March 24, 1942. H. WEISSINGER 2,277,572

ADJUSTABLE BRUSH TENSION DEVICE FOR ELECTRIC MOTORS, GENERATORS, ETC

Filed Feb. 14, 1940 2 Sheets-Sheet 1

Fig. 1.

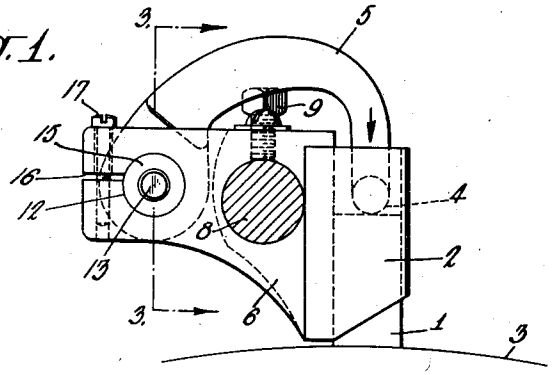


Fig. 2.

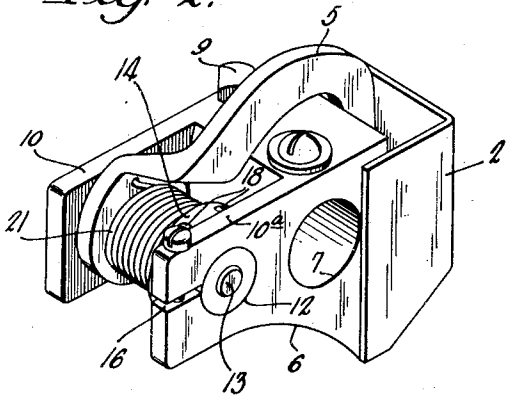


Fig. 3.

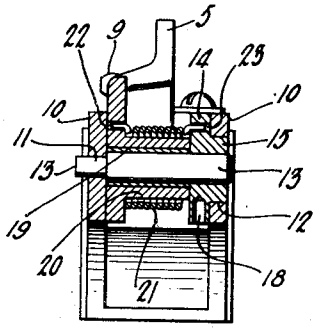


Fig. 5.

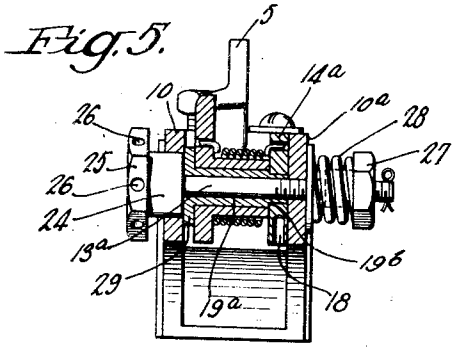
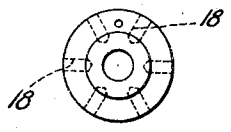


Fig. 4.



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Filed Feb. 14, 1940 2 Sheets-Sheet 2

Fig. 6.

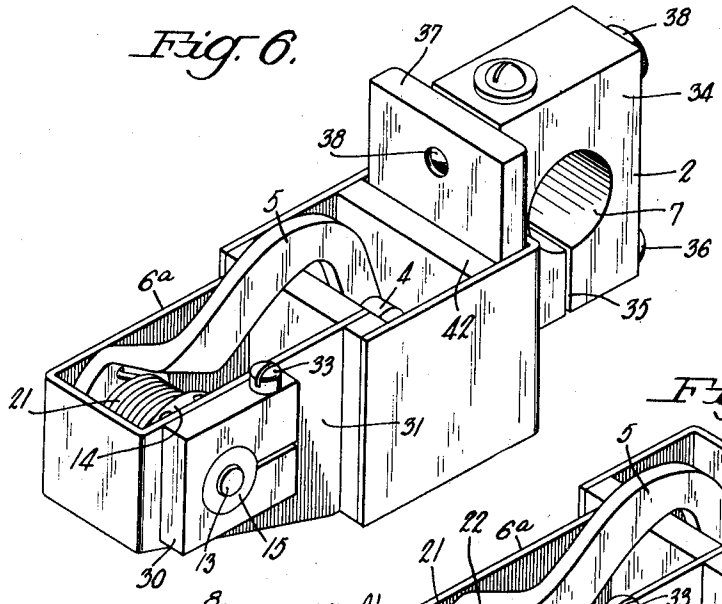


Fig. 7.

