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(71) Applicant: **Goglio S.p.a**
20144 Milano (IT)

(72) Inventors:
• **Goglio, Franco**
20145 Milano (IT)
• **Bottini, Giorgio**
Gallarate - Varese (IT)
• **Zocchi, Angelo**
Samarate - Varese (IT)

(74) Representative: **Petruzzello, Aldo**
Racheli & C. S.p.A.
Viale San Michele del Carso, 4
20144 Milano (IT)

(54) Method and apparatus for implementing, filling and packaging containers

(57) An apparatus (20) for implementing containers (12) starting from a tape (1) comprises a group for feeding the tape (1), a first filling station (40) for filling a first cavity (5) of each container, a cutting station (60) for cutting a portion of an intermediate sheet (4) left uncovered, along a second longitudinal cutting line (68), so as to generate a plurality of openings (69) for accessing a second con-

tainment cavity (6) of each container, a second filling station (70) for filling the second containment cavity (6) of each container and a heat-sealing station (80) for heat-sealing the first and the second longitudinal cutting line (9, 68) so as to close the openings (90, 69) for accessing the first and the second cavity (5, 6), respectively, of each container.

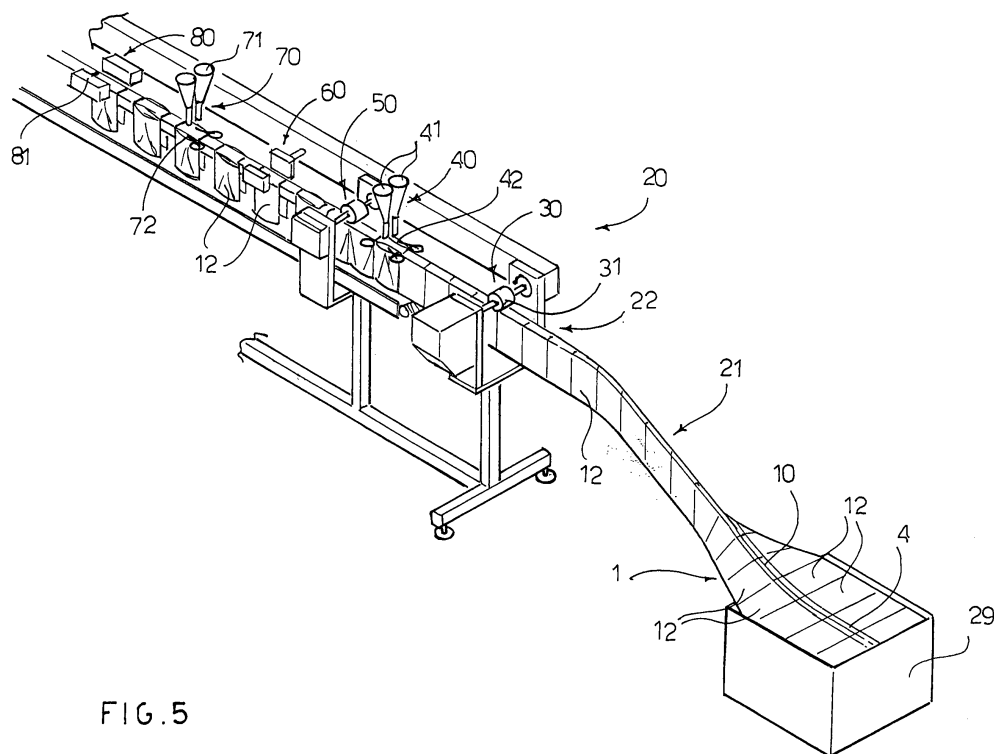


FIG. 5

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Description

[0001] The present invention relates to a method and to an apparatus for implementing, filling and packaging containers. In particular, the present invention relates to pack-like or bag-like containers for containing two products to be mixed before use, such as for example food products, but also detergents and the like.

[0002] In the field of the packagings for greatly-used products, bag-like containers, made of heat-sealable flexible plastic material or of an aluminium plate coupled to a heat-sealable flexible material, are widely used. Such containers are filled with the product to be sold and then the filling opening is sealed so as to market the packaging.

[0003] Recently, an increasing request for packagings providing two separate products, which must be mixed with each other before use, has been found.

[0004] The methods for implementing such packagings result to be quite complex and expensive, as they require long periods of time and different processing phases.

[0005] The object of the present invention is to eliminate the drawbacks of the prior art by providing a method and an apparatus for implementing, filling and packaging containers which allow a production in a wholly automatic way and at high speeds.

[0006] Another object of the present invention is to provide a method and an apparatus for implementing, filling and packaging containers which are versatile, cheap and simple to be implemented.

[0007] These objects are achieved according to the invention with the method and the apparatus whose features are listed in the enclosed independent claims 1 and 6, respectively.

[0008] According to the invention, in the method and in the apparatus for implementing, filling and packaging containers, one starts from a tape with multiple sheets. The tape with multiple sheets comprises an upper sheet, an intermediate sheet and a lower sheet heat-sealed to each other along peripheral heat-sealing lines, so as to define at least a row of containers equipped with a first containment cavity between the upper sheet and the intermediate sheet and a second containment cavity between the intermediate sheet and the lower sheet.

[0009] In the tape at least a strip of the upper sheet along at least a first longitudinal cutting line is removed, so as to define a plurality of openings for accessing the first containment cavity of each container and for leaving uncovered at least a longitudinal strip of the intermediate sheet.

