Oct. 25, 1960 B. DIBNER 2,957,226

METHOD OF MANUFACTURING TERMINAL LUGS

Filed May 22, 1958

FIG. 1

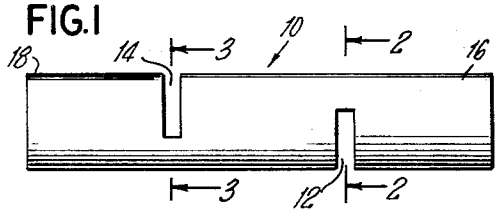


FIG. 2

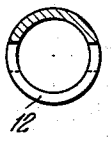
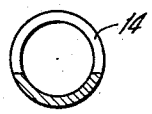


FIG. 3



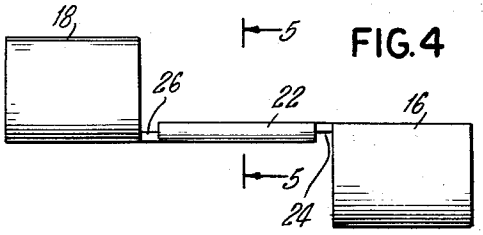


FIG. 4

FIG. 5

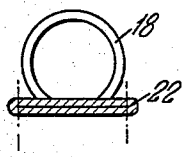


FIG. 8



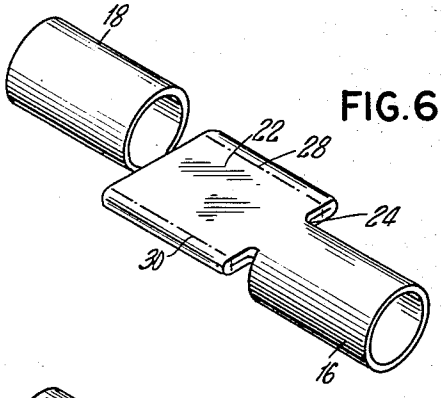


FIG. 6

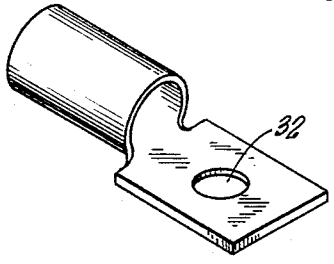


FIG. 7

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METHOD OF MANUFACTURING TERMINAL LUGS

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2 Claims. (Cl. 29—155.55)

This invention relates to the manufacture of terminal lugs, and more particularly, to the manufacture of a pair of electrical terminal lugs having tubular barrel portions.

Previously, terminal lugs having tubular barrel portions were manufactured by cutting off a predetermined length of seamless tubing and flattening one end. The flattened end became the terminal pad or tongue of the connector, and the tubular end was the conductor receiving portion. A hole was punched in the terminal pad or tongue for receiving a mounting screw.

In this prior art method of manufacture particular care had to be taken during the flattening operation so that the transition section between the flattened pad and the tubular body would not shear or tear. Moreover, there often would occur a drawback of metal from the top of the tubular body. In order to overcome these difficulties, the transition section had to be made excessively long, adding to the cost of the connector and adding to its over-all length. In addition, the use of a double wall thickness for the terminal pad was wasteful of metal. Also, the minimum width of the terminal pad was determined by the size of tubing used in manufacture. In addition, when plating of the terminal was necessary, there was always a danger that the plating acids would be caught up between the leaves of the flattened pad portion and cause corrosion.

One of the objects of my invention, therefore, is to provide a novel method of producing a pair of terminal lugs which is simple, economical and fast.

Another object of my invention is to provide a novel method of manufacturing electrical connectors having a seamless barrel portion and a terminal pad of a thickness no greater than the wall of the barrel portion.

A further object of my invention is to provide a pair of electrical connectors capable of being manufactured from seamless tubing with a minimum of scrap metal.

One of the features of my invention is the method by which electrical connectors have a seamless tubing barrel portion and a terminal lug having a thickness equal to the wall of the barrel are manufactured. My method contemplates starting with a tube of suitable material and cutting this tube into sections having a length approximately equal to twice the over-all length of a single terminal lug. This length of tubing then has two saw cuts made transverse to the axis of the tube and on opposite sides thereof and separated from each other approximately by the desired length of the terminal pad. This cut section of tubing is then flattened between the cuts and the edges of the flat are cut into to provide a pair of terminal lugs.

These and other features and objects of my invention will become more apparent by reference to the following description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a side elevational view illustrating the first step in my method of manufacturing terminals from a length of tubing;

Fig. 2 is a view in cross section taken along the lines 2—2 of Fig. 1;

Fig. 3 is a view in cross section taken along the lines 3—3 of Fig. 1;

Fig. 4 is a side elevational view illustrating another step in the practice of my method of manufacturing terminals;

Fig. 5 is a view in cross section taken along the lines 5—5 of Fig. 4;

Fig. 6 is a perspective view of Fig. 4 illustrating still another step of the practice of my invention;

Fig. 7 is a perspective view of a finished terminal lug made in accordance with my invention; and

Fig. 8 is a view in cross section of the terminal shown in Fig. 7.

