United States Patent [19]

Flenige

[11] **3,850,301**

[45] **Nov. 26, 1974**

[54] **MOUNT FOR ELECTRICAL JUNCTION BLOCKS**

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[73] Assignee: **McDonnell Douglas Corporation,** St. Louis, Mo.

[22] Filed: **Mar. 14, 1973**

[21] Appl. No.: **341,299**

[52] **U.S. Cl.** ..... **211/26,** 211/162, 339/198 GA

[51] **Int. Cl.** **A47f 7/00,** H01r 9/00

[58] **Field of Search** ..... 211/26, 94, 162, 89; 339/198 GA, 198 G, 91; 248/68 R, 68 CB, 72, 361 A, 310, 314; 24/265 CT; 403/44

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Attorney, Agent, or Firm—Gravely, Lieder & Woodruff

[57] **ABSTRACT**

A mount for electrical junction blocks includes a slide track in which the blocks are received and cooperating locking clamps which urge the sidewalls of the track together and thereby clamp the track about the blocks.

11 Claims, 6 Drawing Figures

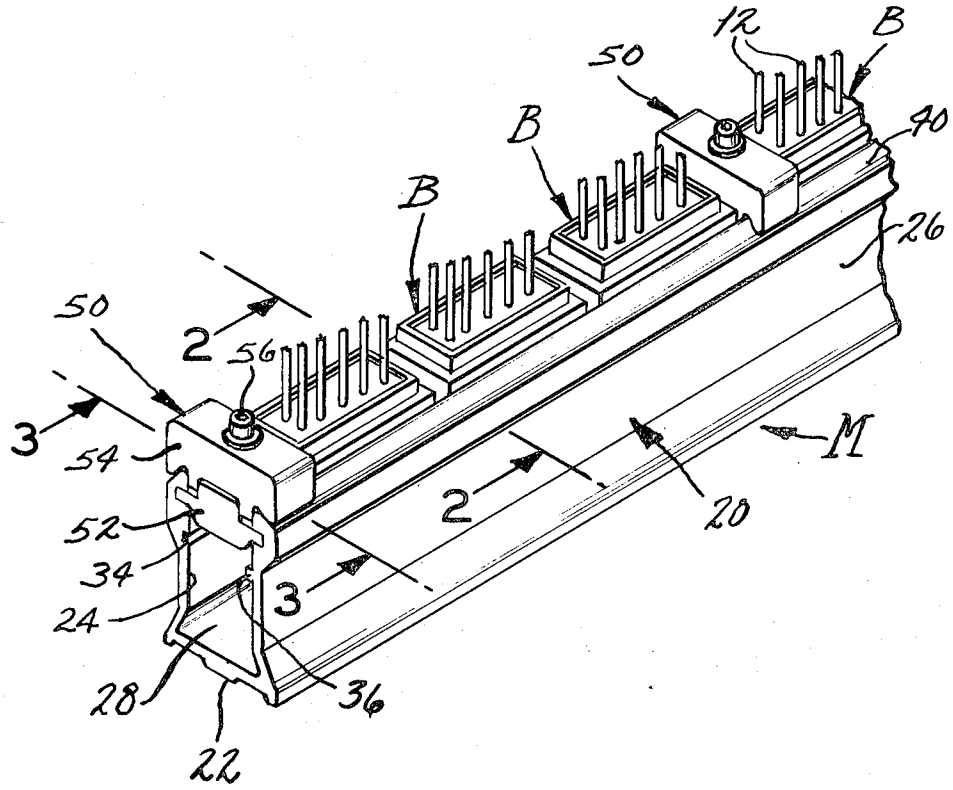


FIG. 1

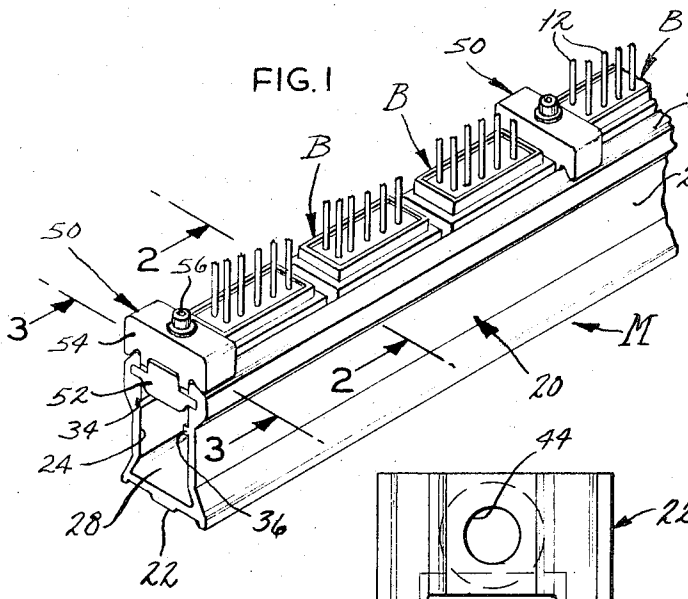


FIG. 4

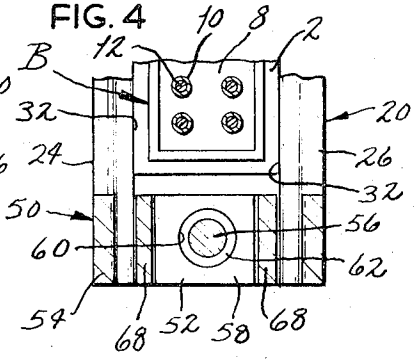


FIG. 6

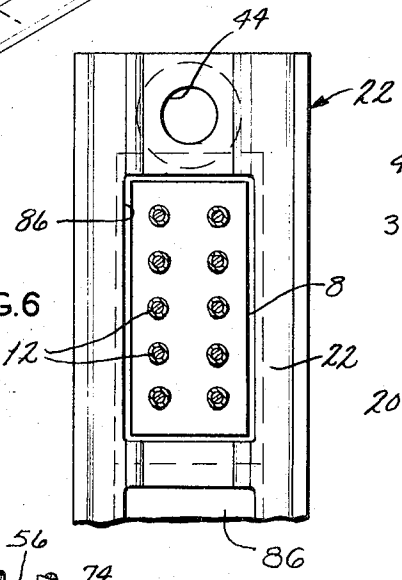


FIG. 2

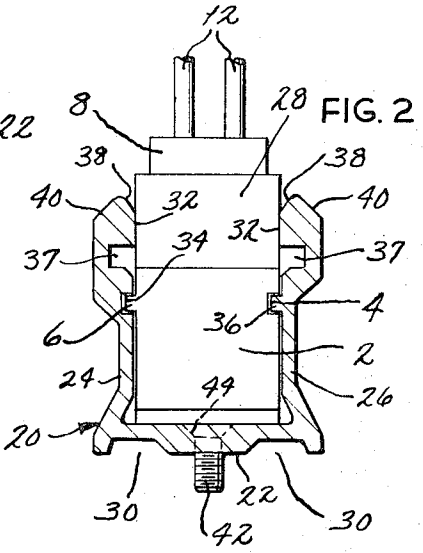


FIG. 3

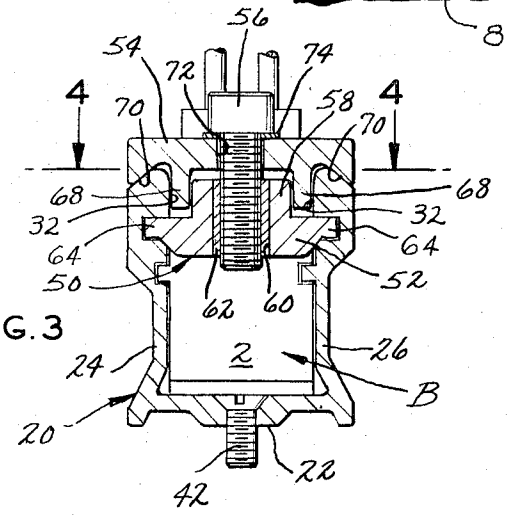
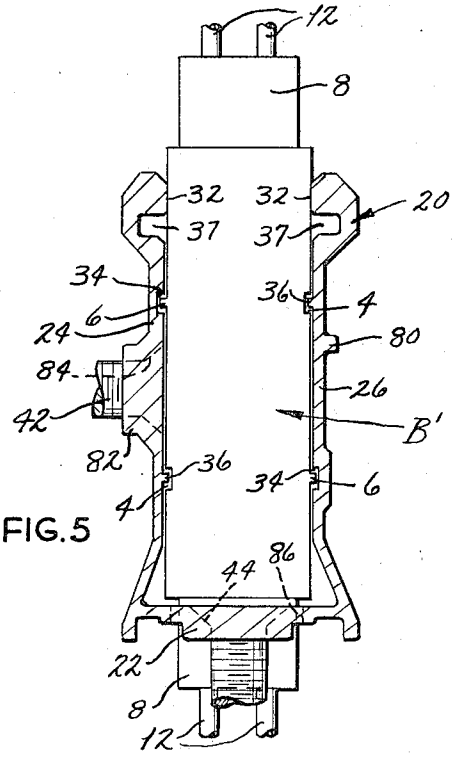


FIG. 5



MOUNT FOR ELECTRICAL JUNCTION BLOCKS

BACKGROUND OF THE INVENTION

This invention relates in general to a mount, and more particularly to a mounting device for positioning and securing junction blocks used in electrical systems.

