Dec. 25, 1956 C. W. VOGT 2,775,082

METHOD OF FILLING AND SEALING BAGS

Original Filed June 2, 1948

FIG. 1.

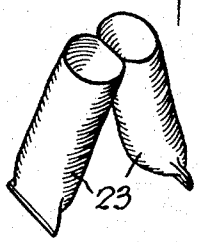


FIG. 2.

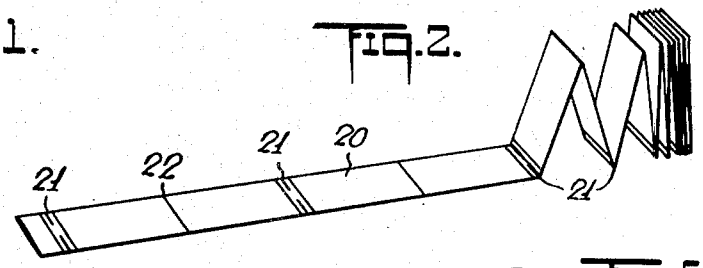


FIG. 3.

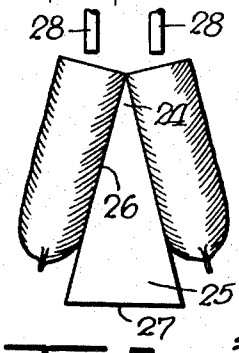


FIG. 4.

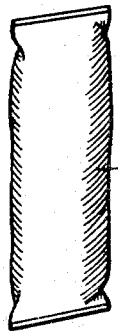


FIG. 5.

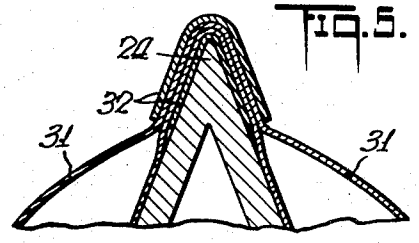
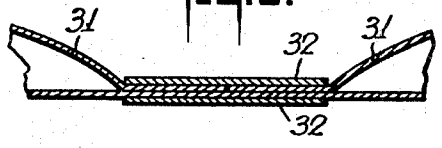


FIG. 6.



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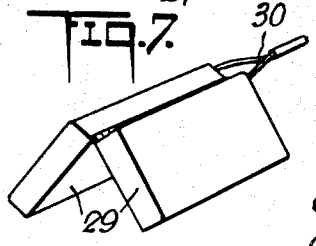


FIG. 8.

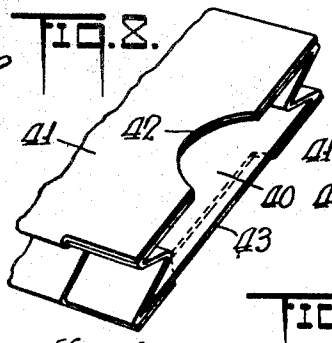


FIG. 9.

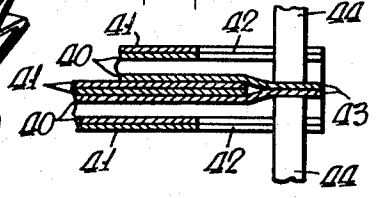


FIG. 10.

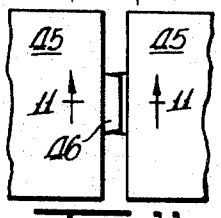


FIG. 11.

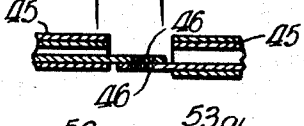


FIG. 12.

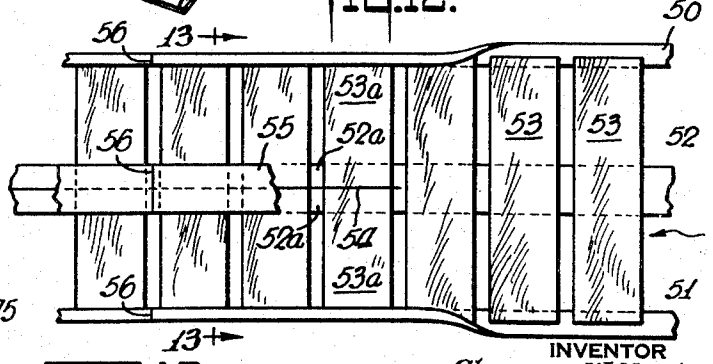
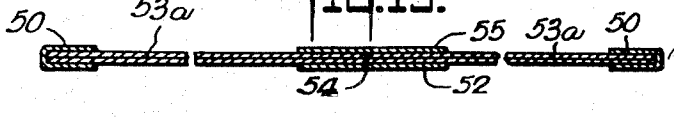


FIG. 13.



