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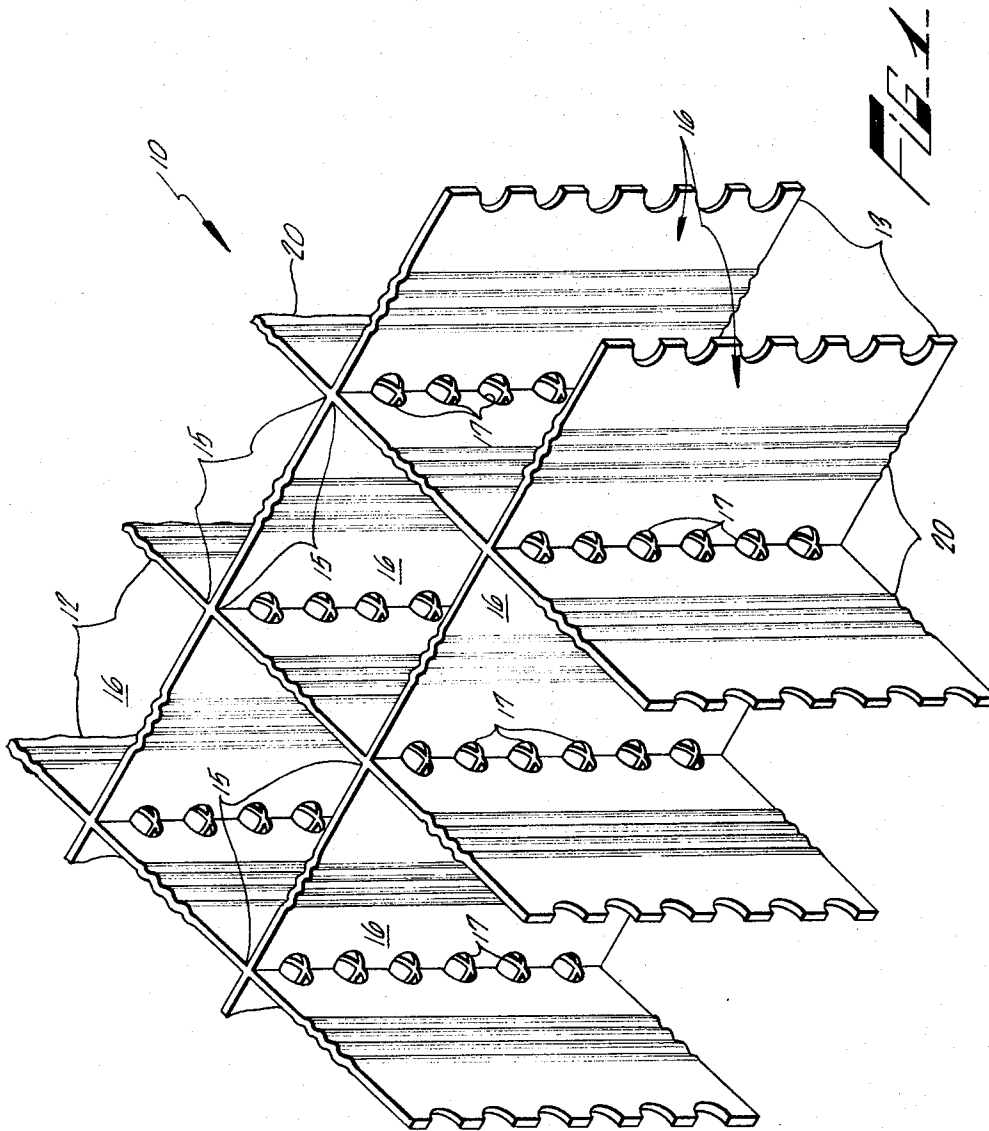
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UNITARY COLLAPSIBLE PARTITION

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2 Sheets-Sheet 1



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UNITARY COLLAPSIBLE PARTITION

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ABSTRACT OF THE DISCLOSURE

A unitary collapsible partition for use with cartons, the partition including a pair of permanently inseparable, intersecting divider walls, said walls being flexible and relatively thin whereby they are collapsible about their intersection.

