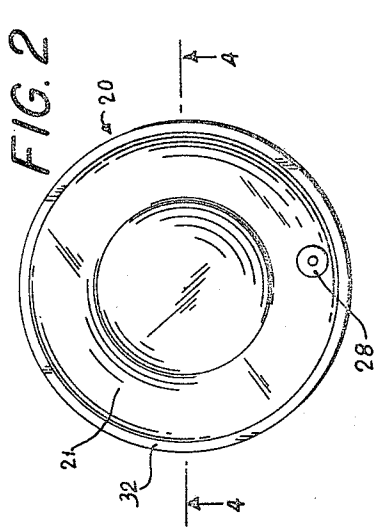
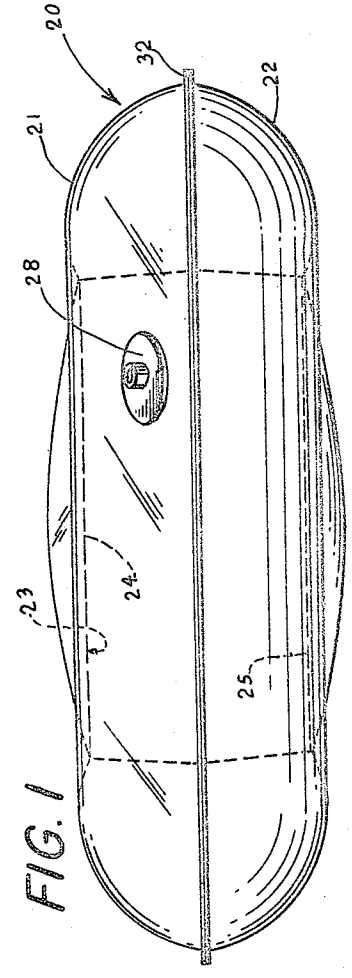
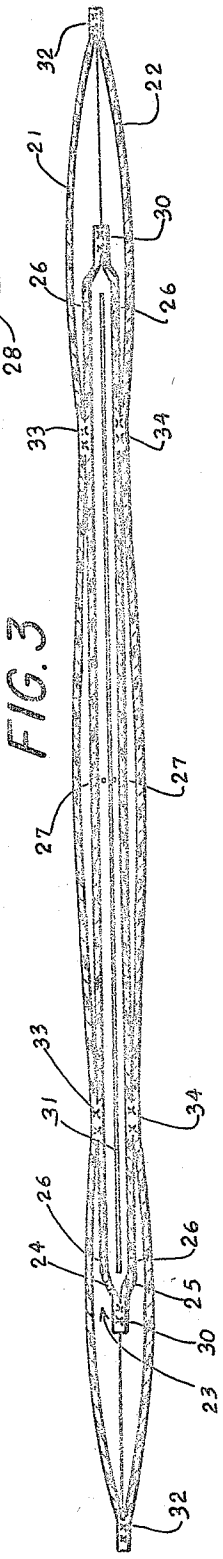
Aug. 8, 1967 L. POST 3,335,045

