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(54) A method and a unit for packaging products

(57) Products of parallelepiped shape are packaged in wrappers (7) with two end folds (21), fashioned by folding a sheet (6) of wrapping material initially to obtain a part-enveloping tubular sheath with a flap (18) of each end fold (21) projecting beyond a corresponding corner edge (13) of the product (5). The wrapper is completed by advancing the product in a direction parallel to the corner edges (13) and through a conditioning station (S) where the flaps (18) are first made to curl temporarily, each along an intermediate band (31) located between the edge (19) joined to the wrapper which coincides with the line of the relative end fold (21) and with the corner edge (13), and a free edge (20) opposite the joined edge (19), then gummed along a further band (33) located between the intermediate band (31) and the free edge (20); thereafter, each flap (18) is bent square along the joined edge (19) and flattened against the product (5)

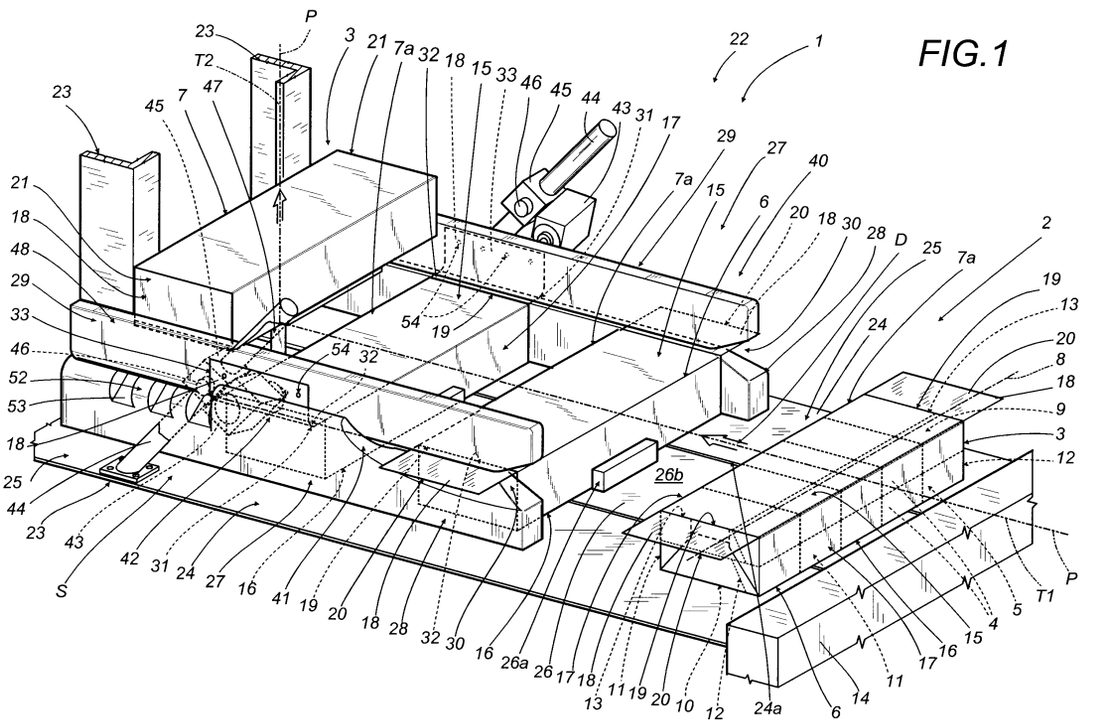

FIG.1

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Description

[0001] The present invention relates to a method of packaging products.

[0002] The invention finds application to advantage in the art field of machines for overwrapping products, and in particular packets of cigarettes ordered into groups of parallelepiped appearance, to which direct reference is made throughout the following specification albeit with no limitation in scope implied.

[0003] The prior art embraces machines known as cartoners, employed for overwrapping packets of cigarettes in multiples, by which a continuous strip of paper material is decoiled from a roll and fed through a gumming station toward a cutting station; the strip is glued transversely and then severed transversely into sheets, whereupon the sheets are folded around corresponding groups of packets to fashion relative overwrappings of a soft consistency, substantially parallelepiped in appearance.

[0004] Also at the cutting station, further transverse cuts are made in each sheet in such a way as to fashion two flaps serving ultimately to secure the two end folds of the relative overwrapping.

[0005] The operation of gumming the continuous strip in the transverse direction is performed generally by jet type devices capable of movement relative to the strip, and in such a way that the transverse edges of the cut sheet can be joined subsequently to form a wrapper of tubular shape. The tubular wrapper presents a predominating longitudinal axis and two open end portions projecting on either side of the group of packets, each of which comprises a respective flap occupying the same plane as one larger face of the tubular wrapper.

