May 31, 1955

A. B. HASLACHER

2,709,549

LAMINATED BAG BOTTOM

Filed March 22, 1952

2 Sheets-Sheet 1

Fig.1

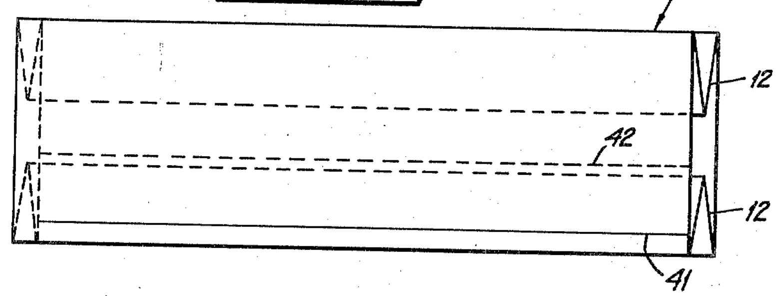


Fig.2

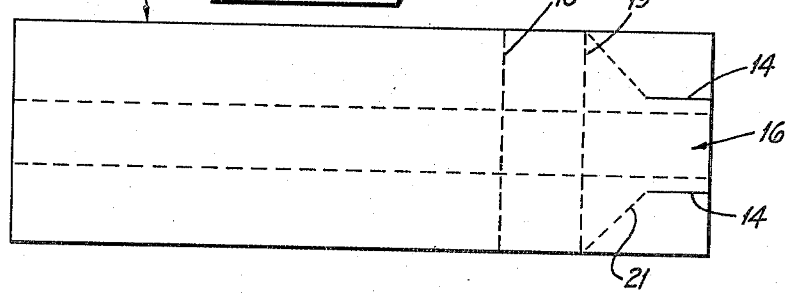


Fig.3

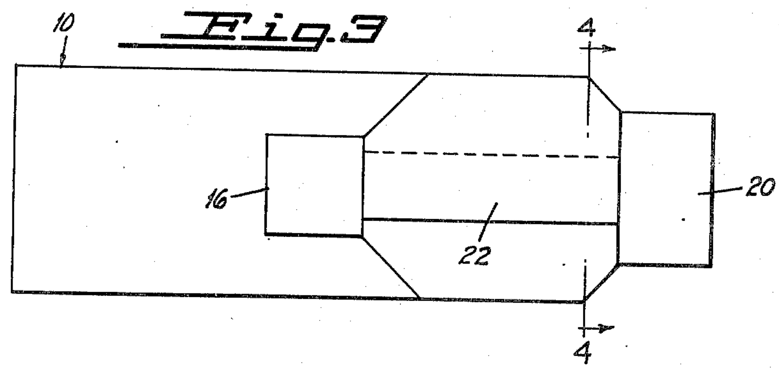
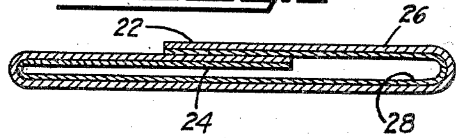


Fig.4



INVENTOR.
Alfred B. Haslacher
ECKHOFF & SLICK
ATTORNEYS
BY [signature]
A MEMBER OF THE FIRM

