

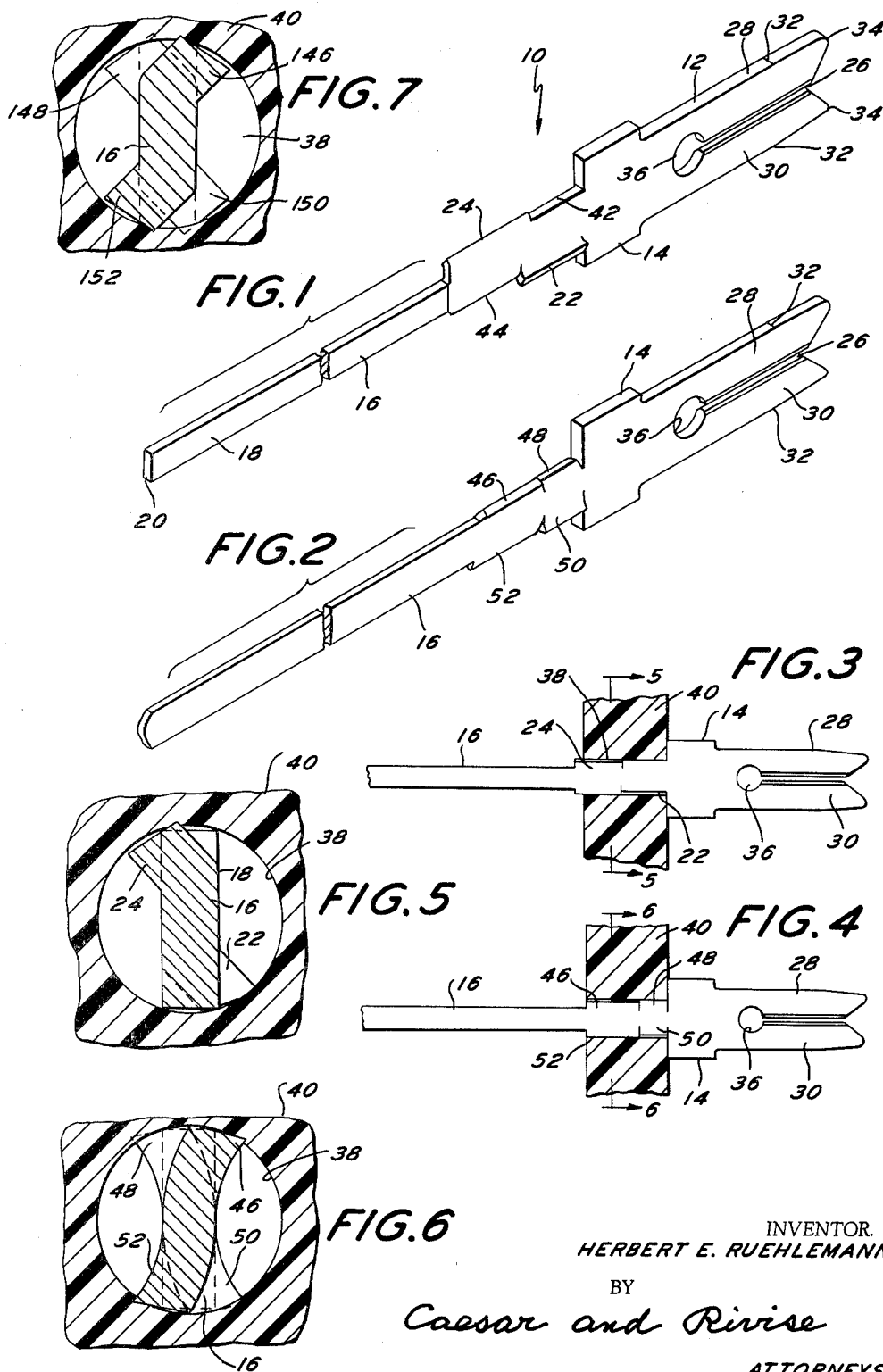
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CONTACT WITH WAVE SHAPED TAIL SECTIONS

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CONTACT WITH WAVE SHAPED TAIL SECTIONS

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This invention relates to a contact with wave shaped tail sections and has as its objective the provision of a contact with a tail of rectangular or square cross section which can be secured within a circular opening in a laminate or connector casing.

Where the tail of a contact is of a circular cross section it may be simply secured in a circular opening by frictional engagement or similar means of attachment as the contour of the tail is complementary to the configuration of the opening in the laminate or connector casing.

