March 15, 1955 W. STERN 2,704,183

FLEXIBLE CONTAINER

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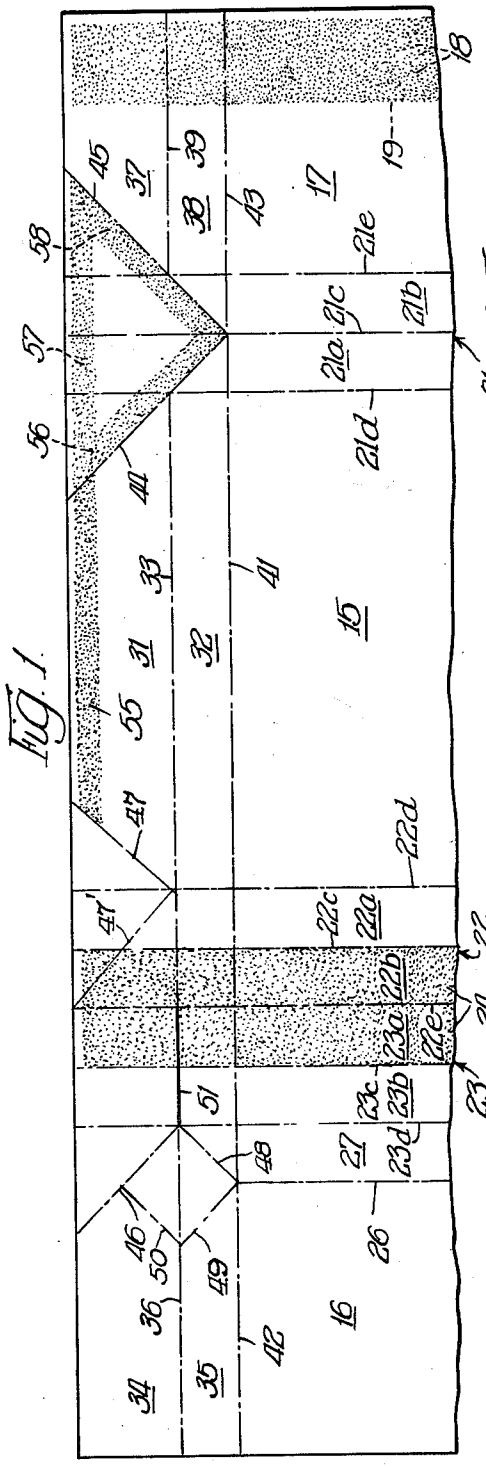


Fig. 1.

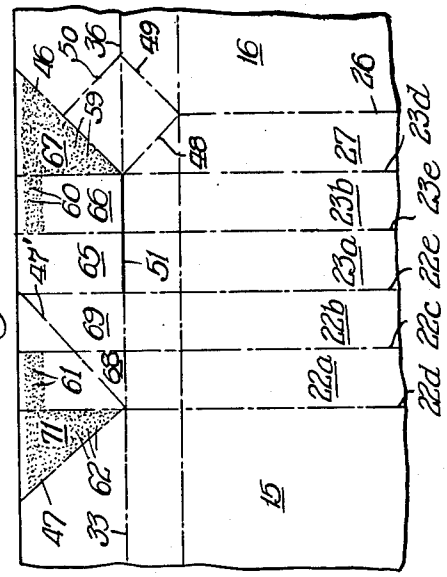


Fig. 2.

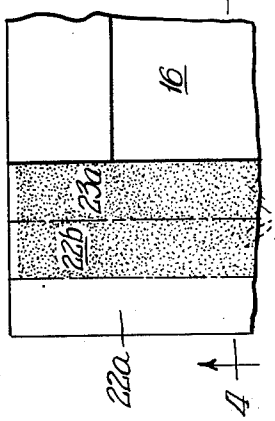


Fig. 3.

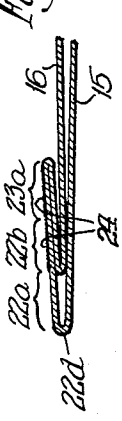


Fig. 4.

INVENTOR.
Walter Stern,
BY Brown, Jackson,
Boettcher & Dienner
Attys.

