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(54) IMPROVEMENTS IN AND RELATING TO
 CONTAINERS FOR PACKAGING OF PARALLELEPIPED
 SHAPE

(71) We, CORDOTEX S.A. a Swiss corporate body, of 2, Rue de la Paix, Lausanne, Switzerland, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to containers for packaging of parallelepiped shape and to a method of and means for producing such a container.

Packaging containers of parallelepiped shape are used in packaging technology on account of their good stackability and space saving.

Heretofore parallelepiped containers have been made from a strip of packaging material by a comparatively complicated folding operation combined with pressure moulding, or by deformation of a plastics tube or a flat plastics blank heated to its softening temperature.

These methods have certain drawbacks. For example the folding and pressure moulding operation involves a relatively large consumption of materials since it entails the formation of triangular corner flaps which are not included in the effective surface of the package, while moulding by deformation of plastics material heated to its softening temperature involves uneven distribution of wall thickness and also distortion of any decorative pattern there may be, and in addition the moulding method is relatively slow. It has also been found difficult in cases where filling is carried out in conjunction with the container-moulding operation, to prevent the flavour of the plastics material from being acquired by the goods being packaged.

The object of the invention is to provide a container for packaging, and a method of, and means for, producing the same, which will be less subject to the aforesaid defects than previously known containers.

With this end in view the invention consists in a container for packaging, of substantially parallelepiped shape, comprising two conjoined U-shaped or channel elements having

their respective side limbs mutually at right angles, forming a hollow enclosure.

The invention further consists of a method of producing a container such as set out in the next preceding paragraph or a line of such containers, wherein a line comprising a plurality of said containers connected together is produced, and one or more containers separated from the line.

The invention also consists of a method of forming a plurality of containers connected together in line, wherein a first length of material of inverted U-shaped or channel section is fitted over, and secured to, a second length of material formed with integral upstanding transverse double walls spaced at intervals along its length.

The invention yet further consists in apparatus adapted to produce containers as specified in the next but two preceding paragraphs comprising means for shaping a strip or web of packaging material, movable along a cyclic path, having at spaced intervals upstanding plate-like members substantially perpendicular to their direction of movement, and means for depressing the web running over the said upstanding members in order to form channel-shaped web portions between them.

The invention will now be described below with reference to the accompanying diagrammatic drawings in which

Figure 1 shows a container in accordance with the invention:

Figure 2 shows a series of such containers in a continuous row or line:

Figures 3 and 4 show strips of packaging material suitable for making a container in accordance with the invention:

Figure 5 shows a folded strip of packaging material:

Figure 6 shows equipment for the production of containers in accordance with the invention:

Figure 7 shows a cross section in the plane AA of the equipment shown in Figure 6:

Figure 8 shows a section in the plane BB of the equipment shown in Figure 6: and Figure 9 shows the strip of Figure 4 folded into a channel section.

5 The container shown in Figure 1 comprises two elements 1 and 2 each of channel section, fitted together with their respective side limbs at right angles to one another in order to form a closed parallelepiped body.

10 Figure 2 shows a series of parallelepiped container units in a continuous line or row, each of which comprises a channel element 3 and an element 4 formed with successive transverse channel sections.

15 Between adjacent channel sections of element 4 is a space 5, and the container units can be separated from one another by severance or rupture of a tear strip 8 which extends transversely from edge to edge of the channel-shaped element 3.

20 As will be seen in Figure 2 the tear strip 8 may be defined by two lines of perforations each of which extends over the full width of the channel-shaped element 3. The tear lines are carefully located within the gap 5 between two adjacent container units. When a unit is to be removed from the row, one end of the tear strip 8 is raised and the strip removed by a pull in the direction of the arrow. Since the channel-shaped element 3, in the gaps 5 between adjacent units, is joined to the top edges 16 of folds in the element 4, tear lines are preferably also provided along the tops 16 of the folds. The edge zone of the longitudinally channel-shaped element 3 preferably projects beyond the edges of the base of the folded element 4, and the channel-shaped element 3 may also incorporate a draw-flap 9 shown folded towards the face of the element 4. A method of producing a row of containers in accordance with Figure 2, and equipment for carrying out the said method, will now be described in greater detail with reference to Figure 6.

45 The equipment shown in Figure 6 comprises an endless belt or chain 18 which runs over wheels (not shown). The chain incorporates container-forming sections 26 linked together, and each consisting of a closed flat box, the interior of which can be connected to a source of vacuum. Those faces of the box sections 26 on the outer side of the chain loop are provided with suction holes or slots.

