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M. E. THOMPSON.
BRUSH HOLDER FOR DYNAMO ELECTRIC MACHINES.

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NO MODEL.

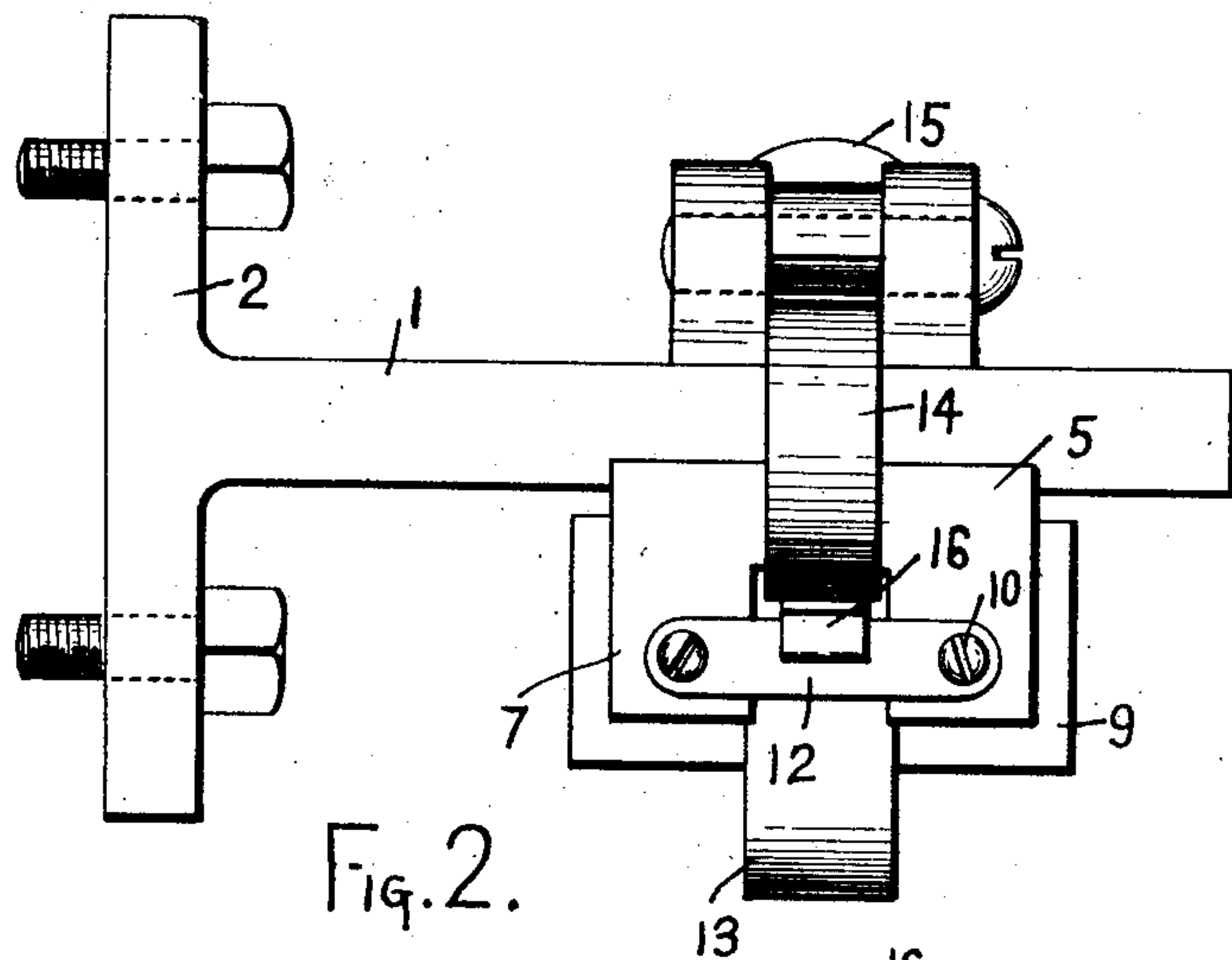


Fig. 2.

