

S. M. KINTNER & G. B. ROSENBLATT.

FUSE FOR ELECTRICAL CIRCUITS.

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959,552.

Patented May 31, 1910.

Fig. 1

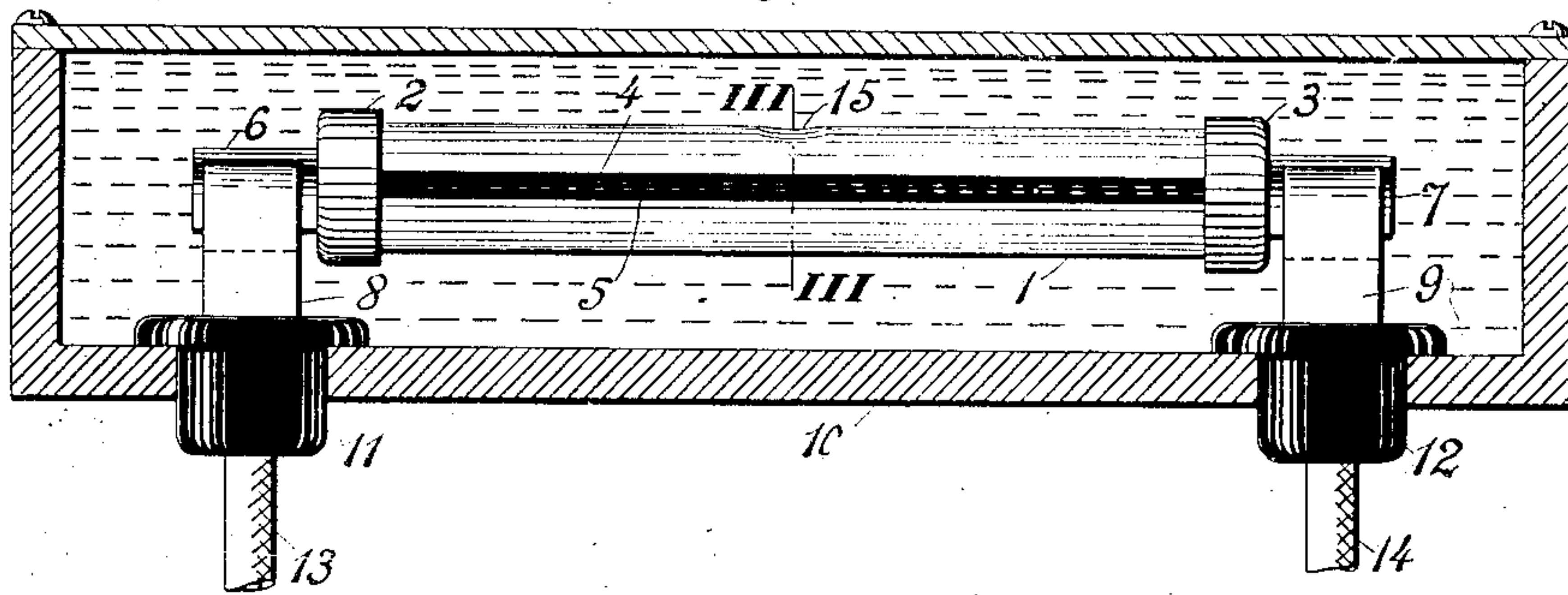


Fig. 2

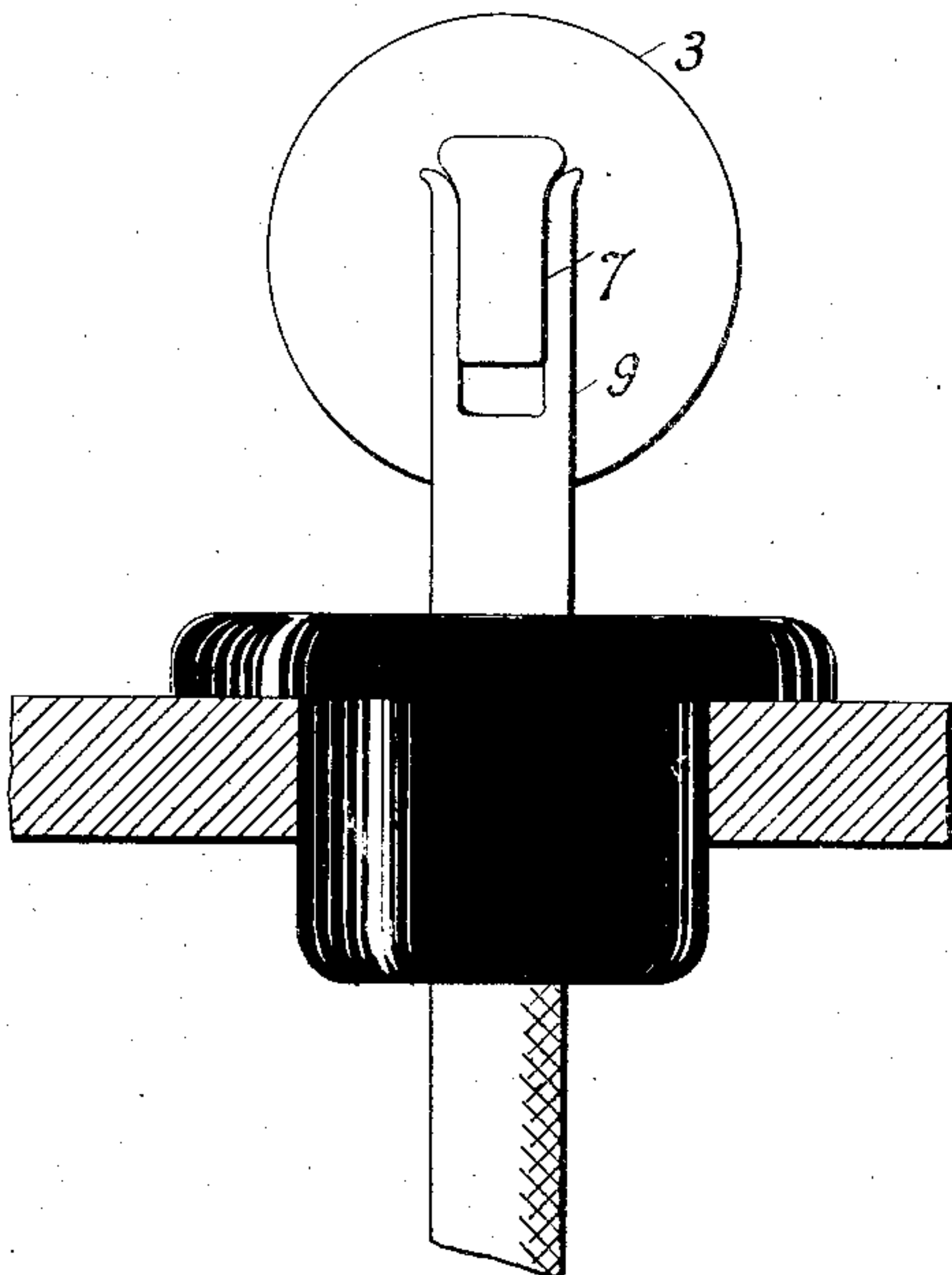
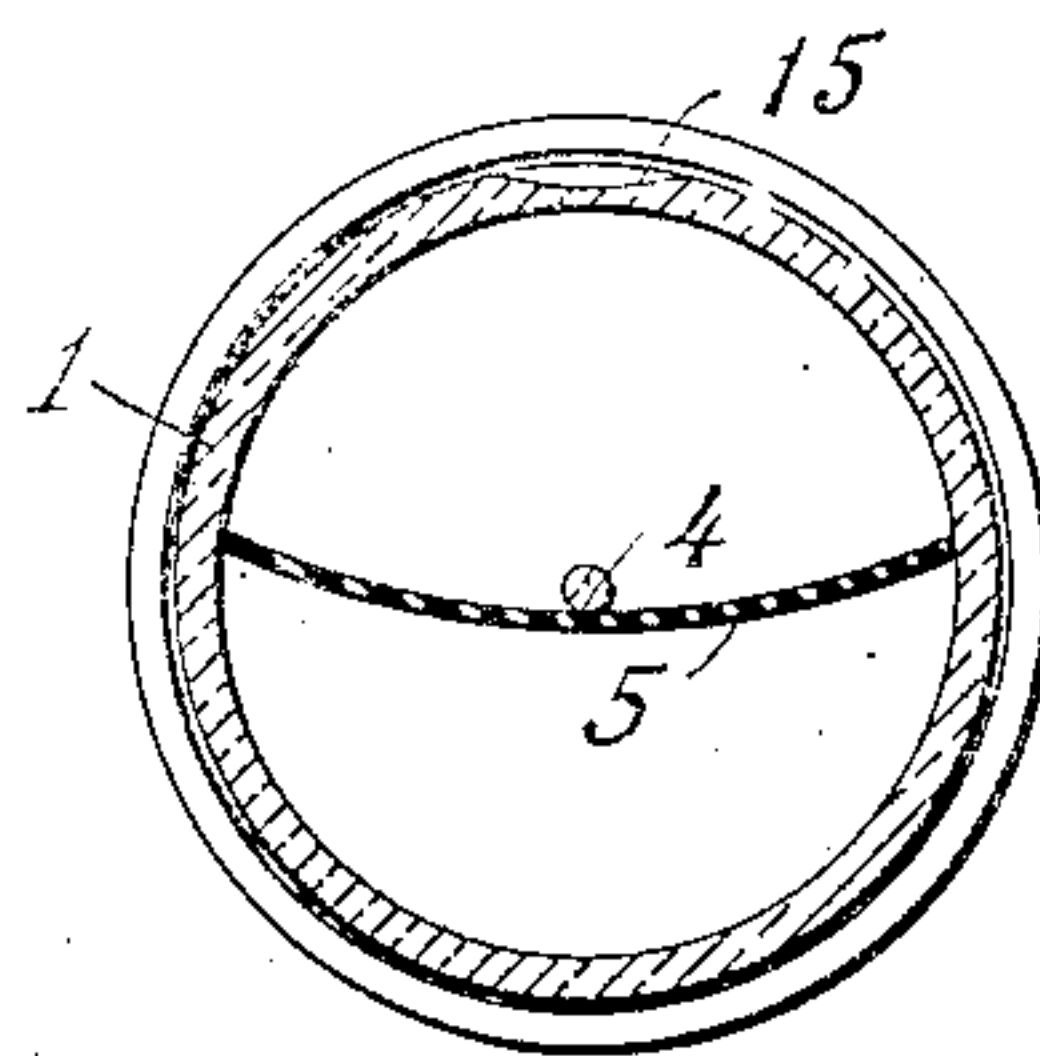


