

A MULTI-WALL SACK

5 The present invention relates to a multi-wall sack.

 The term "multi-wall" sack is understood to mean a sack that has:

- 10 (i) two or more walls;
- (ii) each wall is formed from paper, polymeric, or any other suitable material; and
- 15 (iii) the walls may be adhered together so that the sack is a single multi-wall bag or may be separate (or partly adhered together and partly separate) so that the sack includes an outer bag and one or more inner bags
- 20 positioned in the outer bag.

 The present invention relates particularly, although by no means exclusively, to a multi-wall sack which includes a single or multi-wall outer bag, typically

25 formed from paper, and an inner pouch, typically formed from a polymeric material.

 These sacks are suitable for storing a wide range of products including dry food products, such as powdered

30 milk products.

 In the storage of such products it is important to ensure that the dry food product is completely sealed in a pouch made from a polymeric material to maximise the

35 product life. A strong outer bag (usually having two or more walls of paper) is also necessary to protect the inner pouch and to facilitate handling and identification of the

enclosed goods.

Known multi-wall paper/polymeric material sacks for dry food products comprise an inner polyethylene pouch and an outer paper bag having either a block (ie, 5 rectangular) bottom end or a "pinch" (ie. flat, folded over) bottom end.

Some known multi-wall paper/polymeric material 10 sacks are manufactured with an "easy-open" tearing feature at their bottom end to facilitate the easy opening of the outer paper bags of the sacks, without the use of a sharp instrument, so as to enable the inner polymeric pouches to be removed from the bags. These easy-open tearing features 15 are incorporated into cover sheets (often referred to as patches) that are glued onto and thereby cover the folded bottom ends of the outer paper bags during manufacture of the sacks. Such sacks are sold to manufacturers of the food products with an open-top ready for filling with the 20 food products and then closing by the "pinching" method to form a pinch-top end or by stitching to make a stitched top end. These last closure steps are completed by the food products manufacturer.

25 The production steps required to manufacture multi-wall paper/polymeric material sacks with this easy-open feature at the bottom ends must be conducted with a high level of accuracy.

30 Specifically, in the case of the block-bottom sack, the cover sheet incorporating the easy-open tear feature on the base of the block-bottom sack must be carefully positioned to ensure that the tear-strip is correctly aligned with the underlying edge of the folded 35 bag end. If not correctly aligned, it is not possible to open the bottom of the outer paper bag without the use of a sharp instrument.

The control of the sack manufacturing operation required to ensure correct positioning of the easy-open cover sheets adds significantly to the cost of manufacture
5 of the sacks.

It is a specific object of the present invention to alleviate the problems associated with these known paper/polymeric material multi-wall sacks.

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It is a general object of the present invention to provide an improved multi-wall sack with easy open capability. This object extends not only to known paper/polymeric material multi-wall sacks discussed above
15 but also extends to other sacks, including single multi-wall bags that are within the above definition of "multi-wall" sack.

According to the present invention there is
20 provided a multi-wall sack which includes:

- (a) a closed bottom end; and
- (b) an open top end that, when closed, forms a
25 closed top end with a tearing means which facilitates easy opening of the sack.

The above-described easy-open sack is less complex to manufacture than the known easy-open
30 paper/polymeric material multi-wall sacks described above, is more effective in opening the sack, and is less costly to manufacture.

The closed top end may be of any suitable
35 configuration. By way of example, the closed top end may be a pinch-top end. By way of further example, the closed top end may be a stitched top end, a stitched/folded top

end or a folded/stitched top end that are used for flour sacks.

As used herein, the term "tearing means" is to be construed as referring to any flexible elongate element suitable for tearing the sack, such as a string, strip, ribbon or rope. The tearing means may be integrally formed as part of an outer wall of the sack or may be affixed to or otherwise positioned in relation to the outer wall and become part of the closed top end when that end is formed.

The tearing means may form part of a cover sheet formed from paper or other suitable material.

Preferably the cover sheet is affixed to the sack in a location that is selected so that the tearing means becomes part of the closed top end as sections of the sack at the open top end are folded to form the closed end.

