W. P. BOVARD.

METHOD OF MANUFACTURING ELECTRICAL CONDUCTORS.

APPLICATION FILED SEPT. 27, 1916.

1,220,596.

Patented Mar. 27, 1917.

2 SHEETS—SHEET 1.

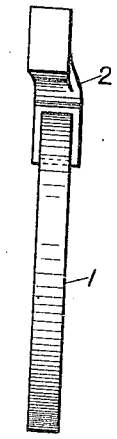


FIG. 2

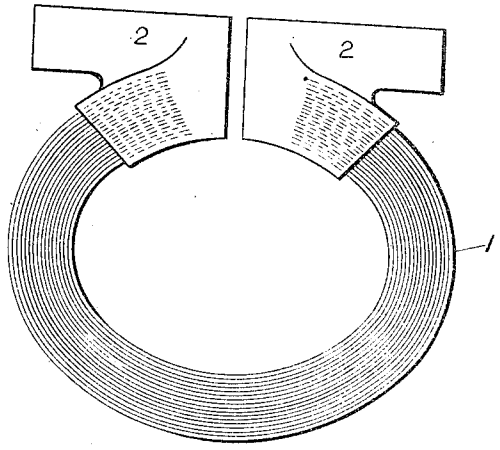


FIG. 1

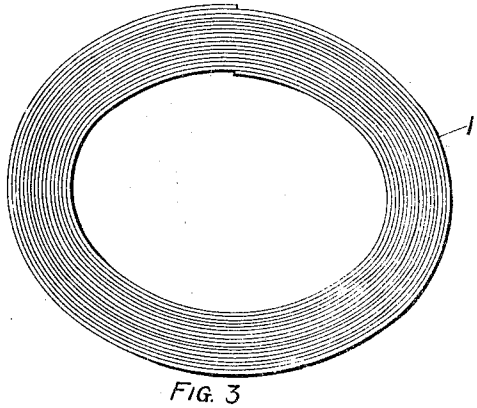


FIG. 3

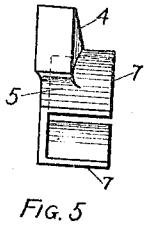


FIG. 5

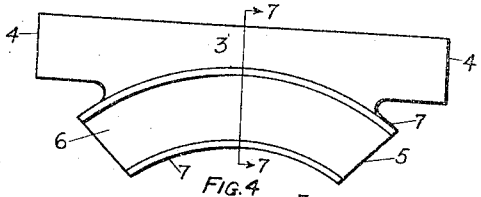


FIG. 4

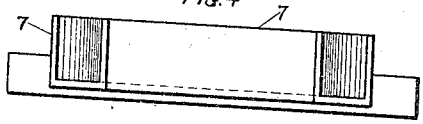


FIG. 6

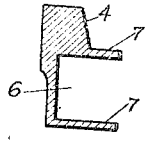


FIG. 7

Witnesses
Harry Wilkinson
Otis Miller

Inventor
WILLIAM P. BOVARD.

By Gaillard.

Attorney

W. P. BOVARD.

METHOD OF MANUFACTURING ELECTRICAL CONDUCTORS.

APPLICATION FILED SEPT. 27, 1916.

1,220,596.

Patented Mar. 27, 1917.

