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(54) **Stand-up pouch for packaging food products**

(57) A stand-up pouch (1) made from a continuous tube (15) of web packaging material (3) and including a base wall (4), a top wall (5), a front wall (6) and a back wall (7); the front wall (6) and back wall (7) are joined together by seals (10) extending along their respective

lateral edges (11) and formed by transversally sealing the tube (15) of web packaging material (3), base and top walls (4, 5) are folded between the front and back walls (6, 7) and have respective lateral edges (12) doubled and sealed between the lateral edges (11) of front wall (6) and back wall (7).

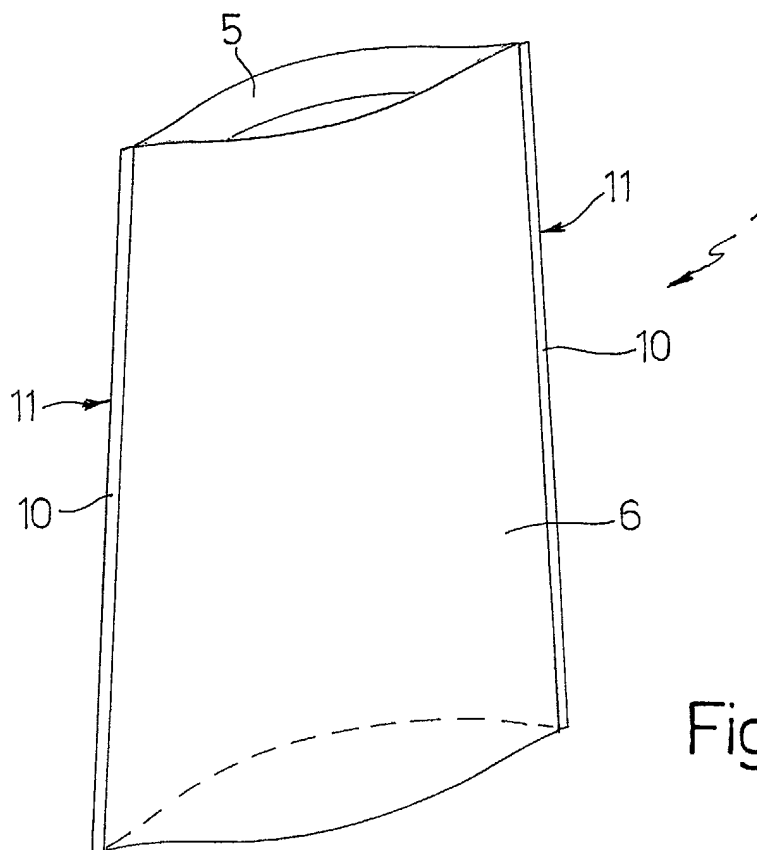


Fig. 1

Description

[0001] The present invention relates to a stand-up pouch for packaging food products.

[0002] As is known, many food products, in particular pourable food products such as fruit juice, UHT (ultra-high-temperature processed) milk, wine, tomato sauce, etc., are sold in packages made of sterilized packaging material.

[0003] The packaging material has a multilayer structure comprising a layer of fibrous material, e.g. paper, covered on both sides with layers of heat-seal plastic material, e.g. polyethylene, and, in the case of aseptic packages for long-storage products, such as UHT milk, also comprises a layer of oxygen-barrier material defined, for example, by an aluminium film which is superimposed on a layer of heat-seal plastic material and is in turn covered with another layer of heat-seal plastic material eventually defining the inner face of the package contacting the food product.

[0004] A typical example of such a package is the parallelepiped-shaped package for liquid or pourable food products known as Tetra Brik Aseptic (registered trademark), which is formed from a continuous tube of packaging material obtained by bending and longitudinally sealing a web packaging material; the web of packaging material is sterilized on the packaging machine itself, e.g. by applying a chemical sterilizing agent, such as a hydrogen peroxide solution, which, after sterilization, is removed, e.g. vaporized by heating, from the surfaces of the packaging material; and the web of packaging material so sterilized is maintained in a closed sterile environment, and is folded and sealed longitudinally to form a vertical tube.

