Jan. 29, 1929. 1,700,727

H. CAMPBELL

PANE RETAINER

Filed Aug. 1, 1923

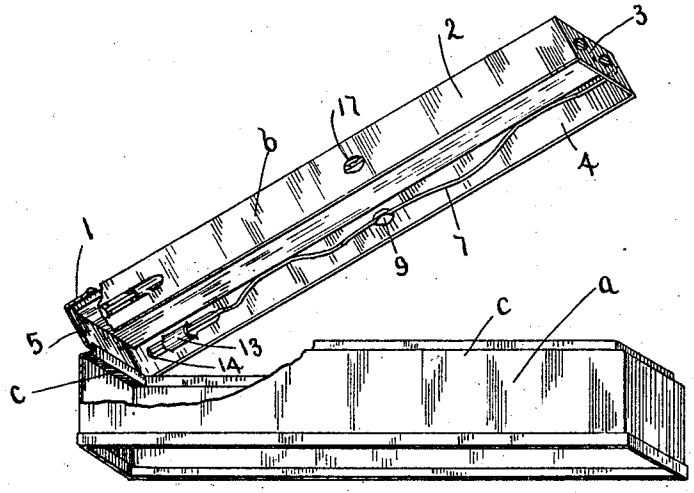


Fig. 1.

Fig. 2.

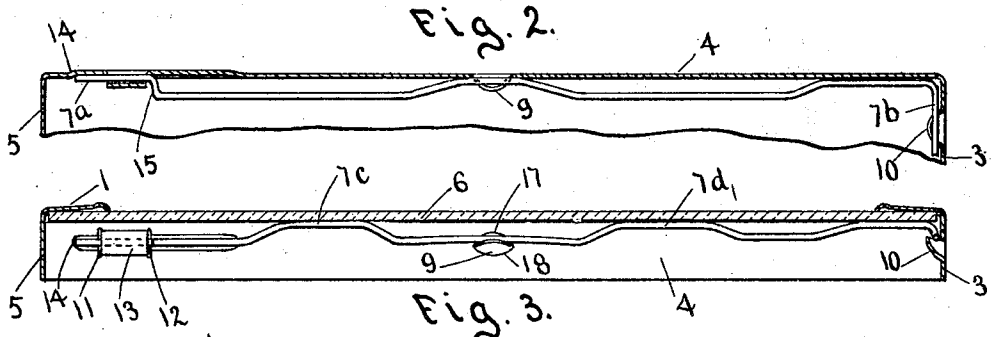


Fig. 3.

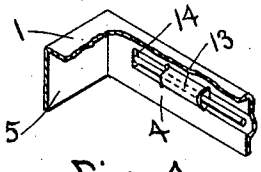


Fig. 4.

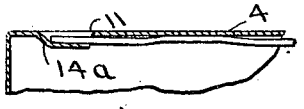


Fig. 5.

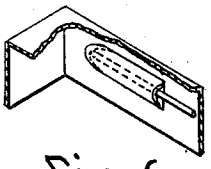


Fig. 6.

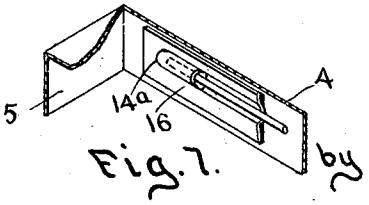


Fig. 7.

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UNITED STATES PATENT OFFICE.

CHARLES H. CAMPBELL, OF BROOKLINE, MASSACHUSETTS, ASSIGNOR TO SAID CHARLES H. CAMPBELL AND HAROLD B. CAMPBELL, OF CAMBRIDGE, MASSACHUSETTS, COPARTNERS DOING BUSINESS AS COLONIAL CAN CO.

PANE RETAINER.

Application filed August 1, 1923. Serial No. 655,035.

