March 20, 1973 G. L. MEYERS 3,721,380

PARTITIONED TRAY

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FIG. 1

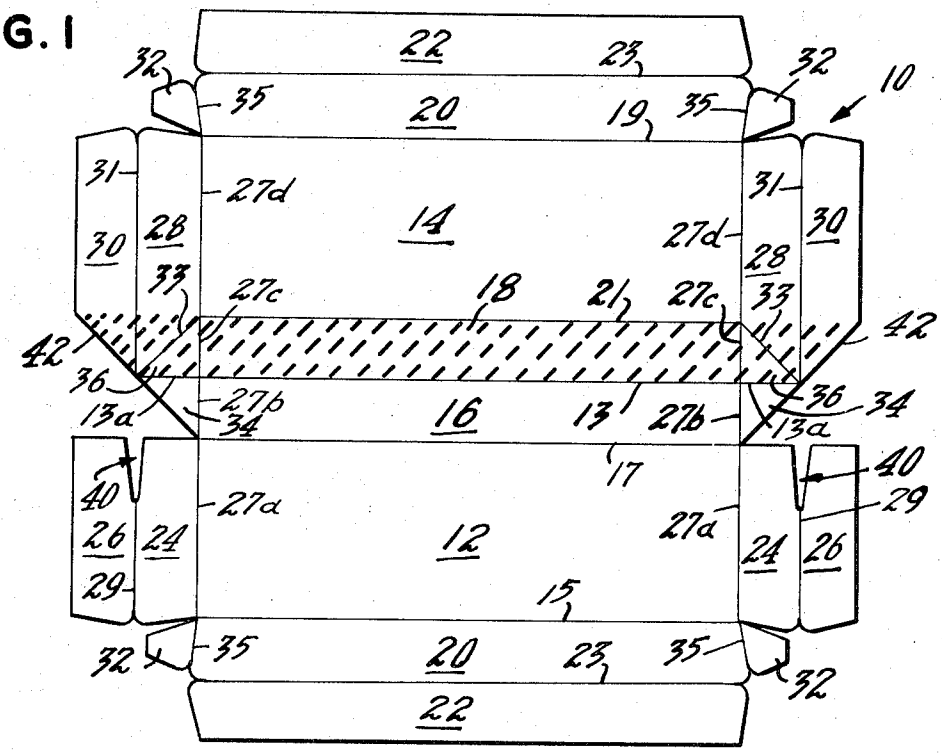
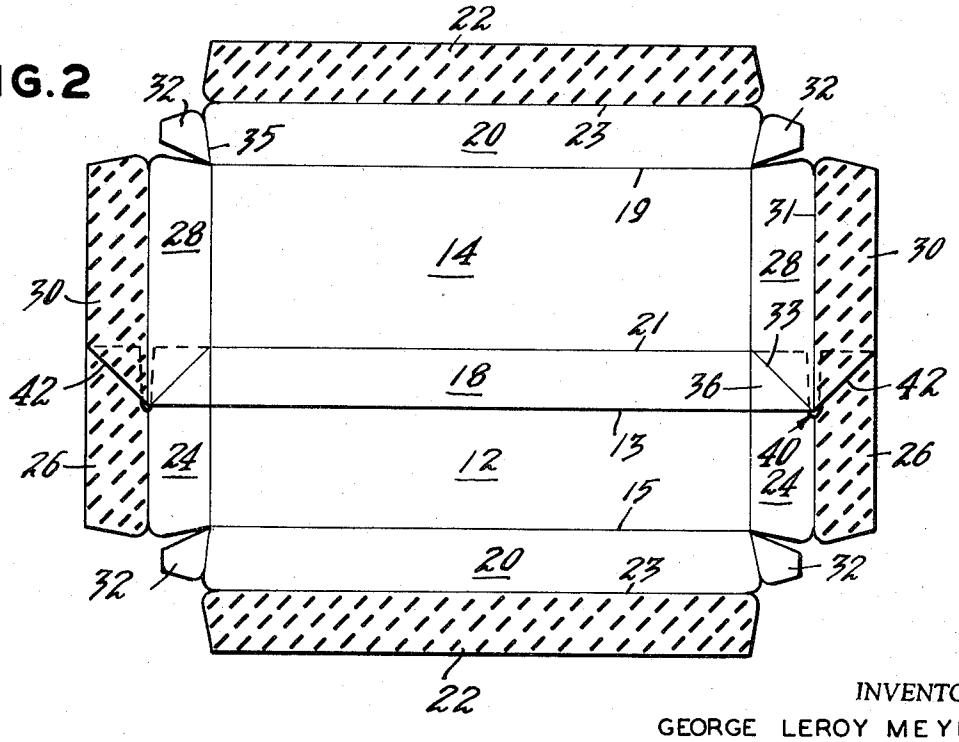


