

March 1, 1949.

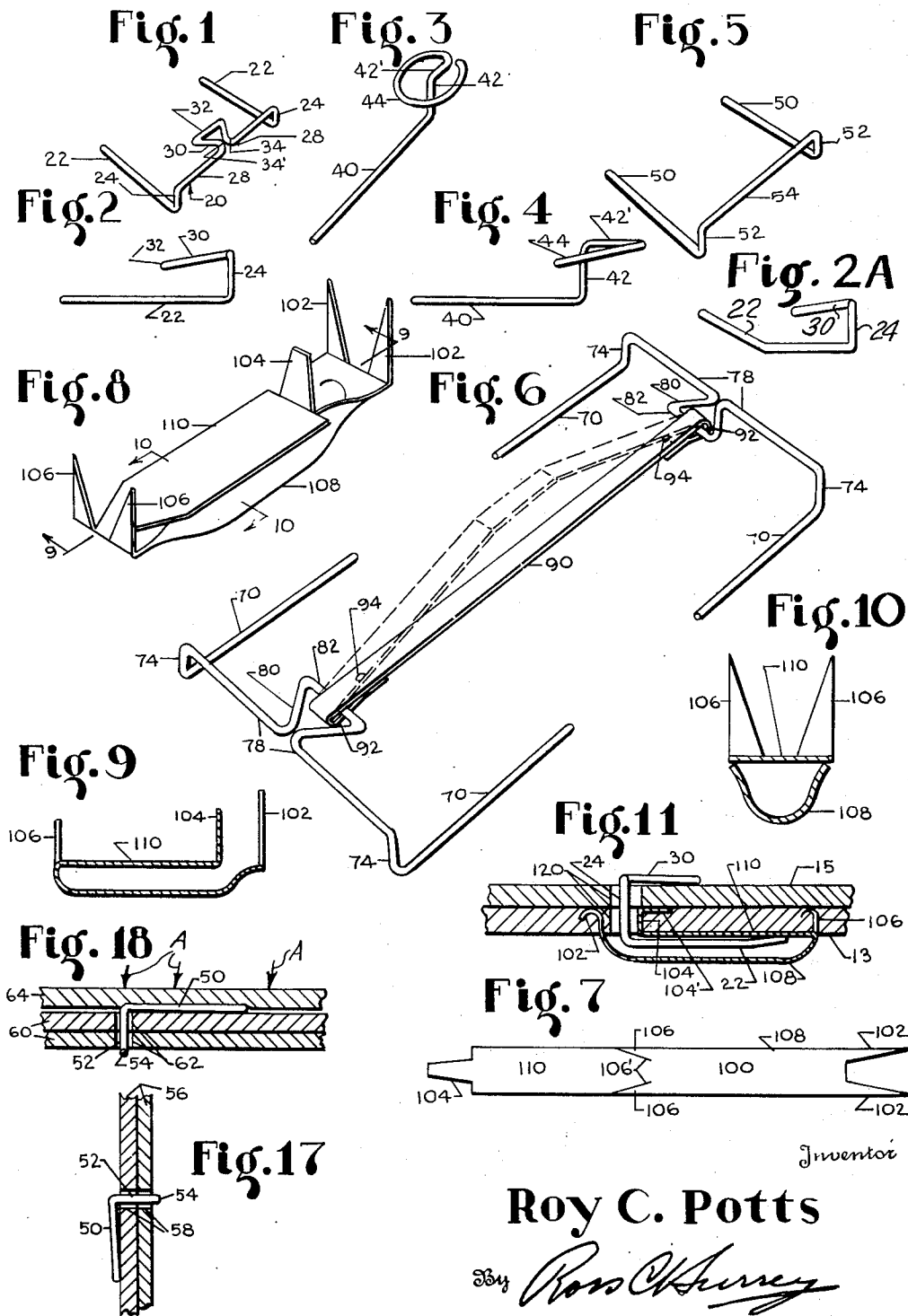
R. C. POTTS

2,463,306

CARTON SECURING MEANS AND METHOD OF USING SAME

Filed April 26, 1944

5 Sheets-Sheet 1



Roy C. Potts

By *Roy C. Potts*

Attorney

March 1, 1949.

R. C. POTTS

2,463,306

CARTON SECURING MEANS AND METHOD OF USING SAME

Filed April 26, 1944

5 Sheets-Sheet 2

Fig. 12

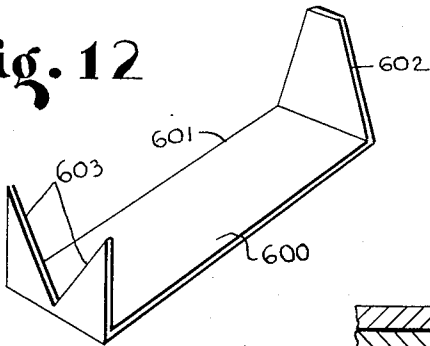


Fig. 13

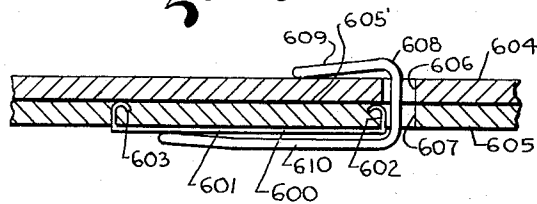


Fig. 14

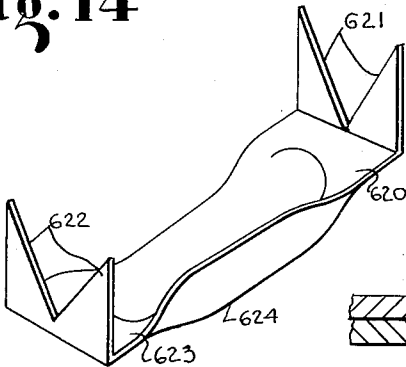


Fig. 15

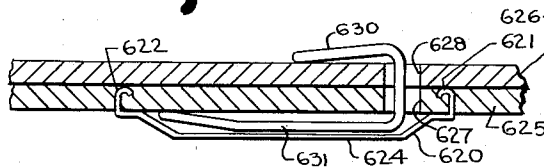


Fig. 16

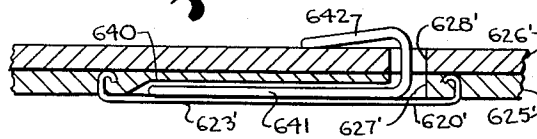
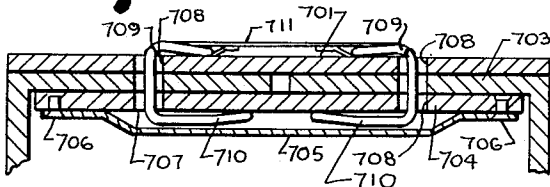


Fig. 32



Inventor

Roy C. Potts

By *Ros O'Sullivan* Attorney

March 1, 1949.

