

United States Patent

Elkins

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[54] CABLE JUNCTION BOX

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174/138 F

[51] Int. Cl.H01r 13/44

[58] Field of Search339/39, 75, 76, 36, 77, 75 P,
339/75 M, 92, 198 R, 198 P, 198 T; 317/118;
174/59-61, 66, 92, 138 F, 65

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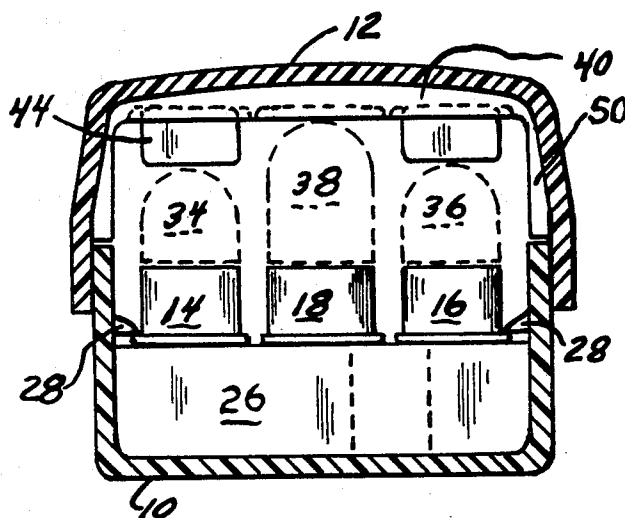
Assistant Examiner—U. Weldon

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[57] ABSTRACT

Housing for a plurality of elongated cable junction connectors of different heights provides a box with a snap-on cover which, when closed, retains connectors in assembled relation. Ribs in the cover adjacent to the ends of connectors engage high profile connectors directly. Slots are provided in the ribs, and removable spacer blocks are provided to be manually push fitted into appropriate slots. When so inserted they will engage and retain low profile connectors. The cover has a positive hook engagement with the box at the cable-entry end, and a snap detent latch at the opposite end.

