June 28, 1966 H. A. EWALT 3,258,039

CABLE-MAKING HARNESS

Filed May 3, 1963 2 Sheets-Sheet 1

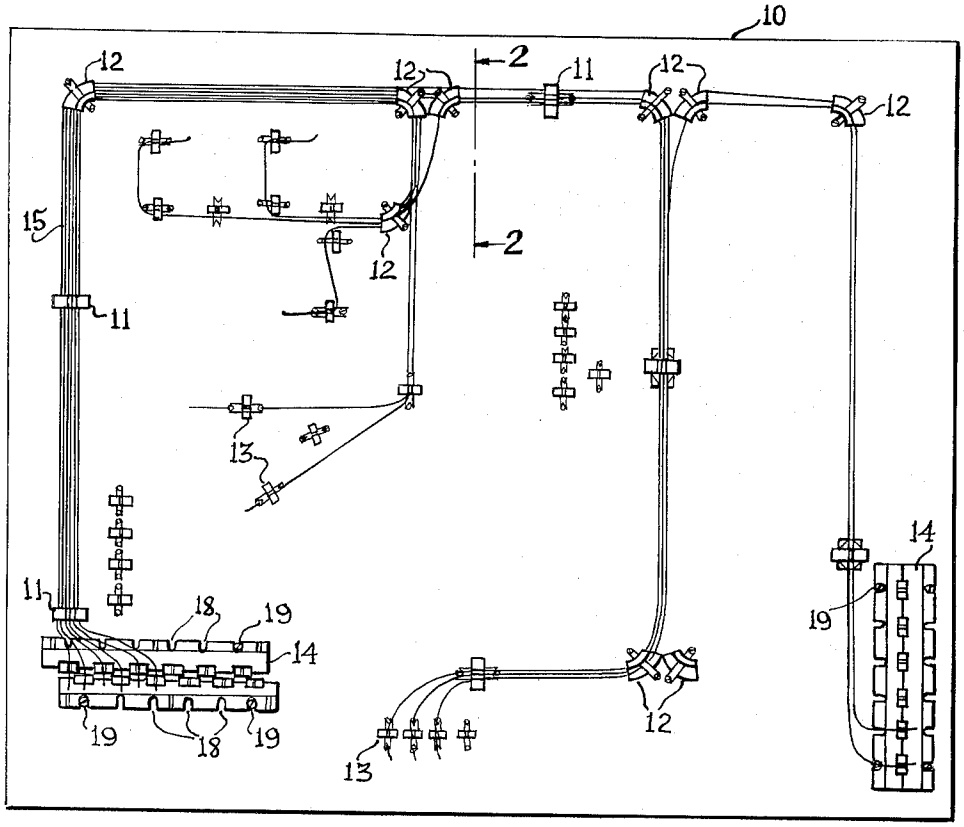


Fig. 1.

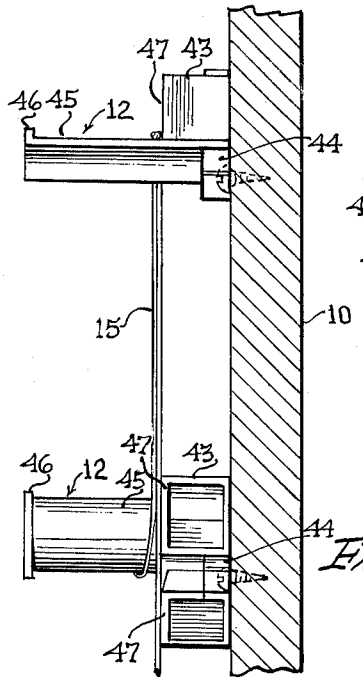


Fig. 2.

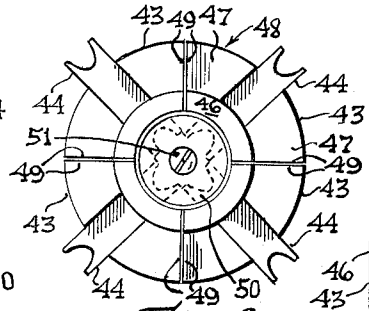


Fig. 3.