The present invention relates to means for retaining a glass pane in a frame. It is particularly applicable to such purposes as the covers or doors for display boxes, such as those in which crackers and similar food articles are packed, or the display tops of cartons containing such articles. Such cans or boxes or display tops are customarily provided with hinged covers or doors having sight openings across which glass panes are placed and secured. Such covers or doors are customarily made of thin sheet iron or steel coated with tin or lacquer; that is, the material known as tin plate and commonly called "tin". In the following specification the word "tin" is used as meaning the material just described, or an equivalent material. This material is flexible and springy, and those doors or covers in which the sight opening is provided are virtually no more than frames. It is a prime consideration in making these structures, owing to the conditions of the trade, to produce them as cheaply as possible, wherefore the limitations imposed by such conditions prohibit their being made with much strength or stiffness, or that the means for retaining the glass panes shall be at all elaborate in construction; while the circumstances of use require the pane holding means to be simple and easy of application or removal for the purpose of setting a pane in place or substituting a new one for one which has been broken. At the same time the pane must be held in place securely and firmly enough to obviate danger of its being broken or falling out in the ordinary conditions of use, and the means used for retaining the pane in place must be such as to permit of ready removal and replacement in order that if a pane is accidentally broken a new one may be easily substituted.

It is for the purpose of holding the glass panes in a frame under the conditions of use above briefly outlined, and particularly of furnishing rigid and practically unbreakable securing means for locking the retainers of such pane in place, that I have devised the improvement which forms the principal subject-matter of the present invention, and it has been my object under these conditions to provide locking means which have ample strength and rigidity for the purpose, permitting the retainers to be easily applied and removed, and can be produced at low cost. I may observe, however, that the utility of the invention and the scope of the protection which I claim are not necessarily limited to the particular uses above indicated, but are of general utility and scope, commensurate with the novelty of the invention, in all of the uses to which the essential principles may be applied. However, in explaining the invention I have chosen for illustration its application to the use of a display top for cartons, that being the use for which the special embodiment here illustrated was designed.

In the drawings,—

Figure 1 is a perspective view of a display top of the sort last mentioned partly broken away and showing the cover in partly opened position.

Figure 2 represents a section on a plane parallel to the glass pane and cutting the flange of the cover on which one of the retainer wires is placed.

Figure 3 is a section parallel to such flange and cutting the glass pane and also the flanges of the cover at right angles to the beforementioned flange.

Figure 4 is a perspective detail view showing one form of means for holding one end of a retainer wire in place.

Figure 5 is a sectional view and Figure 6 a fragmentary perspective view showing another form of means for the same purpose.

Figure 7 is a perspective view showing another form of the same essential means.

Like reference characters designate the same parts wherever they occur in all the figures.

The display top shown in Figure 1 consists of a frame *a* and a cover *b*. The frame is adapted to be slipped over the open end of a box or carton and has a flange *c* to rest on the edge of such open end. It thus becomes, in effect, a part of the carton or box and for the present purposes may be considered as typifying any box to which a cover is attached or may be applied.

The cover *b* in the form here illustrated is made of so-called tin, having a top wall 1 and flanges 2, 3, 4 and 5 on all of its sides adapted to fit over the rim of the frame and rest on the ledge *c*. This cover is hinged to the frame at the edge of its flange 5, in a manner already known and which forms no part of the present invention. Indeed it is immaterial for such purpose whether the cover

is hinged or otherwise attached to the frame or box, or is not attached thereto at all. In the top wall 1 of the cover is a sight opening which may have any dimensions desired, but for the particular purposes of a display top is as large as practicable. A glass pane 6 extends across such opening and lies close to the under surface of the top wall. Its dimensions are nearly as large as those of the cover itself, so that its edges lie close within the flanges. In other words, it fits loosely within the enclosure made by the flanges of the cover.

The retaining means for the pane consists of two wires 7, or equivalent members, which engage the pane near two of its opposite edges and lie along the corresponding opposite flanges of the cover. In the present illustration these wires extend along the flanges 2 and 4. They are held at both ends and the middle and are bent between their points of support in such a fashion as to press on the glass. Both wires here shown are substantially alike except for the reversals or inversions made necessary by the fact that they are opposite one another. That is, they have the relation of right and left members of a pair. However, they are so similar that the following description of one will suffice for both.

