

March 29, 1960

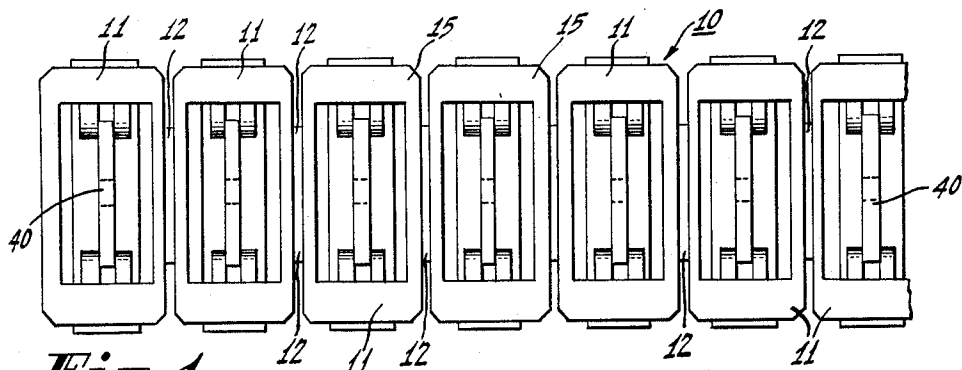
F. KLUMPP, JR

2,931,006

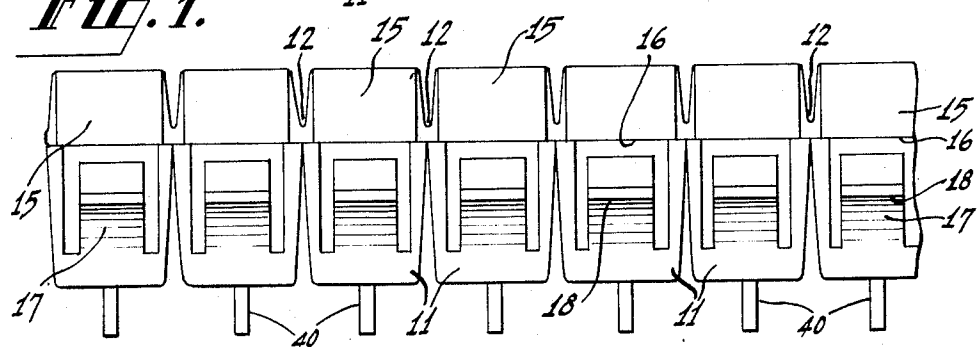
MULTIPLE DISCONNECT JUNCTION-TERMINAL BUSHING

Filed Oct. 16, 1958

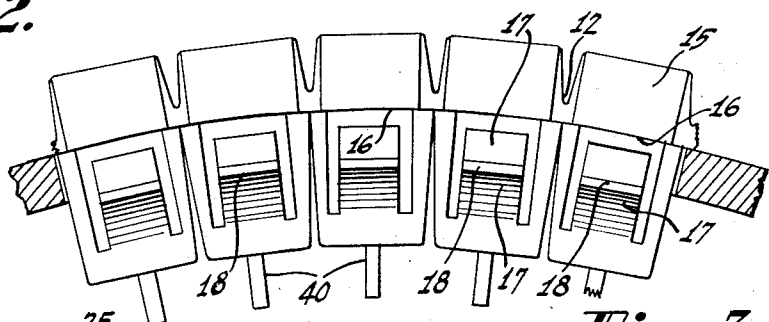
2 Sheets-Sheet 1



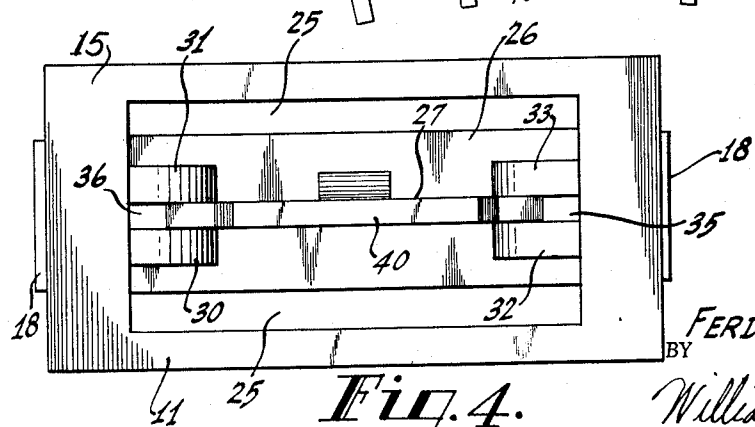
**Fig. 1.**



**Fig. 2.**



**Fig. 3.**



**Fig. 4.**

INVENTOR.

