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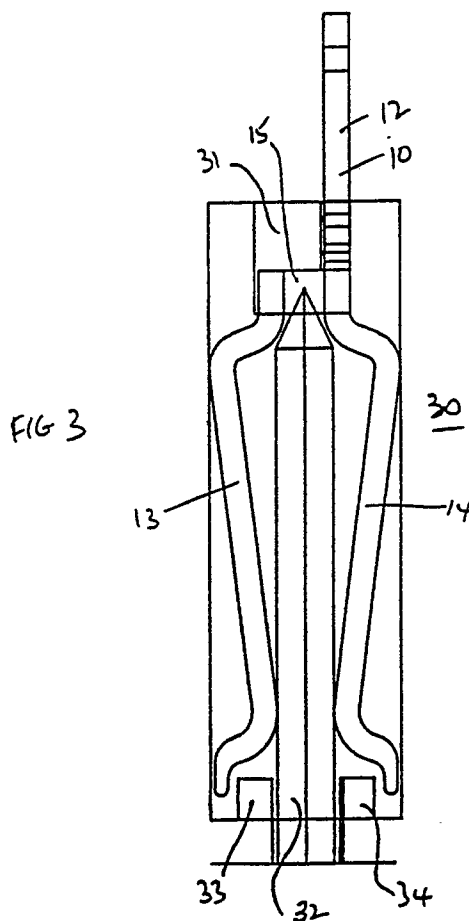
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54 **Contact.**

57 A socket contact (10) is capable of being stamped from sheet material and subsequently formed. The contact has a socket portion for accepting a pin and a terminal portion (12). The socket portion has a pair of mutually facing leg members (13,14) and a bridge portion (15) joining the leg members (13,14). The bridge portion (15) is substantially U-shaped with spacing of the leg members (13,14) where they extend from the bridge portion (15) being less than the size of the pin to be accepted. The leg members (13,14) are cranked to provide a maximum spacing between the leg members (13,14) towards the ends thereof joined by the bridge portion (15) and a reduced spacing between the leg members (13,14) in the region of their free ends to provide resiliently biased contact with a pin, in use.



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IMPROVEMENTS IN CONTACTS

The invention relates to contacts, and more particularly to contacts for use in multi contact socket assemblies for mating with multi pin male connector elements.

In multi pin contacts, pin spacing is close, a typical example being 2.54mm where pin size is 0.635mm. It has been a problem to produce socket contacts by stamping and forming from sheet material using simple tooling of a size capable of accepting a square pin of a size such as 0.635mm square formed at a pitch of 2.54mm. The problem exists for other sizes and pitches.

Elaborate proposals have been made, or simple proposals for a U-shaped socket having parallel spaced contact arms have meant that, in order to provide adequate socket size for pin acceptance, the pitch of socket formation is greater than the pin pitch, so that sockets have to be stamped at double pin pitch, resulting in a double insertion step of socket rows into a connector body to achieve sockets at the desired pitch.

According to the invention there is provided a socket contact capable of being stamped from sheet material and subsequently formed, which contact comprises a socket portion for accepting a pin, in use, and a terminal portion for connection to a conductor or the like, the socket portion comprising a pair of mutually facing leg members between which a pin is engageable, in use, and a bridge portion joining the leg members remote from their free ends, the bridge portion being substantially U-shaped with spacing of the leg members where they extend from the bridge portion being less than the size of the pin to be accepted by the socket, the leg members having a cranked profile to provide a maximum spacing between the leg members towards the ends thereof joined by the bridge portion and a reduced spacing between the leg members in the region of their free ends to provide resiliently biased contact with a pin, in use.

The free ends of the leg members may open away from one another to ease entry of a pin, in use.

The leg members may be gold coated in the region of reduced spacing.

The terminal portion may be an insulating displacement contact portion.

The invention further provides a stamped sheet of conductive material suitable for forming a series of contacts for use in a female connector, which stamped sheet provides an elongate attachment portion and a multiplicity of planar contact portions arranged side by side and attached to said attachment portion, each contact portion having a bridge portion, a pair of leg members extending from the

bridge portion and being formable into a contact according to the invention, spacing of the contact portions corresponding to the pitch of pins of a male connector assembly with which the female connector is to mate, in use.

The invention further provides a series of contacts according to the invention stamped from sheet material and connected together by material of said sheet prior to insertion into a female connector block, spacing of the contacts corresponding to the pitch of pins of a male connector assembly with which the female connector is to mate, in use.

