June 7, 1966 H. LERNER 3,254,828

FLEXIBLE CONTAINER STRIPS

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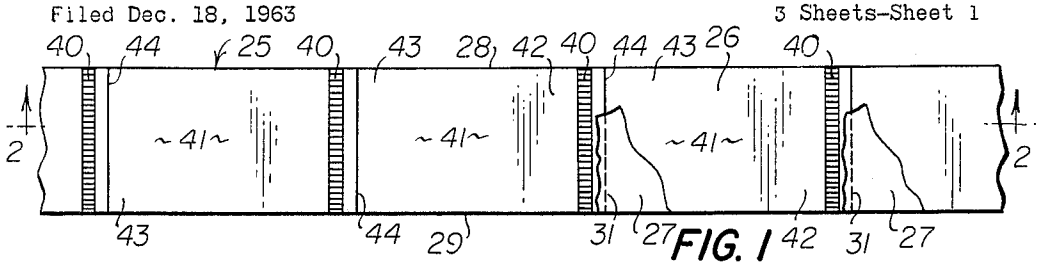


FIG. 1

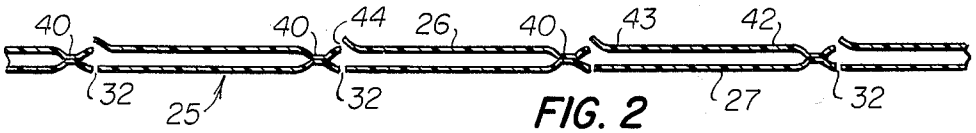


FIG. 2

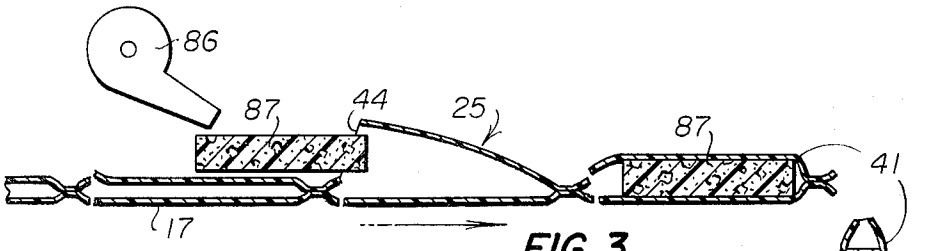


FIG. 3

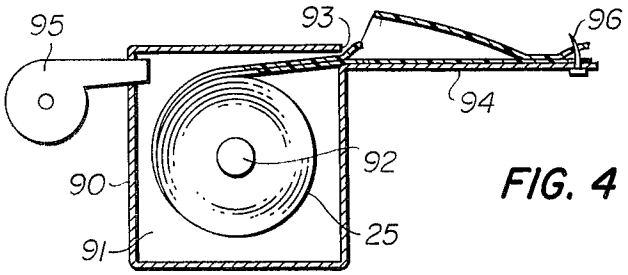


FIG. 4

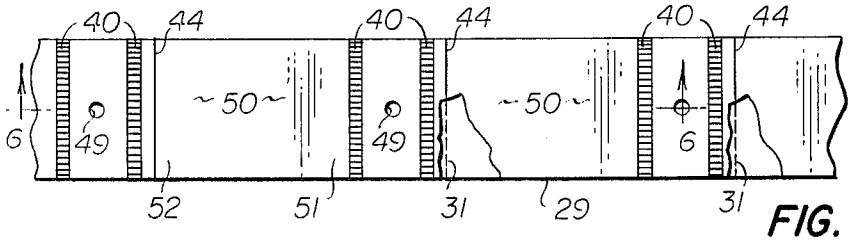