Many electrical circuits and particularly those in military equipment are completed through junction blocks which contain bussing bars and the like and have outwardly opening sockets for receiving electrical wires leading to them. Actually, each socket contains a locking clip which is in electrical contact with a bussing bar, and this clip engages and retains a pin fastened on the end of the wire extended into the socket.

The terminal junction blocks, at least insofar as military applications are concerned, are modular in nature, each being of standard width and cross-sectional configuration at the base or end thereof opposite from the end out of which the wires extend. Moreover, each block has a groove in one side face and a rib projected from the other side face. The groove and rib interlock with complementary configurations on a U-shaped mounting track which serves as a mount for securing the junction block to a supporting structure.

The mounting tracks of current manufacture are not entirely satisfactory. In the first place, they are provided in various standard lengths, and hence a large inventory of tracks must be maintained by the assembler of the electrical circuitry. Secondly, only the natural resiliency of the metal from which the tracks are formed is used to retain the blocks in the tracks. When the tracks are subjected to severe vibrations, the blocks tend to work loose and migrate out of them. Also, conventional tracks are quite wide in comparison to the junction blocks they retain, and thereby consume excessive space.

SUMMARY OF THE INVENTION

One of the principal objects of the present invention is to provide a mount for positively securing and locking electrical junction blocks of current construction to a supporting structure. Another object is to provide a mount of the type stated which is simple in construction and easy to manufacture. A further object is to provide a mount of the type stated which is of minimal width and is therefore highly compact. An additional object is to provide a mount of the type stated which retains junction blocks securely in place when subjected to severe vibrations. Still another object is to provide a mount of the type stated having a locking clamp which is easily accessible. Yet another object is to provide a mount of the type stated which may be cut to any desired length. These and other objects and advantages will become apparent hereinafter.

The present invention is embodied in a mount for electrical junction blocks. The mount includes a track having sidewalls between which the block fits and locking clamps which may be securely positioned on the track at any desired location not occupied by a block, and when so positioned urges the sidewalls together, thus clamping the block tightly between the sidewalls. The invention also consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

DESCRIPTION OF THE DRAWINGS

In the accompanying drawings which form part of the specification and wherein like numerals and letters refer to like parts wherever they occur:

FIG. 1 is a perspective view of a mount constructed in accordance with and embodying the present invention;

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is an end view of the mount taken along line 3—3 of FIG. 1;

FIG. 4 is a sectional view taken along line 4—4 of FIG. 3;

FIG. 5 is a sectional view of a modified mount;

FIG. 6 is a plan view of the bottom of the modified mount.

