

No. 765,206.

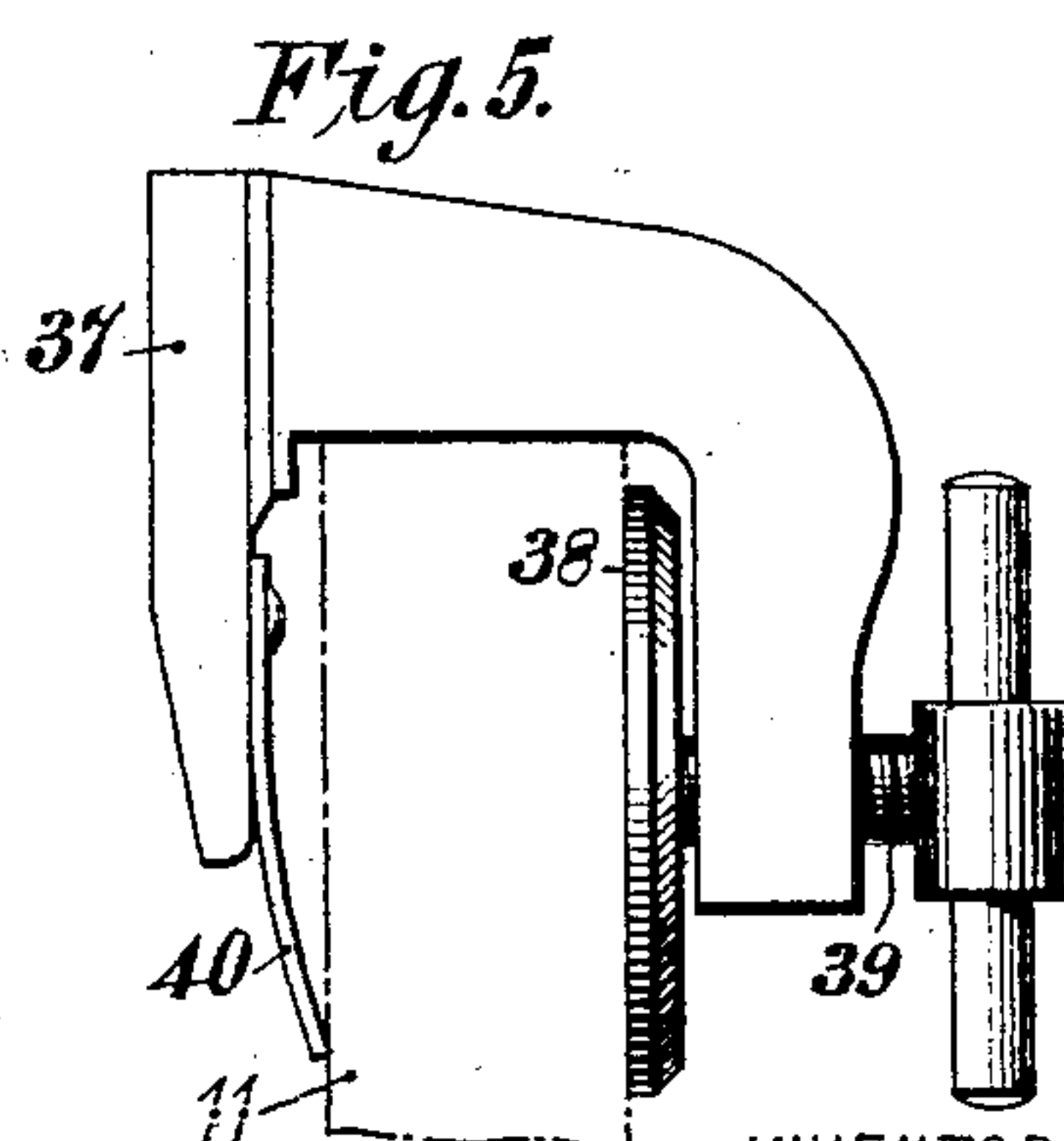