May 31, 1955 A. B. HASLACHER 2,709,549

LAMINATED BAG BOTTOM

Filed March 22, 1952 2 Sheets-Sheet 2

Fig. 5

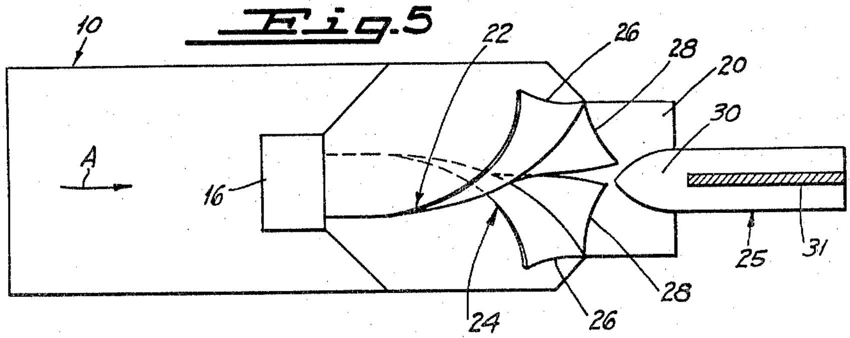


Fig. 6

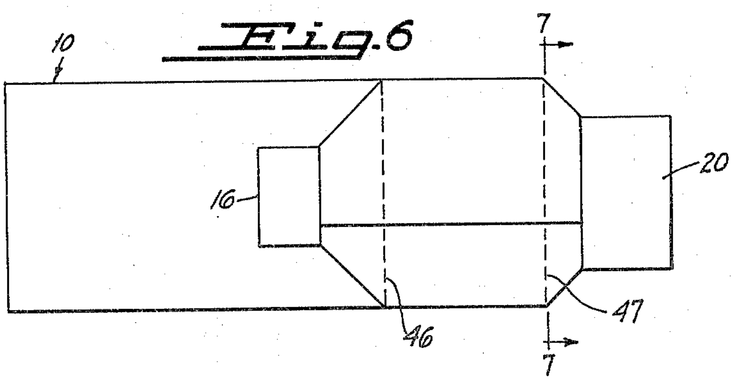


Fig. 7

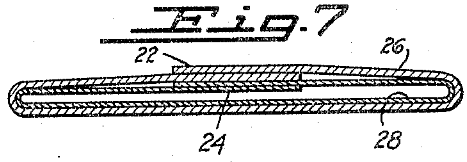


Fig. 8

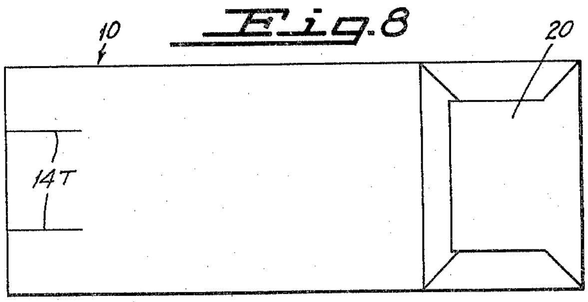
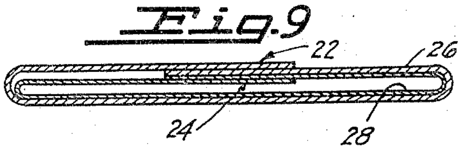


Fig. 9



INVENTOR.
Alfred B. Haslacher
ECKHOFF & SLICK
ATTORNEYS
BY [signature]
A MEMBER OF THE FIRM

United States Patent Office

2,709,549

Patented May 31, 1955

1

2,709,549

LAMINATED BAG BOTTOM

Alfred B. Haslacher, San Francisco, Calif.

Application March 22, 1952, Serial No. 278,046

1 Claim. (Cl. 229—55)

This invention relates to the manufacture of bags which are of such materials and are so constructed that they are highly resistant to the passage of moisture or gases. Such bags can be said to be moisture-proof and moisture vapor proof; in addition, they are sift-proof, retaining materials of fine particle size. They are also highly resistant to the entrance of pests such as insects. Finally, they are so tight that they enable materials to be packaged in them under a vacuum or under pressure.

The invention is broadly concerned with the formation of an improved end closure in a bag of the automatic or satchel bottom type. As I have explained in my Patent 2,353,402, an impervious closure of this type is relatively easy to form if the tube to be closed is fully expanded and if support is afforded across the cross section of the bag for the application of sealing pressure. However, when the closure is to be formed on a flattened tube without opening or distension of the tube, the problem is quite different and is increased in difficulty many-fold. The problems attendant upon formation of an impervious closure in a flattened tube will be appreciated further when it is pointed out that bag machines operate continuously and at a relatively rapid rate.

It is in general the broad object of the present invention to provide a method of making an improved end closure in a bag which is particularly suited to application by mechanical means to enable the bag closure to be formed with great rapidity from a flattened tube.

A further object of the present invention is to provide a method of making bags which may be carried out with a minimum of change in bag-making equipment.

Another object of the present invention is to provide a bag of the automatic type wherein the bag is so constructed that there is not even a single place in the bag where there is a difference of more than one thickness of material at a seam intersection.

The invention includes other objects and features of advantage, some of which, together with the foregoing, will appear hereinafter wherein is further set forth the preferred manner of practicing the method of the present invention.

In the drawings accompanying and forming a part hereof, Figure 1 is a plan view of a flattened tubular bag blank, the tube being shown in a somewhat opened position, to illustrate its construction.

Figure 2 is a plan view of a flattened tubular bag blank showing the formation of slits to define the flaps of the diamond fold and the location of the transverse score lines facilitating the opening of the diamond fold.

Figure 3 is a view similar to Figure 2, but showing the diamond fold fully opened but prior to formation of bottom seals.

Figure 4 is a schematic section on the line 4—4 of Figure 3.

