Sept. 12, 1961 W. J. McDERMOTT 2,999,626

SELF-LOCKING BOX

Filed Aug. 11, 1959

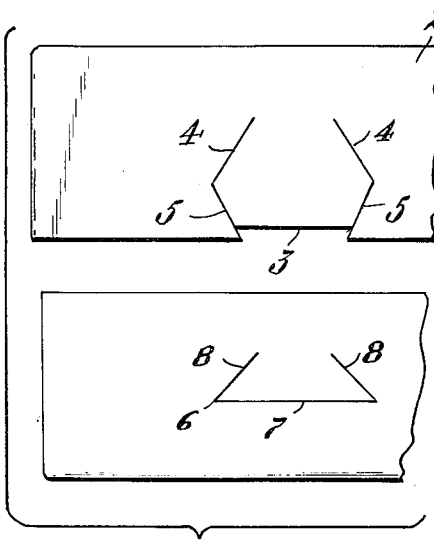


Fig. 1

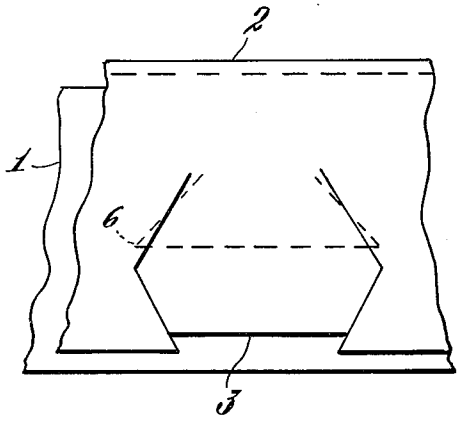


Fig. 2

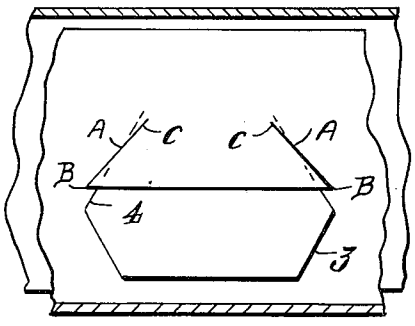


Fig. 4

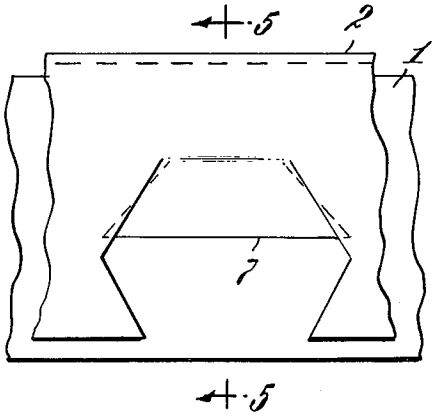


Fig. 3

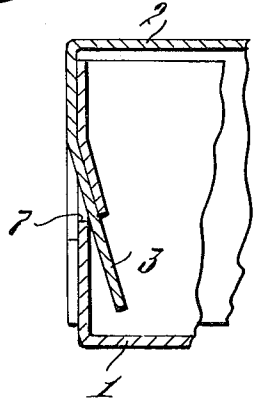


Fig. 5

INVENTOR.
William J. McDermott
BY
Roberts, Cushman & Grover
ATT'YS

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SELF-LOCKING BOX

William J. McDermott, Natick, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass., a corporation of Massachusetts

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1 Claim. (Cl. 229—45)

This invention relates to boxes which may be permanently locked in their closed position and more particularly to pasteboard boxes.

Much difficulty has been experienced with locks heretofore provided for this purpose in that such locks are difficult to bring into engagement, become unlocked accidentally, and do not form a suitably rigid structure. One reason why such earlier locks do not form a substantially rigid structure is that the lock provides only one position of engagement. Thus, if the box is closed further than is necessary to engage the lock, the box has to open slightly before the lock engages and holds.

Accordingly, it is an object of the present invention to provide a lock box incorporating a progressive lock such that the box is permanently held in its most tightly closed position.

Further objects of the present invention are to provide a lock box of simple and inexpensive manufacture which, when locked, cannot be opened except by destroying the locking elements, is of rigid construction, and is suitable for mailing without further wrapping or tying.

According to the present invention, the box is locked by a wedging action between a tongue cut from the top part of the box and an aperture cut in the bottom part. The opposite edges of the tongue diverge toward its free end and the edges of the aperture diverge in the same direction but at a slightly wider angle.

