May 10, 1955 J. B. PATON 2,708,067

HEAT SEALABLE VALVE TYPE BAG

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FIG. 1.

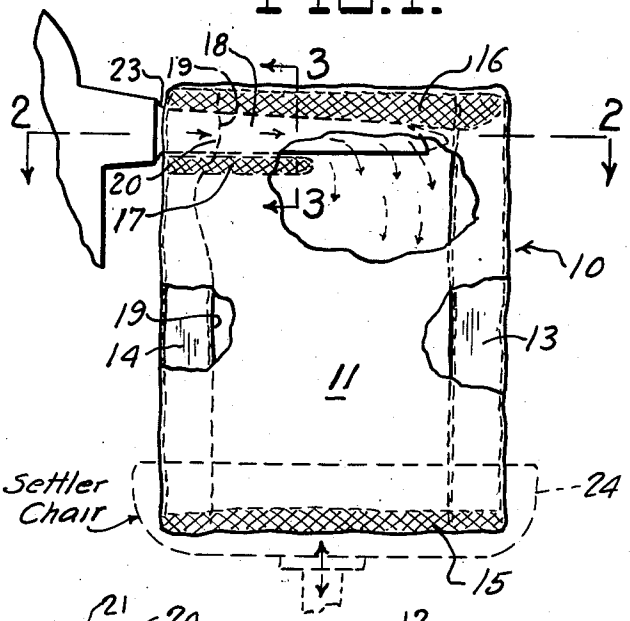
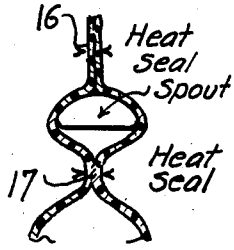


FIG. 3.



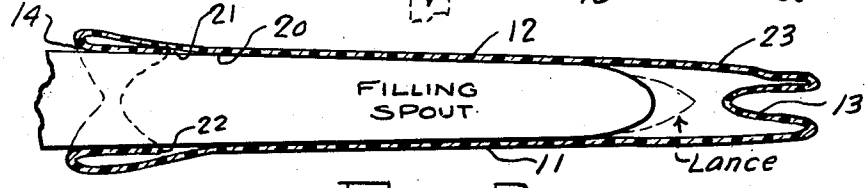


FIG. 2.

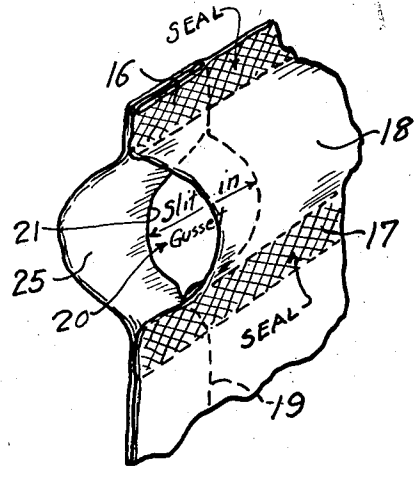


FIG. 4.

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FIG. 6.

