June 26, 1962 J. O. YOUNGER 3,040,960

FIBERBOARD SHIPPING BOX AND BLANK THEREFOR

Filed June 30, 1960

Fig. 1.

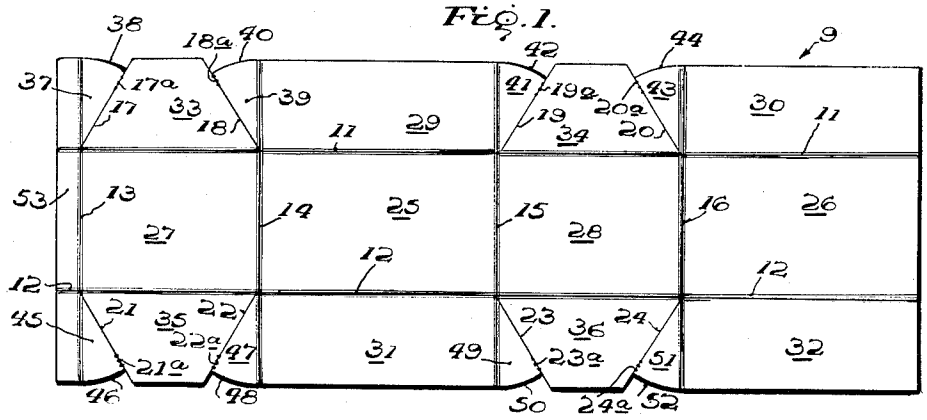


Fig. 4.

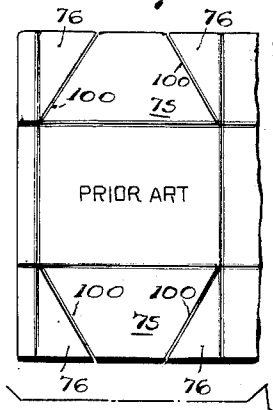


Fig. 5.

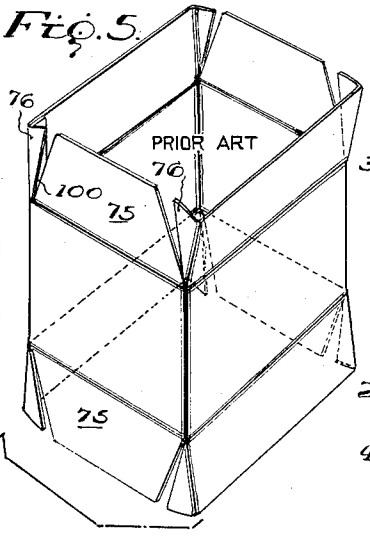


Fig. 2.

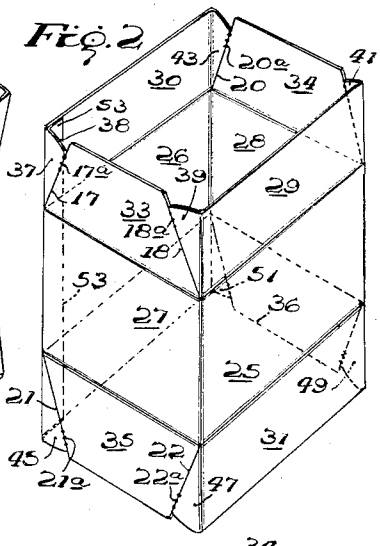


Fig. 6.

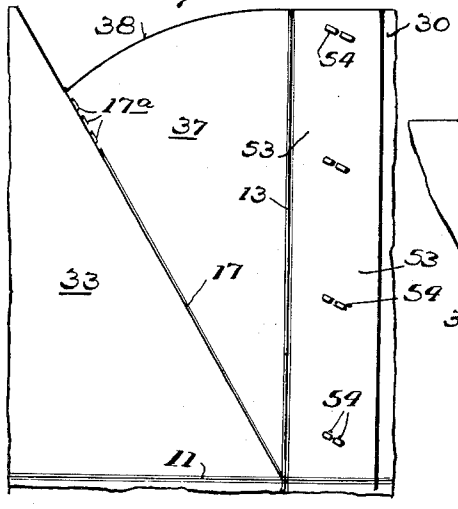


Fig. 7.

