

No. 822,336.

PATENTED JUNE 5, 1906.

J. C. ARMOR.
THERMAL CUT-OUT FOR ELECTRIC CIRCUITS.
APPLICATION FILED JUNE 8, 1903.

Fig. 1.

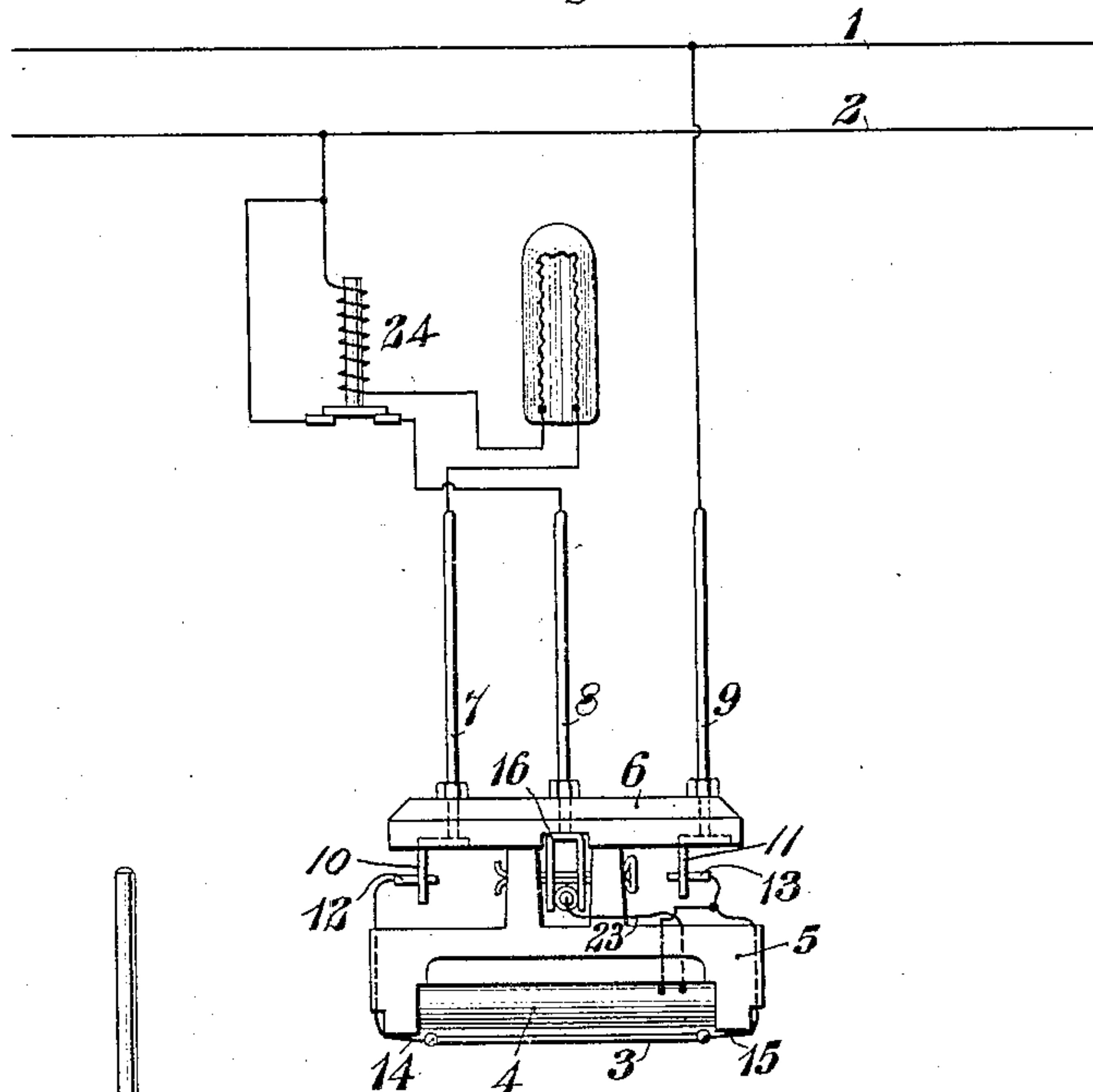


Fig. 2.

