

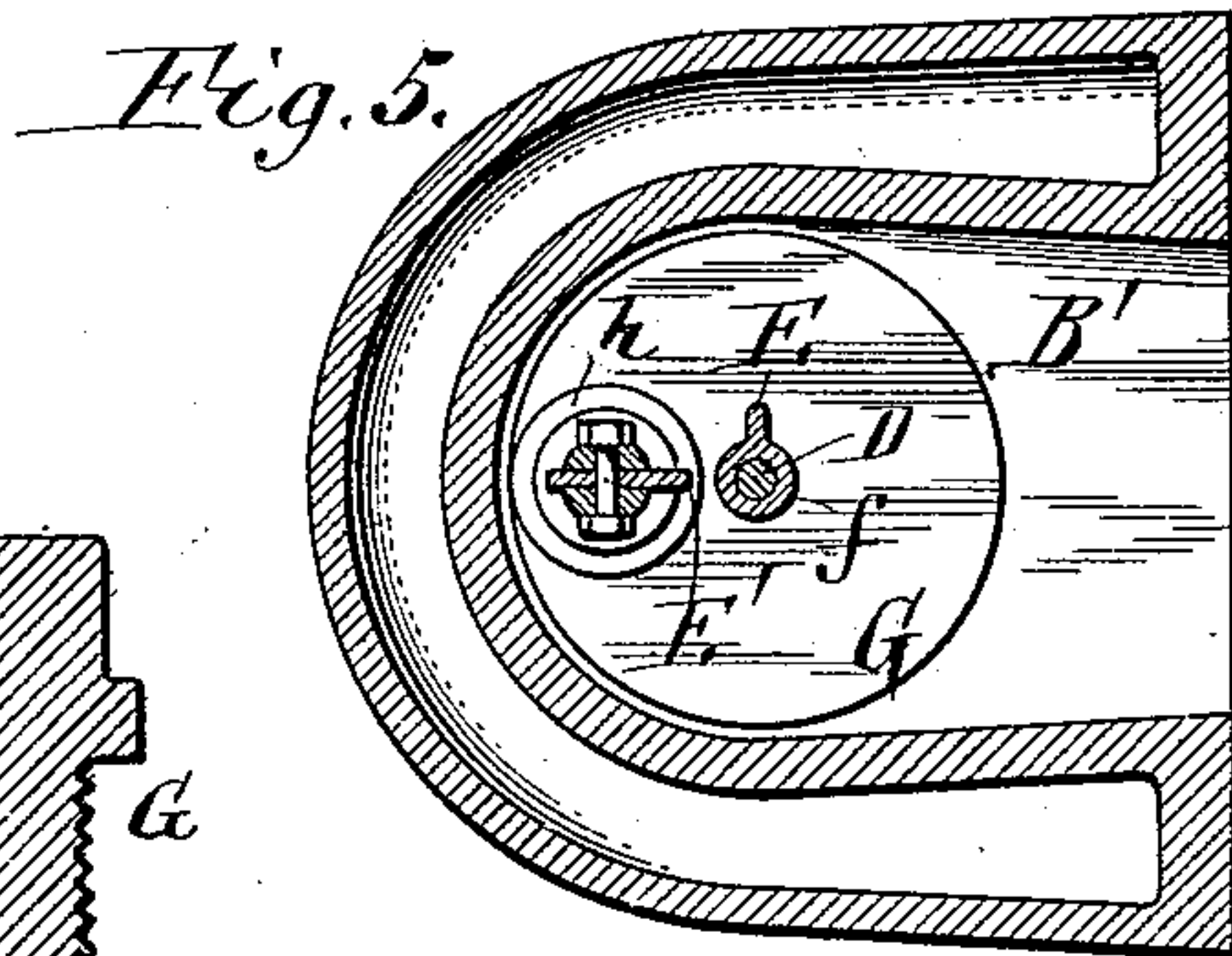
