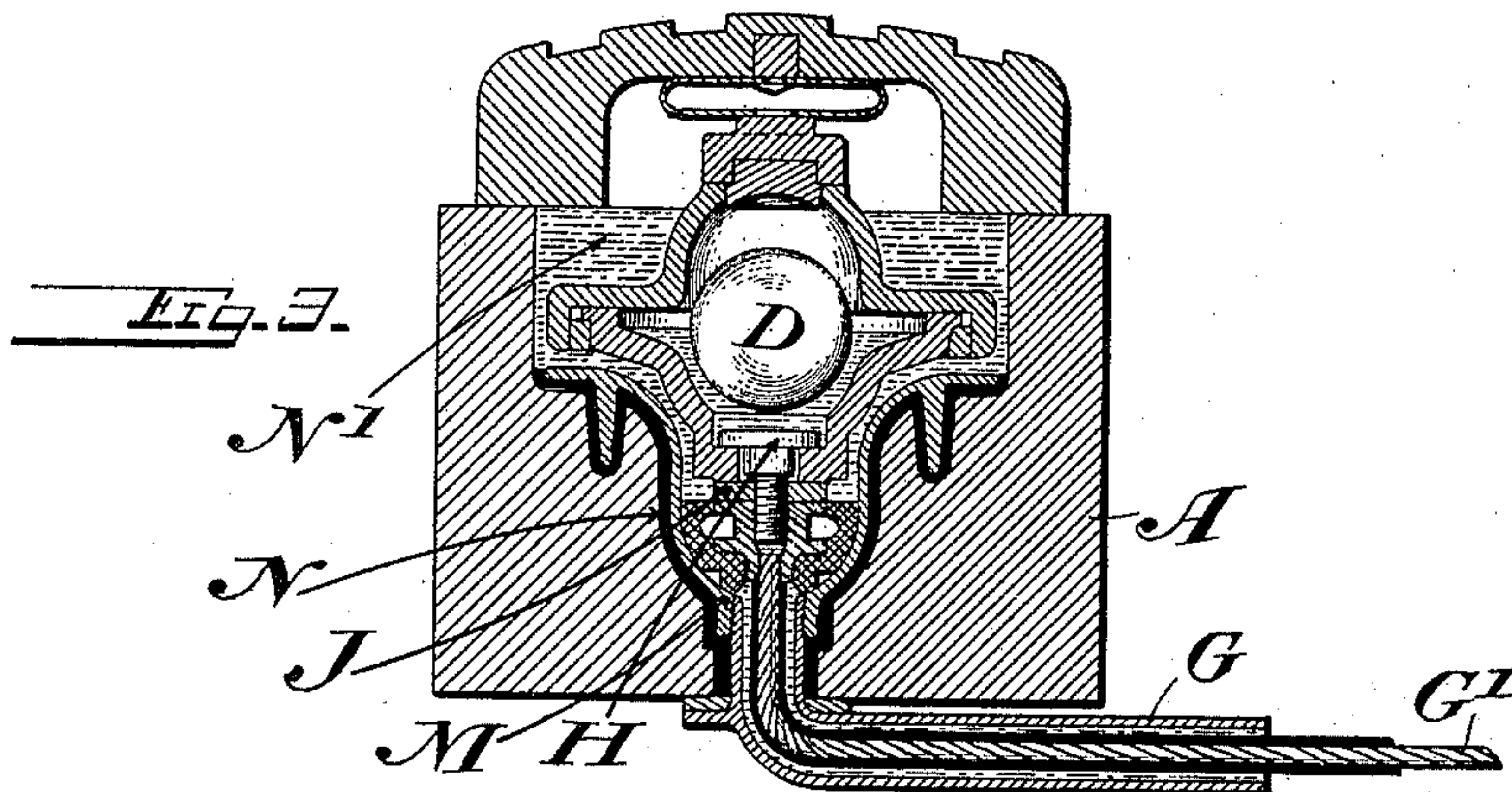