[0005] The tube is filled with the sterilized or sterile-processed food product, and is sealed and cut at equally spaced cross sections to form pillow packs, whose ends are then folded mechanically to form the finished package, which is relatively rigid and has a defined geometry. More particularly, in the finished package, the longitudinal seal of the tube extends vertically along a lateral wall of the package, the transversal seals forming the ends of the pillow pack are folded and sealed against the base and top wall of the package.

[0006] A variant of the usual parallelepiped-shaped packages is obtained by folding the pillow pack so as to dispose the transversal seals along opposite lateral walls of the package and the longitudinal seal on the base wall, so as to leave the top wall free; an example of this variant, which is particularly convenient in view of the application of an opening device, is shown in US-A-4312450.

[0007] A major advantage of the packaging technology using a continuous tube of packaging material is the high production speed.

[0008] An alternative way of packaging products is the use of so-called stand-up pouches, i.e. flexible pouches made from web packaging material and having a "bel-

lows-like" base wall and two faces sealed together along three sides.

[0009] Stand-up pouches are generally made either from a single piece of web material in a W configuration forming the base wall and the two faces, or from two or three different pieces of packaging material sealed together.

[0010] Stand-up pouches are used for a high variety of products, and compared to other packaging technologies have some advantages: stand-up pouches are conveniently portable since they have no fixed shape with hard or rigid parts or corners, require little mass of packaging material per unit of product weight, and have aesthetical appeal and good shelf presence.

[0011] However, the production of stand-up pouches requires dedicated forming and filling machines which are costly and relatively slow, so that the overall packaging cost is relatively high.

[0012] An aim of the present invention is to provide a new stand-up pouch that can be manufactured from a continuous tube of packaging material with little modifications to existing continuous forming-filling machines, such as the ones used for producing parallelepiped packages.

[0013] This aim is achieved by a stand-up pouch made from a web packaging material and including a base wall, a front wall and a back wall, characterised by comprising a top wall forming with said base, front and back walls a single piece of packaging material folded in a tubular fashion and having two opposite edges joined together by a first seal, said front wall and said back wall being joined together by second seals extending along respective lateral edges of said front wall and said back wall and transversely with respect to said first seal, said base and top walls being folded between said front and back walls and having respective lateral edges doubled and sealed between said lateral edges of said front wall and said back wall.

[0014] The invention also relates to a method of manufacturing stand-up pouches including the steps of:

bending and longitudinally sealing a web of packaging material so as to form a continuous tube, feeding said tube along a vertical axis, filling said tube with a food product to be packaged so as to maintain a predetermined level of product within said tube, pre-forming said tube so as to produce a front side, a back side and two longitudinal concave, V-shaped sides connecting said front and back sides, and transversally heat-sealing said tube by means of pairs of jaws provided with sealing members and cyclically gripping said tube so as to double and heat-seal said V-shaped sides between said front and back sides, thereby forming individual pouches which are constituted by tube portions and have a first seal formed by a portion of the longitudinal seal of said tube and a pair of second seals which are

constituted by transversal seals of said tube.

[0015] According to the present invention, therefore, the stand-up pouches can be produced by means of a technology similar to the one used at present for manufacturing parallelepiped packages, with few modification of existing continuous forming-filling machines. Therefore, a high production rate can be obtained, and the overall packaging cost is very low when compared to known stand-up pouches.

[0016] A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a stand-up pouch according to an embodiment of the present invention;

Figure 2 is a front view of the pouch of figure 1;

Figures 3, 4 and 5 are sections taken along lines III-III, IV-IV and V-V, respectively, of Figure 2;

Figure 6 is a section taken along line VI-VI of Figure 4;

Figure 7 is a schematic view showing a forming and filling unit for producing stand-up pouches according to the present invention;

Figure 8 and 9 are sections taken along lines VIII-VI-II and IX-IX;

Figure 10 shows schematically a step of a method of manufacturing stand-up pouches according to the present invention; and

Figure 11 shows schematically a variant of the method of figure 10 for manufacturing stand-up rectangular pouches.

