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PATENTED SEPT. 8, 1908.

R. HENDERSON.  
CIRCUIT CLOSER FOR CALL BELLS.  
APPLICATION FILED JUNE 4, 1906.

Fig. 1.

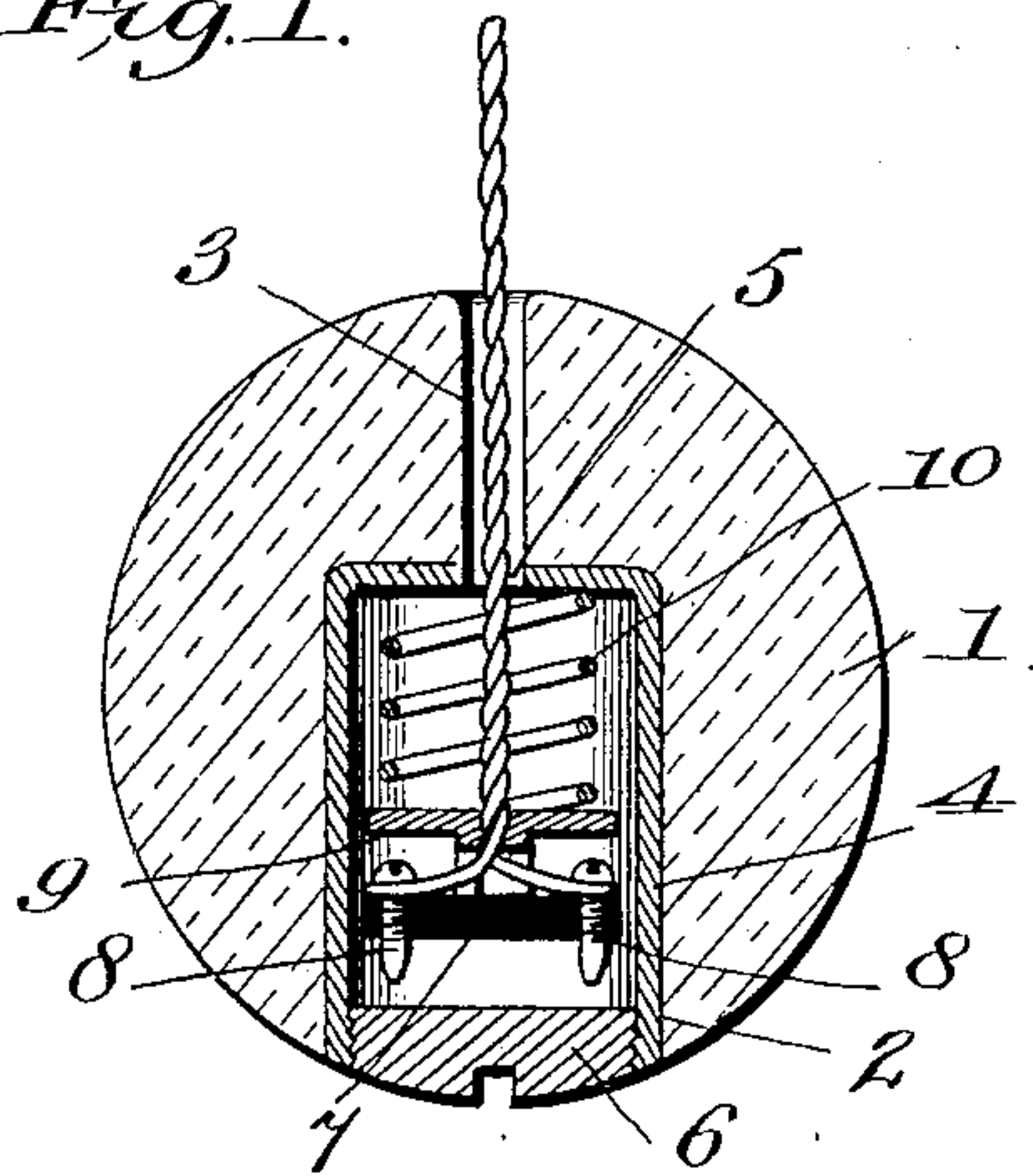


Fig. 2.

