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(72) Inventor: **Goglio, Luigi**  
20146 Milano (IT)

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(74) Representative:  
**Petruzzello, Aldo et al**  
**Racheli & C. s.r.l.**  
Viale San Michele del Carso, 4  
20144 Milano (IT)

(71) Applicant: **Goglio, Luigi**  
20146 Milano (IT)

(54) **Container of flexible material, particularly for liquid products or the like, and relative method of manufacture**

(57) A container is disclosed particularly for liquid products, such as beverages, or for doughy products and the like, consisting of a package of flexible material (2), substantially parallelepiped in shape, with vertical (5) and horizontal (6) welding and folding lines, and having respective frames (3) and (4) at its top and bottom faces, a spout (11) for dispensing the liquid being disposed at the center of the upper frame (3) and connected to the frame by means of a flexible membrane (10) which is folded towards the inside of the container during packaging, providing a housing (15) for the spout (11), and to the outside of the container during use, causing the spout (11) to protrude, the top surface of the container being covered by a peelable diaphragm (13), removal of which causes the spout (11) to protrude from the container.

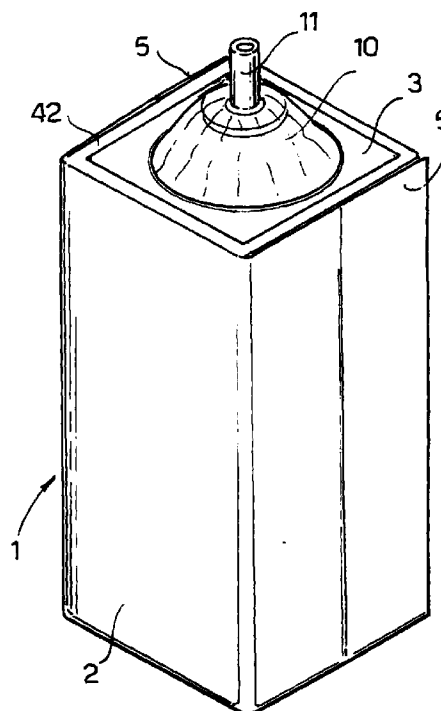


FIG. 3

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## Description

[0001] The present invention relates to a container of flexible material for liquid and doughy products and the like, and a relative method of manufacture.

[0002] Within the context of containers for liquid products, in particular beverages, toward which the invention is particularly directed, the prior art at present offers rather complicated, impractical solutions that do not ensure complete hygiene during dispensing of the product.

[0003] The containers for liquids, particularly beverages, existing at present, which can be substantially rigid (with a layer of cardboard), or soft (of sheet material), are provided with a straw fixed to their outer surface for consumption of the product.

[0004] The user must therefore detach the straw and pierce the membrane covering a hole provided in the package.

[0005] It is apparent that said solutions are awkward, as well as costly, because the straw and the hole made in the package must be sealed, and despite this hygiene is still not ensured during consumption of the product, for example because of the fact that the consumer's mouth can come into contact with the outer surface of the package.

[0006] The object of the invention is to eliminate the aforementioned drawbacks, providing a container for liquids that is simple to make and therefore economical, practical in use, and ensures the maximum hygiene during consumption of the product.

[0007] This object is achieved, according to the invention, with the characteristics listed in the appended independent claims.

[0008] Preferred embodiments of the invention are apparent from the dependent claims.

[0009] In particular, the container according to the invention is of the type described in European patent No. 522 326, in the name of the same applicant, and is obtained by successive folding and welding of a sheet material in one or more layers, with two opposite frames at the top and bottom of the container, to give it stiffness.

[0010] Such a container is improved according to the invention by providing a spout in its top wall, connected to the corresponding reinforcing frame of said wall by means of a flexible membrane, which is folded to the inside of the container when not in use, forming a housing for the spout, which is disposed beneath the plane of the top wall of the container.

