Oct. 13, 1964 S. T. DEAKIN 3,152,849

ELECTRIC SOCKET CONTACTS AND ELECTRIC-CIRCUIT SELECTORS USING SUCH CONTACTS

Filed Jan. 11, 1962

Fig. 1.

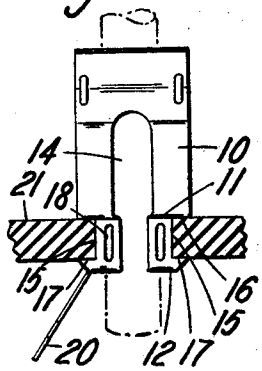


Fig. 2.

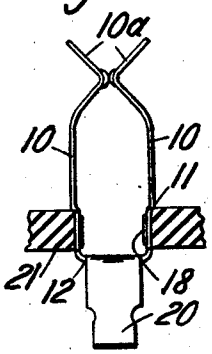


Fig. 6.

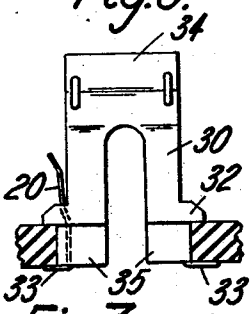


Fig. 3.

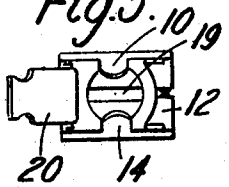


Fig. 5.

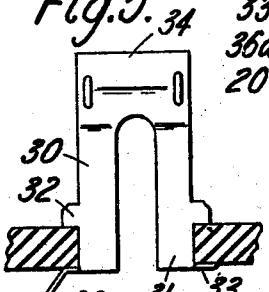


Fig. 7.

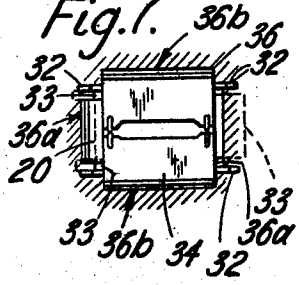


Fig. 4.

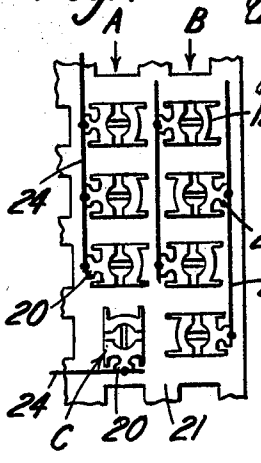
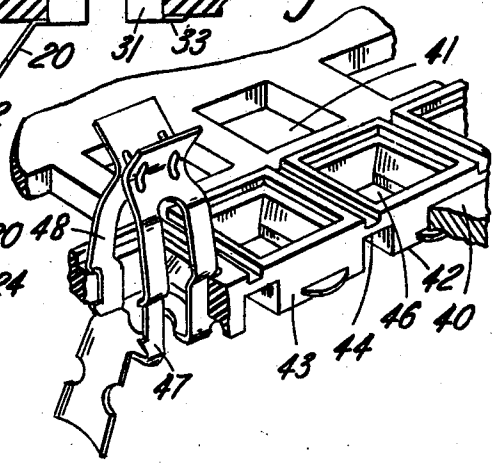


Fig. 8.



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ELECTRIC SOCKET CONTACTS AND ELECTRIC-CIRCUIT SELECTORS USING SUCH CONTACTS

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9 Claims. (Cl. 339—18)

The invention relates to electric socket contacts which are particularly suited for use in electric-circuit selectors of the following kind although the invention is not restricted to this use of the contacts.

The kind of electric-circuit selector is that having at least two sets of socket contacts arranged in substantially parallel rows, the rows of one set of contacts overlying and crossing the rows of the other set with the sockets of the two sets aligned in pairs one over the other at the positions of intersection of the rows and at least one of the sockets of each pair being formed as a throughway whereby selected socket contacts of one set may be electrically connected with the socket contacts of the other set which are aligned therewith, by the insertion of connecting pins through the socket contacts with throughways into the contacts aligned therewith. The contacts, or some of them, in each row or at least some of the rows, may be electrically connected together and have a common means of connection to an external circuit. One construction of such a selector and its mode of use are described in U.S. Patent No. 3,027,534, issued March 27, 1962, to Deakin.

The invention provides an electric socket contact comprising a resilient strip of metal bent to U-form for reception between the arms of the U of a contact pin, the arms being resiliently movable away from one another to provide contact pressure on the pin, and having a slot which extends across the base of the U and up into the lower parts of the arms whereby the base and lower arm parts are divided into two portions which may be resiliently compressed together and then re-separate, in a direction perpendicular to that of the aforesaid resilient movement of the arm.

