

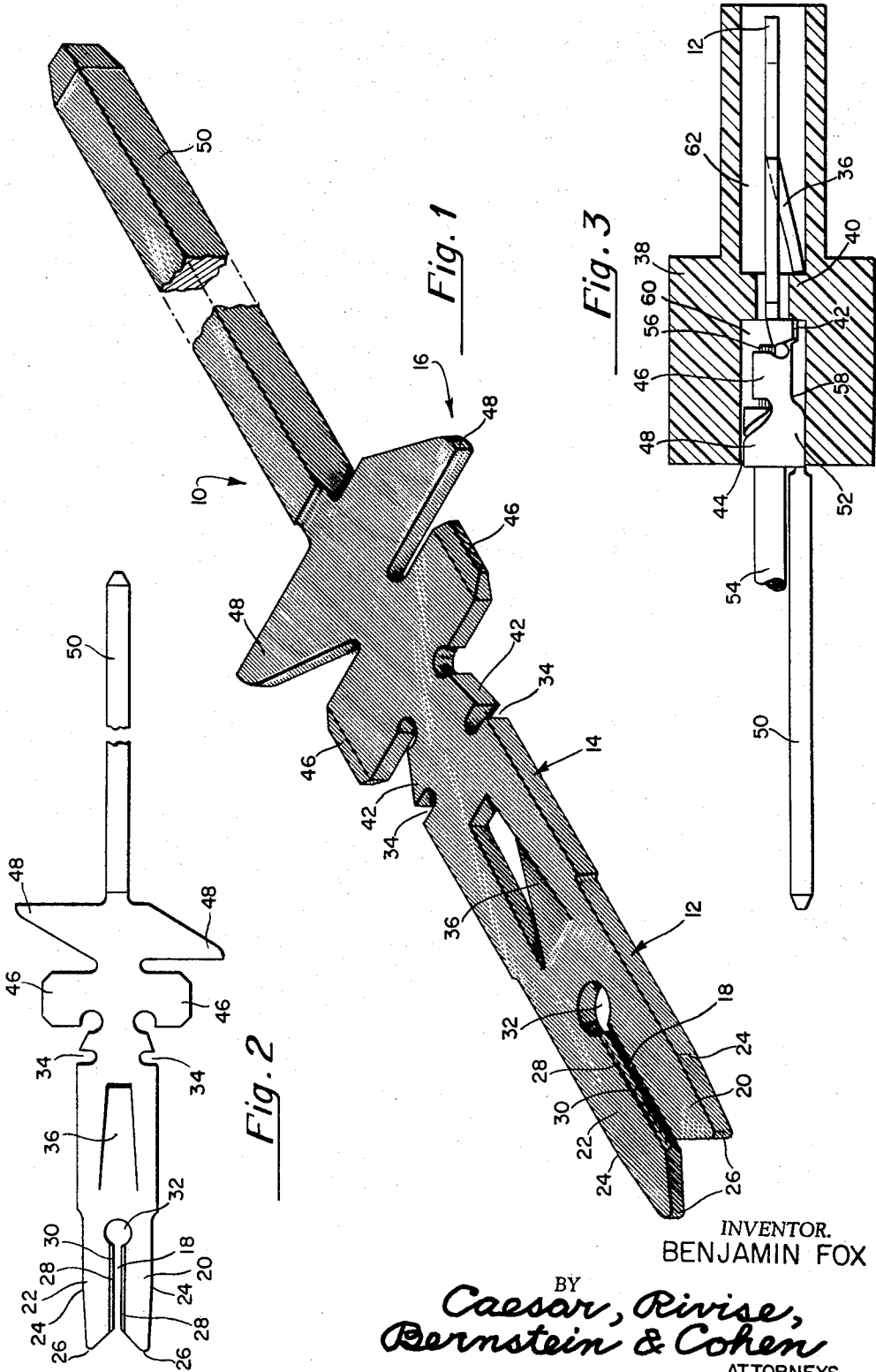
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CONTACT WITH MULTIPLE TERMINATION

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3,412,369

CONTACT WITH MULTIPLE TERMINATION
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ABSTRACT OF THE DISCLOSURE

An electrical contact has a multiple termination tail section comprised of a deformable lead-grasping means, and an elongated tail of noncircular cross-section extending from said grasping means. A lead of an outside circuit can be electrically connected either to the grasping means, or to the elongated tail of the contact.