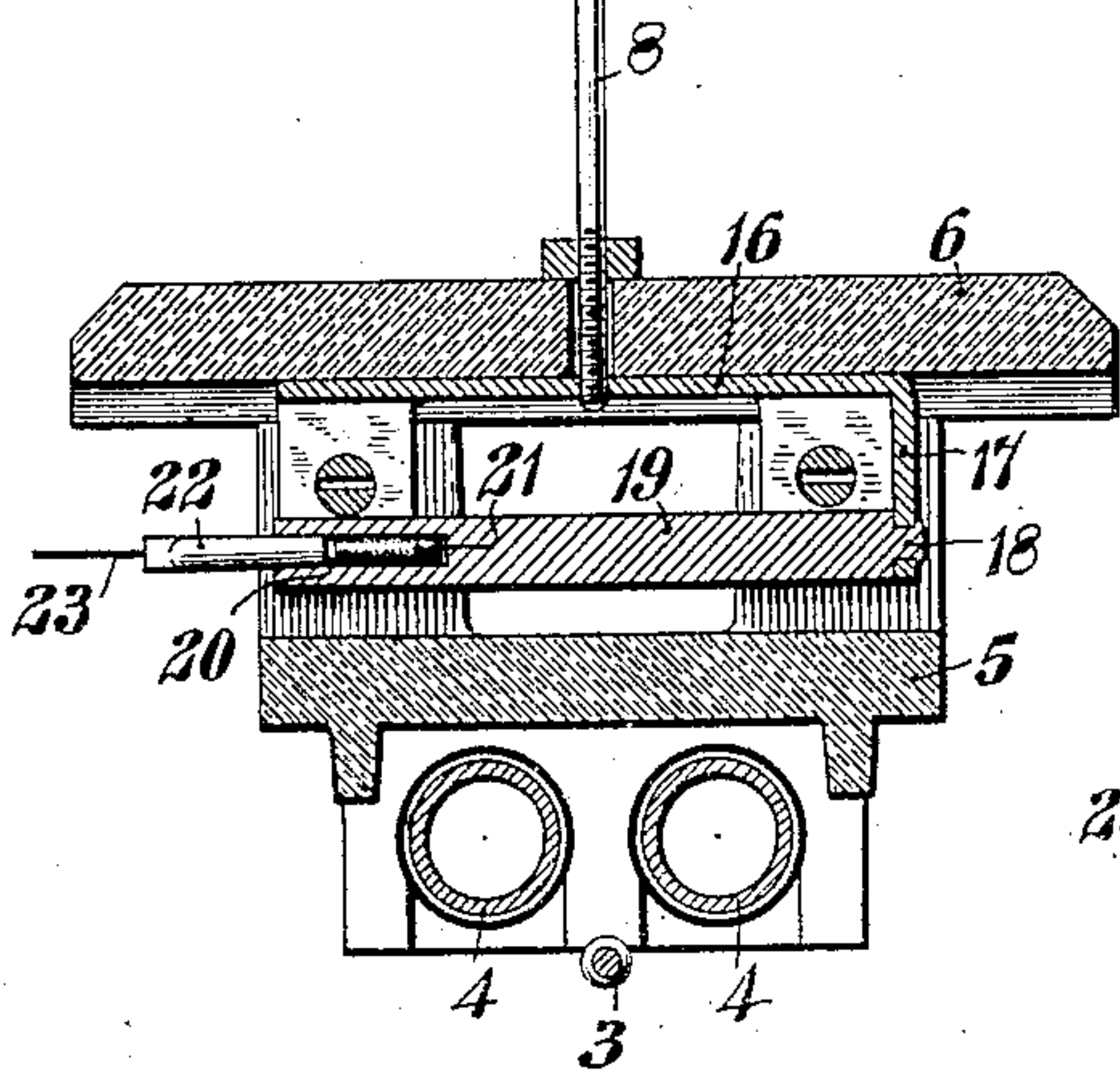
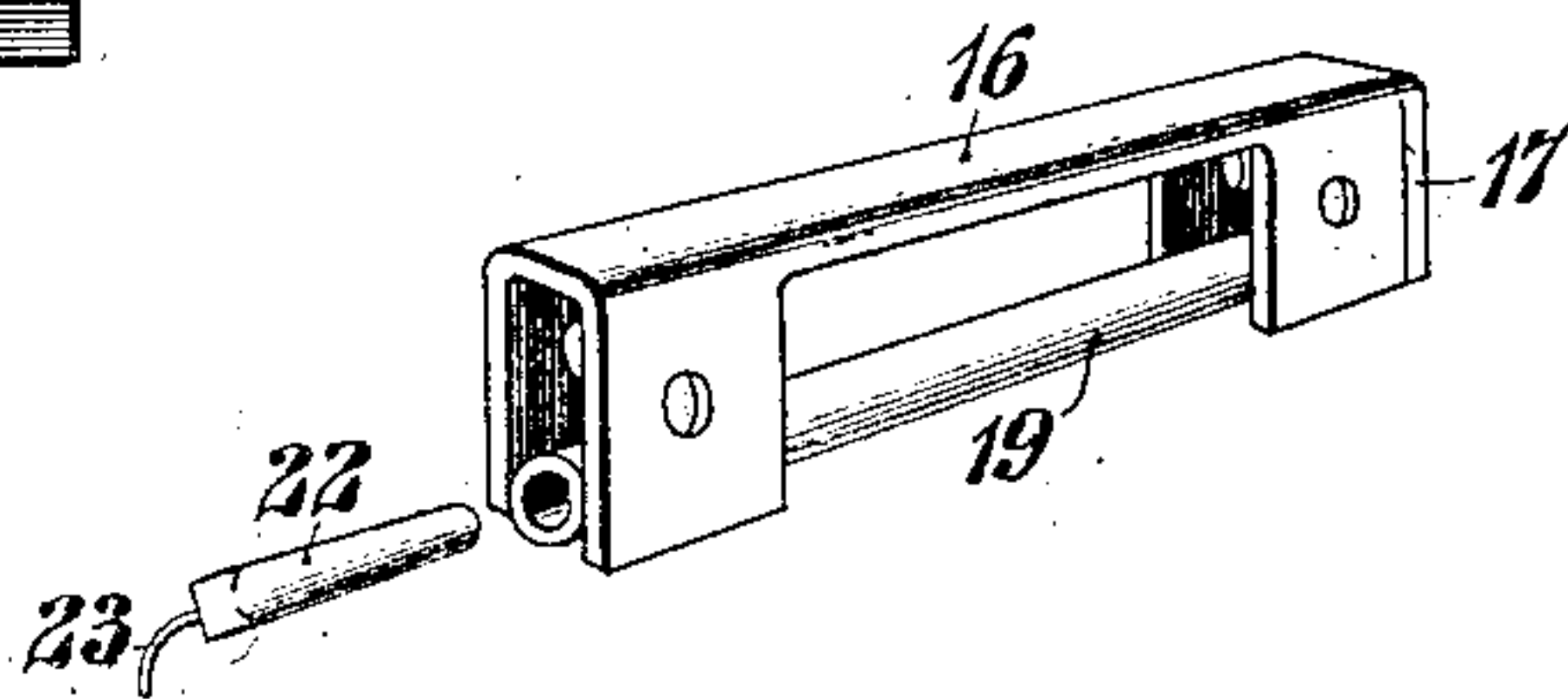


