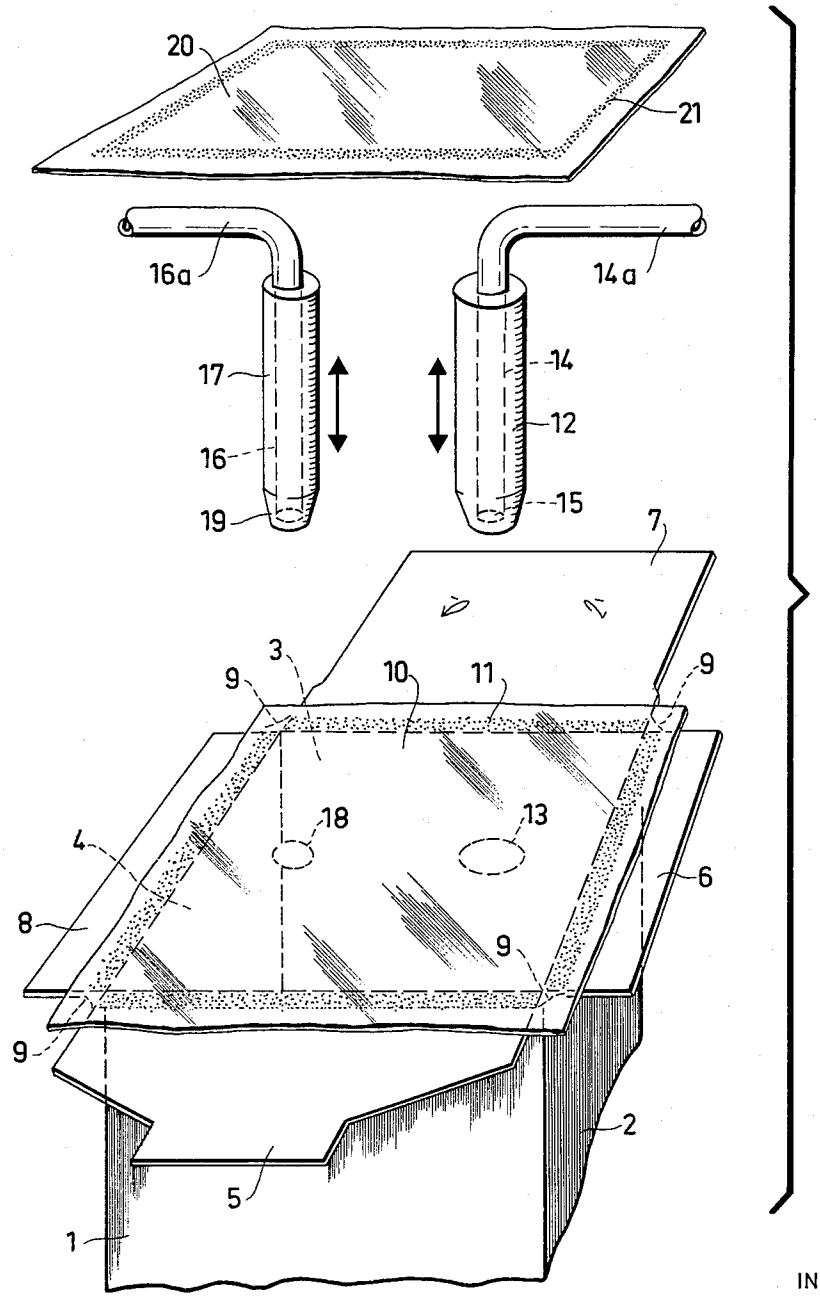
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METHOD OF PRODUCING A SEALED PACKAGE FILLED WITH A LIQUID OR FLOWING COMMODITY

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METHOD OF PRODUCING A SEALED PACKAGE FILLED WITH A LIQUID OR FLOWING COMMODITY

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The present invention relates to a method of producing a sealed package filled with a liquid or flowing commodity by introducing said commodity into an open container and subsequently sealing-closed the container by a continuous closure membrane.

Hitherto known methods of this class have inherently presented considerable limitations, particularly with regard to the filling rate. Thus, with a view to securing good sealing conditions when closing the containers it has been found necessary to have a filling rate so low as to prevent the commodity to be packaged, e.g., a powder or liquid product, from entering, by splashing or dusting, that zone along the container opening edge where the closure sheet is to be sealed to the container. Any deposits of the commodity in this zone might jeopardize the sealing-closed of the container into a package, whether such sealing comprises heat-sealing by a thermoplastic material or normal gluing.

Now, the method according to the invention will eliminate this drawback being characterized substantially by sealing, preparatory to the filling step, a masking membrane to the container over the opening thereof and in a re-entrant seal along the opening edge, and, during the filling step, through said masking membrane and while ensuring an external sealing relationship thereto subsequently introducing one end of a filling mandrel or the like into the interior of the container, thereby from outside to supply commodity to the container through an internal passage which, in the inserted position of the mandrel, extends on both sides of said masking membrane, the filled and sealed package having said closure membrane positioned outside of said masking sheeet.