[0011] The upper end of the spout is anchored and sealed with a liquid-tight seal to a peelable diaphragm that covers the upper wall of the container, and is provided with a pull tab that facilitates its removal.

[0012] During removal of the peelable diaphragm, the spout is raised from its seat thanks to elastic yielding of the membrane that connects it to the frame and is turned to the outside of the container.

[0013] To prevent the spout from being bent toward the wall of the container towards which the pulling force is applied during removal of the peelable diaphragm provision can advantageously be made for the spout to be connected to the covering diaphragm by means of a bellows-type tab that extends during raising of the covering diaphragm, avoiding folding of the spout, which therefore rises more or less vertically when the diaphragm is torn upward.

[0014] The spout thus remains on the outside of the container, for easy gripping by the user. Discharge of the liquid can be facilitated by lightly squeezing the container with the hand.

[0015] Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary and therefore non-limiting embodiment thereof, illustrated in the appended drawings, in which:

Figure 1 is a schematic, axonometric view of a container for liquids according to the invention, in the closed state;

Figure 2 is a schematic view in a midline section, along the line II-II of Figure 1, showing a series of positions of the peelable covering diaphragm, during opening;

Figure 3 is a schematic, axonometric view as in Figure 1, of the open container ready for use;

Figure 4 is a scheme of the manufacturing process for the container according to the invention, showing in particular application of the spouts to the respective top frames;

Figure 5 schematically shows the container forming stage.

[0016] With reference to said drawings, and for the moment in particular to Figures 1 and 3, the container for liquid products, particularly beverages, doughy products and the like according to the invention has been indicated as a whole by reference numeral 1 and is substantially parallelepiped in shape.

[0017] It is made of flexible sheet material with one or more layers, substantially according to the teachings of the cited European patent No. 522 326.

[0018] At the top and bottom faces of the container, inside the flexible material 2 of which it is made, an upper or covering frame 3 and a lower or base frame or bottom 4 are applied, advantageously by welding, and in this case are in the form of a rectangular or square frame, depending upon the shape of the container 1 in horizontal section.

[0019] Structurally, the container 1 has respective vertical folds 5 on the two opposite side walls (see in particular Figures 1 and 3), and a horizontal fold 6 is provided

on a third side wall of the container, as shown in Figure 2.

**[0020]** The frames 3 and 4 and the folds 5 and 6 give stiffness to the container 1, which would otherwise be soft.

**[0021]** According to the invention, the top frame 3 is connected to a flexible membrane 10, in the center of which is applied a spout 11 for dispensing the liquid held in the container 1.

**[0022]** The free end of the spout 11 is sealed tight by a bellows-type flap 12 connected on the inside to a peelable covering diaphragm 13 that covers the top wall of the container and has a pull tab 14, such as to facilitate its removal.

**[0023]** During packaging of the container 1, the flexible or deformable membrane 10 is turned to the inside thereof, forming a housing 15 for the spout 11, such that the end of the latter does not protrude beyond the plane of the top frame 3.

**[0024]** Opening of the container takes place by pulling the peelable diaphragm 13 upward, gripping the pull tab 14, as shown schematically by the sequence of positions shown in Figure 2. During this stage, the bellows-type tab 12, as it extends, maintains the spout 11 in a substantially vertical position, causing complete raising thereof when the diaphragm is torn by pulling it upward, also causing detachment of the bellows-type tab from the spout.

**[0025]** In the open state, the container 1 appears as shown in Figure 3, that is with the flexible membrane 10 turned upwards on the outside of the container and the spout 11 completely free, so as to be readily be gripped between the lips of the user for consumption of the product in the container 1. This operation can be further facilitated by gently squeezing the container with a hand.

**[0026]** In the same way, the liquid in the container 1 can be poured into another recipient such as a glass.

**[0027]** In a variant embodiment, the spout 11 could be connected directly to the peelable diaphragm 13. However, in this case, during removal of the diaphragm 13 the spout would tend to fold toward the edge 16 of the container 1, in the direction of which the pulling force is exerted on the diaphragm 13, as shown schematically by the arrows in Figure 2.