R. C. POTTS

2,463,306

CARTON SECURING MEANS AND METHOD OF USING SAME

Filed April 26, 1944

5 Sheets-Sheet 3

Fig. 19

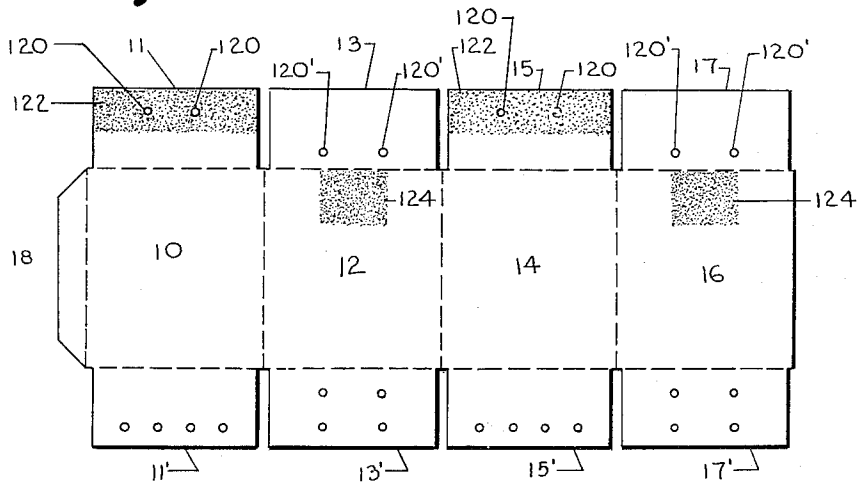


Fig. 20

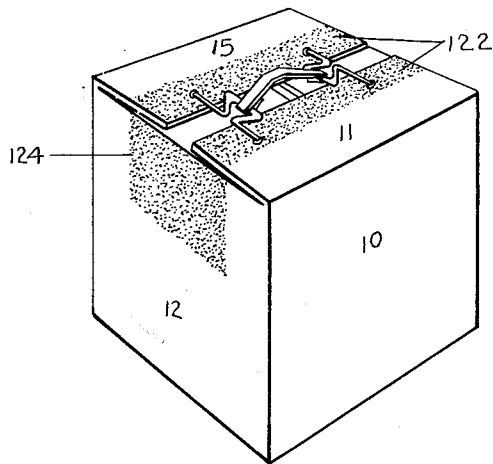
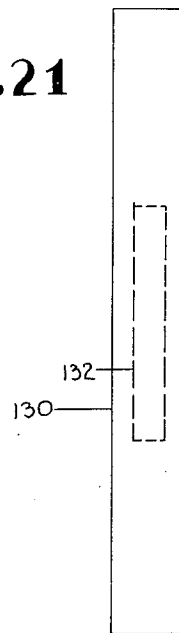


Fig. 21



Inventor

Roy C. Potts

By *Ross Murray*
Attorney

March 1, 1949.

R. C. POTTS

2,463,306

CARTON SECURING MEANS AND METHOD OF USING SAME

Filed April 26, 1944

5 Sheets-Sheet 4

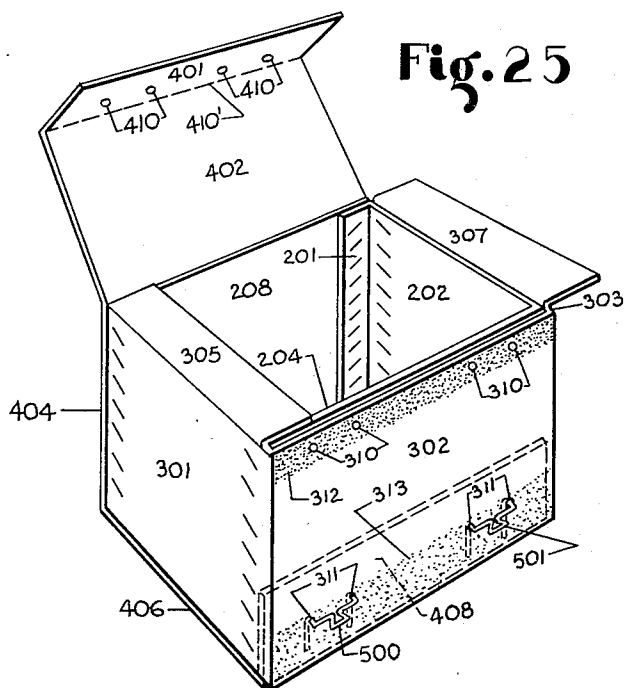


Fig. 25

Fig. 24

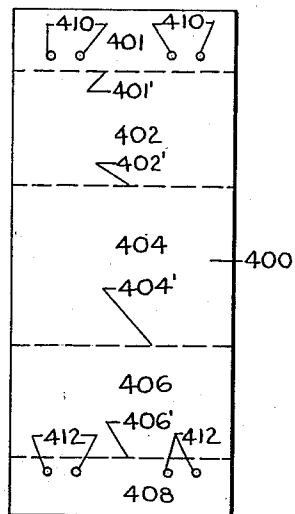


Fig. 22

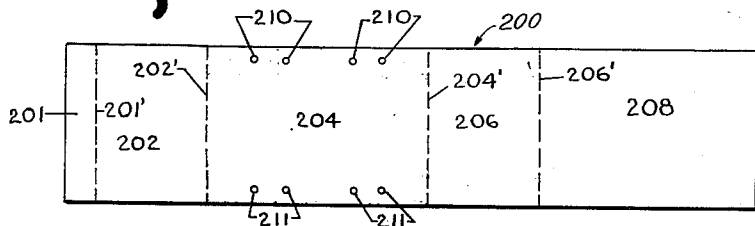
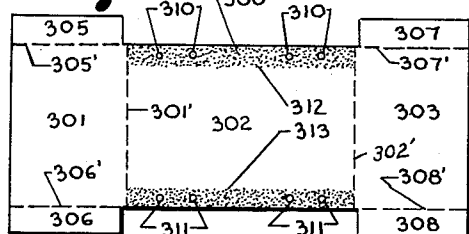


Fig. 23



March 1, 1949.

