Feb. 9, 1943. R. S. SANFORD 2,310,464

CARTON AND TRAY THEREFOR

Filed July 22, 1938 2 Sheets-Sheet 1

Fig. 1.

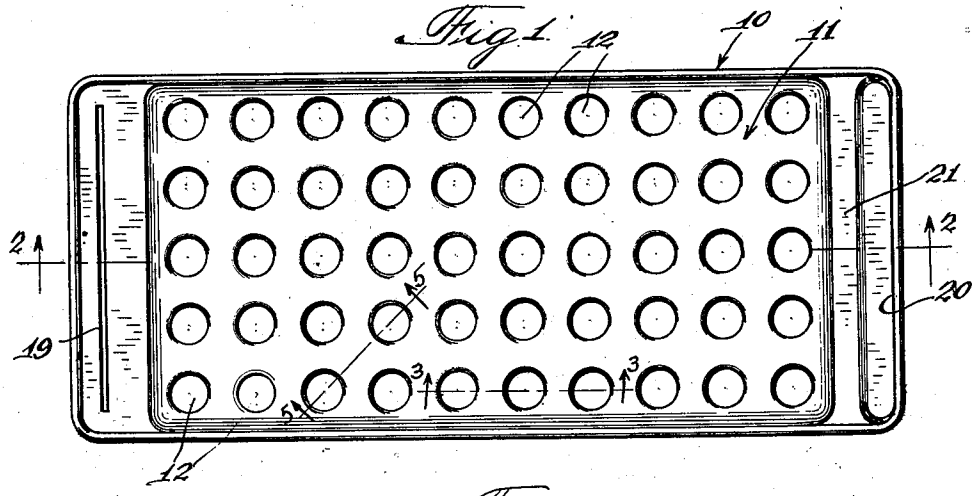


Fig. 2.

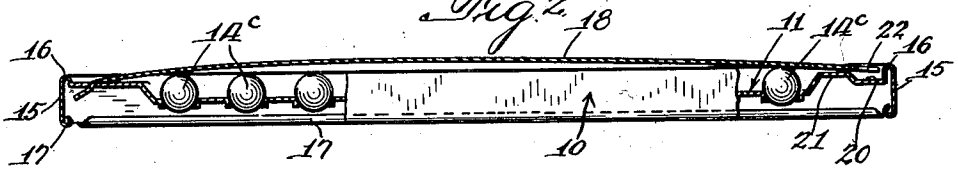


Fig. 3.

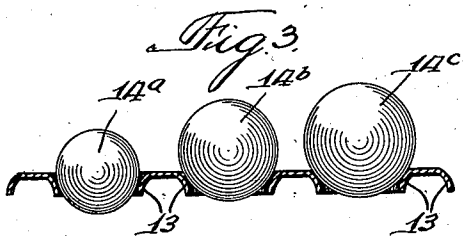


Fig. 4.

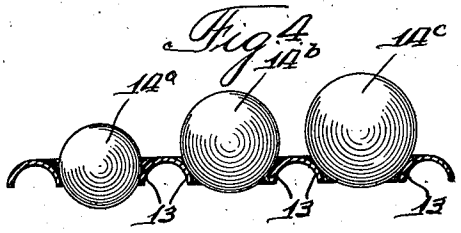


Fig. 5.

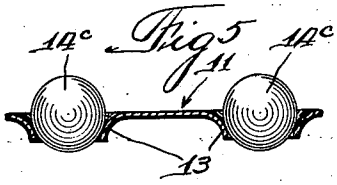


Fig. 6.

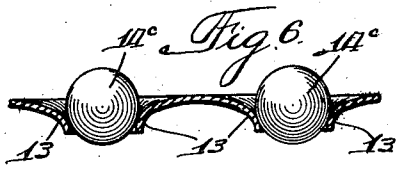


Fig. 7.