[0006] In one conventional type of overwrapping machine, the tubular wrapper is caused to advance along a rectilinear and horizontal stretch of a wrapping path with its own longitudinal axis transversely disposed and with the flaps uppermost, and directed thus through a station at which the aforementioned open end portions are folded.

[0007] The two end portions of the tubular wrapper are closed by means of a first folding operation in which the projecting parts, except for the flaps, are flattened against the group of packets, a gumming operation in which the underside of each flap is dabbed with an adhesive substance by fixed gumming devices, and a further folding operation in which the flaps are bent through a right angle and into contact with the group of packets to complete the end folds.

[0008] The flaps are secured generally by elevating the group of packets through a station positioned on a rectilinear and vertical stretch of the wrapping path, at which each flap is flattened against the group of packets by a fixed folder. More exactly, each flap is bent to a right angle by the relative fixed folder over a corresponding corner edge of the group of packets, the edge by which the end folds are separated from the aforementioned larger face of the wrapper, hence along the side by which the flap is attached to the remainder of the sheet. In a packaging method of this type, where each flap passes through the gumming station advancing in a substantially horizontal plane and with the face to be gummed directed downwards, there is no facility for a directional adjustment of the gumming devices that would ensure the application of the adhesive in the best possible manner.

[0009] Indeed as experience teaches, it is preferable not only that such gumming devices should be oriented in a given manner relative to the gummed face, but also that they should be positioned in space so as to direct the jet of adhesive through a downward trajectory of which the inclination to a horizontal reference plane falls within a given angle.

[0010] This requirement would be satisfied by including a bending step prior to the gumming operation, in which the flaps will be caused to rotate upwards substantially through 90° about the relative fold edge and thus to pass through the gumming station occupying a substantially vertical plane. The 90° rotation of the flaps could be brought about quite easily, using helical elements of conventional type arranged along the wrapping path.

[0011] A solution of this type presents certain drawbacks. A first drawback derives from the fact that the 90° rotation of the flap around the fold edge can cause the sheet of overwrapping material to tear on the larger face, and more exactly in the vicinity of the fold edge, especially at high operating speeds. A second drawback derives from the fact that fixed folder elements are used when flattening the flaps to finish the end folds; this means that an initial counter rotation is needed to dispose the flaps in an oblique or substantially horizontal plane ready for the relative bending step. The counter rotation of the flaps likewise could be brought about quite easily employing helical elements of conventional embodiment arranged along the wrapping path, albeit the inclusion of further elements would increase the length of the wrapping path and render the overwrapping machine as a whole somewhat bulky. The object of the invention is to provide a method of packaging products that will allow of overcoming the drawbacks described above in connection with overwrapping machines of the prior art type.

[0012] The stated object is realized in a method according to the present invention for packaging products of parallelepiped appearance in wrappers with two end folds, comprising an initial wrapping step in which a sheet of overwrapping material is folded around a relative product to fashion a partially enveloping semi-completed wrapper with end folds each of which includes a flap projecting beyond a corresponding corner edge of the product and presenting one edge joined to the wrapper, coinciding with the corner edge and delimiting the end fold, and a free edge opposite the joined edge; also a final wrapping step in which the end folds of the semi-

completed wrapper are closed, characterized in that the final wrapping step comprises the single subsidiary steps of advancing the partially enveloped product along a first rectilinear stretch of a predetermined wrapping path in a direction parallel to the corner edges and through a conditioning station at which each flap is bent to a curve compassing a relative first predetermined portion located between the joined edge and the free edge, gumming each flap on a relative second predetermined portion located between the first portion and the free edge, and bending each flap through a right angle over the relative product along the joined edge.

[0013] The present invention also relates to a packaging unit for implementation of the above method.

[0014] According to the present invention, products of parallelepiped appearance are packaged in wrappers with two end folds by a unit that comprises a first wrapping section in which a sheet of overwrapping material is folded around a relative product to fashion a partially enveloping semi-completed wrapper with end folds each of which includes a flap projecting beyond a corresponding corner edge of the product and presenting one edge joined to the wrapper, coinciding with the corner edge and delimiting the end fold, and a free edge opposite the joined edge; also a second wrapping section in which the end folds of the semi-completed wrapper are closed, and is characterized in that the second wrapping section incorporates fixed conditioning means positioned along a first rectilinear stretch of a predetermined wrapping path and located at a conditioning station, by which each flap is engaged and bent to a curve compassing a respective first predetermined portion located between the joined edge and the free edge; means by which each flap is gummed on a relative second portion located between the first portion and the free edge; and folding means, positioned along the wrapping path, by which each flap is bent through a right angle over the relative product along the joined edge.

[0015] The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

- fig 1 illustrates an embodiment of the packaging unit according to the present invention, viewed schematically and in perspective;
- fig 2 illustrates a detail of the packaging unit in fig 1, viewed in frontal elevation;
- fig 3 is a section through the detail of fig 2;
- fig 4 is a further section through the detail of fig 2;
- fig 5 is the same view as fig 4 illustrating a different moment in operation of the unit.