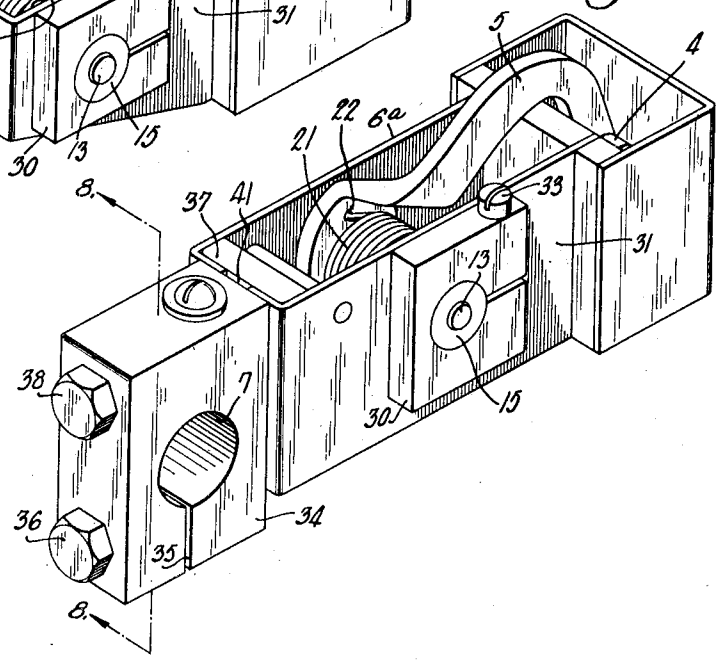
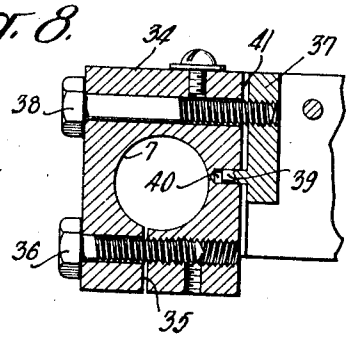


Fig. 8.



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Patented Mar. 24, 1942

2,277,572

UNITED STATES PATENT OFFICE

2,277,572

ADJUSTABLE BRUSH TENSION DEVICE FOR ELECTRIC MOTORS, GENERATORS, ETC.

Harry Weissinger, Philadelphia, Pa.

Application February 14, 1940, Serial No. 318,946

4 Claims. (Cl. 171—324)

This invention relates to new and useful improvements in electric-brush holders and more particularly to such devices wherein the tension or pressure exerted upon the brush may be adjusted at will with extreme exactitude as desired. The invention also contemplates certain improvements in brush holders and the mounting thereof.

The principal object of the present invention, therefore, is to provide an electric-brush holder for generators, motors and the like wherein novel means is provided for effecting controlled adjustment of the tension or pressure exerted upon the brush to the exact degree desired and which is not restricted to certain fixed adjustments because of any limitation in the particular positions to which the tensioning or pressure control means may be adjusted.

Another object of the present invention is to provide an electric-brush holder of the character set forth which is of relatively simple, rugged construction, and entirely fool-proof in use and operation.

A further object of the invention is to provide a brush holder of the type described having a novel construction and arrangement of parts for effecting relatively easy rapid mounting and adjustment of said holder upon a generator, motor or the like.

These and other objects of the invention and the features and details of the construction and operation thereof are hereinafter fully set forth and shown in the accompanying drawings, in which:

Figure 1 is a side elevation view of one form of brush holder made according to the present invention.

