

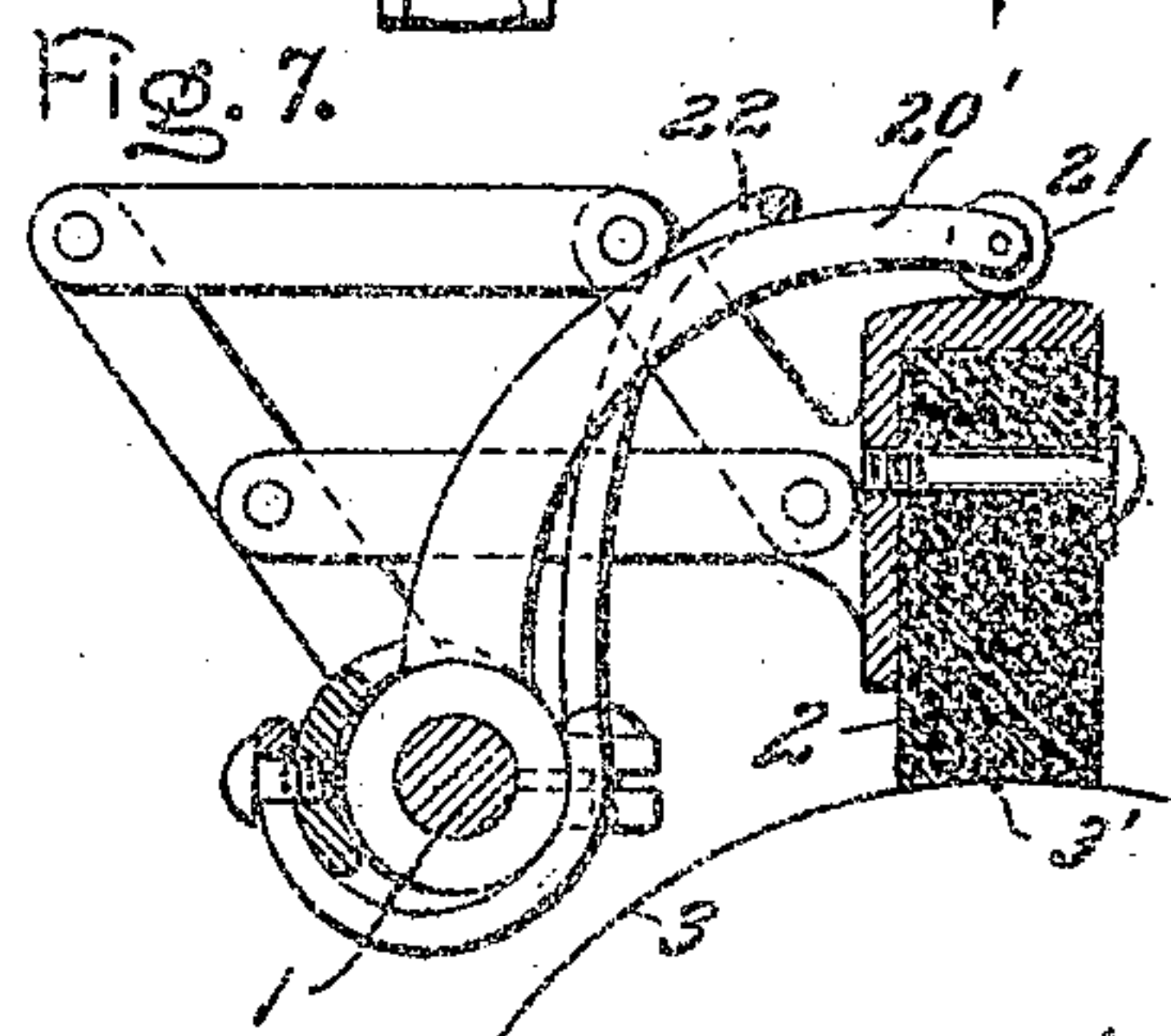