More preferably, the sack is pre-cut and folded with a predetermined design at the open top end and the cover sheet is glued to an outer wall of the sack in a location that is selected so that the tearing means can be part of the closed top end of the sack.

It is particularly preferred that the tearing means form part of a cover sheet that has a first cover sheet section on one side of the tearing means and a second cover sheet section on the other side of the tearing means.

It is more particularly preferred that the first section of the cover sheet be affixed, typically glued, to an outer wall of the sack in a position that is selected so that the top end of the sack can be folded over onto the second section of the cover sheet and affixed, typically by gluing and/or stitching and/or by any other suitable means to the second section in the process of forming the closed

top end. With this arrangement, it is possible to open a closed top end by detaching the tearing means from the sack and pulling back the second section of the cover sheet. Since the second section of the cover sheet is adhered to the folded over top end of the sack, the action of pulling back the second section unfolds the top end of the sack to allow access to the sack.

It is preferred that the sack includes;

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(i) an outer bag having the above described closed bottom end, open top end, and tearing means; and

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(ii) an inner pouch that is adapted to be filled with product and sealed.

The inner pouch and the outer bag may be formed from any suitable material.

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Preferably, the inner pouch is formed from a polymeric material.

Preferably, the outer bag is formed from paper.

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More preferably, the outer bag comprises a plurality of layers of paper.

Preferably, the outer bag is formed with a block end.

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According to the present invention, there is also provided a method for forming a closed multi-wall sack which includes the steps of:

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(i) filling a product into the sack via an open end of the sack; and

- (ii) folding the sack at the open end to form a closed top end with a tearing means which facilitates easy opening of the sack.

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The above-described method may include stitching closed the open end of the filled sack prior to step (ii).

According to the present invention, there is also provided a method for manufacturing a multi-wall sack which includes the steps of:

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- (i) forming a sack having a closed bottom end and an open top end; and

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- (ii) adhering or otherwise attaching a tearing means to the sack in a manner such that, when the sack is filled and a closed top end is formed at the open top end, pulling the tearing means facilitates the easy-opening of the outer bag.

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Preferably the closed top end is formed in step (ii) by folding the sack at the open top end.

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Preferably, the open top end formed in step (i) is pre-cut and folded to permit the formation of the closed top end.

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As indicated above, the closed top end may be of any suitable configuration, such as a pinched top end, a stitched top end, a stitched/folded top end, or a folded/stitched top end.

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Preferably, the tearing means is attached to the sack by adhering the tearing means to an outer wall of the sack at the open top end so that it extends laterally of

the open top end.

Preferably the tearing means forms part of a cover sheet which includes a first cover sheet section on one side on the tearing means and a second cover sheet section on the other side of the tearing means and the tearing means is affixed to the sack by adhering the first section to the outer wall of the sack.

According to the present invention there is provided a multi-wall sack filled with product, which sack includes a closed bottom end and a closed top end with a tearing means that facilitates easy opening of the sack at the top end.

The present invention is described in further detail with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a multi-wall sack in accordance with one embodiment of the invention in the as-manufactured form;

Figure 1a is an enlarged view of the circled region in Figure 1;

Figure 1b is a cross-section along the line 1b-1b in Figure 1a;

Figure 1c is a cross-section similar to Figure 1b but showing the sack after it has been filled with product and closed with a pinch-top end;

Figure 2 is a perspective view of the sack shown in Figure 1 after the sack has been filled with a product, such as flour, and the open top end has been closed by folding the sack to form a pinch-top end;

Figure 3 is a side elevation of a multi-wall sack in accordance with another embodiment of the invention;

5 Figure 4 is a perspective view of the sack shown in Figure 3 after the sack has been filled with a product and before the sack is folded at the open top end to form a pinched-top end;

10 Figure 5 is a perspective view of the sack shown in Figure 4 after the pinch-top end has been formed;

 Figures 6 to 9 are side elevations which illustrate the manufacture of a sack of a second embodiment
15 of the invention; and

 Figures 8 to 12 are side elevations of the sack shown in Figure 9 which illustrate the sequence of steps to open the outer bag and remove the inner sack.
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 Figures 1 and 2 show an embodiment of a multi-wall sack 1 in an as-manufactured form. In this form the sack is essentially pressed flat.