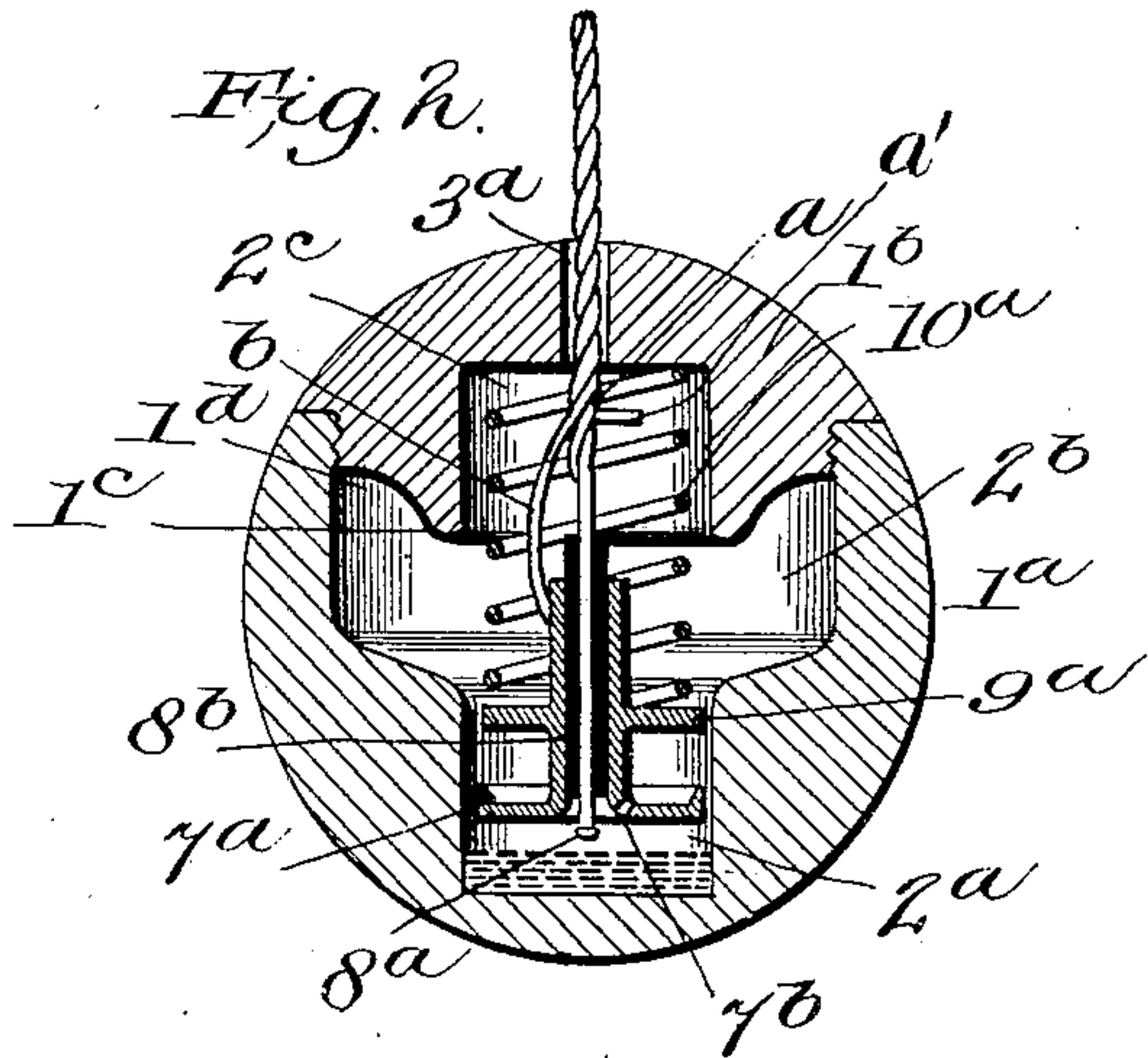
