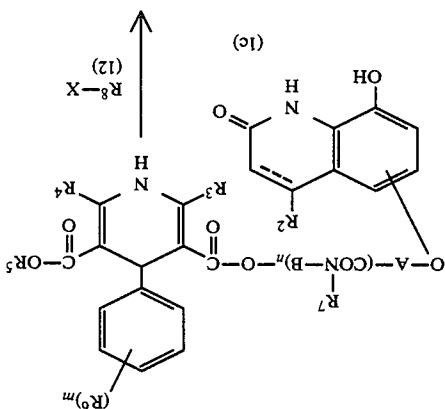




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CONTINUOUS UNITARY PERFORATED TISSUE STRIP
AND METHOD OF MAKING SAME

Filed June 13, 1968

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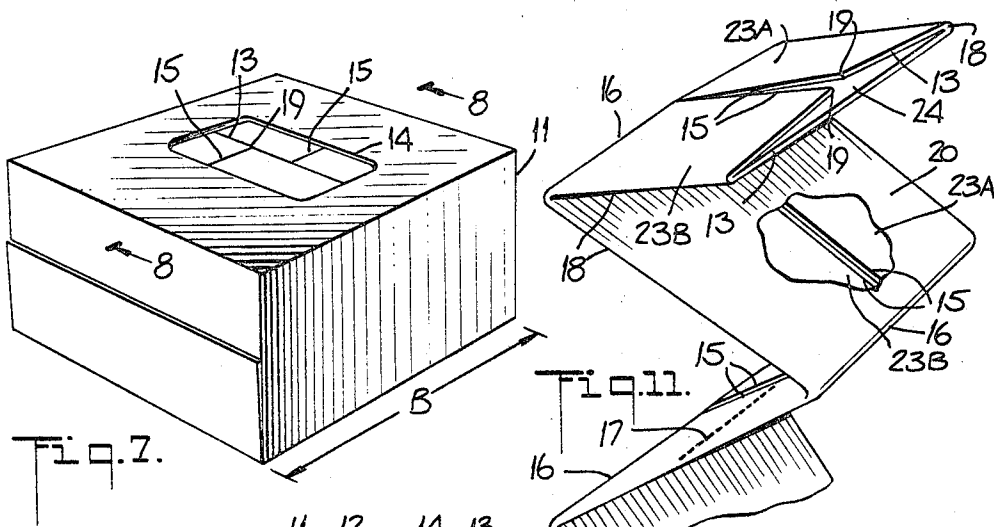


Fig. 7.

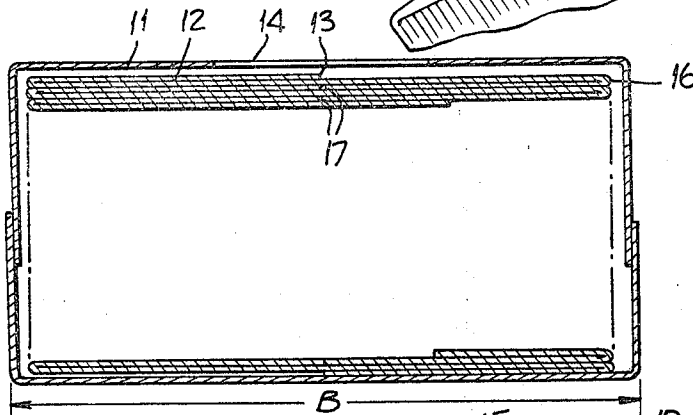


Fig. 8.

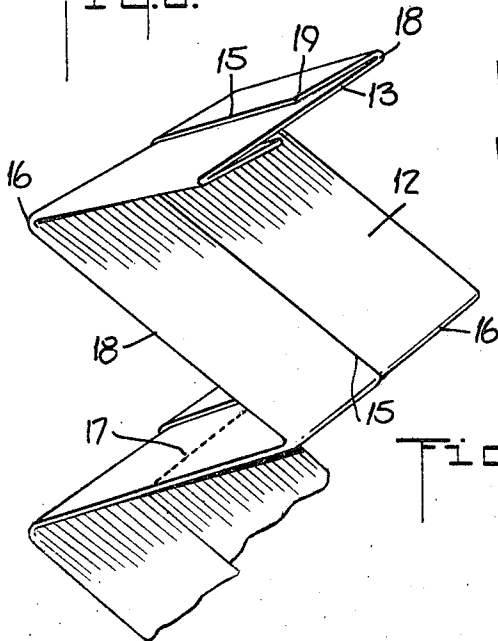


Fig. 9.