FIG. 2



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FIG. 3

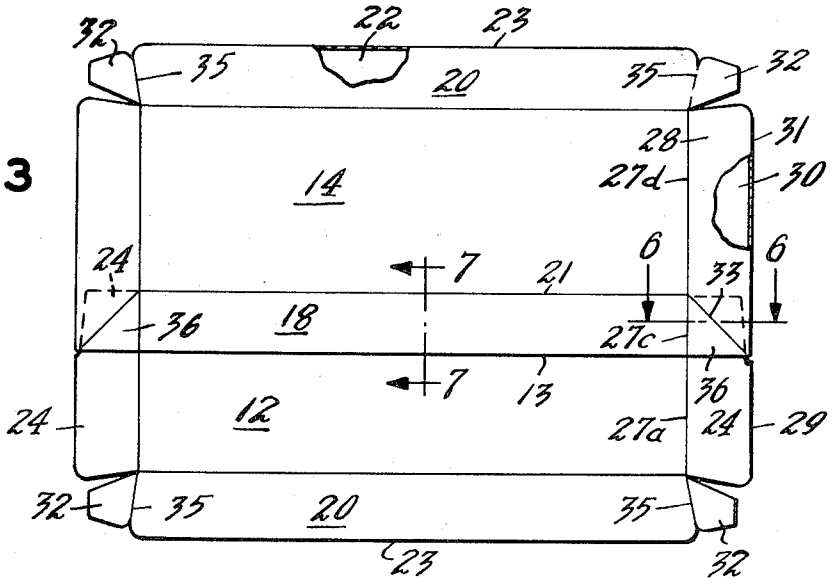
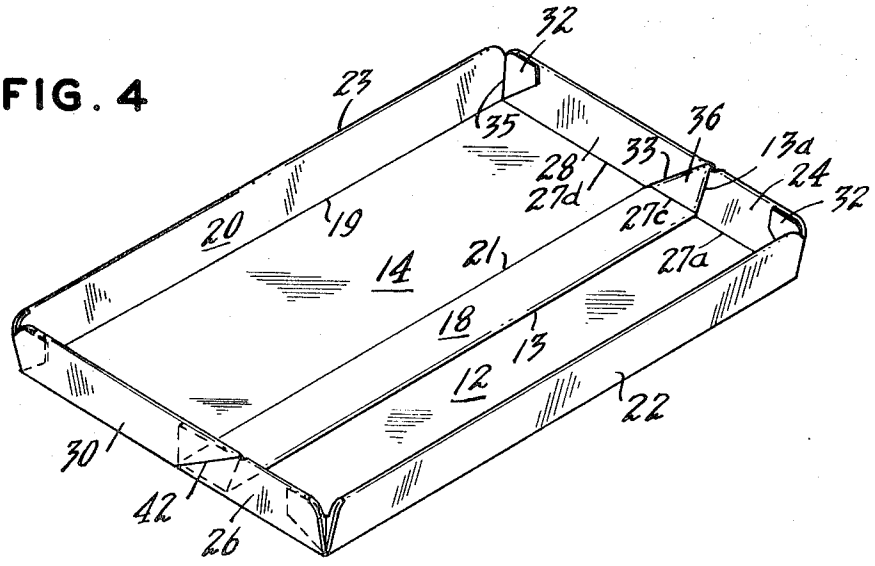


