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Mattheis et al.

[11] **3,894,655**

[45] **July 15, 1975**

[54] **PLASTIC CONTAINER**

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[73] Assignee: **Ethyl Development Corporation,** Kansas City, Mo.

[22] Filed: **June 6, 1974**

[21] Appl. No.: **476,790**

[52] **U.S. Cl.** **220/283;** 150/.5; 206/1.5; 220/265

[51] **Int. Cl.** **B65d 43/16**

[58] **Field of Search** 220/265, 281, 282, 283; 150/.5, 46; 206/1.5

[56] **References Cited**

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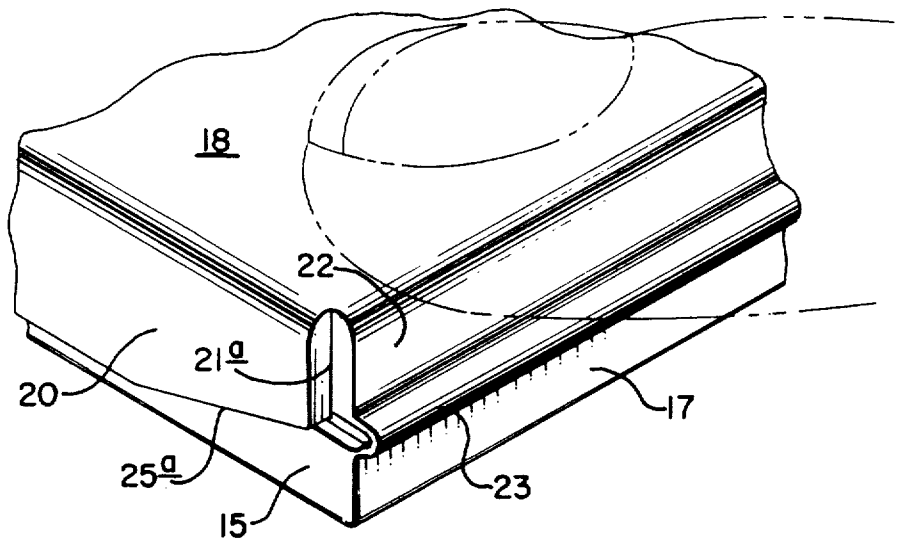
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Assistant Examiner—Ro E. Hart
Attorney, Agent, or Firm—Donald L. Johnson; John F. Sieberth; Edgar E. Spielman, Jr.

[57] **ABSTRACT**

An integrally formed, one-piece, generally rectangular, plastic container particularly adapted for holding medicines. The container includes a generally rectangular bottom section which is connected to a rectangular top section by means of an integrally formed, flexible, plastic hinge at the rear of the two sections. In the closed position, the top section overlies the bottom section and latch means lock the two sections together. The bottom section has a planar bottom wall, two opposed, upturned sidewalls, an upturned front wall, and an upturned back wall, all of which are integrally formed and connected to each other. The top section has a planar top wall, two downturned sidewalls, and a downturned front wall all of which are integrally formed and connected to each other, and a downturned back wall integrally formed and connected to said top wall and to the rearmost edges of the downturned sidewalls, the latter connection being made by means of fracturable plastic webs. The closed container requires that equal pressure be applied to the rear corners thereof in order to disengage the latch means. The container provides a substantially childproof safety closure for tableted medicines such as aspirin, laxatives, cold tablets, prescription drugs, etc. This container also provides a container which will indicate to the consumer whether or not the container has been tampered with by opening.

9 Claims, 14 Drawing Figures



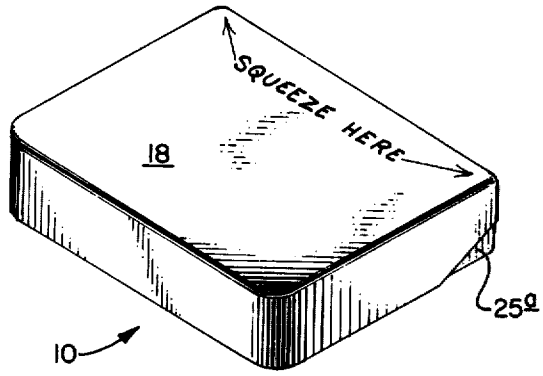


FIG. 1.

