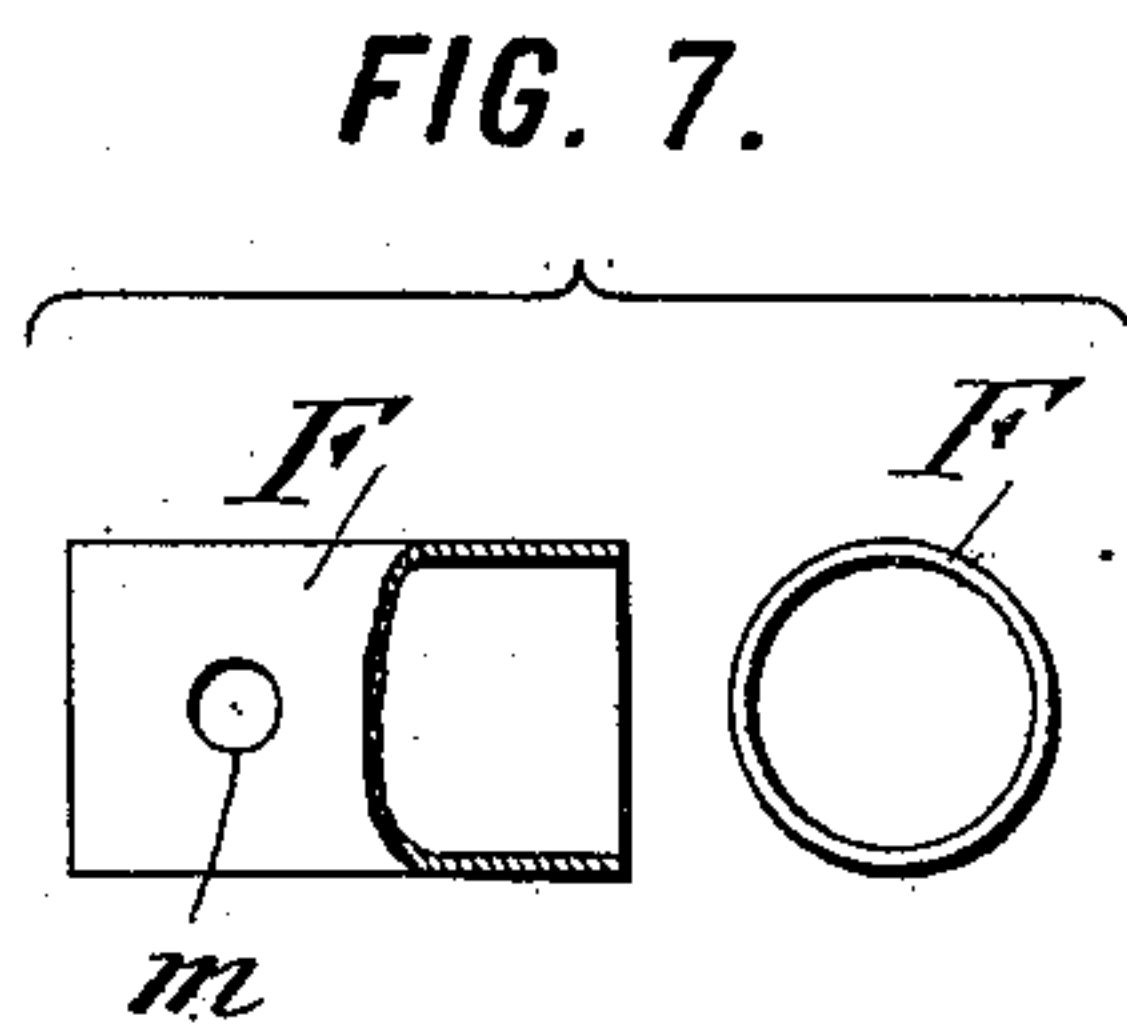
