June 16, 1936. I. HILL 2,044,301

BOX

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Fig. 1.

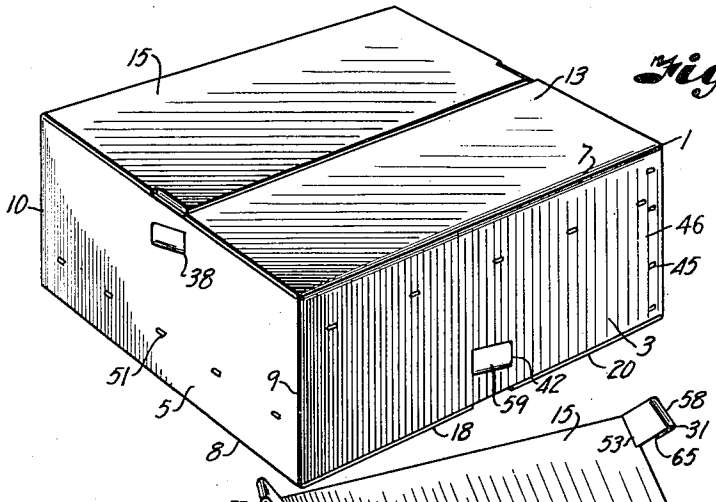


Fig. 2.

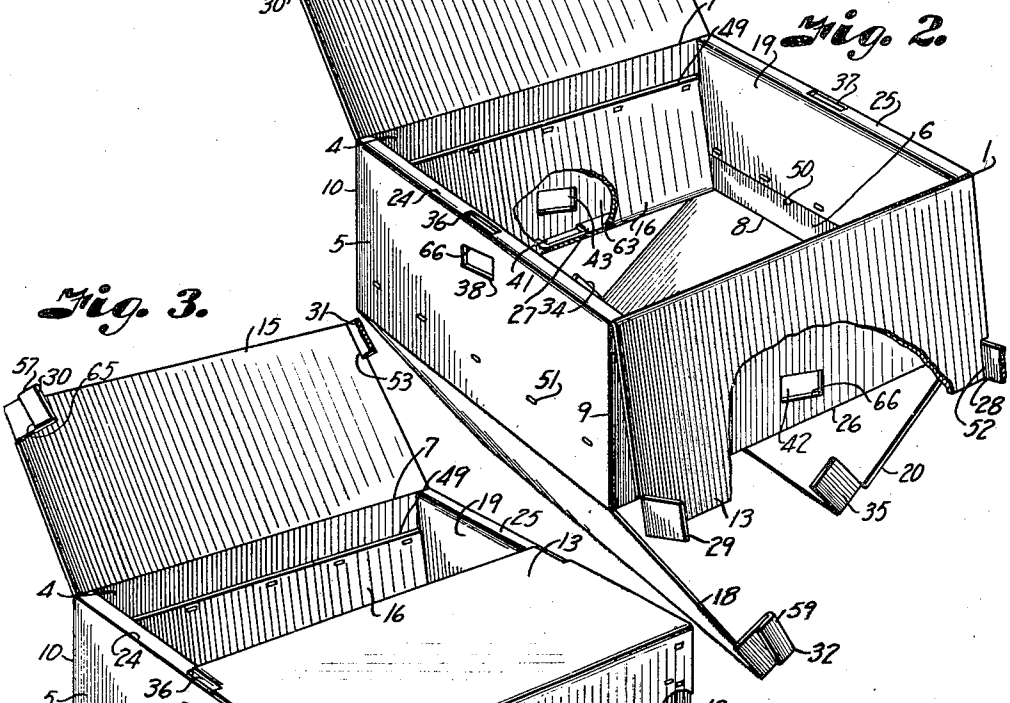


Fig. 3.

INVENTOR
Irving Hill
BY
ATTORNEY

June 16, 1936. I. HILL 2,044,301

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Fig. 4.

