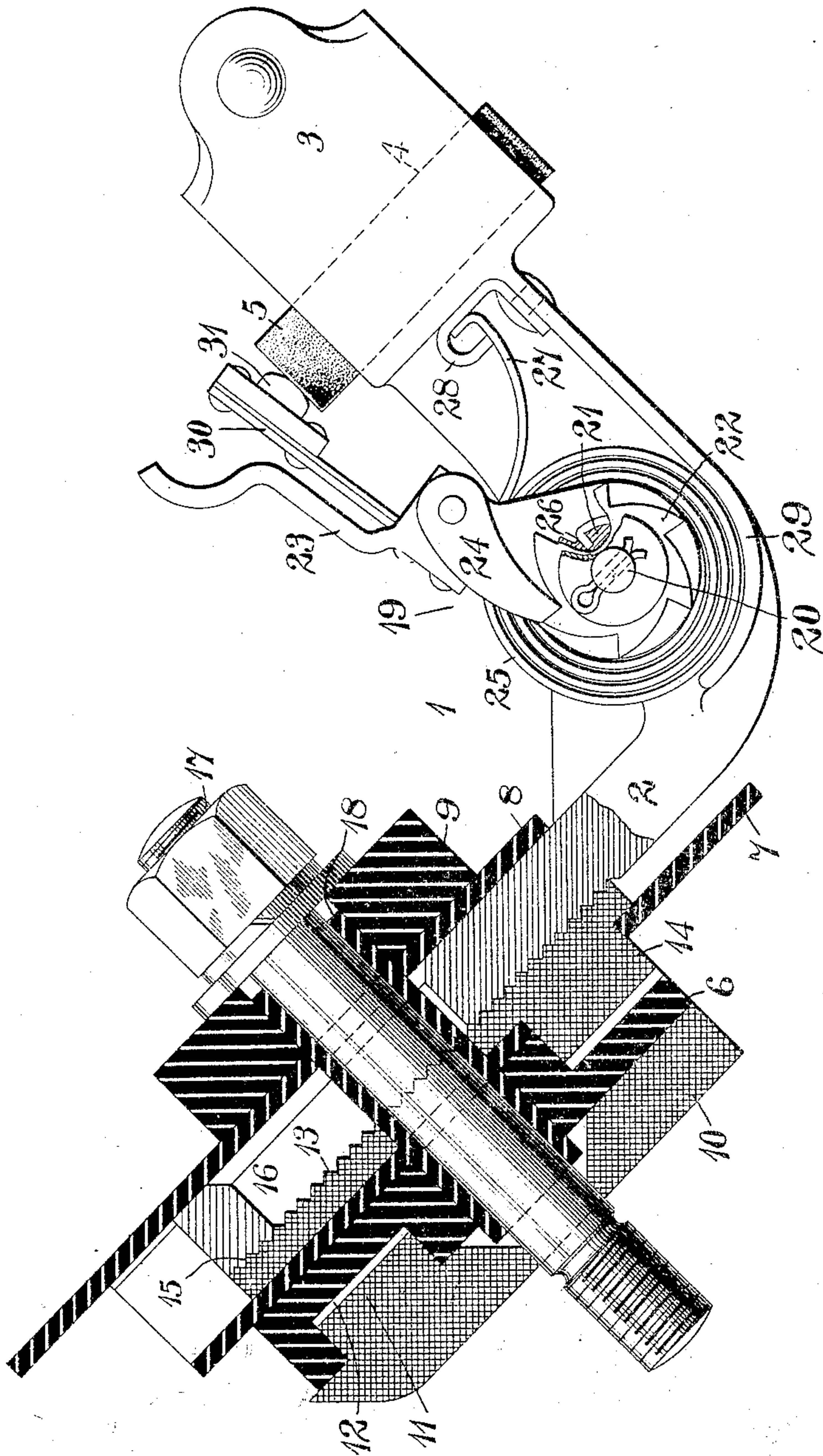


BRUSH HOLDER FOR DYNAMO ELECTRIC MACHINES.

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Patented Aug. 3, 1909.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## BRUSH-HOLDER FOR DYNAMO-ELECTRIC MACHINES.

No. 930,006.

Specification of Letters Patent.

Patented Aug. 3, 1909.