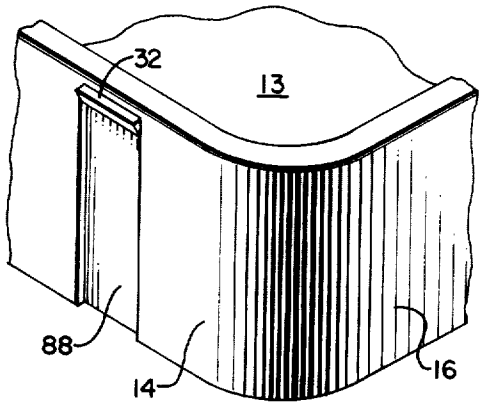


FIG. 4C.

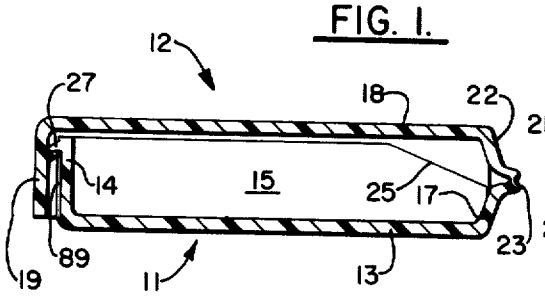


FIG. 5A.

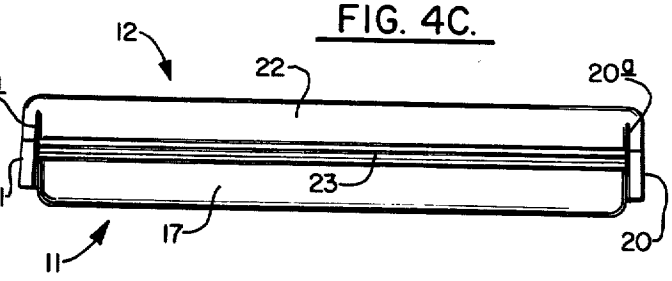


FIG. 2.

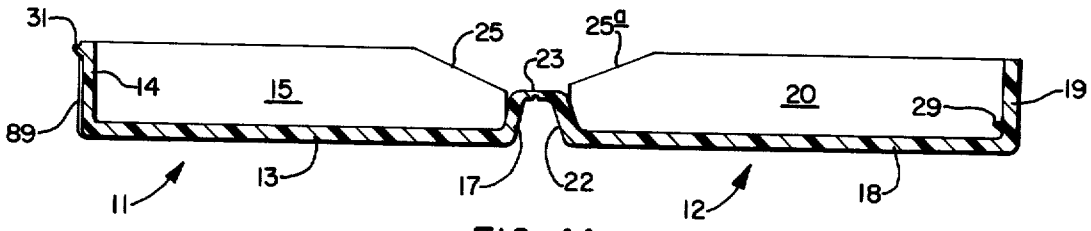


FIG. 4A.

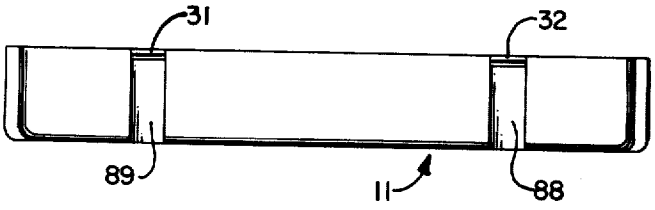


FIG. 3.

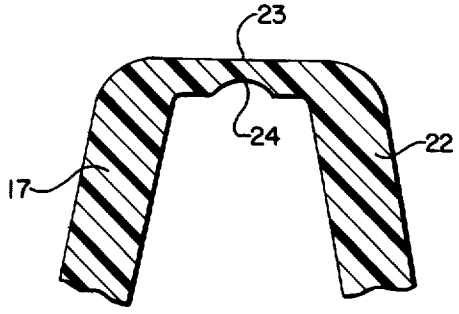


FIG. 4B.