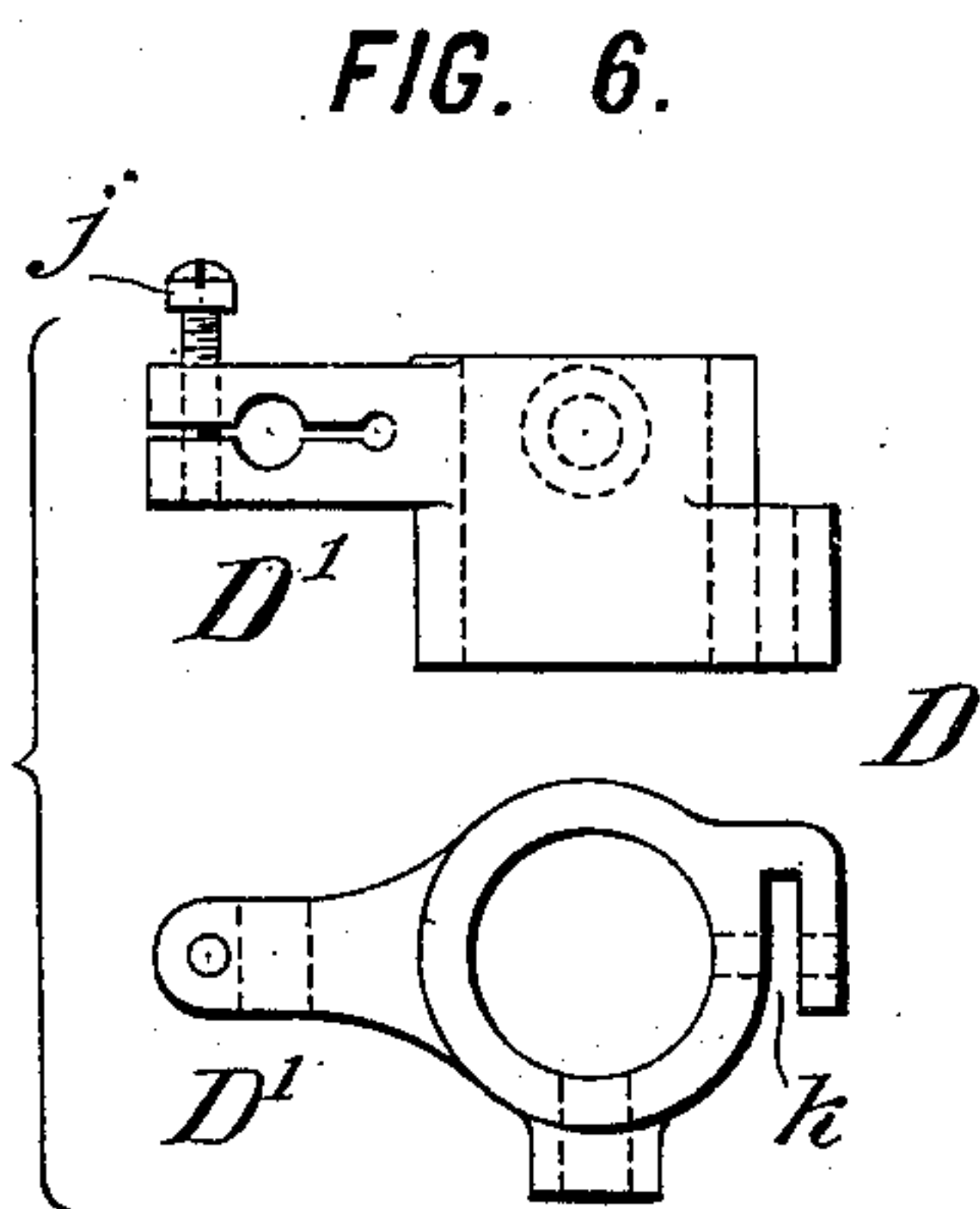
