Feb. 27, 1968 F. B. SHAW 3,370,780

BAG WITH SELF-VENTING BACK SEAM

Filed Oct. 22, 1965

FIG. 1

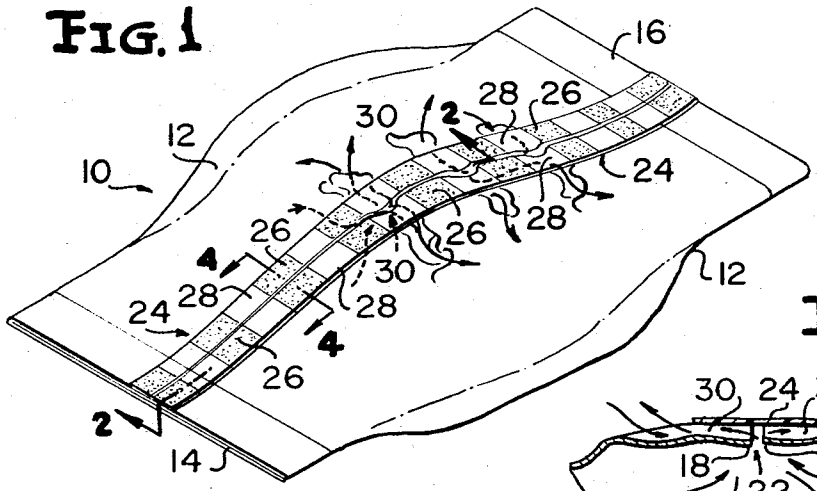


FIG. 3

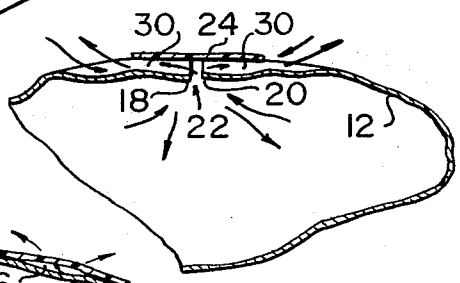


FIG. 2

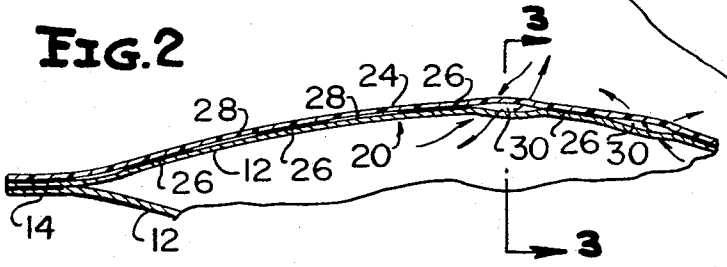


FIG. 4

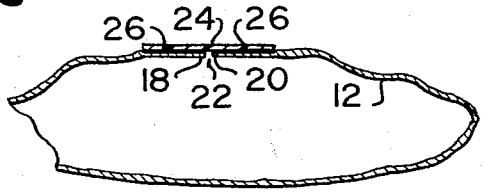


FIG. 5

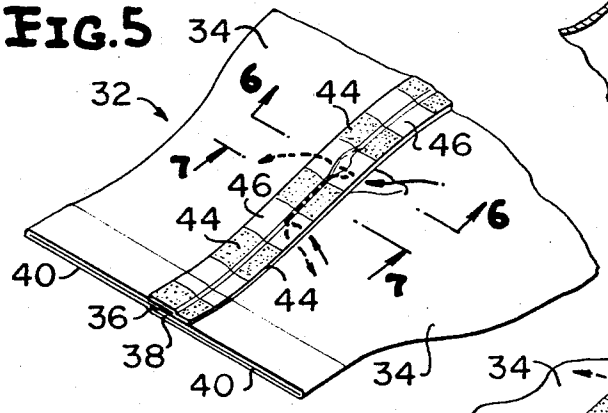


FIG. 6

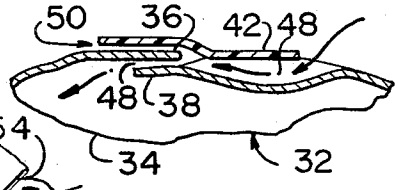


FIG. 7

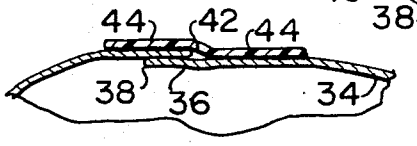
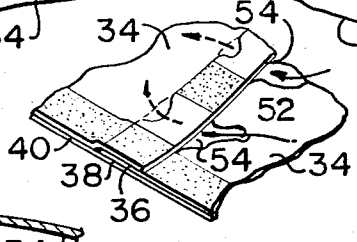


