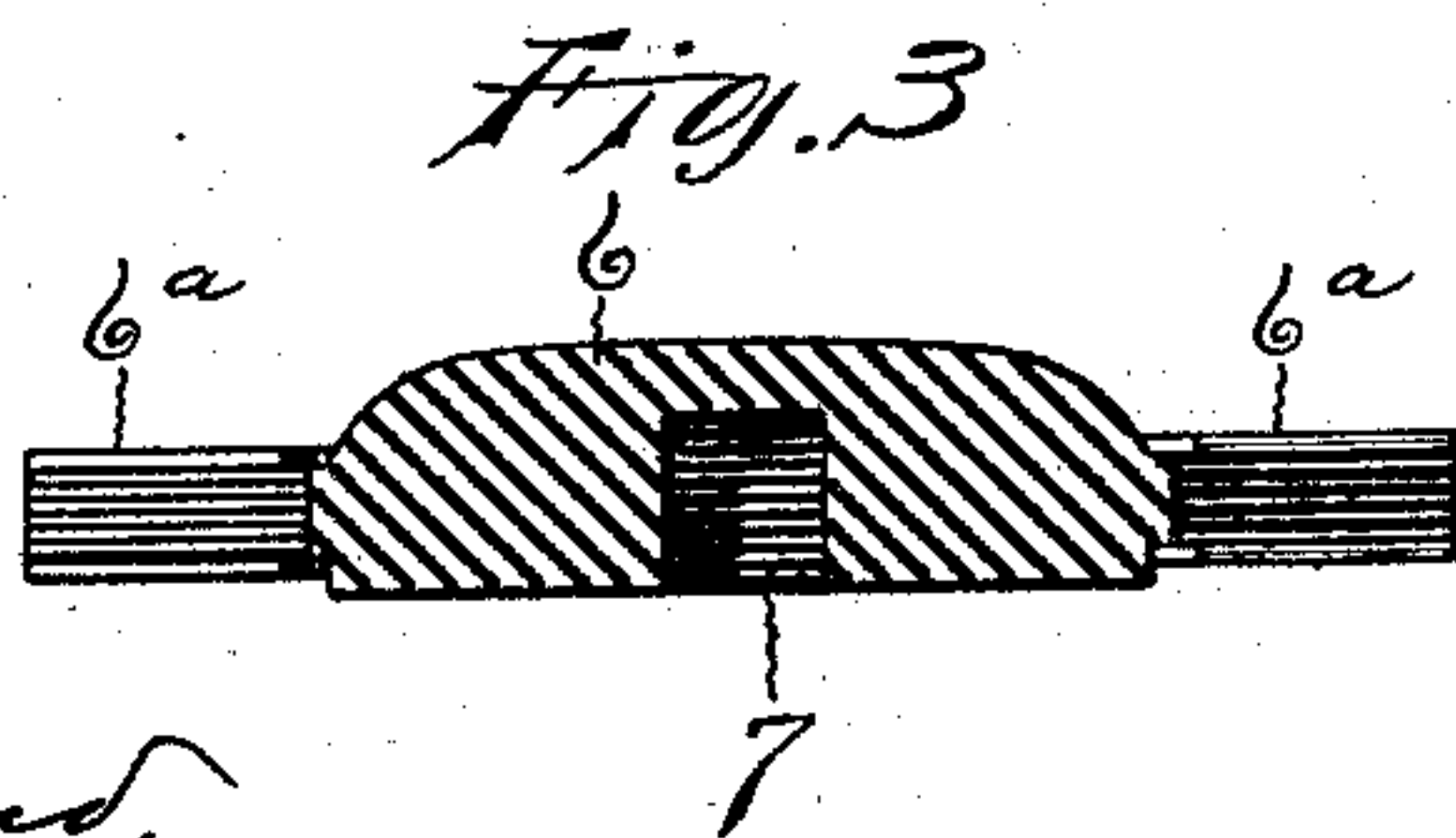
