(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 520 803 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
06.04.2005 Bulletin 2005/14

(51) Int Cl.[7]: **B65D 83/04**

(21) Application number: **04022944.5**

(22) Date of filing: **27.09.2004**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL HR LT LV MK

(30) Priority: **01.10.2003 IT MI20031883**

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(54) Package for medicinal oder pharmaceutical products, method and apparatus for manufacturing and filling it

(57) A package for medicinal, pharmaceutical and similar products, particularly of the pill type, and an associated method and apparatus for manufacturing and filling. The package comprises a shell (1) provided with at least two wings (3), which are provided with respective receptacles (5) for containing corresponding products, and a separation rib (4), which is interposed between said wings; a layer (7) for closing the receptacles (5), which is associated with the shell (2), each wing being articulated about a corresponding side of the separation rib between an open configuration, in which the wings are mutually spaced, and a closed configuration, in which they are arranged so that their respective inner faces are in mutual contact and the receptacles protrude between the faces; and means (8) for closing the wings (3) by pressing, which are associated with the shell. The receptacles (5) of each wing (3) are offset with respect to the receptacles (5) of the other wing (3) and are arranged side by side at a distance that is at least equal to their transverse dimension, part of the receptacles (5) of each wing (3) being able, in the closed configuration, to be accommodated between two adjacent receptacles of the other one of the wings. The closure means (8), moreover, comprise at least one ridge (12) that protrudes laterally from at least one receptacle (5).

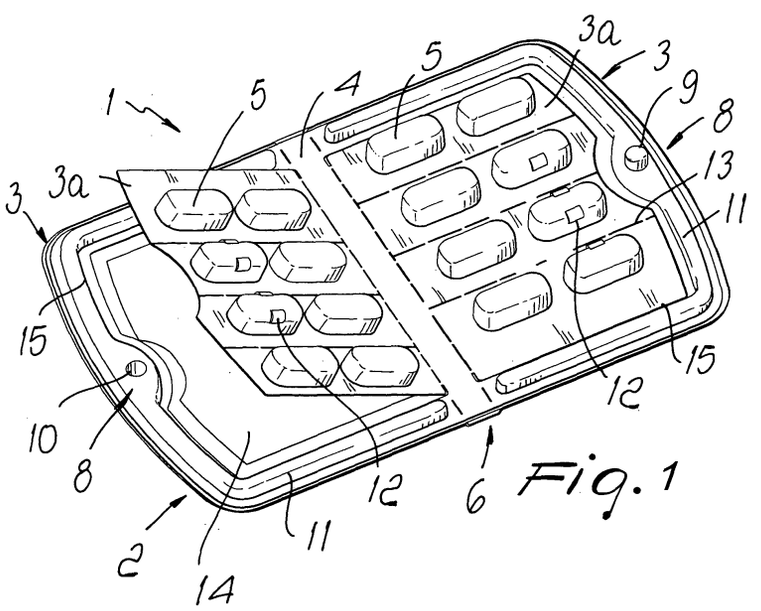

Fig. 1

EP 1 520 803 A2

Description

[0001] The present invention relates to a package for medicinal, pharmaceutical and similar products, particularly of the pill type, and to the associated method and apparatus for manufacturing and filling it.

[0002] Various kinds of container for packaging medicinal products in general, and pills in particular, are known; such containers generally use blisters packages constituted by a film, which is thermoformed so as to provide a sort of shell that has a plurality of receptacles for containing respective products, and by a pierceable aluminum covering film, which is associated with the preceding film so as to close said receptacles.

[0003] The product contained in each receptacle is removed by applying pressure to the convex face of said receptacle, so as to press the product against the covering film until it is pierced, causing said product to exit.

[0004] Blister packages generally have a flat shape and are inserted, together with the information leaflet related to the medicinal products contained therein, in box-like protective enclosures, usually made of die-cut cardboard, before they are sent to commercial distribution.

[0005] These enclosures can be opened at one or more faces constituted by folding tabs.

[0006] However, the use of said enclosures is sometimes awkward, since after opening them, the blister is not directly accessible but has to be extracted from the corresponding enclosure.

[0007] This drawback is even more inconvenient if one considers that a plurality of blisters are usually inserted in the enclosure together with the corresponding information leaflet, and therefore when one turns upside down the open enclosure so as to cause the exit of the intended blister, the remaining contents are also expelled from it.

[0008] Moreover, these enclosures may become damaged over time, no longer allowing to close and protect the blisters contained therein.

[0009] Not least, the information leaflets attached to medicinal products, which are folded and stored loosely inside said enclosures, may become damaged over time, making it impossible to retrieve the information that they contain, or in an extreme case may be lost.

[0010] These drawbacks are at least partially overcome by a second known type of package of medicinal products, which provides a sort of book-like case provided with three pages that can be folded onto each other, one or more blisters of the type described above being arranged at one of the pages.

[0011] These cases are obtained from two superimposed cardboard sheets, which are folded appropriately so as to form the pages, at one of which at least one through opening is provided; a corresponding blister is arranged inside the opening, and the perimeter of the blister is retained between the two cardboard sheets.

[0012] The information traditionally contained in the leaflet can be provided directly on the pages of the case, so as to make it always accessible and available to the user.

[0013] Even these known cases, however, are not free from drawbacks, including the fact that in order to maintain the closed configuration they must be inserted in tubular enclosures, i.e., be provided with other additional closure devices suitable to lock the pages so that they are folded together; these devices are not practical and quick to use for the user and do not ensure safe closure and protection of the products packaged inside them.

[0014] It should be noted that the additional closure devices are for example of the type of sleeves, which need to be removed and then positioned every time the product is taken from the package, or of adhesive elements, which are applied to the cases but do not ensure a sufficiently durable seal.

[0015] Another limitation of these types of package is that their manufacturing cycle is rather complicated, since it requires managing various auxiliary materials and feeding them to the corresponding manufacturing line, which accordingly has a rather articulated and complex structure.

[0016] Finally, the various types of package that are currently known use blisters that allow exclusively to remove individual products, and therefore if the user needs, for example, to take a plurality of pills through the day he/she is forced to take the entire package with him/her, with the risk of damaging it and of damaging the products contained therein that are not used immediately.

[0017] As an alternative, it is possible to cut a portion of the blister by means of conventional cutting tools, such as scissors or the like, which are of course not always easily available and the use of which can injure the user.

[0018] The aim of the present invention is to eliminate the drawbacks mentioned above of the background art, by providing a package for medicinal, pharmaceutical and similar products, and a corresponding method and apparatus for manufacturing and filling, which is practical to use for the end user, is easy to handle during use, and allows to protect appropriately the products contained therein until they are depleted.

[0019] Within this aim, an object of the present invention is to provide a package that allows the information related to the method of use or other information related to the products contained therein to be always available.

[0020] Another object of the present invention is to provide a package that is visually pleasant for the user and can be carried easily in bags, handbags and the like.

[0021] Another object of the present invention is to provide a package that is simple, relatively easy to provide in practice, safe in use, effective in operation, and has a relatively low cost.

[0022] This aim and these and other objects that will become better apparent hereinafter are achieved by the

present package for medicinal, pharmaceutical and similar products, comprising a shell provided with at least two wings, provided with respective receptacles for containing corresponding products, and a separation rib, which is interposed between said wings, a layer for closing said receptacles, which is associated with said shell, each wing being articulated about a corresponding side of the separation rib between an open configuration, in which said wings are mutually spaced, and a closed configuration, in which they are arranged so that their respective inner faces are in mutual contact and the receptacles protrude between said faces, and means for closing said wings by pressing, said means being associated with said shell, characterized in that the receptacles of each wing are offset with respect to the receptacles of the other one of said wings and are arranged side by side at a distance that is at least equal to their transverse dimension, part of the receptacles of each wing being able, in the closed configuration, to be accommodated between two adjacent receptacles of the other one of said wings, and in that said closure means comprise at least one ridge that protrudes laterally from at least one receptacle.

[0023] This aim and these and other objects are also achieved by a method for manufacturing and filling the package according to the invention, characterized in that it comprises: a step for thermoforming a strip of thermoformable film, during which a plurality of said shells provided with corresponding closure means is obtained, said shells being distributed along the strip and being arranged so that their respective receptacles are open upward; a step for filling said receptacles with corresponding products; a step for heat-sealing a pierceable protective film on said shells in order to close said receptacles; a step for pre-cutting each shell, in which at least said folding lines are provided; and a step for cutting and separating each shell and the corresponding closure layer, respectively, from said strip and from said film made of pierceable material so as to obtain a substantially flat package.

[0024] This aim and these and other objects are further achieved by an apparatus for manufacturing and filling the package according to the invention, characterized in that it comprises a unit for discontinuously feeding at least one strip of thermoformable film, along which there are: a station for thermoforming said strip, which comprises a mold constituted by two mold parts, at least one of which can move toward and away from the other, in order to obtain a plurality of said shells, each provided with corresponding closure means, distributed on said strip along at least one row and arranged so that the respective receptacles are open upward; a station for inserting corresponding products in said receptacles; a station for feeding and heat-sealing a protective and pierceable film on said thermoformed strip in order to close said receptacles so as to obtain a plurality of blisters in a flat configuration, distributed along said strip; a station for pre-cutting each flat blister along predefined lines so as to obtain at least said folding lines; and a station for cutting and separating each flat blister from said strip.

