

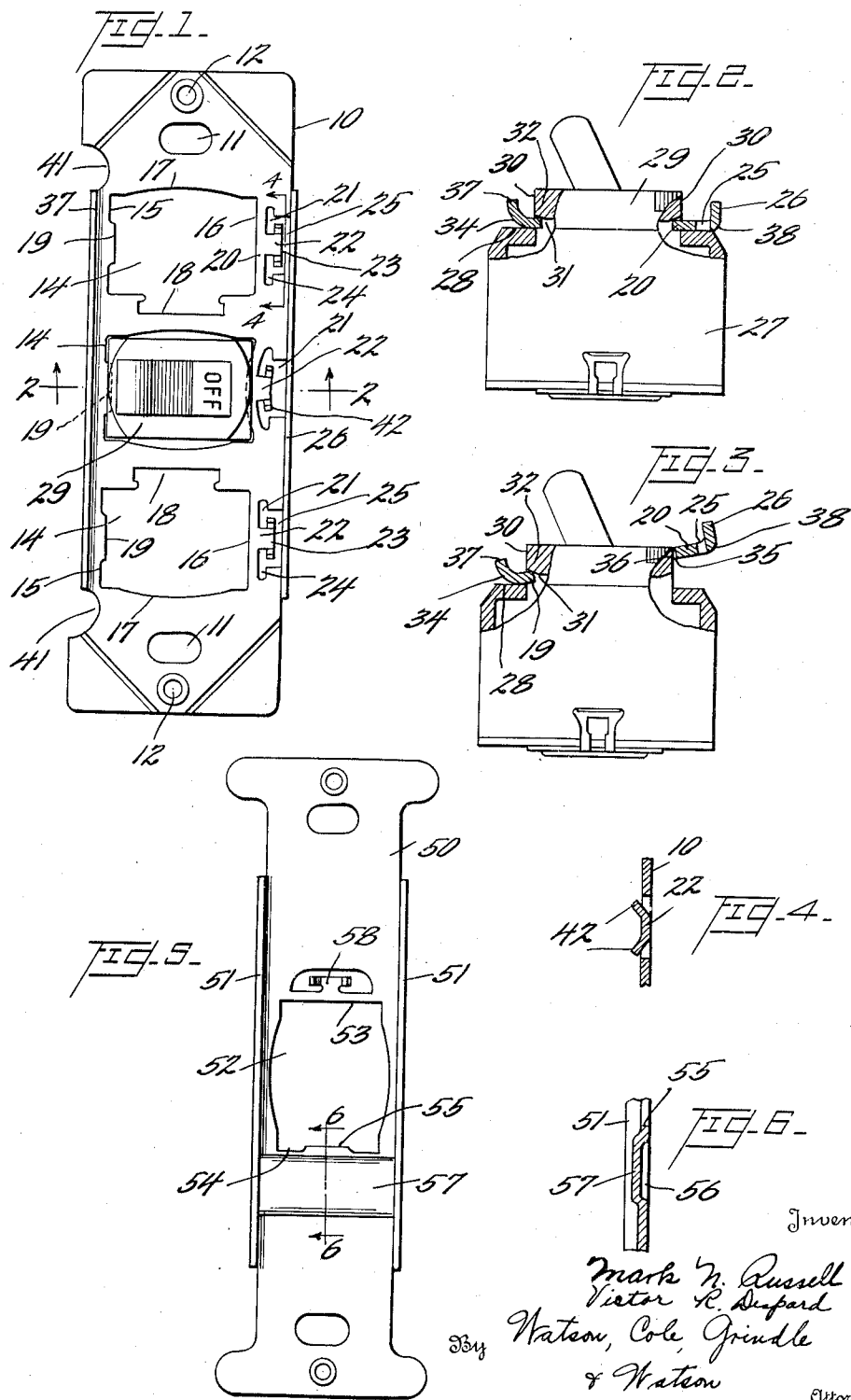
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MOUNTING STRAP FOR INTERCHANGEABLE WIRING DEVICES

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Inventor

Mark N. Russell
Victor R. Shepard
By Watson, Cole, Grindle
& Watson

Attorney

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MOUNTING STRAP FOR INTERCHANGEABLE
WIRING DEVICES

Mark N. Russell and Victor R. Despard, Syracuse,
N. Y., assignors to Pass and Seymour, Inc.,
Solvay Station, N. Y., a corporation of New
York