50 At equi-spaced positions along the belt 18 are provided containers forming units 19 upstanding transversely from the surface of the belt, and each consisting of a double-walled flat box the interior of which can communicate with a source of vacuum. The surfaces of units 19 are provided with suction holes or slots. The belt 18 is equipped with guide units (not shown) to ensure that the said forming units 19 stand up at right angles to the forming sections 26, at least along those sections of the belt where containers are formed,

shown in Figure 6 as moving vertically downwards.

70 Heating units 22 are situated on each side of the belt 18, preferably in the vicinity of the upper turn of the chain 18. The heating units are located so that the ends of the forming units 19 pass in front of them. There is also provided a device (not shown), for folding a flat sheet or web of packaging material into channel shape, and in order to facilitate this step, the strip may be pre-folded as shown in Figure 4. The strip comprises a carrier layer 11 e.g. of foam plastics, or paper, and a layer 10 of homogeneous thermoplastics material or a foil of metal e.g. aluminium laminated to the carrier layer 11. The strip of material is provided with a fold line 12 and, in the form illustrated, a plastics strip 32 projecting from the carrier layer.

80 The strip shown in Figure 4 when folded into channel shape is illustrated in Figure 9, and as there seen one leg or side limb of the channel-shaped member is extended by the draw flap 9, the function of which will be described later.

90 Another strip 13 of packaging material shown in Figure 3 consists of a laminate comprising a carrier layer 11 of foam plastics or paper and a homogeneous layer 10 of plastics. The strip is pre-folded along fold lines 12a in order to facilitate subsequent folding. The strip shown in Figure 3 is designed to be folded in the manner shown in Figure 5, i.e. the strip 13 is folded along the fold lines 12a in order to form close-spaced double folds 14 of uniform height and width and uniformly spaced along the strip, 13. The folds 14 are formed with flat tops 16 and adjacent walls of the folds are separated by a narrow space 17.

100 The strip 13 shown in Figure 3 is folded by means, (not shown) which may in principle consist of a rotatable or reciprocating pusher unit, whereby the pre-folded strip 13 is folded and fitted over and between the forming units 10 (Figure 6).

105 As mentioned above the forming units 19 and the forming sections 26 are connected to a source of vacuum and the surfaces of the forming units 19 and the forming sections 20 are provided with suction holes so that the strip 13 folded in over the forming units 19 is drawn against the surfaces of the forming units 19 and the forming sections 26 and retained there by suction during the whole of the forming operation.

110 The spacings of the various fold lines 12a on the strip 13 are selected to accord, respectively, with the height of the fold forming units 19, the length of the forming sections 26 and the thickness of the forming units 19.

115 The strip 13 is preferably somewhat wider than the forming units 19, so that an edge zone of the strip 13 projects by a matter of a

few millimetres beyond the side edges of the forming units 19.

When the strip 13 has been drawn down between the protruding forming units 19 and held by suction to the faces of the forming units 19 and the top surfaces of the forming sections 26, the folded strip is carried past the heating units 22, and the parts of the folded strip 13 which project from the side edges of the forming unit are heated to sealing temperature. After passing by the heating units 22, the folded strip 13 is carried vertically downwards, the forming units 19 assuming a position at right angles to the forming sections 26, so the folds 14 are at right angles to the base of the strip 13. In this position, the folded strip 13 is joined on to the previously mentioned element 3 which has been previously folded into channel shape, and presented with its web 29 (Figure 7) against or adjacent to the tops 16 of the double folds 14 and with its side limbs 23 against the heated edges 15 of the folded strip 13.

Goods e.g. liquid, to be packaged are introduced through a filling pipe 20 which has an elongated narrow section and is located between the tops 16 of the folds 14 of the strip 13, and the inside of the web 29 of the channel-shaped element 3, (Figure 6).

The web 29 of the channel-shaped element 3 is deformed by the filling pipe (Figure 7) and in order that this deformation will not set up harmful stresses in packaging materials (which have slight elasticity) longitudinal fold lines may be provided in the web of the channel-shaped element 3, which, when the web of the element is stretched in the transverse direction, yield to increase the width of the web by an amount sufficient for the filling pipe to be accommodated without difficulty between the web 29 and the tops 16 of the folds 14 in the folded strip 13. If required, a number of longitudinal fold lines may be provided along the web of the member 3 in order to allow for even greater expansion of the web.

