

Nov. 8, 1966

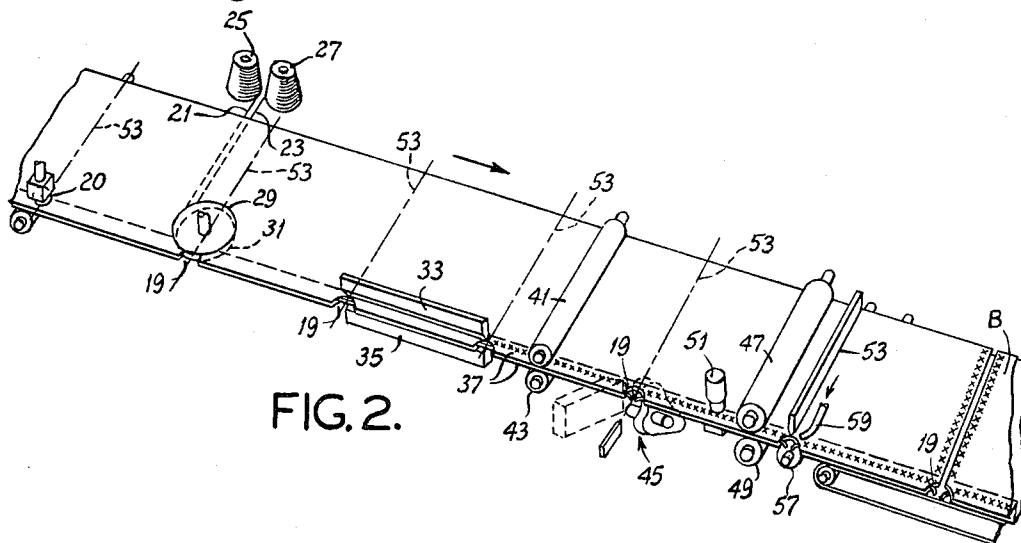
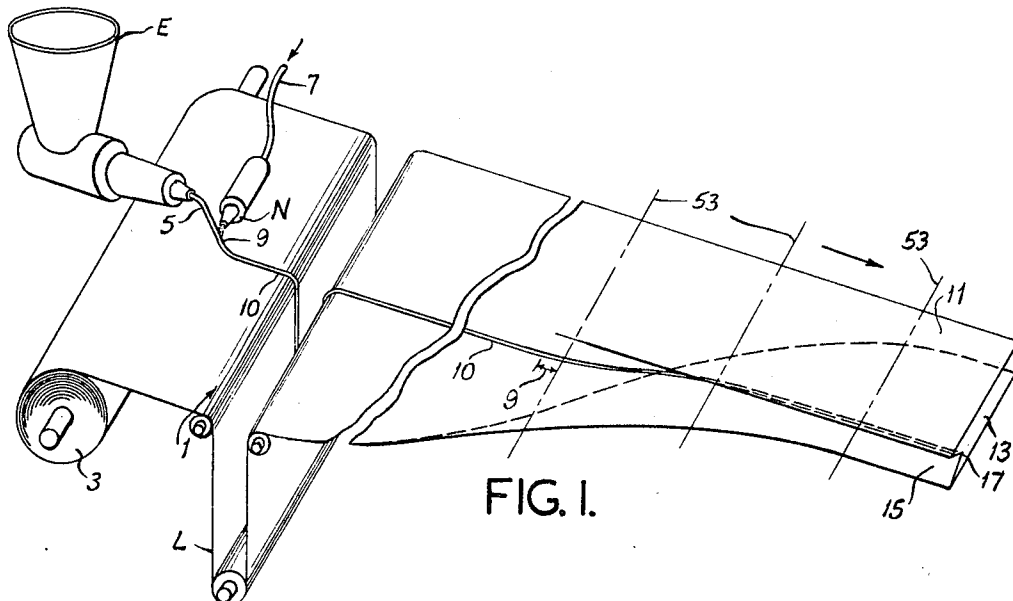
R. C. MUELLER