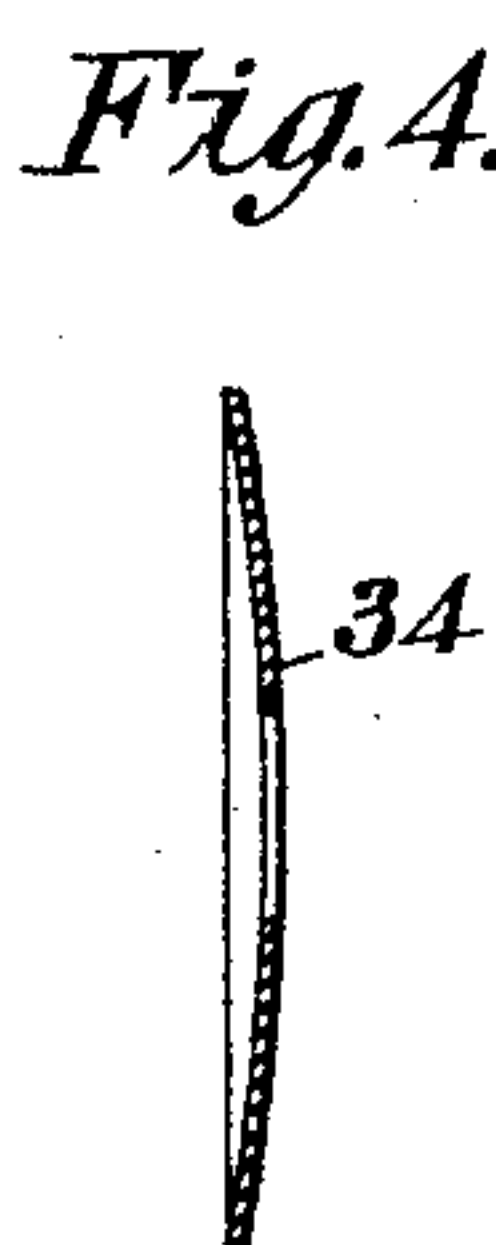
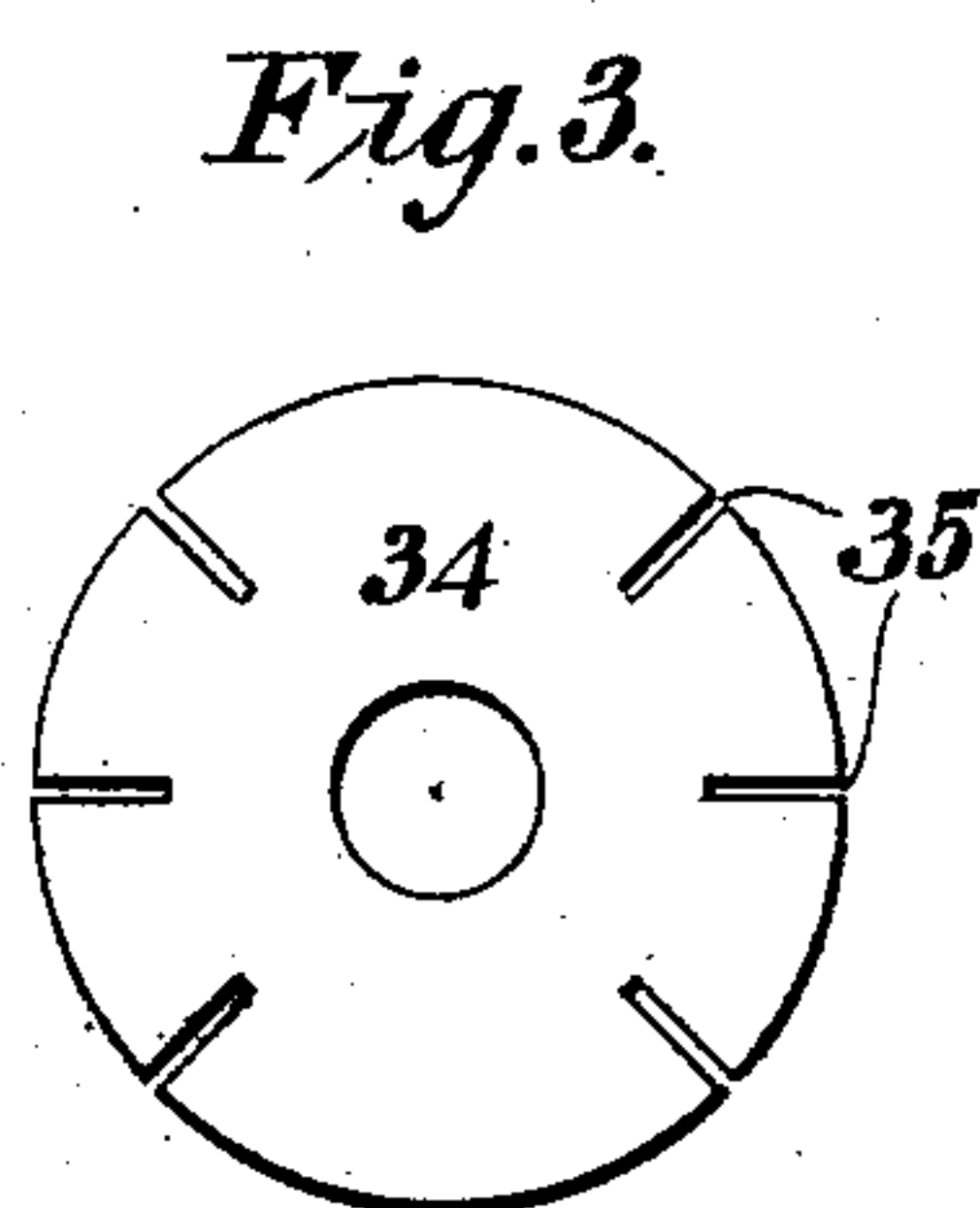
