Dec. 24, 1940. W. S. BRIAN 2,225,970

CIRCUIT INTERRUPTER

Filed Dec. 15, 1938

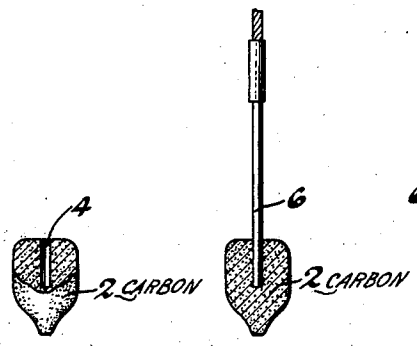


Fig. 1

Fig. 2

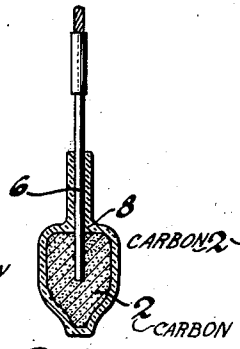


Fig. 3

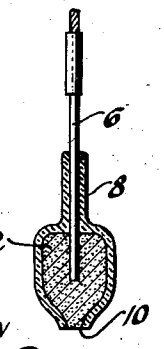


Fig. 4

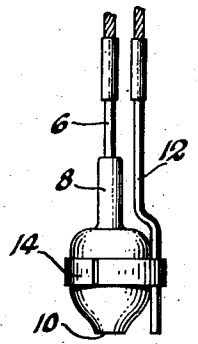


Fig. 5

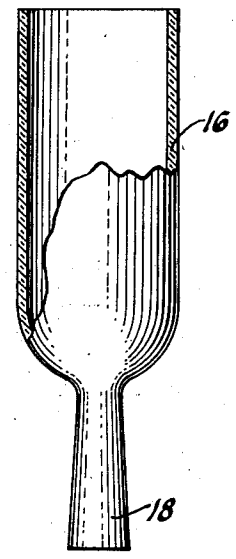


Fig. 6

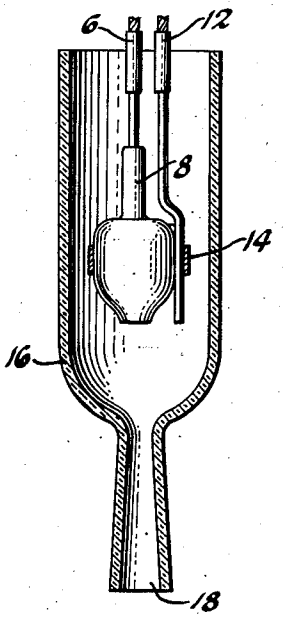


Fig. 7

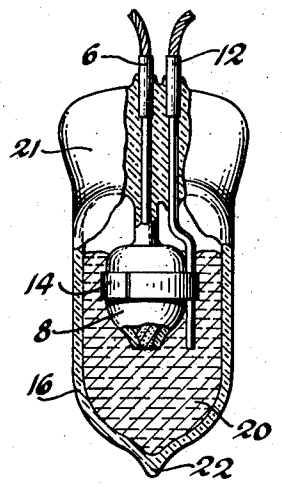


Fig. 8

Inventor

William S. Brian

By Blackmore, Spencer & Flint

Attorneys

Patented Dec. 24, 1940

2,225,970

UNITED STATES PATENT OFFICE

2,225,970

CIRCUIT INTERRUPTER

William S. Brian, Owensboro, Ky., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application December 15, 1938, Serial No. 245,867

6 Claims. (Cl. 200—113)

This invention relates to mercury circuit interrupters and more particularly to a method of making such a circuit interrupter as that disclosed in my copending application Serial No. 241,384 entitled Mercury interrupter and filed November 19, 1938.

As fully described in my above mentioned copending application, it is often necessary to provide some means for automatically interrupting a direct current so that the voltage may be changed or altered from one potential to another, depending upon the voltage which it is desired to obtain for operation of a particular device. After considerable experimentation some designs which were practical were evolved, these designs being described in my copending application.

It is an object of this invention therefore to provide the necessary steps in the method of manufacturing such a design or construction as is shown in my copending case.

