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J. F. EBERT

2,347,815

CONTACT TERMINAL STRUCTURE

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Fig. 1

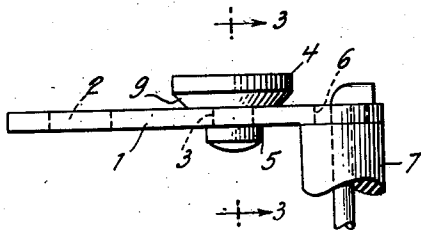


Fig. 3

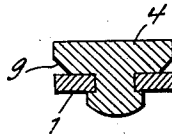


Fig. 2

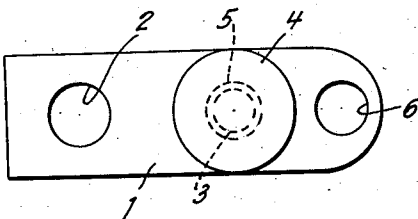


Fig. 4

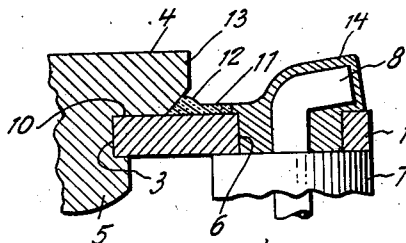
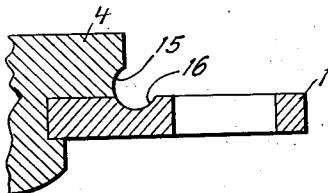


Fig. 5



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CONTACT TERMINAL STRUCTURE

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3 Claims. (Cl. 200—166)

This invention is directed to contact terminal structures particularly adapted for use in various electrical apparatus such as relays.

It has been customary in making contact terminals to provide a metallic member on which is formed, or to which is secured, a suitable contact face adapted to make contact with another member for the transmission of current. It has also been customary to secure to the contact terminal a lead-in wire which carries the current to or from a suitable source through the terminal and the contact to complete the circuit. Such lead-in wires were secured to the terminal by soldering, welding, or the like. It has been necessary in this operation to provide a soldering flux, or the like, to prepare the metal surfaces for the soldering or similar operation.

Unless one took great care in the operation, the flux when contacted by hot solder or a hot soldering iron would flow into contact with the contact button, and by capillary action, would rise and cover the contact face. This, of course, injured the contact area and prevented the full flow of current across the contacts. Therefore, it was necessary to clean the contact faces of the terminals which required delicate operations in order to remove the flux without injuring the contact faces.

In the case of small size and delicate relays, the problem was substantially accentuated. It became still more difficult to prevent the free flow of flux and consequently, the operation of soldering lead-in wires became quite a troublesome one.

The present invention is designed to overcome this difficulty and to provide a contact terminal structure wherein the flow of liquid flux will be incapable of affecting the contact faces thereof.

It is also an object of the present invention to provide a structure wherein flux may be allowed to flow freely without taking any unusual precautions, while at the same time, avoiding the danger of dirtying the contact faces.

In practicing the present invention there is provided a terminal member, as usual, having means for securing the same to a suitable insulating support and also having means for attaching a lead-in wire thereto. A contact button is provided, but the structure thereof is such that the meeting faces of the button and terminal define an area which is less than the area of the contact face itself. Also, the dimensions of the contact area are less than the dimensions of the contact face. By reason thereof, there is an undercut portion at the meeting faces which acts as a trap for liquid flux as it flows on the surface

of the terminal. The undercut portion is usually in the contact button itself, but may be in the face of the terminal or partly in each. The shape of the undercut portion is usually an acute angle, but it may be of any other desired form.

The essential feature of the structure is that there is a sufficient amount of undercut and the undercut is of such shape that it prevents the raising of liquid from the terminal base by capillary action, and thus prevents the dirtying of the contact face of the button. By reason of the re-entrant angle, when liquid flux enters into the undercut portion, surface tension is set up, forming a meniscus, which exerts a sufficient force to hold the flux within the undercut portion.

