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W. L. WATERS.

BRUSH HOLDER.

APPLICATION FILED JAN. 20, 1905.

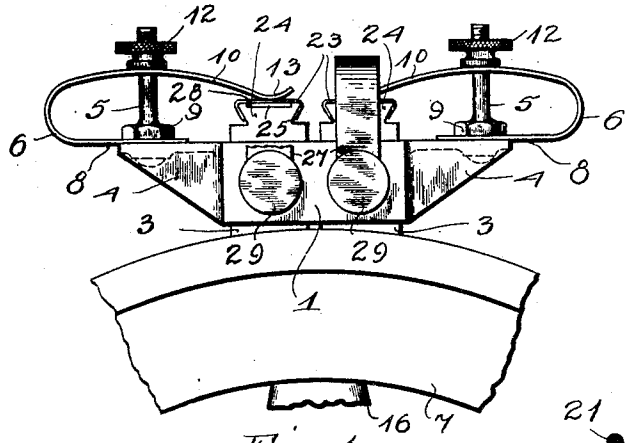


Fig. 1.

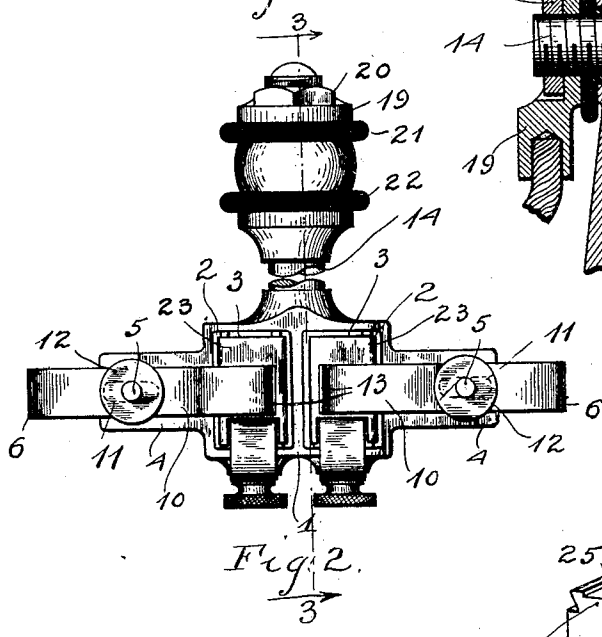


Fig. 2.

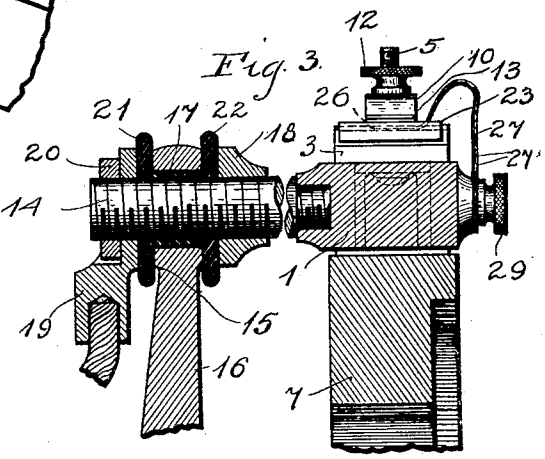


Fig. 3.

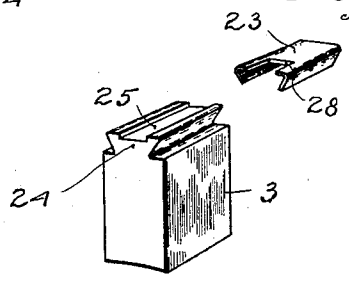


Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

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BRUSH-HOLDER.

No. 823,569. Specification of Letters Patent. Patented June 19, 1906.

Application filed January 20, 1905. Serial No. 241,983.

To all whom it may concern:

Be it known that I, WILLIAM L. WATERS, a subject of the King of England, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Brush-Holders, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to brush-holders, particularly to brush-holders employed for alternating-current machinery.

In the accompanying drawings, Figure 1 shows an elevation view of the brush-holder associated with part of a collector-ring. Fig. 2 is a plan view of the brush-holder and supporting-yoke. Fig. 3 is a sectional view taken on line 3 3 of Fig. 2. Fig. 4 is a perspective view of a carbon brush used in the brush-holder, and Fig. 5 is a perspective view of a cap-plate.