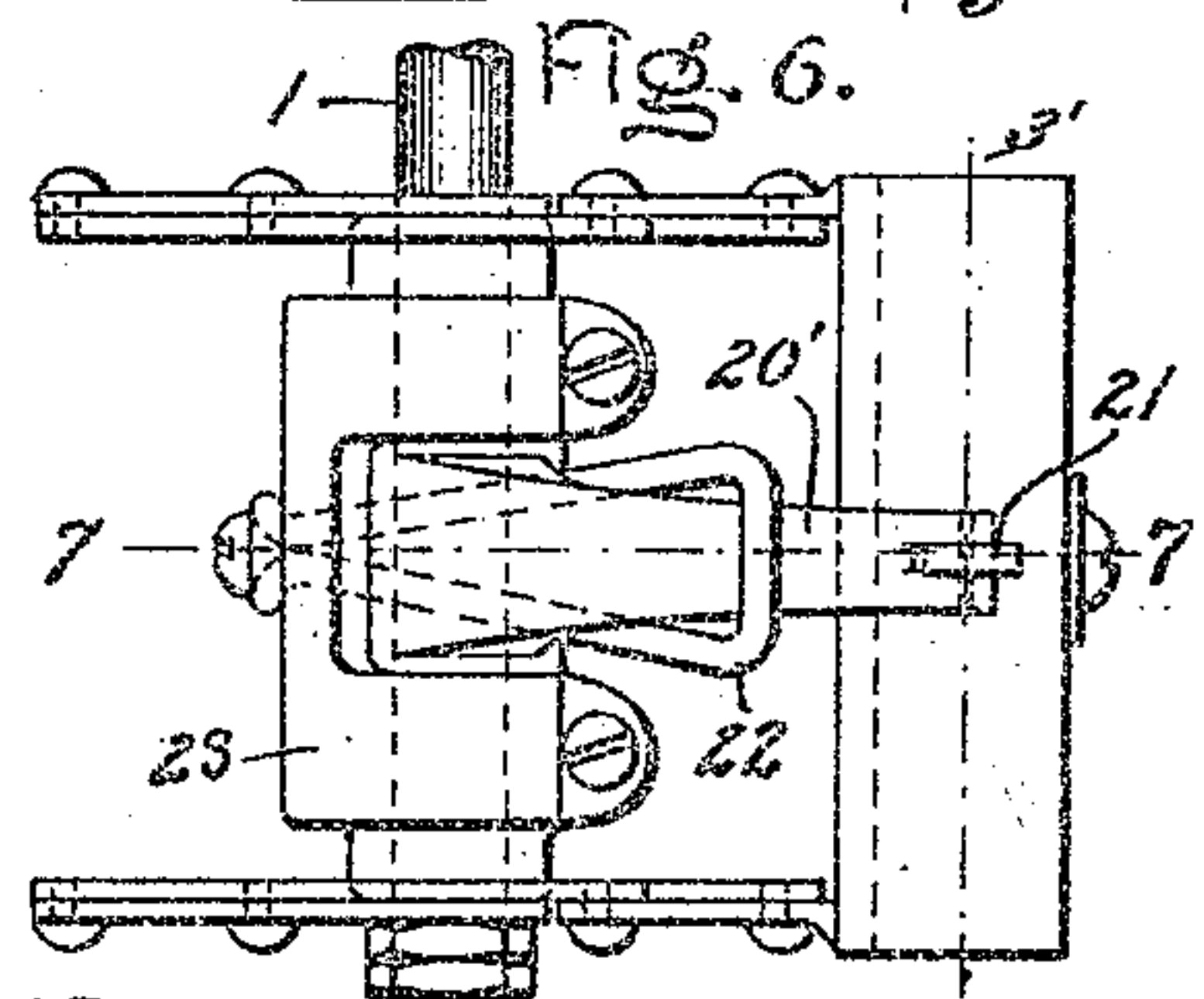
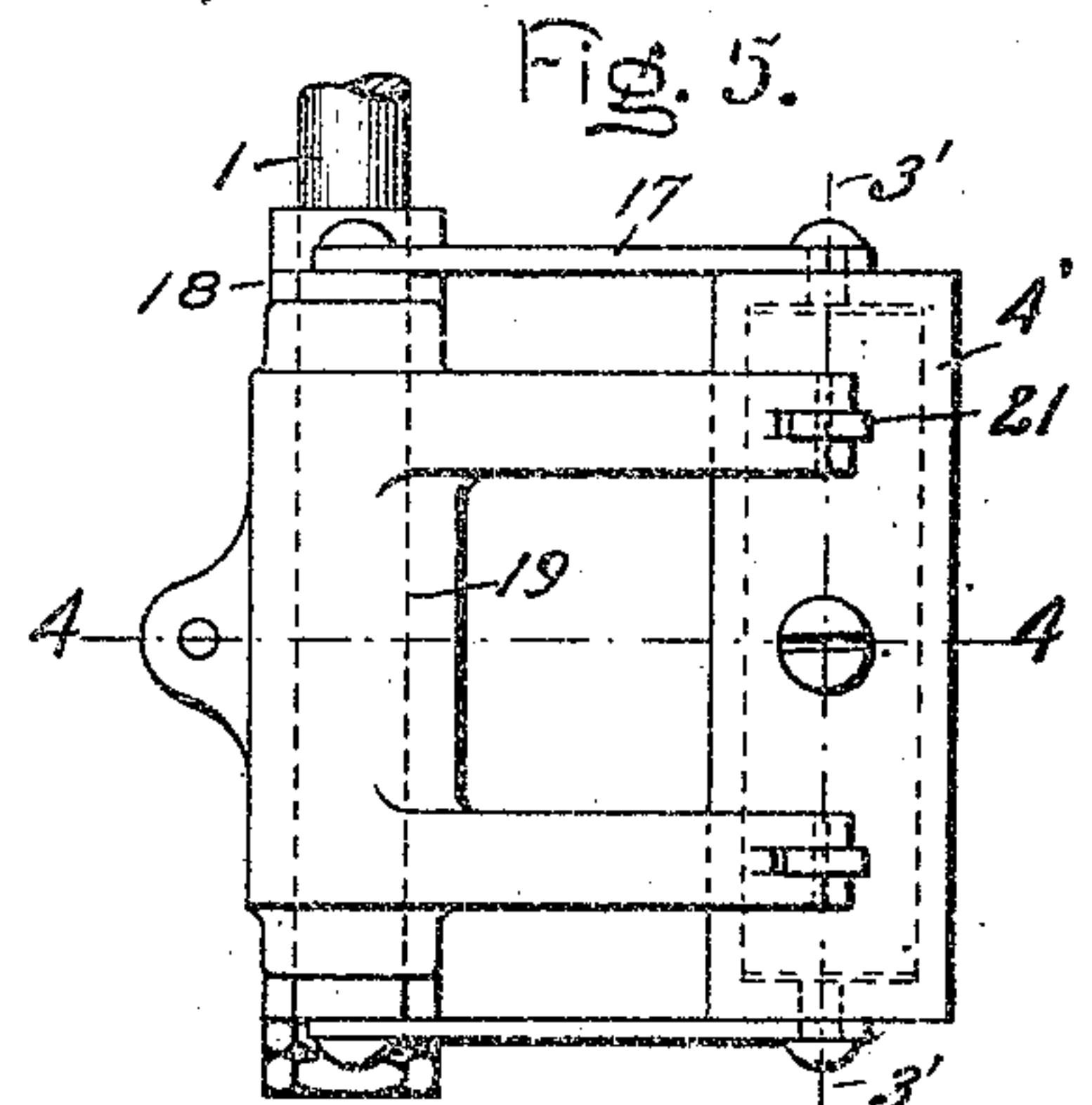