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FLEXIBLE CONTAINER

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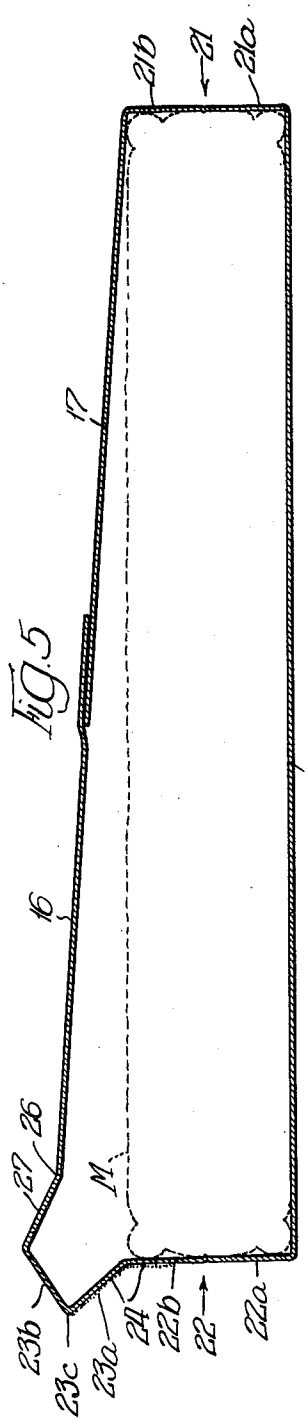


Fig. 5

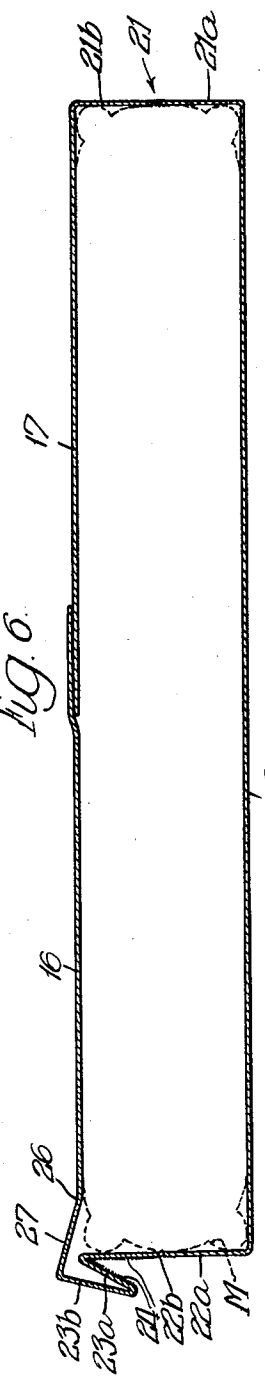


Fig. 6

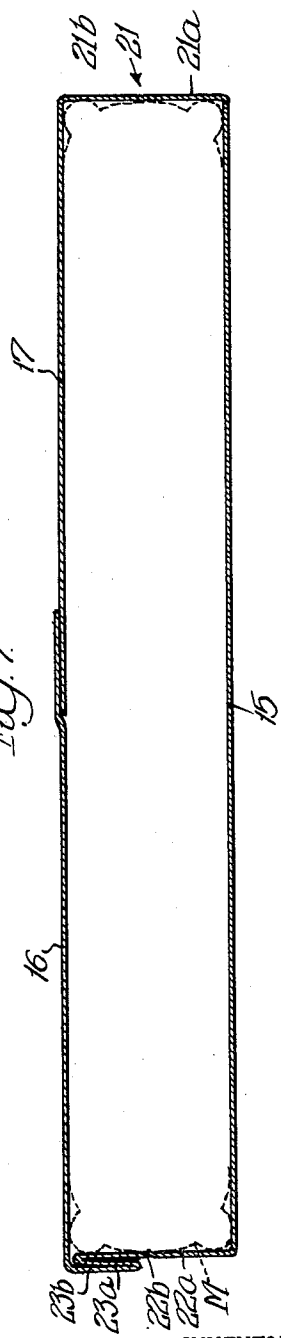


Fig. 7

INVENTOR.
Walter Stern,
BY Brown, Jackson, Boettcher & Dienner
attys

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Fig. 8.