Figure 2 is a view in perspective of the holder disclosed in Figure 1.

Figure 3 is a view in section taken on line 3—3, Figure 1.

Figure 4 is a view in elevation of the adjusting wheel forming a part of the device of Figures 1 to 3.

Figure 5 is a view in section similar to Figure 3 showing a modified form of the invention.

Figures 6 and 7 are views in perspective of still other forms of brush holder embodying the invention; and

Figure 8 is a view in section taken on line 8—8, Figure 7.

Referring now to the drawings, and particularly Figures 1 to 4 thereof, reference numeral 1 represents an electric generator or motor brush which is mounted to reciprocate vertically within a brush box 2, but is thrust toward the rotary contact surface 3 of a generator or motor by the head 4 of pivoted lever 5 which is spring-pressed in the direction of the arrow shown in Figure 1.

The aforesaid brush box 2 forms part of a bracket or supporting structure 6 having an opening 7 therethrough for a supporting bar 8 and upon which said bracket 6 is secured by means of a set screw or the like 9.

The bracket also comprises a pair of spaced flange or arm portions 10 which extend in a direction away from the brush box 2 and these flange portions 10, 10a are each provided with suitable axially aligned bores 11 and 12 in which is mounted a stud or pin 13 so as to extend transversely of the bracket 6 bridging the space between said arm portions.

An adjusting element or wheel 14 having a projecting smaller hub portion 15 is journalled on the aforesaid stud or pin 13 and the bore 12 in the arm portion 10a is, therefore, comparatively larger than the other bore 11 so as to receive therein the said projecting hub portion 15 of the wheel or element 14. In addition, the arm portion 10a is split as indicated at 16 so that the hub portion 15 may be rigidly clamped in the arm 10a by means of the screw or like element 17.

The adjusting element or wheel 14 has a series of sockets or recesses 18 in the peripheral surface and, as shown, said element is retained in the position shown adjacent the inner wall of the arm 10a by means of a sleeve or like spacing element 19 which is mounted upon the stud 13 and of a length substantially equal to the distance or space between the said adjusting element 14 and the inner wall surface of the other arm 10 as best illustrated in Figure 3 of the drawings.

Rotatably supported upon this sleeve or spacing element 19 is the cylindrical hub portion 20 of the previously mentioned pressure lever 5 and this hub portion 20 likewise has a length substantially equal to the distance or space intermediate the adjusting element 14 and the inner wall surface of the arm 10 as shown.

A spring 21 is coiled about or around the hub portion 20 of the lever 5 as shown and the opposite end portions of said spring 21 are inserted in or engage openings 22 and 23 formed respectively in the lever 5 and adjusting element 14, said spring being coiled and connected to said parts so that the said lever is urged thereby in the direction of the arrow in Figure 1.

From the foregoing it will be seen that tension of the spring 20 may be adjusted to exactly the desired degree by first loosening the screw

element 17 to reduce the "brake" effect of the split arm 10a upon the hub 15 to the extent desired and inserting a nail or like slender element into one of the holes 18 in the peripheral surface of the adjusting element 14 then rotating the latter to increase or decrease the spring tension to the degree desired. When this has been done and while holding the element 14 in the adjusted position the screw element 17 is then either tightened sufficiently to create friction enough to over-balance the spring tension or to securely clamp the hub portion 15 and thus hold said element 14 in said adjusted position.

A slightly modified form of the invention is shown in Figure 5 of the drawings. This form of device embodies essentially the same elements present in the arrangement shown in Figures 1 to 4 previously described but the form and construction of some of them has been modified to best fit with certain commercial applications of the invention. As shown in said Figure 5 the stud 13a is in the form of a screw or bolt like element having a shoulder portion 24 adjacent one end thereof of relatively larger diameter and a head portion 25 of still larger diameter, the spacing of the said shoulder 24 and head 25 being such that the latter is held in outwardly spaced relation with respect to the exterior wall surface of the arm 10. The head portion 25 of the element 13a in this form of the invention is provided with sockets or recesses 26 in its peripheral surfaces and is preferably of square or exagonal shape to enable the use of a wrench thereon. Also, the opposite end portion of this element 13a is threaded to receive a nut or like element 27 and between which and the adjacent face of the arm 10a is disposed a relatively stiff coil spring 28.

