May 17, 1960 O. LUNDQUIST 2,936,939

BOX STRUCTURES

Filed Oct. 19, 1956 4 Sheets-Sheet 1

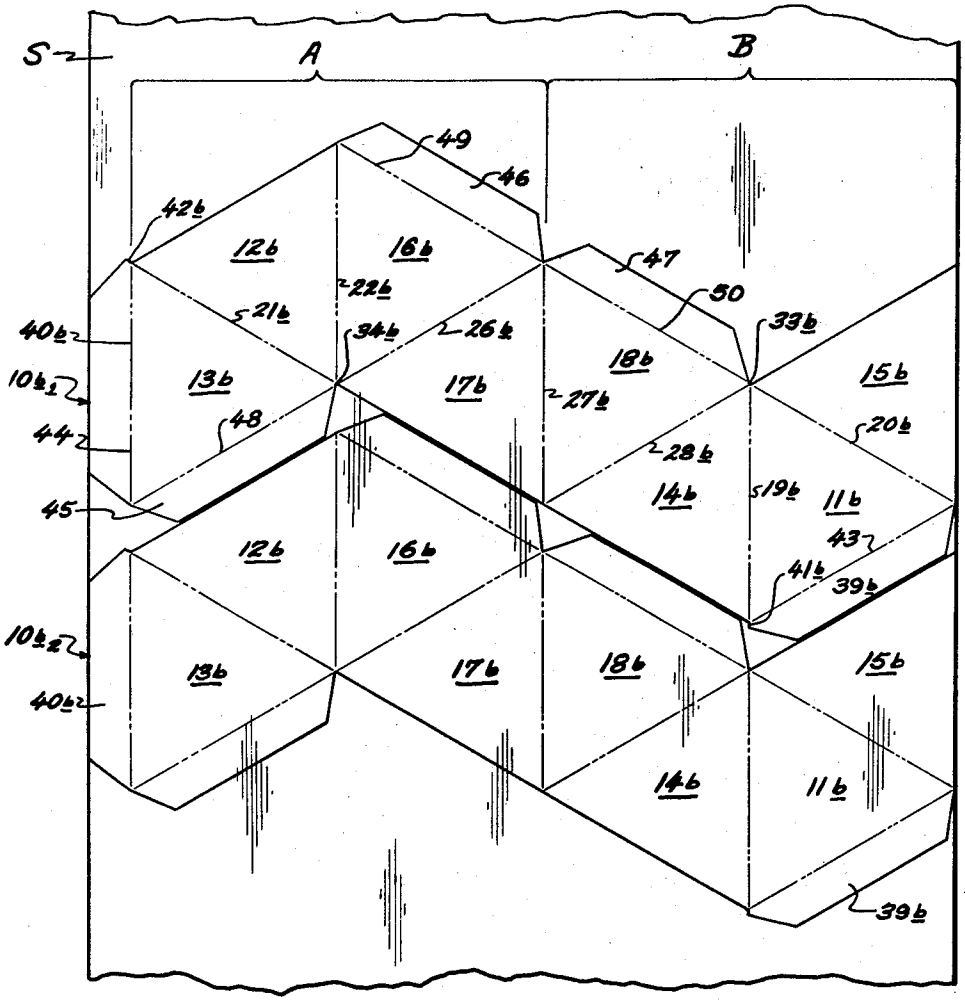


FIG. 1

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BOX STRUCTURES

Filed Oct. 19, 1956 4 Sheets-Sheet 2

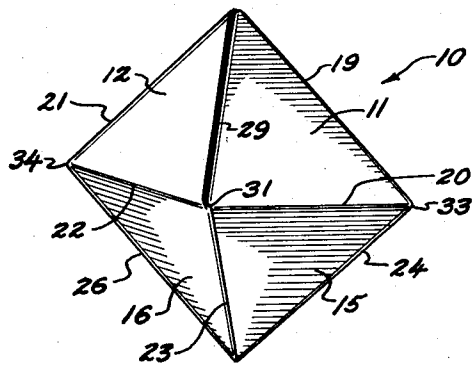


FIG. 4

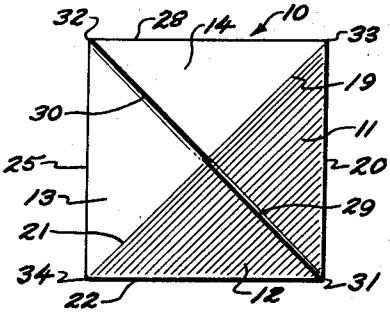


FIG. 6