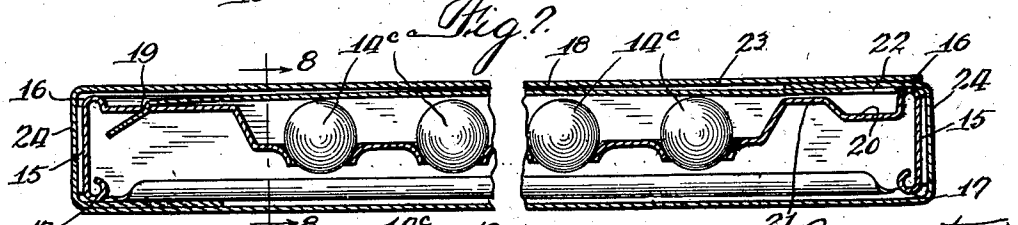


Fig. 8.

Inventor
Roy S. Sanford
By: Ames, Theis, Clear & Mecklenburger
Attys.

Feb. 9, 1943. R. S. SANFORD 2,310,464

CARTON AND TRAY THEREFOR

Filed July 22, 1938 2 Sheets-Sheet 2

Fig. 9.

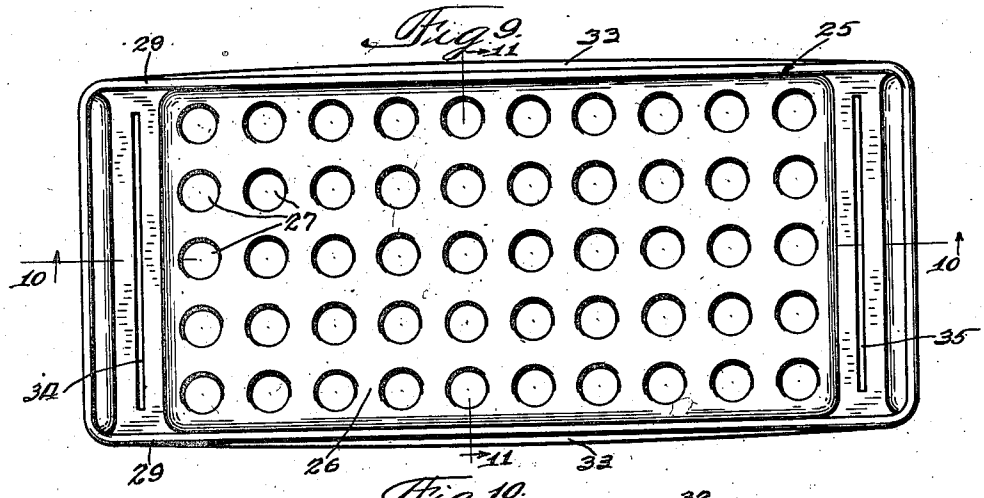


Fig. 10.

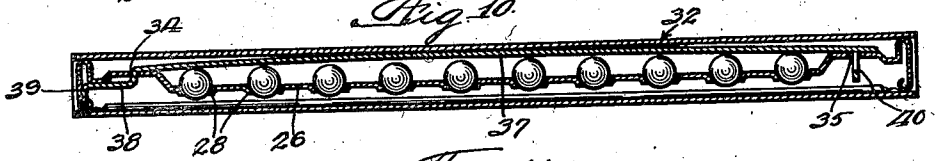


Fig. 11.

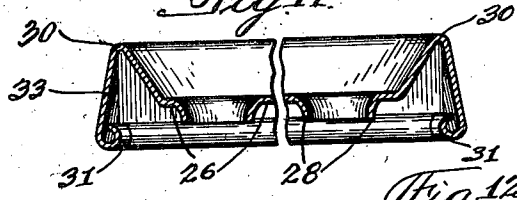


Fig. 12.