In the accompanying drawing constituting a part hereof and in which like reference characters indicate like parts:

Fig. 1 is a side elevational view of a contact terminal structure embodying the present invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is a vertical cross-sectional view taken along the line 3—3 of Fig. 1 and showing more specifically the contact faces of terminal and base;

Fig. 4 is a fragmentary enlarged longitudinal cross-sectional view showing liquid flux and the manner in which it is prevented from rising to the contact face; and

Fig. 5 is a similar view of a modified form.

The terminal base 1 consists in the embodiment shown, of a flat strip of metal having an opening 2 at one end thereof for the introduction of a screw to hold the base to an insulating member. An opening 3 at a central portion of base 1 receives the shank of a contact button 4, the upper face of which is flat and is adapted to cooperate with a similar button on a contact arm (not shown). The opposite end 5 of the shank is upset to anchor the contact button 4 permanently on base 1.

At the opposite end of base 1 is an opening 6 through which a lead-in wire 7 is adapted to be inserted, the free end 8 of said wire being bent over to hold it temporarily in position. The face opposite the contact face of button 4 is undercut as shown at 9 to form a re-entrant angle. The undercut as seen from the several figures, is circumferential and is formed completely around button 4. This provides a face 10 in contact with base 1, the face 10 being of substantially less area than the contact face of the button.

In the operation of attaching a lead-in wire,

the parts are placed in the position shown in Fig. 4, flux is placed on end 8 of wire 7 and on the adjacent parts to be joined. During the soldering operation the flux is heated by the solder or soldering iron and some of it tends to flow along the surface of the terminal toward the contact 4 and enters the undercut 9 as indicated at 11 in Fig. 4. By reason of surface tension, the flux is held within the re-entrant angle and forms a meniscus 12, the surface tension of which is so great as to prevent any liquid from creeping up the side 13 of button 4, and thus keeps the contact face thereof clean. As a result of the soldering operation, the wire 8 is firmly attached to the terminal 1 by the body of solder 14.

Although I have described my invention, setting forth a single embodiment thereof, it will be apparent to those skilled in the art that various changes in the details of construction may be made within the scope of the invention. For instance, the terminal base may be of any size or shape or of any material desired. Contact button 4 need not be circular in outline, but may be of any desired shape, and the contact face thereof need not necessarily be perfectly flat. The re-entrant angle 9 has been shown as an acute angle, but such re-entrant portion need not be made on straight lines, as curved surfaces will also accomplish the desired result. It is also unnecessary to have a side 13 at right angles to the contact face, as the entire side portion of button 4 may be undercut. Also, the re-entrant portion may be formed by a groove or other depression in base 1, or by a combination of groove and re-entrant portion on the button. These and other changes may be made in the

details of construction within the spirit of the invention, and the invention is therefore to be broadly construed and not to be limited except by the claims appended hereto.

What I claim is:

1. A contact terminal structure for electrical apparatus comprising a terminal base, a contact button secured to said base, the contact face of said button being spaced from said base, the opposite face of said button contacting with said base, a lead-in wire soldered to said terminal base, and an undercut at the area of contact sufficient to prevent the raising of liquid from said base by capillary action to said contact face.

2. A contact terminal structure for electrical apparatus comprising a terminal base, a contact button secured to said base, the contact face of said button being spaced from said base, the opposite face of said button contacting with said base, and an undercut formed in both of the meeting faces of said button and base at the area of contact sufficient to prevent the raising of liquid from said base by capillary action to said contact face.

3. A contact terminal structure for electrical apparatus comprising a terminal base, a contact button secured to said base, the contact face of said button being spaced from said base, the opposite face of said button contacting with said base, and an undercut in the form of a groove in said base surrounding said button at the area of contact sufficient to prevent the raising of liquid from said base by capillary action to said contact face.

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