

Aug. 27, 1963

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MOUNTED CONNECTOR COMPONENT

3,101,983

Filed Jan. 4, 1962

FIG. 1

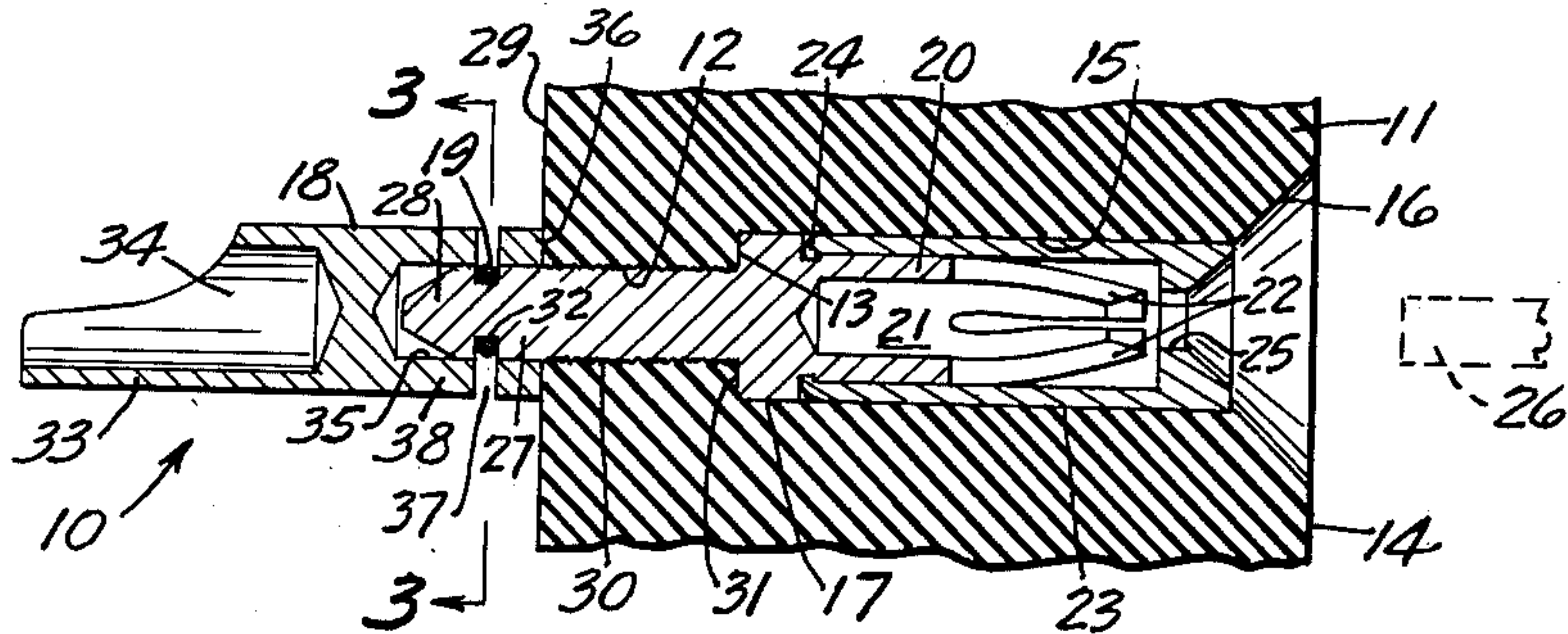


FIG. 2

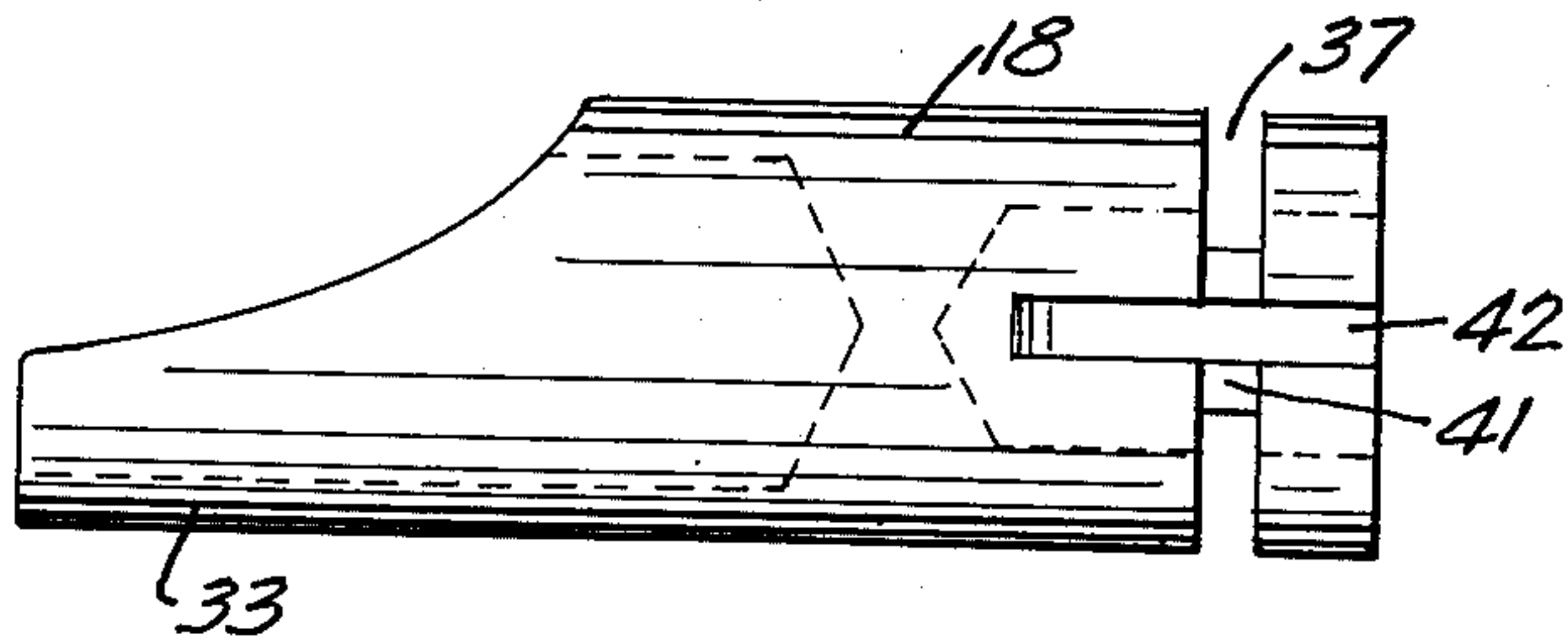


