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(54) **Title**: METHOD AND DEVICE FOR THE COMMISSIONING OF PIECE GOODS

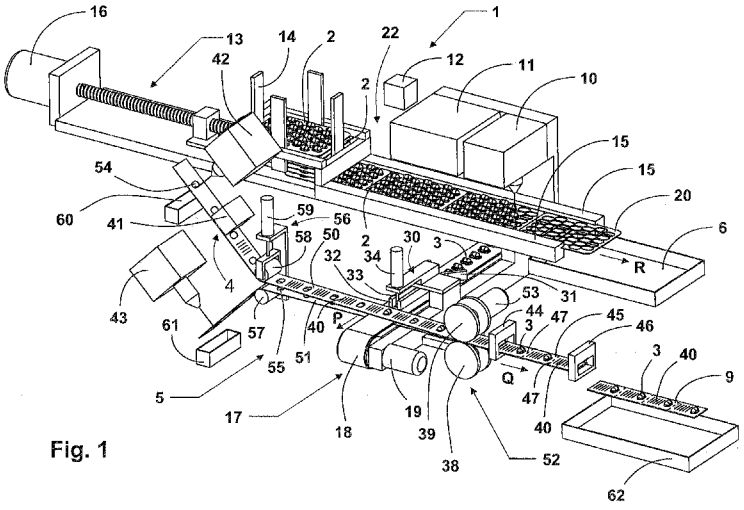

Fig. 1

(57) **Abstract**: Method and device for the commissioning of piece goods from a storage pack (2), wherein a piece goods unit (3) comprises the piece good (7) to be commissioned and a part (8) of the storage pack (2) surrounding the piece good, and wherein a marking (40, 68) is applied to the piece goods unit (3), by which the piece goods unit (3) can be unequivocally identified.

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Method and device for the commissioning of piece goods.

The invention relates to a method and a device for the commissioning of piece goods from a storage pack. The invention also relates to a marked unit and/or a piece goods unit which is formed according to the aforementioned method or which is formed by means of an aforementioned device.

Piece goods, in particular medication such as tablets or pills, are normally sold in storage packs. In the storage packs, so-called blister packs, separate pills or tablets are packed individually and hygienically. In a clinic, in a clinical pharmacy, in a supply pharmacy and/or in other places, medicinal products are taken from the storage pack and placed in a patient bowl, for example. If the medicinal product is not administered immediately there is a risk that it may become contaminated by contact with the surrounding area. There is also a risk that a contact with the surrounding area may result in the decay of the medicinal product.

WO 98/29084 discloses a method and a device for the automatic commissioning of single piece goods wherein the piece good to be commissioned, together with the part of the pack immediately surrounding it, is cut off with a cutting knife from the rest of a blister pack and, packed singly and hygienically, is ejected into a set ready collecting bowl.

Information on the medicinal product is usually printed on the storage pack. As soon as the medicinal product has been separated from the storage pack, this information is no longer available. Consequently the medicinal product may no longer be identifiable and the information on the batch number and use by date, amongst other things, is also lost.

One object of this invention is to provide a method and a device whereby piece goods from a storage pack can be automatically separated without information relating to the piece good being lost.

This object of this invention is achieved by a method for the commissioning of piece goods from a storage pack wherein a piece goods unit, which comprises a piece good to be commissioned and a part of the storage pack surrounding the piece good, is separated from the rest of the storage pack, and wherein a marking is added to the piece goods unit by means of a marking device, as a result of which the piece good is unequivocally identifiable.

This object of this invention is also achieved by a device for the commissioning of piece goods from a storage pack, wherein a piece goods unit, which comprises a piece good to be commissioned and a part of the storage pack surrounding the piece good, is separable from the rest of the storage pack by means of a separating device and wherein the device comprises a marking device whereby a marking for an unequivocal identification relating to the piece good is added to the piece goods unit.

This object is achieved in particular by a method for the commissioning of piece goods from a storage pack, more particularly for the separation and the orderly collecting of piece goods from a storage pack, wherein a piece goods unit, which comprises at least one piece good to be commissioned and a part of the storage pack surrounding and relating to the piece good, is separated from the rest of the storage pack, and wherein a marking is applied to the piece goods unit by a marking device,

as a result of which the at least one piece good of the piece goods unit is unequivocally identifiable.

Since the piece good in the piece goods unit is surrounded by part of the storage pack, contact of the piece good with the surrounding area is guaranteed to be avoided. A separation of the piece good from the storage pack does not therefore have any negative influences on hygiene and/or a use by date. By applying a marking which comprises the required information it is ensured that the piece goods unit carries the information for an unequivocal identification even after the separation from the storage pack. This information may include, for example, a description of the medicinal product, an indication of active ingredients, a use by date, a manufacturer, an origin, a history or similar information. The unequivocal identification may also include, for example, data that are relevant for the destination or other parameters for the piece good.