FIG. 5

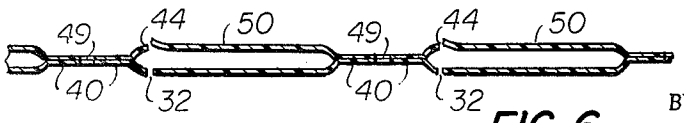


FIG. 6

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FIG. 7

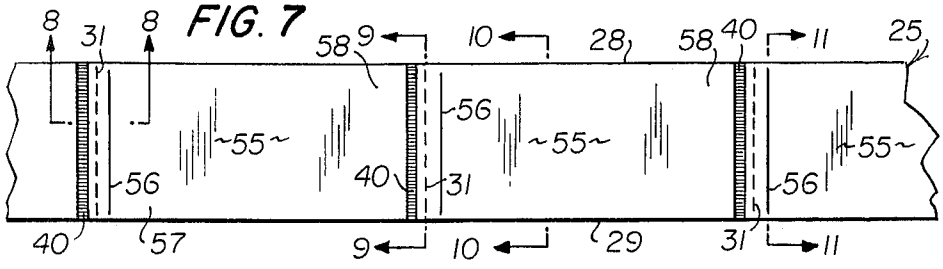
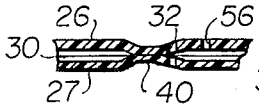


FIG. 8



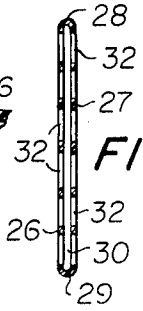


FIG. 9

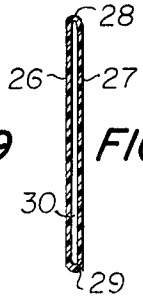
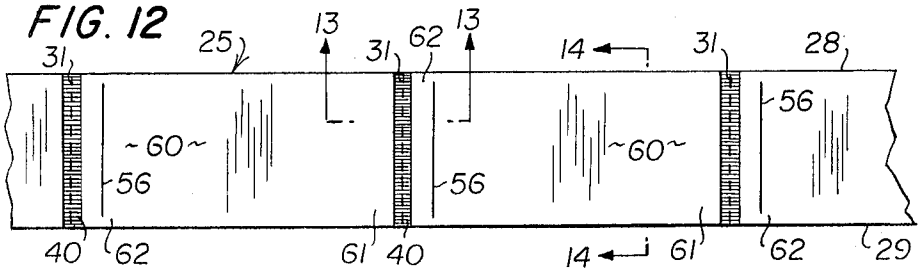


