

No. 859,621.

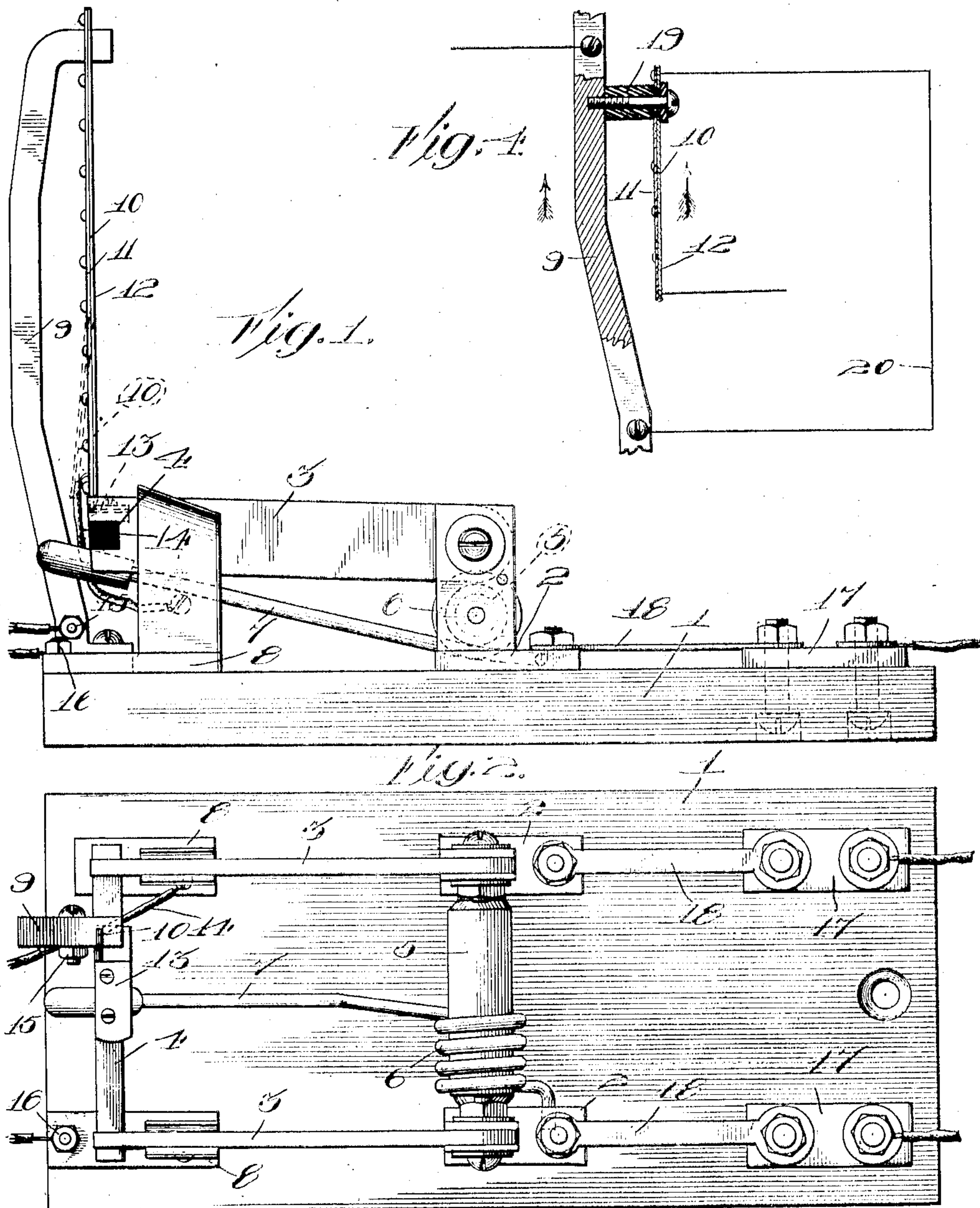
PATENTED JULY 9, 1907.

E. O. SCHWEITZER & A. HERZ.

CIRCUIT CHANGER.

APPLICATION FILED SEPT. 14, 1904.