FIG. 8



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BAG WITH SELF-VENTING BACK SEAM

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ABSTRACT OF THE DISCLOSURE

A flexible package of a tubular configuration having contiguous (contacting or spaced) longitudinal edge portions joined by a strip of overlying material. The strip of material is joined to the edge portions at spaced intervals by adhesive, heat seals, etc. to form vent passages for a fluid media.

This invention relates to flexible packages and more specifically to a package having a self-venting seam.

It is known that flexible packages or bags of paper, plastic film, etc., employed to contain certain products such as fruits and vegetables must be vented so as to permit the free circulation of air to the living organisms which must continue to receive oxygen in order to survive. Without such venting, spoilage of the product is hastened except for those products maintained in the packages for only but a very brief period of time. Other reasons exist for venting packages such as to rid the package of excess air, etc.

It is well known that by perforating the package, the package becomes vented and that perforated packages are well known in the art. Such perforation of the package employed in the packaging of fruits and vegetables allows the escape of products of the vegetable respiration, such as ethylene, which if held within the package would soon build up to concentrations which would accelerate the metabolic process and thus hasten spoilage. A perforated package also permits one to rid the package of excess air or other gases trapped in a package during closure, or generated by the product within the package on standing. Perforation is also occasionally employed to accomplish an equalization of pressure within and without the package when an undesired collapse of the package might otherwise result because of loss of gas pressure within the package, which could be caused by gas absorption by the product in the package.

Although perforation will provide a vented package it possesses a number of disadvantages with regard to the identification or advertising message to be placed upon the package. It is generally not practical to perforate the package or bag before printing as ink would necessarily be transferred to the backing roll or tympan when perforated areas are contacted by the printing plates or other printing surfaces. The ink from such contaminated press plates or printing surfaces would eventually be transferred to and smeared on the reverse side of the web. This, of course, would lead to an unsightly product, wastage, and possible violation of federal food and drug laws.

On the other hand, perforation of the package after printing is not a perfect solution since a great variety of package sizes and print designs require a multitude of aperture sizes and patterns to avoid excessive damage to the printed design and undue weakening of the packages. Accordingly, a variety of expensive perforating dies must be purchased and maintained in good functioning condition. In addition, much labor is involved in changing from one perforating pattern to another perforating pattern. If perforating is performed in-line with the printing press, the downtime of the expensive printing press is increased because of the time and labor involved in changing perforating dies for different requirements. If perforating is performed in a separate operation to avoid loss of valuable printing press capacity, labor costs inherent in a secondary operation are incurred.

Thus, it becomes desirable to overcome the problems inherent with perforated bags and packages. For example, it has been found that by using appropriate techniques a tape-sealed package could be employed in such a manner as to allow passage of air or other gases into and out of a bag of paper, plastic film or laminated material, which bags or packages have not been perforated.

Accordingly, it is the principal object of the present invention to improve packages of the self-venting type.

It is a further object of the present invention to improve packages of the type which permit a circulation of air or other gas into and from the package.

It is a further object of the present invention to improve packages of the type which permit a circulation of air or other gas into the package but inhibits or retards the passage of gas from the package.

It is a further object of the present invention to provide a package having a longitudinal seam which is so constructed as to permit a gas, such as air, to circulate freely into and out of the package.

It is a further object of the present invention to provide a package having a longitudinal seam which is so constructed as to permit a gas, such as air, to circulate freely into the package but is inhibited or retarded in circulating out of the package.

It is a further object of the present invention to provide a package having a longitudinal seam which is economical to manufacture and readily adapted for mass production techniques of construction and filling and is particularly suited for the packaging of products, such as produce, which requires a free circulation of air.

It is a still further object of the present invention to provide a package of self-venting type which may be produced in any size and which may be printed upon with ease and without incurring the problems associated with the forming and printing upon perforated packages.