The brush-holder shown is adapted for the reception of two brushes, and it consists of a body portion 1, through which extend the vertical brush-chambers 2 2 for receiving brushes 3 3. Lateral extensions or shelves 4 4 from the body part 1 support clamping and adjusting posts 5 5. A U-shaped spring 6 is provided for engaging each brush to press the brush into engagement with the commutator or collector-ring 7. The lower limb 8 of the spring is clamped to the corresponding shelf 4 by the collar or nut portion 9 of the clamping-post 5. The upper leg 10 of each spring is provided with a slot or elongated groove 11, through which the stem of post 5 passes, the upper end of the stem being threaded to be engaged by a knurled thumb-nut 12. The end 13 of each spring is slightly curved and engages the top of the corresponding brush, and the pressure on the brush is controlled by the tension caused on the spring upon adjustment of the knurled nut 12. A supporting-stud 14 extends from the brush-holder frame and may be integral therewith or have threaded connection therewith, as shown in Fig. 3. This stud passes through the opening 15 in the end of the yoke-arm 16, and the stud is insulated from the arm by an insulating-bushing 17. A threaded collar 18 engages the inner end of the stud 14, which is also threaded, and a terminal lug 19 and a threaded clamping-nut 20 engage the outer end of the stud. Insulating-washers 21 and 22 are disposed between the yoke-arm 16 and the lug 19 and collar 18, respectively. Thus the brushes and brush-frame are entirely insulated from the yoke-arm 16, but are in direct electrical connection with the terminal lug 19, from which the collected current is transmitted.

The springs 10 afford electrical connection between the brushes and the brush-holder frame; but to insure better contact between the springs and the carbon brushes I provide metallic cap-plates 23. These cap-plates may consist of sheet-copper and are shaped to snugly fit the dovetailed end 24 of the brushes, and the brushes also may be copper-plated. The top of the brushes is provided with a groove 25, and the end 26 of a flexible copper conductor 27 engages in this groove below the cap-plate. The end 26 may be clamped between the top of the carbon brush and the cap-plate to afford the necessary electrical connection or may be soldered to the cap-plate. To allow the end 26 to engage more nearly the center of the brush, the cap-plate is cut away at one end to leave a groove 28, as shown in Fig. 5, and the other end of each conductor is secured to the front of the brush-holder frame by a thumb-screw 29. These conductors are the means for affording the sufficient electrical connection between the carbon brushes and the brush-holder frame and may be either stranded or formed of thin laminations 27 of annealed copper.

An important feature of the brush-holder is the ease with which the brushes can be removed for examination. The studs or posts 5 are not screwed down very tightly to the shelves 4, but readily allow rotation of the springs 10 to carry the ends clear of the brushes, which can then be lifted out of the chambers for examination or repairs.

I do not wish to be limited to the brush-holder frame for supporting two brushes as shown, as equal advantages can be derived from using a brush-holder employing only one brush controlled in a similar manner.

Other changes also may readily be made without departing from the spirit of invention.

I claim as new and desire to secure by Letters Patent—

1. In a brush-holder, the combination with a supporting-frame, of a brush-chamber extending through said frame, a carbon brush extending through said chamber for engagement with a commutator or collector-ring

with which the brush-holder is associated, said brush having a dovetailed upper end, a metallic cap-plate engaging said dovetailed end, a pressure-spring engaging the top of the cap-plate for pressing said brush into engagement with the commutator or collector-ring, and a flexible conductor engaging below said cap-plate and connected with said frame.

2. In a brush-holder, the combination with a supporting-frame, of a brush-chamber extending vertically through said frame, a carbon brush extending through said chamber for engagement with a commutator or collector-ring with which the brush-holder is associated, said brush having a dovetailed upper end, a metallic cap-plate engaging said dovetailed end, a groove in the upper end of the brush below the cap-plate, and a flexible conductor secured to the supporting-frame and engaging in said groove, said conductor serving to afford increased electrical contact between the brush and the supporting-frame.

3. In a brush-holder, the combination with a supporting-frame, of a brush-chamber extending therethrough, a carbon brush extending through said chamber for engagement with a commutator or collector-ring with which said brush is associated, a metallic cap-plate for said brush, a flat spring secured at one end to said supporting-frame, means for causing pressing engagement of the other end of said spring with the top of the cap-plate for pressing said brush against the commutator or collector-ring, a groove along the upper end of said brush below said cap-plate, and a flexible conductor of sheet material secured at one end to the supporting-frame, the other end of said conductor engaging in said groove and secured to the cap-plate.

4. In a brush-holder, the combination with a supporting-frame, of a brush-chamber extending therethrough, a carbon brush extending through said brush-chamber for engagement with a commutator or collector-ring, said brush having a dovetailed upper end, a metallic cap-plate engaging said dovetailed end, a groove extending along the upper end of said carbon brush below said cap-plate, a U-shaped spring clamped at one end to said supporting-frame, means for holding the other end of said spring in pressing engagement with the top of the metallic cap-plate to press the brush against the commutator or collector-ring, means for adjusting the pressure of said spring on said brush, a flat flexible conductor clamped at one end to the supporting-frame, the other end of said conductor extending in said groove in intimate contact with said cap-plate, said conductor and spring affording electrical connection between the brush and the frame, and a support for said brush-holder.

