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S. N. BUCHANAN

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RECEPTACLE AND CLOSURE THEREFOR

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2 Sheets-Sheet 2

FIG. 4.

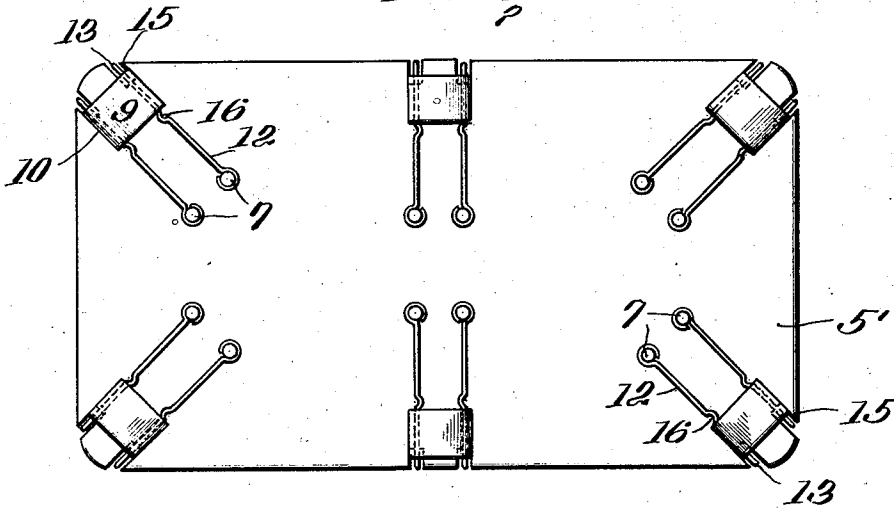


FIG. 5.

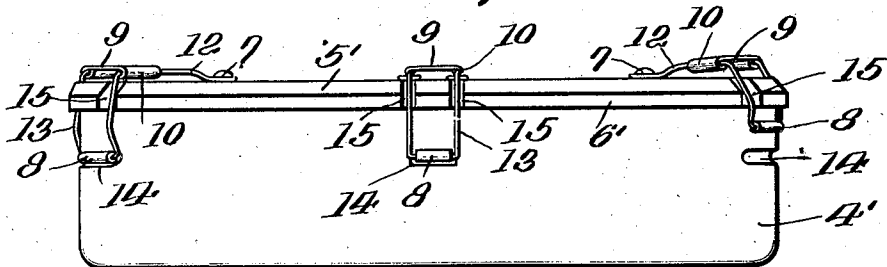


FIG. 6.

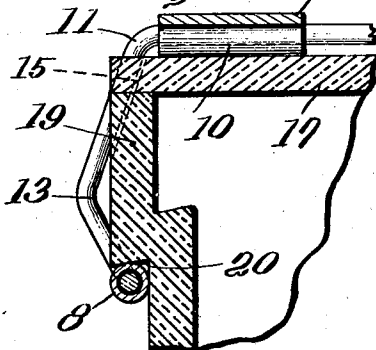


FIG. 8.

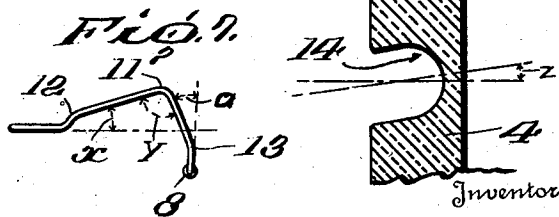
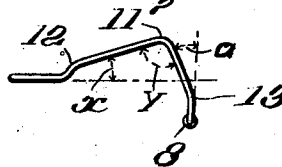


FIG. 7.



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RECEPTACLE AND CLOSURE THEREFOR

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6 Claims. (Cl. 220—55)

The present invention in its broadest aspects, is concerned with a receptacle and a closure therefor. More specifically, however, the invention has especial relation to so-called "terminal or junction boxes" and to a readily attachable and detachable closure therefor provided with means for securely retaining the closure in position thereon against undesired removal.