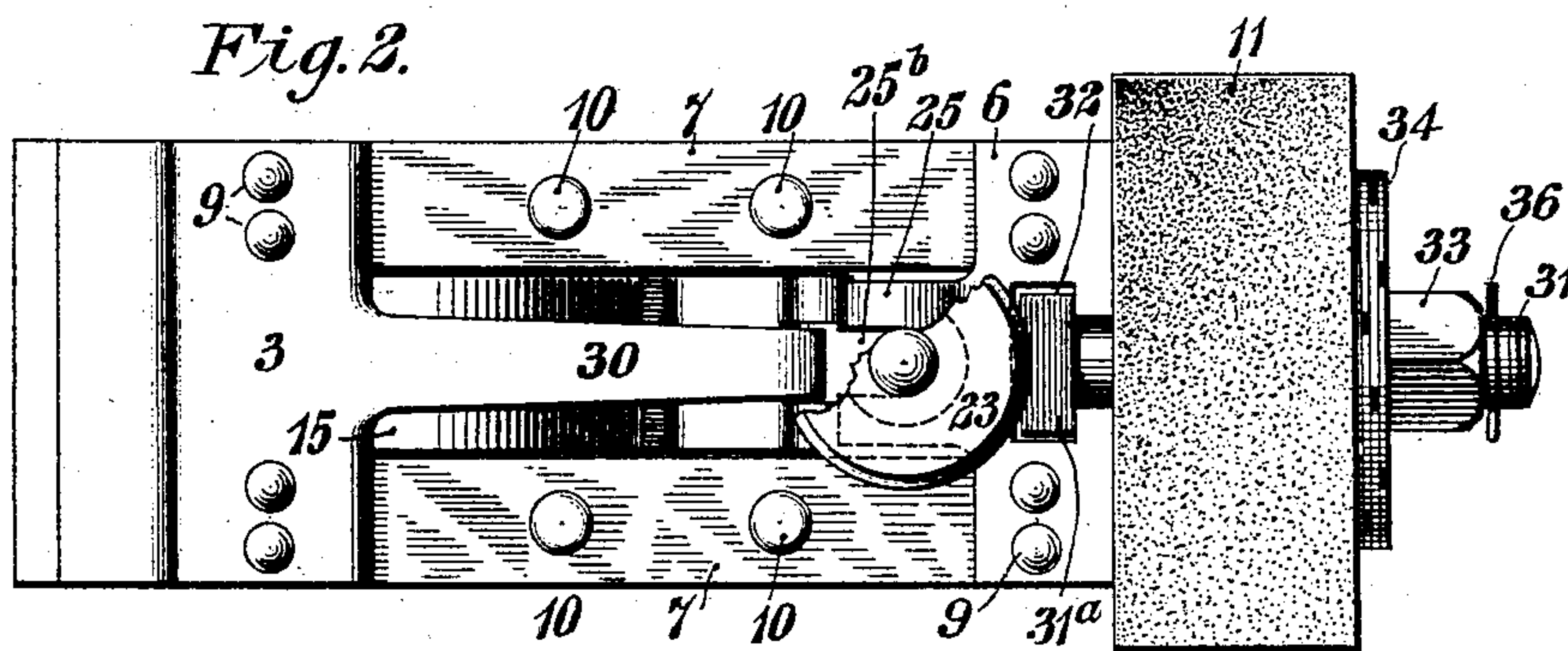
