Aug. 20, 1935. J. SANDIN 2,011,654

FUSE BLOCK

Filed June 18, 1927 2 Sheets-Sheet 1

Fig. 1.

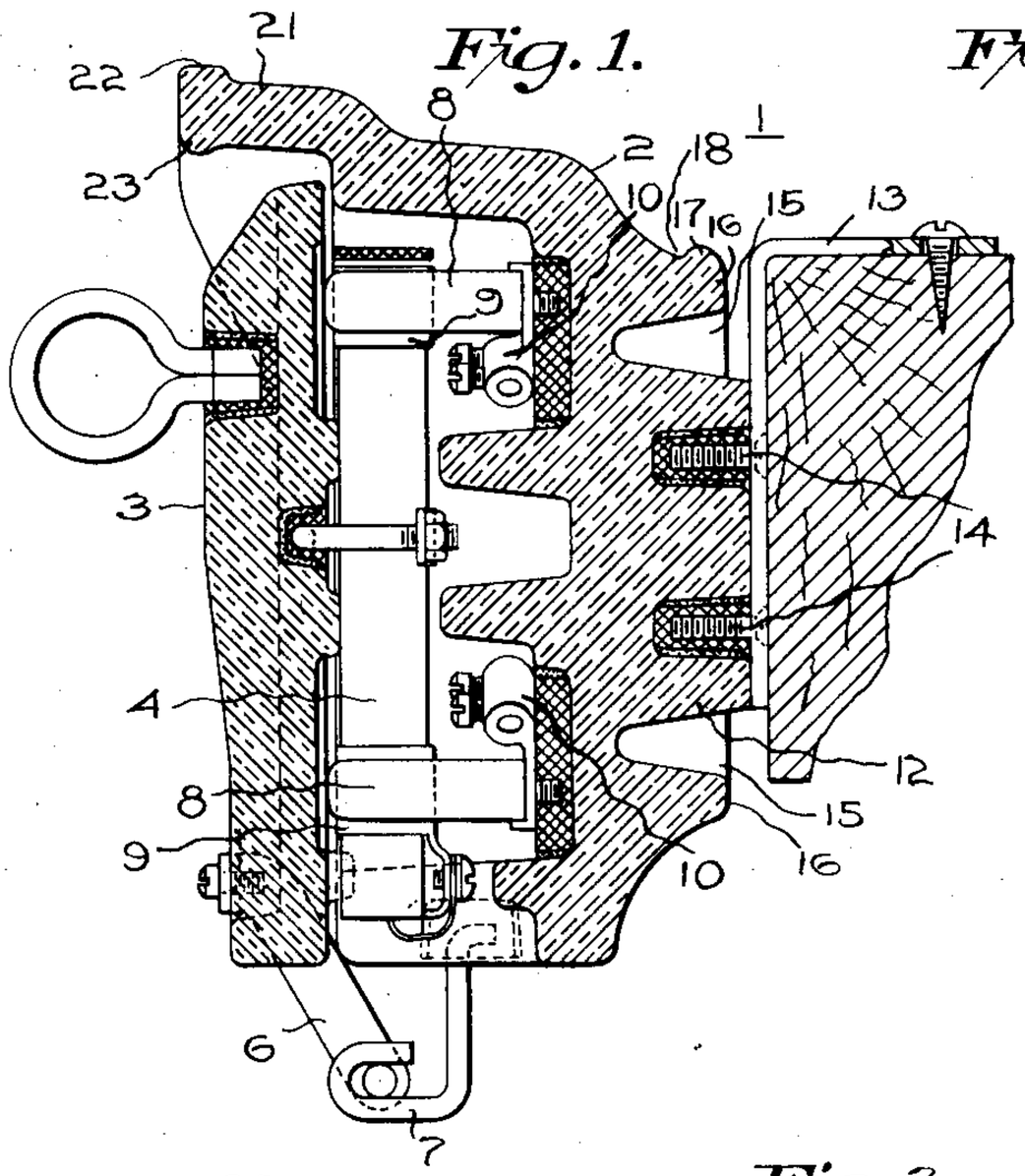

Fig. 2.