In addition to the above changes, the sleeve or spacing element 19a is provided at the arm 10 end thereof with a relatively large diameter flange portion 29 which is engaged by the shoulder portion 24 of the element 13a as shown thus urging the element 19a toward the right with respect to Figure 5. In this form also the element 19a is provided at its arm 10a end with a portion of reduced diameter on which is journalled the adjusting element 14a and the shoulder formed by this reduced portion abuts the said adjusting element retaining or clamping the same adjacent the said arm 10a.

As shown, the adjusting element 19a has no hub portion to be clamped as in the device of Figures 1 to 4 and in the present form of the invention the said adjusting element 19a is held in its adjusted position by tightening the nut or like element 27 thus drawing up on the element 13a and, through the successive shoulder abutments on the elements 13a and 19a, forcing the adjusting member 14a tightly against the adjacent surface of the arm 10a as will be entirely clear from Figure 5 of the drawings.

Referring now more particularly to Figures 6, 7 and 8 of the drawings, the brush-holding devices there shown embody spring-tension adjusting and controlling mechanisms of the construction shown in Figures 1 to 4, except that the hub portion 15 of the adjusting element 14 is clamped in its adjusted positions by means of separate split blocks 30 which are secured against the outer face of the side portions 31 of the bracket member 6a and provided with a locking screw or the like 33. It will be obvious, however, that these forms of devices may be provided, if desired, with adjusting and controlling mechanisms of the construction shown in Figure 5 of the drawings.

Now to facilitate mounting and adjustment of the brush-holder of the present invention upon the supporting bars or structures of generators, motors and the like, I provide a supporting member 34 having an opening therein to receive a supporting bar (such as bar 8 in Figure 1) and constructed and arranged for adjustable supporting connection with the brush-holder structure of the present invention.

For securing the members 34 upon a supporting bar, the same are split as indicated at 35 and provided with a screw element 36 whereby said members may be secured upon such bar in desired position.

Adjustable connection of these supporting members 34 with the brush holders is accomplished by providing the former with a clamp element 37 which is adjustable toward and away from the support proper 34 by means of a bolt or the like 38, the said clamp element being provided also with a suitable centering dowel 39 adapted to engage a socket or recess 40 in the adjacent face of the supporting member 34 (see Figure 8).

The clamp element 37 mentioned just above is constructed and arranged to fit inwardly of or behind the end wall portion of the bracket 6a comprising the brush-holder either at the brush box 2 end thereof as in Figure 6 or at the adjusting mechanism end thereof as in Figure 7. To permit this requires the provision of suitable clearance-way for the tightening screw or bolt 38 and, therefore, the appropriate end of the brush holder is provided with a vertically extending slot 41 therein as shown, for example, in Figure 7. In addition to providing clearance-way for the bolt 38, this slot 41 serves the added and important function of permitting adjustment of the support 34 and brush holder vertically with respect to each other as may be desired or required in a particular given application or installation.

In the case illustrated in Figure 6 wherein the support is attached to the brush box end of the holder, the space for reception of the clamp element 38 is, of course, separated from the brush box 2 by a partition or spacing element of suitable form such as, for example, that indicated at 42. This same arrangement may be utilized at the other end of the brush holder in the case of the form of device shown in Figure 7, although generally the remoteness of the electrical contact brush and lack of any chance of interference with its operation makes this unnecessary in such applications of the invention.

From the foregoing it will be seen that the present invention provides a brush holder for generators, motors and the like wherein spring-tension upon the contact brush may readily be adjusted to the exact degree desired in a holder which is fool-proof in operation and of relatively simple, rugged construction. In addition, the present invention provides a brush-holder construction which is readily mounted and adjusted upon generators, motors and the like.