The invention further provides a method of making socket contacts according to the invention ready for insertion into a female connector block at a pitch corresponding to the pitch of pins in a corresponding male connector assembly, which method comprises stamping planar contact portions from flat sheet material such that the contact portions are connected together by material of said sheet, each contact portion having a bridge portion and a pair of leg members extending from the bridge portion, forming the contacts by bending the bridge portion of each contact portion to form a U-shape, and cranking the leg members to provide said maximum and reduced leg member spacings.

The method may include a step of gold coating the leg members in the reduced spacing region after stamping but prior to forming the final shape.

The invention further provides a method of making and inserting contacts according to the invention into a female connector block comprising the method of making contacts according to the invention and a further step of inserting formed contacts into the female connector block at the pitch of pins with which the sockets are to mate, in use.

The insertion step preferably includes a step of inserting the contacts connected together by material of the sheet, and removing the connecting sheet material after insertion.

By way of example, one embodiment of a socket contact according to the invention and a method of manufacturing the contact will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a plan view of a series of socket contacts stamped from sheet material but not formed into final contact shape;

Figure 2 is a perspective view of a complete socket contact according to the invention; and

Figure 3 is a side view of the socket contact of Figure 2 located in material of a female connector block and engaged by a pin of a male connec-

tor.

Figure 1 illustrates a series of contacts 10 stamped from conducting sheet material 11. Each contact 10 has an insulation displacement portion 12 although it will be appreciated that other types of terminal portion could be used. Each contact 10 has a pair of leg members 13, 14 connected by a bridge portion 15.

The length of the bridge portion 15 is such that if the leg members 13 and 14 were kept essentially straight and the bridge portion 15 bent into a U-shape, the spacing of the leg members 13 and 14 would be substantially less than that required to accept a pin of size typically used in male connectors, for example 0.635mm. The pitch at which the contacts 10 are stamped corresponds, however, to the pitch commonly used in connectors, namely 2.54mm, this being achieved by the shortness of the bridge portion 15 in the contacts 10.

Subsequent to stamping, the bridge portion and leg members are formed to provide the final contact shape shown in Figure 2. Figure 2 illustrates clearly how small the bridge portion becomes when in U-shape and the leg members are formed at this stage with respective outwardly cranked portions 16, 17 and inwardly cranked portions 18, 19 in the leg members 13, 14. This produces leg member profiles with a maximum spacing between the leg members at the ends thereof approaching the bridge portion 15 and a reduced spacing in a region towards the free ends of the leg members 13 and 14.

The leg members are formed with further outwardly cranked portions 20, 21 respectively at their free ends to allow ease of acceptance of a pin in use.

Prior to formation of the shape shown in Figure 2, the regions of the leg members 13 and 14 in the region of the free ends where, in the final form, spacing between the leg members is reduced may be gold plated. Because of the simplicity of the forming operation, gold plating can take place after stamping.

Figure 3 shows a contact 10 in position within a female connector block 30. The block 30 has a passageway 31 therethrough, from one end of which emerges the terminal portion 12 and through the other end of which passes a pin 32. The small dimension of the bridge portion 15 advantageously allows the passageway 31 to be of small dimension at that end thereof.

Ribs 33 and 34 extend into the passageway to lie inside free ends of the legs 13 and 14 to act as stops to prevent the leg members 13 and 14 approaching each other too closely at the reduced spacing region and thus causing difficulty of entry of the pin 32.

Figure 3 illustrates clearly how the pin 32 is

substantially larger than the U-shape bridge portion 15 and how the cranking of the leg members 13 and 14 provides a comfortable entry profile for the pin 32 between the leg members in the region of their free ends.

Forming contacts in this shape allows spacing of the contacts in the stamped sheet to be much closer than has hitherto been possible and enables socket contacts to be able to accept a standard pin size and yet still be stamped at 2.54mm pitch, yet requiring no complex metal forming to produce a workable configuration. The fact that a simple operation is involved in formation of the leg shapes means that gold coating of selected parts can be carried out before formation while the contacts are all still held together. Since the socket pitch is the same as the pin pitch, each row of sockets can be inserted in a single operation rather than a double operation which has hitherto been necessary where sockets have been formed at double pin pitch.

It will be appreciated that the foregoing description is by way of example only and that modifications and alterations may be made within the scope of the invention.

Claims

1. A socket contact capable of being stamped from sheet material and subsequently formed, which contact comprises a socket portion for accepting a pin, in use, and a terminal portion for connection to a conductor or the like, the socket portion comprising a pair of mutually facing leg members between which a pin is engageable, in use, and a bridge portion joining the leg members remote from their free ends, the bridge portion being substantially U-shaped with spacing of the leg members where they extend from the bridge portion being less than the size of the pin to be accepted by the socket, the leg members having a cranked profile to provide a maximum spacing between the leg members towards the ends thereof joined by the bridge portion and a reduced spacing between the leg members in the region of their free ends to provide resiliently biased contact with a pin, in use.