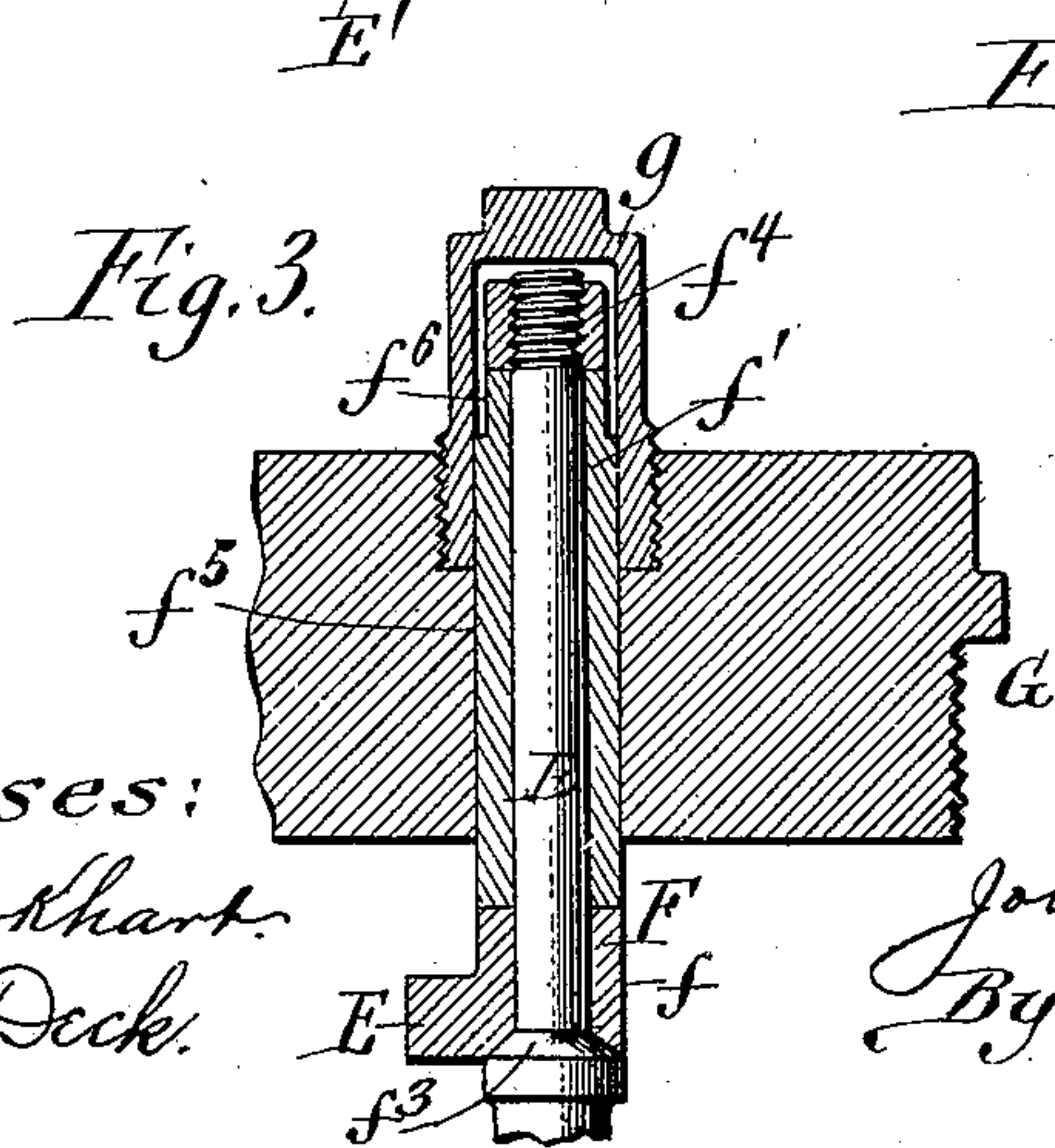