The wire 7 is held at one end 7^a in a socket in the adjacent flange 4 (or correspondingly 2), is supported at or near its middle by an abutment 9, which I call a "lug", in the same flange, and its other end 7^b is bent over and engaged or interlocked with a similar abutment or lug 10 in the adjacent flange 3. The socket in which the end 7^a of the wire is retained may have various forms and constructions, three of which are shown here. The preferred form is that shown in Figures 1 to 4 inclusive and it is made by slitting and offsetting the metal of the flange. That is, parallel slits 11 and 12 are cut in the flange perpendicular to the general direction of the wire and the material 13 between the slits is offset inwardly, while that between the slit 11 and the flange 5 is offset outwardly, forming a pocket. The amount of opposite offset of these parts is just sufficient to receive the wire freely and to provide a shoulder 14 against which the end of the wire may abut, the part 13 then being a loop or eye which holds the wire in the pocket and prevents its end from slipping out of engagement with this shoulder. Preferably the wire is bent at 15 so as to cross the edge of the offset loop and furnish an additional shoulder to limit penetration into the socket.

An alternative mode of forming the socket, shown in Figures 5 and 6, consists in forming a single slit 11 in the flange and offsetting the material between that slit and the flange 5 inwardly to form a shallow groove terminating in a shoulder 14^a. The material of the flange immediately adjacent to the other side of the slit may also be slightly offset outwardly, if necessary, in order to give room for entrance into that socket.

Still another form of socket is shown in Figure 7 and consists in forming a socket like that last described in a separate plate 16 and soldering or otherwise fastening the plate to the flange.

The lugs 9 and 10 are substantially alike and are formed out of the material of the flange. Such flange is cut on a curved slit 17, preferably the arc of a circle. The highest point of this arc is in a line perpendicular to the plane of the glass and the curve extends approximately equal distances to each side of such perpendicular line. The material below the arcuate slit is then pressed and offset inwardly by dies of such formation that the offset part is curved in all directions and dimensions, and forms a convex bulge with respect to the inner surface of the flange. The junction of the offset lug with the plane of the flange is a curved line 18 and the intersections of such lug with all planes are curved lines. This is made apparent by Figures 2 and 3, which show the lugs 9 and 10 in plan, in elevation and in vertical section. The characteristics of both lugs are alike.

The middle part of the retainer wire is caught over the top edge of the lug 9 and its bent end is similarly caught over the curved top edge of the lug 10. Between the socket in which the end 7^a is retained and the lug 9, as also between the lug 9 and the bent end 7^b, the wire is bent and offset both toward the plane of the glass and also inwardly from the flange. Thereby two offset lengths 7^c and 7^d are provided which extend toward the glass and press against it resiliently with a yielding force of which the intensity is determined by the stiffness and resilience of the wire and by the amount to which it is set over toward the glass.

The socket and lug, together with the bent end 7^b of the wire cooperate to hold the wire in place with sufficient security to prevent the glass from falling out, even when the cover is slammed shut or otherwise knocked about in careless handling. Nevertheless, by first disengaging the middle part of the wire from the lug 9 and then its bent end 7^b from the lug 10, which latter can be done by movement away from the flange 4, and then by withdrawing the end 7^a from its socket, the retainer may be easily removed and the glass taken out or a new one put in. After the glass has been put in, the retainer is applied by a reversal of the steps just described as being taken in removing it.

The construction of the supporting or retaining lugs 9 and 10 previously referred to, is a feature of great importance in this invention. Being united to the flange on a curved line, there is no straight bending line on which the lug can swing in the manner of