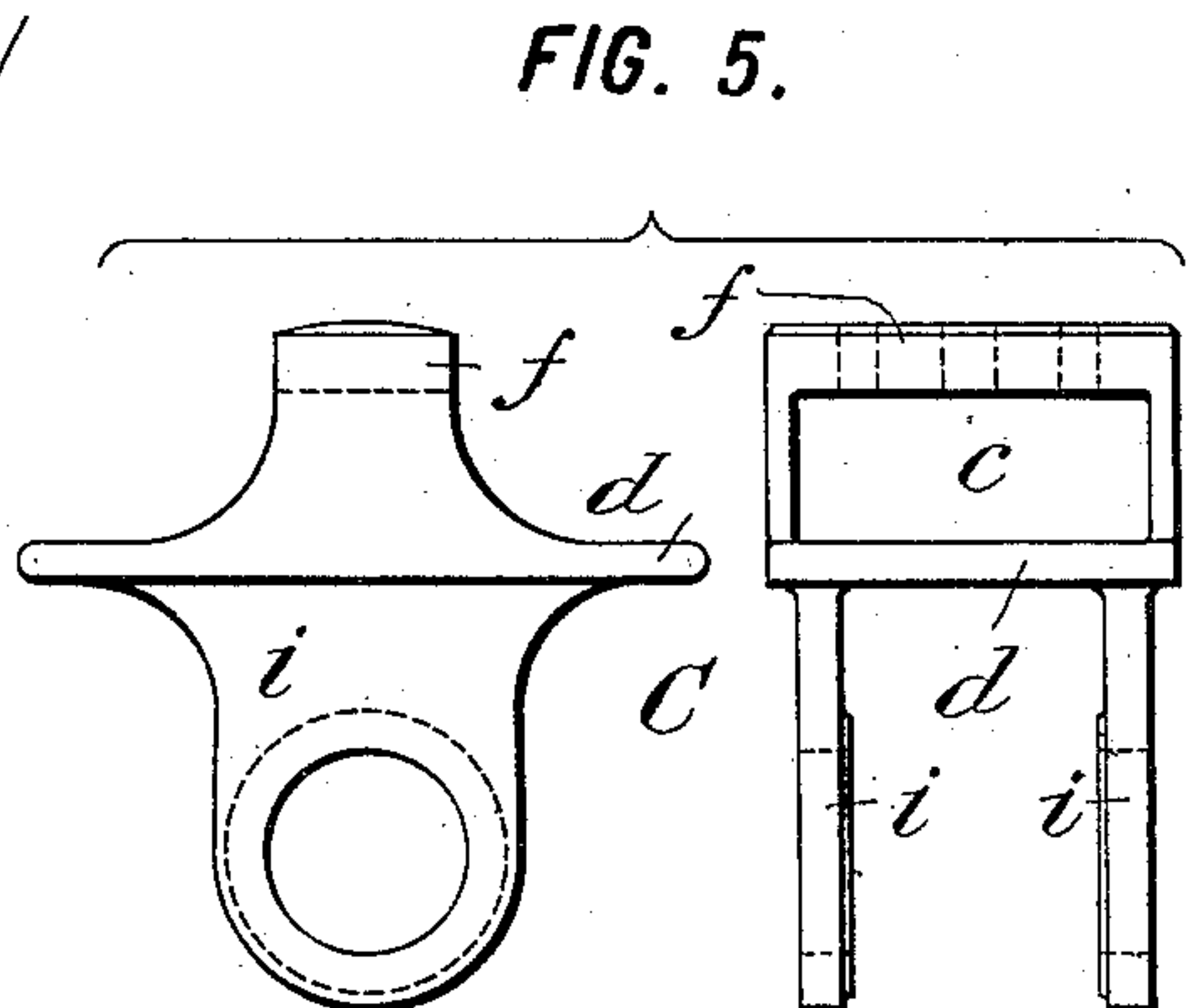
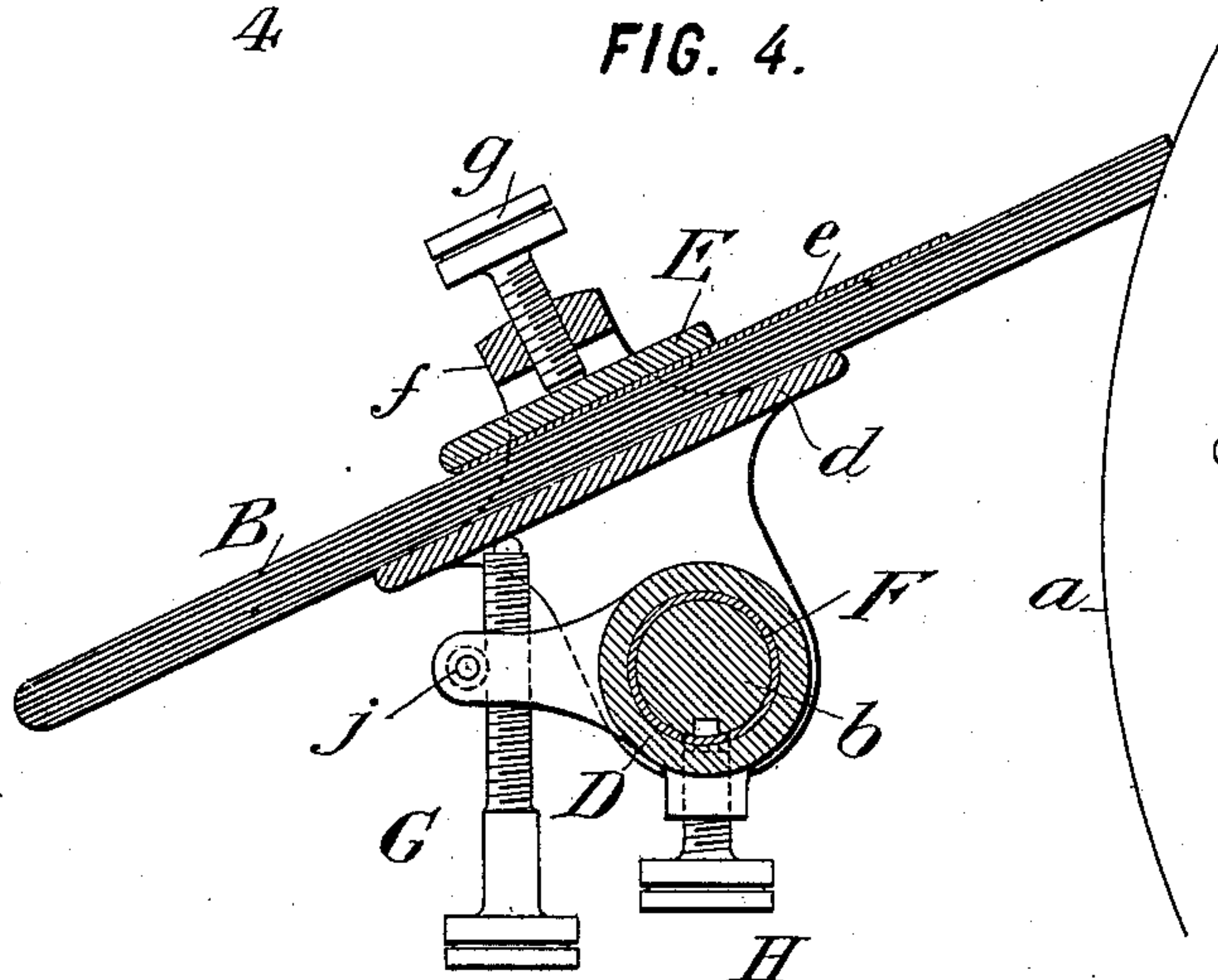
