Nov. 15, 1966 C. A. COOK 3,286,005

METHOD OF MAKING POLYOLEFIN BAGS

Filed April 19, 1963 2 Sheets-Sheet 1

FIG 1

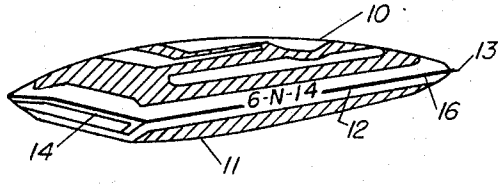


FIG 2

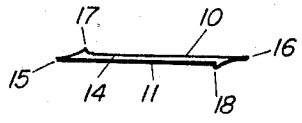


FIG 5

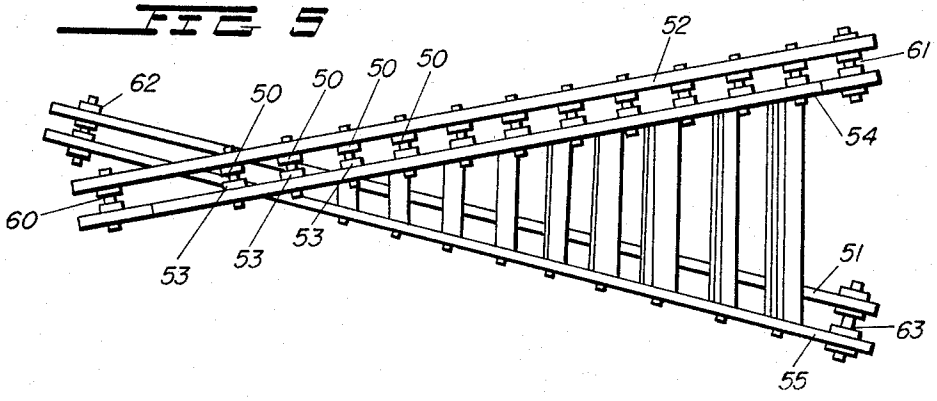
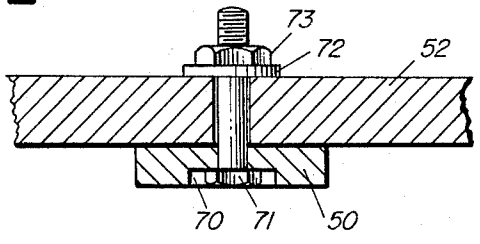


FIG 6



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METHOD OF MAKING POLYOLEFIN BAGS