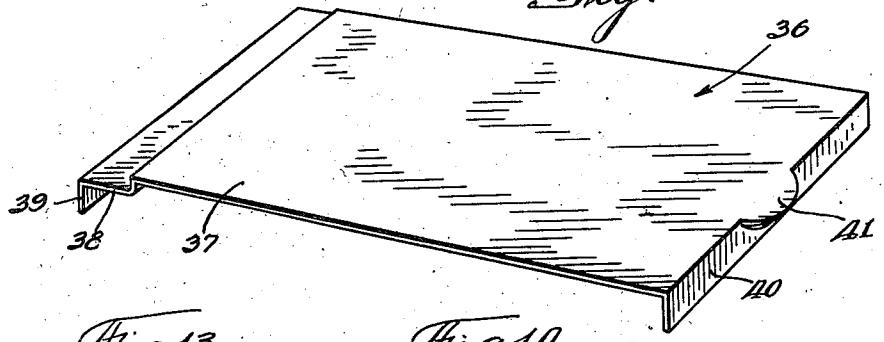


Fig. 13.



Fig. 14.



Inventor:
Roy S. Sanford.
By: Ames, Thiess, Olson & Mecklenburger.
Attys.

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UNITED STATES PATENT OFFICE

2,310,464

CARTON AND TRAY THEREFOR

Roy S. Sanford, Oakville, Conn., assignor to The Autoyre Company, Incorporated, Oakville, Conn., a corporation of Connecticut

Application July 22, 1938, Serial No. 220,627

14 Claims. (Cl. 206—42)

This invention relates to a carton and tray therefor and has special reference to a tray formed of sheet metal which is adapted to contain therein fragile or crushable merchandise, the tray being embraced by a casing.

More particularly, this invention relates to a carton comprising a tray formed of sheet metal having a plurality of spaced apertures bounded by ledges forming seats for holding articles in spaced-apart positions with a casing embracing the tray. The ledges of the sheet metal tray are preferably formed by converging the material bounding the apertures inwardly in a direction toward each other when viewed in cross section so as to have a soft line contact with the articles held in spaced-apart positions by the apertures.

The present invention contemplates the provision of a tray of the character indicated above, wherein the ledges formed from the material bounding the apertures are of annular configuration and converge radially inwardly when viewed in cross section to provide seats for holding globular articles of various sizes in spaced-apart positions. The radially inwardly converging ledges, and particularly as shown in the drawings and as will hereinafter be more particularly described, present arcuate surfaces for engaging the curvilinear surface of articles such as capsules, pills, and the like, and the engagement of the two curved surfaces presents merely a soft line contact to articles of this nature which may vary in size and shape.

In the prior art of which applicant is aware apertures are provided for holding articles in spaced-apart positions, but in many instances such apertures have sharp angular edges which, while they may be satisfactory for use in holding efficiently certain objects such as eggs having hard shells, still are not satisfactory from the standpoint of holding capsules and like articles. The shells of eggs are not affected by temperature conditions while capsules are definitely affected. There are, therefore, many articles of merchandise which, while they may be housed effectively under ordinary conditions to prevent them from being crushed in the usual type of container, would not be so effectively housed under all conditions to which they may be subjected.

The ordinary capsule, for example, if kept in a cool place, may be satisfactorily stored in any usual container. However, if the capsule is even temporarily stored or transported under higher temperature conditions, the sharp edges may break through the shell of the capsule or at least deform the same and cause it to be mutilated or destroyed. The present invention, therefore, has for one of its objects the provision of a construction wherein the capsule under even unusual temperature conditions may be effectively stored or handled, the soft seat provided by the arcuate surfaces substantially preventing distortion or disfiguration of the article held.

In prior art constructions where a cardboard spacer or tray is employed, having ledges surrounding the spaced apertures, the ledges ordinarily conform substantially to the shape of the article; and in the case of capsules where they are stored or handled under higher temperature conditions, the contacting surfaces are such as to prevent the ready removal of the capsule therefrom, owing to the fact that the surface of the capsule becomes more or less plastic and sticks to the cardboard ledges. In sticking to the ledges, such a wide and substantial contact is had that in many instances, if not most, the capsule either is destroyed or becomes unfit for consumption. Thus, where a line contact is had in the usual constructions, such contact is so sharp as not to be wholly satisfactory for use; and, where ledges have been provided in cardboard material, these ledges present too substantial a contact area with the article held so that under various conditions of use the article is mutilated or destroyed.

