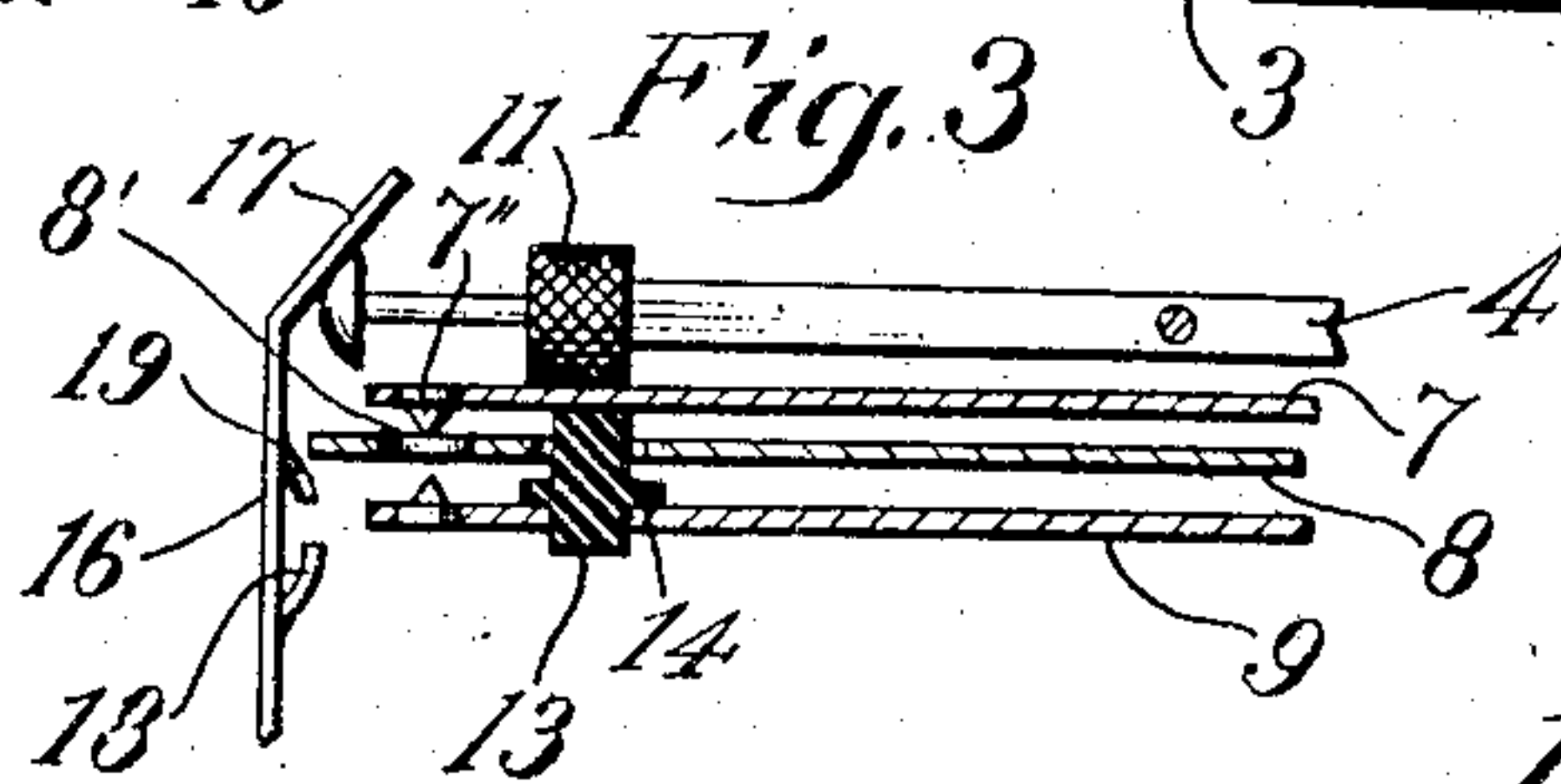
