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2,923,453

CONTAINER AND PROCESS FOR SEALING THE SAME

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2 Sheets-Sheet 1

Fig. 1

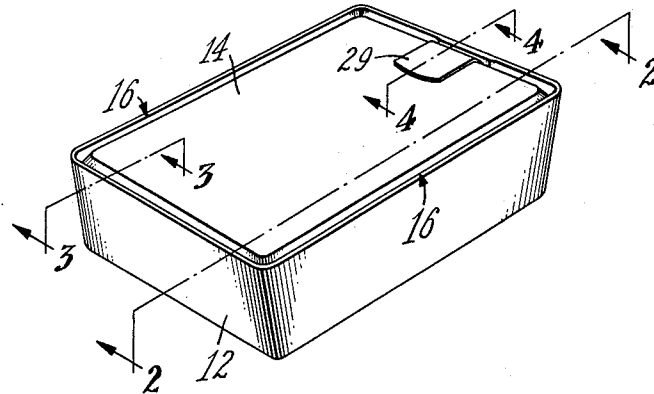


Fig. 2

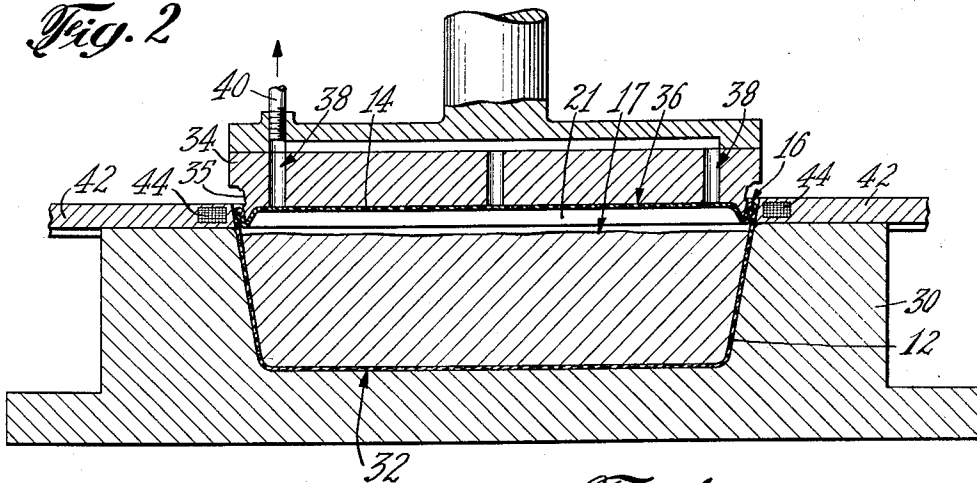


Fig. 3

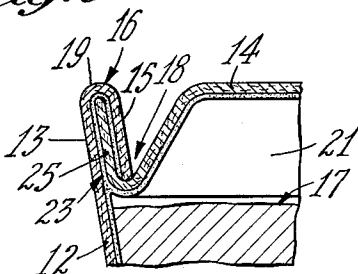
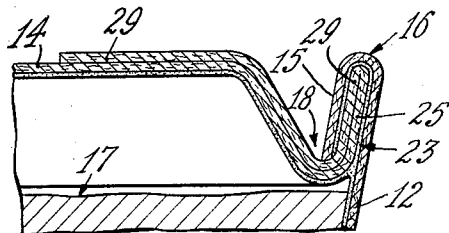