2 SHEETS—SHEET 2.

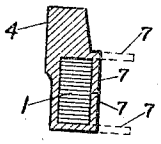


FIG. 9

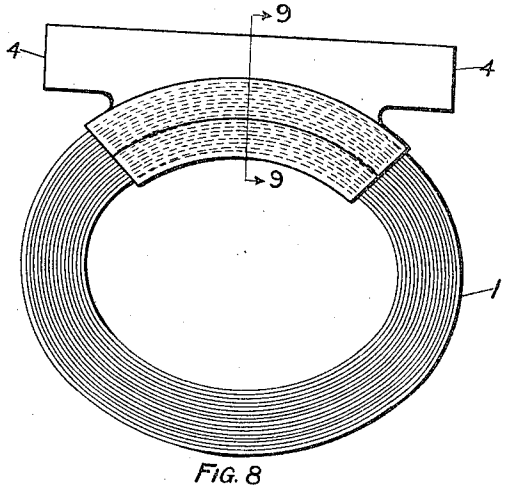


FIG. 8

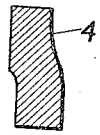


FIG. 11

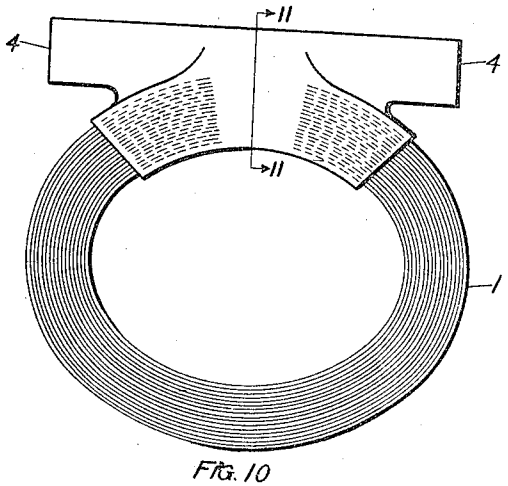


FIG. 10

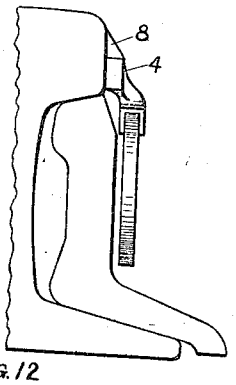


FIG. 12

Witnesses
Harry Robinson
Otis Miller

Inventor
WILLIAM P. BOVARD

By

Attorney

UNITED STATES PATENT OFFICE.

WILLIAM P. BOVARD, OF MANSFIELD, OHIO, ASSIGNOR TO THE OHIO BRASS COMPANY, OF MANSFIELD, OHIO, A CORPORATION OF NEW JERSEY.

METHOD OF MANUFACTURING ELECTRICAL CONDUCTORS.

1,220,596. Specification of Letters Patent. Patented Mar. 27, 1917.

Application filed September 27, 1916. Serial No. 122,417.

To all whom it may concern:

Be it known that I, WILLIAM P. BOVARD, a citizen of the United States, residing at Mansfield, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in the Method of Manufacturing Electrical Conductors, of which the following is a specification.

My invention relates more particularly to that class of electrical conductors known as rail bonds for joining the adjacent ends of rails to make the rail circuit complete.

My device is of that class of rail bonds which is constructed of a flexible body and a terminal attached to each end of the body.

One object of my method of producing rail bonds is to greatly cheapen the cost of production by reducing the number of operations which have in the past been necessary and to do so without losses of material any greater than by present methods.

With this object in view and other objects which will be explained later and pointed out in the claims, my invention consists in the novel feature of the relation of parts and the operations to which the parts are subjected.

In the drawings, Figure 1 is a plan view of a finished bond.

Fig. 2 is an end elevation view of Fig. 1.

Fig. 3 is a plan view of one form of the flexible body before assembling in the terminal member.

Fig. 4 is a plan view of one form of terminal at one stage of manufacture and the form shown is adapted to assemble with the body shown in Fig. 3.

Fig. 5 is an end view of Fig. 4.

Fig. 6 is an edgewise view of Fig. 4 looking toward the lower edge of Fig. 4.

Fig. 7 is a sectional view of Fig. 4 taken on line 7—7.

Fig. 8 is a plan view of the parts represented by Figs. 3 and 4 assembled and the flanges turned over and onto the body.

Fig. 9 is a sectional view of Fig. 8 on the line 9—9 showing the lips or flanges turned down and compressed into place cold and also before turning down by the dotted lines.

Fig. 10 is a plan of my invention after the assembled parts shown in Fig. 9 have been heated and welded.

Fig. 11 is a sectional view of Fig. 10 on the line 11—11, showing the solid condition after welding.

Fig. 12 is an end elevation view of the finished bond attached to a rail.

A description of the method which I use in producing my bond shown in Figs. 1 and 2 in which numeral 1 designates the body member and numeral 2 designates the terminals, is as follows:

I first produce a flexible body member, preferably of copper, which may be constructed in various ways, for instance, I may take a short length of cable composed of a plurality of wires and bend it to the proper shape, or I may take a single wire of small diameter and wind it upon itself on a form until the correct size or capacity is secured or I may follow the method which will produce a body shown by Fig. 3 which consists in winding upon itself a ribbon of copper on a form. It will be noted that in the two latter methods the body forms a closed loop while in the first method mentioned the body has adjacent ends.

I now forge up a single or composite terminal of such shape and size as to meet my requirements, depending to a large degree upon the manner in which the bond is to be attached to the rail.

One form of terminal is shown in Fig. 4 and is adapted in the finished bond to be applied to the rail by welding or soldering. In the terminal which I now produce I combine the two terminals 2 into one. By making the two in one I reduce the number of operations in making the completed bond to nearly one half the operations otherwise required, as will be readily recognized by one skilled in the art. It is the practice in the manufacture of other bonds to make the two terminals separate and attach to the body by separate operations.

The terminal shown in Fig. 4 consists of the attaching member 4 and the projection 5 provided with a groove 6. This form of terminal can be produced readily by means of dies and a drop hammer.