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United States Patent Office 2,775,082
Patented Dec. 25, 1956

2,775,082

METHOD OF FILLING AND SEALING BAGS

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Original application June 2, 1948, Serial No. 30,647, now Patent No. 2,628,013, dated February 10, 1953. Divided and this application November 1, 1952, Serial No. 318,171

5 Claims. (Cl. 53—37)

This invention relates to methods of filling and sealing bags for the protection, storage or shipment of various materials or articles. In the preferred form the walls or liners of the bags are made of impervious material, so that said bags may be hermetically sealed after filling with liquids, pastes, plastics or other products containing liquids or moisture, or products or articles which are to be protected against the action of liquids, gases and the atmosphere outside of the bags.

This is a division of my application Serial No. 30,647, filed June 2, 1948, now U. S. Patent No. 2,628,013, granted February 10, 1953.

The main objects are to provide a method whereby bags may be held upright, filled, closed and sealed, and if desired labeled, in a simple and effective manner, and by the use of simple, inexpensive and easily operated means.

As an important feature of the invention two bags are connected at their open ends, and in such a way that they may be hung on opposite sides of a support, with the connecting portion resting on the support. Thus they will be disposed in substantially upright positions with their open ends uppermost, and will not topple over while being so supported, filled and closed.

The connecting portion between the two bags extends along substantially less than one-half of the perimeter of the open ends, and in some cases may be very short. Thus, when the pair of bags are supported by the connecting portion, the upper ends tends to open so that no mans need be provided for holding the bags open during filling.

The bags at their open ends have inwardly facing surfaces formed of, or coated with, a sealing material, and the support on which the connecting portion between the two bags rests may be of a length in excess of one-half the bag mouth perimeter. Thus, after filling both bags, the opposite sides of the two bag mouths may be pressed together to flatten the bags at their mouths, and the closed mouths hermetically sealed. Preferably the sealing material is of a thermoplastic character, so that when heat and pressure are applied from opposite sides of the two bags simultaneously, the mouths of both bags are closed and sealed. Such closing and sealing of two bags does not exert any appreciable strain tending to move the bag support, and thus the bag support may be of a small portable type which may be placed on a table. The closing and sealing may be effected by any suitable apparatus, such for instance as an electrically heated clamp which may be closed over the upper ends of both bags, and acts not only to close the mouths but press them against the support and heat them to a sufficient temperature to effect the hermetic sealing. After filling, closing and sealing the pair of bags, the connecting portion may be left intact and the pair of bags stored, shipped and sold as a unit, or the connecting portion may be severed at once, or at any later time.

The thermoplastic material may be in the form of strips extending along and around the inner surface of each bag at its mouth, or the bags themselves may be made of the thermoplastic material, or said material may constitute a water-tight liner for bags made of paper or other porous material. Sheets or tubes of a heat sealing "cellophane," such as made and sold by Du Pont, "pliofilm" such as made and sold by Goodyear, films of a polyvinylidene made and sold by Dow Chemical Co. under the trademark "saran," and/or polyethylene such as sold by Plax Corporation and Visking Corporation, are suitable materials for the bags or liners.

Some thermoplastic material, such as films of polyvinylidene chloride, greatly shrinks when subjected to such heating as will permit heat sealing. If such shrinkable material be employed in making my improved bags, or the liners thereof, a stiffening strip which may be applied along or over the mouth portion, and which will adhere to the "saran" and prevent the latter from shrinking during sealing of the bags. Such strips may be applied to the outer surface of each bag mouth of the pair of bags prior to or at the time the heat and pressure are applied to soften and stick the layers of "saran" and the bag walls together. These shrink-preventing strips may be pairs of separate or connected labels indicating the contents of the bags. Thus, the closing, sealing and labeling of two bags may be effected by a single heating and pressing operation.