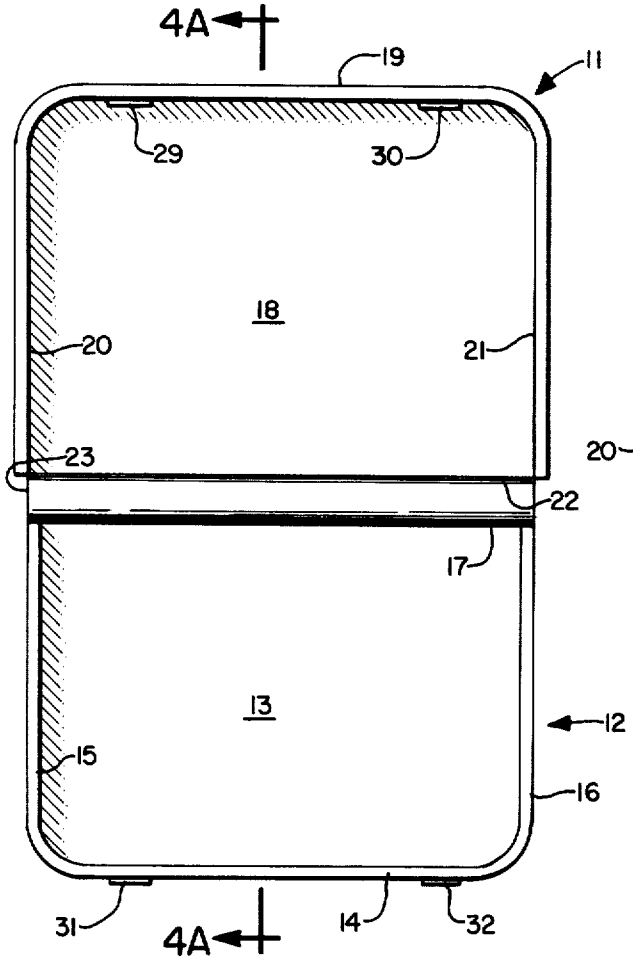


FIG. 4.

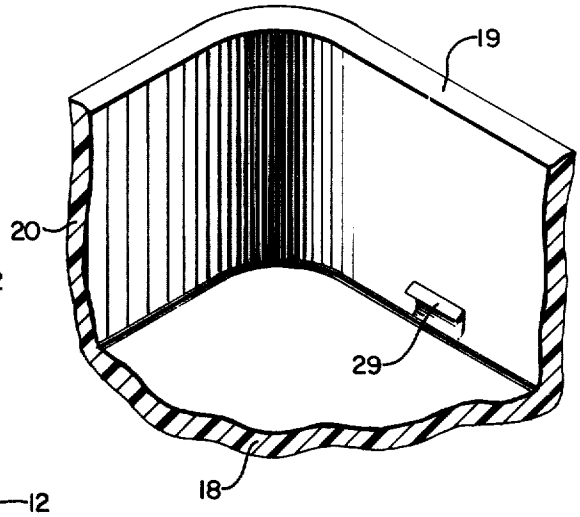


FIG. 4E.

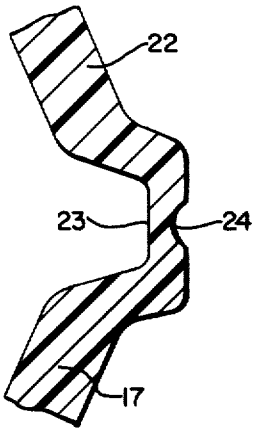


FIG. 4D.

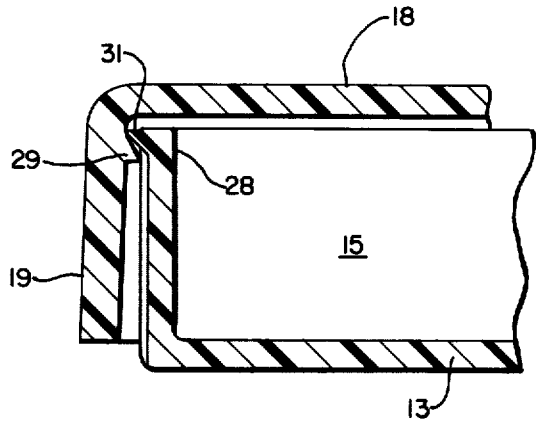


FIG. 4F.