In the use of sheet metal, measurements of the openings and ledges can be very closely controlled, and therefore, as one result thereof, articles of various sizes may be employed in the same tray. In the usual cardboard construction or in the use of any other relatively soft material, it is only practical to employ one tray for each size. A smaller size would readily fall through, while a larger size would not be effectively held, owing to the softness and give of such material. The present invention, therefore, affords the opportunity for a manufacturer to design a tray for use with various sized articles within wide limits. Sheet metal also affords the further opportunity for sanitation, since the trays may be sterilized and even re-used when desired. Further, the sheet metal trays may be enameled in keeping with hospital uses, such enameling preventing accumulation of organisms which may otherwise be held in the usual fibrous trays.

This invention further contemplates the provision of a flap for covering the tray and for preventing axial displacement of the articles from the ledges bounding the apertures. The flap is preferably formed of a relatively stiff although

flexible member, one end of which is inserted in a laterally extending opening of the tray and, when in position thereon, will tend to bow outwardly therefrom. The tray and flap are embraced by a casing, and the flap is held in position over the tray by the casing, the casing resisting the outward bow of the flap.

The position of the flap will readily be seen to relieve any unnecessary pressure on the articles held on the ledges while functioning to prevent displacement thereof. The normal resiliency of the material of the flap exerts its pressure outwardly against the wall of the casing, whereas in constructions now on the market the weight of the flap in most instances bears on the tops of the articles. Where capsules are held in the trays even the weight of the flap thereon may tend to distort the capsules, and the capsules may even stick thereto in conditions of higher than normal temperature, the capsules becoming more or less plastic and adhering to the flap merely by the weight of the flap resting thereon.

The tray is provided with flanges extending above and below the main body portion at least to the planes of the tops and bottoms of the articles, the flanges acting as runners for engaging the casing to facilitate removal therefrom. The edges of the flanges are preferably beaded to provide more or less roller surfaces for substantially eliminating friction. The beaded edges, of course, provide a reinforcing means for the tray so as to afford a durable construction and prevent the crushing of the carton when the cartons are stacked in storage.

The sheet metal of the tray is preferably of very thin material and may be of a minimum thickness owing to the reinforced construction thereof. The weight of the tray may, therefore, be comparable to that of the usual cardboard tray of single thickness and, of course, is much lighter in weight than trays formed of a plurality of thicknesses such as have been heretofore employed more successfully in the storage of capsules. Also, by reason of the relative thinness of the metal tray the opening for receiving the end of the flap is substantially the same size as the thickness of the flap, and when one end of the flap is inserted in the opening at right angles to the normal plane of the flap a sharp edge is presented so that it is at least difficult, if not impossible, to remove the flap excepting by a straight pull at right angles to its normal plane of use.

Other objects and advantages of this invention will hereinafter be more particularly pointed out, and for a more complete understanding of the characteristic features of this invention reference may now be had to the following description when taken together with the accompanying drawings, in which latter:

Figure 1 is a top plan view of a tray embodying the features of this invention;

Fig. 2 is a side elevational view of the construction shown in Fig. 1, partially in section, as taken on the lines 2—2 thereof and showing the flap in section in position thereon;

Fig. 3 is an enlarged sectional view taken on the line 3—3 of Fig. 1, showing capsules of different sizes in position thereon;

Fig. 4 is a view similar to Fig. 3 of a modified form of tray construction embodying the features of this invention;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 1, showing articles of the same size in position thereon;

Fig. 6 is a view similar to Fig. 5 of a modified form of construction embodying the features of this invention;

Fig. 7 is an enlarged central vertical sectional view of the construction of Fig. 1 with the central portion broken away;

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7 with a central portion thereof broken away.