FIG. 4

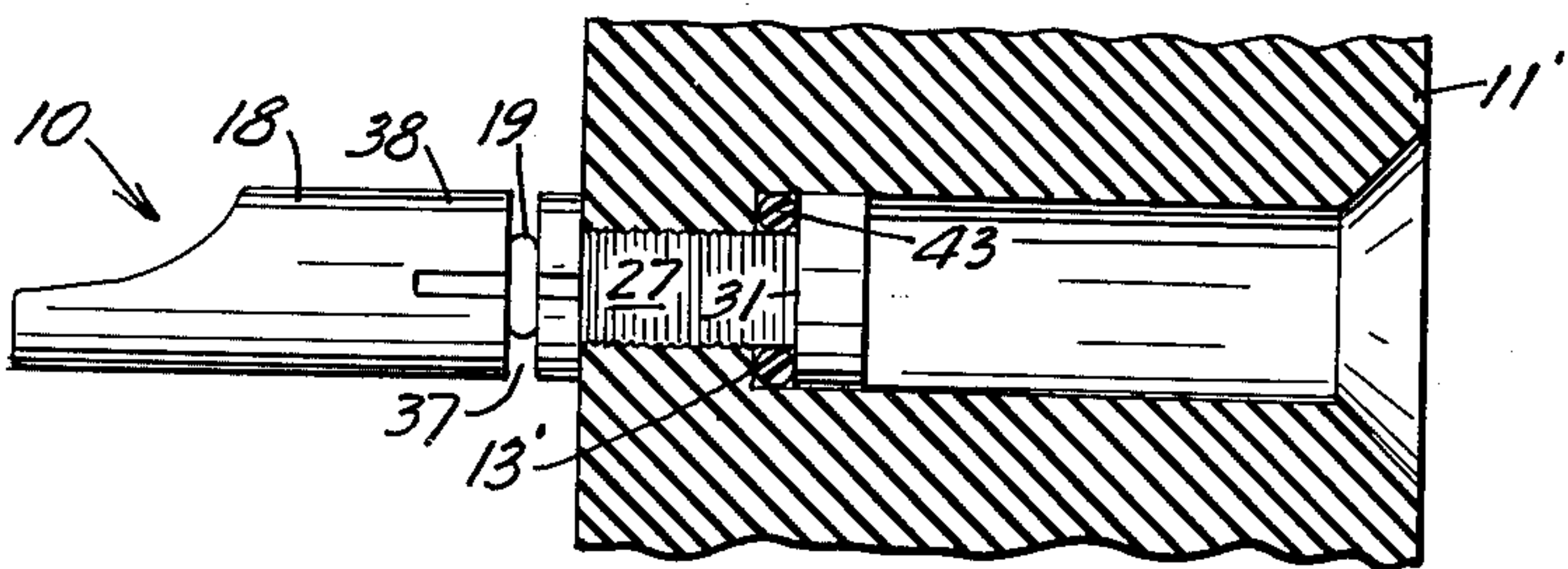
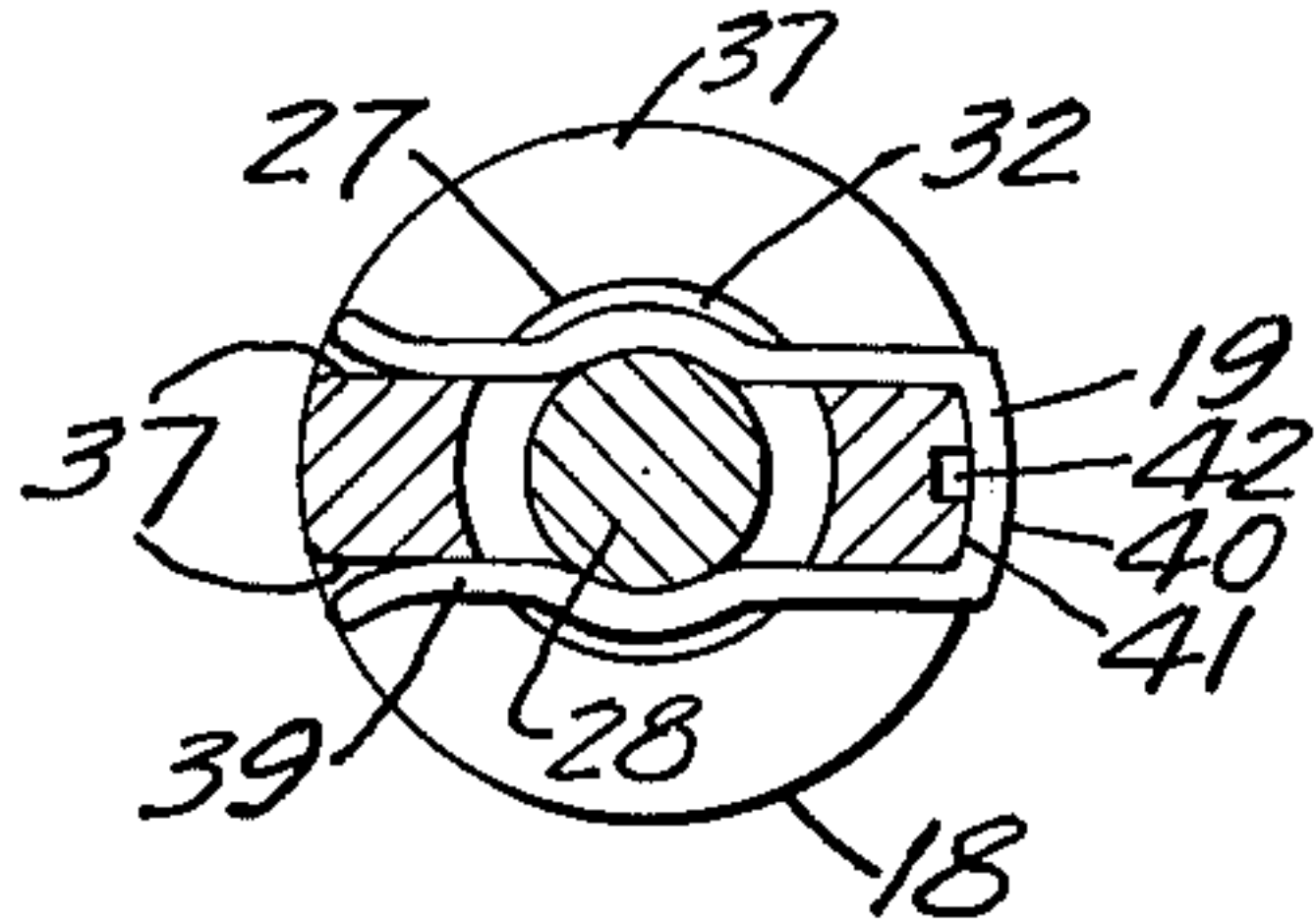


