

No. 649,552.

Patented May 15, 1900.

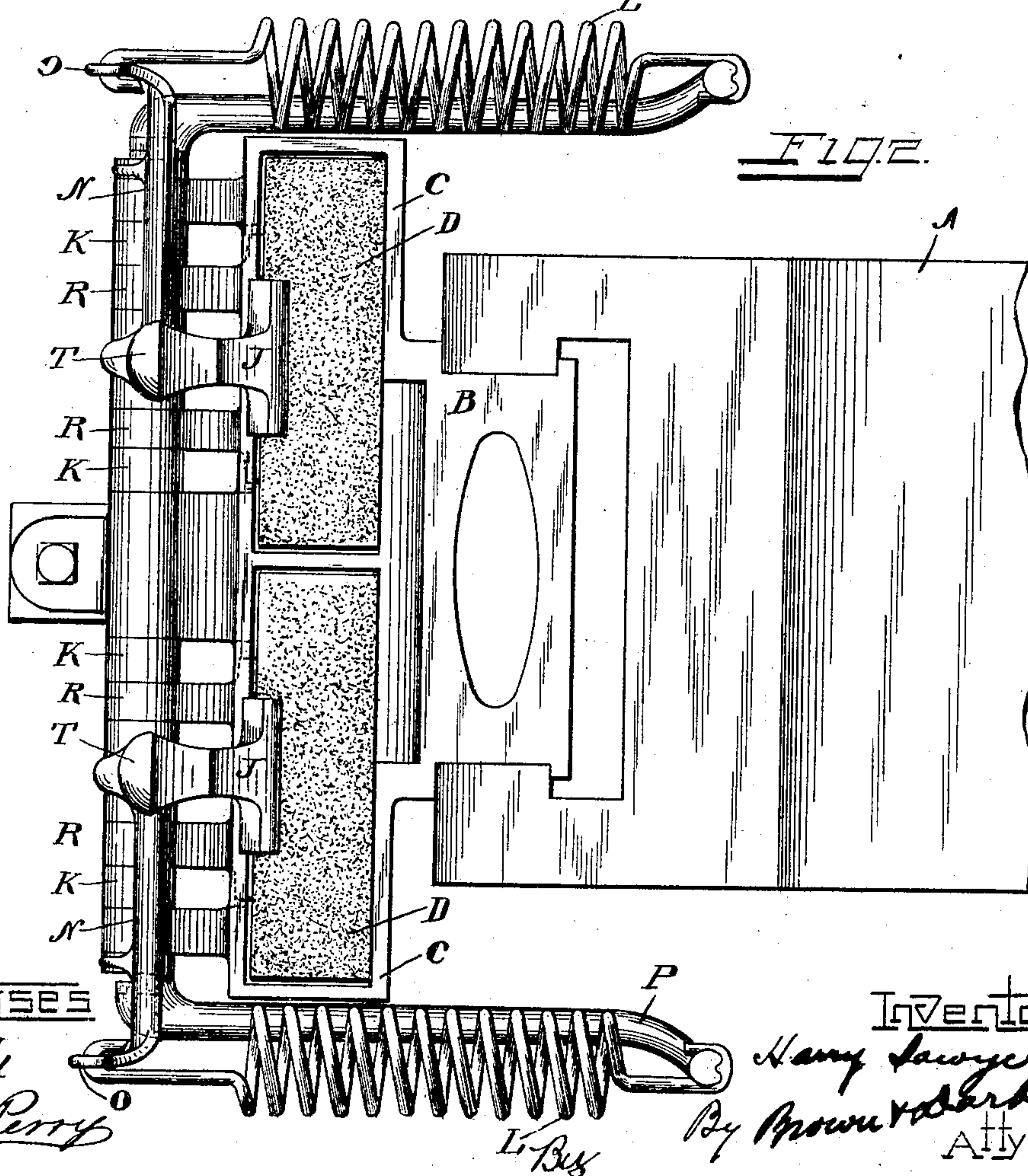
