June 25, 1946. P. S. GAY 2,402,812

LOCK

Filed March 19, 1943

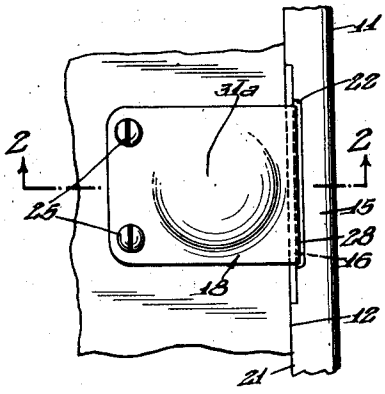


FIG. 1.

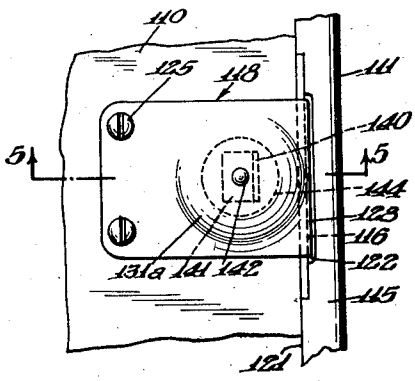


FIG. 4.

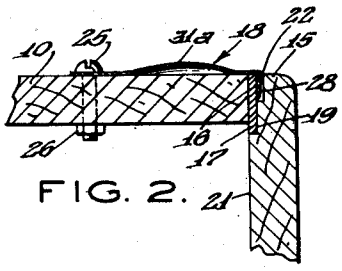


FIG. 2.

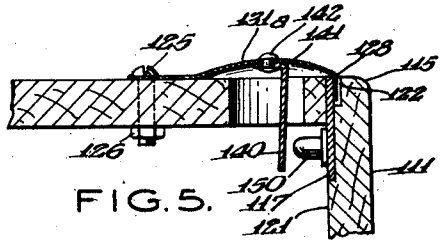


FIG. 5.

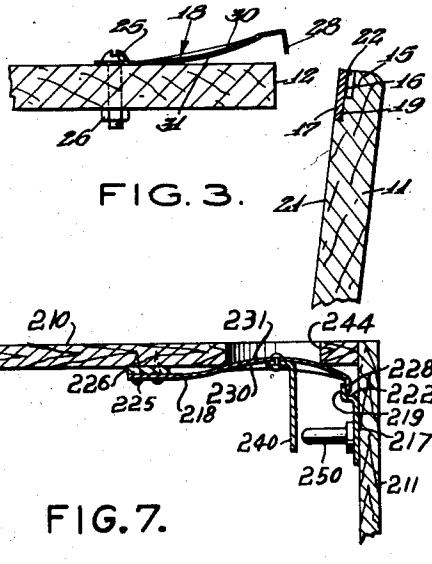


FIG. 3.

FIG. 7.

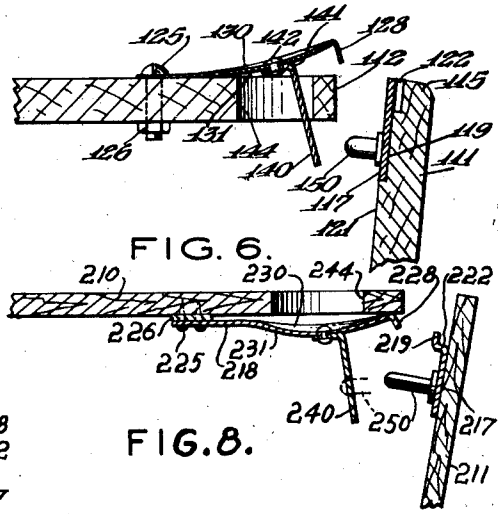


FIG. 6.

FIG. 8.

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LOCK

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3 Claims. (Cl. 292—80)

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My invention relates to a door securing or fastening means and more particularly to a door lock for a cabinet, container or other similar structure, wherein the lock is so arranged that no external projection of any kind appears, especially when the door is closed.

In the construction of cabinet or container members for which it is necessary to provide openings, it is sometimes of real importance that the securing members for the doors which cover the openings be so arranged that they cannot accidentally be operated to release the door. Furthermore in certain types of cabinet or container members where the cabinet is constructed to certain specific dimensions which cannot in any way be increased, any door fastening or securing means must again be so arranged that the outer dimensions of the entire structure is not thereby increased.

