

(No Model.)

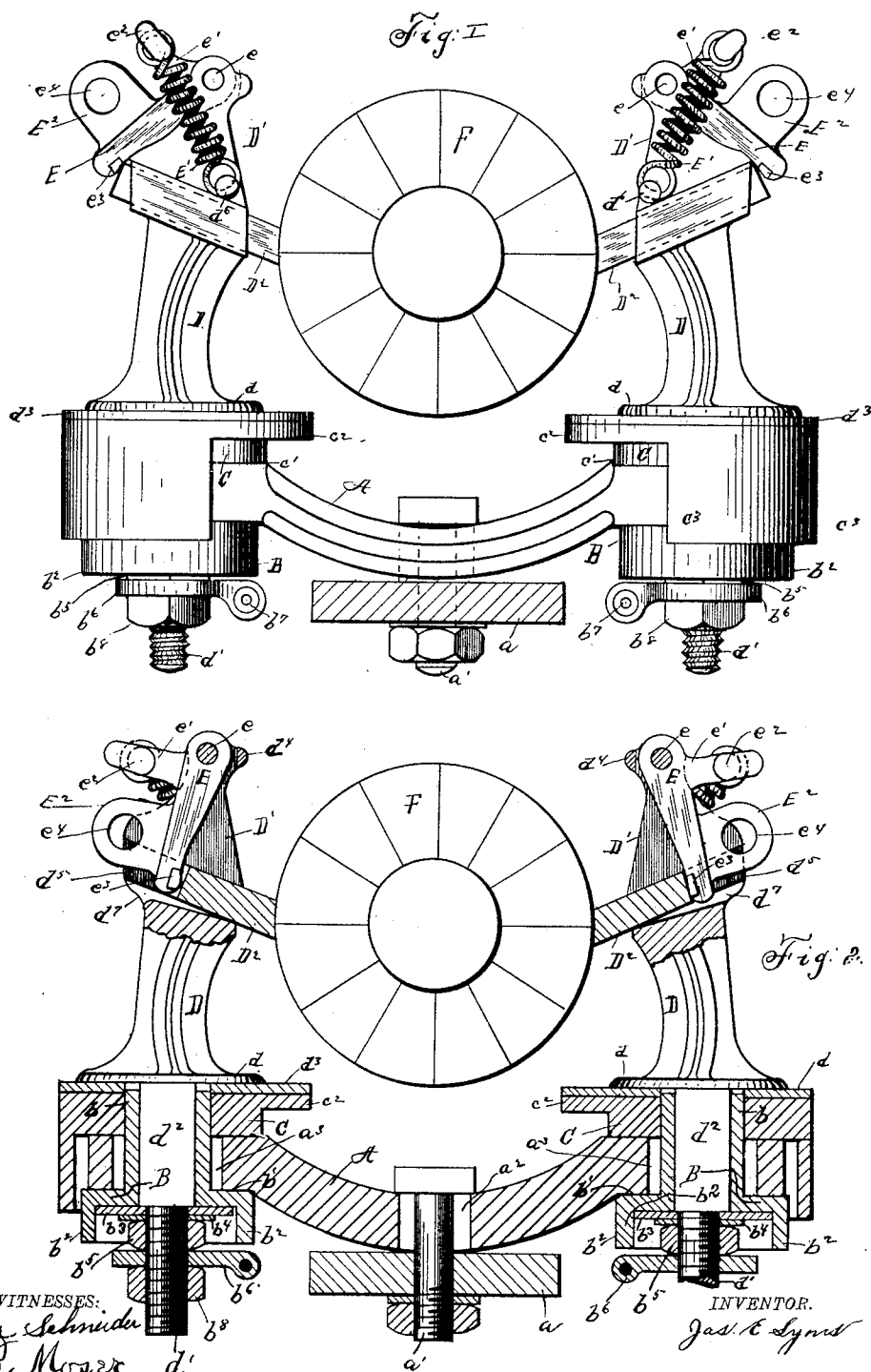
2 Sheets—Sheet 1.

J. E. LYONS.

BRUSH HOLDER FOR ELECTRIC MOTORS.

No. 463,635.

Patented Nov. 24, 1891.



(No Model.)

2 Sheets—Sheet 2.

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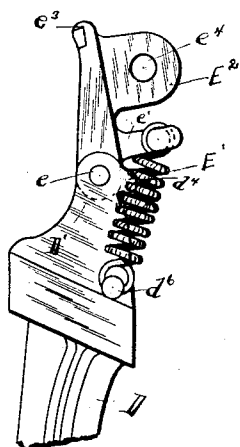


Fig. 3.