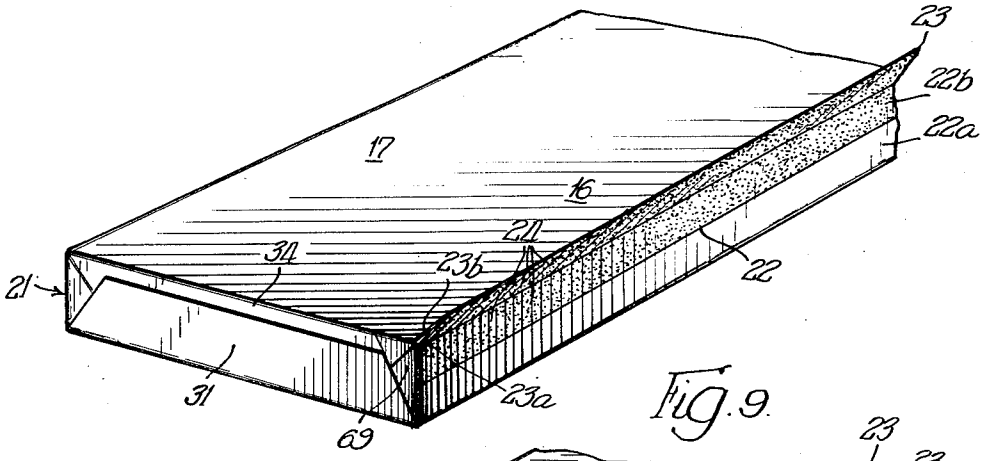


Fig. 9.

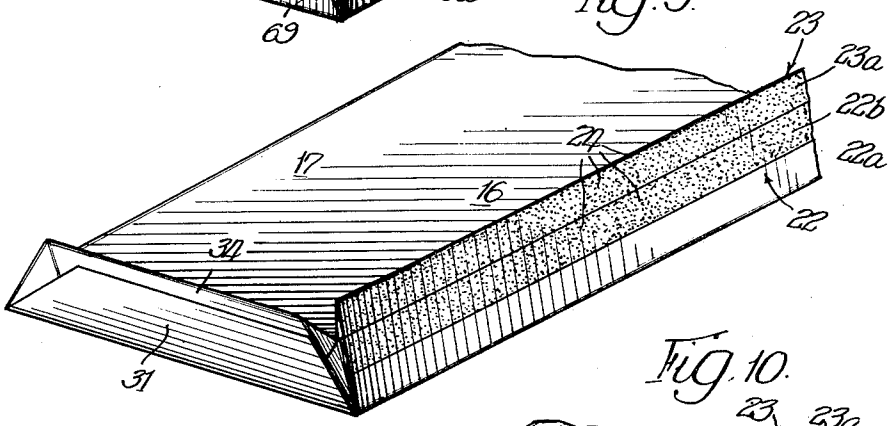
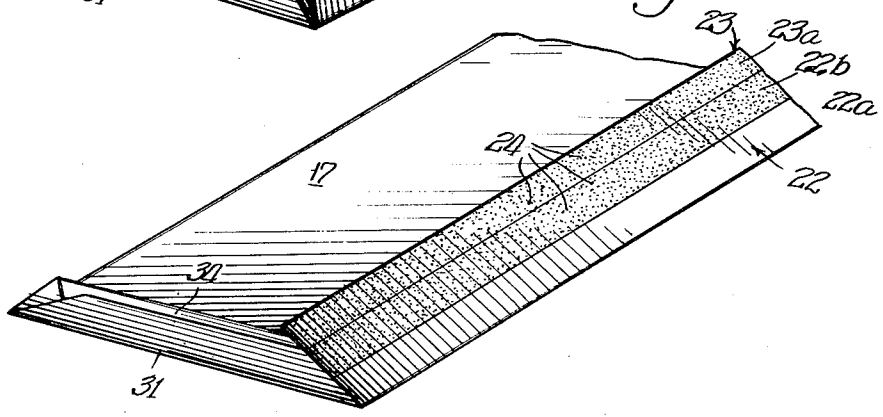


Fig. 10.



INVENTOR.
Walter Stern,
BY Brown, Jackson,
Boettcher & Dienner
Attys.

United States Patent Office 2,704,183 Patented Mar. 15, 1955

2,704,183

FLEXIBLE CONTAINER

Walter Stern, Chicago, Ill., assignor to The Cromwell Paper Company, Chicago, Ill., a corporation of Illinois

Application December 9, 1949, Serial No. 132,170

1 Claim. (Cl. 229—53)

The present invention relates to flexible containers for packaging articles which are to be shipped, stored or the like.