Where the walls forming the cabinet or container are relatively thick, then no substantial problem is presented since the knobs, handles or locks may be placed within countersunk recesses therein without substantially weakening the structure. Where, however, the cabinet walls and doors themselves are of a minimum thickness, this type of countersinking either becomes impossible or will substantially weaken the completed structure. This problem becomes most important in that type of portable radio transmitting and receiving device which has now come to be known as the "walkie-talkie."

In this type of structure, where it is necessary to maintain the weight and size of all parts at a minimum, the enclosing structure for the operating portions therefor are made as thin as possible consistent with necessary structural strength. The fastening for the door of the enclosing structure therefore cannot readily be placed in any countersunk recess since this might weaken or distort the closing structure.

Likewise, in order to prevent accidental opening of the door during operations of the unit in the field or to obviate the possibility that projecting parts may be caught on various obstructions such as barbed wire and the like, it is essential that the door fastening be as far as possible flush with the surface of the container.

The primary object of my invention, therefore, is the provision of a door closure and lock for a container wherein all of the elements are substantially flush with the outer surface of the structure.

An additional object of my invention is the provision of a door fastening or lock for the door

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of a container wherein although the members constituting the same may be mounted on the outside of the container and may be readily accessible therefrom, they may nevertheless be substantially flush with the surface of the container, especially when the door is in locked position.

In order to accomplish this purpose and as an additional object of my invention, I have provided a door fastening device which depends on an element formed of spring metal having a convex area therein, the convexity of which may be snapped to either side and wherein one end of the metallic element is rigidly secured whereas the opposite end provides the door locking or engaging element.

These and many other objects of my invention will become apparent in the following description and drawing in which:

Figure 1 is a fragmentary side view in elevation of a container showing my novel door fastening means.

Figure 2 is a cross sectional view taken on line 2—2 of Figure 1 looking in the direction of the arrows.

Figure 3 is a view corresponding to that of Figure 2, showing the unlocked position of the fastening element.

Figure 4 is a fragmentary side view in elevation of a container showing a slightly modified form of my door fastening means.

Figure 5 is a cross-sectional view taken on line 5—5 of Figure 4 looking in the direction of the arrows.

Figure 6 is a cross-sectional view corresponding to that of Figure 5 but showing the locking element in unfastened position.

Figure 7 is a cross-sectional view showing a slight modification of the construction of Figure 5.

Figure 8 is a cross-sectional view showing a slight modification of the construction of Figure 6 and showing the open position of the construction of Figure 7.

Referring now to Figure 3, I have here shown the side wall 10 of a cabinet or container structure on which is hingedly mounted the door 11.

As may be seen in this type of construction, the door 11 is so arranged that the free end thereof in the closed position does not rest against any jamb or other ledge on the side wall 10 of the container, but rather in the closed position shown in Figure 2, abuts against the edge 12 of the side wall 10.

A portion of the inner surface of the edge 15 of the door 11 is notched out at 16 as seen in

Figures 2 and 3, and especially in Figure 1, for a distance corresponding in length to the width of the locking member 18. A reinforcing metallic strip 17 is mounted over the notch 15, the said reinforcing metallic strip constituting the lock engaging element in the manner hereinafter described.

The metallic member 17 is mounted in a recess 19 in the inner surface 21 of the door 11, the said recess being of sufficient depth so that the plate 17 may be flush with the inner surface 21.

As may readily be seen from Figures 2 and 3, the plate 17 extends over the notch 16 and completely covers the inner surface thereof, leaving only a longitudinal slot 22 at the edge 15. The locking member 18 is designed to engage this longitudinal slot 22 when the door is closed.

The said locking member as has above been pointed out, is a flat metallic element which is secured in any suitable manner, as for instance, by the nuts 25 and bolts 26 to the side wall 10.

The end of the locking member 18 opposite the securing members 25 has a retaining element 28 which is adapted, as may readily be seen from an inspection of Figures 2 and 3, to engage the notch 22 in the free end 15 of the door 11. The retaining element 28 as may readily be seen from Figure 3, is integral with the locking member 18 and is a flange thereon which has been bent normally thereto.

As is seen in Figure 3, the locking member 18 is provided with a depression 30 which is part of a sphere, the convexity 31 of this depression in the open position of the door (Figure 3) extending downwardly.

When the end 28 of the locking member 18 is depressed, then a well known snap action will occur. As the upper surface of the locking member 18 is stretched by the depression of the end 28 of the locking member, the convexity 31 will, during this motion, suddenly snap through center and appear as a convexity 31*a* on the upper side of the locking member 18, as seen in Figure 2.