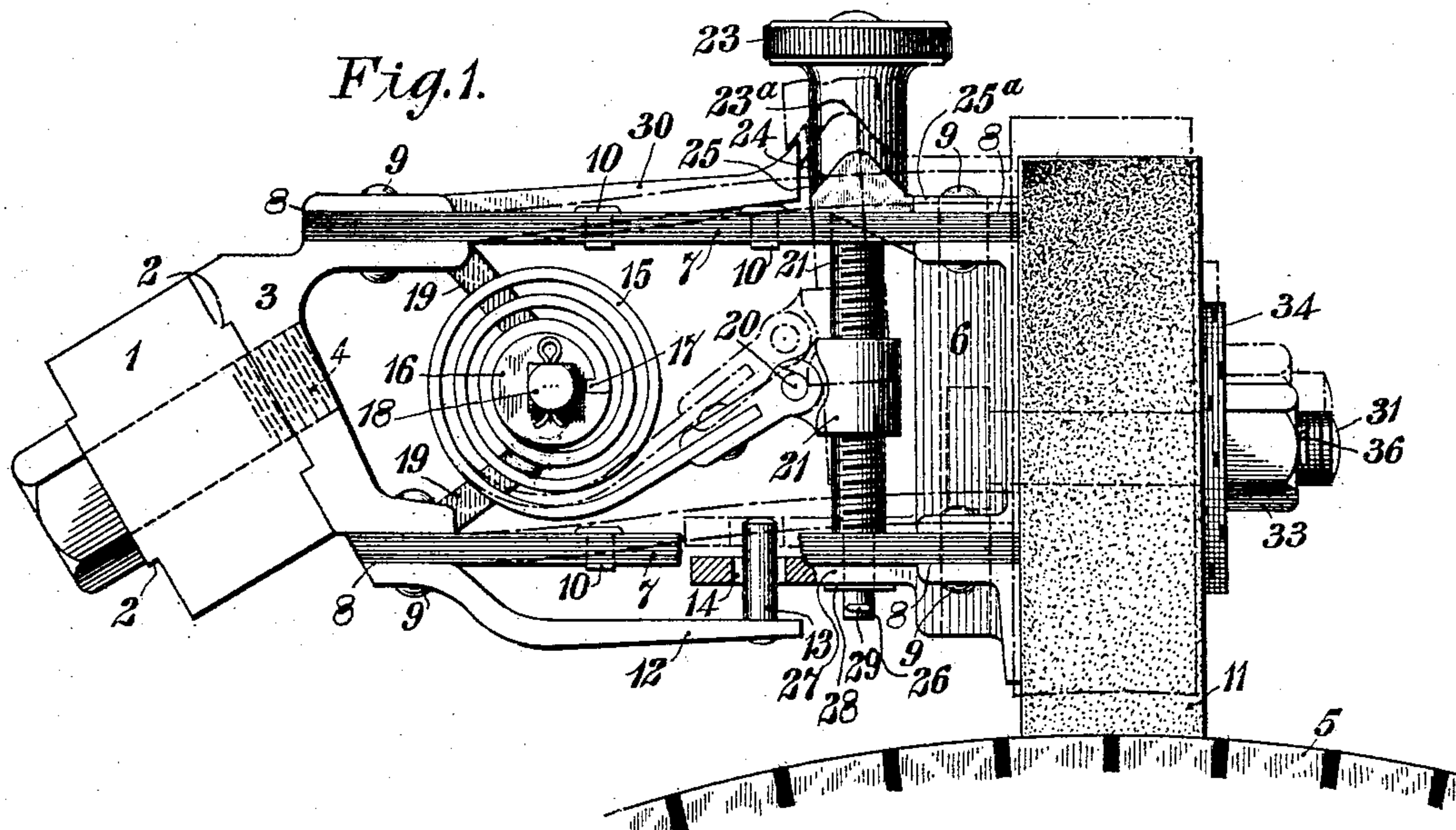
PATENTED JULY 19, 1904.