At times it is desirable to secure two or three wires to the contact, and this is preferably accomplished through the use of automatic wire wrapping machinery. Thus, it is desirable to have a contact with a rigid square tail section for use with the automatic wrapping machinery.

In today's complex world of electronics, a connector arrangement may require that some leads be crimped to certain of the terminals in a connector block whereas other terminals must be automatically wire wrapped, depending upon the requirement of the circuitry. With the present invention, a single terminal will suffice, since the terminal of the present invention permits both crimping or automatic wire wrapping or both.

Furthermore, with the present invention the crimping and automatic wire wrapping features are associated with a bifurcated contact which may be directly secured within an insulating casing.

The foregoing as well as other objects of the invention are achieved by providing a contact including a head and tail portion wherein the tail portion comprises two grasping means and a backwardly extending automatic wire wrapping leg. Of the two grasping means one is adapted to be crimped upon the conductive member of the lead of an outside circuit and the other is adapted to be crimped upon the entire lead of the outside circuit including the insulation thereof.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of a contact embodying the present invention;

FIG. 2 is a plan view of the contact of FIG. 1; and

FIG. 3 is a sectional view taken through a connector block showing the contact of FIG. 1 having a lead of an outside circuit crimped thereto, with said contact being secured within a complementary chamber within said insulating block.

Referring now in greater detail to the various figures of the drawings wherein similar reference characters refer to similar parts, a contact with multiple termination embodying the present invention is generally shown at 10 in FIG. 1. Contact 10 basically comprises a bifurcated mating section 12, body section 14 and tail section 16 with the features of the present invention.

The bifurcated mating section 12 is constructed in accordance with bifurcated contacts disclosed and claimed in United States Patent No. 2,828,474. The entire contact 10 including mating section 12 is generally flat and is constructed of 0.012 inch spring-hard Phosphor bronze, copper or other suitable electrically conductive material having the necessary balance of resiliency and strength required herein.

The mating section 12 is bifurcated by virtue of a slot 18 along the longitudinal center to provide a pair of contact legs 20 and 22 which are spaced from each other by virtue of the slot 18. The outer edges of the contact legs 20 and 22 are generally parallel to each other until the points 24 are attained and then the outer edges of the legs 20 and 22 taper somewhat sharply toward each other to the flattened tips 26. The contact legs then taper toward each other and meet the inner edges 28 of the contact legs at the slot 18.

As shown in FIG. 2, the inner edges 28 are chamfered to present substantially flat contact surfaces 30. In mating position, a contact with a mating section similarly constructed will mate perpendicularly with respect to the contact of FIG. 1 as described in United States Patent No. 2,828,474 and United States Patent No. 2,994,056 so that the chamfered surfaces of the mating sections are in engagement with each other to provide a large area of electrical contact. The distance between the inner edges 28 of the contact legs is slightly less than the thickness of the contact so that when a complementary contact is engaged in slot 18, the contact legs 20 and 22 are slightly forced apart to engage the mating contact under tension. Such tension is considerably enhanced by the provision of an enlarged opening 32 at the rearward end of the slot 18. Thus, the opening 32 provides a hinge action which affords making the slot 18 slightly narrower than would otherwise be possible. As the two cooperating contacts are brought into mating relation, their respective legs 20 and 22 are spread apart slightly by virtue of the aforementioned hinge action to permit a smooth sliding action between the respective pairs of contact legs while still providing adequate tension to ensure good electrical contact.

It is to be understood that other types of bifurcated mating sections may be employed and that the mating sections may be male, female or other types known in the art so long as satisfactory mating can occur where the thickness of the mating section is at least 0.012 inch and the material at that thickness will yield a satisfactory combination of resiliency and strength in the tail section as will be described hereinafter.