R. C. POTTS

2,463,306

CARTON SECURING MEANS AND METHOD OF USING SAME

Filed April 26, 1944

5 Sheets-Sheet 5

Fig. 28

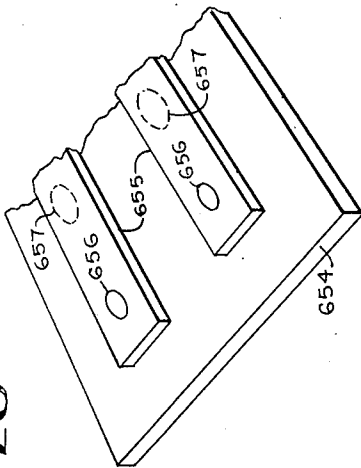


Fig. 27

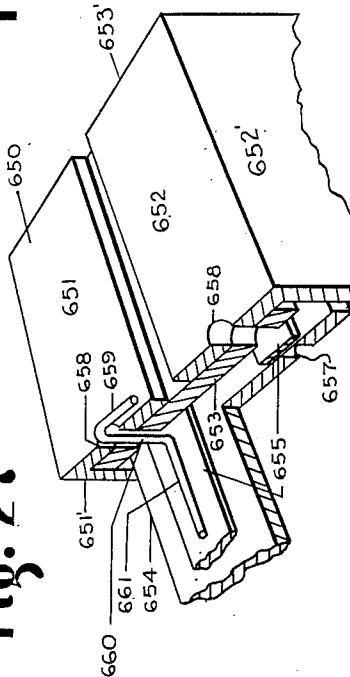


Fig. 29

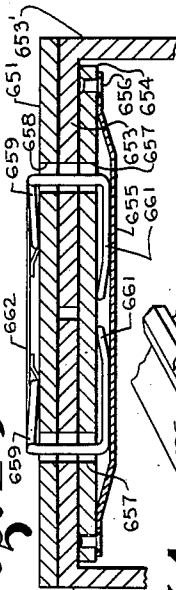


Fig. 31

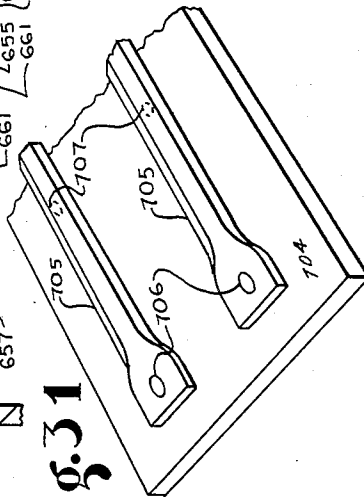
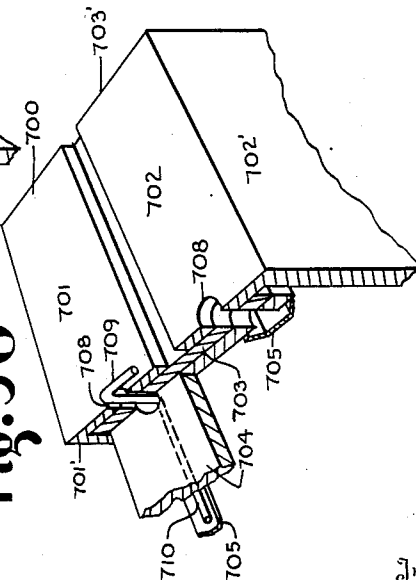


Fig. 30



Inventor

Roy C. Potts

Ross C. Murray

Attorney

UNITED STATES PATENT OFFICE

2,463,306

CARTON SECURING MEANS AND METHOD
OF USING SAME

Roy C. Potts, Takoma Park, Md.

Application April 26, 1944, Serial No. 532,815

9 Claims. (Cl. 229—52)

1

It is an object of this invention to provide a structure wherein a carton of the ordinary slotted type or other type may be closed in a manner which has maximum strength, but may nevertheless be opened without damage to the carton.

It is a further object of this invention to provide a closing means for packages of the types described which is reuseable indefinitely.

It is a further object of this invention to provide a closing means which may be sealed, not only in a tamper-proof manner, but in such manner as to resist all effects of humidity.

It is a further object of this invention to provide a fastener for use as aforesaid which fastener is fully preformed and which is removable and reuseable.

It is a further object of this invention to provide a fastener as aforesaid with a guiding and shielding means which greatly facilitates application and removal of the fastener and at the same time protects the carton against damage incident to the application, removal and use of the fastener.

It is a further object of this invention to provide a combination of two fasteners, as aforesaid, with a handle means connecting the two fasteners, which handle means is capable of being sealed virtually in the plane of the board or boards to which the fasteners are applied.

It is a further object of this invention to provide a solid fiber or other high strength member to improve the results obtained with this fastener when used with corrugated board.

It is a further object of this invention to provide a method of closing boxes or cartons involving the use of my improved fastener.

The above and other objects will be made clear from the following description taken in connection with the annexed drawings in which:

Fig. 1 is a perspective view of one form of my improved fastener;

Fig. 2 is a side elevation of the fastener of Fig. 1;

Fig. 2A is a view, similar to Fig. 2, of a slightly modified form of the invention;

Fig. 3 is a perspective view of an alternative form of the fastener of Fig. 1;

Fig. 4 is a side elevation of the fastener of Fig. 3;

Fig. 5 is a perspective view of a fastener embracing some of the principles of the forms of Figs. 1 and 3, but primarily adapted to resist shear and not tension stresses;

Fig. 6 is a perspective view illustrating the

2

combination of two fasteners of the type of Fig. 1 with a handle member;

Fig. 7 is a plan view of a blank from which a device designed to cooperate with the fasteners of Figs. 1, 3 and 5 may be formed;

Fig. 8 is a perspective view of the device formed from the blank of Fig. 7, ready for application to the work;

Fig. 9 is a section on the line 9—9 of Fig. 8;

Fig. 10 is a section on the line 10—10 of Fig. 8;

Fig. 11 is a section showing the device of Fig. 8 applied to the work and engaging a fastener of the type shown in either of Figs. 1 or 3;

Fig. 12 is a perspective view of a modification of the structure of Fig. 8, limited to the shielding function;

Fig. 13 is a sectional view illustrating the application of the form of Fig. 12;

Fig. 14 is a perspective view showing a modification of the form of Fig. 8 adapted to perform only a guiding function;

Fig. 15 is a section showing the application of the form of Fig. 14;

Fig. 16 is a section similar to Fig. 15, but illustrating a modification of that form;

Fig. 17 is a section showing the use of the fastener of Fig. 5 to resist shear alone;

Fig. 18 is a section showing the use of the fastener of Fig. 5 in a special location in which it will resist not only shear, but tension;

Fig. 19 is a plan view of a blank from which a carton especially adapted for use with my improved fastener may be formed;

Fig. 20 is a perspective view showing the carton formed from the blank of Fig. 19, with the combination handle and fastener of Fig. 6 applied to the top side thereof;

Fig. 21 is a plan view of a special form of tape for use with the carton shown in Fig. 20;

Figs. 22, 23, and 24 are plan views of blanks for forming a different type of container;

Fig. 25 is a perspective view of a double-walled container formed from the blanks of Figs. 22, 23 and 24 and showing the application of my fastener thereto;

Fig. 26 is a section through the front wall of the container of Fig. 25, showing a special form of treatment for the fastener-receiving perforations;

Fig. 27 is a perspective view, partly in section, showing the use of a special adapter member in connection with a slotted type carton;

Fig. 28 is a partial, perspective view of the adapter member per se;

Fig. 29 is a section taken at right angles to the

3

section of Fig. 27, but showing the adapter member in reverse position;

Fig. 30 is a perspective view, partially in section, showing a modified form of the adapter;

Fig. 31 is a partial, perspective view of the adapter per se; and

Fig. 32 is a section taken at right angles to the section line in Fig. 30.