[0016] In fig 1 of the drawings, 1 denotes a unit, in its entirety, forming part of a cartoner: that is to say a machine 2 by which packets of cigarettes are packaged in cartons 3.

[0017] Each carton 3 comprises a plurality of packets 4 of cigarettes assembled side by side and stacked to form a group 5 of rectangular parallelepiped shape, and a sheet 6 of paper wrapping material folded around and enveloping the group 5 to fashion an overwrapping 7 of soft consistency.

[0018] Each group 5 presents a predominating longitudinal axis 8 and is compassed by a front face 9, a rear face 10 and two flank faces 11 extending parallel with the axis 8, also two end faces 12 intersecting the axis 8, each of which combines with the front face 9 to form a respective front corner edge 13 of the group 5.

[0019] The packaging unit 1 comprises a first wrapping section 14 of conventional embodiment, illustrated schematically as a block, in which each group 5 is associated with a relative sheet 6 and the sheet folded and wrapped initially around the group 5 in such a way as to form a semi-completed wrapper 7a that presents two panels 15 and 16 covering the front face 9 and the rear face 10 respectively, two panels 17 covering the two flank faces 11, and two flaps 18 projecting beyond the two end faces 12 and occupying the same plane as the front panel 15.

[0020] More exactly, each flap 18 is joined to the front panel 15 along one edge 19 coinciding with the relative front corner edge 13 and terminates in a free edge 20 remote from and parallel to the joined edge 19, its dimensions substantially identical to those of the relative end face 12. The remaining panels 16 and 17 extend into folds that are bent and flattened against each end face 12, over which the flaps 18 are then also flattened ultimately to close the semi-completed wrapper 7a and establish respective end folds 21 of the overwrapping 7.

[0021] The end folds 21 of the semi-completed wrappers 7a are secured by a second wrapping section 22 of the packaging unit 1 connected to the outfeed of the first section 14, from which the wrappers 7a emerge singly and in succession in conventional manner, not illustrated.

[0022] The second section 22 comprises a frame denoted 23, and associated with the frame, a conveying table 24 with a substantially horizontal top face 25 along which the successive wrappers 7a slide with one respective panel 16 offered in direct contact to the selfsame top face 25.

[0023] The second section 22 further comprises a slat type belt conveyor 26 looped around respective pulleys (not shown), of which an active top branch 26b is disposed in the same plane as the table 24 and runs internally of a gap 24a afforded by the latter. The belt of the conveyor 26 is furnished peripherally with a plurality of slats 26a distributed uniformly along its developable length, by which the single wrappers 7a are engaged and caused to translate in a direction D parallel to the front corner edges 13 of the group along a rectilinear and horizontal stretch T1 of a predetermined wrapping path P.

[0024] The second section 22 is equipped with a station S located along the horizontal stretch T1, comprising two devices 27 by which the respective flaps 18 are

conditioned.

[0025] Each device 27 comprises two fixed conditioning elements 28 and 29 associated one with another in such a way as to create a conditioning channel 30 that extends along the conveying direction D and is shaped in such a way that each successive flap 18 will be engaged gradually as the relative slat 26a advances and bent by degrees across a predetermined portion 31 lying between the two edges 19 and 20. The portion 31 in question coincides in effect with an intermediate band disposed between a portion 32 attached to the corresponding front panel 15 of the overwrapping 7 and an outer portion 33 delimited by the free edge 20.

[0026] As illustrated to advantage in figs 2 to 5, each first element 28 is supported by the table 24 and comprises two substantially vertical side walls 34 and 35 extending upward from the top face 25 in a plane parallel with the conveying direction D, also an upward facing contoured wall 36 that coincides with a bottom surface of the relative channel 30.

[0027] The second elements 29 are carried by the frame 23 and located above the relative first elements 28, each comprising two side walls 37 and 38 parallel to the walls 34 and 35 of the first element 28 and a downward facing contoured wall 39 that coincides with a top surface of the relative channel 30. In particular, the inward facing side walls 37 are vertically aligned with the respective walls 34 of the first elements 28, which are mutually opposed and spaced apart at a distance marginally greater than the longitudinal dimension of the wrapper 7a, as measured along the relative axis 8, and extend along the horizontal stretch T1 of the path at a constant height, relative to the table 24, which is substantially identical to the distance separating the front and rear panels 15 and 16 of the single wrapper 7a.

[0028] Each channel 30 is contoured in such a manner that the attached portion 32 of the relative flap 18 will be engaged and retained in the same plane as the front panel 15 of the wrapper while advancing along the entire length of the channel 30 in the conveying direction D.