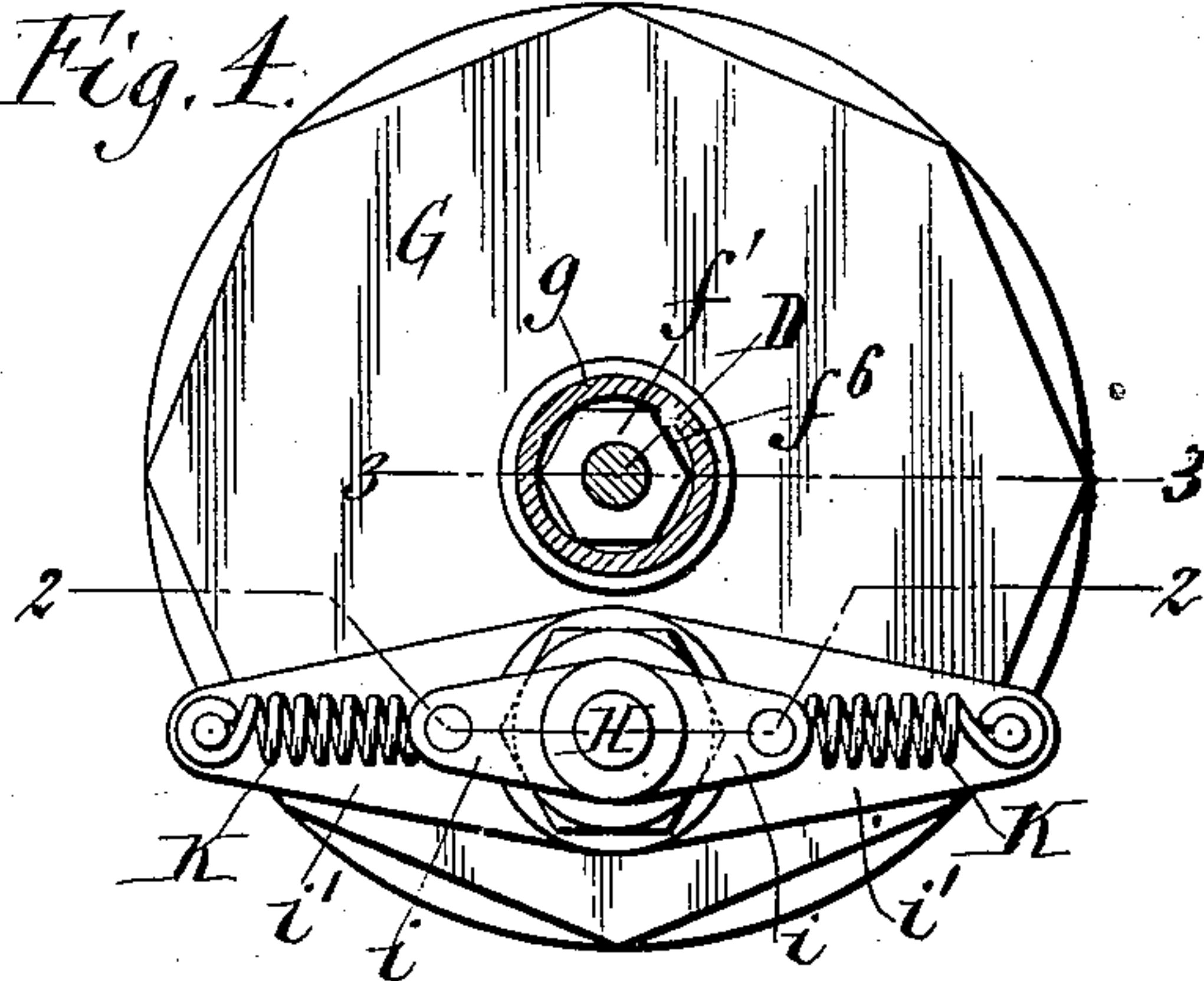