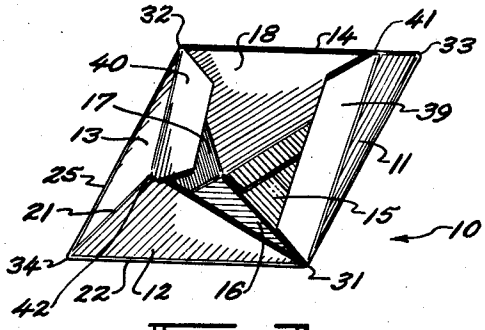


FIG. 3

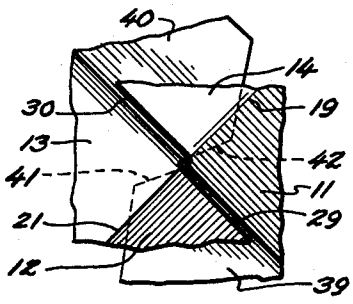


FIG. 12

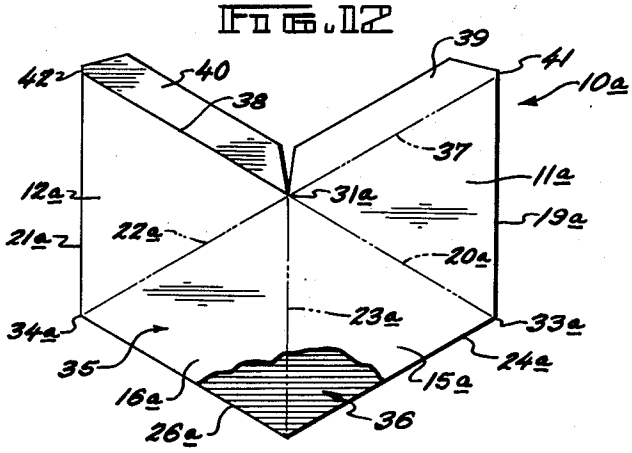


FIG. 2

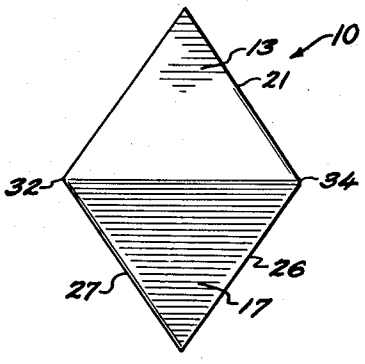


FIG. 5

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BOX STRUCTURES

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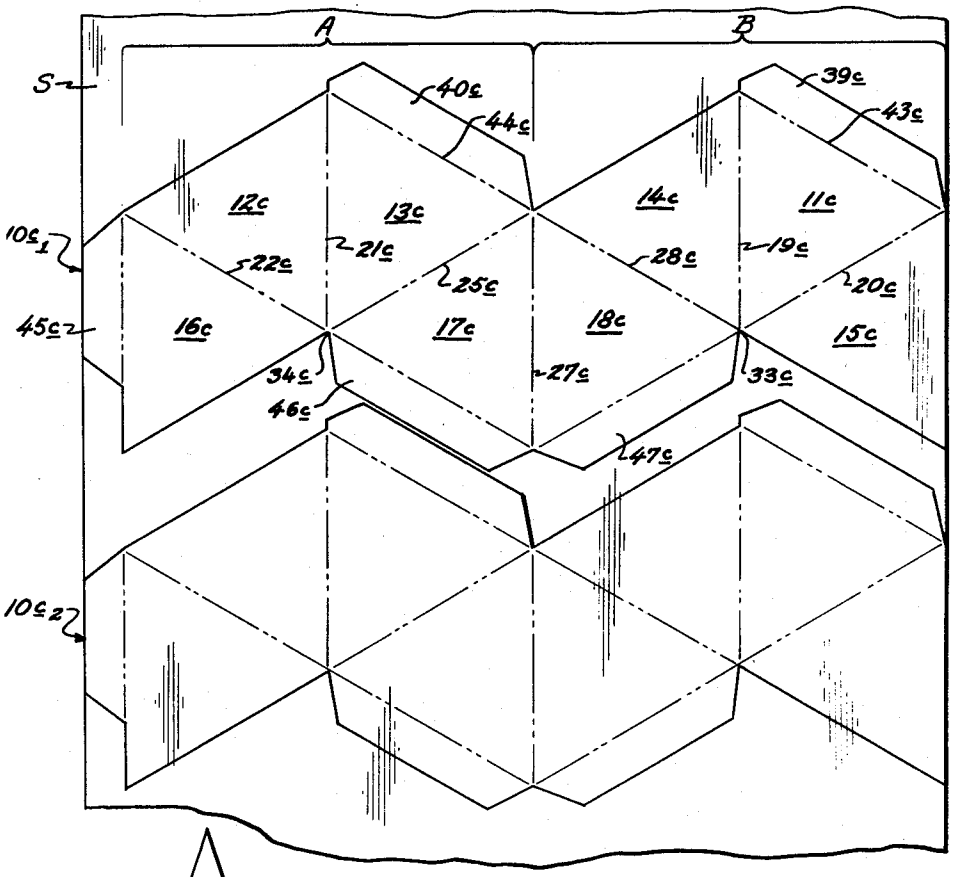