[0010] The apparatus comprises:

- a tape-feeding group,
- a first filling station for filling the first cavity of each container with a first product,
- a cutting station for cutting the portion of intermediate sheet, which is left uncovered, along at least a sec-

ond longitudinal cutting line, so as to generate a plurality of openings for accessing the second containment cavity of each container,

- a second filling station for filling the second containment cavity of each container with a second product, and
- a heat-sealing station for heat-sealing said first and second longitudinal cutting line so as to close said openings for accessing the first and the second cavity, respectively, of each container.

[0011] Additional features of the invention will be more clear from the following detailed description, referred to a purely exemplifying embodiment thereof, therefore not for limitative purposes, illustrated in the enclosed drawings, wherein:

- figure 1 is a top plan view, partially interrupted, illustrating a tape with multiple sheets, for implementing the containers according to the invention;
- figure 2 is an enlarged sectional view taken along the section plan II-II of figure 1;
- figure 3 is a plan view of the tape with multiple sheets of figure 1, wherein two strips have been removed and heat-sealings have been performed to define the containers' perimeter;
- figure 4 is an enlarged sectional view taken along the section plan IV-IV of figure 3;
- figure 5 is a partially interrupted perspective view, schematically illustrating the apparatus according to the invention;
- figure 6 is a perspective view illustrating in greater detail the cutting device of the cutting station of the apparatus of figure 5;
- figure 7 is a schematic perspective view schematically illustrating a pair of containers outletting from the cutting station of the apparatus of figure 5; and
- figure 8 is a view like figure 7, illustrating a pair of containers outletting from the second filling station of the apparatus of figure 5.

[0012] The method and the apparatus for implementing, filling and packaging containers according to the invention will be described with the aid of the figures.

[0013] By referring, at the moment, to figures 1 and 2, the containers according to the invention are implemented starting from a tape with multiple sheets designated as a whole with the reference number 1.

[0014] By referring to figure 2, the tape 1 comprises three sheets overlapped to each other, that is two outer sheets 2 and 3 and an inner sheet 4 interposed between the two outer sheets 2 and 3. Hereinafter, by referring to the figures, the first outer sheet 2 will be called "upper sheet", the second outer sheet 3 will be called "lower sheet" and the inner sheet 4 will be called "intermediate sheet".

[0015] In this way a first cavity 5 between the intermediate sheet 4 and the upper sheet 2 and a second cavity

6 between the intermediate sheet 4 and the lower sheet 3 are created.

[0016] The sheets 2, 3 and 4 are made of one-layer or multi-layer heat-sealable material; for example each sheet can provide an aluminium film coupled to a film of heat-sealable plastic material so to be able to be heat-sealed to each other.

[0017] In the two side portions of the tape 1 a bellows 7 is implemented in a known way. As shown in figure 2, the bellows 7 is implemented by the lower sheet 3, that is the side edge of the lower sheet 3 is "S"-folded and a first heat-sealing 8' is performed along the folding end of the lower sheet 3. Then, a second heat-sealing 8 joins together the side ends of the upper sheet 2, of the intermediate sheet 4 and of the lower sheet 3. As a result, the bellows 7 is arranged in the second cavity 6. Obviously, the bellows can be implemented by the upper sheet 2 and then it can be arranged also in the first cavity 5.

[0018] As an alternative, the bellows can be inserted in the first cavity 5 or in the second cavity 6 with an independent tape.

[0019] As shown in figures 3 and 4, two longitudinal strips with width W1 and W3 are removed from the upper sheet 2, on one side and on the other one with respect to a central strip of upper sheet 2 with width W2. In this way two strips of the intermediate sheet 4 are left uncovered.

[0020] Such longitudinal strips can be removed by means of four longitudinal cuts 9 implemented on the upper sheet 2 on one side and on the other one with respect to the centre line of the tape 1. The distance W between the more external cuts 9 is equal to the sum between W1, W2 and W3.

[0021] At this point, a heat-sealing 10 is performed along the centre line of the tape 1, as illustrated also in figure 4, which joins the upper sheet 2, the intermediate sheet 4 and the lower sheet 3.

[0022] At last, a plurality of cross heat-sealings 11 is implemented, which joins the three sheets 2, 4 and 3. The cross heat-sealings 11 extend from the heat-sealings of the side ends 8 to the cuts 9. The cross heat-sealings 11 are arranged equidistant to each other, so as to define a plurality of rectangular containers 12, shaped like a bag, arranged in opposed pairs on one side and on the other one with respect to the centre heat-sealing 10.

[0023] It is to be noted that an opening 90 for accessing the first cavity 5 is defined in each container 12 below the cut 9, whereas the second cavity 6 of each container 12 remains closed by the intermediate sheet 4.

[0024] As shown in figure 5, the so-obtained tape with multiple sheets 1 is folded transversely like an accordion and inserted into a box 29 to be fed towards an apparatus 20 which will be responsible for filling and packaging the containers according to the invention.

[0025] Even if in figure 5 a box 29 is illustrated, it is clear that the tape 1 can be fed towards the apparatus

20 by a coil, by an uncoiler or by another feeding device.

[0026] Furthermore, in the present embodiment, the tape with multiple sheets 1, already formed as previously described, is fed to the apparatus 20. However, it is clear that upwards the apparatus 20 the following can be arranged:

- a folding station for implementing the bellows 7,
- a first heat-sealing station for heat-sealing the side edges (8, 8'),
- a cutting station for removing the two longitudinal strips of the upper sheet 2, and
- a second heat-sealing station for heat-sealing the centre strip 10 and the cross strips 11.

