

April 30, 1963

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3,087,670

VALVED THERMOPLASTIC BAGS

Original Filed Jan. 26, 1959

2 Sheets-Sheet 1

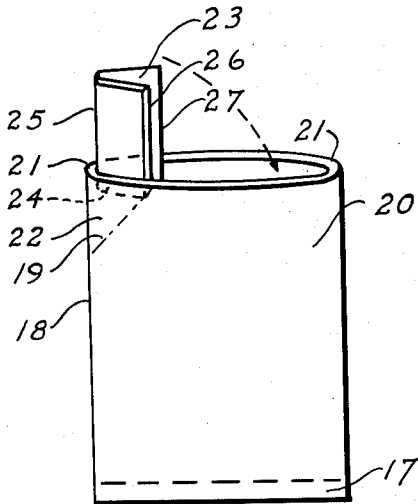


Fig. 1

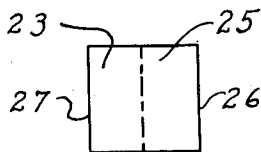


Fig. 2

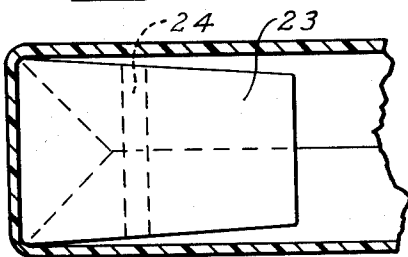


Fig. 5

Fig. 3

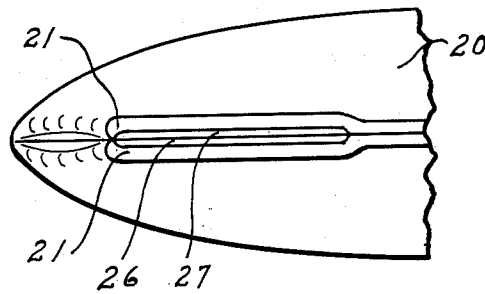
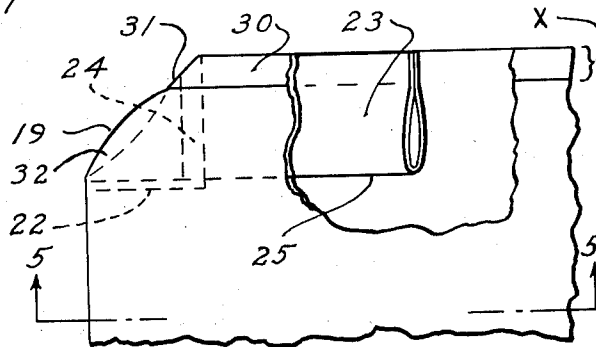


Fig. 4

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3,087,670

VALVED THERMOPLASTIC BAGS

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Continuation of abandoned application Ser. No. 788,970, Jan. 26, 1959. This application Nov. 16, 1961, Ser. No. 157,028

3 Claims. (Cl. 229—62.5)

The present invention relates to novel bags and to methods for preparing same.

This application is a continuation of copending application S.N. 788,970, filed January 26, 1959, now abandoned.

It is an object of this invention to provide novel valved bags of substantial volumetric capacity which are fabricated from thermoplastic materials and to methods for preparing same.

Other objects and advantages of the invention will be apparent from the following detailed description thereof when read in conjunction with the attached drawings in which:

FIG. 1 is an elevation of a blank from which a valved bag is to be prepared;

FIG. 2 is a plan view of the valve sleeve illustrated in FIG. 1 before its attachment to the bag blank;

FIG. 3 is a fragmentary top plan view illustrating the manner in which the valve sleeve and a contiguous corner of the tubular blank illustrated in FIG. 1 are folded into the mouth of the bag blank prior to heat sealing the top of the bag;

FIG. 4 is a fragmentary perspective side view of the sealed valved bag from FIG. 3 with parts broken away;