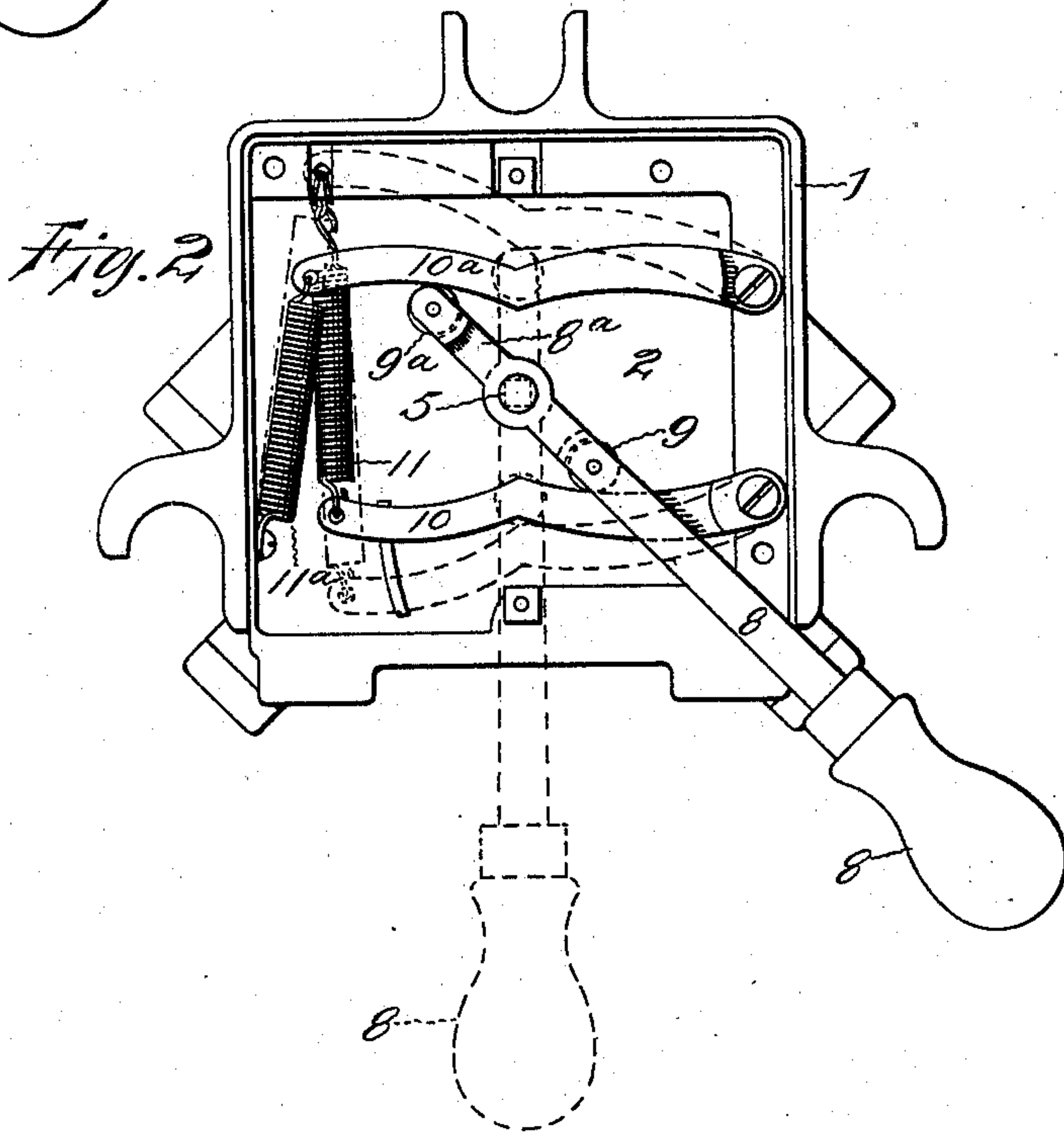