The making of the entire bag or the liner of the bag of thermoplastic material is preferred where the bags are to be filled with a liquid or a liquid-containing material, or a material to be protected against the action of moisture or gas in the atmosphere. The bags may be of the pillow case type, or of the inverted pleat type, or may be of any other suitable type. The single bags shown in my Patent 2,214,944, the Vogt and Lakso Patents 2,177,918 and 2,307,902, or the Lakso Patent 2,234,051, are suitable for use in my present invention, if made or secured together in pairs at the open ends.

The pairs of connected bags may be made by use of the apparatus shown in the Lakso Patent 2,234,051, by a few simple alterations. For instance, a cutter may be geared to be rotated at the same speed as the collapsed tube, and may be located to cut intermediate of two of the heat sealers, but with those heat sealers spaced to the length of two bags instead of one, and the cutter may be arranged to cut through one side panel and the inverted pleats but not through the opposite panel. In the making of the connected pairs of bags, such pairs may be formed end to end as a long strip, or the pairs may be connected side by side, and in the latter case, later cut apart into pairs.

The making of the connected pairs of bags and the filling of them while still connected has many advantages. The bags may be of small size, and serve as ampules for pharmaceuticals, in which case they would be made solely of the thermoplastic material and have a capacity of only 1 to 25 cc. Such ampules do not need to be cut or broken open, as the hypodermic needle may be used to pierce the wall of the bag, and the contents may be drawn directly into the syringe. Thus there is no liability of minute fragments of glass getting into the serum, as sometimes may occur where the ampule is of glass which must be broken open.

The individual filling of small single bags would be tedious and expensive, whereas by means of the present invention the bags may be supported on any small horizontal bar or supporting rod, and the filling and sealing effected by a simple heating and pressing operation which greatly reduces the cost and increases the ease of handling.

The bags may be used in the home for packaging of fruits, catsup, vegetables and other home prepared prod-

ucts, or for protecting products to be subjected to deep freezing. For such purposes the bags may be of pint, quart, or larger capacity. Single bags, even of such larger size and with rectangular bottoms, cannot be readily held in upright position during filling, because of the flexibility of the walls; and sealing cannot be readily effected in the home. By means of the present invention all such difficulties are overcome, as the pair of bags may be supported, for instance, on the back of a chair, during the filling and sealing, as by partly filling one bag before filling the other bag, the weights will counterbalance each other, and the bags do not need to be supported other than by the connecting part.

The sealing may be effected by simultaneously closing and clamping the open ends of both bags against the chair back or other support while the necessary heat is applied to effect the heat-sealing, and as equal pressures are applied from opposite sides there is no liability of tipping the support, even if it be merely placed on a table.

In the home, the heat and pressure may be applied by pressing a flatiron or other heating appliance, or one made particularly for the purpose, laterally against the closed mouths of the bags to press them against the bag support.

The manufacturing of the bags is a simple operation. In some forms they may be made from a continuous seamed or seamless tube with opposite walls sealed together along narrow transverse strips spaced apart a distance equal to the length of two bags. The tube may be cut transversely through each sealed area and cut nearly, but not all the way across midway between such sealed areas, to thus form pairs of bags connected at their open ends. A plurality of pairs of bags may be made from two superposed sheets or strips, heat sealed together along the desired area, and later cut apart into pairs.

Bags of the inverted pleat and rectangular bottom type may be made in pairs, with the closed bottoms at the outer end and the side walls partly connected instead of being completely severed at the open ends. Also, separate bags may be made by any known commercial method, and of a single layer of thermoplastic material, or of multiple layers with the inner lining of the thermoplastic material, and after completion of the individual bags they may be connected together in pairs by superposing and sealing together portions of the thermoplastic material of two bags at their mouths, or by applying a separate sealing strip, or by overlapping tabs at the open ends and sealing such tabs together. The bags may be made of separate sections of tubing, each length sealed or closed at one end, and with its open end connected to a similar open end of another length by a separate strip or short section of thermoplastic coated paper. What is essential is that the bags be connected together in pairs at their open ends, and with the linings or strips at the mouths, or the entire bags may be of the thermoplastic material.

In the accompanying drawings:

Fig. 1 is a perspective view of a pair of bags suitable for use in practicing my invention, and made from seamless thermoplastic tubing.

Fig. 2 is a perspective view showing how such pairs of bags may be made from a continuous strip of tubing.

