

Oct. 13, 1959

R. E. WIRSCHING
SOLDERLESS CONNECTOR

2,908,884

Filed Aug. 9, 1955

2 Sheets-Sheet 1

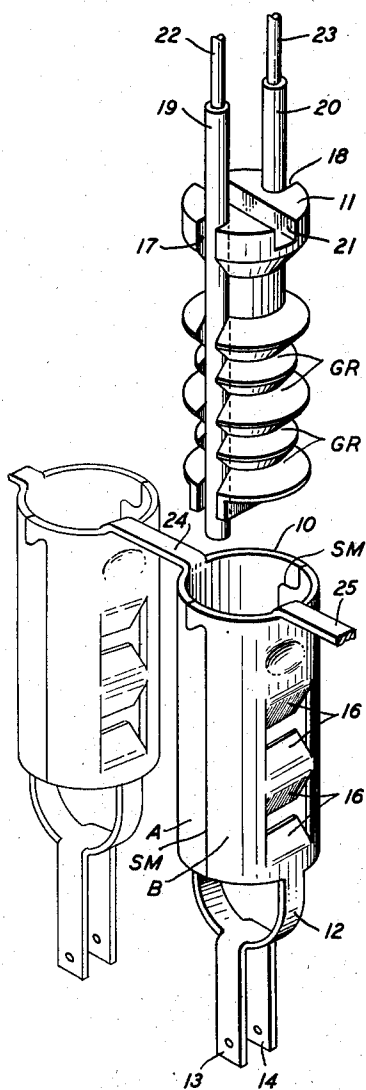


FIG. 1

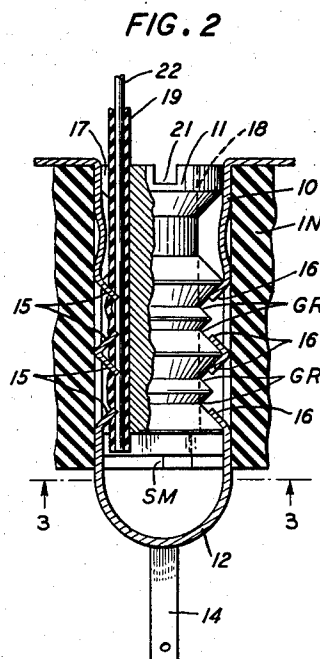


FIG. 2

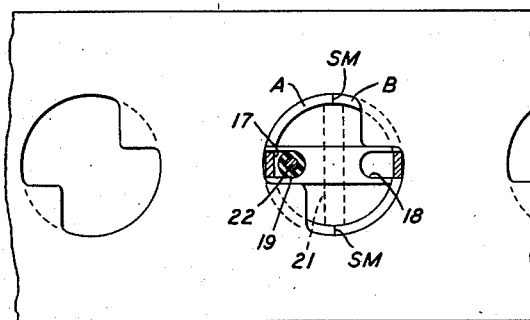


FIG. 3

INVENTOR
R. E. WIRSCHING

BY

Howard A. Stamm
ATTORNEY

Oct. 13, 1959

R. E. WIRSCHING
SOLDERLESS CONNECTOR

2,908,884

Filed Aug. 9, 1955

2 Sheets-Sheet 2

FIG. 4

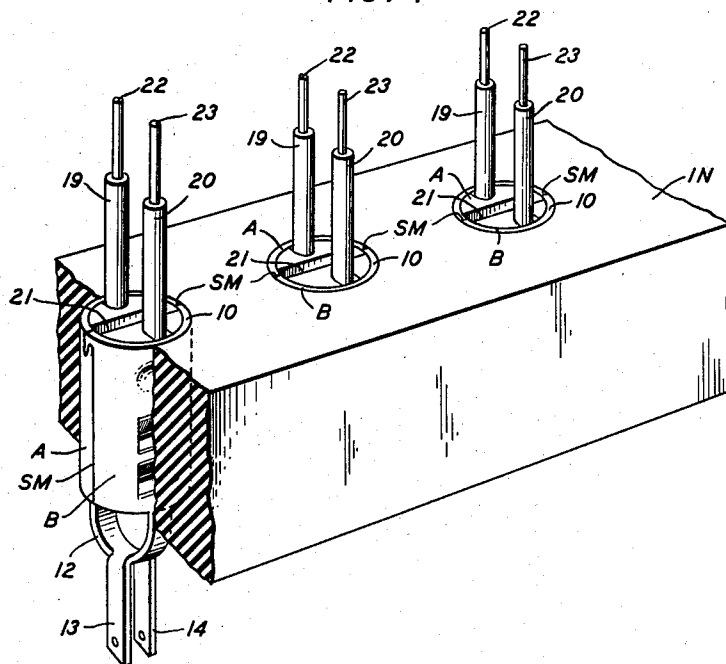
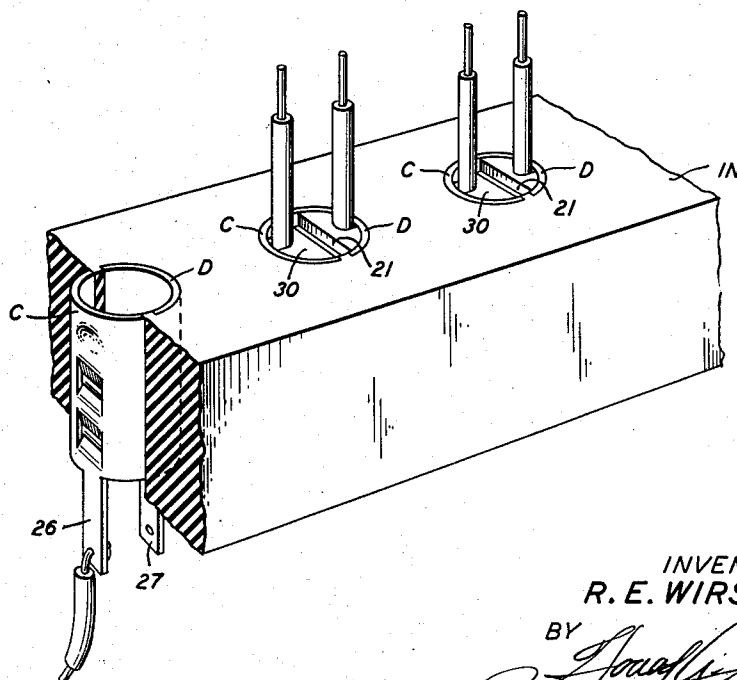


FIG. 5



INVENTOR
R. E. WIRSCHING
BY *[Signature]*
ATTORNEY

1

2,908,884

SOLDERLESS CONNECTOR

Robert E. Wirsching, Chatham, N.J., assignor to Bell Telephone Laboratories, Incorporated, New York, N.Y., a corporation of New York

Application August 9, 1955, Serial No. 527,379

4 Claims. (Cl. 339—99)

This invention relates to wire connectors and more particularly to a combined binding post and terminal of the solderless type.

An object of the present invention is the provision of a solderless terminal, or binding post, for insulated conductors where low resistance electrical connections are made therebetween by the mechanical manipulation of the terminal which ruptures the insulation on the conductors, at a plurality of locations on the ends thereof, and secures them firmly together.

Another object of the invention is the provision of a solderless terminal or binding post, wherein provision is made for connecting a plurality of insulated conductors to a common terminal, which in turn is provided with means for making external connections thereto.

A further object of the invention is the provision of a solderless terminal or binding post which may comprise a number of individual assemblies multiplied together or may comprise individual assemblies mounted on a common insulating member, each one of which is insulated from the other.

A still further object of the invention is the provision of a solderless type of binding post wherein each conductor in each assembly is insulated from each other and is connected individually to a portion of the assembly, each of which is insulated from the other, which in turn are provided with external electrical connections.

A still further object of the invention is the provision of a solderless terminal or binding post which may be fabricated, in part, from a single sheet of metal formed up to provide suitable shells or housings and externally extending electrical connections.

The combined terminal and binding post of this invention is of the solderless type and contemplates the securing together and the making of electrical connections between insulated conductors and also provides means for making additional external electrical connections thereto.

In accordance with the preferred embodiment of my invention, I have provided an elongated cylinder or shell of suitable conducting material, having on its inner walls, in oppositely disposed relation, a plurality of inwardly extending protuberances or embossings, the inner ends of which present substantially sharp edges.