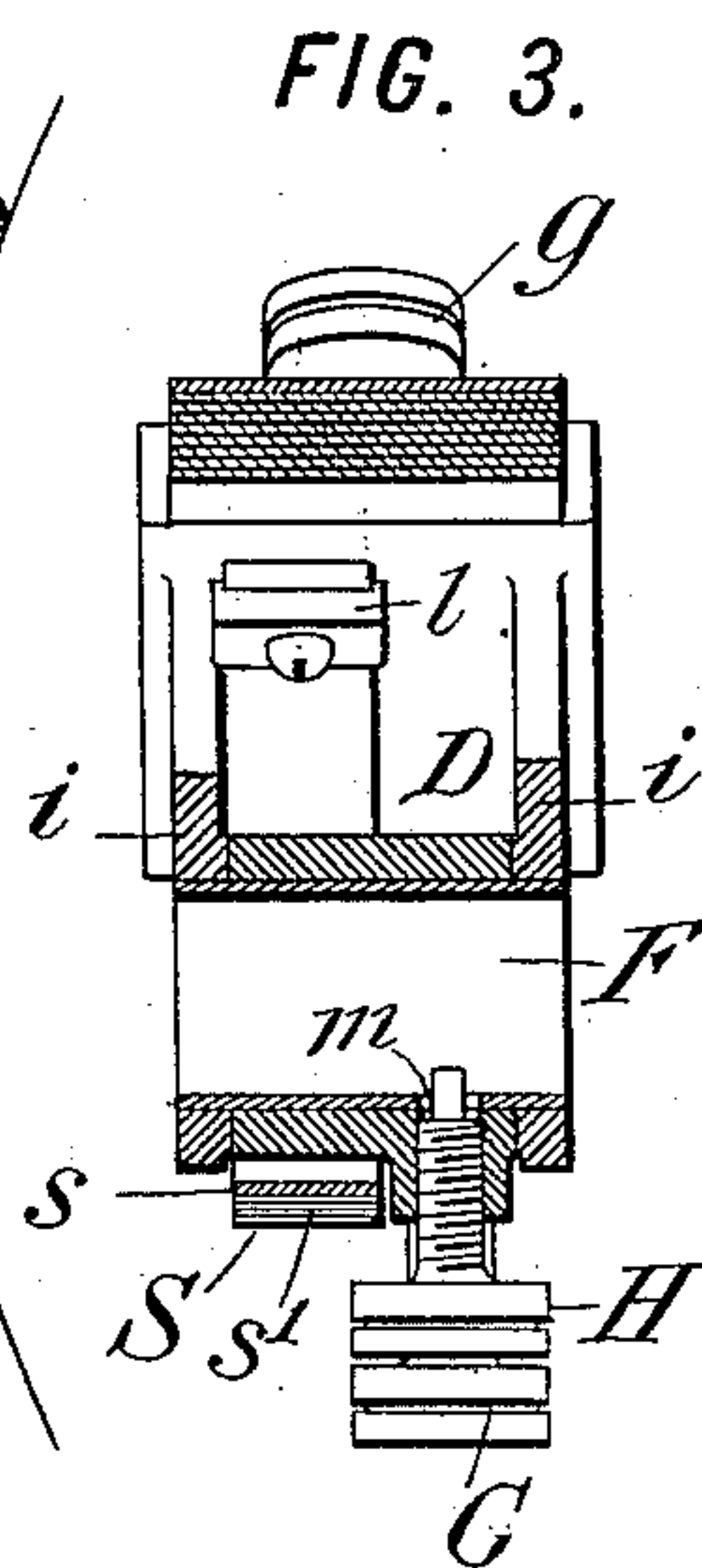