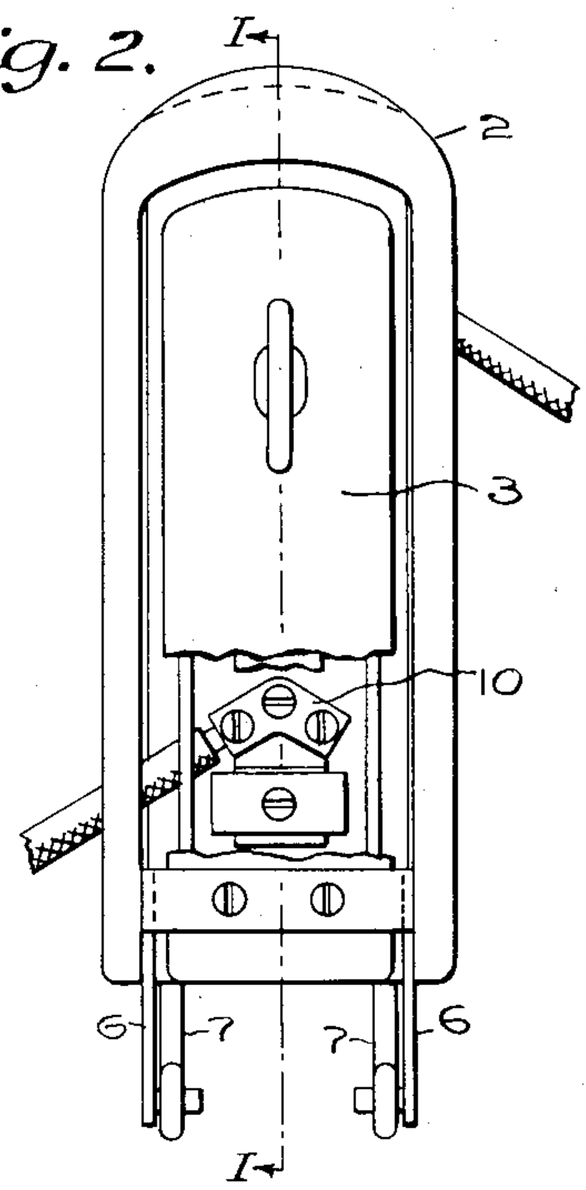

Fig. 3.