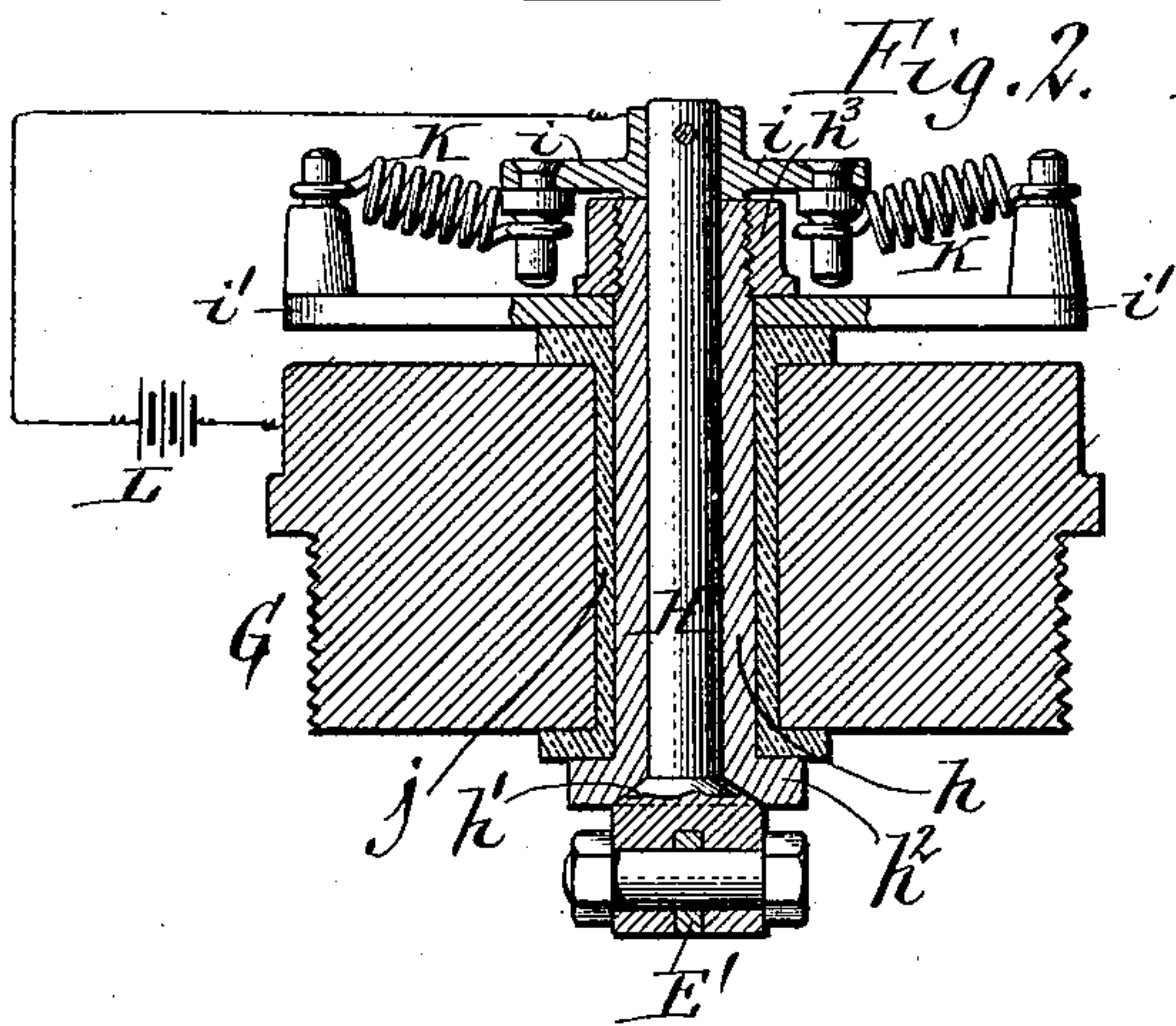