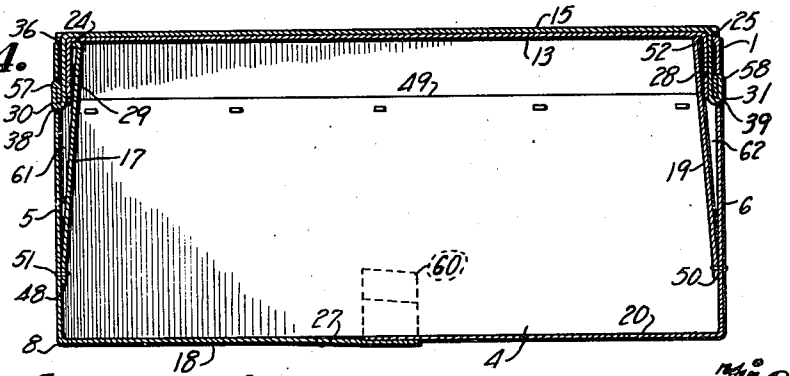


Fig. 5.

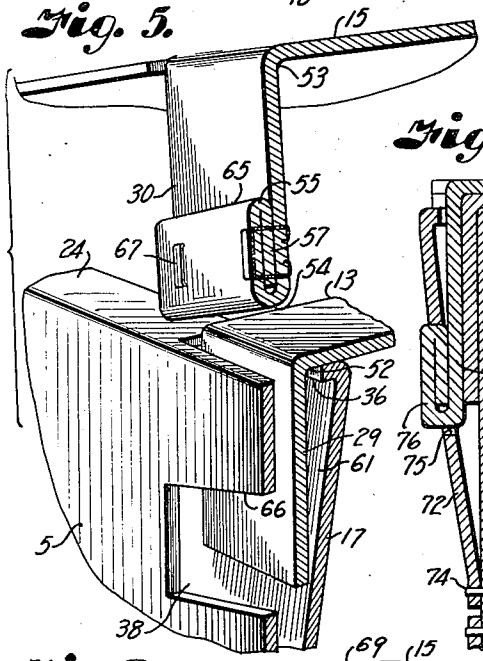


Fig. 11.

Fig. 6.

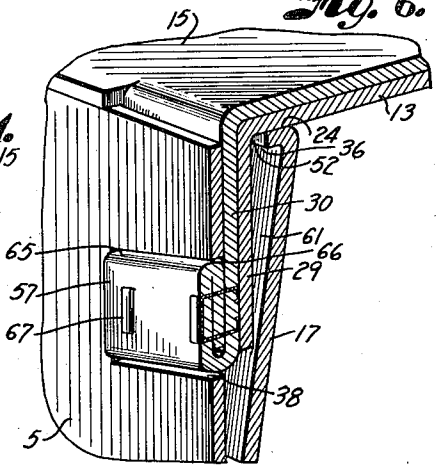


Fig. 8.

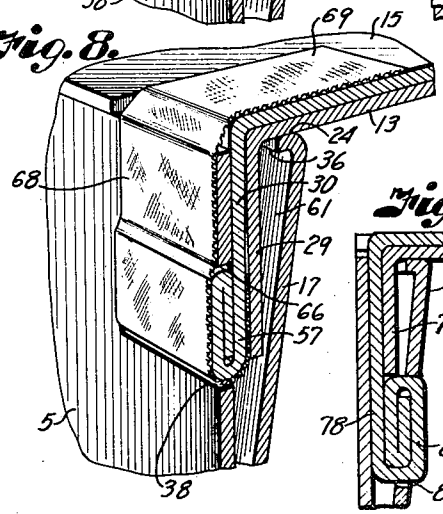
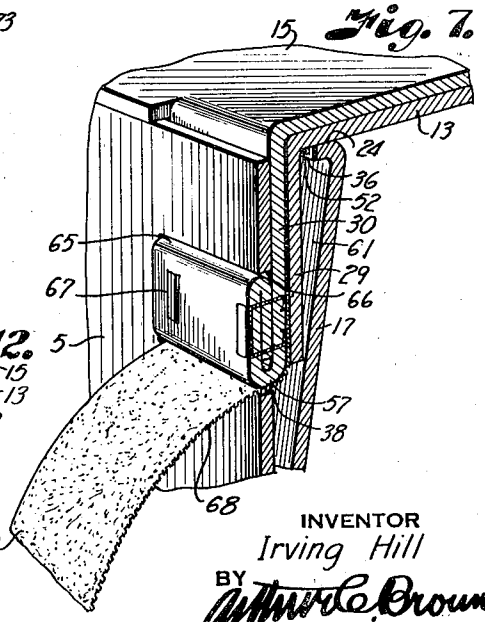


Fig. 12.