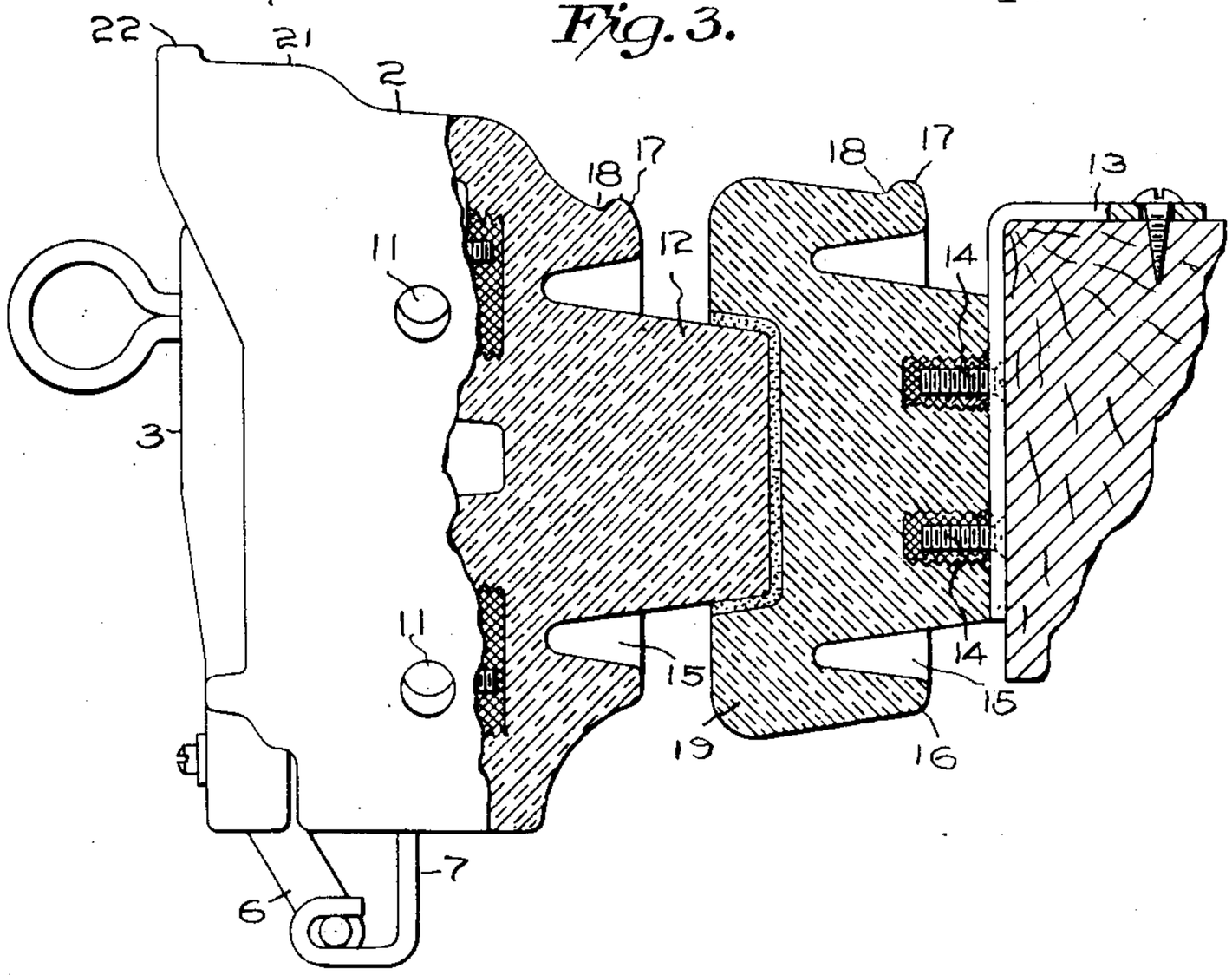

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Fig. 4.