FIG. 5 is a fragmentary sectional view along line 5—5 of FIG. 4 looking in the direction of the arrows and illustrating the manner in which the valve sleeve is sealed when the bag is filled;

FIG. 6 is an elevation of another embodiment of a blank from which a valved bag is to be prepared;

FIG. 7 is a plan view of the valve sleeve illustrated in FIG. 6 before its attachment to the bag blank;

FIG. 8 is a fragmentary top plan view illustrating the manner in which the valve sleeve and a contiguous corner of the tubular blank illustrated in FIG. 6 are folded into the mouth of the bag blank prior to heat sealing the top of the bag;

FIG. 9 is a fragmentary perspective side view of the sealed valved bag from FIG. 8 with parts broken away; and

FIG. 10 is a fragmentary sectional view along line 10—10 of FIG. 9 looking in the direction of the arrows and illustrating the manner in which the valve sleeve is sealed when the bag is filled.

Referring to FIG. 1, 20 is a tube of thermoplastic film which is heat sealed at its bottom 17 and which has a top peripheral edge 21. The upper left hand corner of tube 20 (defined by side 18, top peripheral edge 21 and fold line 19) is designated as 22 and is destined to become the valve flap in the finished bag. Valve sleeve 23 is heat sealed to tube 20 at 24. Valve sleeve 23 is fabricated from thermoplastic film having a substantially thinner gauge than that employed in tube 20. Typically, valve sleeve 23 will be fabricated from 1–2 mil film which will be membrane-like in effect, whereas tube 20 will be fabricated from 5–10 mil film. In FIG. 2, valve sleeve 23 is shown with its center line designated as 25 and its vertical edges designated as 26 and 27.

In FIG. 3, valve sleeve 23 and corner 22 of tube 20 are folded into the mouth of tube 20 so that edges 26 and 27 of valve sleeve 23 are positioned within and in juxta-

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positioned relationship with the peripheral edge 21 of tube 20. While in the position illustrated in FIG. 3, the assembly of 21, 26, 27 and 21 is heat sealed to form a unified top seal 30 as illustrated in FIG. 4. Top seal 30 is made to a width "X," which is at least 0.25 inch. It will be noted that the terminal end 31 of top seal 30 extends to the left of the seal 24 which was employed to join the valve sleeve 23 to the peripheral edge 21 of tubular blank 20 (see FIG. 1). This feature of the seal is an important element of the present invention and its significance is discussed in the next paragraph below. The valve of the finished bag consists of valve flap 22, valve sleeve 23 and a valve opening 32.

FIG. 5 illustrates the manner in which the top of the sealed bag supports the load when filled. It will be noted that the thin gauge film included in valve sleeve 23 lies entirely to the right of heat seal 24 and is supported throughout its entire area by an underlying section of the heavier gauge film from which the body of the bag is fabricated. Thus, throughout the entire bag, the contents are supported by heavy gauge thermoplastic film. As illustrated, the contents of the bag press the membrane-like valve sleeve 23 against the main top portion of tube 20 to effect a tight seal. The thickness of the valve sleeve 23 is extremely important. Generally, tube 20 has to be extremely strong, and therefore thick enough to support heavy loads. If the valve sleeve 23 is constructed of the same thickness film as the tube 20, it may be possible to eliminate the heat seal 24, but to do this would greatly diminish if not destroy the valve's unique self-sealing feature. For example, the pressure of the contained material will immediately collapse the membrane-like valve sleeve 23 and plug up the valve opening regardless of the direction the bag may be turned. As the gauge of the valve sleeve 23 is increased, its flexibility or self-sealing effect is decreased.

