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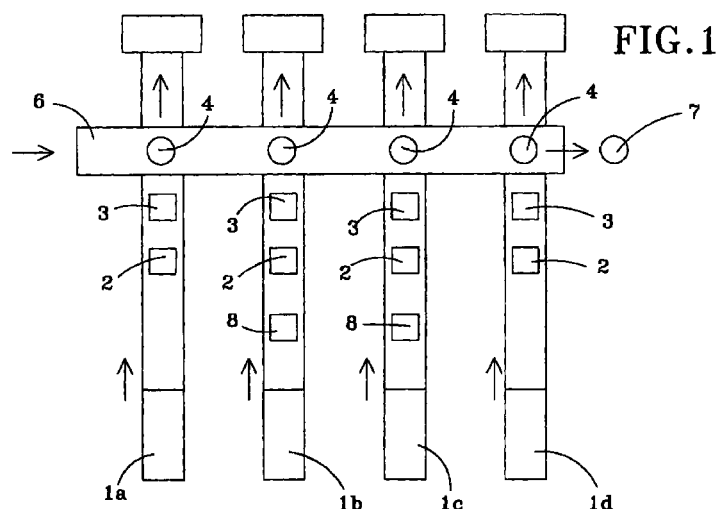
(54) **PROCESS AND MACHINE FOR MAKING CONTAINERS FROM A PLURALITY OF STRIPS AND CONTAINER**

(57) The process comprises the stages of: gluing of said plurality of strips from rolls of sheet material (1a, 1b, 1c, 1d); die-cutting of said plurality of strips; and pressing and joining together of said strips to form the container according to a design predetermined individually for each strip, by adding progressively to a first strip already pressed other further individual strips as they are pressed onto them.

The machine comprises: gluing stations (2); die-

cutting stations (3) which die-cut a plurality of strips; pressing stations (4), on which all the strips are joined together; and transfer means (6) for transferring the strip(s) already pressed from one pressing station (4) to the others.

Much stronger containers can be achieved without thickness limitation.



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## Description

[0001] The present invention relates to a process for the manufacturing of containers, to a machine for manufacturing the same and to a container obtained with this process, said containers being formed from a plurality of strips superposed and joined together and being specially suitable for containing foods.

## BACKGROUND OF THE INVENTION

[0002] Known in the art are various containers for foods which are used for the sale or transporting thereof, these containers usually being for use once only.

[0003] These containers are formed by a plurality of layers of sheet material, the number and the material of the layers depending upon the type of foods to be contained. The layers are normally of cardboard or expanded polystyrene, also including a layer of laminated material suitable for being in contact with foods.

[0004] In some cases, and depending on the type of product to be contained, the containers can include an additional layer of absorbent material placed beneath the layer of material suitable for being in contact with foods.

[0005] One major disadvantage of some of these containers lies in the use of expanded polystyrene, which is not a very ecological product since it is not very economically feasible to recycle it.

[0006] Cardboard containers have the disadvantage of not being very strong and not retaining their shape, that is, they deform and do not recover their original shape. This is due to the fact that during the pressing stage to shape the container according to a predetermined design folds are formed at the pressed zones, and these folds can deform if pressure is applied on same.

[0007] The manufacturing processes for this type of container usually include the stages of:

- gluing and joining of a plurality of strips;
- die-cutting of said plurality of strips already joined together; and
- pressing of said strips in order to shape the container according to a predetermined design.

[0008] In the known processes the strips are first glued, joining them together, are die-cut and all the strips are then pressed together. This pressing of all the strips together is what leads to the formation of folds.

[0009] Moreover, the known processes have the disadvantage that they are carried out by heat processes at very high temperatures and that the thickness of the strips is limited, which also leads to the containers not being very strong.

[0010] Another disadvantage is the power needed for the punching head of the pressing station, since a

number of layers have to be pressed together. Furthermore, the tolerance between the punching heads and the dies of the pressing station has to be quite large, since a plurality of layers of a certain thickness has to be pressed all together.

## DESCRIPTION OF THE INVENTION

[0011] The process of the invention resolves the aforesaid disadvantages, while providing other advantages which will be described below.

