May 2, 1961 J. L. WINGATE 2,982,464

FOLDING BOX

Filed Aug. 25, 1958

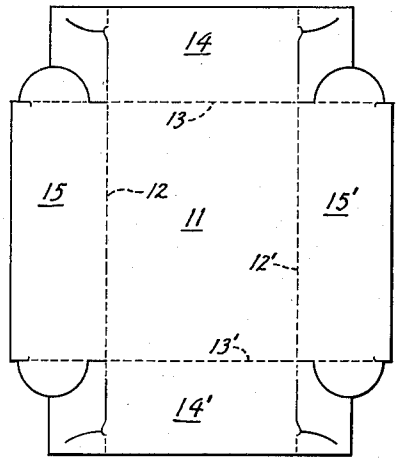

Fig. 1.

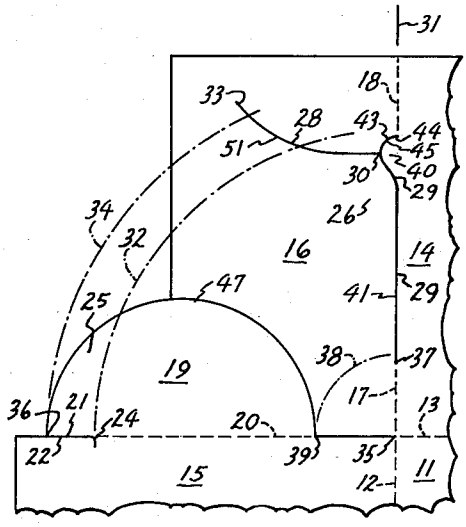

Fig. 2.

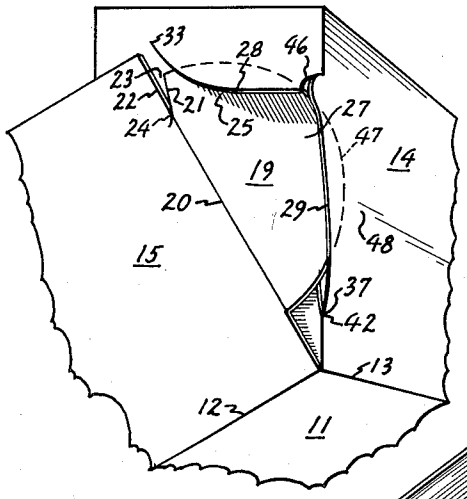

Fig. 3.

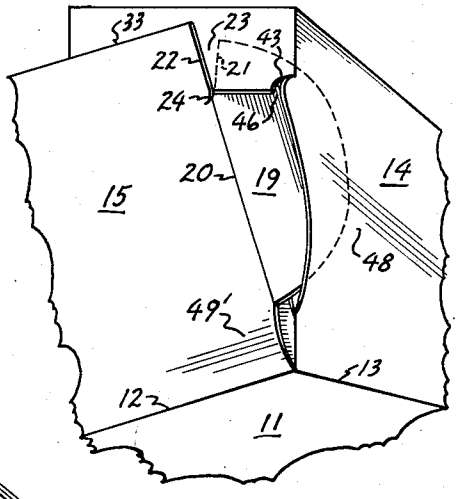

Fig. 4.

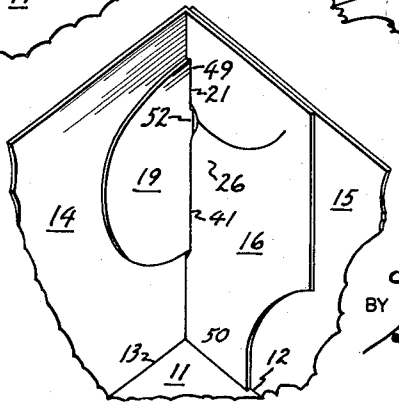

Fig. 5.

INVENTOR

John L. Wingate

BY George H. Baldwin

ATTORNEY

United States Patent Office

2,982,464
Patented May 2, 1961

2,982,464

FOLDING BOX

John L. Wingate, 9648 Gibson Ave., Jacksonville, Fla.

Filed Aug. 25, 1958, Ser. No. 756,985

6 Claims. (Cl. 229—35)

This invention relates to improvements in cartons, boxes, trays and other like structures hereinafter collectively referred to as "boxes" or "folding boxes," made by folding, from blanks of cardboard, paperboard or other like suitable foldable sheet material. More particularly the invention relates to an improved corner construction for folding boxes where the boxes are held in assembled condition by interengagement of certain portions thereof.

