M. BRODEUR.

BRUSH HOLDER.

APPLICATION FILED SEPT. 16, 1909.

963,508. Patented July 5, 1910.

Fig. 1.

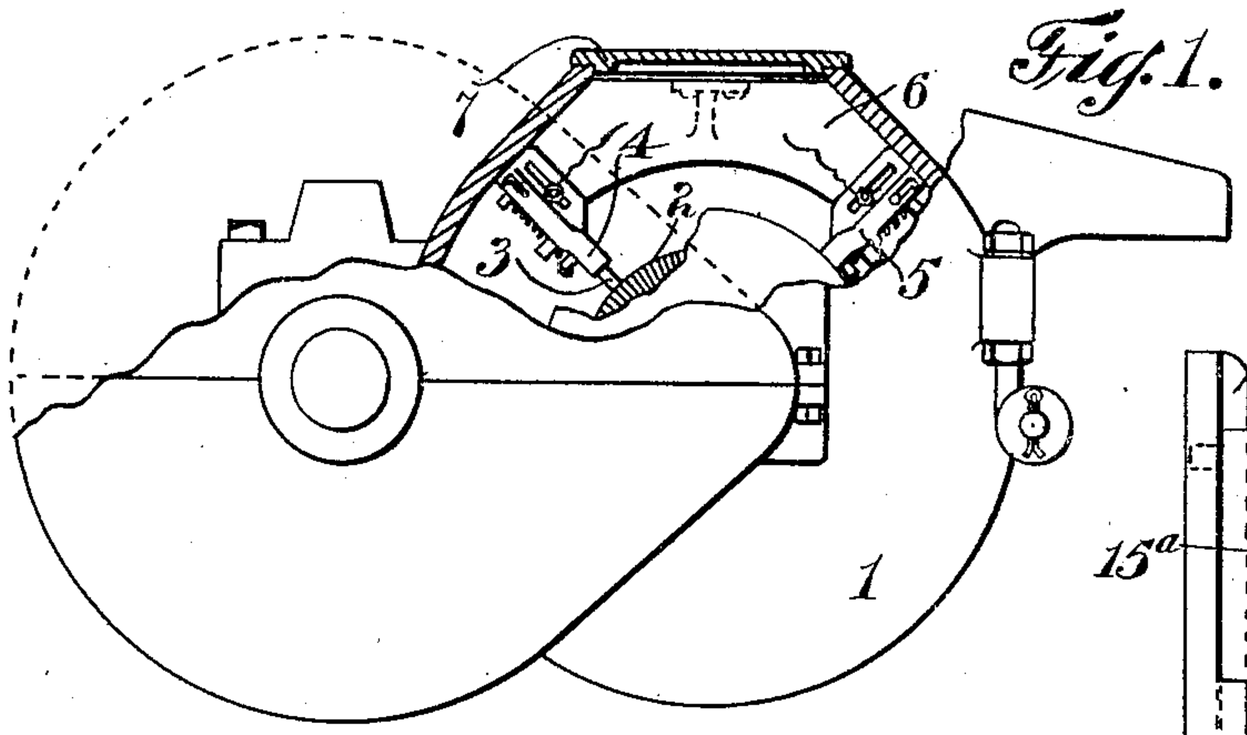


Fig. 3.

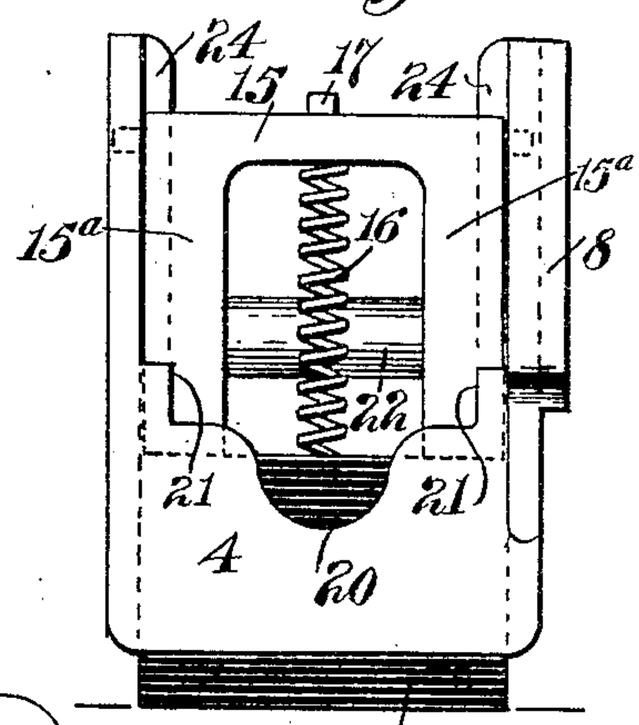


Fig. 2.

