

PATENT SPECIFICATION

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(54) PLASTIC BAGS

(71) We, POLY-LINA LIMITED, a British Company, of Lockfield Avenue, Brimsdown, Enfield, Middlesex, England, do hereby declare the invention for which we

5 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:—

This invention is concerned with the

10 manufacture of bags from synthetic resin material.

It is known to make polythene bags by sealing and severing a flattened tube, known as layflat tubing, of polythene transversely

15 across its width. The two sides of the layflat tubing are sealed together by welding to form the closed ends of the bags and the completed bags are cut away from the trailing portion of the layflat tubing. In-

20 stead of cutting the layflat tubing it can be provided with perforations forming transverse tear lines so that a continuous roll of bags is obtained, from which individual bags can be torn as required. In

25 either case the layflat tubing can be provided with side gussets.

According to the present invention there is provided a method of manufacturing bags from layflat synthetic resin tubing,

30 wherein before being sealed transversely to form the bags, the tubing is folded about longitudinal fold lines so as to have a thickness which is not less than four layers of film at any point across the width of the

35 layflat tubing and not less than six layers of film at at least some points across the width thereof.

The layflat tubing may be folded over upon itself and in one particular method

40 embodying the invention un Gusseted layflat tubing is folded over on itself twice across its face width. The folds may be made about any longitudinal fold lines provided that the thickness of the film produced is

45 not less than four layers at any point and not less than six layers at some points. The exact thickness of the web may vary between four and eight layers across the width and at any point is dependent upon the

50 choice of fold lines. The tubing is pre-

ferably folded in half and in half again.

In an alternative method of the invention the opposite edges of the layflat tubing are first folded inwardly to form gussets which may be of any depth, but do not overlap each other. The gusseted tubing is then

55 folded over on itself once about any longitudinal fold line, but preferably the centre line, so that there is produced a film which may vary in thickness across the width. The

60 minimum thickness at any point is four layers while the maximum is eight, and the actual thickness depends on the depth of the gussets and the position of the fold line.

According to a further method of the invention, the opposed edges of un Gusseted layflat tubing are folded inwardly about any

65 two fold lines mutually positioned so that the intumed edges meet. The tubing is then folded laterally upon itself again about any

70 longitudinal fold line, but preferably the centre line. The resulting film is four to eight layers thick across its width with the number of layers at any given point being

75 four or eight depending on the position of the final fold line.

A still further method embodying the invention differs from the above methods insofar as the layflat tubing is not folded over on itself and instead the tubing is folded to

80 form side gussets having such a depth that they overlap each other. In this case the thickness of the layflat tubing has a minimum of four layers and a maximum of six layers. The gussets are preferably of equal

85 depth and may actually extend the full width of the tubing.

In a known, so-called in-line multi-web process for making polythene bags, a bubble of polythene is extruded and

90 collapsed into layflat tubing which is simultaneously slit and sealed by hot blades to form parallel lanes of flattened tubing. The separate lanes are then passed simultaneously through a bag making machine

95 which seals and cuts or perforates the bags transversely. Gussets can be formed in each of the parallel webs before being fed into the bag making machine.

For any particular bag making machine 100

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the width of the sealing jaws is limited and the number of webs which can be passed through the jaws is dependent upon the face width of each web.

5 With the method of the present invention folding the tubing so that it has a minimum thickness of four layers means that the face width of the layflat tubing is reduced so that a larger bubble can be extruded
10 and a greater bag machine throughput can be achieved, leading to increased productivity.

When forming the bags from layflat tubing, in order to produce seals of good
15 quality, it is necessary to align the sealing bars carefully, one either side of the web, so as to apply uniform pressure across the width of the web. The necessary adjustment is especially difficult when using thin
20 film, for example less than 25 microns thick. In addition, with thin films the tolerance on the optimum temperature required for good quality sealing is reduced. By using high density polythene film it is possible
25 to reduce the film gauge while still retaining a film strength comparable with that of thicker low density film. However, the above mentioned problems associated with thin films have not allowed high density
30 polythene to be taken full advantage of.