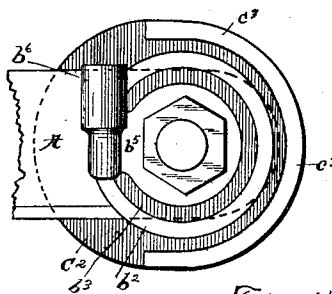


Fig. 4.

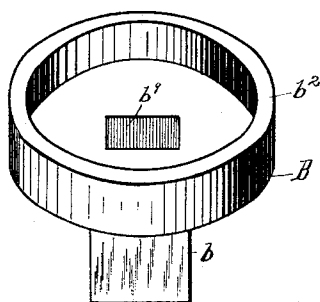


Fig. 5.

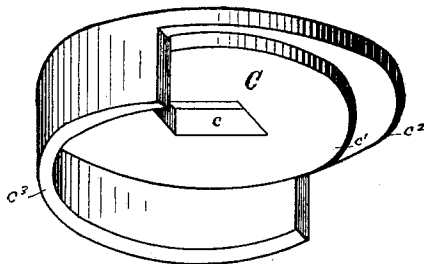
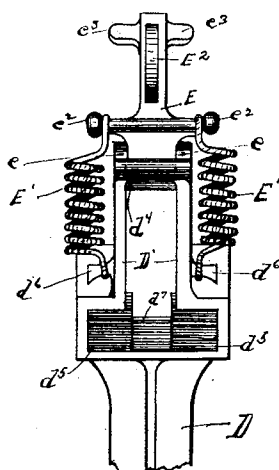


Fig. 6.



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BRUSH-HOLDER FOR ELECTRIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 463,635, dated November 24, 1891.

Application filed March 19, 1891. Serial No. 385,590. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. LYONS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Brush-Holders for Electric Motors; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in brush-holders for electric motors; and it consists of certain features of construction and combination of parts more especially pointed out in the annexed claims. The brushes are placed adjacent to the commutator, not parallel to each other, as has ordinarily been the case of application, but placed at an angle with respect to each other, the angle of their position being such that its point of incidence will be found on the central plane of the commutator or central of the armature-shaft, and, the invention being designed more especially for carbon brushes, the placing of such brushes at the angle as shown in the drawings entirely avoids the scraping and scratching noise which is incident to the placing of commutator-brushes at right angles to the commutator-face, and because of the angle at which the brushes are placed to the commutator and with a steady pull of the springs upon them the brushes last a greater length of time than they would if placed in contact with the commutator in the ordinary manner. The tension of the springs is such as to have a direct pull upon the brush from the bell-crank lever, which engages the brush from the outside and steadily pulls it against the commutator; also, the brush-standards are adjustable upon a common base which supports the two standards for the two brushes, so as to accommodate the brushes to different-sized commutators. Should either one of the brush holders or standards for any reason be incapacitated it could very readily be removed and another placed in position upon the base without destroying the adjustment of the one that had not been injured. The base itself is adjustable upon the motor, so as to enable the operator to move the brushes around to the neutral point on the commutator.

One special feature of my invention is the use of soft-rubber insulation, and also of fiber, or a combination of both. The fiber protects the rubber from oil or any greasy substance that would have a tendency to soften the insulation and leaves a smooth surface, which can be cleaned off readily without injury to the insulation, and the fiber itself is an insulation as well as the rubber. The insulation is composed of soft rubber instead of hard, as has usually been the case, and affords a more elastic connection between the brush-holder and the base for the brush-standards than hard rubber would, and because of its elasticity it forms a tight joint, so as to keep out any dripping water or oil or moisture of any kind, which is very apt to ground a brush-holder. The support has its central portion in the shape of an arc of a circle, so that the brushes may easily be brought to the neutral point on the commutator. In the case of larger commutators the standards can be raised higher from the base by the addition of successive fiber-washers, and the brushes project through the holders in the direction toward the commutator about three-eighths of an inch, more or less, as the circumstances may call for.