2. A socket contact as claimed in Claim 1 wherein the free ends of the leg members open away from one another to ease entry of a pin, in use.

3. A socket contact as claimed in Claim 1 or Claim 2 wherein the leg members are gold coated in the region of reduced spacing.

4. A socket contact as claimed in any one of Claims 1 to 3 wherein the terminal portion is an insulating displacement contact portion.

5. A stamped sheet of conductive material suit-

able for forming a series of contacts for use in a female connector, which stamped sheet provides an elongate attachment portion and a multiplicity of planar contact portions arranged side by side and attached to said attachment portion, each contact portion having a bridge portion, a pair of leg members extending from the bridge portion and being formable into a contact as claimed in any one of Claims 1 to 4, spacing of the contact portions corresponding to the pitch of pins of a male connector assembly with which the female connector is to mate, in use.

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6. A series of contacts as claimed in any one of Claims 1 to 4 stamped from sheet material and connected together by material of said sheet prior to insertion into a female connector block, spacing of the contacts corresponding to the pitch of pins of a male connector assembly with which the female connector is to mate, in use.

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7. A method of making socket contacts as claimed in any one of Claims 1 to 4 or 6 ready for insertion into a female connector block at a pitch corresponding to the pitch of pins in a corresponding male connector assembly, which method comprises stamping planar contact portions from flat sheet material, such that the contact portions are connected together by material of said sheet, each contact portion having a bridge portion and a pair of leg members extending from the bridge portion, forming the contacts by bending the bridge portion of each contact to form a U-shape, and cranking the leg members to provide said maximum and reduced leg spacings.

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8. A method as claimed in Claim 7 comprising a step of gold coating the leg members in the reduced spacing region after stamping but prior to forming the final shape.

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9. A method of making and inserting socket contacts as claimed in any one of Claims 1 to 4 into a female connector block comprising the method as claimed in Claim 7 or Claim 8 and a further step of inserting formed contacts into the female connector block at the pitch of pins with which the sockets are to mate, in use.

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10. A method as claimed in Claim 9 wherein the insertion step includes a step of inserting the contacts connected together by material of the sheet, and removing the connecting sheet material after insertion.