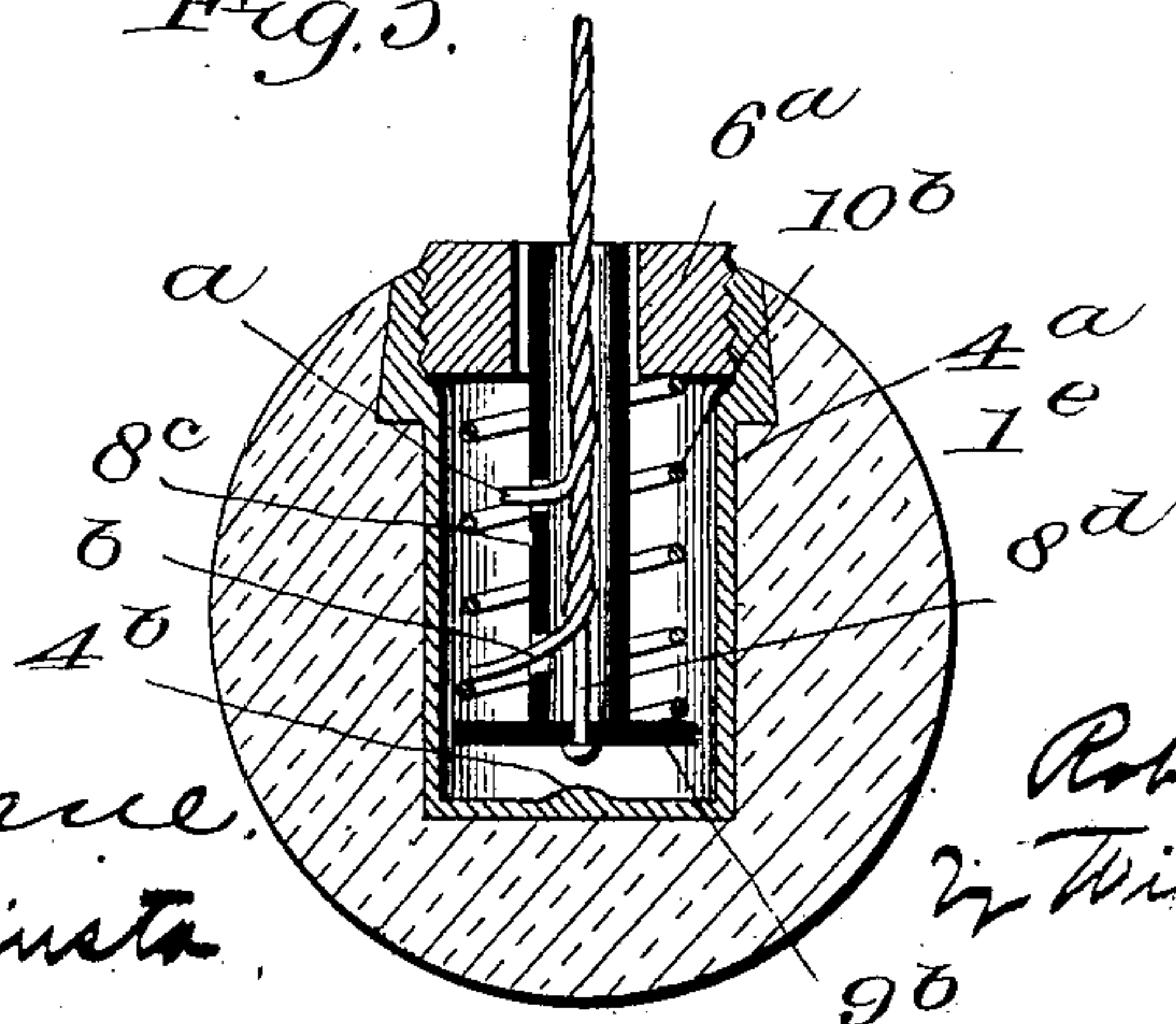