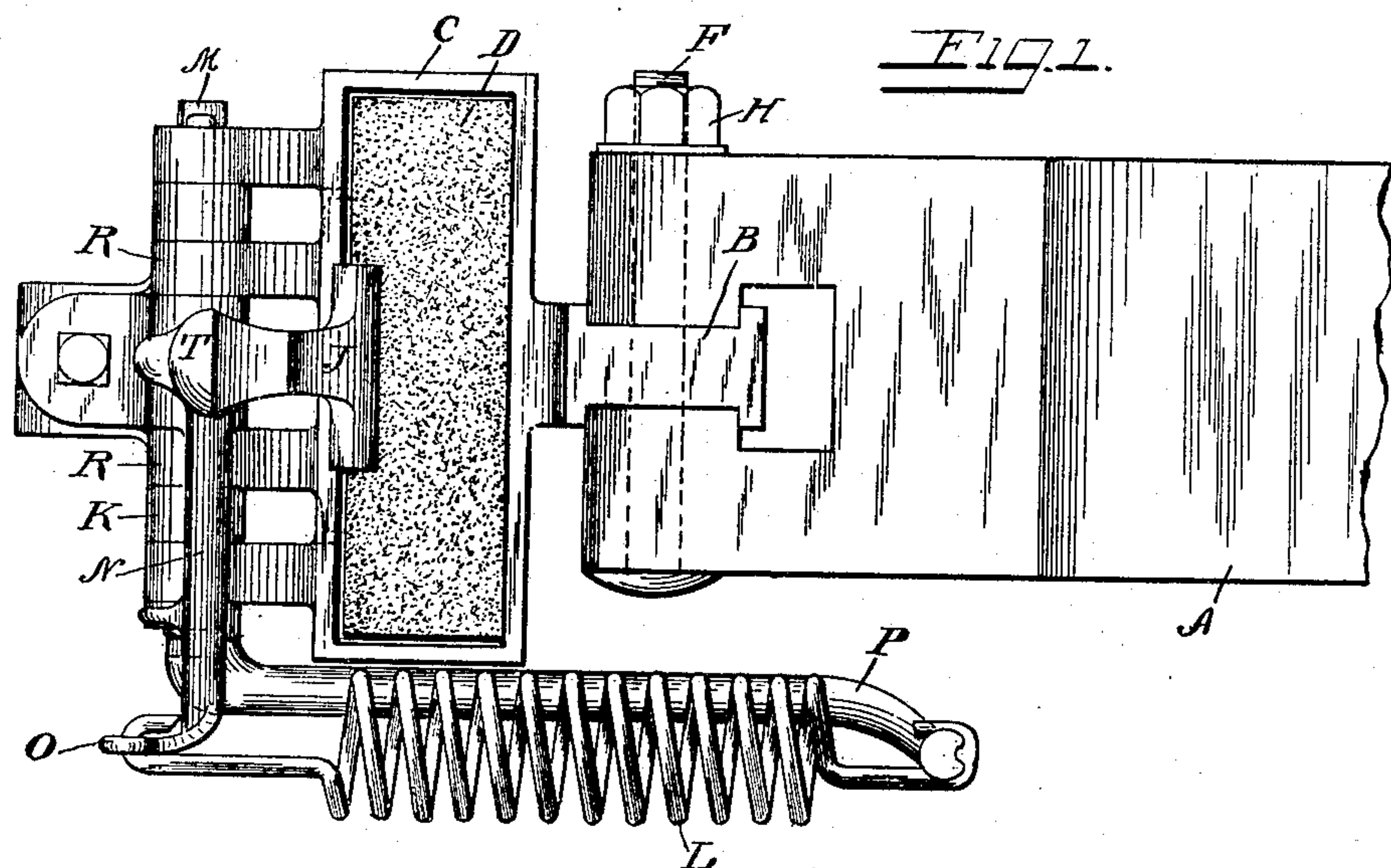
H. SAWYER.