**[0028]** As far as the materials used are concerned, the package 2 of the container, the bellows-type tab 12 and the peelable diaphragm 13 are made of flexible multi-layer sheet material, for example polyester-aluminium-polyethylene, the frames 3, 4 and the spout 11 of weldable plastic material, and the membrane 10 of a material that can easily be deformed, for example thermally, such as a mixture of polyamide and polyethylene.

**[0029]** With the aid now of Figure 4 the manufacturing procedure of the container 1 according to the invention, in particular the part of the procedure relating to application of the spout 11, is schematically illustrated.

**[0030]** Starting from a reel 30', a sheet 30 of flexible

material used to make the membranes 10 is unrolled.

**[0031]** Immediately downstream of a drawing wheel 31 a punching station 32 able to make holes 60 on the sheet 30 for insertion of the spouts 11 is provided. The punching station 32 is followed by an application station 33 for the frames 3, which are positioned on the sheet from above.

**[0032]** There then follows an application and welding station 34 for the spouts 11, which are inserted from below into the holes 60 made in the punching station 32. The spouts 11 have a widened base 11' for better welding to the sheet 30.

**[0033]** The station 34 is followed by a pre-heating station 35, a preheating station with initial deformation 36, in which the flexible membrane 10 begins to be formed through deformation of the sheet 30 interposed between the frame 3 and the widened base 11' of the spout 11. Deformation is completed in a deformation station 37 followed by a possible second deformation station 37', where the flexible membrane 10 takes on the final shape shown in Figures 2 and 3.

**[0034]** The sheet 30 then makes a loop 38 forming a storage unit for the frames 3 with spouts 11, at the exit of which is situated a cutting station 39, which cuts the sheet along the outside of the frames 3, which are sent, together with the corresponding spouts, into a guide channel 40, along which at least one sterilization area 41 using ultraviolet rays or hydrogen peroxide is provided.

**[0035]** Simultaneously, the flexible material 2 serving to form the package of the container 1 is unrolled from a reel 50 and fed to a punching station 51 where rectangular or square openings are made, slightly smaller in size than those of the frames 3, so that an edge 42 of the flexible material 2 is disposed around the perimeter in the surface of the of frame 3 (see in particular Figure 3).

**[0036]** The frames 3 with the spouts 11 are fed to a station 52 immediately downstream of the punching station 51, in which they are positioned in the punched part 53 of the flexible sheet material 2 and subjected to pre-welding, for example on two sides. A station 54 for complete welding of the frames 3 on said outer edge 42 of the sheet 2 then follows.

**[0037]** Downstream of the station 54 an application station 55 is provided for the peelable membrane, possibly prepared with the bellows-type tab 12, followed by an easy-open welding station 56.

**[0038]** The sheet 2 provided with the frames 3 and relative spouts 11, as well as with the base frames 4, application of which has not been shown in Figure 4, but which takes place in a similar way to application of the frames 3, is sent to the container forming station 1, as described in the cited European patent No. 522.326, and finally to filling.

**[0039]** As shown schematically in Figure 5, forming of the containers 1 takes place around a vertical mandrel 70, where welding and folding 6 are carried out giving

rise to a tube open at the two sides of the container in which the two lines of welding and folding will subsequently be made. While the tube comes off from the mandrel, welding and folding 5 is carried out at the bottom, and the tube is then cut at the pre-established height, so as to obtain containers open on one side, which are sent for filling and then closed by further welding and folding 5.

[0040] From the foregoing the advantages of the container for liquids and similar products according to the invention are apparent.

