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METHOD FOR IMPROVING END SEAMS IN CONTAINERS WITH A FIN-TYPE BACK SEAM BY DOUBLE HEAT SEALING

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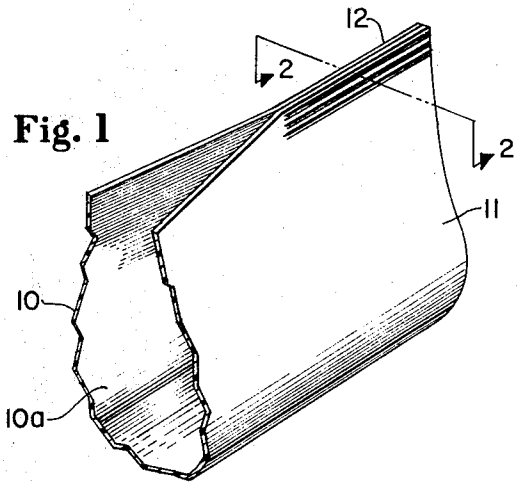
Fig. 1



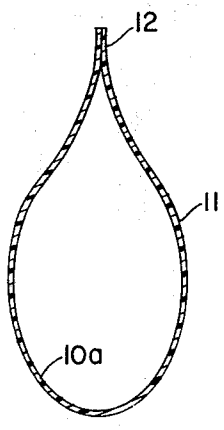


Fig. 2

Fig. 3

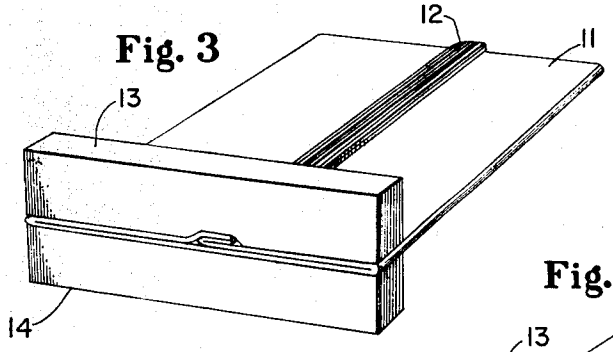


Fig. 4

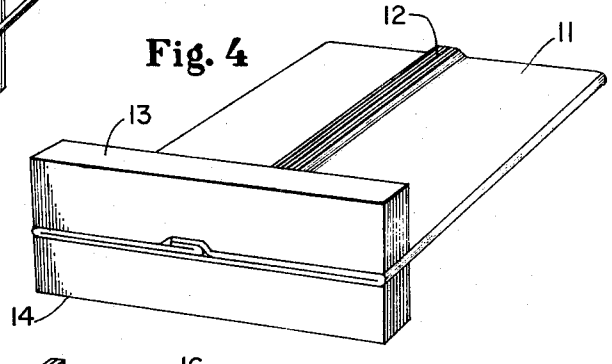
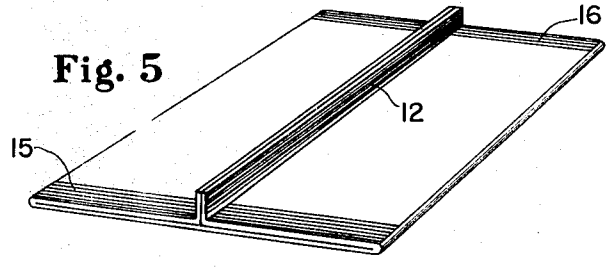


Fig. 5



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METHOD FOR IMPROVING END SEAMS IN CONTAINERS WITH A FIN-TYPE BACK SEAM BY DOUBLE HEAT SEALING

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ABSTRACT OF THE DISCLOSURE

A method for forming a liquid tight end seam on containers having a protruding fin-type back seam by sealing the end seam with one face of the fin-type seam against the end seam, and then, repositioning the fin-type seam 180° so that the other face lies against the end seam and re-sealing the end seam.

This invention relates to a process for improving the end seams on containers or packets fashioned from a flexible web of stock having a protruding fin-type back seam and end seams formed by sealing marginal portions held in face to face relationship.

