

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Seal Barriers for Thermoplastic Bags

5 We, UNION CARBIDE CORPORATION, a Corporation organised under the laws of the State of New York, United States of America, of 270 Park Avenue, New York, State of New York, 10017, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to thermoplastic industrial bags and formation of the ends thereof and more particularly to square-ended thermoplastic bags having a seal barrier which does not require removal from the bag.

15 The manufacture of square-ended thermoplastic bags requires that each end of a bag be cut, folded and heat sealed in a particular configuration which will result in the desired rectangular, flat end when the bag is folded. Since the layers of film to be sealed overlie layers of film which must not be sealed, it is essential that some barrier be introduced between the two. Present day practice has been to form and seal the bottom of the bag around an internal platen which serves the barrier function. This platen is then withdrawn from the open top of the bag. The top of the bag is then formed and sealed around another internal platen and this platen is subsequently withdrawn from the valve opening of the bag. A major drawback of such a process is that the formation of both ends of the bag cannot be accomplished simultaneously resulting in additional time and expense to the manufacturer of the bag.

20 In accordance with the present invention, there is provided a square-ended thermoplastic bag wherein at least one of said ends comprises two side flaps and two end flaps, said end flaps being infolded and one only of said end flaps having a membrane of barrier material inserted thereunder and sealed solely to the underside of said end flap; said side

flaps being infolded over said end flaps and sealed to each other, and a portion of said side flaps being sealed to the end flap in the area backed up by said membrane of barrier material.

A further aspect of the present invention includes a method of making a square-ended thermoplastic bag provided with a barrier material which bag has been pre-cut to form a square bag end having two side flaps and two end flaps which method comprises:

(a) unfolding said side flaps and infolding said end flaps;

(b) inserting said barrier material under one end flap only;

(c) sealing said barrier material to the underside of said end flap;

(d) placing a forming platen over at least one of said infolded end flaps;

(e) infolding said side flaps over said platen and sealing said side flaps to each other, and

(f) removing said forming platen and sealing said side flaps to said end flap in the area backed up by said barrier material.

In the Drawing:

Figure 1 is a plan view partly broken away and partially in phantom of the end of a thermoplastic bag in one aspect of the invention.

Figure 2 is a similar view of the bag of Figure 1 illustrating the outfolded side flaps and the infolded end flaps with the barrier material in place.

Figure 3 is a similar view of the bag of Figure 2 illustrating the folded positions of the flaps upon the insertion of the barrier material.

Referring now to the drawing, there is shown in Figure 3 a collapsed thermoplastic bag 10 having two infolded end flaps 12, 14 and two infolded side flaps 16, 18. Disposed beneath the end flap 12 is a piece of barrier

film 20 which is heat sealed to the underside face of the end flap 12.

In accordance with the method of the present invention, as shown in Figure 1, one end of a piece of tubular film is suitably cut to form a square bag end. Such cutting defines two end flaps 12, 14 and two side flaps 16, 18. Figure 2 shows the next step in the method, which consists of opening up the side flaps 16, 18 and infolding the end flaps 12, 14. It is at this point in the method that the piece of barrier film 20 is inserted under end flap 12 and heat sealed through end flap 12, without sealing to the bag body 10, to the underside face of end flap 12 in the position shown. In a subsequent operation, a forming platen is inserted, the side flaps 16, 18 are infolded over it, and the main seals are made against this back up. Finally, the forming platen is removed and the final closing seal is made in the area backed up by the barrier film 20. Fig. 3 illustrates the position of the barrier film 20 in the completed bag.

Thus, by inserting a membrane of material which, because of its combined properties of heat capacity, thermal insulation, and resistance to melting or sticking, will allow sealing of film layers above it while preventing sealing of film layers below it; and which because of its low cost and its compatibility with the material and function of the bag, can be allowed to become a permanent part of the bag.