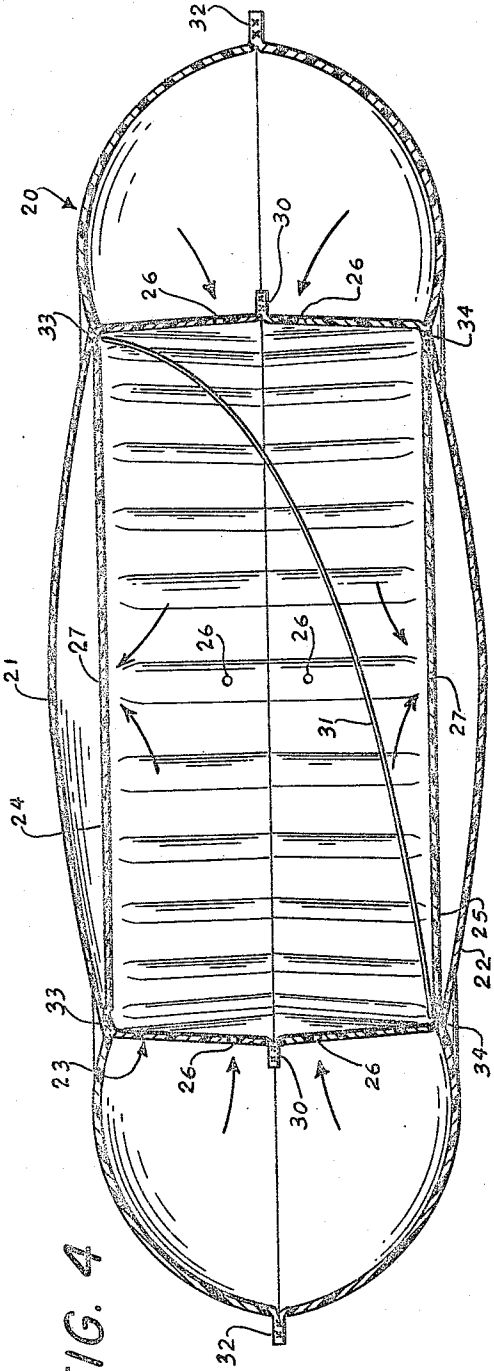
METHOD FOR MAKING AN INFLATABLE ARTICLE

Filed June 15, 1964 2 Sheets-Sheet 1









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METHOD FOR MAKING AN INFLATABLE ARTICLE

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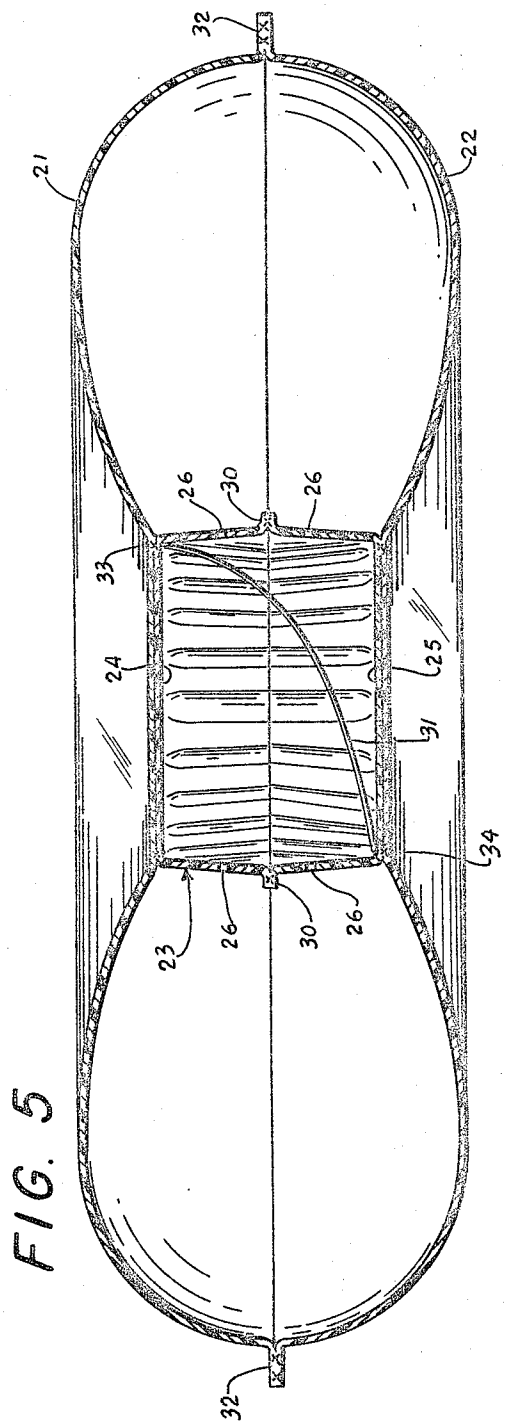