The legs or side limbs 23 of the channel-shaped member 3 and the side edges 15 of the folded strip 13, after being heated to sealing temperature, are joined to one another by means of pressure units in the way shown in Figure 7, which is a cross section A—A of the equipment shown in Figure 6. When the legs 23 of the channel-shaped element 33 are joined to the edge zones 15 of the folds 14 on the strip, there is formed a vertical tubular body partitioned into substantially parallelepiped spaces 33 separated from one another by the folds 14. In the case of some carrier material e.g. of paper, in order to obtain a larger contact surface within the sealing area, the edges 15 of the folded strip 13 may be turned up or folded in over the edge of the forming units 19 before heating of the thermoplastic layer takes place. The spaces 33 are however in

communication with each other since the web of the channel-shaped element 3 in the region of the filling pipe is not joined to the tops 16 of the folds 14 on the strip 13.

The parallelepiped spaces 33 are filled with the goods to be packaged, and, after a filled section has passed the orifice of the filling pipe, the web of the channel-shaped element 3 is sealed to the top 16 of the folds 14 on the strip by means of a sealing unit 21. Sealing may be accomplished by heat, but practical tests have shown that ultrasonic sealing is to be preferred. Figure 8 shows a section B—B through the equipment in Figure 6. After the sections have been filled, and sealed by the sealing unit 21, they are removed by means of a cutter unit 24 which acts along both the tops and side edges of the forming units 19.

It is clearly not necessary to cut away each package, and, as shown in Figure 2, a pre-arranged number of packaging units connected together, may be detached, to be later separated from one another by means of the tear flaps 8 which are best performed in the strip of packaging material prior to the folding operations.

By providing the strip of packaging material to be folded into a channel section with a projecting free plastics edge 32 as shown in Figure 4, it is possible to make part, e.g. the top, of the package from a thinner material, i.e. the carrier layer can be omitted. The fact that the top portion is made from a thinner material may be an advantage when the package is to be opened, which is further facilitated by making the projecting plastics edge 32 wider than the width of the folds 14 in the folded strip of material 13, to provide a draw flap 9 further to facilitate opening of the package by tearing off the top portion.

The form of the invention described above and the method of its production have been found very advantageous. It should, however be understood that the invention is not limited solely to the details of the abovedescribed form which may be modified in order to meet various conditions and requirements encountered, without departing from the scope of the invention as defined in the appendant claims.

WHAT WE CLAIM IS:—

1. A container for packaging, of substantially parallelepiped shape, comprising two conjoined U-shaped or channel elements having their respective side limbs mutually at right angles, forming a hollow enclosure.

2. A container as claimed in Claim 1 wherein the end edges of each U-shaped element are joined to the cross member of the other U-shaped element, and the side limbs of the two elements are joined together at, or adjacent to, their edges.

3. A container as claimed in Claim 1 or 2



few millimetres beyond the side edges of the forming units 19.

When the strip 13 has been drawn down between the protruding forming units 19 and held by suction to the faces of the forming units 19 and the top surfaces of the forming sections 26, the folded strip is carried past the heating units 22, and the parts of the folded strip 13 which project from the side edges of the forming unit are heated to sealing temperature. After passing by the heating units 22, the folded strip 13 is carried vertically downwards, the forming units 19 assuming a position at right angles to the forming sections 26, so the folds 14 are at right angles to the base of the strip 13. In this position, the folded strip 13 is joined on to the previously mentioned element 3 which has been previously folded into channel shape, and presented with its web 29 (Figure 7) against or adjacent to the tops 16 of the double folds 14 and with its side limbs 23 against the heated edges 15 of the folded strip 13.

Goods e.g. liquid, to be packaged are introduced through a filling pipe 20 which has an elongated narrow section and is located between the tops 16 of the folds 14 of the strip 13, and the inside of the web 29 of the channel-shaped element 3, (Figure 6).

The web 29 of the channel-shaped element 3 is deformed by the filling pipe (Figure 7) and in order that this deformation will not set up harmful stresses in packaging materials (which have slight elasticity) longitudinal fold lines may be provided in the web of the channel-shaped element 3, which, when the web of the element is stretched in the transverse direction, yield to increase the width of the web by an amount sufficient for the filling pipe to be accommodated without difficulty between the web 29 and the tops 16 of the folds 14 in the folded strip 13. If required, a number of longitudinal fold lines may be provided along the web of the member 3 in order to allow for even greater expansion of the web.

