Oct. 29, 1968 A. I. APPLETON 3,408,092

SINGLE PIECE CONNECTOR FOR FLEXIBLE HOSING

Filed April 13, 1967

Fig. 1.

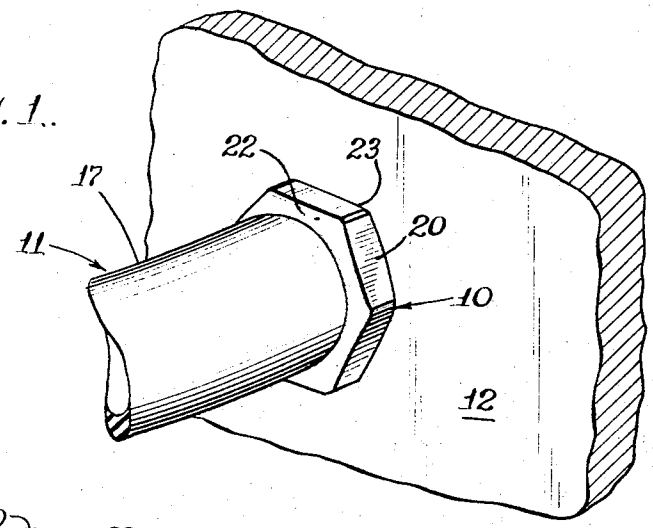
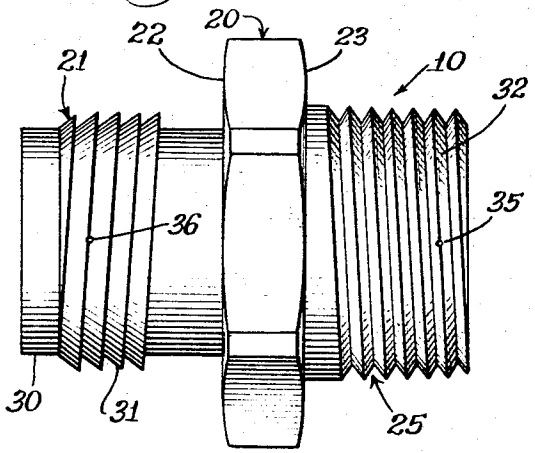


Fig. 2.



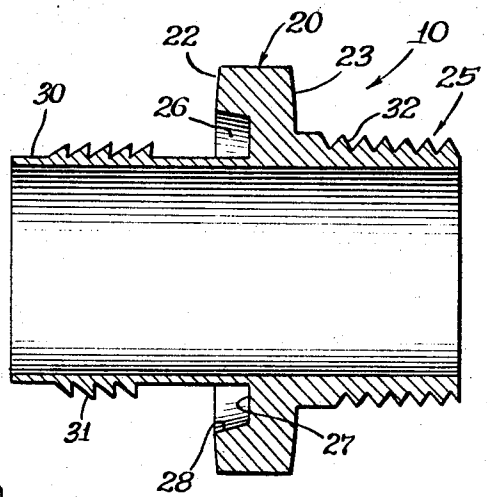


Fig. 3.

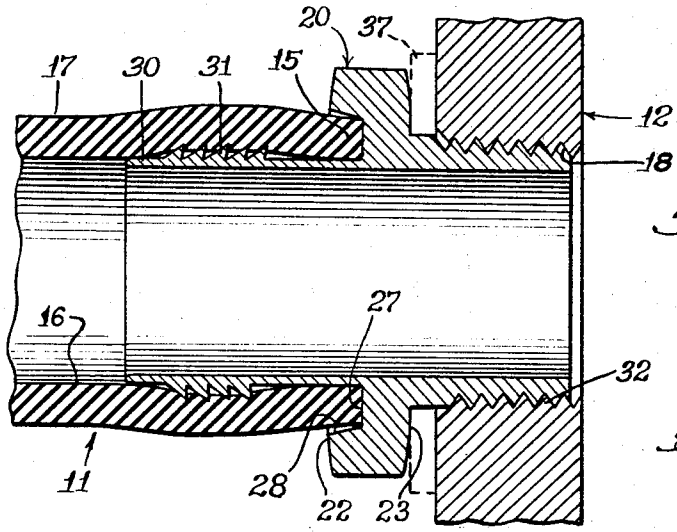


Fig. 4.

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SINGLE PIECE CONNECTOR FOR FLEXIBLE HOSING

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ABSTRACT OF THE DISCLOSURE

A single piece tubular connector for connecting one end of a length of flexible hose to other apparatus and featuring a centrally flanged tubular body separating a preferably externally threaded hose end from another end which is also threaded but preferably with oppositely-handed threads.