By such method there is gained the advantage that the container may be filled with the commodity in question without any part thereof reaching the intended sealing zone of the closure sheet irrespective of the filling rate. In addition, the masking membrane together with the container side and bottom walls during the filling step effectively defining the package cavity and isolating same from the surrounding, the container may be filled to an extent much larger than that otherwise obtainable in cases where, with a view to the risk of an undesired contact between the commodity and the just mentioned sealing zone and of partially spilling commodity out of the filled but, before the application of the closure membrane, entirely open container, only partial filling is possible.

In the following, the invention will be described more in detail as applied onto a particular package type disclosed e.g. in Norwegian specifications Nos. 92,129, 93,-576 and 94,769.

The drawing, in a modified exploded view, illustrates the method according to the invention as applied to filling and closing a folding box carton erected into parallelepipedon shape. The four side wall panels **1**, **2**, **3** and **4** define a rectangular cross-section shape tubular body which, in the filling step, is in a substantially vertical position and is closed at its lower end (not shown). At the opposite end the side wall panels **1**, **2**, **3** and **4** define an end opening to the edge of which there are hinged four end closure flaps **5**, **6**, **7** and **8**, one for each of the side wall panels **1**, **2**, **3** and **4**, respectively.

Preparatory to the filling and closing operations said end closure flaps **5** to **8**, inclusive, are turned outwarly about the corresponding portions of the end opening edge into a position substantially in the opening plane. At least at the end opening edge the end closure flaps **5** to **8**, inclusive, are equal in width to the corresponding side wall panels **1**, **2**, **3** and **4**, respectively, and, in addition, it is herein assumed a folding box carton construction such as, upon outward turning of the end closure flaps **5** to **8**, inclusive, into the position shown in the drawing, substantially in the end opening plane to yield a surface entirely surrounding the end opening edge and defined thereby. Besides, by that side of the end closure flaps **5** to **8**, inclusive, which in said position faces upwardly, it is constituted by the transition elements **9** at each opening edge corner between the respective adjacent end closure flaps. Said transition elements **9** may be in the form of possibly plastic film covered portions of the packaging material of the carton as disclosed in the above mentioned Norwegian patents, but might as well be in the form of gusset portions, e.g. of stretchable plastic film, connecting adjacent end closure flaps **5** to **8**, inclusive, at the opening edge corners.

In accordance with the invention, before the filling step there is applied over the carton end opening a masking membrane **10** which in a re-entrant seal **11** extending along the opening edge is sealed to said surface formed by the end closure flaps **5** to **8**, inclusive, and the transition elements **9**. In the embodiment of the method in question illustrated in the drawing, it is assumed that the masking membrane **10** is continuous, and, therefore, in its sealed state it covers the end opening entirely. In the present case, the container comprised by the carton as closed at the lower end thereof is thus entirely closed just before the filling step.

Thus, for introducing the commodity in question into the interior of the container the closed state thereof should be broken in one way or another. To this end, use is here made of a filling mandrel **12** which in the filling step is caused by one end to puncture the masking membrane **10** at **13** to enter the interior of the container. The filling mandrel **12** has an internal passage **14**, one mouth **15** of which is situated at the insertion end of the filling mandrel **12**, the other end (via a conduit **14***a*) communicating with a commodity supply means not shown. In the introduced position of the filling mandrel **12** the supply means thus communicates with the interior of the container via the supply passage **14**. The filling mandrel **12** is of such a design and the masking membrane **10** is of such a nature as to make the masking membrane **10** in the penetration region **13** be in a sealing relationship to the outside of the filling mandrel **12** extending into the interior of the container.

In the inserted state of the filling mandrel **12** the liquid or flowing commodity in question is supplied to the container interior through the mandrel supply passage **14**. Because the masking membrane **10** covers the end opening entirely and is in a sealing relationship to the filling mandrel **12** the air quantity displaced by the commodity in the container interior has to be removed from the container through the wall of the container cavity defined by the container side wall panels **1** to **4**, inclusive, the container bottom wall, and the masking membrane **10**. In the case illustrated the air in question is vented off through an internal venting passage **16** in a venting mandrel **17** which similarly to the filling mandrel **12** in the filling step is caused by one end to puncture the masking membrane **10** at **18** to enter the container interior. One end **19** of the supply passage **16** is situated at

the insertion end of the venting mandrel **17**, the other end thereof communicating with the ambient atmosphere either directly or via a conduit **16***a*. If desired, there might be incorporated a precipitator or the like in the conduit **16***a*.

Thus, in the inserted position of the venting mandrel **17** the container interior communicates with the ambient atmosphere via the venting passage **16**. As with the filling mandrel **12** the venting mandrel **17** is of a design such as to make the masking membrane **10** in the insertion region **18** establish a sealing relationship to the outside of the venting mandrel **17**.

