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MOUNTING STRAP FOR INTERCHANGEABLE WIRING DEVICES

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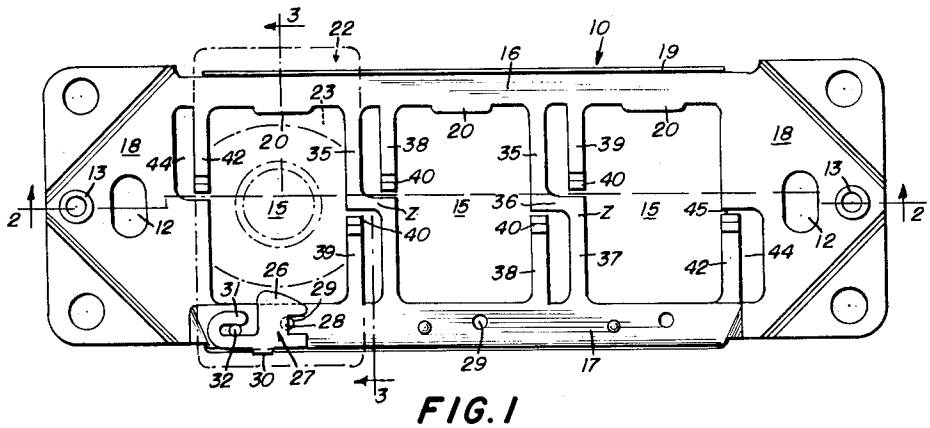


FIG. 1

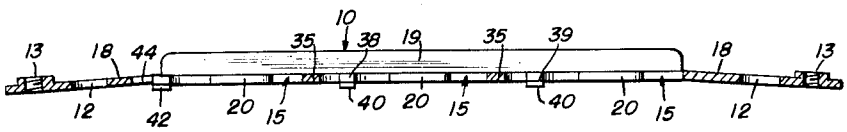


FIG. 2

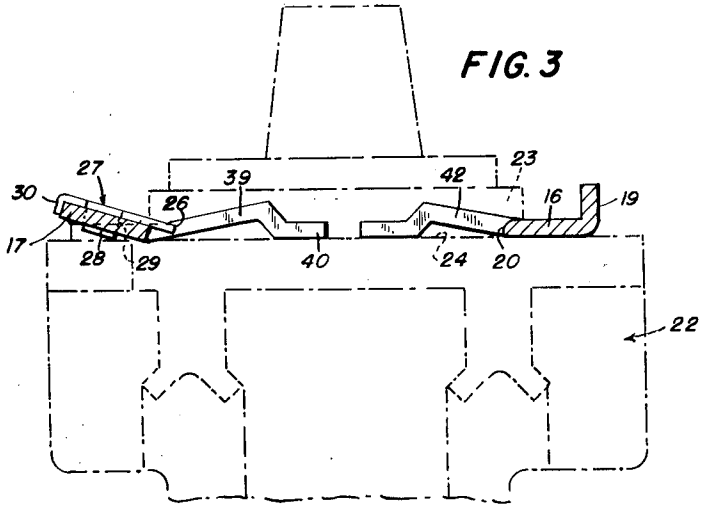


FIG. 3

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# MOUNTING STRAP FOR INTERCHANGEABLE WIRING DEVICES

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This invention relates to mounting straps or bridge plates of the type adapted to span the front or open face of an outlet box and to receive and support therefrom up to three wiring devices of the interchangeable type such as disclosed in general in Reissue Patent 19,092, granted February 20, 1943, to Victor R. Despard. Widespread acceptance and use of the interchangeable devices led to changes and improvements in them and in the mounting straps, culminating in the so-called "cam strap" of Despard Patent 2,560,507, July 10, 1951.

The present invention constitutes improvements on the "cam strap plate" of the last mentioned patent, insuring automatic, rigid mounting of the wiring devices in the cam strap and the perpetual tight maintenance thereof.

It is a general object of the present invention to provide a novel and improved mounting strap for interchangeable wiring devices capable of rigidly holding such devices while permitting rapid attachment and release of such devices entirely without the use of tools.

More particularly it is an object of the invention to provide a mounting strap for up to three wiring devices having a fixed mounting lug and an opposed manually operable cam lug for engaging and holding each wiring device plus spring means which must be deflected to seat the device and which continually maintain a bias thereon to prevent looseness.

An important object of the invention comprises the arrangement in a bridge plate or strap for supporting a wiring device in the mouth of a conduit box, of means for manually securing the device removably in an opening in the strap including opposed fixed and cam lugs for engaging opposite ends of the device above a shoulder thereon adapted to engage the undersurface of the strap and resilient means on said strap flexed against said shoulder when the device mounted in the strap is secured by said lugs.

