Jan. 28, 1947. E. W. RICKMEYER 2,414,897

ELECTRODE ATTACHMENT

Filed Oct. 26, 1945

Fig. 1

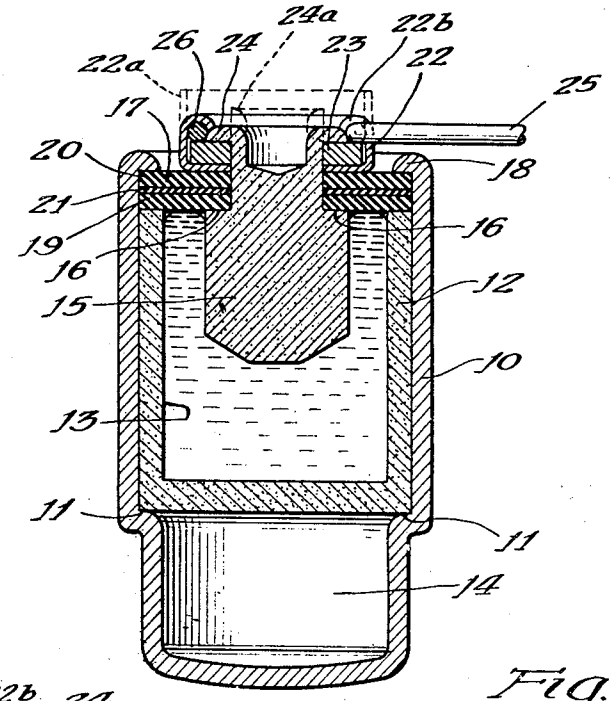


Fig. 3.

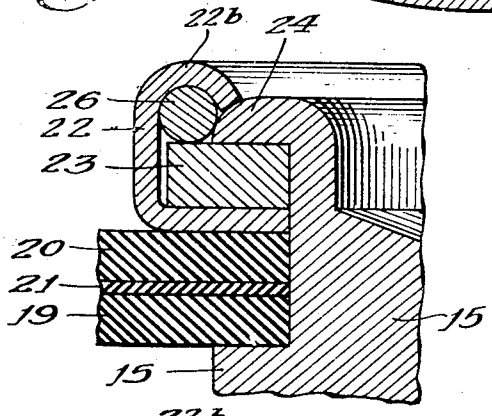
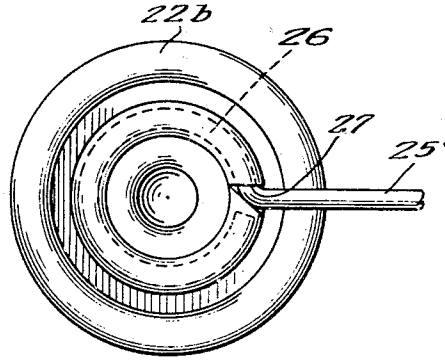


Fig. 2.



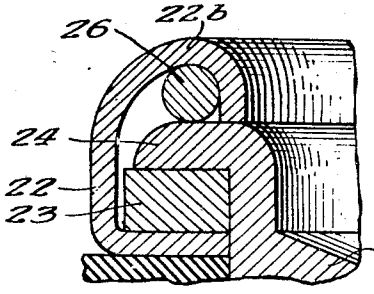


Fig. 4.

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UNITED STATES PATENT OFFICE

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ELECTRODE ATTACHMENT

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8 Claims. (Cl. 200—152)

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The present invention relates to a novel terminal wire connection to a center contact member of a mercury switch.