FIG. 3



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3,101,983

## MOUNTED CONNECTOR COMPONENT

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Filed Jan. 4, 1962, Ser. No. 164,285

5 Claims. (Cl. 339-59)

This invention relates to electrical connectors and more particularly relates to an electrical connector component for attachment to a wire and for mounting in an aperture of an insert or other mounting medium.

It is oftentimes desirable when terminating a wire at a connector mounted in an insert or other mounting medium to be assured that if necessary the connector component may be readily removed although the connector component is normally mounted in a stable manner in the insert and in such a manner as to prevent moisture migration between opposite sides of the insert. An object of my invention is the provision of a new and improved electrical connector component of simple and inexpensive construction and operation.

Another object of my invention is to provide a novel connector component readily adapted for mounting in an aperture of an insert in such a manner as to prevent migration of moisture between opposite sides of the insert.

Still another object of my invention is the provision of a novel and improved connector component which is readily and easily applicable to an apertured insert, so as to be securely and firmly mounted as to prevent moisture migration between opposite sides of the insert, and also as to permit the component to be readily and easily removed if desired.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to similar parts throughout the several views and in which:

FIG. 1 is a detail section view showing the connector component mounted in the aperture of an insert;

FIG. 2 is an enlarged elevation view of one of the parts of the connector component;

FIG. 3 is a detail section view taken at 3-3 in FIG. 1, and

FIG. 4 is an elevation view of the component shown mounted in an aperture of a modified form of insert or mounting.

One form of the invention is shown in the drawings and is described herein.

The connector component is indicated in general by numeral 10 and is shown mounted in a mounting medium or insert 11 which has an aperture 12 therein, and in the form shown, the insert 11 also has a shoulder surface 13 generally facing the front side 14 of the insert 11, and an enlarged aperture portion 15 between the shoulder surface 13 and the front side 14. It will be seen that the aperture 15 is flared divergently at its outer end 16.

In the form of mounting as seen in FIG. 1, the insert 11 is made of a resiliently compressible material such as rubber or other comparable insulative and resiliently yieldable material. It will be noted that the insert might be made of a rigid material as depicted at 11' in FIG. 4.

The connector component 10 includes a contact part 17, a retainer and wire termination part 18 and a spring wire clip or keying element 19.

