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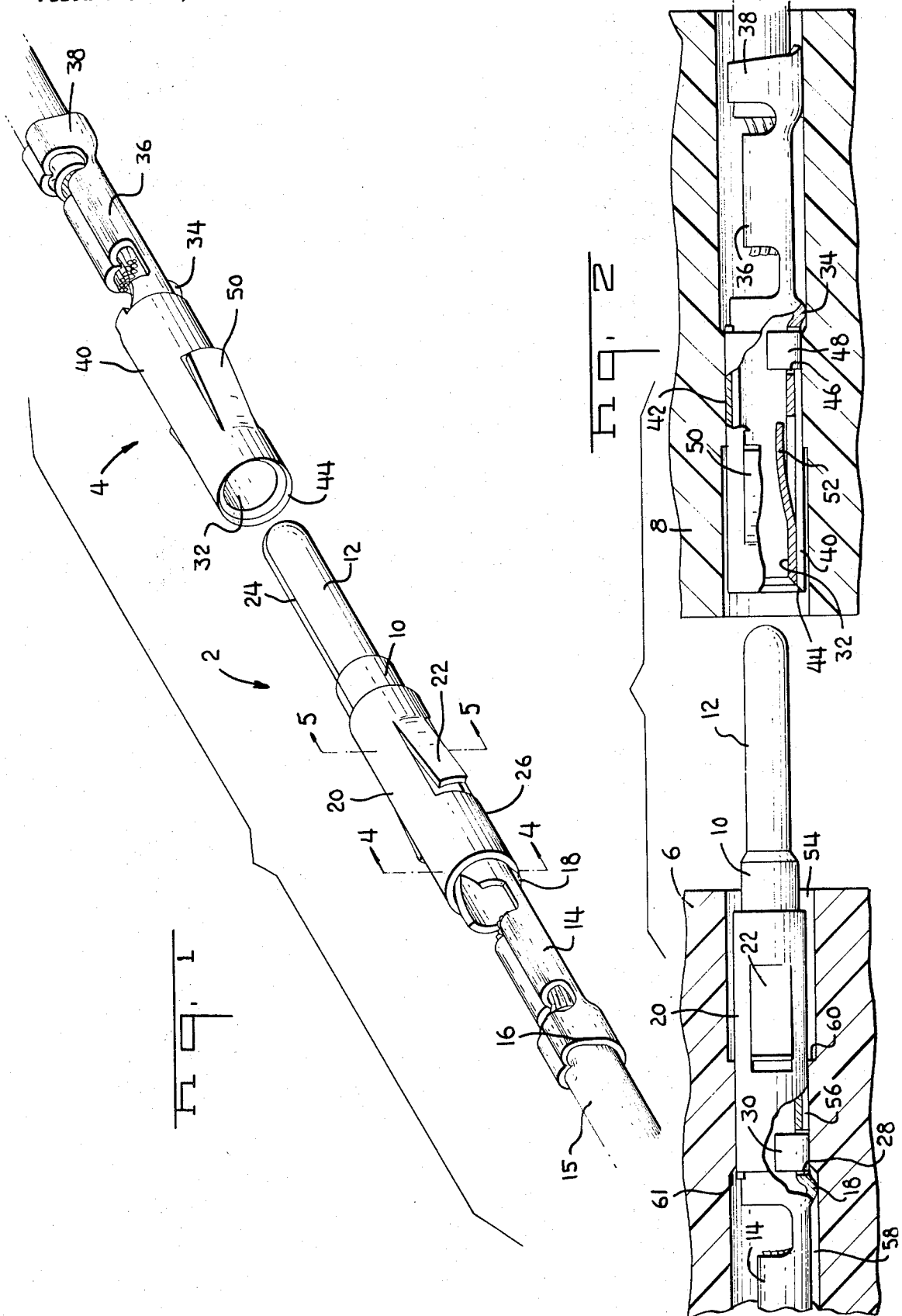
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PIN AND SOCKET TYPE ELECTRICAL CONTACT TERMINALS