[0029] Merged in sequence along the conveying direction D, each of the single channels 30 exhibits a linear entry portion 40 with which the attached portion 32 of the advancing flap 18 enters progressively into contact; a portion 41 of substantially helical geometry positioned with respect to the conveying direction D in such a way as to bend the flap 18 by degrees across the intermediate portion 31, thereby inducing a substantially elastic deformation; and a further linear portion 42 shaped in such a manner as to maintain the relative flap 18 in a curved configuration with the outer portion 33 projecting above the first element 28 and substantially in contact with the side wall denoted 38 (fig 3).

[0030] The second section 22 is also equipped with jet type gumming devices 43 located one alongside the third portion 42 of each channel 30, externally and facing the upper side wall 38, which are aligned in such a manner as to project an adhesive substance intermittently and downwards, through a trajectory forming a predetermined angle with a horizontal plane, onto the outer portion 33 of each flap 18.

[0031] As discernible from fig 1, each gumming device 43 is carried by the frame 23 on a relative post 44 angled in the direction opposite to the conveying direction D, to which the device 43 is mounted slidably by way of a sleeve 45. A clamp screw 46 associated with the sleeve 45 and interacting with the post 44 allows the gumming device 43 to be secured both in the lowered operating position of figs 1 to 5 and in a raised cleaning position (not illustrated).

[0032] Also forming part of the second wrapping section 22 is an elevator 47 located beyond the conditioning devices 27 in the conveying direction D, of which the function is to pass through the gap 24a in the table 24 and invest each successive wrapper 7a with linear translational movement along a rectilinear and vertical stretch T2 of the wrapping path P that follows the horizontal stretch T1.

[0033] The second section 22 incorporates a pair of fixed folders 48 located along the vertical stretch T2, each consisting in an extension of one relative second element 29, by which the successive flaps 18 are engaged and flattened against the group 5 of packets.

[0034] More exactly, and as discernible in figs 4 and 5, each folder 48 presents a forcing edge 49 afforded by the extension of the corner edge formed by the adjoining walls 37 and 39 of the relative second element 29.

[0035] Each folder 48 is positioned above an extension of the corresponding first element 28, which combines with the folder 48 to establish an extension 51 of the relative channel 30.

[0036] Each extension 51 is shaped in such a way as to smooth the successive flaps 18 during the combined action of the elevator 47 and the folder 48, and presents a bottom wall 52 affording a plurality of grooves 53 extending in a direction transverse to the conveying direction D which are spaced apart along the selfsame direction D so as to coincide with gummed portions 54 of the relative flap 18.

[0037] In operation, semi-completed wrappers 7a emerging in succession from the first wrapping section 14 are taken up by the slats 26a of the conveyor 26 and translated along the table 24 in the conveying direction D, sliding on the top face 25.

[0038] The wrappers 7a are caused to advance along the horizontal stretch T1 of the wrapping path toward the conditioning station S, with the result that the flaps 18 are engaged gradually by the relative channels 30.

[0039] A wrapper 7a approaches the entry portions 40 of the channels 30 with the flaps 18 occupying the same plane as the front panel 15. As the flaps 18 are taken up by the respective entry portions 40, the attached portions 32 are engaged progressively and then maintained in the same plane as the front panel 15, passing thus

along the entire length of the channel 30 in the conveying direction D.

[0040] Thereafter, the intermediate portions 31 are taken up by the helical portions 41 and bent by degrees, elastically, between the two walls 36 and 39 of the respective channels 30. Passing thus to the third linear portions 42, the flaps 18 will have assumed a configuration with the intermediate portions 31 deformed elastically to a curved profile and the outer portions 33 breasted with the corresponding vertical walls 38.

[0041] Advancing along the final linear portions 42 of the channels 30, the flaps 18 are gummed intermittently by the respective devices 43. More precisely, the intermittent action of the gumming devices 43 will be timed with the movement of the wrapper 7a along the conveying direction D in such a manner that the adhesive is applied to discrete portions 54 of the flaps 18 spaced apart uniformly along the selfsame direction D at a distance matching the distance that separates the grooves 53.

[0042] Once beyond the final portion 42 of the channel 30, the single flap 18 resumes its former position of alignment with the front panel 15 and is engaged gradually by the extension 51.

[0043] The wrapper 7a is now taken up by the elevator 47, which ascends through the gap 24a and causes the wrapper 7a to translate upwards along the vertical stretch T2 of the wrapping path. At the moment when the wrapper 7a is diverted by the elevator 47, the gummed portions 54 of the flaps will coincide with the grooves 53 in such a way that the smoothing action applied to the flaps 18 by the extensions 51 of the channels 30 can be accomplished without the extensions being fouled by the adhesive substance jetted previously from the gumming devices 43.