Fig. 7.



INVENTOR
Irving Hill
BY
Arthur C. Brown
ATTORNEY

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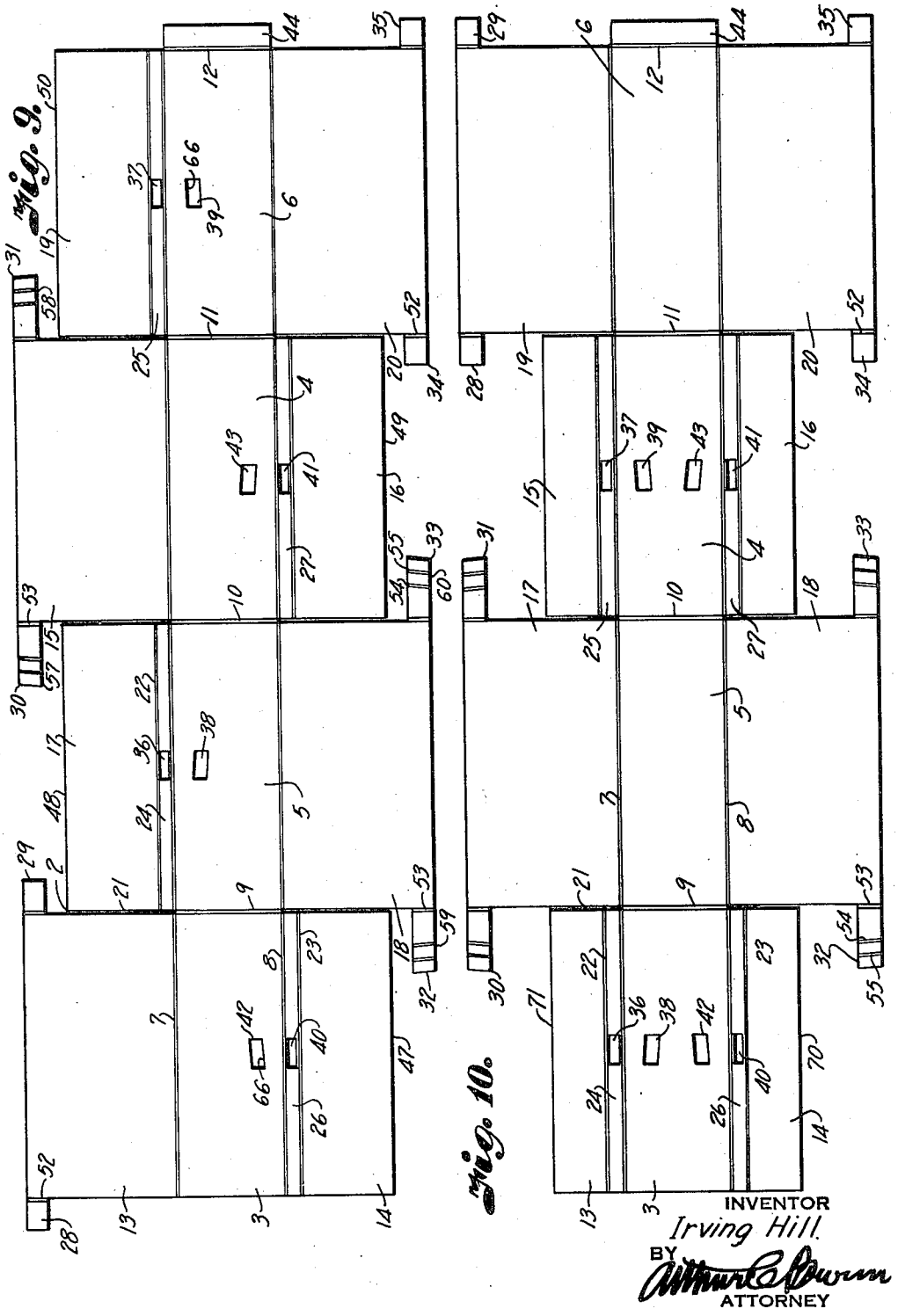


Fig. 9.