FIG. 4



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FIG. 5

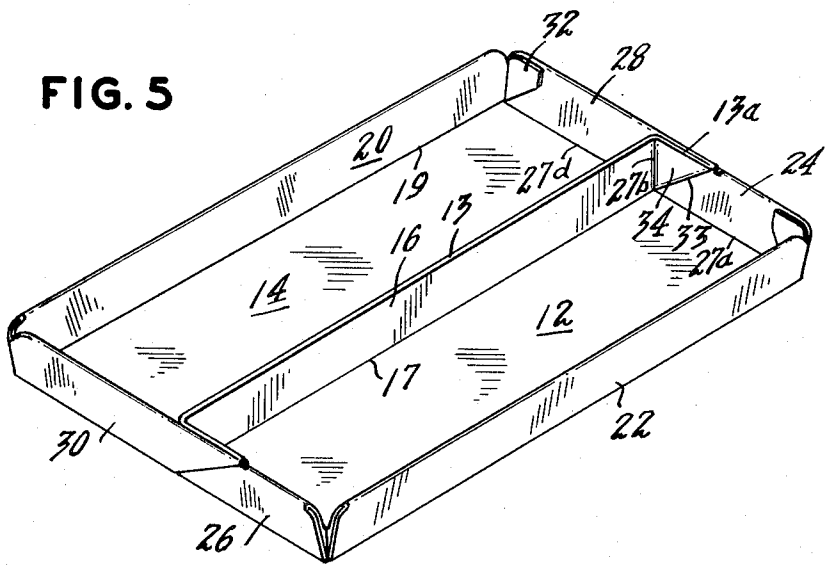


FIG. 6

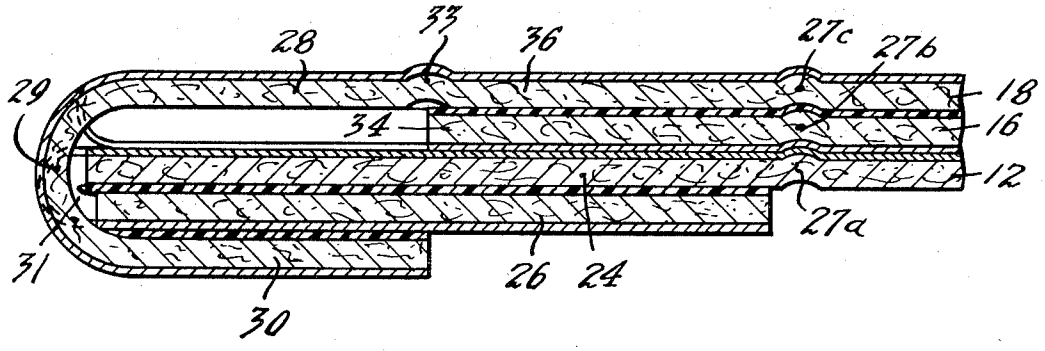
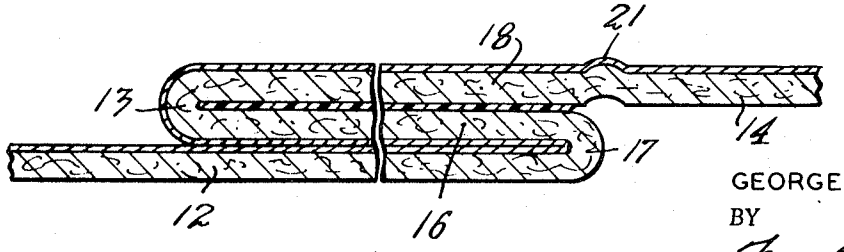


FIG. 7



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3,721,380

PARTITIONED TRAY

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Int. Cl. B65d 85/36
U.S. Cl. 229—15 8 Claims

ABSTRACT OF THE DISCLOSURE

A one-piece tapered food packaging tray having a centrally located, integral partition member hingedly movable between a collapsed position in which a plurality of trays may be shipped in nested condition and an erected position in which the partition positively divides the tray into two separate compartments. The tray has double thickness side walls and, in the preferred embodiment, is foil coated on all inner surfaces and on the outer side wall surfaces.