DETAILED DESCRIPTION

Referring now to the drawings (FIG. 1), M Designates a mount for positioning and retaining terminal junction blocks B in a fixed position on a supporting structure. The terminal junction blocks B are of the so-called feedback variety, meaning they have wires leading to only one end thereof, and are standard in configuration and design.

Each junction block B includes a base 2 (FIG. 2) which is molded from plastic and is rectangular in configuration, having flat side faces and a flat bottom face. Opening out of one side face is a groove 4, while the other side face has a rib 6 projected from it. Both the groove 4 and rib 6 extend longitudinally of the base 2 and are parallel to its bottom face. The base 2 has an elastomeric boot 8 (FIGS. 2 & 4) fitted against its top surface and this boot has sockets 10 (FIG. 4) opening out of it. The sockets 10 continue inwardly into the base 2 where they are provided with a retention clip connected to a bussing bar or some other electrical connecting device (not shown). The locking clips engage and retain pins on the end of wires 12 leading into the sockets 10, thus securing the wires 12 to the block B.

The mount M for one or a plurality of blocks B includes a track 20 which is preferably an extrusion of aluminum or some other suitable material. Being an extrusion, the track 20 possesses the same U-shaped cross-sectional configuration throughout its length. In particular, the track 20 (FIG. 2) has a base wall 22 and two sidewalls 24 and 26 connected to the base wall 22 at stress relieving corners so as to form an outwardly opening channel 28 between the sidewalls 24 and 26. This channel receives the bases 2 on the blocks B when the blocks B are mounted in the track 20. The base wall 22 adjacent its junction with the sidewalls 24 and 26 is relieved at two grooves 30 which enable the sidewalls 24 and 26 to flex relative to the base wall 22 with relative ease.

The sidewalls 24 and 26 both have flat abutment surfaces 32 (FIG. 2) at the top or outer ends thereof, and those faces are parallel and presented inwardly. The tops of the sidewalls 24 and 26 at the abutment faces 32 are spaced apart a distance slightly less than the width of the base 2 on the block B so that a slight interference fit will exist between the base 2 and the sidewalls 24 and 26 at the tops thereof when the block B is inserted into the channel 28. The inside surface on the wall 24 is interrupted by a longitudinal groove 34

which opens into the channel **28**, and this groove will align with and receive the rib **6** in the base **2** of the block B when the block B is installed in the track **20**. The inside surface **32** on the other sidewalls **26** has a rib **36** which will align with and project into the groove in the base **2** when the block B is installed in the track **20**.

The outer or free ends of the sidewalls **24** and **26** are enlarged and these enlarged portions are provided with opposed grooves or slideways **37** which open into the channel **28** along the lower margins of the flat abutment surfaces **32**. The enlarged portions of each sidewall **24** and **26** terminate in an inside beveled surface **38** (FIG. 2) and an outside beveled surface **40**. The inside beveled surfaces **38** of the two sidewalls **24** and **26** face each other across channel **28** and facilitate installation of the block B in the track **20**, for as the block B is pressed into the channel **28** the bottom corner edges of the block B will engage the inside bevel surfaces **38** and cause the sidewalls **24** and **26** to spread.

The track **20** is fastened to a supporting structure by flat head screws **42** (FIGS. 2 and 3) which extend through countersunk holes **44** in the base wall **22**. The flat heads of the screws **42** are flush with the inside surface of the base wall **22** and are accessible from within the channel **28**.

Aside from the track **20**, the mount M also includes locking clamps **50** (FIGS. 1 and 3) which bridge the channel **28** between the two sidewalls **24** and **26** at the enlarged end portions of those sidewalls. A locking clamp **50** should be located against each of the endmost junction blocks B and more may be located intermediate adjacent blocks B, the number required being dependent on the number of blocks B within the channel **28**. Each locking clamp **50** includes a slide **52**, which is disposed entirely within the channel **28**, a cap **54** which overlies the slide **52**, and a screw **56** for drawing the cap **54** and slide **52** together.

