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3,322,263

CARTONS FOR FRAGILE ARTICLES

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2 Sheets-Sheet 1

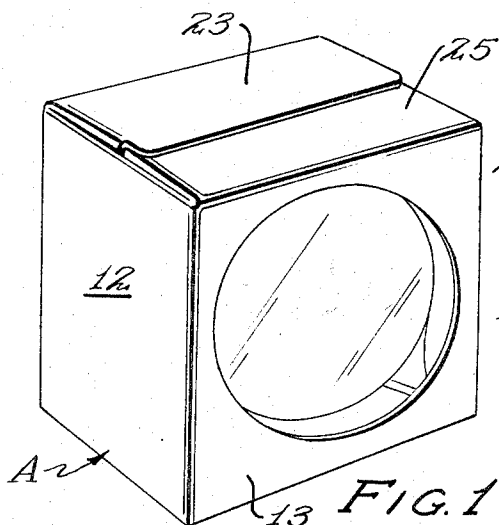


FIG. 1

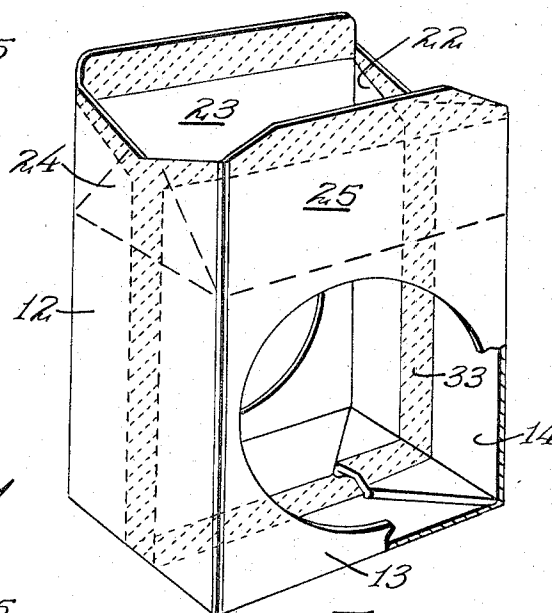


FIG. 2

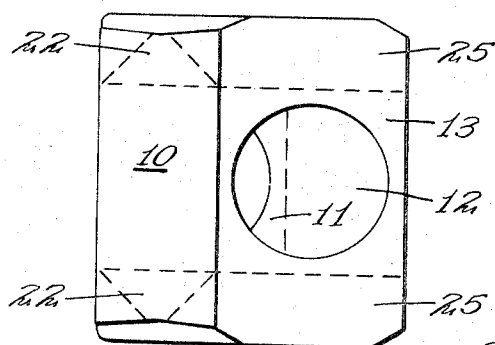


FIG. 3

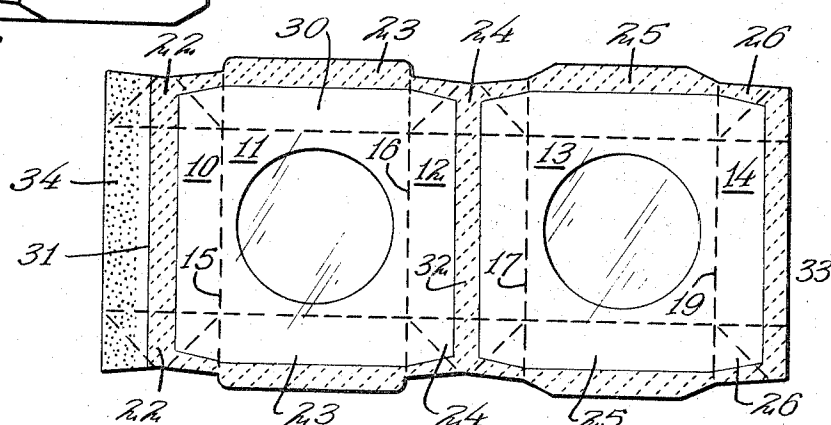


FIG. 4

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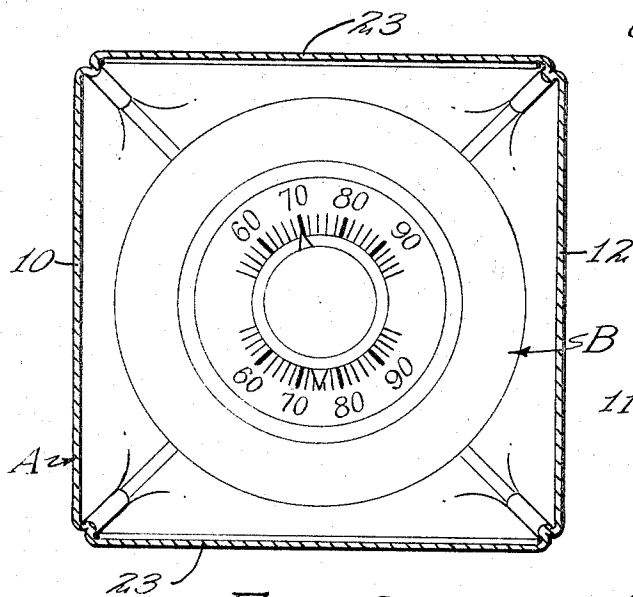