However, contacts with a rectangular or square cross section tail are widely used since the lead wires from outside circuits can be wrapped around the tail and secured thereto by means of automatic wrapping machinery.

It has been suggested that contacts with tails of a rectangular square cross section may be secured in laminates or connector casings by providing a complementary rectangular or square opening therein as was done with the contacts with a circular cross section.

However, rectangular holes cannot be drilled, they must be punched. Such an operation is expensive and furthermore punching is practical only with relatively thin laminates or casings.

It is therefore an important object of the present invention to provide a contact with a tail of a rectangular or square cross section which may be secured within a circular opening in a laminate or connector casing. Such securement in accordance with the present invention is reliable and stable even when the contact is thereafter mated and unmated with other contacts.

The foregoing as well as other objects of the present invention are achieved by providing a contact with a tail of a rectangular or square cross section which includes wave shaped tail sections, adjacent the root of the tail.

In one embodiment of the invention the tail section may be of the half-wave type to include two sections, the bottom section opposite to the top section and spaced therefrom. In another embodiment of the invention, the tail section is of the full-wave type and includes four sections which are spaced side-by-side and also opposite to each other in pairs. The wave sections themselves may be rectangular in cross section or they may be arcuate.

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 constituting a first embodiment of the present invention;

FIG. 2 is a perspective view of a contact constituting a second embodiment of the present invention;

FIG. 3 is a sectional view showing the contact of FIG. 1 secured within a laminate;

FIG. 4 is similar to FIG. 3 but shows the contact of FIG. 2 secured within the laminate;

FIG. 5 is an enlarged sectional view taken along the lines 5-5 of FIG. 3;

FIG. 6 is an enlarged sectional view taken along the lines 6-6 of FIG. 4; and

FIG. 7 is a sectional view similar to FIG. 6 but show-

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ing a contact of a slightly different cross section in the wave sections.

Referring now in greater detail to the various figures of the drawings wherein similar reference characters refer to similar parts, a contact with wave shaped tail sections constituting a first embodiment of 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 16 which possesses a rectangular cross section with long sides 18 and a short end 20. The wave sections 22 and 24 extending from the root of the tail 16 constitute a significant feature of the present invention.

The bifurcated mating section 12 is constructed in accordance with contacts sold under the trademark "Varicon" and is 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 spring-hard Phosphor bronze, copper or other suitable electrically conductive material having the necessary balance of resiliency and strength required herein. The tail 16 may have a minimum dimension of, for instance, 0.026 inch with a width of 0.050 inch or more.

The mating section 12 is bifurcated by virtue of a slot 26 along the longitudinal center of the contact to provide a pair of contact legs 28 and 30 which are spaced from each other by virtue of the slot 26. The outer edges of the contact legs 28 and 30 are generally parallel to each other until the points 32 are attained and then the outer edges of the legs 28 and 30 taper somewhat toward each other to the flattened tips 34. The contact legs 28 and 30 then taper sharply toward each other and meet the contact legs at the slot 26. The edges of the contact defining the slot 26 are chamfered to present substantially flat contact surfaces.

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 edges of the mating sections are in engagement with each other to provide a large area of electrical contact. The distance between the inner edges of the contact legs along the slot 26 is slightly less than the thickness of the contact so that when a complementary contact is engaged in slot 26, the contact legs 28 and 30 are slightly forced apart to engage the mating contact under tension. Such tension is considerably enhanced by provision of enlarged opening 36 at the rearward end of the slot 18. Thus, the opening 36 provides a hinge action which affords making the slot 26 slightly narrower than would otherwise be possible. As the two cooperating contacts are brought into mating relation, the respective legs 28 and 30 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 insure good electrical contact and relative ease of withdrawal.

It is to be understood that other types of bifurcated mating sections may be employed and the mating sections may be male, female or other type known in the art so long as satisfactory mating can occur.

The root of the tail 16 is located immediately behind the body section 14 as shown in FIG. 1. As further shown in FIG. 1 the wave sections 22 and 24 are stamped from the tail root and extend outwardly therefrom. As best illustrated in FIG. 5, the root of the tail 16 may be located in a circular opening 38 in a laminate 40. The tail root may be forced into place and thus the contact is held in place by frictional engagement without need of any other fastening aids. As noted in FIG. 5, the wave

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sections 22 and 24 are in bearing relation against the side of the circular opening 38 and in addition the straight sides 42 and 44 of the tail root may also make contact against the circular opening sides. This is further illustrated in FIG. 3. As noted in FIG. 5, the outer edges of the wave sections 22 and 24 are relatively straight and are of the same general configuration as the tail root. In addition, the wave sections extend at an acute angle with respect to the tail 16.