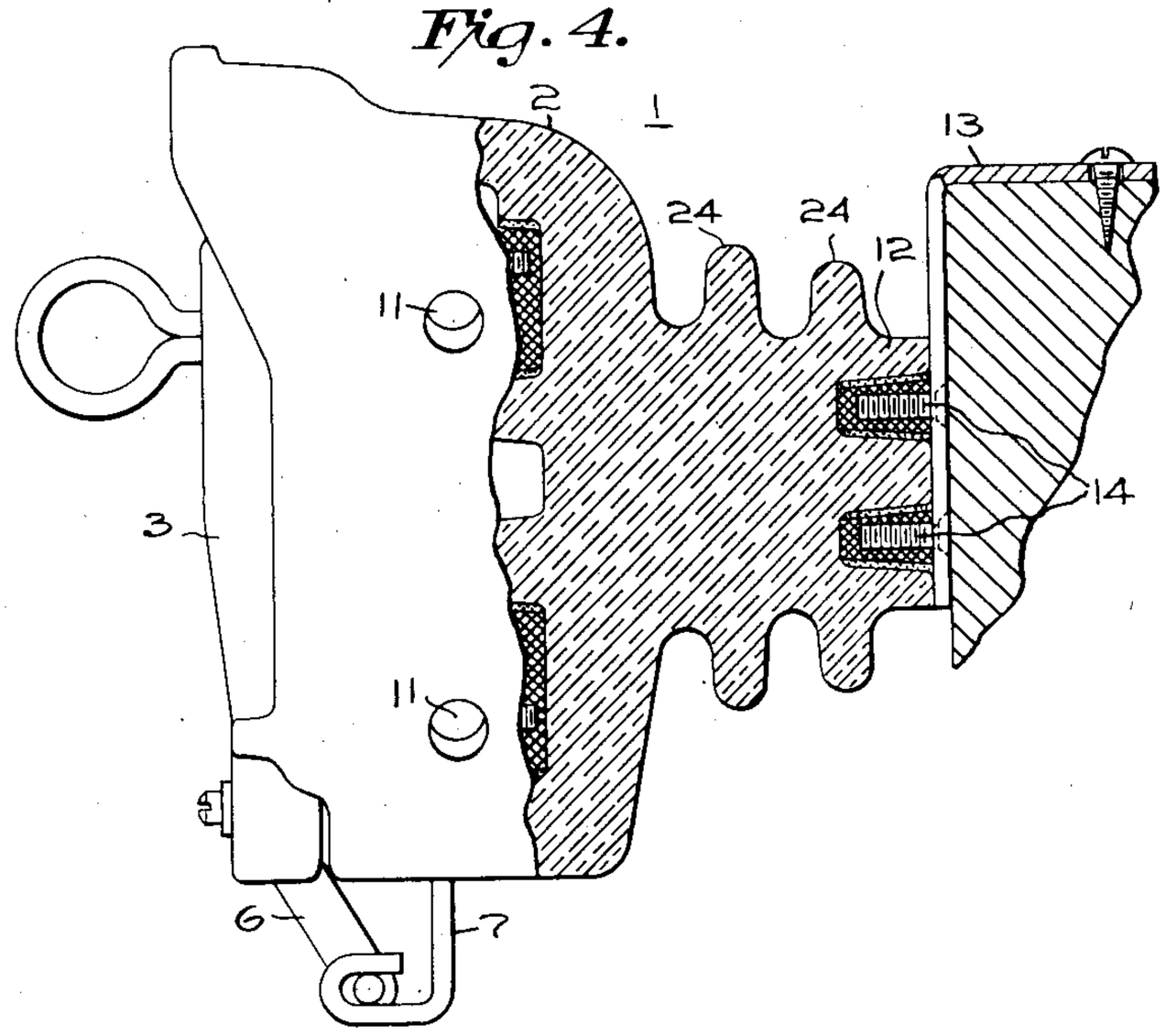
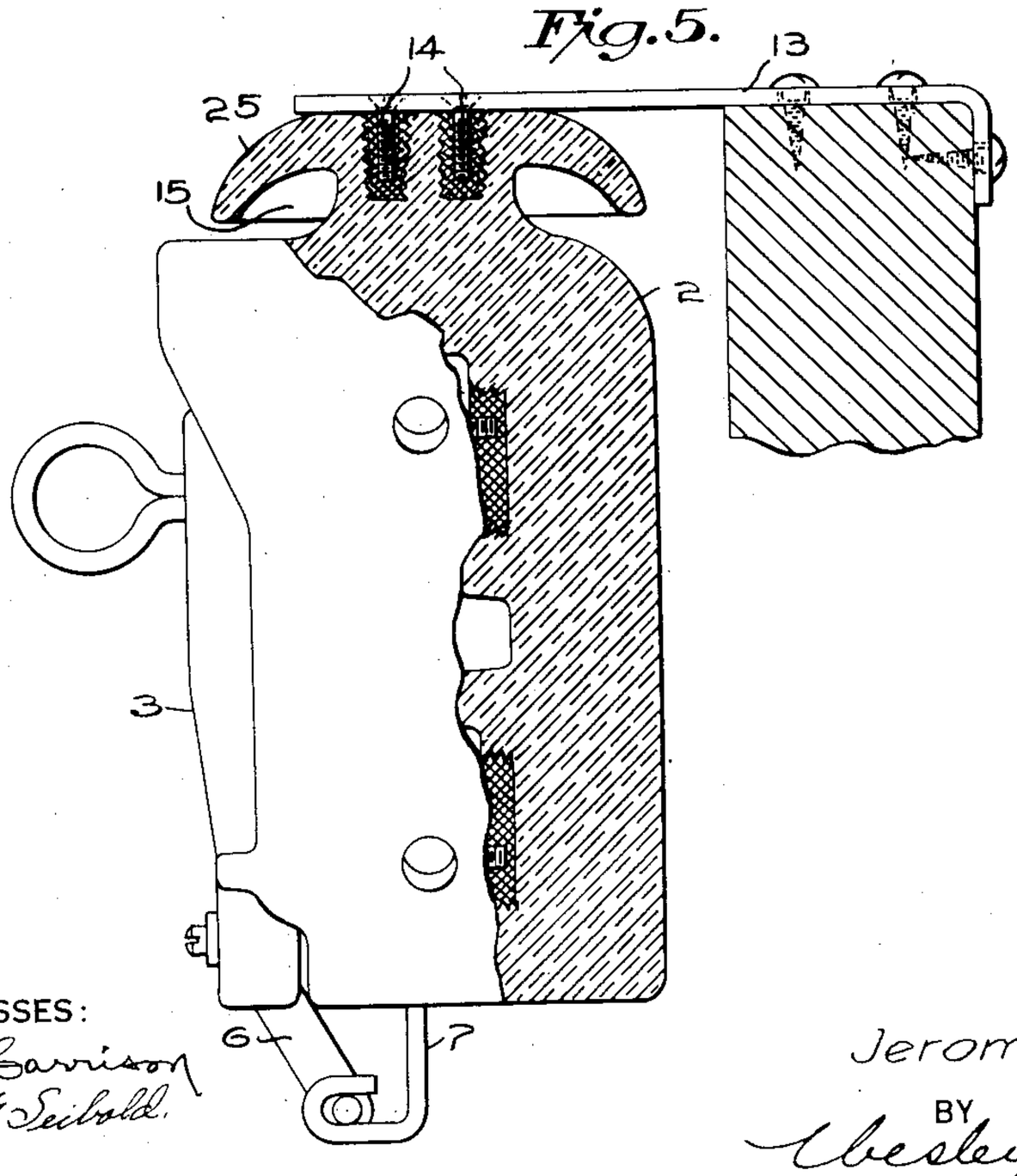