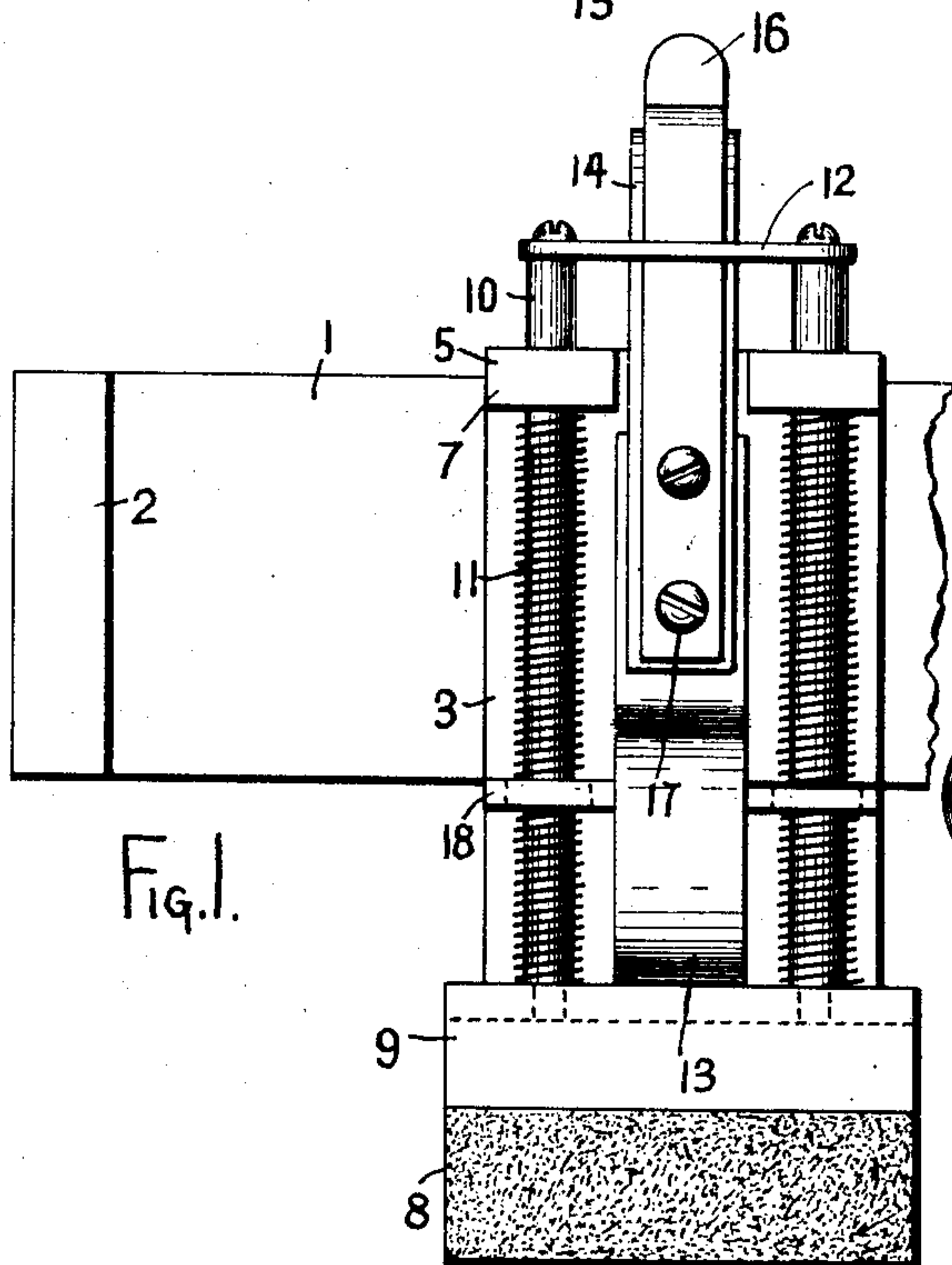


Fig. 1.