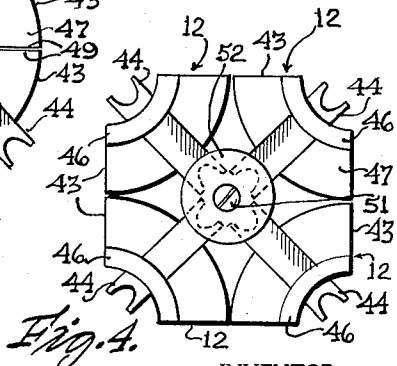


Fig. 4.

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CABLE-MAKING HARNESS

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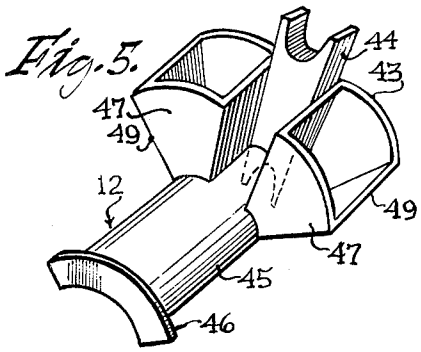


Fig. 5.

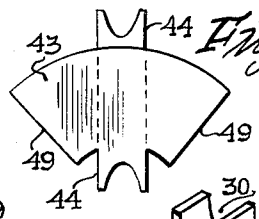


Fig. 6.

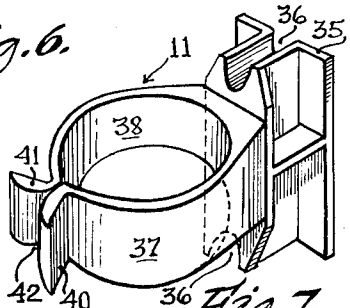


Fig. 7.

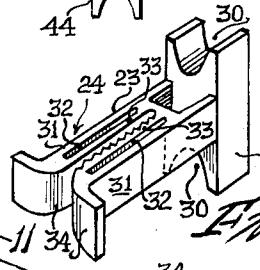


Fig. 8.

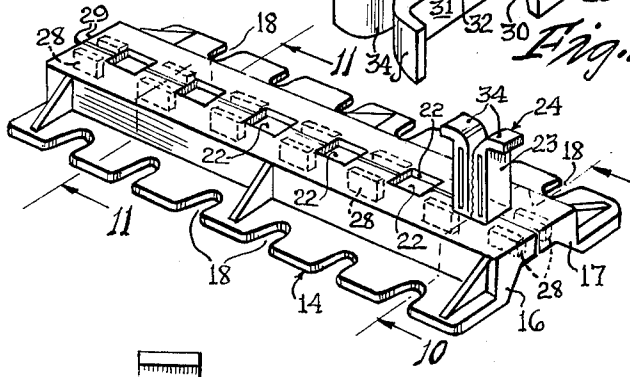


Fig. 9.

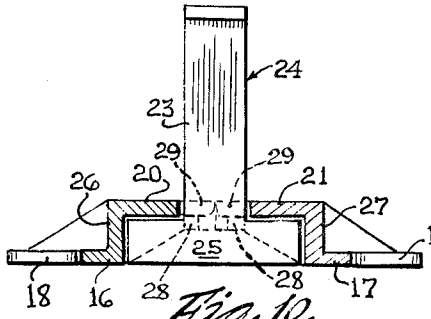


Fig. 10.

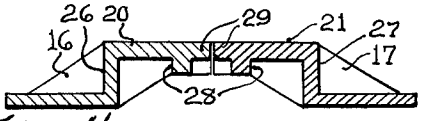


Fig. 11.

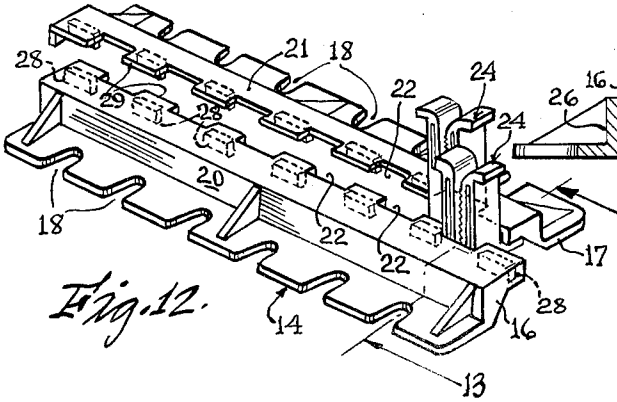


Fig. 12.