This invention relates to a unitary collapsible partition for use with cartons and other regularly shaped containers.

Partitions are widely used in the packaging industry to divide the space in a carton into a number of separate compartments or cells. A common application is in the packaging of products in glass containers which are to be packed in a single carton. The partition provides a compartment or cell for each glass container, and the sides of the partition serve to hold each container in position and to prevent adjacent containers from striking each other when the carton is subjected to transit shocks or other rough handling. Partitions provide support and protection for individually packaged or unpackaged food products, or other articles which require individual cellular packing and storage.

Carton partitions have for many years been formed from a number of separate elongated divider walls formed of chipboard or corrugated paper. The divider walls are notched or slotted, and the partition is assembled by engaging the several divider walls together at the slotted portions. The walls hinge freely about the slotted intersections, permitting the partition to be collapsed substantially flat for compact storage. Collapsibility is considered an essential feature as an erect partition occupies considerable space, and must be adapted for compact storage prior to use in a carton.

A disadvantage of conventional partitions is that the divider walls tend to become disengaged from each other during handling of the partition. This unwanted disassembly of the partition is a particularly acute limitation of automated packaging techniques which have come into use in recent years. When handled by automatic machinery, conventional partitions often separate or break, and lack the qualities of shape retention and structural integrity which are essential to a successful automatic packaging process.

The unitary collapsible partition of this invention overcomes these difficulties, and is an economical carton divider which is well adapted for handling by automatic packaging machinery. The partition is integrally formed from a single piece of plastic, completely eliminating any possibility of separation of individual divider walls during handling of the partition. The partition is collapsible for compact storage, and is readily erected to a precise, predetermined shape when it is to be installed in a carton or other container.

The unitary partition may be formed from a variety of different plastics, and is especially well adapted for manufacture by economical extrusion techniques. Many plastic materials are already competitive in cost to corrugated paper or chipboard materials, and present trends in the plastics industry indicate that plastic materials will be less expensive than paper products within a relatively few years. The use of plastic in the invention is thus believed to be a significant advantage.

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Briefly stated, the unitary collapsible partition of this invention comprises a pair of permanently inseparable intersecting divider walls which are integrally formed from a single piece of plastic. The walls are flexible and relatively thin whereby they are bendable about their intersection, or joint, toward each other to collapse the partition. Preferably, the intersection of the divider walls is apertured to provide increased flexibility of the structure for facilitating collapsibility.

Each divider wall may include corrugated portions which strengthen the partition, and which are dimensioned to grip the products to be packaged. Preferably, all surfaces of the divider walls are substantially perpendicular to a single plane when the partition is erect, permitting manufacture of the partition by an extrusion process.

The invention will be described with reference to the attached drawings, in which:

FIG. 1 is a perspective view of an erect unitary collapsible partition;

FIG. 2 is a top view of the partition in collapsed form;

FIG. 3 is a perspective view of an alternative form of the partition having obliquely oriented sets of divider walls; and

FIG. 4 is a perspective view of another alternate form of the partition having a peripheral wall.

Referring to FIG. 1, a unitary collapsible partition 10 formed according to the invention includes a set of first divider walls 12 which are spaced apart and oriented generally parallel to each other. A set of second divider walls 13 are also spaced apart and oriented generally parallel to each other. The first and second sets of divider walls are transversely oriented, and intersect at a number of permanently inseparable joints 15. The intersecting sets of walls thus form a number of compartments or cells 16.

The partition is integrally formed from a single piece of flexible plastic, and the divider walls are relatively thin so they may be bent or hinged about the joints toward each other to collapse the partition as shown in FIG. 2. To reduce the force required to collapse the partition, each joint preferably includes at least one aperture 17 there-through.

The apertures may be formed as round holes through the intersection, or joints, as shown in FIGS. 1 and 2, or may be formed in any other convenient shape such as elongated slots. As suggested in FIG. 2, the apertures are readily punched through the joints or intersections 15 when the partition is collapsed to place diagonally oriented joints in juxtaposition. Apertures 17 are also useful to provide air-circulation paths through the partition. This is an important feature in the packaging of warm or hot products (such as canned or bottled foods packed immediately after cooking) which are allowed to cool in a controlled fashion after insertion in a partitioned carton.