R. SIEGFRIED & C. B. MILLS.

BRUSH HOLDER.

APPLICATION FILED NOV. 21, 1903.

NO MODEL.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## BRUSH-HOLDER.

SPECIFICATION forming part of Letters Patent No. 765,206, dated July 19, 1904.

Application filed November 21, 1903. Serial No. 182,194. (No model.)

*To all whom it may concern:*

Be it known that we, ROBERT SIEGFRIED, a resident of Pittsburg, and CHESTER B. MILLS, a resident of Wilkesburg, in the county of Allegheny and State of Pennsylvania, citizens of the United States, have invented a new and useful Improvement in Brush-Holders, of which the following is a specification.

Our invention relates to brush-holders for electrical machines; and it has for its object to provide a simple and efficient means for supporting the brushes and for obtaining a parallel motion of the same.

A serious objection to the use of holders for carbon brushes in which the brushes are movable in guides or brackets is the fact that carbon particles often become lodged between the brushes and their guides, thus interfering with free movement of said brushes. Brush-holders which swivel on a cylindrical supporting-arm, and, in fact, all holders embodying parts between which there is friction during motion, are subject to the same objection. These difficulties we avoid in a manner to be hereinafter more fully described.

Our invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view in side elevation of a brush-holder constructed in accordance therewith, a section of the rocker-arm and a portion of the commutator-cylinder in end elevation being also shown and the relative positions of the parts when the brush-holder is moved away from the commutator-cylinder being indicated by broken lines. Fig. 2 is a plan view of the holder shown in Fig. 1, a portion of one of the members being broken away. Figs. 3 and 4 are detail views of one of the washers employed in connection with bolts to secure the carbon brushes in their holders, and Fig. 5 is a detail view of a modified form of brush-clamping means.

The rocker-arm 1 is provided with a longitudinal projection 2 on each side thereof, the one or the other of which fits into a corresponding recess in the brush-holder bracket 3, substantially as shown. The bracket 3 is secured to the rocker-arm by means of tap-

bolts 4, which are easily removed and replaced when reversing the brush-holder, such reversal being effected by transferring the bracket from one side to the other of the rocker-arm, according to the direction of rotation of the commutator-cylinder 5.