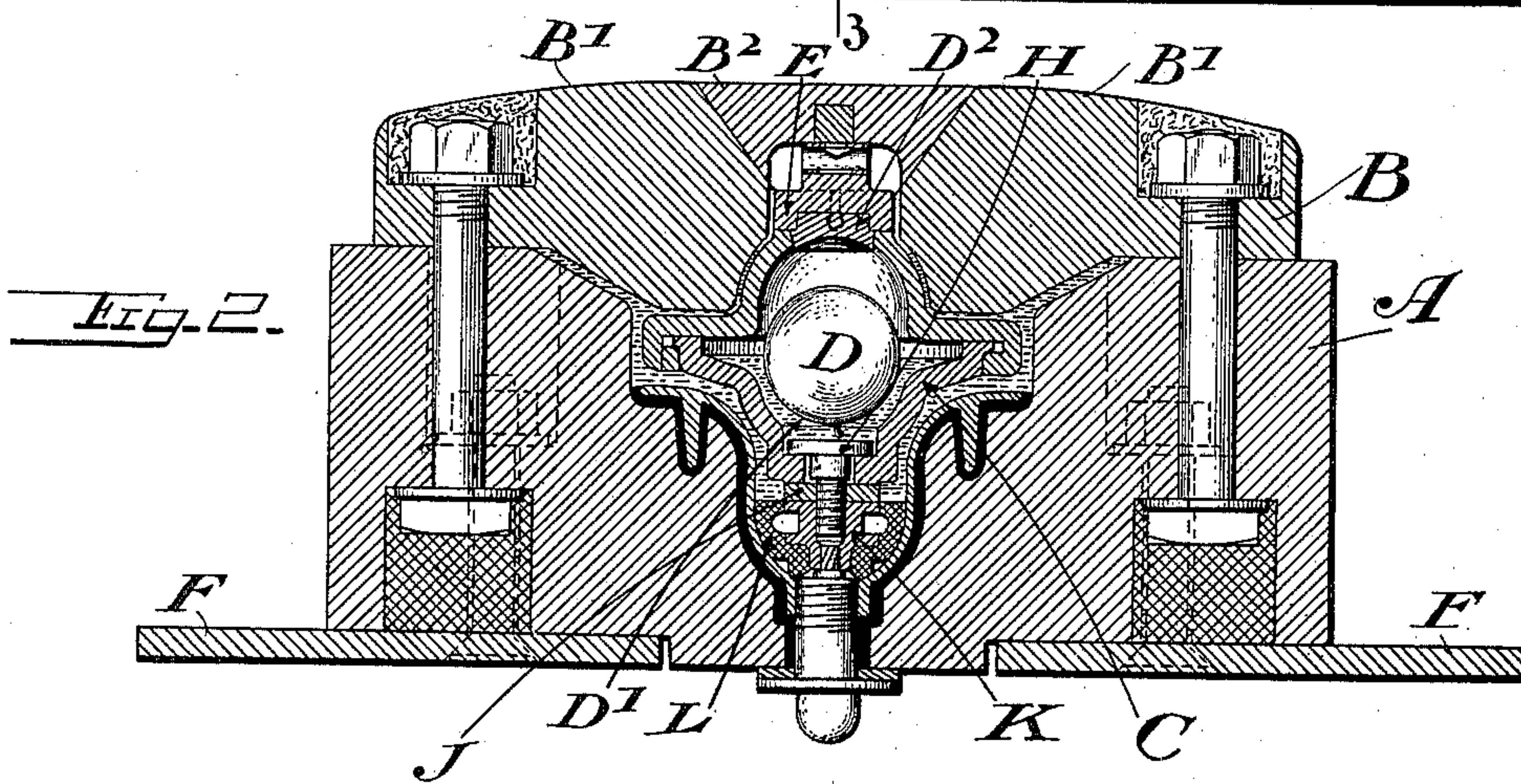