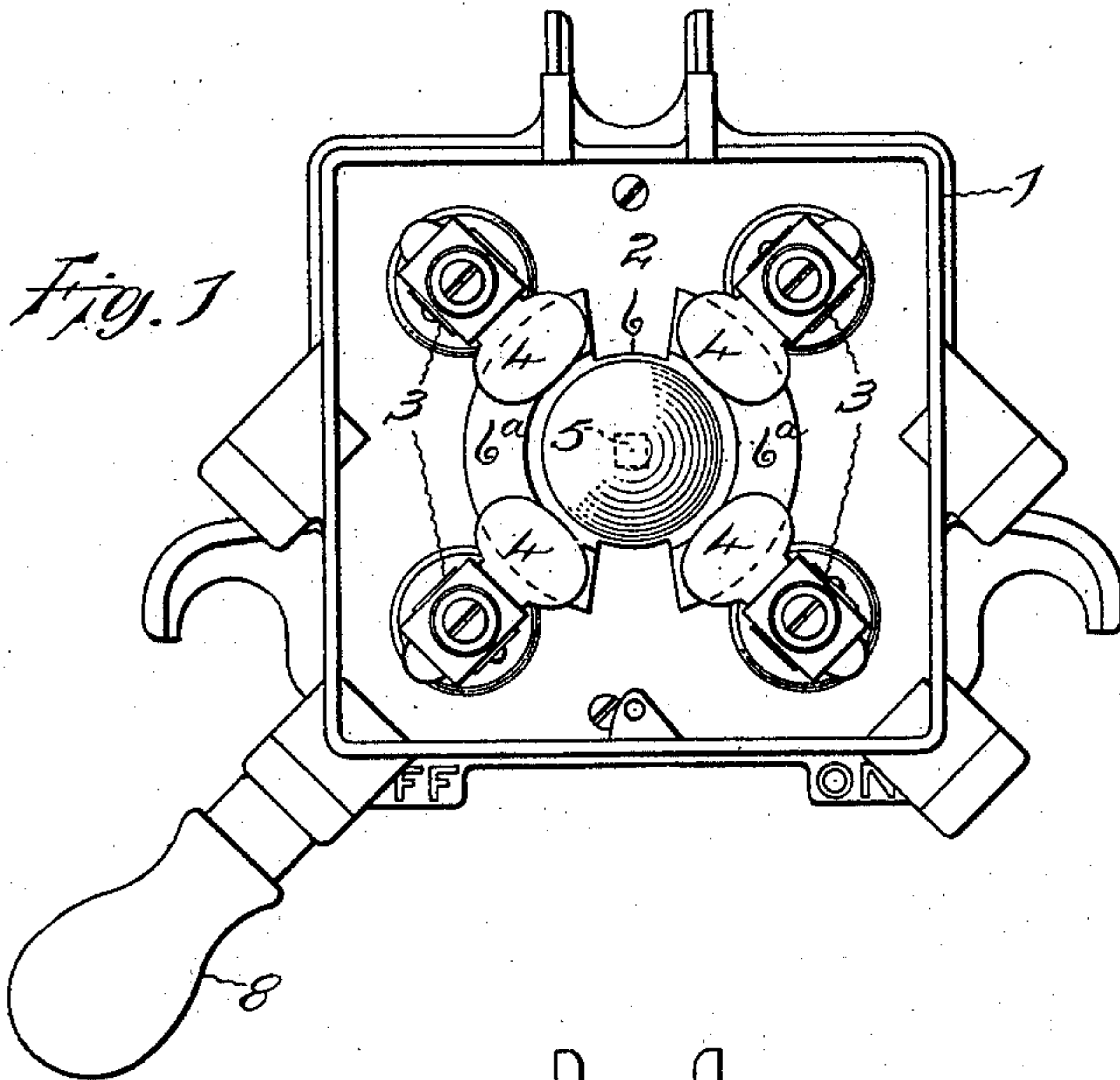