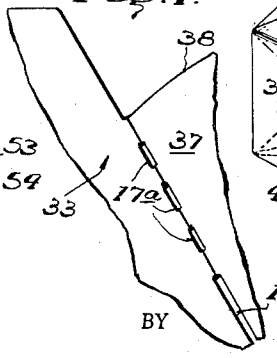
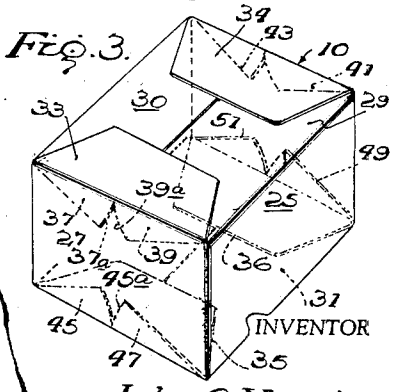


Fig. 3.



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FIBERBOARD SHIPPING BOX AND BLANK THEREFOR

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3 Claims. (Cl. 229—38)
(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

The present invention relates to a fiberboard shipping box and blank therefor. An object of the invention is to provide a blank and a box or container of maximum strength formed therefrom, which blank is cut and scored from a sheet of commercial fiberboard without any appreciable waste of material, and in which the blank is so formed and slit as to permit its use with high-speed automatic manufacturer's joint stitching equipment, as well as to permit the box formed therefrom to be filled and closed by automatic or semi-automatic equipment.

Another object of the invention is to provide an improved box blank in which the flap portions thereof are so shaped, proportioned, and held together as to prevent their damage in shipment and handling, as well as to permit the machine stitching of the joint thereof by automatic joint-stitching equipment.

A further object of the present invention is to provide an improved blank of the foregoing character in which the several flap portions thereof are separated by non-continuous or interrupted knife cuts or slits, whereby to prevent the accidental or unintentional separation or relative movement of adjacent flaps while said blank is being fed through the automatic joint-stitching mechanism, and during other handling and/or shipment thereof.

The blank and the shipping box or container formed therefrom, in accordance with the present invention, constitute an improvement upon the blank and box disclosed in Patent No. 2,835,431 issued May 20, 1958, to Leslie Frank Stone.

The foregoing and other objects and advantages of the invention will appear from the following description and appended claims when considered in conjunction with the accompanying drawing forming a part of this specification, wherein like reference characters designate corresponding parts in the several views.

In said drawing:

FIG. 1 is a plan view of the box blank as it appears after being cut and scored;

FIG. 2 is a perspective view of the box partly set-up;

FIG. 3 is a perspective view of FIG. 2, completely set-up and closed, in readiness for sealing, stapling, or other final steps;

FIG. 4 is a fragmentary plan view of a portion of a box blank typifying the prior art;

FIG. 5 is a perspective view similar to FIG. 2, but showing a partly set-up prior art box formed from a complete prior art blank like that seen in FIG. 4;

FIG. 6 is an enlarged fragmentary sectional elevation showing the setting-up flap stapled to the box of the present invention, and showing the inner surface thereof; and

FIG. 7 is a fragmentary elevation, also on an enlarged scale, taken in the area of the severable ties or connectors incorporated in the slit between the substantially triangular and the trapezoidal flaps shown in FIG. 6.

Before explaining in detail the present invention, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawing, since

the invention is capable of other embodiments and of being practiced or carried out in various ways. It is to be understood also that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention claimed herein beyond the requirements of the prior art.

Generally speaking, it is the purpose of the present invention to overcome some of the difficulties which are inherent during the steps of manufacturing fiberboard blanks and shipping boxes of the prior art, such as that covered by the Stone patent mentioned above, particularly in connection with the manufacture thereof by mass production equipment, including automatic or semi-automatic box loading and sealing equipment.