Filed April 19, 1963 2 Sheets-Sheet 2

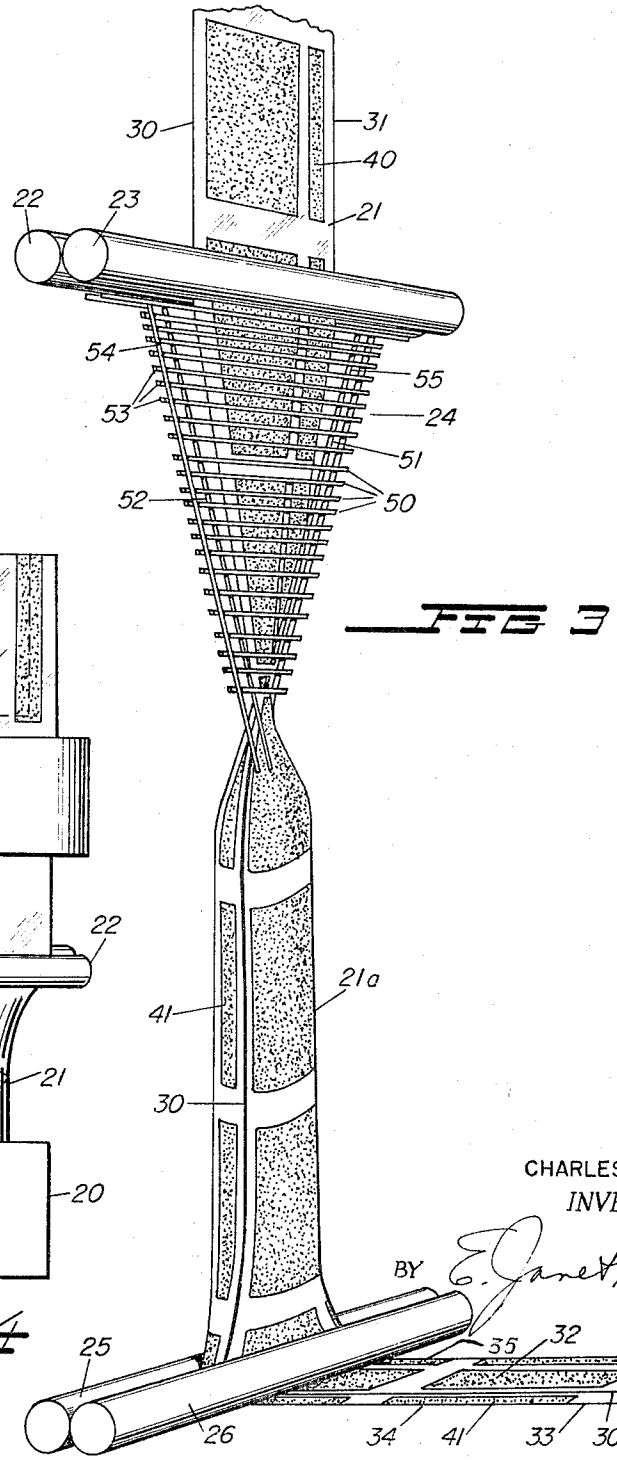

FIG 3

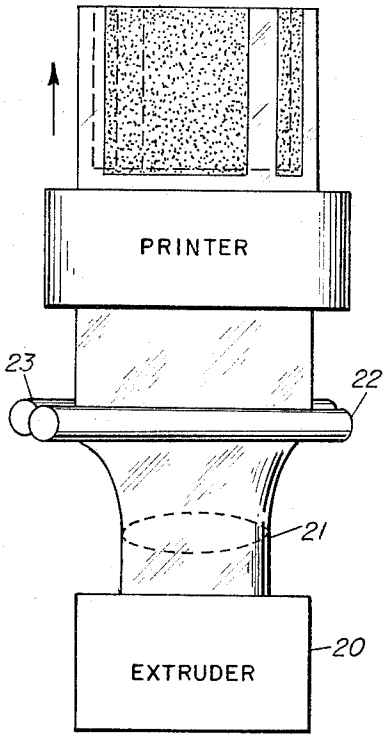

FIG 4

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METHOD OF MAKING POLYOLEFIN BAGS

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Filed Apr. 19, 1963, Ser. No. 274,120
10 Claims. (Cl. 264—95)

This invention relates to a novel method of manufacture of polyolefin type bags and more specifically relates to a method of manufacturing such bags wherein, after printing on a tube of polyolefin material, the tube is reinflated and rotated with respect to a pair of subsequently collapsing nip rolls. By this method a new crease line is formed along a printed area of the bag while the original crease line falls along the front and rear panels of the bag.

Polyolefin bags and the manufacture thereof are well known to the art. Generally, a tube of polyolefin material is drawn from appropriate extrusion die and the tube is thereafter collapsed and the surfaces may be printed upon. The tube is then transmitted to a bag making machine which in essence cuts the tube into a plurality of lengths, one end of which is sealed and the other of which is open, so that individual bags are formed. In the past such difficulty has been experienced in the opening of the bags and in providing printing for the bags which will be observable along the edge of the bag when the bag is filled.