The marking is applied automatically by a marking device so that mistakes due to human error can be largely eliminated.

In the context of the invention a separate unit of the piece good is considered to be a piece goods unit. This may, for example, be a single pill or tablet. In other cases it is nevertheless also conceivable that two or three or more pills or tablets constitute a piece goods unit, this unit being taken from a larger number. According to the invention commissioning refers to separating and/or orderly collecting something from a greater whole.

According to one embodiment information from the storage pack relating to the piece good is automatically recorded by a recording unit and the marking is applied to the piece goods unit according to the recorded information. The recording unit

comprises, for example, a camera and/or a reading unit enabling a barcode present on the storage pack to be read, for example. The piece good in the storage pack is unequivocally identifiable on the basis of this information. The marking applied to the piece goods unit may in this case correspond to the recorded information in terms of form, language and/or content. According to other embodiments it is conceivable, for example, to record a barcode or the like and link the information to the piece goods unit in the form of readable or comprehensible text as marking.

According to a further development the piece goods unit is connected to at least one belt element for marking. A marking can be applied, in particular printed and/or written, to the belt element. A plurality of piece goods units can be connected to at least one common belt element, the belt element preferably having a perforation between the separate piece goods units so that the piece goods units can easily be separated from each other. A separation is in this case preferably such that a part of the belt element connected to a separate piece goods unit shows the necessary marking. A belt element with thereto attached piece goods units can, for example, be rolled up and then made available to a department of a hospital or the like.

A piece goods unit or a plurality of piece goods units is preferably received in sandwich fashion between two belt elements running parallel to each other and more particularly received between the belt elements. The separate belt elements which form part of a packing device may in this case each have an adhesive layer or the like on the sides facing each other so that a connection of the separate belt elements to each other and/or a connection of the belt elements to the piece goods unit is easily achievable.

According to a further embodiment a recess, in particular a through opening, is made in the at least one belt element for the at least one piece goods unit. The piece goods unit can be inserted in the recess of the belt element, and more particularly can extend through the recess. In this case a connection of the piece goods unit to the belt element is possible without the belt element getting folds or similar. Moreover, a particularly reliable connection is possible because the belt element lies tightly against the piece goods unit and there are no seams or the like present between the belt element and the piece goods unit after the connecting.

According to a further embodiment provision is made for piece goods units from different storage packs to be connected to at least one common belt element, wherein parts of the belt element are each marked according to the associated piece goods unit. In this case piece goods units may, according to a usual form of supply, be attached to a common belt element such that the belt element preferably has perforations or the like so that the piece goods units can be individually separated from the belt element.

According to one embodiment the marking is applied to the piece goods unit itself, more particularly by means of a laser device.

According to an advantageous embodiment the piece goods unit is separated from the storage pack by cutting, in particular by cutting by means of a laser beam, by means of an air jet, by punching and/or by cutting with a knife blade. With a laser beam and/or an air jet an extremely accurate separation of the separate piece goods unit is possible. In particular, if cutting is carried out with an air jet it is possible to separate the piece

goods unit from the storage pack so that a part of the storage pack separated with the piece goods unit is minimised. Due to possible heating up of the piece good when using a laser beam, it is recommended that a certain distance between the piece good to be separated and a line of separation be taken into consideration.

This object of this invention is achieved in particular by a device for the commissioning of piece goods from a storage pack, wherein a piece goods unit, which comprises at least the piece good to be commissioned and a part of the storage pack surrounding and belonging to the piece good, is separable from the rest of the storage pack by means of a separating device, and wherein the device comprises a marking device by which a marking for an unequivocal identification of the piece goods unit may be added to the piece goods unit. The device allows an automatic separation of a piece good, for example of separate pills or tablets. It is possible, by means of the marking device, to apply a marking to the piece goods units, by which each piece goods unit, and hence each piece good, may be unequivocally identified also after separation from the storage pack.

According to one embodiment the device comprises a recording unit by which information on the piece good, in particular the characteristics and/or a position of the piece good in the storage pack may be registered from the storage pack. The registering unit comprises, for example, a reading device for reading a barcode and/or an RFID chip and/or another marking present on the storage pack and/or on a packing enclosing the storage pack. An arrangement of the piece goods in a storage pack, in particular a blister pack, has not been standardised. An accurate positioning of the piece good in the storage pack is

therefore preferably recorded by means of a camera or the like, thereby enabling a piece goods unit to be separated from the storage pack, without the piece good coming into contact with the surrounding area and/or without the piece good being damaged.