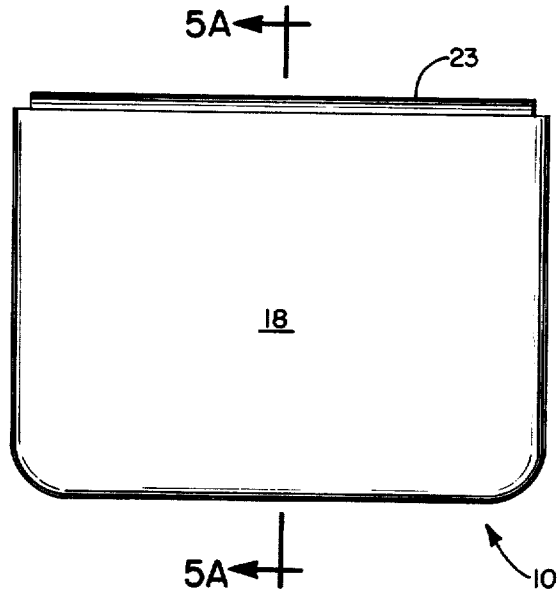


FIG. 5.

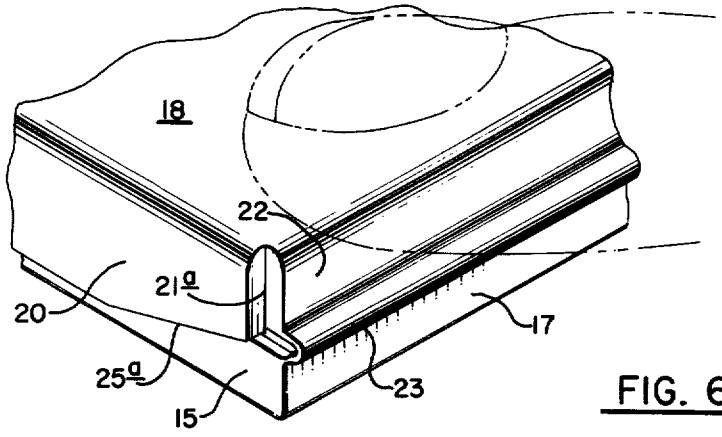


FIG. 6.

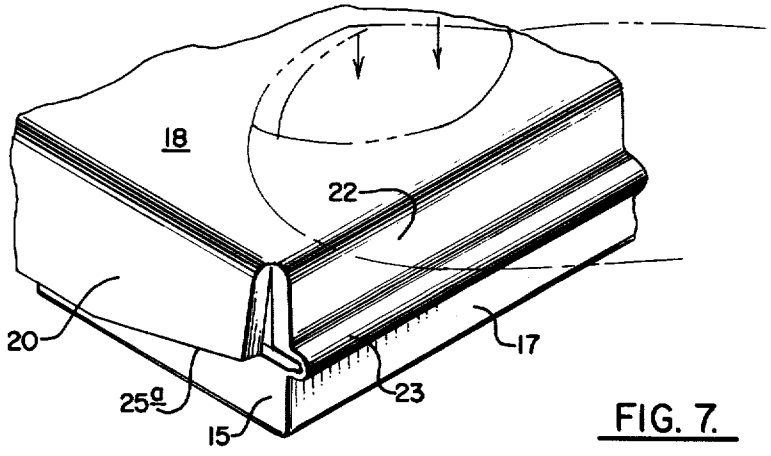


FIG. 7.

PLASTIC CONTAINER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a one-piece, integrally formed, generally rectangular, plastic box particularly suited for packaging medicines.

2. Description of the Prior Art

Many medicines such as aspirin have conventionally been packaged in generally rectangular, two-piece, metal containers having a top rectangular section which is hingedly connected to a rectangular bottom section. Earlier boxes utilized a conventional pinned hinge arrangement at the rear thereof to join the two components together. More recent two-piece boxes are connected by means of matching projections and recesses provided on each sidewall of the box slightly forward of the rear thereof (see U.S. Pat. No. **2,906,428**). These boxes are opened by applying pressure to the rear of the box.

