

**BULK CARGO BAG INCLUDING AN INNER CONTAINER BODY
WITH REINFORCING FOLDS**

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority of Taiwanese
5 application No. 098121166, filed on June 24, 2009.

This invention relates to a bulk cargo bag, more particularly to a bulk cargo bag including an inner container body with a plurality of reinforcing folds.

Referring to Figs. 1 and 2, a conventional bulk
10 cargo bag 10 includes an outer container body 11, an inner container body 12, and four retention plates 13. The outer container body 11 defines an inner space for receiving the inner container body 12 therein. The outer container body 11 has four corners 110, and
15 four hanging straps 111 connected to the corners 110 for hanging the bulk cargo bag 10. The inner container body 12 is made from a material having functional properties, such as waterproofing and airproofing properties, and has an open top end 121 for filling
20 a bulk cargo material.

The inner container body 12 includes a surrounding wall 123 having four corners 122. Each of the four retention plates 13 has two opposite sides 130 respectively connected to the surrounding wall
25 123 on two sides of one of the four corners 122. The retention plates 13 are further formed with a plurality of through holes 131 for flow of the bulk cargo material

toward the corners 122. When the inner container body 12 is filled with the bulk cargo material, the bulk cargo material and the retention plates 13 produce counteracting forces, which prevent deformation of the inner container body 12 so that a substantially rectangular shape of the inner container body 12 can be maintained. However, since the structural strength of the inner container body 12 is generally insufficient, the outer container body 11 is required as a protection. In addition, the inner container body 12 is likely to break due to outward pushing forces from the bulk cargo material.

Therefore, an object of the present invention is to provide a bulk cargo bag that can overcome the aforesaid drawbacks associated with the prior art.

According to the present invention, a bulk cargo bag comprises: an outer container body having an outer surrounding wall; and an inner container body disposed within the outer container body and having an inner bottom wall, and an inner surrounding wall extending upwardly from the inner bottom wall. The inner surrounding wall has a plurality of spaced apart reinforcing folds that extend in a top-to-bottom direction and that project outwardly from an outer surface of the inner surrounding wall, and a plurality of fixing members. Each of the reinforcing folds has an outwardly bent portion, and a folded back portion.

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Each of the fixing members fixes the outwardly bent portion and the folded back portion of one of the reinforcing folds to the outer surrounding wall.

Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiments of this invention, with reference to the accompanying drawings, in which:

Fig. 1 is a partially exploded perspective view of a conventional bulk cargo bag;

Fig. 2 is a partially assembled perspective view of the conventional bulk cargo bag;

Fig. 3 is an assembled perspective view of the first preferred embodiment of a bulk cargo bag according to this invention;

Fig. 4 is an exploded perspective view of the first preferred embodiment;

Fig. 5 is a sectional side view of the first preferred embodiment;

Fig. 6 is a sectional top view of the first preferred embodiment;

Fig. 7 is an enlarged fragmentary exploded view of an encircled portion in Fig. 6;

Fig. 8 is an enlarged fragmentary sectional view of an encircled portion (I) in Fig. 6;

Fig. 9 is an exploded perspective view of the second preferred embodiment according to this

invention;

Fig. 10 is an enlarged fragmentary sectional view of the second preferred embodiment;

Fig. 11 is an enlarged fragmentary sectional view
5 of the third preferred embodiment according to this invention;

Fig. 12 is an enlarged fragmentary sectional view of the fourth preferred embodiment according to this invention; and

10 Fig. 13 is an enlarged fragmentary sectional view of the fifth preferred embodiment according to this invention.

Before the present invention is described in greater detail with reference to the accompanying
15 preferred embodiments, it should be noted herein that like elements are denoted by the same reference numerals throughout the disclosure.

Figs. 3 to 8 illustrate a bulk cargo bag of the first preferred embodiment according to this invention.
20 The bulk cargo bag includes an outer container body 20 and an inner container body 30, and a plurality of retention plates 40.

The outer container body 20 is a woven bag made of polyethylene, and has a substantially rectangular
25 outer surrounding wall 21 and a base 22 that is connected to the outer surrounding wall 21 and that cooperates with the outer surrounding wall 21 to define

a receiving space 23 therein. The outer surrounding wall 21 has four sides 213 and four corners 211. The outer surrounding wall 21 is formed with a plurality of spaced apart couplers 212 at approximately one-third positions of the width of the four sides 213. In this embodiment, each of the couplers 212 is formed as a U-shaped fold that projects outwardly from an outer surface of the outer surrounding wall 21 and that extends in a top-to-bottom direction. A reinforcement strip 60 is attached to the outer surrounding wall 21 in proximity to the base 22 and is disposed transversely over bottom ends of the U-shaped folds of the couplers 212. Alternatively, the outer surrounding wall 21 may be planar and not provided with the couplers 212.