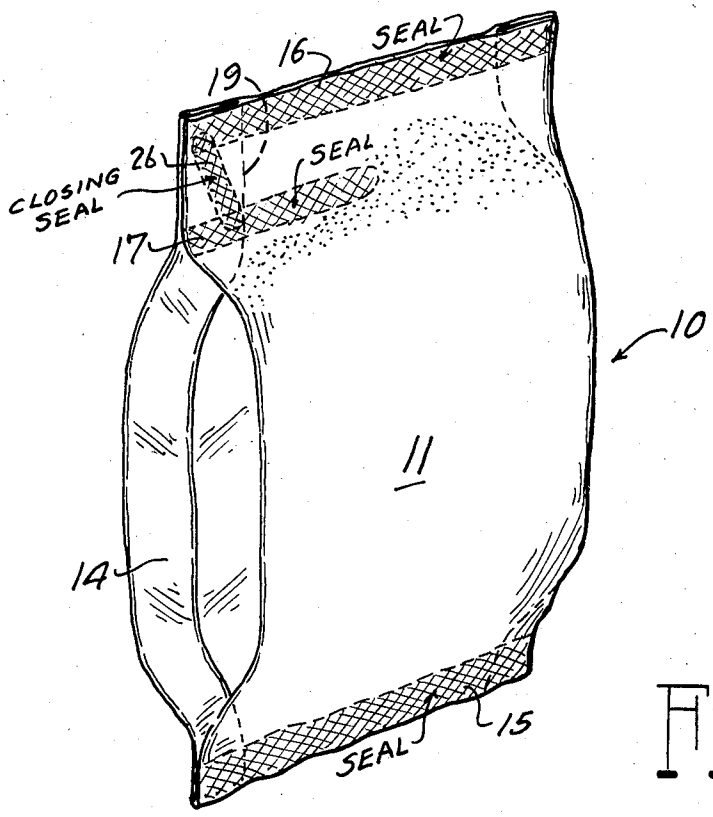
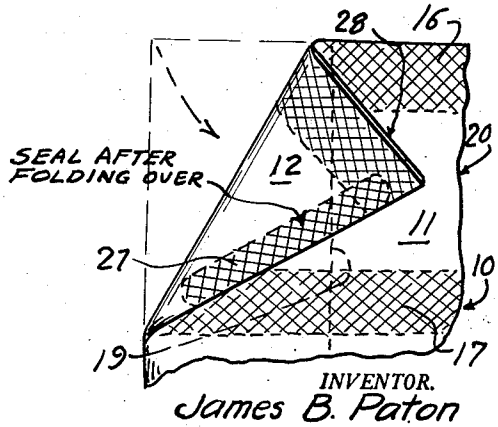


FIG. 7.



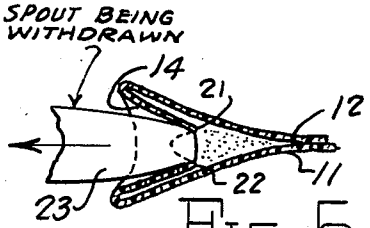


FIG. 5.

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HEAT SEALABLE VALVE TYPE BAG

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Application September 9, 1954, Serial No. 454,927

3 Claims. (Cl. 229—62.5)

This invention relates to the packaging of fluid materials such as powders, granular materials and liquids and, more particularly, to bags for the packaging of such materials which are fabricated from sheet material that is either thermoplastic itself or has a thermoplastic coating and that is heat sealed in a particular manner to form the bags to provide for valve-bag action when the bags are inserted on a filling spout of a conventional spout type bag packer.

So-called "valve bags" are employed for packaging many granular and powdered materials such as cement, fertilizer, etc., the bags in these instances being fabricated from several thicknesses of heavy paper which are sewed together to provide a valve type opening at one of the corners of the bag through which can be inserted the elongated nozzle of a packing machine to feed the material into the interior of the bag. When the bag is full it is withdrawn off the nozzle and the folds of the paper which form the valve are squeezed upwardly by the content material to close the opening through which the nozzle was originally inserted.

While the use of paper for bagging is widespread, many materials preferably should be packaged in moisture-proof material such as thermoplastic resinous films and, in some instances, if it were possible rapidly and easily to package some types of material in a bag made of a selected thermoplastic material, the thermoplastic material of which the bag is formed would not be incompatible in the formulation or compound in which the content material is used so that the bag would not need ever to be opened after it once had been packed. As an example of such a utilization of a thermoplastic bag, carbon black employed as an ingredient in the formulation of rubber for automobile tires can be packaged in a package made of polyethylene film in measured amounts, say, one-quarter, one-half, one or five pounds each, and the carbon black can be added to the Banbury mixer in the rubber formulation room by merely tossing the closed polyethylene bags of carbon black into the mixer. Such a procedure is highly advantageous because the bags of carbon black would never need to be opened in the formulation room, thus obviating the possibility of the carbon black spreading around the room and eliminating a problem of clean up or control.

The use of thermoplastic film as a material for the formation of bags in the packaging of powdered substances is known in many arts, but for the most part the operations have included the formation of an open mouthed bag, the deposition of the powder in the bag and the subsequent sealing of the bag; or the formation of bags continuously from a tube of material with the tube formed longitudinally around a filling spout which intermittently charges the bags after their lower seals are formed. In either case no way is provided to prevent the content material from adhering or clinging to those portions of the bags which are to be heat sealed for closing. Contamination of the areas to be heat sealed by the content material very seriously interferes with effective sealing of the bags.