As used herein, the term "fully preformed fastener" means a fastener in which the strains incident to its application to and removal from the work will not distort the material from which it is made beyond the elastic limit of such material. Usually the material will be ordinary wire, but the invention contemplates special alloys for special purposes and even the use of certain plastics and other material suitable for the purpose.

Referring now to Figs. 1 and 2, I show a fastener 20 having a pair of legs 22 adapted to lie in the plane of the innermost free surface of a plurality of superimposed boards. Each of the legs 22 has a fastener element 24 projecting upwardly therefrom and approximately at right angles thereto. The elements 24 are joined by a body portion 28 at the center of which is a loop 30. The loop 30 is shown as triangular, but may be given any desired shape. As best shown in Fig. 2 the loop 30 is tilted relative to the plane of the legs 22 so that its extremity 32 is spaced from the plane of the legs 22 by a distance less than the length of the elements 24. If desired, the inner extremities 34 of the loop 30 may be joined by a spot weld 34' or they may be crossed over each other by a half turn of the loop 30.

Referring now to Figs. 3 and 4 I show a single leg having a single fastener element 42 at one end thereof and extending at right angles thereto. At its upper end the fastener element 42 has a strut 42' projecting therefrom and substantially parallel to the plane of the leg 40. The stock from which the device is formed is then bent into a full circle substantially centering on the element 42. A portion of this circle 44 overlies the leg 40, and, as shown in Fig. 4 lies in a plane tilted toward the plane of the leg 40. Obviously the principle of the device would be unchanged regardless of the geometric form given the parts 42' and 44. I prefer the circle shown for simplicity of manufacture.

In the forms of both Figs. 1 and 3, and for certain purposes which will hereinafter be more fully described, I may bend the legs part way of their length, as shown in dotted outline at 22' in Fig. 2A. Such bending is most convenient from the standpoint of manufacture, but a mild curvature in the same general direction, and occupying the full length of the legs would be equally satisfactory.

Referring now to Fig. 5, I show a device comprising a pair of legs 50, each having at one end thereof a fastener element 52 extending upwardly from the legs 50 and substantially at right angles thereto. The elements 52 are joined by a straight body portion 54 and have a length approximating the thickness of the superimposed boards which are to be secured.

In Fig. 17, boards 56 are superimposed and have registering perforations 58. Through these the legs 50 are passed and lie in the plane of one free surface of the superimposed boards. The elements 52 lie within the perforations 58 and the body portion 54 lies in the plane of the opposite free surface. The boards 56 are thereby effectively prevented from sliding one upon the other, that is, the device effectively resists shear.

4

In Fig. 18, I show the device of Fig. 5 applied in such relationship as to resist both shear and tension. Here, boards 60 are superimposed and have registering perforations 62. The legs 50 have been passed through the perforations 62 and lie on the upper free surface of the boards 60. The element 52 lies within the perforations 62 and the body portion 54 lies in the plane of the lowermost free surface of the board 60. This structure occurs in the bottom of a slotted carton of the type illustrated in Figs. 19 and 20. A supplementary board 64 overlies the bottom of the carton and the weight of the contents, as indicated by the arrows A, presses the board 64 against the legs 50, clamping the legs between boards 64 and 60. Closure flaps of the type illustrated in Figs. 19 and 20 would, under load A, tend both to slide one upon the other and to separate in a direction normal to their contacting surfaces. This resistance of this fastening to a sliding tendency has already been described. Any tendency to separate will tend to tilt the legs 50 out of their natural plane, but this tendency, in Fig. 18, is resisted by the weight of the contents pressing upon the board 64.

It will be noted, in an examination of Fig. 18, that the leg 50 is indented into the board 64 by an amount equal to approximately half the thickness of the leg 50. The precise amount of indentation will depend on the nature of the board, and its thickness. In the case of corrugated board, it is quite easy to indent to almost the full thickness of the board. In the case of solid fiber, however, indentation beyond half the thickness of the board will so far compress the fiber as to weaken the whole structure, producing lines of failure. The indentation to which I here refer is from one side only, unaccompanied by marking on the opposite side. Indenting which penetrates the board so that there is formed a female impression on one side and a complementary male impression on the other amounts to "scoring" which is familiar practice and establishes a line of folding or bending without substantial weakening of the board itself. Such scoring is a mere displacement of the fibers, without decreasing the cross-section of the board.

The indentation to accommodate the fastener parts may occur in only one external surface of the superimposed boards, for example, in the free surface of either of the boards 60 in Fig. 18, or in both free surfaces, or, it might occur both in board 64 and the adjacent free surface of the adjoining board 60. In a structure such as that of Fig. 11, the outer surface of the flap 15 may be indented in the pattern of body portion 20 and loop 30 of Fig. 1, or that of members 42' and 44 of Fig. 2. Still referring to Fig. 11, if the combined shielding and guiding member 100 be eliminated, the flap 13 (or any equivalent board) may be indented in the pattern of the leg or legs 22. Such a construction will be especially useful in bottom formations which do not require as frequent application and removal of the fasteners since it may make possible the elimination of the shielding and guiding members 100 with a consequent saving in overall cost. In packing such commodities as eggs, a bottom board such as 64 (Fig. 18) will almost always be used to provide a uniform bottom surface and also to provide an extra padding quality. In such case, indentation of the meeting surface of the board 64 and the upper surface of the inner board 60 will perform all of the guiding functions of the member 100 and will be sufficient even though the box

of which these members form a part is used for several trips.

Referring now to Fig. 6, I show a combination of two devices of the type of Figs. 1 and 2, connected by a handle-forming strap. Each of the devices comprises legs 70, corresponding to legs 22, Figs. 1 and 2. Each leg 70 has a fastener element 74, identical with the fastener elements 24, Figs. 1 and 2. The element 74 of each pair of legs is connected by a body portion 78 corresponding to the body portion 28, Figs. 1 and 2. Each body portion 78 has a loop 80 corresponding to the loop 30, Figs. 1 and 2. A strap 90 has loops 92 formed at each end thereof by bending the material of the strap 90 upon itself and either riveting or spot-welding the end of the strap to its body, as indicated at 94. The loops 92 are sufficiently elongated so that the strap 90 may be flattened upon the upper surface of the boards to which the device is applied, or it may be drawn up, as shown in dotted outline to form a hand-grip.

The legs 70 may be bent upwardly part way of their length. This bending corresponds to the dotted outline 22' of Fig. 2.

The principle of operation is the same as to each of the forms of Figs. 1, 3 and 5. Superimposed boards to be secured are provided with pairs of registering perforations to receive the devices of Figs. 1 and 5, or with a single registering perforation for the device of Fig. 3. The legs are inserted through the perforations and the fastener elements rest within the perforations. The respective body portions overlie the opposite free surface of the superimposed boards. Due to the tilting of the body portion particularly illustrated in Fig. 2, there results a clamping action which will be intensified by any tendency of the boards to separate in a direction normal to their abutting surfaces. If secure holding power were the sole essential element, these devices would be complete upon mere insertion, as described. Where, however, re-use is desired, the life of the container is greatly extended and the ease of insertion and removal greatly increased by the use of a complementary device illustrated in Figs. 7 through 11, inclusive.