[0025] Further characteristics and advantages of the present invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of a package for medicinal, pharmaceutical and similar products, particularly of the pill type, and of the corresponding method and apparatus for manufacturing and filling, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figure 1 is a schematic perspective view of the package according to the invention, in the open configuration and with the internal region of one wing partially raised;
Figure 2 is a schematic perspective view of the package of Figure 1 in a partially closed configuration;
Figure 3 is a schematic perspective view of the shell of the package according to the invention, with the internal regions of the wings partially closed;
Figure 4 is a schematic perspective view of the covering layer of the package according to the invention;
Figures 5 and 6 are two schematic enlarged-scale sectional views, taken along a transverse plane, of two details of the interlocking means of the package according to the invention;
Figure 7 is a lateral schematic view of the apparatus for manufacturing and filling the package according to the invention;
Figure 8 is a schematic transverse sectional view of the molding station of the apparatus of Figure 7;
Figure 9 is a schematic plan view of the lower mold part of the molding station of Figure 8;
Figure 10 is a schematic front view of the blanking station of the apparatus of Figure 7;
Figure 11 is a schematic and partial plan view of the blanking station of Figure 10;
Figure 12 is a schematic and partial front view of the pre-cutting station;
Figure 13 is a schematic top view of the lower and upper plates of the pre-cutting station of Figure 12, with the upper plate shown in phantom lines;
Figure 14 is a schematic view of the lower plate of the pre-cutting station of Figure 12;
Figures 15 and 16 are two schematic and partial front views of the shaping and feeding station of the apparatus of Figure 7;
Figure 17 is a schematic and partial side view of the folding and closure station of the apparatus of Figure 7;
Figure 18 is a schematic and partial plan view of the station of Figure 17.

[0026] With reference to the figures, the reference nu-

meral 1 generally designates a package for medicinal, pharmaceutical and similar products, particularly of the pill type or the like.

[0027] The package 1 comprises a shell 2 provided with at least two quadrangular wings 3 and with a rib 4 for separating the wings; each wing 3 is provided with a plurality of receptacles 5 for containing corresponding products, of the pill type or the like, and is articulated about a corresponding side of the rib 4 that is formed by a corresponding folding line 6.

[0028] Accordingly, the wings 3 can assume an open configuration, in which they are mutually spaced, and a closed configuration, in which they are arranged so that their respective internal faces 3a are in mutual contact and the receptacles 5 protrude between the faces.

[0029] The shell 2 is obtained by thermoforming a film made of thermoformable material, such as PET or PVC.

[0030] In the illustrated embodiment, the receptacles 5 have an elongated shape and are arranged transversely with respect to the rib 4.

[0031] Conveniently, the receptacles 5 of each wing 3 are offset with respect to the receptacles 5 of the other wing 3 and are arranged side by side, at a distance that is at least equal to their transverse dimension; in the closed configuration, some of the receptacles 5 of each wing 3 can be accommodated between two adjacent receptacles 5 of the other wing 3.

[0032] In a possible embodiment, not shown in the figures, such distance may be on the same order of magnitude as the transverse dimension of the receptacles 5, or better still slightly smaller than said dimension, so that in the closed configuration some of the receptacles 5 of each wing 3 can be accommodated with interference between two adjacent receptacles 5 of the other wing 3, making it easier to maintain the closed configuration.

[0033] Further, the package 1 comprises a layer 7 for closing the receptacles 5, which is associated with the shell 2 by heat-sealing or other methods, so as to cover it at least at the wings 3.

[0034] The layer 7 is made of flexible and pierceable material, such as for example aluminum, and has a low thickness.

[0035] Advantageously, the package 1 has means 8 for closing the wings 3 by pressing; such means are associated with the shell 2 and are adapted to keep said wings in the closed configuration.

[0036] The closure means 8 and the wings 3 are preferably formed monolithically with respect to each other.

[0037] The closure means 8 comprise a tab 9, which protrudes from the inner face 3 a of one of the wings 3, and a corresponding recess 10 formed at the inner face 3a of the other wing 3; the tab 9 can be inserted with interference in the recess.

[0038] During use, the user has to gently pull the closed wings so as to disengage the tab 9 from the recess 10 and open the wings; to close the wings 3, it is instead necessary to apply a slight pressure to them so as to force the tab 9 into the recess 10.

[0039] Each wing 3 has a profile 11 that protrudes from the corresponding internal face 3a and lies along the peripheral portion of said wing.

[0040] The tab 9 and the recess 10 are formed at the respective profiles 11, proximate to the centerline of the portions of said profiles, and substantially parallel to the folding line 6.

[0041] The profiles 11 are wider at the tab 9 and at the recess 10.

[0042] The recess 10 is constituted by a slot formed in the corresponding profile.

[0043] Advantageously, the closure means 8 further comprise at least one, and preferably several, ridges 12 that protrude laterally from some of the receptacles 5.

[0044] With reference to Figure 6, it should be noted in particular that ridges 12 are provided on two adjacent receptacles 5a of one of the wings 3 and on the corresponding receptacle 5b of the other wing 3 that can be inserted between the preceding receptacles, so as to reduce the useful space for the insertion of the receptacle 5b between the receptacles 5a and increase the pressure or traction to be applied to the wings 3 in order to close them or open them, respectively.

[0045] Conveniently, there are a plurality of pre-scoring portions 13 formed on the wings 3, which allow to remove a portion of said wing that contains one or more receptacles 5.

[0046] Finally, the package 1 is provided with a covering sheet 14, which is associated on the layer 7 by adhesive bonding or by other methods and is made of substantially paper-like material or the like.

[0047] The sheet 14 must be shaped appropriately at the rib 4, so as to allow articulation of the wings 3.

[0048] At the wings 3, the sheet 14 is coupled to the peripheral portion of the layer 7, i.e., to the portion that is arranged at the profiles 11.

[0049] Each wing 3 in fact has a scoring line 15, which also passes through the layer 7 and is arranged inside the peripheral portion of said layer that is coupled to the sheet 14, so as to allow separation of the internal region provided with receptacles 5 of the wing 3, together with the layer 7, from said sheet.

[0050] The scoring lines 15 lie inside the profiles 11.

[0051] The sheet 14 therefore has an outer surface that is always exposed and an inner surface that is partially visible when the package 1 is open and the internal regions of the wings 3, together with the layer 7, are spaced from the sheet.

[0052] It is conveniently possible to provide, on such surfaces, descriptive indications related to the type of product contained, to its methods of use, therapeutic indications and others, as well as commercial information of any kind.

[0053] The method for manufacturing and filling the package 1 substantially comprises a step for thermoforming a strip 16 of thermoformable film, in which a plurality of shells 2 provided with corresponding closure

means 8 are obtained, the shells 2 being distributed along the strip 16 and being arranged so that their respective receptacles 5 are open upward; a step for filling the receptacles 5 with corresponding products; a step for heat-sealing a protective pierceable film 17 on the shells 2 in order to close the receptacles 5; a step for pre-cutting each shell 2, in which the folding lines 6, the pre-scoring portions 13 and the scoring lines 15 are provided simultaneously; and a step for cutting and separating each shell 2 and the corresponding layer 7, respectively, from the strip 16 and from the film 17 in order to obtain a substantially flat package 1.

[0054] Downstream of the forming step there is a step for blanking out the slot that forms the receptacle 10 on each shell 2.

[0055] The method further provides for performing a step for applying the sheet 14 to the layer 7, which is performed downstream of said cutting and separation step.

[0056] The method can provide for a step for shaping the sheets 8, which is performed upstream of the application step; as an alternative, the sheets 8 may be fed in an already-shaped configuration.

[0057] Finally, the method provides for a step for folding and closing the flat packages 1 so as to obtain said packages in the closed configuration.

[0058] The apparatus for manufacturing and filling the packages 1 and for performing the method described above is generally designated by the reference numeral 18 and is shown schematically in Figure 7.

[0059] In Figure 7, the reference numeral 19 designates a unit for discontinuously feeding the strip 16 of thermoformable film arranged on a horizontal surface; the reference numeral 20 designates a station for the hot molding of the strip 16, which comprises a mold 21, constituted by two mold parts, i.e., a lower one 22, which can move alternately toward and away from the upper one 23, in order to obtain a plurality of shells 2 provided with corresponding closure means 8, which are distributed on the strip 16 along at least one row and arranged so that their corresponding receptacles 5 are open upward; the reference numeral 24 designates a traditional station for the insertion of corresponding products in the receptacle 5; the reference numeral 25 designates a conventional station for feeding and heat-sealing the protective pierceable film on the thermoformed strip 16 in order to close the receptacles 5, so as to obtain a plurality of blisters in a flat configuration, distributed on the strip 16; the reference numeral 26 designates a station for pre-cutting each flat blister along predefined lines so as to obtain the folding lines 6, the pre-scoring lines 13 and the scoring lines 15; the reference numeral 27 designates a station for cutting and separating each flat blister from the strip 16.

[0060] Conveniently, the apparatus 18 is provided with a blanking station 28, which comprises at least one punch 29 and a corresponding die 30 for cutting the slots that form the recesses 10.

[0061] The stations 20, 24, 25, 26, 27, 28 are distributed along the feeder unit 19, which is not shown in detail because it is of a conventional type.

[0062] The feeder unit 19 is provided with a reel 31, which is supported so that it can rotate freely and is associated with a conventional type of unwinding system.

[0063] The feeder unit 19 further comprises a first unit 32 for drawing the strip 16, which is arranged downstream of the forming station 21, and a second unit 33 for drawing said strip, together with the film 17 heat-sealed thereon, which is arranged upstream of the cutting and separation station 27, the units 31 and 32 not being shown in detail because they are of a known type.

