Aug. 31, 1965 J. E. STOWE 3,203,613

COLLAPSIBLE SHIPPING CARTON

Filed Nov. 19, 1962 3 Sheets-Sheet 1

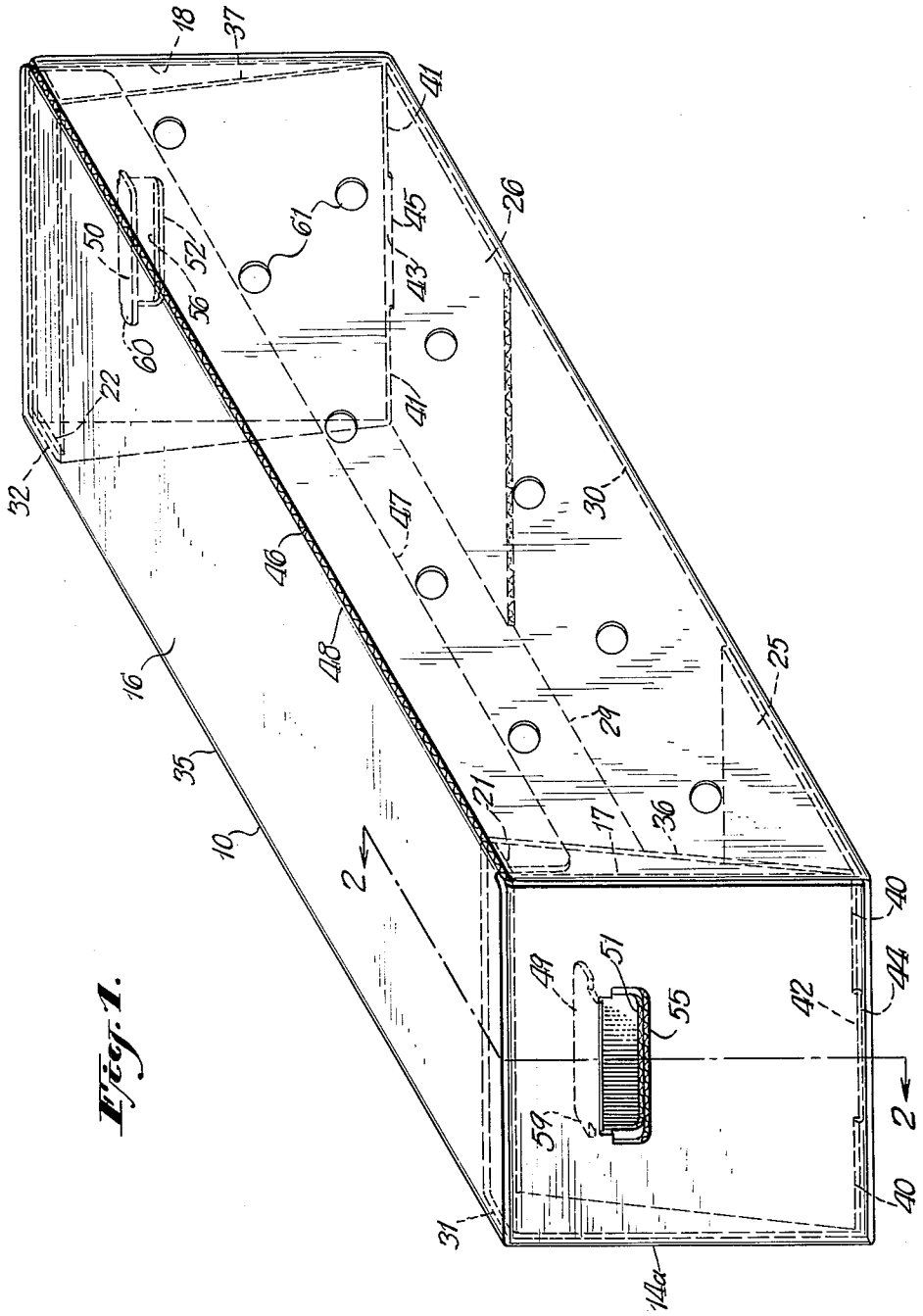


Fig. 1.