Fig. 9 is a view similar to Fig. 1, of a modified form of tray construction embodying the features of this invention;

Fig. 10 is a view similar to Fig. 2, showing the modified form of tray of Fig. 9, together with a modified flap construction disposed in a casing shown in section;

Fig. 11 is an enlarged fragmentary sectional view taken on the line 11—11 of Fig. 9;

Fig. 12 is a perspective view of the flap construction shown in Fig. 10;

Fig. 13 is an enlarged detailed sectional view of a portion of the tray having an aperture bounded by a ledge of a modified type; and

Fig. 14 is a view similar to Fig. 13, showing a ledge of a still further modified type.

Referring now to the drawings, and more particularly to Figs. 1 to 8, inclusive, thereof, the tray embodying the features of this invention is preferably formed of a single sheet of metal of a very light gauge. It has been found preferable to form the tray of sheet steel of substantially paper thickness. While other metals may be readily employed, allowances must be made for the character of the material. In using sheet steel, it may be desirable to plate the tray with cadmium, nickel, or chrome, or then again it may be desirable to enamel the tray. Also, the use of cast aluminum or of a polished aluminum sheet may be desirable.

The sheet metal tray 10 is provided with a substantially horizontally extending main body portion 11 having a plurality of spaced apertures 12 formed therein, the material bounding the apertures forming ledges 13 for holding articles 14*a*, 14*b*, or 14*c* in spaced-apart positions. The apertures may be aligned in rows either staggered or straight as may be more convenient for filling. In the drawings the rows of apertures are formed in straight lines both longitudinally and laterally of the main body portion. The apertures are shown as being round with annular ledges, although, of course, it is to be understood that apertures of any configuration may be employed in keeping with the configuration of the article to be held therein. For example, capsules may be of globular or elliptical configuration and it is desirable to have the aperture conform therewith, although this is not entirely essential.

The ledges 13 converge inwardly in a direction toward each other when viewed in cross section. The specific ledges shown are of arcuate configuration, although it is to be understood that the ledges may converge in a straight line or in either a convex or concave arc. The converging ledges of convex form are preferably shown.

By referring more particularly to Fig. 3 it will be observed that the apertures and ledges are of the same size and shape, and yet efficiently hold the articles of various sizes in spaced-apart positions. The article 14*a* of smaller diameter extends farther into the aperture than the article 14*b* of larger diameter. However, the same line contact is obtained in the use of any of the various sizes shown, and, as above stated, by reason of the converging directions of the ledges a soft line contact is obtained.

In Figs. 3 and 5 the material between the apertures is substantially flat, while in Figs. 4 and 6 the material between the apertures is formed arcuately so that, in filling, the articles will automatically seek their positions on the ledges. The material between the apertures need not necessarily be of arcuate configuration but should extend from an intermediate point divergingly toward the ledges in the shape, for example, of a pyramid, cone, or the like.

The main body portion 11 of the tray 10 is provided with a peripheral flange 15 extending substantially vertically therefrom, the main body portion lying in a plane intermediate the edges of the flange. The peripheral flange 15 is preferably formed integrally with the main body portion and extends upwardly a distance at least to the plane of the tops of the articles and downwardly therefrom a distance to the plane of the bottoms of the articles. The upper edge of the flange, formed by bending the material of the flange downwardly upon itself, is preferably beaded, as at 16, with the lower edge of the flange turned inwardly to form a bead 17. As will hereinafter be more particularly apparent, the beaded edges 16 and 17 act as runners to facilitate removal of the tray from the carton.

A flap 18, preferably formed of cardboard or other relatively stiff yet flexible material, is detachably secured to the tray for covering the tray and for preventing axial displacement of the articles from the ledges 13. The main body portion 11 of the tray is provided with a laterally extending slit 19 of substantially the same length as the width of the flap and of substantially the same width as the thickness of the material of the flap.

The end of the flap 18 is inserted into the slit 19 a short distance and is thereafter laid across the tray in its longitudinal direction. By reason of the relative stiffness of the material of the flap and the fact that the end of the flap is inserted into the slit at a substantially right angle to the normal plane of the flap, the flap bows away from the tray, as shown more particularly in Fig. 2. In this manner of construction the flap will not rest of its own weight on the top of the tray or on the tops of the articles, and the articles are thus relieved of unnecessary pressure during the functioning of the flap to prevent axial displacement of the articles from the tray.