[0064] The apparatus 18 is of the modular type, and depending on the number of rows of shells 2 obtained on the strip 16 by molding, the subsequent stations are sized with an appropriate number of work units.

[0065] In the illustrated embodiment, the molding station 20 allows to mold simultaneously three shells 2, arranged side by side along respective rows.

[0066] The lower mold part 22 is in fact provided with three impressions 34 for molding respective shells 2.

[0067] Each impression 34 is provided with respective slots 35 and hollows 36, which are arranged respectively at the profiles 11 and at the receptacles 5 that one wishes to obtain on the shell 2.

[0068] Conveniently, the impressions 34 are shaped so as to obtain the closure means 8 on the shells 2.

[0069] The upper mold part 23 acts as a fixed abutment for the lower mold part 22 and is associated with the molding punches 37, which allow to stretch the strip 16 until it assumes the shape of said punches.

[0070] The molding station 20 further has conventional means, not shown in the figures, for injecting compressed air inside the mold 21.

[0071] The molding station further provides a preheating unit 38 upstream of the mold 21.

[0072] The blanking station 28 therefore has three punches 29, which can move below the strip 16 and are arranged at corresponding shells 2 to be slotted, and an upper die 30, which is also movable and is provided with three holes 39, each arranged at a corresponding punch 29.

[0073] Conveniently, the blanking station 28 is provided with a system for removing the process waste by suction, which is not shown in the figures because it is of a known type.

[0074] The pre-cutting station 26 comprises a fixed upper plate 40, which is provided with a plurality of blades 41 arranged at the folding lines 6, at the pre-scoring lines 13 and at the scoring lines 15 of the shells 2, and a lower plate 42, which can move vertically and is provided with three seats 43 for centering respective flat blisters, at which a plurality of complementary blades 44 for the abutment of the blades 41 are provided.

[0075] Conveniently, the blades 41a arranged at the folding lines 6 and at the pre-scoring portions 13 have a jagged edge, while the blades 41b, suitable to form

the scoring lines 15, have a straight edge.

[0076] The blades 41 are preferably associated with the upper plate 40 by interposing elastic springs, which are not visible in the figures.

[0077] Downstream of the cutting and separation station 27 there is a unit 45 with sliders for removing the resulting flat blisters.

[0078] The apparatus 18 is provided with a station 46 for applying a sheet 14 to each flat blister conveyed on the removal unit 45 so that the associated layer 7 is directed upward.

[0079] Advantageously, the apparatus 18 is provided with a station 47 for shaping and feeding sheets 14 toward the application station 46, which is arranged transversely to the removal unit 45.

[0080] The station 47 comprises means for supporting the lateral portions of the sheet 14 being processed, and a rectilinear presser 49, which is arranged below the sheet 14 at the centerline thereof and can move alternately in a vertical direction between a configuration in which it is spaced from the sheet 14 and a configuration in which it is closer to it; an element 50 for the abutment of the presser 49 in the closer configuration, which is arranged above the sheet 14, and two claws 51, which are arranged above the sheet 14 on opposite sides of the presser 49 and are suitable to press the sheet 14 on the presser 49 in the closer configuration, so as to achieve the intended shaping of the central portion of said sheet.

[0081] The supporting means 48, not shown in detail in the figures, are constituted by two flexible elements such as conventional segmented belts, which are closed in a loop and wound around a driving wheel and a driven wheel and are provided with a side for loading the sheets 14 to be shaped and with a side for unloading the shaped sheets, which is arranged proximate to the application station 46.

[0082] The lateral portions of the sheets 14 are arranged so that they rest on said belts, which are located at a distance that is shorter than the width of the flat sheets 14.

[0083] The driving wheel is associated with step feeder means, which are suitable to actuate an intermittent advancement of the sheets 14 conveyed on the belts.

[0084] The vertical movement of the presser 49 and of the abutment element 50 is actuated respectively by a conventional cam mechanism 52 and by a fluid-operated actuator 53.

[0085] The movement of the claws 51 toward and away from each other is actuated by means of a second cam mechanism 54.

[0086] Finally, the apparatus 18 comprises a station 55 for folding and closing the packages 1 obtained in a flat configuration, said station being arranged downstream of the removal unit 45.

[0087] The station 55 comprises an element 56 with suckers for gripping each row of flat packages 1, in order to remove a corresponding package 1 from the removal unit 45; the grip element 56 is associable in an upper region with respect to the package 1 at the wing 3 located proximate to said element, and can oscillate between a configuration for picking up the package 1 and configuration for releasing it, said package being at least partially closed at an unloading station 57.

[0088] The station 55 further has a curved guide 58 for the abutment of the portion of the package 1 that is spaced from the grip element 56 during transfer from the pick-up configuration to the release configuration, said guide being suitable to facilitate the closure of the package 1 on said grip element.

[0089] Finally, the station 55 is provided with first means 59 for pushing the packages 1 released at the unloading station 57 and with presser means 60, which are arranged above said station and ensure the closure of the packages 1.

[0090] Finally, there are second pusher means 61 for moving the closed packages 1 away from the unloading station 57.

[0091] Downstream of the station 55 it is possible to provide, for example, additional stations for the final packaging of the packages 1, which for example can be grouped into units for sale in trays or other means.

[0092] In practice it has been found that the described invention achieves the proposed aim and objects, and in particular obtains a package that is practical and safe to use and has a pleasant appearance.

[0093] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0094] All the details may further be replaced with other technically equivalent ones.

[0095] In practice, the materials used, as well as the shapes and dimensions, may be any according to requirements without thereby abandoning the protective scope of the appended claims.

[0096] The disclosures in Italian Patent Application No. MI2003A001883, from which this application claims priority, are incorporated herein by reference.

[0097] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A package for medicinal, pharmaceutical and similar products, comprising a shell provided with at least two wings, which are provided with respective receptacles for containing corresponding products, and a separation rib, which is interposed between said wings, a layer for closing said receptacles, which is associated with said shell, each wing being

articulated about a corresponding side of the separation rib between an open configuration, in which said wings are mutually spaced, and a closed configuration, in which they are arranged so that their respective inner faces are in mutual contact and the receptacles protrude between said faces, and means for closing said wings by pressing, said means being associated with said shell, **characterized in that** the receptacles of each wing are offset with respect to the receptacles of the other one of said wings and are arranged side by side at a distance that is at least equal to their transverse dimension, part of the receptacles of each wing being able, in the closed configuration, to be accommodated between two adjacent receptacles of the other one of said wings, and **in that** said closure means comprise at least one ridge that protrudes laterally from at least one receptacle.

2. The package according to claim 1, **characterized in that** said closure means comprise a plurality of said ridges, which protrude laterally from at least two adjacent receptacles of one of said wings and from the receptacle of the other one of said wings that can be inserted between the previous receptacles in the closed configuration.

3. The package according to claim 1, **characterized in that** it comprises a plurality of pre-scoring portions formed on said wing provided with receptacles, said portions being adapted to allow removal of part of said wing.

4. The package according to one or more of the preceding claims, **characterized in that** it comprises a covering sheet that is associated with said closure layer.

5. The package according to one or more of the preceding claims, **characterized in that** said sheet is made of a substantially paper-like or similar material.

6. The package according to one or more of the preceding claims, **characterized in that** said sheet is shaped at said rib.

7. The package according to one or more of the preceding claims, **characterized in that** at said wing provided with receptacles, said sheet is associated with the peripheral portion of said closure layer, said layer and said wing being provided with a scoring line, which is arranged inside said peripheral portion and is suitable to allow the separation of the internal region provided with receptacles of said wing from said sheet.

8. A method for manufacturing and filling a package according to one or more of the preceding claims, **characterized in that** it comprises: a step for the thermoforming of a strip of thermoformable film, in which a plurality of shells provided with corresponding closure means are obtained, said shells being distributed along the strip and being arranged so that their corresponding receptacles are open upward; a step for filling said receptacles with corresponding products; a step for heat-sealing a protective pierceable film on said shells, in order to close said receptacles; a step for pre-cutting each shell, during which at least folding lines are formed; and a step for cutting and separating each shell and a corresponding closure layer, respectively, from said strip and from said film of pierceable material in order to obtain a substantially flat package.

9. The method according to claim 8, **characterized in that** said pre-cutting step consists in providing said pre-scoring portions.

10. The method according to one or more of claims 8 and 9, **characterized in that** said pre-cutting step consists in providing said scoring line.

11. The method according to one or more of claims 8 to 10, **characterized in that** said pre-cutting step consists in providing simultaneously said folding lines, said pre-scoring lines and said scoring line.

12. The method according to one or more of claims 8 to 11, **characterized in that** it comprises a step for applying said covering sheet to said closure layer, performed downstream of said cutting and separation step.

13. The method according to one or more of claims 8 to 12, **characterized in that** it comprises a step for shaping said covering sheets, said step being performed downstream of said application step.

14. The method according to one or more of claims 8 to 13, **characterized in that** it comprises a blanking step performed downstream of said thermoforming step, during which said slot is formed.

15. The method according to one or more of claims 8 to 14, **characterized in that** it comprises a step for folding and closing said substantially flat package so as to obtain a closed package.