Background of the invention

This invention relates specifically to a single piece connector for use exclusively with flexible hosing of principally or entirely non-metallic material such as is already in wide use in fluid and pressure transmission and which is gaining in popularity for carrying electrical wires in electrical installations.

While at least one known single piece connector fairly closely resembles the present invention, the present disclosure represents an improvement thereover which, as will be see, facilitates its installation and removal to thereby make the connector a more desirable piece with which to work.

This known single piece connector includes a tubular end portion which is interferingly inserted into the end of a length of flexible hose. To assist in effecting a seal therebetween, the inserted portion carries around its periphery a plurality of individual and axially spaced apart ridges. These ridges are interferingly sized so as to bitingly engage the inner surface of the flexible hose and thereby resist its removal. Although the ridges are also designed to facilitate insertion of this end of the connector into the hose, the stiffness of modern plastic hosing in conjunction with the interfering fit makes full insertion of the hose end a difficult if not impossible task. And, in removing the hose from the connector, these frequently sharp ridges occasionally tear or gouge the inner surface of the hose which renders the injured end non-reusable where some semblance of a seal is required. In extreme cases the connector can only be removed by cutting the hose.

This known form of connector also possesses some undesirable aspects in conjunction with its installation. For example, the connector is usually first rigidly connected into some other apparatus, such as an electrical box, and then the flexible hose is forceably pushed over the outwardly projecting and ridged hose end. Particularly in the use of relatively short lengths of stiff hose material, it may be quite difficult to make the appropriate bends in the hose and simultaneously push it onto the connector. This problem is even more acute when the installer is working in close quarters.

Summary of the invention

In solving the above described problems of known constructions, the preferred embodiment of the present invention includes a tubular hose end portion which carries a thread thereon having a major diameter designed for interfering relationship with the inner surface of the hose. The thread design is preferably that of a buttress thread arranged to resist removal of the connector from the hose when pulled axially outwardly, however, insertion and removal may be readily achieved without injury to the hose merely by screwing the connector into or out

of the end of the hose. Thus, considerable interference between the thread and the hose can be designed into the connector, yet removal does not cause gouging or tearing of the hose material.

Since the other end of this type of connector frequently would be screwed into an internally threaded hole in a standard housing or electrical box, it preferably carries an external right-handed thread while the hose inserted portion carries a left-handed thread. Thus, the installer need only give the connector about one turn to get it started into the electrical housing, push the end of the hose over the other end of the connector, and then draw up both sides simultaneously by rotating the connector to thereby form the sealed connection.

While the invention is shown in the drawings to assist in an understanding of one preferred form of the invention, this showing is not intended to limit the invention to the specific embodiment shown or to defeat that purpose of a patent which is to protectively cover the inventive concepts contained therein. The appended claims are the chief aid toward this purpose as it is these that point out the scope of the invention.

Description of the drawings

FIG. 1 is a perspective view of a connection formed by a connector incorporating the principles of a preferred form of the invention, this view including a short segment of flexible hose connected thereto and also a fragment of an electrical box;

FIG. 2 is a side view of the connector;

FIG. 3 is a side view of the connector in cross-section; and

FIG. 4 is a fragmentary cross-sectional view of an installation incorporating the connector and as shown generally in FIG. 1.

Description of the preferred embodiment

Referring now to the drawings, the single-piece connector is shown generally at **10** and is used to connect a length of flexible hose **11** to some other piece of equipment such as to the side wall **12** of an electrical box. Hose **11** includes a connector end **15**, an inner surface **16**, and an outer surface **17**. The other apparatus to which the connector is connected may be of any general form, but is here shown as a fragment of a thick wall electrical housing having an internally threaded hole **18** therethrough.

Connector **10** is of generally tubular and cylindrical shape and includes tightening or grasping means in the form of a centrally located flange **20** having an octagonally-shaped or nut-shaped outer periphery, a smaller diameter hose end portion **21** extending outwardly and axially from one side **22** of flange **20**, and connecting means **25** extending outwardly from the other side **23** of flange **20** and axially thereof.

Side **22** of flange **20** is undercut as at **26**, this undercut being defined in part by a back wall **27** and an inwardly tapering side wall **28**. As will be brought out in greater detail later, undercut **26** tapers to crimping proportions to assist in forming a seal between the connector **10** and flexible hose **11**.