5. In a brush-holder, the combination with a supporting-frame, of a brush-chamber extending therethrough, a carbon brush extending through said chamber for engagement with a commutator or collector-ring, the upper end of said brush being dovetailed, a metallic cap-plate engaging said dovetailed end, a slot in one end of said cap-plate, a groove extending along the top of said brush and below said cap-plate, and a conductor secured at one end to the supporting-frame, the other end of said conductor engaging in said slot and said groove.

6. In a brush-holder, the combination with a supporting-frame, of a brush-chamber extending therethrough, a carbon brush extending through said chamber for engagement with a commutator or collector-ring, said brush having a dovetailed upper end, a metallic cap-plate engaging said dovetailed end, a slot in one end of said cap-plate, a groove extending along the top of the carbon brush directly below said cap-plate, a post extending from said supporting-frame, a U-shaped spring having one of its limbs clamped to said supporting-frame by said post, a slot in the other limb of said spring through which said post extends, the end of said other limb engaging the top of the cap-plate, a thumb-nut having adjustable engagement with said post above said spring, whereby the pressure of said spring on the brush may be adjusted, and a conductor secured at one end to the supporting-frame, the other end of said conductor engaging in said slot and said groove below the cap-plate, said conductor serving to increase electrical connection between the brush and the supporting-frame.

7. In a brush-holder, the combination with a supporting-frame, of two brush-chambers extending therethrough, a carbon brush extending through each chamber for engagement with a commutator or collector-ring, said brushes having a dovetailed upper end, a metallic cap-plate for each brush engaging the dovetailed end, a groove extending along the top of the carbon brush below the cap-plate, a shelf extending from each side of the supporting-frame, a post extending upwardly from the shelf, a U-shaped spring having its one limb clamped to the shelf by the corresponding post, a slot in the other limb of each spring through which the corresponding post extends, the free end of each spring being in engagement with the top of the cap-plate of the corresponding brush and tending to press said brush into engagement with the commutator or collector-ring, a thumb-nut engaging the upper end of each post whereby the pressure of said spring upon the brushes may be adjusted, and a flat flexible conductor for each brush clamped at one end to the front of said supporting-frame, the other end of each conductor engaging in the slot of the corresponding brush below the cap-plate in intimate contact with the cap-plate.

8 In a brush-holder, the combination with

a supporting-frame, of a brush-chamber extending therethrough, a carbon brush extending through said chamber for engagement with a commutator or collector-ring with which the brush is associated, a channel extending across the top of the brush, a cap-plate secured to the top of the brush over said channel, a spring engaging the top of said cap-plate for pressing the brush for engagement with the commutator, and a flexible conductor secured to the brush-holder frame and engaging in said channel below the cap-plate.

9. In a brush-holder, the combination with a supporting-frame, of a brush-chamber extending therethrough, a carbon brush extending through said chamber for engagement with a commutator or collector-ring with which the brush is associated, said brush having a dovetailed upper end, a cap-plate securely held on the brush by engagement with said dovetailed end, and a flexible conductor connected with the brush-holder frame and clamped between the tip of the brush and said cap-plate.

10. In a brush-holder, the combination with a supporting-frame, of a brush-chamber extending therethrough, a carbon brush extending through said chamber for engagement with a commutator or collector-ring with which the brush is associated, the top end of the brush being dovetailed, a channel extending across the top of the brush, a metallic cap-plate engaging the dovetailed end over the channel, and a flexible conductor connected with the brush-holder frame and engaging in said channel to be clamped between the top of the brush and said cap-plate.

11. In a brush-holder, the combination with a supporting-frame, of a brush-chamber extending therethrough, a carbon brush extending through said chamber for engagement with a commutator or collector-ring with which the brush is associated, the upper end of said brush being dovetailed, a metallic cap secured to the brush by engaging in the dovetailed end, and a spring engaging the top of the cap-plate for pressing the brush against the commutator.

12. In a brush-holder, the combination with a supporting-frame, of a brush-chamber extending therethrough, a carbon brush extending through said chamber for engagement with a commutator or collector-ring with which the brush is associated, the upper end of said brush being dovetailed, a metallic cap-plate secured to the brush by engaging the dovetailed end, a slot in said cap-plate, and a flexible conductor connecting at one end with the brush-holder frame, the other end of said conductor engaging in the cap-plate slot and between the cap-plate and top of the brush to be securely clamped to the brush.

In witness whereof I hereunto subscribe my name this 16th day of January, A. D. 1905.

WILLIAM L. WATERS.

Witnesses:
JOHN E. HUBEL,
W. S. MAY.