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MINIATURE ELECTRICAL SHUNT

This relates to the field of electrical connectors and more particularly to electrical shunts.

5 Electrical shunts are known that common a pair of circuits with a unitary contact secured within a housing, where the contact provides a pair of contact sections aligned with housing openings into which are insertable respective post contact sections. Many such
10 shunts are adapted to be mounted onto a circuit board, to common a pair of posts mounted to the board that otherwise are electrically connected to respective circuits of the board. Usually the posts are within an array of posts, only certain ones of which are to be
15 commoned, and the shunt must be of a miniature size to be positioned within the array. Also, the posts are elongate and the shunt must provide for the post to extend completely through the housing.

It is desired to provide such a shunt that is
20 easily assembled and is easily placed onto a pair of adjacent posts such as in a circuit board post array.

The shunt of the present invention includes a housing having a contact-receiving cavity extending thereinto from an assembly face, and two pairs of post-receiving and post-exiting apertures in communication
25 with the cavity along opposed board-proximate and board-remote faces. Opposed guide slots extend along cavity side walls from the assembly face. The contact includes contact sections at opposed ends of a body section, and
30 the body section includes a pair of tabs bent to extend laterally outwardly to pass along the guide slots of the cavity during assembly, and the tab ends are dimensioned to create an interference fit in the guide slots to retain the contact in the housing. Each contact section
35 includes a pair of spring arms extending from a base and opening toward one of the pair of opposed post-receiving apertures, and a hole in the base so that a post is

insertable between the spring arms and extends through the hole, thus extending completely through the shunt.

A shunt may be initially defined at an end of a placement tool, by the insulative shunt housing being molded on the end of a tool handle, with a frangible section adjacent the housing easily allowing for the tool handle to be broken off and removed after shunt placement. Further, a strip of such tool/shunts may be created by molding a row of such tool handles and shunt housings, where the tool handles are initially joined to each other at additional frangible sections that enable a single tool/shunt to be removed from an end of the row; ends of the strip may be formed into shunt removal tools that latch onto a shunt housing.

Accordingly, the present invention is directed to an electrical shunt assembly, comprising:

an insulative housing having a mating face, an opposed face, and an assembly face and opposed rear wall both orthogonal to said mating face and said opposed face, said housing including a contact-receiving cavity extending from an entrance at said assembly face, and said housing including at least two post-receiving apertures extending through said mating face and at least into said contact-receiving cavity; and

a contact member insertable into said contact-receiving cavity from said entrance, said contact member having a body section with a retention section, and further having at least two post-engaging contact sections aligned with respective said post-receiving apertures upon full insertion.

An embodiment of the shunt and the row of tool handles will now be described by way of example with reference to the accompanying drawings, in which:

FIGURE 1 is an isometric view of a single shunt assembly, extending from an end of a tool handle;

FIGURE 2 is a cross-sectional view of the shunt of FIG. 1 joined to the tool handle at a frangible section;

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FIGURE 3 is an enlarged cross-sectional view of the shunt assembly of FIGS. 1 and 2;

FIGURE 4 is a an isometric view of a plurality of shunt contacts;

FIGURE 5 is an isometric view of an array of shunts integrally joined to a strip of tool handles; and

FIGURE 6 is a plan view of the strip of FIG. 5.

Shunt assembly 10 in FIGS. 1 to 3 includes an insulative housing 12 containing a contact 14 disposed in a contact-receiving cavity 16, the cavity extending from an entrance 18 at an assembly face 20. Housing 12 provides a first pair of apertures 22,24 at a first end 26 and a second pair of apertures 28,30 at a second end 32, with post-receiving apertures 22,28 defined along a post-receiving or mating face 34 and post-exiting apertures 24,30 defined along a post-exiting face 36 opposed from the mating face. Housing 12 includes a

pair of guide slots 38 extending into cavity 16 along opposed side wall surfaces 40. The housing is shown integrally joined to an angled work end projection 84 of tool handle 80 at a frangible section 82.

5 A plurality of contacts 14 is seen in FIG. 4, joined to a carrier strip 42 to facilitate forming of the contacts and assembly thereof into housings 12, as well as handling prior to assembly, with contacts 14 being removed from carrier strip following assembly into
10 respective housings 12. One contact 14a is shown after being stamped but prior to forming. Contact 14 includes a body section 44, first and second contact sections 46,48 extending from opposed ends of the body section, and a pair of tabs 50 bent laterally outwardly from side
15 walls 52,54 of body section 44 to define short flanges at the tab free ends 56. Tabs 50 are associated with guide slots 38 and pass therealong during assembly of contact 14 into cavity 16, and the flanges at tab free ends 56 are adapted to define a force fit within the
20 guide slots by virtue of spring bias from tabs 50. Providing the retention tabs centrally between the pair of contact sections enables minimizing the length of the contact and the housing therefor.