5 Claims, 8 Drawing Figures



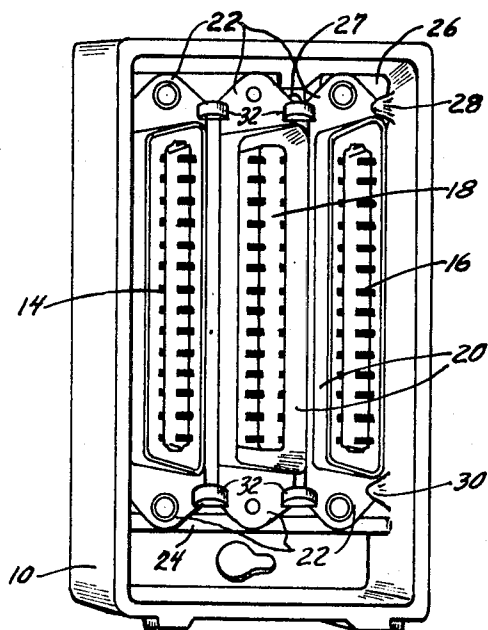


Fig. 1

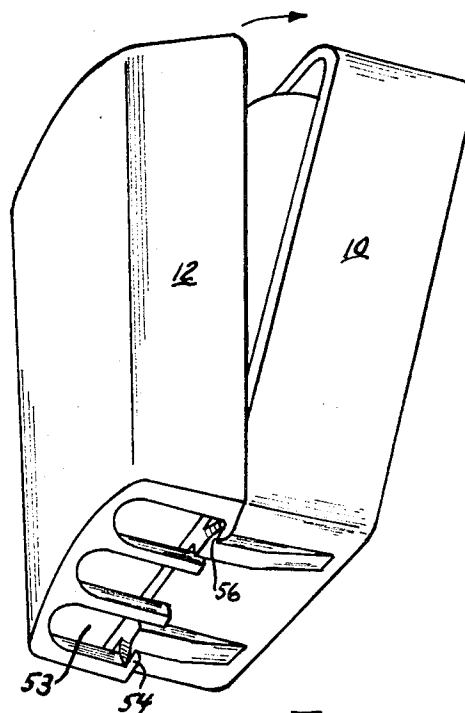


Fig. 2

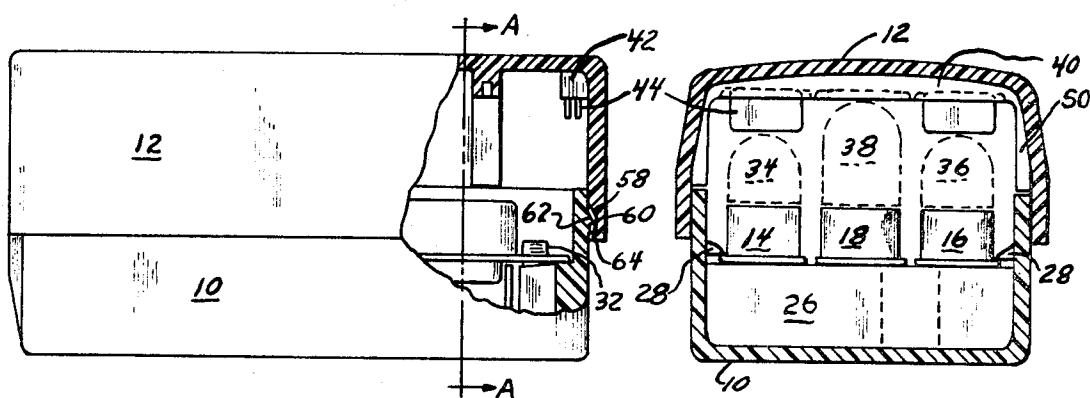


Fig. 3

Fig. 4

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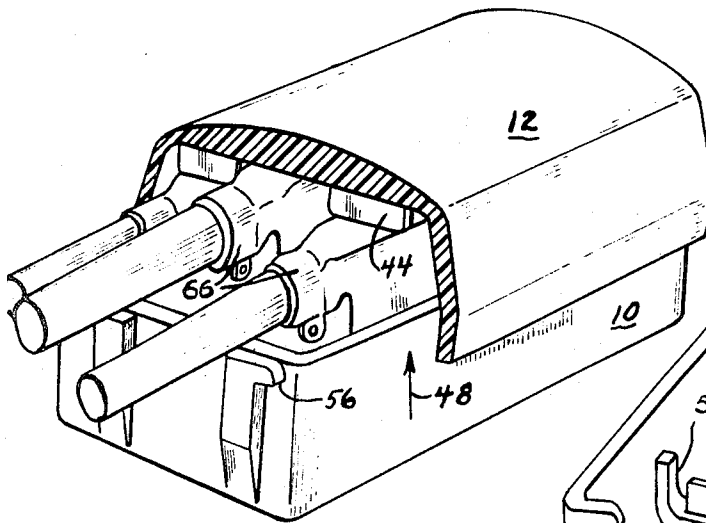