Application filed September 25, 1905. Serial No. 230,033.

*To all whom it may concern:*

Be it known that I, JOHN E. WEBSTER, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Brush-Holders for Dynamo-Electric Machines, of which the following is a specification.

My invention relates to brush holders for dynamo-electric machines and has special reference to carbon-brush holders of the spiral spring type that are adapted for railway vehicle motors.

The object of my invention is to provide a spring guide for brush holders of the above-mentioned type that shall be simple in design and easy of application and that shall effectively maintain the several coils of the spring in concentric relation without materially impairing their flexibility.

In order to obtain efficient action and constant pressure from a spiral spring such as is ordinarily employed in connection with carbon-brush holders for dynamo-electric machines, it is desirable to maintain a substantially concentric relation between the turns of the spring. I secure this result by attaching the outer end of the spring to the brush holder arm and its inner end to a rotatably adjustable hollow shaft or sleeve that is substantially concentric with the turns of the spiral and by providing a suitable curved guide for the outer turn of the spiral portion of the spring.

While the best results are secured by combining the aforesaid spring arrangement with suitable means for maintaining a concentric relation between the turns of the spiral, the spring guide is not essential to the improved operation of the brush holder and a material advantage over the brush holders of the prior art may be secured by connecting the brush-actuating arm or member to the inner end of the spiral where the tendency for the adjacent turns to become eccentric is minimized on account of the physical properties of the spring.

The single figure of the accompanying drawing is a side elevation of a brush holder constructed in accordance with my invention, the brush holder bracket arm being shown in cross-section near the point of support, to disclose an advantageous method of mounting and insulating the same.

Referring to the drawing, the brush holder

comprises a supporting arm 2, the extremity 3 of which is provided with a slot 4 through which a carbon brush or other suitable contact brush 5 may slide freely. The supporting arm 2 is sometimes mounted directly upon the motor frame, as in railway vehicle motors, so that it must be insulated therefrom as well as be securely attached thereto. This is accomplished in the brush holder shown in the drawing by a plurality of insulating blocks 6, 7, 8 and 9. The block 6 is mounted upon a suitable ledge or shelf 10 which may be provided on the motor frame, the relative position of the two being determined by a projection 11, which engages a corresponding recess 12 in the block 6. A toothed engaging surface 13 is provided on a block 14, which is preferably constructed of relatively soft material such as Babbitt metal, and engages a corresponding toothed surface 15 on the arm 2.

The arm 2 is provided with a slot 16 through which a clamping bolt 17 may project, said bolt being provided with an insulating sleeve 18 and projecting through the blocks 8 and 9 which are mounted on top of the arm 2 and the blocks 14, 7 and 6, which are interposed between the arm and the shelf 10. The toothed engaging surfaces serve to oppose any tendency of the arm to rotate about the bolt 17 as an axis and further allow an adjustment of the arm relative to the commutator by reason of the slot 16. The insulating sleeve 18 and the insulating blocks 9 and 6 completely insulate the arm 2 from the bolt 17 and from the supporting ledge 10 on the frame.

A brush holder pressure mechanism 19 comprises a shaft 20 which is attached to the arm 2, a sleeve 21, that is rotatably mounted thereon and is provided with a ratchet wheel 22, and a brush-engaging finger 23 which is rotatably mounted on the sleeve 21 and is provided with a pawl 24 to engage the ratchet wheel 22. A spiral spring 25 is coiled about the sleeve 21, its inner extremity engaging a longitudinal groove 26 in the sleeve 21 and its outer extremity 27 being held stationary by engagement with a hooked projection 28 on the extremity 3. A guideweb 29, which may be an integral part of the arm 2, extends from the extremity 3 and so engages the outer turn of the spring 25 that all of its turns are held substantially in concentric relation to



each other and to the sleeve 21. The finger 23 is provided with a flexible member 30 having an end piece 31 which is held against the outer end of the brush 5 by the pressure of the spring 25, the degree of pressure being adjusted by means of the pawl 24 and the ratchet 22. The engaging surface of the ledge 10 may be covered with a layer of Babbitt metal or other similar material so that the supporting arm and its insulating blocks may more readily seat themselves when pressure is applied by means of the bolt 17.