### Claims

1. A container of flexible material particularly for liquid products, with a substantially parallelepiped shape, consisting of a flexible package (2) and having a frame (3) at least at its upper face, said frame (3) taking the form of a peripheral rim, characterized in that in the center of said frame is situated a spout (1 1), connected to the frame by means of a flexible membrane (10) turned to the inside of the container (1) during packaging so as to form a housing (15) for the spout (11) and which, together with the spout, can be turned to the outside of the container (1) during use, at least the end of the spout (11) being sealed with a liquid-tight seal. 15
2. A container according to claim 1, characterized in that the upper face of the container (1) is covered by a peelable diaphragm (13), provided with a pull tab (14) to facilitate removal thereof. 20
3. A container according to claim 2, characterized in that said peelable diaphragm (13) is connected to said spout (11) and closes the end thereof with a tight seal. 25
4. A container according to claim 2 or 3, characterized in that said peelable diaphragm (13) is connected to said spout (11) by means of a bellows-type tab (12), able to cause more or less vertical raising of the spout during removal of the diaphragm. 30
5. A container according to any one of the preceding claims, characterized in that said flexible membrane (10) is a plastic membrane that can be deformed, provided with a central hole (60) where the spout (11) is housed, welded to a base flange (11') of the spout and around the perimeter of the frame (3). 35
6. A container according to any one of the preceding claims, characterized in that it also has a frame (4) inside its bottom face, two vertical folding and welding lines (5) on two opposite sides, and a horizontal welding and folding line (6) on a third side. 40
7. A method for manufacturing containers for liquid products according to any one of the preceding claims, comprising the stages of:
  - feeding a sheet of flexible material (30) for forming said membranes (10);
  - making holes (60) in said sheet (30);
  - applying frames (3) around said holes (60);
  - inserting spouts (11) into said holes (60) and welding the respective bases (11') to the sheet (30);
  - pre-heating and deformation of the portion of sheet comprised between each spout (11) and the corresponding frame (3) to create said flexible membrane (10);
  - cutting the sheet (30) along the outer edge of each frame (3);
  - feeding the frames (3) with respective spouts (11) to a strip of flexible sheet material (2);
  - positioning and welding said frames (3) at the respective punched windows in the sheet (2);
  - applying and welding a peelable diaphragm (13) possibly with a bellows-type tab (12) to the frame
  - sending the sheet (2) after possible application of the base frames (4) to a vertical mandrel (70), where a tube is formed by closing the web along a welding and folding line (6), and then an open container by making a weld and fold (5) and cutting the tube at the desired height. 45