The body section 14 is formed between the mating section 12 and the tail section 16, and generally constitutes a continuation of the mating section 12. The body section 14 terminates adjacent rearward notches 34, and includes a locking lance 36 which is stamped from the body section 14. The locking lance 36 is basically a rearwardly extending tongue which assists in holding the contact 10 in a locked position in insulating casing 38 as shown in FIG. 3. The locking lance 36 engages shoulder 40 of insulating casing 38, and thereby prevents rearward withdrawal of the terminal from the insulating casing.

The body section 14 further includes a locking shoulder 42 which exists immediately behind the notches 34. The locking shoulder extends somewhat downwardly to the approximate level of the rear end of the locking lance 36 as illustrated in FIG. 3. The locking shoulder 42 is positioned against the rear face of insulator shoulder 40 as shown in FIG. 3 to prevent further forward movement of the contact in the insulating casing. It is seen that when the contact 10 is inserted in rearward opening 44 of insulating casing 38 that a point will be reached when the locking lance 36 contacts the insulating shoulder 40.

The insulating casing 38 basically comprises a rear chamber 60, a forward chamber 62 and a narrow shoulder portion 40 interconnecting said rear and forward chamber.

As the contact is thrust forwardly, the locking lance 36 rides over or is depressed upwardly until the rear edge of the locking lance 36 clears the insulating shoulder 40. At this time the locking lance 36 will snap to its original position. The locking shoulder 42 is so dimensioned

that when the locking lance 36 snaps to its original position, the locking shoulder 42 will be positioned substantially against the rear face of insulating shoulder 40.

The tail section 16 generally comprises first grasping means 46, second grasping means 48 and rearwardly extending wire wrapping tail 50. A trough 52 (FIG. 3) exists adjacent the second grasping means 48 in order to accommodate insulated wire lead 54. However, it is the usual practice to remove some of the insulation to bare conductors 56 of the wire 54, and this is the reason for the inward curving 58 of the contact surfaces adjacent trough 52 as shown in FIG. 3.

The first grasping means 46 includes a pair of rectangular wings, and the second grasping means 48 includes a pair of triangular wings which are crimped respectively about the wire lead 54 as shown in FIG. 3.

The wire wrapping tail 50 is generally constructed in accordance with Travis Patent No. 3,142,891 and extends rearwardly from the grasping means 48. The tail 50 must be sufficiently rigid to withstand the pressures of automatic wire wrapping, and should have sharp corners to provide biting edges that are necessary to the automatic wrapping process. The tail 50 preferably has a square cross-section of 0.045 inch on a side.

The contacts of the present invention are produced in accordance with progressive die and coining techniques well known to the art. The contacts are assembled into insulating casings typified by the showing of FIG. 3, either by the contact manufacturer or by the user. Large numbers of contacts of the present invention will be employed in complex connector arrangements where it is necessary in some cases to secure but a single wire lead to a given contact, and the identical contact is used in other cases where it is necessary to secure two or more wire leads to a different single contact.

Where single wire leads are to be secured to the contact, the crimping wings of the present invention are employed. Where it is necessary to secure two or more wires to the contact either simultaneously or at different times, automatic wire wrapping machinery in conjunction with the rigid tail 50 is utilized. The use of automatic techniques is necessary when the wire leads are to be attached at different times so that a crimping technique would be wholly unsatisfactory.

This is because it would be necessary to open up the crimped tail at a later time in order to insert a second wire lead and then to apply pressure again to the crimping wings. This procedure would have to be again repeated should it be necessary at yet a later time to secure a third lead to the contact. With automatic wire wrapping techniques it is a simple matter to secure three wire leads to the tail 50 at different times.

It is therefore seen that with the present invention full freedom for back-panel wiring is obtained in a simple and economical manner. The contacts of the present invention overcome the previous problem of having to utilize terminals of at least two constructions, with certain of the terminals having crimping means and certain other of the terminals having wire wrapping means.

