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C. A. LEVIN ET AL

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PLUG SEPARATOR

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FIG. 1

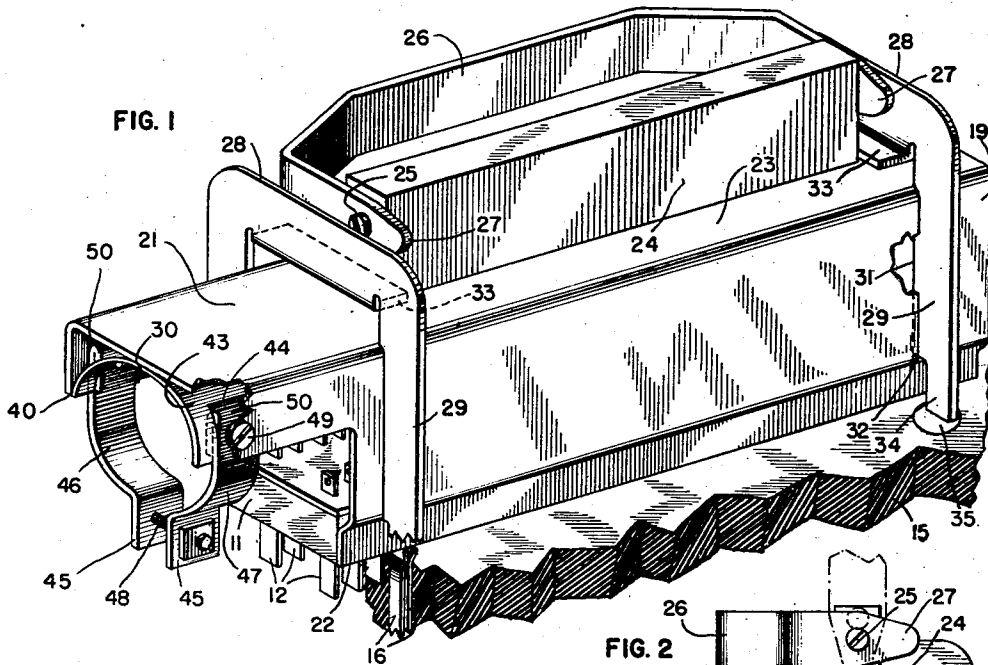


FIG. 2

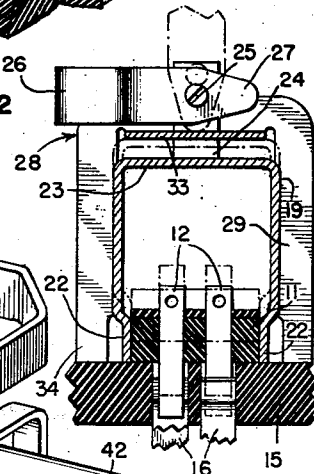
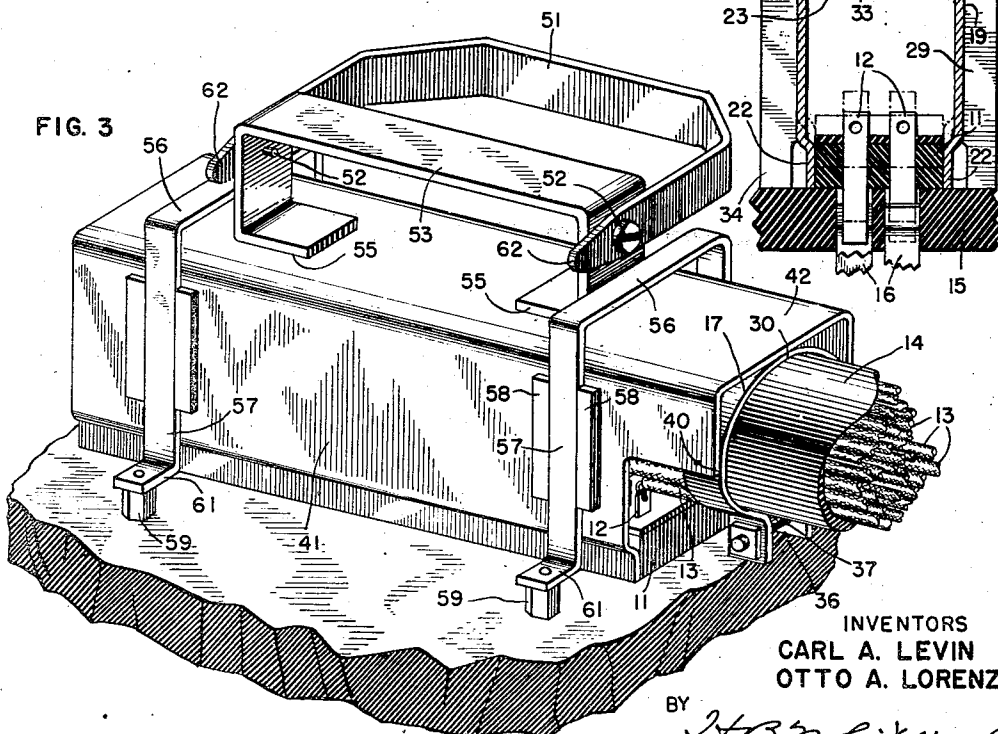