[0044] Finally, as the elevator 47 ascends, the flaps 18 of the semi-completed wrapper 7a are engaged by the edges 49 of the respective folders 48 and flattened square against the group 5 of packets to complete the end folds 7 of the finished overwrapping 7.

[0045] In other embodiments of the packaging unit 1 not illustrated in the drawings, the fixed folders 48 could be replaced by conventional fixed folders of helical profile, positioned along the horizontal stretch T1 of the path P.

Claims

1. A method for packaging products of parallelepiped appearance in wrappers (7) with two end folds (21), comprising an initial wrapping step in which a sheet (6) of overwrapping material is folded around a relative product (5) to fashion a partially enveloping semi-completed wrapper (7a) with end folds (21) each of which includes a flap (18) projecting beyond a corresponding corner edge (13) of the product (5) and presenting one edge (19) joined to the wrapper (7, 7a), coinciding with the corner edge (13) and delimiting the end fold (21), and a free edge (20) opposite the joined edge (19); also a final wrapping step in which the end folds (21) of the semi-completed wrapper (7a) are closed, characterized.
characterized
in that the final wrapping step comprises the single subsidiary steps of advancing the partially enveloped product (5) along a first rectilinear stretch (T1) of a predetermined wrapping path (P) in a direction parallel to the corner edges (13) and through a conditioning station (S) at which each flap (18) is bent to a curve compassing a relative first predetermined portion (31) located between the joined edge (19) and the free edge (20), gumming each flap (18) on a relative second predetermined portion (33) located between the first portion (31) and the free edge (20), and bending each flap (18) through a right angle over the relative product (5) along the joined edge (19).

2. A method as in claim 1, wherein each flap (18) is bent gradually and in such a way as to induce a substantially elastic deformation in the wrapping material, and the subsidiary gumming step is effected at the conditioning station (S).

3. A method as in claim 1 or 2, wherein each flap (18) advances through the conditioning station (S), at least during the subsidiary gumming step, with the second predetermined portion (33) disposed parallel to a substantially vertical plane.

4. A method as in claim 1, wherein the subsidiary step of bending each flap (18) through a right angle over the relative product (5) is accomplished through the agency of respective fixed folding means (48) positioned along a second rectilinear stretch (T2) of the wrapping path (P) substantially orthogonal to the first stretch (T1), and in such a way as to intercept the advancing flaps (18).

5. A unit for packaging products of parallelepiped appearance in wrappers (7) with two end folds (21), comprising a first wrapping section (14) in which a sheet (6) of overwrapping material is folded around a relative product (5) to fashion a partially enveloping semi-completed wrapper (7a) with end folds (21) each of which includes a flap (18) projecting beyond a corresponding corner edge (13) of the product (5) and presenting one edge (19) joined to the wrapper (7, 7a), coinciding with the corner edge (13) and delimiting the end fold (21), and a free edge (20) opposite the joined edge (19); and a second wrapping section (22) in which the end folds (21) of the semi-completed wrapper (7a) are closed,
characterized
in that the second wrapping section (22) incorpo-

rates fixed conditioning means (27) positioned along a first rectilinear stretch (TI) of a predetermined wrapping path (P) and located at a conditioning station (S), by which each flap (18) is engaged and bent to a curve compassing a relative first predetermined portion (31) located between the joined edge (19) and the free edge (20); means (43) by which each flap (18) is gummed on a relative second portion (33) located between the first portion (31) and the free edge (20); and folding means (48), positioned along the wrapping path (P), by which each flap (18) is bent through a right angle over the relative product (5) along the joined edge (19).

6. A unit as claim 5, wherein conditioning means (27) positioned to engage each flap (18) comprise two conditioning elements (28, 29) breasted one with another and combining to create a conditioning channel (30) by which the flap (18) is engaged and bent gradually in such a manner as to induce a substantially elastic deformation in the wrapping material, and the gumming means (43) are positioned at the conditioning station (S).

7. A unit as claim 6, wherein the conditioning channel (30) presents a developable surface of substantially helical geometry at least in part.

8. A unit as in claims 5 to 7, wherein conditioning means (27) positioned to engage each flap (18) are shaped in such a way as retain the flap (18) with the relative second predetermined portion (33) disposed parallel to a substantially vertical plane at least when in alignment with the gumming means (43).

9. A unit as in claim 5, wherein folding means (48) consist in fixed folder elements positioned along a second rectilinear stretch (T2) of the wrapping path (P) substantially orthogonal to the first stretch (T1), and in such a way as to intercept the advancing flaps (18).