FIGS. 6–10 correspond, respectively, to FIGS. 1–5 with the parts illustrated in FIGS. 6–10 bearing numbers 100 units higher than the corresponding parts illustrated in FIGS. 1–5. The single point of distinction between the two embodiments of the invention illustrated in FIGS. 2 and 7. In FIG. 7, it can be seen that valve sleeve 123 is made from a rectangle from which the upper right hand corner has been removed. In the subsequent discussion of the invention and in the claims, this geometric form will be referred to as a "corner truncated rectangle." Referring to FIGS. 6 and 7, it will be noted that edge 126 of valve sleeve 123 is materially shorter than edge 127. As a result, when valve sleeve 123 and corner 122 of tube 120 are folded into the mouth of tube 120, the assembly of 121, 126, 127, and 121 (see FIG. 8), when viewed from left to right, decreases in steps from 4 to 3 to 2 layers of thermoplastic film. As this assembly of layers of thermoplastic film changes more gradually and more uniformly in thickness than the corresponding assembly illustrated in FIG. 3 (in which the assembly decreases in a single step from 4 to 2 layers of thermoplastic film), it is much easier to obtain a strong and more uniform heat seal.

The valved thermoplastic bags can be fabricated from such heat-sealable plastic materials as polyethylene, polystyrene, polyethylene terephthalate, polyvinyl chloride, polyvinyl acetate, polyvinylidene chloride, polyisobutylene, polypropylene, polytetrafluoroethylene and the like.

The preferred material of construction is polyethylene, a solid, tough polymer of ethylene which can be manufactured in film-form in thicknesses less than one mil. It is light in weight, extremely low in water absorption and moisture permeability and consequently is an excellent material for packing uses. In addition layers of poly-

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ethylene can be heat-sealed or fused together to present a strong bond. It is also preferable to utilize the same material for the construction of both the bag and the sleeve member since optimum fusion of two or more layers of film can only be accomplished if the fusion temperatures of the various joining layers are approximately within the same temperature range.

The valved bags of this invention ordinarily will have a substantial volumetric capacity, e.g., at least 1 cubic foot, and are designed primarily to carry from about 50 to about 100 pounds of such common pulverulent materials such as cement, flour, fertilizer, carbon black, chemicals and the like. The walls of the bag ordinarily will have a thickness of the order of 5-10 mils, although obviously the walls may be either thinner or thicker as indicated by the use to which the bags are to be put. If desired, the walls of the bag can be fabricated from a plurality of plies of thin thermoplastic film. The valve sleeves ordinarily will be considerably thinner than the walls of the bag and usually such sleeves will be fabricated from film which is about .5 to 4 mils thick depending on the strength and flexibility of the material, and in the case of polyethylene, thicknesses of 1-2 mils are generally sufficient.

The above descriptions and particularly the drawings are set forth for purposes of illustration only. Many variations and modifications thereof will be obvious to those skilled in the art and can be made without departing from the spirit and scope of the invention herein described.

What is claimed is:

1. A valved bag comprising in combination a non-

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gusseted tubular body of thermoplastic film that is heat sealed across its top and bottom, a top corner of said tubular body being folded into the top of the bag and constituting a valve flap, and a rectangular valve sleeve of thermoplastic film that is heat sealed along one edge to the valve flap and has two of its parallel edges sealed into the interior of the heat seal at the top of the bag; the thermoplastic film of the valve sleeve being membrane-like in effect and of a substantially thinner gauge than the thermoplastic film of the tubular bag body; the heat seal of the top of the bag extending beyond the heat seal which attaches the valve sleeve to the valve flap.

2. A valved bag as in claim 1 in which the two parallel edges of the rectangular valve sleeve that are sealed into the interior of; the top heat seal of the bag are of different lengths.

3. The valved bag according to claim 1 wherein the tubular body of thermoplastic film and the valve sleeve of thermoplastic film are polyethylene.

References Cited in the file of this patent

UNITED STATES PATENTS

2,708,067	Paton	May 10, 1955
2,959,343	Rosander	Nov. 8, 1960

FOREIGN PATENTS

687,235	France	Apr. 28, 1930
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