The slide **52** (FIGS. 3 and 4), like the track **20**, is preferably formed from aluminum or some other suitable light weight material which has been extruded and cut into short segments. The slide **52** has an enlarged center portion **58** formed with a centrally disposed bore **60**, the axis of which is perpendicular to the base wall **22**, and fitted into this bore is a self-locking insert **62**. The screw **56** threads into the insert **62** and irrespective of the position of the screw **56** in the insert **62** substantial resistance to rotation is offered so that the screw will not loosen when the slide **52** is subjected to vibrations. In addition to the center portion **58**, the slide **52** has integral wings **64** which project from the center portion **58** into the opposed slideways **37** in the enlarged portions of the sidewalls **24** and **26** (FIG. 3). A reasonable amount of clearance exists between the sufaces of the wings **64** and the surfaces of the slideways **37** so that the slide **52**, unless otherwise restrained, will move easily along the track **20** within the channel **28** thereof.

The cap **54** (FIG. 3), like the slide **52**, is preferably a segment of an extrusion formed from aluminum or some other suitable material, and the width of the cap **54**, that is its dimension in the longitudinal direction of the track **20**, is equal to the width of the slide **52**. Near its ends, the underside of the cap **54** is relieved to accommodate the enlarged ends of the sidewalls **24** and **26**, and the cap **54** is further relieved at its center to accommodate the enlarged center portion **58** of the slide **52**. Separating the center relief from the two side reliefs are guide tabs **68** (FIGS. 3 and 4) which project inwardly into the channel **28** of the track **20** and occupy the space therein between the flat abutment surfaces **32** of the sidewalls **24** and **26** and the enlarged center portion **58** of the slide **52**. A reasonable amount of clearance exists between the guide tabs **68**, on one hand, and the slide center portion **58** and the track sidewalls **24** and **26**, on the other, so that the guide tabs **68** do not impede movement of the locking clamp **50** along the track **20**. The guide tabs **68** do, however, prevent the cap **54** from skewing on the track **20**. The two outside reliefs along the underside of the cap **54** are partially defined by beveled camming surfaces **70** which are disposed at the same angle with respect to the inside abutment faces **32** on the track **20** as are the beveled outside surfaces **40** on the enlarged ends of the track sidewalls **24** and **26**. Indeed, the camming surfaces **70** of the cap **54** overlie and abut the outside beveled surfaces **40** on the track sidewalls **24** and **26**. The cap **54** is provided with a bore **72** through which the screw **56** extends, and interposed between the head of the screw **56** and the underlying surfaces of the cap **54** is a washer **74**.

When the screw **56** is tightened down against the cap **54**, the slide **52** is drawn toward the cap **54** and the wings **64** thereof bear firmly against the opposite surfaces of the slideways **37**. Likewise, the camming surfaces **70** on the cap **54** bear firmly against the outside beveled surfaces **40** on the track sidewalls **24** and **26**. The friction developed along the foregoing pairs of abutting surfaces is enough to prevent the locking clamp **50** from moving along the track **20**. Moreover, as the screw **56** draws the slide **52** and cap **54** together, the beveled camming surfaces **70** on the cap **54** will cam the enlarged outer ends of the sidewalls **24** and **26** toward one another, and this will reduce the space between the parallel flat abutment faces **32** of the sidewalls **24** and **26**.

OPERATION

Prior to installing the junction blocks B in the track **20**, the track **20** is cut to the proper length, and that length is equal to the sum of the lengths of the various blocks B which are to be mounted by the track **2** plus the widths of the locking clamps **50** which are to be used with the track. In this connection, a locking clamp **50** should be installed at each end of the track and if more than four blocks B are to be installed, additional clamps **50** should be employed. In other words, no two locking clamps should be separated by more than four blocks B in severe vibrational environments.

Once the track **20** is cut to the proper length it is secured to the supporting structure, and this is achieved by first drilling the countersunk holes **44** in the base wall **22** at desired locations and then inserting the screws **42** through those holes and retaining those screws in the supporting structure. The flat heads of the screws **42** lie flush with the surface of the base wall **22**.