With the method of the invention, however, the layflat tubing has a minimum thickness of four layers of film, and six layers at some points, with the result that
35 the adjustments to the bag machine sealing bars to produce good quality seals become less critical. It follows that the method of the invention allows full advantage to be taken of the strength of high density poly-
40 thene.

A commonly used test for testing the strength of polythene bags is to inflate the bags with air and attempt to burst the bags by applying pressure. With conventional
45 gusseted bags the weakest points are those immediately adjacent the seal at the inside edges of the gussets, as shown by the "burst test."

With bags manufactured according to the
50 invention the "burst test" shows the pressure forces to be more evenly distributed and hence a strong seal is obtained which does not impair the strength of the bag film in the vicinity of the seal.

55 The invention also provides a bag manufactured according to the method of the invention.

One embodiment of the invention will now be described in greater detail by way
60 of example with reference to the accompanying drawing, in which:—

Figure 1 is a perspective view of layflat plastics tubing; and

Figure 2 is a perspective view of a bag
65 produced from a length of the tubing shown

in Figure 1.

Referring to the drawing, the layflat tubing 1 illustrated in Figure 1 is formed by extruding a so-called bubble of high density polythene to produce a seamless tube, col-
70 lapsing the tube flat so that it has longitudinal edges defined by folds 2 and 3, and tucking in the edges between the two layers of the flattened tube to provide side gussets
75 4, 5. It will be appreciated that the tube has two folds at each edge of the tube and six longitudinal folds in all. As so far described the production of the layflat tubing
80 1 is known. The tube is then folded in half about its longitudinal axis so that, as seen in Figure 2, the folded layflat tubing has a right hand edge portion with a thick-
85 ness of four film layers whereas the remainder of the tubing has a thickness of eight film layers.

The folded layflat tubing is then sealed by welding and severed across its width to produce a finished bag 10 in which the seal
90 11 constitutes the closed bottom end of the bag. During the sealing the superposed layers of polythene film are welded together.

It will be appreciated that when the bag 10 is opened up for use, the seal gathers together the wall of the bag at its bottom. This does reduce slightly the capacity of the
95 bag but does not constitute a great disadvantage.

WHAT WE CLAIM IS:—

1. A method of manufacturing bags from layflat synthetic resin tubing, wherein be-
100 fore being sealed transversely to form the bags, the tubing is folded about longitudinal fold lines so as to have a thickness which is not less than four layers of film at any
105 point across the width of the layflat tubing and not less than six layers of film at at least some points across the width thereof.

2. A method according to claim 1, wherein the tubing is ungusseted and is
110 folded twice about longitudinal fold lines.

3. A method according to claim 2, wherein the tubing is folded in half and in
half again.

4. A method according to claim 1, wherein the longitudinal edges of the tubing
115 are folded inwardly to form gussets, and the gusseted tubing is folded over on itself.

5. A method according to claim 4, wherein the gussets have equal depth and the gusseted tubing is folded over about its
120 longitudinal centre line.

6. A method according to claim 1, wherein the tubing is ungusseted, the
125 opposed edges of the tubing are folded inwardly and meet each other, and the tubing is then folded over about a longitudinal fold line.

7. A method according to claim 6, wherein the inwardly folded edge portions
130 meet along the longitudinal centre line of



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the width of the sealing jaws is limited and the number of webs which can be passed through the jaws is dependent upon the face width of each web.

5 With the method of the present invention folding the tubing so that it has a minimum thickness of four layers means that the face width of the layflat tubing is reduced so that a larger bubble can be extruded
10 and a greater bag machine throughput can be achieved, leading to increased productivity.

When forming the bags from layflat tubing, in order to produce seals of good quality, it is necessary to align the sealing bars carefully, one either side of the web, so as to apply uniform pressure across the width of the web. The necessary adjustment is especially difficult when using thin film, for example less than 25 microns thick. In addition, with thin films the tolerance on the optimum temperature required for good quality sealing is reduced. By using high density polythene film it is possible
25 to reduce the film gauge while still retaining a film strength comparable with that of thicker low density film. However, the above mentioned problems associated with thin films have not allowed high density
30 polythene to be taken full advantage of.