[0027] In this way, the containers' implementation takes place in line, in a wholly automatic way, starting from rollers of sheet material.

[0028] The apparatus 20 comprises a longitudinal guide support, substantially shaped like a rod, which upwards has a first part 21 tilted towards the box 29. The heat-sealed centre line 10 of the tape 1, which keeps joined the pairs of containers 12, is centred on the tilted part 21 of the guide support, so that the uncovered portion of the intermediate sheet 4 is turned upwards.

[0029] Upon proceeding towards the apparatus 20, the containers 12 arrange astride the tilted part 21 of the guide support which becomes progressively larger until reaching a width W (equal to the sum of the widths of the central strip of the upper sheet and of the two strips removed from the upper sheet 2 of the tape 1) in a substantially horizontal second part 22 of the guide support. That is, the width W is equal to the distance between the two more external cuts 9.

[0030] Above the horizontal part 22 of the guide support a towing group 30 is arranged, apt to make the tape 1 to feed towards a first filling station 40.

[0031] The towing group 30 comprises a roller or drive pinion 31 equipped with teeth which engage in openings 90 of the single containers 12, so as to allow an indexed feeding of the containers 12 towards the filling station 40 and at the same time a divarication of the edges of the openings 90.

[0032] As an alternative or in addition thereto, the towing group 30 can provide a photocell, which detects the passage of each container and accordingly controls the rotation of the drive pinion 31.

[0033] The first filling station 40 comprises a pair of hoppers 41 arranged above the feeding line of the tape 1 to feed the first product to be packaged.

[0034] Abreast of the feeding line of the tape 1 two grasping members or divaricating members 42 are provided, arranged on one side and on the other one with respect to the support 22. The grasping members 42 are apt to grasp the edge 9 of the upper sheet 2 of the respective container 12 and to move outwards, so as to further enlarge the opening 90 to allow inserting the first product into the first cavity 5 of the container 12, through

the hopper 41.

[0035] Downwards the first filling station 40 a second towing group 50, substantially similar to the first towing group 30, is provided.

[0036] Downwards the second towing group 50 a cutting station 60 is provided. As better shown in figure 6, the cutting station 60 comprises a pair of supporting plates 61 integral to the machine frame and arranged on one side and on the other one with respect to the support 22 of the tape.

[0037] A respective spacing plate 63, arranged according to a substantially horizontal plane at a certain distance from the lower edge of the supporting plate 61, is fastened to each supporting plate 61 by means of an "L"-shaped flange 62. The spacing plate 63 has a longitudinal slot 64 wherein a cutting blade 65 having a cutting profile tilted with respect to the spacing plate 63 is arranged. The cutting blade 65 is supported by a flange 66 fastened to the supporting plate 61.

[0038] The spacing plate 63 has a rounded inlet edge 67 acting as invitation to enter the second cavity 6 (figure 4) between the lower sheet 3 and the intermediate sheet 4, near the centre line 10 of the tape 1.

[0039] In this way, the spacing plate 63 lifts the intermediate sheet 4 with respect to the lower sheet 3 and at the same time the cutting blade 65 performs a longitudinal cutting 68 (figures 5 and 7) on the intermediate sheet 4, so as to open a second opening 69 for accessing the second cavity 6 of each container 12.

[0040] At this point, turning back to figure 5, the tape 1 moves forward towards a second filling station 70 arranged downwards the cutting station 60. The second filling station 70 is substantially similar to the first filling station 40 and it comprises a pair of hoppers 71 and two grasping members 72.

[0041] The grasping members 72 are apt to grasp the second cutting edge 68 of each container 12 so as to enlarge the opening 69 to allow the feeding therein of the second product, by means of the hopper 71.

[0042] In order to favour the distribution of the material within the container 12, both in the first and in the second filling station (40, 70) a vibrating device can be provided, apt to make the containers 12 to vibrate during the filling thereof.

[0043] As shown in figure 8, at the outlet of the second filling station 70 a container 12 is obtained, comprising two pockets formed by the two cavities 5 and 6, that is a front pocket full of a first material, preferably a liquid or a pasty material, and a rear pocket full of a second material, preferably made of coarse pieces.

[0044] The containers 12 outletting from the second filling station 70 are sent towards a heat-sealing station 80 equipped with two heated bars 81 apt to contact with the centre portion of the tape 1 at the first cut 9 and at the second cut 68, so as to generate a heat-sealing and therefore an hermetic sealing of the first and of the second opening (90, 69) of each container.

[0045] Finally, even if it is not illustrated in figure 5, a

longitudinal cutting along the centre line of heat-sealing 10 of the tape and cross cuttings along the cross heat-sealing lines 11 of the tape are performed, so as to obtain the single containers 12 separated from the tape 1. Alternatively and more advantageously, the cross cuttings along the heat-sealing lines 11 are made upwards the apparatus 20.

[0046] Several variations and modifications of the details within the range of a person skilled in the art, however comprised within the invention scope as expressed by the enclosed claims, can be introduced to the present embodiment.

[0047] For example, even if in the detailed description specific reference to a tape 1 provided with pairs of containers 12 arranged on one side and on the other one of the centre line 10 has been made, it is clear that the invention extends also to a tape providing a single row of containers. In this case, the members of the apparatus 20, which have been illustrated in pairs, can be provided singularly only on one side of the apparatus.