BACKGROUND OF THE INVENTION

This invention relates to a one-piece partitioned tray, particularly for the packaging of foodstuffs, although the tray is equally adaptable to the packaging of other products. More specifically, the invention relates to a tray constructed of a semi-rigid sheet material such as paperboard, preferably having a thin metallic foil adhesive-laminated thereto on one side thereof, and having a centrally located partition which separates the tray into two compartments of more or less equal capacity. In the construction of the preferred, foil coated embodiments of this invention, the metal foil serves as the inner surface of the tray and covers both sides of the partition in its operative position. Further, the four side walls of the tray are of double thickness and the metal foil extends to cover the outside of each of these walls so that the tray is suitable for convenience food packaging and, together with its contents, may be preheated in an oven before the food product is served. The partition and the pair of opposed side walls with which it is operatively connected are of a unique construction which permits manufacture of the tray on conventional gluing and tray-forming equipment and which permits the resultant trays to be stacked and shipped in tightly nested condition with the partition resting flat against the inner bottom surface of the tray. Preliminary to filling the tray with a product, the partition may be readily pivoted into an upright position in which it effectively divides the tray into two isolated compartments. Although the following discussion is related particularly to foil-coated paperboard trays, it is to be understood that the unique features of the tray construction are equally applicable to uncoated paperboard trays, plastic coated paperboard trays and the like.

Convenience foods such as bakery items including dinner rolls, sweet rolls, coffee cakes and the like are often packaged in trays of aluminum or paperboard laminated to aluminum foil, the tray and its contents being overwrapped in a film of regenerated cellulose, a polyolefin or equivalent transparent plastic, it being intended that the housewife, after removal of the overwrap, will heat the product in the packaging tray before placing it on the dining table. In this connection, a need has been expressed for a divided or partitioned tray in which more than one variety or flavor of, for example, coffee cake can be packaged in order to more adequately provide for the varied taste preferences of the different members of a group being served with the food product. In order that such need may be economically satisfied, the packaging must be capable of manufacture on standard high speed carton or tray making equipment, must occupy a minimum of space in shipping to the food processor, must operate smoothly on package filling and wrapping machinery, must be attractive in appearance to the consumer and must be capable of withstanding the temperatures normally encountered in the preheating of the packaged food product in the home.

SUMMARY OF THE INVENTION

These and other criteria for the packaging of "heat-in-the-tray" food products are satisfactorily met by the product of the present invention, which, in a preferred embodiment, comprises a nestable metal-foil lined paperboard tray having double thickness, tapered side walls which are foil coated on the outside as well as the inside and having a centrally located, unitary partition which is maintained in a collapsed position planar with the bottom panel of the tray during shipping to the food packager and which may be erected very simply into a position normal to the bottom panel to divide the tray into two compartments which may thereafter be filled with different food products without fear of intermingling thereof.

It is an object of this invention, therefore, to provide a packaging tray for comestibles or other products which are intended to be preheated before consumption.

It is a further object to provide a compartmented tray in which two different food items may be packaged and may be preheated by the consumer without intermingling of the package contents.

It is a further object to provide a compartmented tray which may be produced on standard carton cutting, gluing and tray forming equipment and stacked in nested array to occupy a minimal volume of shipping space.