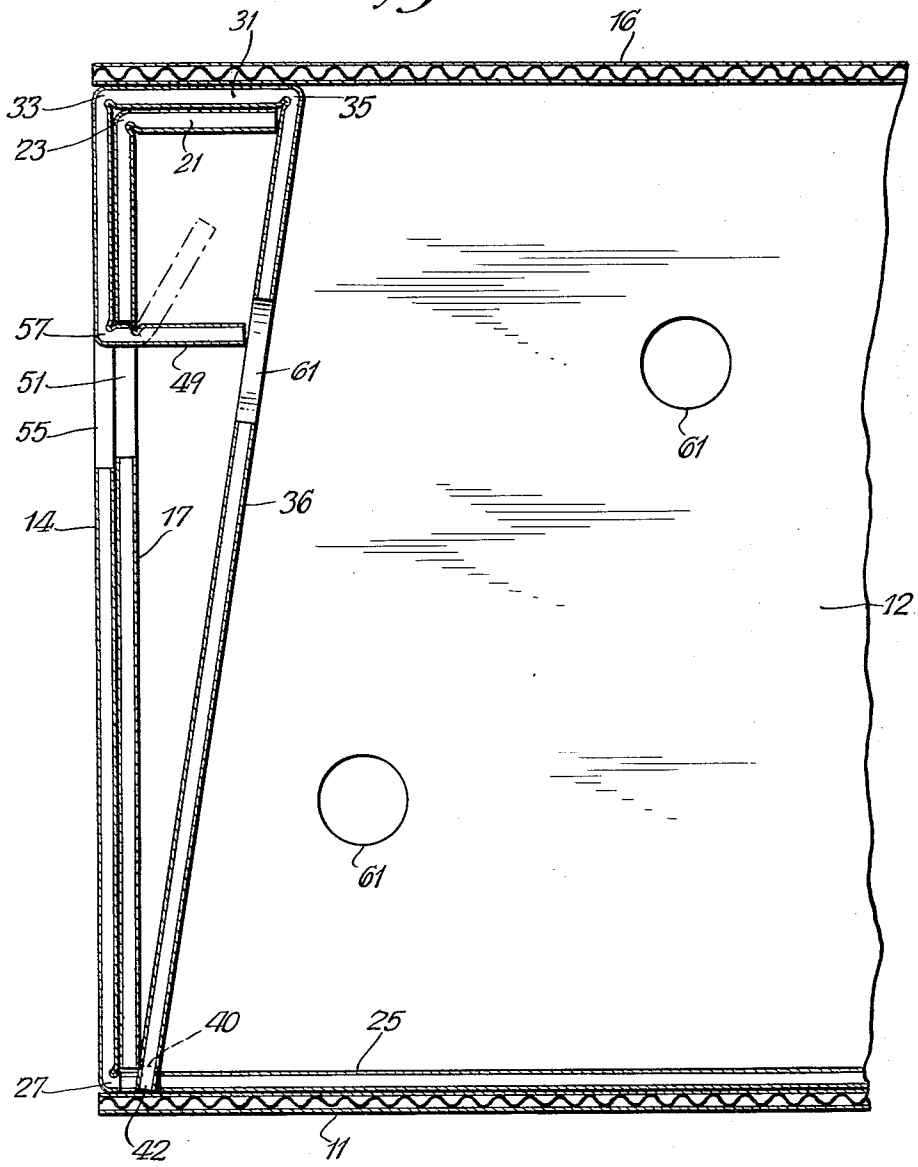
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Fig. 2.