Fig. 10.

INVENTOR
Irving Hill.
BY
ATTORNEY

Patented June 16, 1936

2,044,301

UNITED STATES PATENT OFFICE

2,044,301

BOX

Irving Hill, Lawrence, Kans., assignor to The Lawrence Paper Company, Lawrence, Kans., a corporation of Kansas

Application October 22, 1934, Serial No. 749,394

19 Claims. (Cl. 229—39)

This invention relates to boxes and more particularly to those of that character constructed of fibre or like board, and has for its principal object to provide a box of this nature with self-locking means to reduce the time required in sealing the box, to provide for opening and closing of the box for inspection of its contents, and to permit reuse of the box.

Other important objects of the invention are to increase strength of the box for stacking, and to increase the end and side compression, as well as corner strength without materially increasing cost of the box or the material required in its construction.

In accomplishing these and other objects of the invention, as hereinafter set forth, I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a box embodying the features of the present invention and illustrating the flaps in locked condition.

Fig. 2 is a similar perspective view of the box showing the top and bottom flaps in open condition.

Fig. 3 shows the bottom flaps moved to locked position and one of the top flaps in closed position.

Fig. 4 is a vertical longitudinal section through the box particularly illustrating the locking tabs in position.

Fig. 5 is an enlarged detail perspective section particularly illustrating the lock features of the invention.

Fig. 6 is a similar perspective section showing the locked parts in engaged position.

Fig. 7 is a perspective view similar to Fig. 6 illustrating the method of sealing the lock.

Fig. 8 is a similar perspective view after the lock has been sealed.

Fig. 9 is a plan view of a blank from which the box illustrated in Figures 1 to 4 is formed.

Fig. 10 is a modified form of blank wherein both sets of locking tabs are engaged with the ends of the box.

Fig. 11 is a modified form of the invention wherein the reinforcing flaps are folded outwardly on the exterior of the box and provided with lock-engaging openings.

Fig. 12 is a fragmentary section of a still further modified form of the invention.

Referring more in detail to the drawings:

1 designates a box constructed of fibre or like board from a single blank 2 shaped to form pairs of opposed side walls 3—4, and 5—6 which are defined on the blank by parallel score lines 7 and 8 and transverse score lines 9, 10, 11 and 12. Extending laterally from the side walls along the score lines 7 and 8 of the blank are sets of flaps 13—14, 15—16 and 17—18, 19—20, respectively. The flaps extend coextensively with their corresponding side walls and are separated from each other by slits 21 which align with the respective transverse score lines 9, 10 and 11, as shown in Figures 9 and 10.

In the blank illustrated in Fig. 9 the flaps 13 and 15 constitute the top closure flaps of the box and are of greater length than one-half the length of the side walls 5 and 6 to overlap substantially in the center of the box when the blank is folded. Similarly, the flaps 18 and 20 constitute the bottom closure flaps of the box and are of sufficient length to overlap midway of the side walls 3 and 4. The intermediate flaps 14—16 and 17—19 constitute reinforcing flaps for the inner face of the side walls and for this reason they are substantially no greater in length than the depth of the side walls depending upon the amount of flap required to effect the desired degree of reinforcement.