Recent FDA regulations will require that aspirin tablets and a number of items be packaged in special containers which have "childproof" features. The containers must not be openable by children under a certain age in a certain number of attempts to open the containers. Satisfactory closures have been developed for bottle-type containers for aspirin and prescription drugs and other items which may be potentially dangerous to children. However, difficulty has been encountered in producing a satisfactory rectangular, two-piece, hinged, conventional container for packaging tablets. The problem has primarily been one of developing a container which has a consistent opening pressure, such that only pressure applied by an adult can open the container. Erratic opening pressures utilizing the conventional engaging means for the closure, i.e., the projection on the front of the lower portion of the container which is engaged in a recess in the front wall of the upper portion of the container, together with the difficulty in producing the recesses and protrusions which form the hinge mechanism of the container, have prevented the conventional metal tablet box from qualifying as a childproof container.

The present invention overcomes numerous disadvantages of previously used containers in that it can be readily prepared by utilization of flexible plastic materials and has reproducible opening and closing characteristics rendering it eminently suitable for use in packaging medicines.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an integrally formed, plastic container suitable for holding tablets.

It is another object of the present invention to provide an integrally formed, plastic container having reproducible opening characteristics.

It is still another object of the present invention to provide an integrally formed, plastic container which can qualify for certification as "childproof."

It is a still further object of the present invention to provide an injection molded, plastic container having two components joined by a "living hinge."

It is an even further object of this invention to provide an integrally formed plastic container which is tamper determinative and which protects the enclosed contents from contamination.

The foregoing objects and other advantages that are brought out hereinafter are realized in the container of the present invention in an integrally formed, one-piece plastic container which has a generally rectangular bottom section having a planar bottom wall, two opposed, upturned sidewalls, an upturned front wall, and an upturned back wall all of which are integrally formed and connected to each other. The container also has a top section having a planar top wall, two downturned sidewalls, and a downturned front wall all of which are integrally formed and connected to each other, and a downturned back wall integrally formed and connected to said top wall and to the rearmost edges of the downturned sidewalls, the latter connection being made by means of a fracturable plastic web. Integrally formed hinge means are provided which connect the back wall of the top section to the back wall of the bottom section. The top section is adapted to overlie the bottom section and to be frictionally engaged therewith when the container is in the closed position.

The present invention provides many advantages over those containers previously utilized for packaging medicants such as aspirin. The present container is readily formed of plastic material such as medium, low or high density polyethylene, polypropylene, or other semi-rigid plastic materials which can be readily injection molded. The device can be produced by preferably injection molding these thermoplastics to produce an integrally formed container having two rectangular compartments connected by a living hinge. The present container has reproducible opening characteristics which will qualify it as a childproof container.

Another advantage is that the container of this invention provides, by way of the fracturable plastic webs, a means for the consumer to detect whether or not the container has been tampered with by opening. This fracturable web also serves to keep the contents of the container contamination free.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective, elevational view of the container of the present invention showing the container in a closed position;

FIG. **2** is a rear view of the container shown in FIG. **1**;

FIG. **3** is a front, elevational view of the container as shown in FIG. **4**;

FIG. **4** is a top plan view of the container of the present invention in the open position;

FIG. **4A** is a cross-sectional view of the container of FIG. **4** along the line **4A—4A**;

FIG. **4B** is a broken, enlarged view of the hinge portion of the container as shown in FIG. **4A**;

FIG. **4C** is a broken, enlarged, perspective view of a forward corner of the lower section of the container as seen in FIG. **3**;

FIG. **4D** is an enlarged, broken view of the hinge portion of the container shown in FIG. **5A**;

FIG. **4E** is a broken, elevational, perspective view of an inside corner of the top section of the container as seen in FIG. **4**;

FIG. **4F** is an enlarged, broken, sectional view of the forward portion of the container of FIG. **5A** showing the details of the engagement of the latch means;

FIG. 5 is a top plan view of the container of the present invention shown in the closed position;

FIG. 5A is a cross-sectional view of the container of FIG. 5 taken along the line 5A—5A;

FIG. 6 is a broken perspective view of a rear corner of the container of FIG. 2 prior to force being exerted upon the top of the container by a human finger; and