These and other objects of the present invention are accomplished by forming a flexible package with a generally tubular body, the body having a first sealed end portion and a second sealed end portion. A longitudinal seam extends between the first and second sealed end portions and is defined by contiguous longitudinal edge portions of the body. In one embodiment, a flexible strip of material is positioned over the longitudinal seam and secured to the edge portions of the body forming the longitudinal seam. The strip of material is joined to the edge portions at spaced intervals by any suitable means such as heat-sealing, adhesive, etc. Further embodiments do not require the use of the strip of material.

Throughout this specification and in the claims, the use of the term "contiguous" is that defined in The American College Dictionary, copyright 1955, which defines contiguous as "(1) touching in contact, or (2) in close proximity without actually touching, near." Accordingly, in one embodiment the edge portions forming the longitudinal seam of the package are actually touching and in contact and slightly overlying or overlapped. In another embodiment, and perhaps the preferred embodiment, edge portions of the tubular body forming the longitudinal seam are in spaced relation and close proximity, without actually touching. In the preferred embodiment, air or other gas may freely circulate into or out of the package. In the embodiment wherein the edge portions overlap, air or other gas may pass into the package while the reverse direction of the air or other gas is inhibited or at least retarded since a higher pressure within the package than atmospheric pressure outside of the package, would tend

to force the two edge portions into engagement and retain the higher pressure within the package.

By securing the strip of material along the seam at spaced intervals, the edge portions forming the seam are securely maintained in place while an area is formed between each interval which is free of any adhesive or sealing so that air (the use of the term air will be construed to include any gas or vapor) may pass between one of the edge portions and the strip of material and into the package, and in the preferred embodiment the reverse process may also occur, i.e., air may pass out of the package into the atmosphere.

In a further embodiment, the edge portions of the bag forming the seam are overlapped and the two edge portions are secured together at spaced intervals such as by heat-sealing, adhesives, etc. No overlying strip of material or tape is employed.

The invention both as to its organization and method of operation together with further objects and advantages thereof will best be understood by reference to the following specification taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a perspective view of a bag constructed in accordance with the principles of the invention and illustrating the novel longitudinal seam of the bag;

FIGURE 2 is a sectional view taken along the line **2—2** of the FIGURE 1 and illustrating, in exaggerated form, the passage of air into and out of the bag along the unsealed portions of the seam;

FIGURE 3 is a sectional view taken along the line **3—3** of the FIGURE 2 and further showing the free movement of air into and out of the bag of the FIGURE 1;

FIGURE 4 is a sectional view taken along the line **4—4** of the FIGURE 1 and illustrating one of the areas in which the tape or strip of material is joined or sealed to the edge portions forming the seam;

FIGURE 5 is another embodiment of the invention wherein the edge portions of the bag forming the seam are slightly overlapped and the tape or strip of material is positioned thereover;

FIGURE 6 is a sectional view taken along the line **6—6** of FIGURE 5 and illustrating the passage of air into the bag along the area where the tape or strip of material is unjoined to the edge portions of the seam;

FIGURE 7 is a sectional view taken along the line **7—7** of the FIGURE 5 and illustrating a sealed or joined portion of the tape or strip of material to the overlapped edge portions forming the seam; and

FIGURE 8 is a fragmentary perspective view of a further embodiment of the invention wherein the edge portions forming a seam are overlapped, the seam being formed without the use of the overlapping strip of material.

With reference to the FIGURE 1, a bag **10** is illustrated and comprises a generally tubular flexible body **12** which is joined at its ends **14** and **16** in any suitable manner such as by heat-sealing, adhesive, etc. As shown in the FIGURE 3, an edge portion **18** and an edge portion **20** of the flexible body **12** are not brought into contact but are in close proximity, without touching, so that a small slit or area **22** is formed therebetween.

With continued reference to the FIGURE 1, a tape or strip of material **24** is positioned over the edge portions **18** and **20** forming the longitudinal seam between the ends **14** and **16**. The tape **24** is secured to the edge portions **18** and **20** at the secured areas indicated at **26** and is not secured at the areas indicated at **28**. These areas are also illustrated in the FIGURE 2 with the dark areas indicating a joined or secured area **26** with the light areas **28** being the unjoined areas. It will be understood that a coating of flexible material may be deposited over the edge portions **18** and **20** and would serve in place of the tape **24**. The coating may be put down at spaced intervals or may be continuous with adhering and non-adhering areas.