After the track **20** is secured to the supporting structure, the junction blocks B are fitted into the channel **28** of the track **20**. This is accomplished by pressing the blocks B directly into the channel **28** from the open side thereof until the rib **6** on the block B snaps into the groove **34** of the side wall **24** and the rib **36** on the side

wall 26 snaps into the groove 4 in the block B. As each block B is installed it will engage the inside beveled surfaces 38 on the enlarged ends of the side walls 24 and 26 and will spread the side walls 24 and 26, thus facilitating entry of the block B into the channel 28. In the alternative the blocks B may be inserted into either end of the track and then moved longitudinally along the track to the desired location.

The locking clamps 50 are installed on the track 20 preferably from the ends thereof, before or after blocks B are in place. Once engaged with the track 20, the endmost locking clamps 50 are moved against the ends of the endmost blocks B, and then the screws 56 thereof are tightened. This draws the cap 54 and slide 52 together, causing the two to tightly engage the enlarged end portions of the side walls 24 and 26. The friction is great enough to prevent the clamps 50 from moving along the track 20, and this of course holds the blocks B in place. Moreover, as the screw 56 is tightened, the beveled camming surfaces 70 on the cap 54 move down the outside beveled surfaces on the sidewalls 24 and 26 of the track 20, and this causes the enlarged ends of the sidewalls 24 and 26 to move together and tightly grip the blocks B. Actually, the sidewalls 24 and 26 bear against the block B only at the flat abutment surfaces 32 of those sidewalls 24 and 26. As a result the blocks B are retained positively in the channel 28 of the track 20 and will not migrate out of that channel 28, even when subjected to severe vibrations.

The track 20 is only slightly wider than the block B and therefore the mount M is extremely compact. Also the clamps 50 are secured merely by turning the screws 56 — a one step operation — and the screws are easily accessible.

MODIFICATION

The utility of the mount M is not confined exclusively to so called feedback junction blocks, that is blocks B having boots 8 on and wires 12 leading to only one end thereof. On the contrary, with slight modifications of the track 20, the present invention may be utilized with so called feed-thru junction blocks B^1 which have boots 8 on and wires 12 leading to opposite ends thereof (FIGS. 5 and 6). Each feed-thru junction block B^1 also has a groove 4 and rib 6 on each side with the groove 4 and rib 6 on one side being reversed in position with respect to their counterparts on the other side.

The modifications exist in the track 20. In particular, the sidewalls 24 and 26 are somewhat greater in height to accommodate the greater height of the feed-thru blocks B^1. Also, the sidewall 24, in addition to the groove 34 therein, has a rib 36 located below the groove 34 and that rib 6 projects into the additional groove 4 on one side of blocks B^1. The other wall 26, in addition to the rib 36 thereon, has a groove 34 therein and that groove receives the additional rib 6 on the other side of the block B^1. Moreover, the sidewall 26 has a rib 80 projecting outwardly therefrom and that rib extends the length of the wall 26, thus rigidifying the same. The wall 24 also has a longitudinal boss 82 extending the length thereof, and this boss is somewhat larger than the rib 80. Its outer face is flat and flush with the other outermost lateral faces on the wall 24. The boss 82 has countersunk holes 84 extended through it for accommodating the mounting screws 42. Thus, the modified track 20 may be secured to a supporting structure along its base wall 22 and also along its sidewall 24.

Aside from the changes in the sidewalls 24 and 26, the base wall 22 is provided with machined cutouts 86 which receive the elastomeric boots 8 at the innermost ends of the feed-thru blocks B^1; thus enabling the wires 12 to extend through the base wall 22. The material between the cutouts 86 in the basewall 22 is somewhat thicker in the modified track 20 to provide additional stiffening. The locking clamps 50 fit on the modified version of the track 20 and clamp the sidewalls 24 and 26 thereof together in the same manner.