In accordance with the invention and after the printing step has been completed the tube is reinflated and is caused to be rotated with respect to a pair of collapsing nip rolls. Thereafter a new crease or bag edge is formed which can lie directly over printing intended to be in the edge of the bag while the original creases fall in the front and rear panels of the bag. Accordingly, when the bag is filled, the side printing will be continuous and be easily observable while at the same time the crease lines in the front and rear panels form air channels extending into the bag which permit the easy opening thereof, as is described in the copending application Serial No. 274,119 filed April 19, 1963, now U.S. Pat. No. 3,216,646 titled, "Side Printed Easy Opening Polyolefin Bag."

Accordingly, a primary object of this invention is to provide a novel method of manufacture of a polyolefin type bag which can be easily opened.

A further object of this invention is to provide a novel method of manufacture for polyolefin bags which permits the direct printing on the front or rear panels or both which ultimately becomes the edge of the bag.

These and other objects will become apparent from the following description when taken in connection with the drawings, in which:

FIGURE 1 illustrates a bag printed in accordance with the concepts of the present invention.

FIGURE 2 schematically illustrates the unsealed end of the bag of FIGURE 1 when the bag is unfilled, to particularly illustrate the formation of creases in the front and rear panels of the bag.

FIGURE 3 is a partially diagrammatic and partially perspective view of the manner in which the preprinted tube of film is rotated and reinflated and then reclosed prior to the bag forming process.

FIGURE 4 is a side plan view of the twister mechanism of FIGURE 3.

FIGURE 5 is an enlarged detail view which illustrates the manner in which the slats of FIGURE 4 may be secured to their side support members.

Referring first to FIGURE 1, there is illustrated therein a novel bag construction wherein a bag is comprised of a front panel **10**, a rear panel **11**, an edge portion **12**, which connects the front and rear panels **10** and **11**, and sealed ends **13** and **14**. The end **13** is a previously sealed end and the bag prior to being filled as shown in FIGURE 2 was open at front end **14**. The front end **14** of the bag is schematically illustrated in FIGURE 2 with the bag collapsed prior to the filling operation. It will be noted that the bag of FIGURE 2 has two manufacturer's creases **15** and **16** (crease **16** is seen in FIGURE 1) and additionally has further creases **17** and **18** in panels **10** and **11** respectively. The creases **17** and **18** provide means for easily opening the bag of FIGURES 1 and 2. That is to say, a typical polyolefin bag of the prior art is difficult to "snap" open since the inner surfaces of the front and rear panels tend to stick together. In accordance with the invention, however, additional creases **17** and **18** run completely along the length of the bag to provide air passages within the bag and a thumb hold for ease of opening.

As a further feature of this invention, it can be seen in FIGURE 1 that printed information (the label 6–N–14 appears directly in the side of the bag and straddles crease line **16**. Therefore, when bags of the type of FIGURE 1 are placed in a large stack, this identifying information is readily observable as contrasted to prior art type bags which contain information either on front or rear panels which were hidden from view.

The manner by which the bag of FIGURES 1 and 2 can be manufactured is illustrated in FIGURES 3, 4 and 5. FIGURE 3, is a schematic illustration of the method of manufacture leading to the printing of an extruded tube which ultimately is formed into bags. Thus, in FIGURE 3 there is illustrated an extruder **20** which may be of any desired type well known to those skilled in the art, which extrudes a thin walled tube **21** of any appropriate polyolefin material.

The tube **21** is grasped at its upper end by appropriate nip roll means **22** which is also well known to those skilled in the art, which flattens the tube to an appropriate flat web which is ultimately processed in any desired manner and then is applied to a printer **23**. The printer **23**, which may be of any desired type, then prints some repetitive pattern on the tube moving in the direction of the arrow **24**, where the pattern on the upper side of the web is shown by shading lines while a similar pattern is printed on the rear panel of the web as shown by dotted lines.