The general object of the invention is to provide an improved expansible form of flexible container which can be opened up to a larger-than-normal size to facilitate the insertion of an article or articles into the container, following which the container can then be reduced to its normal size for obtaining a relatively snug fit over the article or articles.

One embodiment of my invention which particularly illustrates the advantages of being able to first expand or distend the container at the time of article insertion, and then reduce or contract the container into a snug fit over the article for shipment, storage or the like, is exemplified by an expansible paper bag for packaging a mattress. Because of the large size, weight and relative rigidity of a mattress, particularly one of the inner spring type, it is ordinarily very difficult to insert a mattress into a snug fitting paper bag, as specified by common carriers for interstate transit. A paper bag of the proper weight and texture of paper can serve very satisfactorily for the shipment and storage of a mattress, but one of the principal objections to the use of a paper bag for this type of packaging has been the difficulty of getting the mattress quickly and easily into a snug fitting bag without damaging the bag. The relatively snug fit of the bag over the mattress in the finished package is required so as to minimize tearing of the bag in handling the package.

I obtain the above described expansible feature in my improved bag by the provision of a unique, supplemental gusset which supplements the main gusset along one side edge of the bag. This supplemental gusset enables the entrance opening of the bag and also the main body of the bag to be opened up to an expanded size, so as to facilitate the insertion of the mattress into the bag, following which the supplemental gusset can be folded down and into the main gusset so that the bag is reduced to its normal packaging size for obtaining a relatively snug fit over the mattress. Supplemental gussets of this type can be provided along both side edges of the bag if desired, but ordinarily the provision of one supplemental gusset along one side edge of the bag is adequate to give the necessary range of expansion to the bag.

Another object of the invention resides in an improved arrangement of a supplemental gusset which can be folded back into closed position and into the main gusset after the insertion of the contained article into the bag, so that the supplemental gusset thereupon becomes a part of the main gusset. This closing and folding of the supplemental gusset back into the main gusset brings the bag back to its normal size, and the supplemental gusset is preferably adhesively joined to the main gusset at this time to retain the snug fit of the bag over the article.

In this regard, another feature of the invention resides in an improved arrangement of the main and supplemental gussets whereby a pressure sensitive type of adhesive may be employed for adhesively joining the supplemental gusset to the main gusset. The use of pressure sensitive adhesive on these bag containers is frequently objectionable because of the possibility of two adhesive coated surfaces of such a bag being accidentally brought together while the empty bags are being transported or stored, or before the article has been completely inserted into the bag; also because of the possibility that two of these adhesive coated surfaces may be brought together

at the wrong angle or wrong location, with the result that these surfaces cannot be separated for proper use of the bag and hence the bag must be discarded. I avoid or minimize these difficulties by an improved arrangement wherein the pressure sensitive adhesive is placed upon one of the panels of the main gusset and upon an adjoining panel of the supplemental gusset, and wherein these two panels are arranged to lie flat in coplanar edge-to-edge relationship while the bag is in its empty, flat condition for shipment or storage. This relation of these two panels prevents the panels from contacting each other until it is desired to have them do so in the final operation of folding the supplemental gusset closed and into the main gusset.

I wish it to be understood that the invention is not limited to paper bags, but that this supplemental gusset feature can also be embodied in bags or flexible containers made of treated fabric, plastic or any other desired material. Also, the invention is not limited to mattress bags. Still further, while the use of pressure sensitive adhesive for joining the supplemental gusset to the main gusset is preferred, nevertheless it will be understood that the securing of these two gussets together after the insertion of the article into the bag may be effected by a moistened type of adhesive, or by heat sealing, stapling, or in any other suitable manner. Moreover, the supplemental gusset does not have to be an extension of the regular gusset, but could, for example, be located down the center of the bag.

Referring now to the accompanying drawings illustrating one preferred embodiment of my improved flexible container, and one preferred method of making the same;

Figure 1 is a plan view of the original blank of the bag, upon which I have illustrated by crease lines, folding lines, panel areas, folding slit, etc. the subsequent operations which are performed upon this blank in producing the finished bag, this view illustrating the inside of the blank;

Figure 2 is a fragmentary elevational view of the reverse or outer side of the blank, particularly that portion which forms the bottom of the bag at the supplemental gusset side;

Figure 3 is a fragmentary elevational view of the lower corner of the bag at the supplemental gusset side, showing the finished bag, in its flat folded condition;

Figure 4 is a fragmentary cross-sectional view taken approximately on the plane of the line 4—4 of Figure 3;

Figure 5, 6 and 7 are transverse sectional views through the finished bag, showing the different stages of expanding the supplemental gusset to open position for article insertion, then folding it inwardly after the article has been inserted into the bag, and finally sealing the folded supplemental gusset to the main gusset; and

Figures 8, 9 and 10 are fragmentary rear perspective views of the bag; Figure 8 showing the main gussets expanded but the supplemental gusset not expanded; Figure 9 showing the bag in a partly folded condition; and Figure 10 showing the supplemental gusset folded down almost flat upon the body of the bag.