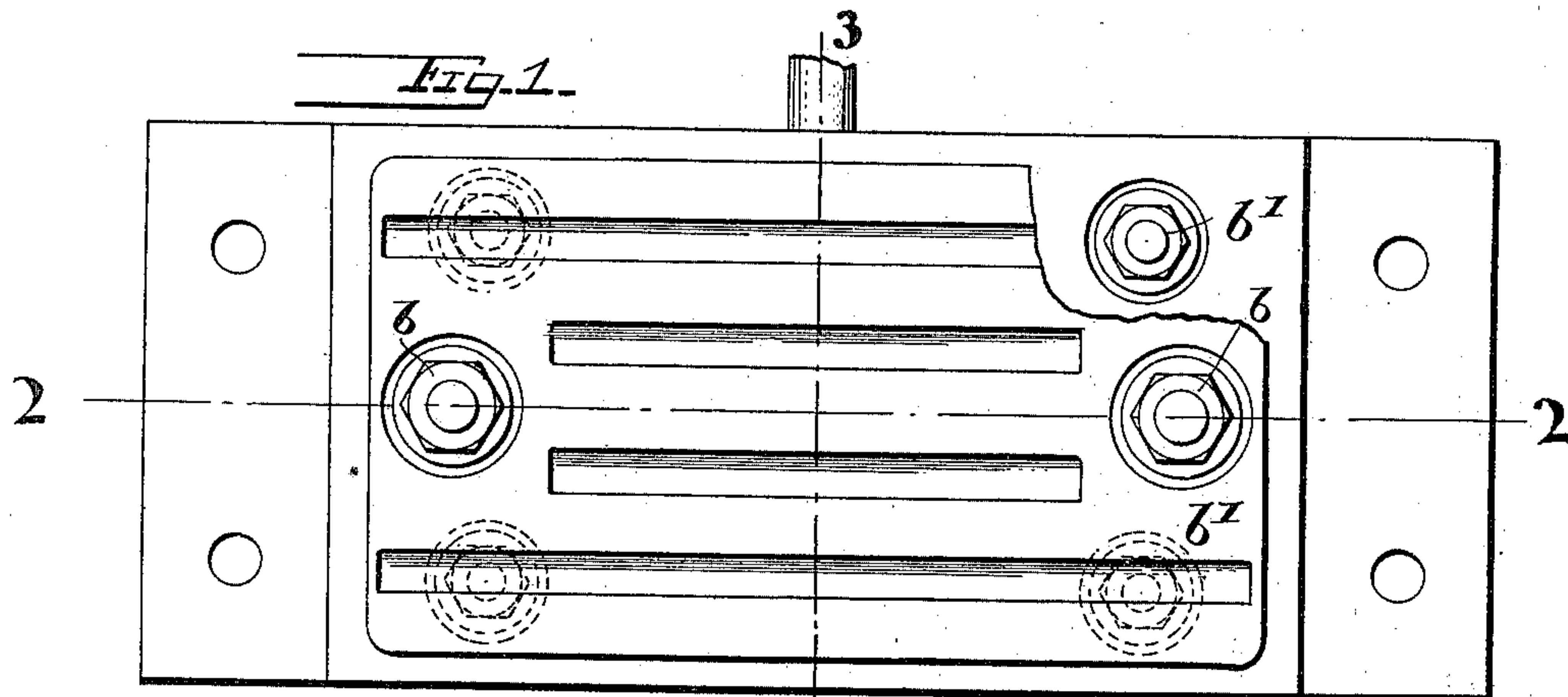