FIG. 10



FIG. 11

FIG. 12



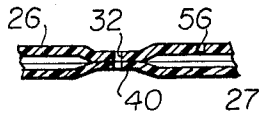


FIG. 13

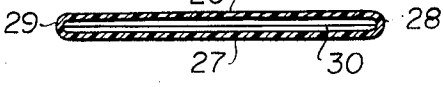


FIG. 14

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FIG. 15

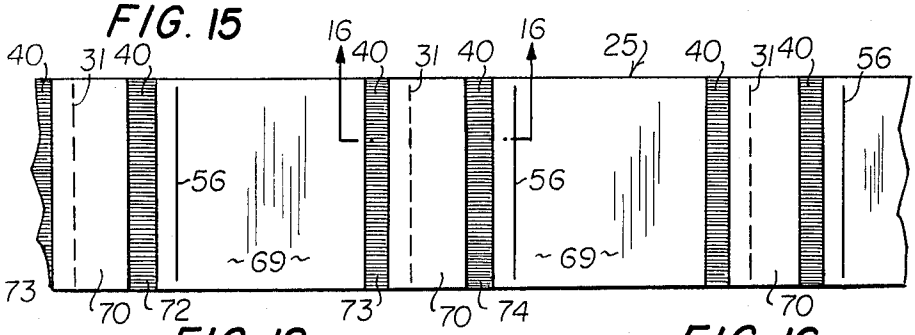


FIG. 18



FIG. 16

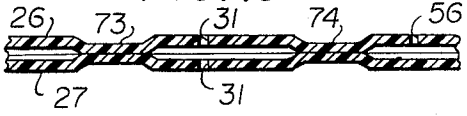


FIG. 19

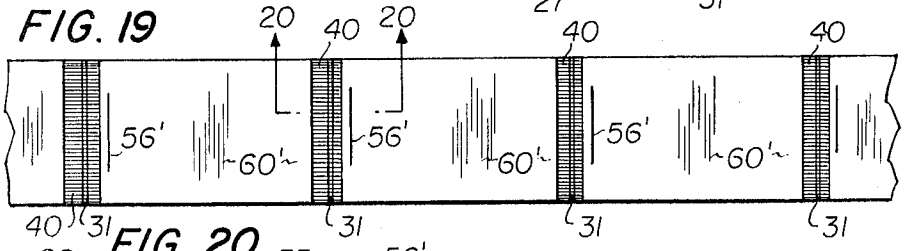


FIG. 20

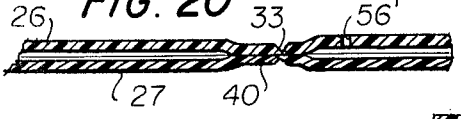


FIG. 22

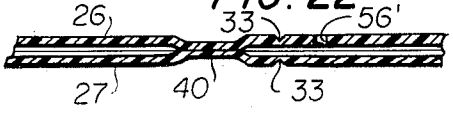


FIG. 21

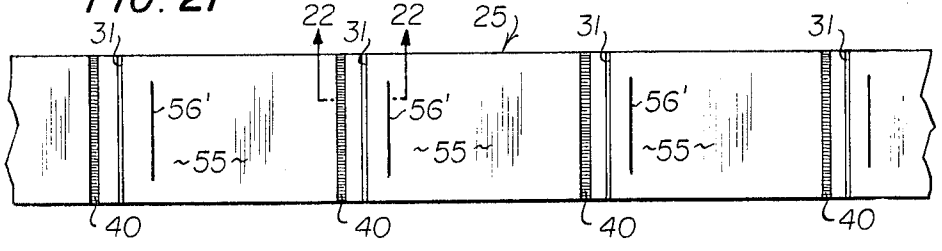
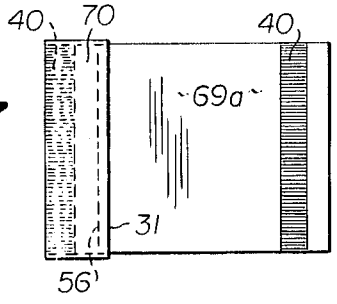


FIG. 17



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United States Patent Office

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Patented June 7, 1966

3,254,828

FLEXIBLE CONTAINER STRIPS

Hershey Lerner, Cleveland Heights, Ohio, assignor to Automated Packaging Corporation

Filed Dec. 18, 1963, Ser. No. 331,492
8 Claims. (Cl. 229—53)

This application is a continuation-in-part of application Serial No. 64,157 for Container Strip, Method of Packaging Articles, and Container Delivery Device, filed October 21, 1960, now abandoned.

This invention relates generally to article packaging, and more specifically to improvements in flexible container strips of a type including a plurality of connected containers which are adapted to be handled and filled in an improved manner.

With the advent of flexible packaging, it has been proposed to provide containers which are initially connected in strip form. In general, the usual container strip is in the form of a continuous tube made of a suitable heat sealable plastic material. The conventional tube has spaced transverse sealing areas which define individual containers that may be severed from the tube as they are desired for packaging. As will be appreciated by those skilled in the art, flexible container strips facilitate handling, shipping and storage of the containers.

An important disadvantage of conventional container strips, however, is that they cannot be expeditiously filled and sealed. More particularly, conventional container strips do not lend themselves to economical high-speed operations in which each container can be automatically opened for filling while still connected to the strip.

It is the usual practice to sever each individual container from the strip as it is desired for use and to feed the individual containers to the operator. This practice is necessitated by the conventional strip construction. Among other disadvantages, this prior method is unsatisfactory for modern high-speed operations that are required at the present time. When conventional containers, container feeding devices, and container packaging techniques are used, considerable time is usually required in order to open each container so that the articles can be inserted therein. In addition, since the containers are separate, careless handling of a package of containers will cause them to fall out of alignment. When this occurs, the containers cannot be dispensed at all by automatic means until they are realigned and the cost of straightening the misaligned containers is greater than the cost of the containers themselves. This condition also occurs when less than an entire carton of containers is used at one time and the remainder is to be used later.