Fig. 5

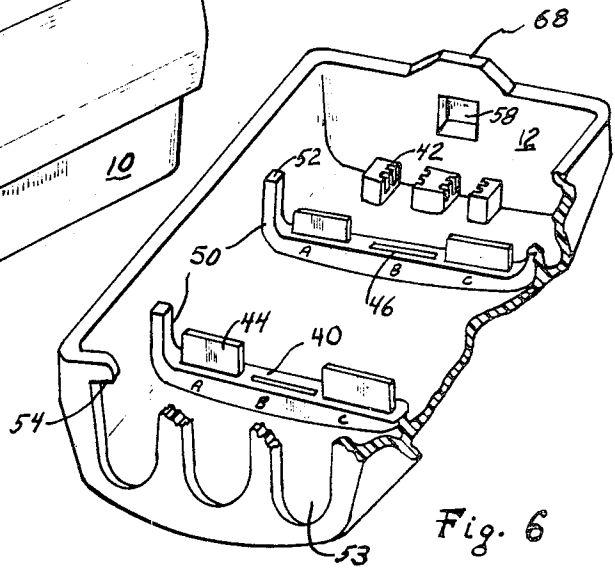


Fig. 6

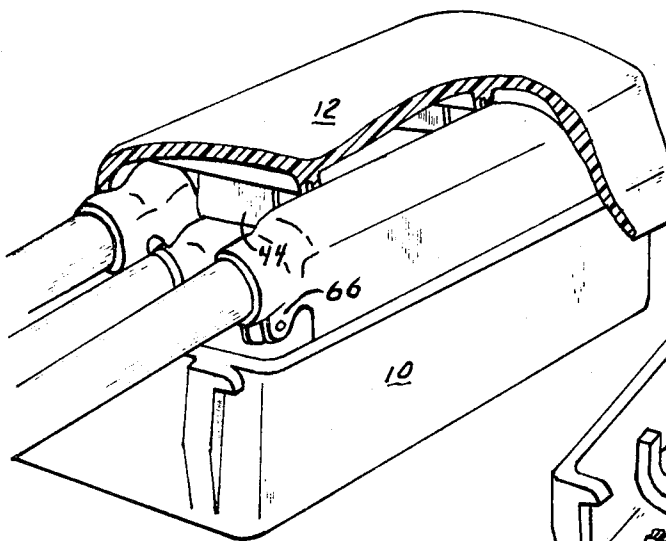


Fig. 7

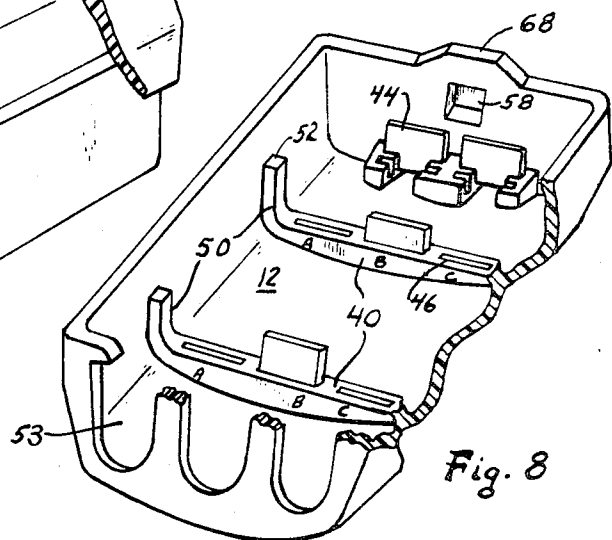


Fig. 8

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CABLE JUNCTION BOX

BACKGROUND OF THE INVENTION

The rapid growth of business and industry has been accompanied by an equally rapid increase in the need for telephone facilities at the subscriber terminal, and for labor saving devices for making installation of such facilities.

The type of desk telephone set which permits access to any one of a number of lines by the use of push buttons on the set has become very popular. However, where the simple one-line extension may need only a 2- or 3- conductor wire for connection, the multiple line sets require cables with substantially more conductors, 50 conductors, for example, being quite common.

Experience has shown that it is expensive and wasteful of labor for an installer to do the detailed work of fanning out and terminating a cable of that size in the field if it can be avoided. Therefore, it has come to be common practice to use prefabricated cables of various standard lengths which are made up under factory conditions, complete with a standard series of connectors. Each cable has a connector at each end and is analogous to the ordinary household extension cord, except that it may have 50, 100, 150 or even 200 conductors.

To provide for branches and interconnections as may be necessary in a run of such cable, it has become common to use what is sometimes called a bridging adapter box. This is simply a junction box containing several flange-mounted plugs and receptacles, with the corresponding terminals of all of them prewired in parallel. This provides a quick and simple substitute for "splicing" several cables together.

