

The invention relates to a parallelipipedic flat top pack, more particularly a lug-type pack, having: a central seam; a prepared surface in the pack top which can be penetrated or parted along a closed parting line and which after penetration or parting forms a pouring hole; a plastics pouring member whose flange, enclosing the parting line and the pouring hole, is rigidly connected to the outer surface of the pack top and into whose pouring spout a tube, possibly corresponding in periphery to the closed shape of the parting line and having a plurality of triangular teeth on the end face adjacent the pouring hole can be axially introduced; and a closure cap which can repeatedly close the pouring spout, the inner surface of the packing being coated with a thermally adhesive plastics film. The invention also relates to a process for making the aforementioned parallelipipedic flat top pack.

The usual prior art parallelipipedic packs such as, for example, combibloc, Tetra Brik, which are mainly used in the field of liquid packaging with normal cold, cold-sterile, hot and aseptic filling, cannot be closed again after being once opened.

It has therefore already been suggested that the top of flat top packs should be formed with a prepunched pouring and ventilation hole hermetically sealed on both sides by foils, a special intermediate layer making reclosure possible via a self-adhesive pull-tab (European Patent A 0214791).

However, due to remainders left on the intermediate layer after pouring, reclosure is neither hygienic nor hermetic, and even impossible in the case of products of relatively high viscosity.

The Journal "die Molkerei-Zeitung WELT DER MILCH", 40, 1986/23, page 696 also discloses a flat top pack to whose top a plug-like closure is articulated whose side walls are constructed tapering conically in the forward direction. The plug can be slid in and out of the pouring opening on the top of the pack and has for this purpose a pull tab on the top of the closure.

However, that closure fails to ensure adequate hermeticity, since the plug does not bear securely guided against the edge of the pouring hole in the relatively soft composite foil. Furthermore, even a slight application of lateral pressure to the pull tab can lead to accidental opening. There is also the fact that after being opened once, the pouring zone of the pack is neither hygienically covered, nor is it certain that after pouring has been completed more particularly products of higher viscosity will run back into the pack, so that such liquids become deposited on the top of the pack or drip off in an uncontrolled manner.

US Patent A 3 924 777 discloses a closure system which has the same disadvantages and furthermore permits no continuous internal coating covering the opening zone, such as is absolutely necessary, for example, for gas-tight, aroma-tight packs.

More particularly hitherto it has had to be accepted that non-gurgle, drip-free pouring cannot be achieved with flat top packs.

European Patent A 0167095 proposes for a steep top pack an integrated plastics pouring device which consists of a nozzle and

a snap cover of the kind which is introduced from inside into the hole punched in the steep pack top and sealed on inside with a steadying means on the outside. However, due to the risk of pocket formation only moderate sterile security is produced with incomplete sealing.

German Patent Specification A 3039299 also discloses a steep top container to whose top a three-part pouring element is attached from outside; the pouring element comprises a flange sealed on to the pack top and having a cylindrical portion which is perpendicular to the flange and in whose inside wall a pouring tube internally subdivided by a L-shaped wall is axially displaceably disposed, the flange also having a cap which can be fitted on to the top end of the perpendicular portion. To open the container, after the cap has been removed the inner pouring tube is forced downwards until the triangular teeth disposed at its end penetrate the top of the pack. This penetration movement is limited by a barrier edge provided on the pouring member. However, the disadvantage of this construction is that it is very expensive.

However, proposals for steep top packs cannot be transferred to flat top packs, simply because of the stackability required with the latter. Another obstacle to the transfer of this proposal is that flat top packs have different requirements as regards the required guidance and direction of the jet.

One unsatisfactory feature of the pouring device disclosed in European Patent A 0167095 is also the relatively small pouring aperture, which is unsuitable for liquids of higher viscosity.

The reclosable pouring device known from German Patent Specification A 3039299 has the disadvantage of being open in the direction of the inside of the pack, so that it can be sterilized together with the pack only at considerable expense and risk; neither is it possible to apply thereto a continuous inside coating covering the zone of the pouring opening prior to the opening of the original closure.