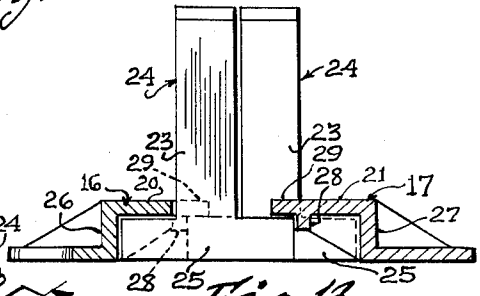


Fig. 13.

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3,258,039

CABLE-MAKING HARNESS

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Filed May 3, 1963, Ser. No. 277,887
4 Claims. (Cl. 140—71)

This invention relates to a new and useful improvement in a cable-making harness and, more particularly, to an apparatus used in the constructing of a cable which comprises a plurality of strands of wire or the like, many of which terminate into separate end connectors.

An important object of this invention is in the provision in an apparatus of this character of a means for releasably receiving and holding a plurality of wires as they are assembled into a multiple strand cable.

A further object of this invention is in the provision in an apparatus of this character of a means for holding in spaced relation, with respect to a layout board bearing a cable pattern, the plurality of strands of wire so that the wires may be conveniently secured together before being removed from the layout board.

Yet another object of this invention is in the provision in an apparatus of this character of a bracket that holds a plurality of clamps used to releasably secure the ends of each of the strands of wire that are used to make up the cable.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

FIG. 1 is a plan view of the cable harness layout board showing the deployment of the various clamps used thereon;

FIG. 2 is a fragmentary detailed sectional view taken on line 2—2 of FIG. 1;

FIG. 3 is a top plan view of a circular post constructed from a plurality of cooperating junction dividers;

FIG. 4 is a top plan view of an assembly of junction dividers defining separate wire paths thereabout;

FIG. 5 is a perspective view of a junction divider as shown in FIG. 2;

FIG. 6 is a bottom plan view of the junction divider;

FIG. 7 is a perspective view of a wire harness clip;

FIG. 8 is a perspective view of a wire end post;

FIG. 9 is a perspective view of a mounting bracket for a plurality of end posts;

FIG. 10 is a detailed sectional view taken on line 10—10 of FIG. 9;

FIG. 11 is a detailed sectional view taken on line 11—11 of FIG. 9;

FIG. 12 is a perspective view of the mounting bracket in adjusted position to accommodate a greater number of end posts; and

FIG. 13 is a detailed sectional view taken on line 13—13 of FIG. 12.

In the normal construction of a multiple strand cable there is employed a layout board, or harness, upon which the pattern of the cable is traced such, for example, by colored adhesive-type tapes. At certain stages of the cable pattern, it is necessary to secure together all of the wire strands of the cable, or to change the direction of certain of the wire strands, or to terminate one strand separate and apart from the whole cable. This invention is directed to a harness which includes wire clips, junction dividers, and end posts to be used in the assembling of a cable.

This invention also includes a mounting bracket whereby a plurality of end posts may be positioned relative to

the overall cable harness so that the ends of the multiple strands making up the cable may be separately held in secured fashion.

Referring to FIG. 1, there is disclosed a layout board or harness 10 having mounted on one face thereof a plurality of assembly clamps 11, junction dividers 12, end posts 13 and two mounting brackets 14 for the end posts 13.

Appearing on the harness 10 as shown in FIG. 1, is a partially constructed cable made up of a plurality of strands 15 of wire, or the like. It is readily apparent that certain of these wires individually terminate intermediate the ends of the overall cable construction. These ends are adapted to be secured in place by end posts 13, pending completion of the cable, at which time the ends will have attached thereto suitable electrical connectors, not shown.

In preparing the harness or layout board 10 for making a cable, a cable pattern is placed on one face of the harness 10. This pattern will determine the location of the different clips 11, junction dividers 12, end posts 13 or mounting brackets 14. The mounting brackets 14 will normally be used at either or both ends of the cable wherein it is necessary to separately maintain the ends of each of the wire strands 15 that make up the cable.

Referring to FIG. 9 there is shown an end post mounting bracket 14. This mounting bracket 14 comprises two separate substantially Z-shaped body portions 16 and 17. Each of the Z-shaped body portions 16 and 17 provides a supporting leg which lies in facial abutment upon the layout board 10, with each leg having formed therein along one edge thereof, a series of cut-outs 18 which are adapted to receive screws 19 or the like (see FIG. 1) for removably mounting each of the bodies to the board 10.