Containers of this type can be fashioned from a flat web of flexible stock by first forming the stock into a tubular shape and placing the marginal edge portions in face to face relationship on their inner surface. Heat sealing the marginal portions results in the formation of a seam extending longitudinally along and projecting away from the tube. The longitudinal seam is referred to herein as a fin-type back seam. The tubular material can be formed into a packet by sealing the two ends on their superposed inner surfaces. Relatively thin, flat pouches result if the two ends are sealed in a common plane; whereas, if the end seams are placed in planes disposed at 90° to each other, a tetrahedron having four triangular faces of the same size is formed.

Containers of the above-mentioned type wherein there is a protruding fin-type back seam and end seams are especially useful for holding liquids because none of the raw edges of the stock material are exposed to the contents of the container, and, therefore, wicking of the contents is not possible. While such containers are very useful for holding liquids, the use of these containers for certain very mobile liquids, for example cooking oil, has been limited. The reason for this is that it is extremely difficult to make an adequate seal on the end seams where the fin-type back seam crosses the end seam, and mobile liquids will tend to leak from the imperfect seal. Heretofore, it has been difficult to form an adequate seal at the point of intersection of the back seam and the end seam because of the hump formed by the extra overlapped layers of stock material.

An object of this invention is to provide a method of improving the end seam on containers having a protruding fin-type back seam.

It is another object of this invention to provide a method for forming end seams on containers of the type hereinbefore described which are not susceptible to leakage at the intersection of the back seam and the end seam.

The nature and substance of the invention can be briefly summarized as a two step method of making a leakproof end seam on containers having a protruding fin-type back seam. The method comprises the steps of folding the fin-type seam flat against the container and forming an end seam in the container material, and as a second step, folding the fin-type seam approximately 180° so that the other face of the fin-type seam lies flat against container

and re-sealing the end seam to form a leak-proof joint at the intersection of the fin-type seam and the end seam.

The invention is more readily understood by reference to the following description and the annexed drawings, in which:

FIGURE 1 is a perspective view showing how a web of stock is folded to form a tubular member;

FIGURE 2 is a transverse cross section of a tubular member taken on the line 2—2 on FIGURE 1;

FIGURE 3 diagrammatically illustrates the first step of sealing the end seam and the position of the protruding fin-type back seam during the sealing of the end seam;

FIGURE 4 diagrammatically illustrates the second step of sealing the end seam wherein the protruding fin-type back seam is re-positioned 180° and the end seam is re-sealed.

FIGURE 5 is a perspective view of a completed container wherein the end seams have been placed in a common plane.

There is shown in FIGURE 1 the end of a flat web **10** of stock which is a thin flexible material which can be heat sealed on the face **10***a* only. Suitable stocks can be laminates or coated materials. These stocks are normally supplied in a roll, not shown in the drawings, which is unrolled to provide a continuous web of material, a portion of which is shown at **10**. In order to form a tubular member as at **11** from the web **10** the two longitudinal edges of the web are brought together so that the inside faces of marginal portions adjacent opposite edges are in contact in a face to face relationship. The marginal portions are heated under pressure, i.e., heat sealed, to form a longitudinal fin-type seam **12**. Thus, the marginal portions of the web are sealed together with their inside face in superposed relationship. The web may be cut off at any desired point, resulting in a tubular member **11** of a desired length which appears in cross-section as in FIGURE 2.

Details of the method of this invention for forming an improved end seam in a tubular member **11** having a protruding fin-type back seam **12** are shown in FIGURE 3 and FIGURE 4. In the first step of the sealing operation as represented by FIGURE 3, the marginal portions of the walls of a tubular member **11** are brought together and sealed by applying heat and pressure. In this case heat and pressure are supplied by the upper jaw **13** and the lower jaw **14** of a heat sealing device clamped together to form an end seam **15** (FIGURE 5). During this sealing operation, the face of the fin-type seam **12** lies flat against the tubular member **11** (FIGURE 3). The jaws **13** and **14** of the heat sealing device are then parted and the fin-type back seam **12** is folded over 180° so that the other face of the fin-type seam **12** lies flat against the tubular member **11**. As a second step the jaws **13** and **14** of the heat sealing device are clamped together on the end seam **15** (FIGURE 4) to apply heat and pressure and the end seam **15** is re-sealed with the fin-type seam **12** in its new position.