Located in the bore of the shell and extending the full length thereof, is a plug member. This plug member is profiled to provide a plurality of circumferentially disposed spaced apart grooves and ridges which are adapted to register with the protuberances on the inner wall of the shell to provide a bearing surface for the plug.

Located on the plug member, in oppositely disposed relation, and extending longitudinally the full length thereof, are two conductor receiving grooves or slots. These slots are arranged to receive the ends of the insulated conductors to be connected together.

After the insulated conductors have been inserted in their respective grooves, the plugs are rotated one quarter

2

turn, or 90 degrees, by means of a suitable tool engaging a slot in the top of the plug. This rotating action forces the conductors into intimate contact with the protuberances on the inner wall of the shell which ruptures the insulation on the conductors and establishes electrical contact therewith.

Other objects and advantages of this invention will be readily apparent from the following detailed description when read in connection with the accompanying drawing, in which:

Fig. 1 is an exploded view, in perspective, of one specific illustrative embodiment of this invention, wherein insulated conductors are depicted in place in the wire receiving grooves;

Fig. 2 is a fragmentary view, partly in cross section, of the embodiment of Fig. 1 mounted in an insulating strip and illustrates the manner in which an insulated conductor is forced into intimate contact with the protuberances on the inner wall of the shell, the rupturing of the insulation and the establishing of electrical contact with the conductor;

Fig. 3 is a fragmentary bottom plan view of the structure as shown in Fig. 2;

Fig. 4 is a fragmentary perspective view, partly in section, illustrating the binding post as shown in Figs. 1 and 2, in position on a strip of insulating material with the insulated conductors secured therein; and

Fig. 5 is a view similar to Fig. 4 but discloses a modified structure wherein the two halves of the shell of the binding post are insulated from each other to provide separate insulated connectors for each conductor, and the plug is of insulating material.

In the embodiment of my invention depicted in Figs. 1 to 4, inclusive, the structure comprises a tubular shell 10 and a cylindrical plug member 11. Both of these members are constructed of suitable conducting material with the shell 10 preferably fabricated from a strong resilient spring material, such as beryllium copper and the plug preferably of brass.

The shells 10 are fabricated from a single sheet of metal and may comprise single or multiple units.

As shown in Fig. 1, the shell 10 is composed of two similar halves A and B, formed up and joined along the seams SM—SM. The bottom portions of the halves A and B are joined together by the yoke member 12, which in turn is provided with downwardly extending soldering lugs 13 and 14 to facilitate the making of external electrical connections to the shell.

Located on the inner wall of the shell 10, oppositely disposed and extending longitudinally, are a plurality of spaced apart protuberances or embossings 15 and 16, the inwardly extending edges of which are substantially sharp to provide insulation rupturing portions. The protuberances 15 and 16 extend at an angle of approximately 45 degrees and are arranged to engage the circumferential grooves GR in plug member 11 when the shell 10 is assembled, as shown in Fig. 2, as by joining the two halves A and B along the seams SM with the plug member 11 in position between the two halves A and B.

As shown in the various figures, the plug 11 is provided on its outer surface with oppositely disposed longitudinally extending grooves 17 and 18 which extend the full length of the plug 11 and intersect the grooves GR—GR to provide wire receiving grooves, as shown in detail in Fig. 1. Insulated wires 19 and 20 are positioned in the grooves 17 and 18, as shown in Fig. 1; only wire 19 is depicted in groove 17 in Fig. 2 to allow a clearer depiction of the mating of the protuberances 16 and the plug 11.

When the plug 11 and the shell 10, as shown in Fig. 1, are assembled as shown in Fig. 2, the plug is adapted to rotate but is prevented from longitudinal movement due

3

to the engagement of the protuberances 15 and 16 with the grooves GR—GR. Thus, when the insulated conductors 19 and 20, as shown in Fig. 1, are positioned in the assembly and the plug is rotated one quarter turn or 90 degrees by means of a suitable tool (not shown) engaging the slot 21, the protuberances 15 and 16 rupture the insulation on the conductors 19 and 20 and establish electrical contact with the metal portions 22 and 23 thereof, as clearly seen in Fig. 2 where, however, as noted above, only conductor 19 is depicted.