In the accompanying drawings, Figure 1 illustrates a front elevation of my improved brush-holder and its adaptation to a commutator. Fig. 2 is a view similar to Fig. 1, excepting that it shows the parts in vertical section, so as to disclose the construction of the springs which force the brushes against the commutator as well as the construction of the insulating features between the brush-standards and the brush-holder piece. Fig. 3 is an elevation of the upper portion of one of these brush-standards, showing the bell-crank arm and the actuating-spring in a raised position. Fig. 4 is a bottom plan view of the insulating features as between the brush-standards and the base. Fig. 5 is a perspective view of the lower insulating-sleeve. Fig. 6 is a perspective showing the insulating-cap of soft rubber. Fig. 7 is an inside front elevation of the upper end of one of the brush-holders, showing the bell-crank arm E in its raised position.

In the drawings, I represent a base A, which is secured to a suitable projection on the motor, as, say, *a*, by a bolt *a'*. This bolt,

as shown in Fig. 2, passes through a slot a^2 of the base A. This slot serves to allow the base with its brush-standards to be adjusted in a concentric direction relative to the commutator itself. Either end of the base A has a slotted opening a^3 , which is adapted to receive the square end b of the soft-rubber sleeve B. This square end b is so constructed—that is, square in cross-section—that it holds the brush-standards in one position and maintains the face of the brushes parallel to the axis of the commutator. Making the openings a^3 , as well as the portion b of the sleeve B, rectangular in shape effects this purpose cheaply and yet effectively. The openings a^3 , as will be noticed in Fig. 2, are longer than the width of the portion b . Hence the brush-standards can be adjusted toward or from each other in the openings a^3 to accommodate themselves to different-sized commutators. The sleeve B just below the projection or shank b forms a flanged head b' , which abuts against the under side of the base A, and from this flange is a depending annular ring b^2 , the purpose of which is subsequently described. Upon the outside of the flange b' is a fiber washer b^3 , which fits snugly against the flange b' and encircles the threaded stem d' of the brush-standards D. Next to these fiber washers are placed metallic washers b^4 , which serve to receive the wear of the nut b^5 .

Upon the stem d' , adjacent to the nut b^5 , is the terminal plate b^6 , which has suitable openings for the reception of the leading in and out wires, as at b^7 . These terminal plates are held against the nuts b^5 by nuts b^8 .

Upon the upper side of the base A and passing upon the shank b of the soft-rubber sleeve B is the soft-rubber cap C, which cap has a rectangular opening c to receive the shank b of the sleeve B. This cap is also made with a central thickened portion c' , as shown in Figs. 2 and 6, the same being of smaller diameter than the thinner portion c^2 of the cap. This is designed to present an offset to any condensations of moisture or otherwise that may collect upon the thin edge c^2 and stop their creeping between the cap C and the base A, as might possibly be the case if the cap C were of the same thickness throughout as at c^2 . About one-half of the diameter of the cap is provided with a depending flange or apron c^3 , which is designed to carry below the metal base A any collections of moisture or oil or any foreign matters which would cause a liability of the brush-holder to ground itself. This apron extends beyond the metal base, so that by gravity these elements will drop away from the bottom edge of the apron c^3 . The brush-standards D have a supporting-flange d , from which projects a rectangular shank d^2 , which shank passes through the rectangular opening b^9 of the sleeve B. Just below the flange d is a fiber washer d^3 of a like diameter as the soft-rubber cap C. This fiber washer serves to keep the rubber cap C free from any dripping oil or the like, which might

unduly soften the same or injure its effectiveness. The fiber washer is very hard and easily cleaned, as the oil or moisture will not penetrate its surface.

In conjunction with the apron c^3 of the cap C and for a similar purpose I provide a depending annular flange b^2 , so that any moisture or other extraneous matter will collect thereon and drip off therefrom by gravity without endangering the reliability of the brush-holder. These brush holders or standards D at their upper ends are bifurcated, forming two upwardly-projecting bearing-brackets D' D'. These brackets are cast integral with the standards D, and a pair of them are united upon their inner side by a tie connection d^4 , which is cast upon both of the brackets constituting a pair. Upon the inner face of these brackets are grooves or slots d^5 , adapted to receive the carbon brushes D^2 . These slots or grooves and the base thereof in a pair of standards constitute a complete brush-holder, and are placed at an angle with respect to each other, so that as the brushes are fed inwardly toward the commutator if an imaginary projection were affixed to them upon their inner ends of the same length for each brush these ends would pass inside and meet upon the vertical axial line of the commutator. Thus it will be seen that the brushes do not stand parallel to each other, as has been a common custom heretofore in placing brushes upon brush-holders in relation to the commutator. Brushes of course have been placed at an angle to the base of the motor or dynamo, but yet parallel with each other; but in my invention I do not place them parallel to each other, but at an angle to each other.