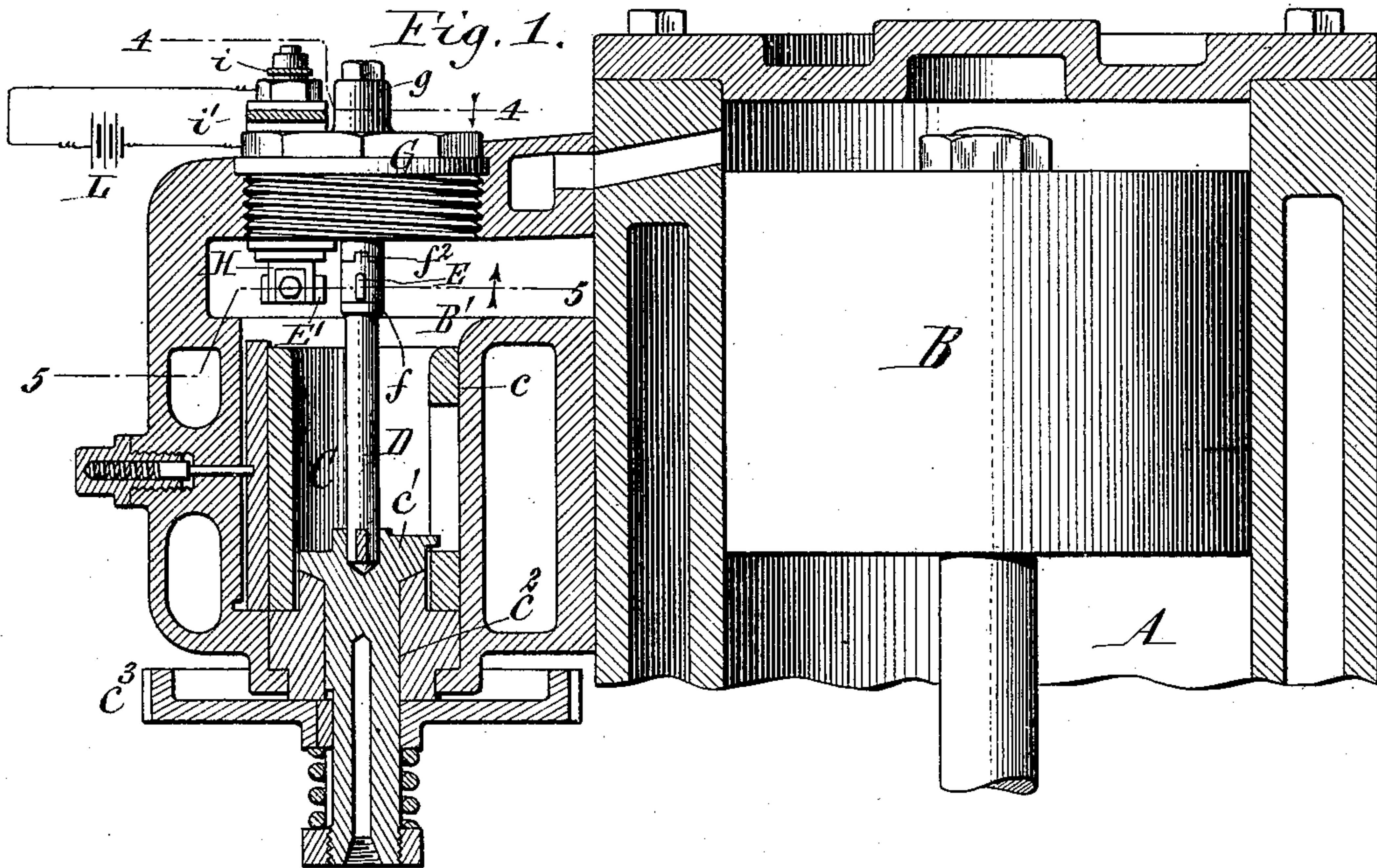
No. 636,453.