BRUSH HOLDER FOR ELECTRIC MACHINES.

(Application filed Dec. 6, 1899.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES

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FIG. 3

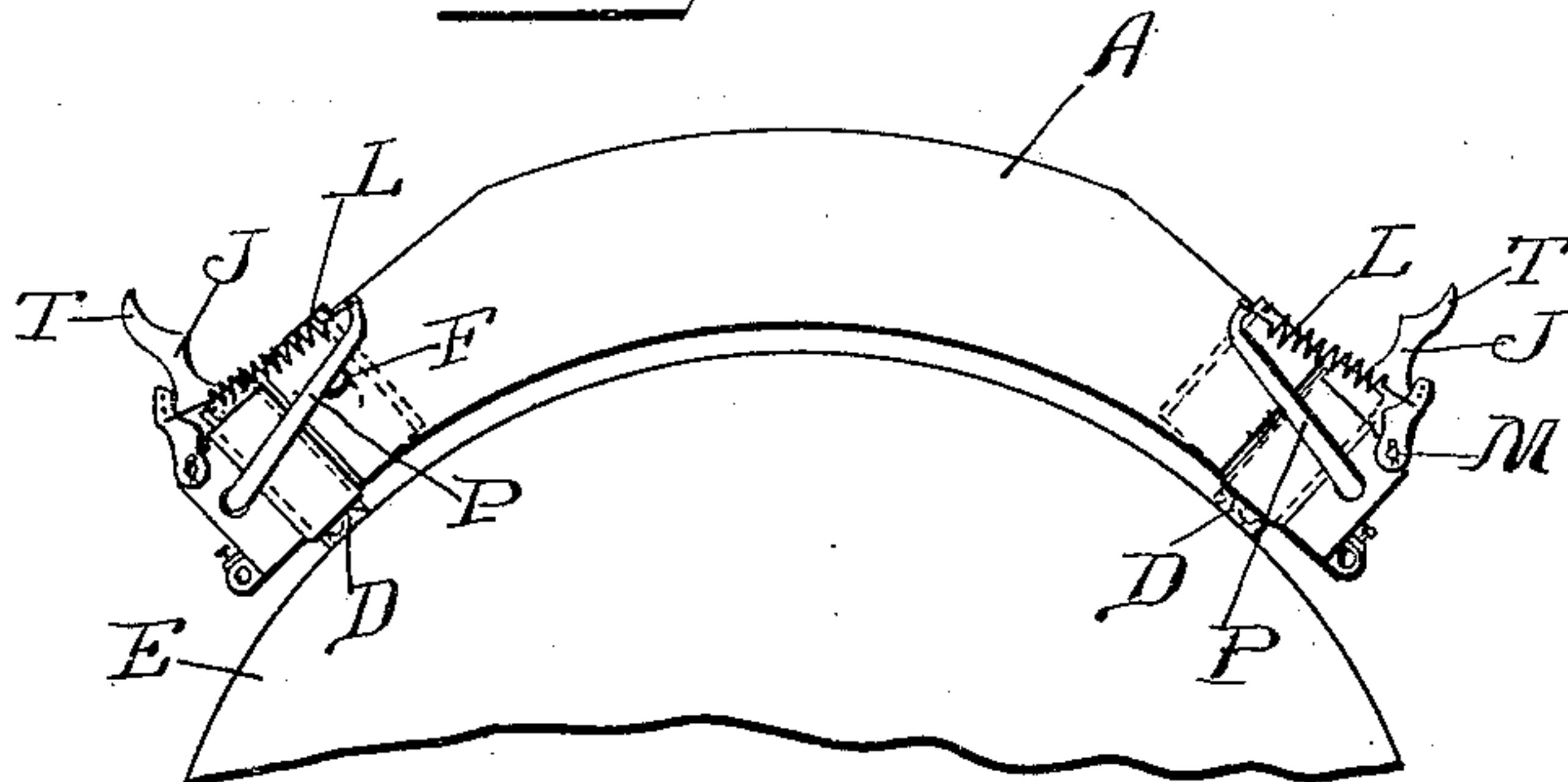


FIG. 5

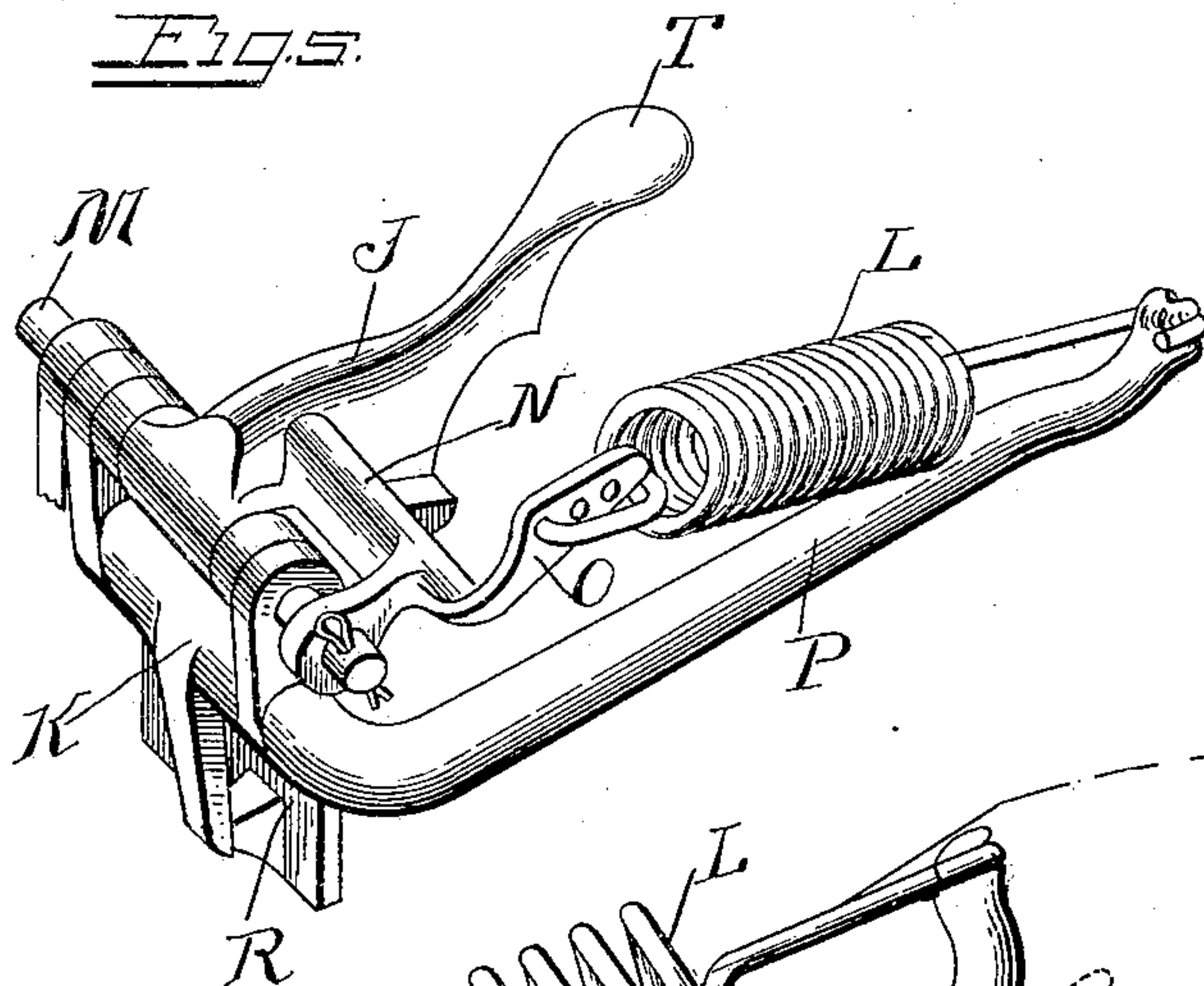
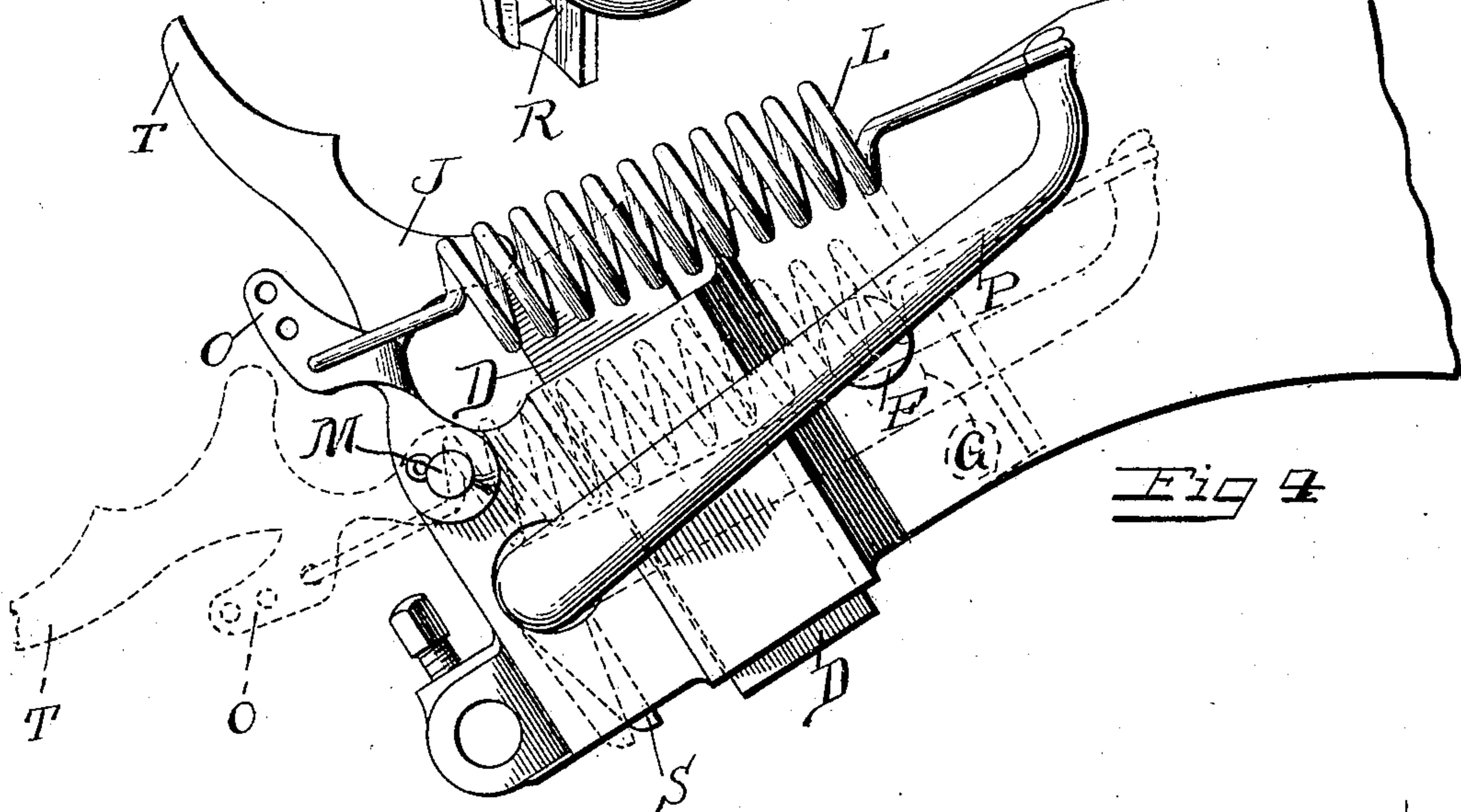