Filed Oct. 21, 1968

2 Sheets-Sheet 1



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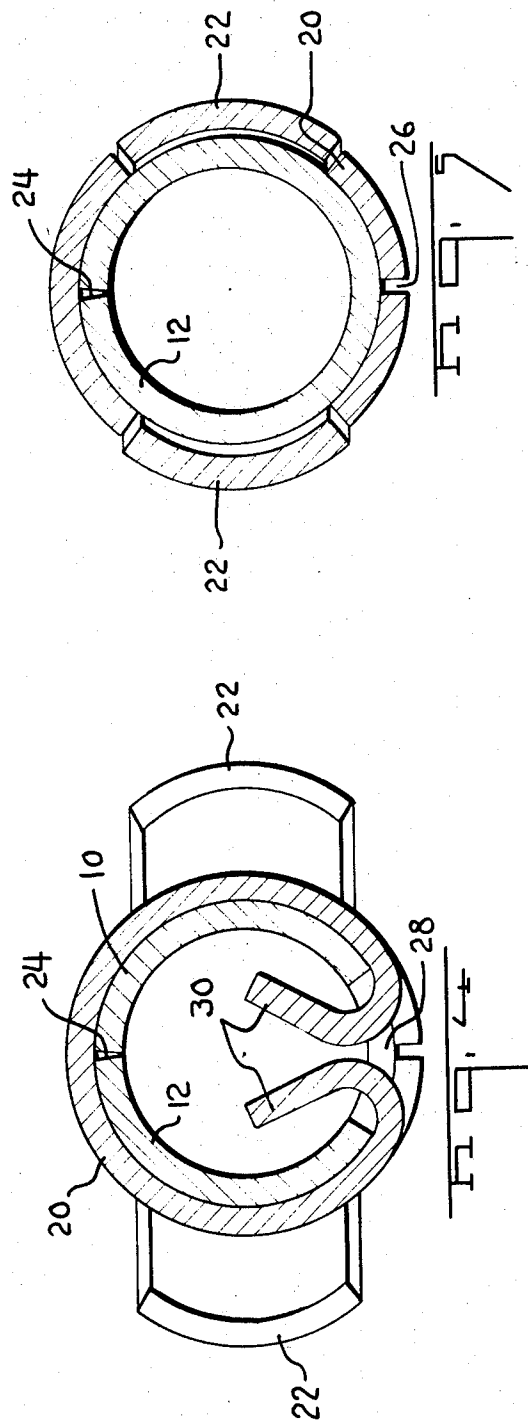
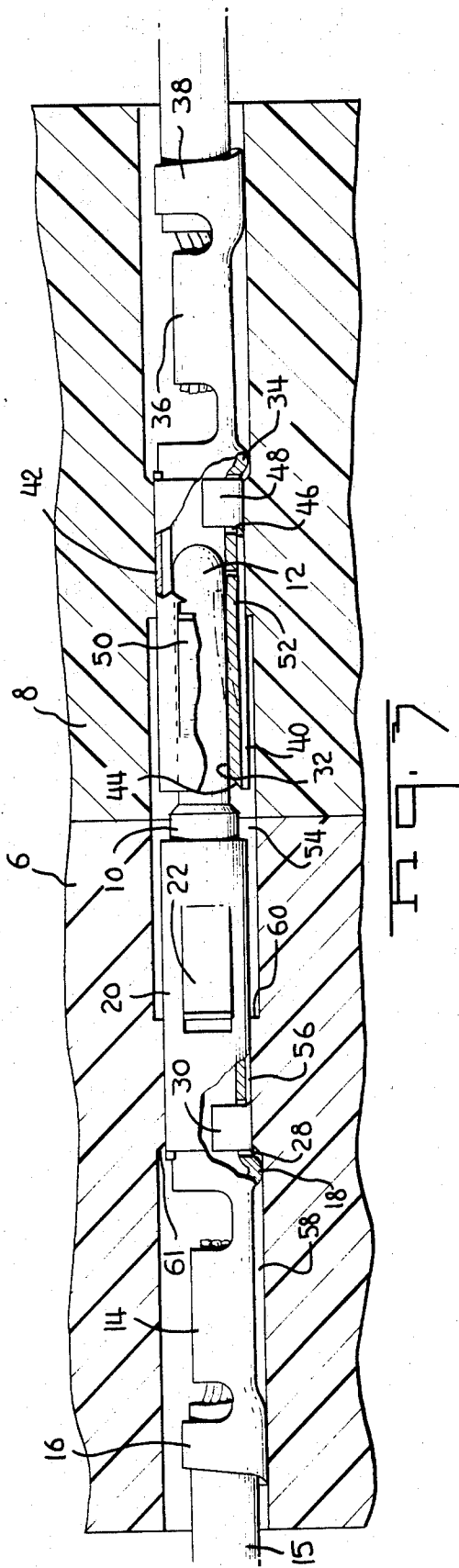
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PIN AND SOCKET TYPE ELECTRICAL CONTACT TERMINALS