FIG. 7

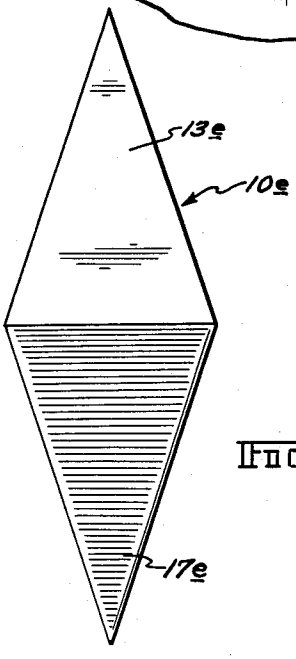


FIG. 9

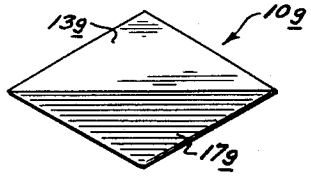


FIG. 11

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BOX STRUCTURES

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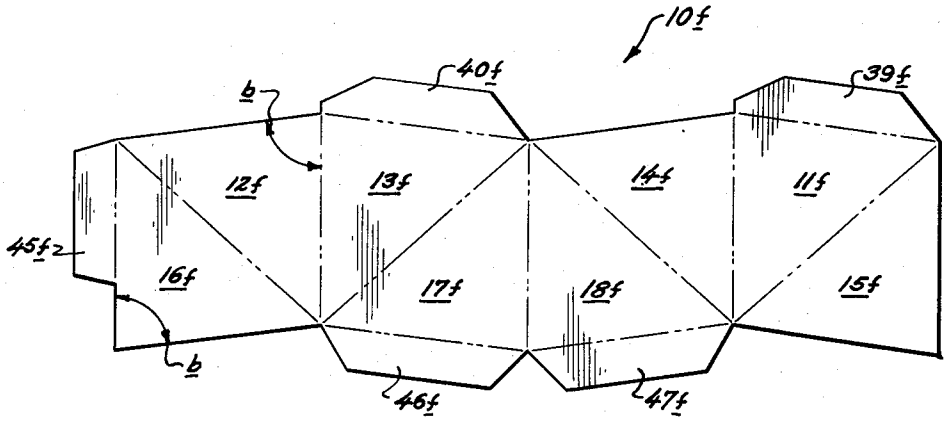


FIG. 10

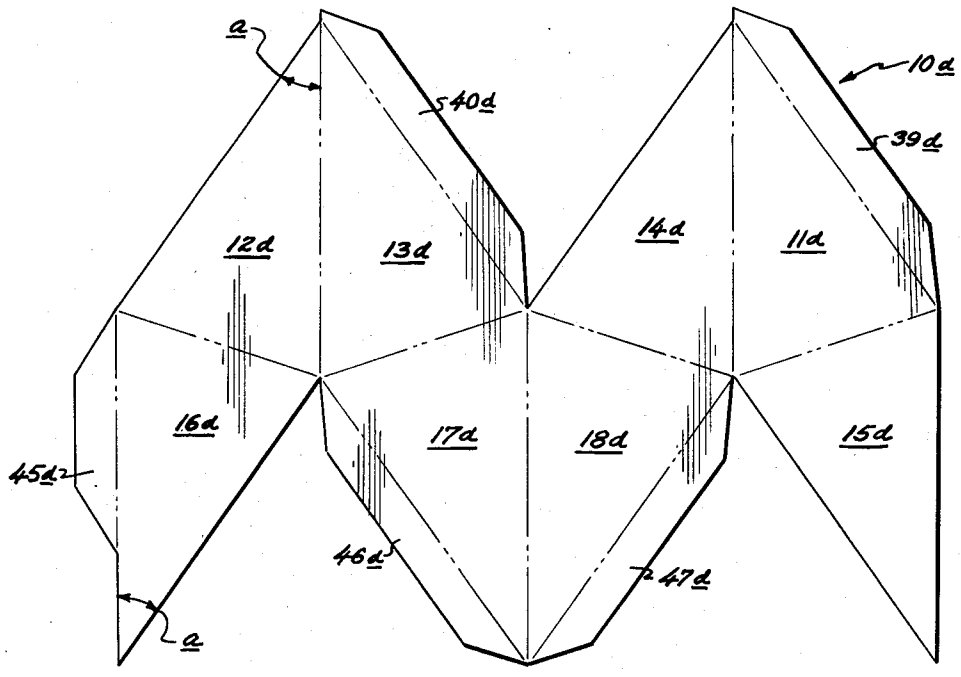


FIG. 8

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United States Patent Office 2,936,939 Patented May 17, 1960



2,936,939

# BOX STRUCTURES

Oliver Lundquist, Westport, Conn.

Application October 19, 1956, Serial No. 617,068

5 Claims. (Cl. 229—8)

This invention relates generally to box structures, and more particularly is directed to ornamental box structures of cardboard, stiff paper, plastics or other suitably rigid sheet material.

It is an object of the present invention to provide octahedral box structures, that is, box structures having eight plane triangular faces.

Another object is to provide octahedral box structures which can be stored or shipped in flat condition, and then easily erected.

Another object is to provide an octahedral, collapsible box structure which is openable along two contiguous edges lying in the same plane when the box is erected, and which has simple means at said edges for closing the latter and maintaining the collapsible box structure in its erected condition.

Still another object is to provide one-piece blanks of stiff paper, cardboard or the like, which can be folded and glued to form octahedral box structures.

A further object is to provide blanks of the described character which can be cut, in nested relation, from a web or length of stiff paper, cardboard or other suitably rigid sheet material, to reduce to the minimum the wasted portions of the sheet material.