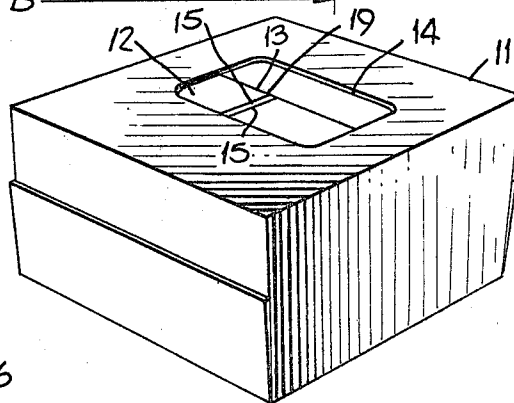


Fig. 10.

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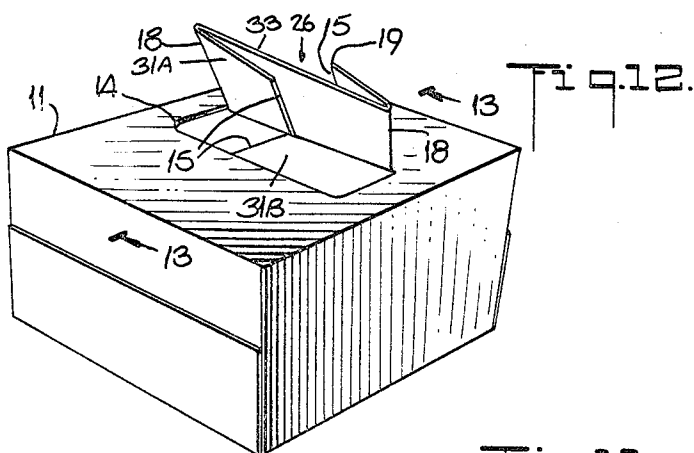
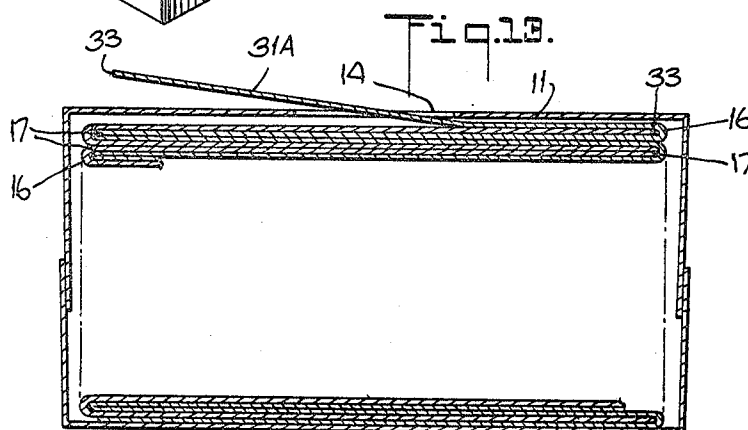
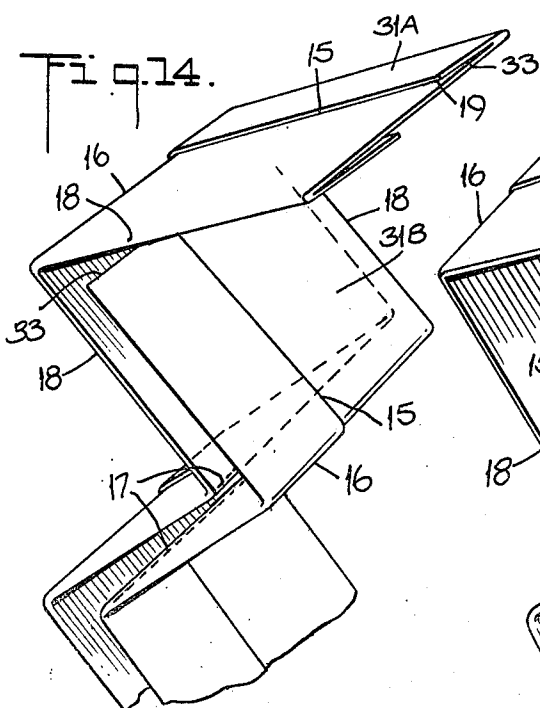
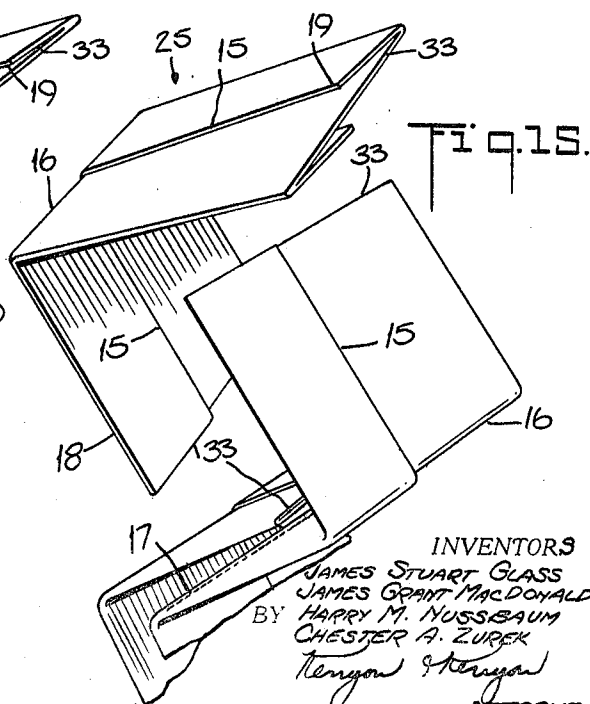
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CONTINUOUS UNITARY PERFORATED TISSUE STRIP AND METHOD OF MAKING SAME