The member 18 will thus be biased so that the end 28 thereof is urged downwardly with respect to Figure 2 and therefore the retaining element 28 will enter into the notch 22 in the edge of the door and thus securely lock the door in place. When it is now desired to open the door, finger pressure on the convexity 31*a* (Figure 2) of the locking member 18 will push this convexity through center, so that it will reform as the convexity 31 (Figure 3) and the retaining member 28 on the free end of the locking member 18 will be raised out of engagement with the notch 22 of the door.

The door may now readily be swung open or may be so arranged as by spring hinges to immediately swing open. Again, when the door is to be closed, the reverse procedure is followed, the door is moved to closed position, the end 28 of the locking member is depressed, and the door is latched in closing relation.

By this simple means, it will be seen that an effective lock or latch for the door is provided which is substantially flush with the exterior of the cabinet and which is at the same time maintained on the exterior of the cabinet and readily accessible therefrom. But there are no projecting portions on the lock itself, which may catch on obstructions of any kind or may cause the accidental opening of the door.

If desired, a very thin swinging guard plate may be placed over the outside of the locking member 18 to prevent any unforeseen bump from opening the lock. Preferably, however, the spring metal of the locking member 18 is such that a mere accidental striking of the convexity 31*a* should not result in its opening. Locking plate 18 may be sufficiently thick as to require a steady finger pressure in order to depress the convexity 31*a* to reform as the convexity 31.

In Figures 4, 5 and 6, I have shown my invention in a slightly modified form wherein the operations for opening the lock are exactly the same but wherein the lock closes automatically when the door is closed so that the additional operation of depressing the locking member need not be performed.

In this construction, the locking member 118 is secured to the side 110 of the cabinet in the same manner as by the bolts 125 and nuts 126. The locking member 118 also has the retaining flange 128 which engages in the notch 122 in the edge 115 of the door 111. The notch 122 is formed in the same manner as previously described in connection with the other figures by first forming the cut out 116 at the inner surface of the edge of the door and then forming an additional recess 119 within which the metallic plate 117 is mounted so that it is flush with the inner surface of the door and extends over the cut out 116 to combine therewith to form the notch 122.

The locking member may, in this embodiment, function in the same manner as previously described. I have, however, added in this embodiment two additional elements which serve automatically to latch the locking member in position when the door is closed.

The locking member 118 has secured to the inner surface thereof a dependent lug 140 which may be fastened thereto in any suitable manner as, for instance, by bending over the upper end 141 thereof and riveting the same to the locking member by means of the rivet 142. The dependent lug 140 passes through a small opening 144 in the side 110 of the cabinet. This opening 144 is of a diameter which is only sufficient to permit the movement of the lug 140 from the position shown in Figure 6 to the position shown in Figure 5. It may, if desired, be a simple slot in order to accommodate for this movement, and thus does not interfere with the structural strength of the cabinet side at all.

If desired, also, the inner surface of the side wall 110 may be reinforced around the slot or opening 140 or the inner surface of the slot or opening 140 may be reinforced. Since, however, this opening is relatively small, such reinforcement may be dispensed with. The metallic plate 117, which reinforces the door 111 at the locking area thereof and cooperates in forming the notch 122, has secured thereto and projecting therefrom the button 150.

Again, in the structure shown in Figures 4–6, the locking member 118 is of spring metal having a depression 130 therein and which produces the convexity 131 (of Figure 6). When the door is rotated to closed position, then the button 150 on the metallic element 117 strikes against the free end of the lug 140 and moves the same inwardly into the cabinet.

Since the upper end of the lug 140 is fixed at 141 to the plate 118, this lug rotates about this point as a center. As the door continues to close, pressure is exerted on the convexity 131, tending to snap the same through center.

The metal in the locking member 118 is so arranged that when the door reaches the closed position, this pressure on the convexity 131 ex-

erted by the button 150 against the lug 140 now forces the convexity 131 through center to produce the upper convexity 131a, and to cause the flanged end 128 of the locking member 118 to snap down into the notch 122.

In order to open the door, finger pressure on the convexity 131a will urge the end of the lug 140 against the button 150 and at the same time will urge the convexity 131a through center so that it will snap through and reform as the convexity 131 of Figure 6, thus raising the retaining element 128 out of the notch 122 and unfastening the door. At the same time, this snap action will cause the lug 140 to strike the button 150 smartly and thus snap the door open.