It is an object of this invention to provide a bag fabricated from a heat sealable film which is presealed to provide a valve type bag, the presealed areas and the bag design resulting in the formation of a bag incorporating an automatic valve and means for preventing the contamination of the final sealed area by the content material.

It is another object of this invention to provide a bag easily fabricated from a standard gusseted tubing continuously fabricated by an extrusion die machine from a thermoplastic resinous material.

A still further object of this invention is to provide a bag having the advantages of the film from which it is formed, such as ease of fabrication, heat sealability, impermeability to air or moisture, and also having the advantage of a valve-bag design.

More specific objects and advantages will be apparent from the specification which follows and from the drawings, in which:

Fig. 1 is a view in elevation with parts broken away showing a bag embodying the invention in filling position on the spout of a conventional spout type packing machine.

Fig. 2 is an enlarged horizontal sectional view taken along the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary vertical sectional view taken along the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary view in perspective and on a greatly enlarged scale of an upper corner of a bag embodying the invention, and illustrating the formation of the sealed areas by which the "valve-bag" feature of the invention is provided.

Fig. 5 is a fragmentary view in section similar to Fig. 2 but on a smaller scale and showing the filling spout being withdrawn from a bag embodying the invention.

Fig. 6 is a view in perspective of a bag embodying the invention after it has been filled and sealed.

Fig. 7 is a fragmentary view in elevation of the upper corner of a bag embodying the invention and illustrating a modification in the method of sealing the bag after the withdrawal of the sealing spout.

A bag embodying the invention and generally indicated at **10** in Fig. 1, is fabricated from a gusseted tubing of appropriate transverse dimension, the tubing being seamless and consisting of a thin film of a thermoplastic resinous material. Any thermoplastic resinous sheet material or plastic sheet material having a heat sealable coating or other sheet material, for example, wax paper, may be fabricated to construct a tube having a generally planar front face **11**, a back face **12** (Fig. 2) and infolded gussets **13** and **14** at its sides. Gusseted tubing of this type is available as a commercial article of manufacture in many types of sheet materials and in many sizes of tubing and thicknesses of material.

The first step in the formation of a bag embodying the invention consists in cross sealing the bag as at **15**, for example (Figs. 1 and 6) to close the bottom of the bag. The cross seal **15** may be formed simultaneously with a top cross seal **16** to close the top of the bag if desired by sealing a wider transverse area of the tubing from which the bag is formed and then cutting across the sealed area or the tubing may first be cut into lengths and then the top and bottom seals formed in successive operations or simultaneously by spaced dies. In any event the cross seals **15** and **16** extend all the way across the tubing from which the bag **10** is formed. If the material is thermoplastic itself, the seals are merely fused areas of the material. If the material is not thermoplastic, but is coated with a heat sealable substance as, for example, cellophane coated with heat sealable waxes or paper coated with wax, metal foil coated with a fusible

resin or varnish, or any other sheet material having a heat sealable coating, the heat applied at the time of formation of the seals **15** and **16** adheres the several folds of sheet material at the gussets **13** and **14** and the front and back **11** and **12** together in the areas of the bottom seal **15** and top seal **16**.

At the time of formation of the top seal **16** or in a subsequent step, a partial seal **17** also is formed near an upper corner of the bag **10** and extending across the bag from one edge inwardly to say approximately the center of the bag. The seal **17** is spaced from the seal **16** leaving an unsealed area generally indicated at **18**. Simultaneously with the formation of the seal **17** or in an operation performed subsequently thereto, the innermost fold of the gusset **14**, indicated at **19**, is slit transversely between the seals **16** and **17** so that the corner of the bag **10** may be flexed slightly as in Fig. 4 to provide a passageway **20** leading inwardly between the top seal **16** and the partial seal **17** and communicating with the interior of the bag **10**. Slitting the edge **19** of the gusset **14** provides two edges **21** and **22**, one at each side of the passageway **20**.