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## CIRCUIT-CLOSER FOR CALL-BELLS.

No. 898,104.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed June 4, 1906. Serial No. 320,188.

*To all whom it may concern:*

Be it known that I, ROBERT HENDERSON, an engineer in the United States Navy, and a citizen of the United States, stationed at Washington, in the District of Columbia, have invented certain new and useful Improvements in Circuit-Closers for Call-Bells; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in circuit closers which may be utilized for various purposes, but for simplicity of description will be hereinafter referred to particularly as associated with call-bells.

In the following description, for the purpose of brevity, the member containing the circuit closing means proper will be referred to as a knob or handle, but obviously it may be of any other suitable form when used for purposes other than call-bells. The essential feature in all cases, is that the weight of the knob or handle is utilized to automatically open the circuit, when the device is not in use.

Referring to the drawings illustrating three applications of the invention:— Figure 1 is an axial section through the knob, the line wires and contact members being shown in elevation and in which construction contact is made by elevating the knob. Fig. 2 is a similar section through a modified form of knob, in which construction a connection is employed comprising an electrical conducting fluid, such for instance as mercury, whereby the closed circuit is maintained for a predetermined time after the knob has been released by the operative, said figure also showing associated means whereby a plurality of bells may be operated from a single knob, dependent upon the elevation or depression of the knob, and Fig. 3 is a similar section of a modified construction for operating a plurality of bells substantially in the same manner as shown in Fig. 2, without the employment of the mercurial connection.

It will be understood that the knob or its equivalent may be of any suitable heavy substance and of any ordinary design.

In the drawings, for the purpose of illustration, in Figs. 1 and 3, the knob is shown as comprising a glass ball, while in Fig. 2 the

knob comprises a metallic ball in two sections.

Referring to Fig. 1, 1 designates the knob provided with a bore therethrough, one portion of the bore being enlarged as at 2, and the other portion being restricted as at 3. Within the enlarged portion 2 may be fitted a metallic thimble 4 apertured as at 5 to register with the restricted portion 3 of the bore. The open end of the thimble 4 may be internally screw-threaded to receive the metallic plug 6, which plug affords means of access to the interior of the thimble to make the connections between the contact member and the line wires. 7 designates the contact member carrying the contact pins or binding posts 8 which are connected to the line wires. Superposed on the contact member 7 is an abutment plate 9 between which and the inner closed end of the thimble is interposed a spring 10.

In Fig. 2, the knob, designated as 1<sup>a</sup>, is shown as comprising two sections of metal, the lower section being internally cut away to form the bore 2<sup>a</sup> and the enlarged recess 2<sup>b</sup>. The wall around the recess 2<sup>b</sup> may be internally screw-threaded to receive the upper section 1<sup>b</sup> of the knob. This upper section is also bored to form the enlarged chamber 2<sup>c</sup> and the restricted passage-way 3<sup>a</sup>. The upper section is also formed with an annular projection 1<sup>c</sup> adapted to project within the enlarged recess 2<sup>b</sup> and form the annular recess 1<sup>d</sup>, for a purpose hereinafter referred to. In this modified form, the contact member comprises the hollow shank or spindle provided with the tray or cup 7<sup>a</sup>, the contact pin 8<sup>a</sup> (insulated as at 8<sup>b</sup> from the hollow shank), and the abutment plate 9<sup>a</sup>. The tray 7<sup>a</sup> is provided with a drain hole 7<sup>b</sup>. 10<sup>a</sup> designates the interposed spring previously described. In this construction one of the line wires *a* is connected with the contact pin 8<sup>a</sup>, the other wire *b* being connected with the hollow shank of the contact member. The bore 2<sup>a</sup> in this construction is adapted to contain mercury or other electrical conducting fluid. Also an auxiliary contact for a two-bell system may be employed with this construction. This contact is designated at *a'* and corresponds to the contact *a* of Fig. 3, hereinafter referred to. The function and operation of this auxiliary contact will be clear from the description of the construc-



tion and utility of the modified form illustrated in Fig. 3, in which latter case the means for making a mercurial connection is omitted. In Fig. 2 *b* is a common wire complementary to *a* and *a'*.