Patented Nov. 7, 1899.

J. W. RAYMOND.  
ELECTRIC IGNITER FOR GAS ENGINES.

(Application filed Nov. 17, 1898.)

(No Model.)



Witnesses:  
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# UNITED STATES PATENT OFFICE.

JOHN W. RAYMOND, OF OIL CITY, PENNSYLVANIA, ASSIGNOR TO THE  
STANDARD AUTOMATIC GAS ENGINE COMPANY, OF SAME PLACE.

## ELECTRIC IGNITER FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 636,453, dated November 7, 1899.

Original application filed February 21, 1898, Serial No. 671,193. Divided and this application filed November 17, 1898. Serial No. 696,680. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN W. RAYMOND, a citizen of the United States, residing at Oil City, in the county of Venango and State of Pennsylvania, have invented new and useful Improvements in Electric Igniters for Gas-Engines, of which the following is a specification.

This invention relates to an electric igniter for gas-engines, and has the object to produce an igniter of this character which is simple and durable in construction, reliable in operation, and which will effectually prevent gas from leaking past the journal of the igniter.

This application is a subdivision of an application for patent on gas-engines filed by me February 21, 1898, Serial No. 671,193.

In the accompanying drawings, Figure 1 is a fragmentary horizontal section of the cylinder, piston, and valve mechanism of a gas-engine, showing my improved electric igniter applied thereto. Figs. 2 and 3 are longitudinal sections, on an enlarged scale, in lines 2-2 and 3-3, Fig. 4, respectively. Fig. 4 is a transverse section, on an enlarged scale, in line 4-4, Fig. 1. Fig. 5 is a transverse section in line 5-5, Fig. 1.

Like letters of reference refer to like parts in the several figures.

A represents the cylinder, and B the piston, arranged therein.

B' represents a valve-chamber arranged lengthwise on the outer side of the cylinder and connected with one end of the cylinder.

C represents a rotary fuel and exhaust valve journaled in a cylindrical seat *c* in the valve-chamber and connected with a driving-plug *c'*, which is journaled in a bearing *c<sup>2</sup>* in one end of the valve-chamber. This plug is provided outside of the valve-chamber with a driving-wheel *c<sup>3</sup>*.

D represents a driving-spindle arranged axially in the rotary valve and connected with its inner end to the driving-plug, so as to turn therewith.

E represents a rotary electric contact, and E' a rocking electric contact, which are arranged in the valve-chamber and adapted to engage with each other for closing the electric circuit of which they form the terminals.

F represents an adjusting or supporting sleeve from which the rotary contact projects laterally and which is adjustably mounted on the outer portion of the driving-spindle. This supporting-sleeve is preferably made in sections for convenience in manufacturing, the inner section *f* carrying the rotary contact and the outer section *f'* being coupled with the inner section by an interlocking lug *f<sup>2</sup>* and a recess arranged on the opposing ends of the sleeve-sections. The inner section of the adjusting-sleeve is provided with a conical inner end, which bears against a conical shoulder *f<sup>3</sup>* on the driving-rod.

*f<sup>4</sup>* is a clamping-nut which is arranged on the outer screw-threaded end of the driving-spindle and which bears against the outer end of the outer section of the adjusting-sleeve for clamping the latter on the driving-spindle. The outer portion of the driving-spindle and the adjusting-sleeve mounted thereon extend through an opening *f<sup>5</sup>* in a head G, which closes the adjacent end of the valve-chamber, so that the outer end of this sleeve and its clamping-nut are accessible from the outside of the valve-chamber for adjusting the rotary contact about its axis. The outer portions of the adjusting-sleeve and driving-spindle are covered when the parts are adjusted by a cap *g*, which has a screw connection with the outer side of the head G.

The rocking electric contact is arranged in the path of the rotary contact and projects laterally from the inner end of a rocking spindle H. This spindle is journaled parallel with the driving-spindle in a bushing *h*, which extends outwardly through the head G, and is provided with an outwardly-facing conical shoulder *h'* at its inner end, which bears against a corresponding shoulder on the inner end of the bushing.

*i i* are two rock-arms which are secured to the outer end of the rock-spindle and which project in diametrically opposite directions.

*i' i'* are two supporting-arms which are secured to the outer end of the bushing in line with and behind the rock-arms *i*. The bushing is insulated from the supporting-head G by an insulating sleeve or spool *j*, which is interposed between the bushing and head.



The bushing is secured in the insulating-sleeve by a shoulder  $h^2$ , arranged on the inner end of the bushing and bearing against the inner end of the insulating-sleeve, and a clamping screw-nut  $h^3$ , arranged on the externally-screw-threaded outer end of the bushing and bearing against the hub of the supporting-arms  $i'$ , which latter in turn bear against the outer end of the insulating-sleeve.