A bracket 6 is mechanically and electrically connected to the bracket 3 by means of a plurality of flexible bars 7, each comprising a plurality of strips of hard rolled sheet-copper or other suitable conducting material. The respective ends of the bars 7 are secured in suitable slots 8 in the brackets 3 and 6 by means of rivets 9, and the sheets of the individual bars are firmly held together by means of a plurality of rivets or other suitable fasteners 10. The bars 7 are primarily employed for obtaining a substantially right-line motion of the carbon brush 11, which is attached to the bracket 6 in a manner to be hereinafter more fully described; but they also serve as electrical connectors, since they are composed of good conducting material.

A shield 12 projects from the bracket 3 toward the brush 11 to protect as far as possible the lower bars 7 from the destructive effects of arcs which might occur between the brush-holder and the commutator. The free end of the shield 12 is provided with a pin 13, which projects through a slot 14 in the bracket 6, in order to prevent displacement of the bracket 6 in case the lower bars 7 become broken or burned away.

Proper pressure of the carbon 11 on the commutator-cylinder 5 is maintained by means of a spiral spring 15, one end of which is attached to a block 16, substantially as shown at 17. The block 16 is mounted upon a square pin 18, which is secured to arms 19, projecting from bracket 3. The other end of the spring 15 is pivotally attached at 20 to a floating nut 21 on a threaded spindle 22, which is provided for adjustment of the tension of said spring. To one end of the spindle 22 we attach in any suitable manner a milled or knurled head 23, the stem 23<sup>a</sup> of which is provided with a concave seat 24, which rests normally upon the convex por-



tion or crown 25 of an arm 25<sup>a</sup>, projecting from the bracket 6, said arm being slotted or bifurcated, as shown at 25<sup>b</sup>, to receive the spindle 22. It is obvious that the locking engagement between the head 23 and the arm 25<sup>a</sup> might be effected by making the lower end of the head convex and providing a concave seat in the arm 25<sup>a</sup>, or otherwise, if desired. It is evident that the pressure due to the spring 15 is transmitted directly from the head 23 to the bracket 6 through the seat 24 and crown 25, and hence that this arrangement of parts provides a reliable means for preventing any automatic or accidental change in the tension of the spring 15. The other end of the spindle 22 is provided with a cylindrical portion 26, which is of less diameter than the threaded portion and projects through a hole in an arm 27 of the bracket 6. The portion 26 is provided with washers 28 above and below the arm 27 and with a cotter-pin 29 at such distance below the arm 27 as to provide sufficient lost motion for the spindle to permit the head 23 to be removed from the arm 25<sup>a</sup>. The structure and arrangement of the above-described parts are therefore such that the rod 22 may be lifted, by means of its head 23, to raise the seat 24 from the corresponding crown 25, and when the said seat is raised sufficiently the rod may be tilted until the seat rests upon the free end of an arm 30, with which the bracket 3 is provided. By this means the brush 11 may be supported out of contact with the commutator-cylinder. The brush 11 is secured to the bracket 6 by means of a bolt 31, the head 31<sup>a</sup> of which fits in the undercut portion of a groove 32 in the face of the bracket. As shown, the undercut portion of the groove is rectangular in cross-section; but it may be of different form, if desired. The screw-threaded end of the bolt 31 is provided with a nut 33, and in order to prevent loosening of the nut and the brush 11 we insert between the nut and the brush one or more spring-metal washers 34 of slightly-dished contour and having radial saw-cuts 35, as indicated in Figs. 3 and 4. As an extra safeguard against the unscrewing of the nut 33, the end of the bolt 31 may be provided with a cotter-pin 36.

The devices just described constitute an effective means for securely clamping the brush and its holder and for adjusting it toward the commutator-cylinder as it wears away in service.

In Fig. 5 we have shown a modified form of clamping means which permits of the use of shorter carbons than can be used in the clamp shown in Figs. 1 and 2. In this modification the clamp is provided with a piece 37, which fits into the undercut portion of the groove 32 in the bracket 6, the brush 11 being clamped between a plate 38 and the face of said bracket by means of a thumb-screw 39. A spring 40 is riveted or otherwise secured to the piece 37

so as to project outwardly through the groove 32 and hold the brush clamped between its free end and the plate 38 when it is desired to remove the brush and its clamp from the bracket.