FIG. 3



INVENTORS
CARL A. LEVIN
OTTO A. LORENZ

BY *H. B. Whitfield*
ATTORNEYS

UNITED STATES PATENT OFFICE

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PLUG SEPARATOR

Carl A. Levin and Otto A. Lorenz, Chicago, Ill.,
assignors to Teletype Corporation, Chicago, Ill.,
a corporation of Delaware

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The present invention relates to separable connection couplings for multiple conductor cables and more particularly to apparatus for effecting a convenient and directive disjunction between the plug and receptacle elements of such couplings.

Multiple-pronged connection couplings are frequently utilized in electrical communication systems for establishing terminal connections between apparatus units or between adjacent apparatus boards. Generally, such plugs are provided with a large number of individual electrical connection elements arranged in relative close juxtaposition and utilizing flat contacting surfaces which have wiping engagement with associated contactor sheaths. The separation of the plug elements of these units from their receptacle elements is necessarily met with frictional resistance due to the effect of the several connecting members combinedly and in order to separate the coupling elements it is necessary to maintain parallelism during the withdrawal operation. Slightly excessive frictional resistance at either end of elongated types of multiple connection plug units may cause the opposite end to yield to the withdrawal pull more readily and thereby there may result a distortion causing bending, breakage or twisting of the connection prongs so that subsequent operation is thereby impaired.

In order to avoid this difficulty in the handling and operation of multiple pronged connection couplings there is herewith proposed a combined handle and separation mechanism which is integrally associated with a plug encasing structure by means of which the couple element which terminates a cable may be conveniently handled and through which the withdrawal or separation of the plug from its receptacle may be accomplished with invariably parallel action, with a mechanical advantage so as to require but slight effort, and by a simple single movement action through the use of the handle.

Accordingly, the principal object of the present invention is the provision of a multiple pronged connection coupling utilizing an encasement structure equipped with a leverage action separating mechanism for withdrawing the plug element from its receptacle element.

Further objects of the present invention and features thereof will be evident from the following detailed description taken in conjunction with the accompanying drawing in which like reference characters designate corresponding parts throughout and in which;

Fig. 1 is a perspective view of one embodiment of the present invention having portions thereof broken away to reveal interior structure,

Fig. 2 is a transverse sectional view of the mechanism featured in Fig. 1 with a dotted posi-

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tion indicating an alternative condition of operation; and

Fig. 3 is a perspective view of a modified structure having embodied therein features of the present invention.

In a specific contemplation, the present invention was designed for use in connection with a multiple pronged electrical connector plug commercially known as the "Jones" type of connection coupling. In this apparatus a rectangular base 11 of insulated material is provided with a multiplicity of blades 12 each electrically insulated from the other and extending through the body portion 11 top and bottom so as to afford on the one hand, insertion blades to be received by the electrical connection sheaths 16 of the receptacle base 15 and so as to afford on the other hand, electrical connection terminals to the individual insulated conductors 13 which collectively are encased in a cable wrapping 14.

In order to relieve possible strain from the solder connections between the individual conductors 13 of the cable 14 which are secured to the uppermost protruding portions of the contact blades 12, an encircling clamp is provided consisting of an inert semi-circular member 43 secured as by spot welding at points 30 and 40 to the canopy 21. The semi-circular member 43 is furthermore provided with slotted extremities as at 44 so as to admit thereat the double-over portions 50 of a pair of opposite quadrant sections 46 and 47, respectively.

The clamp quadrants 46 and 47 are held in position by means of securement screws 49 to the side walls of the canopy 21, Fig. 1, and upon constriction by operation of the clamping bolt 48, distortion, due to the clamping operation, is imparted solely to the quadrant sections 46 and 47 rather than to the inert member 30 in a direction which might rupture it from its points of securement to the canopy 21. This construction is especially convenient where the cable is of large cross section and would otherwise require serious distortion of the clamp in attempting to pass the clamp extremities 45 around it.

The jacket side walls 19 form part of an integral jacket structure 21 and the lowermost extremity of the side walls 19 is necked inwardly as at 22 to fit and be suitably connected to the side surfaces of the plug element 11. The top wall 23 of jacket 21 provides a securement base for the trunnion block 24, the opposite ends of which afford support to the axially aligned trunnion screws 25. These screws are provided to pivot the supporting handle 26 which is a bail member whose extremities terminate with the camming lugs 27 normally disposed in a horizontal position as illustrated in Fig. 1.

When the bail handle 26 is rotated from its horizontal or reclined position to its vertical or

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erect position as indicated in dotted outline, Fig. 2, its cam lugs 27 are compelled to engage oppositely bent shelves 33 which are integrally formed with the stripping balls 28 which straddle the jacket 21 and are provided with the integral vertical legs 29. The opposite and innermost edges of the legs 29 are parallel and constitute runner surfaces 31 that reside within the channel-ways 32 cut through the side walls 19 of the jacket structure.