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6 Claims

ABSTRACT OF THE DISCLOSURE

Invention relates to pin or socket type contact terminal in which terminal body comprises stamped end formed cylinder, having an axially extending open seam. A stamped and formed sheet metal sleeve is co-axially mounted on the terminal body and has an open seam which is on the opposite side of the terminal from the side of the open seam. The sleeve and the terminal body are secured together, by means of ears on the sleeve, which extend radially inwardly through an opening in the terminal body, the sleeve functioning to cover and protect the contact spring in the terminal body. The principles of the invention can be applied to the manufacture of both pin contacts and socket contacts, one sleeve length being mountable on either type of contact.

BACKGROUND OF THE INVENTION

Pin and socket type electrical contact terminals can be manufactured either from bar stock by conventional screw machine methods or by stamping and forming sheet metal. Generally, the machined pin and socket terminals are regarded as being of higher quality than stamped and formed terminals for the reason, among others, that the stamped and formed terminals will have an axially extending seam which is normally closed but which may not be fully closed if the part is not carefully made. Furthermore, in the case of socket contacts, the axially extending seam may be forced open when a test probe or other foreign instrument is inserted into the contact or if the contact is mated with an oversized contact pin.

The present invention is directed to the achievement of pin and socket type contacts which can be manufactured by stamping and forming methods and which will have the reliability, current carrying ability, and the ruggedness of the more expensive machined type contacts. It is accordingly an object of the invention to provide improved contact terminals which can be manufactured by stamping and forming methods. A further object is to provide a stamped and formed terminal having improved means for maintaining the seam of the terminal in a closed condition and for maintaining the dimensions of the finished contacts. A further object is to provide a stamped and formed terminal which can be manufactured in relatively small sizes. A further object is to provide a contact socket having a sleeve mounted thereon, which functions to protect the contact spring in the socket and prevent it from being overstressed. These and other objects of the invention are achieved in a preferred embodiment, thereof, in which the terminal comprises a generally cylindrical body portion having an axially extending seam. A cylindrical sleeve is fitted over the body portion and has a seam which is disposed on the opposite side of the terminal from the seam of the body portion, the sleeve being secured to the body portion by means of radially inwardly directed ears which extend through an opening in the body portion. By virtue of the fact that these ears are locked to the body portion, the seam of the sleeve is held in a closed condition, that is with its longitudinal edges adjacent to, or against, each other, and the sleeve in turn functions to hold the edges of the seam of the body portion of the

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terminal in closed condition. The principles of the invention can be applied to the manufacture of both pin type and socket type contacts, an added advantage of the invention in the case of socket type contacts being that the sleeve prevents damage to the contact when an oversized test probe or the like is inserted into the end of the contact. Terminals in accordance with the invention are normally provided with open U-type ferrule-forming portions adjacent to one end of the terminal and are produced in the form of a continuous strip so that they can be applied to wire ends by automatic or semi-automatic crimping applicators.

