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②② Date of filing: 16.01.81

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The invention also comprises a method of making a carrier strip and the electrical contact members. The method comprises producing an elongate metallic strip having a number of contact portions extending at right angles from the strip and a number of cantilevered portions. Contact legs are inserted between the cantilevered portions and the strip in line with each contact portion and welded in position. A portion of the strip is then cropped out so that each contact portion is supported by a contact leg which, in turn, is supported on the strip by the cantilevered portion.



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IMPROVEMENTS IN OR RELATING TO CARRIER STRIPS FOR
ELECTRICAL CONTACT MEMBERS AND METHODS OF MAKING
SUCH CARRIER STRIPS AND THE ELECTRICAL CONTACT MEMBERS.

This invention relates to carrier strips for electrical
5 contact members and to methods of making such carrier
strips and electrical contact members.

It is an object of the present invention to
provide a carrier strip for electrical contact members
which will securely hold the contact members even
10 when the carrier strip is guided round quite sharp
corners and which will also allow the electrical
contact members to be readily removed therefrom for
insertion into electrical apparatus such as a multi-
contact electrical connector. A further object
15 of the invention is to provide a simple and cheap
method of making carrier strips for electrical contact
members and the electrical contact members.

According to the present invention a carrier
strip for electrical contact members comprises an
20 elongate metallic strip having formed therein a
plurality of orifices, the orifices being shaped to
result in the formation of a plurality of cantilevered
portions in the metallic strip each of which is
deformable out of the plane of the metallic strip to
25 permit the insertion between each cantilevered portion

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and the metallic strip of at least a portion of an electrical contact member.

Thus a plurality of pairs of orifices may be formed in the metallic strip each pair comprising
5 substantially U-shaped orifice, and a substantially rectangular shaped orifice arranged between the two limbs of the U-shaped orifice to form a substantially U-shaped cantilevered portion in the metallic strip.

The substantially U-shaped orifice and the
10 substantially rectangular shaped orifice may be connected by a cutaway portion in the metallic strip to form two substantially L-shaped cantilevered portions in the metallic strip.

The invention also comprises a method of making
15 a carrier strip and electrical contact members comprising the steps of producing an elongate metallic strip having a plurality of contact portions formed thereon and a plurality of orifices formed therein, the orifices being shaped to result in the formation
20 of cantilevered portions in the metallic strip in line with the contact portions, each cantilevered portion being deformable out of the plane of the metallic strip to permit the insertion between each cantilevered portion and the metallic strip of at
25 least a portion of an electrical contact member,

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inserting a contact leg between each cantilevered portion and the metallic strip in line with each contact portion, welding the contact leg to the metallic strip and cutting the metallic strip whereby the contact portion is severed from the metallic strip and retained on the contact leg.

Preferably the metallic strip with the contact portions is made by pressing.

The metallic strip is preferably formed with the contact portions projecting at right angles from one side of the axis of the metallic strip, but may be formed with contact portions projecting from both sides of the carrier strip. In this case the carrier strip is separated along its central axis before the contact legs are located in position.

Embodiments of the invention will now be described by way of example only with reference to the accompanying drawings in which

Figure 1 shows a portion of a carrier strip for electrical contacts according to the present invention

Figure 2 is a cross-sectional view of the carrier strip shown in Figure 1 along the line 2-2 and

Figures 3 shows a portion of a modified form of carrier strip.

In Figure 1 there is shown part of a carrier

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strip 32 which is formed by pressing. The strip includes a plurality of contact portions 12 extending at right angles to the longitudinal axis of the strip and a number of slots 50 having a substantially U-shape and a number of slots 34 having a substantially rectangular shape positioned within the legs of the U-shaped slots 50. A further slot 52 connects the slots 50 and 34 to form two substantially L-shaped portions 36 in the carrier strip 32. These portions are cantilevered and are deflectable away from the plane of the carrier strip 32.

The portions 36 are formed in line with the contact portions 12 and in between these portions 36 and the carrier strip 32 are fed contact legs 16, one in line with each of the contact portions 12. The portions 36 hold the contact legs 16 in contact with the carrier strip 32 by spring force.

Each contact leg 16 is then welded to the contact strip 32 at a spot 18 adjacent to the lower end of its respective contact portion 12.

A part 42 (shown cross-hatched in Figure 1) of the carrier strip is now cut away between the contact portions 12, the part 42 reaching slots 40 formed in the carrier strip 32 so that the contact portions are completely detached from the carrier strip 32.