3,283,672

BAG

Original Filed June 9, 1961

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

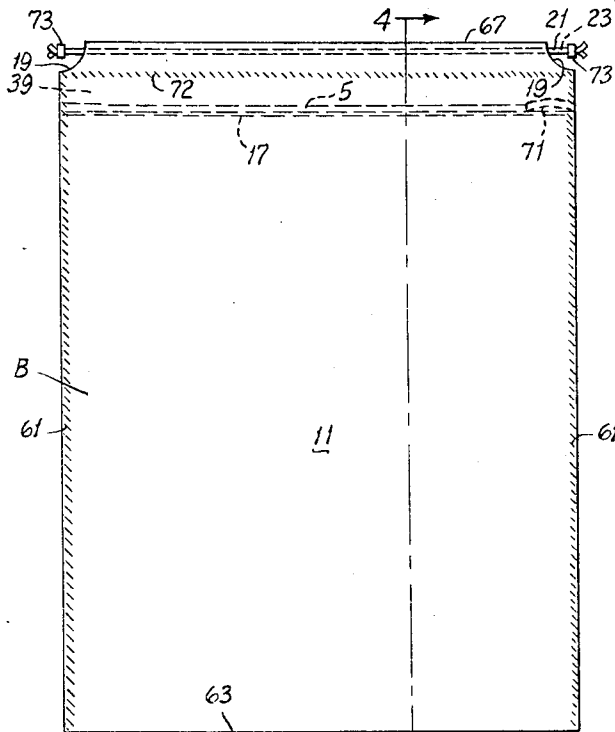


FIG. 3.

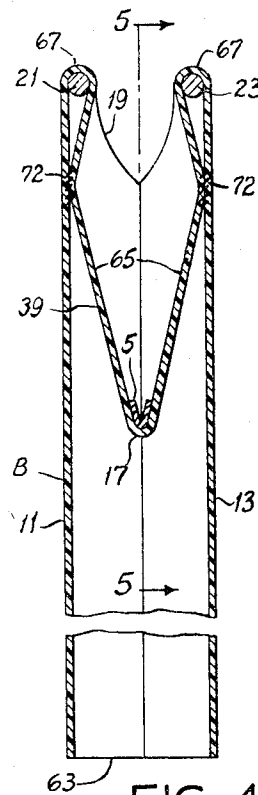


FIG. 4.

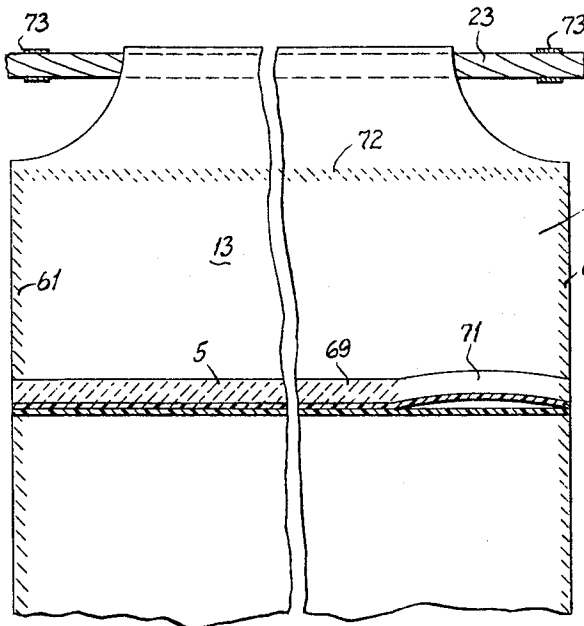


FIG. 5.

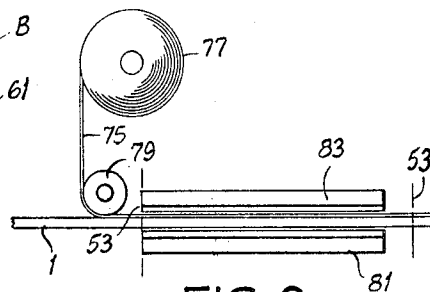


FIG. 6.

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Original application June 9, 1961, Ser. No. 115,964, now Patent No. 3,226,009, dated Dec. 28, 1965. Divided and this application July 2, 1965, Ser. No. 478,512 14 Claims. (Cl. 93—35)

This application is a division of my copending application Serial No. 115,964, filed June 9, 1961, issued as U.S. Patent 3,226,009, December 28, 1965.

This invention relates to methods of making bags, and more particularly a bag made of heat-sealable plastic, such as polyethylene, with means for tearing an opening in the bag.