Fig. 3



WITNESSES:
Camille Boulin
Otto S. Schauer

INVENTORS
Samuel M. Kintner
& Girard B. Rosenblatt
BY
Walter S. Carr
ATTORNEY

UNITED STATES PATENT OFFICE.

SAMUEL M. KINTNER, OF PITTSBURG, PENNSYLVANIA, AND GIRARD B. ROSENBLATT, OF NEW YORK, N. Y., ASSIGNORS TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

FUSE FOR ELECTRICAL CIRCUITS.

959,552.

Specification of Letters Patent.

Patented May 31, 1910.

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To all whom it may concern:

Be it known that we, SAMUEL M. KINTNER and GIRARD B. ROSENBLATT, citizens of the United States, and residents, respectively, of Pittsburg, in the county of Allegheny and State of Pennsylvania, and of New York, in the county of New York and State of New York, have invented a new and useful Improvement in Fuses for Electrical Circuits, of which the following is a specification.

Our invention relates to fuses for electrical circuits, and it has for its object to provide a novel and improved fuse device that shall be especially adapted to the protection of high potential circuits.

Our invention is illustrated in the accompanying drawing, Figure 1 of which is a view, partially in section and partially in side elevation, of a device constructed in accordance therewith; Fig. 2 is a view, partially in end elevation and partially in section, of the device shown in Fig. 1, and Fig. 3 is a view in section on line III—III of Fig. 1.