BRIEF DESCRIPTION OF THE DRAWINGS

Further objects will become apparent from the following specification and drawings, in which:

FIG. 1 is a plan view of the blank of the tray of this invention,

FIG. 2 is a plan view of the tray blank at a stage in the tray manufacture in which the double thickness partition panel has been formed and glued,

FIG. 3 is a plan view of the tray blank at a stage in the tray manufacture in which the double thickness side wall panels have been folded and glued,

FIG. 4 is an isometric view of the completely formed tray with the partition in its collapsed or shipping position,

FIG. 5 is an isometric view of the tray with the partition in erected position,

FIG. 6 is an enlarged cross-sectional view of a portion of the tray side and bottom wall taken along line 6—6 of FIG. 3, and

FIG. 7 is an enlarged cross-sectional view, fragmented, of a portion of the bottom wall and collapsed partition of the tray taken along line 7—7 of FIG. 3.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

The blank, generally indicated by the FIG. 10, from which the tray is constructed, comprises a paperboard sheet material of suitable thickness, preferably between about 0.012 and 0.24 in. in thickness, and preferably having one surface thereof covered with a thin metal foil, suitably aluminum foil, of about 0.00037 in. in thickness. The foil is overall laminated to the paperboard by a suitable temperature-stable adhesive. The blank 10 is suitably cut and scored to provide a first bottom panel 12, a second bottom panel 14, first and second partition panels 16 and 18, an opposed air of inner side wall panels 20 with corresponding outer side wall panels 22 hingedly connected thereto, an opposed pair of first inner end wall panels 24 with corresponding first outer end wall panels

26 hinged thereto, an opposed pair of second inner end wall panels 28 with corresponding second outer end wall panels 30 hinged thereto, corner glue tabs 32 extending from the ends of the inner side wall panels 20 and paired triangular first partition web panels 34 and triangular second partition web panels 36 hinged to the ends of the first and second partition panels 16 and 18, respectively.

The first and second partition panels 16 and 18 are joined at their top edges along score lines 13 which serves as a hinge line between these panels. Similarly, the first bottom panel 12 is joined on one side edge to the bottom edge of inner side wall panel 20 along score line 15 and on the opposite side edge to the bottom edge of the first partition panel 16 along score line 17. Score lines 19 and 21 similarly join second bottom panel 14 to the other inner side wall panel 20 and second partition panel 18, respectively. Scores 23 join respective pairs of inner and outer side wall panels 20 and 22. Scores 13, 15, 17, 19, 21 and 23 are all parallell.

At the juncture of each end of the bottom panels with the end wall panels is score line 27, comprising four portions as follows: portion 27*a* joining first bottom panel 12 with first inner end wall panel 24, portion 27*b* joining first partition panel 16 with first partition web panel 34, portion 27*c* joining second partition panel 18 with second partititon web panel 36, and portion 27*d* joining second bottom panel 14 with second inner end wall panel 28.

The inner end wall panels are joined to the outer end wall panels by score lines as follows: score lines 29 join panels 24 and 26, and score lines 31 join panels 28 and 30. In each case, the individual members of the pairs of panels joined by score lines 13, 23, 29 and 31 are of equivalent shape and size so that the pair members may be superposed in back to back relationship by folding the outer member of each pair 180° about the respective score line joining the pair of panels.

Score line portion 13*a*, which is an extension of score line 13, joins partition web panels 34 and 36 at each end of the blank.

Inner end wall panels 28 are also joined to second partition web panels 36 by a score line 33 extending diagonally outward from the junction of score line portions 27*c* and 27*d* to the junction of score line 31 with score line portion 13*a*, score line 33 thus forming the hypotenuse of the right angle triangle delineated by score lines 13*a*, 27*c* and 33, the area within the triangle being partition web panel 36.

Score lines 35 join corner glue tabs 32 to the ends of inner side wall panels 20. Score lines 35 are angled slightly outwardly from their point of junction with the respective portions of score line 27 since the final tray has slightly outwardly tapered side walls for the purpose of nesting the trays to save shipping space.