[0017] With reference to figures 1-4 and 6, numeral 1 references as a whole a stand-up pouch, particularly for packaging a liquid food product 2, e.g. a drink.

[0018] Pouch 1 is manufactured from a single piece of laminated packaging material 3 (see enlarged detail of figure 5) including at least a first paper layer 3a, a second oxygen-barrier layer 3b (e.g. an aluminium foil or a mineral-coated polymer such as a SiO_x-coated PET, PA or EVOH), an intermediate hot-melt adhesive layer 3c between the first and second layers and an internal heat-seal layer 3d defining the inner face of the package contacting the food product.

[0019] Pouch 1 includes a base wall 4, a top wall 5, a front wall 6 and a back wall 7 formed from a single web of packaging material 3, which is folded and heat-sealed at in tubular fashion; e.g. respective adjacent edges of top wall 5 and back wall 7, which constitute opposite edges of the web, are sealed together by a first seal 9. Front wall 6 and back wall 7 have a trapezoidal shape with the longer base adjacent to base wall 4 and the shorter base adjacent to top wall 5, and are heat-sealed together by means of respective seals 10 extending along respective lateral edges 11 of walls 6, 7 (figure 3). Base wall 4 and top wall 5 are inwardly folded in a bel-

lows-like fashion, and have respective lateral edges 12 which are doubled between the respective lateral edges 11 (fig. 5) of front wall 6 and back wall 7, with each half 12a, 12b of each edge 12 facing and being heat-sealed to a respective edge 11.

[0020] Each half 12a, 12b of edges 12 has a pre-laminated hole 13, i.e. a hole made only in the paper layer 3a before laminating the packaging material 3. In this manner, when seals 10 are made and edges 12 are doubled between edges 11 of walls 6, 7, edge halves 12a, 12b are "spot-welded" together by the adhesion of the respective hot-melt intermediate layers 3c that are exposed through holes 13. As a result, lateral edges 11 of front wall 6 and back wall 7 remain attached to one another throughout their length, as shown in figure 1.

[0021] With reference to figures 7-10, a method of producing the stand-up pouch 1 as described is the following.

[0022] A continuous cylindrical tube 15 is formed, in known manner, by bending and longitudinally sealing a web of packaging material. Numeral 16 references a continuous longitudinal seal of tube 15, which eventually will form seals 9 of the finished pouches 1 as hereafter explained. Tube 15 is axially fed along a vertical direction A, and continuously filled by a known filling device 17, partially and schematically shown in figure 7, to form a predetermined head of liquid within the tube.

[0023] Downstream from the filling device 17, tube 15 is pre-formed according to a crease pattern (not shown) provided on the packaging material 3 by a pre-forming device 18 including a plurality of forming rollers 19, 20, thereby passing from a circular cross section (fig. 8) to a substantially polygonal cross-section (fig. 9) having two elongated parallel flat sides 21, 22 which eventually will constitute front wall 6 and back wall 7 of the finished pouches 1, and two concave V-shaped sides 23, 24 which eventually will constitute base wall 4 and top wall 5 of the finished pouches 1. Longitudinal seal 16 is located along an edge formed between one (22) of the flat sides (21, 22) and one (24) of the V-shaped sides 23, 24.

[0024] Downstream from the pre-forming device 18, tube 15 is transversally heat-sealed by two pairs of jaws 25, per se known, which are driven so as to reciprocate along direction A and alternately clamp tube 15; as is known, e.g. from EP-A- 1 101 700, the two pairs of jaws 25 interact alternately and cyclically with the tube 15 of packaging material, and are movable between an open position (not shown) and a closed position (figure 7) in which the jaws 25 grip the tube 15 of packaging material between respective sealing members 26, 27 which are parallel to flat sides 21, 22 of tube 15 and extend transversally with respect to tube 15.