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21 Claims

ABSTRACT OF THE DISCLOSURE

A continuous unitary tissue strip folded as described and having its length dimension greater than its width dimension wherein the strip has perforations essentially across its width dimension; contains transverse folds essentially across its width dimension in sequential alternate directions and uniformly separated from one another; and contains longitudinal folds substantially along its length dimension.

This invention relates to paper tissues and methods for making them. More particularly the invention relates to continuous strips of folded paper tissue containing perforations therein as more particularly hereinafter described.

So-called "pop-up" tissues are widely used today in both the home and in commercial establishments. Such tissues are generally packaged in cardboard storage boxes which also are conveniently adapted to be used as the dispenser of the tissues. The acceptability of "pop-up" tissues is to a great extent due to the ease with which it is removed from the storage box, i.e. by pulling one tissue segment from the box, about one-half of the next tissue is also pulled out of the box. This half of tissue segment is "popped-out" of the box and may readily be pulled out of the box thereby bringing about one-half of the next tissue segment with it. In making "pop-up" tissues it has been common practice to interleave separate tissue segments in alternate sequence in order to provide the "pop-up" result. This is an expensive and cumbersome operation. The machinery for making such interleaved tissue segments is comprised essentially of a plurality of wound tissue rolls which are fed into known interleaving devices whereupon the tissue is cut to size with cutting blades. A parent roll of tissue paper—initially about 2–5 feet in diameter—is required for each tissue segment in the storage box. Therefore, for example, in a storage box containing 200 double ply tissue segments, at least 200 rolls of double ply tissue paper are required. These rolls are carried on backstands which can be 150 feet long or more. The web from each roll is unwound and folded once along its length. The folds are made on alternate sides of the machine from roll to roll. Each web is then interleaved with the two adjoining webs and the whole is laid with previous webs similarly interleaved to form a rope which is carried upon a feeder belt. At its discharge end the belt has 200 separate webs of tissue paper upon it. The rope is then passed into the cutter section of the machine where one or more oscillating rotating disc knives cut the rope into segments, each segment being the length of a single tissue. The piles of tissue segments are then packaged into folding storage boxes and put into commerce. The significant problems associated with the size of the plant are apparent.

