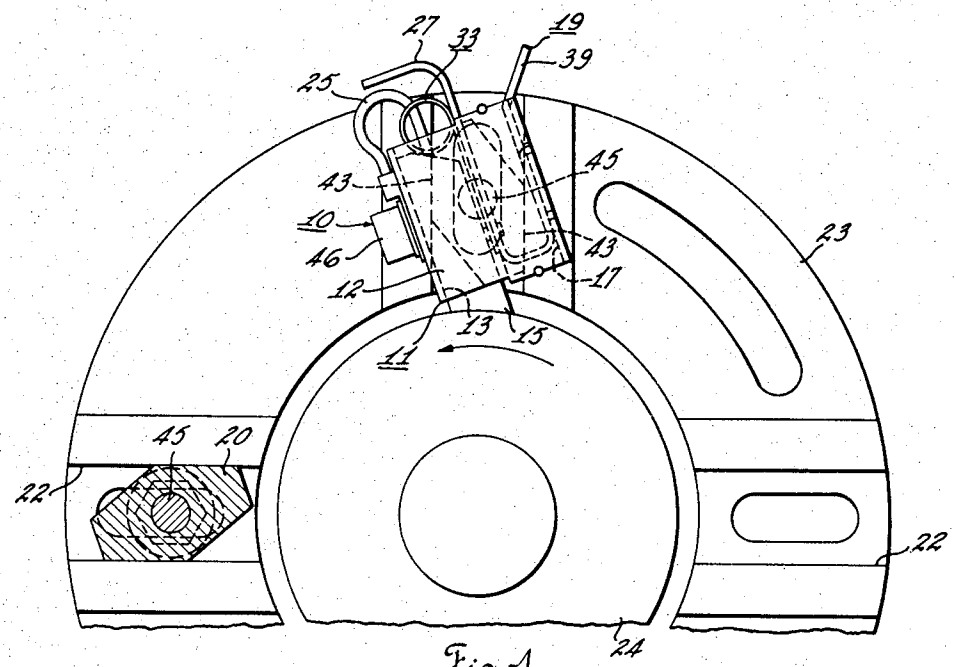


Fig. 1

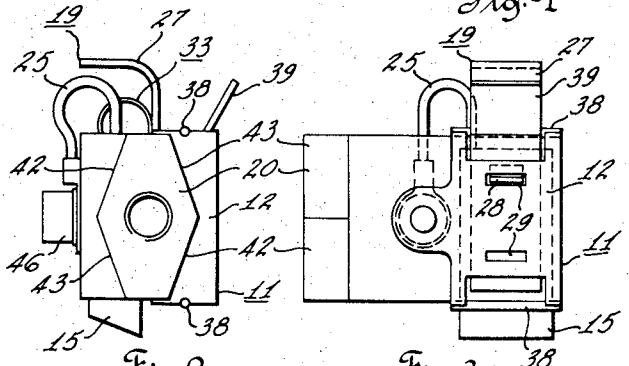


Fig. 2

Fig. 3

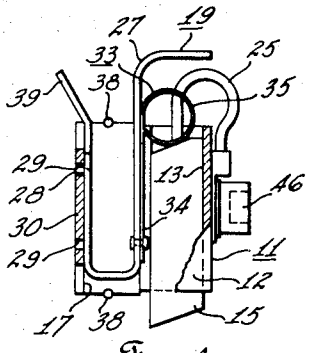


Fig. 4

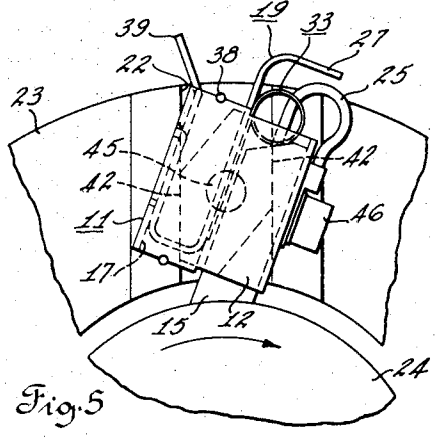


Fig. 5

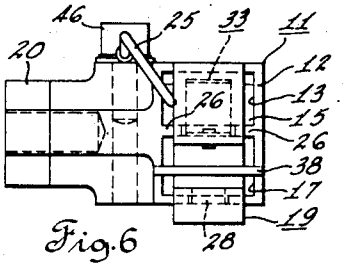


Fig. 6

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United States Patent Office 2,950,404
Patented Aug. 23, 1960