Figure 5 is a schematic view illustrating the rearrangement of the central flaps of the bottom.

Figure 6 illustrates the diamond fold following completion of the rearrangement and after formation of the bottom seals.

2

Figure 7 is a schematic section on the line 7—7 in Figure 6.

Figure 8 is a plan view illustrating the completion of the bag bottom.

Figure 9 is a section illustrating a modified form of seal as compared to that shown in Figure 7.

A flattened length of tube **10** having gussets **12** formed therein is shown in Figure 1; in its simplest form, such a tube includes two elements, an outer one of flexible sheet material such as paper, cellophane, and the like, and an inner element of flexible sheet material which is highly moisture impervious and has kindred properties, e. g., is quite gas resistant, and which is sealed by application of heat or pressure or both. Thus, the tube **10** is, in fact, made up in its simplest form of two tubes, for example, of an outer paper tube and an inner moisture impervious tube, the two fitting snugly together and being formed by securing together the longitudinal terminal edges of each sheet along the run of the tube so that one tube is within the other. These running seams in the sheet are offset and usually are provided in an edge of the bag so as not to interfere with the sealing of the bottom; the seams have been indicated by lines **41** and **42** in Figure 1. The several tubes can be secured together at spaced points, if desired, by glue or other means. Of course, one can use more than one non-heat sealing tube, or more than one heat-sealing tube, as desired, and while the method will be described as applied to a two-wall-tube, it is not limited to this form.

To prepare the tube **10** for the formation of an automatic bottom, slits **14** are formed in one wall to define a flap **16**, and parallel transverse score lines **18** and **19** are formed at predetermined distances from the slit end of the tube. In the opposite wall a flap **20** similar to the flap **16**, but preferably of greater width, is similarly defined by a pair of slits; the flaps can be the same size, if desired, or flap **16** can be larger than flap **20**.

A diamond fold is opened by maintaining the underflap **20** in its original plane and by folding the flap **16** rearwardly about the rearmost score line **18** and into the plane of the bag body and by folding the gusset portions of the tube along angular fold lines **21**. The edges **22** and **24** of the material intermediate the flaps **16** and **20** are brought into overlapping relationship by this opening of the diamond fold. The distance between fold lines **18** and **19** is in such relation to the width of the tube **10** that the edges of the flaps **22** and **24** overlap and the two materials making up the tube are in a staggered, overlapping relation, as is particularly illustrated in Figure 4 wherein the tube **10** is shown as composed of an outer, non-thermoplastic ply **26** and an inner thermoplastic ply **28**. In the overlapped portion, it will be observed that the layers are staggered, that is, a non-thermoplastic layer is in face-to-face contact with a thermoplastic layer. This is because the terminal edge portions of the bag end forward of fold line **19** are moved into the overlapping position of Figures 3 and 4.

In the ordinary manufacture of bags, the slitting of the front and rear walls to define the flaps **16** and **20** is carried out as part of the operation of forming the tube **10**. The opening of the diamond fold to the condition illustrated in Figure 3 takes place immediately after the cutting off of a bag length from the continuously formed tube. The formation of the score lines **18** and **19** ordinarily takes place either during or immediately after severance of the bag length and before the opening of the diamond fold. The overlapping of the flaps **22** and **24** is not the usual practice and the extent of the overlap is regulated by the spacing of the score line **18** from the end of the bag length. The spacing of the score line **18** from the score line **19** is necessarily equal to the depth of the gusset. All of the principles of this method, although illustrated with respect to a gusseted bag, are equally applicable to a "flat" tube, in which case the ultimate bottom will be of the "satch" bottom rather than the "automatic" bottom type.

With a blank in the condition shown in Figure 3, the blank advances in the direction of the arrow in Figure 5 to encounter a fixed plough **25** which raises the overlapping flaps **22** and **24** and initially brings their edges into a plane substantially normal to the plane of the diamond fold. Plough **25** comprises a flat entering end **30**, merging into a vertical plate **31**. The end **30** enters below the overlapped flaps **22** and **24** while the vertical plate **31** raises the flaps **22** and **24** with the result that the flap portions **22** comprising the outer non-thermoplastic material **26** are maintained in a raised position while the flap portions **24** comprising the adjacent thermoplastic material **28** are released and fall back and into a position wherein the thermoplastic layers are in face-to-face contact; any adhesive which has been applied between the layers making up each flap is placed so that the layers separate readily. Usually, the thermoplastic materials have less stiffness than the non-thermoplastic materials so the thermoplastic material falls away more readily from the plough. When overlapped, heat, pressure, or both, are applied to the overlapped thermoplastic material edges to seal their common surfaces together with a seam. The precise mode of applying heat or pressure is immaterial and one can utilize heated bars, heated gas, heated wheels, heated belts, electronically, with or without pressure; for example, plough **25** can be used as part of the sealing mechanism. Simultaneously, or thereafter, a strip of suitable adhesive is applied to the non-thermoplastic outer layers which are in abutment so that these are joined together and the thermoplastic and non-thermoplastic layers are in that relation in which they appear in Figure 7. This is achieved with each layer comprising the tube **10**; if necessary, auxiliary surfaces can be applied to separate the several fold elements and effect their rearrangement. The seal or joint made between each overlapped layer is offset from the other seals so the bottom is quite flat and one seal is not made directly above another.