A further object is to provide blanks of the described character which can be folded and glued to form flat structures erectable into octahedral boxes, and wherein the blanks are arranged to facilitate the performance of the necessary folding and gluing operations in existing machines adapted therefor.

In accordance with an aspect of the present invention, an octahedral box structure is erected from a flat cardboard or the like structure having two superposed, coextensive layers each including a series of four triangular portions having successive common sides along which the triangular portions of each layer are hingedly connected, with such common sides all converging to a single point, the edges of the two layers being hingedly connected to each other only along the sides of the respective triangular portions which are remote from the single point where the related common sides converge, so that, when the two layers move laterally apart at said single points thereof, the flat structure attains the erected form of a hollow octahedron with the free edge portions of the two layers then defining an opening along two contiguous edges of the octahedron lying in the same plane.

Further, in accordance with this invention, the above described flat structure has hinged flaps extending along the free edge portions of the two layers at the sides of the opposite end triangular portions of the series of the latter making up the two layers, such flaps being adapted to extend across the opening of the erected octahedral box and to interlock at their adjacent ends for closing the opening and holding the box in its erected condition.

In accordance with still another aspect of this invention, a one-piece blank is used to form the above described flat structure and the octahedral box erected therefrom, said blank including eight triangular portions arranged



in two groups of equal number, the four triangular portions of each group having successive common sides all converging to a single point, and one triangular portion of one of said groups having a single common side with one triangular portion of the other group.

The above, and other objects, features and advantages of the present invention, will be apparent in the following detailed description of illustrative embodiments thereof, which is to be read in connection with the accompanying draiwngs forming a part hereof and wherein:

Fig. 1 is a plan view showing one-piece blanks cut from a strip or web of sheet material in accordance with one embodiment of the invention;

Fig. 2 is a plan view of a flat structure formed from a blank of the kind shown in Fig. 1;

Fig. 3 illustrates the appearance of the structure of Fig. 2 following the partial erection thereof;

Fig. 4 is a perspective view of an octahedral box resulting from the full erection of the flat structure of Fig. 2;

Fig. 5 is a side elevational view of the octahedral box of Fig. 4;

Fig. 6 is a top plan view of the octahedral box of Figs. 4 and 5;

Fig. 7 is a view similar to Fig. 1, but illustrating other one-piece blanks from which the flat structure and box of Figs. 2 and 4, respectively, may be formed;

Fig. 8 is a plan view of another blank embodying the present invention;

Fig. 9 is a view similar to that of Fig. 5, but showing a box formed from the blank of Fig. 8;

Fig. 10 is a plan view of still another blank embodying the present invention;

Fig. 11 is a view similar to Figs. 5 and 9, but showing a box formed from the blank of Fig. 10; and

Fig. 12 is a fragmentary, enlarged top plan view illustrating the details of a feature of octahedral boxes embodying this invention.

Referring to the drawings in detail, and initially to Figs. 3, 4, 5 and 6, it will be seen that a box structure embodying the present invention and there generally identified by the reference numeral **10** includes eight triangular plane faces **11**, **12**, **13**, **14**, **15**, **16**, **17** and **18** which define an octahedron. The face **11** has common sides with the faces **14** and **15** to define edges **19** and **20**, respectively, of the box **10**. The face **12** has common sides with the faces **13** and **16** to define edges **21** and **22**, respectively, of the box. The face **15** has common sides with the faces **16** and **18** to define edges **23** and **24**, respectively, of the box. The face **17** has common sides with the faces **13**, **16** and **18** to define edges **25**, **26** and **27**, respectively, of the box (Fig. 5), while the face **18** has a common side with the face **14** to define an edge **28** of the box. The faces of the box **10** having common sides along the edges **19** to **28**, inclusive, are there hingedly connected to each other, while the adjacent sides of the faces **11** and **12** defining an edge **29** (Figs. 4 and 6) and the adjacent sides of the faces **13** and **14** defining an edge **30** (Fig. 6) are free of each other so that the box **10** is openable along the two contiguous edges **29** and **30** which lie in the same plane when the box is closed or fully erected, as is apparent from Fig. 6.

In order to open the box **10**, it is only necessary to press toward each other the apices **31** and **32** thereof at the junction of the edges **20**, **22** and **23** and at the junction of the edges **25**, **27** and **28**, respectively, thereby to angularly spread open the adjacent free sides of the faces **11** and **12** and of the faces **13** and **14**, respectively. In order to close the box **10**, it is only necessary to press toward each other the apices **33** and **34** of the box at the junction of the edges **19**, **20**, **24** and **28** and at the junction of the edges **21**, **22**, **25** and **26**, respectively, thereby to urge the

free sides of faces 11 and 14 angularly toward the free sides of faces 12 and 13, respectively.

When the junction of the common sides of the faces 11, 15, 16 and 12, at the apex 31, and the junction of the common sides of the faces 13, 18, 17 and 14 at the apex 32 come together, as in the completely collapsed or flattened condition of the box 10, a flat structure 10*a* (Fig. 2) results that may be easily shipped, packaged and stored.