FERDINAND KLUMPP, JR.

BY

William A. Galuska  
ATTORNEY

March 29, 1960

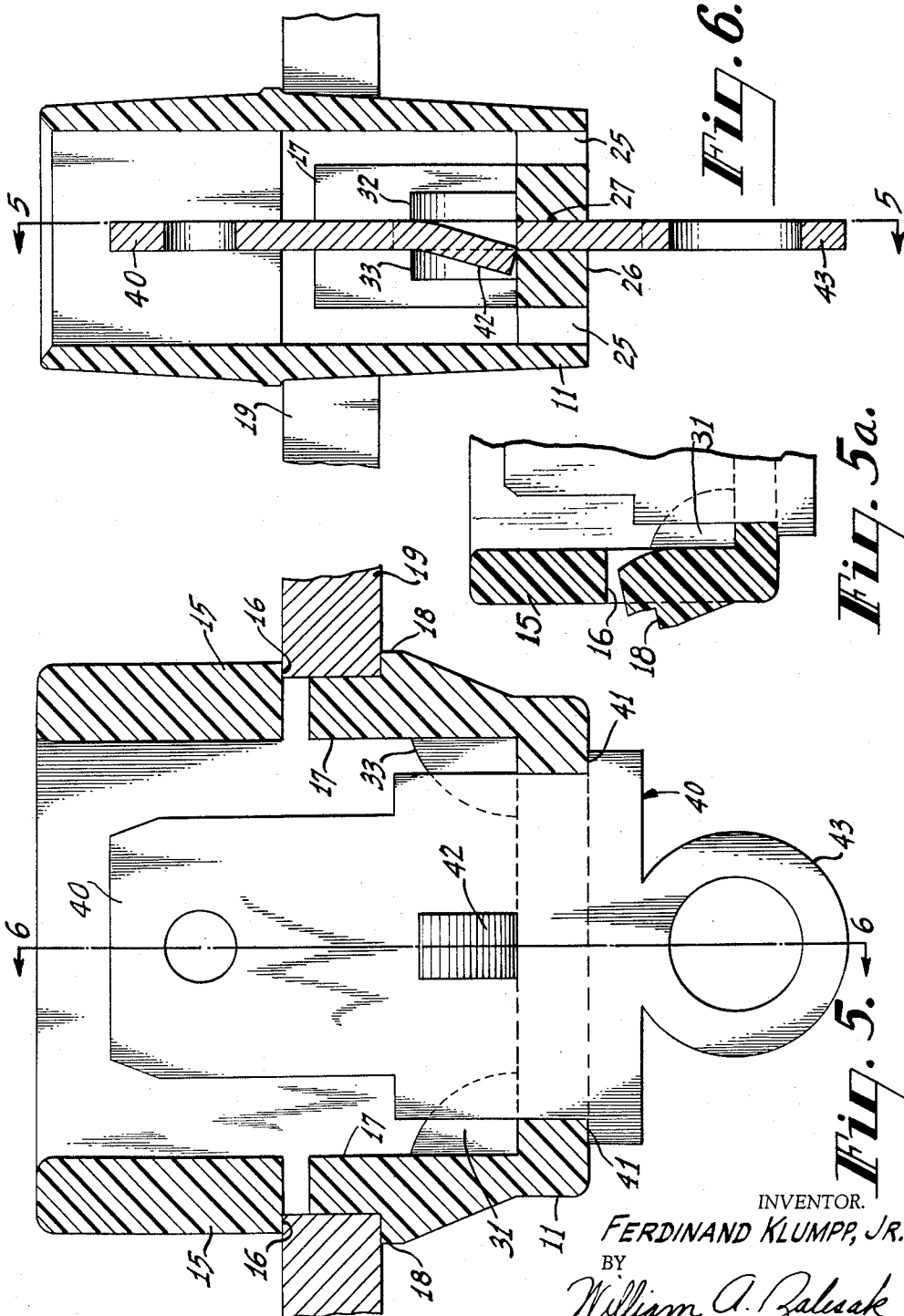
F. KLUMPP, JR

2,931,006

MULTIPLE DISCONNECT JUNCTION-TERMINAL BUSHING

Filed Oct. 16, 1958

2 Sheets-Sheet 2



INVENTOR.  
FERDINAND KLUMPP, JR.  
BY  
William A. Zalesak  
ATTORNEY

1

2,931,006

## MULTIPLE DISCONNECT JUNCTION-TERMINAL BUSHING

Ferdinand Klumpp, Jr., Union, N.J., assignor to  
Heyman Manufacturing Company

Application October 16, 1958, Serial No. 767,725

10 Claims. (Cl. 339—198)

My invention relates to an improved type of electrical junction-terminal bushing or disconnect strip which is self-locking within a supporting panel or wall whether the panel or wall be straight or curved and to a novel combination of bushing and conductor terminal.

In previous applications where multiple unit bushings were used with curved panels or walls, each bushing molded as a rigid unit had to be formed with a curve corresponding to that of the supporting panel or wall. This required many expensive dies. These units, whether for flat panels or curved panels, were also made in short sections or as single units so that where the number of junction terminals was large, a plurality of short sections could be utilized to form a long line of terminal bushings. This also had to be done to avoid the need of many expensive dies for different lengths of multiple bushings.

It is frequently desirable to be able to use various types of disconnect terminals, for example, solder disconnect terminals, crimp disconnect terminals, and double disconnect terminals. This requires in molded bushings, with the terminals molded in, at least several types of bushings and terminals in stock to provide for various requirements.

Another problem is that of easy assembly of the terminal conductor and the bushing and for providing flexibility of the conductor within the bushing to facilitate attachment to a disconnect terminal on a wire or cord.

It is an object of my invention to provide an improved form of electrical junction-terminal bushing of the multiple unit type which may be made of any desired standard length but which can be cut to any desired length.

A further object of my invention is to provide such a terminal bushing which can be supported on flat panels or which can be fitted to any curvature of any curved panel within wide variations of curvature even a multiple curved panel.