[0025] More particularly, if trapezoidal pouches such as the one of figure 1 are to be produced, the sealing members 26, 27 of the pairs of jaws 25 are inclined in a vertical plane in opposite directions, so as to form inclined transversal seals 10 as schematically shown in figure 10.

[0026] When pre-formed tube 15 is clamped between sealing members 26, 27, V-shaped sides 23, 24 are longitudinally doubled and sealed between flat sides 21, 22; a succession of alternately-oriented pouches 1 linked by seals 10 is therefore formed. Pouches 1 can eventually be separated by a cutting device (not shown) incorporated in one jaw 25 of each jaw pair, or by a knife located downstream jaws 25, at cut lines 30 extending along and within seals 10, so as to obtain individual finished packages 1.

[0027] Figure 11 shows a variant of the method adapted to produce rectangular pouches 1', i.e. having parallel edges 11. All the preceding description applies, except that the sealing members 26, 27 of the pairs of jaws 25 are horizontal and parallel with one another. As a consequence, the transversal seals 10 of tube 15 are parallel.

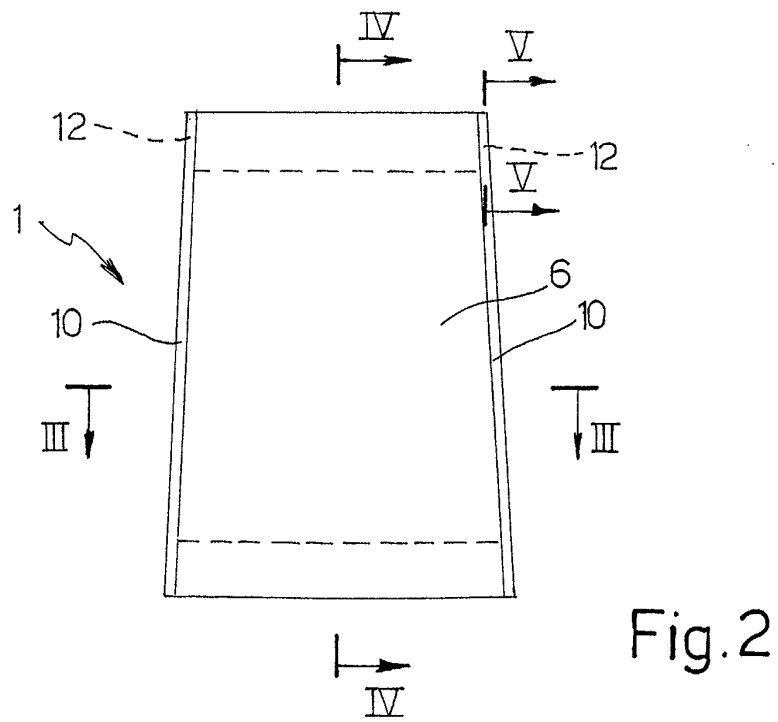
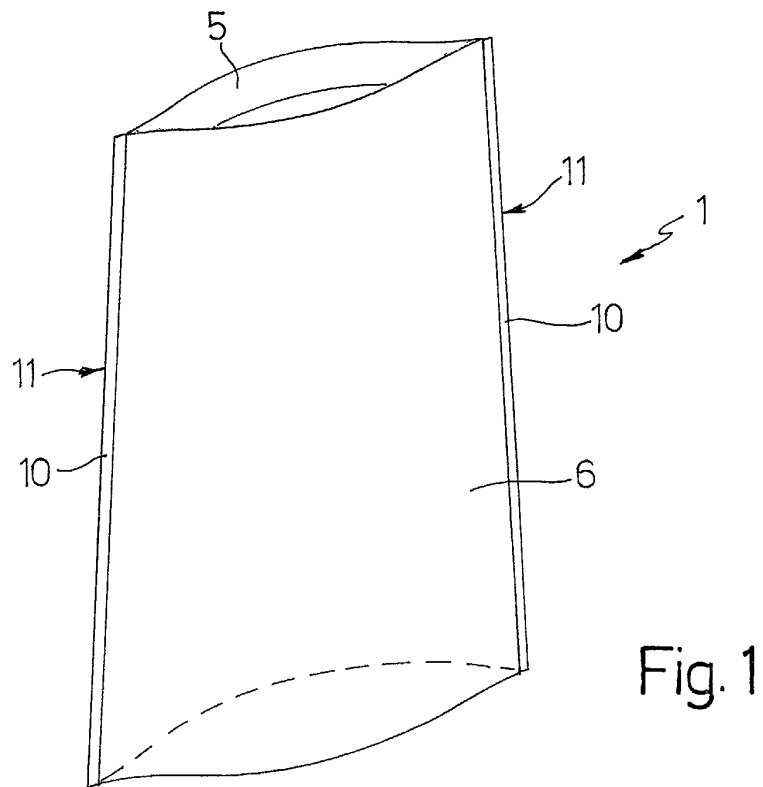
[0028] Finally, it should be noted that stand-up pouches as described may be modified without departing from the scope of the present invention as defined by the claims. In particular, the packaging material may be provided with an external heat-seal layer, so that when seals 10 are made and edges 12 are doubled, they are sealed together and ensure shape stability of the pouch without the need to provide pre-laminated holes 13.