Fig. 4



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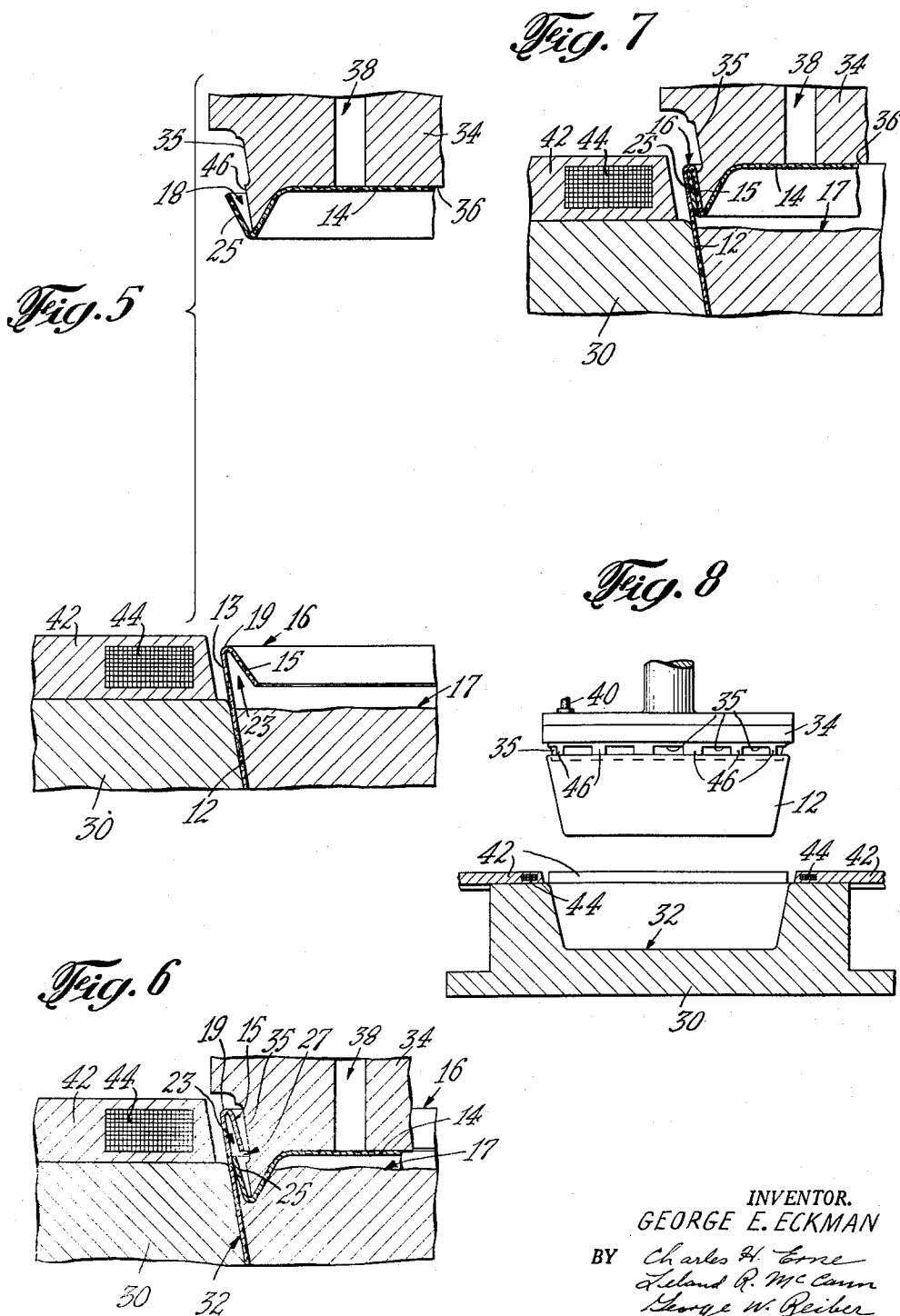
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CONTAINER AND PROCESS FOR SEALING THE SAME

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2 Claims. (Cl. 229—43)

This invention relates to containers for fluid foods and more particularly to an improved container body and lid construction including a process for sealing the same.

To meet the demands of the frozen food industry it is required to provide an inexpensive liquid tight fibre container which, when empty, may be nested for transportation and storage without wasting space; and which, after filling, is sealable in a manner that will prevent liquid leakage. Accordingly, it is the first object of this invention to provide an improved container.

It is a further object of this invention to provide an improved method for sealing a fibre food container.

In the packaging of frozen foods, provision must be made for the expansion of the contents during the freezing operation. The expansion room, known as head space, is the space between the fill line of the container and the cover. The problem with the head space is that, if it contains air, "freezer burn" may result; e.g. the air dries up the food which detracts from the salability of the goods. It follows that industry demands a container having a head space as free of air as possible. Admittedly, vacuum packing would solve this problem, but vacuum packing necessitates the use of expensive, cumbersome equipment. Accordingly, it is a still further object of this invention to provide an improved fibre food container which by its inherent structure facilitates expelling enough air from the head space during the sealing operation to satisfy the demands of the frozen food industry.

It is a still further object of this invention to provide an improved process for sealing containers wherein the container is partially evacuated during the sealing process.

It is a still further object of this invention to provide a sealed container for frozen foods which may be easily opened without the use of tools, or other instruments.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Briefly this invention relates to an improved food container body and cover having sealing flanges wherein the flanges are so constructed that the cover is first inserted into the container body in order to interlock their respective sealing flanges, and this insertion of the cover acts to expel air from the container head space to partially evacuate the container. The sealing process is completed by withdrawing the cover until the complementary flange portions are interlocked and then heat sealed.