Claims

1. Method for implementing, filling and packaging containers (12) starting from a tape (1) having an upper sheet (2), an intermediate sheet (4) and a lower sheet (3) heat-sealed to each other along peripheral heat-sealing lines (8, 11) so as to define at least a row of containers (12) equipped with a first containment cavity (5) between said upper sheet and said intermediate sheet and with a second containment cavity (6) between said intermediate sheet and said lower sheet, wherein in said tape (1) at least a strip of said upper sheet (2) is removed along at least a first longitudinal cutting line (9) so as to define a plurality of openings (90) for accessing said first containment cavity (5) of each container (12) and to leave uncovered at least a longitudinal strip of said intermediate sheet (4), the method comprising the following steps:

- feeding the tape (1) in automatic way,
- filling said first containment cavity (5) with a first product,
- cutting said portion of intermediate sheet (4) left uncovered, along at least a second longitudinal cutting line (68), so as to generate an opening (69) for accessing said second containment cavity (6) of each container,
- filling said second containment cavity (6) of each container with a second product, and
- heat-sealing said first and said second longitudinal cutting line (9, 68) so as to close said openings (90, 69) for accessing the first and the second cavity (5, 6), respectively, of each container.

2. Method according to claim 1, characterized in that

in said steps for filling the first cavity (5) and the second cavity (6), the first access opening (90) and the second access opening (69), respectively, of each container are enlarged.

3. Method according to claim 1 or 2, **characterized in that** in said step for cutting the uncovered portion of the intermediate sheet (4) to generate said second longitudinal cutting line (68), said intermediate sheet (4) is spaced from said lower sheet (3).

4. Method according to anyone of the preceding claims, **characterized in that** in said step for feeding the tape (1) in an automatic machine, the tape portion wherein the intermediate sheet (4) is uncovered is supported onto a longitudinal support (22) and it is towed by means of towing groups (30, 50) equipped with towing rollers (31) to make said tape (1) to feed on the longitudinal support (22).

5. Method according to anyone of the preceding claims, **characterized in that** said tape (1) comprises two rows of containers (12) arranged in pairs on one side and on the other one with respect to a centre portion constituted by a longitudinal strip of said upper sheet (2) and by two longitudinal strips wherein said intermediate sheet (4) is uncovered.

6. Apparatus (20) for implementing, filling and packaging containers (12) starting from a tape (1) having an upper sheet (2), an intermediate sheet (4) and a lower sheet (3) heat-sealed to each other along peripheral heat-sealing lines (8, 11) so as to define at least a row of containers (12) equipped with a first containment cavity (5) between said upper sheet and said intermediate sheet and with a second containment cavity (6) between said intermediate sheet and said lower sheet, wherein in said tape (1) at least a strip of said upper sheet (2) is removed along at least a first longitudinal cutting line (9) so as to define an opening (90) for accessing said first containment cavity (5) of each container (12) and to leave uncovered at least a longitudinal strip of said intermediate sheet (4), the apparatus (20) comprising:

- a group for feeding the tape (1),
- a first filling station (40) for filling said first cavity (5) of each container with a first product,
- a cutting station (60) for cutting said at least a portion of intermediate sheet (4) left uncovered, along at least a second longitudinal cutting line (68), so as to generate a plurality of openings (69) for accessing said containment cavity (6) of each container,
- a second filling station (70) for filling said second containment cavity (6) of each container with a second product, and
- a heat-sealing station (80) for heat-sealing said

first and said second longitudinal cutting lines (9, 68) so as to close said openings (90, 69) for accessing the first and the second cavity (5, 6), respectively, of each container.

7. Apparatus according to claim 6, **characterized in that** said first and second filling station (40, 70) comprise grasping members (42, 72) apt to grasp the edge (9) of the upper sheet which defines the opening (90) for accessing the first cavity (5) and the edge (68) of the intermediate sheet (4) which defines the opening (69) for accessing the second cavity, respectively, so as to enlarge said openings for accessing the first and the second cavity of each container.

8. Apparatus according to claim 6 or 7, **characterized in that** said cutting station comprises at least a supporting plate (61) which supports a spacing plate (63) arranged according to a substantially horizontal plane and a cutting blade (65) with a cutting profile tilted with respect to said spacing plate (63), wherein said spacing plate (63) is apt to arrange within said second cavity (6) below said portion of intermediate sheet (4) left uncovered, so as to space the intermediate sheet (4) with respect to the lower sheet (3) in order to perform the longitudinal cutting (68) on said intermediate sheet (4).

9. Apparatus according to anyone of claims 6 to 8, **characterized in that** said feeding group comprises a longitudinal support (22) supporting the tape portion wherein the intermediate sheet (4) is uncovered and at least a towing group (30, 50) equipped with towing rollers (31) to make said tape (1) to feed onto the longitudinal support (22).

10. Apparatus according to anyone of claims 6 to 9, **characterized in that** said tape (1) comprises two rows of containers (12) arranged in pairs on one side and on the other one with respect to a centre portion constituted by a longitudinal strip of said upper sheet (2) and by two longitudinal strips wherein said intermediate sheet (4) is uncovered.