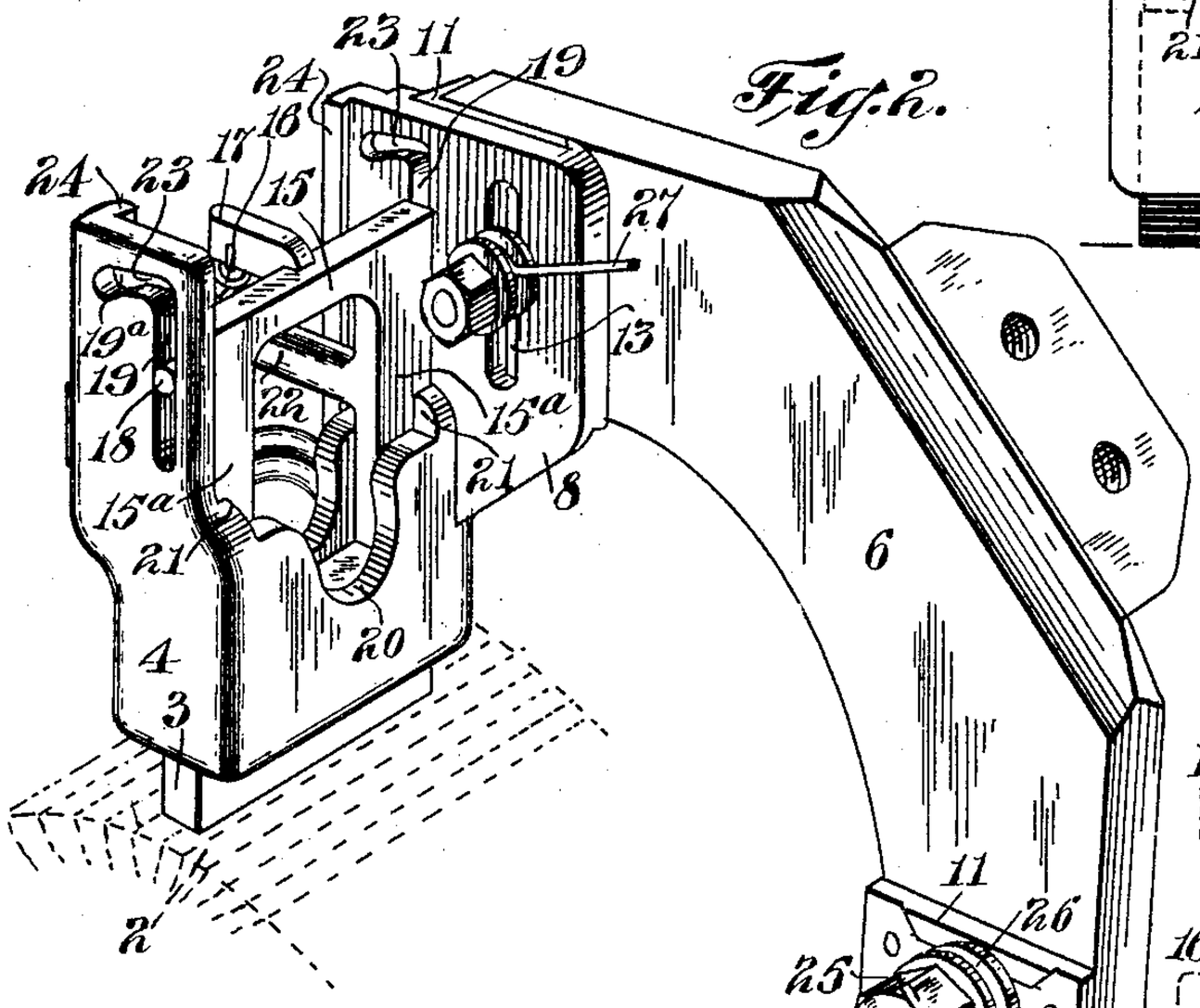


Fig. 4.