Referring to Figs. 1–3 of the drawing and in accordance with the principles of my invention, in order to manufacture a pair of terminal lugs having a flat terminal pad portion and a barrel portion, it is necessary to start with a mill length of seamless tubing from which a predetermined length **10** is cut. Two cuts **12** and **14** are made on opposite sides of the tubing **10** transverse to the longitudinal axis of the tubing **10** and at a distance from each end which is approximately equal to the desired length of the conductor receiving barrel portion **16** and **18** of each of the finished terminals. The portion **22** of the tubing **10** between the cuts **12** and **14** is equivalent to the length of the terminal pad desired. In the next step in accordance with the method of my invention, the central portion **22** between the cuts **12** and **14** of the tubing **10** is flattened as shown in Figs. 4 and 5. This results in a double ended terminal having one conductor receiving body **16** having a central axis position below the center line of the tongue portion **22** and another conductor receiving body **18** on the opposite end of the tube section **10** and a central axis positioned above the center line of the tongue portion **20**. Between these barrel receiving portions **16** and **18** is a terminal pad **22** having a thickness equal to twice the thickness of the wall of either barrel portion. Between the terminal pad **22** and each body **16** and **18** at the location of the two cuts **12** and **14** there is a resultant neck portion **24** and **26**. If it should be necessary to have a long neck portion **24** and **26** for specific mounting purposes, the saw cuts **12** and **14** can be increased in width.

The next operation in accordance with the method of my invention requires the separation of the two terminal lugs. Referring to Fig. 6, the two dotted lines **28** and **30** along each edge of the tubular terminal pad **22** represent the cutting lines for the next step in the practice of my method which is a shearing operation in which the unitary edges **34** and **36** of the tubular terminal pad are cut off resulting in a separation of the terminal pad. The cut off edges **34** and **36** are the only scrap metal produced in the practice of my invention.

As shown in Fig. 7 each terminal has a terminal pad of a thickness equivalent to the wall thickness of the barrel portion or the wall thickness of the original tubing. A mounting hole **32** may be punched in the terminal pad or otherwise provided. One easy method of accomplishing this is during the shearing operation wherein the die may be spring-loaded to first punch the mounting hole through the double pad and then shear along the lines **30** and **28**. If the terminal pad of the resulting tongues is desired to be narrower than the diameter of the tube, it is possible for the shearing lines **28** and **30** to be moved closer to the center of the terminal lug, thus narrowing the pad section. It can thus be seen that by this method of manufacture, terminal lugs with tubular barrel receiving portions can be made at an extremely fast rate of production, since pairs of terminals are produced instead of single terminals as in previous methods. Moreover, due to this method,

the terminal pads need not have excessive width or thickness resulting in a saving of metal. The corrosion hazards from retained acids during the plating operation is eliminated. Moreover, narrow terminal pads may be provided and a minimum of scrap results from the manufacture in accordance with my invention.

It is, of course, obvious that a single terminal can be produced by this method rather than the production of a pair of terminals described above. To produce a single terminal, it is merely necessary to make a saw cut in the wall of the tube transverse to the central axis and then flatten the tube to one side of the saw cut. After flattening the tube, shearing the edges of the flattened portion will yield a single terminal having a seamless barrel portion and a terminal portion having a length equal to the flattened portion and a thickness equal to the thickness of the wall of the starting tube material.

I have thus described my invention, but I desire it understood that it is not confined to the particular forms or uses shown and described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of my invention, and, therefore, I claim broadly the right to employ all equivalent instrumentalities coming within the scope of the appended claims, and by means of which, objects of my invention are attained and new

results accomplished, as it is obvious that the particular embodiments herein shown and described are only some of the many that can be employed to attain these objects and accomplish these results.

I claim:

1. The method of manufacturing a pair of terminals comprising the steps of cutting a pair of saw cuts on opposite sides of a predetermined length of tube, said cuts spaced from each other and transverse to the central axis of said tube said saw cuts being made to a depth at least equal to the radius of said tube; flattening the portion of said tube between said saw cuts and shearing off the edges of said flattened portion by making cuts intersecting said saw cuts.

2. The method according to claim 1 which further includes the step of punching a hole in said flattened portion to produce a mounted hole in each of said pair of terminals.

References Cited in the file of this patent

UNITED STATES PATENTS

910,684	Horner	Jan. 26, 1909
1,391,792	Recker	Sept. 27, 1921
2,371,469	Rogoff	Mar. 13, 1945
2,511,806	Macy	June 13, 1950

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,957,226 October 25, 1960

Bern Dibner

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 17, for "mounted" read -- mounting --.

Signed and sealed this 17th day of April 1962.

(SEAL)
Attest:

ESTON G. JOHNSON
Attesting Officer

DAVID L. LADD
Commissioner of Patents