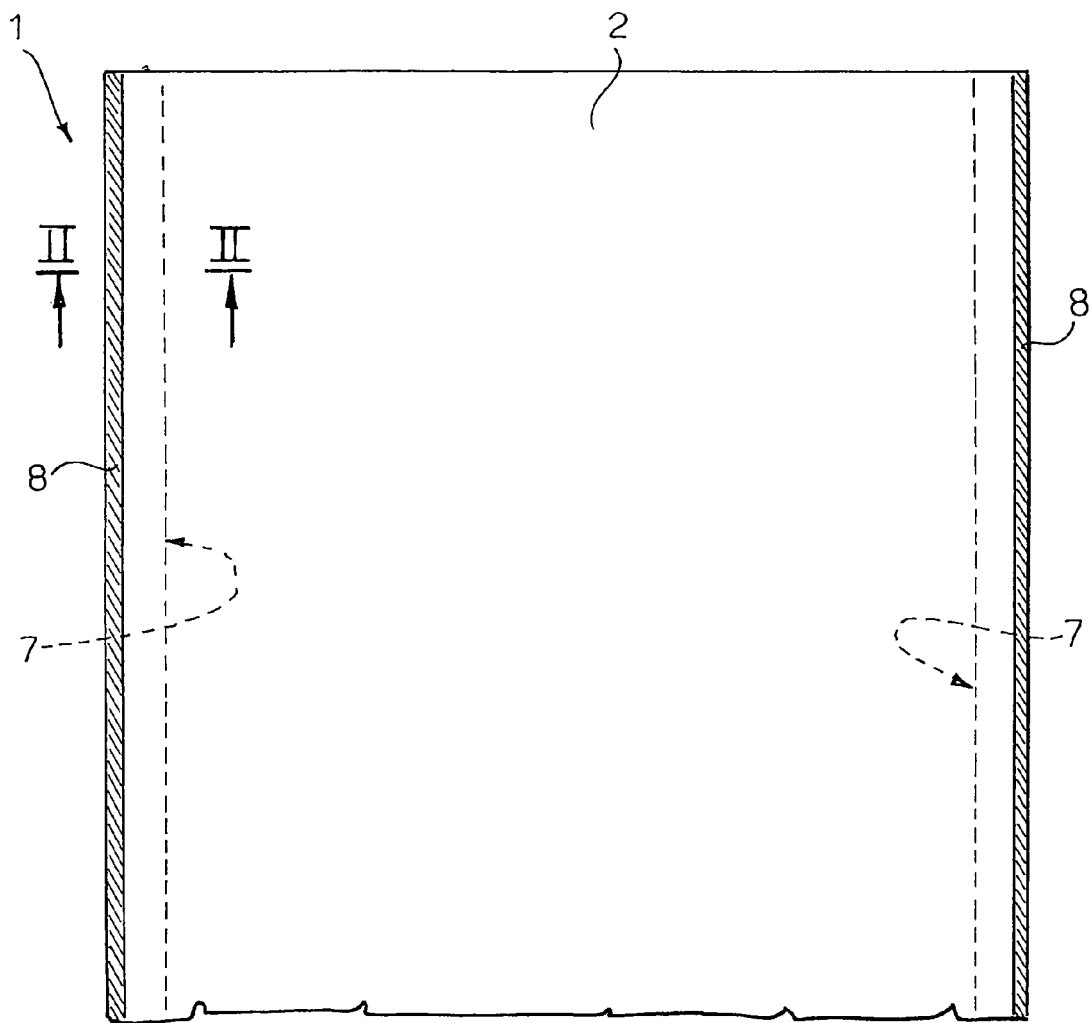


FIG. 1

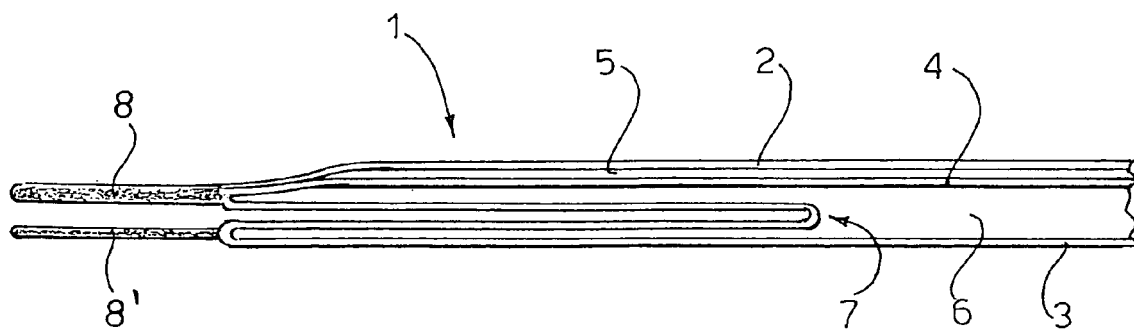