Preferably the said lower arm parts are formed with steps or projections spaced apart along their length, at least the projection or projections nearer to the base extending from the arms in the direction of re-separation aforesaid.

A socket constructed according to the invention may be attached to a support panel or base by compressing the two portions aforesaid into a hole in the panel or base. When the aforesaid preferred form is employed the two portions may be compressed together so that the projections nearer to the base may be passed through the hole and on re-separation will engage behind the panel which is then held between the spaced projections.

The invention includes the combination of a socket and panel or base constructed and secured together as just described. In this combination the panel may have rows of such contacts forming one set of the contacts of a selector of the above kind.

The strip may be cranked or joggled to form the steps or projections further from the base.

The base of the contact, which may be flat, may have

a central hole for passage of a contact pin, the hole intersecting the slot. There may also be a connection tag extending from the base, e.g. from an edge thereof.

The contacts are preferably formed individually but they may be formed as a continuous row, the arms of adjacent contacts being interconnected by tongues.

Some specific constructions of individual contacts and assemblies employing such contacts will now be described, by way of example and with reference to the accompanying drawings in which:

FIGURE 1 is a front view of one form of contact,

FIGURE 2 is a side view of the contact,

FIGURE 3 is an under plan of the contact,

FIGURE 4 is an under view of a portion of a contact panel with contacts in place,

FIGURE 5 is a view, similar to FIGURE 1, showing another form of the contact,

FIGURE 6 is a view, also similar to FIGURE 1, showing a third form of contact,

FIGURE 7 is a plan view of the contact of FIGURE 6 in a support plate, and

FIGURE 8 is a perspective view showing a contact in place in a metal support plate with an insulating cover.

Each form of contact is constructed from beryllium copper strip bent to U-form, the arms of the U-form being brought together, near the mouth, to provide contact surfaces to engage a contact pin inserted between them into the U.

Referring first to FIGURES 1–3, the arms 10 of the U-form are each joggled outwardly at 11, to provide an external step facing towards the base 12, which is flat.

Extending across the base 12 from one arm to the other and also about two-thirds of the way up each arm there is a slot 14 of appreciable width, the width being greater above the steps than it is below these steps. The slot divides the base and the lower two-thirds of each arm into two portions which can be resiliently compressed towards each other in a direction at right-angles to the resilient movements of the free ends 10*a* of the arms to receive a contact pin.

Each arm is reduced in width, at 15, between the step and the base to leave, at each side edge, a lateral projection 16 at the step and another lateral projection 17, adjacent the base. These portions of the arms are stiffened by means of ribs or depressions 18 pressed therein.

In the base the slot 14 is enlarged at 19 to provide for the passage of a round contact pin.

Extending from one outside edge of the base there is a connection tag 20.

In use, the contact is attached to a panel, 21, by compressing the base and arm portions together, passing the portions through a square or rectangular hole in the panel from one face of the panel until the end projections 17 are beyond the other face and then releasing the compressed portions so that they separate and the projections 17 engage behind the said other face, the hole being of appropriate size. The steps 11 and projections 16 remote from the base then rest against the said one face of the panel and the panel is securely held between the two sets of projections. The hole is a close fit around the lower parts of the arms so that resilient contact pressure on a contact pin is derived mainly from the upper parts of the arms and the joggled portions.

In a complete assembly (see FIGURE 4) of a set of

contacts for a circuit selector of the kind described, there are individual contacts as above arranged in rows on a panel 21 and the contact tags 20, which project at the said other face of the panel, are connected to metal strips or wires 24. The tags 20 of a row of contacts may all be at the same side of a row, as in row A, in which case they may all be soldered to a common wire or they may lie some at one side and some at the other, as in row B, and connected respectively to two wires.

When, as is preferred, the hole in the panel is square and the co-operating portion of the contact is also of square outline, the contact may be inserted in any one of four attitudes. FIGURE 4 shows, in row B and at C, contacts in three of the attitudes.

If desired and where connections can conveniently be made (e.g. at the outer rows of a selector panel) the connection tags 20 may be bent to extend from the same face of the panel as do the contact arms (see FIGURE 6).

In the example described above, the arrangement is that the contact is inserted into the hole in the panel base first. In an alternative arrangement (see FIGURE 5) the contact is inserted mouth first. The contact construction is substantially as described above except that the arms are not reduced in width as described (i.e. the parts 30, 31 of the arms have the same widths) and the projections 32, 33 are from the full width of the arms. Furthermore the projections 33 at the base, are provided by increasing the width of the base itself beyond that of the arms. With this arrangement the contact may be inserted through a square or rectangular hole with the mouth 34 leading until the projections 32 contact the panel. The base and arms portion is then compressed to allow these projections to pass through the hole, after which the portion is released. In a modification (FIGURES 6 and 7), the parts, 35, of the arms between the projections are wider than the other parts 30 of the arms and the hole 36 in the panel has the form of a cross. Two opposed limbs 36*a* of the hole receive and closely embrace the edge portions of these parts 35 of the arms, whereby rotation and rocking of the contact is prevented. The other limbs 30*b* permit passage of the flared mouth portions 34 of the arms during assembly.