All of the foregoing are steps well known to those skilled in the art, and in the past, the printed web coming down printer **23** is connected to a bag making machine which now cuts the tube into predetermined lengths, one end of which is sealed and the other end of which is open to form a bag. In accordance with the invention, however, the web **21** is transmitted to a pair of nip rolls **22** and **23** and through a twisting structure **24** which will be described more fully hereinafter.

Essentially, the purpose of twisting structure **24** is to cause the web **21** to rotate. The web **21** emerging from the end of twister **24** is then inflated between the end of twister **24** and a second pair of nip rolls **25** and **26** which recollapse the lower tube **21***a*. It is to be specifically noted, however, that since tube **21***a* is rotated that when the nip rolls **25** and **26** recollapse tube **21***a*, the original crease line **30** and **31** of web **21** will now lie in the front and rear panels **32** and **33** respectively and new crease lines **34** and **35** are formed for the tube.

In comparing the flattened tube of FIGURE 3 to the bag of FIGURE 5 is it now seen that crease line **30** corresponds to crease **17** of FIGURE 2 while the other crease line **31** corresponds to crease line **18** of FIGURE 2 to provide the desired air passages and thumb holds needed for easy opening of the bag. Moreover, it will be seen that the printed pattern, such as patterns **40** and **41**, which were originally on the front and rear panels of the tube prior to the passage through twister **24**, are now directly over the crease lines **35** and **34** respectively. Therefore, bags formed from the flattened tube leaving nip rolls **25** and **26** will, when filled have the printed material of areas **40** and **41** on the side of the bags. By way of example, area **41** could be printed with the information "6–N–24" shown in the edge **12** of FIGURE 1, where this printing is done with conventional printing techniques in the front and rear panels of the bag by the printer **23**, although it ultimately appears on the edges of the bag after the twisting operation.

It is to be specifically noted that in a typical manufacturing process it is desirable that the nip rolls **22**, **23**, **25** and **26** be parallel to one another. Therefore, a twisting operation is necessary to rotate tube **21***a* to the position shown in FIGURE 3. Clearly, however, no twisting operation is necessary if nip rolls **25** and **26** form some angle to the axis of nip rolls **22** and **23**. That is to say, in accordance with the invention, it is only necessary that the web be reinflated and then recollapsed at a new angle with respect to the axis of the bag.

Where the twisting operation is found desirable, the twister **24** can be provided as illustrated in FIGURES 3, 4 and 5 by means of a plurality of spaced slats such as a first group of slats **50** which are supported by end supports **51** and **52** and a second similar group of slats such as slats **53** which are supported by end supports **54** and **55**. It will be noted particularly from FIGURE 5 that supports **51** and **55** are parallel to one another and are at an angle to the supports **52** and **54**. Moreover, supports **52** and **54** are parallel to one another and are spaced from one another by end clamps **60** and **61** to maintain a predetermined spacing between the faces of slats **50** and **53**. In a similar manner, members **51** and **55** are held spaced from one another by end clamps **62** and **63** whereby the other end of slats **50** through **53** are held spaced from one another.

Accordingly, a web twisting area is designed between the opposing surfaces of slats **50** and **53** to twist the web **21** which rides between the spaced slats in the manner illustrated in FIGURE 3. Slats **50** and **53** as well as their supports **51** through **55** can be formed of any desirable material and can be secured to one another in any desired manner.

By way of example, FIGURE 6 illustrates the manner in which support **52** is secured to one end of slat **50**. Thus the slat **50** has a countersunk opening **70** therein which receives the head of a bolt **71**. Bolt **71** extends through an opening in slat **50** and a cooperating opening in member **52** and is captured on the other side of member **52** by means of an appropriate washer **72** and nut **73** which is threaded onto the end of bolt **71**. By appropriately loosening these connections it will be clear that the twisting structure **24** can be rotated to any desired twisting angle with external support structure (not shown) thereafter maintaining the structure in this twisted position with the individual securing means between the supports and the slat being thereafter tightened.