A further important object of the invention comprising the arrangement of a multi-opening bridge plate to provide automatically for independent compensation for tolerance variations in individual wiring devices so that all are secured tightly in the plate.

Another important object of the invention comprises, in a multi-opening bridge plate of the arrangement of a Z-shaped, transverse separator between adjacent mounting openings for wiring devices, plus two spring tongues interfitting with the Z and offering resilient resistance to the seating of the wiring device shoulder against the underface of the strap where it must be to be engaged by the fixed and cam lugs.

Other and further objects of the invention will be more apparent to those skilled in the art upon a consideration of the following specification and accompanying drawing wherein is disclosed a single exemplary embodiment of the mounting strap for interchangeable wiring devices, with the understanding that such changes and modifications may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawings:

FIGURE 1 is a plan view of a three opening, single gang, mounting strap constructed in accordance with



the present invention and illustrating a wiring device mounted in one of the openings thereof;

FIGURE 2 is a longitudinal central section through the strap taken on line 2—2 of FIGURE 1; and

FIGURE 3 is a transverse section, taken on line 3—3 of FIGURE 1 shown on an enlarged scale, and illustrating in dotted lines a wiring device in position therein.

The mounting strap of the present invention constitutes an improvement on the strap illustrated in the Despard Patent 2,560,507 referred to above, and includes all of the components of that strap plus added features insuring that any wiring device mounted in an opening in the strap will be rigidly held therein and not subject to movement or rattling during use, which action is particularly offensive in connection with tumbler or rotary switches and to a lesser extent with convenience outlets.

As seen best in FIGURE 1, the strap comprises a substantially rectangular strip **10** of heavy sheet metal, sized to fit length-wise across the face of a single or multigang outlet box to which it may be attached by screws passing through elongated openings **12** in the strap and receive in threaded openings in ears struck outwardly from the end walls of the box. In order that the wall plate for the wiring devices may be secured to the mounting strap, the latter is provided with an opening **13**, outboard of each hole **12**, formed by piercing to provide added metal to accommodate more internal threads for the mounting screw for the cover plate.

Straps have been conventionally offered in two styles, the first with a single opening for receiving and mounting a wiring device, the long axis of the opening being coincident with the axis of the strap, and second a three-opening type with the short axes of the three openings coincident with the axis of the strap. This accommodates three interchangeable wiring devices for mounting in a single-gang box. Each is indicated in the drawing by reference character **15** and in the three opening variety shown, these are side by side having their major axes transverse to that of the axis of the strap.

Each opening is substantially rectangular, and relatively wide borders **16** and **17** extend longitudinally of the strap and form the ends of the device openings while much wider, heavier ends **18** terminate the strap and provide for the mounting openings already discussed. One of the borders **16**, is provided with an upturned reinforcing flange **19** and the opposite border **17** is slightly upwardly inclined as seen in FIGURE 3. From border **16** lugs **20** each of considerable width but little length extend one into each opening **15** to provide a fixed device engaging element for securing one end of a wiring device, such as shown at **22** in dotted lines in FIGURES 1 and 3, in position in the opening.

Such a wiring device may comprise a switch, convenience outlet, push button, aperture closing blank, pilot light or the like and while these several devices have different functions, they each include a laterally elongated neck portion **23** sized to closely fit into an opening **15** in the plate. Beneath this neck is a plane shoulder area **24** normal to the axis of the neck and adapted to substantially engage the underface of the strap, as seen in FIGURE 3, to provide stability.

Each neck has end faces normal to the shoulder plane and each is provided with a shallow recess, the lower wall of which is coincident with the surface of shoulder **24** so as to receive, at one end, lug **20** and at the opposite end lug portion **26** of a cam-lever device **27**, formed of sheet metal, having a tongue **28** passing through perforation **29** in flange **17** of the strap and turned over beneath to act as a pivot or fulcrum for the lever. The lever also has a down turned stop **30** to engage the edge

of flange **17** when the lever is in the lug engaging position, at which time a spring tongue **31** thereon is caught behind a struck-up projection **32** on the border **17** to hold the lever in position. The cam-lever permits manual engagement or disengagement of the wiring device.

While the inclined arrangement of the cam-lever, best emphasized in FIGURE 3, is intended to closely engage and lift the device neck to snug the shoulder beneath the under surface of the strap, nevertheless, due to small manufacturing inequalities, necessary tolerances, shrinkage of plastic parts, wear in the metal-working dies and the like, the fits are not always as close as desired and there may be permitted certain small relative movement between the wiring device and the strap, giving a feeling of insecurity to users. This derives from minor clearances between the walls of the neck and opening and insufficient contact between the strap and shoulder. Various schemes have been proposed to improve the relative rigidity of the assembly, including the addition of bendable metal portions somewhat as illustrated in FIGURE 4 of Despard Patent 1,992,059, granted February 19, 1935. One such bendable portion for each opening and opposing the "fixed" lug provides for rigid mounting but requires a tool in the mounting operation and offers difficulty should disassembly be required and effectively nullifies the 100% manual mounting provision of the lever lug arrangement described above.