Fig. 3.



WITNESSES:

C. L. Belcher
Birney Hines

INVENTOR

James C. Armor
BY
Hesley G. Carr
ATTORNEY.

UNITED STATES PATENT OFFICE.

JAMES C. ARMOR, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO GEORGE WESTINGHOUSE, OF PITTSBURG, PENNSYLVANIA.

THERMAL CUT-OUT FOR ELECTRIC CIRCUITS.

No. 822,336.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed June 8, 1903. Serial No. 160,636.

To all whom it may concern:

Be it known that I, JAMES C. ARMOR, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Thermal Cut-Outs for Electric Circuits, of which the following is a specification.

My invention relates to safety devices or cut-outs for electric circuits; and it has for its object to provide a device of this character which shall embody a substance that is combustible or vaporizable when subjected to a predetermined excessive temperature, and thus becomes effective to open the circuit in which the device is included.

While my invention is susceptible of use in any electric circuit, it was primarily designed for use in the heater-circuits of electric lamps, the light-emitting members or glowers of which are non-conductors at ordinary temperatures and are heated to conducting temperature by means of electric heaters. For convenience the invention will be illustrated and described as embodied in a lamp of the character above indicated, but without intention of limiting it to use in such relations.

It is usual to provide the heater-circuits of lamps of the character above indicated with cut-outs which are opened by means of coils in the glower-circuits and which are automatically closed by means of gravity or springs when no current is flowing in the glower-circuit.