While it is preferred to use as the barrier film a laminate of polyethylene, which heat seals readily to end flap 12, and polypropylene, which does not heat seal to the under layers of the bag film, many other types of materials can be used as well including polyethylene coated polyethylene terephthalate, carboxyl containing olefin polymer coated aluminium foil, various kinds of paper, polypropylene, and polyethylene coated paper. The transparent films and laminates are favored when it is desired that the barrier film not show while, in other applications, there are obvious advantages in having the barrier film bear a printed message or a distinctive color for identification. Where printing covers the entire area under the seal, the ink itself has been found to be an adequate barrier against sealing through.

It is to be further noted that there are a great many configurations of cuts, folds, and seals which will form a desired bag end. It will be obvious to those skilled in the art that a barrier film can be incorporated in such configurations to perform substantially the same functions as described herein.

It will be appreciated that this invention as hereinbefore specifically described provides thermoplastic bags of the above type with a seal barrier which does not require removal from the bag.

WHAT WE CLAIM IS:—

1. A square-ended thermoplastic bag wherein at least one of said ends comprises two side flaps and two end flaps, said end flaps being infolded and one only of said end flaps having a membrane of barrier material inserted thereunder and sealed solely to the underside of said end flap; said side flaps being infolded over said end flaps and sealed to each other, and a portion of said side flaps being sealed to the end flap in the area backed up by said membrane of barrier material.

2. The bag of claim 1 wherein said thermoplastic bag is polyethylene.

3. The bag of claim 2 wherein said membrane of barrier material is a polyethylene-polypropylene laminate and wherein the polyethylene side of said laminate is sealed to the underside of said end flap.

4. The bag of claim 2 wherein said membrane of barrier material is polyethylene coated polyethylene terephthalate.

5. The bag of claim 2 wherein said membrane of barrier material is polypropylene.

6. The bag of claim 2 wherein said membrane of barrier material is polyethylene coated paper and wherein the polyethylene side of said laminate is sealed to the underside of said end flap.

7. The bag of claim 2 wherein said membrane of barrier material is carboxyl containing olefin polymer coated aluminium foil.

8. Method of making a square-ended thermoplastic bag provided with a barrier material which bag has been pre-cut to form a square bag end having two side flaps and two end flaps which method comprises:

(a) outfolding said side flaps and infolding said end flaps;

(b) inserting said barrier material under one end flap only;

(c) sealing said barrier material to the underside of said end flap;

(d) placing a forming platen over at least one of said infolded end flaps;

(e) infolding said side flaps over said platen and sealing said side flaps to each other, and

(f) removing said forming platen and sealing said side flaps to said end flap in the area backed up by said barrier material.

9. The method of claim 8 wherein said thermoplastic bag is polyethylene.

10. The method of claim 9 wherein said barrier material is a polyethylene-polypropylene laminate and wherein the polyethylene side of said laminate is sealed to the underside of said end flap.

11. The method of claim 9 wherein said

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film 20 which is heat sealed to the underside face of the end flap 12.

In accordance with the method of the present invention, as shown in Figure 1, one end of a piece of tubular film is suitably cut to form a square bag end. Such cutting defines two end flaps 12, 14 and two side flaps 16, 18. Figure 2 shows the next step in the method, which consists of opening up the side flaps 16, 18 and infolding the end flaps 12, 14. It is at this point in the method that the piece of barrier film 20 is inserted under end flap 12 and heat sealed through end flap 12, without sealing to the bag body 10, to the underside face of end flap 12 in the position shown. In a subsequent operation, a forming platen is inserted, the side flaps 16, 18 are infolded over it, and the main seals are made against this back up. Finally, the forming platen is removed and the final closing seal is made in the area backed up by the barrier film 20. Fig. 3 illustrates the position of the barrier film 20 in the completed bag.

Thus, by inserting a membrane of material which, because of its combined properties of heat capacity, thermal insulation, and resistance to melting or sticking, will allow sealing of film layers above it while preventing sealing of film layers below it; and which because of its low cost and its compatibility with the material and function of the bag, can be allowed to become a permanent part of the bag.