In another known container strip, the containers are formed in pairs. The mouths of the containers of each pair are connected together, while the closed ends of the containers of each pair are connected to the closed ends of containers in adjacent pairs. In use of such a container strip, a pair of bags is severed therefrom and the two bags are filled while connected to each other. While some improvements in handling are provided by this conventional container strip, each pair of bags still must be individually manipulated in the filling operations. The containers cannot be automatically opened and they cannot be filled while still connected in strip form.

The instant invention avoids the difficulties associated with the prior art containers, and more particularly with the prior art container strips. In accordance with the present invention, the containers to be filled with various articles are initially disposed in the form of a strip with each container of the strip being attached to the adjacent container and oriented in the same direction so that the containers can be sequentially filled by advancing the strip endwise. Since the containers can be filled while still connected in strip form, handling of the containers is greatly improved and it is impossible for individual containers to get out of alignment before utilization. Further, the ability to handle the containers in strip form provides for methods of opening and filling the containers which are greatly superior to the methods heretofore required with conventional container strips.

In each embodiment of the invention hereinafter described, the strip comprises first and second plies joined together along the sides of the strip. The plies are transversely sealed together at spaced intervals along the length of the strip so as to define containers having closed end portions and opposite end portions. These containers are oriented in the same direction with the opposite end portion of each container being connected by at least one of the plies to the closed end portion of an adjacent container. The connecting ply is preferably provided with a tearable portion so that the containers can be selectively severed from the strip after insertion of the packaged articles. The other of the plies is formed with transverse openings spaced along the length of the strip so as to provide access into each container, the slit opening into each container being located adjacent its opposite end portion.

When the improved container strip having the construction generally described above is utilized in order to package articles, the first container of the strip may be placed in registration with an opening mechanism which operates to open a container through its slit opening. The article to be packaged is then disposed within the opened container, the opening mechanism rendered inoperative, and the strip advanced endwise to bring the next adjacent container into registration with the opening mechanism. Each filled container may be severed from the strip if desired.

It is also possible to place articles within each container of the container strip of this invention and leave each filled container in interconnected relationship with the adjacent container. Such a structure can be advantageously used in a vending machine, for example, or in other dispensing devices, thereby assuring proper feeding of the articles to be dispensed.

It is also possible to dispose articles within each container of the container strip of this invention while maintaining the containers in interconnected relationship and without sealing the slit openings therein. If the adjacent container (assuming a flexible strip is used) is then disposed over the opening of the preceding container, the dirt is kept out of each container of the strip without the necessity of a sealing operation. Such a structure can be used where clothing articles, for example, are to be sold, and permits dirt to be kept from the articles. At the same time, the structure permits the articles contained in each container to be removed temporarily and examined by the customer prior to purchase.

A further advantage of the container strip of the present invention resides in the fact that separate containers cannot be inadvertently dropped and thus become locally contaminated.

In one specific embodiment of the invention, the tearable portion between the closed end portion of one container and the opposite end portion of the adjacent container is coincident with the slit opening in the adjacent container. Preferably, the tearable portions are formed by perforations extending across the ply which connects the containers, while the slit openings are formed entirely across the other ply and overlie the tearable portions. With this construction, each tearable portion and coincident slit opening can be advantageously formed at the same time.

In accordance with other embodiments of the invention, the slit opening into each container is spaced from the tearable portion by which the container can be removed from the strip.

An object of the invention is to provide an improved container strip comprising a plurality of connected containers, each of said containers having a closed end portion and a slit opening in its opposite end portion.

Another object of the invention is to provide an improved container strip comprising a plurality of connected containers adapted to be opened easily and sequentially filled by advancing the strip endwise.

A more specific object of the invention is to provide a container strip as described above wherein each container includes a closed end portion and a slit opening in its opposite end portion, the strip being further characterized by the orientation of the containers in the same direction so that the closed end of one container is connected to the opposite end of the adjacent container.