Hose end portion **21** includes an outermost thin wall end **30** having an outer diameter substantially the same as the inner diameter of flexible hose **11**. Between outermost end **30** and flange undercut **26**, hose end portion **21** carries an external buttress thread **31**. Thread **31** is preferably left-handed, for reasons to be discussed in greater detail later, and is oriented to facilitate its insertion into the hose as well as to prevent the easy removal thereof by pulling axially outwardly.

The connecting means or housing end portion **25** is preferably externally threaded as at **32** to permit it to

be screwed into the internally threaded hole in the housing **12**. These threads are preferably right-handed so as to fit standardly sized and internally threaded holes. In some applications, of course, connector **10** may be used with a thin-wall housing containing an unthreaded hole. In this case, an ordinary right-handed nut can be drawn up on portion **32** from the other side of the housing wall to secure it.

In forming a connection with the connector **10**, the installer will normally first screw end **25** partially into the housing wall **12** to a sufficient depth to align and hold it therein. This would normally require engagement of only one or two threads, and if desirable, the end threads can be colored differently from the rest or marked with a dab of coloring material as at **35** to put the installer on notice that the thread is engaged the proper amount. Hose end **15** is then pushed over outermost end **30** of the hose end portion **21** and over the first one or two threads of buttress thread **31**. Again, this end might carry a mark as at **36** to show the installer that the hose is pushed over the end of the buttress thread **31** to the proper degree. With the assistance of a wrench engaged over nut-shaped flange **20**, the installer can then screw end portion **25** into the housing **12**. Simultaneously with the tightening of end **25**, and by virtue of the left-handed buttress thread **31**, hose end **15** is advanced over hose end portion **21** toward undercut **26**. At substantially the same time that the connector is snugly secured to the housing **12**, hose end **15** has been driven into back wall **27** of the tapered undercut **26** and has been crimped en route by tapered side wall **28**. Thus, hose end **15** is sealed against the connector **10**. If desired, a washer-shaped gasket such as shown in dotted lines at **37** could be first slipped over end portion **25** before assembly to ensure a fluid-tight seal between the connector and the housing wall **12**.

Removing the connector is even simpler than installing it. By rotating flange **20** in the direction opposite that of tightening, the entire connection screws apart without injuring the inner surface **16** of the hose **11**. This is a decided advantage over and should be contrasted with known connectors having hose end portions which must be ripped out of or cut from the hose to effect their removal.

Of course, other applications of the connector might preferably lend themselves to the use of right-handed threads on the hose end portion **21**, and still other applications might preferably utilize a different form of connection at end **25** other than the external threads shown at **32**. Slight changes in form from that shown in the drawings which are peculiarly suited to a given application should not be construed to detract from the inventive concepts defined below in the claims.

I claim:

1. A connector for matingly joining the end of a length of generally plastic-like flexible hose to other apparatus and consisting essentially of a single piece for interposition therebetween, comprising: a straight tubular body of generally cylindrical shape, said body having a generally cylindrical first end for connection to the end of said flexible hose and a second end adapted for connection to said other apparatus, co-operating means on both of said ends for effecting a simultaneous connection of said first end to said hose and said second end to said apparatus, said co-operating means including an external and left-handed thread on said first end of interfering major diameter with said hose before insertion therein and an oppositely-handed thread formed with said second end, said left-handed thread having a crest portion extending radially outwardly beyond all other portions of said first end to bite into said hose, said body including a flange having parallel peripheral flats between said first and second ends for facilitating the turning of said body with a tool and effecting the simultaneous connection, said flange having larger outside dimensions than said first end and including annular undercut means therein extending axially thereof and opening outwardly toward said left-handed thread on said first end for internally receiving the end of the hose as said connector is screwed therein, said undercut defining at least one generally radial sealing surface and converging inwardly in the direction of said second end by means of a generally gradually tapered sidewall to an innermost back wall of interfering dimensions with the thickness of the hose material whereupon tightening of said connector into said hose causes said hose end to be generally radially compressed and crimped to substantial proportions within the undercut by virtue of the inwardly diminishing proportions of said undercut as caused by said tapered sidewall to thereby form an effective seal between said hose end and said radial sealing surface.

2. The connector as set forth in claim **1**, including indicia means on said first end and on said second end for indicating the proper initial thread engagement of said first end in said hose and said second end with said other apparatus so that a given number of revolutions of said connector thereafter effects simultaneously a seal with said hose at said first end and a fully drawn up condition with said apparatus at said second end.

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