Claims

1. A stand-up pouch (1) made from a web packaging material (3) and including a base wall (4), a front wall (6) and a back wall (7), **characterised by** comprising a top wall (5) forming with said base, front and back walls (4, 5, 6) a single piece of packaging material (3) folded in a tubular fashion and having two opposite edges joined together by a first seal (9), said front wall (6) and said back wall (7) being joined together by second seals (10) extending along respective lateral edges (11) of said front wall (6) and said back wall (7) and transversely with respect to said first seal (9), said base and top walls (4, 5) being folded between said front and back walls (6, 7) and having respective lateral edges (12) doubled and sealed between said lateral edges (11) of said front wall (6) and said back wall (7).
2. A pouch as claimed in claim 1, **characterised in that** said second seals (10) are inclined and converge with one another towards said top wall (4).
3. A pouch as claimed in claim 1, **characterised in that** said second seals (10) are parallel to one another.
4. A pouch as claimed in any of the preceding claims, **characterised in that** said web packaging material (3) includes an outer layer (3a), an oxygen-barrier layer (3b), an intermediate, hot-melt layer (3b) in-

terposed between and connecting said outer layer (3a) and oxygen-barrier layer (3b), and an internal heat-seal layer (3d).

5. A pouch as claimed in claim 4, **characterised in that** said doubled lateral edges (12) of said top and bottom walls (6, 7) include, each, two halves (12a, 12b) facing and heat-sealed to a respective edge (11) of said front or back wall (6, 7).
6. A pouch as claimed in claim 5, **characterised in that** said lateral edges (12) of said top and bottom walls have respective pre-laminated holes (13) on each half (12a, 12b), said holes (13) exposing said intermediate layer (3c) and facing one another when said lateral edges (12) of said top and bottom walls (6, 7) are doubled and sealed between said lateral edges (11) of said front wall (6) and said back wall (7) so as to weld together said halves (12a, 12b).
7. A pouch as claimed in claim 5, **characterised in that** said web packaging material (3) includes an external heat-seal layer providing for heat-sealing together said halves (12a, 12b) of said lateral edges (12) of said top and bottom walls (6, 7) when said lateral edges (12) of said top and bottom walls (6, 7) are doubled and sealed between said lateral edges (11) of said front wall (6) and said back wall (7).
8. A method of manufacturing a stand-up pouch as claimed in any of the preceding claims, including the steps of:
 - bending and longitudinally sealing a web of packaging material (3) so as to form a continuous tube (15),
 - feeding said tube (15) along a vertical axis (A),
 - filling said tube (15) with a food product (2) to be packaged so as to maintain a predetermined level of product (2) within said tube (15),
 - pre-forming said tube (15) so as to produce a front side (21), a back side (22) and two longitudinal concave, V-shaped sides (23, 24) connecting said front and back sides (21, 22), and transversally heat-sealing said tube (15) by means of pairs of jaws (25) provided with sealing members (26, 27) and cyclically gripping said tube (15) so as to double and heat-seal said V-shaped sides (23, 24) between said front and back sides (21, 22), thereby forming individual pouches (1, 1') which are constituted by tube portions and have a first seal (9) formed by a portion of the longitudinal seal (16) of said tube (15) and a pair of second seals (10) which are constituted by transversal seals (10) of said tube (15).