It is therefore an object of the invention so to further develop a flat top pack with integrated pouring device as to obviate the aforementioned disadvantages. More particularly the flat top pack is to be suitable for an aseptic packing system, for example, in the case of packs having an aluminium multi-layer laminate with a plastics film (polyethylene layer) covering the inside surface of the pack. Furthermore, the preparation of the pouring hole by punching out the laminate means that the pack meets the maximum sterility and hygienic demands without adverse effect on basic hermeticity. Lastly, the reclosable pouring device is firmly connected sealing-tight to the pack and allows non-gurgle, drip-free pouring.

This problem is solved in the flat top pack of the kind specified by the feature that the closure flap cover connected to the tube is articulated, preferably via a connecting band, to the strap of the pouring member taking the form of a casting spout. In

distinction from the container known from German Patent A 3039299, which can also be constructed as a flat top pack and which most closely resembles the subject matter of the Application as regards sterility and hygienic demands, the flat top according to the invention has a number of decisive advantages:

On the one hand, the whole reclosable pouring device is constructed in one piece and can be constructed flat via a connection of the flange-shaped strap on the outside of the pack top, so that the stackability of the pack is affected only slightly, if at all. In the multi-layer stacking of packs combined in shrinking casks or trays any possible troublesome differences in height can be compensated or taken up by means of intermediate webs.

Furthermore, the inner coating of the pack is not interrupted by the pouring device, but the punched-out portion introduced for the pouring aperture can be coated on the inside or on both sides, preferably on the extruder; however, the casting opening can also be produced on a foil sealer with a laminate corresponding to the coating of the rest of the pack.

Alternatively, the opening can also be punched into a finished laminate in the inward direction (so-called half-cut). As a whole, therefore, the basic hermeticity of the pack, which is decisive for its gas-tightness and aroma-tightness, remains unaffected, since the pouring device is sealed or glued on to the finished pack laminate from outside. More particularly in the packs according to the invention the continuously produced inner coating obviates any risk of pocket formation in the case of foils which may not be sealed to one another over the whole

surface, thus ensuring reliable sterilization and the retention of the residual quantities of sterilizing agents when the packs are used in the aseptic field.

According to another feature of the invention the collar of the pouring nozzle is so connected to a releasable securing ring that the securing ring maintains the tube end face with the triangular teeth at a distance from the parting line in the pack top. Preferably the securing ring circumferentially completely engages around the collar of the pouring spout. Both these steps ensure complete hygiene in the opening zone of the unopened pack, since the whole zone of the pouring aperture is covered by the nozzle member which is hermetically encapsulated in itself via the securing ring. Advantageously the securing ring also prevents accidental opening of the pouring aperture when pressure is exerted on the hinge cover in the form of a spacer.

The opening of the original closure is facilitated by a pull tab attached to the securing ring. Preferably the pull tab is preferably disposed in the connecting zone between the closure flap cover and the connecting band, where there is also a breaking notch. When the notch is broken and the securing ring pulled along the breaking line, by outside pressure on the closure cap the tube can be moved in the direction of the prepared annular opening, the toothed end face cutting open the coated pouring hole. The pouring nozzle ensures the secure guiding of the tube right up to the cutting open and removal of all the openings to be cut out.

According to another development of the invention the casting channel in the casting spout and the casting aperture have a slightly oval droplet-shaped cross-section, which both ensures the ventilation of the inside of the pack and also guides the jet of fluid, even in the case of highly viscous products.

The guidance and direction of the jet is also further improved by the feature that the pouring spout disposed in one corner of the flat surface of the pack top has a sharp-edged drawn-out lip which extends beyond the edge of the narrow side of the pack and which is constructed at its free end as a tear-off edge. This prevents after-dripping when the pouring operation has been terminated, since the liquid still present in the zone of the nozzle runs back via the inclined portion of the nozzle into the pack.

Even after the pack has been reclosed, satisfactory hygiene is ensured in the zone of the pouring opening by the feature that in the closure state the closure flap cover extends beyond and completely covers the collar including the tear-off edge on all sides. Such covering immediately and effectively prevents any dirtying of the edge zones in question.

Preferably the connecting band takes the form of a three-part hinge strap which enables the closure flap cover to pivot through 180°.