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Filed Nov. 19, 1962 3 Sheets-Sheet 3

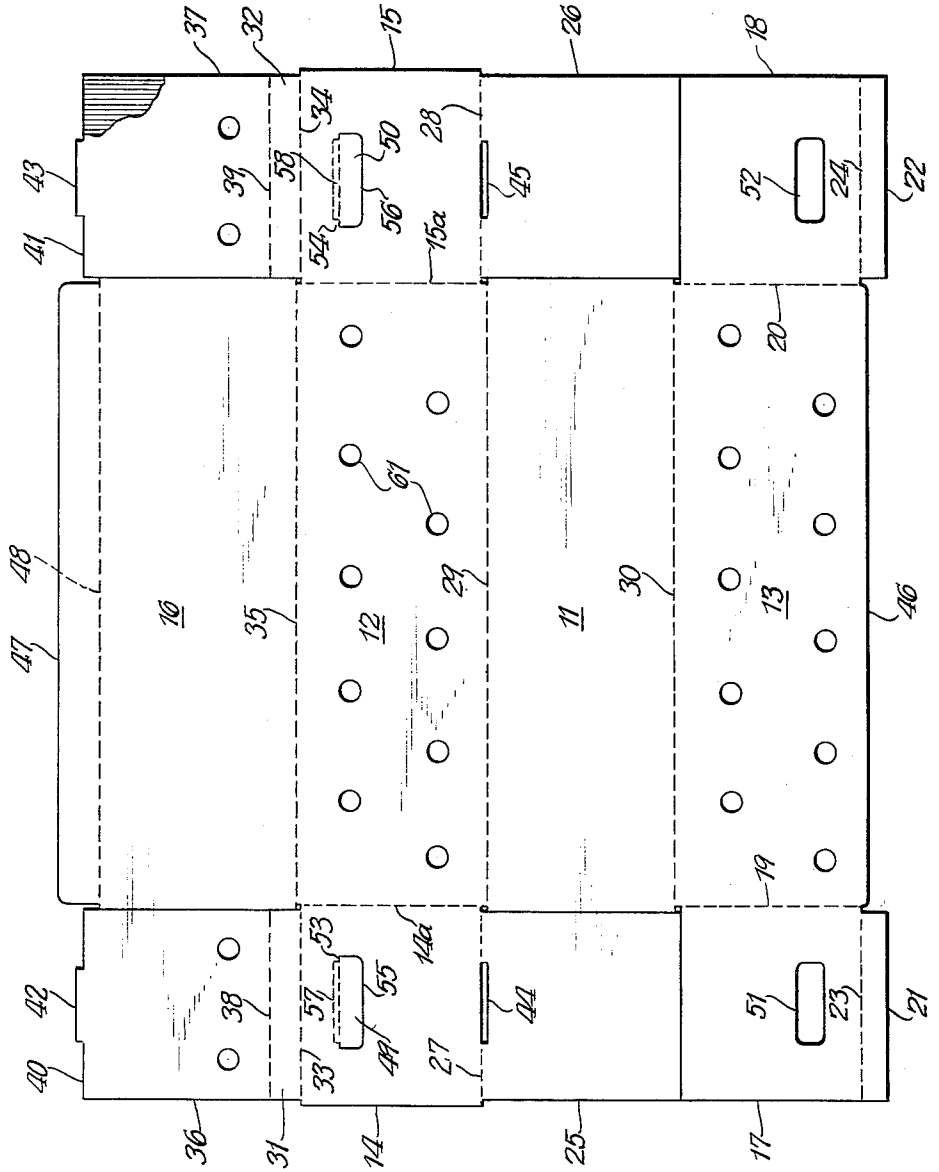


Fig. 3.

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COLLAPSIBLE SHIPPING CARTON

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2 Claims. (Cl. 229—16)

This invention relates to cartons or boxes of improved construction. More particularly, it relates to cartons suitable for carrying heavy loads and capable of withstanding the stresses resulting from stacking several loaded cartons, one above the other, especially during shipping. It relates also to the blank from which the carton is constructed. In one of its aspects, the invention relates to cartons suitable as containers for freezing and shipping edible foods.

