July 14, 1964 J. J. GOODRICH 3,140,810

BOX-LIKE CONTAINERS

Filed March 29, 1962 2 Sheets-Sheet 1



Fig. 1.

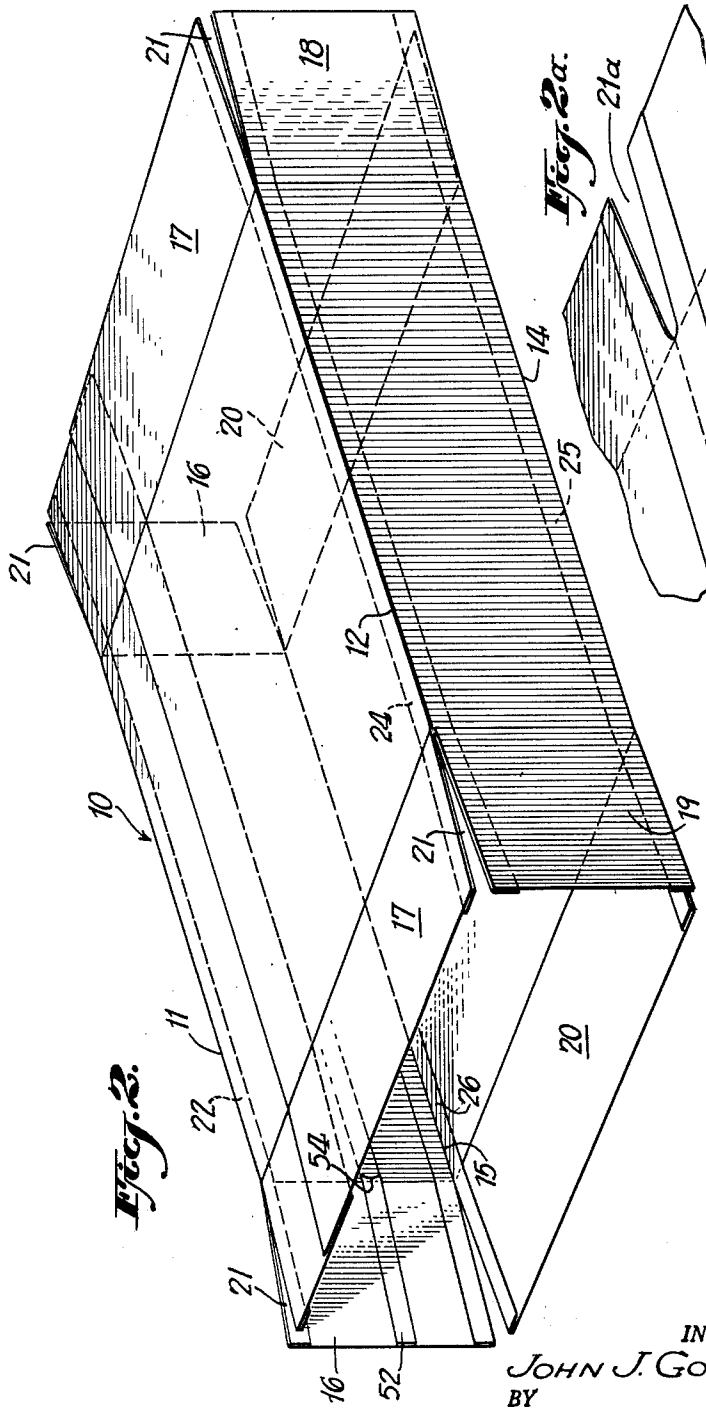


Fig. 2.

Fig. 2a.

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Fig. 3.

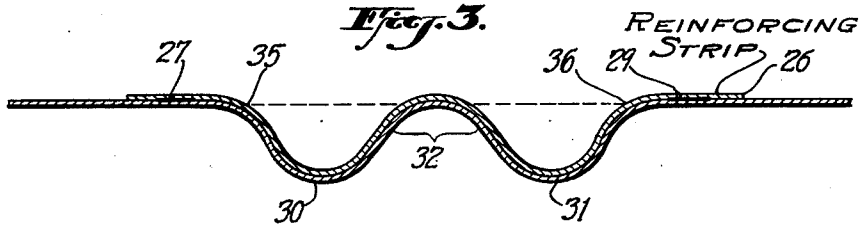


Fig. 4.