a hinge; while being united to the flange at its ends at points higher than the junction of its middle part with the flange, such ends are tied to the flange and the tensile strength of the material is available to prevent bending of the lug. Then the convex formation of the lug gives it the properties of the arch, whereby the strength of the material is most effectively applied to resist bending and buckling under any pressure which may be applied by or through the glass and retainer. I mean to point out that while tin, by reason of its slight thickness, has little strength to resist bending, yet it has great tensile strength and great compressive strength when prevented from bending; and that the peculiar formation of the lug here disclosed applies this tensile and compression strength to resist bending, buckling or other distortion under any stresses which can be applied by, or by means of the glass or the retainer. Finally, the curved shape of the upper edge of the lug, by reason of which the middle part of the lug is higher than its sides, gives the lug the characteristic of a hook arranged to overlap the side of the wire away from the flange and to prevent disengagement by movement straight away from the flange or in any other direction than with a substantial component toward the glass itself. Thus stresses applied by means of the glass are unable to cause accidental disengagement of the wire from its lugs. At the same time, however, the convex free edge of the lug has such a slight curvature, that is, it is formed as such a flat arch, that the tensile strength of the sheet material is available, without sensible diminution, to resist bending or other distortion of the part bounded by such convex edge. Therefore the retaining means which I have disclosed hold the glass firmly and without looseness or liability to rattle, hold it securely and are not liable to be dislodged by severe stresses, such as occur when the cover is shut violently or when a blow is struck on the glass. In fact, a blow severe enough to break the glass is not powerful enough either to distort the wire-supporting lugs or to disengage the wire from these lugs. Then, the wires are easy to remove and apply; and finally the wires and their supporting means may be made at the minimum cost for material and labor.

The lug, which I have just described in detail, will be recognized as constituting both an abutment and a lock; in that it sustains and supports the pane-retaining wire and the reaction of the latter while pressing on the glass, and is so interlocked with the wire as to prevent accidental dislodgment thereof. Its peculiar characteristics, as an extremely strong and rigid abutment struck up from sheet material having slight rigidity, adapt it well to the uses of an abutment, lock, or catch in any circumstances where an interlock is required between a member or part made of such relatively flexible sheet material and some other piece or structure. Therefore, while I claim such lug or abutment as an essential part of my improved pane-retaining means, I do not limit my protection for the same to that specific combination only, but claim protection for it in all analogous circumstances and uses.

Having regard to the statement in the foregoing specification as to the scope of the invention, I would say that the descriptive terms used in the description and in the appended claims are to be construed in the light thereof. For general purposes, however, the part which I have described as the cover may be considered as a frame, the flanges 2, 3, 4 and 5 of such cover being the members of the frame and the top wall being a ledge against which the pane is thrust by the retaining wires and by which it is supported in opposition to such thrust.

What I claim and desire to secure by Letters Patent is:

1. For use in a frame having sheet metal side members and a ledge adapted to support a removable pane, and to secure an elongated pane retainer in operative position beside one of said side members and in engagement with the inner side of the pane, the following structure: a lug indented and bulged inward from the last named side member and severed therefrom at one edge, being located so that its cut edge extends across the retainer at the side of the latter away from the pane, the lug being integrally joined with the metal of the adjacent side member on a curved outline which is generally convex away from the cut edge.

2. For use in a frame having sheet metal side members and a ledge adapted to support a removable pane, and to secure an elongated pane retainer in operative position beside one of said side members and in engagement with the inner side of the pane, the following structure: a lug indented and bulged inward from the last named side member in a position to overlap the retainer at the side of the latter away from the pane; the side of the lug next to the retainer being wholly severed from the side wall on a protruding outline, whereby it partially embraces the retainer, and the lug otherwise being integrally joined with the side member on an outline which is generally convex away from the retainer.

3. For use in a frame having sheet metal side members and a ledge adapted to support a removable pane, and to secure an elongated pane retainer in operative position beside one of said side members and in engagement with the inner side of the pane, the following structure: a lug indented and bulged inward with a generally spherical curvature between a line of severance and a convex outline of in-

tegral union with the side member, the said line of severance being convex toward the pane and the said outline of junction being convex away from the pane, and the lug being at such a distance from the pane that the retainer is interlocked with the severed edge of the lug when in the before named operative position.

4. For use in a frame having sheet metal side members and a ledge adapted to support a removable pane, to secure one end of an elongated pane retainer in connection with the frame, a socket formed in one of said side members by an integral portion of the side member offset inwardly beside a slit which is cut in the side member crosswise of the intended location of the retainer end.

In testimony whereof I have affixed my signature.

CHARLES H. CAMPBELL.