FIG. 4



WITNESSES

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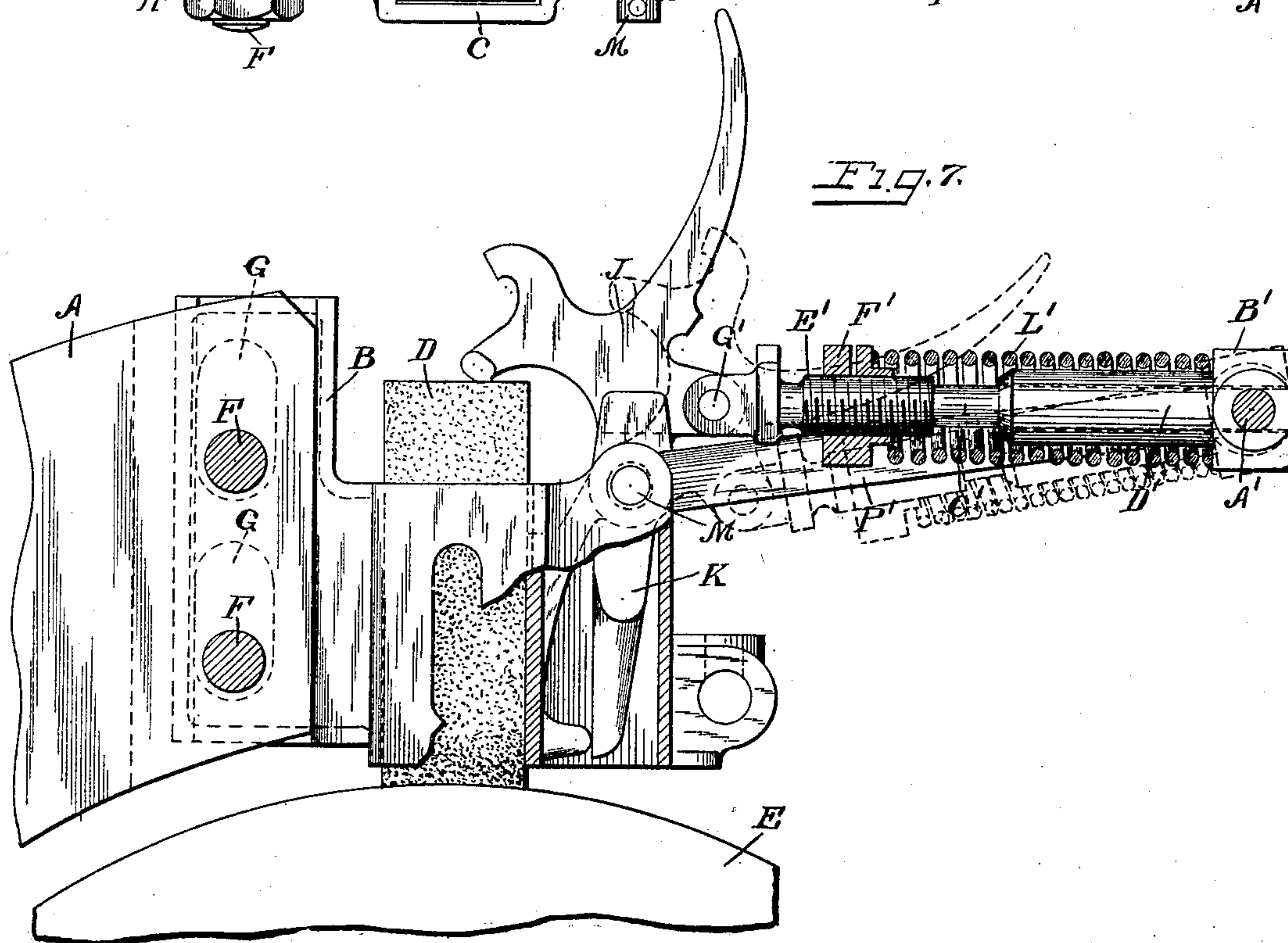