It is quite desirable to inclose the body 1 by means of the terminal walls and for that reason I form flanges 7 surrounding the groove 6.

These flanges are adapted to be bent over and upon the body 1 after placing the body 1 in the groove 6 as shown. This operation is usually done cold although if desired it may be done hot. Better results in welding the two parts together are secured however

when the flanges are turned over cold. Fig. 9 is a sectional view showing the relation of parts before and after turning the flanges over and compressing the parts solidly together.

The parts are now placed in a suitable heating flame or other means for bringing them to a welding temperature and when such temperature is reached they are placed in suitable dies and compressed, whereby the parts are welded securely together. The layers or individual wire making up the body, usually retain their individuality for a short distance beyond the point where they enter the terminal as shown in Fig. 1 and loose same as they enter farther and finally become welded together and to the terminal member.

I now have a combination of a flexible body and terminal welded together and forming a complete loop without ends as indicated in Fig. 10, a section of which on the line 11—11 is shown in Fig. 11. It now remains to cut through the single terminal on the line 11—11 and spread the two parts slightly and we have a complete bond ready for application.

The particular bond herein shown is well adapted to be attached to the rail by means of the oxyacetylene or electric flame as shown in Fig. 12 in which the attaching metal is designated by 8.

The method of manufacturing rail bonds or electrical conductors as described and shown is subject to modifications without departing from the scope of my claims and I do not wish to be limited to the exact description and drawings herein disclosed, but what I do claim as new and desire to secure by Letters Patent, is:

1. The method of forming an electrical conductor having a flexible body member and two terminal members, consisting in forming a solid terminal having a groove therein with extended walls to form flanges to encircle and inclose the body member, inserting a portion of the body member in the groove and bending the flanges over onto the body member cold to encircle the body member, heating the parts and integrally uniting them together in a varying degree of intimacy, then cutting the solid terminal member forming thereby two oppositely disposed terminals.

2. The method of forming an electrical conductor having a flexible body member and terminal members which consists in forming a single terminal having a groove therein and extended flanges, pressing a portion of the body in the groove while cold, heating the parts and welding them into an integral union, then cutting the single terminal to form two oppositely disposed terminals attached to the ends of a flexible body.

3. A method of forming an electrical conductor having a flexible body and a terminal member at each end thereof, consisting in forming up a solid terminal consisting of two terminals in one and having a groove therein with extended walls to form flanges to encircle and inclose the body member and having a projection formed therewith for attachment to a rail; inserting a portion of the body member in the groove and bending the flanges over onto the body member to encircle the body member; compressing the parts strongly together cold; heating the parts and welding them under pressure to form an integral union and then cutting the terminal member, forming thereby a conductor having a terminal at each end.

4. The method of forming an electrical conductor having a flexible body member and a terminal member on each end of the body, consisting in forming a body constituting a closed member by winding up strand until the desired capacity is secured, then forming up a single terminal member having a groove for receiving a portion of the body member, then compressing the body into the groove to secure internal contact, heating the parts and welding together and then cutting the single terminal to form two oppositely disposed terminals attached to the ends of a flexible body.

5. The method of forming an electrical conductor having a flexible body member and a terminal member on each end of the body, consisting in forming the body of a plurality of strands, then inclosing a portion of the body in a single terminal forging, compressing the forging about the body to form an intimate contact and expel the air, then heating the parts and welding them together in a varying degree of intimacy, then cutting through the single terminal forming thereby a terminal on each end of the flexible body.

6. The method of forming an electrical conductor having a flexible body member and a terminal member on each end of the body, consisting in forming the body of a plurality of members, then forming a single terminal member, welding a portion of the terminal and body member together in a varying degree of intimacy, then cutting the single terminal thereby forming a terminal on each end of the body.

7. The method of forming an electrical conductor having a flexible body member and a terminal member on each end of the body and provided with a flat face and projecting portions adapted to be welded to a rail, consisting in forming a body of a plurality of members, then forming up a single terminal member provided with a flat surface and projecting portions for contacting with a rail surface and having means

for receiving the body, then heating and integrally uniting the single terminal and body together in a varying degree of intimacy, then cutting the single terminal to form a terminal on each end of the body.

8. The method of forming an electrical conductor having a flexible body member and a terminal member on each end of the body, consisting in forming a flexible body, then forming up a single terminal from metal having a welding point approximately the same as the body and having means for receiving the body, welding a portion of the terminal and body member together, then cutting the single terminal to form a terminal on each end of the body.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM P. BOVARD.

Witnesses:
REX G. AVERILL,
W. W. HUNZICKER.