Accordingly, the present invention provides an efficient and economic "pop-up" tissue product. The tissue is produced and packaged on relatively simple equipment thereby eliminating the cumbersome equipment of the prior

art. The tissue is easily dispensed from the storage box and separated into tissue segments. As each segment is separated from the tissue strip, the next tissue segment of the tissue strip is in the "pop-up" orientation and is ready for removal from the storage box.

Briefly, the present invention comprises a continuous unitary tissue strip which is folded across its width dimension, each such fold being in the alternate direction thereby providing a zig-zag configuration. These folds are hereinafter referred to as "transverse folds." The tissue strip also contains perforations across its width dimension. These perforations are hereinafter referred to as "transverse perforations." As an important feature of this invention, the tissue strip is also continuously folded along its longitudinal dimension. These folds are hereinafter referred to as "longitudinal folds" and it is understood that the longitudinal folds may be folded over or under the tissue strip in a C-fold configuration, or alternatively, the longitudinal folds may be over and under the tissue strip, respectively in a Z-fold configuration. Generally, the longitudinal folds may be described as C-folds or Z-folds in the longitudinal direction when taken in transverse section. In the preferred embodiment of this invention, the longitudinal folds are made so that the longitudinal edges of the tissue strip terminate at a point intermediate the width of the tissue strip. In other words, the flaps which are longitudinally folded over onto the tissue mid-portion extend to about the center of the tissue mid-portion. This configuration of folds and perforations provides a continuous tissue strip which may be removed and separated as tissue segments from a storage box. Removal and separation of the tissue strip into tissue segments is accomplished by pulling the tissue strip out of the storage box through an opening therein. When the tissue strip is pulled out of the storage box up to the transverse perforation in the tissue strip, tissue segments are separated from the tissue strip at that transverse perforation by tearing it thereacross. As will be hereinafter more clearly described in connection with the drawings, an important feature of this invention is that at least one free corner of the tissue strip is available through the opening of the storage box. By means of the free corner, the tissue strip may be held and pulled from the storage box and the tissue segment detached therefrom.

In order to more fully describe the invention, reference is now made to the accompanying drawings which describe certain exemplary embodiments thereof.

FIGURE 1 is a perspective sketch of a storage box containing Z-folded tissues.

FIGURE 2 is a sectional view of the box and tissues along line 2—2 of FIGURE 1.

FIGURE 3 is a perspective sketch of a Z-folded tissue strip without the storage box.

FIGURE 4 is a sectional view of the tissue strip along line 4—4 of FIGURE 3.

FIGURE 5 is a sectional view of the tissue strip along line 5—5 of FIGURE 4.

FIGURE 6 is a perspective sketch of a tissue segment after being detached from the tissue strip.

FIGURE 7 is a perspective sketch of a smaller storage box containing Z-folded tissues.

FIGURE 8 is a sectional view of the box and tissues along line 8—8 of FIGURE 7.

FIGURE 9 is a perspective sketch of a Z-folded tissue strip without the storage box.

FIGURE 10 is another embodiment of the invention similar to that shown in FIGURE 7 except that the tissue is C-folded.

FIGURE 11 is a perspective sketch of a C-folded tissue strip without the storage box.

FIGURE 12 is a perspective sketch of a smaller storage

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box containing Z-folded tissues. This embodiment is descriptive of a double tissue system.

FIGURE 13 is a sectional view of the box and double tissues along line 13--13 of FIGURE 12.

FIGURE 14 is a perspective sketch of Z-folded double tissue strips without the storage box.

FIGURE 15 is a perspective sketch of the double tissue system showing one tissue segment detached from the tissue strip and the remaining double tissue strips.