In this type of switch an envelope or shell is provided with two chambers separated by a partition or dividing wall that is provided with a passage or passages through which mercury is allowed to flow in moving from one chamber to the other. The rate of flow through this dividing wall is controlled so as to provide a definite predetermined time delay in the operation of the switch. While the mercury is disposed in one of the chambers, it bridges or closes an electrical circuit through the switch. As the mercury flows through the dividing wall into the second chamber, the electrical circuit through the switch is broken after a predetermined amount of mercury has left the first chamber. One of the electrical elements making up the circuit through the mercury switch is a center contact member or electrode that passes through the wall of the switch envelope or shell and projects into the mercury that is disposed in the first chamber. The wall of the shell or switch envelope may constitute the other electrical contact so that the mercury in the first chamber may serve as the electrical connection between the center contact member and the shell wall. In this instance the center contact member must be insulated from the envelope in all respects except through the mercury. Such a mercury switch is placed in an electrical circuit by attaching a terminal wire to the central contact member and a second terminal wire to the switch envelope. The present invention is concerned with the attachment of the terminal wire to the center contact member. It is an object of the invention to provide such a connection that makes good electrical contact with the center electrode so as to provide very low resistance to the flow of electrical current from the terminal wire to the center contact member. It is intended that this be accomplished in a relatively simple manner and in a manner that is readily adaptable to mass production. Ease of assembly is an advantage of the present invention and the connection thus produced assures a completely assembled switch that is well sealed.

The foregoing constitutes some of the principal objects and advantages of the present invention others of which will become apparent from the following description and the drawing, in which

Fig. 1 is a vertical sectional view taken through a completely assembled mercury switch embodying the present invention;

Fig. 2 is a top plan view of the mercury switch shown in Fig. 1;

Fig. 3 is an enlarged fragmentary sectional view showing one embodiment of the invention wherein the terminal wire is disposed adjacent

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to one side of the crimped over portion of the center contact; and

Fig. 4 is a view corresponding to Fig. 3 but showing a modified form of the invention.

For purposes of illustration, two embodiments of the invention are shown and will be described. It is recognized, however, that many modifications may be made in these embodiments without departing from the intended scope of the invention.

Referring to the drawing the invention is shown embodied in a mercury switch that comprises a switch envelope or shell 10 that is of more or less uniform diameter throughout its upper portion and has a smaller diameter at its lower portion so as to provide a shoulder indicated at 11. A cup 12 is adapted to rest on this shoulder 11 and the bottom of this cup forms a dividing wall or partition separating the shell 10 into two chambers 13 and 14. This cup 12 may be made of sintered metal particles of nickel or like material so that the voids between the particles will provide passages through which mercury and air may pass.

As shown in Fig. 1 the cup 12 terminates below the upper end of the shell 10. A center contact member 15 projects through the open end of the shell 10 into the chamber 13. This contact member 15 is provided with a shoulder portion 16 and sealing members generally indicated at 17 are mounted concentrically around the center contact member 15 and are adapted to rest on the upper edge of the cup 12. The shell 10 is crimped over onto the insulating members 17 as shown at 18.

For purposes of illustration, the sealing member 17 comprises a pair of washers 19 and 20 of Bakelite having sandwiched therebetween a rubber gasket 21. The crimped over portion 18 of the shell 10 firmly holds the sealing elements 16 against the top of cup 12 to form an effective seal.

Mounted on top of the sealing members 17 is a copper cup 22 that is disposed concentrically about the center contact member 15 and initially projects upwardly as indicated by the broken lines 22a. A metal washer 23 of good electrical conductivity is dropped into the bottom of the copper cup 22 over the upstanding end indicated at broken lines at 24a of the center contact member 15. The end 24a of the center contact member 15 is then crimped over as shown in solid lines at 24 firmly against the metal washer 23. It is to be noted that the length of the crimped over portion 24 of center contact member 15 is such that it lies within the vertical projection of the shoulder 16.

Referring to Fig. 2 it can be seen that the terminal wire 25 is provided at its free end with a loop 26. Referring to Figs. 1 and 3 this looped

portion 26 of the terminal wire 25 is placed in the copper cup 22 on top of the metal washer 23. The wall of the copper cup 22 is notched as shown at 27 in Fig. 2 to permit the terminal wire 25 to pass through the wall of the copper cup. The upstanding walls 22a of the copper cup 22 are now crimped over as shown in solid lines at 22b at Fig. 1 to hold the looped portion 26 of the terminal wire 25 firmly against the metal wire 23 and preferably against the crimped over portion 24 of center contact member 15.