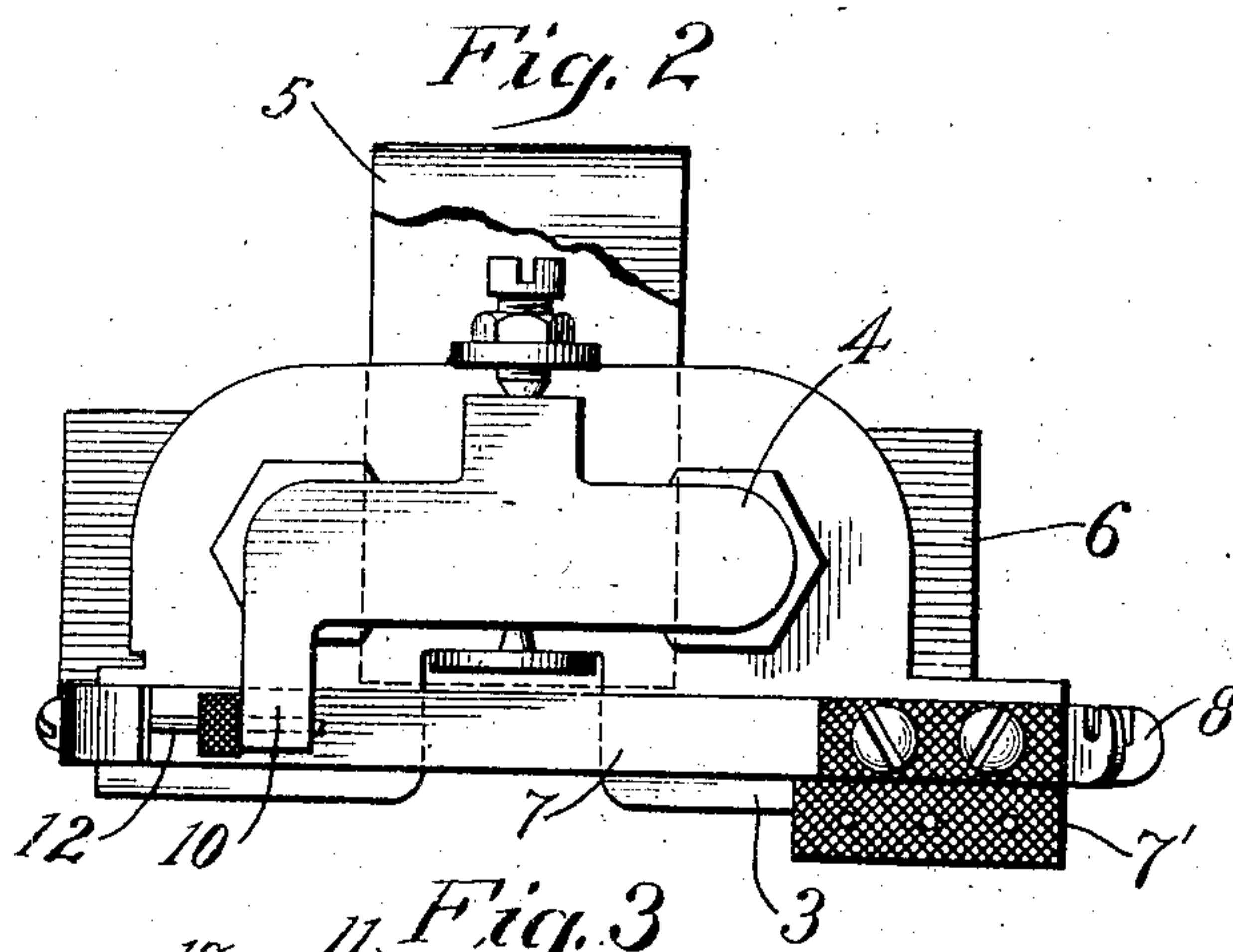