In Fig. 7, I show a sheet metal blank 100 having pointed tongues 102 formed at one free end, a blunt central tongue formed at the other free end, and pointed tongues 106 defined by slots 108, but lying in the plane of the blank 100.

Fig. 8 shows the device completely formed and ready for application. It has a lower portion 103 drawn into the form of a trough. A blank 100 has been folded along the base line of the tongues 106 to superimpose an upper portion 110 upon the lower portion 103. Tongues 102 and 106 have been bent so as to be mutually parallel and substantially at right angles to the plane of the portion 110, as has the blunt tongue 104.

In Fig. 11, I show in section upper closure flap 15 and lower closure flap 13. The relationship of these flaps will be apparent from Figs. 19 and 20. The complementary device just described has been attached to flap 13 by forcing the prongs or tongues 102 and 106 through the material of the flap 13 for clinching them in the manner of staples. The tongue 104 enters registering perforation 120 in the flap 13 and its extremity 104' has been folded upon and embedded in the upper abutting surface of the flap 13. The fastener of Figs. 1 and 2 has been inserted. In the insertion of this fastener the tongue 104 prevents any gouging of the wall of the perforation 120 in flap 13, and the trough 108 guides the end of the leg 22

into final position. The member 110 overlies the leg and is interposed between the leg and the free surface of the flap 13. In this position it shields the material of flap 13 from any gouging incident either to the insertion or removal of the fastener. The complementary device, therefore, constitutes both a guiding means and a shielding means.

In Fig. 12 I show a member 600 formed, preferably, of relatively mild sheet metal and comprising a flat body portion 601 having an upstanding tapered tongue 602 at one end and a pair of upstanding sharpened prongs 603 at the other end. In Fig. 13 I show an outer board 604 and an inner board 605. A perforation 606 in the outer board 604 registers with a perforation 607 in the inner board 605. The member 600 is secured to the inner face of the inner board 605 with the prongs 603 penetrating and clinched into the board 605. The tongue 602 passes through the perforation 607 and is clinched into the outer surface 605' of the inner board 605. A fastener 608 similar to the form of Figs. 1 and 3 passes through the perforations 606 and 607 and has its body portion 609 pressed against the outer surface of the outer board 604 and its legs 610 pressed against the body 601 of the member 600. It is, of course, clear that the fasteners of either Figs. 5 or 6 could equally well be utilized. The prong 602 acts in part as a guiding means for the leg 610 but discharges a very real shielding function in preventing tearing of the edge of the perforation 607. This is particularly important if the board 605 is of corrugated construction rather than solid fiber.

Referring now to Fig. 14, I show a guiding device 620 having upstanding prongs 621 at one end and similar prongs 622 at the other end. Between the prongs is a body portion 623 which is bent to form a trough 624. In Fig. 15 I show an inner board 625 and an outer board 626. The inner board 625 has a perforation 627 and the outer board 626 has a perforation 628 registering with the perforation 627. The member 620 is secured to the inner surface of the board 625 with the prongs 621 and 622 clinched into the material of the board 625. A fastener 630 of the type illustrated in either of Figs. 1, 3 or 5 is inserted through the perforations 627 and 628 and has its leg 631 guided by the trough 624 of the member 620.

Fig. 16 is a view similar to Fig. 15 showing a member 620' which is somewhat modified from the structure of the member 620. In this case the inner board 625' and an outer board 626' respectively have perforations 627' and 628' in registry. The body portion 623' of the member 620' instead of having a trough such as 624 of member 620 is perfectly flat while the inner surface of the inner board 625' is indented at 640 to accommodate the leg 641 of a fastener 642 similar to the fastener 630 shown in Fig. 15.

In forming the perforations through which the fasteners pass, it would usually be desirable to indent the outer surface of the carton with the outline of the fastener, so that the body portion will project as little as possible out of the plane of the top or bottom of the carton. This is an obvious advantage for stacking, sealing and handling the packages and adds nothing at all to the cost incident to forming the perforations.

The most widely used type of shipping container is the ordinary slotted carton, illustrated in Figs. 19 and 20, in which a single blank has four wall-forming panels with a relatively narrow closure panel at the edge of one wall panel. Each wall panel has a closure flap at each end and, when the carton is erected, it is usually propor-

tioned so as to bring the closure flaps of opposite walls into substantially abutting relation when they are folded to closing position.

The flaps are held in closed position by any of several conventional means. The simplest and also the weakest is merely to run a strip of gummed tape across the line of division between the outermost flaps and carry the tape somewhat down over the vertical walls. This, however, is not a particularly strong closure, especially under conditions of high humidity. Such conditions tend to destroy the strength of the tape. Where greater strength is desired, silicate or other adhesive is inserted between the lowermost and uppermost pairs of flaps. When still more strength is required, the outermost of the four flaps are proportioned so as to be completely superimposed rather than merely to abut. It is then possible to insert the anvil of a stitching machine under the superimposed flaps and thus to effect any desired amount of stitching through the two flaps.

Cartons closed by tape only are capable of re-use, since there is no occasion to destroy any of the closure flaps in the course of opening the carton, and the nature of the construction is such that, when both ends are opened, the carton may be collapsed. It is, however, virtually impossible to open a carton in which the flaps have been adhered without such damage as to prohibit re-use of the carton. The same is obviously true of the stitched closure which suffers from the further defect of adding 50 per cent or more to the amount of board which must be consumed in manufacturing a package.

I have devised a package which, with only very slight modification of the structure of the conventional slotted carton, may be closed with a closure comparable in strength to that of the stitched closure but in which securing means of the types heretofore described are readily removable to permit collapse, return and re-use of the carton.

Referring now to Figs. 19 and 20, I show a blank comprising wall forming panels 10, 12, 14 and 16. A corner flap 18 adjoins the wall forming panel 10. The corner flap may be omitted if cloth tape is used to close the corner. The wall forming panels are placed in rectangular relationship and the flap 18 is joined to the panel 16 by adhesive, stitching or other suitable means. The wall forming panel 10 has a top closure flap 11 and a bottom closure flap 11'. The panel 12 has a top closure flap 13 and a bottom closure flap 13'. The panel 14 has a top closure flap 15 and a bottom closure flap 15' while the panel 16 has a top closure flap 17 and a bottom closure flap 17'. The top and bottom closure flaps are separated by "slots" in order to provide the necessary clearance when the flaps are folded inwardly into the plane of the top and bottom respectively.