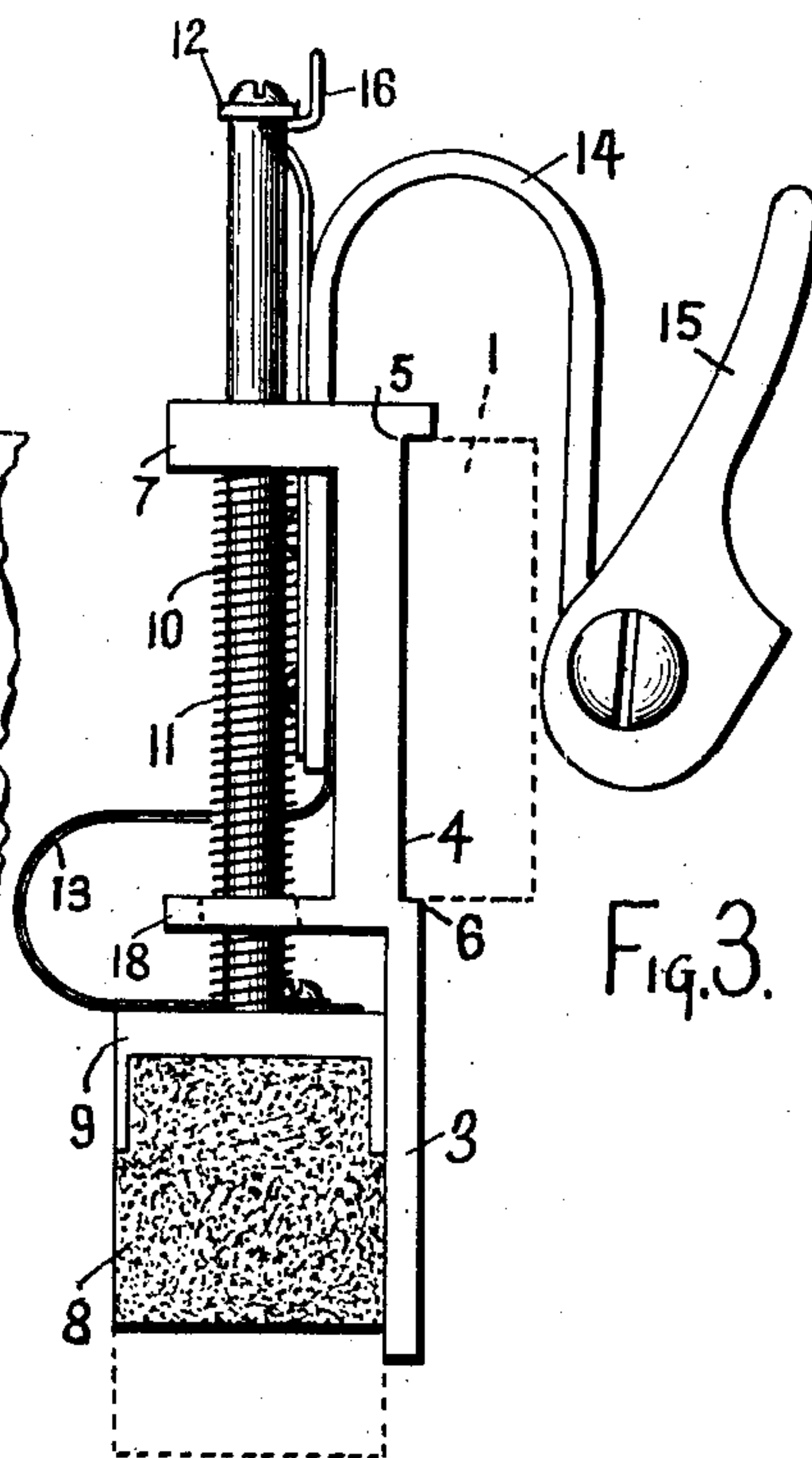


Fig. 3.

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BRUSH-HOLDER FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 741,945, dated October 20, 1903.

Application filed March 6, 1903. Serial No. 146,436. (No model.)

To all whom it may concern:

Be it known that I, MILTON E. THOMPSON, a citizen of the United States, residing at Ridgway, Elk county, Pennsylvania, have invented certain new and useful Improvements in Brush-Holders for Dynamo-Electric Machines, of which the following is a specification.

This invention pertaining to improvements in brush-holders for dynamo-electric machines will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a front elevation of a brush-holder exemplifying my invention, the same being illustrated as in working position upon its supporting-stud; Fig. 2, a plan of the same, and Fig. 3 a side elevation of the same in latched-up unclamped condition.

The object of my invention is to produce a brush-holder readily detachable from its support, detachable without the use of tools, detachable by the use of one hand only independent of rubbing contacts for conductivity, and readily adjustable for staggering relationship on the commutator.