The tape **24** may be secured to the edge portions **18** and **20** in any suitable manner. For example, the tape **20** and the body **12** may be of heat sealable material so that a heat sealing device would be applied to the areas indicated at **26** so as to seal the tape **24** to the edge portions **18** and **20**. Other means are suggested for affixing the tape **24** to the seam such as by the application of an adhesive to the tape **24** or to the edge portions **18** and **20** and then the subsequent application of the tape **24** to the area over the slit **22** and encompassing the edge portions **18** and **20**. Other methods for securing the tape **24** to the desired areas will be evident to those skilled in the art.

In the package of the FIGURE 1, air may be expelled from the bag or taken into the bag through the unjoined areas **28** and are indicated by the arrows in that figure. More specifically, the FIGURES 2 and 3, which are exaggerated to show the air passages, illustrate the tape **24** over the edge portions **18** and **20** and the slit **22** formed therebetween with the air escaping through the slit **22** and into a passageway indicated at **30** and then to the atmosphere. The passageway **30** can be considered analogous to an unjoined area **28**. With the construction provided in the FIGURES 1, 2 and 3, the path of the air formed by the slit **22** and the passageway **30**, is bidirectional, i.e., the air is free to move into or out of the bag **10**. In this manner, any products, such as produce, encased within the bag **10** will be permitted free circulation of air into the product and any of the products of vegetable respiration will be expelled. Less spoilage and greater storage time of the product in the vented bag **10** is accomplished. If it is desired to rid the bag or package **10** of excess air, this may be readily accomplished by pressing the bag between a pair of objects to force the air out of the bag **10** via the slit **22** and the passageway **30**.

The FIGURE 4 is a sectional view taken along the line **4—4** of the FIGURE 1 and illustrates the tape **24** over the slit **22** and secured at **26** to the edge portions **18** and **20** of the body **12**. The secured areas **26** may be equally spaced along the seam of the bag **10** or they may be equal, greater or lesser in distance than the unjoined areas **28**. It is intuitively clear that experience will dictate the points and the number of points at which the tape **24** is secured to the edge portions **18** and **20**; however, it is necessary that sufficient secured areas **26** be maintained so as to rigidly maintain the bag **10** in its closed position, such as the position shown in the FIGURE 1, without bursting or rupture of the bag.

The FIGURES 5, 6 and 7 illustrate another embodiment of the invention wherein the edge portions of the body **12** are overlapped, which is unlike the embodiment set forth in the FIGURES 1, 2, 3 and 4 where the edge portions **18** and **20** are maintained in spatial relationship so as to form the slit **22** therebetween.

As shown in the FIGURE 5, a bag **32** is formed of a generally tubular flexible body **34** whose edge portions **36** and **38** are brought over into overlapping relationship as best illustrated in the FIGURE 7. The ends of the body **34** are then joined by any suitable means, only the end **40** being shown in the FIGURE 5. A tape **42**, similar to the tape **24** of the FIGURE 1, is positioned over the edge portions **36** and **38** and generally centered over the tip of the edge portion **36** as shown in the FIGURE 7. As previously set forth, the tape **42** may be of a heat-sealable material, may have adhesive applied thereto, or adhesive may be applied to the body **34** at the desired position so that joined or secured areas **44** and unjoined or unsecured areas **46** are formed between the tape **42** and the edge portions **36** and **38**. In this manner, the bag **32** is formed in a secure manner without fear of rupture or bursting with normal loads and at the same time permit the entrance of air into the interior of the bag **32** along the path indicated by the arrows of the FIGURE 5.

Although the bag **32** of the FIGURE 5 may not always expel gases, the bag **32** will always admit gases

along a pair of passageways 48 and 50 as best shown in the FIGURE 6. If the internal pressure of the bag 32, as shown in the FIGURE 6, is less than atmospheric pressure, then the edge portions 36 and 38 will assume the position shown and readily admit any outside air. If, however, the pressure in the interior of the bag 32 exceeds atmospheric pressure, then although some air may be expelled from the interior of the bag 32, the edge portions 36 and 38 would move against the tape 42 and generally inhibit or at least retard the passage of air out of the bag 32.

The FIGURE 7 is a sectional view taken along the line 7—7 of the FIGURE 5 and shows one of the secured or sealed areas 44 which extend onto the edge portion 36 and a portion of the edge portion 38. Although the edge portions 36 and 38 are not sealed together, they will generally maintain the position shown in the FIGURE 7 although they may separate somewhat so as to permit the edge portions 36 and 38 in the unsecured areas 46 to assume the position shown in the FIGURE 6.