The re-positioning of the fin-type back seam **12** is a necessary element in the above-mentioned process of forming an improved end seal. As can be seen from the illustrations in FIGURES 3 and 4, at the intersection of the fin-type seam and the end seam there is a build-up of four layers of stock material. As mentioned hereinbefore, it is difficult to form an adequate seal where the back seam intersects the end seam because of the extra layers of stock material. By re-positioning the fin-type back seam **12**, this weak portion of the end seam **15** is exposed, and gaps left during the first sealing operation because of the overlapping of four layers of material are bridged in the second sealing operation.

It is at this stage in the formation of a container, i.e., when the first end seam has been formed, that the con-

tainer is normally filled. After the tubular member is filled, the other end is closed by bringing together the marginal portions of the walls of the tube at the open end thereof and sealing them together to form an end seam **16** in the manner hereinbefore described.

By placing the end seal **16** in a plane common to the end seam **15**, a container, such as shown in FIGURE 5, which takes the form of a relatively thin packet results. If this latter end seam is placed in a plane disposed substantially 90° with respect to the other end seam, a container of greater capacity which takes the form of a tetrahedron results.

Stocks useful in the process of this invention are those which are heat sealable and consist of two or more films or layers of different materials. Useful stocks can be a wide variety of laminated products, for example, a polyethylene, polypropylene, polyvinylchloride, polyvinyl acetate, nylon, polyester, or other thermoplastic film or layers laminated to paper, fabric, aluminum foil, lead foil or other suitable flexible packaging materials and combinations thereof.

It is, of course, preferable that the stock be of a type which is sealable on one side only. If this were not the case, the protruding fin-type back seam **12** would be sealed to the container when the end seam is formed, and could not be easily repositioned on its other face for resealing. Two especially preferred laminated stock materials heat sealable on one side only which are useful in the process hereinbefore disclosed are a laminate consisting of successive layers of non-heat sealable cellophane, polyethylene, aluminum foil and polyethylene, and a laminate consisting of successive layers of paper, polyethylene, aluminum foil and polyethylene.

Heat sealing devices for accomplishing the sealing operations of this invention are those capable of supplying heat and pressure, and can be of the usual type which have the normal hot-bar, impulse, or high frequency sealing jaws. For use in the process hereinbefore described, it is preferred that these heat sealing devices have resilient sealing jaws. Such heat sealing devices are well known in the art.

While particular embodiments of the invention have been illustrated and described, it will be obvious to those

skilled in the art that various changes and modifications can be made without departing from the spirit and scope of the invention, and it is intended to cover by the appended claims all such changes and modifications that are within the scope of this invention.

What is claimed is:

1. A method of forming an end seam on a tubular member formed from thin flexible web material that is heat sealible only on its inner surface, said tubular member having a longitudinal outwardly protruding fin-type seam formed by bringing together the longitudinal edges of the web material in face to face relationship and sealing said edges to form the longitudinal fin-type seam, said method comprising the steps of bringing together the transverse end of the tubular member and folding down the fin-type seam flat against the surface of the tubular member intermediate the extremities of said transverse end, forming an end seam at said transverse end by applying heat and pressure thereto, folding over the fin-type seam approximately 180° so that it lies flat against the end seam, and applying heat and pressure to the end seam a second time to form a liquid tight joint at the intersection of the fin-type seam and the end seam.

2. The method of claim **1** wherein the flexible stock is a laminate heat sealable on one side only consisting of successive layers of non-heat sealable cellophane, polyethylene, aluminum foil, and polyethylene.

3. The method of claim **1** wherein the flexible stock is a laminate heat sealable on one side only consisting of successive layers of paper, polyethylene, aluminum foil, and polyethylene.

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U.S. Cl. X.R.

156—217, 306; 161—102