Fig. 5.



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UNITED STATES PATENT OFFICE

2,011,654

FUSE BLOCK

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Application June 18, 1927, Serial No. 199,708

16 Claims. (Cl. 200—133)

My invention relates to fuses and more especially to fuses for high-voltage services.

One object of my invention is to provide a fuse block that shall have increased creepage distance between the live parts and ground.

Another object of my invention is to provide a fuse block constructed of insulating material that shall have the characteristic of absorbing no moisture.

A further object of my invention is to provide a fuse block that shall have a cover constructed of molded glass for permitting the inspection of the interior without the removal of the said cover.

A still further object of my invention is to provide a method of drainage that shall prevent collected moisture or rain from wetting certain portions of the surface of the fuse block, thereby maintaining its effectiveness against electrical breakdown in all weather conditions.

Heretofore, fuse blocks of molded material have been limited in their voltage capacity because they were constructed of materials that absorbed moisture and because of the limited striking distance between their electrical conducting elements and parts connected to ground. In practicing my invention, I am able to increase the creepage distance between the live parts and ground by surrounding the insulating base on which the live parts are mounted with a deep groove, the outer rim of which forms an insulating skirt that protects the surfaces which it encloses from weather and dust, thereby materially increasing the creepage surface from the live parts to the support on which the fuse is mounted.

By the use of insulating materials which do not absorb moisture, such as glass or glazed porcelain, I am able to employ my fuse blocks on electric circuits of much higher voltage than has heretofore been practicable. If glass is used, it is desirable that it be a boro-silicate glass because of the ability of the latter to withstand the temperature strains met with in service. Such glass is well known and comprises substantially 80% SiO_2, 14% B_2O_3, 4% Na_2O and 1% Al_2O_3. The use of this glass has the further advantage that metal inserts made from steel, a rustless alloy comprising approximately 60% Ni, 33% Cu, 6.5% Fe and perhaps small amounts of Mn, Si and C, and the like may be molded in it, thereby eliminating the necessity of cementing or babbitting the insert in place, as is necessary in the case of porcelain. Where the cover member of the fuse block is of glass, the condition of the fuse may be determined by viewing it from the exterior of the casing without the removal of the cover, a procedure which is undesirable in the case of fuses of this type since it necessitates the opening of the electric circuit.

In referring to the drawings;

Figure 1 is a side view of a preferred form of my invention and shows the containing member and cover member in section.

Fig. 2 is a front view, in elevation, of the fuse block shown in Fig. 1.

Fig. 3 is a view of a fuse embodying my invention and shows, in section, a form of base adapted for use in higher voltages.

Fig. 4 is a side view, partly in section and partly in elevation, showing another embodiment of my invention in a fuse for higher voltage service.

Fig. 5 is a side view, partly in section and partly in elevation, showing still another form my invention may assume.

According to the drawings, the fuse block **1** comprises a base member **2** and cover **3**, both made of molded or cast insulating material. A fuse **4**, which may be of the expulsion type, is attached to the cover **3**, the two forming a unitary structure supported on a pair of arms **6** which engage a pair of hooks **7** supported on the base **2**. As will be evident from Fig. 1, the cover **3** may be entirely disengaged from the hooks **7** when so desired. The fuse terminal-clips **8** engage the fuse terminal **9** when the cover **3** is in its closed position. The line wires are connected to the electrical clips **8** through terminals **10**, as shown clearly in Fig. 2.