The improved corner construction is particularly adapted for quick and easy assembly and features clean side panel portions which are not interrupted by slots or slits having engaging elements therein such as to interfere with the appendance of printed matter thereon.

It is an object of the invention to provide a corner construction for a folding paper box blank which is easily and quickly assembled.

Another object is to provide a folding paper box blank which has side wall panels free of slots and slits through which engaging elements pass so that the side panels can be printed when in blank form.

Another object is to provide a corner assembly for folding boxes which contain interlocking flap and tongue elements, the corner assembly being characterized in that the tongue may be passed through the flap into locking engagement therewith by means of a guide slot without being folded to enter into the locking engagement.

Another object is to provide a corner construction for a folding paper box which is characterized in the assembled condition by adjacent panels held in corner forming relationship by an interengaging tongue and flap each separately connected to adjacent panels and overlying the inside of the other panel and further characterized in that during the assembling of the corner a portion of the tongue is passed through a guide slot so that the tongue need not be folded to pass through the flap into engaging relationship therewith.

The novel features which are believed to be characteristic of this invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawing, in which:

Fig. 1 is a plan view of a representative form of an entire box blank incorporating the features and elements of the improved corner construction.

Fig. 2 is a plan view of a corner portion of a flat box blank embodying the invention, the outside surface of the blank facing the observer.

Fig. 3 is a perspective view of the outside of the box corner during its initial stage of assembly from the box blank portion shown in Fig. 2.

Fig. 4 is a perspective view of the outside of the box corner during an advanced stage of assembly.

Fig. 5 is an inside perspective view of the assembled box showing the interengagement of the locking elements thereof and also illustrating the inside location of the flap and tongue and their respective positions as overlying the adjacent inside walls of the panel.

In the drawings accompanying, and forming part of this specification, certain specific disclosure is made for the purpose of explaining the broad aspects thereof but it is understood that the details may be modified in respects without departure from the principles of the invention.

The blank **10** shown in Fig. 1 may be cut from sheets or rolls of paperboard, cardboard, container board or other like suitable foldable sheet material, all usually ranging in thickness from about 0.007 to 0.050 inch, on automatic cutting and creasing machines. For purpose of illustration of specific features the improved corner construction is illustrated as applied to a paperboard blank as illustrative of the type of material employed.

The paperboard blank **10** is subdivided by scored fold lines and cuts into a plurality of panels, flaps, and tongues connected to one another.

A base panel **11** is attached to side wall panels along fold lines **12**, **12'**, **13** and **13'** at the side edges thereof. Wall panel **14** is hingedly attached to a side edge of the base panel **11** along fold line **13** whereas a wall panel **15** is hingedly attached to another side edge of the base panel **11** along fold line **12**. Wall panels **14'** and **15'** are hingedly attached to the other side edges along fold lines **13'** and **12'** respectively. A flap **16** is hingedly attached to a lower side edge portion of the wall panel **14** along fold line **17** and to an upper side edge portion along fold line **18**. An external tongue **19** is hingedly attached to a middle side edge portion of the wall panel **15** along a fold line **20**. As will be seen the tongue **19** is adapted to pass through an aperture in flap **16** during the assembling of the elements of the corner and to overlie the inside of the wall panel **14** when the panels are in corner forming relationship. Thus, in the corner assembled condition the hinged attachment for tongue **19**, namely fold line **20** is located generally above the fold line **17** and generally below fold line **18**.

Between the trailing edge **21** (see Figs. 3 and 4) of the tongue **19** and an upper side edge portion **22** of the wall panel **15** is an open slot **23** having a base **24** above the fold line **20**. Thus, the upper tongue portion **25** is separated along the trailing edge **21** from the edge portion **22** by the slot **23**. This upper tongue portion **25** will be seen to engage an upper inside portion of the flap along the trailing edge **21** when the corner is assembled.

In the flap **16** is an internal tongue **26** which resiliently yields from the plane of the flap under pressure from the external tongue **19** during the assembling of the elements of the corner, thereby producing an aperture **27**. The aperture **27** is defined by a guide edge **28**, another edge **29**, at least a portion of which is coincident with the normal edge of wall panel **14** along line **31**, and an internal tongue bend **42**. The tongue bend is caused by the displacement of the internal tongue from the plane of the flap **16** during the reception of the external tongue **19** in the aperture **27**.