Tight fitting wiring devices can be achieved if all dimensions are held closely enough, but manufacturing requirements provide tolerances which vary from the ideal. Where, as in the older style plates the wiring device shoulders do not bear tightly against the underside of the bridge the solution, if only a single device is mounted could be the bending of the normal cross-arms out of the plate plane, but each arm is common to two devices and such bending would only be effective if the devices on each side of it had the same tolerance variation.

In accordance with the present invention, use is made of the normal separators between the openings **15** to provide means to bias the wiring devices tightly in position under all circumstances, while yet not sacrificing their function of holding the two borders **16** and **17** against spreading in spite of pressures imposed on them in holding the wiring devices in position. For this purpose each of the two spacers between the center opening and the two end openings is severed into three sections, the first being a sinuous connector between the sides **16** and **17**, and hereinafter referred to as a **Z** having, as viewed from the right in FIGURE 1, offset horizontal top and bottom legs **35** and **37** whose inner ends are joined by a short vertical leg **36**, whereby legs **35** and **37** each form more than half of the side wall of one of the openings **15**.

The remaining portion of each side wall of the center opening is formed by a tongue **38** integral with either border **16** or **17** and cantilevered therefrom toward the connecting leg **36** of the **Z**. Each tongue comprises a strap of the same general width as bar **35** or **37** and of a length to not quite engage the end of this bar or its junction with the connector strap **36**. In a like manner a tongue **39** for each end opening is substantially coextensive with the remaining leg of the **Z** and forms the remainder of the side wall of the end opening. As seen in FIGURE 3, the tongues **38** and **39** have their ends **40** offset downwardly by about the amount of the thickness of the metal of the tongue. This provided tips extending well below the underface of the strap which are engaged by the shoulder **24** on the wiring device as the latter is pressed into position to substantially engage its area with the underface of its strap. The tongues are thus flexed so that they bear with considerable force at opposite points



on the shoulder and draw the wiring device downwardly so that the upper walls of the notches or channels in the ends of the neck **23** are pressed tightly against lugs **20** and **26** to thereby give a four point mount, one point on each of the areas of the shoulder adjacent the sides and ends of the neck thereto preventing any relative movement between the wiring device and its mounting strap.

In connection with the end openings in the strap, only one wall is provided with the combination **Z** and tongues but a tongue **42**, as seen at the right end of FIGURE 1, is formed diagonally opposite tongue **39** by cutting away the material of end **18** to provide clearance area **44** to the right of tongue **42** and the narrow clearance area **45** between its tip and the metal forming the end of the strap. Thus any wiring devices in the end openings of the strap are provided with the same dual biasing tongues as is a device in the middle opening.

We claim:

1. In a mounting strap, for use with interchangeable wiring devices, each strap comprising a metal plate having three rectangular openings therein side-by-side, with integral borders extending along the ends of the openings, a fixed and a movable lug opposing each other in each opening and extending into the ends thereof from said borders, parts integral with said strap borders separating adjacent openings, one of said parts for each separation comprising a rigid **Z**-shaped member extending from border to border, the top and bottom legs of the **Z** respectively bordering adjacent openings, other parts for said separation comprising tongues cantilevered from said borders, one extending parallel to each **Z** leg, terminating short of the **Z** connecting arm and being aligned with the other **Z** leg, each tongue being resilient and having its free end deflected below the undersurface of the strap.

2. The strap as defined in claim 1 in which each end opening has a tongue diagonally opposite the tongue forming one of the parts of the opposite wall and separating it from the center opening, said first mentioned tongue being severed except at its anchor end from the metal of the strap and being deflected below said undersurface.

3. The strap as defined in claim 1 in which the **Z**'s are so arranged that the tongues bordering the center opening extend from diagonally opposite corners thereof.

4. In a mounting strap, for use with interchangeable wiring devices, each strap comprising a metal plate having three rectangular openings therein side-by-side, with integral borders extending along the ends of the openings, a fixed and a movable lug opposing each other in each opening and extending into the ends thereof from said borders, strips of the material of said strap extending integrally between said borders and separating adjacent openings, a pair of tongues one integral with and cantilevered from each border, extending along opposite sides of each opening and terminating near the longitudinal axis of the strap, each tongue being resilient and having its free end deflected below the undersurface of the strap.

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