A further object of the invention is to provide an improved container strip characterized by a plurality of connected containers oriented in the same direction, a tearable portion between adjacent containers, and a slit opening into each container which is coincident with a tearable portion.

Yet another object of the invention is to provide an improved container strip characterized by a plurality of connected containers oriented in the same direction, a tearable portion between adjacent containers, and a slit opening into each container which is spaced from the tearable portion by which the container can be severed from the strip.

Still another object of the invention is to provide an improved container strip characterized by transversely sealed areas arranged in regularly spaced pairs along the length of the strip and by tearable portions formed along the strip so that each container therein has a closed end portion defined by a pair of transverse sealing areas.

Another object of the invention is to provide an improved container strip comprised of connected containers oriented in the same direction, each of the containers having a closed end, an opposite sealed end, and a slit opening closely spaced from the sealed end.

The word "adjacent" as used in the specification and claims in relation to the tearable, perforated, and/or scored portions of the improved container strip of the invention and defined in connection with the spaced, sealed portions of such container strip is intended to cover not only the situation where the perforated portions are in conjunction with the spaced sealed portions of said strip, but also applies to the situation where such perforated, tearable and scored portions are within a spaced sealed portion of the strip. The word "tearable" is intended to define weakened portions formed in the strip for severing the containers and includes perforations, score lines, and the like.

Other objects and advantages of the invention will become apparent from the following detailed description and the accompanying drawings.

In the drawings:

FIGURE 1 is a plan view of one form of the container strip made in accordance with this invention;

FIGURE 2 is an enlarged cross-sectional view taken on the line **2**—**2** of FIG. 1;

FIGURE 3 is a diagrammatical side elevational view, partially in cross-section, illustrating one manner of opening the containers of the improved strip for sequential filling;

FIGURE 4 is a vertical cross-sectional view of an operative container delivery device which may be used in conjunction with the improved container strip of this invention;

FIGURE 5 is a plan view of still another form of the invention;

FIGURE 6 is an enlarged cross-sectional view taken on the line **6**—**6** of FIG. 5;

FIGURE 7 is a plan view of still another form of the present invention;

FIGURE 8 is an enlarged cross-sectional view of the form of the container strip shown in FIG. 7 and is taken along the line **8**—**8** of FIG. 7;

FIGURE 9 is a cross-sectional view taken along the line **9**—**9** of FIG. 7;

FIGURE 10 is a cross-sectional view taken along the line **10**—**10** of FIG. 7;

FIG. 11 is a cross-sectional view taken along the line **11**—**11** of FIG. 7;

FIGURE 12 is a plan view of still another form of the container strip made in accordance with this invention;

FIGURE 13 is an enlarged cross-sectional view taken along the line **13**—**13** of FIG. 12;

FIGURE 14 is an enlarged cross-sectional view taken along the line **14**—**14** of FIG. 12;

FIGURE 15 is a plan view of still another form of the present invention;

FIGURE 16 is a cross-sectional view taken along the lines **16**—**16** of FIG. 15;

FIGURE 17 is a plan view of a single container made from the container strip shown in FIG. 15;

FIGURE 18 is a cross-sectional view similar to that of FIG. 10 but showing an alternate manner in which a portion of the container strip may be folded;

FIGURE 19 is a plan view of still another form of the container strip made in accordance with this invention;

FIGURE 20 is a cross-sectional view taken along the line **20**—**20** of FIG. 19;

FIGURE 21 is a plan view of still another form of the container strip made in accordance with this invention; and

FIGURE 22 is a cross-sectional view taken along the line **22**—**22** of FIG. 21.

Referring now to the drawings, the improved container strip is generally designated by reference numeral **25**. The strip **25** is formed by a first ply **26** and a second ply **27**. The plies **26**, **27** are joined together along the side portions **28**, **29** of the strip. A channel portion **30** intervenes the first ply **26** and the second ply **27**.

