April 7, 1959 P. H. WINTER 2,881,407

UNITARY ELECTRICAL CONTACT ARRANGEMENT

Filed July 5, 1956

FIG. 1

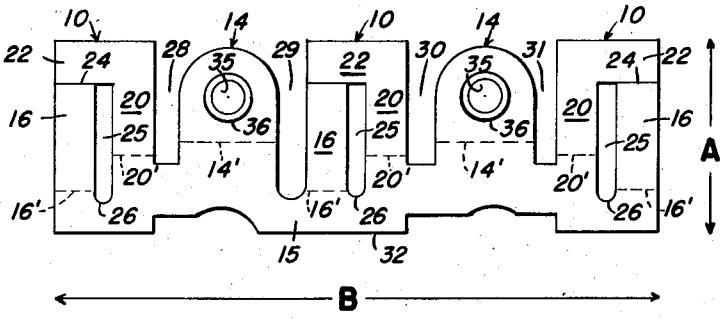


FIG. 2

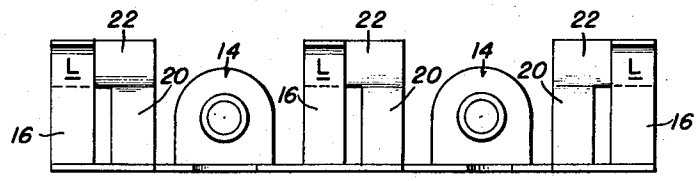
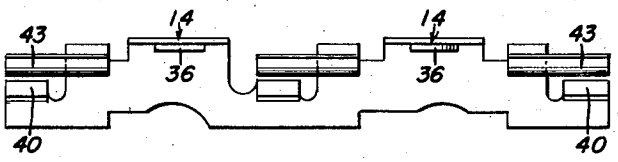


FIG. 3



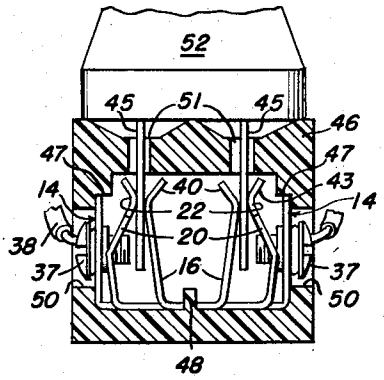


FIG. 4

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UNITARY ELECTRICAL CONTACT ARRANGEMENT

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7 Claims. (Cl. 339—258)

This invention relates to electrical contacts, and more particularly to unitary electrical contacts constructed to effect double or opposite face engagement with a cooperating blade or pole piece.

The invention deals more specifically with a multiple contact unit bent up from a punched sheet metal blank with the projections which are to become the opposing contact fingers extending all from the same edge of the integral base whereby a substantial saving in the extent of the blank in the direction of the projections is effected.

It is a general object of the present invention to provide a novel and improved form of unitary electrical control arrangement constructed to effect a substantial saving in the amount of metal required for its construction.

An important object of the invention consists in the formation of a blank for a unitary electrical contact arrangement having an elongated base and a plurality of integral contact and terminal forming projections springing wholly from one longitudinal edge thereof.

Another important object of the invention consists in the arrangement of two tongues extending from the same longitudinal edge of the blank base whereby portions of them overlap when bent up from the plane of the base to effect a double engagement contact.

Still another important object of the invention consists in the provision of two contact forming projections extending adjacent each other from one edge of a base and in the blank form consisting of a longer L-shaped projection having the base of the L overlying the free end of the shorter projection.

A further important object of the invention consists in bending the contacts up at an angle to the base about such different fold lines that the tip of the shorter projection overlaps the lateral extension of the other.

Other and further objects of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawing and following specification wherein is disclosed a single exemplary embodiment of the invention with the understanding that such changes may be made therein as fall within the scope of the appended claims without departing from the scope of the invention.

In said drawings:

Fig. 1 is a plan view of a sheet metal blank punched to shape for subsequent bending and forming into a unitary multiple electrical contact arrangement in accordance with the present invention;

Fig. 2 is a side elevation of a completed unitary multiple electrical contact arrangement as bent and formed from the blank of Fig. 1;

Fig. 3 is a top plan view of the completed unitary multiple electrical contact arrangement of Fig. 2; and

Fig. 4 is a transverse section through a triplex convenience outlet equipped with two unitary multiple electrical contact arrangements of the form shown in Figs. 2 and 3, and showing an attachment plug having its blades engaged by two of the contacts therein.