Although the spring-guide of my invention is shown and described in connection with a specific brush holder it may obviously be applied to any other type of brush holder which embodies a similar spring pressure mechanism and I desire that variations in size, form and arrangement of details which do not depart materially from the spirit of my invention shall be included within its scope.

I claim as my invention:

1. In a brush holder for dynamo-electric machines, the combination with a supporting arm having a brush-holding slot, a shaft mounted on said arm and a spiral spring comprising a plurality of turns of different diameters which surround said shaft, of a guide web which is integral with said arm and a portion of which is substantially concentric with said spring-shaft and contiguous to the outer turn of the spring.

2. In a brush holder for dynamo-electric machines, the combination with a supporting arm having a brush-holding slot, a shaft mounted on said arm, a brush-engaging finger rotatably mounted on the shaft and actuated by a pawl and ratchet connection, and a spiral spring comprising a plurality of turns of different diameters which surround said shaft, of a guide web which is integral with said arm and a portion of which is substantially concentric with said shaft and is contiguous to the outer turn of the spring.

3. In a brush holder for dynamo-electric machines, the combination with a supporting arm, a shaft mounted on said arm, a brush-engaging finger rotatably mounted on the shaft and actuated by a pawl and ratchet connection, and a spring comprising a plurality of turns of different diameters which surround said shaft, said spring having its inner end connected to said finger and its outer end attached to the supporting arm, of a guide web for said spring which is integral with said arm and a portion of which is substantially concentric with said shaft.

4. A brush holder for dynamo-electric machines comprising a supporting arm having a brush-holding slot, a shaft attached to said arm, a yieldable pressure finger rota-

tably mounted on said shaft and actuated by a pawl and ratchet device, a spiral spring comprising a plurality of turns of different diameters and having a laterally projecting outer end which is attached to a projection on said arm and the body portion of which surrounds said shaft and is connected to the pressure finger, and a guide web which is integral with said arm and a portion of which is substantially concentric with said shaft.

5. A brush holder for dynamo-electric machines comprising a supporting arm having a toothed engaging surface to engage a suitable complementary engaging surface with which the dynamo-electric machine is provided, a shaft attached to said supporting arm, a yieldable pressure finger rotatably mounted on said shaft and actuated by a pawl and ratchet device, a spiral spring comprising a plurality of turns of different diameters and having a laterally projecting outer end which is attached to a projection on said arm and the body portion of which surrounds said shaft and is connected to the pressure finger, and a guide web which is integral with said arm and a portion of which is substantially concentric with said shaft.

6. In a brush holder, the combination with a supporting arm having a brush-holding slot and a brush, of a finger that engages the brush, a spiral spring comprising a plurality of turns of different diameters and serving to operate the finger, and a curved guide located contiguous to a portion of the outer turn of the spiral spring for maintaining its convolutions in substantially concentric relation.

7. In a brush holder, the combination with a supporting arm having a brush-holding slot and a brush, of an exposed spiral spring comprising a plurality of turns of different diameters, means actuated by said spring to engage and operate the brush, and a curved guide located in proximity to a portion of the outer convolution of the spring and serving to maintain the convolutions in substantially concentric relation.

8. In a brush holder, the combination with a brush, of a spiral spring comprising a plurality of turns of different diameters and having its outer end stationarily secured, means actuated from the inner end of the spring for operating the brush, and a guide for maintaining the convolutions of the spiral spring in substantially concentric relation.

9. In a brush holder, the combination with a brush, of a spiral spring comprising a plurality of turns of different diameters and having its outer end stationarily secured, a ratchet attached to the inner end of the spring, a pawl, a finger to which the pawl is attached for effecting operation of the brush, and a guide for maintaining the con-



volution of the spiral spring in substantially concentric relation.

10. In a brush holder, the combination with a brush, of an exposed spiral spring comprising a plurality of turns of different diameters, means actuated by said spring for operating the brush, and a guide disposed in substantially concentric relation to the center of the spiral spring and adjacent to a portion of its outer convolution, whereby the

convolutions are maintained in substantially concentric relation.

In testimony whereof, I have hereunto subscribed my name this 13th day of September 1905.

JOHN E. WEBSTER.

Witnesses:

R. M. FULTON,  
BIRNEY HINES.