(No Model.)

J. N. THOMAS.
ELECTRIC CONTACT BOX.

No. 600,937.

Patented Mar. 22, 1898.



WITNESSES:

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JOSEPH N. THOMAS, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNOR TO THE
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ELECTRIC CONTACT-BOX.

SPECIFICATION forming part of Letters Patent No. 600,937, dated March 22, 1898.

Application filed September 18, 1897. Serial No. 652,182. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH N. THOMAS, of Johnstown, Cambria county, Pennsylvania, have invented certain new and useful Improvements in Electric Contact-Boxes, of which the following is a specification.

My invention is especially designed for electric railways of the class which employ normally-open-circuited current-conveyers between the source of supply and discontinuous bared conductors and provide means for closing the circuit through the current-conveyer when the moving vehicle is at a fixed position relative thereto. Such a system is described in the patent issued April 14, 1896, to W. Milt Brown and numbered 558,151.

My invention especially relates to that part of the railway system which is situated between the bared conductor-sections and the supply-feeders, and primarily consists of improvements especially applicable to the system described in the aforesaid Letters Patent.

I have stated that my invention relates to electric railways and is especially applicable for certain types of electric railways. It will be obvious, however, that certain features of my invention, as hereinafter described, are applicable to many electric systems other than railways. I do not, therefore, restrict myself to the use of my invention upon electric railways.

One object of my invention is to provide means for automatically opening the circuit in case of any accidental leakage of current through the current-conveying devices. This object I attain by providing a fuse which will melt by an abnormal increase of temperature caused by any arcing which may take place between the terminals of the circuit-breaker.

A further object of my invention is the removal of every possible source of leakage. The different means which I employ for this purpose will fully appear in the following description.

Other objects of my invention, with their incumbent advantages arising from my improved construction, arrangement, and combination of parts, will also be fully set forth hereinafter.

Referring to the drawings accompanying this specification, Figure 1 is a plan view of

an electric contact-box which embodies the various features of my invention. Fig. 2 is a vertical section on the line 2 2, and Fig. 3 is a vertical section on the line 3 3.

A is the base of the electric contact-box and is preferably formed of a single vitrified brick.

B is the cover, which in this particular box is composed of two sides B' of magnetizable material, which are cast to and separated by a center B² of non-magnetic material.

Within the box is the sealed vessel C, containing the circuit-closer, comprising the iron ball D, floating in mercury D' and adapted to close the circuit when raised by magnetic attraction against the contact D². Between the contact D² and the exposed contact B², I cast the metallic plug E, which is amply sufficient to carry the normal current or even to carry an excessive current without becoming highly heated, but is of a composition which will melt at a comparatively low temperature, say about 200° Fahrenheit. In case any accidental leakage should cause an arc between D and D² as they are breaking contact with each other the temperature of D² will rise very quickly. This heat will be at once communicated to the plug, melting the latter and opening the circuit thereby. The alloy which I prefer for this purpose is a mixture of eight parts of bismuth, five parts of lead, and three of tin. I do not, however, care to limit myself to any specific mixture, as I believe that it is broadly new to employ a fuse which melts not by the increased temperature caused by a heavy current, but by the increased temperature caused by the formation of an arc. In railway systems of this character it is almost impossible to avoid occasional accidental leakage. In winter, for example, salt is used very largely for melting the snow upon the track, and as a result the top of the contact-box may be flooded with a strong brine, which might cause sufficient leakage from the contact-box to the rail (usually connected to the opposite side of the main circuit) as to cause an arc between D and D² when the former drops into the mercury. If my fusible plug E is not inserted, this arc will continue for a considerable time and passers-by are liable to receive an electric

shock. By the use of my invention, however, the rise in temperature which the arc causes will quickly melt the plug and remove all danger of this character. Faulty insulation at various parts of the contact-box may also develop such a leak, with the same result.

I secure the top B of the contact-box to the base A by means of the bolts b. These bolts are only intended for this purpose and do not pass down to the lower parts of the base to fasten the latter to tie-plates F or other holding-down devices. For this purpose I provide the four bolts b', which connect the base member A to the tie-plates F, but do not extend upwardly into the top of the box. In this way I avoid any danger of leakage from the top of the box through the bolts and tie-plates to the ground. Hitherto all three members have been secured together by the same bolt and insulation was inserted between them and the cover; but it is extremely difficult to safely and permanently insulate them.

If the tie-plates F are not used and the base A is to be secured directly to the tie, it is quite evident that lag-screws may be used in place of bolts b' without affecting the purpose of this part of my invention.

In the bottom of the vessel C rests the plate portion of a member H, which is secured in the wall of the vessel by means of the clamping-nut J. The lower portion of the member H screws into the terminal K, which is surrounded and held in place by cast-sulfur L or similar material. Within this terminal and soldered thereto is the end of the supply-cable G'. The member H therefore serves to retain the mercury in the vessel, electrically connect the mercury with the source of supply, and removably secure the vessel to the fixed terminal K. The cable G' is surrounded by a lead covering, which I have not here shown. This lead covering is, for the purpose of avoiding electrolysis, directly connected to the opposite side of the main circuit from that to which the cable itself is connected.