Other modifications of and variations from what is here shown which do not materially change the mode of operation or the result may be made, and we desire to have the same construed as within the scope of our invention.

We claim as our invention—

1. In a brush-holder, the combination with a bracket having a slotted arm, of a threaded spindle having a head at one end which normally rests upon said arm and is locked thereto and having a lost-motion connection with said bracket at its other end, a nut on said threaded spindle and a spring having one end attached to said nut.

2. In a brush-holder, the combination with a set of flexible, resilient bars and brackets fastened to the ends thereof, of a threaded spindle mounted in one of said brackets so as to have limited movement both longitudinally and laterally but normally locked in one position, a nut on said spindle and a spring having one end attached to a stationary part and its other end attached to said nut.

3. A brush-holder having means for supporting the brush out of contact with the commutator-cylinder comprising a stationary arm, an adjusting-spindle capable of both lateral and longitudinal movement and having a head by means of which it is normally locked in one position and by means of which it may be supported on said arm when moved longitudinally and laterally from its normal position, a nut on said spindle and a spiral spring having one end attached to a stationary member of the holder and having its other end attached to said nut.

4. In a brush-holder, the combination with a bracket having an undercut groove in its face, of a bolt projecting through a hole in the brush and having a head located in said groove, a nut on the outer end of the bolt and one or more dish-shaped washers interposed between the nut and the brush.

5. In a brush-holder, the combination with a bracket having an undercut groove in its face, of a bolt projecting through a hole in the brush and having its head located in said groove and a nut on the outer end of said bolt.

6. In a brush-holder, the combination with a bracket having an undercut groove in its face, of a bolt projecting through a hole in the brush and having a head seated in said groove, a nut on the outer end of the bolt and one or more dished washers having radially-split edges and located between said nut and the outer face of the brush.

7. In a brush-holder, the combination with a bracket having an undercut groove in its face, of a bolt projecting through a hole in the carbon and having a head located in said



groove, a nut and washers coöperating with said bolt to clamp the brush against the face of the bracket, means for yieldingly pressing the bracket toward the commutator-cylinder and means for locking the same in retracted position.

8. The combination with a rocker-arm, of a bracket fastened thereto, a brush-supporting bracket, parallel, resilient bars connecting said brackets, an arm and a spring supported by the rocker-arm bracket, a spindle having an adjusting connection to said spring and supported upon the other bracket and movable into engagement with said arm to fasten the brush-supporting bracket in inoperative position.

9. The combination with a stationary bracket, a movable bracket and parallel spring-bars connecting said brackets together, of a screw-threaded spindle supported by the movable bracket, a nut on said spindle, a spiral spring having one end connected to said nut and its other end connected to the stationary bracket and means into engagement with which said spindle may be moved to hold the movable bracket in inoperative position.

10. In a brush-holder, the combination with

a stationary bracket, a movable brush-supporting bracket and flexible conducting-bars connecting said brackets together, of an arc shield located beneath said flexible bars.

11. In a brush-holder, the combination with a stationary bracket, a movable brush-supporting bracket and flexible conducting-bars connecting said brackets together, of an arc shield rigidly connected to the stationary bracket and loosely connected to the movable bracket.

12. In a brush-holder, the combination with a stationary bracket, a movable brush-supporting bracket and flexible conducting-bars connecting said brackets together, of an arc shield rigidly projecting from the stationary bracket beneath said flexible bars and having a pin that projects through a hole in the movable bracket.

In testimony whereof we have hereunto subscribed our names this 19th day of November, 1903.

ROBERT SIEGFRIED.  
CHESTER B. MILLS.

Witnesses:

F. G. PIERCE,  
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