It will be noticed that the inner ends of the brushes are diametrically opposite each other in their relation to the commutator F. The brushes are held against the commutator by a bell-crank arm E, such arm being pivoted at e in the bearing-brackets D' , and the arm is provided with a rearward projection e' , which has lateral projections e^2 , which projections serve to hold the tension-springs E' , the other ends of these springs being hooked on lateral projections d^6 on the side of the bearing-brackets D' . The lower ends of the bell-crank arms E are provided with lateral projections e^3 , which projections serve to bear against the rear edge of the carbon brush. A flange E^2 is also cast upon the rear side of the bell-crank E, which has a suitable hole e^4 , which may serve for the attachment of a ring or the like for the more easy pulling back of the bell-crank arm E. When the bell-crank arm E is thrown in extreme upward position, the springs E' serve to hold it in this raised position, the same being stopped by the rear projection e' coming in contact with the portion d^4 of the standards D, the raised position of which is more especially shown in Fig. 3. The little groove d^7 is for the purpose of providing a clearance for the extreme lower end of the bell-crank arm E.

The portions c^2 of the caps C project beneath the commutator a short distance and serve to collect or to hold any carbon or copper dust that may collect thereon as it is worn from the brushes or from the commutator, and thus prevent the collection of this sediment upon the metal base A and a consequent piling up of it until it would reach the standards D in case the extension c^2 were not provided. With this extension this is entirely obviated. The piling up of the metallic dust or sediment, as above stated, would short-circuit the machine and cause the usual attendant injury. The brushes are placed at an angle, as shown, to avoid the chattering, &c., to which they would be subjected were they made to bear against the commutator at right angles thereto, and besides the placing of the brushes in the manner shown and described allows me to make the standards in duplicate, thus materially saving in cost of construction. If the brushes were placed against the commutator in the ordinary manner with my independent base, it would be necessary to make the standards of different heights, thus adding additional expense, &c., in their construction. It will also be observed that I support my base entirely away from the commutator-axis. The support is not upon the bearing or upon the shaft adjacent to the commutator, but entirely distinct therefrom.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a brush-holder for electric motors and the like, brush-holding standards, angular guideways for brushes in said standards, and a base to support the same, said base being so constructed as to admit of its own adjustment or that of the brush-holding standards at substantially right angles to the axial line of the motor-armature and to move said standards toward or from each other, substantially as described.

2. In a brush-holder, brush-holding standards, a base therefor and adjustable connections between said base and standards, and an adjustable support for said base, the relation between the standards, the base, and its support being such as to admit of adjustment thereof in a line substantially at right angles to the motor-armature axis, substantially as described.

3. In brush-holders, a suitable base, a support therefrom, said base being adapted to have adjustment concentric to the commutator upon its support, which is located outside

of the axis of said commutator through its slot, and brush-holding standards adjustable toward or from each other held upon said base, in combination with suitable elastic insulating caps or washers interposed between said base and said standards, substantially as described.

4. In a brush-holder, a suitable base, a brush-supporting standard mounted upon said base, and elastic insulating washers or caps between said base and such standards, in combination with an indurate fiber or like hardened insulating-washer above such elastic insulating-caps, whereby the said elastic insulation is preserved from undue absorption of oil or other injurious foreign matters, substantially as described.

5. In a brush-holder, a suitable base provided with brush-holding standards secured thereon, the said standards being insulated from the base by elastic insulating washers or caps provided with depending flanges or aprons external of said base, said aprons adapted to convey beyond the possibility of accidental contact with said base any moisture or the like, substantially as described.

6. In a brush-holder, a suitable metallic base, a sleeve or the like of elastic insulating material upon one side of said base having a shank projecting through said metallic base, an elastic insulating-cap passing over said shank in contact with said base upon its other face, and suitable brush-holding standards passing through said cap and said sleeve, in combination with depending aprons or flanges external of the metallic base, said aprons or flanges terminating below the lower face of said base, substantially as described.

7. In a brush-holder, brush-holding standards with bifurcated upper ends, brushes in slots or grooves of such upper ends placed at an angle with respect to each other, and a spring-actuated bell-crank arm or the like secured to the brush-holding standards, said arm adapted to preserve an even tension upon the brushes in presenting them to the commutator, in combination with suitable stops integral with said standards adapted to maintain an open or raised position of said arm, substantially as described.

Witness my hand to the foregoing specification this 29th day of January, 1891.

JAMES E. LYONS.

Witnesses:

N. L. McLANE,
N. S. AMSTUTZ.