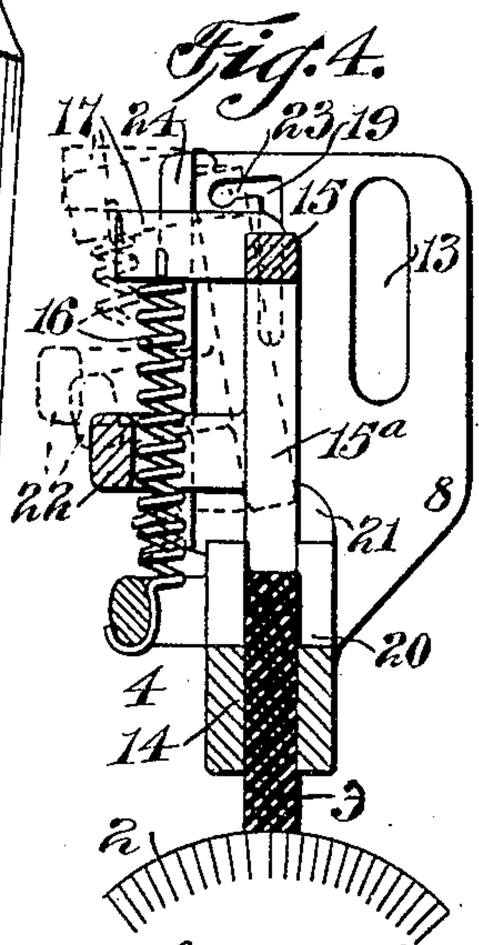
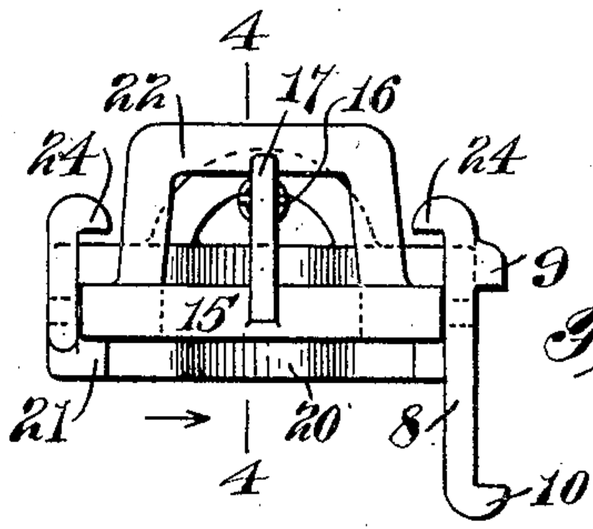


Fig. 5.



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UNITED STATES PATENT OFFICE.

MAGLOIRE BRODEUR, OF LYNN, MASSACHUSETTS.

BRUSH-HOLDER.

963,508. Specification of Letters Patent. **Patented July 5, 1910.**

Application filed September 16, 1909. Serial No. 518,000.

To all whom it may concern:

Be it known that I, MAGLOIRE BRODEUR, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Brush-Holders, of which the following is a specification.

This invention relates to means for holding the brushes of electric machinery, such, for instance, as electric motors, dynamos, or other apparatus in which the stationary brush or contact piece is held against a moving conductor.

My object has been to provide a holder which would permit of the ready removal of a worn-out brush and the substitution of a new one which will hold the brush against the armature commutator or other moving surface with a constant, yielding pressure and without causing the brush to bear more heavily at either end and thereby without wearing the commutator unevenly; and finally to eliminate danger of sparking between any part of the brush holder such, for instance, as the spring acting on the brush, and the commutator or the moving conductor.

In the accompanying drawings, I have illustrated a brush holder constructed in accordance with the principles of my invention and applied to a direct current motor, it being understood, however, that its use is not in any wise limited to such use, but may extend to dynamos and all other sorts of apparatus in which it is necessary to maintain a stationary conductor in contact with a moving one.

In the drawings,—Figure 1 represents an elevation partially in section of such a motor. Fig. 2 is a perspective view of a brush holder mounted upon a yoke or frame by which it is supported. Fig. 3 is a front elevation of the holder. Fig. 4 is a central cross section of the holder. Fig. 5 is a plan view of the holder.