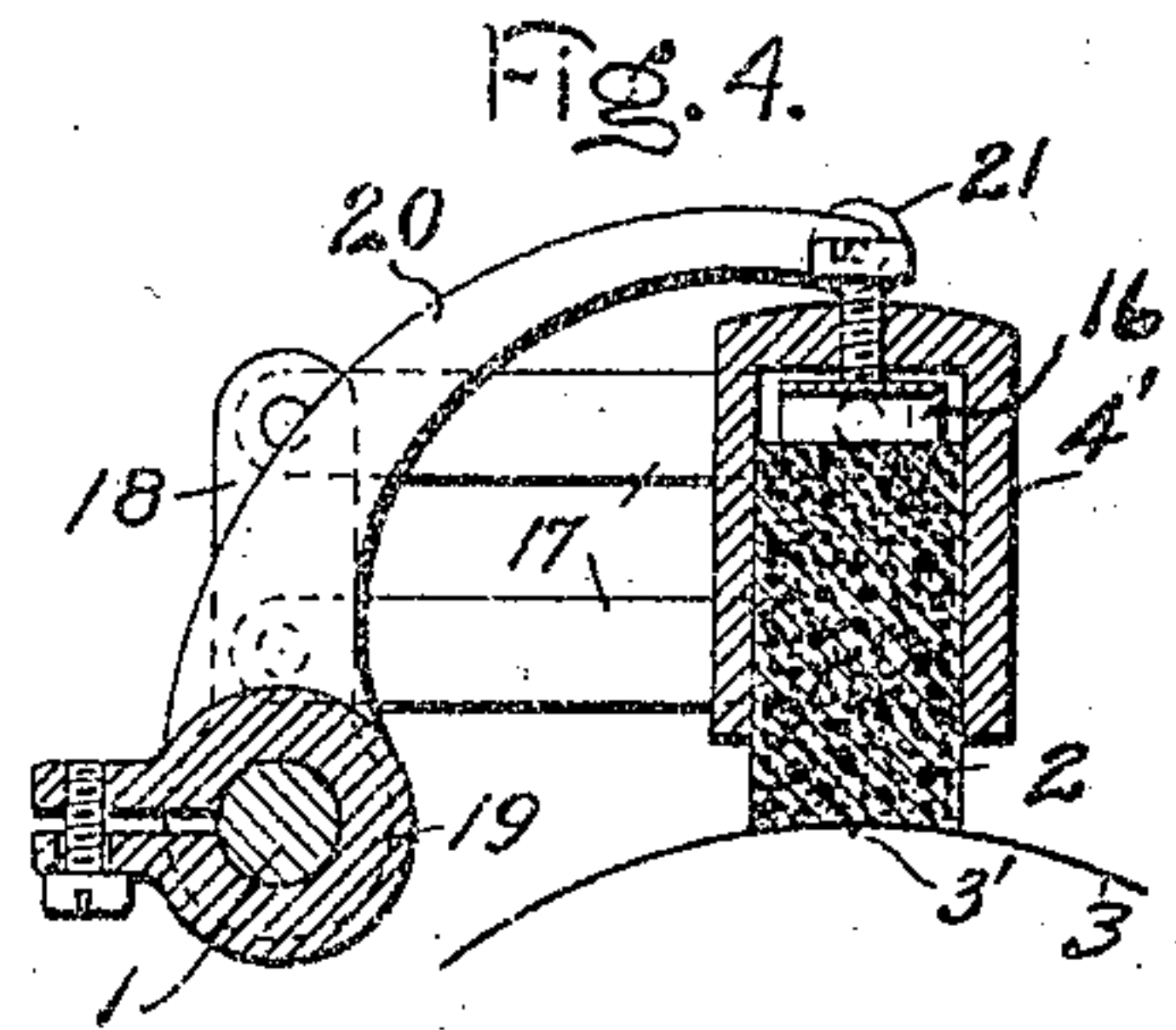