In locking the box the tongue is pushed through the aperture as the top part of the box is closed over the bottom part. As the tongue enters the aperture the lower edge of the aperture bears on the outside of the tongue and resiliently tends to push its divergent edges into engagement with the divergent edges of the aperture.

Engagement between the two sets of divergent edges occurs where the edges of the tongue intersect the edges of the aperture, this being approximately at the point where the tongue begins to be narrower than the currently corresponding portions of the slot by virtue of its lesser taper.

The arrangement of the tongue, aperture, and the side walls of the top and bottom parts of the box is such that, once the tongue has come into engagement with the divergent edges of the aperture, the process cannot be reversed from outside the box without the destruction or distortion of the locking members. If force is applied to remove the tongue from the slot, the divergent edges of the tongue act as a wedge bearing upon the divergent edges of the slot thereby causing the tongue to bind and thus preventing its removal.

Since the aperture flares at a greater angle than the tongue, the divergent edges of the tongue are in continuous engagement with the corresponding edges of the aperture over an appreciable travel of the tongue through the aperture. Thus as the tongue is inserted further into the aperture beyond the point where engagement begins,

the engagement will continue and will prevent any withdrawal even to the extent of such further insertion.

The length of the tongue's travel over which such engagement exists is equal to the difference in height traversed by the two sets of divergent edges as they traverse the same lateral distance.

For the purpose of illustration a typical embodiment of the invention is shown in the accompanying drawings in which:

FIG. 1 is a side elevation of a box with the top and bottom parts separated;

FIG. 2 is a side elevation of the box assembled but with the lock not engaged;

FIG. 3 is a side elevation of the box assembled and with the lock engaged;

FIG. 4 is a section showing the engaged lock as seen from the inside of the box; and

FIG. 5 is a section on the line 5—5 of FIG. 3.

In the particular embodiment chosen for the purpose of illustration, a bottom part **1** telescopes into a top part **2**. A tongue **3** is cut from a side wall of the top part **2** and includes along a portion of its length terminally divergent edges **4**. The edges **5** of the tongue at its outer end are convergent in order to facilitate the insertion of the tongue into the aperture **6** comprising edges **8** and edge **7** cut into the bottom part **1**. The edges **8** of the aperture **6** are also divergent and correspond generally with the divergent edges **4** on the tongue **3** when the parts of the box are telescoped together (FIG. 2) but said edges **8** have an angle of divergence slightly greater than the angle of divergence of the edges **4** on the tongue. The divergent edges **8** terminate at the bottom edge **7** of the aperture.

With the tongue **3** inserted in the aperture **6** and viewed from inside the box (FIG. 4), the tongue **3** crosses from the outside to the inside of the bottom part of the box at the point A. Due to the resilient pressure of the bottom edge **7** of the aperture **6** against the tongue **3**, the divergent edges **4** of the tongue **3** are forced into a firm engagement with the divergent edges **8** of the aperture **6** at that same point.

Since there exists a small angle between the two sets of divergent edges, any attempt then made to separate the top and bottom parts will cause the tongue **3** to wedge tightly in the aperture thus holding the box closed. The box may then be taken apart only by destroying the lock. It is this small angle which also provides that the two sets of divergent edges will be in engagement and capable of immediate holding action over an appreciable travel of the tongue in the aperture.

As shown in FIG. 4 the point of engagement between the two sets of divergent edges will be at B when the widest portion of the tongue has just cleared the aperture and will progress continuously to C as the tongue travels further into the aperture, unless closing movement is otherwise arrested as for example by engagement of the edges of the bottom against the inner face of the top.

Since the box will lock at any point over this travel the contents may more easily be held under compression as, for example, when the box is packed with a resilient filling or cushioning material.

It should be understood that the present disclosure is for the purpose of illustration only and that this inven-

tion includes all modifications and equivalents which fall within the scope of the appended claim.

I claim:

A self-locking box comprising a bottom part having an upstanding portion and a top part having a depending portion extending downwardly along the outside of the bottom portion when the box is closed, the upstanding portion being cut to define a pair of opposed edges which diverge from each other downwardly and the depending portion having a tongue fitting into the cut between said edges, the tongue having a pair of side edges which also diverge from each other downwardly, the angle of divergence of the tongue edges being less than the angle of divergence of said cut edges and the edges of one of said pairs intersecting the edges of the other pair when the box is closed with the tongue inserted in the cut, the edges of the lower end of the tongue being convergent to facilitate insertion of the tongue into the cut and the maximum width of the cut being substantially equal to the maximum width of the tongue so that the tongue may be freely inserted into the cut.

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