2 SHEETS—SHEET 1.



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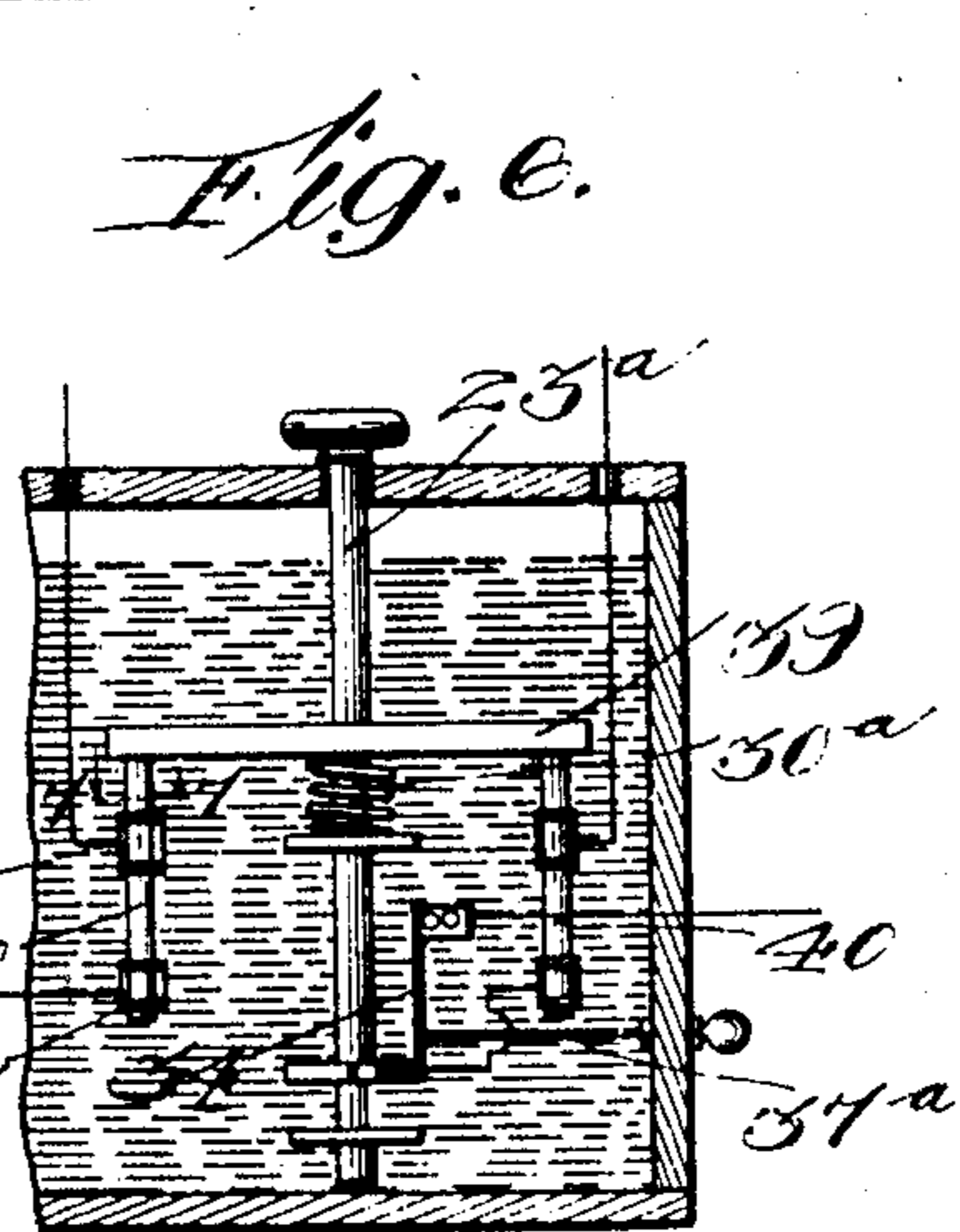