The inner container body 30 is made of a waterproof polyethylene sheeting and is disposed within the receiving space 23. The inner container body 30 has an inner closed bottom wall 311, an open top end 312 for filling a bulk cargo material (not shown) into the inner container body 30 therethrough, and an inner surrounding wall 31 extending upwardly from the inner closed bottom wall 311. The inner surrounding wall 31 is folded at intervals so as to provide a plurality of spaced apart reinforcing folds 313 that extend in the top-to-bottom direction corresponding in position to the couplers 212 and that project outwardly from

an outer surface 317 of the inner surrounding wall 31.

As best shown in Figs. 7 and 8, each of the reinforcing folds 313 has an outwardly bent portion 3130, a folded back portion 3132, and a plurality of hot press fluid-seals 35. Each of the hot press fluid-seals 35 is formed by hot pressing the outwardly bent portion 3130 and the folded back portion 3132 and extends in the top-to-bottom direction to seal the outwardly bent portion 3130 and the folded back portion 3132 of one of the reinforcing folds 313, thereby improving structural strength of the inner container body 30 and providing waterproofing properties to the inner container body 30. Each of the reinforcing folds 313 is inserted into the U-shaped fold of one of the couplers 212.

The inner surrounding wall 31 further has a plurality of fixing members 3133 each of which is disposed outwardly of one of the hot press fluid-seals 35 and fixes the outwardly bent portion 3130 and the folded back portion 3132 of one of the reinforcing folds 313 to one of the couplers 212. In this embodiment, each of the fixing members 3133 is a stitch line extending in the top-to-bottom direction and through one of the reinforcing folds 313 and one of the U-shaped folds. Therefore, each reinforcing fold 313 is sewn to the outer surrounding wall 21 through the respective

stitch line of the fixing member 3133. Since the hot press fluid-seals 35 are provided inwardly of the stitch lines of the fixing members 3133, they can prevent leakage that can occur at the stitch lines.

5 In addition, the hot press fluid-seals 35 increase the strength of the reinforcing folds 313. The inner container body 30 can therefore be coupled stably to the outer container body 20.

Each of the retention plates 40 having a
10 predetermined thickness is made of polyethylene and is disposed within the inner container body 30. The inner container body 30 has a plurality of corners 314 aligned respectively with the corners 211 of the outer surrounding wall 21. Each of the retention plates
15 40 has two opposite ends 42 secured to the inner surrounding wall 31 respectively on two sides of one of the corners 314 and is formed with a plurality of through holes 41 for flow of the bulk cargo material toward the corners 314 of the inner container body
20 30. In this embodiment, the opposite ends 42 of each of the retention plates 40 are inserted respectively into two of the reinforcing folds 313 and are hot pressed together with the outwardly bent portions 3130 and the folded back portions 3132 of the reinforcing
25 folds 313 to form two of the hot press fluid-seals 35. The fixing members 3133 extend through the respective reinforcing folds 313, the respective

U-shaped folds, and the respective ends 42 of the retention plates 40 as shown in Figs. 6 and 8.

In use, when the bulk cargo material is filled into the inner container body 30, a pressure exerted by the bulk cargo material on the inner container body 30 can be transferred to the outer container body 20 through the reinforcing folds 313 of the inner container body 30. As such, the pressure of the bulk cargo material inside the inner container body 30 is shared by the inner and outer container bodies 30 and 20 so that the inner container body 30 is not liable to break and the loading capacity of the inner container body 30 is increased.

Referring to Figs. 9 and 10, the second preferred embodiment of the present invention differs from the first preferred embodiment in that the bulk cargo bag further includes a plurality of embracing pieces 50. Each of the embracing pieces 50 covers one of the reinforcing folds 313 within a respective one of the U-shaped folds of the couplers 212, and includes a first layer 501 made of polyethylene (PE) and a second layer 502 made of polyethylene terephthalate (PET). The first layer 501, the outwardly bent portion 3130 and the folded back portion 3132 are hot pressed together, thereby forming the hot press fluid-seals for improving structural strength of the reinforcing folds 313. The embracing pieces 50

further improve the structural strength of the reinforcing folds 313.