Referring first to Figure 1, this illustrates the original blank from which the bag is made, this blank being of oblong, rectangular shape cut of flat stock, either transversely of the length of the stock or longitudinally thereof. In order to facilitate an understanding of the subsequent folding and adhering operations, Figure 1 illustrates the inner side of the original blank, corresponding to that side which will be the inside of the finished bag. Also, that portion of the blank appearing at the top in Figure 1 represents that portion of the blank which will form the bottom of the finished bag. The bag will be described as having a single supplemental gusset disposed at the left hand side of the finished bag and projecting outwardly from the main gusset and from the front panel of the bag, but this reference to "left" and "right," "front" and "back" is purely relative for the purpose of facilitating an understanding of the invention, and is not limitative.

The creasing or folding lines are indicated by dash-and-dot lines, these creasing or folding operations being performed upon the blank after the cutting of the blank out of the stock strip, these creasing or folding opera-

tions being performed either entirely by one or more folding machines, or partly by the cutting machine after the cutting operation and partly by a folding machine. Different bag manufacturers have different preferred practices in this regard.

The large rectangular area near the center of the blank, designated **15**, constitutes the main back panel in the finished bag, the front panel being in this description considered as that part of the bag which is formed by adhesively joining the overlapping edges of the blank together down the center of the bag. This front portion of the bag comprises a left hand panel, designated **16**, which is adapted to fold over the front side of the back panel **15**, to constitute the left hand half of the front panel. Correspondingly, a right hand panel, designated **17**, extends from the right hand edge of the back panel **15** and is adapted to fold over the front side of this back panel to constitute the right hand half of the front panel. These left and right hand half-panels are secured together in lapped relation, to form a bag seam extending down the approximate center of the front panel. In the adhesive joining stage of the bag forming operation, adhesive **18** is applied over the adhesive zone or area on the back side of the right hand half-panel **17**, this adhesive area being indicated by the dotted lines **19**. When the left and right hand half-panels are brought together in overlapping relation to form the front of the bag, these two half-panels are secured together by means of the adhesive **18**.

In the exemplary embodiment illustrated in the drawings, the left hand edge of the finished bag is shown as being provided with a main gusset and a supplemental gusset, and the right hand edge of the bag is shown simply as having a main or plain folding gusset. Referring first to this right hand edge, this main or plain folding gusset, designated **21**, is located between the back panel **15** and the right hand front half-panel **17**. This plain gusset comprises a gusset back panel **21***a* and a gusset front panel **21***b* which meet at a reverse crease line **21***c*. The back panel **21***a* is defined between the reverse crease line **21***c* and a crease line **21***d*, and the front panel **21***b* is defined between the reverse crease line **21***c* and the front crease line **21***e*. The manner in which this right hand gusset **21** extends outwardly and folds inwardly will be apparent from the perspective view of the bag shown in Figure 8.

Referring now to that part of the blank which will form the left hand edge of the finished bag, this portion also has a conventional or standard gusset, in addition to the new and improved supplemental gusset, as above described. This standard or main left hand gusset, designated **22**, comprises a gusset back panel **22***a*, and a gusset front panel **22***b*, which meet along a reverse crease line **22***c*. The panel **22***a* is defined between the reverse crease line **22***c* and the crease line **22***d*, and the front panel **22***b* is defined between the reverse crease line **22***c* and the reverse crease line **22***e*. This left hand main gusset **22** can be practically the same as the right hand gusset **21**.