[0012] According to a first aspect, the present invention relates to a process for the manufacture of containers, characterized in that it comprises the stages of:

- gluing of said plurality of strips from rolls of sheet material;
- die-cutting of said plurality of strips; and
- pressing and joining together of said strips in order to make up the container according to a design predetermined individually for each strip, by adding the other strips as they are pressed successively and individually to a first already-pressed strip.

[0013] With the process of the invention containers are formed with the number of strips desired, thus achieving a suitable thickness, without limitation. A container of considerable strength is thus achieved, forming folds of very small dimensions, with high shape-retention, that is, if the containers deforms it returns to its original shape.

[0014] The pressing stage can be carried out using cold or hot processes, achieving very high manufacturing speeds compared with the known processes.

[0015] Moreover, little power is needed to press the strips, since only one strip is pressed at each of the stations, not all the strips together as has been done to date.

[0016] Advantageously, the process of the invention also includes an additional stage of cutting away the edges of the container after pressing and joining together all the strips.

[0017] Preferably, the container is made by taking up strips from at least three rolls of sheet materials, the first sheet material being suitable for being in contact with foods and, when all the strips have been pressed and joined together, the one left on the internal part of the container.

[0018] Also preferably, at least one of said rolls is cardboard, the strip(s) which are die-cut from the roll(s) of cardboard being fitted between the first strip of material suitable for being in contact with foods and the strip applied on the outermost part when all the strips have been pressed and joined together.

[0019] Where necessary, and depending on the product the container is to contain, at the die-cutting stage some slots or orifices can be made in the first strip

of material suitable for being in contact with foods. Where such slots or orifices are made, a zone of the cardboard strip(s) corresponding to the slots or orifices of the first strip is treated for absorption at predetermined zones of the juices produced by the product to be packaged.

**[0020]** Advantageously, during the stage of pressing and joining together of the strips, that latter are secured by means of vacuum absorption.

**[0021]** Preferably, treatment of the cardboard strip(s) is carried out by spraying a material suitable for preventing porosity at certain zones of said strip(s).

**[0022]** In the die-cutting stage of the invention the strips are cut out in advance and marks made for carrying out the subsequent pressing on each of the strips.

**[0023]** Advantageously, at least one of said strips is of dimensions different from the other strips. A reinforcement or absorbent strip of smaller dimensions can thus be included between the other strips.

**[0024]** According to a second aspect, the present invention also relates to a machine for manufacturing containers, characterized in that it comprises:

- a number of gluing stations, the number of which coincides with the number of rolls of sheet material or is one unit less than the number of rolls;
- a number of die-cutting stations which die-cut a plurality of strips taken from the same number of rolls of sheet material, the number of these die-cutting stations coinciding with the number of rolls of sheet material;
- a number of pressing stations, formed by a plurality of punching heads and dies, the number of pressing stations coinciding with the number of rolls of sheet material, these pressing stations carrying out the joining together of all the strips; and
- means of transfer of the already pressed strip or strips from one pressing station on to the others, so that a first strip passes successively through all the pressing stations, individually adding one strip at each of said stations to said first strip until the final make-up of the container has been achieved.

**[0025]** In this way, the tolerance between the die and the punching head increases as the thickness increases, thereby achieving very precise pressing.

**[0026]** Advantageously, the machine of the invention also includes a cutting station at which the edges of the already-shaped container are cut after all the strips have been joined together.

**[0027]** Where necessary, the machine can also include at least one additional station for treating a zone of at least one of said strips.

**[0028]** Advantageously, the rolls of sheet material are positioned one beside the other, with the roll corresponding to the innermost strip of the already-formed container placed at one end and the roll corresponding to the outermost strip of the already-formed container at

the other end.

**[0029]** Also advantageously, the dies of the pressing stations are positioned one beside the other facing the outlet of sheet material from the rolls.

**[0030]** According to a third aspect, the present invention also relates to a container manufactured according to the foregoing process and with the machine described.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0031]** For a better understanding of all that has been set out herein, some drawings are attached which show, schematically and solely by way of non-restrictive example, a practical case of embodiment.

Figure 1 is a schematic plan view of the machine of the invention; and

Figure 2 is a schematic elevation view of the machine of the invention.