It is a further object of my invention to provide a simple and efficient method of manufacture.

With the above and other objects in view which will become apparent as the specification progresses, my invention will best be understood by reference to the following specification and claims and illustrations of the accompanying drawing, in which:

Figures 1–8 inclusive illustrate the various steps in the assembly of a mercury circuit interrupter as described.

It will be recalled that the basic feature of the operation of these devices is that there shall be in contact with a pool of mercury within an enclosure a definite area of a material having a higher resistance to the passage of current than mercury and that these two members shall be in series in the electrical circuit which it is desired to autonomically break. There is here illustrated the use of carbon as the member having a higher degree of resistivity to the passage of current than mercury but it should be understood that this is merely illustrative of my materials and I do not wish to be limited to its use. Furthermore, the encircling glass envelope which is used as an insulator is also only one of a plurality of substances which may be used and I do not wish to be limited in this case either to only glass as any other insulating material will be satisfactory.

In the process of manufacturing this tube the first step is to form a small button of carbon, such as that shown in Figure 1 at 2, of the general outline shown therein having a hole 4 drilled therein into which is staked an electrode 6 as shown in Figure 2. The assembly of electrode and contact 2 is then inserted within a hollow glass rod, suction being applied to one end of the hollow rod, and the latter heated and formed around to form a glass coating under vacuum such as shown at 8 in Figure 3. It is to be noted that the evacuated glass entirely surrounds and covers the carbon member 2 and the next step is to grind off the lower surface or tip, such as shown at 10 in Figure 4, to remove the glass insulation and to expose a certain predetermined area of the tip 2.

Following this the assembly so far manufactured has supported in juxtaposition thereto a second electrode 12 by a band 14 as shown but it may be held in place by any desired means. There is then molded a larger outer insulating shell 16 within which this assembly can be placed, its location being best illustrated at Figure 7 and the steps being, first, the assembly of electrodes is placed in the larger end of the glass vessel 16, the upper end is then heated and pressed together to seal the electrodes mechanically as shown at 21, the vessel 16 is evacuated by suction applied to the lower end of the tube 18 following which the open end is placed in contact with a body of mercury and mercury 20 is allowed to flow in through this same tube to a certain predetermined height and, lastly, the tube is sealed off as shown at 22 to provide a totally enclosed body of mercury in which the two electrodes are immersed, the completed design being shown in Figure 8.

I claim:

1. In a manufacturing process wherein it is desired to provide a conductive member with only a minute area exposed and the remainder enclosed within an insulating medium, the steps of first totally encasing a conductive member in insulating medium and secondly removing a small portion of the insulating medium to expose the predetermined area.

2. In a manufacturing process wherein it is desired to provide a conductive member with only a minute area exposed and the remainder enclosed within an insulating media, the steps of totally enclosing a conductive member in glass and secondly grinding off a small portion of the glass to expose a predetermined area.

3. In a manufacturing process wherein it is desired to provide a minute area of carbon surface exposed and enclose the remainder in insulating media, the steps of first totally enclosing a block of carbon in glass and secondly grinding off a small portion of the glass coating to expose the carbon over a predetermined area.

4. The method of manufacturing an electrode comprising staking a lead to a conductive body, totally encasing the body and a portion of the lead with insulating media and then removing a small portion of the insulating material to expose a predetermined area of the conductive body.

5. In a manufacturing process wherein it is desired to provide a conductive member with only a minute area exposed and the remainder enclosed within an insulating medium, the steps of placing a conductive member within a hollow insulating shell, exhausting the air from within the shell and at the same time heating the shell to a plastic state whereby it is drawn in to conform to the outer surface of the conductive member to totally encase the same and then removing a small portion of the insulating material.

6. In a manufacturing process wherein it is desired to provide a conductive member with only a minute area exposed and the remainder enclosed within an insulating medium, the steps of placing a carbon block within a glass shell, exhausting the air from the glass shell and heating the same to a plastic state whereby the glass is drawn in tightly around the carbon to totally encase the same and then grinding off a portion to expose a predetermined area of carbon.

WILLIAM S. BRIAN.