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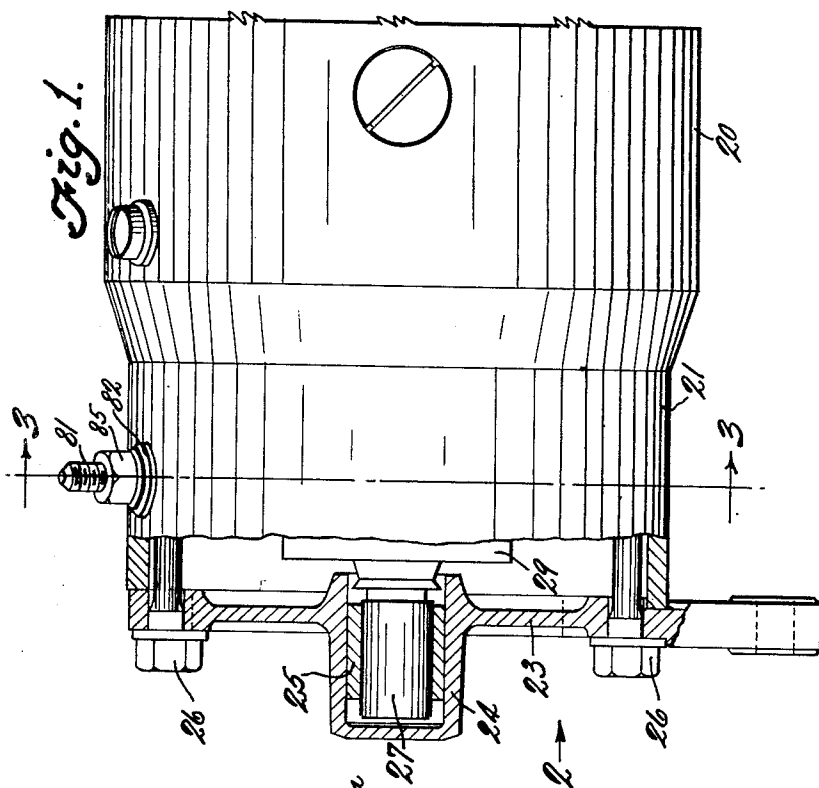
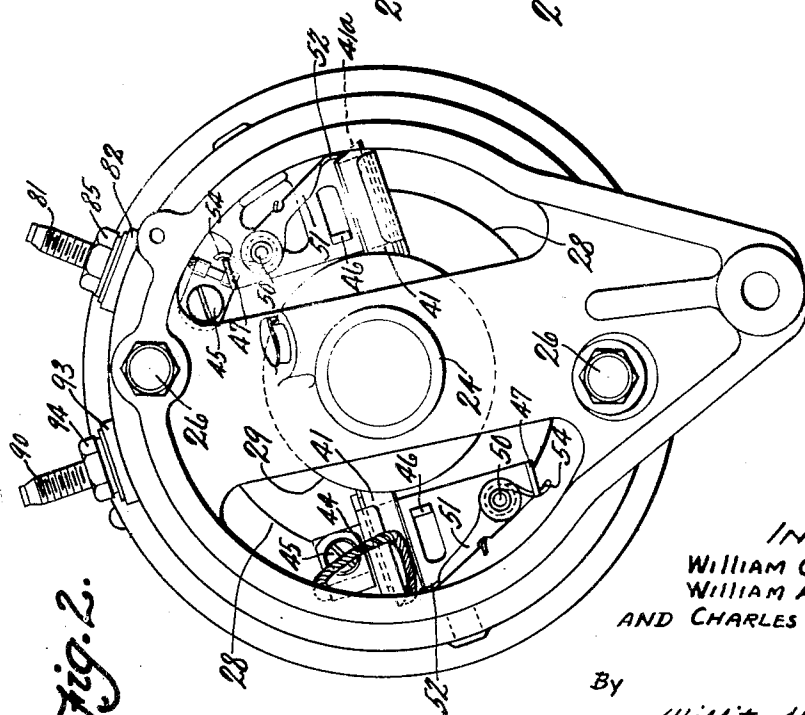
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BRUSH RIGGING FOR GENERATOR