FIG. 7 is the same view as FIG. 6 except that the rear corner is shown after the force has been exerted thereon by the human finger.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1–5, 4A and 5A, the container of the present invention is characterized in that it is made from one integrally formed piece of semi-flexible plastic material. The container, designated generally by the reference numeral **10**, is composed of two sections—a bottom section, designated generally by the numeral **11**, and a top section, designated generally by the numeral **12**. The bottom section includes a generally rectangular planar bottom wall **13** which is integrally connected to an upturned front wall **14**. The front wall **14** and the bottom wall **13** are integrally formed with and connected to opposed, upturned sidewalls **15** and **16**. The bottom section has a rear wall **17** which is integrally formed with and projects upward at a slight angle from the bottom wall **13**. The rear wall **17** is slightly less than one-half of the height of the front wall and sidewalls of the bottom section. The bottom section sidewalls and front wall and the top section sidewalls and front wall are preferably all of equal height. By these walls being of equal height the container can then be easily placed in an open upside down position for printing on the top or bottom walls without "rocking" of the container as would be the case if the walls were of unequal height.

The top section **12** of the container includes a generally planar top wall **18** which is integrally formed with and connected to a downturned (in the closed position) front wall **19**. The top wall **18** and front wall **19** are integrally formed with and connected to two opposed sidewalls **20** and **21**. Top wall **18** has integrally formed therewith a downwardly and rearwardly projecting rear wall **22**. Rear wall **22** is also connected at its ends to the rearmost ends of sidewalls **20** and **21** by integrally formed frangible plastic webs **20***a* and **21***a*. The rear walls **22** and **17** are joined by an integrally formed living hinge section **23**. As seen more clearly in FIGS. **4B** and **4D**, the hinge section **23** has a wall thickness which is substantially thinner than the wall thickness of the rear walls **22** and **17**. Preferably, the wall thickness of the hinge section is about one-half or less of the thickness of the rear walls **17** and **22**. The longitudinally extending groove **24** (which may be in any particular form, but is shown in the drawings as a semicircular groove) extends the full length of the rear walls. The groove provides a weakening of the major flexing portion of the hinge element **23** to facilitate easy flexure of the hinge element **23** when opening and closing the container.

Referring now to FIGS. **1**, **4A** and **5A**, it can be seen that bottom section **11** and top section **12** of the container have their sidewalls **15**, **16**, **20** and **21** respectively provided with rearwardly tapered sections **25** and **25***a* which permits the top wall **18** to be flexed downward and forward by application of thumb pressure to the rearward corners thereof (see the SQUEEZE HERE indications in FIG. **1**) to activate the latching means and to fracture frangible webs **21***a* and **20***a* as will be hereinafter described. As seen more clearly in FIG. **2**, the sidewalls **20** and **21** of the upper section of the container terminate at the rear end of the container and are integrally connected to the rear wall **22** by means of thin, frangible, plastic webs **21***a* and **20***a*. The rear wall **17** of the bottom section is also integrally attached (but not by frangible webs) to sidewalls **15** and **16**.

Referring now to FIGS **3**, **4**, **4A** and **4F**, the upper or top section of the container **12** and the bottom or lower section **11** of the container are held in the closed position, as seen in FIGS. **1**, **4F**, **5** and **5A**, by means of a left latch **27** and a right latch **28**. Each latch includes an integrally formed, short, longitudinally extending protrusion (**29** for the left latch and **30** for the right latch) on the inside wall of the front wall **19** of the top section **11** of the container. The two top protrusions **29** and **30** are adapted to engage and interlock with like left-hand protrusions **31** and right-hand protrusion **32** which are integrally formed with and project from the upper edge of the outside wall of the front wall **14** of the lower section of the container. Beneath protrusions **31** and **32** are channels **88** and **89**. These channels are optional and serve to give protrusions **31** and **32** more depth for obtaining attachment with top protrusions **29** and **30**. As seen more clearly in FIG. **4F**, when the top section of the container is folded over and pressed downwardly over the bottom section of the container, the two sections are latched together by engagement of the respective left- and right-hand protrusions on the top section and bottom section of the container. While the protrusions on each section of the container are shown in FIG. **4F** with sloping engaging walls, the protrusions may have transverse walls on the engaging surfaces, if desired.

In order to open the closed container, an adult will take the container in both hands and position the left- and right-hand rear corners of the box between the thumb and forefinger of the left and right hands and apply a combination of downward and forward pressure by the thumbs. This will tend to do two things—distort the upper cover to bow the front wall **19** outwardly thereby assisting in releasing the left- and right-hand latches; the forward pressure component will insure that the thin, frangible webs **20***a* and **21***a* will be broken and that the latch means are completely disengaged thereby permitting the spring force present in the hinge member **23** to swing the upper or top section of the container **18** open thereby exposing the contents of the container held in the lower section.