The camming action exerted by the lugs 27 against the shelves 33 of the stripping balls 28 results in the relative downward movement of the stripping balls 28 with respect to the trunnion pivot screws 25 which, being integral with jacket structure 21, causes the relative motion to be effected as between said stripper balls 28 and the plug jacket 21 as best illustrated in Fig. 2.

Under this condition of operation the hoop extremities 34 of the stripper balls 28 thrust against strike embedments 35 and cause a relative movement between the plug 11 of the electrical connection coupling and its associated receptacle base 15 thereby withdrawing the blades 12 from their sheaths 16 to a distance as illustrated by the dotted line position in Fig. 2.

It is to be noted that the legs 29 are not connected to the base 15 or the strike embedments 35, but that the lower ends thereof merely rest on the base 15. After the handle 26 has been operated, causing the camming lugs 27 to exert pressure on the shelves 33 and thereby lift the upper blades 12 from the sheaths 16, as seen in dotted outline in Fig. 2, the handle may be raised further, which results in the upper plug being moved upwardly, raising the stripping balls 28 therewith clear of the base 15. Thus, the upper plug may be removed completely from the base 15. The stripping balls 28 remain in alignment with respect to the upper plug as runner surfaces 31 thereon are within the channel-ways 32 cut through the side walls of the upper plug.

In the modified structure, Fig. 3, simplification and economy are keynoted in the structural details characterized, for example, by the single element clamp 17 which is secured to the canopy 42 by spot welding at points 30 and 40, as in the preferred embodiment but in which drawing together of the clamp ears 36 upon operation of the clamping bolt 37 distributes a constriction strain throughout the clamp member. This type of clamp is practical where the cable may feasibly be inserted endwise of the housing and where the compressibility thereof is relatively slight in effecting suitable clamping constriction.

The camming bail or handle 51 in the modification, Fig. 3, is supported in a manner generally similar to that of the preferred form on a pair of shouldered trunnion screws 52 but in this instance the screws are threaded into a strap bridge 53 bent over at opposite ends and supported by the foot lugs 55 on the top wall of the housing 41. Also, it is to be noted that the stripping balls 56 are made of bent strap metal and terminate with horizontally disposed feet 61 having secured thereto the abutment lugs 59.

The vertical portions 57 of the balls 56 are in this embodiment confined by means of guide blocks 58 secured as by abutment welding to the side walls of the enclosure structure 41. The action of the camming extremities 62 of the handle and camming bail member 51 is akin to that of the preferred embodiment, Fig. 1.

While the present invention has been explained

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in connection with specific embodiments illustrated in the accompanying drawing, it is to be understood nevertheless that numerous variations and modifications in structure may be invoked without departing from the essential spirit or scope of the present invention. Accordingly, it is not intended to be limited by the detailed illustration in the annexed drawing nor by the particulars of the foregoing specification except as indicated in the hereunto appended claims.

The invention claimed is:

1. A separator for multiple-prong connection plugs comprising, a pair of yokes straddling one element of a connection coupling and supported for movement toward and away from abutment with the other element of said coupling, and a member having opposite camming portions effective upon said pair of yokes and pivotally carried by said one of said pair of elements, said camming portions being concurrently effective to move said yokes for thereby maintaining parallelism during separation of said one of said connection elements from the other of said pair of elements.

2. A plug connection separator comprising an enclosure housing member for one plug connection element of a pair, a pair of spaced pusher members supported for longitudinal movement relative to said housing and aligned to be brought into abutment with another plug connection element of said pair, and a bail rotatable from a reclined to an erect position having cam means associated integrally therewith effective concurrently upon said pusher members as said bail is moved from one of its positions to the other, to thrust said pusher members and thereby to strip one of said plug connection elements of a pair from said other one of said plugged connection elements.

3. An electrical plug connection including a movable covering supporting a plurality of terminal members and a fixed base supporting a plurality of terminal members connectible to said first mentioned terminal members, a pair of spaced yokes mounted for relative slidable movement with respect to said covering, and a pivotable bail having a pair of cam surfaces, one for engaging each of said yokes, whereby pivotal movement of said bail is effective to impinge said yokes against said base to thereby enable said covering to be withdrawn from said base and resulting in the disconnection of the said terminal members of said covering from the said terminal members of said base.

4. An electrical plug connection including a movable covering supporting a plurality of terminal members and a fixed base supporting a plurality of terminal members connectible to said first mentioned terminal members, a clamp at one end of said covering for a multiple conductor whose individual conductors are connected with said first mentioned terminal members, a pair of spaced yokes mounted for relative slidable movement with respect to said covering and a pivotable bail having a pair of cam surfaces, one for engaging each of said yokes, whereby pivotal movement of said bail is effective to impinge said yokes against said base to thereby enable said covering to be withdrawn from said base and resulting in the disconnection of the said terminal members of said covering from the said terminal members of said base.

CARL A. LEVIN.
OTTO A. LORENZ.