Since the connectors themselves do not have latches or other means by which they are held in mated relation, it has become customary to rely on the cover of the box to do this, the cover being usually fastened to the box by screws. The cover is sized so that when it is closed, its inner surface engages or comes in very close relation to the hoods or backshells of the connectors. Thus, if the cables are jerked, as may happen in an office location, the cable connector cannot be accidentally pulled loose from its corresponding member in the adapter.

A problem arises from the fact that a female cable connector (cable receptacle) has a higher profile, that is, a greater backshell or hood height, than the male cable connector (cable plug). Further, the requirements encountered in field installation work make it necessary to have adapter boxes of various plug and receptacle combinations. In a 3-connector adapter box, for example, there are requirements for male-female-male, female-male-female, and female-female-female. In the past it has been necessary to manufacture and stock a different kind of box for each of these, with mounting surfaces at different heights for the flanges of the male and female receptacles, in order for the assembly of the adapter box with the cable connectors in each combination to have the connector hoods all at the same height, for proper engagement with the cover.

SUMMARY OF THE INVENTION

The present invention provides a single style of box for the flange mounting of male and female connectors in any desired combination, with the mounting flanges

all at the same height. The cover of the box is sized for proper relation to high profile connectors, so that when the box cover is in place, such connectors are confined to prevent accidental unmating. Optional spacer blocks, stored in the cover, can be inserted in slots inside the cover at appropriate locations, where the blocks serve to confine low-profile connectors.

The cover is arranged for a positive hook engagement with the box at the cable-entry end, where the greatest stress would occur if the cable is jerked. A resilient detent latch at the opposite end permits the cover to be closed and retained on the box without tools.

It thus becomes possible to manufacture and keep in inventory a single type of box, usable for any of the required connector combinations, and only a few seconds of the installer's time is necessary to modify the cover as required for any combination. He needs no tools to apply the cover; the cable end can be hooked onto the box, and the other end snapped home with a quick movement.

The arrangement by which the economy and convenience described are attained is exemplified in a preferred embodiment which is described in detail in the accompanying specification and illustrated in the following drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an uncovered cable junction box, showing a typical arrangement of connector plug and receptacles therein.

FIG. 2 is a perspective view of a junction box and cover, showing how the cover is first engaged with the box at the cable outlet end.

FIG. 3 is a side elevation of box and cover, partly in section to show internal details.

FIG. 4 is a cross section on the line A—A of FIG. 3.

FIG. 5 is a perspective view of a junction box, with the cover partly broken away, to illustrate one typical combination of connectors of different hood heights.

FIG. 6 is a perspective view of an arrangement of inserts in the cover appropriate for the connector combination shown in FIG. 5.

FIG. 7 is a perspective view similar to FIG. 5, but shows another typical combination of connectors of different hood heights.

FIG. 8 is a perspective view of an arrangement of inserts in the cover appropriate for the connector combination shown in FIG. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings, the box is designated generally by the reference numeral 10, and the cover by the numeral 12. These parts are preferably molded in a tough plastic, such as a high impact polystyrene. The box provides a mounting and enclosure for connectors such as the female connectors 14 and 16, and the male or plug connector 18. These connectors are of multiple contact type and in a form commonly used are elongated in shape. The metal shells 20 which enclose them are made with mounting flanges 22 at the ends. In the box 10, cross ribs 24 and 26 are provided to support the connector by engagement with the flanges 22. As may be seen in FIG. 4, these ribs run straight across the box,

and support all flanges at the same height with reference to the top edge of the box. The rib 26 is interrupted to allow space for screwdriver access to a mounting hole 27 in the bottom of the box. Lugs 28 and 30, molded in the sides of the box at points as shown in FIG. 1, overlap the flanges on the connectors adjacent to the side walls of the box. At intermediate points on the ribs 24 and 26, openings are provided to receive the shanks (not shown) of headed plugs 32. The heads of the plugs overlap the flanges 22, and in conjunction with the lugs 28 and 30 retain the connectors in place within the box.