2,950,404

BRUSH HOLDER ASSEMBLY

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Filed Dec. 12, 1958, Ser. No. 780,099

6 Claims. (Cl. 310—241)

This invention relates generally to brush holder assemblies or brush riggings for dynamoelectric machines and more specifically to brush riggings that include brush holders of the reaction type that are adapted to be mounted in more than one position relative to the commutator.

Recognized standard directions of rotation in nonreversing D.C. machines are clockwise for generators and counterclockwise for motors. Consequently, brush riggings which use reaction type brush holders will differ in brush holder orientation to suit the direction of rotation.

A reaction type brush holder is one which holds the longitudinal axis of the brush at an angle with respect to a radial line of the commutator. This angle, measured at the surface of the commutator where the brush axis intercepts a radial line, corresponds to the direction of the net force acting on the brush due to friction against the commutator surface and against the brush holder guides.

Prior art dynamoelectric machines teach two different brush rigging constructions to provide for clockwise and counterclockwise rotation of the machine. The more common of these two constructions consists of mounting the individual brush holders on studs which are secured to the rocker ring in such a manner as to be equally spaced around the ring and have their axes parallel to the rotational axis of the machine. The second method involves mounting the brush holders directly on the rocker ring.

The brush rigging of this invention overcomes the problems of prior art brush riggings by calling for a single set of brush holders and one rocker ring to which the holder may be fitted for either clockwise or counterclockwise rotation of the motor armature. The holder of this invention utilizes a constant tension spring removably mounted on a brush holder that has a base mounted in a suitable slot on the rocker ring. The sides of the base are so formed that by merely inverting the base you can change the operating position of the brush from counterclockwise to clockwise.

Therefore it is the object of this invention to provide a new and improved brush holder assembly for dynamoelectric machines.

Another object of this invention is to provide a new and improved brush holder assembly for dynamoelectric machines that can be positioned for either clockwise or counterclockwise rotation of the motor armature.

Another object of this invention is to provide a new and improved brush holder assembly that is rugged in construction and which is easily assembled and accurately positioned in a dynamoelectric machine.

Other objects and advantages of this invention will be apparent from the following description when read in conjunction with the attached drawings in which:

Fig. 1 is a view partially in section showing the brush holder assembly of this invention mounted on a rocker ring of a dynamoelectric machine for counterclockwise rotation of the machine;

Fig. 2 is a rear view of the holder shown in Fig. 1;

Fig. 3 is a side view of the holder shown in Fig. 1;

Fig. 4 is an end view, with parts broken away, of the brush holder shown in Fig. 3;

Fig. 5 is a partial view showing the holder mounted on the rocker ring for clockwise rotation of the machine; and

Fig. 6 is a top view of the brush holder.

Referring more particularly to the drawings, the reaction type brush holder assembly **10** of this invention consists of a holder **11** comprising a casing **12** having a first channel **13** for receiving a carbon brush **15**, a second channel **17** for receiving a spring assembly **19** and a base **20** having a novel configuration which is adapted for mounting in a slot **22** in the rocker ring **23** of a dynamoelectric machine. The first channel **13** can be of any suitable configuration for receiving a carbon brush in longitudinal sliding relation. As shown in Fig. 1, the brush holder assembly is formed so that the first channel forms a predetermined angle relative to the radius of the commutator **24** when the brush holder **11** is mounted in the rocker ring. The holder can be adjusted longitudinally in the slot to accurately position the brush relative to the commutator.

The carbon brush **15** is of the type normally used in dynamoelectric machines. The brush **15** is connected by a suitable conductor **25** to the casing **12** which in turn is in contact with conductors embedded in the rocker ring **23**.

