

Aug. 22, 1967

R. R. DAMIANO ET AL

3,337,838

WIPING CONTACT

Filed Dec. 16, 1964

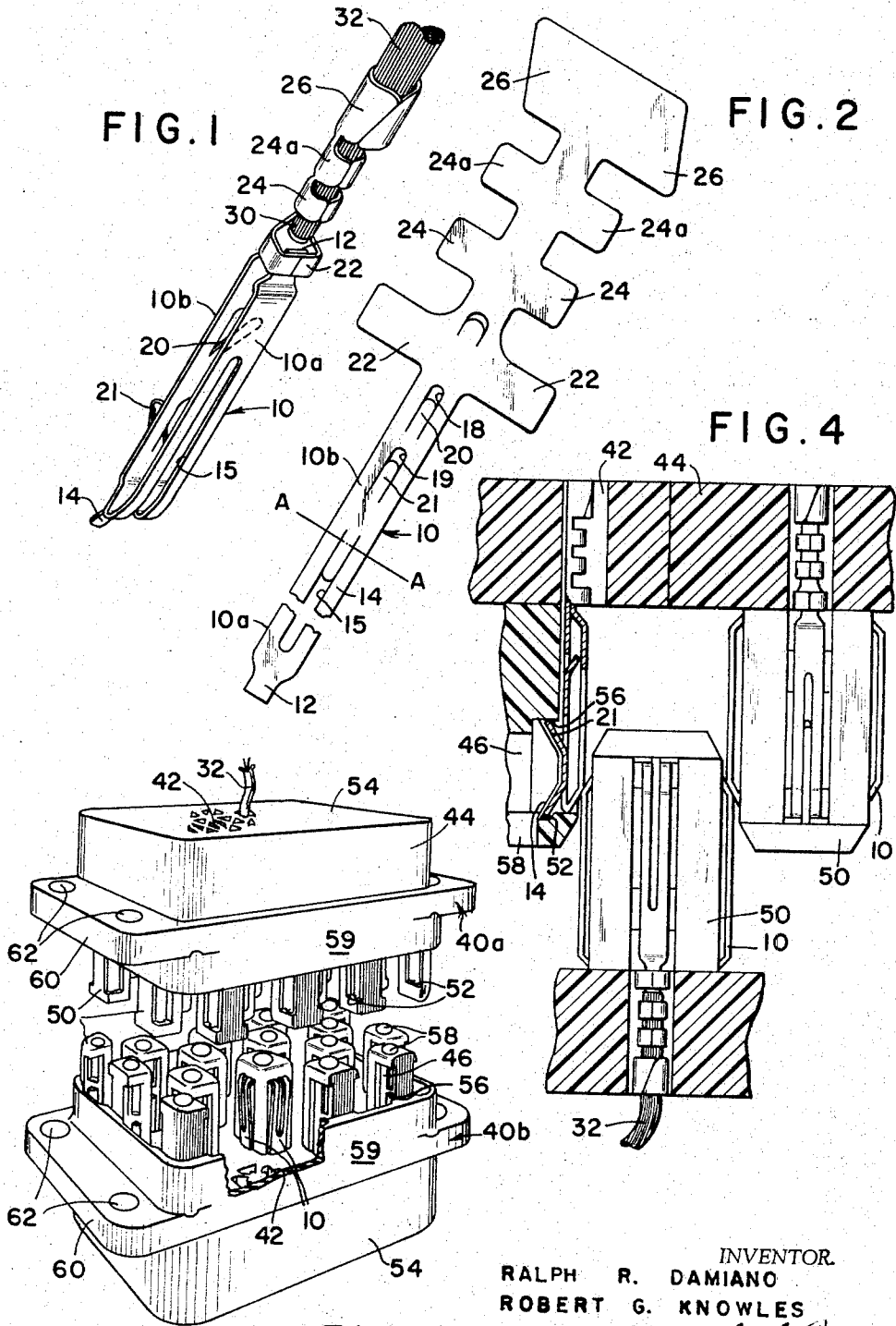


FIG. 3

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3,337,838

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Filed Dec. 16, 1964, Ser. No. 418,749

2 Claims. (Cl. 339—217)

ABSTRACT OF THE DISCLOSURE

A separable electrical connector in which an insulating housing having a plurality of extending posts and recessed sockets is provided with contact members mounted to the posts. The posts are shaped to receive the contacts in openings therein and the contacts are shaped to interlock with the posts. Means for permitting release of the contacts from the post are included.