In the form illustrated in Fig. 3, 1<sup>e</sup> is the knob, 4<sup>a</sup> the metallic thimble, and 6<sup>a</sup> the metallic plug. In this construction 8<sup>c</sup> designates a hollow shank of insulating material provided with the abutment plate 9<sup>b</sup> and perforated to allow the ends of the line wires *a* and *b* to be projected outwardly therethrough. In this form, the line wire *b* is common to a plurality of bells and of which, in the present figure, *a* and 8<sup>d</sup> are the respective complementary wires. 4<sup>b</sup> is a contact point formed on the inside of the thimble adjacent the pin 8<sup>d</sup> and may be in the nature of a drop of platinum to make the connection more positive. 10<sup>b</sup> is the interposed spring previously referred to.

Referring to Fig. 1, in operation it will be observed that the weight of the knob will normally hold the spring 10 compressed with the contact pins disengaged from the plug 6. Upon slightly elevating the knob, however, the spring 10 will force the contact pins against the plug 6, closing the circuit.

In Fig. 2 the metallic thimble is dispensed with, the knob being made of metal, and the weight thereof normally compresses the spring 10<sup>a</sup> and keeps the circuit open. Upon slightly elevating the knob, as previously mentioned, the circuit is closed by the cup or tray 7<sup>a</sup>, and the contact pin 8<sup>a</sup> coming into contact with the mercury or other electrical conducting fluid, it being remembered that the line wires *a* and *b* are respectively connected to the contact pin 8<sup>a</sup> and the shank of the tray 7<sup>a</sup>. Upon the release of the knob the tray will elevate a quantity of the fluid which will be discharged through the drain orifice 7<sup>b</sup> into engagement with the pin 8<sup>a</sup>, thereby maintaining the circuit closed a predetermined time (dependent upon the size of the orifice and tray), thereby automatically continuing the ringing of a bell without the necessity of the operative manually maintaining the closed circuit. The object of the annular recess 1<sup>d</sup> in this construction is for the purpose of catching the fluid in case the knob should accidentally be inverted.

In Fig. 3, which illustrates a two-bell call, it will be observed that upon slightly elevating the knob, the spring 10<sup>b</sup> cooperating therewith will force the contact pin 8<sup>d</sup> in engagement with the point 4<sup>b</sup> and closes the circuit of one bell, it being remembered that in this case the line wire *b* is connected with the spring 10<sup>b</sup> which in turn is electrically connected with the thimble or liner 4<sup>a</sup>. To ring the other bell of the two-bell system, the knob is pulled downwardly compressing the spring 10<sup>b</sup> until the projecting end of the

line wire *a* is brought into engagement with the plug 6<sup>a</sup>, when the circuit of that bell is closed. It will thus be seen that in all cases my circuit closer utilizes the weight of the knob or handle to open the circuit when not in use. In this respect it differs essentially from those circuit closers depending upon springs to open the circuit, for that in my device the weighted handle or knob serves the double purpose of a circuit opener and a handle. This double function is important to my invention in that if a pull on the suspended circuit wires was required, in order to either close or open the circuit, the operator could not be certain as to just how much strain he was exerting on said wires at any particular time, and therefore said wires, or the means with which they are provided in order to fasten them to the ceiling, would soon be disarranged and rendered inoperative. On the other hand, by the simple expedient of providing a spring 10, which is sufficiently light to enable the knob or handle to compress the same, and by providing the said knob or handle with one of the contacts, I am enabled to protect the circuit wires and their fastenings, from all unnecessary strain and am absolutely sure of having the circuit automatically broken the instant the apparatus is not in use.

Having thus described practical embodiments of the invention, what I claim is:—

1. In a circuit closer, the combination of a weighted knob or handle adapted to be grasped by the hand of the operator, and provided with one of the contacts of the circuit; circuit wires adapted to suspend and to slide in said knob or handle and provided with the other contact of said circuit; and a spring adapted to close said circuit when the said knob or handle is lifted, substantially as described.