There are a great number of conditions of association between the flap and the tray in which the functions of retaining the flap from pulling out of the opening in the tray and bowing outwardly of the tray may be obtained. The slit 19 in the tray may be disposed therein at various angles, and the end of the flap inserted through the openings may be of different shapes. The present invention contemplates the provision of a slit in the tray to prevent accidental detachment of the flap from the tray and to direct a bowing outwardly of the flap from the tray to relieve excessive pressure on the articles disposed on the tray. Various modifications of this construction will be apparent to those skilled in the art, and this invention is not limited to the specific construction shown.

The end of the tray opposite to that of the slit end is provided with a recess 20 depressed from the surface of the tray in the main body portion thereof, providing a ledge 21 on which the free end of the flap 18 may rest. The flap is provided with a notch 22 so that access may be had to the articles on the tray by inserting the tip of the finger in the notch 22 above the recess 20 to lift the flap 18. The flap 18 may be scored laterally at spaced intervals over the surface thereof so that sections only of the flap may be lifted to uncover certain only of the articles.

A casing 23 embraces the flap 18 and the tray 10, the casing preferably comprising a substantially rectangular paper, cardboard, or metal box having open ends enclosed by flaps 24. The flaps, as is usual in the cardboard type of construction, are preferably formed integrally with the main body portion with the flap extending into the space between the walls thereof to removably enclose the ends.

When the tray is initially filled with articles the cover flap 18 is secured in position, as shown in Fig. 2, whereafter the assembled tray and flap are inserted into an open end of the casing and when in position therein are enclosed by the end flaps 24. In moving the tray into and out of position within the casing, the beaded edges 16 and 17 of the flange 15 act as runners to facilitate the relative movement therebetween. The flap 18 is held in position to prevent axial displacement of the articles from their seats, although the position of the flap against the casing relieves unnecessary pressure on the articles.

Referring now more particularly to Figs. 9 to 12, inclusive, a modified form of carton and tray construction embodying the features of this invention is shown, the tray 25 being preferably formed of a single sheet of metal of a very light gauge. The tray comprises a substantially horizontally extending main body portion 26 having a plurality of spaced apertures 27 formed therein, the material bounding the apertures forming ledges 28 for holding articles in spaced-apart positions.

The main body portion 26 of the tray 25 is provided with a peripheral flange 29 extending substantially vertically therefrom, the main body portion lying preferably in a plane intermediate the edges of the flange. The peripheral flange 29 is preferably formed integrally with the main body portion and extends upwardly a distance at least to the plane of the tops of the articles and downwardly therefrom a distance at least to the plane of the bottom of the articles. The upper edge of the flange formed by bending the material of the flange downwardly upon itself is beaded as at 30 with the lower edge of the flange being turned inwardly to form a bead 31. These beaded edges, as in the previously described embodiment, act as runners to facilitate removal of the tray from the carton.

It is desirable, in some instances, to form the casing or carton 32 for the tray with open ends such that the tray may readily be moved into position therein and withdrawn therefrom. Without flaps to enclose the open ends of the casing or carton, the present embodiment of tray has a portion deformed from the material thereof and out of its normal plane for engaging the inner walls of the casing to provide frictional resistance against relative movement therebetween. Such deformed portion is shown more particularly in Figs. 9 and 11 and consists preferably in bowing the flange outwardly as at 33 in a longitudinal direction.

Since the tray 25 is of metal and preferably resilient, moving the tray to position within the carton provides a frictional resistance in either overcoming the resilience of the material of the flange or in deforming the side walls of the car-

ton depending upon which resistance is greater, that is, of the carton or of the flanges of the tray. The bowing may extend substantially over the entire longitudinally extending portion of the flanges **29** or may extend over but a short distance thereof sufficient to give frictional resistance to relative movement between the tray and the carton.