The contact part 17 has a front end portion 20 which in the form illustrated defines a receptacle or socket 21 encompassed by resilient spring fingers 22 biased inwardly and formed integrally of the connector part 17

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for receiving and retaining a pin-type contact of another connector component. In the form illustrated the connector part 17 also has a metallic shroud 23 encompassing the front end 20 and affixed thereto as by spinning the rear end 24 of the shroud into encompassing engagement with an annular recess of the contact part 17. The shroud 23 has an inwardly protruding front end portion defining a contact pin-receiving aperture 25 for guiding the pin contact 26 (shown in dotted lines) of another connector component into the socket 21 and preventing damage to the fingers 22 by centering the pin contact in the socket 21 and by preventing contacts of excessive size being admitted into the socket 21.

The connector part 17 also has a rearwardly extending shank 27 which projects through the aperture 12 in the insert 11 and protrudes at its terminal end 28 rearwardly from the rear side 29 of the insert. The shank 27 is provided with a serrated or otherwise roughened outer peripheral surface 30 having a diameter slightly in excess of the normal diameter of aperture 12 when the insert 11 is in relaxed condition so as to effect a moisture seal between the metallic shank 27 and the resiliently yieldable insert 11 when the shank is mounted in the manner shown. When the connector part 17 is properly mounted in the insert 11, the rearwardly facing shoulder surface 31 of the connector part bears firmly against the shoulder surface 13 of the insert 11 in a moisture-sealing relationship.

It will be seen, particularly in FIGS. 1 and 3, that the shank 27 adjacent its rear end 28 is provided with an annular groove 32 spaced from the rear surface 29 of the insert.

The retainer part 18 has a rear end portion 33 defining a suitable wire termination means, which, in the form shown, comprises a solder pot 34 into which the terminal end of a wire may be affixed as by soldering so as to produce a sound physical and electrical connection between the wire and the conductive retainer part 18. The retainer part 18 has an opening or shank-receiving socket 35 in the front end thereof which is shaped in substantial conformity with the exterior configuration of the rear end 28 of shank 27 so as to slidably and telescopically receive the shank 27 in tight-fitting relation. The front face 36 of the retainer part 18 bears firmly against the rear side 29 of the insert 11 when assembled with the contact part 17. The retainer part 18 also has a pair of transverse notches or grooves 37 through the peripheral wall 38 surrounding socket 35. The notches or grooves 37 are disposed in alignment with the annular groove 32 in the shank 27 when the front face 36 is pressed firmly against the rear side 29 of the insert.

Keeper spring or keying part 19 is constructed of a resilient spring wire and is generally U-shaped with a pair of elongate and juxtaposed finger elements 39 extending through the grooves 37 and recess 32 so as to prevent relative fore-and-aft movement between the shank 27 and retainer part 18. The spring keeper element 19 also has an intermediate portion or head 40 extending transversely of the fingers 39 and lying in a peripherally extending groove 41 at one side of the retainer part 18 but in the plane of the notches or grooves 37. The intermediate portion or head 40 of the keying part 19 is thereby at least partially embedded or confined in the side of the retainer part.

It will be seen that the retainer part 18 also has an elongate groove 42 extending in a fore-and-aft direction slightly deeper than the groove 41 and intersecting relation with the groove 41. It will be seen that the groove 42 extends a substantial distance rearwardly from the groove



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41 so as to facilitate insertion of a probe or sharply pointed object along the groove 42 and beneath the intermediate portion or head 40 of the spring wire 19 to facilitate removal of the spring wire 19 from the grooves 37 and recess 32.

It will be noted that the finger elements 39 of the spring wire 19 are slightly deformed so as to capture or clip the shank 27 at the bottom of annular recess 32 and thereby retain the spring wire 19 in fixed relation.