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2 Sheets-Sheet 1



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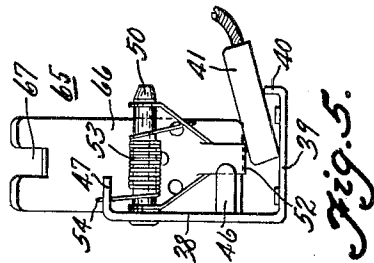
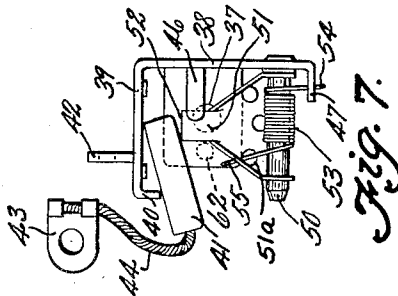
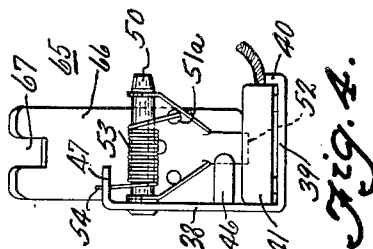
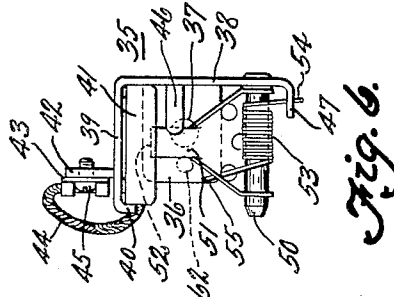
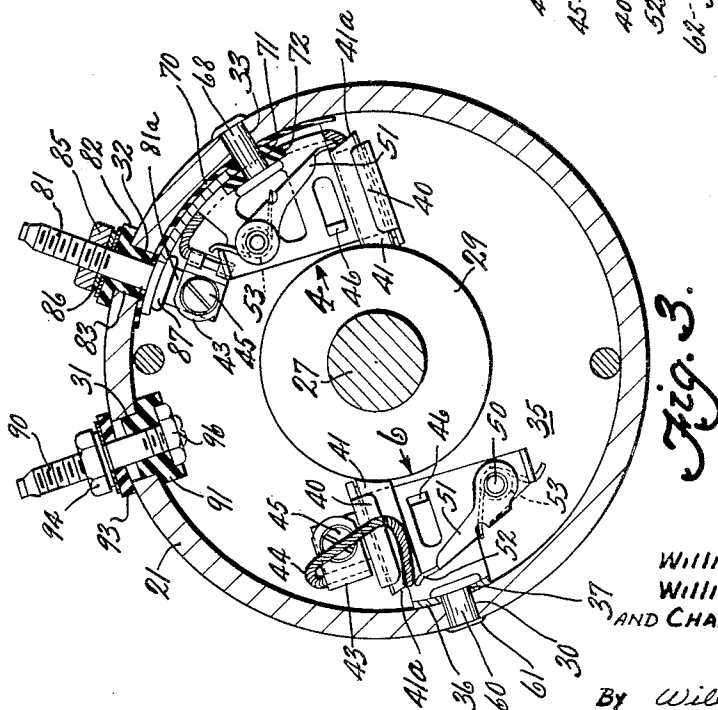
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BRUSH RIGGING FOR GENERATOR

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5 Claims. (Cl. 310—239)

This invention relates to improvements in brush riggings for electric generators, or dynamos, particularly to holders for the carbon brushes or the like which are biased against the commutator.

An object of the present invention is to simplify the construction and to reduce the cost of manufacture of the brush rigging. In order to accomplish this object the present invention provides a construction of parts which can be manufactured from sheet metal.

It is also an object of the present invention to provide an end member, which is attached to the frame of a generator, with a plurality of openings so arranged with respect to the brush holders that one brush may be assembled with or from its holder without removing the end member and without disturbing other brushes so that replacement of brushes is a very quick and inexpensive operation.

To accomplish these and other objects, the generator frame is provided with a protruded end for attachment of brush holders and provisions for the attachment of an end member having apertures adjacent the brush holders. The brush holders and end member when assembled in their proper position permit removal or assembly of brushes from points outside the end member without disturbing the end member. The brush holders are formed from sheet metal blanks, and these blanks are constructed to provide means for receiving the brushes for engagement with a rotating part, means for urging the brushes into engagement with the rotating part, and means for securing the holder to the frame and in such a way that the brushes can be removed from the holder and pulled through the openings of the end member.

Further objects and advantages of the present invention are apparent from the following description reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is a fragmentary, side view of the commutator end of the generator, parts being broken away and parts in section to better illustrate the details of construction of generator frame or housing.

Fig. 2 is an end view looking in the direction of arrow 2 in Fig. 1.

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

Fig. 4 is a view of one of the brush holders with a brush mounted therein and looking in the direction of arrow 4 in Fig. 3.

Fig. 5 is a view similar to Fig. 4 but illustrating the manner in which the brush is removed from the holder.

Fig. 6 is a view of another brush holder with a brush mounted therein and looking in the direction of arrow 6 of Fig. 3.

Fig. 7 is a view similar to Fig. 6 but illustrating the manner how the brush is removed from the holder.