The "terminal boxes," for which the present invention is particularly but not exclusively adapted, are intended to house so-called "terminal blocks," i. e. blocks provided with means whereby wire ends may be interconnected; see, for example, the applicant's copending application, Serial No. 455,636, filed August 21, 1942. These boxes are usually open-ended, the wires or wire conduits coming in through suitable openings in the bottom or sides thereof.

It has heretofore been customary to secure the closures for the open ends of the boxes with the aid of bolts extending through suitable perforated and/or screw-threaded lugs or ears provided on the boxes and on the covers. The box lugs have, in some cases, been positioned on the outside of the boxes but this arrangement is not favored because of the resultant increase in size of the assembly and because of the extra material involved in the lug appendages. For this reason, it has been preferred to provide the bolt-receiving, screw-threaded lugs on the inside of the boxes, the bolts passing through aligned bolt openings in the box covers. A disadvantage of this type of construction is the commensurate reduction in available space within the box.

Both types of construction are further bound up with the disadvantage that a considerable expenditure of time and energy is necessarily involved in the mounting of the cover or closure on the box, since each individual retaining bolt must be separately manipulated and moved into cover-retaining position or, upon removal of the cover, out of such position.

It is manifest from the foregoing that a relationship of parts which does not involve either external or internal bolt lugs on the box and/or cover, which does not involve retaining bolts which require individual and time-consuming handling, but which rather comprises a readily mountable and securely retainable cover means, represents a substantial contribution to the state of the art.

The problem solved by the present invention is the realization of a relationship of parts of the aforescribed character. Briefly stated, the relationship of parts according to the present in-

vention comprises, first, a box which may be essentially unmodified except for the provision of notches on the walls thereof, of a character and for a purpose which will hereinafter more clearly appear, and secondly, an essentially unmodified cover which however is provided with springy "snap-on" elements including portions which fit into and are resiliently releasably retained in the aforesaid notches.

The result is that the entire interior of the box is free—no part being taken up by bolt-receiving lugs or the like; neither the cover nor the box has to be provided with external lug appendages; and the cover may be easily applied to the box in essentially normal manner, retention thereof in closure position being assured by merely snapping the aforesaid spring locking elements into notch-engaging position.

Further objects and advantages of the invention will be apparent to those skilled in the art to which it appertains, from the following detailed description of presently-preferred exemplary embodiments thereof, reference being had in this regard to the accompanying illustrative sheets of drawings, wherein:

Fig. 1 is a top plan view of the closure and springy locking elements, as seen in mounted position on one type of box;

Fig. 2 is a side elevation corresponding to Fig. 1, with the lower portion of the box broken away;

Fig. 3 is an enlarged fragmentary sectional detail along line 3—3 of Fig. 1, the dotted lines showing the locking element out of notch-engaging position;

Fig. 4 is a top plan view of a closure with locking elements according to the present invention, as seen in mounted position on a second type of box;

Fig. 5 is a side elevation corresponding to Fig. 4, with the lower portion of the box broken away, and with one locking element shown out of notch-engaging position;

Fig. 6 is a fragmentary side elevation corresponding essentially to Fig. 2 but showing a modified form of box and cover;

Fig. 7 is a side elevation of the spring frame of a locking element according to this invention; and

Fig. 8 is a fragmentary view on an enlarged scale showing a detail of the invention.

Corresponding reference numerals designate corresponding parts throughout the several figures of the drawings.

Referring first to Figs. 1-3 of the drawings, reference numeral 4 designates a box on which the closure or cover 5 is to be mounted. The

polygonal configuration of the box and cover, shown in Fig. 1, has no particular significance except as hereinafter indicated, since any other suitable and/or desirable box configuration may be employed within the purview of this invention. The box 4 may be a terminal box of the character hereinbefore described, but manifestly the invention is equally applicable to other types of boxes.

The cover 5 may preferably be downwardly flanged at its edges, as shown in Fig. 3, to provide a peripheral flange 6 about the upper edges of the box. The relationship between box and cover, in assembled and locked position, is shown in Figs. 2 and 3 of the drawings. If desired, flange 6 may be omitted.