FIGURE 8 shows a contact in position in a panel, the contact being a slightly modified form of that shown in FIGURES 1–3. The panel consists of a metal plate 40 having parallel rows of square holes 41. Along each row there is a strip 42 of deformable insulating material (e.g. polythene). These strips may be constructed separately or united to form a sheet. In another arrangement the strip is cut into sections, one for each hole in the plate 40. For each hole 41 there is a square portion 43 of insulating material which enters into the hole. At the top there is a ledge or bridge 44 which seats on the upper face of the plate and engaging against the lower face of the plate there are tongues or lips 45 on at least two sides of the portions 43 and, it may be, on each side. The square portions have throughways 46 for reception of the contacts 48, one in each throughway. These contacts are as shown in FIGURES 1–3 except that the portions 47 are lengthened to accommodate the additional thickness of the strips 42. In the assembly, the insulating material is first attached to the plate, the square portions 43 being inserted into the holes 41. During this operation the tongues 45 and their supporting sides are compressed inwardly and re-expand beneath the plate to retain the insulation in place. The contacts are then inserted into the holes 46 and have the effect of locking the insulation in place by preventing compression of the sides carrying the tongues.

I claim:

1. The combination of

(*a*) a support panel having a through hole therein, and

(*b*) an electric socket contact whose lower end is positioned within the hole and comprising a resilient strip of metal bent to U-shape and providing a base and two arms upstanding therefrom to receive a contact pin,

(*c*) the arms being resiliently movable away from one another to provide contact pressure on said contact pin,

(*d*) the U-shaped contact having a slot which extends across the base and up into the lower parts of the arms, whereby the base and the lower arm parts are divided into two portions which may be resiliently compressed together and then re-separate, in a direction perpendicular to the aforesaid resilient movement of the arms,

(*e*) projections extending laterally from the lower parts of the arms and which engage the upper and lower faces of said panel,

(*f*) the arm portions above said lower parts being upstanding from the panel and providing the contact surfaces for engaging a pin.

2. The combination as claimed in claim 1 in which the strip is joggled to form at least one of the projections.

3. A contact as claimed in claim 1 in which the base of the U-shape has a hole for passage of the contact pin, the hole intersecting the slot.

4. The combination as claimed in claim 1 in which a connection tag extends from the base of the U-shape.

5. The combination as claimed in claim 1 in which the panel comprises a metal plate and the hole is lined with a bushing of insulating material.

6. The combination as claimed in claim 5 in which the bushing is of deformable material and has projections engaging opposite faces of the metal plate, inward deformation of the bushing being necessary for disengagement of the projections and in which the lower portion of the arms of the contacts engage the sides of the bushing internally and support the bushing against such deformation.

7. The combination as claimed in claim 6 in which there are a plurality of contacts and bushings in a row and the bushings are united as a row.

8. The combination of

(*a*) a support panel having a through hole therein, and

(*b*) an electric socket contact comprising a resilient strip of metal bent to U-form and providing a base and two arms upstanding therefrom for reception between the arms of a contact pin,

(*c*) the arms being resiliently movable away from one another to provide contact pressure on said contact pin,

(*d*) the U-form contact having a slot which extends across the base and up into the lower paths of the two arms and stopping short of the free ends of the arms, whereby the base and lower arm parts are divided into two portions which may be resiliently compressed together and then re-separate, in a direction perpendicular to the aforesaid resilient movement of the arms,

(*e*) projections on the lower parts of the arms spaced apart along the length of the parts with at least the projection nearer to the base extending from the arms in the direction of re-separation thereof,

(*f*) said lower arm parts passing through and closely fitting the hole in the panel with the spaced apart projections engaging the opposite faces of the panel to hold the contact on the panel,

(*g*) the arm portions above said lower parts being upstanding from the panel and providing the contact surfaces for engaging a pin.

9. An electric socket contact for mounting in a panel opening and comprising

(*a*) a resilient strip of metal bent to U-form and providing a base and two arms upstanding therefrom to receive a contact pin,

(*b*) the arms being resiliently movable away from one another to provide contact pressure on said contact pin,

(*c*) the U-form contact having a slot which extends

across the base and up into the lower parts of the arms, whereby the base and lower arm parts are divided into two portions which may be resiliently compressed together and then re-separate, in a direction perpendicular to the aforesaid resilient movement of the arms,

(*d*) spaced projections extending horizontally from the lower parts of the arm to engage the upper and lower faces of the panel to hold the contact on the panel,

(*e*) the arm portions above said lower parts providing the contact surfaces for engaging a pin.

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