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This invention relates to mounting straps for that type of interchangeable wiring device disclosed in general in Reissue Patent No. 19,092, granted on February 20, 1934, to Victor R. Despard. Improvements in the means for supporting the interchangeable wiring devices and particularly to the construction of the strap or bridge and the means for attaching the wiring devices thereto are disclosed in the patent to Despard No. 1,992,059, granted February 19, 1935. On the second page of drawings of that patent are disclosed wiring devices and a form of mounting strap or bridge which have been manufactured and sold in large numbers and used with great satisfaction for several years.

The present invention contemplates improvements in the structure of the mounting strap or bridge whereby its cooperation with the wiring devices is improved and the assembly operations simplified.

It is therefore a general object of the present invention to provide a novel and improved mounting strap for interchangeable wiring devices.

An important feature of the improved strap consists in so arranging the same that one side of the neck of the wiring device is automatically connected to the strap by the mere insertion of the neck into position.

Another important feature of the improved strap consists in the provision of relief for the rear surface thereof to prevent interference with the shoulder adjacent the neck of a wiring device when the same is positioned for inserting the lug into the neck recess.

Still another important feature of the invention consists in the novel arrangement of the stiffening flange on that longitudinal edge of the mounting strap which carries the fixed lug for engaging with one side of the wiring device neck whereby the rear face of the strap is so relieved that it does not interfere with a forwardly facing shoulder of the wiring device when the lug is being engaged in the neck recess.

A further important feature of the invention resides in an improved construction of the withdrawing extension on the bendable metal strip which is adapted for manual lateral displacement by the electrician when attaching a wiring device to the mounting strap, which comprises deflecting portions of this withdrawing means out of the plane of the strap for more facility in applying the tool which may be used to withdraw the deflected metal strip from engagement with the neck recess of a wiring device when

it is desired to remove one from its strap for any purpose.

Other and further objects and features of the present invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawing and following specification wherein is disclosed, for purposes of this application, two exemplary embodiments thereof with the understanding that such changes and variations may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawing:

Figure 1 is a plan view of a strap constructed according to the present invention and showing one wiring device in position therein;

Figure 2 is a section on line 2—2 of Figure 1;

Figure 3 is a view similar to Figure 2 but showing the parts in process of assembly;

Figure 4 is a fragmentary section on line 4—4 of Figure 1;

Figure 5 is a view similar to Figure 1 but showing a slightly different form of the device; and Figure 6 is a fragmentary section on line 6—6 of Figure 5.

In the form of mounting strap at present commercially available, such as shown in Figure 8 of Despard Patent 1,992,059, a flat metal plate, flanged on two edges, is provided with one or more openings each adapted to receive the neck of a wiring device which protrudes forwardly from a planar shoulder at the forward side of the main portion of the body of the device. This shoulder is adapted to be snugly fitted against the rear face of the strap and held there by cooperating means on the strap and neck. In the earlier form of the device such cooperating means comprised a pair of integral bendable strips forming opposite walls of the opening in the strap and adapted to be manually and laterally deflected during the assembly to engage in recesses in the neck walls. The forward walls of these recesses were so inclined that their cooperation with these bendable strips caused a camming action to force the shoulder against the rear face of the strap. In order to assemble such a device it was essential for the mechanic to hold it in position in the opening with one hand and with the other manipulate a tool to successively bend both of the metal strips to cause them to engage within the recesses in the neck. During this operation there was nothing to hold the wiring device in position except the dexterity of the mechanic.

In the present invention one of the bendable

strips on the strap is supplanted by a fixed lug adapted to be initially inserted into the appropriate recess in the wiring device neck when the two parts are brought together. This eliminates, therefore, one operation of strip bending and at the same time serves to hold the wiring device initially in position relative to the strap while the electrician bends the single remaining deflectable metal strip into locking position.

Not only is time saved in the new construction by reason of the reduced number of operations and facility with which the remaining one can be carried out, but better centering of the wiring device is effected and a stronger assembly results.