Referring to the drawings:

Figure 1 is a perspective view of an improved container body and cover assembly embodying the instant invention;

Fig. 2 is an enlarged sectional view of the container taken substantially through plane 2—2 of Fig. 1, in the

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direction of the arrows and a side elevation, partially in section of some of the elements including a chuck and a mold used in the sealing process;

Fig. 3 is an enlarged fragmentary sectional view of the container sealing construction taken substantially along plane 3—3 of Fig. 1, in a direction of the arrows;

Fig. 4 is an enlarged fragmentary sectional view of a container opening tab taken substantially along plane 4—4 of Fig. 1, in the direction of the arrows;

Fig. 5 is an enlarged exploded view, partially in section, showing a portion of the elements of the container and the sealing apparatus before the container body has been covered;

Fig. 6 is another fragmental view of the elements of Fig. 5 with the cover shown in a pre-assembly position relative to the container body;

Fig. 7 is a view similar to Fig. 6 showing the cooperation of the elements just after the actual sealing operation; and

Fig. 8 is a reduced scale view, partially in section and shows the covering chuck acting to remove the sealed container from the mold.

With reference to the drawings an improved container in a preferred or exemplary embodiment of the invention is shown comprising a body 12 and a cover 14 (Fig. 1). The body is a dish-shaped paper or fibre container of any selected contour having upwardly and outwardly extending walls to allow for nesting of empty containers thereby saving space during shipment and storage. The container body 12 preferably is lined with any well known coating agent, such as paraffin or thermoplastic material to provide a liquid tight lining. The body 12 is provided further with a surrounding peripheral hem 16 which, in cross-section, is in the form of an inverted U, and which for purposes of definition shall be called caret shaped. The caret shaped hem has one leg 13 (Figs. 3 and 5), which actually is a continuation of the wall of the body portion and an inner, or returned leg or flange 15, which is bent inwardly and downwardly to form a peripheral termination lying substantially in the plane of the fill line 17 of the container (Figs. 2 and 3). The upper peripheral edge 19 of the hem lies substantially in the plane of the cover 14 (of the sealed container) (Figs. 2 and 3) and, therefore, the hem 16 may be described as having a vertical component substantially equal to the head space 21 (Figs. 2 and 3) of the container. The space 23 (Figs. 3 and 5) between the legs of the hem 16 before the sealing operation, is slightly greater than the thickness of the cover material (later described) so as to provide for clearance during the interfitting of the flanges of the cover and the container body.

Cover 14 like body 12 is made of coated fibre or paper, and it is substantially planar and of the same general contour as that of the upper periphery of the body portion 12 with free dimensions slightly greater than those of the inner peripheral termination of hem 16. The cover 14 is provided further with a peripherally depending channel 18 which in cross-section (as shown in Figs. 3 and 5) has a V-shape; with the outer leg or flange 25 of the V being substantially equal in length to the inner leg or flange 15 of the caret shaped hem 16. In a preferred form, the outer leg of the V-shaped cover channel 18, has a vertical component substantially equal to that of hem 16 and to that of the head space 21 of the sealed container and it follows that the interlocking portions of the hem 16 and V-shaped channel 18 can be called complementary.

With this construction, it is apparent that the cover 14 must be pressed down into the container, through the head space, before the corresponding legs or flanges of

the hem 16 and channel 18 are positioned to be interlocked (see Fig. 6). This position of the parts may be reached in spite of the fact that the cover is larger than the inner periphery of hem 16, since the body and cover of the container are formed of coated paper or fibre having a natural resiliency. Therefore, the corresponding legs or flanges of the hem and channel are deflected as the cover is inserted into the container body thereby permitting the cover to be inserted into the container body to the Fig. 6 position. Parenthetically, it should be noted that the inner surface of the hem 16 and the surface of leg 25 of the V-channel 18 are coated with a suitable heat sealing material such as a modified polyethylene, whereby the interlocking elements may be sealed together by the application of heat.

While the cover is being moved down into the container body, towards its Fig. 6 position, any air in the head space 21 will be compressed and forced out of the container about the peripheral edge of the outer leg 25, of the V-shaped channel 18; e.g. the greater air pressure (within the container) will act to radially compress the outer leg 25 of the channel 18 to permit the compressed air within the container to escape. Furthermore, during that instant when the outer leg 25 of the V-shaped channel has just passed the edge of the inner leg 15 of the hem 16—while the outer leg 25 of the channel is being urged, resiliently, into peripheral contact with the body 12—a peripheral air gap 27 (Fig. 6) is provided permitting air to escape from the container. On the other hand, when the cover 14 is withdrawn to move the outer leg 25 of the V-shaped channel into its Fig. 3 position, the greater air pressure (atmospheric pressure outside the container) will add to the inherent resiliency of the leg 25 urging it into closer contact with the wall of the container thereby providing an effective air seal that prevents air from leaking back into the container. The amount of air thus expelled during the covering operation creates a partial vacuum in the head space, thereby meeting the demands of industry.