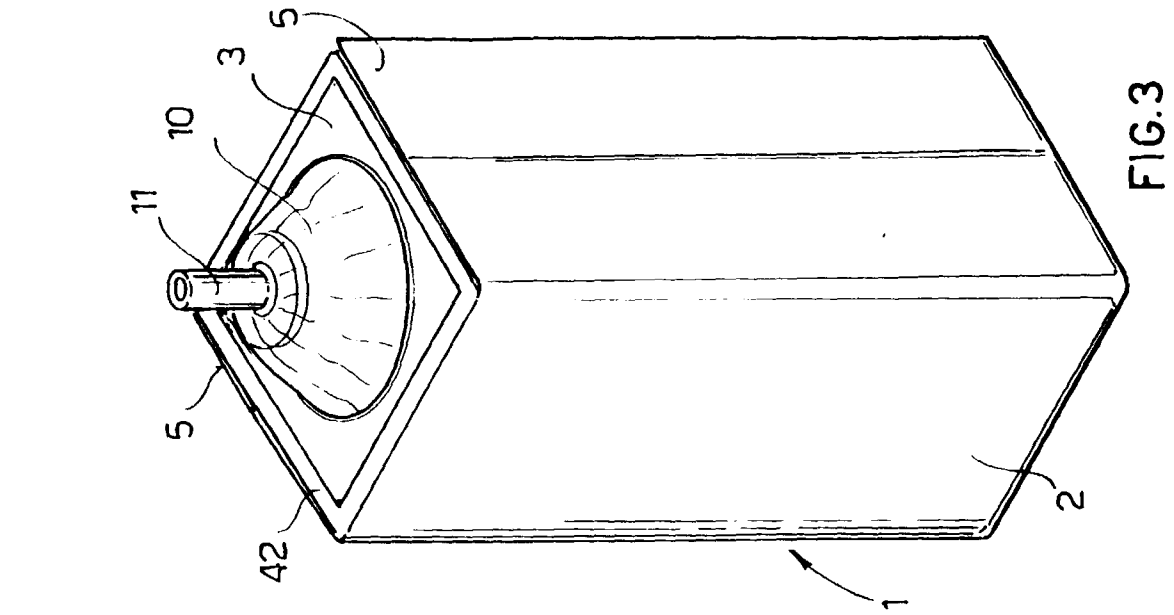


FIG. 1

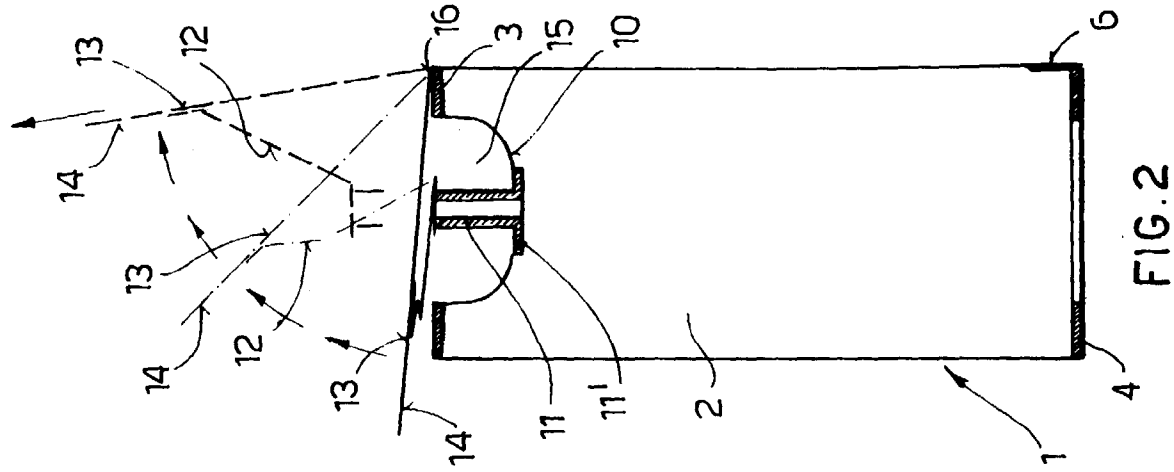