Despite many new designs, there is still a need for a carton which is capable of construction using a minimum of material while still having sufficient strength to withstand high stresses without undue loss of shipping space. Ideally, it should be constructed for easy handling so that it may be readily moved from one place to another. Moreover, the blanks should be easily prepared and adapted to be stacked one above the other in a collapsed condition for economical transportation from the point of manufacture to the point of use.

In recent years, large amounts of frozen food-stuffs, especially meats have been shipped under refrigeration in cartons of corrugated paperboard, cardboard, or like semi-material. To expedite handling procedures, it has been the practice to pack the carton with meat in the unfrozen condition and to freeze it while in the carton. Unfortunately, paperboard is an excellent heat insulator and, therefore, it has been necessary to keep the cartons open during the freezing process. This requirement has limited the amount of foodstuffs which could be frozen in a given refrigerated area since an open carton obviously requires more space than a closed one. Moreover, the additional operation of closing the carton after freezing increases the handling time and expense.

In the past, attempts have been made to alleviate this problem by providing shipping boxes with holes in the sides. Unfortunately, the presence of holes has seriously decreased the strength of the box resulting in shipping accidents and losses. In one of its aspects, the present invention provides a box having holes in the walls for easy freezing of the contents. Because of its unique design, especially the end wall reinforcing panels, a box when constructed in accordance with this invention, will have sufficient structural integrity to minimize shipping losses due to bursting of the container or other shipping accidents. Preferably, a box within the scope of this invention intended for use in connection with frozen foodstuffs will be especially treated to withstand moisture. The construction material may, for example, be impregnated with wax or other water resistant substance.

In view of the foregoing, it is the primary object of this invention to provide a box which will offer maximum protection against shipping stresses for the enclosed goods.

It is a further object of this invention to provide a box which is readily erected from a single blank to provide maximum shipping space while maintaining adequate strength to withstand heavy loads.

Yet another object of this invention is to provide a paperboard or cardboard box in which meat or other food-

stuffs may be packed and frozen without the necessity of leaving the box open during the freezing operation.

These and further objects of the invention will appear from the following detailed description of preferred embodiments thereof to be read in conjunction with the accompanying drawings in which like elements in the different views are identified by the same reference numerals:

FIG. 1 is a perspective view of a box of this invention;

FIG. 2 is a cross-section taken on the line 2—2 of FIG. 1; and

FIG. 3 is a view of the blank from which the box of FIG. 1 is constructed.

Referring now to the drawings, there is shown a tray type box in which the construction material is cut and scored so that the side walls are folded upward from the bottom wall to form a box body. FIG. 1 shows a box illustrating the concept of this invention, generally represented by the numeral **10**. The box is constructed with bottom wall **11**, back wall **12**, front wall **13**, end walls **14** and **15**, and top wall **16**. The top wall **16** is adapted to be swung so as to open or close the box. The end walls **14** and **15** are foldably connected to back wall **12** along score lines **14***a* and **15***a*, respectively. End wall reinforcing panels **17** and **18** are connected to opposite transverse edges of the front wall **13** along score lines **19** and **20**, respectively. Each end wall reinforcing panel is provided with a top panel support represented by the numerals **21** and **22** connected along score lines **23** and **24**, respectively.

Bottom panels **25** and **26** are provided integral with end walls **14** and **15**, respectively, along score lines **27** and **28**, the same being continuations of score line **29** between bottom wall **11** and back wall **12**. Front wall **13** is integral with bottom wall **11** along score line **30**.

Each of the end walls **14** and **15** is constructed with a top panel **31** and **32**, respectively, connected along score lines **33** and **34** which are continuations of score line **35** connecting back wall **12** and top wall **16**. Top panels **31** and **32** are foldably connected each to a top panel extension represented by the numerals **36** and **37** along score lines **38** and **39**.