In the drawing:

FIG. 1 is a perspective view of a contact pin and a contact socket in accordance with the invention;

FIG. 2 is a sectional side view showing a pair of contact terminals in accordance with the invention mounted in contact cavities in an insulating block, the parts being disengaged from each other in this view;

FIG. 3 is a view similar to FIG. 2 but showing the parts engaged with each other; and

FIGS. 4 and 5 are views taken along the lines 4—4 and 5—5 of FIG. 1.

An electrical contact pin 2 in accordance with the invention comprises a cylindrical intermediate body portion 10, a reduced diameter leading end 12, which extends from the forward end of the body portion, and a pair of U-shaped crimp portions 14, 16, which are crimped onto the stripped end and, the insulation respectively of a wire 15. Adjacent to the rearward end of the body portion 10, the contact terminal is generally U-shaped and is outwardly formed as shown at 18 to provide a stop, when the terminal is inserted into a cavity in an insulating block 8. Sleeve 20 is provided with divergently extending lances 22 on its opposite sides, which are adapted to retain the pin in a cavity in an insulating housing as will be described below.

Contact terminals in accordance with the invention are conventionally manufactured by stamping and forming methods and will have an axially extending seam 24 on their upper sides as viewed in FIG. 1. Ordinarily, and for reasons of economy, these open seams are not welded or otherwise bonded so that they have a tendency to spring apart or open up after forming. In the disclosed embodiment of the pin contact terminal 2, this tendency is counteracted by the sleeve 20 which also has an axially extending open seam 26 on its underside, as viewed in FIG. 1. The sleeve 20 is secured to the intermediate body 10 of the pin contact, by means of ears 30, which extend inwardly through an opening 28 in the body portion of the pin contact, and which is on the opposite side of the body portion from the seam 24. The ears 30 function to retain the sleeve 20 on the body portion of the contact and to hold the open seam 26 of this body portion in a closed condition so that the sleeve is concentrically arranged with respect to the intermediate body portion of the contact. The sleeve also functions to hold the seam 24 of the body portion 10 in a closed condition by virtue of the fact that the two seams 24, 26 are arranged on opposite sides of the contact terminal. The ears 30 also function to maintain the orientation of the sleeve 20 in the body portion, such that the seams 24, 26 are on opposite sides of the terminal. Finally, these ears 30, function to transmit tensile loads from the wire to the sleeve when the terminal is mounted in an insulating housing. This latter function is important for the reason that the contact terminal is retained in the housing by lances 22 and the tensile load applied to the wire must be transmitted to these lances.

The socket contact 4 in accordance with the invention has a cylindrical body 32, the inside diameter of which is substantially equal to, and slightly larger than, the out-

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side diameter of the end portion 12 of the pin contact, an outwardly formed section 34 against which a sleeve 40 is disposed, and a pair of aligned crimp portions 36, 38 which again are secured to the stripped end and the insulation of a wire. The sleeve 40 may be identical to the sleeve 20 of the pin contact and is secured to the body portion 32 by means of inwardly directed ears 48 which again extend through an opening 46 in the body portion of the socket contact. The open seam 42 of the socket contact is on the opposite side of the terminal, from the open seam 44 of the sleeve, so that the sleeve functions to hold the seam 42 in a closed condition as previously described.

