April 9, 1963 E. KUGLER 3,084,731

REINFORCED PLASTIC BAG AND METHOD OF MAKING THE SAME

Filed Dec. 15, 1959

Fig. 1.

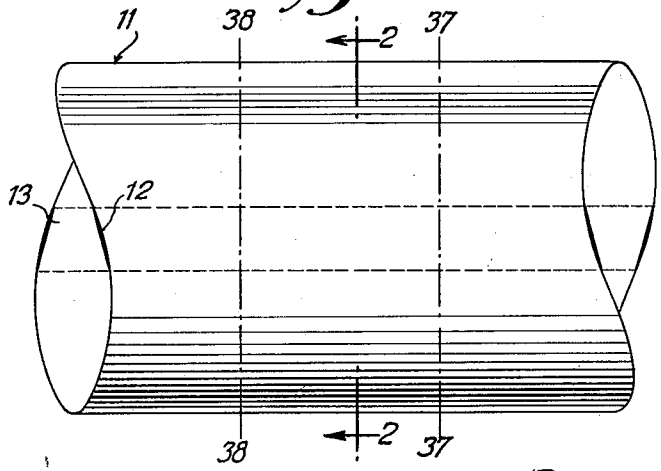


Fig. 3.

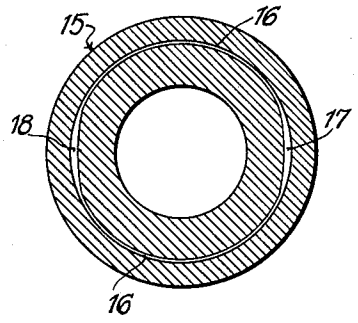


Fig. 2.

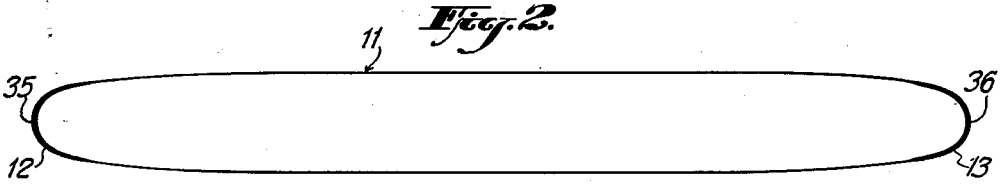


Fig. 4.

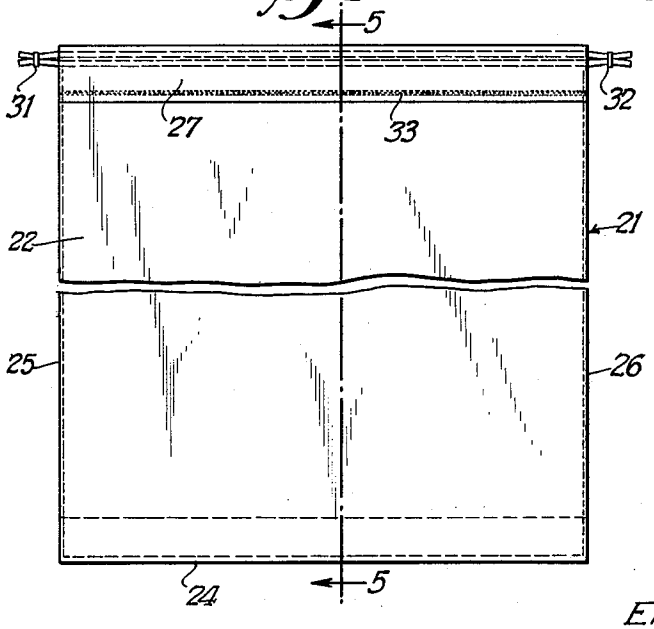


Fig. 5.

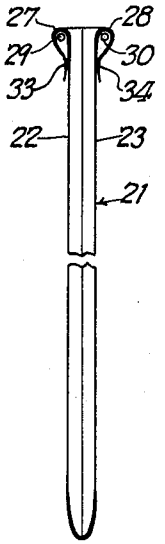
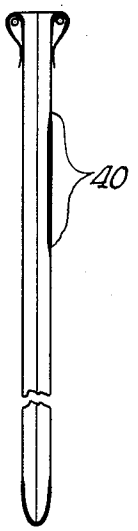


Fig. 6.



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REINFORCED PLASTIC BAG AND METHOD OF MAKING THE SAME

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2 Claims. (Cl. 150—11)

This invention relates to plastic bags and the method of making same. More particularly, the invention relates to reinforced plastic bags of an improved type which are less susceptible to failure during use than conventional plastic bags utilizing an equal amount of material.