FIG. 5

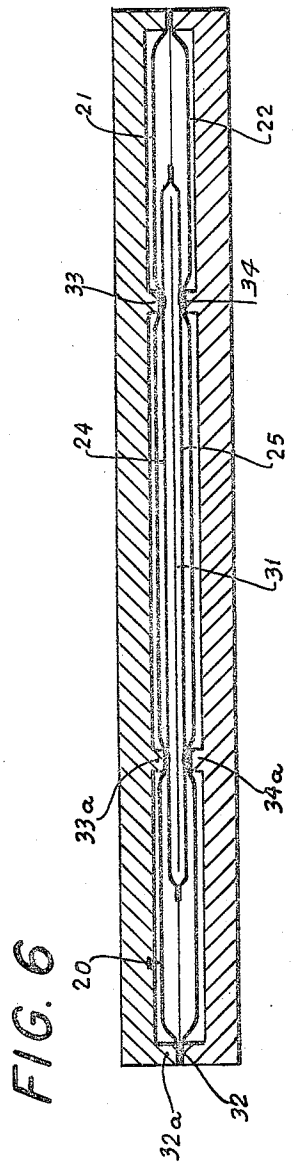


FIG. 6

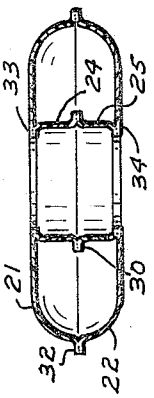


FIG. 7

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3,335,045

METHOD FOR MAKING AN INFLATABLE ARTICLE

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2 Claims. (Cl. 156—289)

This invention relates to an inflatable cushion or like article and to the method of making the same.

More particularly, this invention relates to an inflatable cushion of heat sealable, pliant, plastic material.

Still more particularly, this invention relates to an inflatable article and method of making the same, the article being characterized by the ability to be folded to a substantially completely flat condition so that the same occupies a minimum volume, to facilitate shipping.

In my United States Patent No. 2,919,747, I have shown and described an inflatable cushion and method of making the same. While the cushion of my said invention has enjoyed considerable commercial success, certain drawbacks inhere in its manufacture and use. Particularly, the method of making the cushion has been found to be somewhat cumbersome for large volume production. Further, a drawback in the cushion as shown in my prior invention, lies in the inability to exhaust all of the air from within the cushion for storage or shipping.

Specifically, in my prior patent there is shown a cushion wherein a series of annular members internally connect top and bottom sheets to form partitions within the cushion. In such units, the upper and lower extremities of the partition forming members are fused directly to the upper and lower surfaces. As a result, when it is desired to collapse the cushion by exhausting the air therefrom, it is impossible to cause the partition forming member to lie flat, i.e. in parallelism with the top and bottom members. At best, the partition may be bunched between the said members, necessitating a spacing apart of the upper and lower members.

It will be readily recognized that by thus spacing the members, a considerable volume of air is entrapped, thus resulting in each unit, in accordance with my prior invention, occupying considerable volume even in the uninflated condition thereof. As a result, the packaging and shipment of devices in accordance with my prior patent have involved undue cost.

Accordingly, it is an object of the present invention to provide an improved inflatable article, such as a cushion, from which substantially all of the air may be readily exhausted, to enable the article to be packed for shipment. A further object of the invention is the provision of a novel and improved method for making an article of the type described.

Still other and further objects will appear in connection with the description of the drawings, forming a part hereof, in which:

FIGURE 1 is a perspective view of a cushion in accordance with the invention;

FIGURE 2 is a plan view of the cushion of FIGURE 1;

FIGURE 3 is a cross sectional view of an article in accordance with FIGURE 1 in the substantially deflated condition thereof;

FIGURE 4 is a section taken on the line 4—4 of FIGURE 3;

FIGURE 5 is a sectional view similar to FIGURE 4 through a different embodiment of the invention;

FIGURE 6 is a heat seal forming die shown in position for forming the final heat seal, the die and article positioned therein being shown in section;

FIGURE 7 is a cross-sectional view of a further embodiment of my invention, similar to the other embodiments except that the center portions of the outer sheets and the insert have been removed.