It will be apparent that the flat structure 10*a*, from which the octahedral box 10 may be erected, has two superposed, substantially coextensive layers 35 and 36 (Fig. 2) each including a series of four triangular portions, for example, the portions 11*a*, 15*a*, 16*a* and 12*a* of layer 35, having successive common sides 20*a*, 23*a* and 22*a*, along which the triangular portions of each layer are hingedly or foldably connected. All of such common sides of the triangular portions of each layer converge to a single point, for example, the point 31*a* at which the common sides 20*a*, 23*a* and 22*a* all converge. Further, the edges of the two layers 35 and 36 are hingedly or foldably connected to each other only along the sides 19*a*, 24*a*, 26*a* and 21*a* of the triangular portions which are remote from the single point, for example, the point 31*a*, where the related common sides all converge.

In the flat structure 10*a* of Fig. 2, the parts thereof corresponding to parts of the octahedral box 10 are identified by the same reference numerals but with the letter "*a*" appended thereto. Thus, the triangular portions 11*a*, 15*a*, 16*a* and 12*a* of the layer 35 of the flat structure, correspond to and form the faces 11, 15, 16 and 12 of the erected octahedral box 10, while the common sides 20*a*, 23*a* and 22*a* and the secured together edge portions 19*a*, 24*a*, 26*a* and 21*a* of the flat structure define the edges 20, 23, 22, 19, 24, 26 and 21 of the erected box. Although the lower layer 36 of the flat structure 10*a* is not wholly visible in Fig. 2, it is to be understood that the lower layer also has four successive triangular portions in the positions of, and underlying triangular portions 11*a*, 15*a*, 16*a* and 12*a* and correspond to and form the faces 14, 18, 17 and 13, respectively of the erected box 10, while the common sides of the successive underlying triangular portions correspond to the edges 28, 27 and 25, respectively of the erected box. Further, the point 31*a*, at which common sides 20*a*, 23*a* and 22*a* of the triangular portions of layer 35 converge, corresponds to the apex 31 of the erected box 10, while the underlying point of the lower layer 36, at which the common sides of its triangular portions converge, corresponds to the apex 32 of the erected octahedral box. Finally, it will be understood that the corners 33*a* and 34*a* of the flat structure 10*a* at the junction of the edge portions 19*a* and 24*a* and the common side 20*a*, and at the junction of the edge portions 21*a* and 26*a* and the common side 22*a*, respectively, correspond to the apices 33 and 34 of the erected octahedral box.

Thus, the flat structure 10*a* can be erected to form the box 10 merely by pressing the corners 33*a* and 34*a* generally toward each other. Since the sides 37 and 38 of the triangular portions 11*a* and 12*a*, respectively, of the upper layer 35 are free of the corresponding sides of the underlying triangular portions of lower layer 36, the pressing toward each other of corners 33*a* and 34*a* results in the movement of point 31*a* of layer 35 away from the corresponding underlying point of layer 36 while the triangular portions of each layer are progressively angularly displaced relative to the contiguous triangular portions with which they have contiguous sides, as in Fig. 3, until, finally, such triangular portions of the flat structure being erected occupy the positions of the corresponding triangular plane faces of the octahedral box 10.

In order to close the box 10 across the two contiguous edges 29 and 30 lying in the same plane, the layer 35 of the flat structure 10*a* has a flap 39 extending along, and foldably or hingedly joined to, the side 37 of the triangular portion 11*a*, while the lower layer has a similar flap 40 extending along, and foldably or hingedly joined to, the side of the triangular portion thereof corresponding to the side 38 of triangular portion 12*a* of the upper layer, that is, to the triangular portion of the lower layer corresponding to the face 13 of the erected box. As the flat structure 10*a* is being erected, in the manner described above, to form the octahedral box 10, the ends of the flaps 39 and 40 adjacent the developing apices 31 and 32, respectively, are tucked inside the faces 12 and 14, respectively, as shown in Fig. 3, so that, in the fully erected condition (Figs. 4 and 6) flap 39 extends across edge 29 and under face 12, while flap 40 extends across edge 30 and under face 14, thereby to close the edges 29 and 30.

It will be apparent that, when the box is in a partially erected condition, for example, as in Fig. 3, the free sides of the triangular faces 11, 12, 13 and 14 define an opening through which articles can be inserted or removed, and that, as the box is manipulated to its fully erected condition, the size of said opening is progressively decreased until the latter is fully closed in the fully erected condition.

