

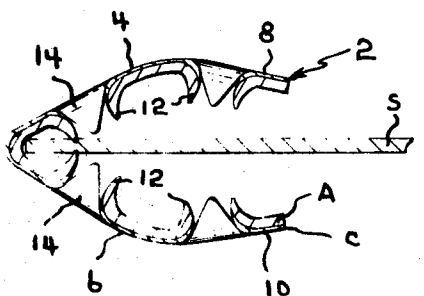
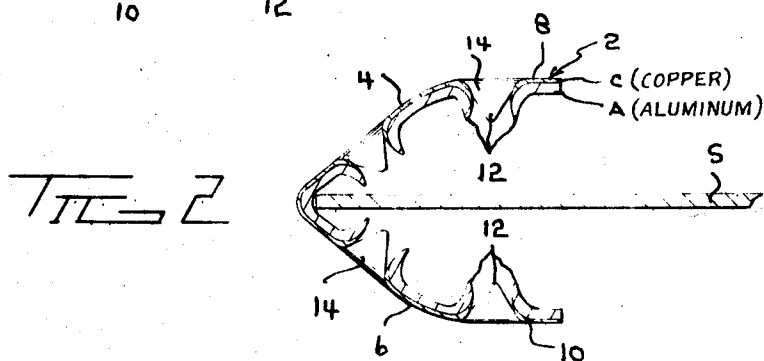
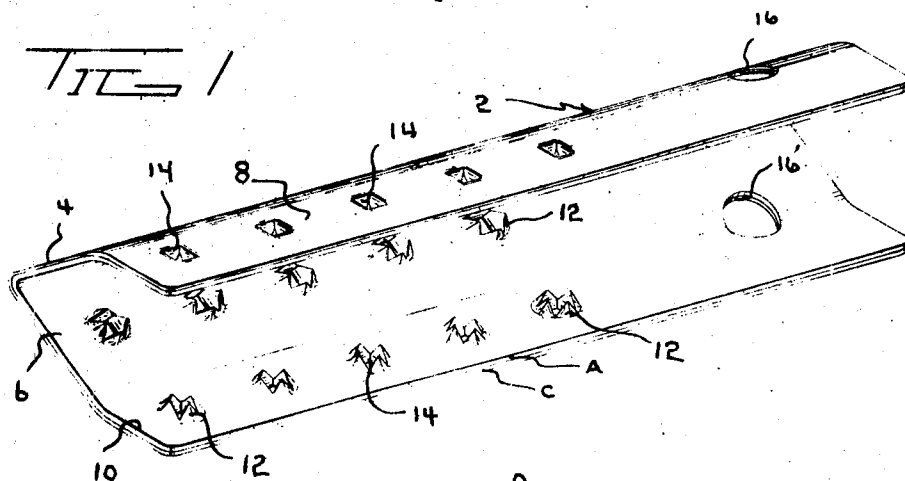
March 31, 1970

A. F. MUTO

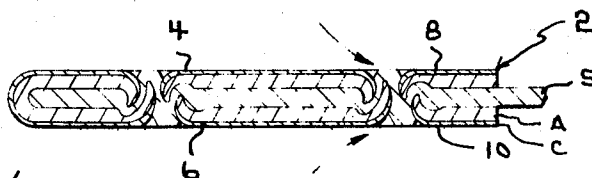
3,504,101

ELECTRIC CONNECTOR FOR ALUMINUM FOIL

Filed Sept. 30, 1969



TI-3



TIG 4

INVENTOR.
ANTHONY FALCON MUTO

BY

Y
Adrian J. LaRue

1

2

3,504,101

ELECTRIC CONNECTOR FOR ALUMINUM FOIL
Anthony Falcon Muto, Winston-Salem, N.C., assignor to
AMP Incorporated, Harrisburg, Pa.
Filed Sept. 30, 1968, Ser. No. 763,888
Int. Cl. H02g 15/08

U.S. Cl. 174-94

7 Claims

ABSTRACT OF THE DISCLOSURE

An electrical connector adapted to be mechanically and electrically secured to conductive metal strip such as aluminum. The connector has two opposing surfaces which are hinged together at one side. Each surface is slightly bowed and has tang means thereon with the pointed ends of the tangs directed towards each other. Some of the tangs grip and hold certain portions of the conductive strip at the start of the connector securing process, and others of the tangs grip and hold other portions of the conductive strip during the final stages of the process. The tangs pierce and stretch certain portions of the strip thereby scraping oxides and providing a good mechanical/electrical connection. The connector is made of a base metal such as aluminum which is electrically conductive, and is clad on one side with a secondary electrically conductive metal such as copper. The electrically conductive base metal intimately engages the conductive aluminum metal strip whereas the secondary metal engages an associate copper electrical component.

This invention relates to electrical connectors of the type adapted to be connected to a sheet-like conductor such as metal foil or strip.

The extensive use of conductive foil and thin sheet metal (e.g., aluminum) as an electrical conductor for electronic equipment and coils is complicated by the fact that it is difficult to join the conductor to other conductors. The securing of thin sheet conductor to a component tends to either tear the sheet or to make an imperfect connection, by virtue of its fragile nature. Similar connector means are disclosed in U.S. Patent Nos. 3,138,658 and 3,247,316, and Ser. No. 626,108, filed Mar. 27, 1967, all of which are assigned to the present assignee.

It is an object of this invention to provide connector means which may be secured to sheet metal strip by folding it over the strip and pressing it into the strip.