Referring to the drawings, 1 represents a motor case and 2 represents the commutator of the motor armature. Coöperating with the armature are two or more brushes, 3, each mounted in a holder represented at 4 and 5 which holders are adjustably secured to a yoke 6, fastened to the top 7, of the motor case. The holder 4, has a wing 8, provided with ribs 9 and 10, which embrace a guide 11, the latter being arranged on the yoke 6, radially of the armature and having a stud 12, projecting through a slot 13, in the wing 8, by which the brush holder is adjustably mounted upon the yoke so that it may be moved toward or away from the armature. The end of the brush holder nearest to the commutator is formed with a guide 14, in which the brush is held in such a way that it may move freely toward and from the armature. Preferably, the walls of the holder entirely surround the sides and edges of the brush. Also mounted to slide in the guide 14, is a follower or presser 15 which is yieldingly actuated by a spring 16, and bears against the brush to hold the latter in contact with the commutator. The follower 15, is preferably in the form of an inverted U, having legs 15^a, which press upon the brush near opposite ends thereof. A spring 16 acts upon a bar 17, projecting from the connecting web or cross piece of the follower to press the follower against the brush and the latter against the commutator. The upper end of the follower is guided by pins 18 which project into slots 19, in the opposite end portion of the holder. These slots are parallel with the part of the holder which guides the brush so that the follower is enabled to move under the influence of the spring as the brush wears away in use.

In order to permit removal and replacement of brushes, the follower is made so that it can be displaced from the brush guide or chamber of the holder. For this purpose the upper ends of the slots 19 are offset at 19^a, so that when the follower is moved to its outermost position, it may slip aside out of alinement with the brush. The ends of the legs of the follower are then wholly removed from the channels in which the edges of the brush are contained whereby the follower, as a whole, is permitted to be displaced and the brush can readily be lifted and taken wholly out of the holder. In order to permit grasping of the brush when it is to be thus removed, the walls are recessed as at 20, giving access for the thumb and finger to grasp the brush.

By reason of the fact that, as previously stated, the spring 16, is connected with the follower by a bar 17, projecting laterally, the tendency of the spring is naturally to throw the pins 18 into the offset part 19^a, of the guide slot when the follower is raised sufficiently far. The follower is then held in the position indicated by dotted lines in Fig. 4, the eccentricity of the line of pull

of the spring being such as to project the lower end of the follower across the brush guiding channel, such lower end being prevented from being pushed beyond said channel by the lugs 21. When the handle 22, extending from the back of the follower and embracing the spring 16, is grasped, the lower end of the follower may be shifted clear of the brush and the latter removed. This arrangement of the spring relatively to the follower enables a new brush to be inserted without the necessity of the follower being manually held out of the way because the pins 18, are held in the offset ends 19[a], of the guiding slot and are prevented from slipping out of the offsets by shoulders 23. The lower end of the follower then projects yieldingly across the brush channel but gives way when a brush is pushed down into such channel. Immediately upon the brush being pushed sufficiently far in, the lower end of the follower springs out across the brush and retains it. The follower may then be caused to bear upon the brush by moving it slightly upward and inward to displace its pins 18, from the offset ends 19[a], of the guiding slots. It should be noted that there are flanges 24, on the edges of the side members of the holder which limit the displacement of the follower to an amount just sufficient to permit removal of the brush.

The holder being applied to the yoke 6, in the manner previously described, is held thereon by a nut 25, threaded upon a bolt 12 between which nut and the wing 8 of the holder, are washers 26. These washers serve the further purpose of clamping a wire 27 or other conductor by which electrical energy is carried to or from the brush holder. It should be noted in passing, that the holder is preferably made as a single casting out of metal which is a conductor of electricity so that no special conductor is needed between the lead wire 27, and the brush.

Owing to the shape of the follower and the arrangement of the actuating spring 16, midway between its edges, the spring pressure is applied equally to the opposite ends of the brush and there is thus no possibility of either end of the brush being caused to press more firmly than the other upon the armature commutator or contact ring, and therefore unequal wear on the latter or on the brush is wholly eliminated. The movement of the follower also is so slight, being limited to a slow, gradual, inward movement, while one brush is being worn away and an occasional displacement while brushes are being changed, that the wear on the holder and its parts is very slight in amount, and the possibility of the holder becoming worn out is very remote. Furthermore, the form of the holder enables changing of brushes to be effected with the greatest ease and without disconnecting the holder or removing any part thereof.

I desire it to be distinctly understood that where I have referred to a motor and to an armature commutator in the foregoing description, such terms are intended to be terms of description merely and not of limitation, for I do not intend to limit the scope and extent of my invention to any particular type of apparatus but include within the scope of my invention all such apparatus and machinery in which a stationary conductor is held in contact with a moving conductor, my invention residing in the means for holding such stationary conductor.