Among the several objects of the invention may be noted the provision of a bag made of heat-sealable plastic with means for readily tearing an opening in the bag to empty the bag contents; the provision of a bag of the class described wherein said means comprises a tearing member, such as a strip of plastic, for tearing an opening in the bag, the tearing member being heat-sealed to the bag throughout a portion of its length and free of the bag at another portion of its length to provide a portion for grasping to pull the tearing member to tear an opening in the bag; the provision of a draw cord bag of the class described having a top gusset and a tearing member such as described for tearing an opening in the gusset, after which the bag may be closed by the draw cord; and the provision of methods of economically manufacturing such bags. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the methods hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which several of various possible embodiments of the invention are illustrated,

FIG. 1 is a perspective illustrating generally diagrammatically certain initial steps of a method of this invention for making bags of this invention;

FIG. 2 is a perspective illustrating generally diagrammatically the concluding steps of the method;

FIG. 3 is a view in elevation of a bag made by the method of FIGS. 1 and 2, prior to filling thereof;

FIG. 4 is an enlarged vertical section taken on line 4—4 of FIG. 3, thicknesses being exaggerated;

FIG. 5 is a vertical section taken on line 5—5 of FIG. 4, thickness being exaggerated; and

FIG. 6 is a view in side elevation illustrating generally diagrammatically a modification in the method of this invention.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to FIG. 1 of the drawings, there is indicated at 1 a continuous web of heat-sealable sheet plastic material, such as polyethylene. The web 1 is drawn from a supply roll 3, and a bead or strip 5 of molten plastic, such as polyethylene, is extruded by a conventional extruder E onto web 1 as the web moves toward the right in FIG. 1. This bead 5 is applied generally along the longitudinal center line of the web. Since extrusion is best accomplished continuously, web 1 is continuously withdrawn from roll 3 for continuous application of bead 5 to the web. Thereafter, the web is intermittently fed forward, one bag width interval at a time. This may be accomplished, in conventional manner, by providing for accumulation of the web as it is continuously withdrawn

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from roll 3 in a slack loop L (see FIG. 1) from which bag width intervals of the web may be withdrawn, one at a time, and into which the web is continuously fed at an appropriate rate from the roll 3.

At N is indicated a nozzle which is positioned for delivering a light stream of cooling air on to the bead 5 before it comes in contact with the web. Air is intermittently delivered to the nozzle through a line 7 under control of a suitable valve (not shown) with the delivery timed to occur at intervals corresponding to the intermittent feed of the web, resulting in chilling of portions 9 of the bead spaced at bag width intervals to such an extent as to inhibit heat-sealing of these portions to the web. Portions 10 of the bead between portions 9 remain hot and consequently become heat-sealed to the web. Thus, bead 5 is prevented from becoming securely bonded to the web at a portion 9 on each bag width interval of the web and is securely bonded throughout portion 10 on each bag width interval. The purpose of preventing portion 9 of the bead in each bag width interval from adhering to the web 1 will become apparent.

The web 1 with the bead 5 thereon is then folded on longitudinal fold lines by conventional folding apparatus (not shown) to form superposed first and second walls 11 and 13, respectively, with an intuck 15 joining these walls. As illustrated, wall 11 is the upper wall, and wall 13 is the lower wall. The fold joining the two halves of the intuck is indicated at 17. This is located on the line of the bead 5, and the folding is such that the bead is located within the intuck (i.e., between the two halves of the intuck).

Now referring to FIG. 2, the folded web with bead 5 thereon is shown as travelling toward the right through apparatus such as shown in U.S. Patent 2,897,729. As the folded web travels through this apparatus, notches 19 are formed in the intuck edge thereof at bag width intervals, by notching means such as indicated at 20. After the web has been notched, a first cord 21 is fed in between the first wall 11 and the upper half of intuck 15, and a second cord 23 is fed in between the second wall 13 and the lower half of intuck 15. The cords are guided from the supplies 25 and 27 around pulleys 29 and 31 into their respective positions. Following the insertion of the cords, the walls 11 and 13 are heat-sealed to the respective halves of intuck 15 along lines located between the cords and the fold 17 by means of upper and lower sealing bars 33 and 35. It will be understood that a separator (corresponding to plate 221 shown in U.S. Patent 2,897,729) is used to separate the two halves of intuck 15 to prevent them from becoming heat-sealed together. As a result of this heat-sealing operation, each of the walls 11 and 13 of the web is provided with a hem 37 along the intuck edge thereof, with a cord contained in each hem. The walls are integrally joined below the heat seals by a gusset 39 (see FIG. 4) constituted by portions of the two halves of intuck 15 below the heat seals. A pair of rollers 41 and 43 effect gripping of the cords 21 and 23 to the web to insure the feeding of the cords with the web.

After the formation of hems 37, portions of the cords 21 and 23 which are exposed in a notch 19 are drawn out of the notch and secured together by stapling the portions of the two cords at two points spaced along the length of the cords. The secured cords are then severed between the two points of securement. The drawing out, severing and stapling together of the cords are accomplished by a severing and stapling unit generally indicated at 45, which is fully described in the above-mentioned patent.