## DESCRIPTION OF A PREFERRED EMBODIMENT

**[0032]** As can be seen in Figure 1, which shows an embodiment of the machine of the invention, the machine comprises:

- four gluing stations 2;
- four die-cutting stations 3 which die-cut a plurality of strips which come from four rolls of sheet material 1a, 1b, 1c, 1d;
- four pressing stations 4, made up of a plurality of punch heads 5 and dies, the joining together of all the strips being carried out on these pressing stations;
- means of transfer 6, such as for example a conveyor belt, to take the already-pressed strip or strips from one pressing station 4 to the others, so that a first strip passes successively through all the pressing stations 4, individually adding one strip at each of said stations to said first strip until the final make-up of the container has been achieved;
- two stations 8 for treating some zones of two of said strips, at which a substance is sprayed onto said zones to prevent them being porous; and
- a cutting station 7 at which the edges of the already-formed container are cut away following the joining together of all the strips.

**[0033]** It should be noted that this machine is designed for the manufacturing of containers of four layers of sheet material, though containers of more or fewer layers can be manufactured by adding or removing the corresponding stations.

**[0034]** Preferably, the innermost strip of the formed container is of a material suitable for being in contact with foods and can be printed on if wished. This strip can be made of a heat-fusible and impermeable mate-

rial, depending on requirements.

**[0035]** The outermost sheet of the formed container can be made of any suitable material, such as paper or others, and can be printed on.

**[0036]** The intermediate strip or strips, two in the case of the container manufactured with the machine shown in the drawings, are preferably of cardboard.

**[0037]** In order to manufacture the containers, the rolls of sheet material 1a, 1b, 1c, 1d are first placed in position in such a way that they feed said material to the stations described. Any suitable means can be used as driving means of said rolls for feeding of material.

**[0038]** The machine of the invention will be synchronised in such a way that, when it comes into operation, the material is fed first from the first roll 1a, the roll on the left of the machine shown.

**[0039]** The sheet material will pass first through the gluing station 2, where one section of the material will be glued. Preferably, the glue used will be heat-fusible, being allowed to cool before pressing.

**[0040]** The sheet material is then die-cut and marked according to a predetermined design, with marks made for subsequent pressing thereof.

**[0041]** The strip is then pressed, by either cold or hot process. If carried out by hot process, the temperature reached will not be very high, but only sufficient to heat the glue on the strip. The part of the pressing station which will be heated will always be the die, while the punching head 5 will remain cold.

**[0042]** This already-pressed strip will pass on to the next pressing station 4 by means of the conveyor belt 6, on which a second strip will be incorporated onto said first strip when it is pressed. Said second strip had passed through the same processes as the first strip.

**[0043]** This process for incorporating a strip will be carried out successively until the entire container has been formed.

**[0044]** The machine of the invention will be synchronised in such a way that container manufacturing is carried out continuously.

**[0045]** An additional operation of spraying onto a zone of the sheet material can be carried out on the intermediate sheet materials. This spraying is carried out in order to treat some zones, thereby preventing porosity at some zones of the strip or strips.

**[0046]** It is important to stress that gluing of the first strip is not essential, and the gluing station corresponding to the first roll 1a can be removed.

**[0047]** It should be noted that one of the strips making up the container can be of dimensions different from those of the other layers. For example, a reinforcement strip of smaller dimensions can be included between the other strips.

**[0048]** Moreover, at least one of the rolls can be positioned to feed material in a different direction from the rest of the rolls, thereby allowing the fibres of the sheet material from this roll to cross over the fibres of the other sheet materials. The container is thus pro-

vided with greater shape stability, preventing deformations.

**[0049]** Although reference has been made to one specific embodiment of the invention, it is obvious to an expert in the subject that both the process and the machine described can have many variations and modifications and that all the details mentioned can be replaced by others which are technically equivalent without departing from the scope of protection defined by the attached claims.

**[0050]** Some of these modifications might consist, for example, in the arrangement of the gluing and die-cutting stations, with the gluing being carried out before the die-cutting, or vice versa.

**[0051]** Another modification might relate to the means of transfer of the already-formed strips. In the embodiment shown, these means of transfer consist of a conveyor belt provided with the dies, the latter being attached onto the belt. The same die thus passes successively through all the pressing stations. It should be noted that the punching heads could be attached onto the conveyor belt, so that the punching heads would pass through all the pressing stations.