In order to provide a simple means for releasably securing the box 10 in its fully erected or closed condition, the ends of the flaps 39 and 40 which are adjacent to each other in the fully erected condition are formed to then interlock slightly, as shown particularly in Fig. 12. Since the sheet material of which the box 10 is formed, for example, cardboard, stiff paper and the like, has considerable resiliency, the slight interlock of the flaps 39 and 40 can be easily disengaged in response to the pressing toward each other of the apices 31 and 32 when it is desired to open or collapse the box 10. As seen in Fig. 2, the ends of the flaps 39 and 40 are generally cutback at an angle to avoid substantially interference between the ends of the flaps and the adjacent faces of the box 10 during the erection of the latter. However, in order to provide the desired slight interlock of the adjacent ends of flaps 39 and 40 in the fully erected or closed condition of the octahedral box, the ends of the flaps, which are adjacent to each other in the erected or closed condition, have relatively short edge portions 41 and 42, respectively, which are longitudinally aligned with the adjacent edge portions 19*a* and 21*a* in the flat condition of the box structure (Fig. 2). Since the flaps 39 and 40 are angularly disposed with respect to the related faces 11 and 13 by engagement under the faces 12 and 14, respectively, in the fully erected or closed condition of the box, the short end edges 41 and 42 of the flaps 39 and 40, respectively, incline toward each other and overlap, as shown in Fig. 12, to provide the desired interlocking engagement. Further, since the flaps 39 and 40 are first engaged by the faces 12 and 14 at the ends of the flaps remote from edge portions 41 and 42 during erection of the box from its flat condition, as shown in Fig. 3, the flaps can twist about their longitudinal axes when the edge portions 41 and 42 first engage, thereby to permit passage by each other of such overlapping edge portions. Only when the box 10 is in its fully closed or erected condition, do the faces 12 and 14 engage the flaps 39 and 40 at the overlapping ends thereof to ensure the interlock of edge portions 41 and 42.

In accordance with the present invention, the flat structure 10*a*, and hence the box 10 erected therefrom, is formed from a one-piece blank of suitably folded and glued cardboard, stiff paper or other sheet material. In Fig. 1, a blank configuration is illustrated which is best adapted for the economical utilization of the sheet material from which the blank is to be cut. Thus, it will be seen that successive identical blanks $10b_1$ and $10b_2$ may be cut from a web or strip S of suitable sheet material with a minimum waste of the latter. In the blanks of Fig. 1, the several parts or portions and foldlines thereof are identified by the same reference numerals employed in

connection with the corresponding parts and edges, respectively, of the previously described box **10**, but with the letter "*b*" appended thereto.

It will be seen that each of the blanks **10***b*$_1$ and **10***b*$_2$ includes eight triangular portions **11***b*, **12***b*, **13***b*, **14***b*, **15***b*, **16***b*, **17***b* and **18***b*, which are arranged in two groups A and B of equal number, the four triangular portions of each group having successive common sides all converging to a single point, and one triangular portion of one of said groups having a single common side with one triangular portion of the other of said groups. Thus, in each of the blanks of Fig. 1, the triangular portions **13***b*, **12***b*, **16***b* and **17***b*, corresponding to the faces **13**, **12**, **16** and **17** of box **10**, form the group A and have successive common sides **21***b*, **22***b* and **26***b* along which the blank is scored to define fold lines corresponding to the edges **21**, **22** and **26** of the box **10**, while the triangular portions **18***b*, **14***b*, **11***b* and **15***b*, corresponding to the faces **18**, **14**, **11** and **15** of box **10**, form the group B and have successive common sides **28***b*, **19***b* and **20***b* along which the blank is scored to define fold lines corresponding to the edges **28**, **19** and **20** of box **10**. The common sides **21***b*, **22***b* and **26***b* of the triangular portions of group A converge to a single point **34***b* corresponding to the apex **34** of the erected box, while the common sides **28***b*, **19***b* and **20***b* of the triangular portions of group B converge to a single point **33***b* corresponding to the apex **33** of the erected box. Finally, it will be seen that only the triangular portion **17***b* of group A has a single common side **27***b* with only the triangular portion **18***b* of group B.

The sides of the triangular portions **11***b* and **13***b* remote from the points **33***b* and **34***b*, respectively, have flap defining portions **39***b* and **40***b*, respectively, extending therealong and corresponding to the flaps **39** and **40** of box **10**, the flap defining portions **39***b* and **40***b* being joined to the related triangular portions **11***b* and **13***b* at scored fold lines **43** and **44**, respectively. Further, although the end edges of the flap defining portions **39***b* and **40***b* generally converge toward each other in the directions away from the related fold lines **43** and **44**, the end of flap defining portion **39***b* adjacent fold line **19***b* has an edge portion **41***b* which is longitudinally aligned with the latter and, similarly, the end of flap defining portion **40***b* adjacent fold line **21***b* has an edge portion **42***b* which is longitudinally aligned with the latter, so that the edge portions **41***b* and **42***b* of the blank correspond to the interlocking edge portions **41** and **42** of the flaps on box **10**.

Finally, each of the blanks **10***b*$_1$ and **10***b*$_2$ of Fig. 1 has flaps **45**, **46** and **47** extending along the outer or free sides of triangular portions **13***b*, **16***b* and **18***b* and joined to the latter along scored fold or hinge lines **48**, **49** and **50**, respectively.

In order to form the flat structure **10***a* of Fig. 2 from one of the one-piece blanks **10***b*$_1$ or **10***b*$_2$ of Fig. 1, adhesive is applied to the top surface, as viewed in Fig. 1, of each of the flaps **45**, **46** and **47** of the blank. Then, assuming that the blank faces as shown in Fig. 1, triangular portion **13***b* is folded about fold line **21***b* to underlie triangular portion **12***b*; flap **47** is turned under adjacent triangular portion **18***b*; triangular portions **13***b*, **12***b* and **16***b* are folded, as a unit, about fold line **26***b* so that portion **16** underlies portion **17** and so that flap **45** extends under the adjacent edge portion of triangular portion **17** to adhesively secure the latter to triangular portion **13**; and, finally, the triangular portions **11** and **15** are folded under, as a unit, about the fold line **19***b* to respectively underlie the triangular portions **14***b* and **18***b* with the free edge portions of triangular portion **15***b* being applied against the adhesive coated flaps **46** and **47** and thereby secured to the triangular portions **16***b* and **18***b*.