In a representative method for forming the blank into a tray, a suitable adhesive is applied to the outer surface of panels 18 and 36. As illustrated in the drawings, the adhesive is on the under or unseen surface of the blank and is therefore indicated in phantom lines. Adhesive is also applied to the portions of flaps 28 lying adjacent to score lines 33, and finally adhesive is applied to the portions of panels 30 adjacent the diagonally cut edges of these panels. The blank is then folded inwardly of the tray (i.e., to bring the foil coated faces together) along score line 17 until first partition panel 16 lies superposed on a portion of first bottom panel 12, and then the blank is folded outwardly of the tray along score line 13 and extending score line portions 13*a* until panels 12, 14, 18, 20 and 22 are once more substantially planar, as shown in FIG. 2. The panels 18 and 16, which are to form the partition in the finished tray, thus lie in down-folded or collapsed condition superposed on a portion of first bottom panel 12, as most clearly illustrated in FIG. 7.

Adhesive is then applied to the exterior surfaces of outer side wall panels 22 and outer end wall panels 26 and 30, as shown in FIG. 2, and these panels are then folded 180° outwardly of the tray along the hinge lines connecting them to their respective inner wall panels to lie superposed on and adhered to the inner wall panels as shown in FIG. 3.

Although the gluing operations have been described in a particular sequence, it is to be understood that this sequence may be varied substantially, some of the adhesive application steps being combined in various ways, and the adhesive being applied to either member of a pair of panels to be adhered together, as convenience dictates.

The resulting blank is then fed to a conventional tray-forming machine which applies adhesive to the exterior surface of corner glue tabs 32 and folds these tabs inwardly about their respective score lines 35 to become adhered to the inner surface of inner end wall panels 24 and 28, respectively, adjacent the free edges thereof, the end and side walls of the tray simultaneously being pivoted upward and inward about the score lines joining the respective wall panels to the bottom panels to assume positions tapering slightly outward from a position of normalcy to the tray bottom. The resulting tray, as shown in FIG. 4, has the partition element lying flat on the interior bottom surface of the tray and thus a plurality of trays may be stacked in nested condition to be shipped to the food packager with minimum wasted shipping space. When the tray is to be filled with a food product, the partition may be readily raised into its normal, upright position, as shown in FIG. 5, by flexing the end walls of the tray outwardly to the degree necessary to allow the partition web panel portion at each end of the tray to pivot about score lines 33 which serve as hinge connections to the tray end walls and also about superposed score lines 27*b* and 27*c*, which serve to connect the double thickness partition web panels to the main body of the double thickness partition. Thus, in the collapsed position of the partition, as in FIG. 4, the faces of partition web panels 34 lie in superposed contact with portions of inner end wall panels 24. Upon erection of the partition, the partition web panels are shifted through an arc sufficient to bring web panels 36 into face to face superposition on portions of inner end wall panels 28, as in FIG. 5, and, in this position, the web panels serve to retain the partition in upright position.

In the gluing operations involving the end wall panels, it will be noted that the end wall area in the vicinity of the partition web panels is formed of several thicknesses of the tray forming sheet material, whereas the end wall areas remote from the partition web panels are formed with only two thicknesses of the sheet material. In order to minimize the effect of varying wall thickness on the gluing operation, and to maintain a uniform height of the end wall over its entire length, the end wall panels and associated partition web panels are uniquely shaped, as will be described in detail hereinafter. In the following description, reference will be made to one end of the tray, it being understood that the other end is identical to that described.

First inner and outer end wall panels 24 and 26 are hingedly connected along score line 29, as shown in FIG. 1, which terminates in a deep, V-shaped notch 40 extending inwardly from the edge of end wall panels 24 and 26 adjacent the partition web panel 34. The notch 40 is substantially symmetrical with respect to an imaginary extension of score line 29, thus being formed equally from panels 24 and 26. The depth of the notch 40 is essentially equal to the width of each of the partition panels 16 and 18 so that when the partition panels are adhered together in the collapsed condition, as shown in FIG. 2, the point of junction between panels 28, 30, 34 and 36 will lie at the point of the notch 40 and score lines 29 and 31 will form a substantially continuous line of weakness. It will be noted that, in folding the blank along score lines 29 and 31 to form the multi-layer end wall structure of the final tray, the portions of first end wall panels 24 and 26 lying adjacent notch 40 are en-

folded within the inner end portions of second end wall panels **28** and **30** and that removal of the sheet material to form notch **40** enables this enfolding to occur while maintaining a smooth upper folded edge throughout the entire length of the end wall of the tray, as shown in FIG. 4 and FIG. 5.