To permit its successful handling by mass production equipment, the blank of fiberboard embodying the invention is provided with slits or knife cuts at appropriate locations, such as between adjacent flap portions of the blank, and with tied-together but severable adjacent flap portions, by interrupting the continuity of the slits by perforations, punctured holes, or pierced openings, several of which may be provided intermediate the opposite ends of the slits to thus provide severable connectors, or ties, between the adjacent flap portions. These serve to hold said flap portions in juxtaposition during the mass production of the box blanks and the later stitching operation, while permitting the movement or folding of one or more flap members relative to an adjacent flap member, or adjacent flap members, during the operation of setting-up the box or container.

Another feature of the present invention is the provision of new and novel right-triangular and trapezoidal flap members which are provisionally or temporarily tied together as aforesaid, in which the free edges of the first-named flap members are so formed and shaped as to permit economical mass production of blanks and the automatic or semi-automatic equipment-filling of boxes; said specially shaped free flap edges also serving to prevent interference with one another while the blank is being manipulated into positions to produce the set-up box or container.

It is an added feature of the present invention to provide the blank with severable connectors, preferably produced by perforating the blank within the area of a portion of the length of the knife cuts or slits, with the size of the cuts or slits being proportioned to and in accordance with the size and gauge of the fiberboard from which the blank is formed, thus to insure the holding-down of the flaps during the stitching process and while the carton is being set-up, as well as to insure the strength and holding or tying ability of the severable connectors during transportation and handling of the blank. It is, of course, important that the perforations or severable connectors be strong enough to serve their purpose yet sufficiently weak to permit them to be broken or severed easily when the box or container is being set-up prior to loading. The ties or severable connectors thus function to hold down the substantially triangular flaps formed, as set forth above, to permit the use of the automatic so-called manufacturer's joint-stitching equipment.

In previously known box blanks in which the flaps were spaced and separated by relatively wide slots and were not tied together or held down, it was impossible to stitch the blank in an automatic machine, because some of the flaps would invariably move into position to prevent the box from being passed freely under the stitching head of the machine, and were thus damaged or torn off.

A further advantage of the use of severable connectors, as aforesaid, has to do with the fact that the boxes or containers of the present invention may be safely shipped from the manufacturing plant to the user in a flatwise

condition and thus in a more economical manner than heretofore.

Referring particularly to FIGS. 1, 2, 3, 6 and 7 of the drawing, there is shown as a whole at **9**, FIG. 1, one of the blanks from which the nearly-completed box or container **10** of FIG. 3 is formed. The other figures of the drawing, namely, FIGS. 4 and 5, represent a prior-art box or container which is partially formed and which will be referred to below.

The box blank **9** has, as shown, two longitudinal, parallel score lines **11** and **12** and four transverse, or right-angularly disposed parallel score lines **13**, **14**, **15** and **16**. The blank shown in FIG. 1 is also provided with eight slits or knife cuts **17**, **18**, **19**, **20**, **21**, **22**, **23** and **24**. These score lines and slits or knife cuts define a pair of side walls **25** and **26**, end walls **27** and **28**, top flaps **29** and **30** which are attached to and adapted to be bent inwardly from the side walls **25** and **26**, respectively, bottom flaps **31** and **32** which correspond to the top flaps **29** and **30**, respectively, and which are attached to and adapted to be bent inwardly from the side walls **25** and **26**, respectively. The blank also includes four trapezoidal flaps **33**, **34**, **35** and **36** which are attached to and adapted to be bent inwardly from the end walls **27** and **28**, eight right substantially triangular flaps **37**, **39**, **41**, **43**, **45**, **47**, **49** and **51**, and a setting-up or securing flap **53** which is adapted to be stapled, glued, or otherwise secured to the opposite end of the box blank when the latter has been brought into the proper position in the setting-up operation. The parts are shown held together in such position by means of a plurality of staples **54**, see FIG. 6.