Adjacent to the contact-box and connected to the lead covering by a wiped joint (which I do not here show) is the brass tube G, surrounding the cable G'. As this tube through the lead covering will also be in direct connection with one side of the main circuit, it is important that no moisture-leaks will develop between G and K or other similar parts.

I effectually prevent moisture-leaks by means of the following agencies: An open metallic vessel M is screwed to the upturned end of the tube G. About the metallic vessel is a solid insulating material N, such as tar. Within the metallic vessel and surrounding the mercury-containing vessel is a liquid insulator N' which is heavier than water. A preferable mixture for this purpose is composed of asphalt and oil.

Any moisture which could enter the lower portion of the base would be obliged to work

its way around the outside of the metallic vessel, and would then meet the heavy fluid and pass to the top thereof, where it could do no harm. Even if such a liquid is not used the provision of the metallic vessel is desirable because of the long path which the moisture is obliged to span before a leak could occur, and the leak, if it did occur, would be inconsiderable through such a high resistance.

I desire to be understood as not limiting myself to the specific details shown and described, for modifications may readily be made therein without departing from the scope of my invention.

Having thus described my invention, what I claim, and desire to protect by Letters Patent, is—

1. The method of interrupting an arc which may be formed between the terminals of a switch by the regular current, which consists in utilizing the heat developed by said arc to melt a fusible portion of the circuit and thus open the circuit to one of the terminals.

2. The combination with the terminals of a switch of means for opening the circuit thereto when the separation of said terminals draws an arc between them, said means being actuated by the heat developed by said arc.

3. A switch comprising a fixed electrode and a movable electrode in combination with a highly-fusible alloy contacting, and in circuit, with one of the said electrodes.

4. The combination of the contact-section B², a fixed electrode in circuit therewith, a movable electrode in circuit with the source of supply, and a fusible alloy in the circuit located in sufficient proximity to the electrode as to be melted by the heat developed by any arc which may span the electrodes.

5. In an electric contact-box the combination with a movable electrode in circuit with the source of supply and a fixed electrode in circuit with the contact portions of the box, of a highly-fusible alloy in contact with the said fixed electrode.

6. In an electric contact-box, the combination with a movable electrode in circuit with the source of supply and a fixed electrode in circuit with the contact portions of the box, of a highly-fusible alloy in contact with the said fixed electrode and forming part of the main circuit.

7. The combination, in an electric contact-box, of a cable connected with the positive side of the circuit and secured to a terminal within the box, a metallic tube which surrounds said cable, is connected to the negative side of the circuit, and extends into the box and terminates in a metallic vessel, and a fluid insulator within, and above the top of, said metallic vessel.

8. The combination, in an electric contact-box, of a cable connected with the positive side of the circuit and secured to a terminal within the box, connections from said terminal to a circuit-closing device, a tube which surrounds

5 said cable, is connected to the negative side of the circuit, extends into the contact-box and carries at its end a metallic vessel, and an insulating fluid which is heavier than water, within, and above the top of, said vessel.

10 9. The combination of the cable in connection with the positive side of the circuit and secured to a terminal within the contact-box, a tube connected to the negative side of the circuit and surrounding the aforesaid cable, and a metallic vessel within the contact-box secured to the end of said tube.

15 10. The combination of the cable G', the terminal K to which it is secured, the insulating material cast about and holding the terminal in place, the vessel containing the cir-

cuit-closing mechanism, and means for removably securing the vessel to said terminal.

11. In an electric contact-box, a metallic top and a base of insulating material, in combination with members securing the top and base together, but extending only partially through said base and members securing the base to a track structure but only passing partially up through the base.

25 In testimony whereof I have affixed my signature in presence of two witnesses.

JOS. N. THOMAS.

Witnesses:

RICHARD EYRE,
H. W. SMITH.