June 8, 1943. C. A. REES 2,321,158

CONNECTOR

Filed April 8, 1942

FIG. 1.

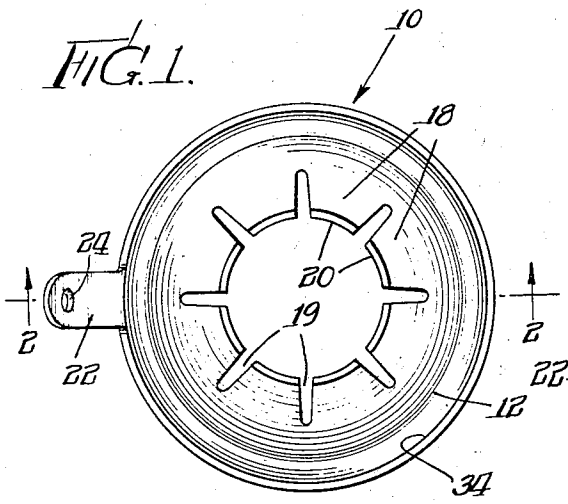


FIG. 3.

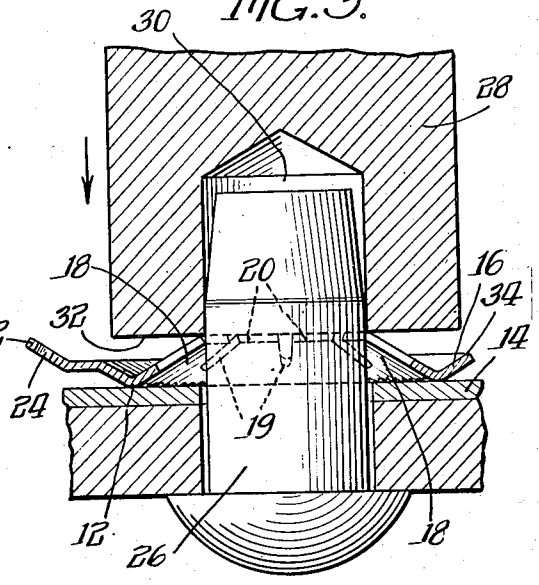


FIG. 2.

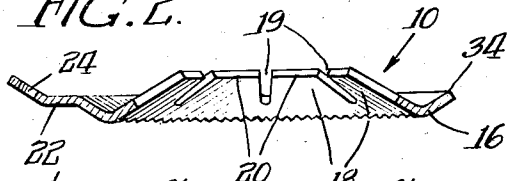


FIG. 6.

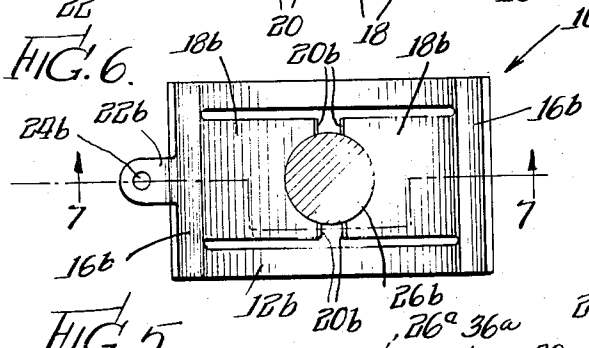


FIG. 4.

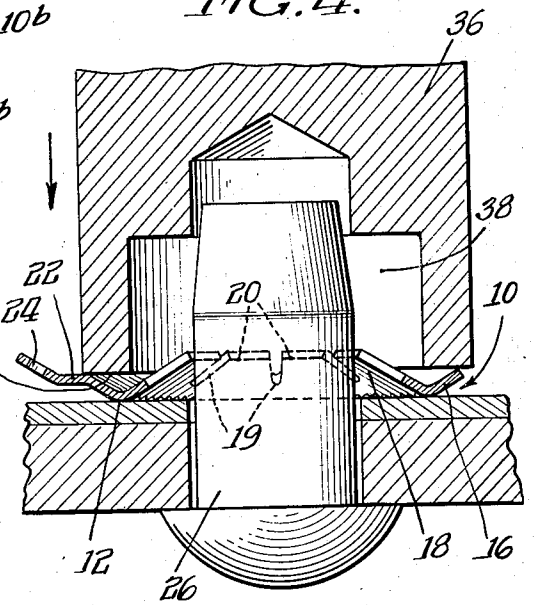


FIG. 5.