I claim:—

1. A brush holder made in one piece having a channel, a brush contained in said channel, a follower arranged to enter said channel, and means for causing said follower to bear on said brush and feed the latter as it becomes worn away, said holder having provisions permitting displacement of said follower to one side of the channel and at the same time retaining the follower in position for reëntering the channel to enable brushes to be placed in and taken from the channel.

2. A holder for an electrical contact brush having a channel in which the brush is contained and through which it may be fed, a follower arranged to bear on said brush, being equal in width thereto and having an extended contact with the opposite side walls of said holder whereby it is caused to press equally on both ends of the brush, and a spring for actuating said follower.

3. A holder for an electrical contact brush having a channel in which the brush is contained and through which it may be fed, a follower arranged to bear on said brush and to enter the brush channel, and guiding means for that end of said follower which projects from the channel, said guiding means being offset to permit displacement of the follower to one side of the channel.

4. A holder for an electrical contact brush having a channel in which the brush is contained and through which it may be fed, a follower arranged to bear in said brush and to project at one end into the brush channel, a guide for the end of said follower remote from the brush offset to permit displacement of the follower to the side of the brush channel, and yielding means tending to project the end of the follower nearest to the brush across the channel.

5. A holder for an electrical contact brush having a channel in which the brush is contained and through which it may be fed, a follower arranged to bear on said brush, and projections on opposite edges of said follower contained in guiding grooves in the

sides of the holder, said grooves being offset a sufficient distance from the brush channel to permit displacement of the follower bodily to one side of the channel.

6. A holder for an electrical contact brush consisting of side members connected together near an end thereof to form a guideway, a brush having its opposite edges embraced by said guideway, said side members having also grooves extending in part directly away from said guideway and in part being offset aside from the line of the guideway, and a follower entering the brush guideway and having studs contained in said grooves and guided thereby, said follower being of such a length that when said studs are in the offset portion of said grooves, the follower is wholly withdrawn from the guideway and may be displaced to one side thereof.

7. A holder for an electrical contact brush consisting of side members connected together near an end thereof to form a guideway, a brush having its opposite edges embraced by said guideway, said side members having also grooves extending in part directly away from said guideway and in part being offset aside from the line of the guideway, a follower entering the brush guideway and having studs contained in said grooves and guided thereby, said follower being of such a length that when said studs are in the offset portion of said grooves, the follower is wholly withdrawn from the guideway and may be displaced to one side thereof, and a spring connected to said follower arranged to press the latter against the brush.

8. A holder for an electrical contact brush consisting of side members connected together near an end thereof to form a guideway, a brush having its opposite edges embraced by said guideway, said side members having also grooves extending in part directly away from said guideway and in part being offset aside from the line of the guideway, a follower entering the brush guideway and having studs contained in said grooves and guided thereby, said follower being of such a length that when said studs are in the offset portion of said grooves, the follower is wholly withdrawn from the guideway and may be displaced to one side thereof, and a spring connected to the follower at one side of the plane thereof and arranged to exert its force in such direction as to press the follower toward the brush, whereby the end of the follower is caused to project yieldingly across the brush guideway when withdrawn therefrom.

9. A holder for an electrical contact brush consisting of side members connected together near an end thereof to form a guideway, a brush having its opposite edges embraced by said guideway, said side members having also grooves extending in part directly away from said guideway and in part being offset aside from the line of the guideway, a follower entering the brush guideway and having studs contained in said grooves and guided thereby, said follower being of such a length that when said studs are in the offset portion of said grooves, the follower is wholly withdrawn from the guideway and may be displaced to one side thereof, a spring connected to said follower so as to cause the latter to press against the brush, and a handle on the follower by which the latter may be withdrawn in opposition to the spring.

10. The combination of a support having a guide, a stud projecting therefrom, a brush holder provided with a wing formed with ribs to embrace said guide and slotted to receive said stud, the slot of said wing extending in the same direction as the guide to permit adjustment of said holder with respect to said support, a nut and washers on said stud to clamp said holder in adjusted position and to secure an electrical conductor in electrical connection with the holder, said holder having a brush channel, a brush contained in said channel in electrical contact with the body of the holder, and resilient means acting on said brush to press the same into contact with its coöperating conductor.

In testimony whereof I have affixed my signature, in presence of two witnesses.

MAGLOIRE BRODEUR.

Witnesses:
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P. W. Pezzetti.