This invention relates to an electrical contact and more particularly to a wiping contact which may be readily inserted into the socket of a mating connector, and securely supported therein.

The problem of secure retention of individual electrical contacts arises especially in multiple connectors in which dozens and sometimes hundreds of terminal contacts are individually inserted. When the mating connectors are coupled together, a failure in alignment and/or retention of a single contact may destroy the integrity of the entire connector.

Among the objects of this invention are to provide individual electrical contacts that are self aligning when inserted; that will seat themselves accurately in a socket; that provide multiple wiping surfaces to insure maximum area of contact; that are readily deflectable and self adjusting; that may be made of a single piece of sheet metal; that are individually replaceable; that are relatively simple to insert, reliable in operation and easy to connect and disconnect.

These and other objects are accomplished, and new results obtained as will be apparent from the device hereinafter described, particularly pointed out in the attached claims, and illustrated in the accompanying drawings in which:

FIG. 1 is a perspective view of an electrical terminal contact made in accordance with the invention;

FIG. 2 is a development plan view of the sheet metal blank from which the contact is made;

FIG. 3 is a perspective view of a pair of mating electrical connectors which may employ the terminal contacts of FIG. 1;

FIG. 4 is a sectional view taken through a pair of mating connectors into which the terminal contact has been inserted.

Referring now more in detail to the drawings, in FIGS. 1 and 2, reference numeral 10 designates generally a sheet metal blank in the form of a flat stamping from which the terminal contact is developed.

Accordingly the blank is provided with a lip portion 12, a slot 15 from which a portion of the metal is removed and a portion is retained to form a tongue 14 positioned in the slot, a second tongue 20 similarly formed in a slot 18, and still a third tongue 21 formed in a slot 19; a pair of ears 22 extending laterally from both sides of the body of the blank 10, a double pair of ears 24 and 24a longitudinally spaced from ears 22, and a pair of insulation gripping ears 26 are also included.

In production, the blank is folded back upon itself approximately along line A—A to form a set of parallel spaced apart surfaces 10a and 10b. Tongue 14 is bent

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to extend somewhat at an angle to the plane of the rear face 10b as shown in FIG. 1. Tongue 21 is likewise bent outwardly to extend at an angle to the face 10b in a direction substantially opposite the direction of tongue 14.

To create greater stiffness, for a purpose discussed below, tongue 21 may be formed into the spout or channel shape shown. Further, tongue 20 is either separately or simultaneously bent inwardly to extend from the inner face of portion 10b toward the back of face 10a; this tongue thus serves as a back-up support for face 10a, adding to its stiffness and preloading it to achieve higher and more positive contact pressure. Ears 22 are then formed into a bridge over the extending lip 12 to help maintain the portion 10a in preloaded relationship substantially parallel to face 10b.

Tongue 21 is bent to extend outwardly from the rear face 10b for a purpose hereinafter explained.

In use, after portions 10a and 10b have been shaped as described a conductor 30 is placed along the axis of the blank between ears 24 and 24a and the ears are then crimped over to grip the conductor. Ears 26 are similarly crimped over to grip the shroud or insulation 32 on the conductor.