If a lamp contains several glowers, rupture of one of them will of course not interrupt the glower-circuit; but where a single glower is employed in a lamp, or even where two glowers are employed, it is possible that the glower-circuit may be interrupted by reason of the burning out or accidental breaking of the glower in case only one is employed, or both in case there are two, and when such accident occurs the heater is automatically cut into circuit, and under the conditions heretofore existing the current will continue to traverse the heater and will in time cause serious deterioration or actual destruction of the same unless current is cut off from the lamp.

I propose to provide a means whereby the heater-circuit will be automatically interrupted a predetermined length of time after

the glower-circuit becomes broken and to thereby indefinitely prolong the life of the heater and preserve it from unnecessary deterioration.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view, partially in side elevation and partially diagrammatic, of the principal operating parts of a lamp provided with my improvement. Fig. 2 is a central sectional view taken at right angles to Fig. 1 and showing the parts on a larger scale. Fig. 3 is a detail perspective view, also on an enlarged scale, of the device constituting the chief element of my invention.

The lamp here indicated is of the single-glower type and is supplied from a circuit 1, 2, the glower 3 and tubular heaters 4 being supported in a suitable non-conducting frame 5, such frame being suspended below a non-conducting disk 6, which is provided with three contact terminal pins 7, 8, and 9, the latter making engagement with terminal sockets in the non-removable portion of the lamp. (Not shown.)

The pins 7 and 9 constitute glower-terminals, the connection therewith being made by means of metal angle-pieces 10 and 11 and removable pins 12 and 13, which are respectively connected to the glower terminal wires 14 and 15. The pin 9 also constitutes one of the heater-terminals, the pin 8 being the other heater-terminal, which is fastened to a metal bar 16, whereby the latter is clamped to the under side of the disk 6.

One end 17 of the bar 16 is bent at substantially right angles to the body portion, and seated in a hole therein is the reduced end 18 of a small rod 19, the other end of this rod being bored out to form a cavity 20, in which is placed a piece 21 of material that is combustible or vaporizable or otherwise produces a sufficient volume of gas to more than fill the cavity when subjected to a maintained high temperature. The outer end of the hole or cavity 20, which may be of any desired depth, is closed by means of a terminal plug 22, to which is fastened the end of heater-terminal wire 23.

The rod or tube 19 is located sufficiently near the heater-tubes so that when the latter operate for a considerable length of time—say four or five minutes—the heat generated

will be sufficient to burn or vaporize the body 21, and thus produce a sufficient volume of gas to blow out the plug 22, and since this rod is connected directly in the heater - circuit 5 when the plug is blown out the said circuit will be interrupted.

Any one of a considerable variety of materials or compositions of materials may be employed as the combustible or vaporizable substance. One substance which I have employed and found to be satisfactory consists of chlorate of potash, powdered charcoal, and a solution of silicate of soda mixed together, compressed, or molded into suitable form and 15 dried. The composition may be conveniently forced through a suitable die while in plastic condition, and after the string thus formed is dry it may be readily broken into short lengths, which are well adapted to the purposes of my invention. 20

The heat generated during the time necessary for raising the glower to conducting temperature is not sufficient to vaporize the body 21, and consequently the heater-circuit 25 remains closed except when opened by the cut-out 24 or when the heater operates a certain predetermined length of time in excess of that required for raising the glower to conducting temperature, as will be the case when 30 the glower is broken or the circuit otherwise interrupted.

Operative means for effecting the result herein specified, which differ from the means here set forth as regards structural details, 35 but not as regards mode of operation, I de-

sire to include within the scope of my invention.

I claim as my invention—

1. In an electric lamp, the combination with a glower that is a non-conductor at ordinary temperatures, of an electric heater therefor and a thermal cut-out in the heater-circuit comprising a solid-metal body having a cavity in one end thereof, vaporizable material in said cavity and a terminal plug removably fitted into one end of said cavity. 40 45

2. In an electric lamp, the combination with a glower that is a non-conductor at ordinary temperatures, of an electric heater therefor and a thermal cut-out comprising a solid-metal rod having a cylindrical chamber in one end, a body of vaporizable material in said chamber and a terminal plug normally fitted into the outer end of said chamber. 50

3. The combination in an electric circuit, of a solid-metal rod having a cavity in one end and constituting one terminal, a plug fitted into the end of the cavity and constituting the other terminal and a charge of combustible or vaporizable material in said cavity that acts to blow out the plug when subjected to a rise of temperature above a predetermined limit. 55 60

In testimony whereof I have hereunto subscribed my name this 25th day of May, 1903. 65

JAS. C. ARMOR.

Witnesses:

EDWARD BENNETT,
HUGH A. CROOKS.