Referring to the accompanying drawings, 20 designates a main portion of a field frame or housing of a generator having a protruded reduced diameter end portion 21 whose external cross dimension is less than main por-

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tion. The rear end of the frame, not shown, is closed by an end member or cover not shown, while the forward or protruded end 21 is closed by an end member 23. The end member is provided with a boss 24 enclosing a bearing bushing 25. The end member 23 together with the other end member is secured to the frame 20 by a pair of bolts 26 which extend through the generator within the frame.

Rotatably mounted in the bearings supported by the end member is a shaft 27 of an armature 28. The armature is provided with a commutator 29 which has the usual arrangement of conducting bars and insulating spacers.

One of the main features of the present invention is the novel method whereby the brushes which coact with the commutator are supported in holders or brackets so that they can be removed and assembled without disturbing the end member 23. In the present instance the protruded end 21 is provided with a plurality of radially spaced openings 30, 31, 32 and 33. Referring to Figs. 3, 6 and 7, one of the improved brush holders 33 is shown. A blank is first punched from sheet metal and this is then formed by bending operations to provide an arched base 36 having an opening 37. Formed integral with the base is a side plate 38 which is bent at right angles to the circumferential plane of the base to provide a bottom wall 39 of a brush guide. The wall 39 is bent at right angles to the bottom wall to provide a leg or flange 40 which is parallel to the plane of side plate 38. The side plate 38, bottom wall 39 and leg 40 provide a U-shaped channel or guide to receive a carbon brush 41. Additionally, to provide an electrical connection, wall 39 is provided with a lug 42, struck outwardly from the wall 39 in a position such that a clip 43 attached to one end of a lead 44 may be attached by a screw 45. The other end of the lead 44 is attached to the brush 41. The side plate 38 is provided with a stop 46, struck inwardly from the plate 38. The other end of the plate 38 is bent at right angles to the plane of the plate to provide an ear 47 having a notch.

A post or pin 50 is secured to the plate in any suitable manner. The base 36, wall 39, stop 46, ear 47 and pin 50 all extend laterally from one side of the plate 38 in the same direction. A spring pressed lever or arm 51 is adapted to engage the outer end of a carbon brush 41 to retain it in engagement with the commutator. As shown in Fig. 5, the lever 51 has one end pivoted on the pin 50 while having its free end 52 engaging the outer end of the brush 41. The arm 51 is caused to exert pressure on the brush by the action of a closely coiled spring 53. The coiled spring is disposed about the pin 50 and has one end 54 bearing in the notch of ear 47 and has the other end 55 extending through an opening 51a in the arm 51 and operates to urge the lever 51 toward the stop 46. By this arrangement of the spring 53 the lever 51 is held in assembled relation on the pin 50. In order that the brush 41 will not be forced out of the channel in case of sudden shocks the outer face 41a of the brush is tapered toward the pivot pin 50, thus the brush 41 will be moved constantly against the bottom wall 39 and also toward the commutator 29. The brush holder 35 is secured to the frame by a headed rivet 60 having its shank passing through the openings 37 and 39, respectively, of the base 36 and the frame end 21. The shank of the rivet 60 is peened over at 61 securing the bracket 35 to the cylindrical wall 21 and making grounding contact with frame. The base has a detent 62 which extends into a recess provided in the end 21 to prevent the bracket from turning on the rivet 60 with respect to the frame.

Figs. 4 and 5 show a companion bracket 65 which is similar in construction to bracket 35 with these exceptions; the bracket 65 is provided with a base portion 66 that is considerably longer than base 35 and the lug 42 is eliminated. A lengthwise central slot 67 is punched in the end of the base portion 66.

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The bracket 65 is secured to the interior of the cylindrical wall of end 21 by a rivet 68 to the frame end 21 and this rivet is insulated from the frame by an insulating strip 70, a resilient insulating bushing 71 having a collar 72. The brush guide portion of the bracket 65 slidably supports a brush 41 having the lead 44 provided with the terminal clip 43 which is electrically connected to an extension 81a of a terminal 81. The terminal 81 is insulatingly supported on the frame end 21 by an insulating washer 82 having a projection 83 extending into the opening 32 in the frame, and abuts the insulating strip 70. A nut 85 cooperates with the terminal 81 to draw a collar 87 on the terminal 81 against the base 66 and thereby clamp base 66 and the washer 82 on opposite sides of the wall 21 of the frame. It is pointed out that the slot 67 straddles the terminal 81 between the strip 70 and the collar 86. By this arrangement the bracket 65 is prevented from turning on the rivet 68 relative to the housing or frame end 21.