An insulating tube 1 is provided with end caps or terminal pieces 2 and 3, to the inner and opposing faces of which a fusible conductor 4 is soldered or otherwise suitably secured in such a manner that it is suspended out of contact with the tube 1. The conductor 4 may be further supported by means of a strip 5 of insulating material, such as mica, the width of which is approximately equal to or is slightly greater than the diameter of the insulating tube 1 whereby it is secured in position, or an additional support of other suitable character may be employed. The end caps 2 and 3 are provided with flattened projections 6 and 7 that are adapted to be engaged by suitable jaws or split terminal pieces 8 and 9, respectively, the tube 1 being thereby supported in position. The upper edges of the flattened portions 6 and 7 are flared or they may be otherwise suitably enlarged or arranged so as to prevent placing of the fuse device in position in the jaws except in such a manner as to insure supporting of the conductor 4 by the strip 5. The terminal pieces 8 and 9 extend through an inclosing casing 10 and are supported in position and insulated therefrom by means of bushings 11 and 12, circuit conductors 13 and 14 being soldered or otherwise

suitably secured to the extensions or lower ends thereof. The inclosing casing 10 is filled with any suitable insulating fluid, such as oil, wherein the parts just described are immersed.

Under normal operating conditions, the insulating tube 1 maintains the insulating fluid out of contact with the fusible conductor 4 and the insulating support 5 serves to prevent the conductor 4 from sagging when it becomes heated to a degree less than that at which it fuses. Upon continuance of more than a predetermined amount of current in the circuit which the device is adapted to protect, the conductor 4 fuses and causes destruction of the insulating tube 1, thereby permitting the insulating fluid to occupy the space thus left vacant and to extinguish any arc that might exist between the terminal pieces 2 and 3 after fusing of the conductor. Since the pressure of the oil and currents set up therein by the destruction of the tube insures extinguishment of the arc, it is evident that the device is particularly adapted to the protection of high potential circuits.

The oil is maintained out of contact with the conductor because it may become sufficiently heated to vaporize the oil when operating under normal conditions or, at least, to disintegrate it in such a manner as to form heavy deposits of foreign material on its surface and therefore bring about, in a short time, changes which would alter the current value at which the device would operate. The insulating tube may be composed of glass or any other suitable insulating material which will be destroyed by the explosion or fusing of the conductor.

If the receptacle for the insulating fluid is provided with a moisture proof cover, the device may be placed where it is likely to be submerged, as in the manholes of subterranean systems of distribution.

If desired, the air may be exhausted from the inclosure within the insulating tube, or the inclosure may be filled with any suitable inert gas, or with an explosive mixture. A locally weakened portion 15 may also be provided in the insulating tube, which may be the only portion that is destroyed or which may be the first destroyed upon the fusing of the conductor, and this weakened portion may be so located as to direct the

flow of insulating fluid upon any desired portion of the conductor.

The structural details of our invention may obviously be modified within wide limits without departing from its spirit and we desire that all such modifications be included within its scope.

We claim as our invention:

1. A fuse for electrical circuits comprising a sealed insulating tube of frangible material and a fusible conductor suspended therein, in combination with means for making circuit connections to the terminals of the fusible conductor, a receptacle filled with insulating liquid in which the insulating tube is immersed, and an insulating strip located within the tube and supporting the fusible conductor throughout its length.

2. A fuse for electrical circuits comprising a sealed insulating tube, a fusible conductor suspended therein, and means within the tube for supporting the conductor from end to end throughout its length, in combination with means for making circuit connections to the terminals of the fusible conductor, and a receptacle containing insulating fluid in which the insulating tube is immersed.

3. A fuse for electrical circuits comprising an insulating tube, conducting end caps therefor, a fuse suspended within the tube between the end caps, a support therefor upon which the fuse may rest throughout

its length, and a receptacle filled with an insulating liquid in which the said parts are immersed and provided with circuit terminals that engage the end caps and support the tube.

4. A fuse for electrical circuits comprising an insulating tube, conducting end caps therefor, a fusible conductor suspended within the tube between the end caps, an insulating support upon which the fusible conductor may rest throughout its length, and a receptacle containing an insulating fluid in which the said parts are immersed, and provided with circuit terminals that engage the end caps and support the tube.

5. The combination with an insulating fluid and a fusible conductor, of an inclosing device for the conductor that normally maintains the insulating fluid out of contact therewith and is provided with a weakened portion which is ruptured upon the fusing of the conductor.

In testimony whereof, we have hereunto subscribed our names this 30th day of October, 1905.

SAMUEL M. KINTNER.

GIRARD B. ROSENBLATT.

Witnesses as to Samuel M. Kintner:

OTTO S. SCHAIRER,

BIRNEY HINES.

Witnesses as to Girard B. Rosenblatt:

BERTRAND P. ROWE,

BIRNEY HINES.