Referring particularly to the blank of FIG. 1 and the partially set-up box or carton of FIG. 2, it is to be noted that each of the slits or knife cuts **17** through **24** is interrupted by a plurality or series of perforations, punctured holes, or otherwise pierced openings which provide therebetween severable or breakable connectors **17***a* through **24***a*. The severable connectors, or ties **17***a* and **18***a*, see FIGS. 1, 6 and 7, serve to hold the trapezoidal flap **33** and its pair of substantially triangular rounded-edge flaps **37** and **39** together during the stapling operation, during handling and shipment, and through the several steps of setting-up the box, or container to the stage of box construction illustrated in FIG. 2. It is to be noted that the series of connectors or severable means **17***a* through **24***a* are located intermediate the ends of the slits or knife cuts and preferably closer to the outer or free edge of the several pairs of cooperating and adjoining flap members. Thus, it is to be observed that the knife cuts or slits **17** through **24** are non-continuous, or interrupted, by the severable connectors **17***a* through **24***a*.

It is to be noted further, with special reference to FIGS. 1 and 2, that each of the substantially triangular flaps **37** through **51** has a convexly curved outer or free edge, such being indicated on these flaps by the reference characters **38** through **52**. As stated above, these convex or curved free edges allow rapid handling of the blank in the stitching machinery and further prevent interference, one with the other, when the box is set up, as clearly shown in FIG. 3.

Special attention is directed to FIGS. 6 and 7 of the drawing in which one of the knife cuts or slits **17** is shown on an enlarged scale, as are the severable connectors or ties **17***a*, as well as the convex curvature of the outer extremity or free edge **38** of the substantially triangular flap **37**.

The top flaps **29** and **30** are preferably rectangular and have lengths which are equal to the lengths of side walls **25** and **26**, their widths being equal to approximately one-half the width of the box on its inside measurement. This permits the top flaps, see FIG. 3, to lie in a position with their outer free curved edges **37***a* and **39***a* in substantial contact with each other but without causing interference in the setting-up process, and thus substantially closing the top of the box **10**. The bottom or lower flaps **31** and **32** are precisely like the top flaps **29** and **30** and they also substantially close the bottom of the box when folded, as may also be seen in FIG. 3. So as to completely close the box at the top and also at the bottom and to provide a box which is capable of supporting a load and resisting blows in handling, trapezoidal flaps **33** through **36**, when bent inwardly, lie outside the top flaps **29** and **30** and outside bottom flaps **31** and **32**.

The box **10** is further strengthened and braced at its ends and corners by virtue of the provision of the substantially right-triangular flaps **37** through **51**. All of these flaps, with the exception of two of them, are attached to top and bottom flaps **29**, **30** and **31**, **32**, respectively, by the score lines mentioned above. Hence, they are bendable at right angles, as will be seen in FIG. 2. Right-triangular flaps **37** and **45** are directly attached to the setting-up flap **53** which is bendable into three portions due to the presence of the score lines **11** and **12** which extend transversely through it. When the box **10** is set-up, the end wall **27** is braced at the top by the flaps **37** and **39** and at the bottom by the flaps **45** and **47**. Since flaps **37** and **45** are integral with the setting-up flap **53** and since the latter is stapled to the bottom flap **32**, the side wall **26** and its top flap or section **30** provide adequate support. As the two substantially triangular flaps at the top and at the bottom of each of end walls **27** and **28** art in contact along their short sides or edges, see FIG. 3, and since the goods inside the box will normally hold the substantially triangular flaps in such contact, the corners of box **10** are strengthened. As a result of the particular structure described above, the box of the present invention is especially useful for shipping goods, because it resists blows, rubbing, compression, and other stresses at its opposite ends. Moreover, by virtue of the present structure, the top and bottom portions of the finished box are also strong, permitting stacking of loaded boxes one above the other without danger of crushing at the joints.