A modified form of the invention is illustrated in Fig. 3 where the looped portion 26 of the terminal wire 25 is disposed on top of the crimped over portion 24 of center contact member 15 and in this instance the crimped over portion 22b of copper cup 22 holds a terminal wire firmly against the looped over portion 24 of the center contact member.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a mercury switch having a switch envelope open at one end, a central contact member projecting into the envelope through the open end, a closure for said open end including means electrically insulating the contact member from the envelope walls, an electrical conducting cup mounted on top of the closure and electrically engaging the contact member, a terminal wire looped in said cup and projecting outwardly thereof, the top of the central contact member being crimped over so as to rigidly hold the cup against the top closure of the envelope, and the top of the cup being crimped over the looped terminal wire to firmly secure the wire in place.

2. In a mercury switch having a switch envelope open at one end, a central contact member projecting into the envelope through the open end, a closure for said open end including means electrically insulating the contact member from the envelope walls, an electrical conducting cup mounted on top of the closure and electrically engaging the contact member, the top of the central contact member being crimped over so as to rigidly hold the cup against the top closure of the envelope, a terminal wire looped in said cup and in electrical contact with the crimped over portion of the central contact member, and the top of the cup being crimped over the looped terminal wire to firmly secure the wire in place.

3. In a mercury switch having a switch envelope open at one end, a central contact member projecting into the envelope through the open end, a closure for said open end including means electrically insulating the contact member from the envelope walls, an electrical conducting cup mounted on top of the closure and electrically engaging the contact member, the top of the central contact member being crimped over so as to rigidly hold the cup against the top closure of the envelope, a terminal wire looped in said cup and disposed adjacent to the crimped over portion of the central contact member and the top of the cup being crimped over the looped terminal wire to firmly secure the wire in place.

4. In a mercury switch having a switch envelope open at one end, a central contact member projecting into the envelope through the open end, a closure for said open end including means electrically insulating the contact member from the envelope walls, an electrical conducting cup mounted on top of the closure and electrically

engaging the contact member, the top of the central contact member being crimped over so as to rigidly hold the cup against the top closure of the envelope, a terminal wire looped in said cup and disposed on top of the crimped over portion of the central contact member, and the top of the cup being crimped over the looped terminal wire to firmly secure the wire in place.

5. In a mercury switch having a switch envelope open at one end, a central contact member projecting into the envelope through the open end, a closure for said open end including means electrically insulating the contact member from the envelope walls, an electrical conducting cup mounted on top of the closure and electrically engaging the contact member, the top of the central contact member being crimped over so as to rigidly hold the cup against the top closure of the envelope, a terminal wire projecting into said cup and disposed adjacent to the crimped over portion of the central contact member, and the top of the cup being crimped over the looped terminal wire to firmly secure the wire in place.

6. In a mercury switch having a switch envelope open at one end, a central contact member projecting into the envelope through the open end, a closure for said open end including means electrically insulating the contact member from the envelope walls, an electrical conducting cup mounted on top of the closure and electrically engaging the contact member, the top of the central contact member being crimped over so as to rigidly hold the cup against the top closure of the envelope, a terminal wire projecting into said cup and disposed on top of the crimped over portion of the central contact member, and the top of the cup being crimped over the looped terminal wire to firmly secure the wire in place.

7. In a mercury switch having a switch envelope open at one end, a central contact member projecting into the envelope through the open end, a closure for said open end including means electrically insulating the contact member from the envelope walls, an electrical conducting cup mounted on top of the closure and electrically engaging the contact member, means at the bottom of the cup on the inside thereof providing a relatively large surface contact with the central contact member, the top of the central contact member being crimped over against said means, a terminal wire disposed on said means and adjacent to the crimped over portion of the central contact member, and the top of the cup being crimped over the terminal wire.

8. In a mercury switch having a switch envelope open at one end, a central contact member projecting into the envelope through the open end, a closure for said open end including means electrically insulating the contact member from the envelope walls, an electrical conducting cup mounted on top of the closure and electrically engaging the contact member, a metallic washer at the bottom of the cup, a terminal wire disposed in the cup against the washer and projecting outwardly thereof, the top of the central contact member being crimped over so as to rigidly hold the cup against the top closure of the envelope, and the top of the cup being crimped over the looped terminal wire to firmly secure the wire in place.

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