Another object is to provide connector means as described above having tang means thereon to pierce and subsequently grip the metal strip.

Another object is the provision of the above connector means wherein one row of tang means grips and holds one portion of a strip during the start of the connector securing process, and wherein an adjacent row of tang means grips and holds an adjacent portion of the strip during the final stage of the connector securing process.

Still another object is the provision of tang means as described above wherein portions of the conductor strip between adjacent rows of tangs are scraped and stretched during the connector securing process.

An additional object is to provide an electrical connector means having a base metal clad with another metal, the base metal being connected with a like metal and the clad metal being connected with a like metal.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the accompanying drawings.

In the drawings:

FIGURE 1 is a perspective view of a connector according to this invention;

FIGURE 2 is a cross-sectional view taken transversely through a connector showing a conductive strip in place prior to effecting a connection;

FIGURE 3 is a view similar to FIGURE 2 but showing a connector partly pressed onto a conductive strip; and
FIGURE 4 is a view similar to FIGURE 2 but showing a connector fully compressed onto a conductive strip.

Referring to FIGURE 1, a connector 2 comprises a flat strip of aluminum A having copper C or other metal clad onto one surface thereof. The strip is folded over such that the aluminum surface A is disposed on the inside of the strip between the folds. The connector 2 is first folded so that the sides 4 and 6 form an acute angle. The end portions 8 and 10 of sides 4 and 6 are bent further inwardly so that they are substantially parallel to each other, however, they can be bent slightly toward each other. The sides of the connector are bowed. The strip-receiving portion of connector 2 including sides 4, 6, 8 and 10 has rows of pyramidal tangs 12 formed about perforations 14, tangs 12 being directed inwardly. The tangs are shown and described in detail in the above references. The tangs on sides 4 and 6 are opposite each other, and the tangs on sides 8 and 10 are opposite each other. The component-engaging portion of connector 2 includes a pair of holes 16 and 16', which are formed in each folded side of the connector. A terminal lug may be used in these holes to secure the connector to a component such as, for example, a bus bar.

OPERATION

Referring generally to the sequential views of FIGURES 2, 3 and 4, and particularly to FIGURE 2, a flat conductive metal strip S is disposed in connector 2 such that it lies between the bowed sides 4 and 8, 6 and 10.

Referring to FIGURE 3, the connector 2 is pressed inwardly towards strip S by compression plates of conventional compression tool, not shown, during which time the tangs 12 on sides 4 and 6 first pierce the strip S.

Referring to FIGURE 4, the connector is further pressed onto strip S during which time the tangs 12 on sides 4 and 6 penetrate strip S and engage each other in an intermeshing arrangement and effectively rivet themselves together and onto the strip S. During further pressing action of the connector onto strip S, the tangs 12 on sides 8 and 10 pierce another portion of strip S and subsequently engage each other and become riveted together in the same manner as described above for sides 4 and 6. The small arrows in FIGURE 4 indicate the direction of movement of the connector sides during final compression.

It is apparent from the description and the drawing that the tangs on sides 4 and 6 first engage one portion of the strip, and the tangs on sides 8 and 10 later engage another portion of the strip. The portions of the strip between sets of tangs become scraped and stretched during the compression operation. This arrangement provides a secure mechanical and an excellent electrical connection between a connector and a strip.

It is also apparent that the inner aluminum surface of connector 2 engages the aluminum strip, and the outer copper surface of the connector is to be secured to a copper terminal lug on an associate component.

I claim:

1. A method of making an electrical connection comprising the steps of placing a conductive metal strip between hingedly-connected bowed sides of an electrical connector with the bowed sides defining first sections extend-

3

ing at an acute angle away from a hinged area therebetween and second sections extending substantially parallel to each other as extensions of said first sections with each of said sections having inwardly-directed and opposed tangs at spaced locations applying pressure to said electrical connector, pressing said first sections of said bowed sides into engagement with one area of said metal strip thereby causing said tangs thereon to penetrate and scrape said metal strip and become intermeshed, and pressing said second sections of said bowed sides into engagement with another area of said metal strip thereby causing said tangs thereon to penetrate, scrape and stretch said metal strip and become intermeshed.

2. An electrical connector comprising a first metal clad with a second metal and defining bowed sides, hinge means connecting said bowed sides together and being opposite each other, said bowed sides having first sections extending outwardly from said hinge means at an acute angle and second sections disposed substantially parallel with respect to each other, and inwardly-directed tangs in each of said sections.

3. An electrical connector according to claim 2 wherein said first metal is aluminum.

4. An electrical connector according to claim 2 wherein said second metal is copper.

4

5. An electrical connector comprising a sheet of metal folded about a fold line to define first sections and second sections hingedly connected together along said fold line, said first sections extending away from said fold line at an acute angle, said second sections being extensions of said first sections and extending substantially parallel to each other, and inwardly-directed tangs in each of said sections.

6. An electrical connector according to claim 5 wherein said sheet of metal comprises copper clad aluminum.

7. An electrical connector according to claim 5 wherein said tangs in each of said sections are disposed opposite said tangs in oppositely disposed ones of said sections.

References Cited

UNITED STATES PATENTS

3,138,658	6/1964	Weimer	174—94
3,194,877	7/1965	Collier	339—95 XR
3,247,316	4/1966	Weimer	174—94

DARRELL L. CLAY, Primary Examiner

U.S. CI. X.R.

29—628; 174—84; 339—95, 276