A still further object of my invention is to make the terminal bushing self-locking regardless of whether one or more units of the multi-unit panel are used.

A still further object of my invention is to provide such a bushing which can be combined with several different types of disconnect terminals.

In accordance with my invention the multi-unit terminal bushing is molded in long strips of any desired length. Each unit is connected to the adjacent unit by an integrally molded hinge intermediate the ends of the units which preferably have flat sides and are of rectangular cross section, each unit being in the form of an elongated cup. The sides of the cups are preferably tapered toward both ends between the hinged sides and away from the hinge. This permits flexing of the bushing strip in two directions and to any curvature and provides a guide for any cutting tool to sever the hinge to provide the lengths desired.

The bottom of each cup is slotted to receive various types of terminals which can be locked to the bottom of the cup, as will be described.

The sides of the individual units or cups which are

2

not hinged are provided with locking tongues which engage the opposite wall of the supporting panel from the wall engaged by flange elements at one end of the bushing. Slots are formed in the bottom and sides of the cups for providing desirable flexibility for the terminal and for the tongues or fingers.

The detailed description of my invention follows, reference being had to the drawings, in which:

Fig. 1 is a plan view of a junction terminal bushing or multiple disconnect strip made according to my invention;

Fig. 2 is a side elevation of Fig. 1;

Fig. 3 is a side elevation of the strip bushing shown in Figs. 1 and 2 mounted on a curved panel;

Fig. 4 is an enlarged plan view of one section or unit of the bushing;

Fig. 5 is a vertical section taken along the line 5—5 of Fig. 6;

Fig. 5a is a partial section of Fig. 4 showing a tongue in unsprung position; and

Fig. 6 is a section taken along the line 6—6 of Fig. 5.

In the drawings (Figs. 1 and 2) the multiple unit disconnect strip or terminal bushing 10 made according to my invention includes a plurality of elongated cup shaped units or sections 11. These units are connected by integral hinges 12. This strip is molded as a single unit to any desired length. The hinges 12 can be readily severed to obtain any length desired.