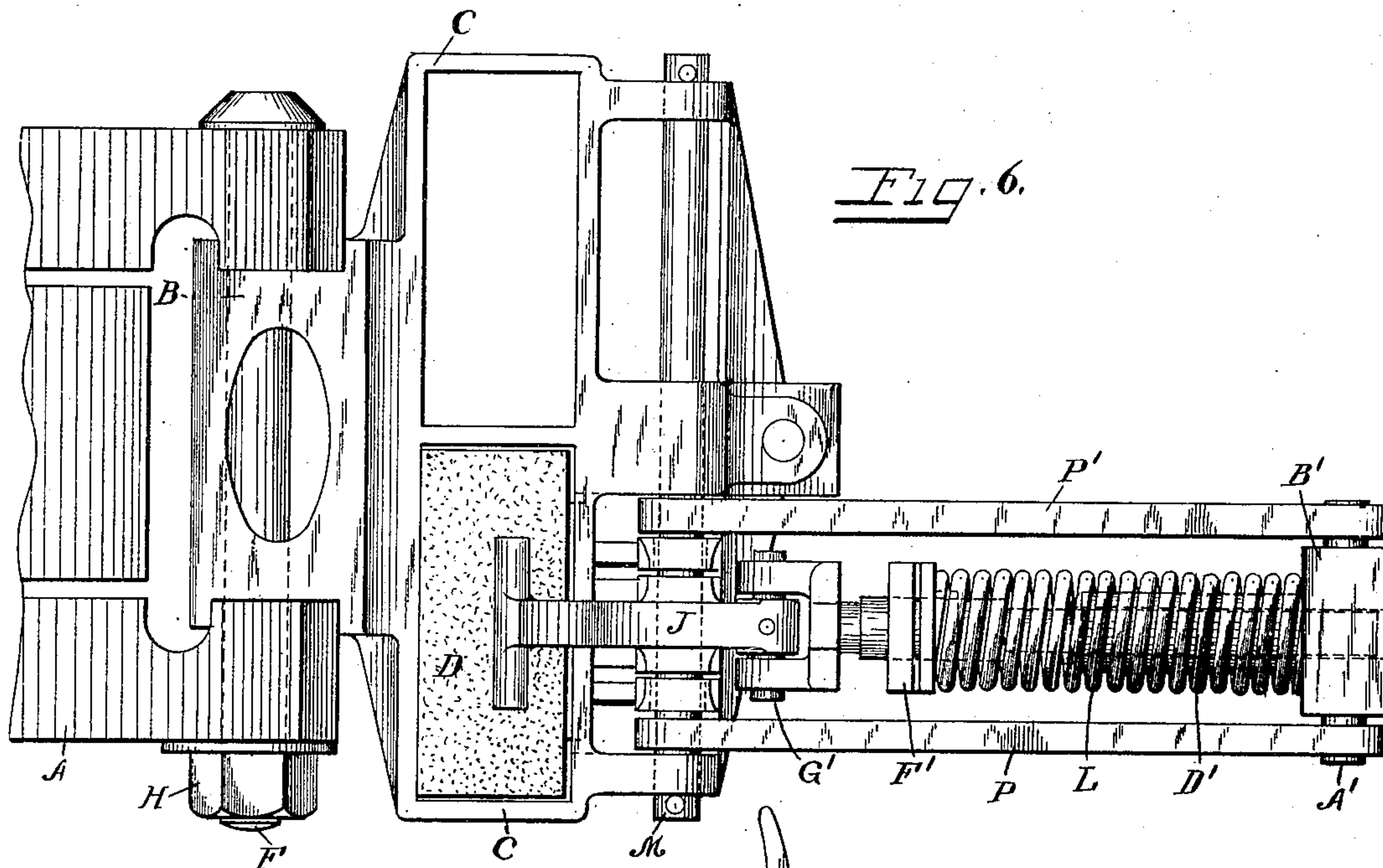
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UNITED STATES PATENT OFFICE.