In the form shown in FIG. 4, the connector component 10 is identical to that shown in FIGS. 1-3 and is mounted in the insert 11', which in this case is constructed of a rigid material. Of course the insert may be constructed of insulative or conductive material, but in the event the insert is constructed of conductive material, the insert must be suitably insulated by other means from other electrical apparatus that may be attached thereto. In FIG. 4 it will be seen that the forwardly facing shoulder surface 13' of the insert 11' is spaced slightly from the abrupt shoulder 31 of the contact part 17 and a resiliently compressible annular gasket or O-ring 43 is applied in encompassing relation with the shank 27 so as to be retained in moisture-sealing relation with the shank 27, abrupt shoulder 31 and shoulder surface 13' and thereby prevent moisture migration between front and rear ends of insert 11'.

It will be understood that the socket-type contact at the front end 20 of the contact part 17 is merely illustrative of one type of contact that might be employed and that it is contemplated that a pin-type or male-type contact might alternatively be employed. In this case the contact pin might protrude from the side 14 of the insert or the insert 11 might be reduced in thickness so as to dispose the front side 14 thereof closely adjacent the forwardly facing shoulder surface 13. It will also be noted that the particular form of wire termination means illustrated by the solder pot 34 might also be replaced with some other wire termination means so as to physically clamp or crimp the rear end of retainer part 18 against the wire.

It will, of course, be understood that various changes may be made in the form, detail, arrangement and proportion of the parts without departing from the scope of our invention which consists in the matter described herein and set forth in the appended claims.

What is claimed is:

1. A removable electrical connector component to be assembled with an apertured insert, comprising a conductive contact part having a front end with contact means thereon and also having a rear end with an elongate rearwardly extending shank to extend through the aperture of the insert, said shank being transversely grooved at opposite sides thereof, said contact part also having a rearwardly facing shoulder engageable with the insert adjacent the aperture therein,
- a conductive retainer part having a rear end with wire terminal means thereon and also having a front end with a peripheral wall defining a shank-receiving socket slidably receiving the grooved shank in tight-fitting relation,
- the front end of the retainer part having slots through the wall at opposite sides of the socket in alignment with the grooved sides of the shank, the front end of the retainer part also having a front face engaging the insert adjacent the aperture,
- and a generally U-shaped spring wire having generally parallel ends lying in said slots and in the grooved sides of the shank and preventing relative forward and rearward movement between the contact and retainer parts, said wire also having an intermediate portion lying against a peripheral portion of the retainer part,
- and said retainer part having a probe-receiving groove extending in a fore-and-aft direction beneath the intermediate portion of said wire to permit a probe to

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be inserted beneath the wire for removing the wire and thereby permitting separation of the retainer and contact parts from each other and from the insert.

2. A removable electrical connector component to be assembled with an apertured insert,

comprising a conductive contact part having a front end with contact means thereon and also having a rear end with an elongate rearwardly extending shank to extend through the aperture of the insert, said shank having an annular groove adjacent the rear end thereof, said contact part also having a rearwardly facing shoulder engageable with the shoulder adjacent the aperture therein,

a conductive retainer part having a rear end with wire terminal means thereon and also having a front end with a peripheral wall defining a shank-receiving socket slidably receiving the rear end of the shank in tight-fitting relation, the front end of the retainer part engaging the insert and having a pair of slots through the wall on opposite sides of the socket and being aligned with the groove in the shank,

an elongate U-shaped spring having opposite juxtaposed ends lying in said groove and slots and having an intermediate portion at the exterior of said retainer part,

the retainer part having a peripheral groove underlying and receiving said intermediate portion of the spring therein,

and said retainer part also having an elongate groove extending in a fore-and-aft direction on the periphery thereof and intersecting said peripheral groove beneath the intermediate portion of the spring to provide access beneath the intermediate portion of the spring for removing the same from the retainer part and thereby permit separation of the retainer and contact parts from each other and from the insert.