Referring to Fig. 11, the third preferred embodiment of the present invention differs from the first preferred embodiment in that each reinforcing fold 313 is hot pressed almost entirely so that the width of each hot press fluid-seal 35 is increased, and the stitch line of each fixing member 3133 extends through one of the hot press fluid-seals 35.

Referring to Fig. 12, the fourth preferred embodiment of the present invention differs from the second preferred embodiment in that each of the opposite ends 42 of each of the retention plates 40 is hot pressed to an inner surface 316 of the inner surrounding wall 31, each reinforcing fold 313 is hot pressed almost entirely, and each of the fixing members 3133 extends through one of the hot press fluid-seals 35.

Referring to Fig. 13, the fifth preferred embodiment of the present invention differs from the first preferred embodiment in that the inner surrounding wall 31 per se is not folded, each of the reinforcing folds 313 further has two opposite hot-pressed ends 3134 that respectively extend from the outwardly bent portion 3130 and the folded back portion 3132 and that are hot pressed to the outer surface 317 of the inner surrounding wall 31. In

addition, each of the opposite ends 42 of each of the retention plates 40 is hot pressed to the inner surface 316 of the inner surrounding wall 31.

CLAIMS:

1. A bulk cargo bag comprising:

an outer container body having an outer surrounding wall; and

5 an inner container body disposed within said outer container body and having an inner bottom wall, and an inner surrounding wall extending upwardly from said inner bottom wall, said inner surrounding wall having a plurality of spaced apart reinforcing folds that extend in a top-to-bottom direction and that project outwardly from an outer surface of said inner surrounding wall, and a plurality of fixing members, each of said reinforcing folds having an outwardly bent portion, and a folded back portion, each of said fixing members fixing said outwardly bent portion and said folded back portion of one of said reinforcing folds to said outer surrounding wall.

2. The bulk cargo bag of Claim 1, wherein said outer surrounding wall has a plurality of spaced apart couplers, each of said fixing members fixing said outwardly bent portion and said folded back portion of one of said reinforcing folds to one of said couplers.

3. The bulk cargo bag of Claim 2, wherein each of said couplers is formed as a U-shaped fold that projects outwardly from said outer surrounding wall, each of said reinforcing folds being inserted into said

U-shaped fold of one of said couplers, each of said fixing members being a stitch line extending in the top-to-bottom direction and through one of said reinforcing folds and one of said U-shaped folds.

5 4. The bulk cargo bag of Claim 3, wherein said inner container body further has a plurality of hot press fluid-seals each of which seals said outwardly bent portion and said folded back portion of one of said reinforcing folds and extends in the top-to-bottom
10 direction.

5. The bulk cargo bag of Claim 4, further comprising a plurality of retention plates disposed within said inner container body, said inner container body having a plurality of corners, each of said retention plates
15 having two opposite ends secured to said inner surrounding wall respectively on two sides of one of said corners.

6. The bulk cargo bag of Claim 5, wherein said opposite ends of each of said retention plates are inserted
20 respectively into two of said reinforcing folds and are hot pressed together with said outwardly bent portions and said folded back portions of said reinforcing folds to form two of said hot press fluid-seals.

25 7. The bulk cargo bag of Claim 6, wherein each of said fixing members is disposed outwardly of one of said hot press fluid-seals, and further extends through

a respective one of said opposite ends of said retention plates.

8. The bulk cargo bag of Claim 5, wherein each of said fixing members extends through one of said hot press
5 fluid-seals.

9. The bulk cargo bag of Claim 5, wherein each of said opposite ends of each of said retention plates is hot pressed to an inner surface of said inner surrounding wall.

10 10. The bulk cargo bag of Claim 3, further comprising a plurality of embracing pieces each of which covers one of said reinforcing folds within a respective one of said U-shaped folds.

11. The bulk cargo bag of Claim 3, wherein each of
15 said reinforcing folds further has two opposite hot-pressed ends that respectively extend from said outwardly bent portion and said folded back portion and that are hot pressed to said outer surface of said inner surrounding wall.

20 12. The bulk cargo bag of Claim 11, further comprising a plurality of retention plates disposed within said inner container body, each of said retention plates having two opposite ends which are hot pressed to an inner surface of said inner surrounding wall.