16. An apparatus for manufacturing and filling a package according to one or more of claims 1 to 7, **characterized in that** it comprises a unit for the discontinuous feeding of at least one strip of thermoformable film, along which there are: a station for the thermoforming of said strip, which comprises a mold constituted by two mold portions, at least one

of which can move toward and away from the other, in order to obtain a plurality of said shells, each provided with corresponding closure means, distributed on said strip along at least one row and arranged so that their corresponding receptacles are open upward; a station for inserting corresponding products in said receptacles; a station for feeding and heat-sealing a protective and pierceable film on said thermoformed strip in order to close said receptacles so as to obtain a plurality of blisters in a flat configuration, distributed along said strip; a station for pre-cutting each flat blister along pre-defined lines so as to obtain at least said folding lines, and a station for cutting and separating each flat blister from said strip.

17. The apparatus according to claim 16, **characterized in that** it comprises a blanking station, which is arranged downstream of said thermoforming station and comprises at least one punch and a corresponding die for cutting said slot.

18. The apparatus according to one or more of claims 16 and 17, **characterized in that** said pre-cutting station comprises an upper plate, which is provided with a plurality of blades arranged at said predefined lines, and a lower plate, which is provided with at least one centering seat for a flat blister being processed, at which a plurality of complementary blades for the abutment of said blades are arranged.

19. The apparatus according to one or more of claims 16 to 18, **characterized in that** said predefined lines are arranged at said folding lines, the corresponding blades having a jagged edge.

20. The apparatus according to one or more of claims 16 to 19, **characterized in that** said predefined lines are arranged at said pre-scoring portions, the corresponding blades having a jagged edge.

21. The apparatus according to one or more of claims 16 to 20, **characterized in that** said pre-defined lines are arranged at said scoring lines, the corresponding blades having a straight edge.

22. The apparatus according to one or more of claims 16 to 21, **characterized in that** it comprises a station for applying a covering sheet on each flat blister so as to obtain a reclosable package in a flat configuration.

23. The apparatus according to one or more of claims 16 to 22, **characterized in that** it comprises a station for shaping and feeding said covering sheets toward said application station.

24. The apparatus according to one or more of claims 16 to 23, **characterized in that** said shaping and feeding station comprises means for supporting the lateral portions of the covering sheet being processed, a substantially rectilinear presser, which is arranged at the centerline of said covering sheet and can move alternately between a spaced configuration and a closer configuration with respect to said sheet, and two claws, which are arranged on opposite sides of said presser with respect to said covering sheet and are adapted to press said sheet laterally against said presser in the closer configuration.

25. The apparatus according to one or more of claims 16 to 24, **characterized in that** said shaping and feeding station comprises an element for the abutment of said presser in the closer configuration, said element being arranged on the opposite side of said presser with respect to said covering sheet being processed.

26. The apparatus according to one or more of claims 16 to 25, **characterized in that** said supporting means comprise two flexible elements, which are closed in a loop and are wound around a driving wheel and a driven wheel, and are provided with a side for loading a plurality of said covering sheets to be shaped and with a side for unloading said shaped sheets, which is arranged proximate to said application station and on which the lateral portions of said covering sheets are rested, the driving wheel being associated with means for stepwise feeding means, which are adapted to actuate an intermittent advancement of said sheets.

27. The apparatus according to one or more of claims 16 to 26, **characterized in that** it comprises a unit with sliders for removing said flat blisters, which is arranged downstream of said cutting and separation station.

28. The apparatus according to one or more of claims 16 to 27, **characterized in that** said application station is arranged at said removal unit with sliders.

29. The apparatus according to one or more of claims 16 to 28, **characterized in that** it comprises a station for folding and closing each package in a flat configuration arranged downstream of said removal unit with sliders.

30. The apparatus according to one or more of claims 16 to 29,
characterized in that said folding and closing station comprises at least one grip element with suckers for picking up at least one package in the flat configuration from said removal unit, said element

being associable in an upper region with said package at the wing that is arranged proximate to said element and can rotate between a configuration for picking up said package and a configuration for releasing it in an at least partially closed condition, and a curved guide for the abutment of the portion of said package that is spaced from said grip element during transfer from said pick-up configuration to said release configuration, which is adapted to facilitate the folding of said package.

31. The apparatus according to one or more of claims 16 to 30, **characterized in that** said folding and closing station comprises presser means, which are adapted to press on said at least partially closed package for the coupling of said closure means.

32. The apparatus according to one or more of claims 16 to 31, **characterized in that** said folding and closing station comprises first means for pushing the package released by said grip means at said presser means.