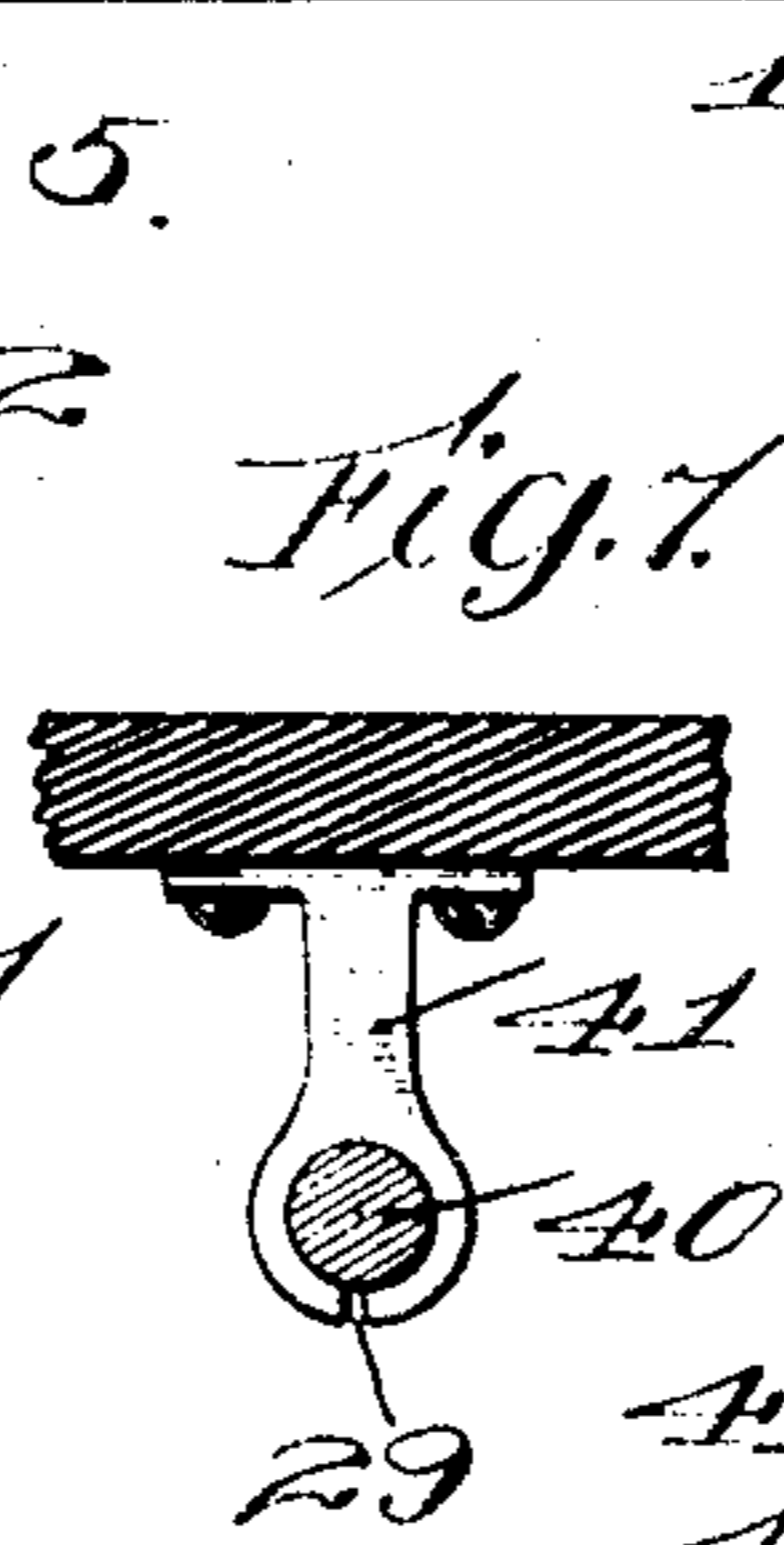
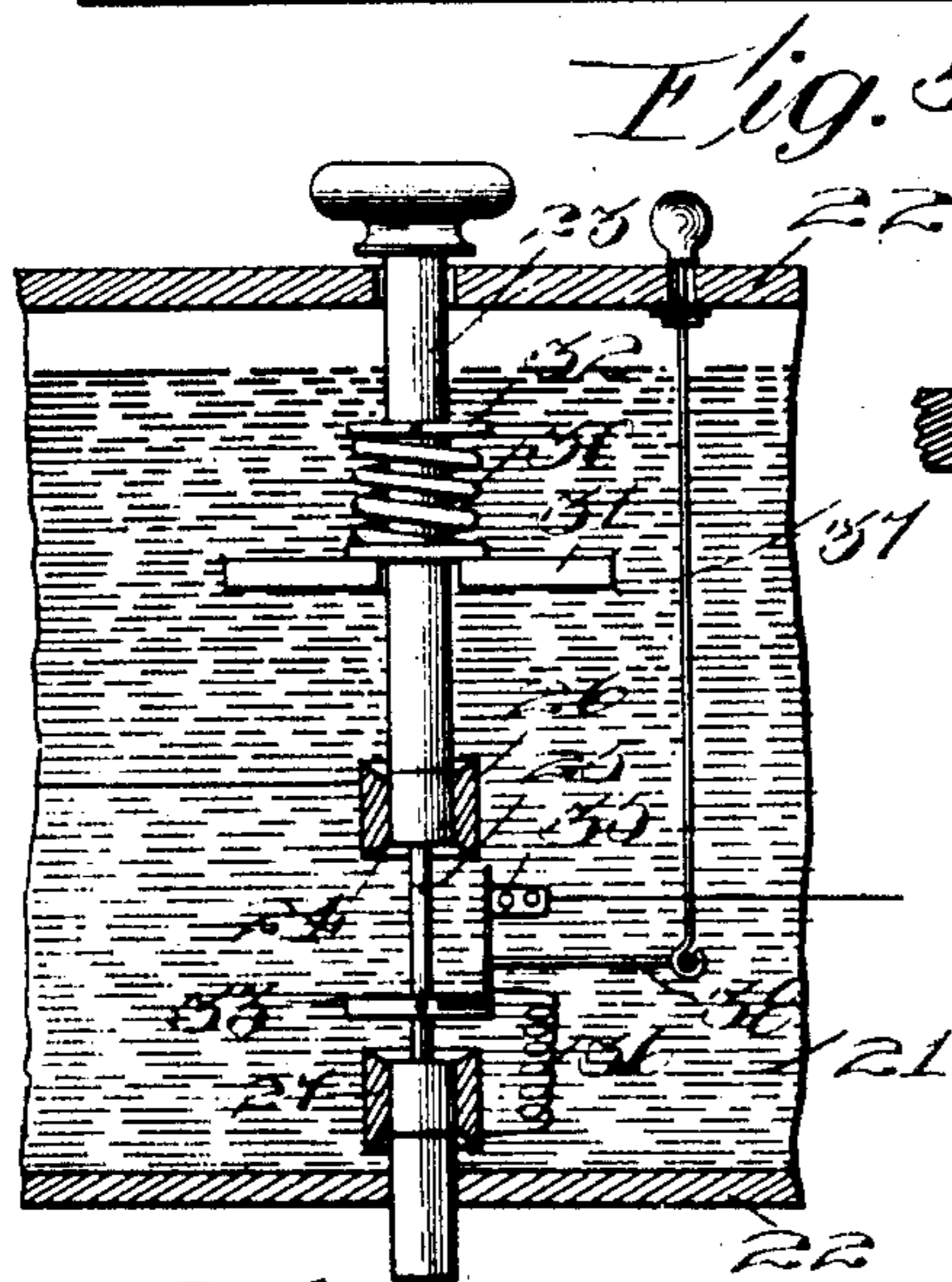
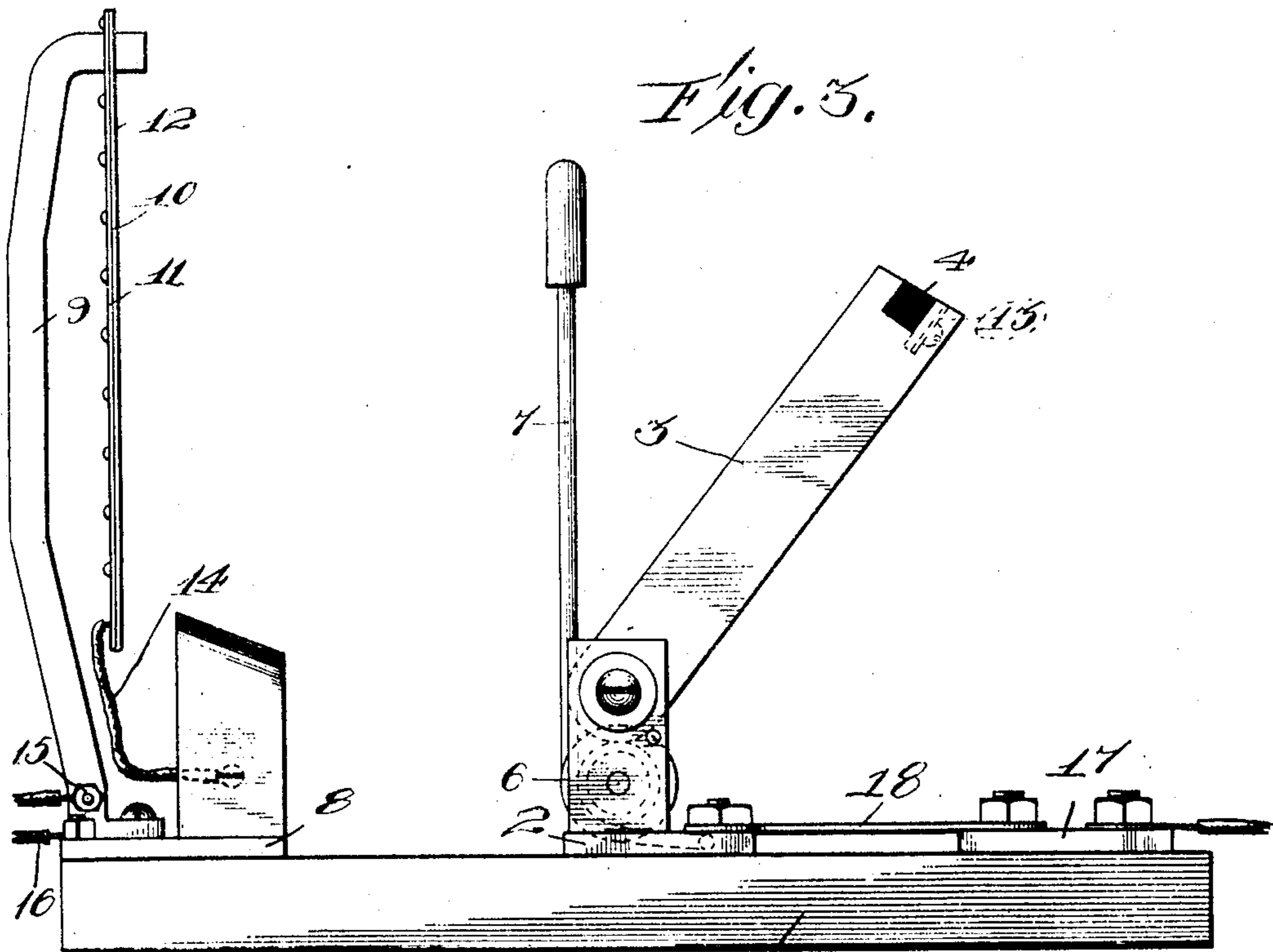
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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CIRCUIT-CHANGER.