It is common practice to form bags from relatively thin plastic material such as polyethylene. Such bags are put to a variety of uses and are made in a wide variety of sizes from material of varying thicknesses. Since it is possible to form such plastic bags with walls of almost any desired thicknesses, the wall thickness of a given bag is usually determined by the use to which it is designed to be put. Obviously, it is to the manufacturer's advantage to make the bag as thin as possible in order to use a minimum of material. At the same time the bag must be sufficiently thick so that it does not rupture or tear at localized zones of stress under normal conditions of use. Certain portions of a plastic bag are frequently subjected to considerably greater strain than other portions thereof. This may be due to the size, weight or shape or character of merchandise which is packaged in the bag, or to other factors. For instance, in the case of draw string bags which are frequently reused by the ultimate consumer, the tubular hems at the mouth of the bag which contain the draw strings often tear when a filled bag is carried by the draw strings or following openings or closing of the bag a number of times. Likewise, bags into which relatively heavy objects are put also tear at the bottom margin of the bag. In order to prevent failure of bags under conditions such as these, while at the same time economizing in the poundage of material used, it is highly desirable to provide reinforcement at those portions of a bag which are likely to be subjected to greater strain than the remainder of the bag. It is also highly desirable to avoid the use of separate reinforcing strips since the use of such strips complicates the manufacturing process, increases the cost appreciably and is not well adapted to continuous manufacturing operations. It is an object of the present invention to provide an improved plastic bag and process of making same which allows attainment of the above objectives in a simple and efficient manner.

According to a preferred embodiment of one aspect of this invention, a plastic bag is provided which is formed from a single ply piece of relatively thin, flexible plastic material such as polyethylene and in which the single ply material at one or more localized zones is substantially thicker than the material forming other portions of the bag. For example, such thicker zones may be a pair of opposed zones such as at the mouth and the bottom margin of the bag. Likewise, a thickened zone may be provided at a desired location on one or both side bag panels to resist localized strain or abrasion due to the character of the article to be packed.

According to a preferred embodiment of another aspect of the invention, plastic bags of the type described above are produced by forming a tube of plastic material which has at least one longitudinally extending thickened area of restricted width positioned to correspond to a transversely extending reinforced zone where desired on the finished bag. Further, a plurality of such thickened areas may be provided circumferentially spaced from each other to correspond to thickened hem portions of the bags,

and if desired, also a predetermined thickened area of a face panel. This tube is then formed into plastic bags of the type described above so that the thickened areas of the tube fall at the desired zone or zones to be reinforced in each of the bags made from such tube.

For a better understanding of the invention reference should be had to the accompanying drawings which illustrate somewhat diagrammatically a bag constructed in accordance with the invention and a method of making the same in accordance with the invention.

In the drawings:

FIG. 1 is a plan view of a tube of plastic material made in accordance with my invention suitable for forming into plastic bags in accordance with the invention;

FIG. 2 is a cross-sectional view taken at line 2—2 of FIG. 1, with the tube shown in somewhat collapsed or flattened form;

FIG. 3 is a somewhat diagrammatic sectional view of a portion of a suitable arrangement of apparatus for producing the tube shown in FIG. 1;

FIG. 4 is a front elevational view of one embodiment of a draw string bag made from the tube shown in FIG. 1 and constructed in accordance with the invention;

FIG. 5 is a sectional view taken along line 5—5 of FIG. 4; and

FIG. 6 is a view similar to FIG. 5 showing a modification of the invention.

Referring to the drawings, FIGS. 1 and 2 show a tube 11 of relatively thin, flexible plastic, single ply material such as polyethylene and having a pair of longitudinally extending, circumferentially spaced thickened areas 12 and 13. The tube 11 may be formed in any suitable manner such as by extruding the plastic material through an extrusion die 15 having an annulus nozzle 16 (FIG. 3) in the manner taught by U.S. Patent No. 2,720,680. When the tube is formed in accordance with my invention, the thickened areas 12 and 13 of the tube are easily formed by varying the radial width of the nozzle at localized zones, as indicated at 17 and 18 in FIG. 3. It is readily apparent that these zones of greater nozzle width determine the thickness of the extruded tube and that this thickness may, therefore, be varied by varying the thickness of the nozzle width at one of more zones spaced about the circumference of the die. In accordance with the disclosure in said patent, the extruded tube is expanded to a diameter depending upon the wall thickness desired.

FIGS. 4 and 5 show a draw string bag 21 which may be formed in any suitable manner such as from the tube 11 in the manner described below and taught in greater detail in my copending application Ser. No. 858,659 filed December 10, 1959. As shown in FIGS. 4 and 5, the bag 21 is constructed of flexible plastic single ply material such as polyethylene and has front and back panels 22 and 23 connected together along the bottom margin 24 and side margins 25 and 26 of the bag. Opposed transverse edge portions of the panels 22 and 23 remote from the bottom margin 24 are formed into tubular hems or lips 27 and 28 which form an open mouth at the upper margin of the bag and are adapted to contain draw strings such as 29 and 30. The draw strings 29 and 30 may be of suitable material such as string and may be fastened together outside the side margins of the bag as by staples 31 and 32, while the tubular lips 27 and 28 may be formed by folding the edge portions of the panels 22 and 23 and sealing as indicated by the seal lines 33 and 34 (FIG. 5). As best shown in FIG. 5, the bottom margin 24 and the tubular hems 27 and 28 forming the upper margin of the bag 21 are formed of material which is substantially thicker than material forming other portions of the bag. Because of these reinforced upper

and lower margins, the bag **21** is able to withstand greater strains at these vulnerable portions of the bag than would otherwise be possible without the use of substantially greater amounts of material in making the bag. Furthermore, this reinforcement is obtained without the use of separate reinforcing strips which would greatly complicate the process of manufacturing the bag and add considerably to the cost thereof.