To prevent the closure flap cover from dropping down into the poured jet, the invention provides two further features:

On the one hand the hinge strap can be constructed toggle-lever-like with two dead centres in the closed and the opened (hinged-open) position of the closure flap cover. Secondly, the surface of the closure flap cover remote from the pouring hole and the outer surface of the top, which abut in the completely hinged-open or hinged-over position of the closure flap cover, preferably have strip-shaped overlays acting as an adhesion closure.

The preferably slightly conical shaping of the tube and the pouring channel of the nozzle ensure reclosure sealed against shaking, since the nozzle walls are reliably prevented from falling in.

To prevent the piece punched out for the formation of a pouring hole from dropping down into the inside of the pack, the inside of the closure flap cover has a wedge disposed centrally of the tube or a needle which extends beyond the end face of the tube with the triangular teeth. This construction is more particularly advantageous if a linear inward punching (half-cut opening) is also provided centrally for the subsequent pouring hole (claim 22).

According to another inexpensive feature of the invention which readily lends itself to manufacture, the whole pouring device is made from a plastics, preferably injection moulded soft plastics. The resulting one-part flat pouring device can be produced at the works ready for functioning by deflecting the hinge strap through 180° and bending it around the nozzle and by fixing the pull tab

thereon. The flat pouring device is applied to the flat top of the pack either in the filling machine or on applicator machines connected to the filling machines.

Further developments of the invention are disclosed in subclaims 15 to 22 which taken as a whole advantageously ensure that there is no adverse effect either on the usual operations of shaping, filling and closing the packs, or on the closed foil adjacent the inside of the packs.

For the production of the aforescribed flat top pack, during the preparation of the blank a droplet-shaped punched-out or punched-in portion is coated in the extruder, or a droplet-shaped half-cut is introduced from outside into the coated laminate by means of a punch, and the strap of the pouring element is glued or sealed on the fully formed pack in registration over the punched-out or punched-on portion or half-cut, after the closure flap cover and the collar of the pouring nozzle have been welded to an interposed securing ring.

As a result, the packs can be made economically and inexpensively without essential alteration to the previous manufacturing and filling operations.

Embodiments of the invention will now be explained with reference to the accompanying drawings, wherein:

Fig. 1 is a perspective view of a container according to the invention,

Figs. 2a to 2d show pouring devices in different views and positions,

Figs. 3a to 3d show corresponding pouring devices which also have a wedge or a needle in the centre of the tube, and

Figs. 4a, b to Figs. 7a, b are each cross-sectional and plan views of the prepared pouring apertures.

Fig. 1 shows a parallelepipedic flat top pack in the form of a lug-type pack with central seam and is therefore part of the prior art. According to the invention the pack has as far in the corner as possible on the top surface 1 a closable pouring device 2 which is shown in greater detail in Figs. 2 and 3. The pouring device 2 is constructed in one part and comprises a strap (flange) 3 which is sealed on to the top surface of the pack. The substantially rectangular strap 3 is formed with a slightly oval, droplet-shaped opening 3a and is bounded by a substantially vertically projecting pouring nozzle 4 which terminates in a collar 4a. A tube 4 acting as a plug and whose free end side has triangular teeth 6 is rigidly connected to a closure flap cover 13. The closure flap cover 13 is low and flat and is articulated to the strap 3 via a connecting band 12 having three hinges 12a. Disposed between the collar 4a of the nozzle 4 and the closure flap cover 13 is a securing ring 7 which extends substantially circularly and acts as a spacer between the closure flap cover and the prepared pouring aperture. Attached to the securing ring 7 is a pull tab 8 whose actuation first opens a breaking notch, whereafter the securing ring 7 can be torn off along a breaking line and removed. The pouring nozzle 4, disposed in one corner of the pack top 1, is extended with a sharp edge in the direction

of narrow sides 16 of the pack beyond its edge 10 in the form of a lip taking the form at its free end of a tearing-off edge 11. On reclosure the closure flap cover 13 abuts the circularly extending collar 4a.

The embodiment illustrated in Figs. 3a to 3d differs therefrom simply by the feature that disposed in the centre of the tube is a wedge attached to the inside of the closure cap cover or a needle 19 which extends beyond the triangular teeth 3 at the end, while on reclosure the annular attachment 7a of the securing ring 7 remaining on the closure flap cover 13 encloses the circularly extending collar 4a.