In the casing **12** adjacent to the first channel **13** is a second channel **17** especially adapted for receiving the spring assembly **19**. As shown in Fig. 6 these channels **13**, **17** are formed in the casing by inwardly extending ribs **26** that divide the casing into two compartments. The spring assembly generally consists of a suitable support member with resilient means attached thereto. Specifically as shown in the drawings, the assembly consists of a U-shaped support member **27** that has on one side an outwardly extending clip **28** which is designed to engage a suitable slot **29** in the rear surface **30** of the casing **12** for retaining the support member with the confines of the second channel. The resilient means are attached to the support member and are positioned to engage the top of the brush in the first channel to urge the brush toward the commutator surface of the dynamoelectric machine.

The resilient means preferably consists of a constant tension spring **33** such as the NEG'ATOR type spring. The spring **33** is formed of a relatively thin strip of spring metal that is prestressed prior to assembly so that it normally forms a spiral coil in its longitudinal direction. The spring **33** has one end **34** attached to the support member in any suitable way, such as by rivets, and the other end **35** which tends to remain coiled engages the top of the brush **15** positioned within the first channel **13** to urge the brush in a longitudinal direction through the channel with a substantially constant pressure. The uniform pressure assures a good substantially constant contact of the brush with the commutator to reduce chattering.

Mounted on the casing **12** at the open ends of the second channel **17** are retaining members **38** which extend across the opening in a transverse direction to the support member. In assembly, the leading edge **39** of the support member **27** is inserted beneath the retaining means **38** and moved until the sides of the U-shaped member **27** are substantially parallel to the sides of the second channel **17**. The member **27** is then forced into the channel **17** until the clip **28** engages the slot **29** in the casing **12**. In this arrangement the retaining members are intermediate the legs of the U-shaped member so that when the U-shaped member is released from the casing the bottom of the U-shaped member will engage the retaining means to prevent the support member from being removed entirely from the brush holder assembly while permitting the

support member to pivot around the retaining means. When the support member **27** is pivoted around the retaining member **38**, the spring no longer contacts the brush and the brush can be easily removed from the first channel for inspection or replacement.

The rocker ring **23** is suitably attached to the dynamoelectric machine and may be of any construction well known in the art. As shown in the drawings, the rocker ring has formed therein slots for receiving the base of the brush holder. For convenience the slots **22** are illustrated as substantially radial slots.

The base **20** of the brush holder **11** has two sets of cooperating surfaces **42**, **43** which are adapted to independently engage the sides of the slot **22** in the rocker ring **23** to position the brush and brush holder at a predetermined angle relative to the radius of the commutator **24**. As shown in Fig. 5, when surfaces **42** engage the sides of the slot **22** the brush is positioned for clockwise rotation of the armature and in Fig. 1 when surfaces **43** engage the sides of the slot the brush is set for counterclockwise rotation of the armature.

The surfaces **42** and **43** of the base can be at any suitable angle so long as they will fit the corresponding sides of the slot. Therefore, the slot could be at an angle other than perpendicular to the axis of rotation of the shaft as shown so long as the surfaces of the base were formed to cooperate with corresponding sides of the slot to properly position the holder relative to the commutator.

To assemble the brush holder for clockwise rotation of the armature as shown in Fig. 1, the base **20** is appropriately positioned in the slot **22** of the rocker ring and secured therein by suitable means such as the bolt **45**. The brush **15** is then placed in the first channel **13** and the conductor **25** from the brush is secured to the terminal **46** on the side of the casing **12**. The support member **27** is then inserted beneath the retaining member **38** and clipped into the slot **29** in the holder casing. In this position the coiled end of the spring engages the top of the brush and urges it toward the commutator **24**. This accurately and quickly positions the brush for clockwise rotation of the armature.

When it is desired to rotate the armature in a counterclockwise direction, such as shown in Fig. 5, the support member **27** is released and removed from the second channel. The brush **15** is then removed and disconnected. The mounting bolt **45** is withdrawn and the brush holder **11** is inverted. The brush **15** is then reinserted in the first channel **13** but from the opposite end and the support member is positioned in the second channel **17** and also from the opposite end. The holder is then positioned in the slot **22** in the rocker ring. However, in this position the second set of surfaces **43** engage the sides of the slot to angle the brush holder at substantially the same angle relative to the slot in the rocker ring but on the opposite side of the slot from the first position. In this arrangement the brush is positioned relative to the commutator for counterclockwise rotation of the commutator.