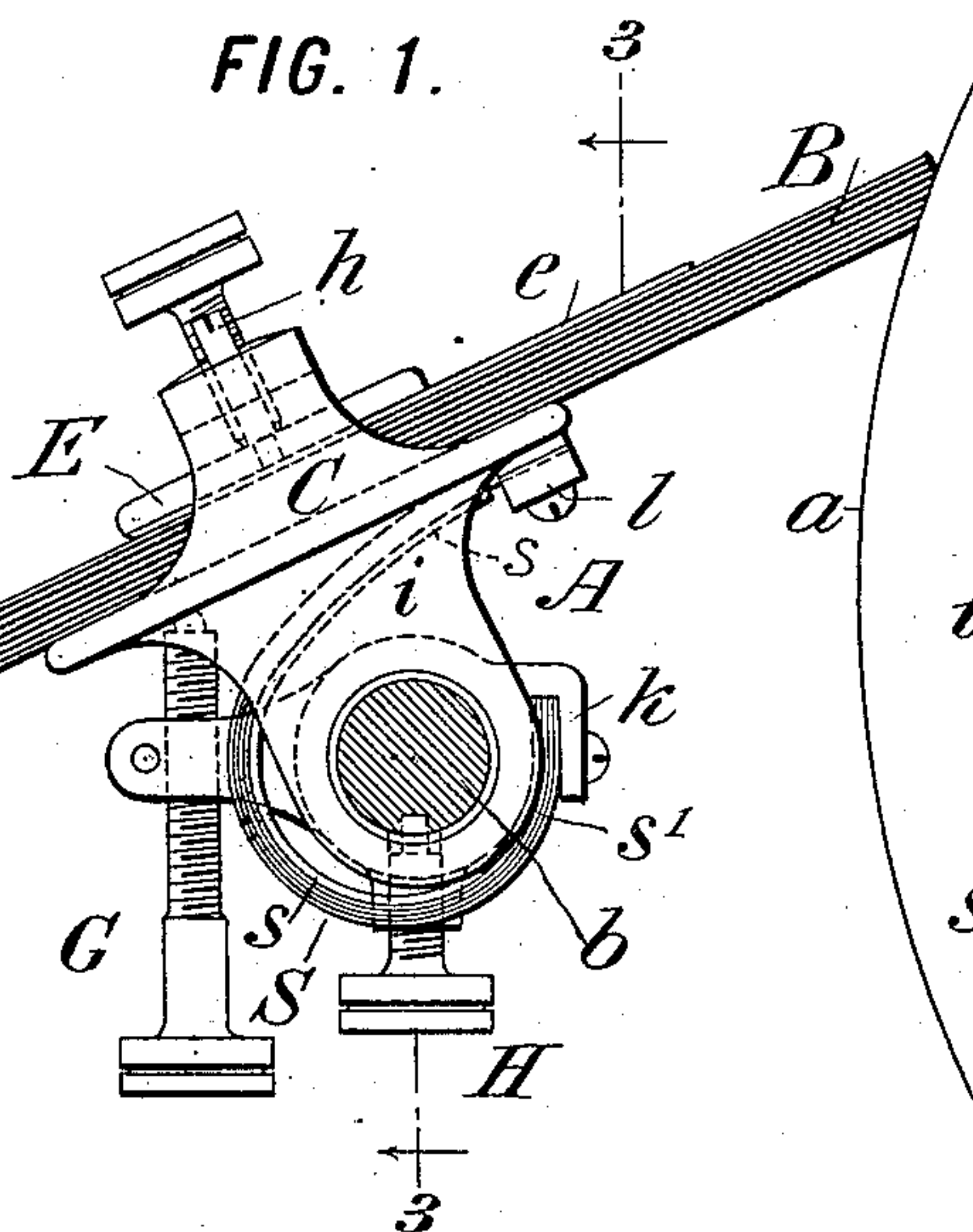