(No Model.)

T. H. BRADY.  
ELECTRIC SWITCH.

No. 580,678.

Patented Apr. 13, 1897.



Witnesses

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# UNITED STATES PATENT OFFICE.

THOMAS H. BRADY, OF NEW BRITAIN, CONNECTICUT.

## ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 580,678, dated April 13, 1897.

Application filed January 9, 1897. Serial No. 618,546. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS H. BRADY, of New Britain, Hartford county, Connecticut, have invented certain new and useful Improvements in Electric Switches, which improvements are described in the following specification and are illustrated by the accompanying drawings.

My invention relates generally to those electric switches that are designed to be used on circuits carrying heavy electric currents, such, for instance, as arc-light circuits. Particularly the invention relates to that class of double-pole electric switches in which circuit-closing contact-plates are carried by an insulating-disk turned by a lever-handle that is moved partly by hand and partly by means of springs.

It is the object of the invention not only to increase the efficiency of the spring mechanism of such a switch and to improve the insulation of the circuit-closing plates that are carried by the insulating-disk, but also to impart to that disk a limited faculty of automatic adjustment for the purpose of securing uniformity and equality of contact between those plates and the terminals of the switch. To accomplish these several objects, I employ a pair of springs acting upon the lever-handle through intermediate levers and connect the insulating-disk with its actuating mechanism in a peculiar manner.

The best mode in which I have contemplated applying the principles of my invention is indicated by the said drawings.

Figure 1 is a front elevation of a switch that is constructed in accordance with those principles. This figure includes a containing switch-box, from which the front side or cover has been removed. Fig. 2 is a rear elevation of the same switch, including the same box, from which the back side or cover has been removed. Fig. 3 is a detail showing a central cross-section of the insulating-disk upon a larger scale.

In the views, Figs. 1 and 2, the numeral 1 denotes the said box, in which the switch is mounted and contained. This box is preferably, though not necessarily, of the kind shown and described in Letters Patent of the United States No. 555,922, issued to me March 10, 1896, for improvements in insulating-sup-

ports for boxes containing electrical apparatus. By means of a fixed plate of porcelain or other insulating material 2 this box is divided into separate front and rear compartments whose contents are shown in Figs. 1 and 2, respectively.

In Fig. 1 the four numerals 3 denote four binding-posts, which are planted in plate 2 at the corners of an imaginary square. Each of of these binding-posts is provided with a contact-plate 4, constituting one of the terminals of the switch.

In the middle of the box is a stem 5, which extends through a hole in plate 2 and reaches into both of said compartments. On one end of this stem is mounted the insulating-disk 6, which is shown in position in Fig. 1, and is shown in detail in Fig. 3. This disk, being formed of a composition of hard rubber and other insulating material, and being made thicker at the middle than elsewhere, is partly perforated at the middle by a square hole 7, as shown in Fig. 3. By inserting in this hole the end of stem 5, made square for that purpose, the disk and the stem are fitted together with sufficient closeness to insure that any turning of the stem will cause the turning of the disk, but not so closely as to prevent a slight movement of the disk upon the stem, nor so tightly as to prevent a slight tipping of the disk in response to any unequal pressures that may be exerted upon its wings. The two wings of disk 6 are covered, respectively, by the contact-plates 6<sup>a</sup>, which are adapted to connect the terminals of the switch in pairs in the usual manner. By the opposing pressure of the terminal contact-plates 4 upon the faces of the circuit-closing contact-plates 6<sup>a</sup> the disk 6 is retained in position upon stem 5 and is prevented from slipping off. In the said rear compartment of the switch-box, as shown in Fig. 2, is pivoted the lever-handle 8 by a rigid connection with the rotatable stem 5. This handle extends through a slot in the bottom of the box in the usual manner, and at the opposite end is provided with an extension 8<sup>a</sup> beyond stem 5. The handle 8 and its extension 8<sup>a</sup> are provided with pins or studs, carrying, respectively, the antifriction-rollers 9 and 9<sup>a</sup>, which are adapted to run, respectively, upon the levers 10 and 10<sup>a</sup>. These levers are pivoted



at one end to one side of box 1, and are provided at the other end with springs 11 and 11<sup>a</sup>, which tend constantly to draw the levers toward stem 5 and toward each other.

5 As a modification of the described spring mechanism, the described lever extension 8<sup>a</sup>, roller 9<sup>a</sup>, lever 10<sup>a</sup>, and spring 11<sup>a</sup> may be eliminated from the structure, leaving the remaining parts as described and shown.