Referring now to the supplemental gusset, designated **23** in its entirety, this supplemental gusset comprises an inner panel **23***a* and an outer panel **23***b* which join along crease line **23***c*. I have used the terms "inner" and "outer" to designate the panels **23***a* and **23***b*, because when the supplemental gusset **23** is closed and folded down into its final position in adhesive engagement with the main gusset **22**, the panel **23***a* will lie on the inside of this fold and the panel **23***b* will lie on the outside. This inner panel **23***a* is defined between the crease line **23***c* and the reverse crease line **22***e*, and the outer panel **23***b* is defined between the crease line **23***c* and the reverse crease line **23***d*. The backs or outside surfaces of the main gusset panel **22***b* and of the adjoining supplemental gusset panel **23***a* are both coated with a pressure sensitive adhesive **24**, when this mode of fastening the supplemental gusset is employed.

An auxiliary folding line or reverse crease **26** is provided between the left hand half-panel **16** and the supplemental gusset folding line **23***d*. The space between these two folding lines **26** and **23***d* defines an auxiliary panel **27** of the same width as the gusset panels **21***a*, **21***b*, **22***a*, **22***b*, etc. This auxiliary folding line **26** enables the adhesive bearing panels **22***b* and **23***a* of the main and supplemental gussets **22** and **23**, respectively, to be folded down flat in the same common plane when the empty bags are folded flat for storage or shipment, as shown in Figures 4 and 10. This prevents the two adhesive bearing panels of the main and supplemental gussets from accidentally contacting each other prior to the opening of the bag and the insertion of the contained article therein.

The bag may be made with a so-called "square bottom" or "satchel bottom," or with any other desired formation of bottom so long as it does not interfere with the functioning of the supplemental gusset **23**. In the drawings, I have illustrated the folding operations incidental to producing a square bottom bag, but it will be understood that the invention is not necessarily limited thereto. A conventional manner of producing this square bottom is to provide panel areas **31**, **32**, separated by a crease line **33**, extending transversely across the end of the back panel **15**; to provide panel areas **34**, **35** separated by a crease line **36**, extending transversely across the end of the half-panel **16**; and to provide panels **37** and **38**, separated by a crease **39**, extending across the end of the other half-panel **17**. A crease line **41** enables the panels **31** and **32** to be folded inwardly with respect to the back panel **15**, and crease lines **42** and **43** enable the panels **34**, **35** and **37**, **38** to be folded outwardly with respect to the half-panels **16** and **17**. Diagonal folding lines **44** and **45** extend diagonally outwardly from the center crease line **21***c* of the right hand gusset **21**, so as to provide for the square bottom formation at the right hand side of the bottom. Certain differences occur where the main gusset and supplemental gusset intersect the bottom panels at the left hand side of the bag. For example, three diagonal folding lines **46**, **47** and **47'** extend upwardly from the crease line **33** to the edge of the blank, and additional diagonal folding lines **48**, **49** and **50** are disposed downwardly and to the right of folding line **46**. Also, a folding slit **51** is cut transversely across the panels **23***a* and **23***b* of the supplemental gusset substantially in line with or between the ends of the bottom crease lines **33** and **36**.

In the folding and joining operations, adhesive is applied on the inner side of the blank (Figure 1) along the edge portion of panel **31**, as indicated at **55**. On the opposite or outer side of the blank, adhesive is also applied on the areas indicated by the dotted lead lines **56**, **57** and **58** (Figure 1). Also, on this outer side, adhesive is applied on the areas **59**, **60**, **61** and **62** (Figure 2).

The folding of the bottom of the bag at the right hand side will be well understood by those skilled in the art, since it follows conventional practice in the formation of a square bottom bag. Figure 2 fragmentarily illustrates the left hand portion of the blank turned over for the purpose of illustrating the folding operation at the left hand side. At this side, the two panel areas **65** and **66** which lie just beyond the folding slit **51** can be folded together toward the inside of the bag, and adhesively joined in this folded condition. The slit **51** permits the panels **65** and **66** to fold inwardly while still permitting the supplemental gusset panels **23***a* and **23***b*, which are coextensive with the panel areas **65** and **66**, to fold outwardly. The front half-panel **16** is then folded over the front side of the back panel **15**. Triangular area **67** is thereupon folded over along the fold lines **23***d* and **46** to overlie portions of the panel areas **68** and **69**, and is then secured thereto. Triangular area **71** is then folded outwardly and upwardly along folding lines **22***d* and **47** to overlie portions of the outside surfaces of panel area **68** and bottom flap **34**; being then secured to these surfaces. The joining of the inside edge portion **55** of the central bottom flap portion **31** to the outside surfaces of the other two bottom flap portions **34** and **37** completes the folding and joining at the bottom of the bag, which, together with the adhesive uniting of the half-panels **16** and **17** along the seam line of the bag, completes the folding and joining operations.