A corrugated or laterally deformed portion 20 is preferably formed in each divider wall in each of the compartments or cells formed by the partition. The depth of the corrugations is selected to provide a snug-fitted compartment for the product to be packaged. The corrugations cushion the packaged product, and prevent shifting of the product within the compartment. The corrugations also serve to stiffen the divider walls, adding strength and rigidity to the overall partition structure.

The partition may be molded from a variety of plastic materials, and thermoplastic resins are preferred to permit reuse of the material punched out of the partition intersections. A variety of synthetic or natural thermoplastic resins are suitable, and may of course include fillers, extenders, pigments, and other conventional ingredients. For example, typical suitable materials are polyethylene,

polypropylene, polystyrene, polyvinyl chloride, cellulose acetate, acrylic resins, polyethylene foam, polystyrene foam, polyurethane foam, etc.

Although the partition may be formed using any conventional molding process, it is particularly suited for extrusion through strip-slot dies using either continuous flow or intermittent ram injection. The extruded partition is cut to a desired height using a metal shear, hot-wire cutter, or any other conventional process. After cut off, the warm partition is collapsed to a flat position and the intersection apertures are die cut to reduce "hinge" resistance and to reduce weight of the completed partition.

Extrusion techniques may be used to produce partitions formed according to the invention in which one or both sets of divider walls are obliquely oriented with respect to the floor of the carton in which the partition is to be installed. For example, as shown in FIG. 3, a partition 25 includes a first set of divider walls 26 which are perpendicular to an underlying carton floor 27, and a second set of divider walls 29 which are oblique to the surface to the carton floor. This type of partition forms a plurality of wedge-shaped compartments or cells 31 which are useful for compact storage of non-rectangular products.

Partition 25 is formed in the same manner as partition 10, but cut off is performed "on the bias," the severing cut being at an oblique angle to the extrusion axis of the partition. The only limitation on partition shape is that all surfaces of the divider walls must be perpendicular to a common plane when the partition is erect, providing a constant cross-section part which can be extruded through conventional dies.

Another form of the partition of this invention is shown in FIG. 4, and is especially suited for use with automatic, high-speed packing machines. A partition 35 includes first and second sets of transversely oriented, intersecting divider walls 37 and 38. Large apertures are preferred to maximize the amount of thermoplastic material which may be recovered for reuse, and to minimize partition weight and "hinge" resistance. Each intersection includes two relatively large apertures 40. A flexible peripheral wall 42 extends around the periphery of the partition, and is integrally secured to the ends of divider walls 37 and 38.

The peripheral wall insures that the ends of the divider walls will erect immediately from the collapsed condition to a desired orientation for installation in a carton. The divider-wall ends will drift into position without a peripheral wall, but the addition of wall 42 forces them to shift immediately into erect form as they must move with the peripheral wall.

Wall 42 need not be equal in height to walls 37 and 38, and will serve its function even if formed as a relatively narrow strip. However, for economical construction by extrusion techniques, making all the walls of equal height permits a simple cut-off operation.

The partition can be formed with any number of divider walls to provide the desired number of compartments or cells. In its simplest form, the partition is formed of two perpendicularly oriented divider walls intersecting at a permanently inseparable joint, the joint and divider walls being adapted to permit substantially back-to-back disposition of walls upon flexure of said joint and walls.

The partition of this invention is lighter and stronger than conventional partitions formed of interleaved separate sections of corrugated paper or chipboard, and completely avoids the problem of divider wall separation which has posed a substantial obstacle in the use of automatic packaging machinery. The partition is readily produced by conventional molding machinery in a variety of shapes, and is expected to be less expensive than paper-product partitions if the present trend in plastics prices continues.

We claim:

1. A unitary collapsible partition for a container comprising a plurality of first divider walls which are spaced apart and oriented generally parallel to each other, and a plurality of second divider walls which are spaced apart and generally parallel to each other, the first and second walls being transversely oriented and intersecting at integral joints, said joints include a plurality of apertures facilitating the collapse of said walls about said joints, said walls and joints being flexible and relatively thin whereby the walls are collapsible about said joints.

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