The closure is actuated as follows: The pulling of the pull tab 8 and the opening of the breaking notch 7a and also the separation of the securing ring 7 along the breaking line 9 and the following pressure applied to the surface 17 of the closure flap cover guides down the closure flap cover 13 together with the tube 5, the teeth 6 penetrating the prepared aperture for the casting hole 15, possibly along the parting line 14 (Fig. 7). The particular positions prior to and following penetration are shown in Figs. 2c and 2d and also 3c and 3d. The closable pouring device shown in Figs. 3a to 3d with the wedge 19 disposed in the centre in relation to the tube 5 can be used more particularly in conjunction with the pack illustrated in Figs. 7a and 7b. Provided alongside the parting line 14, which as shown in Fig. 7a takes the form of a half-cut opening 29 in the inward direction, there is also a further half-cut punching centrally of the longitudinal sides of the droplet oval created by the parting

line 14. If the closure flap cover 13 is now depressed, first the wedge or needle 19 contacts the half-cut opening 30, parts the further layers during its continual movement, and finally acts as a barb to retain the surface punched out by the teeth 6 along the parting line 14. After depression the closure flap cover either bears, as shown in Fig. 2d, against the collar 4a of the pouring member (nozzle 4), or also engages via the annular attachment 7a around the collar 4a of the pouring member, as shown in Fig. 3d.

Another variant embodiment is illustrated in Fig. 3b, which shows applied to the surface 17 of the closure flap cover 13 a support 18 forming part of an adhesion closure (velcro closure). The counterpart in question is disposed on the pack top in the corner where the surface 17 abuts when the closure flap cover 13 is completely hinged over.

Figs. 4a, b to 7a, b illustrate the construction of the packs and the preparation of the casting hole 15. Apart from the prepared aperture, the aseptic pack comprises an aluminium multi-layer laminate having a construction which comprises the following layers in the outward direction: polyethylene 21, cardboard 22, polyethylene 23, aluminium 24, coupling agent 25 and polyethylene 26 (inner plastics coating). As shown in Fig. 4a, the cardboard layer 22 is cut away in the zone of the subsequent casting aperture 15 and the lamination layers have then been applied "in-line" to the extruder.

As shown in Fig. 5a, the casting aperture introduced into the finished lamination is again covered on the foil sealer with a

lamination substantially corresponding to the coating of the rest of the packing and consisting of foils 31 and 32.

Fig. 6a shows a variant of Fig. 4a in which the cardboard layer 22 is interrupted in a circle except for a few bridges 28 (Fig. 6b).

As shown in Figs. 7a and 7b, the aperture is prepared by so-called half-cut openings 29, 30 by punching into the finished coated lamination from outside, for example, in a rotary punch.

The pack according to the invention is more particularly distinguished by high pilfer-proof and tamper-proof security, without the need to accept losses of basic hermeticity, while ensuring reliable reclosability.

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CLAIMS

1. A parallelepipedic flat top pack, more particularly a lug-type pack, having: a central seam; a prepared surface in the pack top which can be penetrated or parted along a closed parting line and which after penetration or parting forms a pouring hole (15); a plastics pouring member whose flange (3), enclosing the parting line (14) and the pouring hole, is rigidly connected to the outer surface of the pack top and into whose pouring spout (4) a tube (5), possibly corresponding in periphery to the closed shape of the parting line and having a plurality of triangular teeth on the end face adjacent the pouring hole can be axially introduced; and a closure cap which can repeatedly close the pouring spout, the inner surface (20) of the packing being coated with a thermally adhesive plastics film, characterized in that the closure flap cover (13) connected to the tube (5) is articulated, preferably via a connecting band (12), to the strap (3) of the pouring member taking the form of a casting spout (4).

2. A flat top pack according to claim 1, characterized in that the closure flap cover (13) is so connected to a releasable securing ring (7) that the securing ring (7) maintains the tube end face with the triangular teeth (6) at a distance from the parting line (14) and the casting hole (15) in the pack top (1).

3. A flat top pack according to claim 2, characterized in that the securing ring (7) circumferentially completely engages around the collar (4a) of the pouring spout (4).



4. A flat top pack according to claims 2 or 3, characterized in that attached to the securing ring (7) is a pull tab (8) by whose pulling-off the securing ring (7) can be removed along a breaking line (9).