In the present embodiment the main body portion of the tray is provided with a laterally extending slit **34** adjacent one end thereof and a second laterally extending slit **35** adjacent the other end thereof. A flap **36** preferably formed of cardboard or other relatively stiff yet flexible material is detachably secured to the tray for covering the tray and for preventing axial displacement of the articles from the seats formed by the material surrounding the apertures **27**.

The flap **36** preferably comprises a main body portion **37** having an offset portion **38** and angularly extending end portions **39** and **40**. The end portion **39** and offset portion **38** are inserted into the laterally extending slit **34** of the tray with the shoulder formed at the juncture between the offset portion and the main body portion resting in the slit and the end portion **39** lying adjacent the flange of the tray. The end portion **40** is inserted in the transverse slit **35** and as a result the flap **36** is prevented from longitudinal displacement of the tray.

When the tray is removed from the carton, a finger piece **41** extending beyond the end of the main body portion and preferably cut and deformed from the material of the end portion **40** provides a grip to raise the flap upwardly in a direction away from the tray so that access may be had to the articles in the tray. The shoulder formed between the offset portion **38** and the main body portion **37** acts as a fulcrum on which the main body portion is pivoted.

The end portions **39** and **40**, together with the offset portion **38**, prevent longitudinal displacement of the flap **36** from the tray **25** in moving the tray into and out of the carton or casing. Also, in the use of the tray independently of the casing such as storing the tray in an ice box, the tray and flap comprise a complete unit with the flap preventing displacement of the pills or articles from the tray. However, in the use of the tray and flap in the casing, it may be desirable to have the main body portion **37** of slightly greater length than the distance between the transverse slits **34** and **35** to effect a bowing outwardly of the main body portion so that the weight of the flap will not rest on the articles contained in the tray but will be urged outwardly against the adjacent portion of the carton.

Referring now more particularly to Fig. 13, a modified form of ledge construction for the tray is shown, the ledges **42** converging inwardly in a direction toward each other when viewed in cross section in a straight line to provide seats for holding articles of various sizes in spaced-apart positions. In Fig. 14 the ledges **43** converge inwardly in a direction toward each other when viewed in cross section and different from Fig. 13 in that the ledges are arcuately formed instead of being formed in a straight line. Also the ledges **43** differ from the ledges **13** of Figs. 3 to 6, inclusive, in that the arcuate formation of the ledges is in the opposite direction.

While several embodiments of this invention are herein shown and described, it is to be understood that various modifications thereof may be apparent to those skilled in the art without departing from the spirit and scope of this invention, and, therefore, the same is only to be limited by the scope of the prior art and the appended claims.

I claim:

1. A carton comprising a tray formed of sheet metal having a plurality of spaced apertures, the material bounding said apertures forming seats for holding articles in spaced apart positions, a peripheral flange on opposed sides of said main body portion, and a casing embracing said tray and said flanges, each of said flanges having a portion deformed from the material thereof and out of its normal plane for engaging said casing to provide frictional resistance against relative movement therebetween.

2. A carton comprising a tray formed of sheet metal having a plurality of spaced apertures, the material bounding said apertures forming seats for holding articles in spaced-apart positions, a flap for covering said tray and for preventing axial displacement of said articles from said seats, and a casing embracing said tray and said flap.

3. A carton comprising a tray formed of enameled sheet metal having a plurality of spaced apertures, the material bounding said apertures forming seats for holding articles in spaced-apart positions, a flap for covering said tray and for preventing axial displacement of said articles from said seats, and a casing embracing said tray and said flap.

4. A carton comprising a tray formed of sheet metal having a plurality of spaced apertures bounded by ledges forming seats for holding articles in spaced-apart positions, a flap for covering said tray and for preventing axial displacement of said articles from said ledges, said tray having a transverse slit substantially the thickness of said flap for receiving one end of said flap, and a casing embracing said tray and said flap.

5. A carton comprising a tray formed of sheet metal having a plurality of spaced apertures, the material bounding said apertures forming seats for holding articles in spaced-apart positions, a flap for covering said tray and for preventing axial displacement of said articles from said seats, said tray having a transverse slit substantially the thickness of said flap for receiving one end of said flap, said flap being formed of a relatively stiff flexible material which when in position on said tray will tend to bow outwardly therefrom, and a casing embracing said tray and said flap.