The FIGURE 8 is somewhat similar to the FIGURES 5, 6 and 7 except that with the omission of the tape 42, a further embodiment is realized. The edge portion 36 is formed to overlap the edge portion 38 of the body 34 and the longitudinal seam is completed by heat-sealing, glueing, etc., the seam at spaced intervals such as at 52, only one such area 52 being visible in the FIGURE 8. Air or other gas may now pass freely between the edge portions 36 and 38 at the un-sealed areas 54. No overlying seam tape is employed. The seam of the package is secured together to provide a usable package as at 52 while still retaining the salient features of the foregoing embodiments.

Thus, there has been described and illustrated a self-venting bag of the non-perforated type. In the preferred embodiment illustrated in the FIGURES 1, 2, 3 and 4, the bag permits two-way flow of air, into and out of the bag. In other embodiments illustrated in the FIGURES 5, 6, 7 and 8, unidirectional flow of air is favored although air may flow in the other direction also. It will be readily evident to those skilled in the art that a bag having a seam permitting primarily unidirectional flow out of the bag can be constructed.

In the preferred embodiment of the invention, the edge portions forming a longitudinal seam of the bag are in spatial relationship and covered over with a tape or strip of material which is secured by any suitable means at spaced intervals along the seam. The secured areas provide rigidity to the bag without danger of fracture or bursting while the unsecured areas of the tape and edge portions permit the free circulation of air or other gas into and out of the bag. The air enters between the sealed areas and into the slit formed between the edge portions of the body of the bag and into the interior of the bag. Exit of air from the bag to the atmosphere is in the reverse direction, i.e., through the slit between the edge portions and into the passageways formed between the sealed spaced intervals along the longitudinal seam.

In another embodiment of the invention which has been described and illustrated, the edge portions of the bag body are slightly overlapped and a tape is secured over the longitudinal seam so formed. In a manner similar to the more flexible embodiment just described, the tape is secured at spaced intervals along the seam. In this construction, air is freely permitted to enter the interior of the bag while being inhibited or retarded in leaving the bag. This is achieved since the edge portions tend to separate from the overlying tape during lesser pressures within the bag and tend to be forced into engagement during pressures greater than atmospheric within the bag.

In a further embodiment, no overlying seam tape or material is employed as the edge portions of bag are joined by heat-sealing or by the application of an adhesive, along the seam at spaced intervals. Thus, the air or gas movement features of the package are preserved while simplifying the package by eliminating the seam tape.

Thus, the present invention may be embodied in other specific forms without departing from the spirit and the essential characteristics of the invention. The present embodiment is, therefore, to be considered in all respects as illustrative and the scope of the invention being indicated by the appended claims rather than the foregoing description, and all changes which come within the meaning and range of the equivalency of the claims are, therefore, intended to be embraced therein.

What is claimed is:

1. A flexible package comprising a generally tubular body, said body having sealed end portions, a longitudinal seam extending between said end portions and being defined by contiguous longitudinal edge portions of said body, and means overlapping said contiguous longitudinal edge portions and being joined at spaced intervals along said seam whereby air may circulate into the package.

2. A flexible package comprising a generally tubular body, said body having sealed end portions, a longitudinal seam extending between said end portions and being defined by contiguous longitudinal edge portions of said body, and a strip of flexible material overlying said contiguous longitudinal edge portions and being joined at spaced intervals along said seam.

3. A flexible package comprising a generally tubular body, said body having sealed end portions, a longitudinal seam extending between said end portions and being defined by overlapping longitudinal edge portions of said body, and means overlying said overlapping edge portions and being joined at spaced intervals along said seam whereby external greater pressures may be equalized within the package.

4. A flexible package comprising a generally tubular body, said body having sealed end portions, a longitudinal seam extending between said end portions and being defined by overlapping longitudinal edge portions of said body and a strip of flexible material overlying said overlapping edge portions and being joined at spaced intervals along said seam whereby the passage of gas into the package is permitted and passage of gas out of the package is inhibited.

5. The package as defined in claim 4 wherein said strip of flexible material is heat sealed at spaced intervals to said body along said seam.

6. The package as defined in claim 4 wherein an adhesive is positioned at spaced intervals along said body at said seam whereby said strip is joined to said body by said adhesive.