For a more detailed description of the invention, reference is made to Figs. 4, 5 and 6. Each of the cup-shaped sections or elements 11 is provided at its open end with enlargements or flange elements 15 which provide the shoulders 16. Near the bottom of the ends of the cup-shaped sections 11 are provided the flexible tongue-shaped locking elements 17 which prior to insertion extend outwardly from the body of the cup-shaped elements in a manner described and shown in my previous Patent No. 2,424,757. The tongues are provided with the engaging shoulders 18. Thus, when a strip bushing made according to my invention is inserted into an elongated aperture within a supporting panel, the panel is engaged between shoulders 16 of the flange elements and the shoulders 18 on tongue 17 locking the bushing in place.

The bottom of each cup is provided with a pair of parallel transverse slots 25—25 extending between the opposite walls of the cup. This results in a flexible supporting member 26 in which is formed a slot 27 shorter than the slots 25.

At each end of the slot 27 there are a pair of oppositely disposed retaining walls or elements 30, 31 and 32, 33. These extend past the end of the slot 27 and provide slots 35 and 36 which receive the conductor terminal 40. They insure proper positioning of the terminal 40 when inserted through the slot 27.

The terminal 40 is shaped to have a pair of shoulders 41 which engage the bottom of cup section 11. The outer end in this embodiment shows a loop terminal 43 to which a conductor may be soldered. In practice, any type of disconnect terminal may be inserted into the bushing strip after the bushing is molded. The supporting member 26 can be forced apart at slot 27 to permit entry of the terminal 40 which has the resilient locking tongue 42. This tongue engages the inner surface of the element 26 as shown to lock the terminal in place.

The supporting element can be flexed sufficiently so that when a female connecting terminal is forced into the bushing to make a connection, easy entry is permitted if both connecting elements are not exactly aligned.

What is claimed is:

1. A molded junction-terminal bushing of insulating material including a plurality of elongated cup sections, each section being joined by an integral hinge to an adja-

3

cent section intermediate the ends of said sections, each of said sections supporting an elongated conducting terminal member extending through the bottom thereof and fixed thereto, each of said sections having an enlarged portion at one end providing outwardly extending shoulders and flexible locking elements formed in opposite side walls of each cup section and having free ends extending outwardly from the side walls whereby an apertured panel receiving said bushing will be secured to said bushing by engagement with the free ends of said flexible locking elements and said shoulders.

2. A molded junction-terminal bushing of insulating material including a plurality of elongated cup sections, each cup section being joined by an integral hinge to an adjacent section intermediate the ends of said sections, each of said sections having an opening in the bottom thereof for supporting an elongated terminal member extending through said opening and fixed to said section each of said sections having flange elements at one end providing outwardly extending shoulders and flexible locking fingers formed in the sides of each cup section on opposite sides of the hinge and having their free ends extending outwardly from the side walls whereby said bushing will be locked to an apertured supporting member by engagement of said member with the free ends of said fingers and said flange elements.

3. A junction terminal bushing including an elongated cup-shaped member having a pair of parallel slots extending through and across the bottom thereof whereby an elongated supporting element is formed therebetween, said supporting element having a slot therein, and a conducting terminal member extending through said last slot, said terminal member having shoulders thereon engaging the outside and the bottom of said cup-shaped member and a resilient tongue in said terminal and within said cup and engaging said supporting element to lock said terminal within said cup-shaped member, flange elements adjacent the open end of said cup-shaped member, opposite sides of said cup-shaped member having resilient tongues adjacent said flange elements, said tongues extending outwardly of the walls of the cup-shaped member, the free ends being adapted to engage a supporting panel between the free ends of the tongues and the flange elements.

4. A junction-terminal bushing of insulating material including an elongated cup-shaped member of rectangular cross-section having a pair of parallel slots extending through the bottom thereof and between opposite walls thereof whereby an elongated supporting member is formed therebetween, said supporting member having a slot therein of shorter length than said pair of slots, a pair of retaining walls at each end of the slot in said supporting member and extending from the side walls of said cup-shaped member and past the end of said last slot, and a conducting terminal member extending through said last slot and between said pairs of walls to be retained thereby, said terminal having shoulders thereon engaging the outside and the bottom of said supporting member, and a resilient tongue in said terminal and within said cup-shaped member and engaging said supporting member to lock said terminal within said cup-shaped member, flange elements at the open end of said bushing providing outwardly extending shoulders, opposite sides of said cup having resilient tongues extending outwardly of the walls of the cup and the ends of said tongues being adapted to engage an apertured supporting panel between the free ends of the tongues and the flange elements.