FIG. 6

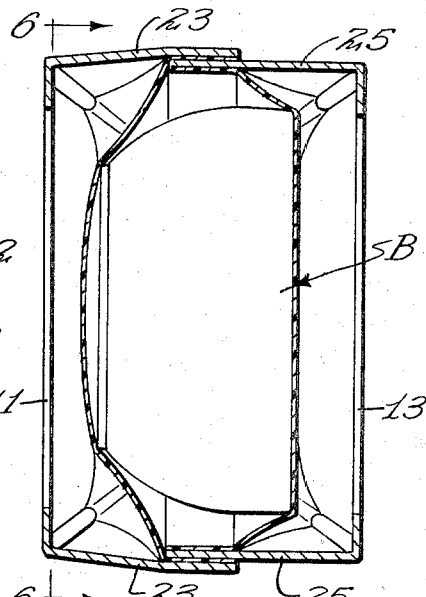


FIG. 5

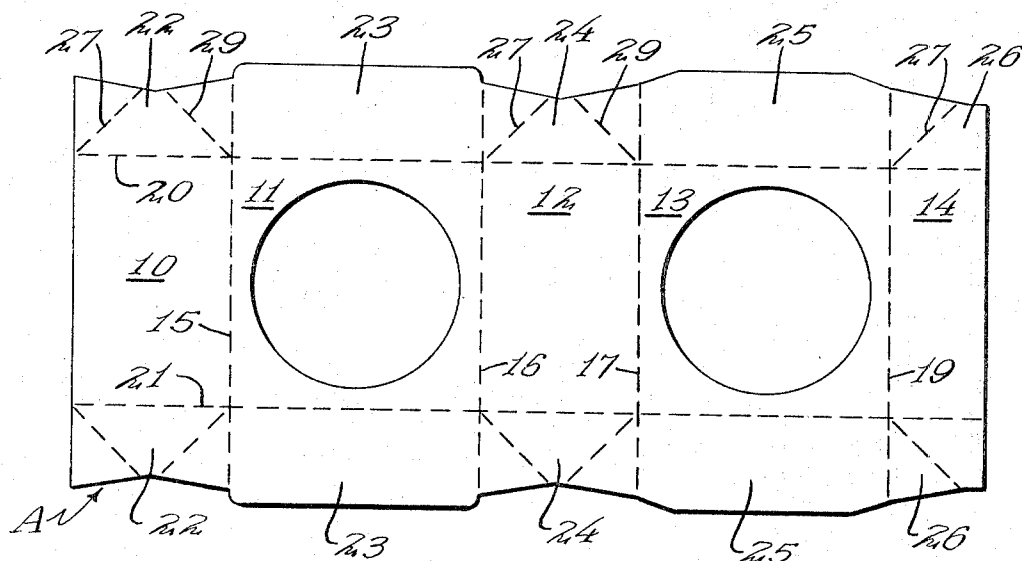


FIG. 7

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1

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CARTONS FOR FRAGILE ARTICLES

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8 Claims. (Cl. 206-45,14)

This invention relates to an improvement in cartons for fragile articles and deals particularly with a foldable rectangular carton capable of suspending an object out of contact with the carton walls.

Numerous cartons have been produced designed to support an object out of contact with the walls of the carton. In most cases, packages of this type are expensive to produce and difficult to handle. In other words, the packaging operation is normally slowed down very considerably when the object is placed in a hammock-like support. It is an object of the present invention to provide a carton which requires no additional effort to close, and which may be closed and sealed virtually as quickly as cartons of conventional form.

An object of the present invention resides in the provision of a carton to which a sheet of shrink film may be attached, usually through the use of an apparatus known to the trade as a cellophane window machine. The blank may be folded and connected in tubular form through the use of regular gluing equipment. Thus when the carton is squared up into rectangular form, the shrink film is in face contact with the inner surfaces of the walls of the carton. As a result, the carton may be filled as easily as a carton of conventional form. After the carton has been filled and closed, heat is applied to the extent necessary to shrink the film. As the film shrinks, it draws away from two opposed panels of the carton, completely enclosing the object and holding it suspended out of contact with the carton walls.