With the present invention such great flexibility is obtained that at a later time additional leads can be applied to the tail 50 by wire wrapping techniques, or where the crimping wings remain unused, an additional lead can be crimped to the terminal at a later time.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is claimed as the invention is:

1. A connector member comprising an insulating casing including a rear chamber and a forward chamber interconnected by a narrow shoulder portion, a contact seated and locked in said chambers and shoulder portion,

said contact comprising a mating section and a tail section united thereto by a body section, said body section including a locking lance, said tail section including locking shoulders defined by pairs of notches and further including at least one grasping means adapted to provide secure electrical and mechanical connection with a lead of an outside circuit, and a relatively rigid elongated tail of square cross-section and having sharp corners extending rearwardly from said grasping means, said contact having its mating section in said forward chamber and its tail section partly in said rear chamber and said shoulder portion being interposed between said locking lance and said locking shoulders, whereby a lead may be crimped to said contact through the compression of said grasping means, and whereby a plurality of leads may also be secured to said tail.

2. The invention of claim 1 wherein said mating section is bifurcated.

3. The invention of claim 1 wherein first and second grasping means are provided, said second grasping means being located rearwardly of said first grasping means, said first grasping means being adapted to provide secure electrical and mechanical connection with an exposed lead of an outside circuit, said second grasping means being adapted to provide secure mechanical connection with an insulated portion of said lead, said first and second grasping means being defined in part by a trough.

4. An electrical contact comprising: a mating section and an integral tail section, said tail section comprising at least one deformable lead-grasping means forming a part thereof for providing secure electrical and mechanical connection with a lead of an outside circuit, and an elongated tail of non-circular cross-section extending from said grasping means, whereby a lead end portion extending generally parallel to said wire wrap tail may be crimped to said contact through compression of said grasping means, and whereby leads may also be secured to said tail.

5. The electrical contact of claim 4 wherein said grasping means is positioned between said mating section and said tail.

6. The electrical contact of claim 4 wherein said tail is comprised of a relatively rigid member of square cross-section with sharp corners.

7. The electrical contact of claim 6 wherein said grasping means is positioned between said mating section and said tail and wherein said sharp corners extend from said grasping means to substantially the end of said tail opposite said grasping means.

8. The electrical contact of claim 4 wherein first and second grasping means are provided, said first grasping means being positioned between said mating section and said second grasping means, said first grasping means being adapted to provide secure electrical and mechanical connection with a lead of an outside circuit, said second grasping means being adapted to provide secure mechanical connection with an insulated portion of said lead.

9. The electrical contact of claim 8 wherein said first and second grasping means are positioned between said mating section and said tail.

10. The electrical contact of claim 8 wherein said tail is comprised of a relatively rigid member of square cross-section with sharp corners.

11. The electrical contact of claim 10 wherein said first and second grasping means are positioned between said mating section and said tail and wherein said sharp corners extend from said grasping means to substantially the end of said tail opposite said grasping means.

12. The electrical contact of claim 4 wherein said mating section and said tail section are connected by a body section.

13. The combination of claim 5 wherein said mating section and said grasping means are connected by a body section.

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14. The electrical contact of claim 12 wherein said tail is comprised of a relatively rigid member of square cross-section with sharp corners.

15. The electrical contact of claim 14 wherein said grasping means is positioned between said mating section and said tail and wherein said sharp corners extend from said grasping means to substantially the end of said tail opposite said grasping means.

16. The electrical contact of claim 12 wherein first and second grasping means are provided, said first grasping means being positioned between said mating section and said second grasping means, said first grasping means being adapted to provide secure electrical and mechanical connection with a lead of an outside circuit, said second grasping means being adapted to provide secure mechanical connection with an insulated portion of said lead.

17. The electrical contact of claim 16 wherein said first and second grasping means are positioned between said mating section and said tail.

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18. The electrical contact of claim 16 wherein said tail is comprised of a relatively rigid member of square cross-section with sharp corners.

19. The electrical contact of claim 18 wherein said first and second grasping means are positioned between said mating section and said tail and wherein said sharp corners extend from said grasping means to substantially the end of said tail opposite said grasping means.

References Cited

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,412,369

November 19, 1968

Benjamin Fox

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 35, "wire wrap" should read -- elongated --.

Signed and sealed this 10th day of March 1970.

(SEAL)

Attest:

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Attesting Officer

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Commissioner of Patents