In accordance with the invention, FIGURES 1 to 5 show an inflatable device comprising cushions of pliant, heat sealable plastic material. While polymerized vinyl compounds, and particularly those having limited distensibility are preferred, it will be understood that certain other heat sealable sheets, such as polyethylene plastic, may suggest themselves for use in accordance with the invention.

The cushion **20** includes an upper surface **21** and a lower surface **22** which, in the inflated condition of the cushion, form the top and bottom surfaces thereof. While circular upper and lower surfaces are shown in the illustrated embodiments, it will be appreciated that square, rectangular or other shapes may be employed.

Between the sheets **21**, **22** there is disposed an insert member **23** which is made of a pliant, heat sealable plastic material compatible with, i.e. fusible to, the material forming the layers **21**, **22**. The insert **23**, in turn, consists of a top sheet **24** and a substantially identical bottom sheet **25**, a barrier sheet **31** being disposed therebetween as hereinafter set forth. The sheets **24**, **25** are provided with apertures **26** adjacent the peripheral edges thereof and they may, in addition, be provided with centrally located apertures **27**, **27**.

One of the outer layers **21** or **22** is provided with an inflation valve assembly **28** which, in accordance with known practice, permits the device to be inflated and also provides means for preventing the escape of air once inflation has been effected.

The device is fabricated by heat sealing, at **30**, the peripheral edges of the congruent sheets **24**, **25** forming the insert member **23**, a barrier sheet **31** being interposed between the sheets **24**, **25** in advance of forming the seal **30**.

The barrier sheet may be comprised of uncoated cellophane, tissue paper or any similar thin, pliable material which is not subject to deterioration under temporary heating conditions and which will not, itself, fuse and form a heat seal or adhere to a portion of the insert when the latter is heated. Preferably, the barrier sheet is of a dimension which approximates the inside area of the insert **23**, i.e. the area inside the peripherally formed heat seal **30**. The formed insert member **23** is then interposed between superimposed upper and lower sheets **21**, **22**, respectively.

The composite, that is, the upper and lower sheets with the insert **23** disposed substantially concentrically therebetween, may then be laid atop a heat sealing die for the formation of the completed cushion.

The final forming steps include the formation of a continuous outer heat seal **32** immediately adjacent the periphery of the upper and lower sheets **21**, **22** and the formation of secondary seals **33**, **34**, respectively, linking sheet **21** to top sheet **24** of the insert **23**, and bottom sheet **22** to the lower sheet **25** of insert **23**.

It will be appreciated that the seals **32**, **33** and **34** may be formed simultaneously in a heat sealing die, such as is diagrammatically shown in FIGURE 6, by reason of the incorporation within the insert **23** of the barrier sheet **31**. It will be appreciated that in the absence of the barrier sheet, an undesired adhesion would be effected between the upper and lower layers **24**, **25** of the insert **23** in the area of the electrodes **33*a***, **34*a***, for forming seals **33**, **34**, respectively. However, the inclusion of the barrier sheet enables the said seals **33**, **34** to be formed simultaneously with each other and with the formation of seal **32** by electrode **32*a***, without fear of such undesired adhesion. Without the use of the barrier sheet it would be necessary first individually to seal layer **24** to sheet **21** and layer **25** to sheet **22**, thereafter seal layers **24** and **25** to each other, and thereafter form the outer seal **32**. Thus, by the novel method of the inven-

tion two simply effected heat sealing operations accomplish what heretofore would have required four operations. Moreover, all heat seals may be effected with simple, flat dies, whereas the former operations required jigs and the like.

The formed article, in its substantially uninflated condition, is shown in FIGURE 5 wherein it will be apparent that since the insert **23** is fabricated of two flat pieces which will tend to lie flat in the uninflated condition, there will be no substantial tendency to space the upper and lower sheets from each other and, thus, no substantial volume of air will be entrapped.

The naturally flat condition assumed by the article of the present invention is to be contrasted with the position of the parts of an uninflated article in accordance with my aforesaid patent, wherein the annular partition forming members will not lie flat or in parallelism with the upper and lower surfaces in the uninflated condition.