The legs or side limbs 23 of the channel-shaped member 3 and the side edges 15 of the folded strip 13, after being heated to sealing temperature, are joined to one another by means of pressure units in the way shown in Figure 7, which is a cross section A—A of the equipment shown in Figure 6. When the legs 23 of the channel-shaped element 33 are joined to the edge zones 15 of the folds 14 on the strip, there is formed a vertical tubular body partitioned into substantially parallelepiped spaces 33 separated from one another by the folds 14. In the case of some carrier material e.g. of paper, in order to obtain a larger contact surface within the sealing area, the edges 15 of the folded strip 13 may be turned up or folded in over the edge of the forming units 19 before heating of the thermoplastic layer takes place. The spaces 33 are however in

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It is clearly not necessary to cut away each package, and, as shown in Figure 2, a pre-arranged number of packaging units connected together, may be detached, to be later separated from one another by means of the tear flaps 8 which are best performed in the strip of packaging material prior to the folding operations.

By providing the strip of packaging material to be folded into a channel section with a projecting free plastics edge 32 as shown in Figure 4, it is possible to make part, e.g. the top, of the package from a thinner material, i.e. the carrier layer can be omitted. The fact that the top portion is made from a thinner material may be an advantage when the package is to be opened, which is further facilitated by making the projecting plastics edge 32 wider than the width of the folds 14 in the folded strip of material 13, to provide a draw flap 9 further to facilitate opening of the package by tearing off the top portion.

The form of the invention described above and the method of its production have been found very advantageous. It should, however be understood that the invention is not limited solely to the details of the abovescribed form which may be modified in order to meet various conditions and requirements encountered, without departing from the scope of the invention as defined in the appendant claims.

WHAT WE CLAIM IS:—

1. A container for packaging, of substantially parallelepiped shape, comprising two conjoined U-shaped or channel elements having their respective side limbs mutually at right angles, forming a hollow enclosure.

2. A container as claimed in Claim 1 wherein the end edges of each U-shaped element are joined to the cross member of the other U-shaped element, and the side limbs of the two elements are joined together at, or adjacent to, their edges.

3. A container as claimed in Claim 1 or 2



formed from foldable flat sheet material having a heat-sealable surface.

4. A container as claimed in Claim 1, 2 or 3 formed of foam plastics, or foam plastics coated with a plastics film, or coated with a foil of metal e.g. aluminium.

5. A container as claimed in any of Claims 1—4 wherein a side-limb of one of said U-shaped elements extends beyond its line of connection with the other U-shaped element to provide a pull-flap whereby the enclosure may be opened.

6. A container as claimed in any preceding claim wherein at least one side limb of one of the U-shaped elements is of thinner material than the other element.

7. A plurality of containers as claimed in any preceding claim interconnected in line, wherein a continuous strip or web of material is formed with upstanding transverse double walls in spaced positions along the length of the strip or web so as to provide one of the U-shaped elements in each of the containers.

8. A line of containers as claimed in Claim 7 wherein the complementary U-shaped elements of the containers are formed by a strip or web of material of channel section, extending over and sealed to the top edges of the said double walls of successive containers in line, and projecting downwards on each side of the double walls, into contact with, and sealed to, the edges of the upstanding double walls.

9. A line of containers as claimed in Claim 7 or 8 wherein the adjacent walls of each pair forming a double wall are spaced from one another by a distance appreciably less than the spacing between neighbouring double walls.

10. A line of containers as claimed in Claims 7, 8 or 9 wherein the junctions between the two walls of the double walls are adapted for rupture or severance to separate containers at one or more points along the line.

11. A line of containers as claimed in Claim 10 wherein a narrow strip of material connecting together adjacent walls of a double-wall is defined by perforations or tear-lines to facilitate removal of the strip when desired.

12. A line of containers as claimed in any of Claims 7—11 wherein all the U-shaped elements incorporated in the various containers are of common shape and dimensions.

13. A method of forming a container as claimed in any of Claims 1—6 or a line of containers as in Claims 7—12 wherein a line comprising a plurality of said containers connected together is produced, and one or more containers separated from the line.

14. A method of forming a plurality of containers connected together in line, wherein a first length of material of inverted U-shaped or channel section is fitted over, and secured to, a second length of material formed with integral upstanding transverse double walls spaced at intervals along its length.

15. A method as claimed in Claim 14 wherein said second length is formed by folding a strip or web of flexible packaging material transversely to form said upstanding double walls.

16. A method as claimed in Claims 14 or 15 wherein said first length of material is formed by another strip or web of flexible packaging material, of which side zones extending beyond opposite edges of the double walls, are folded down into contact with the side edges of said double walls, and bonded thereto.