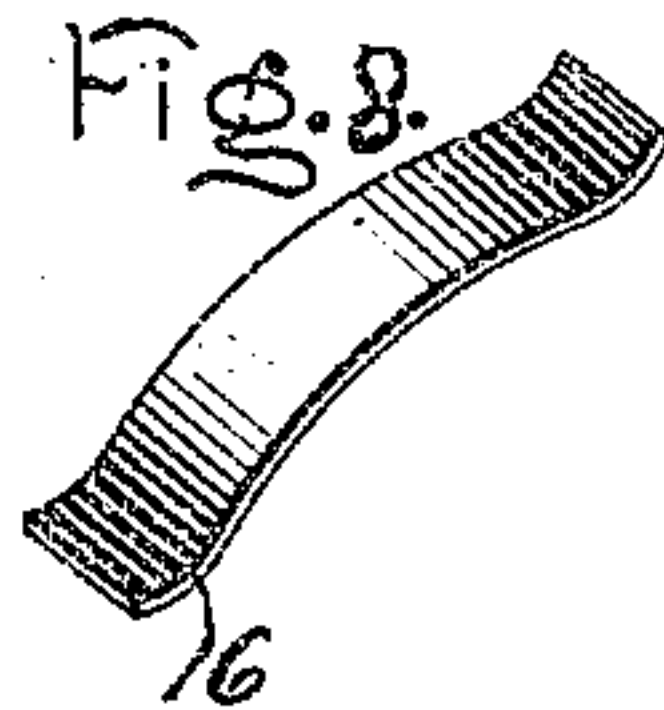
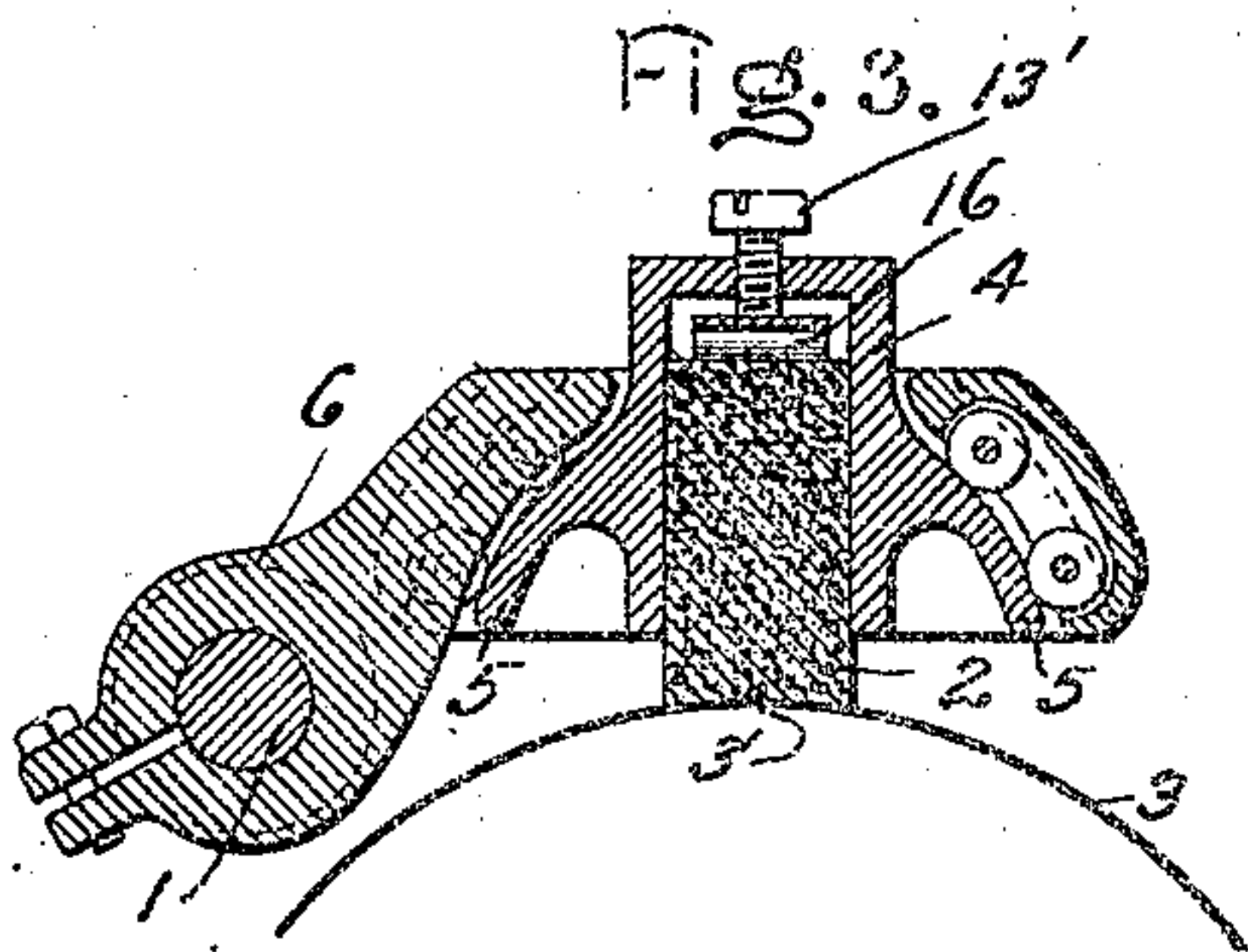