When the above described folding operations are completed, a flat structure **10***a* will result with the layer **36** on top and the flaps **39** and **40** at the lower edge. This



flat structure can be merely turned over to dispose it in the position corresponding to that shown in Fig. 2, or the flat blank can be reversed before commencing the folding thereof.

Although the configuration of the blanks shown in Fig. 1 permits close nesting thereof on the web or strip S of sheet material so that there is substantially no waste of the latter, it may be desirable to sacrifice this economy, to a limited extent, in order to facilitate the folding of the blanks in existing machines adapted for that purpose. Thus, in Fig. 7, two blanks **10***c*$_1$ and **10***c*$_2$ are shown as they are cut from a strip or web S of suitable sheet material. In the blanks of Fig. 7, the several parts and fold lines thereof are referred to by the same reference numerals employed in connection with the corresponding parts and edges of the octahedral box **10** of Fig. 1, but with the letter "*c*" appended thereto. As in the case of the blanks **10***b*$_1$ and **10***b*$_2$ of Fig. 1, the blanks of Fig. 7 for forming octahedral boxes of the kind described in connection with Fig. 1 each include eight triangular portions **11***c*, **12***c*, **13***c*, **14***c*, **15***c*, **16***c*, **17***c* and **18***c* which are arranged in two groups A and B of equal number, the four triangular portions of each group having sucessive common sides all converging to a single point, and one triangular portion of one of the groups having a single common side with one triangular portion of the other of the groups. However, in each of the blanks of Fig. 7, in order to facilitate the subsequent folding and gluing thereof, the two groups A and B are arranged to provide symmetry, that is, the points at which the common sides of the triangular portions of the respective groups converge are disposed at the same side of the blank. Thus, in the blank **10***c*$_1$, group A consists of triangular portions **16***c*, **12***c*, **13***c* and **17***c* arranged successively with their common sides **22***c*, **21***c* and **25***c* converging to a single point **34***c*, while group B consists of triangular portions **18***c*, **14***c*, **11***c* and **15***c* arranged successively with their common sides **28***c*, **19***c* and **20***c* converging to a single point **33***c* which is at the same side of the blank as the point **34***c*, and the one triangular portion **17***c* of group A has one common side **27***c* with the one triangular portion **18***c* of group B. Further, the blank **10***c*$_1$ has flap defining portions **39***c* and **40***c* extending along the sides of triangular portions **11***c* and **13***c* remote from points **33***c* and **34***c*, respectively, and joined to the related triangular portions along fold lines **43***c* and **44***c*. The blank **10***c*$_1$ also includes flap defining portions **45***c*, **46***c* and **47***c* extending along, and foldably joined to, the side of triangular portion **16***c* remote from point **34***c* and the free sides of triangular portions **17***c* and **18***c*, respectively.

In folding and gluing the blanks of Fig. 7 in order to provide the flat structure **10***a* of Fig. 2, and assuming that each blank is initially disposed as in Fig. 7, the flap defining portions **46***c* and **47***c* are folded upwardly to overlie the adjacent side portions of triangular portions **17***c* and **18***c*, and adhesive is applied to the surfaces of the flap defining portions which face upwardly following the above folding operation. Then triangular portions **16***c* and **12***c* are folded upwardly as a unit about the fold line **21***c* so that portion **16***c* overlies portion **17***c* and portion **12***c* overlies portion **13***c* with the flap defining portion **45***c* extending onto portion **18***c* and adhesive is applied to the surface of portion **45***c* which faces upwardly, and, finally, the triangular portions **15***c* and **11***c* are also folded upwardly as a unit about the fold line **19***c* so that portion **15***c* overlies portion **18***c* and portion **11***c* overlies portion **14***c*. At the conclusion of the above simple and symmetrical folding operations which can be easily effected in existing machines adapted for that purpose, flap **45***c* will secure portion **15***c* to portion **16***c*, while flaps **46***c* and **47***c* will secure together portions **16***c* and **17***c* and portions **15***c* and **18***c*, respectively.

The several triangular portions of the blanks in Figs.

1 and 7, respectively, and of the flat structure of Fig. 2, and the faces of the octahedral box **10** of Figs. 4, 5 and 6, are all identical equilateral triangles, so that the box **10**, in its fully closed or erected condition, has the configuration of a regular octahedron. However, the present invention is not limited to that configuration, in that the several triangular portions of the blank and flat structure formed therefrom and the corresponding triangular faces of the octahedral box may be merely identical or equal isosceles triangles where the sides of equal length enclose an angle, that is, the angle at the apex of the triangle, which is less than 90 degrees. Thus, each triangular portion of the blank or flat structure and each corresponding triangular face of the box may be an isosceles triangle having an apex angle of less than 60 degrees or of more than 60 degrees but, in any case, substantially less than 90 degrees.