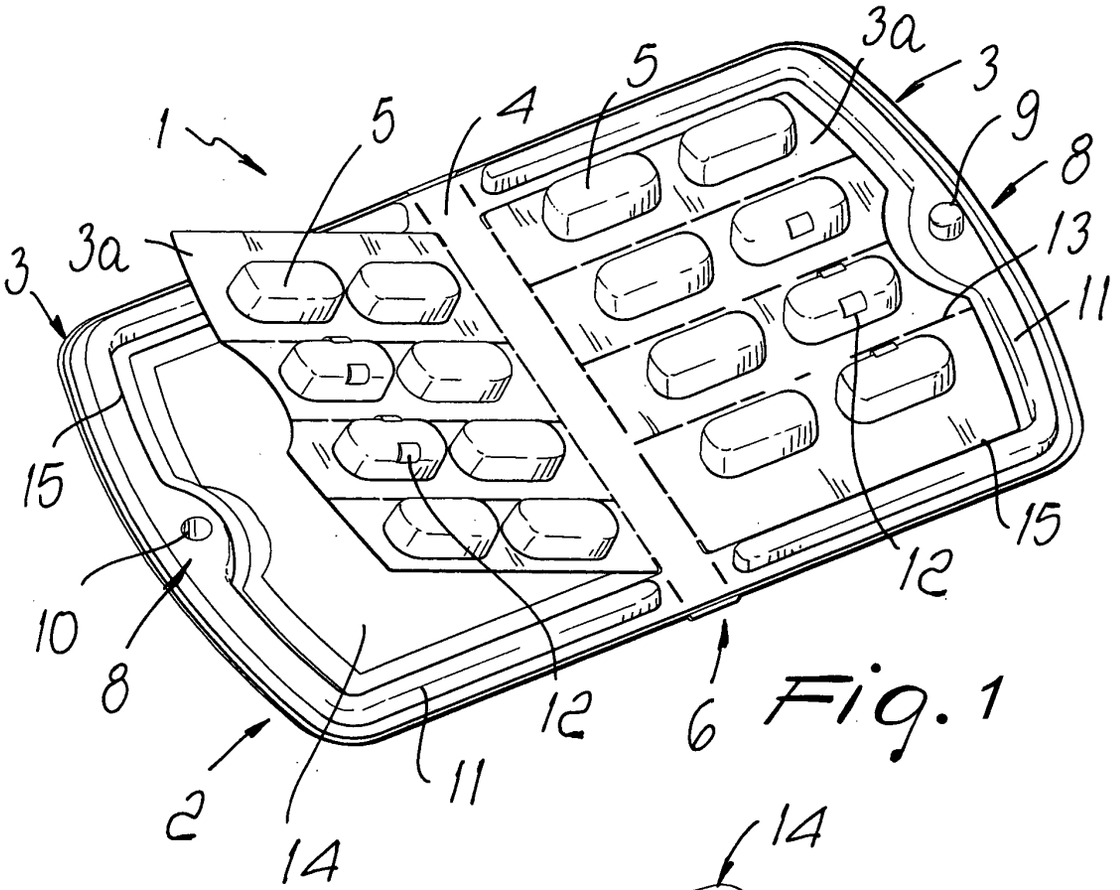

Fig. 1

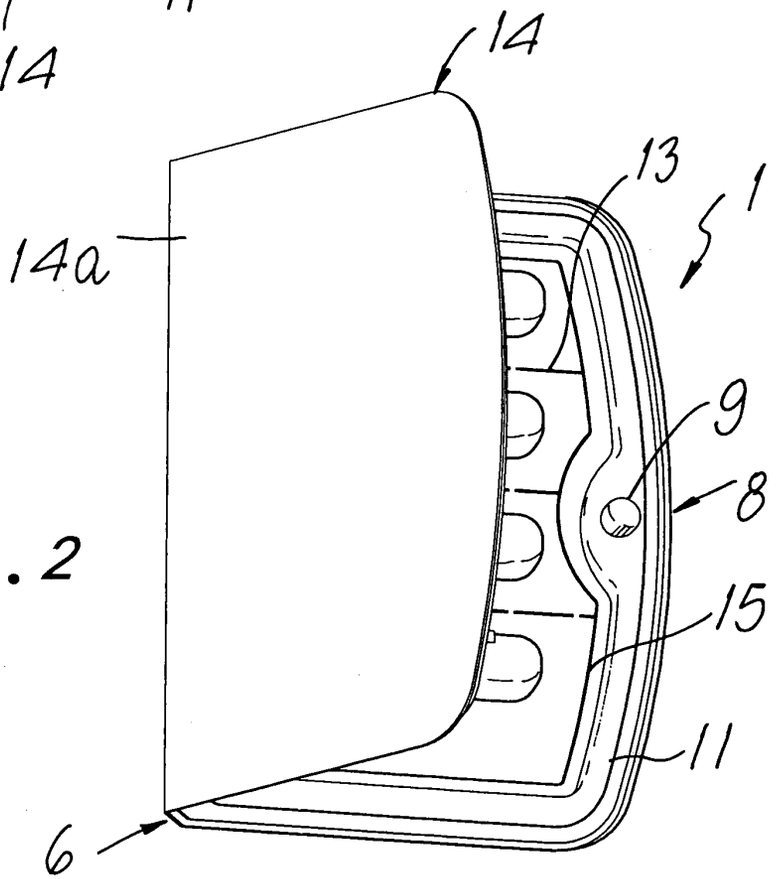

Fig. 2

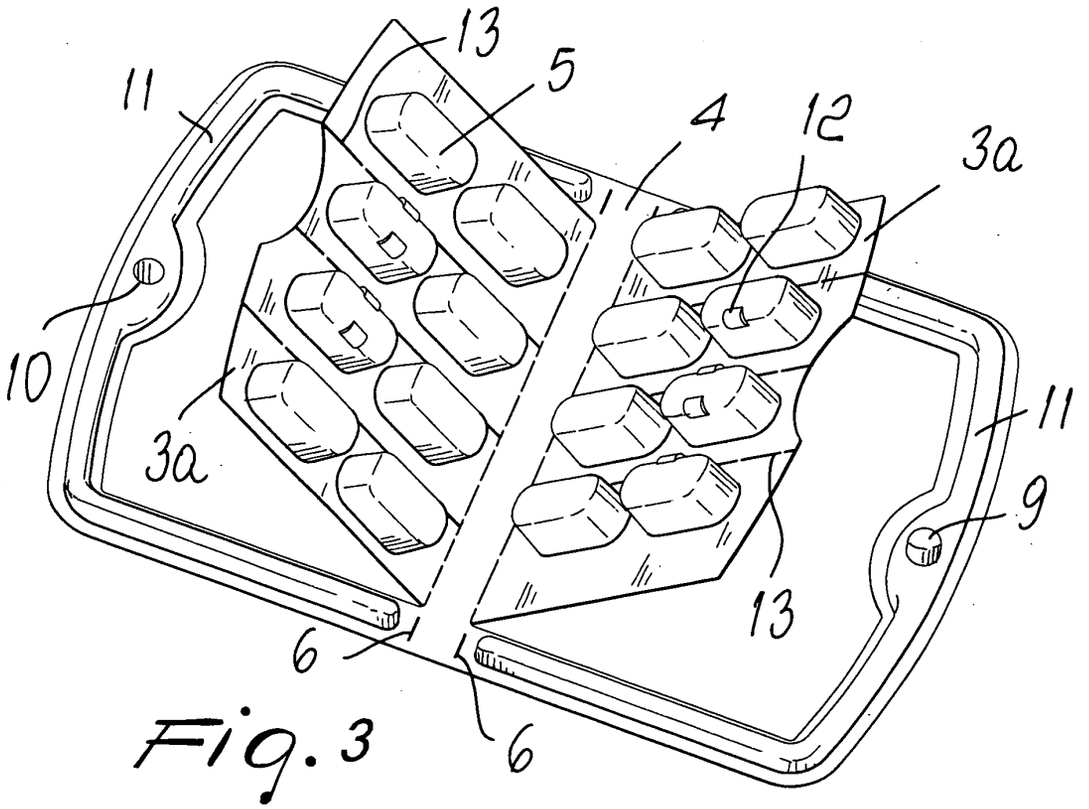

Fig. 3

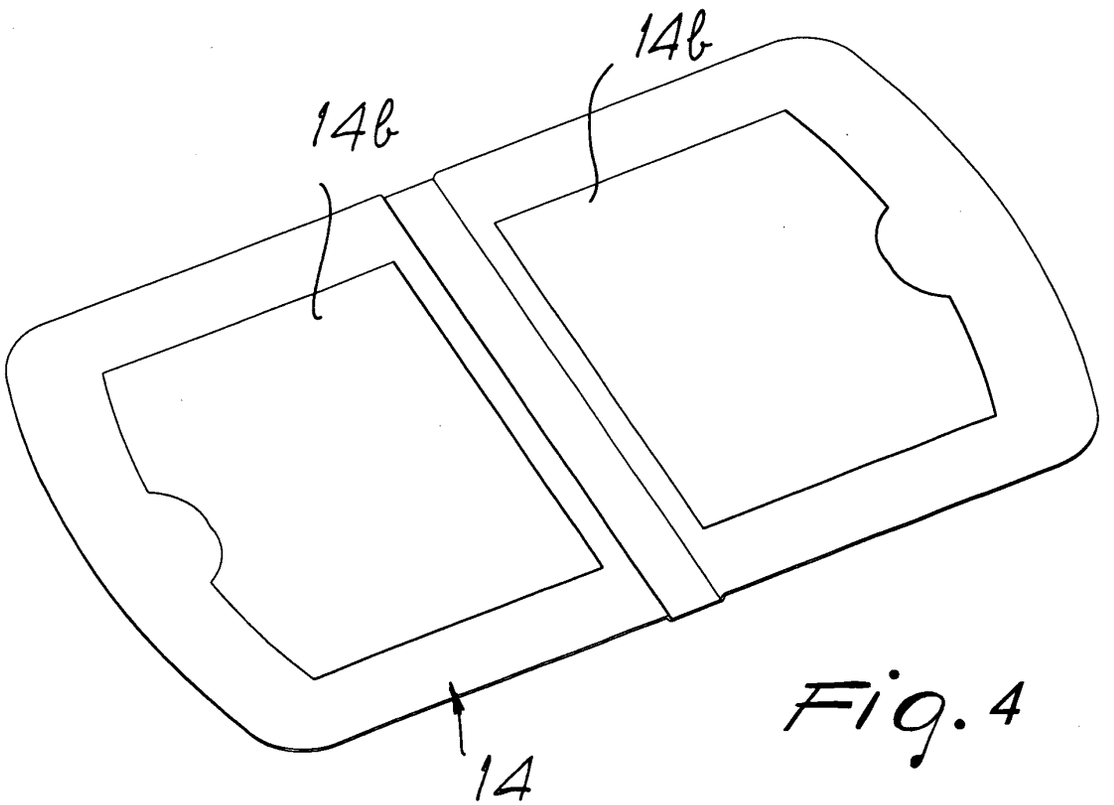

Fig. 4