In the embodiment of FIGURE 5, the structure is substantially identical to that of FIGURES 1 to 4, with the exception that the apertures **27** which are present in the embodiment of FIGURES 1 to 4 have been omitted. As a result, it will be seen that whereas the upper and lower surfaces of the embodiment of FIGURE 5 are concave in the inflated condition, the comparable surfaces in the embodiment of FIGURES 1 to 4 are convex. This convexity is due to the existence of pressure between the members **21** and **24** and the members **22** and **25**, which pressure is admitted through the apertures **27**.

From the foregoing it will be seen that a novel and greatly simplified method of forming an inflatable plastic article is provided by the method of the present invention. Once the novel insert member has been disposed between the upper and lower sheets, the completion of the article may be effected by the simple act of forming a peripheral heat seal between the upper and lower sheets, and secondary inner heat seals between the upper and lower sheets of the insert and the upper and lower sheets of the article, respectively.

The three noted heat seals may be simultaneously formed by reason of the use of a barrier sheet within the insert.

The embodiment shown in FIGURE 7 is similar to the prior embodiments, with the exception that the central parts of the upper sheet **21** and the lower sheet **22**, and the upper and lower sheets **24**, **25** of the insert have been removed at all points inwardly disposed with respect to heat seals **33**, **34**. It will thus be observed that the resultant inflated article is generally toroidal in configuration, and in this instance the barrier sheet **31** may be removed from the completed unit. It will be observed that in the formation of the embodiment of FIGURE 7, a cutting out operation of the upper and lower sheets and the insert may be effected either before or after formation of the heat seals **33**, **34**.

Having thus described the invention and illustrated its use, what is claimed as new and is desired to be secured by Letters Patent is:

1. The method of making a flat article inflatable to the form of a cushion, having a tubular chamber joined to the top and bottom surfaces of said cushion which comprises the steps of superimposing one atop the other, substantially identical, thermoplastic heat sealable plastic sheets, interposing between said sheets a thin pliable barrier member resistant to heat sealing, said member being smaller than said sheets, and being centrally positioned between said sheets to maintain said sheets out of contact with each other except in the area of the peripheral portions of said sheets, forming a heat seal between said sheets in the area of said peripheral portions to thereby unite said sheets and form a sandwich containing said barrier member, positioning flat heat sealable plastic top and bottom members one atop the other, disposing said sandwich between said top and bottom members centrally to provide peripheral contacting areas between said top and bottom members, and simultaneously forming a heat seal between the contacting peripheral areas of said top and bottom members and forming a heat seal between the top member and one said sheet and a heat seal between the bottom member and the other said sheet in the area in registry with said barrier member by the application of heat and transverse pressure against said top and bottom members.

2. The method of forming an inflatable cushion of thermoplastic heat sealable material comprising top and bottom members sealed together at their outer peripheries and a tubular inner member extending between top and bottom members, comprising the steps of:

(a) forming a sandwich comprising first and second sheets of heat sealable plastic having disposed therebetween a smaller barrier member, said barrier member being positioned to isolate central portions of said sheets and provide a contacting area between said sheets adjacent the periphery;

(b) heat sealing said first and second sheets together in said peripheral area;

(c) superimposing top and bottom members of heat sealable plastic material;

(d) interposing said sandwich between said superimposed members to provide a continuous contacting peripheral area between said members;

(e) forming a continuous heat seal about said contacting area to unite said top and bottom members;

(f) and forming a continuous heat seal between said top member and one said sheet and the bottom member and the other said sheet in the area in registry with said barrier member by the application of pressure at opposed areas at the outer surfaces of said top and bottom members, said areas of pressure being coextensive with the seal to be formed.

References Cited

UNITED STATES PATENTS

1,625,810	4/1927	Krichbaum	156—289
1,970,803	8/1934	Johnson	156—289
2,269,342	1/1942	Johnson	156—289
2,294,796	9/1942	Moulder	156—289
2,466,387	4/1949	Curtis	156—289
2,584,632	2/1952	Southwick	156—289
2,742,388	4/1956	Russell	156—289
2,919,747	1/1960	Post	5—348
3,089,153	5/1963	Bosc	5—348

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