The strip **25** may be formed of any suitable material which can be made into a container, but is preferably formed of a flexible packaging material such as polyethylene, cellophane, vinyl films, pliofilms, cellulose acetate film, polystyrene, polypropylene, and the like. Best results are obtained by the use of heat sealable thermoplastic materials such as polyethylene and the like. Various expedients for forming the generally tubular strip **25** will be apparent to those skilled in the art. For example, the strip **25** may be extruded in seamless form or the strip may be formed by sealing or bonding together the side edges of an elongated flat sheet.

The container strip **25** is provided with a plurality of transverse tearable portions **31** which are spaced along the length of the strip. In the embodiments of FIGS. 1, 5, 7, 12 and 15, the tearable portions **31** are formed by perforating the plies **26**, **27**. In the embodiments of FIGS. 19 and 21, the tearable portions **31** are formed by score lines **23**. Where the tearable portions **31** are perforations, they are composed of a series of aligned openings **32**.

The plies **26**, **27** are transversely sealed together in zones spaced along the length of the strip **25** to provide a plurality of spaced sealed portions **40**. The sealed portions **40** and the tearable portions **31**, in the preferred modifications of this invention, extend across the container strip **25** and are preferably at right angles to the side portions **28**, **29**.

In the illustrated embodiments of the invention, each tearable portion **31** is adjacent one of the sealed portions **40** so that the tearable portions and sealed portions cooperate to divide the container strip into containers.

Each such container has a closed end which is defined by a sealed portion **40** and an opposite end which is defined by the location of a tearable portion **31**. The containers are oriented in the same direction with the opposite end portion of each container being connected by at least the ply **27** to the closed end portion of an adjacent container. In addition, the ply **26** is provided with a plurality of transverse slit openings which are spaced along the length of the strip **25** so as to provide access into the opposite end portion of each container.

Referring particularly to the embodiment of FIGS. 1 and 2, it will be seen that the sealed zones **40** are regularly spaced along the length of the strip **25** and that a tearable portion **31** is adjacent each sealed portion. The containers defined by each pair of adjacent tearable portions **31** are generally designated by reference numeral **41**. The closed end portion of each container **41** is designated by reference numeral **42** and the opposite end portion by reference numeral **43**. In the embodiment of FIGS. 1 and 2, the slit openings **44** which provide access into the end portion **43** of each container are coincident with the tearable portions **31**. That is to say, the tearable portions **31** and the slits **44** are formed in the same location along the length of the strip so that the slits **44** in the ply **26** directly overlie the perforations **32** in the ply **27**. The slits **44** preferably extend completely across the width of the ply **26** so that the closed end portion **42** of one container is connected to the opposite end portion **43** of an adjacent container by the perforated ply **27**.

In the embodiment of FIGS. 5 and 6, the sealed portions **40** are formed in regularly spaced pairs along the length of the strip **25**. The tearable portions **31** also are regularly spaced along the length of the strip **25** and each tearable portion is closely spaced from a corresponding sealed portion **40** of each pair. A hole **49** is preferably formed between the sealed portions **40** of each pair. Thus arranged, the tearable portions **31** and the spaced sealed zones **40** cooperate to define containers **50** having closed end portions **51** and opposite end portions **52**. The closed end portions **51** of each container include a pair of the spaced sealed zones **40**. As in the case of the embodiment of FIGS. 1 and 2, the transverse, spaced slit openings **44**, which are formed through the ply **26** along the length of the strip so as to provide access into the opposite end portion **52** of each container, are coincident with the perforated tearable portions **31**.

The containers **50** are commonly referred to as "header bags." When packages are formed using the header bags **50**, the packages can be conveniently displayed by hooks or the like which extend through the holes **49**.

The embodiment of FIGS. 7–11 differs from the constructions previously discussed in that the tearable portions and slit openings are separately formed. In this embodiment, the sealed portions **40** are regularly spaced along the length of the strip **25**. The tearable portions **31** are formed by perforating the plies **26, 27** in zones closely spaced from each sealed portion **40**. The containers **55** defined by each pair of tearable portions **31** are provided with transverse slit openings **56**. The slit openings **56** are shown closely spaced from the tearable portions and are formed in the end portions **57** of the containers opposite their closed end portions **58**.