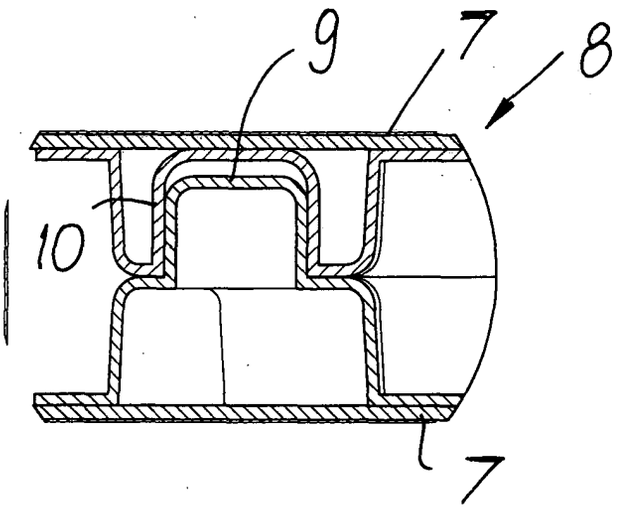

Fig. 5

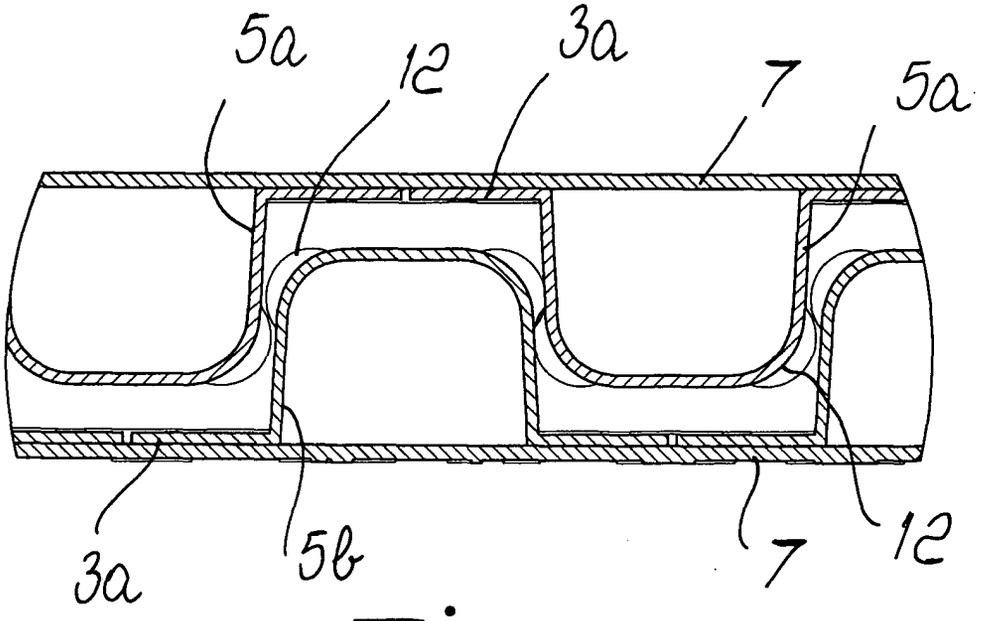

Fig. 6

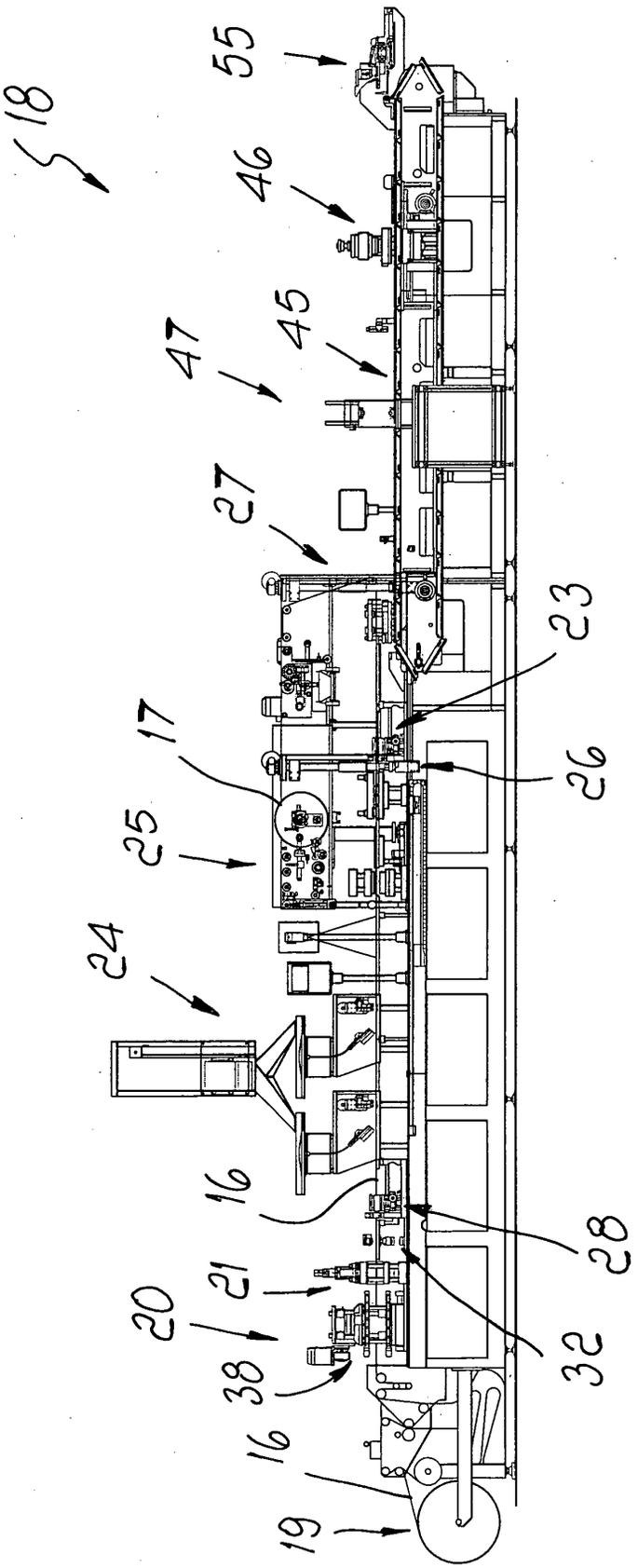

Fig. 7

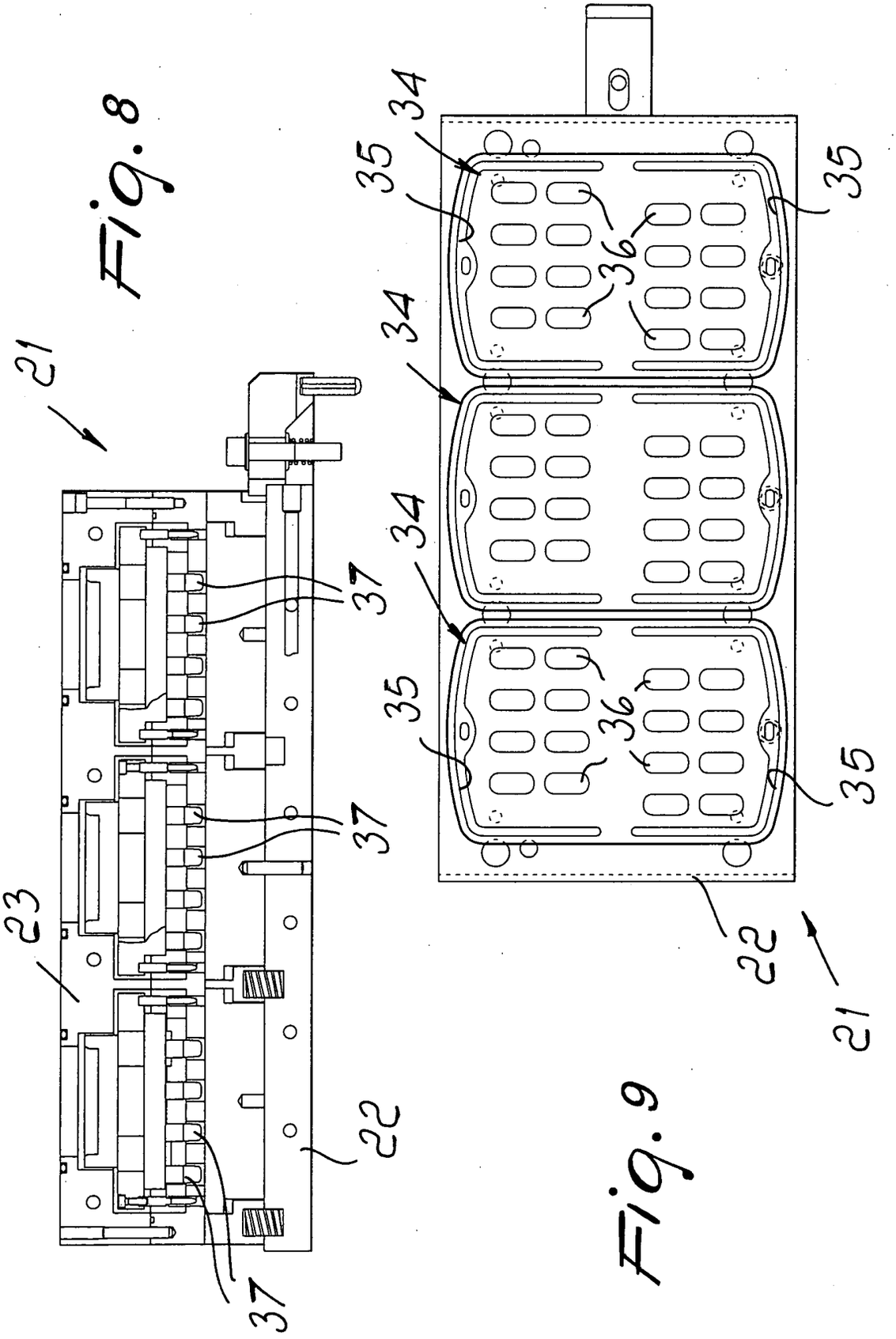

Fig. 8

Fig. 9

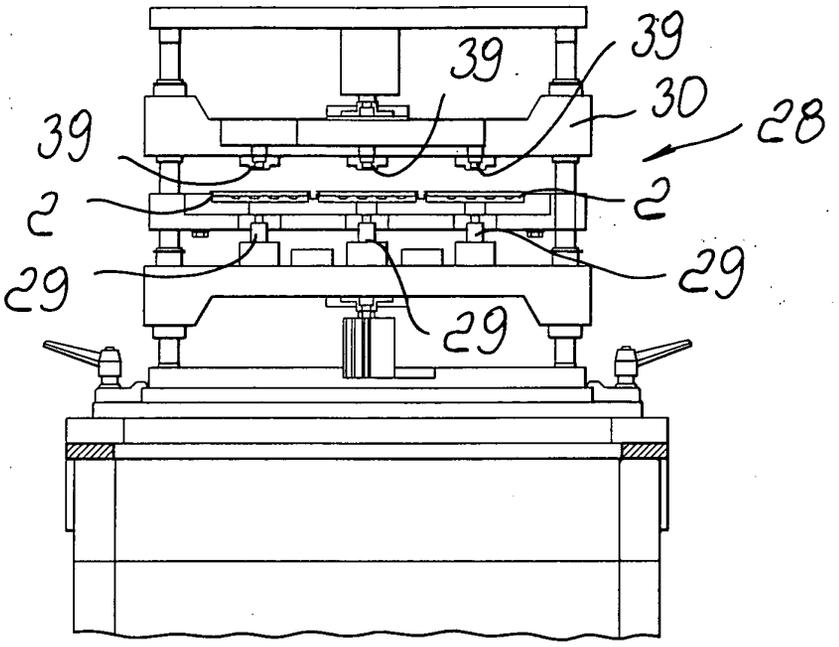