Upon the completion of the bag to this stage, the main gusset and supplemental gusset are folded out flat across the top of the bag, in the position shown in Figures 3 and 4. This folding occurs along the crease lines **22***d* and **26**. This places the outer surface of main gusset panel **22***b* and the outer surface of supplemental gusset panel **23***a* in flat co-planar relation, substantially as shown in Figures 4 and 8. The pressure sensitive adhesive **24** is then spread over these two surfaces **22***b* and **23***a*. Following this, the bags are stored or shipped in this flat condition, with the tacky surfaces of the pressure sensitive adhesive arranged in alternating relation first on one side and then on the other side of the stack of bags, so

that these tacky surfaces of adjacent bags do not come in contact with each other.

When the bag is to be used for packaging a mattress or other article, the bag is opened up in conventional manner, i. e. the right hand gusset is opened, the left hand main gusset is opened, and the bottom of the bag made flat, so that the bag is then of its normal size. When starting the insertion of a mattress M into the bag, or the bag over the mattress, the left hand side of the bag is expanded in size by opening up the supplemental gusset **23**, as illustrated in Figure 5. This greatly increases the entry area of the bag along this left hand edge, so that the mattress can be inserted much more easily and more quickly than with a conventional bag. This expanded dimension of the bag along the left hand side extends practically to the bottom of the bag. After the mattress has been inserted all the way to the bottom of the bag, the supplemental gusset is folded back into a closed relation (Figure 6) and is then folded inwardly into or over the main gusset **22**. As the final operation, the tacky surface of the supplemental gusset panel **23***a* is then pressed firmly in against the tacky surface of the main gusset panel **22***b*, in order to seal the supplemental gusset in its closed, folded position against the main gusset (see Figure 7). The open end of the bag can then be closed in any preferred manner. The closed bag thus affords a tight or snug fitting enclosure for the mattress.

While I have illustrated and described what I regard to be the preferred embodiment of my invention, nevertheless it will be understood that such is merely exemplary and that numerous modifications and rearrangements may be made therein without departing from the essence of the invention.

I claim:

A flexible container comprising a rectangular front main panel, a rectangular rear main panel, a left hand main gusset and a right hand main gusset, both of rectangular form, located at the left and right hand sides of the container respectively, said left hand main gusset comprising a front rectangular main gusset panel and a rear rectangular main gusset panel, said rear main gusset panel of said left hand main gusset being joined to said rear main panel, a pressure-sensitive adhesive on the outer surface of said front main gusset panel of the left hand main gusset, a rectangular supplemental gusset at the left hand side of the container joining said left hand main gusset to said front main panel, said supplemental gusset comprising an inner supplemental gusset panel, an outer supplemental gusset panel and an auxiliary supplemental gusset panel, all of rectangular form and joined to each other and joined to the front main gusset panel of said left hand main gusset and to said front main panel by crease lines, and a pressure-sensitive adhesive on said inner supplemental gusset panel, said main and supplemental gussets joining said front and rear main panels for movement toward and away from one another, said container normally assuming a contracted or first position wherein said front and rear main panels contact one another but have their edges offset from one another by the width of each of said left and right hand main gussets, wherein said left hand main gusset overlies said front main panel, wherein said supplemental gusset is folded and also overlies said front main panel, and wherein the pressure-sensitive adhesive coated left hand front main gusset panel and the pressure-sensitive adhesive coated inner supplemental gusset panel lie flat in coplanar or edge-to-edge relationship to prevent contact therebetween during shipment and storage of the empty container, said container being expandable to an enlarged or second position wherein said front main panel and said rear main panel are spaced apart, wherein said left and right hand main gussets are positioned generally normal to the plane of said rear main panel, wherein said supplemental gusset is unfolded and said front main panel is disposed in spaced relation and at an inclination to said rear main panel, in which position said container is unfolded for the ready insertion of an article into said container, said supplemental gusset thereafter being adapted to be folded to a closed position overlying said left hand main gusset to contract said container to a third position, wherein said front main panel is disposed in spaced parallel relation to said rear main panel, whereby said container closely conforms to the configuration of the article inserted therein, in which third position the adhesive coated surfaces of said left hand front main gusset panel and of said inner supplemental gusset panel are pressed together in adhering relation.

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