The terminal contact thus formed and installed on a conductor, may be employed in a composite connector assembly such as is formed by the terminal blocks 40a and 40b, shown in FIGS. 3 and 4. Each block is provided with socket apertures 42 which project through the base 44 and open into the slots 46 formed in the sides of upright plugs 50. The plugs 50 are arrayed in a checkerboard pattern on the base 44. Face 10a of the formed contact 10, serves as a wiping area for a corresponding contact which is mounted in cooperating position on the complementary connector block as shown in FIG. 4. The tongue 14 is positioned in an aperture 52 which is formed in the top of each slot 46. As illustrated, it serves to more securely position the tip of the contact within slot 46; it may however be deleted entirely, if desired, to facilitate extraction of the contact from the connector block.

Each contact is inserted into a socket 42 from the back face 54 of the block 40a or 40b. At an appropriate point intermediate the ends of the slot 46, a small shoulder 56 is formed on the base of the slot for engaging the springy tongue 21 which projects outwardly from the rear of the contact. When the contact has been fully inserted into the socket this shoulder thus securely locks it against inadvertent withdrawal. If desired, an aperture 58 may be provided in the top of each plug 50, opening into each slot 46, to permit a suitable tool to be inserted into the socket for deflecting the tongue 21 to disengage it from the shoulder 56. This procedure thus permits extraction of the contact from the socket for replacement or inspection. Similarly, a tool may be inserted from back face 54 between the contact and the base of slot 46 for the purpose of deflecting the entire contact sufficiently to disengage tongue 21 from shoulder 56. Two extraction procedures are thus possible.

When the sockets are filled with the required number of contacts, duly connected, the two connector halves are mated, the plugs 50 from one connector half fitting into the space between the plugs of the other connector half. The individual plugs may be rectangular in cross-section, with each face thereof other than those on the outer perimeter of the array filled with engaging contacts.

The mating blocks 40a and 40b may be made of any suitable insulating material such as a polycarbonate, and provided with abutting flanges 59 to enclose the plugs when contact is made. Extensions or lips 60 may also be formed on the blocks, having openings 62 for receiving connecting bolts (not shown) used in clamping the two connector halves together.

The contact 10, made of a conductive metal such as copper or brass suitable for electrical purposes, may readily be made sufficiently wide and thick to provide adequate current carrying capacity for its intended purpose. It is preferably work hardened, or made of springy material to function as a resilient contact.

The contact design provides a springy engaging surface for resilient engagement of corresponding contacts. The outward movement of each contact face 10a is limited by the ears 22 which overlap the lip portion 12. Rearward support for face 10a is provided by tongue 20. Tongue 21 simply and securely locks the contact in its housing. The slot from which tongue 14 is formed also permits the two segments of face 10a thus formed to act substantially independently in adjusting to any unevenness in a mating surface. The ears 24, 24a and 26 provide a substantial electrical and mechanical grip on the conductor 30 and its insulation 32 respectively.

The invention has thus been described but it is desired to be understood that it is not confined to the particular forms or usages shown and described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of the invention; therefore, the right is broadly claimed to employ all equivalent instrumentalities coming within the scope of the appendent claims, and by means of which objects of this invention are attained and new results accomplished, as it is obvious that the particular embodiments herein shown and described are only some of the many that can be employed to obtain these objects and accomplish these results.

We claim:

1. An electrical connector comprising: a base made of

insulating material having a plurality of extending plugs and a plurality of sockets between adjacent plugs; an open slot formed in the side of an extending plug and opening into one of said sockets, and a recess formed in said slot; a metal contact longitudinally insertable into said slot, having a terminal end for engaging an electrical conductor and a wiping surface for engaging a mating contact; said contact further including a tongue formed thereon for insertion into said slot recess; said contact being inserted into said socket with the wiping surface thereof on the open side of the slot and positioned in said slot; said tongue engaging said recess for preventing inadvertent removal of said contact from said slot.

2. An electrical connector in accordance with claim 1 wherein said plugs include a central longitudinal opening cooperating with said slot and said recess for permitting insertion of a tool adapted to deflect said tongue to disengage it from said recess.

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