7. A flexible package comprising a generally tubular body, said body having sealed end portions, a longitudinal seam extending between said end portions and being defined by spaced longitudinal edge portions of said body having terminal edges in opposed butt non-overlapped relationship, and means for joining said edge portions at spaced intervals along said spaced edge portions forming said seam.

8. A flexible package comprising a generally tubular body, said body having sealed end portions, a longitudinal seam extending between said end portions and being defined by spaced longitudinal portions of said body and means overlapping said spaced edge portions and being joined at spaced intervals along said seam whereby gas may circulate freely into and out of the package.

9. A flexible package comprising a generally tubular body, said body having sealed end portions, a longitudinal seam extending between said end portions and being defined by spaced longitudinal edge portions of said body and a strip of flexible material overlying said spaced longitudinal edge portions and being joined at spaced intervals along said seam.

10. A seam comprising a first edge of material, a con-

tiguous second edge of material, and means overlapping portions of said first and said second edges of material and joined to said portions at transversely spaced intervals.

11. A seam comprising a first edge of material, a contiguous second edge of material, and a strip of flexible material overlying portions of said first and contiguous second edges of material and joined to said edges at spaced intervals.

12. A seam comprising a first edge of material, a second edge of material overlapping said first edge of material and means overlapping portions of both of said edges of material at the terminus of one edge of material and joined to said portions at transversely spaced intervals.

13. A seam comprising a first edge of material, a second edge of material overlapping said first edge of material, and a strip of flexible material overlying portions of said first edge and said second edge of material and joined to said portions at spaced intervals.

14. A seam comprising a first edge of material, a second edge of material in spaced butting non-overlapped relation to said first edge of material and means for joining said edges of material at spaced intervals.

15. A seam comprising a first edge of material, a second edge of material in spaced relation to said first edge of material and means overlapping portions of said first and second edges of material and joined to said portions at transversely spaced intervals.

16. A seam comprising a first edge of material, a second edge of material in spaced relation to said first edge of material and a strip of flexible material overlying portions of said first and second edges of material and joined to said portions at spaced intervals.

17. A method of forming a package which comprises forming a section of flexible material into a generally tubular body having first and second ends oppositely disposed on said body and a seam area defined by first and second contiguous longitudinal edge portions, joining said ends to close the package therealong, positioning a strip of material over the seam area, and joining the strip of material to the edge portions at spaced transverse intervals.

18. The method of claim **17** wherein the step of joining is by heat-sealing.

19. The method of claim **17** wherein the step of joining is by applying an adhesive.

20. A method of forming a package which comprises forming a section of flexible material into a generally tubular body having first and second ends oppositely disposed on said body and a seam area defined by first and second overlapping longitudinal edge portions, joining said ends to close the package therealong, positioning a strip of material over the seam area, and joining the strip of material to the edge portions at spaced transverse intervals.

21. A method of forming a package which comprises forming a section of flexible material into a generally tubular body having first and second ends oppositely disposed on said body and a seam area defined by first and second edge portions in spaced relation, joining said ends to close the package therealong, positioning a strip of material over the seam area, and joining the strip of material to the edge portions at spaced transverse intervals.

22. A method of forming a seam which comprises positioning a first edge of material in overlapping relationship to a second edge of material, positioning a strip of material over portions of said edges, and joining the strip of material to the edges at spaced intervals to form a seam having one-way air passages.

23. A method of forming a seam which comprises positioning a first edge of material in spatial relationship to a second edge of material, positioning a strip of material over portions of the first and second edges, and joining the strip of material at spaced intervals to the edges to form a seam having air passages.

24. A flexible package comprising a generally tubular body having opposite end portions, said body including contiguous portions of material, a strip of flexible material overlying said contiguous edge portions, and means joining said contiguous edge portions to each other along spaced transverse intervals thereby defining passages through which may pass a fluid medium.

25. A method of forming a tubular member adapted to be formed into a package comprising the steps of forming flexible material into a generally tubular body having a seam area defined by first and second contiguous longitudinal edge portions, positioning a strip of material over the seamed area, and joining the strip of material to the edge portions at spaced transverse intervals.

26. The method as defined in claim **25** wherein said contiguous longitudinal edge portions have edges in opposed, butting non-overlapped relationship.

27. The method as defined in claim **25** wherein said longitudinal edge portions are in overlapped relationship.

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