The cable connectors with which the junction box is used are shown in the perspective views, FIG. 5 and FIG. 7. As previously mentioned, the backshells of the cable connectors, which are known as hoods, have a higher profile on the female connectors than on the male connectors. This is indicated in FIG. 4, where the hood outlines are shown in dotted lines, indicating the cable connectors which would be used with the box connector combination shown in FIG. 1. Specifically, the female connectors 14 and 16 of FIG. 1 would be used with male cable plugs which would have hoods of low profile as outlined at 34 and 36 in FIG. 4. The plug connector 18 would be used with a female cable connector of high profile, as indicated at 38 in FIG. 4.

The cover 12 is provided with transverse ribs 40 which, when the cover is in place, define a plane which is substantially the same as that of the tops of high profile connectors. Therefore, when the cover is closed, the ribs will engage or come close to engaging the top of a high profile connector, such as the connector at 38 in FIG. 4.

Storage pockets 42 inside the cover are arranged to retain a number of spacer blocks 44 of rectangular shape, and of thickness such that they are frictionally retained in the pockets. Slots 46 in the ribs 40 are arranged to receive spacer blocks 44 at appropriate positions to bear upon adjacent connectors, as indicated by the markings A, B, C in FIGS. 6 and 8.

The combination of cable connectors in FIG. 5 is the same as that in FIG. 4, that is, with a female cable connector (high profile) in the center, and plug connectors (low profile) at the sides. Spacer blocks are therefore placed in positions A and C, as shown in FIG. 6, and when they are so placed and the cover is closed, the spacer blocks will engage the low profile connectors, as may be seen in FIGS. 4 and 5.

With such an arrangement, it will be understood that when the cover is in place on the box, and secured by a suitable fastening, the cable junctions will be protected against accidental separation, because they cannot move apart in the direction necessary for disengagement, i.e., the direction indicated by the arrow 48 in FIG. 5.

To control the fit of the cover on the box, so that it overlaps the box to an extent suitable for bringing the ribs 40 and the inserts 44 therein into proper relation with the connector hoods, the ribs 40 are continued down the sides of the cover as shown at 50 in FIG. 6. The portions 50 terminate in a shoulder 52 which abuts against the upper edge of the side walls of the box, as may be seen in FIG. 4.

For each connector to be accommodated, a slot 53 is provided in one end of the cover for passage of the as-

sociated cable. At the same end of the cover, and near the corners thereof, hooks 54 are formed to interfit with hooks 56 provided on the corresponding end of the box 10.

At the opposite end of the cover is a recess 58 in the proper location to interfit with a projecting member 60 on the box 10. The projecting member has an inclined upper face 62 and an abutment face 64, the latter being approximately perpendicular to the adjacent surface of the box.

After the spacer blocks 44 have been placed in the proper slots 46, and the cable connectors have been properly mated with the box connectors, the cover hooks 54 and the box hooks 56 are engaged in the manner shown in FIG. 2, and the cover and box are swung together as indicated by the arrow at the top of FIG. 2, until the leading edge of the cover slides over the projecting member 60 on the box and the latter engages in the recess 58, thus latching the cover in closed position.

The rib 26 in the box 10 is preferably located close to one end of the box, and the rib 24 is spaced somewhat from the opposite end of the box so that space is allowed within the box and cover for the cable clamps 66, at the ends of the connector hoods, as seen in FIGS. 5 and 7.

It is important in the use of this device that the cover be securely retained so that there is no reasonable likelihood of its being dislodged by a jerk on one of the cables, such as might occur if someone tripped over an exposed cable run. Location of the hooks 54 at the corners of the cover places them where the intersection of the side and end walls gives stiffness which resists any tendency of the hooks 54 to spread apart and lose engagement with the cooperating hooks 56 if jerking of the cable should occur.