A feature of the present invention resides in the location of the areas of adhesion between the shrink film and the carton blank. The film is adhered to the center portions only of the end walls of the carton, and is not connected to the side walls thereof. In preferred form, the film is also secured to the center portions only of the foldable closures, or to the end portions of the closure flaps which overlap to some extent when the closure flaps are closed. As a result, as the film shrinks, it draws the object enclosed to a position substantially midway between the carton side walls to support the object out of contact with the side walls.

A further feature of the preferred form of construction of the invention lies in providing end wall closure flaps which are hingedly connected to the side wall closure flaps and are provided with diagonal fold lines to form gusset folds at the corners of the carton. The film is connected to these gusset folds in such a manner that the generally triangular portions at the corners of the carton are drawn diagonally inwardly toward the center of the carton as the film shrinks to produce an additional flexible support for the object enclosed.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification,

FIGURE 1 is a perspective view of the closed carton.

FIGURE 2 is a perspective view of the carton when in readiness to be filled, a portion thereof being broken away to better disclose the interior structure.

FIGURE 3 is a plan view of the blank after it has been glued in tubular form.

FIGURE 4 is a diagrammatic view of the blank after the shrink film has been attached thereto, the view showing the areas of adhesive connecting the film to the blank.

2

FIGURE 5 is an enlarged sectional view through the closed carton.

FIGURE 6 is a sectional view through the carton, the position of the section being indicated by the line 6-6 of FIGURE 5.

FIGURE 7 is a diagrammatic view of the paperboard blank.

The carton, which is indicated in general by the letter A, is designed to accommodate a delicate instrument such as the thermostat B. The package illustrated is designed to serve as a display package, and accordingly the main panels or side walls of the carton are provided with display windows therethrough through which the object may be viewed. The apertures, which will be described, also permit the quick circulation of heated air through the package to shrink the film.

The carton A includes an end wall panel 10, a side wall 11, an end wall 12, a second side wall 13, and a partial end wall panel 14, hingedly connected together along parallel fold lines 15, 16, 17, and 19. Parallel lines of fold 20 and 21, intersecting the previously described fold lines at right angles, form a means of connecting the various wall panels to closure flaps. The closure flaps 22, 23, 24, and 25 are hingedly connected to the end wall 10, side wall 11, end wall 12, and side wall 13, respectively. A partial end wall closure flap 26 is also connected to the ends of the partial end wall panel 14.

The side and end wall closure flaps which have been described are hingedly connected together along extensions of the fold lines 15, 16, 17, and 19. In order that the end wall closure flaps 22 and 24 may fold down beneath the side wall closure flaps 23 and 25, each of the end wall closure flaps 22 and 24 is provided with a pair of diagonally extending fold lines 27 and 29 which are at 45° angles to the fold lines 20 and 21, and which extend in converging relation from the junctures of the fold lines 20 and 21 and the side edges of the closure flaps. As a result, the portions of the end wall closure flaps which are outwardly of the converging fold lines 27 and 29 may fold into face contact with the center portions of the end wall closure flaps defined by the fold lines 20 or 21 and the fold lines 27 and 29. As a result, there is a generally triangular gusset fold at each corner of the closed carton.

In view of the fact that the end wall 14 is only approximately one-half the width of the end walls 10 and 12, or slightly greater than one-half this width, only the one diagonal fold line 27 extends across the closure flap 26 at each side of the carton. The fold line 27 coincides with the fold line 27 of the closure flap 22 when the carton is glued in tubular form.

With reference now to FIGURE 4 of the drawings, a sheet of shrink film 30 is adhered to the blank along the shaded areas indicated in this figure. The film 30 is free of adhesive attachment to the side walls 11 and 13. One end of the film 30 is adhered to the end wall 10 along a strip 31 of adhesive midway between the fold line 15 and the adjoining end of the blank. The film 30 is also connected to the end wall 12 along a strip 32 of adhesive located midway between the fold lines 16 and 17. The film 30 is also connected to the partial end wall 14 along a strip of adhesive 33 along the edge of the blank, the center of the adhesive strip 33 being spaced from the fold line 19 a distance substantially equal to one-half the width of the end walls 10 and 12.

The closure flaps 23 and 25 attached to the side walls 11 and 13 are of a length slightly greater than one-half the width of the end walls 10 and 12 so that the ends of these flaps overlap to some extent when the carton is closed. The end of one of these closure flaps may tuck into the pocket formed between the other closure flap and the gusset flaps connected thereto to hold the carton

closed. Once the film has been shrunk, the carton is held closed by reason of the adhesion of the film with the closure flaps.