This invention is intended to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. A mount for junction blocks to which electrical wires are connected and having a pair of generally flat and parallel side faces, one of which has a rib projected from it and the other of which has a groove opening out of it; said mount comprising: a track having opposed sidewalls which are resiliently mounted with respect to one another and are spaced apart a distance substantially equal to the spacing between the side faces on the block so that block will fit between the sidewalls, one of the sidewalls having a longitudinally extending rib projecting from it for entry into the groove on the block and the other sidewall having a longitudinally extending groove in it for receiving the rib on the block, each sidewall further having a beveled surface which is inclined relative to the general direction of the wall and faces away from the space between the walls, each sidewall further having a slideway extending longitudinally along it; a slide spanning the space between the sidewalls and engaged with the slideways along the sidewalls such that it will move along the slideways unless otherwise restricted, the slide being shorter than the space between the outer edges of the slideways so that the walls can move together without interference from the slide; a cap overlying the slide and bridging the space between the two sidewalls, the cap having beveled surfaces which abut the beveled surfaces of the sidewalls; and a screw extended through the cap and threaded into the slide for drawing the slide and cap together, whereby the beveled surfaces on the cap will move down the beveled surfaces on the sidewalls so as to urge the sidewalls together, thereby clamping the blocks tightly between them, and whereby the friction between the cap and slide and the sidewalls is increased, thereby securing the cap and slide firmly in place on the track and preventing movement of the blocks longitudinally of the track.

2. A mount for an electrical junction block having generally parallel side faces, said mount comprising: a track having a base and resilient sidewalls connected to and projecting from the base, the sidewalls being spaced apart sufficiently to receive the junction block between them so that the opposed inside faces of the sidewalls will be adjacent to the side faces of the junction block, the sidewalls at their ends remote from the base being free to move toward and against the side faces of the block; a camming member bridging the space between the sidewalls outwardly from the base, the camming member and sidewalls having engaged cooperating surfaces which effect a camming action on

the sidewalls when the camming member is moved relative to the base such that the spacing between the base and member changes, the camming action being such that the sidewalls move together a slide engaged with and movable along the track, the slide being positioned and constructed such that the sidewalls can move together and clamp the junction block without interference from the slide, tightening means connecting the camming member and slide for moving the camming member relative to the base so as to urge the sidewalls together and clamp the junction block between the sidewalls, and means permitting the sidewalls to be moved toward one another during tightening of the tightening means.

3. A mount according to claim **1** wherein the tightening means is a screw which threads into the slide and urges the camming member and slide together as it is tightened.

4. A mount according to claim **3** wherein the sidewalls of the track have longitudinally extending slideways which receive the ends of the slide.

5. A mount according to claim **4** wherein the engaged cooperating surfaces of the camming member and the sidewalls are both inclined at the same angle with respect to the inwardly presented faces of the sidewalls.

6. A mount according to claim **1** wherein the tightening means is a screw which extends through the camming member and threads into the slide midway between sidewalls of the track, the axis of the screw being generally perpendicular to the longitudinal axis of the track.

7. A mount according to claim **6** wherein the camming member has guide tabs which project between the two sidewalls and prevent the cap from skewing on the track.

8. A mount according to claim **6** wherein the base is formed integral with and extends between the sidewalls along substantially the entire length of the track.

9. A mount according to claim **1** wherein the cooperating surfaces are oriented such that the sidewalls move together when the camming member is moved toward the base.

10. A mount according to claim **1** wherein the camming member, slide and tighening means form a locking clamp which interferes with longitudinal movement of the block along the track.

11. A mount according to claim **10** wherein at least some of the cooperating surfaces are beveled relative to the inside faces of the sidewalls.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,850,301 Dated November 26, 1974

Inventor(s) Ralph E. Flentge

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

First page before "Abstract", the section entitled "Inventor:" "Flenige" is misspelled it should be "Flentge".

Column 7, line 4 after "together" insert a comma ",".

Column 7, line 15, "claim 1" should read "claim 2".

Column 8, line 1, "claim 1" should read "claim 2".

Column 8, line 14 "claim 1" should read "claim 2".

Column 8, line 18 "claim 1" should read "claim 2".

Signed and sealed this 21st day of January 1975.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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