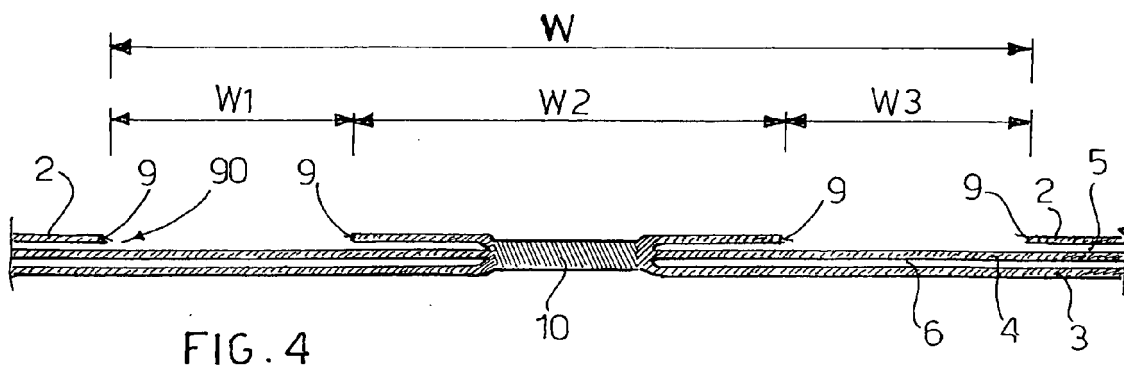
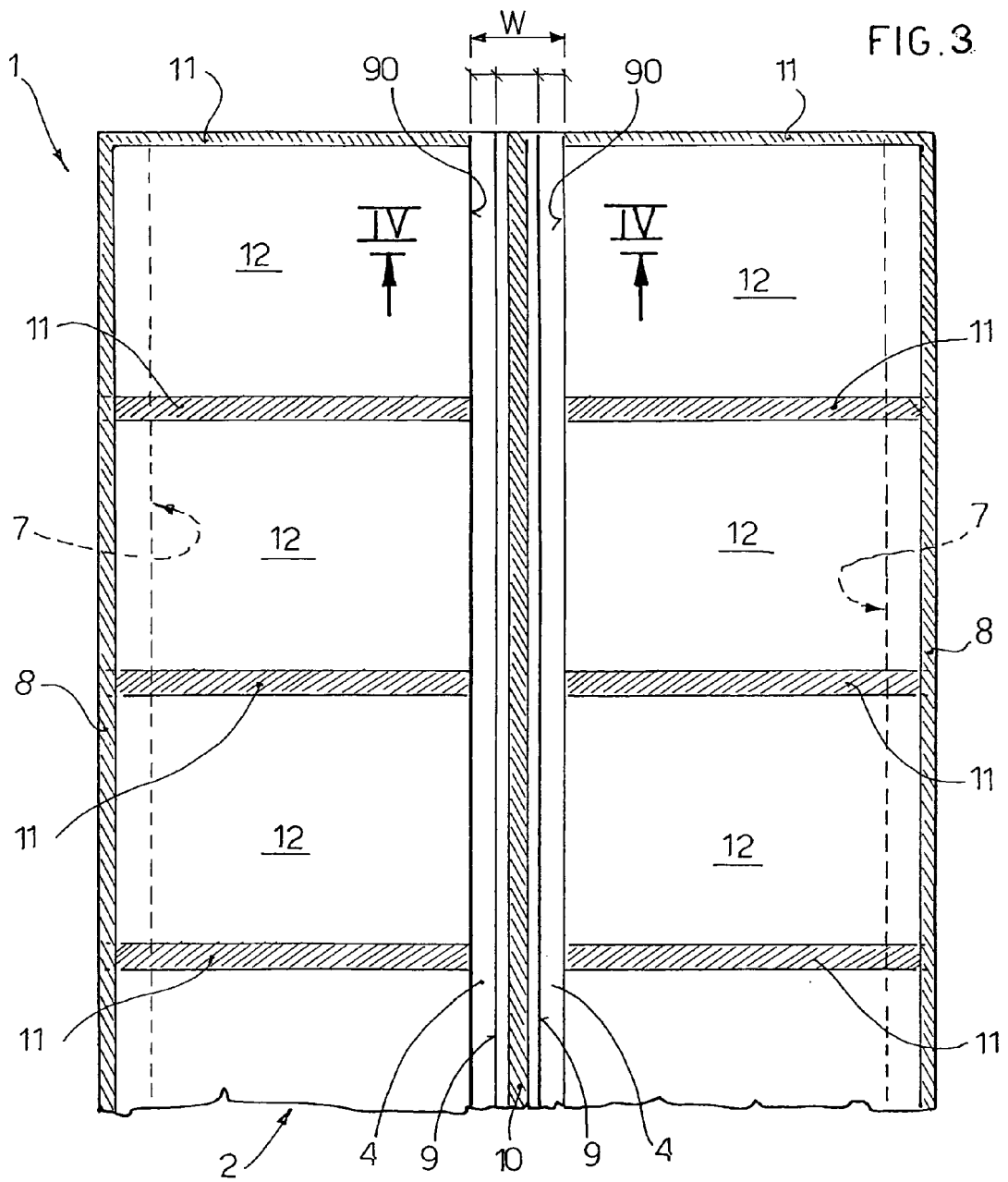