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The carrier strip 32 now acts purely as a bandolier, supporting the contact legs 16 with the contact portions 12 welded to the ends of the contact legs 16. The connectors thus formed can then easily be removed from the bandolier and inserted into, for example, an electrical edge connector.

The slots 34, 40, 50 and 52 can be formed in the same pressing operation as the formation of the carrier strip 32, or any of the slots can be formed immediately before the welding operation.

The carrier strip 32 may be formed with contact portions 12 extending at right angles from opposite sides of the strip. This strip is then parted along its central axis to produce two separate carrier strips.

Figure 2 is a cross-sectional view of the carrier strip 32 showing the cantilever springs 36 acting on the contact legs 16 as shown in Figure 1. The springs can be two L-shapes 36 or a single U-shape 38 as shown in Figure 3. In the former case the finished connector can be withdrawn from the bandolier by pulling the legs 16 lengthwise out from under the springs 36 or by pulling perpendicularly from the strip 32. In the latter case the legs 16 can only be withdrawn by pulling them lengthwise from under the spring 38.

Slightly raised portions 44 are provided on the strip

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to facilitate the welding operation.

In the two embodiments selected parts of the contact portions 12 may be plated, such as with gold, prior to the welding operation or prior to the parting operation.

Also in each case the welding operation may be carried out by welding one leg 16 at a time or a predetermined number of legs can be fed at a known speed under a weld head which is pulsed to coincide with the parts to be welded.

Alternatively the carrier strip can be fed continuously under a weld head which can be arranged to pulse continuously and possibly weld more than once on any leg. Any suitable method of welding can be used.

As well as the legs 16 being retained on the carrier strip by the springs described, additional external means of clamping and locating the legs to the strip can be arranged.

Either prior to welding or after welding and cropping, the legs 16 can be moveable axially on the carrier strip 32 so that subsequent processes such as swaging or forming the leg can be carried out.

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WHAT WE CLAIM IS:

1. A carrier strip for electrical contact members comprising an elongate metallic strip having formed therein a plurality of orifices characterised in
5 that the orifices (34, 50, 52) are shaped to result in the formation of a plurality of cantilevered portions (36, 38) in the metallic strip (32) each of which is deformable out of the plane of the metallic strip (32) to permit the insertion between each cantilevered
10 portion (36, 38) and the metallic strip (32) of at least a portion (16) of an electrical contact member.

2. A carrier strip as claimed in claim 1 characterised in that a plurality of pairs of orifices (34, 50) are formed in the metallic strip (32), each pair
15 comprising a substantially U-shaped orifice (34) arranged between the two limbs of the U-shaped orifice (50) to form a substantially U-shaped cantilevered portion (38) in the metallic strip (32).

3. A carrier strip as claimed in claim 2 characterised in that the substantially U-shaped orifice (50) and
20 the substantially rectangular shaped orifice (34) are connected by a cutaway portion (52) in the metallic strip (32) to form two substantially L-shaped cantilevered portions (36) in the metallic strip (32).

25 4. A method of making a carrier strip and electrical

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contact members characterised by the steps of
producing an elongate metallic strip (32) having
a plurality of contact portions (12) formed thereon,
and a plurality of orifices (34, 40, 50) formed therein,
5 the orifices being shaped to result in the
formation of cantilevered portions (36, 38) in the
metallic strip (32) in line with the contact portions
(12), each cantilevered portion (36, 38) being deformable
out of the plane of the metallic strip (32) to permit
10 the insertion between each cantilevered portion
(36, 38) and the metallic strip (32) of at least a
contact leg (16) between each cantilevered portion (36, 38)
and the metallic strip (32) in line with each contact
portion (12) welding the contact leg (16) to the metallic
15 strip (32) and cutting the metallic strip (32) whereby
the contact portion (12) is severed from the metallic
strip (32) and retained on the contact leg (16).

5. A method as claimed in claim 4 characterised
in that the metallic strip (32) with the contact
20 portions (12) is made by pressing.

6. A method as claimed in claim 4 or claim 5
characterised in that the metallic strip (32) is formed
with the contact portions (12) projecting at right
angles from one side of the axis of the metallic strip.

25 7. A method as claimed in claim 4 or claim 5

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characterised in that the metallic strip (32) is
formed with the contact portions (12) projecting
from both sides of the metallic strip (32,) the
metallic strip (32) being separated along its central
5 axis before the contact legs (16) are located in
position.