It is desirable that the line wires may enter the container **2** opposite the upper or lower terminals **10** at either side. This necessitates the employment of four perforations **11** in the side walls of the containing member **2**, and, to prevent the ingress of moisture or rain, these perforations are constructed with a downward slope, as shown in Figs. 2 and 3.

A mounting hub **12** that is part of the base **2** is supported on a mounting bracket **13** by screws **14**. In Fig. 1, the inserts for the screws **14** and other metal parts are shown babbitted in place as the structure therein is a design using porcelain that requires this method of retaining the inserts in position. When the base is of glass, the material is molded about the insert, and the more expensive and less desirable method of babbitting is avoided.

A channel **15** surrounds the mounting hub **12**, the outer rim of which is a skirt **16** which protects the inner surface of the said channel **15** from moisture, rain, or dust, at the same time increas-

ing the creepage surface between the conducting parts and the mounting bracket 13. To further protect the surface of the channel 15 from collected moisture and rain, by preventing it from draining therein, a raised portion 17 is provided about a greater part of the circumference of the edge of the skirt 16, thereby forming the trough 18. This directs the water or collected moisture that runs off the sides or top of the base 2 down along the side of the edge of the skirt 16 and keeps the channel 15 dry, thereby retaining its effective resistance to flashover.

If still higher voltage protection is desired, an additional or a plurality of additional insulating skirt members 19 may be provided as shown in Fig. 3. The skirt members 19 have a raised portion 17 forming a trough 18 similar to that on the skirt 16 of the containing member 2 as described above. I can thus obtain protection for my fuse block 1 against flashover for any voltage, however large, by the addition of extra skirt members 19.

The skirt member 19 is of a width greater than that of the skirt 16 and adds further protection to the open portion of the channel 15 against moisture and dirt.

Further protection against moisture is obtained in my design of fuse by providing the upper front portion of the base 2 with a hood 21 that projects beyond the cover 3 and that runs part way down along its sides. The hood 21 is provided also with raised portions 22 and 23 to prevent collected moisture and rain from running across the under surface of the hood 21 into the inner recess of the container 2.

Other methods for obtaining greater creepage distance over the surface of the fuse block 1 between the live parts and ground are shown in Figs. 4 and 5. In Fig. 4, a series of ribs 24 are formed on the mounting hub 12 increasing the creepage distance along the surface thereof to ground. In Fig. 5, a skirted projection 25 is shown on the top of the container 2 and this is the means for supporting the entire unit. This exemplifies the different methods of support that may be employed in constructing my fuse block to meet the different field conditions, at the same time retaining the high flashover qualities of the modifications previously described.

It will thus be observed that I have provided a fuse block that may be employed in a circuit of exceptionally high voltage due to its design and to the use of non-porous moisture-proof materials in its construction. The design assures the greatest protection against moisture and provides a maximum flashover protection to ground. The materials employed are non-porous, providing a moisture proof insulating member for the support of the live parts, and, by constructing the cover member of a transparent substance, the interior containing the fuse may be observed without the necessity of opening the cover and, thereby, the circuit, as has been the practice heretofore.

It will be recognized that, while I have described a fuse block in which both the base and the cover are of glass, I contemplate also a structure in which only one of these members shall be of that material.

While I have shown and described a particular form of my invention, changes may be effected therein without departing from the spirit and scope thereof as set forth in the appended claims.

I claim as my invention:

1. A fuse block and cover of non-absorptive insulating material, said fuse block having inserts in a mounting hub providing a support therefor, an annular channel about the mounting hub, the outer wall formed thereby constituting an insulating skirt extending over the mounting hub thereby increasing the creepage distance along the surface of the fuse block between live parts and ground.

2. A fuse box of glass having a door opening in one side thereof and a channel about a mounting hub therefor, the outer wall of said channel constituting an insulating skirt protecting the surface of the mounting hub and increasing the creepage distance along the surface of the fuse block from live parts to ground.

3. A fuse box of insulating material having a door opening in one side thereof and a vitrified surface, mounting means on the side thereof opposite said door and a channel about said mounting means for said box, the outer wall of said channel constituting insulating means for protecting the mounting means and a second insulating member in fixed relation to the mounting means for increasing the creepage distance to ground.