At the other end of the box, where strain on the cable has relatively little effect, the latch elements 58 and 60 are placed centrally in the end walls of the box and cover, so that advantage may be taken of the flexibility of the plastic for quick and easy removal of the cover when this is desired. A tab 68 on the end wall of the cover adjacent the recess 58 provides a convenient member which can be pried up with a screwdriver to release the latch and thus open the box.

To illustrate how the invention is adaptable to other connector combinations, FIG. 7 shows its use where two female cable connectors (with high profile hoods) are employed in the outer positions, and a male cable plug (with low profile hood) occupies the center position. For such a combination, two spacer blocks 44 are placed in the center position in the slots 46, as indicated in FIG. 8. When the cover is closed, these spacer blocks will be in juxtaposition with the hood of the plug in the center position; the cover is shown cut away in FIG. 7 to reveal this relation.

It will be apparent that a number of other possible combinations can be accommodated with equal ease. In each instance certain advantages come into play:

1. The same box and cover set can be used for the various requirements. This fact brings about benefits in cost and convenience in manufacture, cataloging, stocking, procurement, and in actual use at the installer's level.

2. Adaptation to any of the desired combinations by the use of the spacer blocks, where this is necessary, is literally a matter of a few seconds, and is done without tools. The spacers are provided in the storage pockets at the manufacturing location; they do not have to be handled and accounted for at any subsequent stage in the process of distribution up to the point of use; the installer does not have to look them up in a separate package.
3. The cover is applied to the box, likewise, in a second or two, and without tools. This eliminates the cost of the screws which were used in previous boxes, and the appreciable time required to complete a closure of the box when they are used.
4. The box can be opened, when this is necessary, by one quick pry movement with a screwdriver or other appropriate tool. Again, this is a matter of a second or two, an advantage over the longer time previously necessary to remove several screws.

The preferred embodiment has been illustrated and described with three connectors; it is obvious that the invention is not limited to use with a three-connector junction, and that it may be used in other arrangements with the same advantages of economy, convenience and time saving which have been explained in the foregoing description.

The details of the preferred embodiment as herein set forth, as they relate to the design, manufacture and use of the improvement contemplated thereby are only illustrative of a specific form which the present invention may take. Still other modifications and variations will suggest themselves to persons skilled in the art. It is intended therefore that the foregoing detailed description be considered as exemplary only, and that the scope of the invention be ascertained from the following claims.

That which is claimed is:

1. A housing for mounting mated cable connectors of both high and low profile, including
a base member adapted for the mounting of interwired connector halves thereon,
a cover telescopingly engaging said base member and adapted with said base member to enclose the mated connectors, said cover having

side walls and
end walls, and having
a plurality of internal ribs
extending transversely of said cover and
extending part way down the side walls thereof
and
terminating in abutment ends which limit the extent of telescoping engagement of said cover with said base by engagement thereagainst, the underside of said ribs in said cover and the top of a mated high profile connector being in close juxtaposition when said cover is telescoped on said base member with the abutment ends of such ribs engaging said base.

2. A housing in accordance with claim 1, wherein said ribs have recesses formed therein adapted to receive and hold spacer members in appropriate positions to coact with low profile connectors, whereby such connectors are retained in mated relation when said cover is closed.

3. A housing for mounting mated cable connectors of various heights, including a base member on which interwired connector halves may be fixedly mounted, a cover telescopingly engaging said base member, and adapted with said base member to enclose the mated connectors, said cover having internal ribs extending transversely thereof, extending down the sides thereof, and terminating in abutments which limit the telescoping engagement of said cover with said base, said ribs having recesses formed therein adapted to receive spacer members in positions opposite mated connectors of lower height.

4. A housing in accordance with claim 3, wherein said cover includes means cooperating with said base member for releasably retaining said cover and said base member in assembled relation.

5. A housing in accordance with claim 4, wherein said last mentioned means includes engaging surfaces at two adjacent corners of the base, adapted to be releasably interlocked with cooperative surfaces at two corresponding corners of the cover, said cover having cable passage slots formed therein between said two corresponding covers.

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