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BRUSH-HOLDER FOR ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 649,552, dated May 15, 1900.

Application filed December 6, 1899. Serial No. 739,412. (No model.)

To all whom it may concern:

Be it known that I, HARRY SAWYER, a citizen of the United States, residing at Muskegon, in the county of Muskegon and State of Michigan, have invented a new and useful Brush-Holder for Electric Machines, of which the following is a specification.

This invention relates to brush-holders for electric machines.

One object of the invention is to provide a brush-holder of simple and improved construction wherein the brush is efficiently held and fed to its work.

A further object of the invention is to provide means whereby a single spring operates to apply a pressure upon the end of the brush to force the same against the commutator and also to apply a pressure upon the side of the brush to efficiently hold and support the same in the holder.

A further object of the invention is to provide a construction of brush-holder wherein the pressure mechanism for forcing the brush into contact with the commutator-surface and for holding and supporting the brush in the holder may be readily released to facilitate the insertion or removal of the brush.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference-signs appearing thereon, Figure 1 is a plan view of a brush-holder, a part of the supporting-block being broken away, constructed in accordance with the principles of my invention. Fig. 2 is a similar view showing a brush-holder arranged for two brushes or carbons. Fig. 3 is a broken view showing the application of the brush-holder to a commutator, the commutator being shown in end elevation and the brush-holder in side elevation. Fig. 4 is a view in side elevation of a brush-holder embodying my invention, displaced positions thereof being indicated in dotted lines. Fig. 5 is a detached detail broken view showing the levers for applying side and end pressure

to the carbon or brush in their assembled relation and a spring for exerting the pressure. Fig. 6 is a broken view in plan showing a slightly-modified arrangement embodying the principles of the invention. Fig. 7 is a similar view, partly in side elevation and partly in section, of the construction shown in Fig. 6.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

In the drawings reference-sign A designates the brush-holder support. This part may be of any suitable material and arrangement, but preferably of insulating material—such, for instance, as wood—upon which the brush-holder is supported. The brush-holder comprises a casting B, having one or more compartments formed therein, as indicated at C, each adapted to receive a brush or carbon D. In order to secure a desirable adjustment of casting B with reference to the supporting-block A, so that the position of the brush-holder with reference to the surface of the commutator E may be suitably adjusted and regulated, said brush-holder may be supported upon the holder or support A by means of one or more bolts F, arranged to pass through a suitable part of the holder and through the support A, as clearly shown, one of these parts—as, for instance, the holder—being slotted, as indicated at G. (See Figs. 4 and 7.) Thus by loosening the nut H on supporting-bolt F the holder B may be adjusted with reference to the holder or support A and with reference to the surface of the commutator E.

Suitably supported upon the holder B are the rock-levers J K, the lever J being arranged to engage the end of carbon or brush to force the same endwise against the commutator-surface and the lever K being arranged to act upon the side of the carbon or brush to sufficiently support and hold the same in the compartment of the holder and to prevent rattling and lost motion thereof, and L is a spring through which pressure is applied to both of said levers. These parts constitute the important features of the invention, and the details of their relative arrangement may be widely varied in the assembled relation thereof. A convenient and efficient arrangement is shown, to which, however, I do not desire to be limited or restricted, wherein a

pin or rod M is suitably mounted in the holder, and upon this pin or rod the levers J and K are pivoted. Formed on or otherwise secured to one of said levers, as lever J, is an extension N, having an ear O, to which is secured one end of the spring L, the other end of said spring being attached to an arm P of lever K. The side pressure exerted by lever K upon the carbon or brush should be so regulated as to resist merely the friction of the carbon upon the commutator, but should not be sufficient to prevent the carbon from being properly fed to the commutator as the carbon wears away, whereas the pressure exerted by lever J upon the end of the carbon should be sufficient to constantly press the carbon into efficient contact with the commutator-surface, and in order to secure these results the proportion between the lengths of levers J K from the fulcrum thereof—that is, from the axis of the pin or rod M, upon which said levers are pivoted—to the points of application of the pressure exerted therethrough upon the carbon should be such as to give the correct relative pressure upon the end and side of the carbon. The tension exerted by spring L upon both pressure-levers may be varied by varying the point of connection of said spring to one or the other of said levers—as, for instance, by attaching the end of said spring to one or the other of the perforations or holes of the ear O. This variation in the tension of the spring, however, does not vary the relative pressure exerted by the levers upon the carbon, since the effective lever-arm of each lever is the distance from the center of the pivot pin or rod M to the line of tension of the spring, and which relation is not disturbed by increasing the tension of the spring, as above specified.

It will be observed that in the case of a rock-lever K for exerting a side tension upon the carbon such side tension will be exerted only at one point in the length of the carbon. It is desirable, however, in order to efficiently support and hold the carbon laterally to prevent rattling or lost motion that such side or lateral pressure be exerted thereon at more than one point in its length. Therefore in order to secure such result instead of arranging the lever K to bear directly upon the side surface of the carbon I may, if desired, interpose a plate between the point of application of the pressure of said lever and the carbon, so that such plate will bear against the carbon and the lever will bear against the plate, thus efficiently applying the pressure of said lever to the carbon. A convenient arrangement is shown wherein said plate (indicated at R) is loosely sleeved or supported from pin or rod M and is provided with a lug S, against which said lever K bears, as clearly shown in Figs. 5 and 7.

One of the levers J K—as, for instance, lever J—may be provided with or formed into a handle T, by which said lever may be grasped and rocked about its fulcrum to re-

lease the pressure upon the carbon and to permit of the removal or insertion of the same in the holder. The parts are so relatively arranged that the lever J may be rocked about its fulcrum or point of pivotal support a distance sufficient to carry the point of connection of the end of spring L below or past the fulcrum about which said lever J rocks, as clearly indicated in dotted lines in Fig. 4, thus holding both levers J K in retracted position and out of contact with the carbon and leaving the compartment of the holder free for the insertion or removal of the carbon or brush. This I consider an important feature of my invention.