Figure 1 of Despard Patent 1,992,059 shows an assembly in which only a single bendable strip is used for each wiring device, a full length recess in the opposite end of the neck of the wiring device merely having a wall which overhangs the straight fixed edge of the opening in the strap, but such a construction requires a lateral clearance between the inner edge of the bendable strip and the outer edge of the neck portion beneath which it engages equivalent to the amount of overhang on the opposite edge of the neck. It is not feasible, however, with the type of metal which it has been found best to use in the manufacture of straps, to provide this amount of permissible lateral deformation. Not only does the long overhang of the deformed strip weaken its support of the wiring device, but it contributes to the possibility of breakage. Such breakage ruins the strap for further use.

It will be appreciated that the deflectable strip, being supported only at its ends, but there from a rigid plate, must be stretched longitudinally in order to permit its lateral deflection and too much stretching is apt to fracture it. It is therefore desired to have substantially zero clearance between the wiring device neck walls and the edges of the strap opening in order to require only minimum lateral deflection of the bendable strip for securing the wiring device in position. The only necessary clearance is that required to ensure easy insertion of the neck of the wiring device. What may be termed "tolerance" clearance is all that is necessary, i. e. enough to take care of manufacturing tolerances in the punching of the opening in the plate and the molding of the neck of the wiring device.

Some forms of wiring devices have the shoulder relatively wide adjacent the ends of the neck which are provided with the fastening recesses and all have some shoulder. The strap has considerable width beyond the edge of the opening and it will be seen that with the slight clearance above defined, interference would result between the front face of the shoulder and the back face of the strap which would prevent the insertion of the lug into its opening since it must be inserted while the strap is tilted sufficiently high to allow the edge of the opening opposite the lug to rest on the forward face of the neck. To prevent this trouble, that portion of the strap laterally disposed to the opening is bent forwardly on a large radius and starting right at the edge of the opening. This eliminates any interference and permits ready assembly of the devices into their openings without excess clearance between the neck and the opening wall. Since it is essential to provide strengthening flanges or ribs at the edges of the strap this forwardly bent portion, in one form

of the invention, is continued into one of the strengthening flanges.

In the original form of the device each one of the laterally deflectable metal strips had its outer edge extended into a T-shaped lug forming two openings in which a screw driver could be received for withdrawing the deflected metal in the event it became necessary to change or remove a wiring device. These two openings were also recommended for the insertion of the screw-driver when bending the metal into position to engage the wiring device and warning was given against using the head of the T and the inner wall of the flange for tool engaging surfaces when deflecting the strip. This was to ensure against closing the openings beneath the ends of the T head which would make it difficult to later withdraw the strip. In the present construction the spacing is conveniently arranged so that the head of T can be used, permitting deflection of the strip with one twist of the screw-driver instead of the two as were previously required. To overcome the difficulty previously experienced, the ends of the T have been deflected upwardly out of the plane of the strap so that they can always be engaged by the blade of a screw-driver for the withdrawal operation if required.

With the above explanations only a brief reference to the details of construction as shown in the drawing will be required to make clear the improvements incorporated in the new form of strap.

Referring now particularly to Figures 1-4 showing a form of the invention corresponding to the earlier patent, the strap 10 is shown as formed from a substantially flat sheet of metal of more or less rectangular form and of a length sufficient to span the face of an outlet box. The strap is provided with openings 11 to receive screws for attaching the same to lugs on the box and beyond these is provided with tapped holes 12 to receive screws for mounting the customary wall or face plate in position to cover the strap, box and additional equipment.

The strap shown is provided with three openings 14 for the interchangeable reception of wiring devices which are made and sold in the form of switches of various types, convenience and radio outlets, pilot lights, push buttons, telephone and cord bushings, filler blanks, etc. For the sake of simplicity a conventional switch of the tumbler type has been illustrated as the wiring device adapted for cooperation with the strap, although it will be appreciated that the other devices have similar shoulder and neck conformation for cooperation with the strap. Each opening 14 has a pair of opposite walls 15 and 16 substantially straight and parallel to the long axis of the strap. The longer side walls of the opening may be bowed as at 17 to accommodate certain flush type pilot lights and as shown at 18 may merge with peculiarly shaped recesses for the mounting and attachment of box spacers which form no part of the present invention.