It is thus seen that a tail with a rectangular cross section may be simply but effectively anchored or secured within an opening of a circular cross section without need of any additional means other than the wave sections which are an integral part of the tail. The resiliency of the wave sections permits them to be forced into engaging position and then to be seated in tight engagement with the walls of the opening 38.

It is, however, within the scope of this invention to attach or otherwise secure separate wave pieces to the root of a tail in order to effect the structure of FIG. 5. The wave sections 22 and 24 together constitute a half-wave and for this reason such terminology is applied to this type of wave section.

The wave sections of FIGS. 2, 4 and 6 illustrate the full-wave type of tail section.

The contact of FIG. 2 is generally similar to that of FIG. 1 and therefore wherever possible like reference characters will be employed.

In the contact of FIG. 2, four wave sections 46, 48, 50 and 52 are provided in order to effect securement as best illustrated in FIG. 6 of the drawing. Wave sections 48 and 50 are somewhat shorter than wave sections 46 and 52 in order to facilitate the insertion and staking of the contact within the opening 38.

In this embodiment of the invention the four wave sections together constitute a full-wave. As noted in FIG. 6, the wave sections are somewhat arcuate with the sections 48 and 50 being diagonally opposite to each other and the sections 46 and 52 likewise being diagonally opposite to each other. As noted in FIG. 6, the wave sections 46, 48, 50 and 52 make a four point contact or four point support within the opening 38. As further noted in FIG. 6, the wave sections can be somewhat arcuate, dependent upon the particular needs of securement, the dimensions of the tail section and the particular material of which the tail section is made.

The wave sections of FIG. 6 are to be contrasted with those of FIG. 7 wherein the wave sections 146, 148, 150 and 152 are similar to the wave sections 46, 48, 50 and 52. In this case, however, the wave sections have straight sides as compared with the arcuate edges of FIG. 6.

It is also seen that wave sections may be similarly formed anywhere along the tail, but preferably adjacent the root of a tail having a square or any other cross section other than circular. The wave sections are simply stamped during the various mechanical processes which produce the entire contact. Of course, it is possible to form wave sections in a tail of circular cross section, if necessary for a particular purpose.

It is thus seen that a contact is provided which possesses a tail of a square or rectangular cross section but which may be secured within a circular opening by means of the provision of wave shaped tail sections adjacent the root thereof. The wave shaped tail sections may be forced into the opening and will remain there by virtue of frictional engagement with the opening. Once so located, the contact will not be moved from its seated position either by forces of vibration or by withdrawal or mating

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forces of a mating contact in view of the fine anchoring properties contributed by the wave shaped tail sections of the present contact.

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 substantially flat contact of rectangular cross-section, said contact comprising a body section, a mating section and a tail section projecting from said body section, said body and tail sections lying substantially in the same plane, said tail section including a substantially uniplanar root having first and second edges each extending to said body section, at least one integral locking wing extending away from at least one of said edges and lying in at least one plane inclined at an acute angle substantially less than ninety degrees with respect to the plane of said body and tail sections.

2. The invention of claim 1 wherein said locking wings are respectively top and bottom sections, opposite to and inclined away from each other.

3. The invention of claim 1 wherein said locking wings are present in four sections, spaced in at least two rows, side by side and inclined oppositely to each other.

4. The invention of claim 3 wherein two locking wings adjacent said body section are shorter than rearwardly located locking wings.

5. The invention of claim 1 wherein said locking wings are arcuate in cross-section.

6. The invention of claim 1 wherein said locking wings are rectangular in cross-section.

7. In combination a panel and at least one substantially uniplanar contact, said panel including at least one circular opening through which said uniplanar contact is secured, said contact including a body section, a mating section and a tail section of rectangular cross-section projecting from said body section and passing through said opening, said tail section including a substantially uniplanar root having first and second edges each extending to said body section, at least one integral locking wing extending away from at least one of said edges and lying in at least one plane inclined at an acute angle substantially less than ninety degrees with respect to the plane of said body and tail sections.

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