The embodiment of FIGS. 12–14 is generally similar to that of FIGS. 7–11 except that the tearable portions **31** are formed within the regularly spaced sealed portions **40**. Thus formed, each container **60** defined by adjacent tearable portions has a closed end **61** and an opposite, sealed end portion **62**. The slit openings **56** are again closely spaced from each sealed portion **40** and provides access into the sealed, opposite end portions **62** of the containers **60**.

FIGURES 15, 16 and 17 show a container strip which may be utilized to form a container **69** having an overlying portion **70** protecting the transverse slit opening **56** but permitting a purchaser to place his hand under the overlying portion **70** and through the opening **56** so as to feel the merchandise. In the container strip of FIG. 15, the sealed portions **40** are formed in regularly spaced pairs along the length of the strip **25**. Two succeeding pairs of sealed portions constitute a series of four members **71–74**. The first and second members **71, 72** of each such series, and the third and fourth members **73, 74** thereof are relatively close together, while the second and third members **72, 73** are relatively far apart. The tearable portions **31** are disposed between the first and second and third and fourth members of each of the series, while the transverse openings **56** are disposed on opposite sides of the spaced sealed portions than that occupied by the corresponding tearable portions. The distance **70** between a tearable portion **31** and the second member **72** of each of the series of sealed portions **40** and also the distance **70** between tearable portions **31** and the fourth member **74** of each of the series of sealed portions **40** is sufficiently great as to permit the portions **70** to overlie the opening **56** when the portion **70** is reversed as shown at **69***a* in FIG. 17.

FIGURE 18 shows a construction which may be used to produce an extremely strong bottom portion of a container. In this figure the closed end portion **80** which is to form the bottom of the container is doubled in a reverse direction and then doubled again in a forward direction with the overlying portions sealed to one another. This produces an extra strong container.

FIGURES 19 and 20 illustrate another modification of the invention which is similar to the embodiment of FIGS. 12–14. According to this construction, the tearable portions **31** are formed by score lines **33** which extend transversely of the container strip **25** within each sealed portion **40**. In addition, the transverse slit openings **56'** are shown as being relatively short so as to provide small openings into the containers.

The strip construction shown in FIGS. 21 and 22 is similar to the construction of FIGS. 7–11 except that the tearable portions **31** are again formed by score lines **33**. The score lines **33** extend transversely of the container strip between each sealed portion **40** and adjacent slit opening **56'**.

As described above, each embodiment of the invention is characterized by the orientation of the containers in the same direction. Each container has a closed end portion defined by one of the spaced sealed portions and an opposite end portion defined by one of the tearable portions. A transverse slit opening is provided into each container in its opposite end portion which is connected to the closed end portion of an adjacent container. One important advantage of this improved container strip construction is the ease with which the strip can be handled and the connected containers opened and filled.

The improved manner of use which is facilitated by the new container strip construction of this invention is schematically illustrated in FIG. 3. As here shown, the container strip **25** can be intermittently moved in the direction of the arrow to a container opening position defined by the location of a blower **86**. When the blower is turned on, the air issuing therefrom impinges on the container strip and enters the slit opening of the container positioned at the opening station so as to inflate the container. Thus inflated, the article to be packaged, such as a sponge **87**, can be easily inserted through the opening into the container whereupon the strip is advanced to bring the next container into position. After each article has been inserted into a container, the slit opening of the filled container can be sealed if desired. The filled containers either can be severed from the strip along the tearable portions or the strip can be left intact for shipment and subsequent use.