With the method of the invention, however, the layflat tubing has a minimum thickness of four layers of film, and six layers at some points, with the result that
35 the adjustments to the bag machine sealing bars to produce good quality seals become less critical. It follows that the method of the invention allows full advantage to be taken of the strength of high density poly-
40 thene.

A commonly used test for testing the strength of polythene bags is to inflate the bags with air and attempt to burst the bags by applying pressure. With conventional
45 gusseted bags the weakest points are those immediately adjacent the seal at the inside edges of the gussets, as shown by the "burst test."

With bags manufactured according to the invention the "burst test" shows the pressure forces to be more evenly distributed and hence a strong seal is obtained which does not impair the strength of the bag film in the vicinity of the seal.

55 The invention also provides a bag manufactured according to the method of the invention.

One embodiment of the invention will now be described in greater detail by way of example with reference to the accompanying drawing, in which:—

Figure 1 is a perspective view of layflat plastics tubing; and

65 Figure 2 is a perspective view of a bag produced from a length of the tubing shown

in Figure 1.

Referring to the drawing, the layflat tubing 1 illustrated in Figure 1 is formed by extruding a so-called bubble of high density polythene to produce a seamless tube, col-
70 lapsing the tube flat so that it has longitudinal edges defined by folds 2 and 3, and tucking in the edges between the two layers of the flattened tube to provide side gussets 4, 5. It will be appreciated that the tube
75 has two folds at each edge of the tube and six longitudinal folds in all. As so far described the production of the layflat tubing 1 is known. The tube is then folded in
80 half about its longitudinal axis so that, as seen in Figure 2, the folded layflat tubing has a right hand edge portion with a thickness of four film layers whereas the remainder of the tubing has a thickness of
85 eight film layers.

The folded layflat tubing is then sealed by welding and severed across its width to produce a finished bag 10 in which the seal
11 constitutes the closed bottom end of the bag. During the sealing the superposed
90 layers of polythene film are welded together.

It will be appreciated that when the bag 10 is opened up for use, the seal gathers together the wall of the bag at its bottom. This does reduce slightly the capacity of the
95 bag but does not constitute a great disadvantage.

WHAT WE CLAIM IS:—

1. A method of manufacturing bags from layflat synthetic resin tubing, wherein be-
100 fore being sealed transversely to form the bags, the tubing is folded about longitudinal fold lines so as to have a thickness which is not less than four layers of film at any point across the width of the layflat tubing
105 and not less than six layers of film at at least some points across the width thereof.

2. A method according to claim 1, wherein the tubing is ungusseted and is folded twice about longitudinal fold lines. 110

3. A method according to claim 2, wherein the tubing is folded in half and in half again.

4. A method according to claim 1, wherein the longitudinal edges of the tubing
115 are folded inwardly to form gussets, and the gusseted tubing is folded over on itself.

5. A method according to claim 4, wherein the gussets have equal depth and the gusseted tubing is folded over about its
120 longitudinal centre line.

6. A method according to claim 1, wherein the tubing is ungusseted, the opposed edges of the tubing are folded inwardly and meet each other, and the tubing
125 is then folded over about a longitudinal fold line.

7. A method according to claim 6, wherein the inwardly folded edge portions meet along the longitudinal centre line of 130



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the tubing.

8. A method according to claim 6 or 7, wherein after folding in the edge portions the tubing is folded in half about its longitudinal centre line.

9. A method according to claim 1, wherein the longitudinal edges of the tubing are folded inwardly to form gussets which overlap each other.

10. A method according to claim 9, wherein the gussets are of equal width.

11. A method of manufacturing bags from layflat synthetic resin tubing, according to claim 1 and substantially as herein described.

12. A bag manufactured by the method of any preceding claim.

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ERRATA

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Page 1, heading (72) Inventor, for NAKHALA read NAKHLA

At top of pages 2 and 3 for 1594746 read 1584746

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