Although but one embodiment has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

Having now particularly described and ascertained the nature of my said invention and the manner in which it is to be performed, I declare that what I claim is:

1. A brush holder assembly for a dynamoelectric machine having a commutator comprising: a holder having a channel defined therein, a brush mounted in said channel in sliding relation relative thereto, means for urging said brush toward said commutator, means adapted to be connected to said machine for mounting said holder, each of said mounting means having a slot for receiving a holder, said holder having a base extending therefrom, said base having two sets of cooperating surfaces adapted to independently coact with the sides of said slot to locate said holder in two distinct positions for clockwise and counterclockwise rotation of said commutator.

2. A brush holder assembly for a dynamoelectric machine having a commutator comprising: a holder having a channel defined therein, a brush mounted in said channel in sliding relation relative thereto, means for urging said brush toward said commutator, means adapted to be connected to said machine for mounting said holder, each of said mounting means having a substantially radial slot for receiving a holder, said holder having a base extending therefrom, said base having two sets of cooperating surfaces adapted to independently coact with the sides of said slot to locate said holder in two distinct positions for clockwise and counterclockwise rotation of said commutator.

3. A brush holder assembly for a dynamoelectric machine having a commutator comprising: a holder having a channel, a brush mounted in said channel in sliding relation relative thereto, means for urging said brush toward said commutator, means adapted to be connected to said machine for mounting said holder, each of said mounting means having a substantially radial slot for receiving a holder, said holder having a base extending therefrom, said base having two sets of parallel surfaces adapted to independently coact with the sides of said slot to locate said holder in two distinct positions for clockwise and counterclockwise rotation of said commutator.

4. A brush holder assembly for a dynamoelectric machine having a commutator and a rocker ring; said assembly comprising a casing having a first and second channel, a brush mounted in said first channel in sliding relation relative thereto, means positioned in said second channel for urging said brush toward said commutator, said means comprising a U-shaped member and a constant tension spring having one end attached to said member and its other end adapted to engage said brush, a retaining member extending across said second channel and positionable between the legs of said U-shaped member for engaging said U-shaped member when in its nonoperating position, a rocker ring adapted to be mounted on said machine and having surfaces defining a plurality of radial slots, a base extending from said casing and having two sets of surfaces that coact with a corresponding said radial slot in said rocker ring to locate said casing in two distinct positions for clockwise and counterclockwise rotation of said commutator.

5. A brush holder assembly for a dynamoelectric machine having a commutator and a rocker ring; said assembly comprising a casing having a first and second channel, a brush mounted in said first channel in sliding relation relative thereto, means positioned in said second channel for urging said brush toward said commutator, said means comprising a U-shaped member and a constant tension spring having one end attached to said member and its other end adapted to engage said brush, said member having a clip for engaging said casing to hold said member in said second channel, a retaining member extending across said second channel and positionable between the legs of said U-shaped member for engaging said U-shaped member when in its nonoperating position, a rocker ring adapted to be mounted on said machine and having surfaces defining a plurality of radial slots, a base extending from said casing and having two sets of parallel surfaces that coact with a corresponding said radial slot in said rocker ring to locate said casing in two distinct positions for clockwise and counterclockwise rotation of said commutator.

6. A brush holder assembly for a dynamoelectric machine having a commutator and a rocker ring; said assembly comprising a casing having a first and second channel, a brush mounted in said first channel in sliding relation relative thereto, means positioned in said second

channel for urging said brush toward said commutator, said means comprising a U-shaped member and a constant tension spring having one end attached to said member and its other end adapted to engage said brush, said member having a clip for engaging said casing to hold said member in said second channel, a retaining member extending across said second channel at each end and positionable between the legs of said U-shaped member for engaging said U-shaped member when in its nonoperating position, a rocker ring adapted to be mounted on said machine and having surfaces defining a

plurality of radial slots, a base extending from said casing and having two sets of parallel surfaces that coact with a corresponding said radial slot in said rocker ring to locate said casing in two distinct positions for clockwise and counterclockwise rotation of said commutator.

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