FIGURE 4 shows an operative container delivery device which can be used with the improved container strip of this invention. In accordance with the construction

shown in FIG. 4, a housing **90** is provided which defines a hollow chamber **91**. An axle **92** is suitably supported within the housing chamber **91** and a rolled container strip **25** is mounted on the axle **92**. An outlet opening **93** is provided in the housing **90** through which the container strip **25** is adapted to pass and a container support portion **94** is disposed on the housing and projects therefrom. An air-blowing mechanism, which may be a conventional electrically operated blower **95**, is operatively connected to the housing chamber **91** and blows air outwardly through the opening **93**. A container-seperating projection **96** is disposed on the container support portion **94** and is spaced from the outlet opening **93**. The housing **90** and the container support portion **94** can be made of corrugated cardboard and the support portion **94** hinged to the housing and turned so as to overlie the housing when the device is shipped to the customer for use.

In use, the container strip **25** is further unrolled to present the next container to the support portion **94**, the previously loaded container can be severed from the strip along the tearable portion. It will be seen that movement of the container strip **25** will produce alignment of the next container of the container strip with the air blower **95** so that the operation can then be repeated.

If it is desired to leave the containers of the container strip **25** in interconnected aligned relationship, the container separating projection **96** can be eliminated from the device and the container after being filled with the article merely moved along the support portion **94** out of registration with the air blower mechanism **95**.

It will thus be apparent that the invention provides improved container constructions which can be easily handled, opened, and filled. More specifically, the improved container strip of the invention lends itself to an operation in which the container strip is advanced endwise and each container thereof is sequentially opened and filled with the article to be packaged. Further, each container comprising the strips can be filled without disconnecting the container from the strip.

Many additional modifications and variations of the invention will be apparent to those skilled in the art in light of the foregoing detailed disclosure. Therefore, it is to be understood that within the scope of the appended claims, the invention can be practiced otherwise than as specifically shown and described.

What is claimed is:

1. A flexible container strip comprising:

(a) an elongated flexible tube of plastic material capable of bonding to itself at a predetermined temperature on application of pressure but being otherwise non-adherent to material of identical composition;

(b) said tube being longitudinally collapsed to provide first and second symmetrical plies joined together along the longitudinal side edges thereof;

(c) said tube having a plurality of transversely disposed seals each securing said first and second plies together and delineating an end of fillable space of a bag, each such seal extending transversely from one side wall of the tube to another in a sealed zone such that the tube is separated into a chain of connected bags;

(d) one ply of each bag having a transverse end opening extending substantially from one side wall of the bag to the other, each such opening being adjacent the end of the bag remote from the sealed zone forming the filling space end of that bag such that the bags of the chain are all oriented in the same direction;

(e) said openings all being formed in said first ply and being uniformly spaced at longitudinally disposed intervals;

(f) said zones being uniformly spaced from one another at longitudinally disposed intervals substantially equal the opening intervals;

(g) said second ply being transversely weakened in tearable portions at spaced intervals substantially equal the end seal and opening intervals, each such weakening extending substantially from one side edge to another to permit facile separation of the bags manually or the like while maintaining the integrity of the second ply and the tube;

(h) said tearable portions each being located near said bag opening of the same bag; and,

(i) whereby to provide a chain of collapsed bags which may be fed serially along a path from a coil to bag opening and load stations and may be opened by a blast of air directed longitudinally of the path and then loaded and separated from the chain sequentially and one at a time.

2. The strip as claimed in claim **1** wherein said openings and tearable portions are coincident.

3. The strip as claimed in claim **1** wherein said tearable portions are formed by perforations.

4. The strip as claimed in claim **1** wherein said openings are closely spaced from said tearable portions, and wherein said plies are transversely sealed between each tearable portion and the closely spaced opening.

5. The device of claim **1** wherein a plurality of header establishing transverse sealed zones are provided at longitudinal intervals uniformly spaced distances equal to any one of the mentioned intervals of claim **1**, and wherein said header zones are each between a space end delineating zone of one bag and the opening of a bag contiguous to the one bag with said header zone being spaced from the end zones and adjacent the opening of its bag.

6. The strip as claimed in claim **5** wherein said strip includes a hole between the sealed zones of each pair, and wherein said tearable portions and openings are coincident.

7. The strip as claimed in claim **1** wherein said tearable portions are formed between each opening and the nearest end zone.

8. The strip as claimed in claim **7** wherein said tearable portions are formed by perforations.

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