Each of the straight walls or edges 15 mounts an integral lug 19 which projects only a short distance into the opening as clearly seen in the drawing. The confronting edge 16 is carried by an integral, bendable, metal strip 20 whose other edge is defined by the irregular cut-out 21. This is formed by punching clear through the strap and removing the irregular shaped portion of metal. The strip 20 is thus a narrow web supported at its ends by the strap and par-

alleling the edge 15. It is provided with an extension 22 on the edge opposite that numbered 16. As previously defined, this is a T-shaped portion and has the head 23, which, with the strip proper defines the openings 24 for the reception of a screw-driver, or similar tool, which may be used in bending the strip inwardly to engage with the neck of a wiring device but which primarily are for withdrawing the strip in the event that it is desired to remove a device for replacement or change in position or the like. The intent in accordance with the present construction is to use a screw-driver in the narrow space 25 between the head and the flange 26 on the edge of the strip so that a single twist of the tool results in bending the strip to the position illustrated in the middle opening in Figure 1 where it is shown engaged with the recess in the neck of a wiring device to clamp the same in position.

Figure 2 is a cross-section on line 2-2 of Figure 1 with most of the switch, a representative wiring device, in elevation, only those portions being broken away which are necessary to show the cooperation of the neck recesses with portions of the strap. This wiring device 27 includes a main body portion, the forward face 28 of which lies in a plane which constitutes a shoulder from which the neck 29 protrudes. This neck has four flat sides normal to the neck. The two shorter sides 30 are provided with the recesses 31 which begin coincident with the shoulder face 28 and extend outwardly a distance only slightly greater than the thickness of the metal of the strap. The upper or outer walls 32 of these recesses are tapered or chamfered as shown so that when the metal of the strap is forced into them the strap is cammed or wedged down with its rear face tightly against the forward face of the shoulder 28 ensuring a rigid attachment of the wiring device to the strap.

The longitudinal distance between the faces 30 is substantially identical with the distance between the edges 15 and 16 of the opening in the strap. There is only sufficient clearance here to take care of manufacturing tolerances in the two parts. This would normally make it difficult to insert the lug 19 into the recess in the neck since in order to do so the device and the strap must be canted to the position illustrated in Figure 3. Since the fore and aft depth of the recess 31 is so slightly greater than the thickness of the strap, every effort must be made to ensure that the lug can be engaged against the face of the shoulder during this operation and for this purpose the rear face of the strap is relieved as at 34 so that the lug can be brought right down against the shoulder 28 in spite of the tilting. This tilting is necessary so that the lug can be inserted before the edge 35, shown in Figure 3, drops over the front edge 36 of the neck. This relief of the rear face of the strap adjacent the lug is simply effected by curling the whole edge of the strap forwardly beginning in a line with the edges 15 of the several openings.

Since both edges of the strap must be bent forwardly to provide stiffening ribs or flanges for the same, this relief bending is combined with the left-hand flange 37 which therefore is formed on a large radius rather than with a sharp bend such as shown at 33 for the flange 26 on the opposite edge of the strap. The flanges 37 and 26 are but slightly longer than the space occupied by the three openings in the strap as

shown. The flange 26 is formed from a portion of metal outside of the general rectangular shape of the finished strap although that forming the flange 37 may come from the metal entirely within that outline and notches 41 are provided to permit the bending at the ends of the flange.

As previously pointed out, the space 25 between the T-shaped head attached to the bendable strip 20 and the inner face of the flange 26 is just the right size to accommodate a screw-driver for deforming the bendable strip into position in the recess in the side wall of the neck. Sometimes this operation, however, results in a deforming of the T-head with possible reduction in the width of one or both of the openings 24 so that a screw-driver could not be received beneath the over-hangs formed by the ends of the head. To permit withdrawal of the bendable strip even should this happen, it is proposed to bend up the ends of the head of the T out of the plane of the plate as shown at 42 in Figure 4. This ensures an abutment at each end of the head against which the screw-driver blade may be placed to withdraw the bendable strip, any suitable fulcrum for the other edge of the blade being made use of such as the face of the neck or any portion of the wall of the cut-out 21 which is available.