In order to provide support for the top and bottom flaps on the side walls 5—6 and 3—4 respectively, the reinforcing flaps 14—16 and 17—19 are scored thereacross as at 22 and 23 in parallel spaced relation with the score lines 7 and 8, to form ledge portions 24—25 and 26—27 as later described. The blank also includes pairs of tabs 28—29, 30—31 projecting laterally of the top flaps 13—15 and corresponding tabs 32—33 and 34—35 on the bottom flaps 18—20 to cooperate with aligning pairs of rectangular apertures 36—37 and 38—39, located midway the width of the ledge portions 24—25 and the upper edges of the side walls 5—6 respectively, and aligning apertures 40—41 and 42—43, in the ledge portions 26—27 and in the side walls 3—4 for forming the self-locking features of the box later described. Also formed on the end of the blank, coextensive with the score line 12, is a flange 44 to connect with the opposite side wall 3 as now to be described.

In folding the box blank the side walls are folded on the score lines 9, 10, 11 and 12 to form a rectangular body as illustrated in Fig. 2, after which the flange 44 is stitched by staples 45 or otherwise secured to the underlying edge 46 of the side wall 3. The reinforcing flaps 14—16 and 17—19 are then folded on the score lines 7 and 8 and again on the score lines 22 and 23, so that the ledge portions 24—25 and 26—27 extend horizontally of the top and bottom edges of the side walls and the reinforcing flaps 14—16 and 17—19 extend inwardly of the box with their edges, 47—48 and 49—50, lying against the corresponding inner faces of the respective side walls 3, 4, 5 and 6 as best shown in Fig. 2. The edges 47—48 and 49—50 are then secured to the side walls as for example, with staples 51, to support the ledges in horizontal position and to strengthen the box for compression loads when the boxes

are stacked in tiers. The inner flaps being spaced inwardly from the respective top and bottom edges of the side walls by the ledge portions, also strengthen the corners of the box to resist racking strains that may be applied diagonally thereof.

The tabs 28—29 and 34—35 are provided with score lines 52 at the juncture thereof, with the flaps 13 and 20 so that they can be bent at right-angles thereto as shown in Fig. 2. The tabs 30—31 and 32—33 have similar scores 53, and spaced transverse scores 54 and 55, whereon the ends of the tabs are bent retractively and then doubled back as at 56 to provide cleat or lug portions 57—58 and 59—60 conforming in shape and size to the openings 38—39 and 42—43 respectively. The tabs thus described are positioned so that when the top and bottom flaps are folded to lie on the ledges, the tabs will pass through the respective openings 36—37 and 40—41, the flaps being folded so that the tabs 28—29 and 34—35 are the first to enter the openings in order that the flaps carrying the cleated tabs overlap the flaps carrying the plain tabs, as shown in Figs. 3 and 2. The cleated tabs are positioned so that they will project through the openings in the ledges alongside the plain tabs, whereby the tabs are located in recesses 61—62 and 63—64 that are formed between the side walls and their reinforcing flaps. When the top and bottom flaps are in closed position the cleats on the tabs 30—31 and 32—33 are in position to spring into the openings 38—39 and 42—43 in the sides of the box. When in this position the inner edges or shoulders 65, that are formed by the folds, interengage with the edges 66, of the openings 38—39 and 42—43 to lock the flaps in closed position to complete the box.

In order to retain the lugs or cleats in functional position they are preferably stapled to the body portion of the tab as indicated at 67.

In order to facilitate entrance of the cleats the slots 38—39 and 42—43, as well as the cleats are preferably arranged so that the side edges thereof are located on the arc of a circle through which the tabs are carried as the flaps are moved to close the box.

To release the tabs, the cleats thereon are pressed inwardly to permit the shoulders 65 to clear the engaging edges 66 of the openings whereupon the box flaps may be swung to open position, the tabs withdrawing from the ledge openings as the flaps are raised. Due to the fact that one cover flap overlaps the other, it is necessary to provide cleats only on one pair of tabs, for when the tabs on the overlying flaps are locked, the underlying flaps are held thereby against the ledge portions of the box. Attention is directed to the fact that the ledge portions of the box not only provide extended bearing supports for the ends of the cover flaps but they also provide better support for the superimposed boxes when the boxes are stacked in tiers.