Since the non-thermoplastic layers are adhesively secured, the bag strength is increased.

In place of lifting both flaps **22** and **24**, one need lift only a portion of one flap. Thus, as is shown in Figure 9, flap **22** has been separated by lifting only its non-thermoplastic sheet member **26**, to place this in contact with the portion of this same member which forms flap **24**. This joint is particularly useful when Pliofilm is used as the heat-sealing sheet since the seal can be made by applying heat to the non-heat seal member portion of flap **22** while the like portion of flap **22** is out of the way.

Instead of using a plough, one can use fingers, an air blast or a suction to move either of flaps **22** and **24**, or any of their respective constituents.

Thereafter, the bag is completed into the form in which it appears in Figure 8, the steps utilized for this being more particularly disclosed in my Patent 2,353,402 in connection with its Figures 12, 13 and 14; reference can also be had to my Patents 2,377,005 and 2,537,462 for teaching of formation of the bottom at this stage. This is accomplished by first moving flap **16** inwardly into the plane of the bottom about the line **46** and securing the flap **16** with a suitable adhesive. Flap **20** is then moved

about line **47** and secured, the bag and bottom then being in the position in which it appears in Figure 8.

By bringing the layers of thermoplastic material into juxtaposition and then sealing with an overlap seam, I am able to provide a stronger bag having greater resistance to moisture permeability at less cost. This bag can be made in a continuous manner without any change being required in the usual bag-making machine and without the necessity of die-cutting the web of paper utilized in the bag-making operation. By avoiding die-cutting of the outer bag, it is possible to paste it together whereby the bag is strengthened while the continuous passage of bags through the heat sealing mechanism produces more bags in a unit of time as compared to bags made by the intermittent passage. Further, since the outer or non-plastic layer or layers are held out of the way during the sealing of the thermoplastic material, such heat sealing operation can proceed more rapidly, less heat being required, and the heat sealing is more uniform and complete.

If desired, the top of the bag can be provided with pairs of slits **14T**, similar to those provided in the bag bottom. The top slits are formed at the time of cut-off of the tube length and coincident with formation of the slits in the following tube length. Slits **14T** are used to form a top end closure after filling of the bag.

I claim:

A rectangular end bag formed of a flattened composite tube having at least two tubes, an outer tube and an inner tube, at least said inner tube being made of heat-sealing material, said flattened composite tube having front and rear walls and initially having a pair of spaced longitudinal slits in each of said front and rear walls at the end of the composite tube from which the bottom of the bag is to be formed thereby providing two spaced end tabs and two end flaps all of equal length, the slits extending inwardly from the end of the tube and spaced from the sides, the end being formed by a diamond fold with the two tabs on opposite sides thereof, flaps at the middle of the diamond fold in overlapping relationship having a first seal between flaps of the inner tube formed therebetween for the entire length of the overlap and with overlapping flaps of the outer tube fastened together offset from the first seal in an overlapping relationship and two transverse seals at right angles to the first seal across said flaps sealing overlying portions of the inner tube, one end portion of the diamond fold including a tab being folded upon a crease line extending transversely of the flattened tube and secured to the overlapped flaps of the first mentioned tube, the other end portion of the diamond fold including a tab being folded upon a crease line extending transversely of the flattened tube and secured at least to the first folded end portion, the two transverse seals being heat seals extending entirely across the diamond fold between each crease line and its adjacent tab.

References Cited in the file of this patent

UNITED STATES PATENTS

2,078,467	Sterling	Apr. 27, 1937
2,193,755	Avery	Mar. 12, 1940
2,353,402	Haslacker	July 11, 1944
2,377,005	Haslacker	May 29, 1945
2,396,565	Gardner	Mar. 12, 1946
2,496,796	Kardon	Feb. 7, 1950
2,537,462	Haslacker	Jan. 9, 1951