The means for retaining the cover 5 on the box 4 preferably comprises a plurality of locking elements, of which three are shown in Fig. 1.

Each locking element may be made from a single length of suitable spring wire—for example, steel music wire No. 20—bent into substantially U-configuration. At each free end thereof, the locking elements may be looped about a retaining rivet 7 or otherwise suitably affixed to the cover 5. The transverse run of the U may preferably be provided with a freely revoluble cam roller member 8, as shown in Figs. 2 and 3. If desired, however, this roller may be omitted. Transverse spreading of the U is prevented by means of a metallic retainer strip or guide plate 9, positioned substantially centrally of the element, with the longitudinal edges of the strip looped about the adjacent wire portions, as shown at 10 in Fig. 2 of the drawings.

Referring more particularly to the locking element as shown in dotted lines in Fig. 3 (see also Fig. 7) it will be evident that the several parts of the locking element are not coplanar, but that a substantially right-angular bend at point 11, just beyond plate 9, divides the element into an essentially vertical portion and an essentially horizontal portion (as viewed in Fig. 3). See also the corresponding bend in Fig. 7, wherein angle γ is about 90° .

A further bend at point 12, intermediate of plate 9 and rivets 7, in a direction opposite to the bend at point 11, imparts to the locking element a springy tendency to move in the direction of arrow A (Fig. 3), so that the element normally assumes on cover 5 the position shown in dotted lines on Fig. 3. The angle α (see Fig. 7) may preferably be about 30° .

In order to impart to the roller end of the locking element a tendency to move toward the box, this end is bent at point 13 toward the box 4 (as shown in Fig. 3). The angle α , in this case, may also conveniently be about 30° ; (see Fig. 7).

The result is that when cover 5 is on box 4 and the locking element is in cover-releasing position, the spring action at point 13 causes the roller 8 to ride on the adjacent wall of the box 4 at a point about or anteriorly of recess or notch 14 (see Fig. 3), the wall of the box being provided with a plurality of such recesses or notches 14, one for each locking element.

When the locking element is depressed, for example by pressing on plate 9, against the spring action tending to urge the element in the direction of arrow A, the roller 8 rides downwardly along the wall until it reaches the corresponding notch 14 whereupon the resilient tendency of the roller to move toward the box, due to bend 13, causes the roller 8 to move into and seat itself

in the said notch 14, thereby locking the box and cover at this point. With all the locking elements in the aforedescribed depressed or locking position, the cover is securely, although readily releasably, mounted on the box. The arrangement is manifestly such that accidental removal of the cover is practically impossible.

Prevention of undesired removal of cover 5 is assured by making the notches 14 in such way that their center lines extend upwardly at an angle of 7° relative to the horizontal (see angle z in Fig. 8). It is therefore necessary to manually grasp the downwardly extending part of a locking element and force it out of engagement with its slot or recess 14—which, due to the angular disposition thereof, may be termed a reentrant slot—in order to release the locking element.

Quick release of the box may be readily effected by merely manually disengaging the several rollers 8 from their respective notches 14, whereupon each locking element will assume the position shown in dotted lines on Fig. 3, and the cover may be easily removed. As a matter of fact, with the arrangement shown in Figs. 1-3, i. e. where the locking elements are at three corners of the polygonally-shaped box, it is sufficient merely to disengage but one locking element to enable removal of the cover to be effected.

It is manifest that association of box and cover may also be quickly effected by merely assembling the two and then depressing the locking elements until the several cam rollers engage in their respective notches.

If necessary, the cover 5 and/or wall of box 4 may be slotted as at 15 to allow ready positioning of the locking elements. As shown more particularly in Figs. 1-3 of the drawings, the parts are so related that no part extends beyond the outer periphery of the cover 5.

Figs. 4 and 5 show the invention as applied to a rectangular box 4' and cover 5' having a flange 6', locking elements being provided not only at the several corners but also substantially centrally of the long sides of the rectangle.