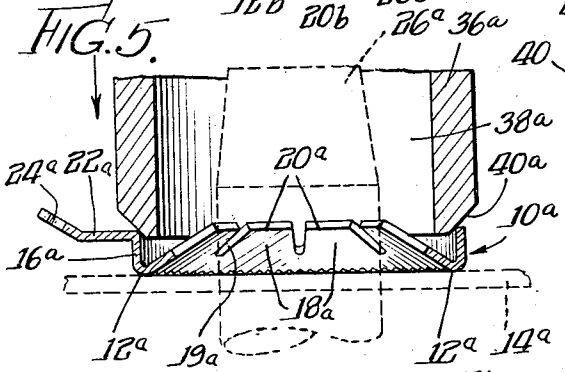
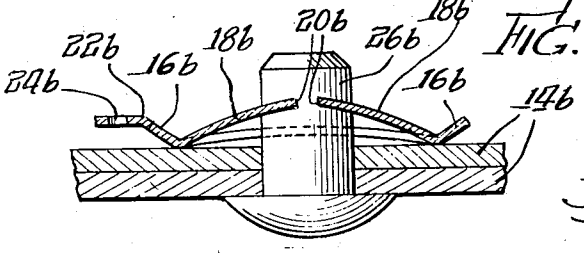


FIG. 7.



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CONNECTOR

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5 Claims. (Cl. 85—36)

This invention relates generally to connectors, and more particularly to connectors formed from metallic sheet stock, which are adapted to be telescopically associated with a stud so as to secure the stud against axial movement with respect to an associated work piece.

The invention contemplates the provision of a connector of sheet metal stock in which inner teeth may be forced into locking engagement with a stud, and by the application of force along the outer margin of the connector the teeth may be released without disturbing the position of a connector arm extending outwardly from the connector body.

More specifically the invention contemplates a connector of the type set forth above which is adapted to be used as an electrical terminal for coupling conductors with a terminal post.

The following detailed description will bring to light other objects and advantages of the present invention when considered in connection with the accompanying drawing wherein:

Figure 1 is a plan view of a connector constructed in accordance with the teachings of the present invention;

Figure 2 is a central transverse sectional view taken substantially along the line 2—2 of Figure 1;

Figure 3 discloses the connector as illustrated in Figure 2 in operative association with the work piece, a connector fastening tool being shown in operative association with the teeth;

Figure 4 is a view similar to Figure 3 disclosing the application of the tool for causing the locking teeth of the connector to be disengaged from the periphery of the stud;

Figure 5 is a sectional view of a slightly modified form;

Figure 6 is a plan view of a modified connector with the associated stud shown in cross section; and

Figure 7 is a transverse central sectional view taken substantially along the line 7—7 of Figure 6.

Referring now to the drawing wherein like numerals have been employed to designate similar parts throughout the various figures, it will be seen that one embodiment of the invention consists of a connector member designated generally by the numeral 10. This connector 10 includes an annular intermediate body portion 12 which is designed to engage the surface of a work piece 14. Positioned externally of the intermediate body portion 12 is a flange or rim 16 which diverges from or is inclined with respect to the plane defined by the work engaging surface of the intermediate body portion 12. Extending inwardly from the intermediate body portion 12 and diverging from the plane of the work engaging surface thereof is a plurality of prongs 18, the inner extremities of which present locking teeth or edges 20. These prongs 18 are separated by radial severances or recesses 19.

Formed integrally with and extending radially from the outer flange or rim 16 is a connector arm 22 provided with an aperture 24 to facilitate connection therewith of an electrical conductor or any other suitable element. One or more of such arms may be formed depending upon the particular use for which the connector is to be employed. The connector 10 is telescopically associated with a stud 26, as illustrated in Figure 3. A fastening tool 28 is employed which has a central recess 30 for accommodating the free extremity of the stud 26 and an annular surface 32 adapted to be pressed against the uppermost extremities of the prongs 18. This causes the teeth 20 of said prongs to become embedded within the periphery of the stud 26. In this position the connector not only serves to secure the stud against axial displacement but also provides a rigid support for the connector arm 22. If the connector is to be used as an electrical terminal, the arm 22 provides the means for establishing a connection with an electrical conductor. In instances where the connector is to serve as a support or connecting member, the arm 22, or modifications thereof, serves as a mechanical connecting element or support.

To loosen the connector 10 it is only necessary to apply pressure against the outer edge or periphery 34 of the rim 16 by means of a suitable tool 36, Figure 4. The tool 36 is provided with a recess 38 for receiving the free extremity of the stud 26 and also for receiving portions of the prongs 18 which project above the plane defined by the peripheral edge 34. Pressure of the annular surface 40 of the tool 36 causes the prongs to be swung or rocked away from engagement with the stud. The flange or rim 16 is sufficiently narrow to provide a rigid arm or body which fulcrums at the point of engagement of the intermediate body portion 12 with the work piece 14 and thus rocks the inner extension of said intermediate body, to-wit, the prongs 18, in a clockwise direction as viewed in Figure 4. The tools 28 and 36 serve to set the stock of the connector In using the tool 28 the stock is set so as to cause firm impingement of the teeth 20 with the periphery of the stud 26. The impingement of the tool 36 with the peripheral edge 34 causes the

stock to be set with the teeth 20 disengaged from the periphery of the stud.