FIG.1

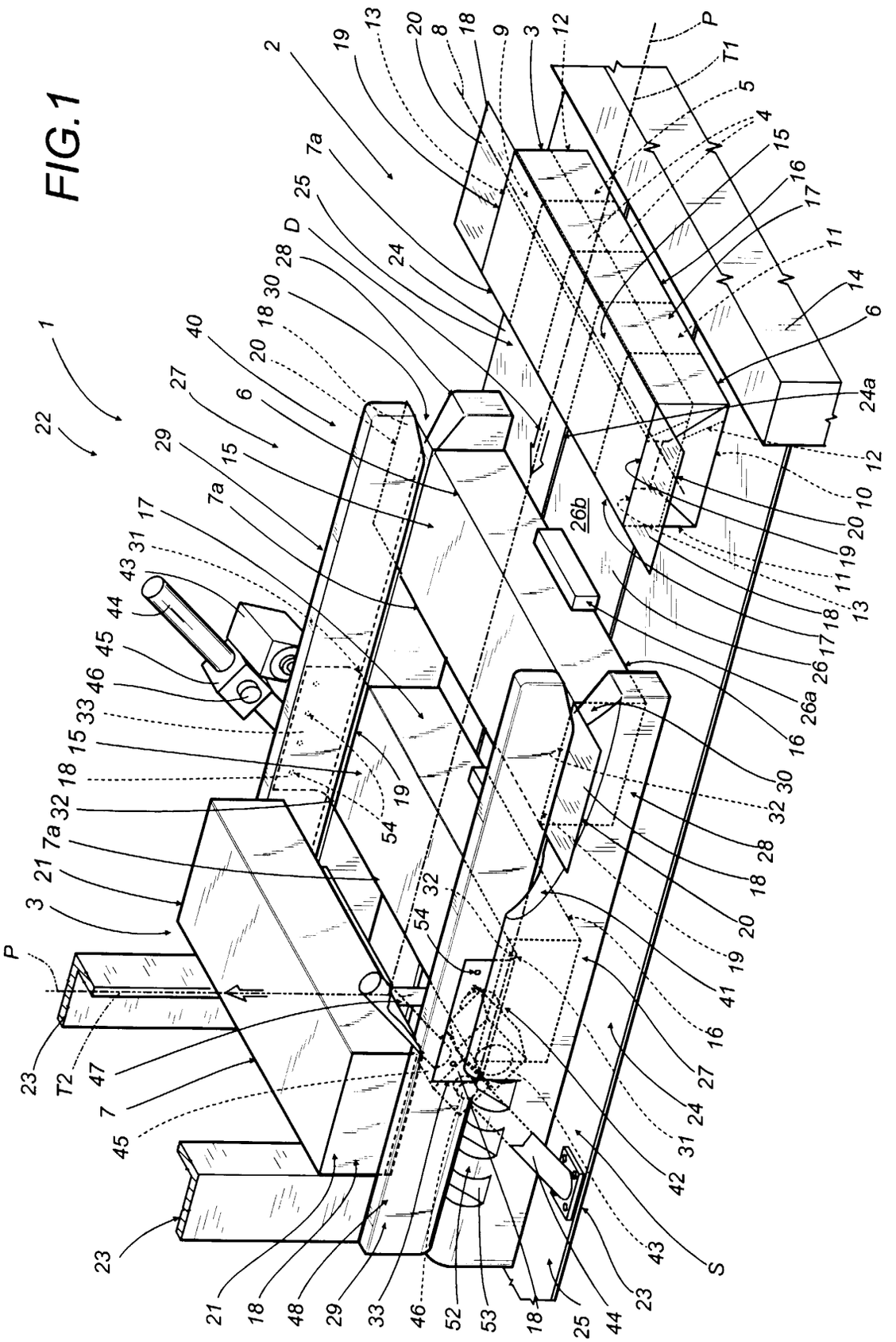
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FIG.2