The guide edge **28** and the edge **29** terminate at a common point or juncture **30** which, in the embodiment shown, is offset toward the flap from the normal edge line **31** of the wall panel **14** and also offset inwardly from an imaginary arc **32** swung from the base panel corner **35** and having a radius equal to the distance of the slot base **24** from the corner **35** of the base panel **11**. As illustrated in Fig. 2 the normal edge line **31** of the wall panel **14** passes along the fold line **17** and the fold line **18**.

The guide edge **28** is curvilinear in the embodiment and extends from the common point **30** to another point **33** which is located in the flap outside an imaginary arc **34** swung from the corner **35** and having a radius equal to

the distance of the uppermost point in the tongue 19 from the corner 35. The uppermost point in the specific embodiment is at 36 but it will be apparent that this point will vary in location depending upon the specific shape of the external tongue. By thus positioning the cut forming the guide edge 28 it will be seen that the upper tongue portion 25 may pass behind the guide edge 28 during the initial stages of the assembling of the corner forming elements. Although the guide edge 28 is illustrated as curvilinear in shape it may be a straight cut or other shape so long as it serves to guide the upper tongue portion 25 through the flap 16 without its having to be folded or drastically bent prior to entering into locking engagement with the flap.

The edge 29 extends from the common point 30 to another point 37 along the normal edge line 31 of the wall panel 15. This point 37 falls within an imaginary arc 38 swung from the corner 35 and having a radius equal to the distance of the lowermost point 39 in the external tongue 19. The lowermost point 39 in the illustration is at the bottom of fold line 20 but again it will be apparent that this point may vary in location depending upon the particular shape of the external tongue.

As will be observed from the drawings a substantial portion of the edge 29 is coincident with the normal edge of the wall panel 14 whereas the remaining portion 29' of the second cut edge is variably offset from the normal edge line 31 and defines a portion 29' of a protuberant side edge. Interposed along and abutting edge 29 is flap edge 41. A portion of the flap edge 41 as illustrated in Fig. 5 is adapted to engage the inside of the external tongue 19 in a region adjacent to the fold line 20 and to retain the tongue against the inside wall of panel 14 when the corner is assembled. It will be apparent that the flap edge 41 need not abut edge 29 throughout its entire length to serve the function of holding the tongue 19 against the inside of wall panel 14. Instead it is only necessary that the flap edge 41 abut the edge 29 along a portion of the normal side edge.

Although the embodiment shown disclosed tongue edge 51 in juxtaposition and abutting the guide edge 28, this is also not essential but rather a matter of convenience and simplicity in the formation of the blanks. Actually the tongue edge 51 may extend directly (as in a straight line) from the point 33 to another point along the normal edge line 31 above the point 37 since the internal tongue 26 merely functions in the corner assembled condition to provide an abutting flap edge portion for engaging the inside of the external tongue 19 when the corner is assembled.

Although not illustrated in its entirety it will be apparent that the internal tongue bend 42 extends from the point 37 at the lower terminus of the edge 29 to the point 33 at the outer terminus of the guide edge 28 when the internal tongue 26 is bent from the plane of the flap 16.

Another edge 43 extends from the common point 30 to another point 44. Point 44 falls along the normal edge line 31 and, in the embodiment, also on the imaginary arc 32. The edge 43 in the embodiment is bounded by a variably offset edge 45 which defines another portion of the protuberant side edge. The edge 43 and edge 45 have a juncture at point 44 and define a slot 46 when the corner is unassembled. As will be evident from the drawings and further disclosure herein this slot 46 opens up during the assembling of the corner forming elements and may then be considered as defined by the edge 43 and the inside of the protuberance 40 adjacent thereto. In the preferred corner assembly, a portion 52 of the external tongue 19 is lockingly confined within the slot 46 whereas another portion 49 of the flap 16 is confined within the open slot 23. The portion of the external tongue 19 adjacent to the fold line is generally designated at 52 whereas the portion of the flap above the point 44 is generally designated at 49 in Fig. 5. Preferably the juncture at 44 is offset slightly inwardly from the imaginary arc 32 (about 1/32 of an inch in most cases) so that the base 24 of the open slot 23 is tightly held against the juncture 44, thereby forming a more rigid corner assembly. Where a more loosely held corner assembly is desired the juncture point 44 may be offset upwardly from the imaginary arc 32 so long as the open slot 23 still functions to confine a portion 49 of the flap 16 as heretofore indicated. It will be understood that in using the phrase "substantially on the arc" for describing the location of the juncture 44 with respect to the base 24 of slot 23, that the phrase is intended to include the situations where the point is slightly offset inwardly or outwardly from said arc.