17. A method as claimed in Claim 15 or 16 wherein said strip or web constituting said second length of material passes over forming units movable in a cyclic path, e.g. on an endless belt.

18. A method as claimed in Claim 17 wherein said forming units comprise upstanding plate-like members substantially perpendicular to their direction of movement.

19. A method as claimed in Claims 17 or 18 wherein the strip or web constituting the second length of material is held to the forming units by suction.

20. A method as claimed in Claims 17, 18 or 19 wherein said strip or web constituting said first length of material is advanced in line with the strip or web constituting said second length of material, and brought into contact with the folds thereof on the forming units, while edge zones of said strip or web constituting said first length of material extending beyond both opposite sides of the forming units are folded down against the edges of the strip or web constituting said second length of material, at the edges of the forming units.

21. A method as claimed in any of Claims 16—20 wherein adjacent edge zones or edges of the two strips or web are heated for bonding together.

22. A method as claimed in Claims 17, 18, 19 or 20 wherein an edge zone of the first strip or web extending beyond the sides of the forming unit is of a width exceeding the height of a forming unit, so that when folded down and sealed against the sides of the second strip or web it extends beyond said first strip to form edge flaps, which may be folded in or compressed during sealing.

23. A method as claimed in any of Claims 16—22 wherein during a first operation of sealing the two strips or webs together, each container at at least one edge is left unsealed to allow material to be loaded into the container before final sealing.

24. A method as claimed in any of Claims 16—23 wherein there are initially sealed together those edges of the strips or webs necessary in order to form a tube which can be loaded with contents being packaged before further sealing partitions the tube into packages.

25. A method as claimed in any of Claims 16—24 wherein the two strips of webs are advanced in a substantially vertical downward

direction when being formed into containers, and loaded.

26. A method as claimed in Claim 23, or in Claim 24 or 25 when appendant to Claim 23 wherein material being packaged is introduced into the space between the two strips or webs, when partially sealed together, by a filling pipe projecting therein between unsealed edges.

27. A method as claimed in Claim 26 wherein the two strips or webs are sealed together to form substantially a tube, round the filling pipe, and move downwards beyond the lower end of the filling pipe, for further sealing to partition the tube into containers.

28. A method as claimed in any of Claims 16—27 wherein the side edges of the two strips or webs are sealed together by heat and pressure.

29. A method as claimed in any of Claims 16—28 wherein sealing of contacting edges or zones of the two strips or webs is effected by ultrasonic means.

30. Apparatus adapted to produce containers as claimed in any of Claims 1—12 comprising means for shaping a strip or web of packaging material, movable along a cyclic path, having at spaced intervals upstanding plate-like members substantially perpendicular to their direction of movement, and means for depressing the web running over the said upstanding members in order to form channel-shaped web portions between them.

31. Apparatus as claimed in Claim 30 wherein the upstanding plate-like members are supported by base members with which the web or strip makes contact.

32. Apparatus as claimed in Claim 30 or 31 wherein the shaping plate-like members are hollow, with perforated faces, adapted to be connected to evacuating means, in order to hold the web by suction.

33. Apparatus as claimed in Claim 31, or in Claim 32 when appendant to Claim 31, wherein the base members constitute links connected together as an endless chain.

34. Apparatus as claimed in any of Claims

30—33 comprising a device for folding a second strip or web of packaging material into longitudinally-channelled shape in proximity to said first folded strip or web.

35. Apparatus as claimed in any of Claims 30—34 comprising means for heating edges of the folded packaging material for sealing.

36. Apparatus as claimed in Claim 34, or in Claim 35 when appendant to Claim 34 comprising pressure means for sealing together the free edge of the two strips or webs of material from which containers are being formed.

37. Apparatus as claimed in Claim 36 comprising container-filling means extending between the two webs or strips of material sealed together at the edges to form substantially a tube.

38. Apparatus as claimed in Claim 37 wherein said filling means comprise a flat tube for projecting through slits formed between unsealed edges of the containers.

39. Apparatus as claimed in any of Claims 30—37 wherein the webs or strips, and containers formed thereby, are moved in a substantially vertical downward direction during formation.

40. A loaded container substantially as described herein with reference to Figure 1 of the accompanying drawings.

41. A plurality of containers, connected together in line, substantially as described herein with reference to Figure 2 of the accompanying drawings.

42. A method of producing containers substantially as described herein with reference to the accompanying drawings.

43. Apparatus for producing containers substantially as described herein with reference to the accompanying drawings.

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