Should it be necessary to seal the boxes, a gummed strip 68 may be sealed to the inner faces of the cleated tabs as shown in Fig. 7, prior to insertion of the tabs through the ledge openings. The free ends, 69, of the strips are then extended through the ledge openings and withdrawn through the openings in the sides of the box as the tabs are moving into locked position. After the tabs are locked, the free ends of the strips are sealed over the cleats and against the side faces of the box and over the ends of the closure flaps as shown in Fig. 8.

A box formed from the blank shown in Fig. 10 will have reinforcing flaps only at its ends, the edges 70 and 71 of the opposed sealing flaps meeting midway of the height of the box. In this form both the top and bottom flaps are locked at the same ends of the box.

In Fig. 11 the reinforcing flaps 72 are shown folded on the exterior of the box and attached to the end wall 73 by staples 74. The reinforcing flaps in this instance are provided with lock-engaging openings 75 similar to the lock openings provided in the preferred form of the invention to receive cleats 76 of tabs 77.

If the box is not to be inspected after sealing or is not to be reused, the cleat-receiving opening may be formed in the reinforcing flaps as shown in Fig. 12. In this instance the locking tab 78 projects below the tab 79 and has a cleat portion 80 formed on its inner face which engages in the opening 81 that is provided in the reinforcing flap 82.

From the foregoing it is obvious that the flaps are automatically locked upon closing thereof, by merely guiding the tabs through the ledge openings to latched position, and that the box can be readily opened to inspect the contents thereof by pushing the cleat portions of the tabs out of locking position and lifting the cover flaps to withdraw the tabs. Since the box is not damaged in opening, it can be used repeatedly.

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

1. A box including pairs of opposed side walls, reinforcing flaps on one pair of said side walls, a closure flap on one of the side walls of the other pair, and tabs on the closure flap engageable between the said reinforcing flaps and said side walls when the closure flap is in closed position.

2. A box including pairs of opposed side walls having tab-engaging means on one of said pairs of side walls, reinforcing flaps on said pair of side walls having openings therein, a closure flap on one of the side walls of the other pair, and tabs on the closure flap projectable through said openings and adapted to be engaged with said tab-engaging means when the closure flap is in closed position.

3. A box including pairs of opposed side walls having tab-engaging means on one of said pairs, reinforcing flaps on said pair of side walls, ledges formed by said reinforcing flaps and having openings therein, a closure flap on one of the side walls of the other pair, and tabs on the closure flap projectable through said openings and adapted to be engaged with said tab-engaging means.

4. A box including pairs of opposed side walls having openings therein, reinforcing flaps on one of said pairs of side walls, ledges formed by said reinforcing flaps and having openings in line with the first-named openings, a closure flap on one of the side walls of the other pair, tabs on the closure flap projectable through said ledge openings, and cleats on said tabs adapted to be engaged in said side wall openings.

5. A box including pairs of opposed side walls having tab-engaging means on one of said pairs, reinforcing flaps on said pair of side walls having openings therein, means securing the reinforcing flaps to said pair of side walls, a closure flap on one of the side walls of the other pair, and tabs on the closure flap projectable through said openings and adapted to be engaged with said tab-engaging means.

6. A box including pairs of opposed side walls having tab-engaging means on one of said pairs, reinforcing flaps on said pair of side walls, ledges formed by said reinforcing flaps and having openings therein, means securing the reinforcing flaps to said pair of side walls, a closure flap on one of the side walls of the other pair, and tabs on the closure flap projectable through said openings and adapted to engage with said tab-engaging means.

7. A box including pairs of opposed side walls having tab-engaging means on one of said pairs, reinforcing flaps on said pair of side walls having openings therein, a closure flap on one of the side walls of the other pair, tabs on the closure flap projectable through said openings when the closure flap is in closed position, and cleats on the tabs adapted to engage with said engaging means.

8. A box including pairs of opposed side walls having tab-engaging means on one of said pairs, reinforcing flaps on said pair of side walls having the tab-engaging means, bent to form recesses between said side walls and reinforcing flaps and having openings therein, means securing the reinforcing flaps to said pair of side walls, a closure flap on one of the side walls of the other pair, and tabs on the closure flap projectable through said openings into said recesses and adapted to be engaged with said tab-engaging means.