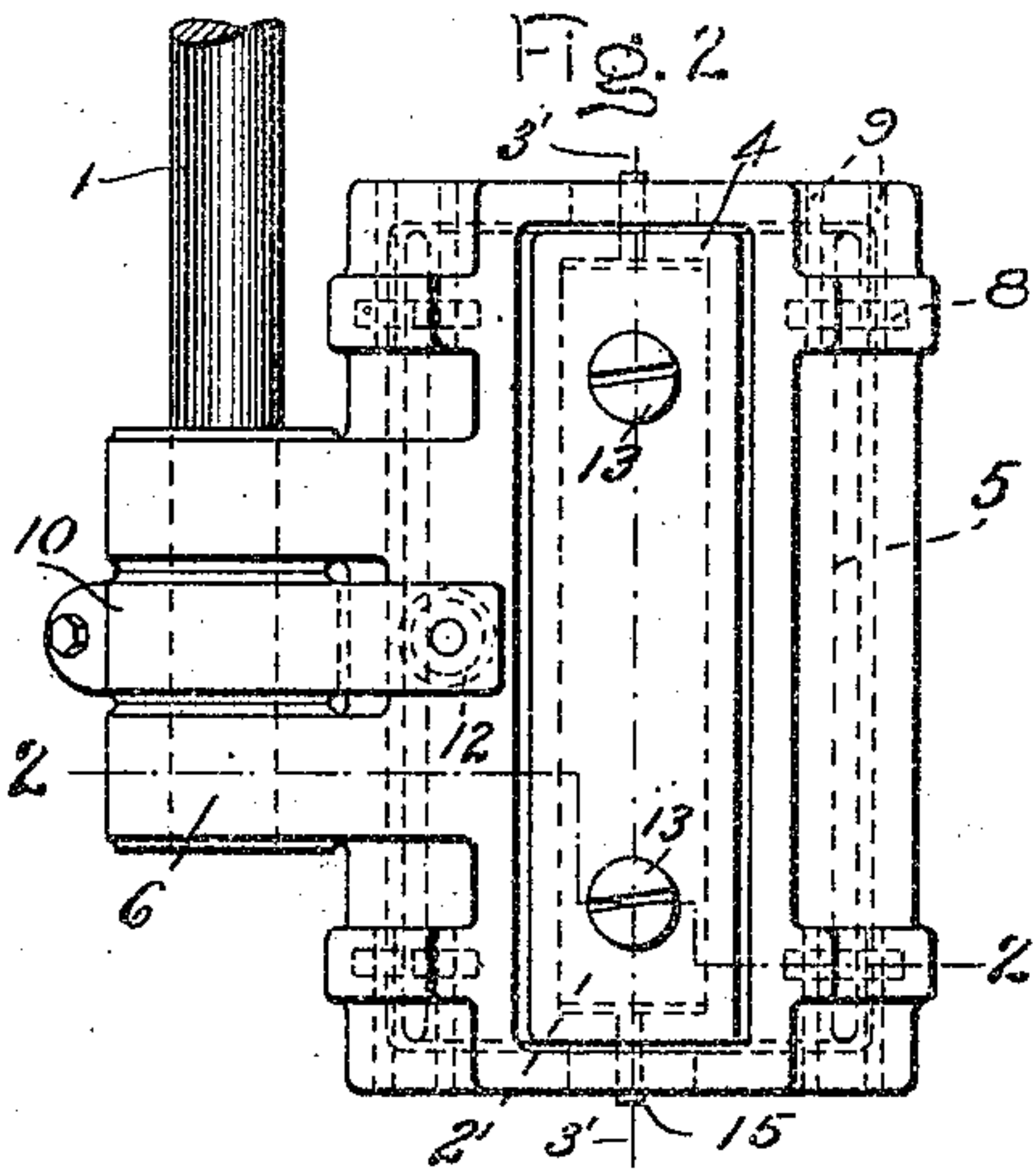