A pair of feed rolls are shown at 47 and 49. These rolls are intermittently driven and thereby cause the inter-

mittent feed of the web. At 51 is indicated a clamping means for the cords 21 and 23 located between unit 45 and the intermittent feed rolls 47 and 49. This clamping means prevents forward movement of the cords when acted upon by the unit 45, and permits the latter to draw out the cords, the excess material for the drawn-out cords being drawn from the cord supplies 25 and 27.

A pair of feed rolls are shown at 47 and 49. These rolls 47 and 49 is heat-sealed and segmented on transverse lines 53 spaced at bag width intervals and intersecting the notches 19 to divide it into individual bags B (a portion of a bag B being shown in FIG. 2). The heat-sealing and segmenting means comprises a knife 55 having electrical resistance heating means incorporated therein, and a back-up roll 57 having a heat-resistant resilient surface, as shown in U.S. Patent 2,897,729. At 59 is indicated an air pipe positioned to direct a stream of air for blowing the cut ends of the cords from between the knife 55 and the roll 57, also as shown in said patent.

As a result of the above-described operations, each bag B comprises front and back walls 11 and 13 joined by heat-sealed seams 61 at the sides, having a top gusset 39 with a tear strip 5 heat-sealed thereto, and being open at the bottom as indicated at 63. The bag consists of a single piece of plastic material, the top gusset 39 being constituted by portions of the piece of material integral with the walls 11 and 13. The top gusset 39 extends from side-to-side of the bag between the walls 11 and 13. As a result of forming the heat-sealed bag side seams 61, the margins of the gusset 39 at each end thereof become heat-sealed together and are caught in the side seams 61. The top gusset therefore constitutes a top closure panel or top wall for the bag. It consists of a fold of the plastic material, each half thereof being designated 65. Each half is integrally joined to the respective wall 11 or 13 at a fold line 67 which constitutes the top edge of the bag, and the two halves are integrally joined together by the fold 17 (originally the fold of intuck 15).

The tear strip 5 extends from side-to-side of the bag on the outside of the gusset or top wall 39 and generally along the fold 17. The tear strip is heat-sealed to the gusset throughout a portion 69 of its length (corresponding to a portion 10 where the original bead 5 was heat-sealed to the web) and substantially free of the gusset throughout another portion 71 of its length (corresponding to a portion 9 where the original bead 5 was cooled so as not to become completely heat-sealed to the web). The ends of the strip are caught in the side seams 61. The free portion 71 of the strip 5 is adapted to be grasped for pulling the strip to tear open the gusset. In this respect it will be noted that application of hot portions 10 of bead 5 to the web provides thin or weak regions along the sides of the bead which give a clean tear when the bead or strip 5 is pulled. The end of the free portion 71 caught in side seam 61 will pull out of the side seam when the strip is grasped and pulled for opening the gusset.

Each half 65 of the top gusset 39 is secured to the respective wall 11 or 13 along a heat-sealed hem-forming seam 72 extending transversely across the bag from one side thereof to the other spaced downward from the top edge 67 and the cords 21 and 23, but above the gusset fold line 17. The hems contain draw cord means comprising lengths of the textile cords 21 and 23 extending through the hems and out of the hems at both ends, and having their ends which extend out of the hems secured by staples 73. The top corners of the bag are cut out or notched as indicated at 19. These notches 19 are located about the hem seams 72 and accommodate the draw cord ends and staples. As will be understood, the draws cords are for drawing the top of the bag closed after an opening has been torn in the gusset by means of tear strip 5.

An alternate method of applying a tear strip to the web 1 is shown in FIG. 6. Instead of providing an extruder as shown in FIG. 1, a continuous strip 75 of heat-sealable plastic, such as polyethylene, is intermittently withdrawn from a supply roll 7, passes around a guide 79 and is applied generally along the longitudinal center line of the web 1 which is being intermittently fed forward one bag width interval at a time as previously described. A heat-sealing bar 81 of a length less than the bag width interval is provided forward of the guide 79 and below the web 1. Mounted above strip 75 and bar 81 is a platen 83. The bar 81 is adapted to be raised to cause the web 1 and the strip 75 to be heat-sealed together by heat and pressure. During each dwell in the movement of the web 1 the bar is raised into contact with the web. Thus the strip 75 is heat-sealed to the web throughout a portion of each bag width interval and is free of the web at another portion of the bag width interval. Since the bar contacts the web 1 rather than the strip, the web will become somewhat weaker along the heat seal than in other areas, thus facilitating the tearing of the web material by the tear strip.