Fig. 3 is a side elevation showing a pair of bags supported in position for filling.

Fig. 4 is a perspective view of a closed and sealed bag.

Fig. 5 is a side elevation showing a pair of bags on a support, and having reinforcing labels or tabs applied at the sealed area.

Fig. 6 is a sectional view of portions of a pair of sealed bags after being sealed as shown in Fig. 5, and preparatory to being cut apart.

Fig. 7 is a perspective view of a form of sealing device which may be employed for effecting the sealing.

Fig. 8 is a perspective view of a multi-ply bag with a heat sealable lining, and of a type adapted to be sealed to a similar bag to form a pair of bags connected together at their open ends.

Fig. 9 is a section showing the sealing operation of two such bags as shown in Fig. 8.

Fig. 10 is a plan view of portions of a pair of bags, each having a tab extending from the open end of the thermoplastic lining.

Fig. 11 is a section on the line **11—11** of Fig. 10, showing two such bags as shown in Fig. 10 with their tabs together.

Fig. 12 is a plan view showing another way in which the bags may be made; and

Fig. 13 is a section on the line **13—13** of Fig. 12, and on a larger scale.

One of the simplest forms of two bags connected at their open ends is that shown in Fig. 1. A seamless tube of thermoplastic material, such as polyethylene, may be employed for making this form of connected bags, or the tube may be made from a sheet with the opposite edges sealed together.

As shown in Fig. 2, a seamless or seamed tube **20** may be heat sealed along comparatively narrow transverse areas **21** spaced apart to distances equal to the length of a pair of bags. This transverse sealing may be effected in any suitable manner by applying heat and pressure to the areas to be seamed. Midway between the sealed areas **21** the tube may be cut nearly, but not entirely in two, along a transverse line **22**. The tube may then be cut up into sections and along lines midway between the side edges of each sealed area **21**, and there will thus be formed a plurality of pairs of bags **23** sealed at the bottom and connected together for a short distance along the periphery at the open ends, as shown in Fig. 1. The pair of tubes may be supplied as articles of commerce, or a tube of any desired length may be partially cut along the lines **22**, and if desired partially across the sealed area, and the tube folded in pleat form as shown at the right hand end of Fig. 2, and with the sealed areas along one end of each alternate fold, and the other partial cuts along intermediate fold lines. Thus when the bags are to be used, the only cutting or tearing necessary is to complete the severing through the sealed areas. If desired, the transverse cut **22** may be made just before the bags are to be filled, and thus the interior of the bags may be maintained sterile.

In using connected bags embodying the present invention, the two bags may be suspended on any suitable device including a bag supporting horizontal bar and side surfaces against which the bodies of the bags may rest. Merely for purposes of illustration I have shown a bar **24** forming the upper portion of a block **25** having opposed inclined walls **26**. This block may be of a single piece of wood presenting opposed inclined surfaces **26** and a base surface **27**, or it may be made of a strip of stiff sheet material such as double-faced corrugated board folded and having its ends overlapped and secured together to form the base, and with the upper fold portion forming the supporting bar **24**.

With the bags supported as shown in Fig. 3, they may be filled in any suitable or well known manner. For instance, the filling material may be poured in from a small dipper, or it may be supplied through tubes **28** terminating over the upper open ends of the two connected bags.

When the bags have been filled to the desired extent, but not entirely full, the upper open ends are closed and subjected to heat and pressure to seal them. The sealing may be effected by pressing two heating elements against the outer surfaces of the two bags at their upper open ends, to press the opposite walls tightly together and against the supporting bar **24**. The bags may be separately sealed if the supporting member is sufficiently rigidly mounted so as to sustain the desired lateral pres-

sure from one side only, or the two bags may be simultaneously closed and sealed by applying heating elements from opposite sides simultaneously.

In Fig. 7 I have shown a simple form of sealing device which includes two jaw members **29** hinged together and having electric heating elements, with the current supplied from suitable wires **30** leading to a source of electrical energy. The current should be so controlled and the heating elements so designed that upon placing the two members **29** upon opposite sides of the open end of the bag and pressing them tightly toward each other, they will heat the thermoplastic material to a sufficient extent to effect complete sealing action in a very short period of time, but not sufficient to unduly melt the thermoplastic material. After the open ends of the bags have been sealed together, the pair of bags may be stored, shipped or sold as pairs, or the connecting portion at the mouths of the bags may be severed to form two hermetically sealed bags **31**, as shown in Fig. 4.