FIG. 2



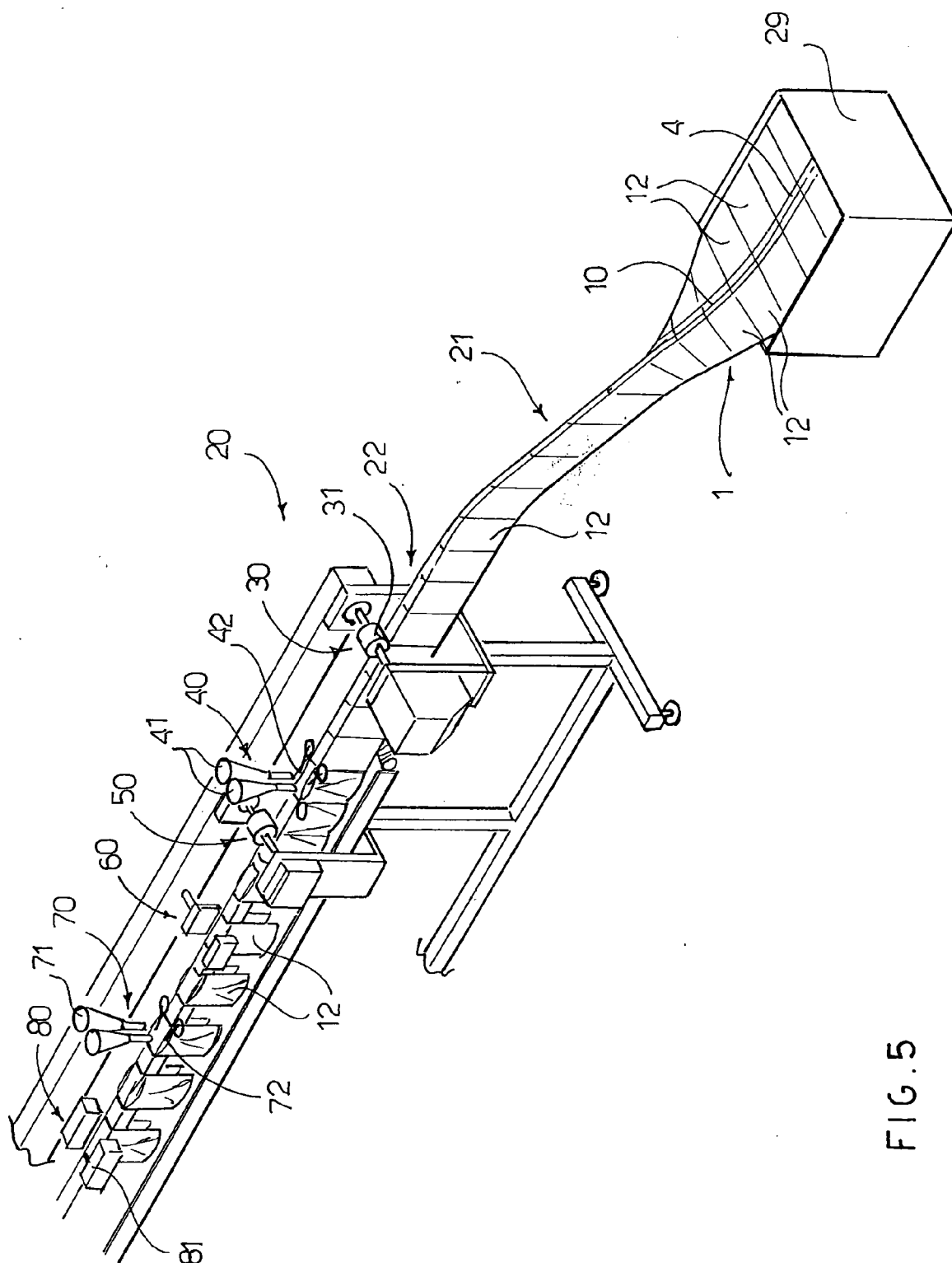


FIG. 5

FIG. 6

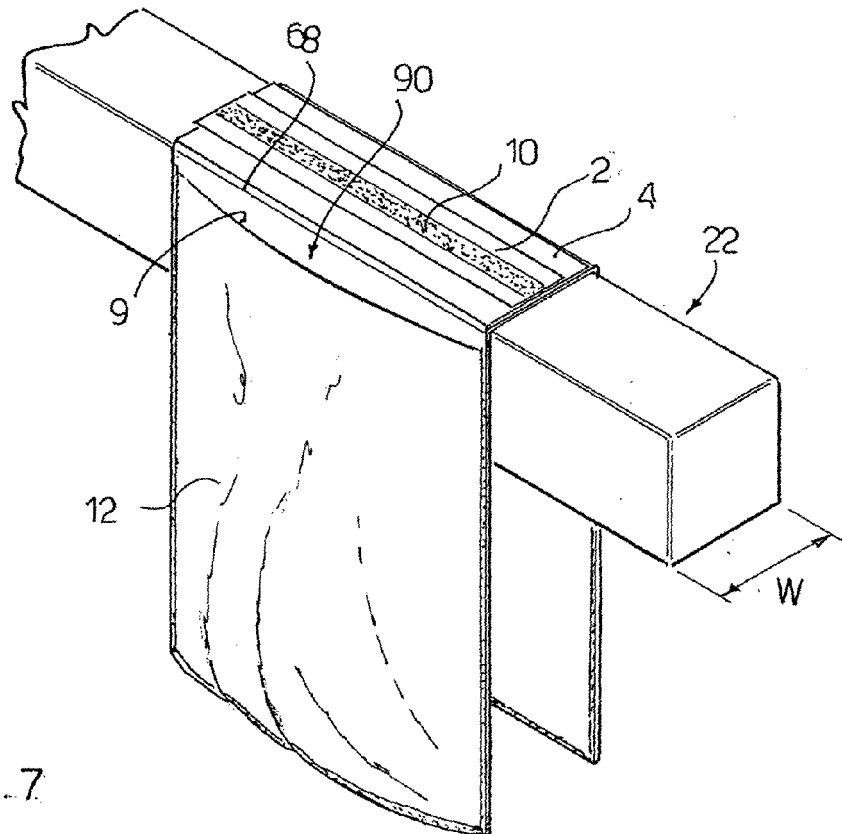
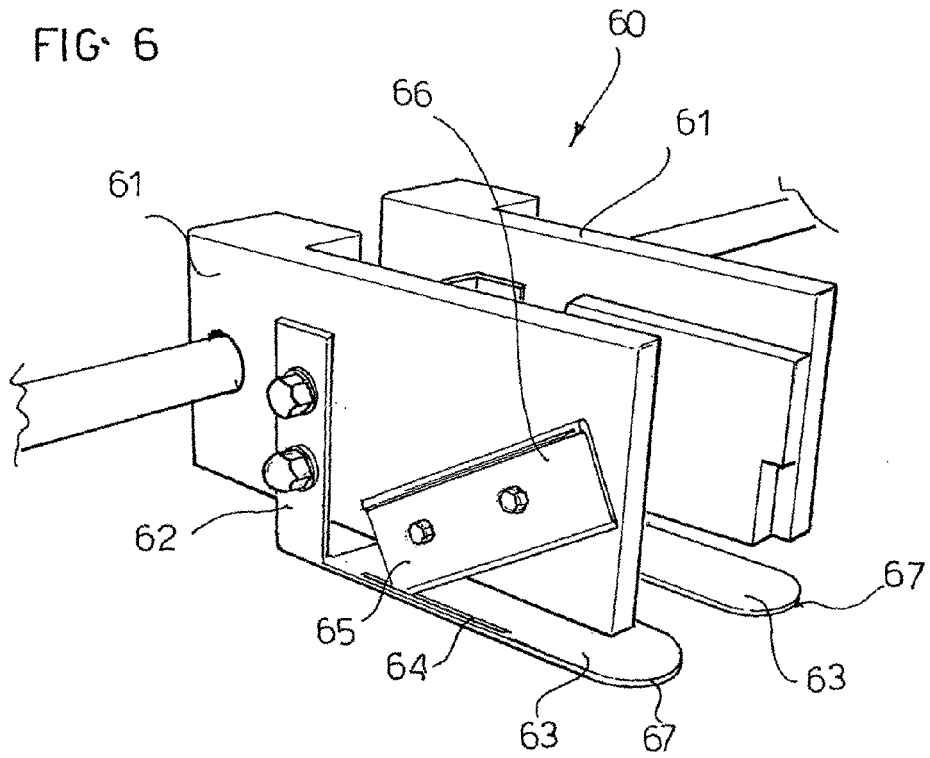


FIG. 7

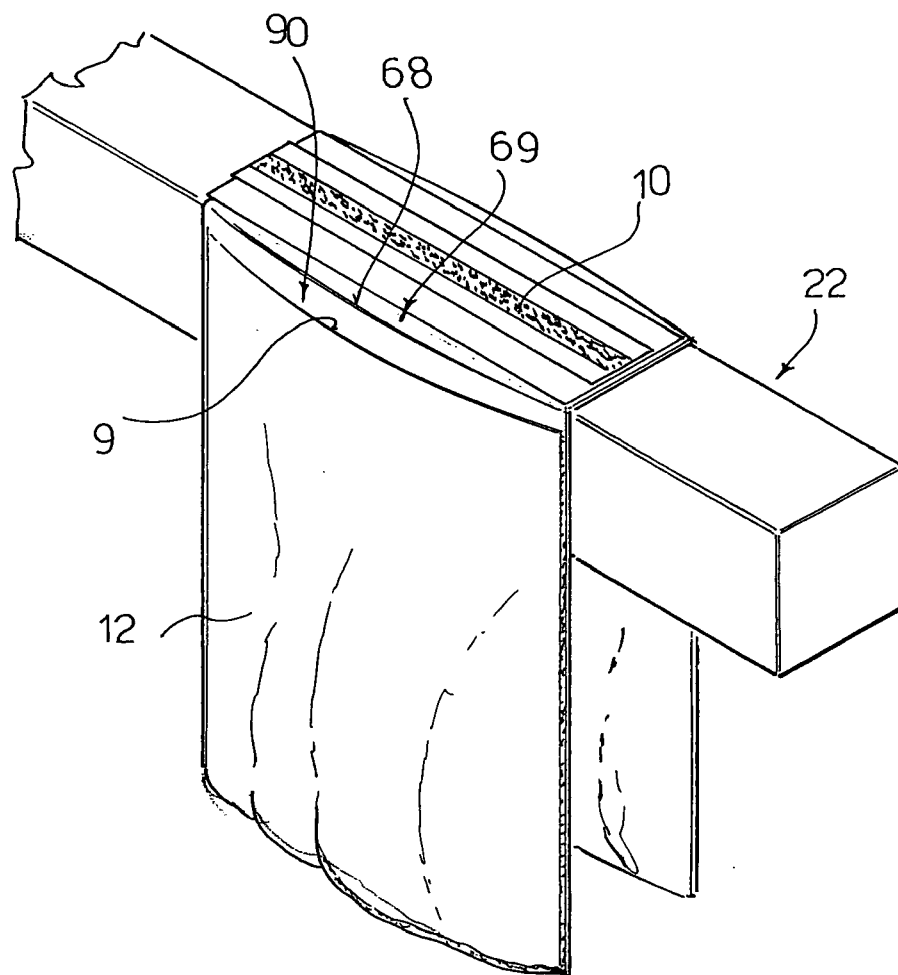


FIG. 8



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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 12 July 2006	Examiner Vigilante, M
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