10 K K represent two springs, each of which is connected at its inner end with one of the rock-arms  $i$  and with its outer end to the adjacent supporting-arm  $i'$ .

L represents an electric generator having one of its poles connected with any suitable part of the engine which is in metallic connection with the rotary contact, while its other pole is connected with a metallic part of the rocking contact. During each rotation of the rotary contact the latter engages with the rocking contact and deflects the same out of its normal position, and when the rotary contact leaves the rocking contact the latter is restored to its normal position by the springs

25 K. While the rotary contact is in engagement with the rocking contact the electric circuit is closed, and when the rotary contact leaves the rocking contact the electric circuit is broken and a spark is formed, which ignites the charge of fuel in the cylinder and valve-chamber.

The springs K are arranged obliquely with reference to the axis of the rock-spindle and their inner ends are arranged nearer the shoulder  $h'$  of the spindle than their outer ends, by which arrangement the springs serve the double purpose of yieldingly holding the rock-spindle against turning, so that the rocking contact is always returned to its normal position after it has been deflected by the rotating contact, and the springs at the same time exert an outward pull on the rock-spindle, so as to press its shoulder  $h'$  firmly against that of the bushing and prevent leakage of gas at this point.

When it is desired to adjust the rotary contact on the driving-spindle, the cap  $g$  is removed from the head G, the clamping-nut  $f^4$  is removed or loosened, and the adjusting-sleeve F, together with the rotary contact, is turned until the latter is in its proper position by applying a wrench to the flat-sided outer end  $f^6$  of the outer sleeve-section. This means of adjusting the igniter enables the adjustment to be effected from the outside of the valve-chamber without disturbing the latter.

I claim as my invention—

1. The combination with the chamber and the two coöperating contacts of the electric igniter arranged in the chamber, of a rotary driving-spindle arranged in said chamber and extending through an opening in the head thereof, a sleeve carrying one of said contacts and extending through said opening in the head, a clamping device whereby the

sleeve is secured to the spindle, and a cap which closes said opening in the chamber-head, substantially as set forth.

2. The combination with the two contacts of an electric igniter and the rotary driving-spindle, of a sleeve mounted on said spindle and carrying one of said contacts, a shoulder formed on said spindle and engaging with one end of the sleeve, and a clamping screw-nut arranged on the spindle and bearing against the other end of the sleeve, substantially as set forth.

3. The combination with the two contacts of an electric igniter and the rotary driving-spindle, of an adjustable supporting-sleeve mounted on said spindle and composed of an inner section which carries one of the contacts and an outer section which is interlocked with the inner section, a shoulder arranged on the driving-spindle and bearing against the inner sleeve-section, and a clamping screw-nut arranged on the driving-spindle and bearing against the outer sleeve-section, substantially as set forth.

4. In an igniter, the combination with a support, of a rock-spindle journaled in said support and having a shoulder which bears against the inner end thereof, a contact at the inner end of the spindle adapted to be engaged by another contact, and a spring connected at its inner end with an arm on the outer end of the spindle and at its outer end to a support, the spring being arranged obliquely with reference to the axial line of the spindle and at its inner end nearer the shoulder of the spindle than at its outer end, whereby the spring holds the spindle yieldingly against turning and also presses the spindle with its shoulder against the inner end of the spindle-support, substantially as set forth.

5. In an igniter, the combination with a bushing or support, of a rock-spindle journaled in the bushing or support and provided with a shoulder bearing against the inner end of said bushing or support, a laterally-projecting contact arranged on the inner end of the rock-spindle and adapted to be engaged by another movable contact, two rock-arms secured to the outer end of the spindle and projecting from diametrically opposite sides thereof, two supporting-arms secured to the bushing or support adjacent to the rock-arms, and obliquely-arranged springs connected with their outer ends to the supporting-arms and with their inner ends to the rock-arms, the outer ends of the springs being arranged more remote from the shoulder of the spindle than the inner ends of the springs, substantially as set forth.

Witness my hand this 9th day of November, 1898.

JOHN W. RAYMOND.

Witnesses:

R. S. GRAY,  
W. E. BLANEY.