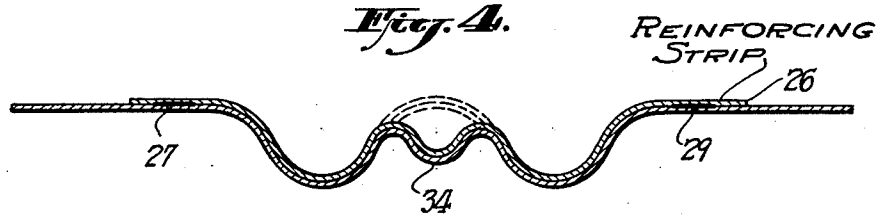


Fig. 5.

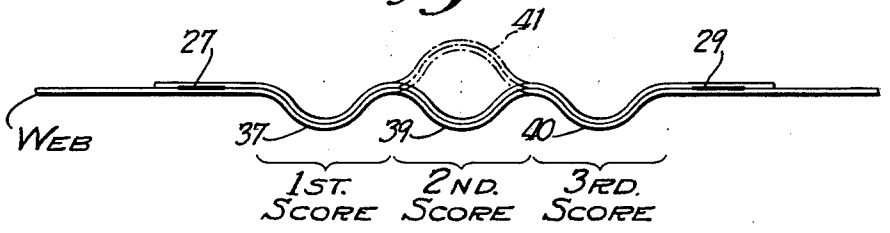


Fig. 6.

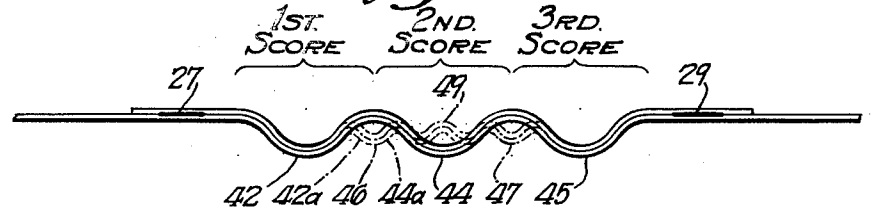
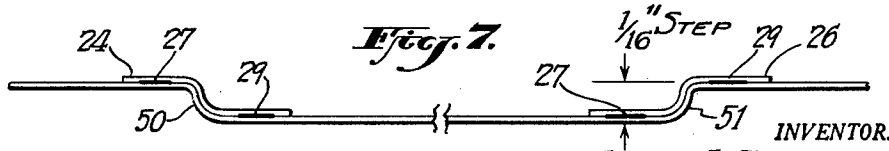


Fig. 7.



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United States Patent Office 3,140,810 Patented July 14, 1964

3,140,810

BOX-LIKE CONTAINERS

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Filed Mar. 29, 1962, Ser. No. 186,585
4 Claims. (Cl. 229—37)

This invention relates to wrappers or cases manufactured from a web of sheet material in the form of flattened or collapsed tubes which can be erected and formed into box shape well adapted to replace corrugated cardboard boxes. The invention more particularly relates to such wrappers or cases which can be quickly and easily erected from collapsed form, the cases being manufactured from relatively stiff paper, such as heavy kraft paper, with or without reinforcing strips along the corners thereof, such cases having a high degree of flexibility or limberness whereby the cases are easily and rapidly erectable from a collapsed condition and formable into such box shape.

This application comprises a continuation-in-part of my co-pending application Serial No. 797,647 filed March 6, 1959, and now abandoned, and entitled Box-Like Containers which latter application was a divisional application and continuation-in-part of my earlier application Serial No. 736,209 filed May 19, 1958, and now abandoned, and entitled Method and Apparatus for the Manufacture of Box-Like Containers.

Articles of this class which have been heretofore proposed have failed to provide suitable characteristics whereby they can be easily, quickly and positively erected into box shape without substantial resistance from certain of the corner line regions of such articles.

One of the objects of the present invention is to overcome the above difficulties or to reduce same to insignificance.