In the foregoing, the invention has been described only in connection with the preferred embodiments thereof. Many variations and modifications of the principles of the invention within the scope of the description herein are obvious. Accordingly, it is preferred to be bound not by the specific disclosure herein, but only by the appending claims.

What is claimed is:

1. The method of manufacturing a polyolefin bag which includes the steps of drawing a tube of polyolefin material, flattening said tube on a first and second crease line, reinflating said tube, and reflattening said tube on crease lines removed from said first and second crease lines.

2. The method of manufacturing a polyolefin bag which includes the steps of drawing a tube of polyolefin material, flattening said tube on a first and second crease line, reinflating said tube, and reflattening said tube on two crease lines removed from said first and second crease lines; and thereafter cutting said tube into predetermined lengths to form bags having crease lines in the top and bottom surface thereof to permit ease of opening of said bag.

3. The method of manufacturing a polyolefin bag which includes the steps of drawing a tube of polyolefin material, flattening said tube on a first and second crease line, rotating said flattened tube, reinflating said tube, and reflattening said tube on two crease lines removed from said first and second crease lines.

4. The method of manufacturing a polyolefin bag which includes the steps of drawing and flattening a tube of polyolefin material, passing said flattened tube through a first nip roll means, rotating said flattened tube about the axis thereof through an angle less than 180°, reinflating said tube and thereafter passing said reinflated tube through second nip roll means having axes parallel to said first nip roll means to reflatten said tube.

5. The method of manufacturing a polyolefin bag which includes the steps of drawing and flattening a tube of polyolefin material on a first and second crease line, passing said flattened tube through a first nip roll means, rotating said flattened tube about the axis thereof through a predetermined angle, reinflating said tube and thereafter passing said reinflated tube through second nip roll means having axes parallel to said first nip roll means to reflatten said tube on a third and fourth crease line removed from said first and second crease lines.

6. The method of manufacturing a polyolefin bag which includes the steps of drawing and flattening a tube of polyolefin material on a first and second crease line, passing said flattened tube through a first nip roll means, rotating said flattened tube about the axis thereof through a predetermined angle, reinflating said tube and thereafter passing said reinflated tube through second nip roll means having axes parallel to said first nip roll means to reflatten said tube on a third and fourth crease line removed from said first and second crease line; and thereafter cutting said tube into predetermined lengths to form bags having crease lines in the top and bottom surface thereof to permit ease of opening of said bag.

7. The method of manufacturing a polyolefin bag which includes the steps of drawing a tube of polyolefin material, flattening said tube on a first and second crease line, printing on at least said top surface of said flattened tube, reinflating said tube, and reflattening said tube on two crease lines removed from said first and second crease lines.

8. The method of manufacturing a polyolefin bag which includes the steps of drawing a tube of polyolefin material, flattening said tube on a first and second crease line, printing on at least said top surface of said flattened tube, reinflating said tube, and reflattening said tube on two crease lines removed from said first and second crease lines, with at least one of said two crease lines extending through the printing on said top surface of said flattened tube.

9. The method of manufacturing a polyolefin bag which includes the steps of drawing a tube of polyolefin material, flattening said tube on a first and second crease line, printing on at least said top surface of said flattened tube, rotating said flattened tube, reinflating said tube, and reflattening said tube on two crease lines removed from said first and second crease lines.

10. The method of manufacturing a polyolefin bag which includes the steps of drawing and flattening a tube of polyolefin material on a first and second crease line, printing on at least said top surface of said flattened tube, passing said flattened tube through a first nip roll means, rotating said flattened tube about the axis thereof through a predetermined angle, reinflating said tube and thereafter passing asid reinflated tube through second nip roll means having axes parallel to said first nip roll means to reflatten said tube on a third and fourth crease line removed from said first and second crease lines; at least one of said first and second crease lines extending through said printing on said top surface of said flattened tube.

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