In Figure 5 a modified connector is shown, said connector being designated generally by the numeral 10a. The connector 10a is similar in all respects to the connector 10 with the exception of the peripheral flange or rim 16a which extends at right angles to the plane defined by the work engaging surface of the intermediate body 12a. A tool 36a is provided with a central recess 38a for accommodating the stud 26a and is provided with a conical surface 40a. This conical surface 40a is designed to coact with the upper margin of the flange 16a to cause said flange to be tilted outwardly and thereby disengage the locking teeth 20a from the periphery of the stud. In both the connector 10 and the connector 10a the outer rim or flange diverges from the plane of the work piece and in both embodiments the application of pressure on the outer rim by the use of an axially shiftable tool causes the disengagement of the locking teeth from the stud surface. The connector 10a like the connector 10 is provided with a suitable arm or extension 22a for receiving the part which is to be joined to or supported by the connector.

In Figures 6 and 7 a slightly modified connector is shown. This device is designated generally by the numeral 10b and includes locking members or prongs 18b presenting locking teeth 20b. Extending along the sides of the prongs 18b is a body portion 12b and diverging upwardly from and formed integrally with the body portion 12b are flanges 16b which correspond functionally with the flanges 16 and 16a previously described. An arm 22b is formed integrally with and extends from one of the flanges 16b and is apertured at 24b to receive the part to be coupled with the connector as, for example, an electrical conductor or wire. The body portion 12b is normally sprung upwardly at its midpoint, see Figure 7. After the locking teeth 20b have been forced into association with the stud 26b by the application of a suitable tool similar to that shown in Figure 3, the connector serves to positively secure the stud against axial displacement with respect to work pieces 14b. To release the locking teeth 20b it is only necessary to apply pressure to the upper edges of the flanges 16b.

In instances where the connectors 10—10a—10b are to be used as electrical connecting devices or terminals, it may be advantageous to provide serrations or teeth along the work engaging surface thereof, as illustrated in Figures 2 and 5. By having this surface broken up into a series of surface areas of limited size, as distinguished from a continuous plane surface, electrical contact between the connector and the work surface may be materially improved.

It will be apparent from the foregoing description that the present invention contemplates a new and improved connector which may be connected and disconnected with a stud member with a minimum amount of effort and skill. It also has a very practical application in instances where the stud or terminal post is of the type having a smooth peripheral surface. Also, a connector constructed in accordance with the teachings of the present invention has the dual function of cooperating with the stud to secure it against axial displacement and of simultaneously providing means for mechanically or electrically connecting said stud member with another part. With the connector properly secured in place, it not only serves to positively secure the associated parts against axial vibration but also against movements of a rotary nature. This is important when the device is used as an electrical connector; for example, when it is used as a connector in a radio hook-up. The slightest vibration or relative movement between the parts may introduce serious operating or functional difficulties.

Obviously the device is not limited to the exact structural form illustrated in the drawing but is capable of other structural forms or modifications which will lend it to a wide range of uses without departing from the spirit and scope of the appended claims.

The invention is hereby claimed as follows:

1. A sheet metal connector device having an inner marginal section adapted to lockingly impinge the peripheral surface of an elongated member, as, for example, the shank of a stud member, an intermediate body portion having a work engaging surface, an outer body portion formed integral with said intermediate portion and diverging from the plane of the work engaging surface thereof, said outer body portion presenting a margin normally spaced from said plane so that it may be engaged by the advancing side of a pressure applying surface, the cross-sectional size and shape of said outer body portion being so proportioned to the corresponding cross-sectional size and shape of stock positioned inwardly thereof, that movement of said outer body margin in a given direction will effect a proportional movement of said inner margin and thereby effect the release of said inner marginal section from the periphery of an associated elongated member such as a stud member, and means carried by one of said body portions to facilitate coupling the connector device with another part.

2. A sheet metal connector device as set forth in claim 1 wherein the inner marginal section comprises a plurality of teeth adapted to lockingly impinge oppositely disposed portions of the peripheral surface of an elongated member, as, for example, the shank of a stud member.

3. A sheet metal connector device as set forth in claim 1 wherein the work engaging surface of the intermediate body portion is normally spaced axially from the stud engaging portion of the inner marginal section.

4. A sheet metal connector device as set forth in claim 1 wherein the intermediate and outer body portions are of annular form.

5. A sheet metal connector device as set forth in claim 1 wherein the work engaging surface of the intermediate body portion comprises a plurality of teeth to facilitate interlocking of said surface with a work piece.

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