In the drawings, 1 indicates a stud of rectangular cross-section to carry the brush-holder; 2, a flange at the inner end of the stud to serve in attaching it to its support; 3, a plate lying against the front face of the stud and projecting from one edge thereof toward the commutator with which the brush is to cooperate; 4, a shallow recess in the back plate 3, where the plate engages the face of stud 1; 5, the upper shore of this recess engaging the upper edge of the stud and having a rearward projection of any desired extent upon the upper edge of the stud; 6, the lower shore of the recess 4, engaging the lower edge of the stud and having but little projection, merely enough to properly position the plate upon the stud; 7, the lugs projecting forwardly from the upper end of plate 3; 8, the brush, illustrated as a rectangular block of carbon, with its rear face seating against the front face of the lower portion of plate 3, its lower face being adapted to make contact with the commutator with which the brush is to cooperate; 9, the carbon-carrier, being a metallic block seated upon the top of the brush and having side flanges embracing its

front and rear faces, this carrier being by preference soldered to the brush, the back of the brush and carrier lying fairly against the front face of the lower portion of plate 3; 10, a pair of studs screwed into carrier 9 and extending upwardly through guiding-eyes in lugs 7; 11, helical springs surrounding these studs and acting under compression between lugs 7 and the carrier of the brush and tending to urge the brush downwardly; 12, a yoke attached to the upper ends of the two studs; 13, a lead in flexible bow form, having its lower end secured by a screw to the upper surface of brush-carrier 9, its upper end being secured against the front face of the upper portion of plate 3, this lead being formed, preferably, of several thicknesses of thin metal; 14, a stiff bow-spring, with its bow upward, its front end being secured to the front of the upper portion of plate 3, preferably overlying lead 13, the rear end of this spring coming behind stud 1 at about its center of width and bent to form a bearing-eye; 15, a finger-cam journaled in the bearing-eye at the rear end of spring 14 and adapted, when the handle is turned down to active position, to bear against the rear face of stud 1 and firmly clamp the brush-holder to the stud with such power as may be due to the stiffness of spring 14, this cam being adapted when turned up to the idle position indicated in Fig. 3 to stand entirely free from stud 1; 16, a spring-trigger secured against the outer face of the front portion of spring 14 and projecting upwardly to the rear of yoke 12, its latch portion being adapted to spring under the yoke when the brush is pulled upwardly away from the commutator; 17, the screws securing the spring-trigger, the spring 14, and lead 13 against the front face of plate 3, and 18 lugs projecting forwardly from plate 3 and loosely encircling the studs and their springs, these lugs being located at such height as not to interfere with the rising of the brush to latching position.

In Fig. 3 the device is shown with the brush latched in upward position and with the cam in unclamping position. Assume the handle of the cam to be turned downward, thus firmly but elastically clamping the brush-holder to stud 1, and assume trigger 16 released, so that springs 11 will force the brush

downward to about the position indicated in the dotted lines in Fig. 3. The brush will then bear upon the commutator and be pressed thereto by the springs 11. The commutator
 5 is to run in such direction as to urge the brush against the lower portion of plate 3. While the brush and its carrier have a good contact bearing against plate 3, such bearing is not depended upon for the conductivity, the lead
 10 13 serving as a positively-connected conductor between the brush and the body of the brush-holder.

I have used the terms "front," "rear," "upper," and "lower"; but it should be understood that these terms are merely relative,
 15 for these brush-holders are to be employed as usual—that is to say, arranged in a circle around the commutator. It is furthermore to be understood that while the drawings show
 20 but one brush-holder arranged upon the stud 1 a single stud may carry a number of the brush-holders. Indeed it is my practice to employ as many as eight of the brush-holders upon a stud, the stud being of appropriate
 25 length. It is to be observed that the brush-holder may be placed at any point along the length of the stud, and it follows that where each stud supports a plurality of brush-holders the brush-holders are quite apt without
 30 any deliberate intent to that end to become staggered in their relationship to each other and in their bearing upon the commutator, or, in other words, the brushes are self-inclined to break joint with each other.