It is to be noted that perforations 120 are formed in the top closure flaps 11 and 15 while perforations 120' are formed in flaps 13 and 17. When the carton is formed, as in Fig. 15, closure flaps 13 and 17 are folded inwardly so that their free edges approximately meet, and flaps 11 and 15 are superimposed upon them. The perforations 120 and 120' are so located that one of the perforations 120' in flap 13 underlies and registers with one perforation 120 in flap 11, while the other perforation 120' in flap 13 underlies and registers with one perforation 120 in flap 15. The same is true of the perforations 120' in flap 17. This provides two pairs of perforations, each

pair adapted to receive a fastener of the type of Fig. 1 or Fig. 6.

Each of the bottom flaps 11', 13', 15' and 17' has four perforations so located as to provide, when the flaps are in closing position, four pairs of perforations, each pair being adapted to receive a fastener. In the bottom flaps, where four pairs of perforations are desired, the outermost flaps 11' and 17' each have four perforations arranged in alignment near the free edges of those flaps. The flaps 13' and 15', which will underlie the flaps 11' and 17' have four perforations arranged in the form of a square. When the flaps 13' and 17' are folded to closing position, two lines of four perforations each will be formed. One of such lines of perforations will underlie the perforations of flap 11' and the other will underlie the perforations of flap 15'. Obviously, depending on the size and proportion of the box, any number of pairs may be provided.

As previously noted, the ordinary gummed tape closure of the slotted carton is unsatisfactory under cold storage conditions. I have overcome this defect by a means illustrated in Figs. 19, 20 and 21. I do this by printing or applying upon the outside closure flaps 11 and 15 areas 122 of self-sealing adhesive and by printing similar areas 124 on wall panels 12 and 16. When the box is erected and closed, the areas 122 on flaps 11 and 15 provide a continuous path of self-sealing adhesive extending across the top of the box, while the areas 124 form continuations of such path down over the walls 12 and 16. A strip of tape 130 (Fig. 21) is similarly coated with self-sealing adhesive and is engaged by pressing it upon the areas 122 and 124. By self-sealing adhesive is meant a mixture of the type which, when applied to a surface, will adhere only to another surface similarly coated. Such adhesives are uniformly water-resistant and, therefore, impervious to high humidity. Such a tape may be applied both at the top and bottom of the carton and should overlie the body portions of the fasteners used in securing the closure. When this is done the package may be made pilfer-proof by printing or otherwise marking any sort of indicia so that the printing or other marking covers part of the tape and part of the adjacent box panel.

When the handle construction shown in Fig. 6 is used as a top closure, the tape 130 may have the particular portion that overlies the handle defined by an outlining or a perforated line 132. This provides easy access to the handle strap 90 by cutting through the tape, or tearing along the perforation without disturbing any other portion of the closure. This is important where the shipping container is to be used as a retail package, since it permits the dealer to hand the customer an obviously tamper-proof package which has never been opened, but which, nevertheless, is equipped with a convenient handle.

In connection with following description of Figs. 22 through 26, inclusive, it is to be noted that the same principles are applicable to all of the boxes disclosed in my copending application Serial No. 532,817, filed of even date herewith.

In Fig. 22, I show a blank 200 having a corner flap 201 adjacent an end wall panel 202 and defined therefrom by a score line 201'. A front wall panel 204 is adjacent the end wall panel 202 and is defined therefrom by a score line 202'. A second end wall panel 206 is adjacent the front wall panel 204 and is defined therefrom by a score line 204'. A rear wall panel 208 is adjacent the

end wall panel 206 and is defined therefrom by a score line 206'.

As illustrated in Fig. 25, the blank 200 is formed into a rectangular box body in an entirely conventional manner, with the corner flap 201 underlying the rear wall panel 208.

In Fig. 23, I show a blank 300 having an end wall panel 301 with a top closure flap 305 defined by a score line 305' and a bottom closure flap 306 defined by a score line 306'. A front wall panel 302 adjoins the end wall of panel 301 and is defined therefrom by a score line 301'. A second end wall panel 303 adjoins the front wall panel 302 and is defined therefrom by a score line 302'. The end wall panel 303 has a top closure panel 307 defined by a score line 307' and a bottom closure 308 defined by a score line 308'.

The blank 300, as shown in Fig. 25, is combined with the box body formed from the blank 200 by securing end wall panel 301 of blank 300 to end wall panel 206 of blank 200. End wall panel 303 of blank 300 is secured to end wall panel 202 of blank 200. Front wall panel 302 of blank 300 overlies and is spaced from front wall panel 204 of blank 200 by an amount sufficient to accommodate one thickness of the board from which the several blanks are made.

In Fig. 24, I show a blank 400 having a central rear wall panel 404. A top closure panel 402 adjoins one side of rear wall panel 404 and is defined therefrom by a score line 402'. A top closure flap 401 adjoins the other side of top closure panel 402 and is defined therefrom by a score line 401'. A bottom closure panel 406 adjoins the opposite side of the central panel 404 and is defined therefrom by a score line 404'. A bottom closure flap 408 adjoins the opposite side of the bottom closure panel 406 and is defined therefrom by a score line 406'.

As shown in Fig. 25, the blank 400 is combined with the box body formed from the combination of blanks 200 and 300 by securing central panel 404 to the rear panel 208 of the blank 200. The result is a box body having all its vertical walls of double thickness. The box is closed by folding inwardly the closure flaps 305, 306, 307 and 308, then bringing the top and bottom closure panels 402 and 406 over the top and bottom of the box body and tucking the closure flaps 301 and 408 into the space between the front walls 204 and 302.

In Fig. 22, I show two pairs of perforations 210 adjacent the top edge of front wall panel 204 and similar pairs of perforations 211 adjacent the bottom edge of that panel.

In Fig. 23, I show two pairs of perforations 310 adjacent the top side of front wall panel 302 and similar pairs 311 adjacent the bottom side. I also show in Figs. 23 and 25 two strip areas, 312 and 313, to which a self-sealing adhesive is applied, these areas comprehending the upper and lower portions of front wall 302, in which perforations 310 and 311 are located. When the fasteners 500 and 501 of Fig. 25 are inserted and a strip of self-adhesive tape (Fig. 21) is then applied a sealed and pilfer-proof package is thereby obtained as hereinbefore explained.

In Fig. 24, I show in the top closure flap 401 two pairs of perforations 410 and, in the bottom closure flap 408, two pairs of perforations 412. The perforations 410 in flap 401 are spaced from the score line 401' a distance approximately equal to the spacing of the perforations 210, in panel 204, and 310, in panel 302, from the top edges of panels 204 and 302. The perforations 412 in

bottom closure flap 408 are spaced from score line 408' by an amount approximately equal to the spacing of perforations 211, in panel 204, and 311, in panel 302, from the bottom edge of panels 204 and 302. The purpose of this spacing is to assure that, when the closure flaps 401 and 408 are tucked between panels 204 and 320, there will be a registration of perforations 210, 310 and 410, at the top, and perforations 211, 311 and 412, at the bottom. When this is accomplished, my improved fasteners, such, for example, as those shown in Figs. 1, 3, and 5, may be applied as hereinbefore described. This application takes place entirely from the exterior of the box and permits the box to be opened and either re-closed or collapsed. Such fasteners are illustrated at 500 and 501, in Fig. 25. The fasteners, thus applied, may be secured in place by applying a strip of adhesive tape (whether or not of the "self-sealing" type) over them. Obviously flap 401 may be similarly secured in place between walls 302 and 408, and the box rendered pilferproof by marking indicia on the tape and wall 302 as heretofore explained.