Each contact section 46,48 includes a base 58 and a
25 pair of opposed spring arms 60,62 coextending from side edges thereof and initially converging, with diverging free ends defining a post-engaging constriction 64. Bases 58 are integral with preferably planar body section 44, and a hole 66 is provided in base 58 aligned
30 with constriction 64. Upon assembly of contact 14 into cavity 16, the contact sections 46,48 are positioned between post-receiving and post-exiting apertures 22,24 and 28,30 of respective pairs; thus, respective posts (not shown) are able to enter apertures 22,28, pass
35 through constrictions 64 and holes 66 and extend outwardly through apertures 24,30. An insertion end 68 of contact 14 includes a projection 70 that is received

into a corresponding slot 72 in rear wall 74 of housing 12 upon full contact insertion into cavity 16.

After mounting of shunt assembly 10 onto an associated pair of adjacent posts to be commoned, tool handle 80 is easily removed by being broken from housing 12 at frangible section 82. Angled work end projection 84 offsets the shunt assembly from the tool handle and the applier's hand, enabling clear visual inspection of the shunt assembly application to the selected pair of posts to be commoned.

FIGS. 5 and 6 illustrate an initially integral strip 86 of tool handles 80 with respective shunt assemblies 10 integrally joined thereto. Tool handles 80 are joined to each other at additional frangible sections 88. Strip 86 further includes end sections 90 that may conveniently serve as shunt-removal tools and are joined to strip 86 by frangible sections 88, with each end section defining a recess 92 with a pair of opposed slots 94; handles of end sections 90 coextend with handles 80 so that the integral strip 86 is of a compact design. Upon insertion over a respective shunt that is mounted on a pair of posts, the shunt is urged into a recess 92 until ledges 96 at opposed ends 26, 32 of shunt housing 12 latch into slots 94, whereafter the shunt is pulled off the associated posts.

The present invention greatly simplifies manufacture and assembly of the shunt, and greatly simplifies application of the miniature shunt to a pair of posts of a circuit board post array; the present invention minimizes the size of the shunt housing and contact while assuring retention of the contact in the housing. The contacts may be initially integrally joined to a carrier strip, and the housings initially joined in an integral strip; the contact members may be inserted simultaneously into respective housings. The housings may be joined to respective handles that provide insertion tools useful in the midst of a post array, with the strip of handles/shunts providing

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initially integral insertion and removal tools for
convenience of the applier.

WHAT IS CLAIMED IS:

1. An electrical shunt assembly, comprising:
an insulative housing having a mating face, an
opposed face, and an assembly face and opposed rear wall
5 both orthogonal to said mating face and said opposed
face, said housing including a contact-receiving cavity
extending from an entrance at said assembly face, and
said housing including at least two post-receiving
apertures extending through said mating face and at
10 least into said contact-receiving cavity; and
a contact member insertable into said contact-
receiving cavity from said entrance, said contact member
having a body section with a retention section, and
further having at least two post-engaging contact
15 sections aligned with respective said post-receiving
apertures upon full insertion.
2. The shunt assembly of claim 1 wherein said body
section includes a projection extending from a leading
end thereof to be received into a corresponding slot in
20 said rear wall of said housing upon full contact
insertion into said contact-receiving cavity.
3. The shunt assembly of claim 1 wherein said body
section includes a post-receiving hole therethrough
aligned with each said post-receiving aperture, and said
25 opposed housing face includes other post-receiving
apertures aligned with said post-receiving apertures of
said mating face, whereby said shunt assembly is adapted
for ends of posts to extend therethrough from said
mating face to beyond said opposed face while engaging
30 respective said post-engaging contact sections.
4. The shunt assembly of claim 1 wherein a
plurality of said contact members are initially
integrally joined to a carrier strip, and a plurality of
said housings are initially joined to an integral strip,
35 enabling mass assembly of said contact members into
respective said housings.
5. The shunt assembly of claim 1 wherein said body
section is disposed proximate said opposed housing face,

said post-engaging contact sections each comprise a pair of fingers coextending from said body section to converging deflectable free ends disposed adjacent a respective said post-receiving aperture.

- 5 6. The shunt assembly of claim 5 wherein said retention section comprises a pair of tabs coextending from edges of said body section between said contact sections, each said tab concluding in a short extending flange extending laterally outwardly therefrom, and said
- 10 housing includes opposed flange-receiving grooves defined into sidewalls of said contact-receiving cavity from said entrance, such that upon insertion of said contact member into said cavity, said flanges are guided along said grooves, and said tabs are spring biased
- 15 toward each other as said flanges bear against bottoms of said grooves in a friction fit for contact retention.