5. A junction-terminal bushing of insulating material including an elongated cup-shaped member having a pair of parallel slots extending through and across the bottom thereof forming an elongated supporting member, said supporting member extending parallel to one pair of oppositely disposed walls and having a slot therein, a pair of spaced retaining walls at each end of said last slot and

4

extending from the side walls of said cup past the ends of said last slot, and a conducting terminal member extending through said last slot and between said pairs of walls to be retained thereby, said terminal having shoulders thereon engaging the outside and the bottom of said cup-shaped member, and a resilient tongue on said terminal and within said cup and engaging said supporting member to lock said terminal within said cup-shaped member.

6. A junction-terminal bushing of insulating material including an elongated cup-shaped member of rectangular cross-section having a pair of parallel slots extending through and across the bottom thereof forming an elongated supporting member extending parallel to two opposite walls of said cup-shaped member, said supporting member having a slot therein parallel to said pair of slots but shorter than said pair of slots, a pair of spaced retaining walls at each end of the slot in said supporting member and extending from the side walls of said cup past the ends of said last slot, said last slot being adapted to receive a conducting terminal member extending therethrough and between said pairs of walls to be retained thereby, flange means at the open end of said cup-shaped member, and resilient locking means extending outwardly from the other opposite walls of said cup-shaped member, said flange means and said resilient locking means being adapted to engage opposite sides of an apertured panel.

7. A junction-terminal bushing of molded insulating material including an elongated cup-shaped member having a rectangular transverse section, the bottom of said cup having a pair of parallel slots extending therethrough between a pair of oppositely disposed side walls and providing a flexible support extending across the bottom of said cup parallel to one pair of oppositely disposed side walls of said cup-shaped member, a conducting terminal secured to and extending through said support, flexible tongues extending through the other pair of oppositely disposed side walls and having their free ends extending outwardly of said other pair of oppositely disposed side walls, and enlarged portions at the top of said cup on said other pair of oppositely disposed side walls providing shoulders cooperating with said tongues to lock an apertured supporting member between said shoulders and said tongues.

8. A junction-terminal bushing of molded material including an elongated cup-shaped member having a rectangular transverse section, the bottom of said cup having a pair of parallel slots extending therethrough between a pair of oppositely disposed side walls and providing a support extending across the bottom of said cup, said support having a slot therein parallel to said pair of slots, said last slot being adapted to receive a conducting terminal therethrough to be fixed to said support, flexible tongues extending through the other pair of oppositely disposed side walls and having their free ends extending outwardly of said other pair of oppositely disposed side walls, and flange means at the top of said cup-shaped member on said other pair of oppositely disposed side walls providing means cooperating with said tongues to lock an apertured supporting member between said flange means and said tongues.

9. A multiple unit junction-terminal bushing of molded insulating material including a plurality of elongated cup-shaped members having a rectangular transverse section, each cup-shaped member being joined to an adjacent cup-shaped member by a hinge, the bottom of each cup-shaped member having a pair of parallel slots extending therethrough between a pair of oppositely disposed side walls providing a flexible support extending across the bottom of said cup, said cup-shaped members being tapered inwardly toward both ends on the sides joined by the hinge and on opposite sides of the hinge, a conducting terminal secured to and extending through said support, flexible tongues extending through the other pair of oppositely disposed sides walls and having their free ends

extending outwardly of said other pair of oppositely disposed side walls, and flange means at the top of said cup-shaped member on said other pair of oppositely disposed side walls providing shoulder means cooperating with said tongues to lock an apertured supporting member between said shoulder means and said tongues.

10. A molded junction-terminal bushing of insulating material including a plurality of elongated cup sections, each section being joined by an integral hinge to an adjacent section intermediate the ends of said sections, said sections being tapered inwardly toward the ends of said sections on opposite sides of the hinge, each of said sections supporting an elongated terminal member extending through the bottom thereof and locked thereto, each of

said sections having flange means at one end and oppositely disposed flexible locking elements formed in the sides of each cup section and extending outwardly from the sides of said section whereby an apertured supporting member receiving said bushing will be locked between said flange means and said flexible locking elements.

#### References Cited in the file of this patent

#### UNITED STATES PATENTS

2,396,725	Thomas	Mar. 19, 1946
2,424,757	Klumpp	July 29, 1947
2,756,403	Francis et al.	July 24, 1956