For example, referring to Fig. 8 of the drawings, it will be seen that a blank **10***d* embodying the present invention may include triangular portions **11***d*, **12***d*, **13***d*, **14***d*, **15***d*, **16***d*, **17***d* and **18***d*, and flap defining portions **39***d*, **40***d*, **45***d*, **46***d* and **47***d* all arranged in the same relationship as the correspondingly numbered parts of the blanks of Fig. 7, but with the several triangular portions of the blank being equal or identical isosceles triangles each having an apex angle *a* which is substantially less than 60 degrees so that, when the blank **10***d* is folded and glued in the manner described with reference to Fig. 7 to provide a flat structure generally of the kind illustrated in Fig. 2, and that flat structure is then erected, the resulting octahedral box **10***e* (Fig. 9) will have isosceles triangular faces, for example, the faces **13***e* and **17***e* visible in Fig. 9, which each have a height or perpendicular distance from the vertex to the base substantially greater than the length of the base, thereby to provide an octahedral box which is generally elongated in the direction of its axis passing through the apices defined by the vertices of the triangular faces.

On the other hand, as shown in Fig. 10, a blank **10***f* for producing an octahedral box in accordance with the present invention may have triangular portions **11***f*, **12***f*, **13***f*, **14***f*, **15***f*, **16***f*, **17***f* and **18***f* and flap defining portions **39***f*, **40***f*, **45***f*, **46***f* and **47***f* arranged in same relationship as the blanks of Figs. 7 and 8, respectively, but with the several triangular portions being identical isosceles triangles each having an angle *b* at its apex which is larger than 60 degrees and substantially smaller than 90 degrees so that the resulting octahedral box **10***g* (Fig. 11) will have isosceles triangular faces, for example, the faces **13***g* and **17***g* visible in Fig. 11, which each have a height or perpendicular distance from its apex or vertex to its base substantially smaller than the length of the base, and the resulting box will be of generally squat appearance.

It will be apparent that the alternative blanks shown in Figs. 8 and 10, respectively, when folded and glued in the manner recited in connection with the blanks of Fig. 7, will produce flat structures similar to that illustrated in Fig. 2, with the exception that the triangular portions of the flat structure, rather than being equilateral, as in Fig. 2, will be isosceles triangles having apex or vertex angles which are either smaller or larger, as the case may be, than the angle of 60 degrees.

It is apparent that boxes embodying the present invention may be employed as containers or receptacles for a wide variety of articles to provide a novel package by reason of the unique shape thereof and the ease with which the boxes can be either flattened for convenient storage and shipment or erected for the reception of articles. Further, when the faces of boxes embodying this invention are suitably decorated, such boxes provide attractive decorative objects useful, for example, as Christmas tree ornaments and the like, which have the advantages, over conventional fragile glass ornaments, of being unbreakable and collapsible for easy storage, shipment and merchandizing. Further, since boxes embodying the present invention and usable as Christmas tree ornaments and the like, are formed from one-piece blanks cut from flat sheet material, such as, cardboard and the like, such flat blanks may be easily decorated by a conventional printing operation, thereby to permit the relatively inexpensive production of intricate, multi-color designs.

Although the use of the described box-like structures as decorative ornaments for Christmas trees and the like has been mentioned above, it is apparent that the box-like structures embodying this invention may have many other uses, such as, for example, as display pieces, shipping containers or cartons, or, when suitably dimensioned and formed of translucent plastic material, as lampshades.

Although illustrative embodiments of the present invention have been described in detail herein with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments, and that various changes and modifications may be effected therein, by one skilled in the art, without departing from the scope or spirit of the invention, except as defined in the appended claims.

What is claimed is:

1. A one-piece flat cardboard blank for forming an octahedral box of the described character, comprising only eight triangular portions arranged in two groups of equal number, the triangular portions of each group having successive common sides along which said triangular portions are foldably connected with said successive common sides all converging to a single point, and only one of said triangular portions of one of said groups having the side thereof which is remote from the related single point in common with, and foldably connected to, the side of only one triangular portion of the other of said groups which is remote from said single point of said other group, said triangular portions of the respective groups having a common side being at the ends of their related groups.

2. A one-piece flat cardboard blank as in claim 1; wherein said single point at which the common sides of the triangular portions of said one group converge and said single point at which the common sides of the triangular portions of said other group converge are at opposite side edges of the blank.

3. A one-piece flat cardboard blank as in claim 1; wherein said single point at which the common sides of the triangular portions of said one group converge and said single point at which the common sides of the triangular portions of said other group converge are at the same side of the blank.

4. A one-piece flat cardboard blank as in claim 1; wherein each of said triangular portions has at least two sides of equal length enclosing an angle of less than ninety degrees.

5. A one-piece flat cardboard blank as in claim 1; wherein each of said triangular portions is of equilateral configuration.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 1,292,188 | Wheeler | Jan. 21, 1919 |
| 2,077,173 | Holy | Apr. 13, 1937 |
| 2,424,601 | Crouch | July 29, 1947 |
| 2,579,354 | Zelt | Dec. 18, 1951 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 360,154 | Great Britain | Nov. 5, 1931 |
| 403,993 | Great Britain | Jan. 2, 1934 |