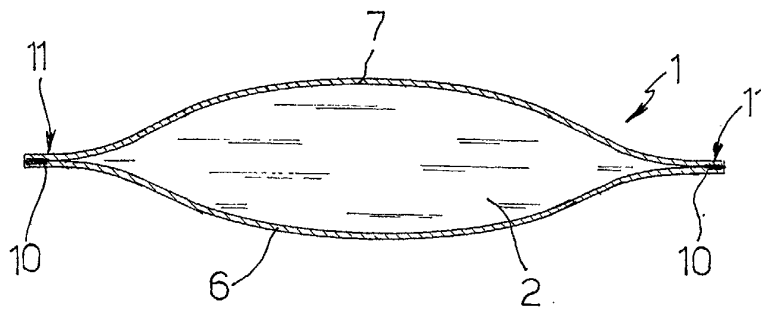


Fig. 3

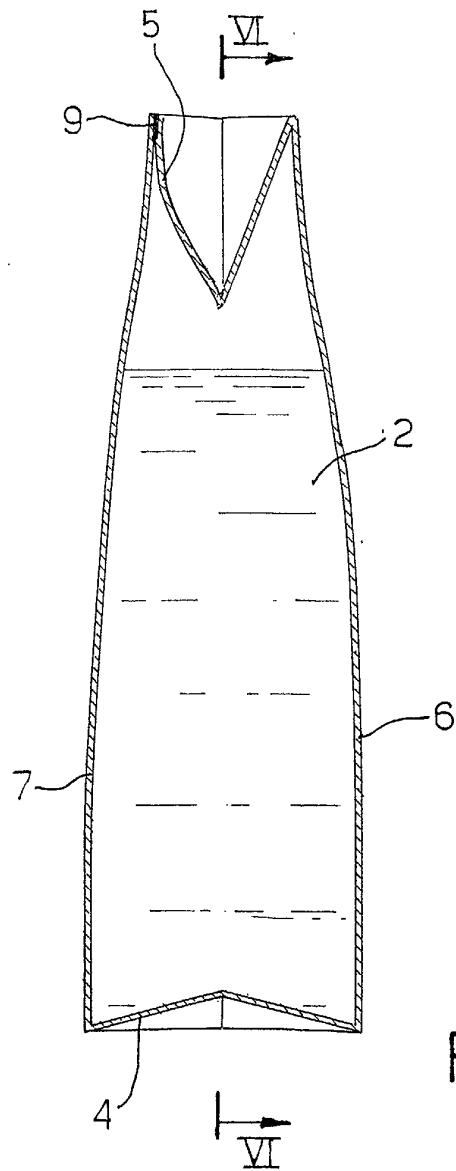


Fig. 4

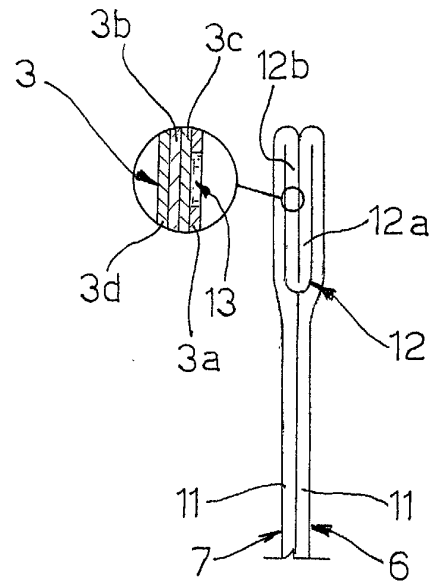


Fig. 5

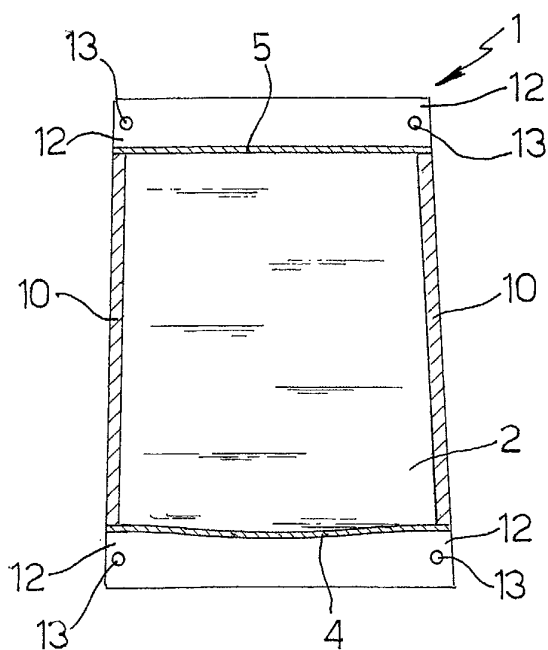


Fig. 6

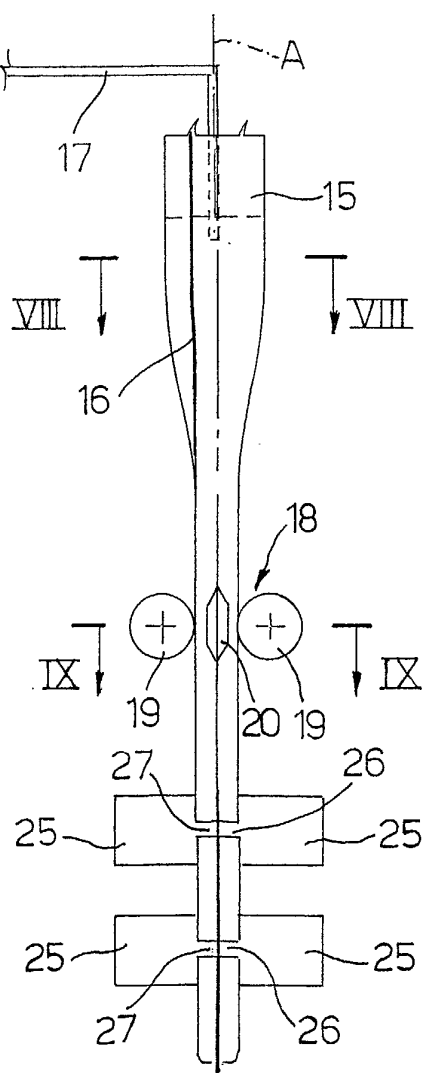


Fig. 7