No. 859,621.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed September 14, 1904. Serial No. 224,463.

To all whom it may concern:

Be it known that we, EDMUND O. SCHWEITZER and ALFRED HERZ, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Circuit-Changers, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to devices for changing the condition of a circuit, as for example by opening it.

Prominent objects of the invention are, to provide a simple, practical and inexpensive device of this sort; and to secure quickness and effectiveness in its operation.

As one form of circuit changer, we show herein an arrangement for opening or breaking the circuit, although it will be obvious that the invention can be applied to change the circuit in other ways. In the arrangement which we show herein for changing the circuit by opening it, a circuit breaker is provided and arranged to break or open the circuit, and this is controlled by a thermostatic device, which latter is subjected to the influence of the current in the circuit to be changed so as to be actuated by any predetermined variation or condition of such current. The device herein set forth is intended to break or open the circuit on an excess current, and so the thermostatic device is constructed to operate on such excess current, and by its control over the circuit breaker, to effect an operation thereof to open the circuit under such a condition. The circuit breaker is conveniently in the form of a spring-controlled switch which tends normally to operate to open the circuit; and the thermostatic device is conveniently in the form of a catch holding such switch normally closed, but having thermostatic properties by which it is actuated to release the switch by being heated by an unduly strong current. A convenient form of thermostatic device is a metallic bar or rod formed of two strips of different kinds of metal having different expansive properties, so that a bending or other effect will be secured by the heating of the unduly strong or excessive current.