In the case of mounting straps designed for supporting only a single wiring device with its axis at right angles to the position assumed by the axis when two or more devices are mounted in a single strap, a construction such as shown in Figures 5 and 6 is resorted to. Here the strap 50 is provided with stiffening flanges 51 on the edges, but these have no relation now to the tilting of the device for assembly since they do not cooperate with the proper edges of the opening 52. These straight edges 53 and 54, the latter of which is provided with a lug 55, are now at right angles to the axis of the strap.

To provide the proper relief to clear the shoulder of the wiring device being inserted, a recess 56 is struck into the under-surface of the strap beginning at the edge 54 as clearly shown in Figure 6. The upper surface 57 of this does not project up beyond the face of the strap to the extent that the flanges 51 project forwardly and hence does not interfere with the face plate. The length of the recess 56 in the direction of the axis of the strap is sufficient to take care of the widest shoulders occurring on any form of device available for use with the strap.

This second form of the invention has incorporated the same features in connection with the ends of the head of the T-portion 53 that are shown in Figure 4 and for the same purpose.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In electric wiring apparatus, in combination, a sheet metal bridge plate for mounting over the face of an outlet box and having an opening with opposite straight walls substantially parallel to the plate axis, a wiring device adapted for support in said box by said plate having a portion presenting a shoulder against the plate back adjacent said walls, a neck protruding from said shoulder to extend through said opening and having only tolerance clearance from said walls, a recess opening through each neck side adjacent said walls, each recess opening extending along the neck from the shoulder a distance not substantially greater than the thickness of said plate, one of said plate opening walls having a

permanent lug for extension into one of said recesses, the opposite wall being a narrow strip formed from the plate and bendable into the other recess, the edge portions of the plate adjacent to said walls being bent forwardly to provide stiffening flanges, the flange at the lug side being curved on a large radius and beginning at the opening wall whereby the shoulder clears the plate back to permit entrance of the lug into its recess while the plate is inclined to the shoulder plane.

2. In electric wiring apparatus, in combination, a sheet metal bridge plate for mounting over the face of an outlet box and having an opening with opposite straight walls substantially parallel to the plate axis, a wiring device adapted for support in said box by said plate having a portion presenting a shoulder against the plate back adjacent said walls, a neck protruding from said shoulder to extend through said opening and having only tolerance clearance from said walls, a recess opening through each neck side adjacent said walls, each recess opening extending along the neck from the shoulder a distance not substantially greater than the thickness of said plate, one of said plate opening walls having a permanent lug for extension into one of said recesses, the edge portion of the plate adjacent to said lug-equipped wall being formed into a stiffening flange by bending forwardly on a large radius starting at said opening edge to provide clearance for said shoulder when inserting the lug.

3. In electric wiring apparatus, in combination, a sheet metal bridge plate for mounting over the face of an outlet box and having an opening with opposite straight walls substantially parallel to the plate axis, a wiring device adapted for support in said box by said plate having a portion presenting a shoulder against the plate back adjacent said walls, a neck protruding from said shoulder to extend through said opening and having only tolerance clearance from said walls, a recess opening through each neck side adjacent said walls, each recess opening extending along the neck from the shoulder a distance not substantially greater than the thickness of said plate, one of said plate opening walls having a permanent lug for extension into one of said recesses, the opposite wall being a narrow strip formed from the plate and bendable into the other recess, the edge portions of the plate adjacent to said walls being bent forwardly to provide stiffening flanges, the flange at the lug side being curved on a large radius and beginning at the opening wall whereby the shoulder clears the plate back to permit entrance of the lug into its recess while the plate is inclined to the shoulder plane, and the flange at the opposite side being bent about a line laterally beyond said bendable strip.

4. For use with electric wiring apparatus, a sheet metal bridge plate for mounting over the face of an outlet box and having an opening with opposite straight walls substantially parallel to the long axis of the plate to receive the neck of a wiring device, one of said opening walls having a permanent lug projecting slightly into the opening, the opposite wall comprising a narrow strip of metal defined by a cut-out laterally thereof and between the strip and the plate edge, the edge portion of the plate on the side of the lug supporting wall being bent into a stiffening flange for the plate, said flange being bent on a

large radius normal to the plate face at the said opening edge.