To assemble the box corner the upper tongue portion 25 is initially passed behind the guide edge 28 (see Fig. 3) by pressing the internal tongue 26 out of the plane of the flap 16, to form the aperture 27. As the external tongue 19 proceeds through the aperture 27 the guide edge 28 is received in the open slot 23 and the leading edge 47 of the external tongue 19 may cause a bulge 48 in the wall panel 14, depending upon the resiliency of the blank material. This bulge 48 is not essential to the locking function of the corner construction but merely depends on the degree of deflection of the internal flap tongue 26 from the plane of the flap which in turn is dependent upon the resiliency of the blank material. At a further stage of assembling, the guide edge 28 engages the base 24 of the open slot 23 and during the further passage of the external tongue 19 through the aperture 27 a bulge 49' is caused to form in wall panel 15. During the last stages of assembling of the corner the resiliency of the material in the bulge portion 49' of the second wall panel 15 causes the slot base 24 to follow the edge 43 into the slot 46 and to become fixedly seated at the juncture 44 when the bulge portion 49' of the wall panel 15 returns to the normal plane of said wall panel. As this seating takes place the internal tongue 26 returns to the plane of the flap 16, thereby closing the aperture 27. Upon the return of the tongue 26 to its normal flap place, the flap edge 41 engages the inside of the external tongue 19 and holds said tongue 19 against the inside of the wall panel 14. The wall panel 14 is thereby prevented from pulling away from the corner relationship by the engagement of the flap edge 41 with the inside of the external tongue 19, whereas the wall panel 15 is prevented from pulling away from the relationship by the engagement of the upper tongue portions 25 along its trailing edge 21 with the inside portion 49 of the flap.

The wall panel 14 is prevented from falling inwardly in the preferred embodiment by the bottom edge 50 of the flap 16 which rests upon the base panel 11 and the engagement of the protuberance 40 with the edge of the wall panel 15. Neither the bottom edge 50 nor the protuberance 40 are essential to prevent the panel 14 from falling inwardly, however, since the flap edge 41 prevents the external tongue 19 from becoming greatly distorted from the plane normal to the plane of the wall panel 15, the extended tongue in turn preventing the panel from falling inwardly. In the extreme case where the external tongue 19 might become folded into a plane parallel to the wall panel 15 the upper tongue portion 25 still holds the wall panel 14 at bay by engaging the panel 14 in a region adjacent to the upper inside portion 49 of the flap 16. The wall panel 15 is prevented from falling inwardly because the interengagement of the tongue and flap would cause the wall panel 14 to become distorted in response to inward pressure from wall panel 15.

It will be seen from the prior disclosure that the flap 16 overlies the inside of the side wall 15 and is hingedly attached to the wall panel 14. The hinged attachment is interrupted by a continuous slot which terminates upwardly at the juncture point 44, which point is spaced downwardly from the upper edge 53 of the flap 16 and located at the bottom of fold line 18. On the other hand it will be observed that the continuous slot terminates downwardly at a point 37 which is spaced upwardly

from the bottom edge 50 of the flap and located at the top of fold line 17. The fold line 20 is adapted to lie generally between the terminal points 44 and 37 of the continuous slot when the corner is assembled. The continuous slot is defined on the wall panel side by the edge 29 and the variably offset edge 45, whereas on the flap side the continuous slot is defined by the abutment edge 41 and the edge 43. The guide edge 28 junctures with the continuous slot and extends in a direction away from the corner 35 and the side edge of panel 14. The guide slot defined by the guide edge 28 and tongue edge 51 is adapted to receive the upper tongue portion 25 and to guide it into locking engagement with the flap above the continuous slot. In the embodiment described in the drawings the guide edge junctures with the continuous slot below the juncture point 44 in a manner such that the continuous slot is divided into upper and lower slot portions. The upper slot portion is the slot 46 whereas the lower slot portion is defined by the edge 29 and the flap edge 41. In the assembled condition the upper slot portion confines the external tongue along a portion 52 thereof below and adjacent to the open slot base whereas the open slot 23 confines the upper portion 49 of the flap 16 which is located above the juncture 44.