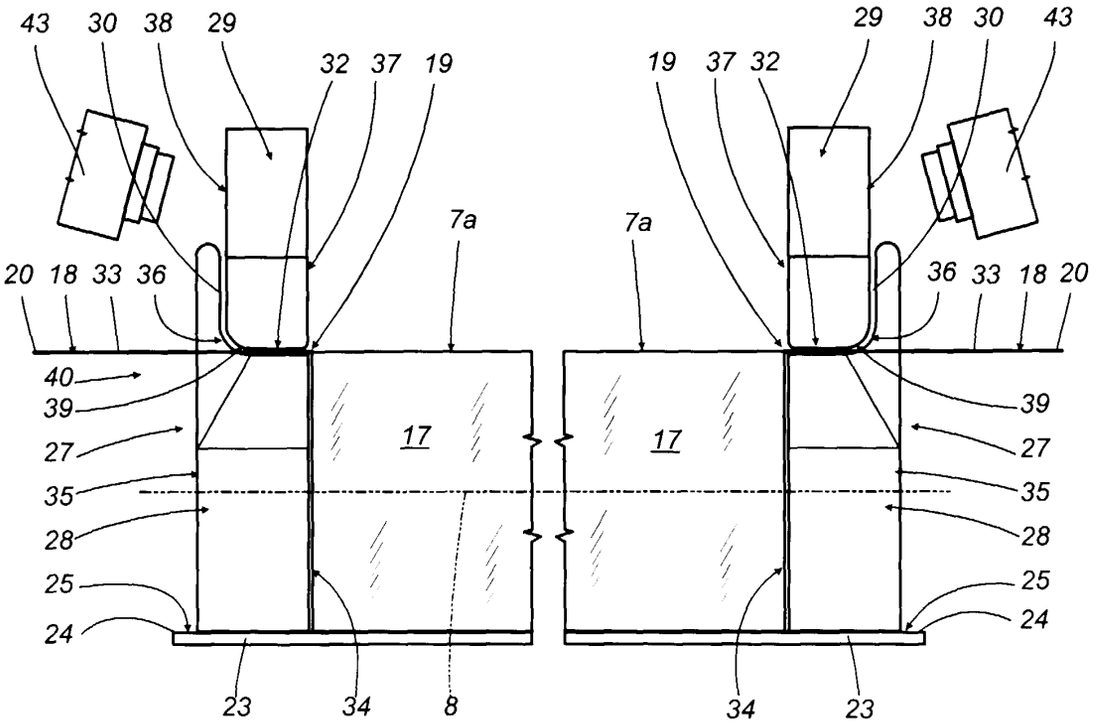
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FIG.3

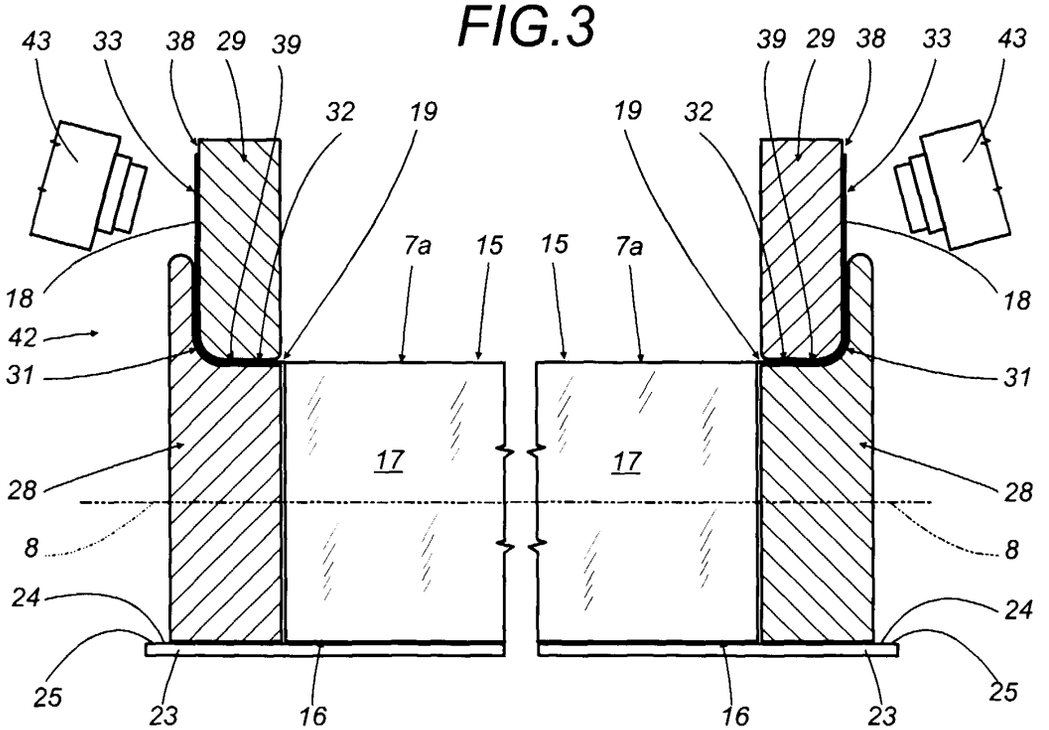
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FIG.4