The operations just described result in the formation of a plastic bag as depicted in Figs. 1–4, inclusive. All of the three seals **15**, **16** and **17** can be simultaneously formed by one sealing operation. It is not necessary even to slit the edge **19** of the gusset **14** at the time of the formation of the seals **15**, **16** and **17** since the gusset edge **19** can easily be slit by a lance formed at the front end of a filling spout **23** of such size as to fit through the passageway **20** and extend beyond the partial seal **17**. For example, if the three seals **15**, **16** and **17** are simultaneously formed and the gusset edge **19** is not slit at formation of the bag, the bags remain hermetically sealed and thus clean until the time of their actual filling. If, on the other hand, the gusset edge **19** is slit at the time of formation of the seals **15**, **16** and **17**, the filling spout **23** need not be provided with a lance on its forward end, under these conditions, the spout **23** can have a rounded forward end such as that shown in the drawings so that the bags will not inadvertently be damaged by the lance otherwise needed to slit the gusset edge **19**.

Conventional spout type packing machines usually are provided with settler chairs, shown in broken lines in Fig. 1 and indicated by the reference number **24**—the settler chair not constituting a part of the instant invention but being a conventional structural element like the spout **23**.

When it is desired to fill a bag of the invention it is thrust over the end of the filling spout **23**, either having its gusset edge **19** lanced at the time or having a previously lanced gusset edge **19**, and after being thrust fully onto the spout **23** the packing machine is energized to feed the content material through the spout **23** and into the interior of the bag **10** as indicated by the arrows in Fig. 1. After the bag is filled, this being determined, for example, by weight or volumetric control mechanism, the bag is withdrawn off the spout **23** and, as illustrated in Fig. 5, the edges **21** and **22** of the slit gusset edge **19** are wiped along the edges of the spout **23**, being squeezed quite tightly against the spout **23** by the weight of the content material tending to pull the bag **10** downwardly. This wiping action prevents the adherence of any small quantities of content material to the exterior of the spout **23** and its consequent deposition on the portions of the spaced wings of the gusset **14** generally indicated at **25** in Fig. 4, and which form portions of the walls of the passageway **20**.

After the spout **23** is completely withdrawn from the bag, pressure of the content material as indicated particularly in Fig. 6, tends to squeeze the bag walls together across the passageway **20** and, if desired, particularly in some instances where contamination of the content material is to be prevented or where the content material is of such nature that escape of even any minute quantity from the bag is to be prevented, the passageway **20** may be sealed by a short transverse closing seal **26** (Fig. 6).

If the content material of the bag is such that dusting of the surfaces **25** is impossible to prevent even by the wiping action of the edges **21** and **22**, for example, if the material is an exceedingly fine powdered material which is wafted onto the surfaces by the air currents set up when the bag is drawn off the spout, it may be desirable to seal the passageway **20** in the manner illustrated in Fig. 7. In this case a sealed area **27** is employed to close a folded-over corner generally indicated at **28** which is folded across the passageway **20**, the thicknesses of the front surface **11**, the two surfaces **25** of the gusset **14** and the rear surface **12** being doubled over upon each other and all fused or sealed together by the single seal **27**. This manner of forming the closing seal **27** positively prevents interference with the seal by any powder or dust on the surfaces **25** because the bag is effectively sealed by the two touching portions of the front face **11** being sealed together since the fold insures the closing of the passageway **20** through the gusset **14**.

Having described the invention, I claim:

1. A package for powdered and the like materials, said package having opposed front and back, gusset-like reentrant fronts of material integral with said front and back and forming sides for said package connecting said front and back, a bottom seal and a top seal closing said front and back together and adhering said front and back and said gusset fronts together, and a filling tube forming seal extending part-way across said package from one edge thereof inwardly and spaced from said top seal, there being an unsealed area between said top and tube forming seal extending from one edge of said package across above said tube forming seal, the space between said front and back in such unsealed area being in communication with the interior of said package and adapted to receive a filling machine spout inserted therein through the side of said package located above said tube forming seal.

2. A package according to claim 1 in which said back and front and said gusset folds all consist of heat sealable sheet material.

3. A package according to claim 2 in which the sheet material is thermoplastic resinous film.

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