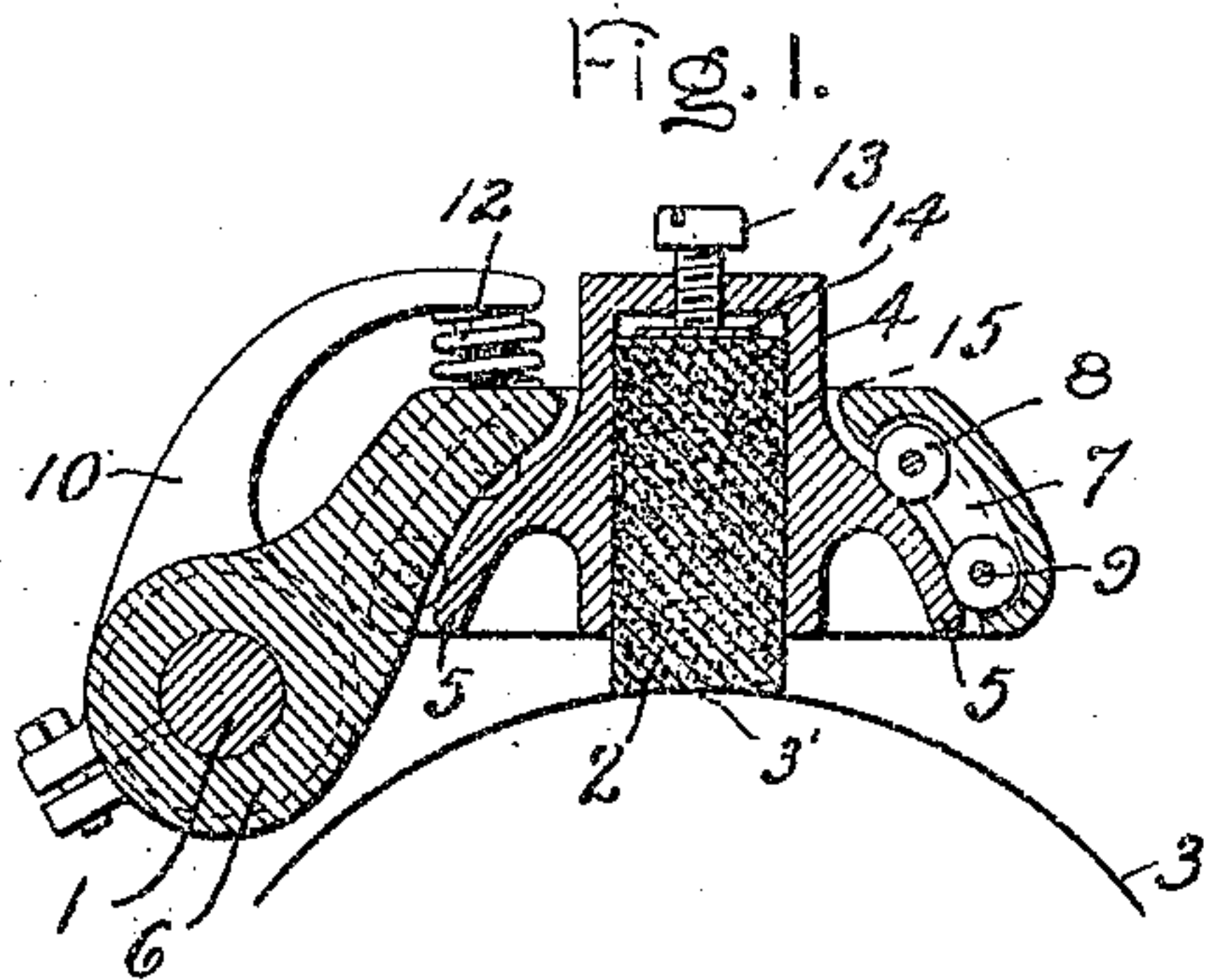
H. E. HEATH.