4. A fuse block of non-absorptive material having a mounting member integral therewith for supporting the block, a cover for said block of glass, an annular channel about the mounting member the outer wall of said channel constituting an insulating skirt for increasing the surface of the mounting member.

5. A fuse box including terminals adapted to support a fuse, said fuse box being of boro-silicate glass molded about said terminals and having top, side and rear walls enclosing said terminals.

6. A fuse block having an annular channel in one face thereof the central portion forming a mounting member for supporting the block, the outer walls of said channel constituting an insulating skirt extending over the central portion, and means on the insulating skirt forming a trough for draining collected moisture therefrom.

7. The combination with a fuse block, of mounting means therefore, a skirt about the mounting means for increasing the creepage surface thereof, and a raised portion about the edge of the skirt forming a trough.

8. A fuse block of insulating material having terminal members adapted to be connected to a circuit, terminals for a fuse associated with the said circuit terminals, a mounting member for the block protruding from a portion thereof and a skirt of the same material forming by extending the sides of the block over the mounting member.

9. A fuse block having terminals adapted to support a fuse, a mounting hub formed by a channed in a face of the block for its support, a shield for the hub formed by the outer portion of the channel and a projection on the outer surface of the shield forming a trough.

10. In a box for a circuit interrupter, rear, top, and side walls of vitreous insulating material, a door opening in the front of said box and a hinged door therefore, electrical terminal members mounted within said box, openings in said side walls for receiving conductors extending to said terminal members, mounting means for said box secured to the rear wall, and a channel extending adjacent the junction of said rear wall with said top and side walls for increasing the electrical creepage distance along the surface of the box between said conductor receiving openings and said mounting means.

11. In a box for a circuit interrupter, rear, top

and side walls of vitreous insulating material, a door opening in the front of said box, electrical terminal members mounted within said box, openings in said side walls for receiving conductors extending to said terminal members, a mounting hub of insulating material projecting rearwardly from said rear wall, and one or more mounting studs inserted in the rear end of said hub adjacent the center thereof and means for increasing the electrical creepage distance between said conductor receiving openings and said mounting studs.

12. In a box for a circuit interrupter, rear, top, and side walls of vitreous insulating material, a door opening in the front of said box, a hinged door for closing said opening in the front of the box, electrical terminal members mounted within said box, openings in said side walls for receiving conductors extending to said terminal members, mounting means for said box secured to the rear wall thereof, and a projecting fin extending along the box adjacent the juncture of said rear and side walls between and spaced from said conductor receiving openings and said mounting means for increasing the electrical creepage distance along the surface of the box therebetween.

13. In a box for a circuit interrupter, rear, top, and side walls of vitreous insulating material, a door opening in the front of said box and a hinged door therefore, electrical terminal members mounted within said box, openings in said side walls for receiving conductors extending to said terminal members, mounting means for said box secured to the rear wall, and an integral projecting ridge extending along the box adjacent the junction of said rear wall with both said top and side walls for increasing the electrical creepage distance along the surface of the box between said conductor receiving openings and said mounting means.

14. In a box for a circuit interrupter, rear, top, and side walls of vitreous insulating material, a door opening in the front of said box and a hinged door therefore, an upper and a lower electrical terminal member mounted within the box, upper and lower openings in each side wall of the box through which conductors may be extended to said terminal members, mounting means for the box secured to the rear wall thereof, a projecting ridge extending along the major part of the length of the walls of the box adjacent each side thereof between said mounting means and both said upper and said lower openings for increasing the electrical creepage distance between said mounting means and both of said openings.

15. The combination with an insulating fuse housing having a support-engaging portion on its rear walls surrounded by a groove for increasing the creeping surface between the outer side walls of the housing and the support, of a bead extending along the top and side walls of the housing adjacent the rear wall for deflecting water away from the said groove.

16. The combination with an insulating fuse housing having rear, top and side walls, a door opening in the front of said housing and a hinged door for closing said opening, supporting means for the housing secured to the rear wall thereof, and means for increasing the creepage distance between the outer side walls of the housing and the supporting means including a bead extending along the top and side walls of the housing adjacent the rear wall for deflecting water away from the rear wall.

JEROME SANDIN.