In order to provide for the opening of such a sealed container, the cover 14 is equipped with a tab 29 (Figs. 1 and 4) which is an integral continuation of a portion of the outer flange or leg 25 of the V-shaped channel 18. With this construction, when the tab 29 is gripped in the fingers and pulled into the plane of the cover, the latter will be peeled out of the hem 16 at one end of the container and may then be removed from the container.

In view of the fact that filling and sealing machinery is well known in the art, the intention of the following description is merely to show the steps of the sealing process, rather than the details of the equipment which would be used in the sealing process.

In this light, an empty container 12 is positioned in a mold 30 which has a cavity 32 corresponding to the shape of the body 12 of the container. The container is then filled with the food product up to a fill line 17 (Fig. 2) which has been selected to leave a required head space in a covered container. Then a sealing chuck 34 which has a face shaped to correspond substantially to the upper contour of the cover 14 grips the cover 14 from a stack or other storage device (not shown)—the cover 14 being held in contact with the face 36 of the chuck by vacuum means which is provided by connecting a number of interconnected vacuum passageways or ports 38 extending from the face of the chuck 34 to a vacuum line 40, as shown in Fig. 2.

The chuck 34 is then guided by suitable machinery (not shown) from the position shown in Fig. 5 to the position shown in Fig. 6. In this travel, as described above, the outer leg or flange 25 of the V-shaped channel 18 engages the inner leg 15 of the caret shaped hem 16 with the corresponding parts compressing one another as the cover is moved relative to the container body towards the Fig. 6 position. When the position illustrated

by Fig. 6 is reached the outer flange or leg 25 of the V-shaped channel 18 springs outwardly into peripheral engagement with the inner wall of the body 12. During this movement of the outer leg 25 of the V-shaped channel 18, the air gap 27 exists permitting compressed air to escape from the container. It will be noted that the chuck 34 is under-cut or notched at 35 to prevent the chuck from blocking the air escape.

Since the cover 14 is still held by the vacuum chuck 34, the cover is then withdrawn to the position shown in Fig. 7 where the outer leg 25 of the V-shaped channel interlocks with the inner leg 15 of the caret shaped hem 16. During this movement from the Figure 6 to the Figure 7 position, the inter-engagement of the cover outer leg 25 with the peripheral wall of the body 12 acts as a seal to prevent air from leaking back into the head space and accordingly a partial vacuum is created within the container.

When the elements are in the Figure 7 position, a plurality of sealing jaws 42 which are equipped with heating elements 44 (Fig. 2) are moved laterally into engagement with the hem of the container body 12. It will be noted here that because the face 36 of the chuck 34 corresponds to a contour of the cover 14 in its sealed position, the peripherally inclined surface 46 (Figs. 2 and 5) of chuck 34 acts as a back stop during the sealing operation; that is it butts up against the hem 16 and holds it firmly while the heated sealing jaws are brought into contact with the hem 16.

Since the inter-engaged parts of the cover 14 and the body hem 16 have been coated with a suitable heat sealing material (as heretofore described), the contact of the heated sealing jaws with the hem produces an air and liquid tight seal between the cover 14 and the container body 12 at the hem 16.

After the sealing operation, the chuck 34 still vacuum connected to the cover 14, is then raised to lift the filled container out of the mold 30 thereby making room for the insertion of another empty container. The filled container stays attached to the chuck 34 until the vacuum in line 40 is released.

This improved container structure sealing method has been found to fill a need in the container filling art and has been accepted enthusiastically by the frozen food industry.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts and that changes may be made in the steps of the process described and their order of accomplishment without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A container comprising a body portion having a peripheral inturned caret shaped hem providing a peripheral downwardly extending channel therein, a substantially planar cover having a flange directed upwardly from the periphery thereof and being substantially complementary in cross-sectional shape to that of said peripheral hem channel, said cover flange being interlocked and sealed in said channel of the body hem, and an opening tab extending from a peripheral portion of said cover flange, said tab being reversely bent against the upper surface of said flange within said hem channel and extending downwardly and inwardly therefrom over said cover, whereby said tab may be pulled to break said seal between cover flange and hem and to remove said cover from said body.

2. The structure of claim 1 wherein only the outer surfaces of that portion of the tab within said hem channel is sealed to the walls of the channel, and the juxta-

posed surfaces of the tab and cover are free from adhesion.

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