The bodies 16 and 17 comprising the mounting bracket 14 are adapted to be assembled in confronting relation as shown in FIG. 9 with their respective raised legs 20 and 21 in a spaced relation above the layout board 10.

Formed in the abutting edges of each of the raised legs 20 and 21, is a plurality of rectangularly shaped notches 22. In the arrangement shown in FIG. 9 these notches 22 are placed in horizontal alignment so as to form an opening of a size equal to the corresponding shaped body 23 of an end post 24.

The end post 24 has an enlarged rectangularly shaped base 25 which, when positioned on the layout board 10, will be of sufficient length to extend beneath the abutting legs 20 and 21 and have its opposite ends engaging the medial portions 26 and 27 of each of the confronting Z-shaped bodies 16 and 17 as seen in FIG. 10.

As shown in FIG. 9, the mounting bracket 14 is employed to maintain six end posts in spaced relation. In the event that more than six end posts are required to be placed in relation one to the other, the mounting bracket 14 may be adjusted to accommodate an additional six end posts. This adjustment is shown in FIG. 12 where it is seen that the body 16 is offset horizontally with respect to the corresponding body 17 of the mounting bracket 14.

In the adjusted position, as shown in FIG. 12, an end post 24 is placed in each of the rectangular recesses 22 formed in each of the raised legs 20 and 21 of the respective bodies 16 and 17. In order to securely hold each of the end posts 24 in the bracket 14 against lateral movement between the bodies 16 and 17 when the bracket 14 is mounted in its adjusted position, each of the bodies 16 and 17 is provided with a positioning lug 28, which is carried beneath a lip 29 which defines the opposite sides of each of the recesses 22. Thus when the end posts 24 are carried by the mounting bracket 14 in its adjusted

position, as seen in FIGS. 12 and 13, the body portion 23 of one of the end posts 24 will be placed in one of the rectangular recesses 22 formed in the body 16 and will have one end of its base 25 extending beneath the corresponding leg 20 of such body 16, while the opposite end of the base 25 will protrude beneath the lip 29 formed by the leg 21 of the confronting body 17, until it engages the positioning lug 28 carried therebeneath (FIG. 13).

The next juxtaposed end post 24 will be positioned in the recess 22 formed in the leg 21 of the body 17 and it will have one end of its base 25 projected into engagement with the depending lug 28 carried beneath the lip 29 of the confronting body 16. Thus, as seen in FIGS. 12 and 13, the end posts 24 are mounted in staggered relation one to the other and are securely held by the heretofore described cooperating elements of each of the bodies 16 and 17. By this arrangement, an end post 24 is held in each of the rectangular recesses 22 provided by each of the bodies 16 and 17.

An end post 24 is shown in FIG. 8. This end post 24 comprises an elongated rectangularly shaped base 25 which has its opposite ends recessed as at 30 so as to accommodate mounting screws, or the like, whereby the end post 24 may be conveniently located at any desired position on the layout board 10. Extending at right angles to the base 25 is an elongated shaped body 23 which comprises a pair of spaced apart arms 31. Each of the arms 31 has formed therein slots 32, which define a relatively thin wall member 33 that extends substantially throughout the length of the arms 31. One of these relatively thin wall members 33 may have its exposed face serrated for a purpose hereinafter made apparent.

The free ends of the arms 31 are formed to fan outwardly in opposite directions and to have a portion of their confronting faces tapered as at 34. By this arrangement a strand of wire, or the like, may be conveniently introduced into the flared tapered end 34 of the end post 24 and be moved downwardly between the arms 31 where the wire will cause the deformation of the thin confronting wall members 33 and where such wire will be frictionally held by the serrations formed on one face on one of such wall members.

At certain points throughout the pattern for the cable, it is apparent that a large clip is needed to hold the plurality of strands that are adapted to lie in a common path. To accomplish this requirement, I provide a resilient wire clip shown in FIG. 7. This clip 11 includes a large rectangularly shaped base 35, the ends of which are recessed as at 36 to accommodate suitable mounting screws or the like. The body of the clip comprises two yieldable semicircular confronting arms 37 and 38. The free ends of the arms 37 and 38 terminate into flared lips 40 and 41, respectively, to form a normally closed mouth 42 for the clip 11. It should be noted that by forming the base 35 from a rectangularly shaped member, the semicircular arms 37 and 38 cooperate together to form a large circular receptacle which is spaced from the layout board 10. Thus, when a plurality of strands of wire are caused to be placed into the clip 11 a cable tie, or clamp, may be projected beneath the cable and fastened about the strands as they are held by the clip 11.