According to an advantageous embodiment the device for commissioning comprises a packing device with a fixing device enabling the piece goods unit to be connected to at least one belt element. In this case the belt element may comprise the marking. In this case at least one belt element provided with a marking is connectable to a piece goods unit. The packing device comprises a fixing device which, for example, performs as a glueing device, stapling device, welding device and/or the like, thus enabling the separated piece goods unit to be connected to a belt element. The fixing device is preferably designed so that a plurality of separated piece goods units can be connected to at least one common belt element. The belt element with piece goods units fitted to it is available, for example, for supplying a department of a hospital or the like. According to one embodiment a perforation or another separating possibility can be provided on the belt element, thus enabling the piece goods units to be easily separated from the belt element.

According to an advantageous embodiment the packing device comprises guiding elements for the guidance of at least two belt elements, wherein the piece goods unit or piece goods units can be arranged in sandwich fashion between the belt elements. Rolls, rollers, rigid deflecting elements or the like serve as guiding elements, for example, thus enabling the belt elements to be guided in such a manner that the piece goods units are received between the belt elements. According to one

possible embodiment the belt elements are unwound from a storage roll provided with a belt or the like and fed to a receiving point for receiving the piece goods units. Depending on how the piece goods units are arranged or fitted between the belt elements, the belt elements can be rewound onto a second roll or the like together with the piece goods units.

According to one embodiment the commissioning device comprises a cutting device for producing recesses in the at least one belt element for the piece goods unit or piece goods units to be received. A laser cutting device, an air jet cutting device, shears, a punch or the like may, for example, be used as the cutting device. The shape and/or size of the recesses is in this case preferably adapted to the piece goods unit or piece goods units to be received.

According to a further embodiment the commissioning device comprises a marking device by which inscription elements, in the form of information, can be written, printed, engraved, lasered or the like onto the at least one belt element. The inscription elements are preferably designed so that information in text form can be applied to the belt element so that information for use, for example for administering a medicinal product, is easily and quickly understandable.

According to a further embodiment provision is made for the separating device for separating the piece goods unit from the rest of the storage pack to be designed as a laser cutting device, an air jet cutting device, shears, a punch or the like. It is possible, by means of such a device, to carry out a separation and an orderly collection of the piece goods fully automatically. In this case information relating to the piece good is preferably recorded by the registering device and this information is fed to

the separating device, so that separation according to the recorded information is possible. The piece good thus separated is connected by means of a fixing device to the belt elements and is, in particular, received between the belt elements.

For feeding or conveying the storage pack and/or the separated piece goods unit or piece goods units, the device preferably comprises conveying devices, for example conveyor belts or the like.

According to a further embodiment an aforementioned device for the commissioning of piece goods comprises a control unit which is programmable for carrying out the aforementioned method for the commissioning of piece goods.

It is an object of this invention to provide a marked unit for piece goods and a method so that information relating to the piece good can be added.

This object of this invention is realised by a marked unit which comprises at least one belt element, at least one piece goods unit which is fixed by means of a surrounding part of a piece good to the belt element, and at least one marking which is associated with the at least one piece good of the piece goods unit.

This object is achieved, in particular, by a marked unit which comprises at least one belt element, a piece goods unit which is fixed with a surrounding part of the piece good to the belt element, and a marking which is associated with the piece good of the piece goods unit. In this case the marking for the piece good of the piece goods unit can be applied to a belt element, preferably close to the piece good of the piece goods unit. According to a variant the marking for the piece good of the piece goods unit can in this case be applied to the piece goods

unit. Here the marking which is applied to the piece goods unit can be applied by means of a laser device.

According to a preferred embodiment a marked unit comprises two connected belt elements, a piece goods unit which is fixed between the belt elements with a surrounding part of the piece good and a marking which relates to the piece good of the piece goods unit.

The marked unit can be formed according to a method in which a plurality of separate piece goods units are connected to at least one belt element by a packing device and a fixing device for forming a marked unit.

According to one embodiment the marked unit can be formed by means of an aforementioned device for the commissioning of piece goods. According to one embodiment the marked unit can be formed according to the aforementioned method for the commissioning of piece goods. A marked unit can also be formed by connecting a plurality of separate piece goods units to at least one belt element by a packing device and a fixing device.

It is an object of this invention to provide a piece goods unit and a method to enable information relating to the piece good to be added.

This object of this invention is achieved by a piece goods unit which comprises at least one piece good and a part surrounding and relating to at least one piece good, the piece goods unit comprising a marking which relates to the at least one piece good of the piece goods unit.

This object is realised in particular by a piece goods unit which comprises a piece good and a part surrounding the piece good, wherein the piece goods unit comprises a marking which

relates to the at least one piece good of the piece goods unit. According to one embodiment the piece goods unit can be fixed in the proximity of a belt element. According to one embodiment the piece goods unit can be fixed between two belt elements in the proximity of the part which surrounds the piece good.