As mentioned above, the bag **21** may conveniently be formed from the tube **11**. This may be accomplished by forming a longitudinal fold along a central portion of the thickened area **12** as indicated by a fold line **35** in FIGS. 1 and 2. The tube **11** is then severed longitudinally along a central portion of the thickened area **13** as indicated at **36** (FIG. 2) to divide the thickened area **13** into opposed severed portions. These severed portions of the thickened area **13** are then folded and sealed along the seal lines **33** and **34** to form the tubular hems **27** and **28** in the manner taught by my above mentioned application Ser. No. 858,659. The tube **11** may then be severed and sealed at bag width intervals along transverse seal lines such as **37** and **38** (FIG. 1) to form individual bags such as the bag **21**. In this way the seal lines **37** and **38** form the side margins **25** and **26** of the bag **21** while the thickened areas **12** and **13** form the upper margin (lips **27** and **28**) and lower margin **24** of the bag respectively. If desired, the fold along the fold line **35** may be a gusseted fold so as to produce a bag having a gusseted bottom margin. It is also, of course, possible to form a bag similar to the bag **21** but without the tubular hems merely by omitting the step of folding and sealing the transverse edge portions of the panels **22** and **23**.

While the bag **21** has been described as having the upper and lower margins thereof formed of relatively thicker material than the remainder of the bag, the present invention is equally applicable to situations in which it is desired to have only one margin, such as the lower margin or the mouth of the bag, of thickened material or in which it is desired to have one or both of the opposite side panels of the bag provided with localized thickened zones of material. A bag similar to the bag **21** described above may, for instance, be formed with only the tubular lips of such thickened material by forming a tube similar to the tube **11** but having only one thickened area corresponding to the thickened area **12** of the tube **11**.

Similarly, a localized thickened zone may be readily provided at any place extending transverse the bag width and said zone may be of such portion of the bag height as desired. For example, where the bag is to be used to hold a toy or other article having a projection or irregular shape, the bag may be provided with a thickened zone extending across one or both side panels so positioned as to reinforce the bag only where needed. Such a modification is shown in FIG. 6 where the bag is identical with that shown in FIG. 5 except for an additional localized reinforcing thickened zone such as **40** on one side panel.

The tube **11** and bag **21** described above, as well as other bags within the scope of the invention, may be formed of any suitable flexible plastic material. Extrudable materials such as polyethylene are especially suitable in this respect since bags may then be formed from extruded tubes in the manner described above. Bags formed of such material may have any suitable normal wall thickness and localized thickened zones within the permissible limits of the extrusion method of making the tubes.

While the invention has been described above with reference to certain preferred embodiments thereof, it will be understood by those skilled in the art that various changes and modifications are possible without departing from the spirit and scope of the invention and it is intended to cover such changes and modifications in the appended claims.

I claim:

1. The method of making a tubular drawstring bag, comprising the steps of forming a substantially cylindrical tube of thin flexible plastic material having a locally thickened area extending longitudinally substantially along its length, longitudinally severing said tube substantially along the centerline of said thickened area to provide a mouth end and oppositely disposed face panels of the bag, said face panels respectively including opposed edge portions provided by said severed thickened area, folding each of said opposed edge portions along and substantially centrally of its length and attaching the same to its said respective face panel to provide complementary tubular hems at said mouth end of the bag for receiving a drawstring, and sealing said face panels together along longitudinally spaced apart transverse seal lines to form opposed side edges of said bag.

2. The method of making a tubular drawstring bag, comprising the steps of forming a substantially cylindrical tube of thin flexible plastic material having a pair of locally thickened areas each extending longitudinally substantially along its length on diametrically opposite sides of the tube, forming a longitudinally extending fold along the length of the first of said thickened areas and longitudinally severing said tube along substantially the centerline of the second of said thickened areas to provide a mouth end and oppositely disposed face panels of the bag, said face panels respectively including opposed edge portions provided by said severed second thickened area, folding each of said opposed edge portions along and substantially centrally of its length and attaching the same to its said respective face panel to provide complementary tubular hems at said mouth end of the bag for receiving a drawstring, and sealing said face panels together along longitudinally spaced apart transverse seal lines to form opposed side edges of said bag.

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