While it is preferred to use as the barrier film a laminate of polyethylene, which heat seals readily to end flap 12, and polypropylene, which does not heat seal to the under layers of the bag film, many other types of materials can be used as well including polyethylene coated polyethylene terephthalate, carboxyl containing olefin polymer coated aluminium foil, various kinds of paper, polypropylene, and polyethylene coated paper. The transparent films and laminates are favored when it is desired that the barrier film not show while, in other applications, there are obvious advantages in having the barrier film bear a printed message or a distinctive color for identification. Where printing covers the entire area under the seal, the ink itself has been found to be an adequate barrier against sealing through.

It is to be further noted that there are a great many configurations of cuts, folds, and seals which will form a desired bag end. It will be obvious to those skilled in the art that a barrier film can be incorporated in such configurations to perform substantially the same functions as described herein.

It will be appreciated that this invention as hereinbefore specifically described provides thermoplastic bags of the above type with a seal barrier which does not require removal from the bag.

WHAT WE CLAIM IS:—

1. A square-ended thermoplastic bag wherein at least one of said ends comprises two side flaps and two end flaps, said end flaps being infolded and one only of said end flaps having a membrane of barrier material inserted thereunder and sealed solely to the underside of said end flap; said side flaps being infolded over said end flaps and sealed to each other, and a portion of said side flaps being sealed to the end flap in the area backed up by said membrane of barrier material.

2. The bag of claim 1 wherein said thermoplastic bag is polyethylene.

3. The bag of claim 2 wherein said membrane of barrier material is a polyethylene-polypropylene laminate and wherein the polyethylene side of said laminate is sealed to the underside of said end flap.

4. The bag of claim 2 wherein said membrane of barrier material is polyethylene coated polyethylene terephthalate.

5. The bag of claim 2 wherein said membrane of barrier material is polypropylene.

6. The bag of claim 2 wherein said membrane of barrier material is polyethylene coated paper and wherein the polyethylene side of said laminate is sealed to the underside of said end flap.

7. The bag of claim 2 wherein said membrane of barrier material is carboxyl containing olefin polymer coated aluminium foil.

8. Method of making a square-ended thermoplastic bag provided with a barrier material which bag has been pre-cut to form a square bag end having two side flaps and two end flaps which method comprises:

(a) outfolding said side flaps and infolding said end flaps;

(b) inserting said barrier material under one end flap only;

(c) sealing said barrier material to the underside of said end flap;

(d) placing a forming platen over at least one of said infolded end flaps;

(e) infolding said side flaps over said platen and sealing said side flaps to each other, and

(f) removing said forming platen and sealing said side flaps to said end flap in the area backed up by said barrier material.

9. The method of claim 8 wherein said thermoplastic bag is polyethylene.

10. The method of claim 9 wherein said barrier material is a polyethylene-polypropylene laminate and wherein the polyethylene side of said laminate is sealed to the underside of said end flap.

11. The method of claim 9 wherein said



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 herein said

barrier material is polyethylene coated
 polyethylene terephthalate.

12. The method of claim 9 wherein said
 barrier material is polypropylene.

13. The method of claim 9 wherein said
 barrier material is polyethylene coated paper
 and wherein the polyethylene side of said
 laminate is sealed to the underside of said end
 flap.

14. The method of claim 9 wherein said
 barrier material is carboxyl containing olefin
 polymer coated aluminium foil.

15. A method of making a square-ended
 thermoplastic bag provided with a barrier
 material as claimed in claim 8 substantially as

hereinbefore described with reference to and
 as illustrated by the accompanying drawings.

16. A square-ended thermoplastic bag
 whenever made by the method claimed in any
 one of claims 8 to 15.

17. A square-ended thermoplastic bag as
 claimed in claim 1 substantially as herein-
 before described with reference to and as
 illustrated by the accompanying drawings.

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