In FIGS. 4 and 5, there is shown a prior-art box or container which is similar to that disclosed by the Stone patent mentioned above, the principal difference being that the prior-art box or carton has no means for severably connecting its several trapezoidal flaps **75** and right-triangular flaps **76**, since they are entirely separated and spaced from one another by the relatively wide slots **100**, see particularly FIG. 4. Whereas, the carton of FIGS. 4 and 5 serves a useful purpose for storing, handling and shipping goods, the blank from which it is formed presents somewhat of a problem in manufacture, due to the fact that the triangular flaps **76**, being entirely separated from the adjacent trapezoidal flaps **75**, are free to assume any position other than flat, and thus they interfere with automatic stitching machinery, necessitating hand-stapling of stitching of the box or carton, which is obviously undesirable, time-consuming, and costly.

While the so-called severable ties or connectors, shown at **17***a* through **24***a* of the present invention are preferably formed by piercing or perforating edgewise near-contacting portions of the several trapezoidal flaps and the several adjacent right substantially triangular flaps, other means for temporarily or provisionally tying the cooperating flaps together to hold position during preliminary operations and flat-wise shipment and handling of the formed blanks, may be employed.

I claim:

1. A box for shipping goods, formed from a single blank of fiberboard substantially without waste of material, comprising, in combination, two identical side walls, two identical end walls integrally connected along three spaced parallel fold lines, one of said identical end walls terminating in an elongated bendable setting-up flap, a top consisting of two identical flaps integral with the side walls and two identical flaps integral with the end walls, a bottom consisting of two identical flaps integral with the side walls and two identical flaps integral with the end

walls, all four flaps which are integral with the end walls being trapezoidal and outside the other flaps at both the top and bottom to protect the top and bottom of the box against compressive stresses, all four of the flaps which are integral with the side walls each having identical right-angled generally triangular flaps integral therewith at the ends thereof adjacent said fold lines and said elongated bendable setting-up flap having two like integral right-angle triangular flaps, means for severably tying each of said triangular flaps to an edge of an adjacent trapezoidal flap, the said setting-up flap being stapled to the said free end of said identical side wall, the adjacent pairs of right-angle triangular flaps being bent and fitting inside the two identical end walls at both the top and bottom of the box with their adjacent base portions in abutting relationship and lying directly in contact with the end walls whereby to reinforce the ends of the box at the top and bottom thereof, the outer edge of each of said triangular flaps being convexly curved toward the adjacent edge of one of the trapezoidal flaps, and said severable tying means being disposed adjacent said convexly curved outer edge.

2. A blank formed from a single piece of fiberboard for producing a box for shipping goods, including an elongated series of alternate side and end wall sections joined at parallel score lines, a setting-up flap score-line-connected to one of said end wall sections, each of said end wall sections having identical trapezoidal flaps projecting outwardly in opposite directions therefrom, each of said side-wall sections having identical top and bottom oblong flaps projecting outwardly therefrom in opposite directions, said identical top and bottom flaps and said setting-up flap having at opposite ends score-line-attached substantially triangular flaps abutting said adjacent trapezoidal flaps and having convexly-curved free outer edges extending between the oblong and trapezoidal flaps and between the setting-up flap and one pair of trapezoidal flaps, and severable means located adjacent said free outer edges for interconnecting said substantially triangular flaps and said trapezoidal flaps, said severable means being in the form of an interrupted slit located between each substantially triangular flap and an adjacent trapezoidal flap.

3. A blank formed from a single piece of fiiberboard for producing a box for shipping goods, including five sections integrally connected by four spaced parallel fold lines, said sections comprising two identical side walls, two identical end walls and an elongated bendable setting-up flap, a top consisting of two identical oblong flaps integral with the side walls and two identical flaps integral with the end walls, all four flaps which are integral with the end walls being trapezoidal, all four flaps which are integral with the side walls each having identical right-angled generally triangular flaps integral therewith at the ends thereof adjacent said fold lines, said setting-up flap also having a pair of identical right-angled generally triangular flaps integral therewith adjacent its fold line, each of said substantially triangular flaps benig unattached by a knife cut to an adjacent trapezoidal flap throughout the major portion of its length and having a convexly-curved outer free edge, each of said substantially triangular flaps being severably connected to an adjacent trapezoidal flap throughout the remaining portion of its length, and the severable connections being located beyond the outer end portion of the knife cut.

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