The invention thus provides a corner construction which is admirably suited for quick and easy assembling of the parts, and further provides wall panels free of slits or other elements which interfere with the printing of matter on the panels. In particular it will be seen that the invention provides a simple and easy means for interlocking the flap and tongue without having to fold the tongue in order to pass it into the interlocking position.

While only a certain preferred embodiment of this invention has been shown and described by way of illustration, many modifications will occur to those skilled in the art and it is, therefore, desired that it be understood that it is intended in the appended claims to cover all such modifications as fall within the true spirit and scope of this invention.

What is claimed as new and what it is desired to secure by Letters Patent of the United States is:

1. In a folding box having adjoining side wall panels hingedly joined along respective edges of a base panel, said edges meeting at a corner of the base panel, a flap hingedly attached to a side edge of one of said wall panels adjacent said corner, said flap being interrupted by a slot along a portion of said side edge, said slot terminating upwardly at a point spaced downwardly from the upper edge of said flap, a flap inner edge at said slot extending adjacently along said side edge portion, a guide edge extending into said flap in a direction upwardly away from said corner and said side edge from a juncture with said slot spaced below said upward termination point of said slot, a tongue hingedly attached to the adjacent side edge of the adjoining side wall panel, said tongue having an upper portion which is separated above its hinged attachment from said adjacent side edge by an open slot, said tongue having a portion adjacently below the lower end of said open slot nestingly receivable into said first mentioned slot above said juncture.

2. A folding box according to claim 1 wherein said open slot extends downwardly to and terminates downwardly at a slot base which is positioned at a distance from said corner greater than the distance from said corner to said juncture.

3. In a folding box having adjoining side wall panels hingedly joined along respective edges of a base panel, said edges meeting at a corner of the base panel, a flap hingedly attached to a side edge of one of said wall panels adjacent said corner, said flap being interrupted by a slot along a portion of said side edge, said slot terminating upwardly at a first point spaced downwardly from the upper edge of said flap and terminating downwardly at a second point spaced upwardly from the bottom edge of said flap, a flap inner edge at said slot extending adjacently along said side edge portion, a guide edge extending into said flap in a direction upwardly away from said corner and said side edge from a juncture with said slot spaced between said first and second points, a tongue hingedly attached to the adjacent side edge of an adjoining side wall panel, said tongue having an upper portion which is separated above its hinged attachment from said adjacent side edge by an open slot, said tongue having a portion below the lower end of said open slot lockingly receivable within said first mentioned slot above said juncture.

4. A folding box according to claim 3 wherein said open slot extends downwardly to and terminates at a slot base which is positioned at a distance from said corner greater than the distance from said corner to said juncture.

5. In a folding box having adjoining side wall panels hingedly joined along respective edges of a base panel, said edges meeting at a corner of the base panel, a flap hingedly attached to a side edge of one of said wall panels adjacent said corner, said hinged attachment being interrupted by a slot along a portion of said side edge, said slot terminating upwardly at a first point spaced downwardly from the upper edge of said flap and terminating downwardly at a second point spaced upwardly from the bottom edge of said flap, a flap edge at said slot extending adjacently along said side edge portion, a guide edge extending from a juncture with said slot spaced between said first and second points in a direction upwardly away from said corner and said edge into said flap to and terminating at a third point within the bounding edges of said flap, a tongue hingedly attached along a middle portion of the adjacent side edge of the adjoining side wall panel, said tongue having an upper portion which is separated above its hinged attachment from said adjacent side edge by an open slot which extends downwardly to and terminates at a slot base, said first point being positioned substantially on an imaginary arc swung from the corner and having a radius equal to the distance of said slot base from said corner, said second point being positioned substantially within an imaginary arc swung from the corner and having a radius equal to the distance of the lowermost point in said tongue from said corner, and said third point being positioned substantially outside an imaginary arc swung from the corner and having a radius equal to the distance of the outermost point in said tongue from said corner.

6. A folding box according to claim 5 wherein said slot base is positioned at a distance from said corner greater than the distance from said corner to said juncture of said guide edge and said slot.

References Cited in the file of this patent

UNITED STATES PATENTS

2,573,379	Acker	Oct. 30, 1951
2,718,998	Bemiss	Sept. 27, 1955