In essence, the present invention comprises an easily erectable collapsed case manufactured from stiff, relatively thick paper, such as kraft paper, having a base weight of the order of 90–200 lbs. The collapsed cases may be formed by feeding continuously a web of such paper to a tube forming device which folds the web over and forms same into a flat tube which is severed into case lengths. The web prior to tubing is considered to have case or box corner lines which are to become corner lines of the finished case or box. A flat ungusseted tube is formed having the usual side or edge folds extending along a first pair of such corner lines (corner lines Nos. one and two), such edge folds comprising the opposite tube edges wherein the web is folded 180° thereby forming two of the longitudinally extending corner lines of each collapsed case of a sufficient degree of flexibility to facilitate the erection of the case. The other pair of corner lines, namely, Nos. three and four, of each collapsed case are located with respect to the web prior to the tube forming operation respectively as follows: (*a*) the third corner line between one of the web edges and one of said first pair of corner lines, and (*b*) the fourth corner line between said first pair of corner lines. During manufacture, the web may be worked along such third and fourth lines in order to achieve suitable flexibility and limberness thereof. Such working may, for example, be accomplished by means for prefolding a margin of the web 180° along such third corner line, pressing same in such prefolded condition and unfolding same back into its flat condition and also forming a plurality of adjacent or contiguous scores or furrows symmetrically along the fourth corner line and for acting upon selected portions of one or more of such scores to invert same. This is preferably accomplished by score means for forming at least two adjacent or contiguous furrows along the fourth corner line which bulge or protrude in one direction normal to the web. Additional score means are provided for inverting selected parts of said furrows, preferably two adjacent portions of both furrows along the center line therebetween, that is, means are provided for acting on the web in conjunction with the double score forming means for, in effect, partially turning inside out adjacent parts of the aforementioned two score lines. In lieu of such means for working the web along such third corner line, it is possible to substitute therefor the last-mentioned means for working the web along the fourth corner line.

If desired, the tubes are provided with a reinforcing strip secured along each of the corner lines thereof, whereby the strips are located within the finished wrapper or case. Also, if desired, a tear strip may be provided which also is located within the finished case and which is positioned in such a manner that it can be employed for tearing open a selected panel of the case after it has been filled. Additionally end portions of the tube may be provided with slits forming end flaps therebetween foldable to closed position, or the slits may be omitted in which case the end portions may be folded to closed position and for this purpose, the end portions may be appropriately creased or perforated.

The above and further objects and novel features will more fully appear from the description set forth below when read in connection with the accompanying drawings, the latter being for purposes of illustration only, it being understood that they do not define the limits of the present invention, reference for this latter purpose being had to the appended claims.

In the drawings:

FIG. 1 is an end view of a collapsed case embodying the present invention;

FIG. 2 is a perspective view of the case shown in FIG. 1, the case being erected and shown prior to the infolding of the flaps thereof, the flaps being formed by appropriate slits in the tube;

FIG. 2*a* is a fragmentary perspective view of a portion of a collapsed tube illustrating the formation of the end flaps by the provision of slots in the end portions of the tube;

FIG. 3 is a sectional view on an enlarged scale through a web portion from which the case is fabricated showing a double score formed therein;

FIG. 4 is a sectional view of the double score shown in FIG. 3 but with adjacent portions of such two scores at least partly inverted or reversed;

FIG. 5 is a sectional view through a web portion showing as an alternative form of the invention three separate furrows or scores formed therein which are consecutively contiguous, such figure also showing a portion of one of said scores inverted or reversed;

FIG. 6 is a sectional view on an enlarged scale through a web portion also showing three continguous furrows or scores and with selected portions thereof inverted or reversed; and

FIG. 7 is a fragmentary cross-sectional view of a web portion creased in accordance with an embodiment of the present invention.

Referring to the drawings in greater detail, there will now be described a semirigid case of the present invention. Such cases or wrappers are formed of relatively heavy and stiff sheet material, such as kraft paper, which, for example, is of a base weight of the order of 126 lbs. Such cases are, as aforementioned, initially in collapsed flattened tubular form and are erectable into box shape for containing, for example, charges consisting of a plurality of smaller containers, such as cans. Such semirigid cases when erected thus are well adapted to replace cor-

rugated cardboard boxes as the master container for a plurality of individual smaller containers or packages.

Referring now to FIGS. 1 and 2, there is shown a slit case **10** in accordance with the present invention in its collapsed condition (FIG. 1) and in its erected condition (FIG. 2). The case **10** may be formed of a single web of sheet material and has four parallel corner lines **11**, **12**, **14** and **15** along which it can be erected from its flattened, collapsed condition into a box-like configuration having oppositely extending end flaps **16**, **17**, **19** and **20**.

As shown in FIG. 2, and for the purpose of facilitating the handling of the end flaps **16**, **17**, **19** and **20**, and for erecting the case **10**, the case is formed with slits **21** along the borderline separating each pair of adjacent end flaps. As shown in FIG 2*a*, the case may be formed with slots **21***a* in lieu of the slits **21**.