In normal use, pins 2 and socket 4 in accordance with the invention will be mounted in suitable insulating housings 6, 8 having cavities extending therethrough for reception of the contacts. One form of cavity will accept either a pin contact or a socket contact in accordance with the invention, these cavities each having a forward section 54, an intermediate constricted section 56, and a rearward section 58, the intermediate section defining a forwardly facing shoulder 60, and a rearwardly facing shoulder 61. The contact terminal inserted into the cavity from the rearward side until the outwardly formed head moves against shoulder 61 and lances 50 of the socket contact and 22 of the pin contact are disposed forwardly of the shoulders 60 so that these lances will prevent accidental or unintentional withdrawal of the contacts from the housings.

When the parts are engaged with each other, the reduced leading ends of the pin contact 12 enters the body portion 32 of the socket contact and moves against the inwardly directed contact spring 52 which is struck from the wall of the body portion 32 of the socket contact. This spring is moved outwardly as illustrated in FIG. 3 until it lies in the plane defined by the body portion 32 of the contact. The sleeve 40 on the socket contact in a connector in accordance with the invention thus functions to prevent over-stressing of the spring and to protect it from damage while the contact is being assembled, shipped, or handled.

A particular advantage of contact terminals in accordance with the invention is that, although they are manufactured by the relatively inexpensive stamping and forming method and have the open seam which is inherent in contacts produced by this method, the seam is maintained in a closed condition by the sleeves 20 of the pin and 40 of the socket. By virtue of this fact, contacts in accordance with the invention are substantially as rugged, and as resistant to damage as the more expensive machined pin and socket type contacts. It should additionally be noticed that the integral contact spring 52 is entirely surrounded by the sleeve 40 in the socket contact so that this is completely protected against damage during handling.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only.

What is claimed is:

1. An electrical contact socket terminal comprising a stamped and formed cylindrical body portion and a stamped and formed cylindrical sleeve portion, said body portion having an open-U ferrule-forming portion integral with, and extending from, one end thereof, and said body portion having an axial seam extending axially thereon, in alignment with the open side of said ferrule

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forming portion, said sleeve portion being coaxially mounted on said body portion and having an axially extending seam on the side of said terminal which is opposite to the side of said seam on said body portion, ear means on said sleeve portion and an opening in the wall of said body portion, said ear means extending inwardly through said opening and retaining said sleeve portion on said body portion with said seams on opposite sides of said terminal, and a contact spring struck from the wall of said body portion and extending obliquely inwardly with respect to the axis of said terminal, said sleeve portion functioning to protect said spring and prevent over-stressing thereof.

2. An electrical contact terminal as set forth in claim 1 including retention lances struck from the wall of said sleeve portion.

3. An electrical contact terminal comprising a stamped and formed cylindrical body and a stamped and formed cylindrical sleeve, said body having an open-U ferrule-forming portion integral with, and extending from, one end thereof, and said body having an axial seam extending axially thereon in alignment with the open side of said ferrule-forming portion, said sleeve being coaxially mounted on said body and having an axially extending seam on the side of said terminal which is opposite to the side of said seam on said body, ear means on said sleeve and an opening in the wall of said body, said opening being diametrically opposite to said seam of said body and being located adjacent to said one end and proximate to said open-U ferrule-forming portion, said ear means comprising extensions of said sleeve adjacent to said seam in said sleeve and directed inwardly through said opening with the planes of said ear means being substantially parallel to the axis of said terminal whereby the edge portions of said ear means bear against edge portions of said opening, and rearwardly directed retention lances struck from wall of said sleeve, said lances being disposed on opposite sides of said sleeve and equidistant from said seam in said sleeve.

4. A contact terminal as set forth in claim 3, said terminal comprising a contact pin terminal having a reduced diameter end portion extending from the end thereof which is opposite to said one end, said reduced diameter end portion being adapted to be received in a complementary contact socket.

5. A contact terminal as set forth in claim 3, said terminal comprising a contact socket terminal.

6. A contact socket terminal as set forth in claim 5 wherein a contact spring is struck from the wall of said body and extends obliquely inwardly with respect to the axis of said terminal, said sleeve functioning to protect said spring and prevent over-stressing thereof.

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