In order to reduce to the practical minimum and to equalize the number of thicknesses of sheet material present in the various portions of the central area of the tray end walls during the gluing and tray forming operations, while retaining the functional qualities of the partition and associated partition web panel construction, web panel **34** is right angle triangular in shape and congruent with web panel **36**, and the free edge **42** of panel **30**, which is near the central section of the tray end wall, is cut on a diagonal which is a mirror image of score line **33** formed between second inner end wall panel **28** and second partition web panel **36**. Edge **42** is thus an extension of the free edge of web panel **34**. Thus, when outer end wall panel **30** is folded over into adherence with inner end wall panel **28**, the inner end portions of first end wall panels **24** and **26** are sandwiched between the end portions of second end wall panels **28** and **30**, but no portion of partition web panels **34** and **36** is included in this portion of the end wall assembly. The total thickness of sheet material in this area is therefore four times the unit material thickness. Furthermore, during the gluing operation, in which the tray partition is in collapsed position, as shown in FIGS. 2, 3 and 4, the partition web panel assembly **34** and **36** lies superposed on the inner end portions of first end wall panels **24** and **26**, but no portion of the web panel assembly **34** and **36** is overlain by any portion of second end wall panel assembly **30** and **28**. Thus, the portion of the end wall area of which the web panel assembly forms a part is also four times the unit sheet material thickness. Having equal thickness in these areas is important in obtaining equal pressure on the glued panel areas during the gluing operation so that good adhesion is obtained between the respective panels. These relationships are best illustrated by the enlarged cross-sectional view of FIG. 6.

It should also be noted that the present construction provides a tray in which all interior surfaces, including both sides of the partition and its attendant web panels, are coated with metal foil, which also extends to cover all outer sidewall and end wall surfaces. The resulting tray is, therefore, more satisfactory for preheating of foods in an oven than are trays having substantial sidewall areas of uncoated paperboard, which tends to become scorched and discolored during oven preheating of the tray contents and thus presents an undesirable appearance upon removal from the oven.

It is to be understood that, if desired, the position of the tray partition may be shifted by varying the location of the partition-delineating score lines **13**, **17** and **21** and correspondingly altering the major dimension of the end panels **24**, **26**, **28** and **30**, other aspects of the tray remaining constant.

Having now shown and described preferred specific embodiments of the invention, it will be apparent that various modifications may be applied without departing from the spirit thereof and the invention is not intended to be restricted except in accordance with the spirit of the appended claims.

I claim:

1. In a tapered wall tray made of a single sheet of a semi-rigid sheet material and having a bottom structure of a single thickness of said sheet material, opposed side walls of double thickness of said sheet material and opposed, double thickness end wall structures, the improvement which comprises:

a partition of double thickness of said sheet material hingedly attached to said bottom structure and adapted to divide said tray into two compartments, said partition being attached at each end thereof to a respective one of said end wall structures intermediate the ends thereof by a partition web structure of generally right angle triangular shape formed from two congruent superposed thicknesses of said sheet material, said web structure being hingedly attached along one leg of said triangle to an end edge of said partition and along the hypotenuse of said triangle to said end wall structure, whereby said partition may be swung from a collapsed position of superposition on said bottom structure to an erect position normal to said bottom structure, thus dividing said tray into two compartments.