The particular construction of device which we show herein for carrying out our invention, will be described more fully with reference to the accompanying drawings, in which

Figure 1 is a side elevation of a circuit changer arranged to open the circuit, embodying our invention, in a normal or unoperated condition; Fig. 2 is a plan view of the same; Fig. 3 is a view similar to Fig. 1 of the device after operation; Fig. 4 is a view partially in elevation and partially in vertical section, of a modified form of device; Figs. 5 and 6 are views partly in plan and partly in horizontal section, of different modifica-

tions; Fig. 7 is a view taken on line 7—7 in Fig. 6 showing a detail of construction.

Referring first to the device shown in Figs. 1 to 4 inclusive, 1 is a base of insulating material such as slate, porcelain or the like. This is provided with metallic posts 2, 2 to which are pivotally connected the metallic blades 3, 3 of a swinging switch member, the blades 3, 3 being connected at their free or outer ends by an insulating cross bar 4. A cylinder 5 of insulating material is extended between the posts 2, 2 and provided with a coil spring 6 having a free end 7 which is extended out and under the cross bar 4, and tends normally to throw and hold the switch member in an upper or raised position, as shown in Fig. 3. The base 1 is also provided with metallic contact jaws 8, 8 adapted to receive the blades 3, 3. A post 9 is secured to the forward end of the base 1 and is provided with a thermostatic rod 10 which is suspended from the upper end of said post. The rod 10 is conveniently formed of two strips 11 and 12 of metal, the strip 11 being of steel and the strip 12 of brass. Other metals of dissimilar kind to accomplish the desired result, could of course be used instead of these. The lower end of the rod 10 is adapted to engage the cross-bar 4 of the switch member and hold the latter in a downward position under restraint, as shown in Figs. 1 and 2, in which position the blades 3, 3 connect the posts 2, 2 with the jaws 8, 8, and thereby maintain the circuit closed. The cross bar 4 is desirably provided with a flat metallic clip 13 to insure good connection with the bar 10 and prevent undue wear of the insulating material comprising the cross rod 4. The lower end of the bar 10 is connected by a flexible connector 14 with one of the contact jaws 8. A binding screw 15 is provided at the base of the post 9, and another binding screw 16 is provided on the other contact jaw 8, these two binding posts being for two line wires. The base 1 is also provided with terminals 17, 17, and these are connected by conducting strips 18, 18 with the metallic posts 2, 2. Thus connection is made through the opposite sides of the device, which sides are insulated from one another, and one of which includes the thermostatic catch consisting of the bar 10. Thus a circuit can be connected with the device so that its opposite sides run through the opposite sides of the device, and one of such sides includes the thermostatic catch for releasing the circuit breaker. The operation of the device, therefore, is that when so connected, an excess current, on traversing the circuit, will heat the thermostatic bar 10, whereupon the brass strip 12 will expand to a greater extent than the steel strip 11, thereby causing the bar 10 to bend so as to swing its lower end outward a little as shown in dotted lines in Fig. 1. The circuit breaker comprising the switch member, is thereupon released, where-

upon it is swung instantaneously and with great rapidity upward and backward to the position shown in Fig. 3. The circuit is thereupon opened on each side, and the excess current guarded against.

5 In the modification shown in Fig. 4, the construction of the circuit breaking device is substantially the same, except that the thermostatic bar 10 is insulated from the post 9 by an insulating tube 19, and is connected therewith by a conductor 20 so that the current runs in the post 9 and bar 10 in parallelism. In this way the two parallel currents tend to attract one another, and the thermostatic effect of the bar 10 is augmented to that extent.