The parts and their relationship are essentially the same as in the previously-described embodiment. A difference is found, however, in the provision of V-notches 16 to retain plates 9 in place.

A further embodiment is shown in Fig. 6 of the drawings. According to this embodiment, the upper part of each wall of box 18 is offset as shown at 19 to provide a shoulder 20 which extends peripherally around the box. The under-surface of shoulder 20 is upwardly inclined—preferably about 7° relative to the horizontal. With this form of construction, recesses 14 become superfluous, since cam rollers 8 of the locking elements may engage the said under-surface, preferably at the box corners. Cover 17, in this embodiment, is not, although it may be, provided with a peripheral flange. In other respects, the device is like those hereinbefore described.

The device operates in essentially the same manner when cam rollers 8 are omitted.

It is preferred, although not essential, to make the box and cover out of synthetic resin, such as "Bakelite" or the like.

Having thus described the invention, what is claimed is:

1. A device of the character described comprising a receptacle, a closure therefor, and spring means secured to the top of said closure adjacent an edge thereof, said receptacle being provided

on the exterior thereof with a notch in substantial alinement with said spring means, said spring means being movable from a closure-locking position to a closure-releasing position and vice versa, said spring means comprising a portion resiliently upstanding from said top in the closure-releasing position and depressible into substantial contact with said top in closure-locking position, said spring means further comprising a portion extending beyond the edge of said closure and a terminal portion extending from said last-named portion toward said receptacle, said terminal portion being releasably engaged with said notch in said closure-locking position and disengaged from said notch in said closure-releasing position.

2. A device of the character described comprising a receptacle, a closure therefor, and spring means secured to the top of said closure adjacent an edge thereof, said receptacle being provided on the exterior thereof with a reentrant notch in substantial alinement with said spring means, said spring means being movable from a closure-locking position to a closure-releasing position and vice versa, said spring means comprising a portion resiliently upstanding from said top in the closure-releasing position and depressible into substantial contact with said top in closure-locking position, said spring means further comprising a portion extending beyond the edge of said closure and a terminal portion extending from said last-named portion toward said receptacle, said terminal portion being releasably engaged with said notch in said closure-locking position and disengaged from said notch in said closure-releasing position, and a pressure plate on said spring means whereby force may be applied thereto to effect depression of said depressible portion and engagement of said terminal portion with said notch.

3. A device as claimed in claim 2, said spring means being essentially U-shaped in form, and the said pressure plate extending between the legs of said U.

4. A device as claimed in claim 2, said spring means being essentially U-shaped in form, and the said pressure plate being connected to and ex-

tending between the legs of said U, and means for securing said plate in predetermined position on said spring means.

5. A device of the character described comprising a receptacle, a closure therefor, and spring locking means secured to the top of said closure adjacent an edge thereof for releasably holding said closure on said receptacle against undesired disengagement, said receptacle being provided on the exterior thereof with an undercut shoulder in substantial alinement with said spring means, said spring means being movable from a closure-locking position to a closure-releasing position and vice versa, said spring means comprising a portion resiliently upstanding from said top in the closure-releasing position and depressible into substantial contact with said top in closure-locking position, said spring means further comprising a portion extending beyond the edge of said closure and a terminal portion extending from said last-named portion toward said receptacle, said terminal portion being releasably engaged with said undercut shoulder in said closure-locking position and disengaged from said shoulder in said closure-releasing position.

6. A device of the character described comprising a receptacle, a closure therefor, depressible spring locking means mounted on the top of said closure and engageable with said receptacle for securing the closure thereto, and means for securing said locking means to said closure; said locking means comprising an initial portion attached to said securing means, a first intermediate portion resiliently upstanding from said closure and being depressible into contact therewith, a second intermediate portion extending downwardly beyond the edge of said closure, and a terminal portion extending from said second portion toward said receptacle, said receptacle being provided with means defining a reentrant recess in alinement with said spring means for engaging and releasably retaining said terminal portion upon depression of said first intermediate portion into contact with said closure, whereby said closure is secured to said receptacle.

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