2. In a circuit closer, the combination of a weighted handle adapted to be conveniently grasped by the hand of the operator and provided with one of the contacts of the circuit; circuit wires adapted to suspend and to slide in said handle and normally support the same, and provided with the other contact of the circuit; and a spring surrounding said circuit wires adapted to be compressed by the weight of said handle sufficiently to open the circuit when the apparatus is not in use, substantially as described.

3. In a circuit closer, the combination of a weighted knob or handle, adapted to be conveniently grasped by the hand of the operator, provided with one of the contacts of said circuit, and having a chamber therein, and a passage through a portion of the same; circuit wires provided with the other contact of said circuit operating in said chamber, and adapted to suspend said knob or handle and to slide through said passage; a spring in said chamber adapted to be normally sufficiently



compressed by the weight of said handle to keep the circuit normally open; and means for closing the said chamber, substantially as described.

5 4. In a circuit closer, the combination of a hollow weighted handle, adapted to be conveniently grasped by the hand, and carrying one contact of the circuit; circuit closing means therein, comprising the other contact member of said circuit; a spring interposed between the said contact member and the top of said handle, and normally held compressed by the weight thereof; and circuit wires connected to said contact and normally suspending the said weighted handle, whereby the weight of said handle normally holds the circuit open, and whereby upon lifting of said weight the spring automatically closes said circuit, substantially as described.

5 5. In a circuit closer the combination of a weighted handle, carrying a contact; circuit wires normally suspending said handle; means located within said handle, and operating to close the circuit upon the lifting of said handle, and to similarly close another circuit upon the movement of said handle in an opposite direction, substantially as described.

30 6. In a circuit closer the combination of a weighted handle, carrying a contact provided with a chamber therein, and a passage through a portion of its body; circuit wires normally suspending said handle, and adapted to slide through said passage; a contact connected to said wires and located in said chamber; a spring surrounding said wires of sufficient lightness to be normally compressed by the weight of said handle, and to thereupon permit the circuit to be opened, but of sufficient strength to close the circuit when the said handle is lifted; and a second contact in said chamber, adapted to close the circuit when the said handle is moved in the opposite direction, substantially as described.

45 7. In a circuit closer the combination of a weighted handle or knob, provided with a chamber, and a passage through a portion of its body; mercury contained in said chamber and constituting one of the contacts of said circuit; circuit wires normally suspending said knob or handle, adapted to slide through said passage, and provided with the other contact of said circuit; a spring surrounding

said wires of sufficient lightness to be compressed by the weight of said handle, and to thereby permit the circuit to be opened; means for closing said chamber; and a second contact in said chamber adapted to be closed when increased pressure is placed upon said spring, substantially as described.

8. In a circuit closer, the combination of a recessed weighted handle, adapted to be conveniently grasped by the hand and adapted to contain an electrical conducting fluid, circuit wires sliding in and normally suspending the said handle; and circuit closing means located in said chamber and adapted to close said circuit when the handle is lifted, and to open the same when the handle is suspended by said wires, substantially as described.

9. In a circuit closer the combination of a hollow knob or handle, provided with a recess adapted to contain a mercury contact; circuit wires normally suspending said handle, and provided with another contact; a spring normally surrounding said wires and adapted to be sufficiently compressed by the weight of said handle to normally separate said contacts; and a pin connected to one of said circuit wires and adapted to be brought into electrical connection with said contact, by a tipping of said handle and a consequent flow of the said mercury, and means whereby the circuit will be maintained closed a predetermined time after the release of said handle, substantially as described.

10. In a circuit closer the combination of a hollow weighted handle, provided with a recess, and a passage through a portion of its body; circuit wires adapted to slide through said passage normally suspending said handle, and provided with a contact located in said recess; mercury in said recess constituting another contact; a pan in said recess, provided with an aperture adapted to discharge its contents on said first contact, connected with the circuit wires; and a spring surrounding said wires adapted to be normally compressed by the weight of said handle, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

ROBERT HENDERSON

Witnesses:

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J. STEPHEN GINSTO.