Both the strip 5 and the strip 75 may be made thicker than the web 1 to insure against failure of the strip when it is pulled to tear open the bag.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above methods without departing from the scope of the invention, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. The method of making bags comprising forming a continuous web of bag material having two superposed walls joined along one edge of the web with a continuous length of tear strip material adhered to the web on the outside thereof and extending longitudinally of the web, segmenting the web with the strip thereon on transverse lines at bag width intervals, and side-seaming the segments, thereby to provide bags each of which has a tear strip extending from one side thereof to the other on the outside of the bag, wherein the tear strip is formed by extruding molten plastic as a continuous bead, and wherein portions of said bead spaced at intervals along the length of the bead are cooled prior to application of the bead to the web, whereby said cooled portions remain substantially free of the web and portions of the bead between said cooled portions adhere to the web.

2. The method of making bags comprising adhering a continuous length of tear strip material to a web of bag material with the tear strip material extending longitudinally of the web, folding the web with the tear strip material thereon longitudinally to provide superposed first and second walls with the tear strip on the outside, and segmenting the folded web with the strip thereon on transverse lines spaced at bag width intervals and side-seaming the segments, thereby to provide bags each of which has a tear strip extending from one side thereof to the other on the outside of the bag.

3. The method as set forth in claim 2, wherein the web and the tear strip material are made of heat-sealable plastic, and said continuous length of tear strip material is adhered to the web by heat-sealing.

4. The method of making bags as set forth in claim 2, wherein the tear strip is formed by extruding molten plastic as a continuous bead.

5. The method of making bags as set forth in claim 2, wherein the continuous length of tear strip material is applied to the web in such manner as to be adhered to the web throughout a portion of each bag width interval of the web and substantially free of the web throughout another portion of each bag width interval of the web.

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6. The method of making bags as set forth in claim 5, wherein heat and pressure are applied to the web and strip in such manner as to cause the strip to be adhered to the one portion of the web of each bag width interval of the web and substantially free of the web throughout another portion of each bag width interval of the web.

7. The method of making bags comprising adhering a continuous length of tear strip material to a web of bag material extending longitudinally of the web, folding the web with the tear strip material thereon on longitudinal fold lines to provide superposed first and second walls joined by an intuck with the tear strip within the intuck, providing openings in the folded web along the intuck edge thereof at bag width intervals, supplying a continuous length of cord between each wall and the intuck, joining each wall to the respective half of the intuck to form hems containing the cords and a gusset joining the walls, segmenting the cords at the openings and segmenting the web along transverse lines spaced at bag width intervals and intersecting the openings, and securing the cord ends together and side-seaming the resultant segments, thereby to provide bags each of which has a hem at the top of each wall with a cord therein, a top gusset joining the walls, and a tear strip on the gusset.

8. The method of making bags as set forth in claim 7, wherein the web and the tear strip material are made of heat-sealable plastic, and said continuous length of tear strip material is adhered to the web by heat-sealing.

9. The method of making bags as set forth in claim 8, wherein the tear strip is formed by extruding molten plastic as a continuous bead.

10. The method of making bags as set forth in claim 7, wherein the continuous length of tear strip material is applied to the web in such manner as to be adhered to the web throughout a portion of each bag width interval of the web and substantially free of the web throughout another portion of each bag width interval of the web.

11. The method of making bags as set forth in claim 8, wherein the continuous length of tear strip material is applied to the web in such manner as to be heat-sealed to the web throughout a portion of each bag width interval of the web and substantially free of the web throughout another portion of each bag width interval of the web,

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12. The method of making bags as set forth in claim 11, wherein heat and pressure are applied to the web and strip in such manner as to cause the strip to be adhered to the one portion of the web of each bag width interval of the web and substantially free of the web throughout another portion of each bag width interval of the web.

13. The method of making bags as set forth in claim 12 wherein heat and pressure are applied to the web and strip by a heat-sealing bar having a length less than the bag width interval.

14. The method of making bags comprising adhering a continuous length of tear strip material to a web of bag material with the tear strip material extending longitudinally of the web, folding the web with the tear strip material thereon longitudinally to provide superposed first and second walls with the tear strip on the outside, and segmenting the folded web with the strip thereon on transverse lines spaced at bag width intervals and side-seaming the segments, thereby to provide bags each of which has a tear strip extending from one side thereof to the other on the outside of the bag, wherein the continuous length of tear strip material is applied to the web in such manner as to be adhered to the web throughout a portion of each bag width interval of the web and substantially free of the web throughout another portion of each bag width interval of the web, and wherein the tear strip is formed by extruding molten plastic as a continuous bead, and wherein portions of said bead spaced at intervals along the length of the bead are cooled prior to application of the bead to the web, whereby said cooled portions remain substantially free of the web and portions of the bead between said cooled portions adhere to the web.

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