10 In the arrangement shown in Fig. 5, a base 21 is constructed with side walls 22, 22, and a reciprocable plunger 23 is mounted in said side walls. The plunger 23 is made of insulating material, and is provided with a pair of metallic sleeves 24, 24 connected by a metallic rod 25. The sleeves 24, 24 are adapted to fit and slide in ring-shaped contacts 26, 27 which are mounted on the base 21, as shown in Fig. 7. A coil spring 30 is provided on the plunger 23, and by co-operating with an abutment 31 on the base 21 and an abutment 32 on the plunger 23, tends to force and hold said plunger in a retracted position, in which the contact sleeves 24, 24 are outside of and out of contact with the ring contacts 26, 27. The rod 25 of the plunger 23, however, is provided with a metallic abutment 33, and this is adapted to engage a thermostatic bar 34 which is secured by a clip or post 35 to the base 21. The bar 34 is constructed in the same way that the bar 10 of the device of Figs. 1 to 4 is constructed, so that on being heated by an excess current, it bends so as to swing its free end outwardly and out of engagement with the abutment 33. A flexible connector 36 connects the bar 34 with the ring contact 27. The line is connected with the contact 26 and with the post or clip 35 supporting the thermostatic catch 34. A manually operated pull 37 is desirably provided and connected through a link 38 with the catch 34. Thus the operation of this device is that the circuit is normally maintained closed by the engagement of the catch 34 with the abutment 33 on the plunger 23. When, however, an unduly strong current traverses the circuit, the catch 34 is heated and is caused to bend so as to swing its free end outwardly and become disengaged from the abutment 33, thereby releasing the plunger 23 which is thrown outwardly by the spring 30 and withdraws the contacts 24, 24 from the ring contacts 26, 27 and thereby opens the circuit. When it is desired to open the circuit by hand, the pull 37 is drawn out slightly, thereby disengaging the catch 34 from the abutment 33 and permitting the plunger 23 to open the circuit as before. This feature is desirable because in many circuit openers of this general kind, more or less of the device is submerged in oil so as to prevent or decrease the spark caused by break.

60 The device shown in Fig. 6 is constructed on the same general principles as that of Fig. 5, the device of

Fig. 6 being a double pole circuit breaker, whereas that of Fig. 5 is a single pole. Otherwise the construction and operation of the device is substantially identical. The plunger 23^a of the device of Fig. 6 is provided with an insulating cross bar 39 having two metallic slide rods 40, 40 which work in metallic ring contacts 41, 41, to which latter the opposite sides of the line are connected. The ring contacts 41, 41 are split longitudinally as shown in Fig. 7. A thermostatic catch rod 34 is arranged as in Fig. 5 to engage and hold the plunger against the action of the spring 30^a and to release the same to permit the opening of both sides of the circuit when an unduly strong current intrudes and causes said thermostatic rod to bend. The rod 34 is operable by hand by a pull 37^a.

It will be understood that changes and modifications can be made in the devices herein set forth, without departing from the spirit of our invention, and also that the invention can be applied to circuit changing devices constructed to change the circuit in ways other than that herein set forth.

What we claim as our invention is:—

1. A device of the class specified, comprising a circuit-changer and a thermoexpansive device controlling the operation of said circuit-changer, said device being included in the circuit and adapted to be operated by the passage of an excess current through the same, and being movable into and out of the path of travel of said circuit-changer to hold and release the same.

2. A device of the class specified, comprising a circuit-changer and a bar or rod composed of strips of metal of different thermoexpansive properties, said bar or rod being included in the circuit and adapted to be operated by the passage of an excess current through it, and being movable into and out of the path of travel of the circuit-changer to hold and release the same.

3. A device of the class specified, comprising a spring-actuated switch and a thermoexpansive device included in the circuit and adapted to be operated by the passage of an excess current through it, and being movable into and out of the path of travel of said switch to hold and release the same.

4. A device of the class specified comprising a spring-actuated switch and a bar or rod composed of strips of metal of different thermoexpansive properties, said bar or rod being held at one end and having its other end free and movable into and out of the path of travel of the switch to hold and release the same, and also being included in the circuit and adapted to be bent so as to swing it into and out of the path of travel of the switch by the passage of an excess current through it.

5. A device of the class specified, comprising a spring-actuated switch, an insulating base on which the same is mounted, a support rising from said base near the free end of the switch, and a bar or rod having its upper end secured to said support above the free end of the switch, and extended down to the same so that the switch acts against the bar or rod, said bar or rod being composed of strips of metal of different thermoexpansive properties, and being included in the circuit and adapted to be bent to swing its free end out of the path of travel of the switch by the passage of an excess current through it.

In witness whereof, we hereunto subscribe our names this 12th day of September A. D., 1904.

EDMUND O. SCHWEITZER.
ALFRED HERZ.

Witnesses:

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ELEANOR BERG.