25 With reference to Figures 1 and 2, the sack has inner and outer paper walls 21a, 21b that are adhered together, a block bottom end 2, and an open top end.

 The open top end is designed to form a pinch-top end 28 (Figure 2) which closes the sack 1. In this
30 connection, the sack 1 includes a line of melt adhesive 26 on the inner faces of the walls 21a, 21b which extends across one side of the flattened sack 1 at the open top end.

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 It is noted that the present invention is not limited to forming a pinch-top end and extends to any

suitable closed top end. By way of example, the present invention extends to stitched/folded and folded/stitched top ends that are used on flour sacks.

5 As can best be seen in Figure 1b, the as-manufactured form of the sack 1 further includes a paper cover sheet 22 that is glued to the outer face of the wall 21a on the other side of the flattened sack 1 to the side on which the melt adhesive 26 is applied. The cover sheet
10 includes a tear strip 24 which divides the cover sheet into a lower cover sheet section 22a and an upper cover sheet section 22b. The lower section 22a is glued to the sack 1.

 The position of the cover sheet 22 is selected so
15 that in use, when the pinch-top end is formed by folding over the sections of the walls 21a, 21b at the open end of the sack 1 in the direction of the arrows shown in Figures 1 and 1b, the line of melt adhesive 26 is brought into contact with and can adhere to the outer face of the upper
20 section 22b of the cover sheet 22 above the tear strip 24.

 Specifically, in use the sack 1 is closed by the steps of:

- 25 (i) filling the sack 1 with product so that the product pushes against the base of the sack and causes it to open flatten out and form a filled open sack with a block bottom as shown in Figure 1;
- 30 (ii) pressing flat the open end of the sack and folding over the sections of the walls 21a, 21b at the open end to bring the line of melt adhesive 26 into contact with the upper
35 section 22b of the cover sheet; and
- (iii) applying heat/pressure to the folded over

area to activate the melt adhesive and adhere the inner faces of the walls 21a, 21b on that side of the flattened open end to the cover sheet.

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As a consequence, as is shown in Figure 1c, the pinch-top end is formed and securely closes the open top end of the sack 1.

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With this arrangement, the pinch-top may be opened by removing the tear strip 24 and pulling upwardly (as viewed in Figure 1c) the upper section 22b of the cover sheet. This action unfolds the pinch-top end and allows direct access to the contents of the sack 1.

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The embodiments of a multi-wall sack 1 shown in Figures 3 to 12 are formed with an inner pouch of polymeric material and an outer multi-layer bag formed from paper. The outer bag of the sack 1 may include either a block bottom end 1, as illustrated in Figures 3-5, or a pinch-bottom end 2, as illustrated in Figures 6-12.

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The embodiment of the sack 1 shown in Figures 3 to 5 is manufactured by:

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(i) forming a sack having an internal pouch (not shown) and an outer bag, generally identified by the numeral 32, with a closed block bottom end 2 and an open top end 3 that is cut and folded to permit the formation of a pinch-top end; and

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(ii) adhering a tearing means that is in the form of a plastic ribbon 4 to the outer bag 32 at the open upper end 3 so that the plastic ribbon 4 extends laterally of the open upper end of the outer bag to form the as-

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manufactured embodiment of the sack
illustrated in Figure 3.

In use, the embodiment of the sack 1 shown in
5 Figures 3 to 5 is closed by the steps of:

- 10 (i) filling the inner bag of the sack 1 with
product so that the product pushes against
the base of the sack and causes it to open
out and form a filled open sack with a block
bottom as illustrated in Figure 4;
- 15 (ii) sealing the product in the inner bag by
pressing together each inner bag along a
line extending across a section of the inner
bag in the region of the open upper end of
the sack and heat sealing the inner bag
along the line; and
- 20 (iii) folding over the outer bag 32 at the open
top end in the direction of the arrow in
Figure 4 to form a pinch-top end over the
plastic ribbon 4 and adhering the pinch-top
end closed.