In accordance with the invention, continuous tissue strips similar to that best shown in FIGURES 3, 9, 11 and 14 are made on paper folding machines which are well known in the art. For example, tissue stripping material which is about 8 inches wide on a roll, is continuously unwound and longitudinally folded along its lengthwise dimension by well known means, such as for example by means of a guide plate. The longitudinally folded issue strip is then passed through a perforator device, where the tissue strip is transversely perforated at predetermined length. Perforating is well known in the art. The longitudinally folded and perforated tissue strips are then passed through machinery which transversely folds the tissue strip in alternating opposite directions. The tissue strip now resembles a continuous and stacked series of layers of material folded in a zig-zag configuration, for example, as shown in FIGURES 2, 8 and 13 (without the storage box). Such transverse folding machinery is well known in the art, and may comprise, for example, a pair of rotatably movable plates which alternatively transversely fold the tissue strip as it is moved through it. The transverse folds are at substantially uniform distances from each other thereby providing a continuous tissue strip product similar to that shown in the figures referred to. In a preferred system, the tissue strip is two-ply in order to provide additional strength and absorbency when used.

The invention relates particularly to the longitudinal folds and transverse folds in combination with the location of the transverse perforation in the tissue strips and it will be described in connection therewith. Referring now to the drawings, one embodiment of the tissue of this invention is shown in FIGURES 1-6 and can be seen to advantage in FIGURE 3. Although all of the drawings show a one-ply tissue strip, it is understood that the tissue strip may likewise comprise two or multiple-ply tissue strips. In this embodiment tissue strip 2 is shown as a continuous length of tissue paper in a longitudinal Z-fold configuration as described. Longitudinal folds 8 in tissue strip 2 divide the tissue strip into tissue mid-portion 21 and upper flap 10A and lower flap 10B. Transverse folds 6 in tissue strip 2 are in alternative directions thereby providing a tissue strip having a zig-zag configuration shown in the drawings. Perforations 7 are shown at about mid-way between transverse folds 6 and extend through the entire tissue strip layer. Longitudinal edges 5 of upper and lower flaps 10A and 10B of tissue strip 2 extend to about mid-way between longitudinal folds 8. Perforated edge 3 is formed by tearing a tissue segment 22 from issue strip 2. Free corner 9 of upper and lower flaps 10A and 10B are shown in about the center of tissue strip 2 in tissue mid-portion 21.

FIGURE 1 shows tissue strip 2 of the embodiment of FIGURE 3 in storage box 1 having an opening 4. Through opening 4 tissue strip 2 is seen to comprise upper and lower flaps 10A and 10B, tissue mid-portion 21, free corner 9, longitudinal edges 5 and perforated edge 3. Tissue strip 2 is conveniently removed from storage box 1 by pulling on free corner 9 formed by longitudinal edge 5 and transverse perforation edge 3. In order to provide a tissue segment (such as tissue segment 22) tissue strip 2 is pulled out of storage box 1 until perforation 7 is reached. At that point, tissue segment 22 is detached from tissue strip 2 along perforations 7.

FIGURE 6 shows tissue segment 22 detached from tissue strip 2 and comprises upper and lower flaps 10A

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and 10B, tissue mid-portion 21, longitudinal folds 8, transverse fold 6, perforated edges 3 and free corner 9.

In FIGURE 4 tissue strip 2 is shown in a sectional side view wherein the zig-zag configuration created by transverse folds 6 in sequential alternate direction are clearly shown.

The Z-fold configuration created by tissue mid-portion 21, and upper and lower flaps 10A and 10B having longitudinal folds 8 and longitudinal edges 5 is clearly seen in FIGURE 5.

FIGURE 2 shows the embodiment of FIGURE 3 in storage box 1. In this view there are shown perforations 7, transverse folds 6, transverse perforated edge 3, and enumerated only for illustration but not by way of limitation, tissue mid-portion 21 and lower flap 10B.