10 Such being the construction of my improved switch, its general mode of operation resembles that of other switches of the specified class, the lever-handle 8 being moved by hand to the intermediate position shown in

15 dotted lines in Fig. 2, the throw of the handle being then completed from that point by the action of the described spring mechanism and the contact-carrying disk 6 being partially rotated thereby, with the effect of

20 turning the current off or on, as occasion may require. The special operative advantage resulting from the described form of spring mechanism lies in the direction of increased efficiency. By the interposition of lever 10

25 between handle 8 and spring 11 the effective power of the spring is multiplied; by the use of the same lever so pivoted as to have a positive motion the position of the dead-center in the movement of the lever-handle

30 8 is fixed with unvarying certainty; by the duplication of the spring and of the spring-lever the efficiency of the spring mechanism is multiplied a second time, and by the pivoting of both levers at one and the same side

35 of the box, or, in other words, in one and the same direction from the lever-handle 8, the effective energy exerted by the spring-levers upon the lever-handle 8 through the antifric-

40 tion-rollers 9 and 9<sup>a</sup> is rendered equal, whether the handle be thrown to the one side of the dead-center or to the other side. By this construction and mode of operation of the spring mechanism the throw of the lever-

45 handle in either direction from the dead-center is made instantaneous, notwithstanding any casual or inadvertent resistance from the hand of the operator.

The operative advantages that result from the described form and mounting of the disk

50 6 relate to the insulation of the stem 5 and to the contact that is made between the terminal contacts 4 and the circuit-closing plates 6<sup>a</sup>. As there is no ready path for the electric current between stem 5, at one side of

55 disk 6, and the contact-plates 4 and 6<sup>a</sup>, at the other side of the disk, the insulation of stem 5 is by that circumstance so much increased as greatly to diminish the danger of short-circuiting. This advantage is rendered

60 possible of attainment by the use of a disk that is not entirely perforated by the stem 5. As that stem does not extend entirely through the disk, there is no danger of the formation of a short circuit between the contact-plates

and the end of the stem by the accumulation 65 of iron-dust or other conductive material upon the exposed face of the disk, and as there is no rigid connection between stem 5 and disk 6 the latter tends at all times to assume that position upon the stem which 70 will equalize the pressure between the terminal contacts 4 and the circuit-closing contacts 6<sup>a</sup>. Like a stiff-brimmed hat, the disk tips upon the head of the stem, according to the varying pressures exerted upon different 75 parts of the brim by the several contact-terminals 4. In this way the pressure of the several contacts is equalized to a greater or less extent by the self-adjustment of the disk, and a uniformity of operation is se- 80 cured, regardless of those imperfections of adjustment that would otherwise result from unequal wear of the contact-surfaces or from other causes.

Thus my invention not only increases the 85 efficiency of the spring mechanism of the switch and improves the insulation of the circuit-closing plates that are carried by the insulating-disk, but also imparts to that disk and to those plates a limited faculty of auto- 90 matically adjusting themselves to the terminal contacts of the switch.

Such being the construction and operation of my improved switch, I claim as my inven- 95 tion—

1. In an electric double-pole switch, four contact-terminals, a central stem, and mechanism for imparting movements of partial rotation to said stem, in combination with an insulating-disk, mounted loosely on said 100 stem, and rotatable therewith, and carrying two circuit-closing plates in contact with said contact-terminals, substantially as and for the purpose specified.

2. In an electric switch, four contact-ter- 105 minals, a central stem, mechanism for rotating said stem, and an insulating-disk, covering the free end of said stem, in combination with two circuit-closing plates, carried by said disk, the said circuit-closing plates and the 110 said stem being respectively located on opposite sides of the said insulating-disk, substantially as and for the purpose specified.

3. In an electric switch, four contact-ter- 115 minals, a central stem, and mechanism for turning the stem, in combination with an insulating-disk, which is provided with circuit-closing plates, and is partly perforated by a central hole, fitting adjustably over the end of said stem, substantially as and for the 120 purpose specified.

In testimony whereof I hereunto set my name in the presence of two witnesses.

THOMAS H. BRADY.

Witnesses:

J. H. WHITE,  
WILLARD EDDY.