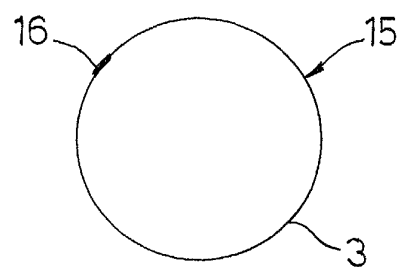


Fig. 8

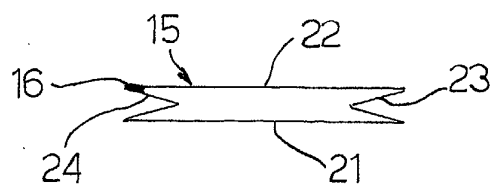
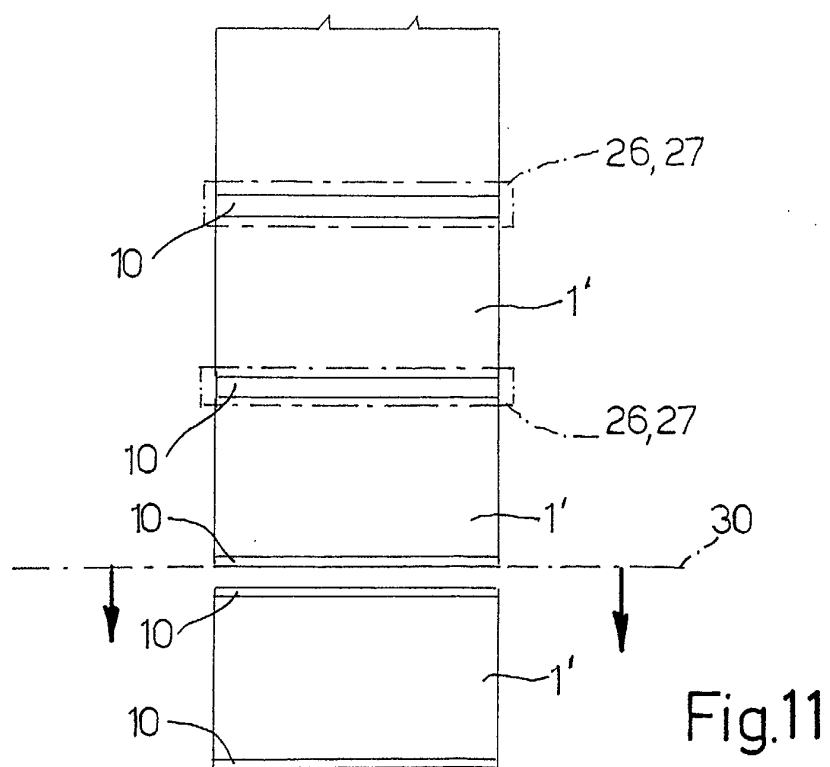
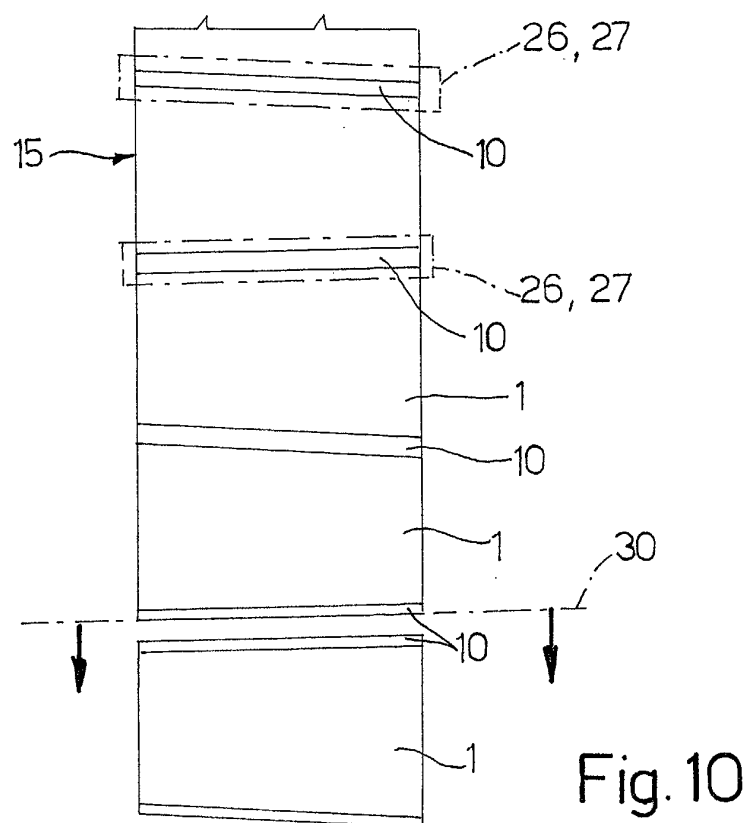


Fig. 9





European Patent
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Application Number
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Place of search THE HAGUE		Date of completion of the search 25 February 2002	Examiner Fournier, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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