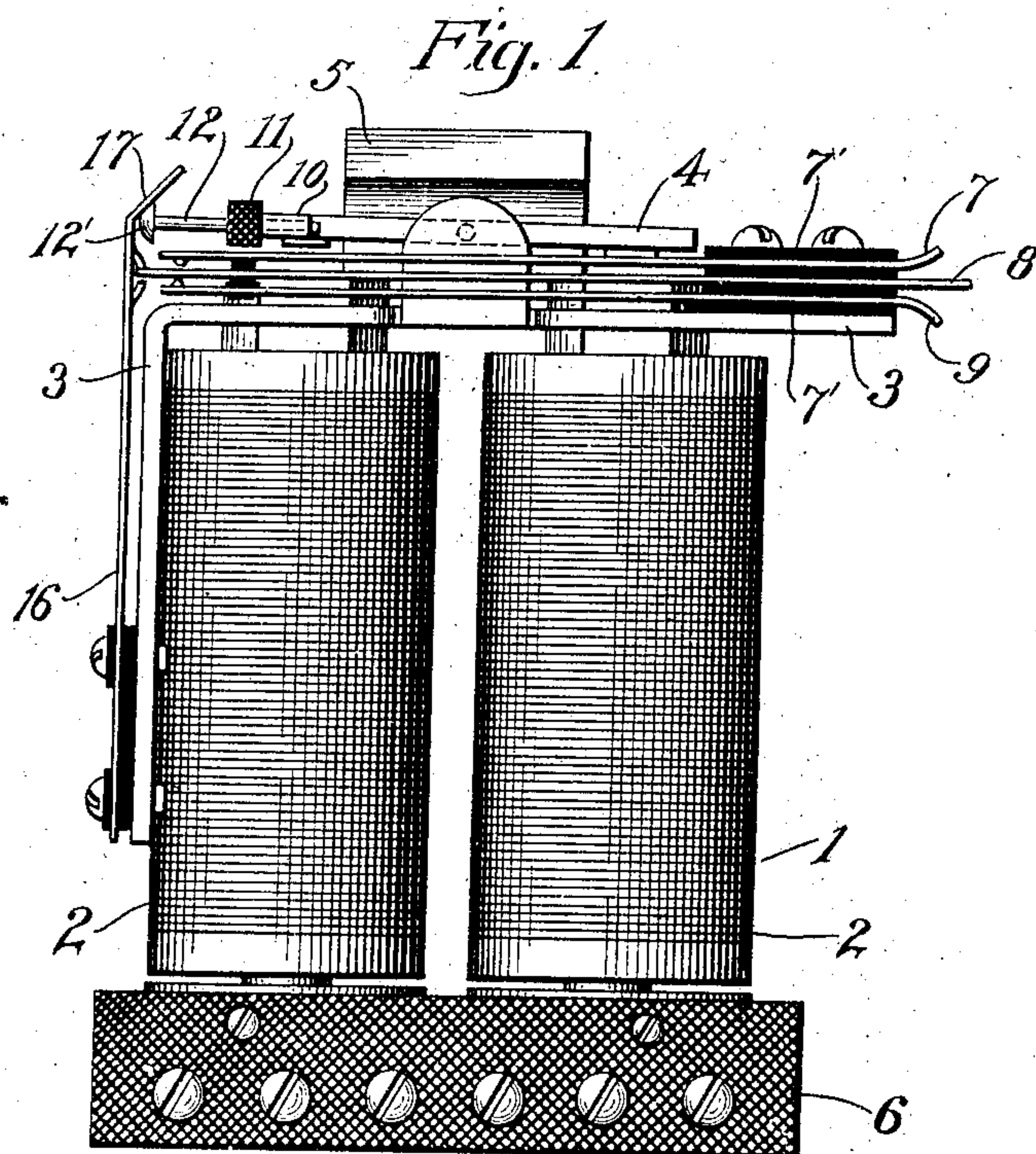