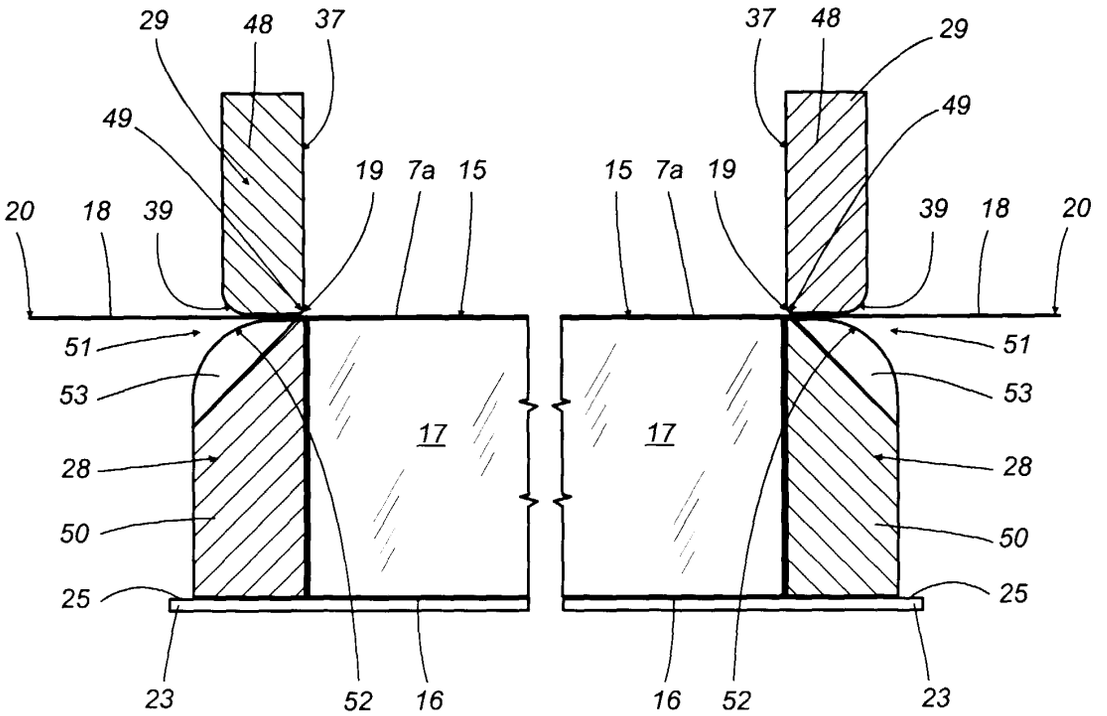
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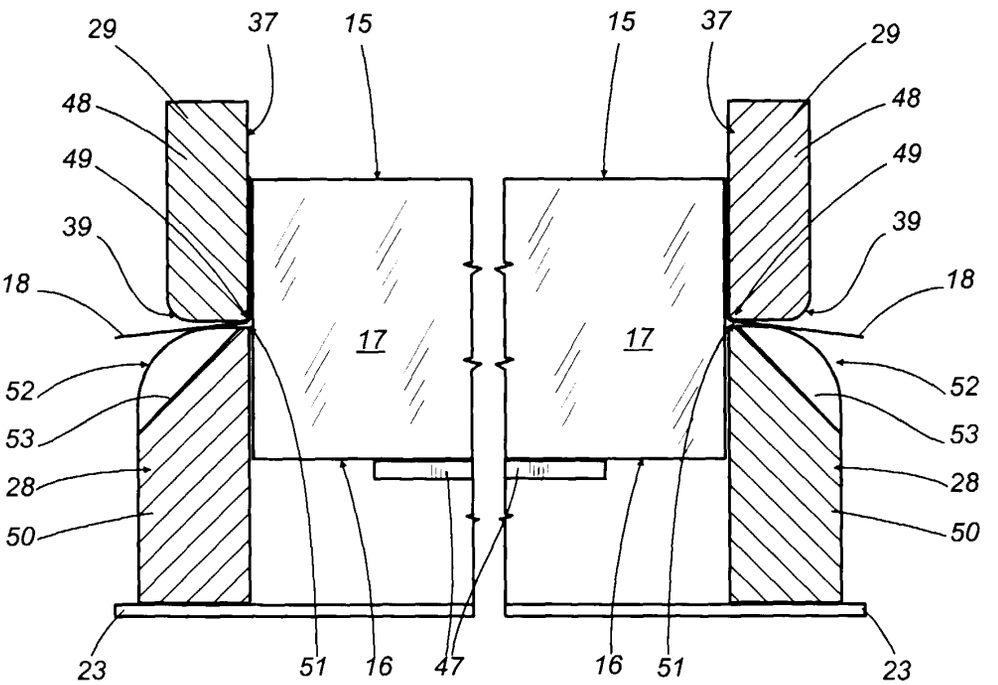
FIG.5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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0774

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	CH 467 193 A (BROWN & WILLIAMSON) * column 5, line 16 - column 6, line 41; figure 2 *	1,5	B65B11/22
A	US 3 110 144 A (JOHANSEN) 12 November 1963 (1963-11-12) * figure 1 * * column 2, line 50 - column 3, line 69 *	1,5	
A	DE 94 17 212 U (BECK) 8 December 1994 (1994-12-08) * page 12, paragraph 2; figures 4A-4F *	1,5	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	9 March 2000	Claeys, H

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 83 0774

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US 3110144 A	12-11-1963	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82