2. A tray according to claim **1** wherein, when said partition is in collapsed position, said web structure has one surface thereof in superposition on a first portion of said end wall structure and when said partition is in erect position, said partition web structure has the opposite surface thereof in superposition on a second portion of said end wall structure separated from said first portion by said hinged connection of said web structure to said end wall structure along the hinge line forming the hypotenuse of the triangular web structure.

3. A tray according to claim **2** wherein said semi-rigid sheet material is paperboard.

4. A tray according to claim **3** wherein the surface of said paperboard forming the inner surface of said tray is completely covered with a metallic foil laminated thereto.

5. A unitary blank adapted to be formed into a partitioned tray, comprising:

a first and a second bottom panel, each hingedly connected along a first side edge thereof to the bottom edge, respectively, of a first and a second partition panel, said partition panels being hingedly connected to each other along their top edges, said bottom panels each being hingedly connected along a second, opposed side edge to the bottom edge of a respective one of a pair of inner side wall panels, each inner side wall panel being hingedly attached along its opposed upper edge to an edge of a respective one of a pair of outer side wall panels,

a corner glue flap hingedly connected to each end edge of each of said inner side wall panels,

a pair of first inner end wall panels, each hingedly connected along its bottom edge to a respective end of said first bottom panel and hingedly connected along its upper edge to an edge of a respective one of a pair of first outer end wall panels congruent with said first inner end wall panels,

a pair of second inner end wall panels, each hingedly connected along its bottom edge to a respective end of said second bottom panel and hingedly connected along its upper edge to an edge of a respective one of a pair of second outer end wall panels congruent with said second inner end wall panels,

a pair of first partition web panels shaped in the form of a right angle triangle and a pair of second partition web panels congruent with said first pair of partition web panels.

each of said first partition web panels being hingedly connected along an edge constituting one leg of said triangle to a respective end edge of said first partition panel, along a second edge constituting a second leg of said triangle to a respective one of said pair of second partition web panels, said first partition web panels being free of attachment to any other tray blank element along the edge constituting the hypotenuse of said right angle triangle,

each of said second partition web panels being also hingedly connected along one edge to a respective end edge of said second partition panel, and along the edge constituting the hypotenuse of said right angle triangle to a side edge of a respective one of said pair of second inner end wall panels.

6. A blank according to claim 5 wherein each pair of said first inner and outer end wall panels has a deep V-shaped groove formed along the hinge line connecting said panels, said groove being of a depth substantially equivalent to the height of said partition panels.

7. A blank according to claim 6 wherein an extension of the free edge of said first partition web panel forms a free edge of said second outer end wall panel.

8. An end wall construction for a tray made from a one-piece blank of a semi-rigid sheet material, said tray including a bottom wall, opposed side and end walls and an integral partition structure extending between the opposed end walls and operatively connected thereto by triangular partition web panels, the end wall construction comprising:

first and second inner end wall panels, each hingedly connected along a bottom edge to a respective portion of said bottom wall,

a first outer end wall panel congruent with said first inner end wall panel and hingedly connected thereto along the upper edge of said first inner end wall panel,

a second outer end wall panel congruent with said second inner end wall panel and hingedly connected thereto along the upper edge of said second inner end wall panel,

a deep, V-shaped groove formed along the hinge line joining said first inner and outer end wall panels, said groove being of a depth substantially equivalent to the height of said partition,

said first outer end wall panel being folded outwardly of said tray along the hinge line connecting said first inner and outer end wall panels to lie superposed on said first inner end wall panel and being adhered thereto,

said second inner and outer end wall panels being folded along their connecting hinge line to lie superposed on each other and being adhered together in the main body thereof, said second inner and outer end wall panels having extending portions in overlying, adhered relationship to end portions of said first inner and outer end wall panels, respectively, in the area adjacent said V-shaped notch, whereby said end portions of said first inner and outer end wall panels are sandwiched between the extending portions of said second inner and outer end wall panels,

said second inner end wall panel being hingedly connected along the edge of said extended portion thereof to an edge of said triangular partition web panel.

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U.S. Cl. X.R.

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