Fig. 10

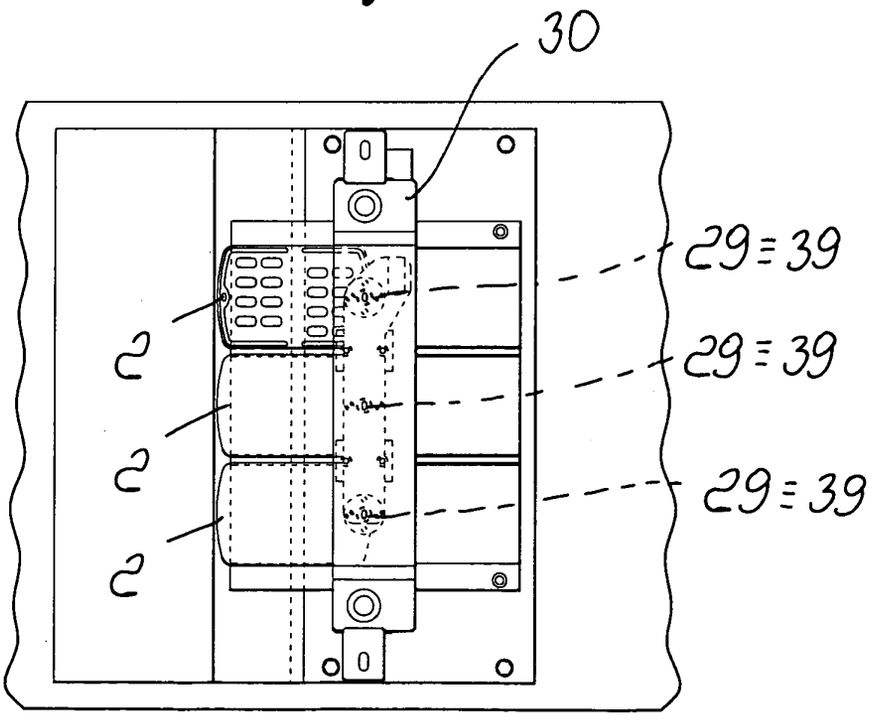

Fig. 11

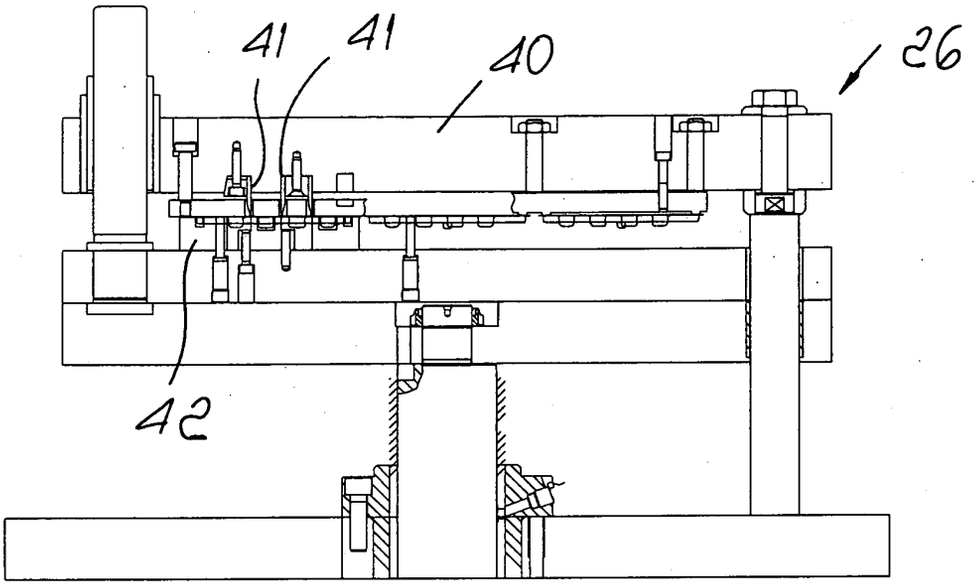

Fig. 12

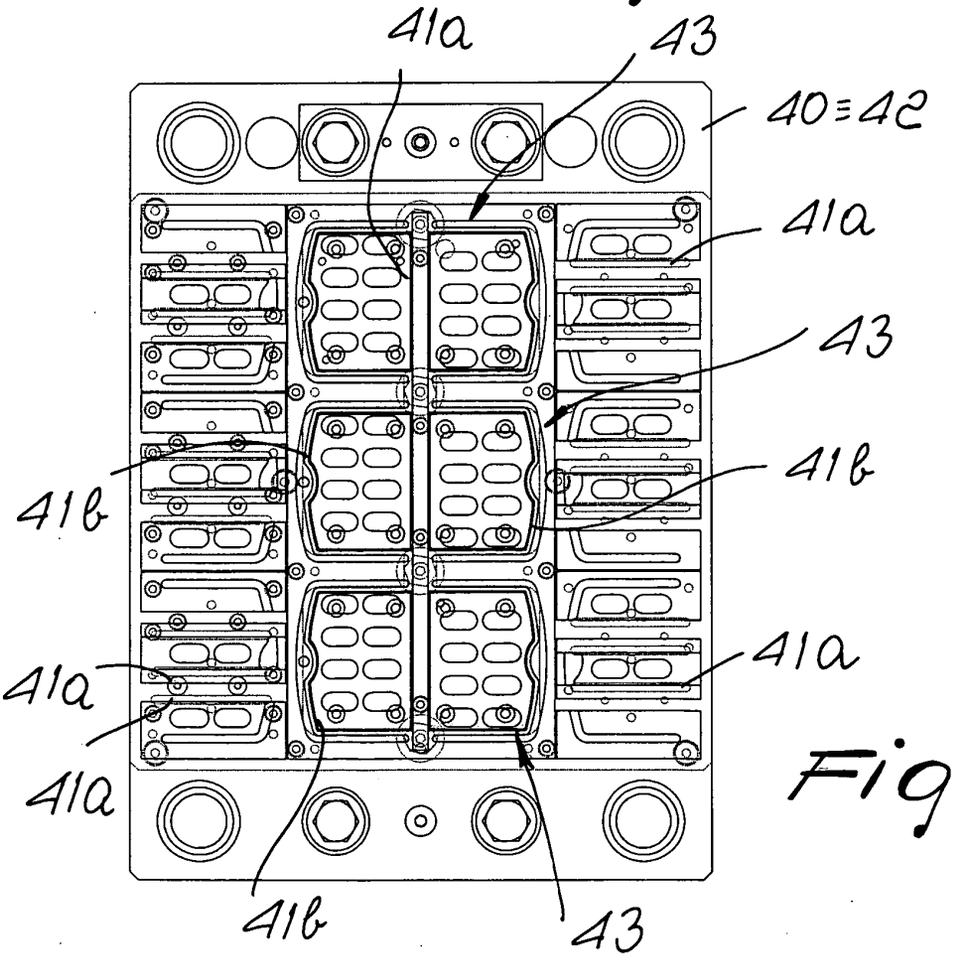

Fig. 13

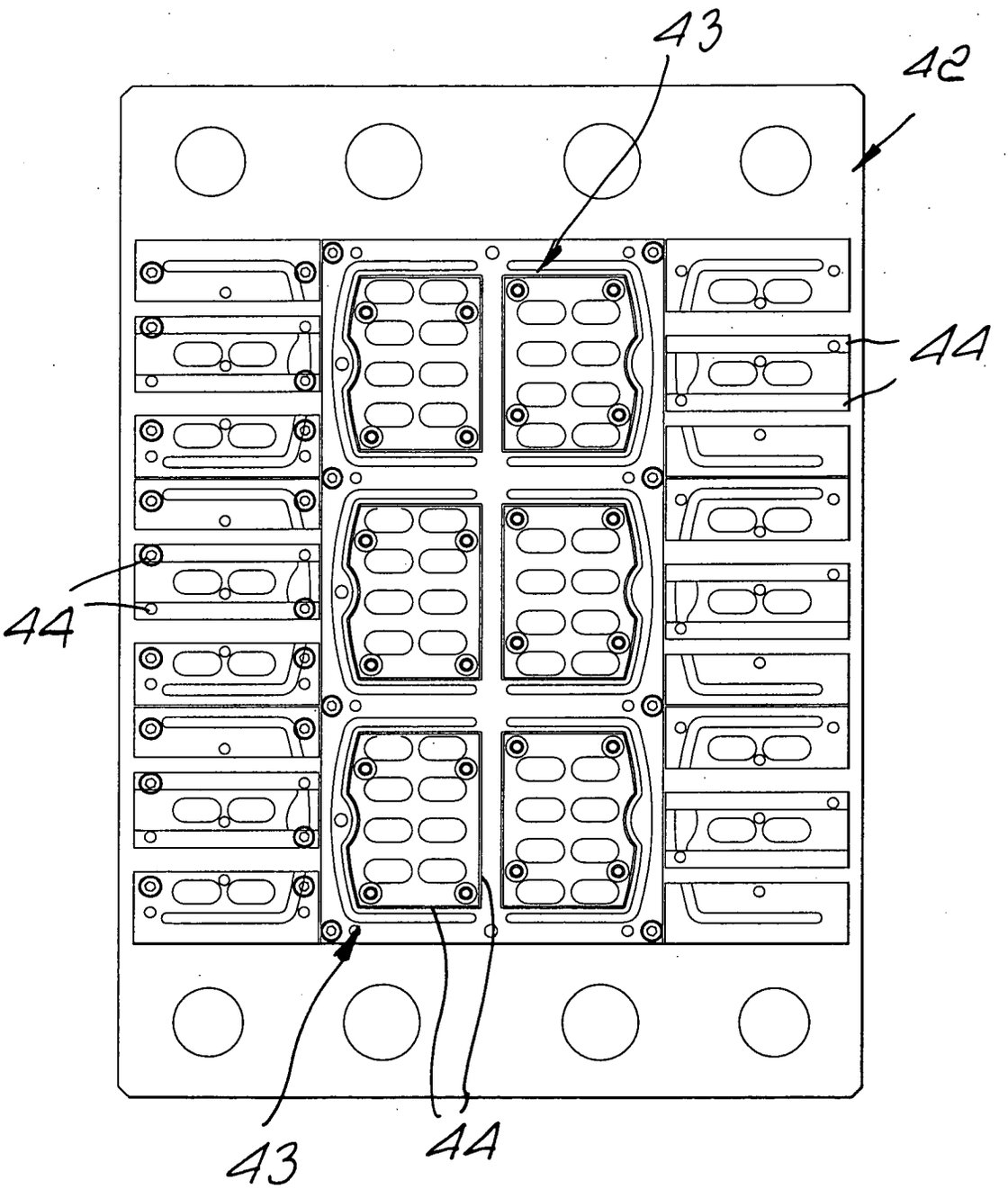