Another embodiment of this invention is shown in FIGURES 7-9 and can advantageously be seen in FIGURE 9. In this embodiment tissue strip 12 is a continuous length of tissue paper in a longitudinal Z-fold configuration. The embodiment is similar to that as shown in FIGURE 3, however, perforations 17 are in alternate layers of the folded tissue stripping. In this embodiment a storage box 11 is advantageously used wherein the lengthwise dimension B of storage box 11 shown in FIGURES 7 and 8 is substantially reduced in relation to the lengthwise dimension A of storage box 1 shown in FIGURES 1 and 2. By controlling the transverse folding operation in conjunction with the transverse perforating operation, the configuration shown in this embodiment is obtained. Of course, the longitudinal length between transverse folds 16 (substantially the B dimension) is reduced relative to corresponding length shown for the embodiment of FIGURES 1-6 (substantially the A dimension). In this embodiment, tissue strip 12 is removed from storage box 11 by pulling on free corner 19 which is formed by longitudinal edge 15 and transverse perforation edge 13. In order to provide a tissue segment, tissue strip 12 is pulled out of storage box 11 until perforation 17 is reached. At that point, a tissue segment is detached from tissue strip 12 by tearing the segment from the strip along perforation 17. It is noted that tissue strip 12 comprises two transverse folds 16. The alternating layers of tissue which contain transverse perforation 17 are shown in FIGURE 8.

FIGURES 10 and 11 represent still another embodiment of this invention which differ from the embodiment of FIGURES 7-9 by providing a tissue strip 20 wherein flaps 23A and 23B are folded in the same upward (shown) and downward (shown in a break-away view in FIGURE 11 as it is beneath the tissue strip) direction. This forms the C-fold configuration wherein both longitudinal tissue edges 15 are on the same side of tissue mid-portion 24. Free corners 19 are substantially adjacent to one another and are available for use in removal of the tissue strip from storage box 11 shown in FIGURE 10 by means discussed above.

Still another embodiment of this invention is described in FIGURES 12-15. In this embodiment a double set of tissue strips 31A and 31B are transversely interfolded as shown in FIGURE 14. This embodiment provides the advantage of being able to alternate the color or quality of tissue in the same storage box 11. Transverse perforations 17 are shown as coextensive with transverse folds 16 and being in alternate folded layers of tissue strips 31A and 31B. In other words, as shown in FIGURE 13, all of the transverse perforations 17 of tissue strip 31A are coextensive with transverse folds 16 and are on the left hand side of the figure, and all of the transverse perforations 17 of tissue strip 31B are coextensive with transverse folds 16 and are on the right hand side of the figure. Referring specifically to FIGURES 13 and 14 it is noted that perforations 17 are located so as to provide a tissue segment 25 upon detaching that segment from tissue strip 31A or 31B, and also provides, through opening 14 of storage box 11, approximately one-half of a tissue seg-

ment from the other tissue strip. The one-half tissue segment is shown generally as numeral 26 in FIGURE 12.

It is noted that in all of the embodiments of this invention which are shown in drawings, the tissue strips contain longitudinal folds which are coextensive with the lengthwise dimension of the tissue strip. These longitudinal folds may be in the same upward or downward direction or may be in alternate upward and downward direction along either side of the tissue strip in the longitudinal direction. In either case, however, it is important that the tissue segment of the tissue strip next in line provide a free corner within the open area of the storage box by which the tissue strip may be removed from the storage box. The tissue segment is detached from the tissue strip by tearing along the transverse perforations as those perforations appear and it is preferable that the perforations appear in the storage box opening. It is understood that the various forms shown in the embodiment may be substituted for one another and that combinations not inconsistent with the present invention are intended to be claimed. For example, the tissue strip of FIGURE 14 may also be a C-fold configuration noting especially that a free corner 19 by which the tissue may be removed from the storage box is always available.

As to the tissue material itself, it is preferably a soft, pulpy non-woven paper material which is absorbent to moisture. Such papers are well known in the art and may comprise thin layers of cellulose wadding paper. Generally the tissue paper is rolled onto a reel and fed therefrom directly to the folding and perforation apparatus. Rolls of tissue may be thousands of feet long and in several plies. These tissue rolls are well known in the prior art and do not form any part of the present invention.