It will thus be seen that in either embodiment, the latching of the door is obtained by the spring action which results from the snapping of the convexity in a metallic spring member from one side to the other thereof.

In Figures 7 and 8 I have shown a slight modification of the construction of Figures 5 and 6 wherein, however, a locking structure is entirely enclosed within the cabinet.

In these constructions, the locking member 218 is secured to the inner surface of the side wall 210 of the cabinet by means of bolts 225 which pass through a washer 226, the said washer 226 being of sufficient thickness to space the locking member 218 from the inside of the side wall 210 by a distance which will permit the operation of the device in the manner hereinafter described.

The locking member 218 also has the retaining flange 228, which engages in the slot 222 formed by the flat metallic member 217. The flat metallic member 217 is bent out at 219 forming a flange which, together with the inner surface of the door 211, serves to define the notch or slot 222.

The locking member 218 has secured to the inner surface thereof a dependent lug 240 which is attached thereto in a manner previously described in connection with the dependent lug 140 of Figures 5 and 6.

Also, as previously described, the locking member 218 is of spring metal having a depression 230 therein which produces a convexity 231.

The metallic member 217 is provided with a button 250 which strikes against the free end of the lug 240.

The operation of the locking device of Figures 7 and 8 is thus exactly the same as that previously described in connection with Figures 5 and 6. The only difference is that all of the elements of the locking device of Figures 7 and 8 are in the interior of the cabinet.

In order to provide access so that finger pressure on the upper surface of the convexity 230 may be effective to open the lock, a finger hole 244 is provided of a diameter sufficient to permit the insertion of a finger to press the convexity inwardly from the position of Figure 7 to the position of Figure 8. When the door has thus been opened by snapping the spring metal member through center, in the manner described in connection with Figures 5 and 6, the said door of Figures 7 and 8 may thereafter be closed also in the manner previously described.

While I have described my securing or locking elements specifically in connection with cabinet or enclosing structures for portable radio transmitting and receiving apparatus of the "walkie-talkie" type, it will now be obvious that it may be applied to any type of cabinet structure which may be used for any purpose.

In addition, while I have set forth my invention primarily in connection with door retaining elements in cabinet or containers, it is obvious that my lock structure may be used to interengage elements of various other types of apparatus and is not necessarily limited to the interengagement of a wall or a door of a cabinet.

In the foregoing, I have described my invention only in connection with a preferred embodiment thereof, but many variations and modifications should now be obvious to those skilled in the art. I therefore prefer to be bound, not by the specific disclosures herein, but only by the appended claims.

I claim:

1. A fastening means for securing a closure over an opening in a wall; said fastening means including a latch formed of a substantially flat spring metal member; means for securing one end of said member to the wall; the opposite end of said member extending to said opening and comprising closure engaging means; said metallic member having a part spherical convexly deformed portion, the convexity of said convexly deformed portion snapping through to the opposite side of said member when the said opposite free end of said member is moved in a direction normal to the plane of said member and toward the side which said convexity originally occupies.

2. A fastening means for securing a closure over an opening in a wall; said fastening means including a latch formed of a substantially flat spring metal member; means for securing one end of said member to the wall, the opposite end of said member extending to said opening and comprising closure engaging means; said metallic member having a part spherical convexly deformed portion snapping through to the opposite side of said member when the said opposite free end of said member is moved in a direction normal to the plane of said member and toward the side which said convexity originally occupies; an arm extending from said spring metal latch member; means on said closure engageable with said arm to snap said convexity from one side to the other of said spring metal latch member when said closure is moved to closing position; said closure engaging means engaging said closure when said convexity is snapped from one side to the other by the engagement of said means on said closure with said arm.

3. A fastening means for securing a closure over an opening in a wall; said fastening means including a latch formed of a substantially flat spring metal member; means for securing one end of said member to the wall; the opposite end of said member extending to said opening and comprising closure engaging means; said metallic member having a part spherical convexly deformed portion, the convexity of said convexly deformed portion snapping through to the opposite side of said member when the said opposite free end of said member is moved in a direction normal to the plane of said member and toward the side which said convexity originally occupies; said closure engaging means comprising a flange at the free end of said spring metal latch member; said closure member comprising means for receiving said reentrant flange; an arm extending from said latch member; and means on said closure engageable with said arm to snap said convexity to the side opposite said flange when said closure is moved to closing position.

PAUL STEAD GAY.