Fig. 14

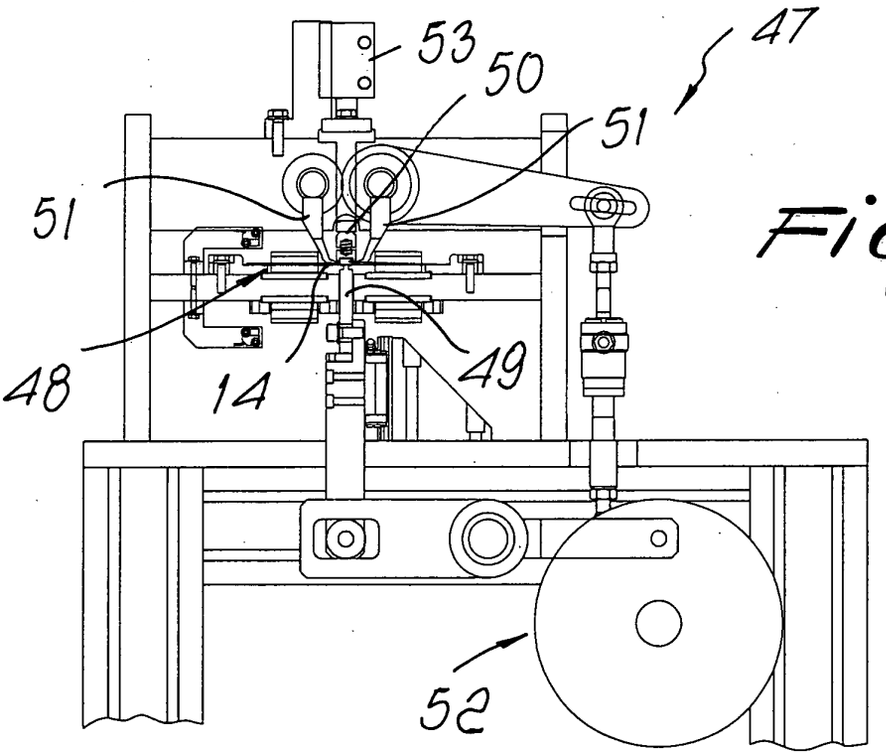

Fig. 15

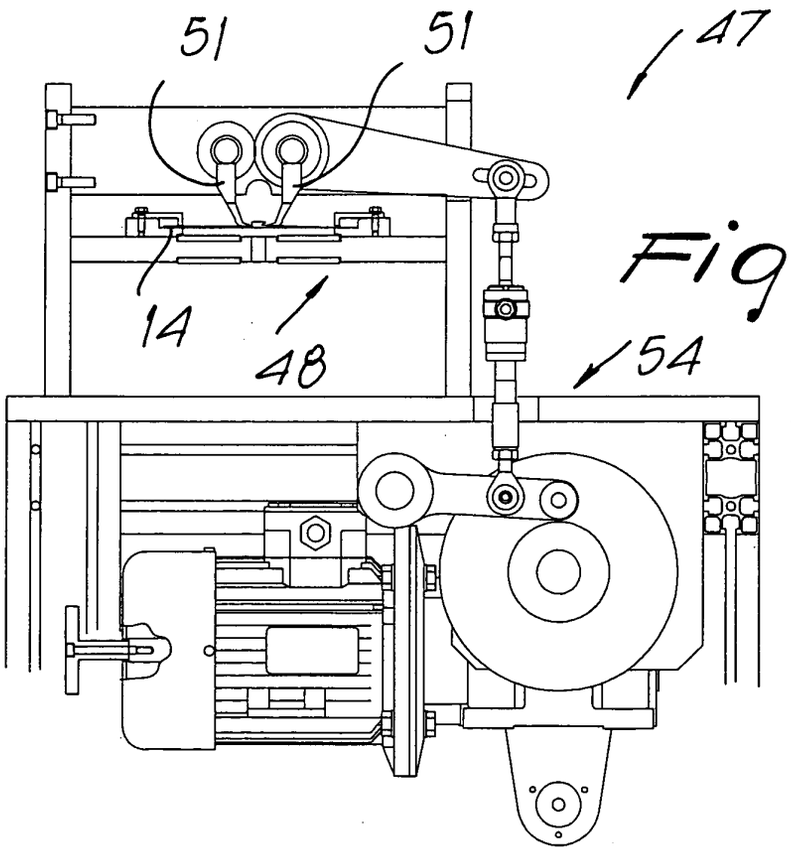

Fig. 16

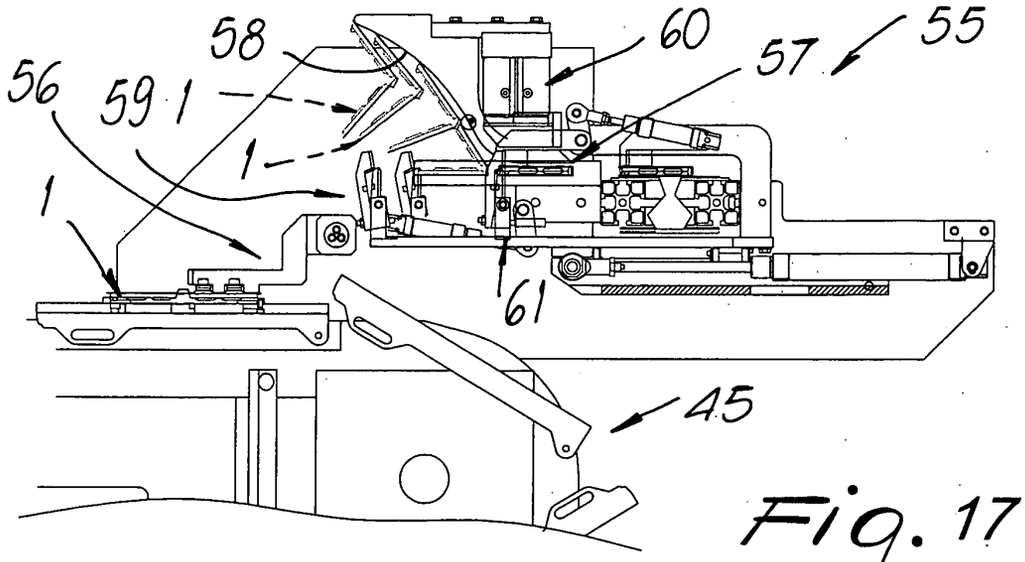

Fig. 17

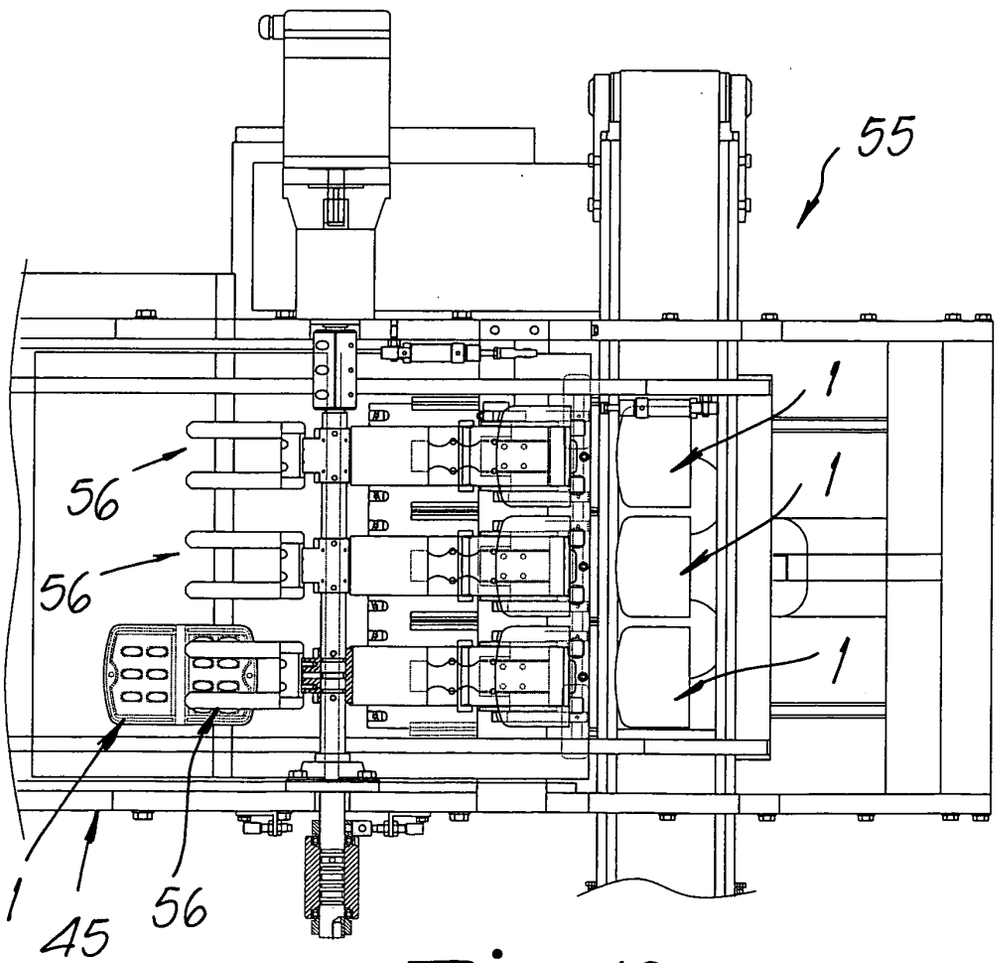

Fig. 18