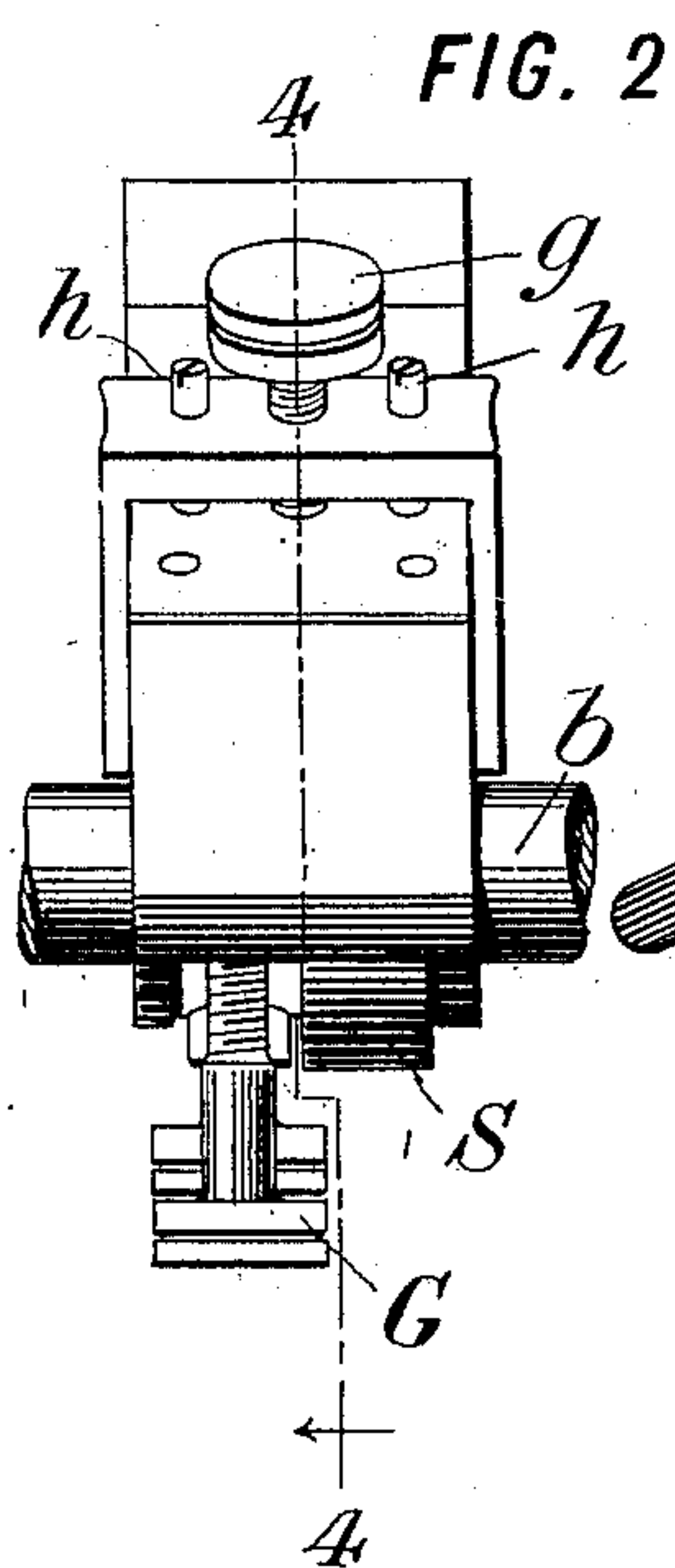