5. A flat top pack according to claim 4, characterized in that in the connecting zone of the closure flap cover (13) the pull tab (8) is attached by the connecting band (12) to the securing ring (7) and preferably a breaking notch (9a) is provided therebeside.

6. A flat top pack according to one of claims 1 to 5, characterized in that the casting channel (3a) in the casting spout (4) and the casting hole (5) have a slightly oval droplet-shaped cross-section.

7. A flat top pack according to one of claims 1 to 6, characterized in that the pouring spout (4) disposed in one corner of the flat surface (1) of the pack top has a sharp-edged drawn-out lip which extends beyond the edge (10) of the narrow side (16) of the pack and which is constructed at its free end as a tear-off edge (11).

8. A flat top pack according to claim 7, characterized in that in the closure state the closure flap cover (13) extends beyond and completely covers the collar (4a) including the tear-off edge (11) on all sides.



9. A flat top pack according to one of claims 1 to 8, characterized in that the connecting band (12) takes the form of a preferably three-part hinge strap.

10. A flat top pack according to claim 9, characterized in that the hinge strap (12) is constructed toggle-lever-like with two dead centres in the closed and the opened (hinged-open) position of the closure flap cover (13).

11. A flat top pack according to one of claims 1 to 8, characterized in that the surface (17) of the closure flap cover (13) remote from the pouring hole (15) and the outer surface (1) of the top, which abut in the completely hinged-open or hinged-over position of the closure flap cover (13), preferably have strip-shaped overlays acting as an adhesion closure.

12. A flat top pack according to one of claims 1 to 11, characterized in that the tube (5) and the pouring channel (3a) of the spout (4) are shaped slightly conically.

13. A flat top pack according to one of claims 1 to 12, characterized in that the inside (13) of the closure flap cover has a wedge (19) disposed centrally of the tube (5) or a needle which extends beyond the end face of the tube (5) and the cutting edges (6).



14. A flat top pack according to one of claims 1 to 13, characterized in that the closure flap cover (13) with tube (5), the pouring member (2) comprising the spout (4) and strap (3) and/or the connecting band (12) are made unitarily from preferably injection moulded soft plastics.

15. A flat top pack according to one of claims 1 to 14, characterized in that the strap (3) is glued or sealed to the outside (1) of the pack top.

16. A flat top pack according to one of claims 1 to 15, characterized in that in the original closure the preferably polyethylene-coated inside surface (20) of the pack also extends beyond the prepared pouring hole (15) and the parting line (14).

17. A flat top pack according to claim 16, characterized in that the pack comprises an aluminium multi-layer composite, preferably with an inward sequence of layers: polyethylene, cardboard, polyethylene, aluminium, coupling agent and polyethylene (21-26).

18. A flat top pack according to claims 16 or 17, characterized in that in the original closure the pouring hole (15) has both externally and internally continuously extruded-on polyethylene layers (21, 26) but no cardboard (22).

19. A flat top pack according to claims 16 or 17, characterized in that in the original closure the pouring hole (15) is closed inwardly and outwardly by sealed-on foils (31, 32).



20. A flat top pack according to claims 16 or 17, characterized in that in the original closure the pouring hole (15) is prepared by a circularly punched-out cardboard layer (27) overlaid in the extruder and preferably interrupted by a few bridges (28).

21. A flat top pack according to claims 16 or 17, characterized by an annular punched-on portion (29) (half-cut opening) made inwardly in the finished composite as a preparation for the casting hole.

22. A flat top pack according to claim 21, more particularly in conjunction with claim 13, characterized in that a linear inward punching (30) (half-cut opening) is also provided centrally for the subsequent pouring hole.

23. A method of making a flat top pack according to claims 1 to 22, characterized in that during the preparation of the blank either a droplet-shaped punched-out or punched-in portion (27) is introduced into the uncoated cardboard and then coated on the extruder, or a droplet-shaped punched-in portion (29) (half-cut) is introduced into the coated laminate, and the strap of the pouring element is glued or sealed on the fully formed pack in registration over the punched-out or punched-in portion or half-cut.

24. A method according to claim 23, characterized in that after the gluing-on or sealing-on of the strap, the closure flap cover and the collar of the pouring spout can be welded to an interposed securing ring.