The container of the present invention may be fabricated from any suitable, flexible, thermoplastic material. Suitable thermoplastic materials are high, medium and low density polyethylene, polypropylene, and copolymers of ethylene and propylene with other comonomers, plasticized PVC and copolymers of vinyl chloride with other comonomers. Any plastic material which is sufficiently flexible to make operable an integrally formed, living hinge, i.e., the hinge **23**, can be used in the container of the present invention. The preferred material is polypropylene. The thicknesses of the hinge element **23** and the rear walls **17** and **22** of the container can be readily determined by experiment to provide the proper resistance to application of pressure

to insure against accidental opening of the container. Additionally, the thicknesses of these members, together with that of the top member **18,** may be suitably adjusted in order to require the application of a specific number of ounces of compression upon each corner of the container before the latches will release. The frangible webs **20***a* and **21***a* should have a thickness such that the compressive pressure that can reasonably be exerted by the forefingers and thumbs of an adult will cause the webs to fracture. The thickness of these webs will also be determined by the physical properties of the thermoplastic from which the container is formed and can be readily determined by those skilled in the plastic molding arts. If desired the webs may be shorter than the full height of the rear wall **22,** or they may be serated for easier fracturing. The container of the present invention may be easily formed by injection molding or by thermoforming suitable plastic material. The container is suitable for packaging medicants in that it can be designed to provide a childproof container.

While there has been described what is considered preferred embodiments of the present invention, it is understood that apparatus and design changes may be utilized for constructing and operating the container of the present invention. For example, instead of the latch members utilizing sloping surfaces on their engaging faces, these members may be made in the form of a generally rectangular protrusion whereby a more vigorous and forceful application of pressure will have to be applied to the rear of the top cover of the container in order to release these latch members. Additionally, if desired grooved or serated surfaces may be provided at the rear corners of the top and/or bottom sections of the container to secure a better grip on the container when applying pressure thereto for opening the container. What is claimed is:

1. In an integrally formed, one-piece plastic container, the combination comprising:

a. a generally rectangular bottom section having a planar bottom wall, two opposed, upturned sidewalls, an upturned back wall, and an upturned front wall, all of which are integrally formed and connected to each other;

b. a generally rectangular top section having a planar top wall, two opposed, downturned sidewalls, and a downturned front wall, all of which are integrally formed and connected to each other, and a downturned back wall integrally formed and connected to said top wall and to the rearmost edges of said downturned sidewalls, said connection of said downturned back wall and said downturned side walls being made by a fracturable web at each point of connection;

c. integrally formed hinge means connecting said back wall of said top section to said back wall of said bottom section; and

d. said top section adapted to overlie said bottom section and to be frictionally engaged therewith when said container is in the closed position.

2. In the container of claim **1** wherein both of said back walls are less than one-half the height of the adjacent sidewalls.

3. In the container of claim **1** wherein said hinge means includes a web of plastic material having a thickness of less than one-half the thickness of said back walls.

4. In the container of claim **1** wherein said fracturable webs can be fractured by the application of pressure exerted on the rear corners of the container by the fingers of an adult.

5. In the container of claim **1** wherein said front walls and said sidewalls of both sections are all of equal height.

6. In the container of claim **1** wherein said top and bottom sections are frictionally engaged in the closed position by integrally formed, spaced apart projections provided adjacent the upper edge of the outer wall of said upturned front wall, which projections are engaged by integrally formed, spaced apart projections provided adjacent the upper edge of the inner wall of said downturned front wall.

7. The container of claim **4** wherein the container is made of polypropylene.

8. In the container of claim **7** wherein said front walls and said sidewalls of both sections are all of equal height.

9. In the container of claim **8** wherein said top and bottom sections are frictionally engaged in the closed position by integrally formed, spaced apart projections provided adjacent the upper edge of the outer wall of said upturned front wall, which projections are engaged by integrally formed, spaced apart projections provided adjacent the upper edge of the inner wall of said downturned front wall.

* * * * *