In the manufacture of electrical contacts of the type including two resilient fingers or arms which oppose each other to engage on opposite sides of a plug blade, switch blade, or the like, and particularly where a plurality of these extend up from one base, it has been customary to stamp the sheet metal blank so that what will be opposing fingers extend in alignment from opposite long edges of the blank base and thereby the width of the blank to be cut off from a strip of sheet metal is the sum of the lengths of two of the arms plus the width of the base, and this necessitates a rather large piece of metal for the purpose. Since this metal must be both a good electrical conductor and a high quality resilient material, such as some of the better grades of bronzes, the expense is not inconsiderable, particularly in a highly competitive market such as that in which many of the items using such contacts are sold. In accordance with the present invention, however, it has been found feasible to have the two fingers or arms forming the opposing parts of one contact extending both from the same longitudinal edge of the base, whereby the overall width of the blank used for the purpose is not substantially greater than that of the length of one finger plus the width of the base.

In the example illustrated herein a plurality of contacts of the type just described are incorporated into a unitary multiple electrical contact arrangement such as may be used in pairs in a triplex convenience outlet, but it is obvious that the showing is merely illustrative of a particular species of the invention, the generic feature of which does not necessarily involve the specific arrangement of a number of contacts on one base. Indeed the advantages may be achieved even with single contact arrangements.

Fig. 1 of the drawing illustrates a punched sheet metal blank from which the unitary multiple electrical contact arrangement is formed. Such a blank is cut, in general, by appropriate dies, from a ribbon of bronze or similar material having a width not substantially greater than the overall length of the blank. The blank is seen to be of generally rectangular form and the overall width measured in the direction of the length of the sheet metal ribbon from which it is cut is indicated by the dimension A and it is this dimension which is materially reduced by using the construction of the present invention rather than that type heretofore used. The blank shown includes a sufficient number of integral parts to form three contact elements and their general areas are indicated by the reference character **10**, and interposed between these are the areas **14**, hereinafter referred to as the "terminal tabs" since they accept the terminal screws by which one or two conductors may be connected to the assembly.

The areas **10** and **14** are connected together by a continuous elongated strip of metal, indicated by the reference character **15**, extending for the maximum dimension B of the generally rectangular form of the blank and lying wholly on one side of all of the previously mentioned areas. Each of the areas **10** includes two laterally spaced fingers, a short straight one **16** and an L-shaped one **20**, so arranged that the horizontal leg **22** of each of the L-shaped fingers overlies the end of a straight finger and is separated therefrom merely by a slit **24**.

Between each pair of fingers of a contact area **10**, metal is completely removed in the elongated rectangular area **25** at the lower end of which the shape is preferably arcuate, as seen at **26**, while at the upper end the line is straight, forming a continuation of slit **24** and defining with it the inner edge of the horizontal arm of the L. The terminal areas are separated from the intermediate and end contact areas by slits **28**, **29**, **30** and **31**, respectively, somewhat wider than the areas **25** and except

in the case of the one numbered **29** extending less close to the lower edge **32** of the base. The straight and L-shaped fingers of the terminal area at the right are reversed in position as shown so as to define each straight finger by two deep notches or one deep one and a free edge.

The various dotted lines in Fig. 1 are the approximate lines of bending in order that the several fingers and tabs may be turned up generally normal to the surface of the base **15**. It will be observed that the straight fingers **16** bend about the lines **16'** which are quite close to the lower edge **32** of the base **15**, so that the overall length of the fingers resulting may be said to reach from **16'** to slit **24**. On the other hand, the L-shaped fingers **20** are bent about lines **20'** each one spaced a distance from the lower base line **32** more than the distance to the lines **16'** by substantially the vertical height of the transverse part **22** on the end of each L-shaped finger. Thus, after bending, the free end section of this part will then confront and overlap the upper end section of the straight finger and be able to cooperate with it to engage on opposite faces of a blade projected therebetween to make contact with the unit formed from the blank.

The terminal tabs **14** are bent up about line **14'** to substantially 90°, as can be seen in Fig. 4. During the manufacture a hole **35** is pierced in each of the terminal blanks and then swaged to a larger diameter, producing an elongation **36** on the back of the terminal best seen in Figs. 3 and 4. This provides an appropriate length whereby it may be threaded internally to receive the external threads of a conventional terminal screw **37** such as shown in Fig. 4, used for the purpose of attaching the bare end of a conductor **38** to the terminal tab.

A consideration of Figs. 2, 3 and 4 gives a better conception of the manner in which the two fingers which form a double contact overlap each other. Thus in Fig. 2 the overlapped area may be designated by the character L in all three positions, and it will be seen that this overlap consists of a length of finger **16** equal to the width of the horizontal portion **22** of finger **20**, and the length of the overlapped portion of **22** is equal to the width of finger **16**. While the overlapped areas confront each other in spaced parallel planes they are not flat, but each is given a configuration best seen in Fig. 4, where the inner fingers are the straight ones **16** of Fig. 1. Their bend is less than 90° to the base by approximately 6° and the upper end is then bent to an obtuse angle thereto as seen at **40**, which also appears in Fig. 3.