6. A carton comprising a tray formed of sheet metal having a plurality of spaced apertures, the material bounding said apertures forming seats for holding articles in spaced-apart positions, a cardboard flap for covering said tray and for preventing axial displacement of said articles from said seats, said tray having a transverse slit substantially the thickness of said flap for receiving one end of said flap, said flap tending to bow outwardly from said tray, and a casing embracing said tray and said flap.

7. A carton comprising a sheet metal tray having a substantially horizontally extending main body portion with a plurality of spaced apertures, the material bounding said apertures forming seats for holding articles in spaced-apart positions, a flap for covering said tray and for preventing axial displacement of said articles from said seats, said tray having flanges extending above and below said main body portion a distance at least to the planes of the tops and bottoms of said articles, and a casing embracing said tray and said flap, said flanges acting as run-

ners for engaging said casing to facilitate removal therefrom.

8. A carton comprising a sheet metal tray having a substantially horizontally extending main body portion with a plurality of spaced apertures, the material bounding said apertures forming seats for holding articles in spaced-apart positions, a flap for covering said tray and for preventing axial displacement of said articles from said seats, said tray having a substantially vertically extending peripheral flange bounding said main body portion and said flange having beaded edges in a plane above and below said main body portion, and a casing embracing said tray and said flap, said beaded edges acting as runners for engaging said casing to facilitate removal therefrom.

9. A carton comprising a tray formed of sheet metal having a plurality of spaced apertures, the material bounding said apertures forming seats for holding articles in spaced-apart positions, a flap for covering said tray and for preventing axial displacement of said articles from said seats, said tray having an opening for detachably receiving one end of said flap, and a casing embracing said tray and said flap.

10. A carton comprising a tray formed of sheet metal having a plurality of spaced apertures, the material bounding said apertures forming seats for holding articles in spaced-apart positions, a flap for covering said tray and for preventing axial displacement of said articles from said seats, said tray having a transverse slit at opposed ends thereof for receiving the ends of said flap, and a casing embracing said tray and said flap.

11. A tray formed of sheet metal having a substantially horizontally extending main body portion with a plurality of spaced depressions therein forming seats for holding articles in spaced-apart positions, a substantially vertically extending flange on opposed edges of said main body portion, said main body portion lying in a plane between the edges of said flange, a flap for covering said tray and for preventing axial displacement of said articles from said seats, and means for detachably holding said flap on said tray.

12. A tray formed of sheet metal having a substantially horizontally extending main body portion with a plurality of spaced depressions therein forming seats for holding articles in spaced-apart positions, a substantially vertically extending flange on opposed edges of said main body portion, said main body portion lying in a plane between the edges of said flange, a flap for covering said tray and for preventing axial displacement of said articles from said seats, said main body portion having a transverse slit at one end thereof substantially the thickness of said flap for receiving a portion thereof to hold said flap detachably on said tray.

13. A tray formed of sheet metal having a substantially horizontally extending main body portion with a plurality of spaced depressions therein forming seats for holding articles in spaced-apart positions, a substantially vertically extending flange on opposed edges of said main body portion, said main body portion lying in a plane between the edges of said flange, a flap for covering said tray and for preventing axial displacement of said articles from said seats, said flange having an open beaded edge and said main body portion having a transverse slit at one end thereof, a portion of said flap extending through said slit and into said opening of said beaded edge to hold said flap detachably on said tray.

14. A tray formed of sheet metal having a substantially horizontally extending main body portion with a plurality of spaced depressions therein forming seats for holding articles in spaced-apart positions, a substantially vertically extending flange on opposed edges of said main body portion, said main body portion lying in a plane between the edges of said flange, a flap for covering said tray and for preventing axial displacement of said articles from said seats, said flap having angular extensions adjacent the ends thereof and said main body portion having openings for receiving said extensions to hold said flap detachably on said tray.

ROY S. SANFORD.