In the formation of the case, there are adhered to the interior thereof four reinforcing strips **22**, **24**, **25** and **26**, one each over the corner lines **11**, **12**, **14** and **15**, respectively. These reinforcing strips may be of kraft paper two inches in width and of a base weight of the order of 126 lbs.

In one advantageous form of the invention each of the reinforcing strips is adhered to the web from which the case **10** is fabricated, by the application of adhesive in two parallel ribbons **27** and **29**. Such adhesive can be applied either to the web or to the strips themselves. The purpose for applying the adhesive in two strips is to enhance the flexibility or limberness of the case corner regions.

However, all of the embodiments of the invention are not limited to such applications of the adhesive in the aforementioned two parallel ribbons.

The application of the adhesive in the two parallel ribbon configuration permits relative sliding movement of those surfaces of the reinforcing strip and the case between such ribbons and in response to erection of the case. This substantially facilitates the ability of the collapsed case to be erected.

For example, in FIG. 1, the reinforcing strips **22**, **24**, **25** and **26** have been adhered to the interior surface of the case near the outer margins of each strip, the respective corner line over which each reinforcing strip passes thus lying between two parallel adhesive ribbons. Accordingly, there is reduced the resistance of the strips to the raising of the case from the flat condition of FIG. 1 to the erected condition of FIG. 2. Such erection is facilitated by virtue of the ability of a substantial surface of the reinforcing strip to slide or move over the adjacent and contiguous surface of the case, portions of both of such contiguous surfaces being scored as will presently be described.

Referring now to FIGS. 3 and 4, there are shown the steps by which the scoring along the corner line **15** may be formed. In the formation of the case, the web is deformed, along with any associated reinforcing strip, such as the strip **26**, in the manner shown in FIG. 3, the corner line **15** being located between the two scores. Such two scores are indicated at **30** and **31**, the corner line being situated along the peak of the intermediate region **32**. It will be understood, of coure, that in lieu of the multiscored corner, a single score line may be used, preferably between the ribbons of adhesive.

Further working of the web along the aforementioned corner line **15** may be effected to reverse parts of the scores **30** and **31** or, if desired, the peak of the intermediate region **32** may be reversed so that such region is moved from the position shown in broken lines in FIG. 4 to the position shown in solid lines and being indicated by the reference numeral **34**.

In one advantageous form of scoring, the distance between points **35** and **36** (FIG. 3) will be approximately three-eighths of an inch.

Referring now to FIGS. 5 and 6, there are illustrated two alternative forms of multiscored corner regions which

may be employed in lieu of the multiscored corner regions of FIGS. 3 and 4.

In FIG. 5, the corner region illustrated has been subjected to a triple score, the triple score or furrows being designated **37**, **39** and **40**. These parallel scores are contiguous to one another, that is, at the terminal point (in cross-section) of scores **37** there commences the next adjacent score **39** and so on. The center score **39** has been reversed or subjected to an inversion, that is, it has been turned inside out thereby to produce an inversion score **41**, shown in broken lines. Alternatively, any one or both of the other two scores **37** and **40** could be subjected to an inversion score.

In FIG. 6, the corner region has been subjected to triple scores **42**, **44** and **45** which are contiguous to one another in the same sense as scores **37**, **39** and **40**, in FIG. 5. Portions of the contiguous scores **42**, **44** and **45** have been inverted. That is, adjacent portions of contiguous scores **42** and **44**, namely, portions **42***a* and **44***a*, have been inverted to provide inversion score **46**. Similarly, an inversion score **47** is formed from portions of the contiguous scores **44** and **45**.

If desired, portions of the center score **44** may be inverted in the manner shown in broken lines, thereby producing an inversion score **49** which is made up solely of portions of the score **44** and not of adjacent portions of two contiguous scores.

Referring now to FIG. 7, there is shown an alternative contour to which the web may be worked along the corner lines that will become the corner lines **12** and **15** of the case **10**. The web may be acted upon by suitable web working means for effecting the step-like web creases **50** and **51** shown in cross section in FIG. 7. The rise of such step-like creases may be one-sixteenth of an inch, for example. Preferably, the reinforcing strips **24** and **26** are so disposed relatively to the web that the steps are formed between the ribbons of adhesive **27** and **29**.

A high degree of flexibility and suppleness or limberness which will facilitate the erecting of the case to the position shown in FIG. 2, may also be imparted to the corner lines **12** and **15** by folding the web over on itself, pressing the fold and thereafter folding it back to the flat condition, thereby forming a corner line as shown at **12** in FIG. 1.