3. A removable electrical connector component to be assembled with an apertured insert,

comprising a conductive contact part having a front end with contact means thereon and also having a rear end with an elongate rearwardly extending shank to extend through the aperture of the insert, said shank having a transverse recess therein adjacent the rear end thereof, said contact part also having a rearwardly facing shoulder engageable with the insert adjacent the aperture therein,

a conductive retainer part having a rear end with wire terminal means thereon and also having a front end with a peripheral wall defining a shank-receiving socket slidably receiving the shank in tight-fitting relation, the front end of the retainer part engaging the insert and also having an opening through the wall in alignment with the recess of the shank,

and an elongate finger element extending through said opening and into the recess and preventing relative forward and rearward movement between the contact and retainer parts, said finger element having a transversely extending head,

said retainer part having a transversely extending recess adjacent said opening and receiving the head of said finger element therein,

and said retainer part having an elongate groove extending in a fore-and-aft direction and intersecting said head-receiving transverse groove to provide access beneath the head to facilitate removal of the finger element from the retainer and contact parts and to permit separation of said parts from each other and from the insert.

4. A removable electrical connector component to be assembled with an apertured insert,

comprising a conductive contact part having a front end with contact means thereon and also having a rear end with an elongate rearwardly extending shank to extend through the aperture of the insert, said shank having a transverse recess therein adja-



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cent the rear end thereof, and said contact part also having a rearwardly facing shoulder engageable with the insert adjacent the aperture therein, said contact part also having means thereon producing a moisture seal between the shank and the insert to prevent moisture migration along the contact part and through the insert,

a conductive retainer part having a rear end with wire terminal means thereon and also having a front end with a peripheral wall defining a shank-receiving socket slidably receiving the rear end of the shank in tight-fitting relation, the front end of the retainer part having an opening through the wall and aligned with the recess in the shank, and an elongate finger element extending through said opening and into said recess and preventing relative forward and rearward movement between the contact and retainer parts, said finger element also having an elongate head extending transversely thereof and transversely of the retainer part adjacent the wall thereof, said retainer part having a head-receiving peripheral groove extending transversely of said opening and receiving the head of the finger element therein, and said retainer part also having an elongate groove extending in a fore-and-aft direction and intersecting said head-receiving groove to provide access beneath the head to facilitate removal of said elongate finger element from the retainer and contact parts and thereby permit separation of said parts from each other and from the insert.

5. A removable electrical connector to be assembled with an apertured resilient insert, comprising a conductive contact part having a front end with contact means thereon and also having a rear end with an elongate rearwardly extending shank to extend through the aperture of the insert, said shank having a roughened periphery to engage the resilient insert in moisture-sealing relation to prevent migration of moisture along the shank and

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through the insert, said shank having an annular groove on the periphery thereof adjacent the rear end thereof,

a conductive retainer part having a rear end with wire terminal means thereon and also having a front end with a peripheral wall defining a shank-receiving socket slidably receiving the shank in tight-fitting relation, the front end of the retainer part being adapted to bear firmly against the resilient insert and having a pair of slots through the wall at opposite sides of the socket and in alignment with the annular recess of the shank,

a generally U-shaped spring clip having generally parallel ends lying in said slots and in said recess and preventing relative forward and rearward movement between the contact and retainer parts, said clip also having an intermediate portion disposed adjacent the outer periphery of the retainer part,

and said retainer part also having an exterior peripheral recess lying between said slots and in the plane thereof and receiving said intermediate portion of the clip therein, and said retainer part also having an elongate groove extending in a fore-and-aft direction and intersecting said peripheral groove to provide access beneath said intermediate portion of the clip to facilitate removal of the clip and separation of the parts from each other and from the insert.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

|           |               |                |
|-----------|---------------|----------------|
| 1,878,247 | Beck          | Sept. 20, 1932 |
| 2,022,669 | Keefe         | Dec. 3, 1935   |
| 2,706,230 | Bourns et al. | Apr. 12, 1955  |
| 2,736,870 | De Jur et al. | Feb. 28, 1956  |
| 2,816,341 | Prest         | Dec. 17, 1957  |

##### FOREIGN PATENTS

|         |         |               |
|---------|---------|---------------|
| 197,880 | Austria | Nov. 15, 1957 |
|---------|---------|---------------|