Each top panel extension **36** and **37** is of sufficient length so that the top edges **40** and **41** abut the bottom of the box substantially along score lines **27** and **28** respectively, when the top panel extensions are folded into the box. It will be noted that each end wall construction is similar to an inverted right triangle where a top panel is the base of the triangle and a top panel extension is the hypotenuse. Each top panel extension is thus biased from a top panel towards an adjacent end wall of the assembled box.

As shown, each top panel extension is provided at its bottom edge with a tab represented by the numerals **42** and **43**, respectively. These tabs are for cooperative engagement with slots **44** and **45** formed intermediate score lines **27** and **28** when the box blank, generally represented by numeral **46** in FIG. 3, is assembled to form a finished box. The tab and slot arrangement is an aid in providing structural rigidity of the assembled box, but is not essential to the invention.

The top wall **16** of the box illustrated in the figures is shown as being formed with a closure flap **47** along score line **48** at the longitudinal edge opposite the back wall. The enclosure flap is not essential to the invention and may be replaced by any equivalent construction, for

example, a strip of adhesive tape. If present, it may be gripped between the front wall **13** and the top of panels **31** and **32** in the completely assembled and closed box. This arrangement is shown in FIG. 1. Alternatively, it may be stapled or otherwise fixed to the outer surface of the front wall **13**.

The assembly of the box may be readily understood by reference to the figures, especially FIG. 3. In the first step, each of the bottom panels **25** and **26**, the end walls **14** and **15**, the top panels **31** and **32** and the top panel extensions **36** and **37** are folded out of the plane of the paper along score lines **14***a* and **15***a*, respectively. The bottom panels **25** and **26** are then folded along score lines **27** and **28**, respectively, so as to bring them into a plane perpendicular to score line **29**. The back wall **12** is then folded out of the plane of the paper along score line **29**. This movement brings the bottom panels **25** and **26** into surface contact with the bottom wall **11**. End wall reinforcing panels **17** and **18** are folded along score lines **19** and **20** so that they are perpendicular to the front wall **13**. The front wall **13** is folded along score line **30** so as to bring the front and the back walls into oppositely disposed parallel relationships. This movement brings the end wall reinforcing panels **17** and **18** into the interior of the partially assembled box. The end wall reinforcing panels **17** and **18** are now in the interior of the box in surface contact with the end walls **14** and **15**. The top panel supports **21** and **22** are next folded along score lines **23** and **24** into a plane parallel with the bottom wall **11**. The top panels **31** and **32** and the top panel extensions **36** and **37** are then folded over the top panel supports **21** and **22** along their respective score lines **33**, **34**, **38** and **39** into the box so as to bring the tabs **42** and **43** into cooperative engagement with slots **44** and **45**. This movement brings the top panel supports into position to underlie and support the top panels. The assembled box may then be filled if desired, and closed by folding top wall **16** along score line **35** until the closure flap **47** is secured between front wall **13** and top panels **31** and **32**. The closure flap **47** may also be folded down on the outside of front panel **13** and secured with staples, glue, steel or wire strapping.

It will be noted that this construction provides an especially strong box. The ends of the box are actually three panels in width. Each end is constructed with an end wall, an end wall reinforcing panel and a top panel extension. The top wall **16** is supported by all three vertical panels and in addition is supported by top panels **31** and **32** and top panel supports **21** and **22**.

It is an added feature of boxes within the scope of this invention that all exterior surfaces may be smooth in contour, so that a plurality of boxes may be shipped one above the other and one next to the other with the utilization of minimum shipping space.