BRUSH HOLDER.

APPLICATION FILED APR. 7, 1904.

900,730.

Patented Oct. 13, 1908.



Witnesses:

George A. Shontz.  
Allen Orford

Inventor:

Harry E. Heath,  
by *Arthur B. Davis*  
Atty.



# UNITED STATES PATENT OFFICE.

HARRY E. HEATH, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## BRUSH-HOLDER.

No. 900,730.

Specification of Letters Patent.

Patented Oct. 13, 1908

Application filed April 7, 1904. Serial No. 201,963.

*To all whom it may concern:*

Be it known that I, HARRY E. HEATH, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Brush-Holders, of which the following is a specification.

The object of my present invention is the production of an improved form of brush-holder for dynamo electric machines.

My invention consists among other things in an advantageous arrangement and construction of the parts composing the brush-holder whereby the brush can readily accommodate itself to any inequalities or irregularities in the commutator or collector-ring surface against which it bears without objectionable circumferential or tangential movement of the brush face.

For a better understanding of my invention reference may be had to the accompanying drawings in which I have illustrated various forms of my invention.

Of the drawings Figure 1 is a sectional elevation taken on the line 2-2 of Fig. 2, and Fig. 2 is a plan view illustrating one form of my invention; Fig. 3 is a sectional elevation, taken similarly to Fig. 1, illustrating a slightly modified form of my invention; Fig. 4 is a sectional elevation taken on the line 4-4 of Fig. 5, and Fig. 5 is a plan view illustrating a third form of my invention; Fig. 6 is a plan view and Fig. 7 is a sectional elevation taken on the lines 7-7 of Fig. 6 illustrating a fourth form of my invention; and Fig. 8 is a perspective view of a detail employed in connection with certain forms of my invention.

In all the drawings 1 represents the stud or post upon which the brush holder is mounted, 2 represents the brush, 3 represents the surface of a member which may be a commutator or collector ring against which the brush 2 bears, and the line 3' represents the element of the surface 3 midway between the front and back edges of the brush.

In the form of my invention shown in Fig. 1 the brush 2 is placed in a socketed box-like frame 4 having curved shoulders or wings 5 formed on opposite sides. The upper end of the frame 4 passes through an aperture formed for the purpose in a member 6 which is loosely mounted on the stud 1. The member 6 is formed with grooves 7

in which anti-friction rolls 8 are placed. These rolls are mounted on pintles 9. As is clearly shown in the drawing, the outer surfaces of the cam wings 5 abut against the rolls 8. An arm 10, adjustably clamped to the stud 1, is employed to regulate the force with which a spring 12 extending between it and the top of the member 6 presses the brush 2 against the commutator surface 3. The portion of the outer surface of the curved wings 5 which engages the rolls 8 is cylindrical about the line 3' as an axis, and the rolls 8 are all tangential to the cylindrical surface of the wings 5. As the brush wears away it may be forced out of the socket in the frame 4 by means of a pair of screws 13 which press against a follower 14 resting against the upper end of the brush. Pins 15 projecting from the ends of the frame 4 through arc-shaped slots 15' in the end walls of the member 6 may be employed to prevent the parts from becoming disassembled.