The storage box is a conventional box, preferably of cardboard construction and containing a suitable openings or openable area, generally, in its top surface. Ordinarily, the tissue strip, for example, the tissue strip shown in FIGURE 9 which has been folded flat, is laid on a flat cardboard cut-out of the storage box. The thickness of the tissue strip stack is dependent upon the height of the box in its constructed condition. However, a tissue strip sufficient to provide about 100-300 double ply tissue segments is advantageously packaged into a storage box. The upright storage box is then constructed about the tissue strip.

The opening in the storage box may be advantageously made considerably smaller than the usual storage box opening. This is due to unique configuration and construction of the tissue strip which permits removal from the storage box by merely pulling on one free corner rather than the method of the prior art wherein one's entire hand was required to be inserted into the storage box to obtain a tissue segment. The smaller opening also reduces the extent to which the tissue is exposed to the environmental surroundings, thereby contributing to the overall cleanliness of the product.

It will be understood that it is intended to cover all changes and modifications of the drawings of the invention herein chosen for the purpose of illustration which do not constitute departures from the spirit and scope of the invention.

We claim:

1. A continuous unitary tissue strip having its length dimension greater than its essentially uniform width dimension and folded as described wherein said strip:
 - (1) contains longitudinal folds substantially along its lengthwise dimension;
 - (2) has essentially equidistant perforations essentially across its width dimension which define individual tissue segments and which are the lines on which the tissue segments separate from the continuous strip; and
 - (3) contains transverse folds essentially across its width dimension in sequential alternate directions and uniformly separated from one another.

2. The tissue strip of claim 1 containing one essentially longitudinal fold along each of the lengthwise edges of said tissue strip.

3. The tissue strip of claim 1 wherein said transverse perforations are intermediate said transverse folds.

4. The tissue strip of claim 2 wherein the longitudinal edge of said folded tissue strip terminates at a point intermediate said longitudinal folds.

5. The tissue strip of claim 4 wherein said transverse perforations are intermediate said transverse folds.

6. The tissue strip of claim 5 wherein each of said longitudinal folds is in the same direction.

7. The tissue strip of claim 5 wherein each of said longitudinal folds is in opposing directions.

8. The tissue strip of claim 4 wherein said transverse perforations are essentially coextensive with said transverse folds.

9. The tissue strip of claim 5 wherein said transverse perforations are in alternate folded layers of said folded tissue strip.

10. The tissue strip of claim 4 including another tissue strip as defined in claim 4 interfolded therewith.

11. An article comprising:

- (1) the tissue strip of claim 4 in a,
- (2) storage box therefor.

12. An article comprising:

- (1) the tissue strips of claim 10 in a,
- (2) storage box therefor.

13. The method of making the tissue strip of claim 1 comprising the steps of:

- (1) longitudinally folding tissue strip along a lengthwise dimension;
- (2) transversely perforating the folded tissue strip at pre-determined lengths; and
- (3) transversely folding the perforated tissue in alternating opposite directions.

14. The method of claim 13 wherein said tissue strip is longitudinally folded along each of the lengthwise dimensions of said tissue strip.

15. The method of claim 13 wherein said tissue strip is transversely folded intermediate said transverse perforations.

16. The method of claim 13 wherein said tissue strip is longitudinally folded along each of the lengthwise dimensions of said tissue strip up to a point intermediate the longitudinal folds.

17. The method of claim 13 wherein said tissue strip is longitudinally folded in the same direction along each of the lengthwise dimensions of said tissue strip.

18. The method of claim 13 wherein said tissue strip is longitudinally folded in opposing directions along each of the lengthwise dimensions of said tissue strip.

19. The method of claim 13 wherein said tissue strip is transversely folded essentially coextensive said transverse perforations.

20. The method of claim 13 wherein said tissue strip is longitudinally folded in the same direction along each of the lengthwise dimensions of said tissue strip and is transversely perforated in alternate folded layers of said folded tissue strip.

21. The method of claim 13 including interfolding another tissue strip with said tissue strip.

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