FIG. 2

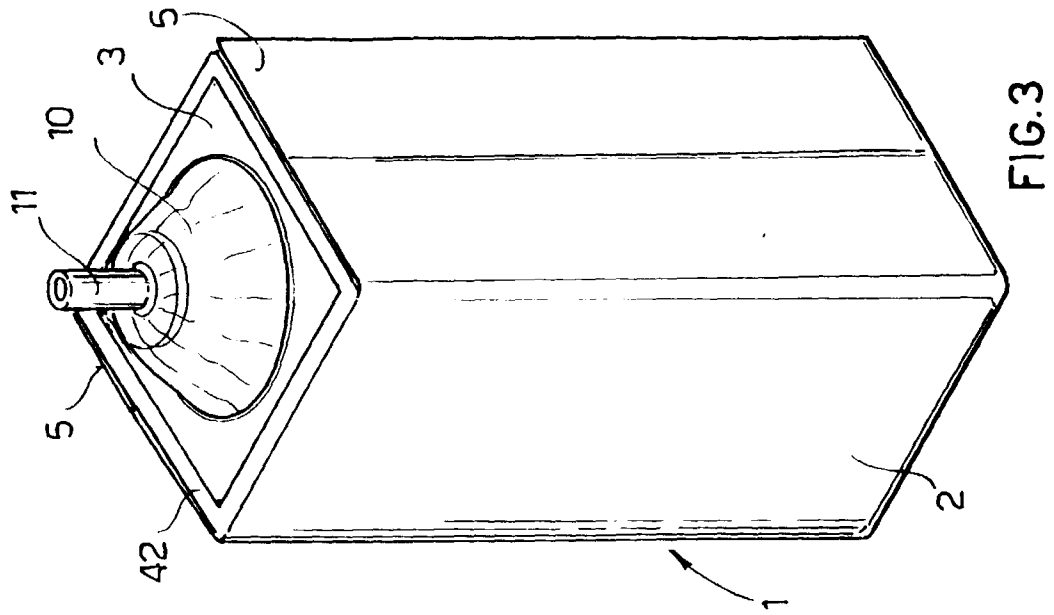


FIG. 3