The first portion of the L-shaped finger is bent upwardly at a greater distance from the base edge of the blank and substantially parallel to the main portion of **16** but at about mid height is given an additional bend and then reversely bent to form the tip **43**. With tip **40** this provides a V-shaped opening between the confronting portions of the two fingers of one contact to readily accept whatever type of blade is to be received between them. The closest confronting portions of the overlapped areas L are spaced from each other considerably less than the thickness of the blade to be received between them, whereby they must be sprung by the blade to insure a firm contacting with both faces thereof. Although not appearing in the drawing, the confronting areas of the fingers which engage the blade, just below the portions of closest approach, are provided with slight circular protrusions adapted to engage in a transverse hole in a plug blade such as shown at **45** to more firmly grip it against mechanical withdrawal unless substantial effort is made to remove it. This is in keeping with present day standard practice.

Fig. 4 shows a possible use of a multiple contact unit of the type shown in Figs. 2 and 3. Here two of these units are mounted in spaced relation back to back in an insulating shell **46** wherein they are held by engaging lugs such as **47** and central spacing rib **48**. Side openings **50** give access to the terminals, and three sets of front slots **51** provide entrances for the blades **45** of attachment plugs such as **52** of generally conventional form. These slots guide the ends of the blades into the V-shaped openings between the contact fingers.

It will be apparent from the showing and description that each of the contacts is equally as effective as if it had been formed from exactly oppositely disposed fingers bent up from opposite edges of the base into confronting relationship, while at the same time effecting a saving in metal, for the instance illustrated, of more than 40%.

I claim:

1. A contact strip for electrical wiring devices having a flat, elongated base extending for the full length of the strip, at least one set of resilient, blade receiving contact portions and a terminal tab all upstanding from said base at an angle of the order of 90°, said portions and tab all extending integrally from the same longitudinal edge of said base, areas of said resilient blade receiving portions overlapping in slightly spaced relation and oppositely flared ends on said areas to guide a blade between them.

2. The contact strip of claim 1 in which said contact portions spring from longitudinally spaced positions on said base edge and one has a lateral offset providing its overlapping area.

3. The contact strip of claim 2 in which the blade receiving portions of a set each extend upwardly from the base by substantially the same length.

4. An integral sheet metal contact device for engaging both sides of a conductor blade, having in combination a base, a pair of fingers upstanding to the same height and extending from the same edge of said base, one of said fingers having a lateral projection at its outer end overlapping the outer end of the other finger for blade reception, said fingers extending upwardly from said base at positions spaced, in a direction normal to said base edge, a distance substantially equal to the width of said lateral projection in the direction of the length of its finger.

5. An electrical contact and terminal unit for a convenience outlet adapted to provide dual face engagement for one blade of each of a plurality of attachment plugs comprising in combination, a one piece strip of resilient metal having a flat elongated base portion extending straight for the full length of the unit and having one free edge, the opposite edge being irregular and having extending integrally therefrom at least one terminal tab and a set of plug blade engaging contacts on each side of the tab, said tab and said contacts being turned upwardly from the plane of the base portion at varying distances from the said free edge, whereby they are spaced across the width of the base, each set of contacts comprising a long straight finger and a laterally adjacent inverted L-shaped finger, the cross piece of which extends along over the end of the straight finger before upward turning, the L-shaped finger being turned up further from said free edge than the straight finger, whereby the upper end of the straight finger confronts the free end portion of the L-shaped finger to receive a plug blade therebetween.

6. An integral sheet metal blank for the formation of a blade engaging unit comprising a base area having a mainly straight, free and an opposite edge, a pair of adjacent contact-couple forming fingers of substantially the same length extending from said opposite edge and with their side edges substantially normal thereto, one of said fingers being straight, the other having a lateral projection extending across but separate from the upper end of the first finger, and portions of the blank along the said side edges defining the fingers being cut to such depth that the first finger can be bent upward from the base along a line parallel to and closer to the straight portion of the free edge than can the second, whereby a face of the free end portion of the first finger will confront part of a face of said lateral projection.

7. The blank as defined in claim 6 in which a tab projects from said opposite edge of the blank adjacent to one of said fingers, the tab edges being wholly free from other projections from said opposite edge of the blank whereby it may be subsequently bent upwardly from the base area along a line, said line being even further from the said free edge than that about which the second finger is adapted to be bent.

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