Attention is now to be called to the following practical points in connection with this structure: First, the conduction between the brush and plate 3 is independent of the character of sliding contact between the brush
 40 and the plate, the lead 13 furnishing a positively-connected conductor; second, contact between plate 3 and stud 1 is a fair and firm one, the cam serving as a means for bringing the surfaces of these parts into contact
 45 with a yielding but powerful pressure; third, the device without modification in form is adapted for right or left hand use—that is to say, giving consideration to Fig. 3, the brush is at the left of the stud, thus adapting
 50 the device to a commutator turning in clockwise direction, but the mere placing of the structure upon the opposite side of the stud would adapt it to an armature running in the opposite direction; fourth, the fact that
 55 the brush-holder is attached to its stud by mere clamping and without any doweling or the like it follows that the brush-holder may not only be adjusted as desired along the length of the commutator, but that, as
 60 before explained, the brushes would be self-staggering; fifth, the general structure is comparatively narrow, thus furnishing superior facility for the grouping of a multiplicity of them upon a single stud; sixth,
 65 as the brush-holder is held to its supporting-stud by means of the clamping-cam only it follows that it can be removed from its stud

without the use of tools; seventh, the form of the structure as regards spring 14 and cam 15 is such that the cam may be released
 70 and the structure withdrawn from its supporting-stud by the use of one hand, thus rendering the device very safe; eighth, the structure when in hand and separated from its support lends itself well to the hand,
 75 somewhat after the order of a pistol-grip, and may thus be readily and conveniently put into position while a machine is running; ninth, this quality peculiarly adapts the
 80 holder to being withdrawn from or placed into association with groups of similar structures; tenth, as positioning-shoulder 6 has but little projection as compared with shoulder 5 the structure requires but a trifle of
 85 forward displacement in being disengaged from its stud, thus permitting the outer radial movement of the structure in the act of withdrawal and guarding against its inward
 movement into inadvertent conflict with the commutator; eleventh, the brush-holder be-
 90 ing separated from the machine and in hand the brush may be latched in retracted position and then the structure applied to the machine, the latch being later released, thus guarding against accidental premature con-
 95 tact between the brush and the commutator; twelfth, the structure having been placed in position on the machine in latched-up condition a mere touch of the finger releases the latch and permits the brush to go into
 100 contact with the commutator; thirteenth, the form of the structure in which the brush-holder seats against the substantially radial face of the supporting-stud permits the removal and application of the brush-holder
 105 from and to the machine in a substantially radial direction free from interference with contiguous brush-holders.

It should be mentioned that lugs 18 are not essential, but that they are useful in preventing forward displacement of the brush, &c.,
 110 in case of accidental turning of the commutator in reverse direction.

This device is in practice almost universally employed in connection with carbon
 115 brushes, and it is only in connection with such brushes, that the carrier 9 becomes essential. In other words, the brush and its carrier may be viewed practically as one item, which may well be spoken of as the "brush."
 120 The brush proper is the perishable portion of the device, and provision is made for its ready replacement, it being only requisite to unscrew studs 10 and the screw at the foot of lead 13 from the brush and substitute a new
 125 brush, the carrier being thrown away with the old brush or used as a mounting for another brush.

I claim as my invention—

1. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a support-
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ing-stud, a clamping device carried by said plate and serving to grip the opposite faces of the supporting-stud, a brush mounted for movement on said plate in a direction substantially parallel with said attaching-surface, and a spring arranged to press the brush to its work.

2. In a brush-holder, the combination, substantially as set forth, of a plate having a recessed attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, shoulders upon said surface to engage the opposite edges of the stud, a clamping device carried by said plate and serving to grip the opposite faces of the supporting-stud, a brush mounted for movement on said plate in a direction substantially parallel with said attaching-surface, and a spring arranged to press the brush to its work.

3. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, an elastic clamping device carried by said plate and serving to grip the opposite faces of the supporting-stud, a brush mounted for movement on said plate in a direction substantially parallel with said attaching-surface, and a spring arranged to press the brush to its work.

4. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, a bow-spring fixed to said plate and arranged to straddle the supporting-stud, a clamping device carried by the free end of the spring and adapted to engage the rear face of the supporting-stud, a brush mounted for movement on said plate in a direction substantially parallel with said attaching-surface, and a spring arranged to press the brush to its work.

5. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, a bow fixed to said plate and straddling the attaching-stud, a cam pivoted to the free end of said bow and adapted to engage the rear face of the attaching-stud, a brush mounted for movement on said plate in a direction substantially parallel with said attaching-surface, and a spring arranged to press the brush to its work.

6. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, a bow-spring fixed to said plate and straddling the supporting-stud and having a bearing formed in its rear end at the rear of

the stud, a cam pivoted to said bearing-eye and adapted to engage the rear face of the stud, a brush mounted for movement on said plate in a direction substantially parallel with said attaching-surface, and a spring arranged to press the brush to its work.

7. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud and provided with a brush-resisting projection downwardly beyond the lower edge of said stud, a clamping device carried by said plate and serving to grip the opposite faces of the supporting-stud, a brush mounted for movement on the brush-resisting projection of said plate in a direction substantially parallel with said attaching-surface, and a spring arranged to press the brush to its work.

8. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, means for securing said plate to the supporting-stud, a brush mounted for movement on said plate in a direction substantially parallel with said attaching-surface, a spring arranged to press the brush to its work, and a trigger arranged to serve in latching the brush in retracted position upon the plate.

9. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, a clamping device carried by said plate and serving to grip the opposite faces of the supporting-stud, a brush mounted for movement on said plate in a direction substantially parallel with said attaching-surface, a flexible lead having one end secured to said brush and the other end secured to said plate, and a spring arranged to press the brush to its work.

10. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, a clamping device carried by said plate and serving to grip the opposite faces of the supporting-stud, a brush mounted for movement on said plate in a direction substantially parallel with said attaching-surface, a flexible lead in bow form having one end connected with the brush and its other end connected with said plate and having its bow projecting outwardly from the front face of the plate, and a spring arranged to press the brush to its work.

11. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles

to the active face of the brush and adapted for engagement with the face of a supporting-stud, means for securing the plate to the supporting-stud, a plurality of perforated lugs projecting from the upper forward portion of the plate, studs sliding each in a pair of said perforations parallel with the plate, a brush secured to the lower end of the studs, and helical springs disposed upon the studs between the lugs and the brush and serving to urge the brush to its work.

12. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, means for securing the plate to the supporting-stud, perforated lugs projecting from the upper forward portion of the plate, studs sliding in said perforations parallel with the plate, a brush secured to the lower end of the studs, helical springs disposed upon the studs between the lugs and the brush and serving to urge the brush to its work, a yoke connecting the upper ends of the studs, and a spring-trigger fixed to the plate and serving to engage under the yoke and retain the brush in retracted position upon the plate.

13. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, means for securing the plate to the supporting-stud, a brush lying against the lower front portion of the plate, a plurality of perforated lugs projecting from the upper front portion of the plate, studs sliding each in a pair of said perforated lugs parallel with the face of the plate and having their lower ends separably screwed into the brush, and helical springs upon the studs between the brush and said lugs and serving to urge the brush to its work.

14. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, means for securing the plate to a supporting-stud, a brush lying against the lower front portion of the plate, a brush-carrier se-

cured to the brush, a plurality of perforated lugs projecting from the front upper portion of the plate, studs sliding each in a pair of said perforated lugs parallel with the face of the plate and having their lower ends separably secured in said carrier, and springs engaging between said lugs and brush and serving to urge the brush to its work.

15. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, means for securing the plate to a supporting-stud, a brush lying against the lower front portion of the plate, a brush-carrier secured to the brush, perforated lugs projecting from the front upper portion of the plate, studs sliding in said perforated lugs parallel with the face of the plate and having their lower ends separably secured in said carrier, springs engaging between said lugs and brush and serving to urge the brush to its work, and perforated lugs projecting forward from said plate above the carrier and encircling the studs and springs.

16. In a brush-holder, the combination, substantially as set forth, of a plate having an attaching-surface at substantially right angles to the active face of the brush and adapted for engagement with the face of a supporting-stud, perforated lugs projecting from the face of the plate, a brush seated against the lower front face of the plate, studs sliding in said perforated lugs parallel with the plate and having their lower ends engaging the brush, a flexible lead having one end attached to said brush and the other end lying against the face of the plate, a bow-spring straddling the supporting-stud and having its front end secured in front of said plate, a clamping device carried by the rear end of the spring, a yoke connecting the upper ends of the sliding studs, a spring-trigger carried by the plate and adapted to engage the yoke when the brush is in retracted position, and helical springs upon the sliding studs between said perforated lugs and the brush.

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