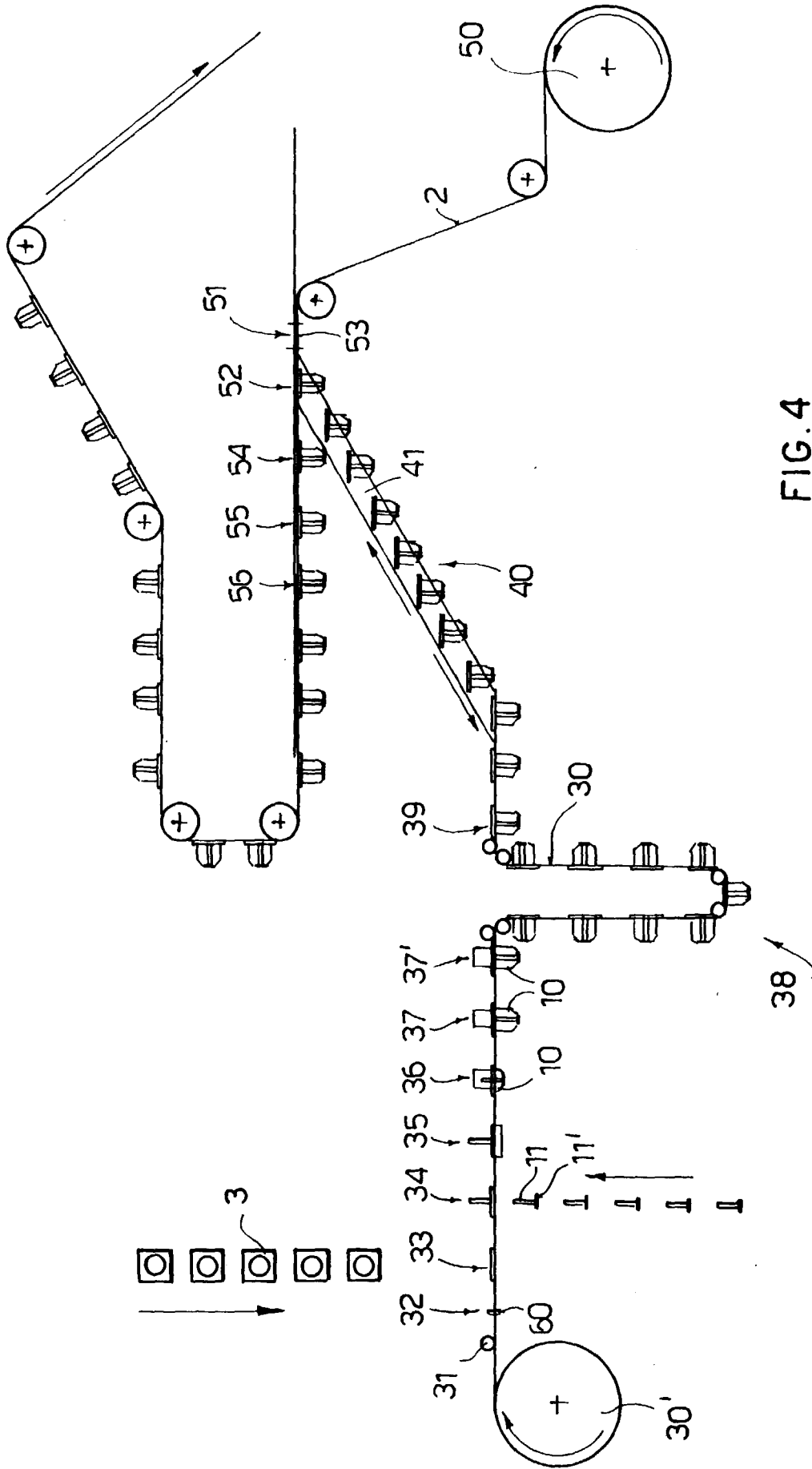


FIG. 4

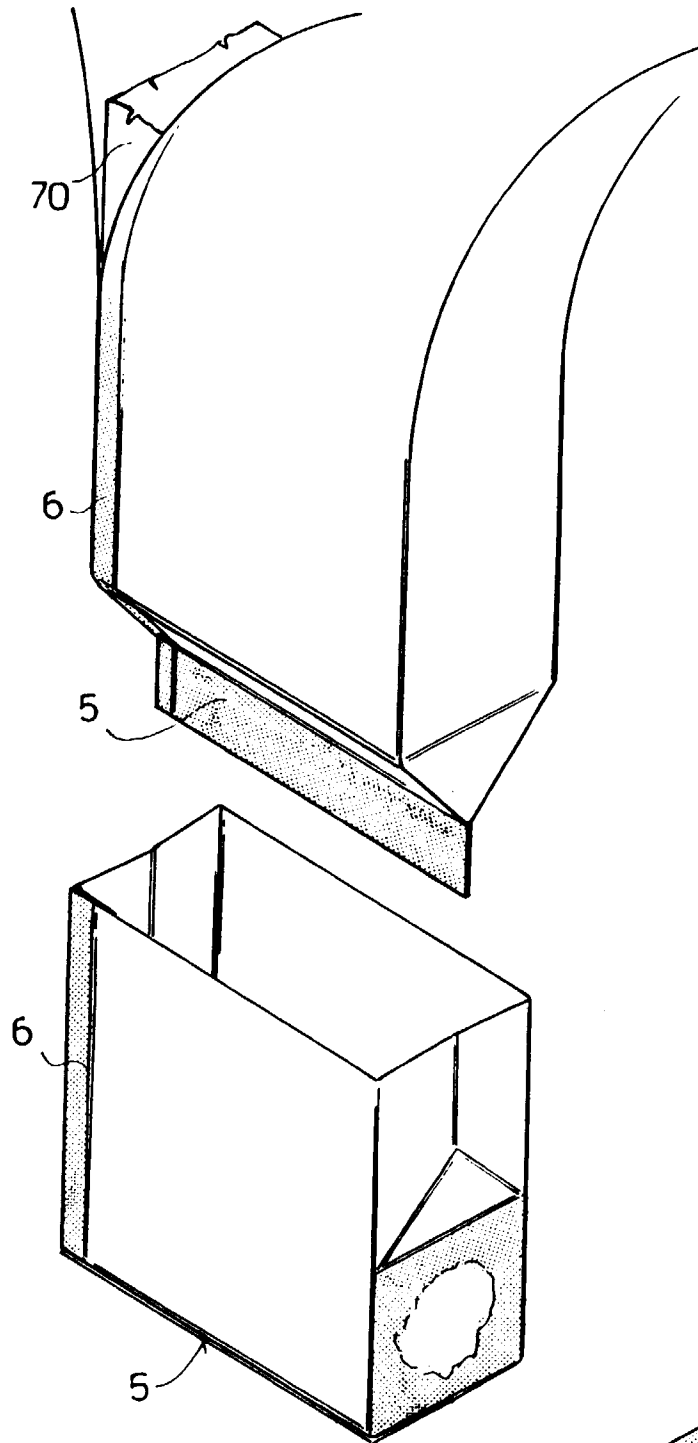


FIG. 5