While various forms of the invention have been illustrated and described herein, it is not intended that said invention be limited thereto but that other changes and modifications may be made and incorporated therein and thereto within the scope of the annexed claims.

I claim:

1. A brush holder comprising a frame structure including a brush box having projecting spaced parallel arms provided with axially aligned bores therein, a stud extending through said bores in said arms and bridging the space therebetween, an adjusting element rotatably mounted on said stud and disposed inwardly adjacent one of the arms, said adjusting element having a projecting hub portion journalled in the bore of the said one arm, a sleeve embracing said stud and extending between said adjusting element and the other arm operable to maintain the adjusting element in the aforesaid position, a lever including an extended end portion arranged to press upon a brush in said brush box and having a hub portion rotatably mounted on said spacing sleeve intermediate said other bifurcation and said adjusting element, a coiled spring encircling said lever hub with the opposite end portion of said spring respectively engaging said lever and adjusting element so that said spring urges said lever against the brush, the adjusting element being circumferentially rotatable at will to regulate the force of the spring on said lever, and means for clamping said hub portion of the adjusting element to secure the latter in any position to which adjusted.

2. A brush holder comprising a frame structure including a brush box having projecting spaced parallel arms provided with axially aligned bores therein, one of said arms being split from an edge thereof to its bore, a stud extending through said bores in the arms and bridging the space therebetween, an adjusting element rotatably mounted on said stud and disposed inwardly adjacent said split arm, said adjusting element having a projecting hub portion journalled in the bore of the split arm, a sleeve embracing said stud and extending between said adjusting element and the other arm operable to maintain the adjusting element adjacent said split arm, a lever including an extended end portion arranged to press upon a brush in said brush box and having a hub portion rotatably mounted on said spacing sleeve intermediate said other arm and said adjusting element, a coiled spring encircling said lever hub and having its opposite ends respectively engaging said lever and adjusting element whereby said spring urges said lever against the brush, the adjusting element being circumferentially rotatable at will to regulate the force of the spring on said lever, and means for compressing the split arm to tighten the same upon the hub portion of the adjusting element and secure the latter in any position to which adjusted.

3. A brush holder comprising a frame structure including a brush box having projecting spaced parallel arms provided with axially aligned bores therein, a stud extending through said bores in said arms and bridging the space therebetween, an adjusting element rotatably mounted on said stud and disposed inwardly adjacent one of the arms, said adjusting element having a projecting hub portion journalled in the opening of the said one arm, a lever including an extended end portion arranged to press upon a brush in said brush box and having a hub portion mounted for rotation about said stud and extending entirely between the other arm and said adjusting element, a coiled spring encircling said lever hub with the opposite end portions of said spring respectively engaging said lever and adjusting element so that said spring urges said lever against the brush, the adjusting element being circumferentially rotatable at will to regualte the force of the spring on said lever, and means for clamping said hub portion of the adjusting element to secure the latter in any position to which adjusted.

4. A brush holder comprising a frame structure including a brush box having projecting spaced parallel arms provided with axially aligned bores therein, one of said arms being split from an edge thereof to its bore, a stud extending through said bores in the arms and bridging the space therebetween, an adjusting element rotatably mounted on said stud and disposed inwardly adjacent said split arm, said adjusting element having a projecting hub portion journalled in the bore of the split arm, a lever including an extended end portion arranged to press upon a brush in said brush box and having a hub portion mounted for rotation about said stud and extending entirely between the other arm and said adjusting element, a coiled spring encircling said lever hub and having its opposite ends respectively engaging said lever and adjusting element whereby said spring urges said lever against the brush, the adjusting element being circumferentially rotatable at will to regulate the force of the spring on said lever, and means for compressing the split arm to tighten the walls of the opening therein upon the hub portion of the adjusting element and secure the latter in any position to which adjusted.

HARRY WEISSINGER.