The method of sealing above described is applicable to those thermoplastic materials which soften but do not shrink upon the application of heat. In case the thermoplastic material be a polyvinylidene chloride film, which very greatly shrinks upon heating, such shrinking may be prevented by the use of reinforcing elements, which elements may also serve as labels to indicate the contents of the sealed bags.

As shown in Fig. 5, two such labels **32** may be employed, and each provided with a thermoplastic cement or other adhesive which upon being pressed against the shrinkable thermoplastic material and heated, will adhere firmly to the sheet material, and will hold it against shinking before the latter becomes heated to the sealing temperature at which it would otherwise shrink. In use, one of such labels is laid across the upper edge of the supporting bar **24** with the adhesive surface uppermost, the bags are placed in position over it, and after the bags have been filled, the mouths are closed by hand or by any suitable apparatus, and the second label, with the adhesive on the lower side, is placed over the connected upper portion of the two bags. Heat and pressure are then applied to seal the labels to the bag walls, and momentarily thereafter seal together the opposite walls of each bag. The adhering of the bag walls to the adhesive labels will prevent the walls from shrinking, if they be of polyvinylidene chloride or other thermoplastic material which tends to shrink on heating. The adhesive may become tacky below 250° F., whereas the "saran" softens and fuses at about 280° F. Thus the time interval in sealing the label in place and sealing the bag mouths may be due solely to the time of heat transmission through the layer.

One or both of the labels may be printed on each half, to indicate the contents of the bag, the amount, the name of the manufacturer or packager, the directions for using, and/or other pertinent information.

In the bags above described, an entire bag is made of thermoplastic material, but as previously noted, the thermoplastic material may serve merely as the lining for a bag of paper or other strong but porous material. In Fig. 8 I have shown the mouth portion of a bag of the type in which there is a liner **40** of thermoplastic, impervious material, and an outer body portion **41** of paper. The bag is shown of the type in which there are inverted pleats, and with the outer paper layer cut away within the pleats at the mouth end of the bag, as disclosed and claimed in my Patent 2,234,065, so that in heat sealing, the pleats as well as the open end of the bag are closed.

In the construction shown in Fig. 8, the usual notch or recess **42** is formed in one side wall at the mouth to facilitate opening of the bag, but in the opposite side wall only the outer paper layer is cut away, so as to leave a wall portion **43** solely in the liner of thermoplastic material. Two such bags as shown in Fig. 8 may be superposed with the wall portions **43** in direct contact, as shown in Fig. 9, and a pair of pressing and heat sealing members **44** may be applied to heat and press together these portions **43** so as to form a pair of bags connected together for a short distance at their open ends.

In Figs. 10 and 11 I have shown the opposed mouth portions of a pair of lined bags **45**, each lining of thermoplastic material having a tab **46** on one side wall only and extending beyond the body of the bag. Thus the two bags may be placed end to end, but slightly spaced apart, and with the tabs **46** superposed, so that these may then be directly sealed together by applying heat and pressure in the same way as indicated in Fig. 9.

In Figs. 12 and 13 there is shown a further form of construction which may be employed. Strips **50**, **51** and **52** may be continuously fed from right to left, and open-ended tubes **53** are fed in any suitable manner to position them transversely of the strips, with the ends of the tubes coming midway of the edges of the strips **50** and **51**, and with the strip **52** under the mid-portion of the tubes. All of the strips contain coatings of adhesive which is preferably of a delayed action thermoplastic type, and which has been activated in spots or limited areas which will register with portions of the ends and mid-portions of the tubes. This activation may be by heat to render the heated area tacky and hold the bags in the desired predetermined positions on the strips. The side strips are progressively folded over the ends of the tubes, pressed down, and heated to hermetically close the ends of the tubes. The tubes and the middle strip are pressed together to cause them to firmly adhere in the activated areas, but not to seal together opposite walls of the tube mid-way between the ends. A cutter then operates to form a slit **54** separating the tubes into two bags **53***a*, closed and sealed at their outer ends, and to cut the middle strip **52** into strips **52***a*, each attached to the mouth portion of a separate row of bags. A fourth strip **55**, preferably previously spot activated by heat, is then applied over the slit and pressed on to cause the activated portions to adhere to the bags but not seal together opposite walls of the bags at their open ends. All of the strips may then be severed between each successive pair of bags, as indicated at **56**, to form pairs open at their adjacent ends but connected together as a pair by the sections of the strip **55**. If desired, the chain of bag pairs thus formed may be printed and/or rolled up in a coil for later filling, sealing and separation into single bags; or the chain may be separated into separate pairs for filling and sealing. For factory filling, the transverse cuts **56** may not be between each pair of bags of the chain, but between each series of for instance six or more pairs, so that all of the series of pairs may be supported on a suitable bar by the connecting strip **55**, and simultaneously filled and sealed. After filling and sealing the bags they may be cut apart and sold as individual packages, or cut into pairs connected end to end, or into pairs connected side by side, or in other multiples.