25 The embodiments of the closed sack, shown in
Figures 2 and 5 have easy-open features at the top ends,
which are simple to access, simple to operate, and simple
to position during manufacture compared with the known
30 block-base tearing strip. Furthermore, the sacks in
accordance with these embodiments are less costly to
manufacture than known sacks with block-base tearing
strips.

35 An alternative method of manufacturing a multi-
wall sack having an easy-open tearing feature in the top
end of the sack as illustrated in Figures 6 to 9.

In accordance with this embodiment of the invention, the sack (a pinch-bottom sack) is filled with product to form a filled sack. The plastic ribbon 4 is
5 inserted during the closing step into the fold so that it will be retained in the pinch-top end when the pinch-top end is adhered closed.

The inner pouch of product can be removed from
10 either of the bags by pulling on the plastic ribbon 4 to tear open the overlying layers of paper. The sack is then inverted to allow the inner pouch 5 to be removed.

Many modifications can be made to the preferred
15 embodiments without departing from the spirit and scope of the invention.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A multi-wall sack which includes:

(a) a closed bottom end; and



(b) an open top end that, when closed, forms a closed top end with a tearing means which facilitates easy opening of the sack.

2. The sack defined in claim 1 wherein the tearing means forms part of a cover sheet formed from paper or other suitable material.

3. The sack defined in claim 2 wherein the cover sheet is affixed to the sack in a location that is selected so that the tearing means becomes part of the closed top end as sections of the sack at the open top end are folded to form the closed end.

4. The sack defined in claim 3 wherein the sack is pre-cut and folded with a predetermined design at the open top end and the cover sheet is glued to an outer wall of the sack in a location that is selected so that the tearing means can be part of the closed top end of the sack.

5. The sack defined in claim 1 wherein the tearing means forms part of a cover sheet that has a first cover sheet section on one side of the tearing means and a second cover sheet section on the other side of the tearing means.

6. The sack defined in claim 5 wherein the first section of the cover sheet is affixed, typically glued, to an outer wall of the sack in a position that is selected so that the top end of the sack can be folded over



onto the second section of the cover sheet and affixed, typically by gluing and/or stitching and/or by any other suitable means to the second section in the process of forming the closed top end.

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7. The sack defined in any one of the preceding claims includes:

- 10 (i) an outer bag having the closed bottom end, the open top end, and the tearing means; and
- (ii) an inner pouch that is adapted to be filled with product and sealed.

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8. A method for forming a closed multi-wall sack which includes the steps of:

- 20 (i) filling a product into the sack defined in any one of the preceding claims via the open end of the sack; and
- (ii) folding the sack at the open end to form the closed top end with the tearing means which facilitates easy opening of the sack.

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9 A method for manufacturing a multi-wall sack which includes the steps of:

- 30 (i) forming a sack having a closed bottom end and an open top end; and
- (ii) adhering or otherwise attaching a tearing means to the sack in a manner such that, when the sack is filled and a closed top end is formed at the open top end, pulling the tearing means facilitates the easy-opening of the outer bag.
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10. The method defined in claim 9 wherein the closed top end is formed in step (ii) by folding the sack at the open top end.

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11. The method defined in claim 9 or claim 10 wherein the open top end formed in step (i) is pre-cut and folded to permit the formation of the closed top end.

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12. The method defined in any one of claims 9 to 11 wherein the tearing means is attached to the sack by adhering the tearing means to an outer wall of the sack at the open top end so that it extends laterally of the open top end.

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13. The method defined in any one of claims 9 to 12 wherein the tearing means forms part of a cover sheet which includes a first cover sheet section on one side on the tearing means and a second cover sheet section on the other side of the tearing means and the tearing means is affixed to the sack by adhering the first section to the outer wall of the sack.

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14. A multi-wall sack filled with product, which sack includes a closed bottom end and a closed top end with a tearing means that facilitates easy opening of the sack at the top end.

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