It will be understood that the edge corner lines **11** and **14** may be rendered flexible and limber merely by folding the web 180° and pressing the folds. Again the reinforcing strips **22** and **25** are adhered to the web by parallel ribbons of adhesive, one on each side of the fold. Prior to folding the web 180° at the corner lines **11** and **14**, a single crease may be formed along those corner lines if desired, it having been found that such creasing facilitates accurate movement of the paper through the folding apparatus. The reinforcing strips may be made in any desired width and it will be seen that the marginal areas of the strips adjacent the top and bottom panels of the case are wide enough to overlie and underlie, respectively, portions of the packaged containers. The strips may even be offset relatively to the corners in order to increase the width of these underlying and overlying marginal areas. Where cans are packaged, the strips reinforce the corner areas of the case against destructive action of the can chimes adjacent those areas. It will be understood, of course, that the present concept is not confined to cases made of a single web of paper but also covers multi-ply cases formed of several webs. In such multi-ply cases the reinforcing strips are not necessary and the plies may be cross-pasted to one another in the well known manner. However, the corner scoring will be applied to all of the plies as in the single ply case where reinforcing strips are used.

Referring again to FIGS. 1 and 2, there is shown positioned interiorly of the case, a tear strip **52** which is located between the reinforcing strips **22** and **26**, for example, along a mid-portion of a side panel of the case.

The tear strip may be applied to the web in a manner similar to that by which the reinforcing strips are applied. To insure easy access to the tear strip **52**, a thumb notch **54** is cut through both the web and the tear strip thus forming a tab which can be grasped by the fingers to open the completed case after it has been closed.

Although certain particular embodiments of the invention are herein disclosed for purposes of explanation, various further modifications thereof, after study of this specification, will be apparent to those skilled in the art to which the invention pertains. Reference should accordingly be had to the appended claims in determining the scope of the invention.

What is claimed is:

1. A case formed of a single web of paper of a base weight between about 90 and 200 and having four parallel corner lines along which such case can be erected from a flattened collapsed condition into box-like configuration having oppositely extending end flaps, which end flaps can be folded inwardly for formation of a box-like container, there being four reinforcing strips of paper adhered to the interior of the case, one each over respective of such corner lines, such case having a first pair of corner lines positioned on opposite side edges thereof when in a flattened collapsed condition and comprising pressed edge folds consisting of corner line regions folded 180° into face-to-face engagement with one another, and having a second pair of corner lines positioned to be diagonally opposed to one another in response to erection of the case but situated between the first mentioned pair of corner lines when the case is in flattened collapsed condition and comprising respectively: a creased corner line formed by folding the web and pressing together portions of the web on opposite sides of such corner line and unfolding same, and a scored corner line region embodying a plurality of contiguous scores extending along such line, one of the latter scores being inverted, such inverted score comprising a reversal of a previously formed score.

2. A case formed of a single web of paper of a base weight between about 90 and 200 and having four parallel corner lines along which such case can be erected from a flattened collapsed condition into box-like configuration having oppositely extending end flaps, which end flaps can be folded inwardly for formation of a box-like

container, such case having a pair of corner lines positioned on opposite edges thereof when in a flattened collapsed condition and comprising edge folds, and having a second pair of corner lines positioned to be diagonally opposed to one another in response to erection of the case but situated between such first mentioned pair of corner lines when the case is in flattened collapsed condition, such web along at least one of such corner lines embodying a plurality of contiguous scores, selected portions of one or more of such scores comprising inversions of one or more previous scores, such inversions in turn comprising a reversal of such previous score or scores.

3. A case in accordance with claim 2 wherein four reinforcing strips of paper are adhered to the interior of the case, one over each of such corner lines, such strips being scored similarly to their respective corner line regions and in interfitting engagement therewith.

4. A case formed of a single web of material and having four parallel corner lines along which such case can be erected from a flattened collapsed condition into box-like configuration having oppositely extending end portions, which end portions can be folded inwardly for formation of a box-like container, such case having a pair of corner lines positioned on opposite edges thereof when in a flattened collapsed condition and comprising edge folds, and having a second pair of corner lines positioned to be diagonally opposed to one another in response to erection of the case but situated between such first mentioned pair of corner lines when the case is in flattened collapsed condition, such web of material along at least one of such corner lines embodying a plurality of contiguous scores, selected portions of one or more of such scores comprising inversions of one or more previous scores, such inversions in turn comprising a reversal of such previous score or scores.

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