Each end wall is formed with a handgrip aperture represented by numerals **49** and **50**, the same being in registry with apertures **51** and **52** formed in end wall reinforcing panels **17** and **18**. These handgrip apertures are located interiorly of the end walls **14** and **15**, preferably closer to the top than to the bottom and are of a design to facilitate handling of heavy loads while at the same time cushioning the hands. The handgrip apertures **49** and **50** may be constructed with cut-out segments generally respresented by numerals **53** and **54** formed in each end wall **14** and **15** along cut lines **55** and **56** and folded into the box along top fold lines **57** and **58**, respectively. It will be noted that the segments **53** and **54** fold through the apertures **51** and **52** of the end wall reinforcing panels **17** and **18**. If desired, each of the segments **53** and **54** may be formed with extensions such as shown at **59** and **60** in FIG. 1, so that the over-all dimensions of each segment are greater than the over-all dimensions of each end wall reinforcing panel handgrip aperture. A segment of this design must be forced through the aperture and must be forced out in order to burst an end of the box. This design, therefore, aids in insuring the box against shipping injury. The design is not essential. In fact the whole segment may be omitted without seriously affecting the operation of the box. It does, however, cushion the hand when lifting the box.

In the embodiment of the invention illustrated, a box is shown in which the walls are formed with a plurality of vent holes generally represented by the numeral **61**. As aforesaid, this construction is especially advantageous when the box is to be used for freezing and shipping foodstuffs since areas of heat exchange are provided whereby the contents of the box may be frozen without the necessity of opening the box. These vent holes are practical in boxes constructed in accordance with this invention since the boxes because of their unique design, are especially strong.

The box of this invention and the blank from which it is formed are constructed in accordance with standard procedure using ordinary box making equipment of the type well known in the art. No special or unusual equipment is necessary. Thus, the blank is cut and score lines formed with the ordinary machinery usually employed for this purpose. The blank may be formed into an assembled box manually or with the use of automatic means.

What has been described is a box or carton which can be simply fabricated from one blank. Since a plurality of reinforcing features are provided in the box construction, a box assembled in accordance with this invention has substantially improved structural qualities compared to ordinary boxes.

A box of this invention is preferably made of corrugated paperboard. If it is to be subjected to moisture, for example, in shipping frozen goods, it is preferably treated or impregnated with a moisture proofing medium such as a wax or a suitable synthetic resin such as thermosetting resin which in addition to imparting moisture resistance gives added strength.

While this invention has been particularly described with reference to specific embodiments, many apparent variations of the invention will become known to those skilled in the art after study of this disclosure. It is to be understood, therefore, that many changes may be made within the scope of the following claims without departing from the spirit of the invention.

What is claimed is:

1. A collapsible carton blank formed of a substantially rectangular piece of paperboard material and comprising top, back, bottom and front walls integrally attached in the order stated along side edge fold lines, each of said walls being of equal length along said lines, said top and bottom walls being of mutually equal width and said front and back walls being of mutually equal width but less than the width of said top and bottom walls, a pair of end wall reinforcing panels of equal width with and extending out from each end of said front wall and integrally attached thereto along end edge fold lines, a pair of bottom panels of equal width with and extending out from each end of said bottom wall but detached therefrom, a pair of end wall panels of equal width with and extending out from each end of said back wall panel and integrally attached thereto along end edge fold lines, a pair of top panels and top panel extensions, each top panel together with its associated top panel extension being of equal width with and extending out from each end of said top wall but detached therefrom, each of said panels extending out from their respective walls by a distance equal to the width of said top and bottom walls, said bottom panels being integrally attached to said end wall panels along fold lines which form extensions of the side edge fold line between said back and bottom walls, said top panels being integrally attached to said end wall panels along fold lines which form extensions of the side edge fold lines between said top wall and said back wall,

and said top panel extensions being integrally attached to said top panels along fold lines located such that when said top panels are bent at right angles to their respective end wall panels each top panel extension may be bent over to form the hypotenuse of a right triangle having its apex at the fold line connecting the end wall panel with its associated bottom panel.

2. A carton blank as in claim 1 wherein said blank includes a pair of top panel supports each forming an extension of the end wall reinforcing panels and integrally connected thereto along further fold lines opposite the edges of said end wall reinforcing panels adjacent said bottom panels, each top panel extending out from said

further fold lines by a distance equal to the width of said top panels.

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