In Fig. 26 I show a section taken through the front walls 204 and 302 and the top closure flap 401 of Fig. 25. This view shows a perforation 310 in the wall 302, a perforation 210 in the wall 204 and a perforation 410 in the flap 401. In the position shown perforations 310, 410 and 210 are all in registry. The eyelet 310' passes through the perforation 310 and is riveted over upon each face of the wall 302. An eyelet 410' similarly passes through the perforation 410 and is riveted upon each face of the flap 410. An eyelet 210' passes through the perforation 210 and is riveted upon the inner surface of the board 204. At the outer surface of the board 204 the eyelet 210' has an integral extension 212 which acts as a shield precisely in the manner of the body portion 601 of Fig. 13. A fastener 700 which may be of the form of either Figs. 1 or 5 penetrates the several perforations and has a leg 701 extending in the plane of the board 204 and bearing against the shielding member 212.

It is to be noted that for the eyelet and shield 210'-212, there could be substituted any of the members shown in Figs. 8, 13, 15 or 16. At the same time, the protective eyelets shown in Fig. 26 could be used to protect the outer boards in any of the other forms, and such combinations are to be understood as being wholly within my inventive concept. In particular, the extension 212 need not be integral with the eyelet 210', and whether integral or not, the outer end of the member 212 may, if desired, be supplied with prongs such as 603 of Fig. 13.

Fasteners of the type heretofore described, when used with solid fiber cartons, produce a phenomenally strong closure, and the nature of the solid fiber is such that removal and replacement of such fasteners result in very little damage to the adjacent board. In fact, where shielding and/or guiding members are affixed to solid fiber, the fasteners may be removed and replaced without damage to the board many more times than is required by the life of the carton as a whole. When, however, the carton is formed of corrugated board, there is a greater likelihood of damaged board incident to the insertion and removal of the fastener, since, in the ordinary carton there will only be .016 inch of solid liner board against which the fastener may bear. In order to assure re-usability, I have devised a solid fiber adapter which may be used in connection

11

with corrugated cartons to protect the corrugated board from damage incident to the insertion and removal of the fastener and to contribute a tremendous element of strength to the closure. These adapters will outlast several corrugated boxes, even though each of such boxes makes a large number of trips. On a per trip basis, therefore, the cost of these adapters is negligible.

In Fig. 27, I show a carton 650 having top closure flaps 651 and 652 extending respectively from vertical walls 651' and 652'. A closure flap 653 underlies flaps 651 and 652 and extends from vertical wall 653'. The walls and flaps just mentioned are shaded in a manner to indicate a solid construction. This has been done for the purpose of simplicity of illustration. In practice, these walls and flaps would be formed of corrugated board with the flukes of the corrugations extending vertically in the vertical walls. A sheet 654 of solid fiber board is cut to conform rather accurately to the interior of the carton 650 and underlies the flap 653.

As shown in Fig. 28, solid fiber adapter 654 has secured thereto a pair of flat metal strips 655. The strips 655 are secured to the board 654 in any suitable manner, as by means of rivets 656. At suitable, predetermined points, perforations 657 are formed in the board 654 but do not penetrate the strips 655.

In Fig. 27, the board 654 has been inserted with the strip 655 uppermost. The flaps 651, 652 and 653 have perforations 658, which overlie the strips 655 of the board 654. As illustrated, a fastener 659, which is preferably of the type shown in Fig. 1, is inserted so that its work-penetrating members 660 penetrate the perforations 658 and its legs 661 extend along the surface of the strips 657 which aid materially in guiding the legs 661 into place and, at the same time, prevent the ends of such legs from engaging the contents of the carton.

In Fig. 29, which is a section at right angles to the section line of Fig. 27, I show the adapter 654 turned over from the position shown in Fig. 27, with the strip 655 underneath. A pair of fasteners 659 penetrate the perforations 658 in flaps 651 and 653, as well as perforations 657 in board 654. In this case, the strip 655 bows slightly toward the interior of the carton 650 to provide clearance for the legs 661 of the fastener 659. The strip 655 guides the fastener legs into position and prevents their ends from engaging the contents. When thus installed, the board or adapter 654 receives any thrust imposed by the legs 661 of the fastener 659. A handle member 662 may be used to join the fastener 659 in the manner described with reference to Fig. 6, and when the package is lifted by such a handle the load imposed on legs 661 is substantial.

In Fig. 30, I show a carton 600 having top closure flaps 701 and 702, respectively, folded in from vertical walls 701' and 702', with a lower closure flap 703 folded in from a vertical wall 703'. The carton 700 is formed of corrugated material, as is carton 650 of Fig. 27, and an adapter 704 formed of solid fiber board underlies the flap 703.

As seen in Fig. 31, the adapter board 704 has secured thereto a pair of metal strips 705. These strips are secured to the board 704 by any suitable means, such, for example, as rivets 706. The board 704 has perforations 707 at predetermined points, which perforations communicate with, but do not penetrate the strips 705. These metal strips have a channeled cross section which

12

is usually flattened at the point 708 where the strips are secured to the board 704. As shown, the channels have their concave faces against the surface of the board 704.

The board 704 is dimensioned to conform to the interior of the carton 700 and underlies the flap 703 (Fig. 32). Perforations 708 are formed in the flaps 701, 702, and 703 and register with perforations 707 in the board 704. A fastener 709 of the type shown in Fig. 1 is inserted through the perforations and its leg 710 is guided by and lies within the channels of the strips 705. If desired, a handle member may be used to connect two fasteners 709 in the manner illustrated in Fig. 6. When this is done, and the carton is handled thereby, a considerable strain is imposed on the leg 710 and this strain is resisted by the adapter board 704 without damage to the corrugated board forming the carton.

While I have disclosed certain specific embodiments of my inventive concept, I do not intend to limit it to the precise disclosures herein, but only as set forth in the subjoined claims which are to be broadly construed.

What I claim is:

1. A method of closing boxes comprising: providing a box in which the closure involves the superimposition of a plurality of plies of board; forming perforations in the plies to be superimposed; locating the perforations in each ply so that when said plies are superimposed said perforations will be in mutual registry; closing said box by superimposing said plies; and thereafter inserting through said registering perforations, by a sliding motion lateral to the axes of said perforations, fully preformed, integral fastening devices having a portion lying on each opposed free surface of said superimposed boards, said portions clamping said board together.