It is obvious that a brush-holder embodying the principles of the construction as above described may be applied to a case in which only a single carbon or brush is employed, as in Fig. 1, or to a holder having two or more compartments, as indicated in Fig. 2, side and end pressure levers, with a spring for exerting pressure on both levers, being provided for each compartment.

In Figs. 1, 2, 3, 4, and 5 I have shown a construction wherein the desired pressure is secured through an extension-spring L. It is obvious, however, that other forms of spring may be employed. For instance, in Figs. 6 and 7 I have shown an arrangement in which a compression-spring is employed, said spring being illustrated at L'. In this construction the lever K, through which the side or lateral pressure is applied to the carbon or brush, is provided with the arms P', their outer ends supporting the pintles A' of a block or cross-head B', against which block or cross-head one end of spring L' bears, and to lever J is pivotally connected a rod C', arranged to slide freely through block B' or through a tubular sleeve or extension D' thereof. The rod C' is threaded, as at E', to receive a nut F', against which the other end of spring L' bears. The pressure of said spring may be readily adjusted by turning up on nut F'. In other respects the construction may be substantially the same as the construction shown in Figs. 1, 2, 3, 4, and 5, and the operation is the same in either case, the pressure of said spring being exerted to apply a pressure through levers J and K, respectively, upon the end and side of the carbon or brush D, and the relative proportion of the distances between the fulcrum of each lever and the point of application of the tension of such spring being such as to maintain the proper relation between the end pressure and the side pressure exerted upon the carbon or brush, and when one of said levers—as, for instance, lever J—is rocked against the tension of said spring L' a sufficient distance to carry the point of connection of rod C' with said lever J, as indicated at G', past the fulcrum M of said lever J a lock is formed to retain said lever, and also lever K, in retracted position.

It is obvious that many other changes and

variations in the details of construction and arrangement would readily suggest themselves to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact details of construction shown and described; but,

Having now set forth the object and nature of my invention and various forms of construction embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent of the United States, is—

1. In a brush-holder, a lever arranged to exert a pressure on the end of the carbon or brush, an additional lever arranged to exert a pressure on the side of the brush or carbon, and a spring arranged to exert its tension on both of said levers, as and for the purpose set forth.

2. A brush-holder adapted to receive a carbon or brush, levers pivotally mounted on said holder, and a spring connected to both of said levers, one of said levers arranged to exert a pressure on the end of said carbon to feed the same to the commutator, and the other lever arranged to exert a pressure on the side of the carbon to hold the same in the holder, as and for the purpose set forth.

3. A brush-holder having one or more compartments, each adapted to receive a carbon, and each provided with levers pivotally mounted on said holder, one arranged to engage the end of the brush and the other to bear against the side of the brush, and a spring arranged to exert its tension on both of said levers, as and for the purpose set forth.

4. A brush-holder adapted to receive a brush, a pin mounted in said holder, levers fulcrumed upon said pin, one of said levers arranged to bear against the end of the brush and the other to bear against the side of the brush, and a spring arranged to exert its tension on both levers, as and for the purpose set forth.

5. A brush-holder adapted to receive a brush, levers pivotally mounted, one of said levers arranged to bear upon the end of the brush, a plate arranged to engage the side of the brush, the other of said levers arranged to bear against said plate, and means for imposing a tension on said levers, as and for the purpose set forth.

6. A brush-holder adapted to receive a brush, a pin mounted in said holder, levers fulcrumed upon said pin, one of said levers arranged to bear against the end of the brush, a plate loosely hung upon said pin and arranged to bear against the side of the carbon, the other of said levers arranged to bear against said plate, and means for imposing a tension on said levers, as and for the purpose set forth.

7. A brush-holder adapted to receive a brush, levers pivotally mounted, one of said levers arranged to bear against the end of the brush and the other against the side of the brush, a spring arranged to exert its tension on both levers, and means for adjusting the tension of said spring, as and for the purpose set forth.

8. A brush-holder adapted to receive a brush, levers pivotally mounted, one of said levers arranged to bear against the end of the brush and the other against the side of the brush, and a spring engaging at one end one of said levers and at the other end the other of said levers, as and for the purpose set forth.

9. A brush-holder adapted to receive a brush, a pin, levers fulcrumed on said pin, one of said levers arranged to bear against the end of the brush and the other against the side of the brush, a spring connected at the respective ends thereof to said levers, respectively, whereby by rocking one of said levers to carry the point of connection of said spring thereto past said fulcrum said levers are locked, as and for the purpose set forth.

10. A brush-holder adapted to receive a brush, levers pivotally mounted, one of said levers arranged to bear against the end of the brush and the other against the side of the brush, said levers provided with operating-arms of different effective lengths with respect to the pivotal axes of said levers, and means for imposing a tension on said arms, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 27th day of November, 1899, in the presence of the subscribing witnesses.

HARRY SAWYER.

Witnesses:

OTTO ALBERT,
NORMAN WHICHELLO.