As is indicated in FIGURE 4, the film 30 is connected along the end edges of the closure flaps 22, 23, 24, 25, and 26. Thus the marginal edge of the film is secured to the blank about its entire periphery. It is not necessary that the shrink film be diecut to the same shape as the flap ends, but it may be rectangular and extend slightly beyond the ends of the closure flaps 22, 24, and 26 if it is desired.

After the film 30 has been attached to the blank, the blank may be folded along the fold line 17 so that the panels 13 and 14 overlie portions of the panels 11 and 12. Adhesive 34 may be applied to the marginal edge of the end wall panel 10, and the adhesive coated area adhered to the partial end wall 14.

When the carton is to be used, the walls are squared up to tubular form, and one end closure is closed to bring the carton into the form illustrated in FIGURE 2. The article B to be packaged is placed within the carton and the other end wall closure flaps are folded into closing position.

When closed, the cartons are normally positioned with their parallel side walls 10 and 12 in a horizontal position. The package is then subjected to a blast of heated air or a similar source of heat to the extent necessary to shrink the film. As the film shrinks, the film tends to draw into two parallel planes which are spaced apart a distance determined by the width of the lines of adhesive such as 31 and 33. The lower of the two films raises the article B out of contact with the bottom of the two side walls, and the film 30 is shrunk into a position to support the article B suspended between the walls of the carton. Usually during the shrinking operation, the triangular gusset portion at each corner of the carton is drawn into a position extending diagonally from the corners and toward the center of the carton. If it is desired, the gusset folds may be proportioned so that the inner ends of these gusset portions are in close proximity with the object, or may even contact the same in order to center the object in the carton.

The film 30 has been described as being attached along the center line of the end wall panels 10, 12 and to the edge of the end wall 14. It is not essential that the attachment be at the center. The arrangement must be such that the areas of attachment of the film to the end walls 12 and 14, and to the side wall closure flaps 23 and 25 be such that when the carton is closed, the adhesive areas on the exposed inner surface of the carton be between two parallel planes, parallel to the side walls and spaced apart a distance equal to the width of the adhesive strips. Thus the heat tends to shrink the film into these parallel planes.

The end wall 10 is shown equal in width to the end wall 12. The end wall 10 can be narrower so that the end walls 10 and 14 overlap only by the width of the adhesive strips, if desired. The structure shown has the advantage that the inner surface of the panel 10 may be adhered directly to the outer surface of the end wall panel 14.

In accordance with the patent statutes, I have described the principles of construction and operation of my improvement in cartons for fragile articles; while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A blank for use in producing protective cartons, including:

a paperboard sheet including a first end wall, a first side wall, a second end wall, a second side wall, and a partial end wall hingedly connected along parallel fold lines,

a sheet of shrink film secured in face contact with said blank,

a narrow strip of adhesive securing said film to said end walls intermediate the opposite edges thereof and parallel to said fold lines,

a third narrow strip of adhesive connecting the end edge of said partial end wall to said shrink film parallel to and spaced from the fold line connecting said partial end wall to said second side wall,

said film being free of connection with the remaining areas of said end walls and said side walls, whereby when said partial end wall is adhered to the inner surface of said first end wall and heat is applied to said film, it will tend to shrink toward two parallel planes extending through opposite edges of said narrow strip of adhesive.

2. A blank for use in producing protective cartons including:

a paperboard sheet cut and scored to provide a first end wall, a first side wall, a second end wall, a second side wall, and a third end wall,

a sheet of shrink film overlying the inner surface of said paperboard sheet,

a series of parallel narrow strips of adhesive connecting said film to said paperboard sheet, said strips being parallel to said lines of fold, and including

a first line of adhesive connecting an end of said film sheet to said first end wall and spaced from the fold line connecting said first end wall to said first side wall a distance at least equal to substantially one half the width of said second end wall,

a second strip of adhesive extending across said second end wall intermediate the hinged edges thereof,

a third strip of adhesive extending across said third end wall and spaced from the fold line connecting said third end wall to said second side wall a distance substantially equal to one half the width of said second end wall,

said third end wall terminating in an edge along said third line of adhesive and being adapted to be secured to the inner surface of said first end wall, whereby

when said walls are secured in tubular form and heat is applied to said film, said film will tend to shrink toward two parallel planes along opposite edges of said second and third adhesive strips.