5. For use with electric wiring apparatus, a sheet metal bridge plate for mounting over the face of an outlet box and having an opening with opposite straight walls substantially parallel to the long axis of the plate to receive the neck of a wiring device, one of said opening walls having a permanent lug projecting slightly into the opening, the edge portion of the plate adjacent the lug being formed into a stiffening flange bent forwardly on a large radius, the bend starting at said lug-provided edge.

6. A bridge plate for supporting electric wiring devices in an outlet box, comprising a sheet metal strap of a length to extend over opposite edges of an outlet box and having at least one opening therein to accommodate the neck of a wiring device, said opening having a pair of opposite edges substantially parallel to the long axis of the strap, one of said edges having a lug projecting a short distance into the opening therefrom and the other edge being on a narrow bendable strip separate from the plate at its other edge only, by a cut-out, said cut-out being so shaped that a T-shaped projection extends from said strip on the opposite side from said opening edge, the ends of the T head being bent up out of the plane of the strap.

7. A bridge plate for supporting electric wiring devices in an outlet box, comprising a sheet metal strap to extend over opposite edges of an outlet box and having at least one opening therein to accommodate the neck of a wiring device, a slot adjacent one side of said opening and defining a narrow bendable strip of metal joined at its ends to the strap, means extending from the strip into the slot and defining with a portion of the slot walls an opening for a tool to straighten the strip after it has been bent in toward the opening, at least a portion of said means being bent up out of the plane of the strap.

8. A bridge plate for supporting electric wiring devices in an outlet box, comprising a sheet metal strap to extend over opposite edges of an outlet box and having at least one opening therein to accommodate the neck of a wiring device, a slot adjacent one side of said opening and defining a narrow bendable strip of metal joined at its ends to the strap, the border of the strap beginning at the outer edge of the slot being bent up to form a stiffening flange, a T-shaped portion of metal extending into said slot from the strip with the T head spaced from said flange only sufficiently for the insertion of a tool to bend the strip toward said opening, the ends of the T head being bent up out of the plane of the strap.

9. A bridge member for wiring devices comprising, a metal plate having an opening there-through to receive the neck of a wiring device, a slot in said plate adjacent an edge of said opening to define therewith a narrow strip bendable toward the opening to reduce the size thereof, and means integral with said strip and extending out of the plane thereof to be engaged by a tool to retract the strip.

10. A bridge member for wiring devices which are equipped with a neck protruding from a broad flat shoulder and adapted to be received closely in an opening of said bridge with the shoulder abutting the bridge back, a flange bent up from one edge of said bridge starting substantially at one edge of said opening, the flange portion forming the opening edge having an integral lug extending into the opening for co-

operation with the neck substantially in the plane of the bridge.

11. For use with electric wiring apparatus, a sheet metal bridge plate for mounting over the face of an outlet box and having an opening with opposite straight walls to receive the neck of a wiring device, one of said walls having a lug projecting slightly into the opening, a portion of the plate adjacent the lug being bent forwardly on a suitable radius to provide relief adjacent said lug.

12. For use with electric wiring apparatus, a sheet metal bridge plate for mounting over the face of an outlet box and having an opening with opposite straight walls perpendicular to the axis of the plate to receive the neck of a wiring device, one of said walls having a lug projecting slightly into the opening, a portion of the plate adjacent the lug being struck forwardly to provide a shallow rear relief recess.

13. In electric wiring apparatus, in combination, a sheet metal bridge plate for mounting over the face of an outlet box and having an

opening with opposite straight walls substantially perpendicular to the plate axis, a wiring device adapted for support in said box by said plate having a portion presenting a shoulder against the plate back adjacent said walls, a neck protruding from said shoulder to extend through said opening and having only tolerance clearance from said walls, a recess opening through each neck side adjacent said walls, each recess opening extending along the neck from the shoulder a distance not substantially greater than the thickness of said plate, one of said plate opening walls having a permanent lug for extension into one of said recesses, the opposite wall being a narrow strip formed from the plate and bendable into the other recess, a portion of the plate adjacent the lugged wall being bent forwardly on a relatively large radius and beginning at the opening wall whereby the shoulder clears the plate back to permit entrance of the lug into its recess while the plate is inclined to the shoulder plane.

MARK N. RUSSELL.

VICTOR R. DESPARD.