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POLARIZED RELAY.

APPLICATION FILED JAN. 25, 1908.

916,373.

Patented Mar. 23, 1909.



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# UNITED STATES PATENT OFFICE.

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## POLARIZED RELAY.

No. 916,373.

Specification of Letters Patent.

Patented March 23, 1909.

Original application filed January 8, 1907, Serial No. 351,296. Divided and this application filed January 25, 1908. Serial No. 412,598.

*To all whom it may concern:*

Be it known that we, HOMER J. ROBERTS, a citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, CYRIL A. SOANS, a citizen of the Kingdom of Great Britain, residing at Chicago, in the county of Cook and State of Illinois, and ALBERT H. GRAVES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Polarized Relays, of which the following is a specification.

This invention is a divisional application of an application on party line telephones, Serial No. 351,296, filed January 8, 1907.

Among the salient objects of the invention are to provide a relay in which the movement of the armature in one direction automatically locks one or more switch springs or contact devices in a predetermined position, and the movement of the armature in the other direction returns said contact members to normal; to provide improved mechanism for preventing sparking between the contact devices when they are actuated by the armature; to provide an improved relay for making circuit changes on its deenergization; to provide an improved locking device for holding one of the spring contact members in fixed position and which is controlled by the action of the armature; and in general to provide an improved construction of the character referred to.

In the drawings Figure 1, is an elevation of our improved relay, showing the contact members in locked position. Fig. 2, is a top plan view of the same with a portion of the biasing bar broken away. Fig. 3, is a sectional detail of the group of contact springs.

Referring to the drawings, 1 designates as a whole an ordinary polarized magnet comprising the usual spools 2, yoke piece 3 carrying the armature 4, biasing bar 5 and heel piece 6. Above the spools is mounted a set of contact springs, three in the present instance, designated 7, 8 and 9 respectively. These springs normally tend to spring upwardly and are respectively insulated from each other by means of insulating blocks 7' as shown in Fig. 1.

The armature 4 is provided with a right angled arm or extension 10 which overlies the group of springs, and in this extension is inserted an insulated bushing 11 in which in turn is mounted a headed pin 12. The head of the bushing 11 projects slightly below the armature and engages the top spring 7 as shown clearly in Fig. 3. Upon the lower spring 9 is mounted an insulating spacing bushing 13 provided with a shoulder 14, and passing freely through an opening in the switch spring 8 and adapted to engage the top of the spring 7.

Heretofore great difficulty has been experienced in preventing sparking between the contact devices when that end of the armature which engages the group of contacts is drawn into engagement with the pole-piece. This sparking is caused by the jar communicated to the group of springs when the armature strikes the pole-piece. To avoid this objection and as an improved feature of our invention we provide means for positively locking the switch spring during the downward movement of that end of the armature which engages the group of contacts and before the armature reaches the pole-piece. As a further novel feature of our invention means are also provided for automatically releasing the switch spring from the locking device by the actuation of the armature in the other direction.

To the above ends 16 designates an upstanding spring latch mounted upon the frame work of the relay and provided at its outer end with an inclined portion 17 adapted to have wiping engagement with the head 12' of the pin 12 as will hereinafter appear. In order that this spring may serve as a latch to lock the switch spring in its down position, the inner face of this latch spring is provided with a downwardly inclined latch lip 19 and with a stop lip 18 which, however, inclines upwardly and projects outwardly beyond the edge of the latch lip so as to form a positive stop to arrest the downward movement of the switch spring 8. When that end of the armature carrying the insulated portion 11 is drawn downwardly by the magnet, said insulated portion will engage the upper one of the contact springs and will force the group of