As shown in Figs. 2, 3 and 4, the binding post or terminal of this invention may be mounted on a strip of insulating material IN with one end flush with the surface thereof and the other end extending therefrom and provided with lugs 13 and 14 for establishing an additional electrical connection thereto. If it is desired to multiple the shells 10, they may be constructed as shown in Fig. 1 wherein they are joined together by the integral portions 24 and 25 which are part of the shell 10.

In the modified form of my invention as illustrated in Fig. 5, I provide an insulating plug member 30 and have insulated the two halves C and D of the shell from each other. The shell may be positioned in the block or strip of insulating material IN thereby providing two external lugs 26 and 27 which may be electrically connected to the conductors 28 and 29 positioned in the insulating plug member 30. In this manner two individual insulated connections may be provided at each connector assembly as shown.

In the practicing of this invention with respect to the termination of insulated conductors, the assembly of the shell 10 and plug 11 is first formed by closing the shell, along the seams SM, against the plug 11 so that the protuberances 15 and 16 properly engage the grooves GR. The free ends of the conductors 19 and 20 are then inserted in the grooves 17 and 18 in plug 11 as shown in Fig. 1, after which the plug is rotated 90 degrees against suitable stops in the shell 10 which, as shown in Fig. 2, forces the protuberances 15 and 16 to "bite" into the insulation on the conductors and establish electrical connection with the metal portions 22 and 23 of the conductors 19 and 20, thereby providing a low resistance strong mechanical joint which may be readily made with a minimum amount of effort.

While I have shown and described my improved solderless connector as applied to a single binding post, it is readily apparent that it may be constructed in a manner to provide a plurality of binding posts multiplied together.

What is claimed is:

1. A solderless connector for insulated electrical conductors comprising a metallic tube, longitudinally disposed protuberances on the inner wall thereof, a plug rotatably mounted therein and having circumferential grooves therein adapted to receive said protuberances, a longitudinally extending groove on the periphery of said plug and intersecting the circumferential grooves thereof, whereby the rotation of said plug wedges a conductor positioned in said longitudinal groove between said pro-

4

tuberances and said circumferential grooves to rupture the insulation on the conductor and establish electrical contact between said metallic tube and the conductor positioned therein.

2. A solderless connector for insulated conductors in accordance with claim 1 characterized in this that a plurality of said connectors are encased in a block of molded insulating material to provide a terminal block having a plurality of connectors thereon.

3. A solderless connector for insulated electrical conductors comprising in combination an insulated electrical conductor, two elongated trough-shaped metallic members insulated from each other along their meeting edges, defining a tubular shell, a non-metallic plug rotatably mounted in the bore thereof and in frictional engagement with the inner walls of said trough-shaped members, a longitudinally extending wire receiving groove in said plug for the reception of said conductor, and having circumferential grooves thereon communicating with said longitudinal grooves, means on said plug for the rotation thereof to wedge said conductor between said plug and the inner walls of said tubular shell, and inwardly extending protuberances on the inner walls of at least one of said trough-shaped members and disposed in said circumferential grooves, for rupturing the insulation on said conductor whereby electrical contact is established between said conductor and one of said trough-shaped members.

4. A solderless connector for insulated electrical conductors comprising in combination a pair of insulated electrical conductors, two elongated trough-shaped metallic members insulated from each other along their meeting edges, defining a tubular shell, a non-metallic plug having circumferentially disposed grooves thereon rotatably mounted in the bore thereof and in frictional engagement with the inner walls of said trough-shaped members, a pair of oppositely disposed longitudinally extending wire receiving grooves on said plug communicating with said circumferential grooves for the reception of said conductors, means on said plug for the rotation thereof to wedge said conductors between said plug and the inner walls of the trough-shaped members, and inwardly extended protuberances on the inner walls of each of said trough-shaped members and extending partially into said circumferential grooves for rupturing the insulation on said conductors, thereby establishing electrical contact between said conductors and said trough-shaped members.

References Cited in the file of this patent

UNITED STATES PATENTS

1,451,569	Frederick	Apr. 10, 1923
2,291,434	Hollopeter	July 28, 1942
2,416,943	Nicolazzo	Mar. 4, 1947
2,434,475	Sullivan	Jan. 13, 1948
2,618,679	Cook	Nov. 18, 1952

FOREIGN PATENTS

205,930	Great Britain	Nov. 1, 1923
---------	---------------	--------------