(No Model.)

J. J. WOOD.
COMMUTATOR BRUSH HOLDER.

No. 507,344.

Patented Oct. 24, 1893.



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UNITED STATES PATENT OFFICE.

JAMES J. WOOD, OF FORT WAYNE, INDIANA.

COMMUTATOR-BRUSH HOLDER.

SPECIFICATION forming part of Letters Patent No. 507,314, dated October 24, 1893.

Application filed June 27, 1893. Serial No. 478,964. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. WOOD, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Commutator-Brush Holders, of which the following is a specification.

This invention introduces certain improvements in the construction of holders for the copper brushes of the commutators or collectors of dynamo electric machines.

The accompanying drawings show the preferred construction.

Figure 1 is a front elevation, and Fig. 2 an end elevation of the brush holder and brushes as applied to the supporting stud. Fig. 3 is a section of the brush holder removed from the stud, the section being cut on the lines 3—3 in Fig. 1. Fig. 4 is a section on the line 4—4 in Fig. 2. Fig. 5 shows the side and end of the socket-piece, and Fig. 6 shows the boss or set-piece in plan and side view. Fig. 7 shows the copper sleeve.

Let *a* in Figs. 1 and 4 designate a portion of the cylindrical surface of the commutator, and *b* in Figs. 1, 2 and 4 designate the stud upon which the commutator brush holder is supported, this stud being itself supported upon the dynamo in any suitable way.

Let *A* designate the brush holder as a whole, and *B* the brush which as usual is made of laminated copper. The brush holder *A* is self-contained, and separable from the stud *b* without impairing its adjustment.

The brush holder consists of a socket-piece *C*, shown separately in Fig. 5, a boss or set-piece *D* shown separately in Fig. 6, a gib *E* carrying a stiffening plate or spring *e*, a conducting sleeve *F* preferably of copper shown separately in Fig. 7, a spring *S*, and the requisite adjusting screws.

The socket-piece *C* is formed with the usual socket *c* for receiving the brush, having a seat *d* and bridge *f*, the latter having a threaded hole for receiving the screw *g* which clamps the gib *E* against the brush and thereby confines the latter against the seat *d*. The gib is held from displacement by two pins *h* (Fig. 2) passing freely through holes in the bridge. The socket-piece is connected to the supporting stud in pivotal manner by being

formed with two perforated ears *i* the openings in which slip over the stud, the sleeve *F* however intervening.

The boss or set-piece *D* consists of a tubular boss or hub adapted to slip over the stud, with the intervention however of the sleeve *F*, and formed with an arm *D'* having a threaded hole in which works the adjusting screw *G*. This arm is preferably slitted to give it elasticity, and a screw *j* is provided for drawing its opposite parts together to clamp the adjusting screw with any desired amount of friction. The boss *D* is also provided with a socket *k* for receiving one end of the spring *S*, which is firmly fastened therein by means of a screw. The spring is a flat or leaf spring, and is bent around the hub portion of the boss, its opposite end being fastened or clamped by a screw *l* to the socket-piece *C*. This spring acts in such direction as to tend to press the tip of the brush away from the commutator, the brush being forced toward the commutator by the adjustment of the screw *G*, the tip of which bears upon the socket-piece *C* underneath the seat *d* in the manner shown, so that by screwing the screw forward it presses the brush toward the commutator in opposition to the tension of the spring. The boss *D* is held in place by means of a set-screw *H* entering through a threaded hole in the boss, and the end of which enters a recess in the stud *b*, this recess being preferably constructed as a longitudinal keyway, in order that the brush holder may be set in place at different points lengthwise of the stud, so as to bring the brush to any desired adjustment against the face of the commutator. By this set-screw the boss *D* is firmly united to the stud so as to resist the tension exerted against it by either the spring *S* or the screw *G*. The boss *D* fits between the perforated ears *i i* of the socket-piece, as shown in Fig. 3, so that when the boss is set in position on the stud it holds the socket-piece against displacement longitudinally of the stud.

The metal sleeve *F* is introduced between the socket-piece and boss on the one hand and the stud on the other, and serves two purposes: first, it serves to improve the electrical connection between the stud and the other parts of the brush-holder, since it affords a

broad surface the contact of which with the stud is not materially impaired by the eccentric displacement of the boss D by the tightening of the screw H; and the second, it serves as a means for connecting together the socket-piece C and boss D in such manner as to prevent their perforations being forced out of alignment by the tension of the spring S. It thus renders the brush holder self-contained, in order that by loosening the set-screw H the entire brush holder may be slipped off from the stud *b* without impairing the adjustment of the brush relatively to the commutator, this adjustment being preserved while the brush is removed, so that upon replacing the brush it does not require re-adjustment.