With the construction shown in Figs. 1 and 2 it will be observed that the brush is yieldingly pressed against the commutator by means of the spring 12 and at the same time is free to rock about the line 3', as the anti-friction rolls 8 offer but little if any opposition to the oscillation of the frame 4. The brush can thus accommodate itself to deviations from the cylindrical of the surface 3. The rocking movement of the brush will not produce a circumferential or tangential movement of the brush face about the cylindrical surface 3, however, since the axis of oscillation of the brush is substantially coincident with an element of the brush face and an element of the surface 3. This may be highly important, particularly where the cylindrical member 3 is a commutator, since the movement of the brush necessary to accommodate itself to irregularities in the commutator surface will not vary the axis of commutation. If the frame 4 and member 6 are moved from the position shown in Fig. 1 to compensate for the wear of the brush some change in position of the axis of oscillation of the brush will be produced. The change in position of the axis consequent upon any ordinary change in the positions of the frame 4 and member 6 will be so slight, however, that no disturbances will be produced thereby.

In the form of my invention shown in Fig. 110



3 the frame 6 is adjustably clamped to the stud 1 and the arm 10 and spring 12 are dispensed with. The spring tension on the brush is obtained by the use of a bowed spring 16 (see Fig. 8). This spring is placed in the box 4 with its ends resting against the brush. A single regulating screw 13', located midway between the ends of the frame 4, is employed to regulate the tension on the brush. By making the brush of a width somewhat less than the width of the socket in the member 4 the brush is free to move parallel to the axis of the commutator and can rock not only about an element of the cylindrical surface 3, but also in a plane passing through the axis of the commutator or collector ring. This movement of the brush is facilitated by the use of the bowed spring shown in Figs. 3 and 8. The same result can be obtained with the construction shown in Figs. 1 and 2 by employing a single screw 13 located midway between the ends of the frame 4. Except as indicated above the construction shown in Fig. 3 may be identical with that shown in Figs. 1 and 2.

In the construction shown in Figs. 4 and 5, a frame 4' is employed which is pivotally connected by a pair of link members 17 to a pair of arms 18 which are loosely mounted on the stud 1. In this form of my invention the upper surface of the frame 4' is cylindrical about the line 3' as an axis. A split collar 19 adjustably secured to the stud 1 is provided with a pair of curved arms 20, in the outer end of each of which is mounted an anti-friction roll 21. As is clearly shown in Fig. 4, the roll 21 engages the upper curved surface of the frame 4'. In this construction the parts are so proportioned that the plane passing through the center of the stud 1 and the line 3' is parallel to each of the links 17, while the center of the stud 1 and the pivotal centers of the left hand ends of the bars 17, as seen in Fig. 4, are in a plane which is parallel to the plane containing the pivotal centers of the right hand ends of the bar 17 and the line 3. With this construction also the brush 2 is perfectly free to rock about the line 3' but the face of the brush is prevented from moving circumferentially around the surface 3. In this form of my invention the brush is yieldingly supported in the frame 4' by the spring 16.

The construction shown in Figs. 6 and 7 differs from that shown in Figs. 4 and 5 principally in the fact that the brush is

rigidly clamped against the frame 4'. In this form of my invention a single arm 20' loosely mounted on the stud 1, and carrying an anti-friction roll 21 at its outer end, serves to hold the brush against the commutator. The arm 20' is embraced at intermediate ends by a spring 22. This spring is secured to a split collar 23 adjustably mounted on the stud 1.

While I have described and illustrated somewhat in detail several embodiments of my invention, it will be readily understood by all those skilled in the art that many changes may be made in the form of my invention without departing from its spirit.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. In combination, a cylindrical surface, a brush engaging said surface, and a supporting frame for the brush free to rock about an element of said surface as an axis.

2. In a brush holder, a brush having a curved surface, and a frame for supporting the brush free to rock about an element of said surface as an axis.

3. In combination, a cylindrical surface, a brush engaging said surface, and a frame for supporting the brush free to rock about an axis substantially coincident with an element of said surface.

4. In combination, a cylindrical surface, a brush holder, and a brush supporting frame pivoted to rock about an axis substantially coincident with an element of said surface.

5. In a brush holder, a brush and a supporting frame therefor free to rock about an axis substantially coincident with a line in the face of said brush.

6. In combination, a cylindrical commutator, and a brush holder comprising a brush supporting frame pivoted to rock about an element of the surface of said commutator as an axis.

7. In combination, a cylindrical surface, a brush engaging said surface, and a holder for the brush, said holder comprising a frame for supporting the brush pivoted to rock about an element of said surface as an axis.

In witness whereof I have hereunto set my hand this fourth day of April, 1904.

HARRY E. HEATH.

Witnesses:

DUGALD McK. McKILLIP,  
JOHN A. McMANUS.