2. A method of closing boxes comprising: providing a box in which the closure involves the superimposition of a plurality of plies of board; forming perforations in the plies to be superimposed; locating the perforations in each ply so that when said plies are superimposed said perforations will be in mutual registry; closing said box by superimposing said plies; and thereafter inserting through said registering perforations fully preformed, integral fastening devices having a portion lying on each opposed free surface of said superimposed boards, said portions clamping said boards together, said method including the step of indenting at least one free surface of said boards, incident to the formation of said perforations, with the pattern of the fastener portion to lie in contact therewith.

3. A method of closing boxes comprising: providing a blank suitable for the formation of a conventional slotted carton; forming, in the closure flaps of said blank, a plurality of perforations; locating said perforations so that those in one pair of opposed flaps will register with those of another pair when the second pair is superimposed on the first pair in closing position; erecting said blank into a box and folding said flaps into such closing positions; inserting a fully preformed, integral fastening device through such registering perforations, by a sliding motion lateral to the axes of said perforations, said fastening device having portions lying on each of the opposed free surfaces of said superimposed flaps and clamping said flaps therebetween.

4. A method of closing boxes comprising: providing a blank suitable for the formation of a

13

conventional slotted carton; forming, in the closure flaps of said blank, a plurality of perforations; locating said perforations so that those in one pair of opposed flaps will register with those of another pair when the second pair is superimposed on the first pair in closing position; erecting said blank into a box and folding said flaps into such closing positions; inserting a fully preformed, integral fastening device through such registering perforations, said fastening device having portions lying on each of the opposed free surfaces of said superimposed flaps and clamping said flaps therebetween, said method including the step of indenting at least one free surface of said flaps, incident to the formation of said perforations, with the pattern of the fastener portion to lie in contact therewith.

5. A method of closing boxes comprising: providing a box in which the closure involves the sliding of a closure flap between spaced plies of a box wall, forming perforations in the spaced plies, forming additional perforations in the closure flap, locating the perforations in each ply and in the flap so that when the flap is slid to final position between the plies, said perforations will be in mutual registry, closing the box by sliding said flap between said plies and thereafter inserting through said registered perforations, by a sliding movement lateral to the axes of said perforations, fully preformed integral fastening devices each having a portion adapted to lie on each opposed free face of the plies making up said wall, said portions clamping together said plies and said flap.

6. A fully preformed fastener for clamping together superimposed perforated sheets of substantially rigid carton material, comprising a pair of substantially parallel legs, a work-penetrating member at one end of each of said legs, said members being substantially parallel and extending in the same direction from and at right angles to said legs, a body portion joining said members, part, at least, of said body portion extending in the general direction of said legs and spaced therefrom, said part having formed therein a loop for engagement with a strap or other handle member, the plane of said loop being inclined towards the plane of said parallel legs whereby to exert a resilient clamping action, upon material secured therebetween, in a region spaced from both of said work-penetrating members.

7. In combination, a pair of fully preformed fasteners, each of said fasteners having a pair of substantially parallel legs, a work-penetrating member at one end of each of said legs, said members being substantially parallel and extending in the same direction from and at right angles to said legs, a body portion joining said members, part, at least, of said body portion extending in the general direction of said legs and spaced therefrom, said part having formed therein a loop, the plane of said loop being inclined towards the plane of said parallel legs whereby to exert a resilient clamping action, upon material secured therebetween, in a region spaced from both of said work-penetrating members; and a handle member connecting said loops of said pair of fasteners.

14

8. A carton comprising a plurality of connected panels of material, certain of said panels being hingedly secured to others of said panels to form an overlapping closure for said carton, perforations in registering relationship in overlapping panels, and a fastener element comprising a body portion and a leg portion inserted through said registering perforations, the body portion of said fastener element comprising a flat-sided loop having substantial extension in a plane spaced from, and slightly inclined to, its leg portion, said body portion lying outside the panels forming said carton.

9. A carton comprising a plurality of connected panels of material, certain of said panels being hingedly secured to others of said panels to form an overlapping closure for said carton, pairs of spaced perforations in registering relationship in overlapping panels, a fastener element comprising a body portion and parallel spaced-apart legs inserted through the registering perforations of each pair, the body portion of each such fastener comprising a flat-sided loop having substantial extension in a plane spaced from, and slightly inclined to, the plane defined by its spaced-apart legs, the body portion lying outside the panels forming said carton, and a handle connecting the body portions of said fastener elements by engagement with the flat sides of their respective loops.

ROY C. POTTS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
395,162	McGill	Dec. 25, 1888
778,711	Rundle et al.	Dec. 27, 1904
851,595	Howell	Apr. 23, 1907
931,655	Sabor	Aug. 17, 1909
933,454	Hudson	Sept. 7, 1909
1,147,276	Southard	July 20, 1915
1,348,844	Borders et al.	Aug. 10, 1920
1,354,253	House	Sept. 28, 1920
1,604,801	Boden et al.	Oct. 26, 1926
1,647,962	Fenton	Nov. 1, 1927
1,916,008	Maynard	June 27, 1933
1,958,587	Mitchell et al.	May 15, 1934
1,999,461	Kells	Apr. 30, 1935
2,124,409	Andrews	July 19, 1938
2,132,115	Jonitz	Oct. 4, 1938
2,132,246	Shapiro	Oct. 4, 1938
2,144,979	James	Jan. 24, 1939
2,206,314	Werner	July 2, 1940
2,232,676	Arpen	Feb. 25, 1941
2,283,814	La Place	May 19, 1942
2,330,093	Van Cleef	Sept. 21, 1943
2,344,009	Trogman	Mar. 14, 1944
2,346,591	La Place	Apr. 11, 1944
2,348,551	La Place	May 9, 1944

FOREIGN PATENTS

Number	Country	Date
584,927	Germany	Sept. 26, 1933

Certificate of Correction

Patent No. 2,463,306.

March 1, 1949.

ROY C. POTTS

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 14, line 30, claim 9, after the word and period "loops." and before the signature of the inventor, insert the following claims—

10. *In combination, a container comprising substantially rigid board-like material in at least one of its walls, two pairs of perforations in said wall, and a fastener handle element in accordance with claim 7, the legs of said fastener handle element being inserted through respective perforations in said wall.*

11. *In combination, a container comprising substantially rigid board-like material in at least one of its walls, two pairs of perforations in said wall, a fastener handle element in accordance with claim 7 having its legs inserted through respective perforations in said wall, and a trough-like metallic guiding and protecting element secured to the inner side of said wall in the region of each perforation and receiving in its trough one of the legs of said fastener handle element, said guiding and protecting element having means at its ends for permanently attaching it to said wall and comprising essentially two integrally connected parts consisting of a lower portion concave throughout its length to form a trough receiving and guiding lengthwise thereof one of the legs of said fastener handle element, and an upper portion overlying said trough and lying flat upon the inner surface of said wall, one end of said upper portion being formed to pass outwardly through said perforation and secured therein.;*

in the heading to the printed specification, line 6, for "9 Claims" read *11 Claims*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 23rd day of August, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.