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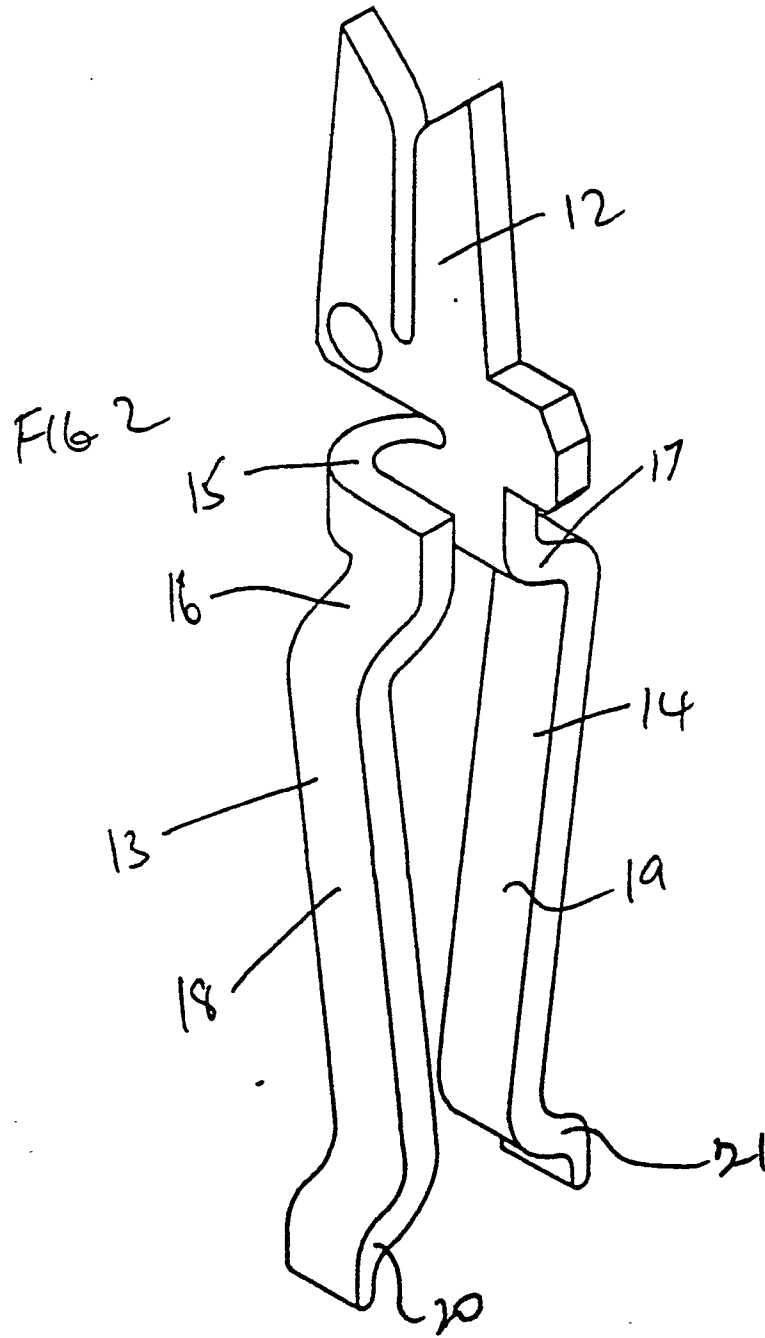
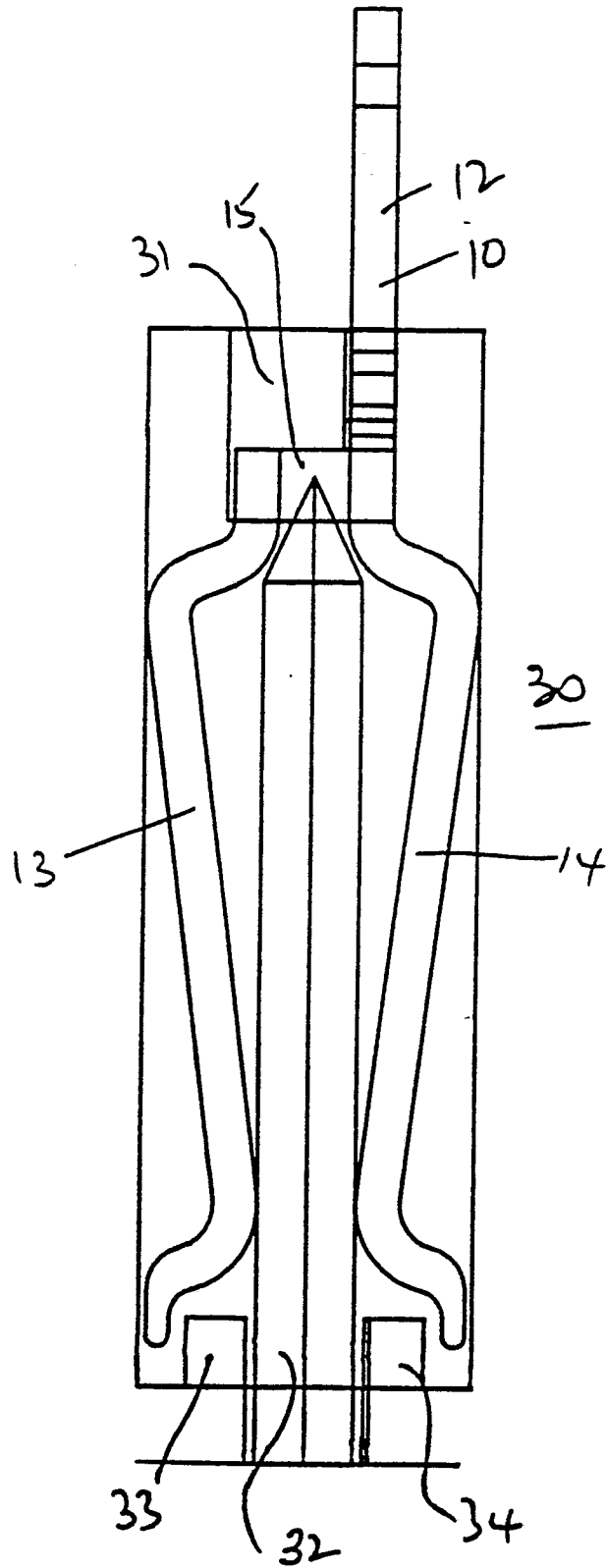


FIG 3





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	FR-A-2 270 694 (BUNKER RAMO CORP.) * page 5, lines 1-30; figure 2 * ---	1	H 01 R 13/115
A	DE-A-3 441 134 (CANNON ELECTRIC GMBH) * page 7, line 17 - page 8; figure 4 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			H 01 R 13/00
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 02-02-1990	Examiner CLOSA D.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			