3. A blank for use in producing protective cartons including:

a paperboard sheet cut and creased to provide a first end wall, a first side wall, a second end wall, a second side wall, and a third end wall,

a shrink film sheet overlying said paperboard sheet and secured thereto along three parallel strips of contact which are narrow relative to the width of said end walls and are parallel to the lines of fold connecting said walls, said strips including:

a first strip extending across said first end wall and spaced from the line of fold connecting said first end wall to said first side wall a predetermined distance less than the width of said second end wall,

a second strip of adhesive extending across said second end wall and spaced from the fold line connecting said second end wall to said first side wall said predetermined distance,

said second strip of adhesive being spaced from the line of fold connecting said second end wall to said second side wall a second predetermined distance which is equal to said first predetermined distance plus the width of said second strip,

a third strip of adhesive extending across said third end wall and spaced from the fold line connecting said third end wall to said second side wall, and

said third end wall terminating along an edge of said third strip of adhesive, whereby

5

when said third end wall is secured in face contact with the inner surface of said first end wall and heat is applied to said film, said film will tend to shrink toward two parallel planes along opposite edges of said second and third strips of adhesive.

4. A blank for use in producing protective cartons and including:

a paperboard sheet cut and creased to provide a first end wall, a first side wall, a second end wall, a second side wall, and a third end wall hingedly connected in series by parallel fold lines,

closure flaps hingedly connected to opposite edges of said walls along parallel fold lines intersecting said first named fold lines at right angles,

the edges of said closure flaps being hingedly connected together along extensions of said first named fold lines,

diagonal fold lines extending across said first and second end wall closure flaps converging from the opposite side edges thereof and dividing said first and second end wall closure flaps into a generally triangular area between said diagonal fold lines and generally triangular gusset portions outwardly of said diagonal fold lines foldable into face contact with the triangular area between said diagonal fold lines when said closure flaps are closed,

said side wall closure flaps being of a length slightly in excess of one half the width of said second end wall, a shrink film sheet overlying said paperboard sheet and secured thereto along three parallel strips of contact which are narrow relative to the width of said end walls and are parallel to the lines of fold connecting said walls, said strips including:

a first strip extending across said first end wall and spaced from the line of fold connecting said first end wall to said first side wall a predetermined distance less than the width of said second end wall,

a second strip of adhesive extending across said second end wall and spaced from the fold line connecting said second end wall to said first side wall said predetermined distance,

said second strip of adhesive being spaced from the line of fold connecting said second end wall to said second side wall a second predetermined distance which is equal to said first predetermined distance plus the width of said second strip,

a third strip of adhesive extending across said third end wall and spaced from the fold line connecting said third end wall to said second side wall,

said third end wall terminating along an edge of said third strip of adhesive, and

narrow strips of adhesive connecting said film to the ends of said side wall closure flaps and spaced from the fold lines connecting said side wall closure flaps to said side walls a distance substantially equal to one half the width of said second end wall.

5. The structure of claim 4 and including an adhesive strip connecting the ends of said end wall closure flaps to said end walls.

6

6. A carton including

a sheet of paperboard cut and creased to provide tubularly arranged side and end walls, and end closure flaps foldably connected thereto and adapted to form parallel closure walls,

a sheet of shrink film in face contact with said side and end walls as well as said closure flaps, and

means securing said film to said end walls and to said side wall closure flaps along strips of adhesion which lie completely between two spaced planes which are spaced apart a distance which is short relative to the width of said end walls, said planes being parallel to and spaced between said side walls when said closure walls are formed.

7. The structure of claim 6 and in which said end wall closure flaps are diagonally creased and adapted to provide gussets connecting said side wall closure flaps.

8. A carton including

a sheet of paperboard cut and creased to provide a first end wall, a first side wall, a second end wall, a second side wall, and a third end wall,

closure flaps secured to the ends of said wall and foldably connected along extensions of the fold lines connecting said walls,

diagonal fold lines extending across said first and second end wall closure flaps and converging inwardly from the edges thereof to divide the first and second end wall closure flaps into a generally triangular inner portion between said diagonal fold lines and a pair of generally triangular outer portions outwardly of said diagonal fold lines which are foldable into face contact with said inner portion when said closure flaps are closed,

said third end wall being secured in face contact with the inner surface of said first end wall,

said third end wall being of a predetermined width substantially narrower than said second end wall,

a sheet of shrink film being substantially coextensive with said paperboard sheet and secured thereto along a narrow strip of adhesive extending entirely about said paperboard sheet, and

a strip of adhesive extending across said second end wall parallel to the fold lines connecting said walls and having an edge spaced from the fold line connecting said second end wall to said second side wall a distance equal to said predetermined distance.

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