The forms shown in the accompanying drawings are only a few of many different forms, and illustrate many different ways in which a pair of bags having the bodies or the linings of thermoplastic material, may be directly connected together at their open ends so that they may be mounted on opposite sides of and suspended over a supporting bar with their open ends uppermost, so that they may be sealed. If labels or other reinforcing strips are not employed, as shown in Fig. 5, it is necessary in some cases to treat the surface of the supporting bar so that the thermoplastic material in being heated and sealed will not at the same time adhere to the bar. Various compositions may be applied to the surface of the bar to prevent such adhesion. A suitable material for the bar is silicone.

In the constructions shown in Figs. 8, 9, 10 and 11, the parts designated as the liner of a multi-ply walled bag may be merely bands or strips along the inner surface of

the outer wall at the open ends, so that the bag may be sealed by the application of heat and pressure immediately after filling, or after a suitable time interval, even though the body of the bag is not formed of impervious thermoplastic material.

In Figs. 11 and 12 a pair of strips may be used on opposite sides of the bags at the bottoms, instead of a single strip of twice the width and folded over as shown.

It will be understood that the sheet or tube material used in making the bags may be extremely thin, and that in the drawings, particularly Figs. 5, 6, 9, 11 and 13, these parts as well as the strips are shown of greatly magnified thickness.

I claim:

1. The method of packaging and sealing materials which consists of providing a separate pair of bags in which each bag has closed sides, a closed end and an open opposite end, connecting said pair of bags at opposing sides thereof at their open ends only, suspending and supporting said pair of bags at said connection so that the open ends are uppermost, providing thermoplastic material on the inner surfaces of said bags at their open ends, filling said bags while so supported, pressing the opposite walls of both bags together at their open ends to close them, and heating both bags at their open ends to simultaneously seal both bags.

2. The method of packaging and sealing materials which consists in providing a separate pair of bags in which each bag has closed sides, a closed end and an open opposite end, connecting said pair of bags at opposing sides thereof at their open ends only, suspending and supporting said bags at said connection on a horizontal support so that the open ends of the bags are upper most, providing thermoplastic material on the inner surfaces of said bags at their open ends, pressing opposite sides of the open ends together and against said support, and applying heat to seal both bags simultaneously.

3. The method of packaging and sealing materials which consists in providing a separate pair of bags having a lining formed of a single piece of thermoplastic sheet material and an outer wall of paper, and in which each bag has closed sides, a closed end and an open opposite end, connecting said pair of bags at opposite sides thereof at the open ends only, suspending and supporting said pair of bags by means of said connection on opposite sides of a horizontal member so that the open ends of the bags are uppermost, filling said bags, pressing the open ends of said bags together and against said member to thereby close both bags and simultaneously applying heat to the closed upper ends of both bags to seal them.

4. The method of packaging and sealing materials which consists in providing a separate pair of bags in which each bag has closed sides, a closed end and an open opposite end, connecting said pair of bags at opposing sides thereof at their open ends only, suspending and supporting said pair of bags at said connection on opposite sides of a horizontal support so that the open ends of the bags are uppermost, providing thermoplastic material on the inner surfaces of said bags at their open ends, filling said bags, closing the open ends of said bags, placing a label over the closed ends, applying heat and pressure to said label and against said support to seal the opposite walls of the bag together and seal said label to both bags, and separating said bags along a line between the side edges of said label and above the sealed area to leave a part of the label on each closed and sealed bag.

5. The method set forth in claim 4 in which the label is provided with a thermoplastic adhesive to seal the label to the closed ends of said bags.

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