9. A box including pairs of opposed side walls, reinforcing flaps on one pair of side walls having horizontal portions provided with openings and having depending portions fixed to the side walls, said pair of side walls having openings located below the openings in the horizontal portions of the reinforcing flaps, closure flaps on the other pair of side walls, tabs on the closure flaps projectable through the first-named openings, and cleats on the tabs of one closure flap for engaging in the side wall openings.

10. A box including pairs of opposed side walls, reinforcing flaps on one edge of one pair of side walls and on the opposite edge of the other pair, closure flaps on the other edges of said walls, and means on the closure flaps engaged with said side walls to lock the closure flaps when in closed position.

11. A box including pairs of opposed side walls, reinforcing flaps on one edge of one pair of side walls and on the opposite edge of the other pair closure flaps on the other edges of said walls, and means on the closure flaps engageable between said reinforcing flaps and side walls to lock the closure flaps when in closed position.

12. A box including pairs of opposed side walls, reinforcing flaps forming ledges on one pair of side walls and having openings therein, said pair of side walls having openings located below the ledge openings, closure flaps on the other pair of side walls, tabs on the closure flaps for projection through the ledge openings, cleats on the tabs of one closure flap for engaging in the side wall openings, and sealing means connected with the tabs and extended through the side wall openings to seal over the outer face of the box.

13. A box including pairs of opposed side walls, reinforcing flaps on one pair of side walls having horizontal portions provided with openings and having depending portions fixed to the side walls, said pair of side walls having openings located below the openings in the horizontal portions of the reinforcing flaps, closure flaps on the other pair of side walls, tabs on the closure flaps projectable through the first-named openings, cleats on the tabs of one closure flap for engaging in the side wall openings, and sealing means connected with the cleated tabs and extended through the side wall openings to seal over the outer face of the box.

14. A box including pairs of opposed side walls, reinforcing flaps on one pair of said side walls and having openings therein, ledges formed by said reinforcing flaps and having openings above the first-named openings, means securing the reinforcing flaps to said pair of side walls, a closure flap on one of the side walls of the other pair, tabs on the closure flap projectable through said ledge openings, and cleats on said tabs adapted to engage in said first-named openings.

15. A box including pairs of opposed side walls, reinforcing flaps exteriorly of one pair of side walls and having openings therein, ledges formed by said reinforcing flaps and having openings therein in line with said reinforcing flap openings, a closure flap on one of the side walls of the other pair and tabs on the closure flap projectable through said ledge openings and having cleats engaging in said reinforcing flap openings.

16. In a box structure including side walls, a reinforcing flap on one of the side walls having a ledge portion provided with an opening therein, said reinforcing flap having an opening below the ledge opening, a closure flap on another side wall, a tab on the closure flap projectable through said ledge opening, and a cleat on said tab engageable in the reinforcing flap opening below the ledge opening to lock the closure flap when in closed position.

17. A box including pairs of opposed side walls, reinforcing flaps on one pair of said side walls and having openings therein, ledges formed by said reinforcing flaps and having openings above the first-named openings, means securing the reinforcing flaps to said pair of side walls, a closure flap on one of the side walls of the other pair, and tabs on the closure flap projectable through said ledge openings and adapted to engage in said first-named openings to lock the closure flap when in closed position.

18. In a box structure including adjacent side walls having an opening in one of the walls, a reinforcing flap fixed to said wall having the opening and having an opening at the upper edge thereof in line with the side wall opening, a closure flap on the other side wall, a tab on the closure flap projectable through said flap opening when the closure flap is in closed position, and a cleat on said tab adapted to engage in said side wall opening to lock the closure flap.

19. A box including pairs of opposed side walls having openings therein, reinforcing flaps fixed to the upper edges of one pair of opposed side walls and on the lower edges of the other pair of opposed side walls, said reinforcing flaps having openings spaced from and in line with the side wall openings, closure flaps on the other edges of said walls, tabs on the closure flaps insertable through said flap openings, and cleats on said tabs engageable with said side wall openings to lock the closure flaps when in closed position.

IRVING HILL.