Of course, the supply passage **14** is of a cross sectional area adjusted to the filling rate desired. The same also applies to the venting passage **16**, being adjusted to the desired venting capacity.

Thanks to the sealing relationship between the masking membrane **10** and the two mandrels **12** and **17** the supply of commodity into the container interior may be effected without commodity depositing onto the end closure flaps **5** to **8**, inclusive, and the outside of the masking membrane. In addition, the container may be filled to an extent much larger than in case the filling was effected through the unmasked end opening.

Upon completion of the commodity supply into the container interior the two mandrels **12** and **17** are removed therefrom.

The final closing of the filled container is effected by a closure membrane **20** which, in a re-entrant seal **21** enclosing the insertion regions **13** and **18** of the two mandrels **12** and **17**, respectively, is sealed to the top face of the masking membrane **10**. For practical reasons the seal **21** of the closure membrane **20** preferably is of an extension equal to that of the corresponding seal **11** of the masking membrane **10**, as shown in the drawing.

Within the scope of the invention the method in question lends itself to modifications in relation to the embodiment above described and shown in the drawing. Thus, a separate venting mandrel **17** may be avoided in case the filling mandrel **12** is provided with an additional internal venting passage. Instead of having the mandrel or mandrels themselves to puncture the masking membrane **10** in the respective penetration regions **13** and **18**, as herein assumed, it is possible though technically more complicated to pre-puncture the masking membrane in such regions and in the filling step to introduce the mandrels in the respective openings thus established.

Subsequently to the final sealing-closed of the carton by the closure membrane **20** the end closure flaps **5** to **8**, inclusive, are folded inwardly to lie over the carton end opening and are secured in such infolded position. At this operation, first the end closure flaps **6** and **8** are folded inwardly, then the end closure flap **7** and finally the end closure flap **5**, the latter by insertion tabs being locked in corresponding slots in the end closure flap **7**.

Herein the principles of the invention have been illustrated as applied to a folding box carton to be erected into parallelepipedon shape and having end closure flaps. However, the invention may be applied to filling and closing containers of other types, e.g. of cup or trough shape. If the masking membrane as in the case of the above described embodiment is, in more or less planar state, to be sealed to the container in question over the end opening thereof, said opening of the cup or trough shape containers should have an edge of sufficient lateral extension to offer a sealing zone which for practical reasons is not merely of linear extension but has a width dimension. Preferably the containers for this reason have a circumscribing "corbelled-out" edge flange.

Irrespective of container type it is possible in accordance with the invention when sealing the masking membrane to the container to depress the masking membrane—push-in lid fashion—into the carton end opening and to seal it to the inside of the container side wall. In its sealed state the membrane then will by its central portion span the corresponding cross sectional area of the container, its margin portions surrounding such central portion being folded outwardly flange-like and engaging the side wall inside.

What has just been stated as regards the masking membrane is entirely applicable to the closure membrane in cases where the same is sealed to the masking membrane in a seal, enclosing the end opening in question.

I claim:

1. A method of producing a sealed package filled with a liquid or flowing commodity, comprising introducing said commodity into an open container and subsequently sealing-closed the container by means of a closure membrane, characterized by the steps of first sealing a masking membrane to the container in a re-entrant seal along the container opening edge, thereby at least to mask off the container opening; subsequently introducing, through said masking membrane and while ensuring an external sealing relationship thereto, one end of a filling mandrel or the like into the interior of the container, said filling mandrel having an internal passage which in the inserted position of the filling mandrel extends on both sides of said masking membrane; supplying the commodity to be packaged to the interior of the container through said mandrel passage; and removing said filling mandrel from the container; and finally sealing closed the filled container by applying a closure membrane outside of said masking membrane and securing it in a re-entrant seal.

2. A method according to claim **1**, characterized by removing from the interior of the container the air quantity which, during the filling of the container, will be displaced by the commodity supplied to the container, such removal of air being effected through an internal venting passage in the filling mandrel, which venting passage in the inserted position of the filling mandrel extends on both sides of the masking membrane.

3. A method according to claim **1**, characterized by introducing, through said masking membrane and while ensuring an external relationship thereto, one end of a separate venting mandrel into the interior of the container, said venting mandrel having an internal venting passage which in the inserted position of the venting mandrel extends on both sides of the masking membrane, thereby to remove the air quantity displaced by the commodity supplied to the container.

4. A method according to claim **1**, said masking membrane sealing off the container before introducing the mandrel thereinto, characterized by causing the mandrel to puncture the masking membrane when being inserted therethrough.

References Cited by the Examiner

UNITED STATES PATENTS

1,972,130	9/1934	Case	53—37 X
2,177,919	10/1939	Vogt	53—37
2,855,006	10/1958	Geisler	141—7

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