The junction divider 12 as used in my cable harness is specifically shown in FIGS. 5 and 6 wherein the junction divider 12 is disclosed as having a base 43 forming a quadrantal sector. The base 43 is provided with laterally extending notched lugs 44 which are adapted to sit upon the layout board 10 and removably receive mounting screws or the like in their notched ends. The junction divider includes an upstanding semicircular post 45 which terminates into a laterally projecting retaining flange 46. The base 43 provides a flat supporting surface 47 which is spaced from and parallel to the flange 46 for retaining the strands of wire therebetween.

Referring to FIG. 2, I show two junction dividers 12 used for supporting and directing the paths of a plurality of strands of wire 15 or the like. It should be noted that the base 43 of each of the junction dividers 12 as shown in FIG. 2 support the strands of wire 15 in a spaced relation to the one face of the layout board 10. The thickness of the base 43 of the junction divider 12 is equal to the thickness of the base 35 of the cable clip 11 heretofore described and serves the same purpose.

During the construction of a cable there may be required an instance where a full circular post is required and to satisfy this requirement, the junction divider 12 is so formed that it may be associated together with three other junction dividers of identical construction to form a full circular post 48 as viewed in FIG. 3. To form the full circular post 48, the quadrantal sectional bases 43 of four junction dividers are arranged so that the angled end walls 49 of each junction divider 12 is caused to abut. In mounting the full circular post 48 to the layout board 10, a washer 50 having a diameter equal to the diameter of the circle defined by the concaved posts 45 of each of the junction dividers 12 is placed over the confronting notched out lugs 44 of each of the junction dividers 12 and then mounted to the layout board by a single screw 51 or the like.

Referring to FIG. 4, I disclose a junction area whereby the assembly of individual junction dividers 12 define a plurality of paths for the strands of wire used in constructing the cable. In this instance, the concaved posts 45 of each of the junction dividers are placed in opposite corners of the assembly and the inner protruding lug 44 of each is placed in confronting relation and a locking washer 52 is placed thereover.

From the foregoing, I have clearly described an assembly of parts which combine to form a cable making harness by which a cable may be conveniently constructed from a plurality of strands of wire or the like. The cable is held in a spaced relation to the layout board 10 so that the strands of wire thereof may be conveniently bound together before removing the same as an integral structure from the cable making harness.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In combination, a cable-making harness including a layout board having on one flat surface thereof a cable pattern indicating the path of each of the strands of wire used in making up the cable,

(a) means removably mounted on said board at positions indicated by the pattern thereon having an open bifurcation for frictionally receiving and holding the free ends of each strand of wire on said board in an elevated plane with respect to the one flat surface thereof,

(b) intermediate posts having a vertically extending arcuated sector surface about which selected strands of wire are passed to change the directional path thereof to correspond to pattern changes as indicated on said layout board,

(c) cable holding means mounted on said board and having a split normally closed mouth through which the strands of wire may be forcibly passed for releasably holding together all of the strands of wire that lie in a common path over the pattern on said layout board, and

(d) mounting means at the opposite ends of the cable pattern for securing together a plurality of said frictional holding means so that the individual ends of each of the strands of wire are separately held in a spaced apart relation.

2. In the combination of a cable making harness as defined by claim 1 wherein the means removably mounted on the layout board for frictionally receiving and holding the free ends of each strand of wire comprise end posts having a substantially rectangular base and a vertically extending bifurcation which frictionally receive and hold the free ends of the strands of wire.

3. The combination of a cable making harness as defined in claim 1 wherein the intermediate posts are provided with a substantially triangularly shaped portion providing a right angle which mates with juxtaposed intermediate posts to form circular and semicircular posts intermediate the ends of the strands of wire.

4. The combination in a cable making harness as defined in claim 1 wherein said mounting means comprises a pair of brackets generally Z-shaped providing a flange

elevated above the surface of the layout board with the flanged notch to receive therein said frictional holding means.

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