springs downwardly. At this time the contact point 7'' of the spring 7 is in engagement with the contact plate 8' of the switch spring 8. The lower contact spring 9, however, will be held out of contact with the switch spring 8 by the insulated bushing 13 as shown clearly in Fig. 3. The group of contacts retain the above position as long as the magnet remains energized and the armature held down. Before the armature has reached its downward limit of movement, the end of the switch spring 8 will have wiped by the latch lip 19 and slipped between the two lips as shown in Fig. 1. The action of the stop lip 18 is such as to give a cushioning effect to the armature to prevent sparking and momentary interruption of the circuit between the top spring and switch spring on the downward movement of the armature. When the switch spring has been latched between the lips, the magnet is deenergized by cutting off the current supply. The pressure of the armature is thus removed and the lower switch spring 9 will spring upwardly into contact with the switch spring 8 now in locked position. At the same time the bushing 13 will lift the upper spring out of contact with the switch spring and also raise the adjacent end of the armature.

As a further novel feature of our invention means are provided for unlocking the switch spring and permitting the group of contacts to return to their normal position when the other end of the armature is drawn down. This is accomplished by the coöperation of the head 12' of the pin 12 with the inclined portion 17 of the latch spring 16. As the pin 12 is carried upwardly, its head will obviously wipe along the inclined surface 17, thus forcing the spring 16 outwardly and releasing the switch spring 8 from lip 19. The contact devices now spring back to their normal position as shown in Fig. 3.

While we have herein shown a specific form of relay which may be used in a particular telephone system, it is apparent that in its broader aspects our invention is not limited to the specific construction of relay herein shown and described; but that various modifications may be made without departing from the spirit of our invention.

We claim as our invention:

1. In a polarized relay, a switch member, a coöperating contact device, means for locking said switch member in one of its two positions relatively to said contact device, means controlled by the relay armature for effecting said locking, and means controlled by said relay armature for unlocking said switch member and effecting its return to the other position.

2. In a polarized relay, a switch member, a normally-open coöperating contact device, associated locking mechanism for holding said parts in closed contact position, means

controlled by the relay armature for effecting said locking, when said armature is moved in one direction, and means also controlled by said armature for unlocking said parts when the armature is moved in the opposite direction.

3. In a polarized relay, a pair of oppositely disposed contact devices and an interposed switch member, self-retaining means operable by the relay armature, for placing and holding said switch member in contact with one of the opposed contact devices, and self-retaining means also operable by said relay armature for switching said switch-member into engagement with the other opposed contact device.

4. In a polarized relay, a switch member, a coöperating contact device normally in one contact relation with said switch-member, means for locking said switch-member in the other contact relation with said contact device, means for placing said switch-member into locked position when the armature is pulled in one direction, means preventing said coöperating contact device from changing its contact relation with said switch-member while the armature is being pulled in said locking direction, and means for unlocking said switch-member when the armature is pulled in the other direction.

5. In a relay, a pair of coöperating contact springs, a latch with which one of said springs is adapted to engage, operative connections between the relay armature and pair of springs for forcing the latter, while in closed contact engagement with each other, into engagement with said latch and a stop arranged to arrest the latching movement of said springs after they have been brought to latching position, but before the actuating movement of the armature ceases.

6. In a relay, a switch member and a coöperating device, a latch into engagement with which the switch-members forced by the relay armature, while said switch-member and contact device are in contact, and a stop arranged to arrest the latching movement of the switch-member while the latter is still subject to the force of the armature, whereby opening of the circuit and consequent sparking at said contacts is prevented during the latching operation.

7. In a relay, a switch spring, one or more coöperating contact springs, a spring pressed latch member provided with oppositely disposed lips, and means for forcing said switch spring into locking engagement with said lips during the closing movement of the coöperating end of the armature.

8. In a relay, a switch spring, one or more coöperating contacts, a spring pressed latch member provided at its inner face with a downwardly inclined lock lip and with an oppositely inclined lip or stop, the latter extending outwardly beyond the former, a



means for forcing engagement between said lips and for tripping off said latch member.

9. In a relay, a contact device, means for locking said contact device, and operative  
5 connections between said lock or means and the armature of the relay whereby the movement of the armature in one direction locks the contact, and movement of the armature

in the opposite direction unlocks the contact.

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