Heretofore in brush holders wherein the brush is pressed away from the commutator by a spring and adjusted toward the commutator by an adjusting screw, this screw has been carried by the socket-piece and has reacted against an arm projecting from the stud *b*, and which arm formed part of the stud and no proper part of the brush holder.

My present invention reverses the adjusting screw, causing it to work through the arm and bear against the socket-piece and constructs the arm not as an integral part of the stud, but as part of a boss or set-piece which is adjustably clamped upon the stud. This construction simplifies the manufacture, and has the advantage of enabling the brush holder to be set to different positions along the stud, and to be removed without impairing the adjustment.

Heretofore in brush holders either a laminated copper spring has served as the sole support of the brush socket, the socket-piece being not otherwise connected with the supporting stud or frame, or else when the socket-piece has been pivotally mounted on the stud, a steel spring has been introduced to exert a pressure upon the brush socket, being fastened to or reacting upon the stud. In the former construction the current is carried solely by the laminated copper spring, which consequently has to be fully as massive as the commutator brush. In the latter construction the current is designed to be carried between the stud and brush through the socket-piece, but this would not be applicable for heavy currents, because any imperfections of electrical contact between the two, would cause a portion of the current to be diverted through the spring, so that the spring would be heated and its tension impaired. To obviate this disadvantage, I construct the brush holder with a double or composite spring S, the same consisting of a steel spring to afford the necessary elasticity, and a laminated copper spring for conducting any current that might otherwise tend to pass between the boss and socket-piece through the steel spring. The steel spring is lettered *s*, and the laminated copper springs lettered *s'*, the steel spring being preferably inside and the copper lamina

extended around its exterior so as to bind ose against it.

The sleeve F is a simple piece of copper tube with a hole *m* through it to admit the end of the set-screw H. This sleeve may be made either a loose or driving fit with the boss D, but must be a free or working fit with the ears *i i* of the socket-piece.

A modification retaining part of my invention would consist in omitting the sleeve F, and bringing the boss and socket-piece ears into direct contact, but this would be an inferior construction.

I claim as my invention the following-defined novel features, substantially as hereinbefore specified, namely:

1. In combination with a supporting stud, a commutator brush-holder consisting of a socket-piece having a pivotal bearing on said stud, and a boss having a screw for fixing it to said stud, and an adjusting screw working in said boss and acting against said socket-piece to rock it on said stud and adjust the brush against the commutator.

2. In combination with a supporting stud, a commutator brush-holder consisting of a socket-piece having opposite perforated ears engaging the stud and forming a pivotal bearing thereon for the socket-piece, a boss detachably fixed on said stud between said ears whereby it prevents the longitudinal displacement of the socket-piece, and an adjusting screw working in said boss and acting against said socket-piece to rock the latter on said stud and adjust the brush against the commutator.

3. In combination with a supporting stud, a commutator brush-holder consisting of a socket-piece having a pivotal bearing on said stud, a boss having a screw for fixing it to said stud, a spring fixed at one end to said boss and at the other to the socket-piece and tending to press the brush away from the commutator, and an adjusting screw working in said boss and acting against said socket-piece to rock it on the stud and press the brush against the commutator.

4. In combination with a supporting stud, a commutator brush-holder consisting of a metal sleeve fitting said stud, a boss engaging said stud and mounted on said sleeve, a socket-piece pivoted on said sleeve, and an adjusting screw engaging said boss and socket-piece for adjusting the socket-piece relatively to the stud, whereby the holder may be removed bodily from the stud without impairing its adjustment.

5. In combination with a supporting stud, a commutator brush-holder consisting of a socket-piece having a pivotal connection with the stud, a boss fixed to the stud, and a metal sleeve interposed between the stud and said socket-piece and boss, and serving to make an effective electrical connection between the brush-holder and stud.

6. In combination with a supporting stud, a commutator brush-holder consisting of a

socket-piece having a pivotal connection with
the stud, and a spring pressing against said
socket-piece and reacting against the stud,
said spring consisting of a steel spring for af-
5 fording the requisite tension, and superposed
copper laminæ for affording the necessary
conductivity and preventing the heating of
the steel springs by the electric current.

In witness whereof I have hereunto signed
my name in the presence of two subscribing 10
witnesses.

JAMES J. WOOD.

Witnesses:

ARTHUR C. FRASER,
GEORGE H. FRASER.