## Claims

1. A process for the manufacture of containers, the containers being formed from a plurality of strips superposed and joined to each other, and made up by gluing, die-cutting and pressing of said strips, characterized in that it comprises the stages of:
  - gluing of said plurality of strips from rolls of sheet material (1a, 1b, 1c, 1d);
  - die-cutting of said plurality of strips; and
  - pressing and joining together of said strips in order to make up the container according to a design predetermined individually for each strip, by adding the other strips as they are pressed successively and individually to a first already-pressed strip.
2. A process as claimed in claim 1, characterized in that it includes an additional stage of cutting away the edges of the container after pressing and joining together all the strips.
3. A process as claimed in claim 1, characterized in that the die-cutting is carried out by taking up strips from at least three rolls of sheet materials (1a, 1b, 1c, 1d), the first sheet material (1d) being suitable for being in contact with foods and, when all the strips have been pressed and joined together, the one left on the internal part of the container.
4. A process as claimed in any of the previous claims, characterized in that at least one of said rolls holds cardboard (1b, 1c), the strip(s) which are die-cut

from the rolls(s) of cardboard being fitted between the first strip of material suitable for being in contact with foods (1d) and the strip applied on the outermost part when all the strips have been pressed and joined together.

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5. A process as claimed in claims 1 and 3, characterized in that at the die-cutting stage some slots or orifices are made in the first strip of material suitable for being in contact with foods (1d).

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6. A process as claimed in claims 4 and 5, characterized in that it includes an additional stage of treatment of a zone of the cardboard strip or strips (1b, 1c) corresponding to the slots or orifices of the first strip.

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7. A process as claimed in claim 1, characterized in that during the stage of pressing and joining together of the strips, that latter are secured by means of vacuum absorption.

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8. A process as claimed in claim 6, characterized in that treatment of the cardboard strip(s) is carried out by spraying a material suitable for preventing porosity at certain zones of said strip(s).

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9. A process as claimed in claim 1, characterized in that in the die-cutting stage the strips are cut out in advance and marks made for carrying out the subsequent pressing on each of the strips.

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10. A process as claimed in any of the previous claims, characterized in that at least one of said strips is of dimensions different from the other strips.

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11. A machine for the manufacture of containers according to the process of claim 1, characterized in that it comprises:

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- a number of gluing stations (2), the number of which coincides with the number of rolls of sheet material (1a, 1b, 1c, 1d) or is one unit less than the number of rolls (1a, 1b, 1c, 1d);
- a number of die-cutting stations (3) which die-cut a plurality of strips taken from the same number of rolls of sheet material (1a, 1b, 1c, 1d), the number of these die-cutting stations (3) coinciding with the number of rolls of sheet material;
- a number of pressing stations (4), formed by a plurality of punching heads (5) and dies, the number of pressing stations (4) coinciding with the number of rolls of sheet material (1a, 1b, 1c, 1d), these pressing stations (4) carrying out the joining together of all the strips; and
- means of transfer (6) of the already pressed strip or strips from one pressing station (4) on

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to the others, so that a first strip passes successively through all the pressing stations (4), individually adding one strip at each of said stations to said first strip until the final make-up of the container has been achieved.

12. A machine as claimed in claim 11, characterized in that it also includes a cutting station (7) at which the edges of the already-shaped container are cut after all the strips have been joined together.

13. A machine as claimed in claim 11, characterized in that it includes at least one additional station (8) for treating a zone of at least one of said strips.

14. A machine as claimed in claim 11, characterized in that the rolls of sheet material (1a, 1b, 1c, 1d) are positioned one beside the other, with the roll corresponding to the innermost strip (1d) of the already-formed container placed at one end and the roll corresponding to the outermost strip (1a) of the already-formed container at the other end.

15. A machine as claimed in claim 11, characterized in that the dies of the pressing stations (4) are positioned one beside the other facing the outlet of sheet material from the rolls (1a, 1b, 1c, 1d).

16. A machine as claimed in any of claims 11 to 15, characterized in that at least one of the rolls is oriented in a different direction from the rest of the rolls.

17. Container obtained with the process claimed in claim 1.