A terminal 90 is insulatingly supported in the frame end 21 by an insulating washer 91 having a projection extending into the opening 31 in the frame. An insulating washer 93 surrounds the terminal outside the frame. Thus the washers 91 and 93 insulate the terminal 90 from the frame 21. A nut 94 threaded on the terminal head 90 clamps the washers 91 and 93 against opposite sides of the wall of the housing. The terminal head 96 of the terminal 90 is electrically connected by a lead to a field coil, not shown, of the generator.

One of the most important features in connection with the brush rigging is the simplicity by which the brushes may be assembled or disassembled from the brush holders 35 and 65. It will be noted in Fig. 1 that the end member 23 is provided with a plurality of openings one opposite each bracket. It is well known that brushes will wear in use and that occasionally one brush will be defective while the other is perfect. In order to remove the worn brushes or defective brushes from the bracket 35, 65, without removing the end member 23 from the frame, the operator simply inserts a screw driver through the opening opposite the bracket from which the brush is to be removed, and loosens for example the screw 45 to release the clip 43 after which the lever 51 is raised, against the action of spring 53, from engagement with the outer end 41a of the brush 41. The brush can be removed by the operator by gripping the brush with his fingers or by using a pair of pliers. The brush is first lifted free of the flange 40 after which the brush is removed edgewise with respect to a bracket. When a new brush is inserted in the guide and the lever released, the spring 53 will automatically move the new brush against the wall 39 and against the commutator 29.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. In a mounting for dynamo brushes, the combination of a metal tubular frame; a plurality of brush holders, each brush holder having a side plate having an integral L-shaped portion extending to one side of the plate at right angles to the normal plane of the plate to provide a guide channel for a brush, and having an integral base portion extending to one side of the plate adapted to be secured to the frame; a post secured to the plate; an arm pivotally mounted at one end on the post and having its free end extending into the channel to engage the brush to hold same in the channel; a spring about the post and having its ends anchored respectively to the arm and the plate whereby the free end of the arm will be resiliently held in engagement with the brush and whereby upon movement of the free end of the arm against the action of the spring, away from the brush, said brush may be moved laterally out of the channel and means for attaching the holder to the frame.

2. In a mounting for dynamo brushes the combination

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of, a circular metal frame, a plurality of brush holders, each holder comprising a metal plate having a flat side portion and an integral L-shaped arm extending outwardly to one side from the side portion in a right angular plane thereto whereby the arm and side form a channel adapted to receive a brush; an integral stop pierced from the side plate and extending in front of the channel; an integral base extending laterally from an edge of the side portion toward said channel adapted to be secured to the frame; a post secured to the side plate; an arm having one end pivotally mounted on the stud and having the other end extending into the channel, a spring about the post and having one end anchored to the support and having the other end anchored to the arm whereby the arm is urged toward the stop; and means for attaching the brush holder.

3. In a dynamo electric machine, the combination comprising, a tubular sheet metal frame having a reduced diameter open end portion; a plurality of brush holder assemblies fixed in predetermined radial spaced relation to the interior wall of the frame at said reduced diameter end portion; removable brushes slidably mounted in said holders; a commutator arranged for engagement by said brushes; an arm pivotally supported on each brush holder for engaging the brushes; coiled springs acting on the arms for causing the brushes to move radially inwardly against said commutator; and an end member for closing the open end of said frame and having longitudinal openings therethrough opposite said holders for the purposes of longitudinally removing or assembling brushes from or with their respective holders without disturbing the brush holders.

4. A brush holder formed from a single blank of sheet metal to provide a U-shaped channel adapted to receive a brush, a base portion adapted to be attached to a support, a stop struck out from the blank and disposed in front of the channel, and an ear provided with a notch position spaced from the stop; a post fixed to the blank and located between the ear and the stop; an arm having one end pivotally mounted on the post and having its free end extending above the stop and the channel; a close coiled spring about the post having one end bearing against notched portion of the ear and having the other end extending through an opening provided by the arm and bearing thereagainst whereby the arm is urged toward the stop as the brush is worn and whereby the arm is maintained in assembled relation on the post due to resistance of axial elongation of the coils of said spring.

5. In a dynamo electric machine, the combination comprising, a tubular sheet metal frame having an open end portion; a plurality of brush holder assemblies fixed in predetermined radial spaced relation to the interior wall of the frame at said end portion; removable brushes slidably mounted in said holders; a commutator arranged for engagement by said brushes; an arm for each brush holder, said arms having one end pivotally mounted on the brush holder and having their free ends engaging the brushes; coil springs having one end engaging the holders and having the other end engaging the arms whereby the free ends of the arms engage the brushes to move same against the commutator; a perforated end member for the open end of the frame whereby the arms may be lifted through said perforation and also for the purposes of longitudinally removing or assembling brushes from or with their respective holders through said perforations.

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