The piece goods unit can be formed according to a method for marking a piece goods unit, wherein a marking is applied by a laser device to the piece goods unit.

According to one embodiment the marking which is applied to the piece goods unit is applied by a laser device. According to one embodiment a piece goods unit can be marked according to a method in which the marking is applied to the piece goods unit by means of a laser device.

According to one embodiment of a method for marking a piece goods unit the method comprises the marking of a piece goods unit which can be used in a device for the commissioning of piece goods. According to one embodiment the marking is in this case applied to the piece goods unit by a laser device.

Further characteristics, advantages and advantageous embodiments of the invention appear from the dependent claims and from the following description of embodiments of the invention, which are represented schematically in the drawings. The same references are used for the same or comparable parts in the drawings. Characteristics described or represented as part of an embodiment may equally be used in another embodiment to create a further embodiment of the invention.

Figure 1 shows a device according to the invention for the commissioning of piece goods from a storage pack in a perspective view.

Figure 2 shows the device according to figure 1 in a top view.

Figure 3 shows schematically and partially a view along arrow F3 in figure 2 of a variant conveying device for piece goods units.

Figure 4 shows, enlarged, the section denoted by F4 in figure 3.

Figure 5 shows schematically a view along arrow F5 in figure 2 of a packing device with a guiding device and a fixing device.

Figure 6 shows, enlarged, the section denoted by F6 in figure 5.

Figure 7 shows a storage pack with possible lines of separation for the separation of piece goods units.

Figure 8 shows a number of piece goods units which have been removed from a storage pack.

Figure 9 shows an empty storage pack from which piece goods units have been removed.

Figure 10 shows a longitudinal section with a number of piece goods units, wherein the piece goods units are fitted in a sandwich manner between two belt elements.

Figure 11 shows, enlarged, the section denoted by F11 in figure 10.

Figure 12 shows a top view of a number of marked units, each with one piece goods unit.

Figure 13 shows a perspective view of a number of marked units each with one single piece goods unit.

Figure 14 shows a perspective view of a marked unit with one single piece goods unit.

Figure 15 shows a variant embodiment of a device according to the invention in a top view according to figure 2.

Figure 16 shows an alternative embodiment of a device according to figure 1 in a perspective view.

Figure 17 shows a further alternative embodiment of a device in a perspective view according to figure 1.

Figure 18 shows a top view of a marked unit with one single piece goods unit.

Figure 19 shows a top view of a further marked unit with one single piece goods unit.

Figure 20 shows a variant of the embodiment of figure 14.

Figure 21 shows a further variant of the embodiment of figure 14.

Figure 22 shows a marked unit with two piece goods units.

Figure 23 shows a marked unit with three piece goods units.

Figure 24 shows a marked unit with one piece goods unit.

Figure 25 shows a marked unit with a plurality of piece goods units and associated markings.

Figure 26 shows a further marked unit with a plurality of piece goods units and associated markings.

Figures 1 to 4 show schematically a device 1 for the commissioning of piece goods which are supplied in storage packs 2. Storage packs 2 are so-called blister packs in which the piece goods are packed separately with hygiene assured. The device 1 comprises a separating device 10, by which piece goods units 3 are separable from the rest of the storage pack 2. The piece goods units 3 each comprise the piece good to be commissioned, in this case one single pill, and a part of storage pack 2 enclosing the piece good. The proposed separating device 10 is, for example, an air jet separating device, wherein the piece goods units 3 are cut out by means of an air jet. Here a

directed air jet is used which engages locally in the proximity of the storage pack 2. The separating device 10 can be controlled by a control unit 12 according to information from a registering device 11 which is able to interact with the control unit 12.

A marking 40 is added to the cut-out piece goods units 3 according to the invention. For this purpose the device 1 shown comprises a marking device 4 by which for each of piece goods units 3 a marking 40 is applicable for an unequivocal identification. The proposed device 1 for the commissioning of piece goods units 3 comprising a marking device 4 also comprises a packing device 5 which is designed so that the piece goods units 3 can be fitted between two belt elements 50, 51 in sandwich fashion. Both belt elements 50, 51 are connected to each other by means of a fixing device 52, more particularly they are connected together to form a string 45, wherein the fixing device 52, for example, welds together the belt elements 50, 51 from a foil material, glues together self-adhesive belt elements or the like. The fixing means can of course be suitably selected and are selected, for example, so that they can be combined or can be assembled with the piece goods units with which they are to interact. The fixing device 52 according to figure 1 comprises two fixing rolls 38 and 39, wherein the fixing roll 39 is driven by a motor 53 controllable by a control unit 12. In this case the string 45 and the belt elements 50, 51 are driven in transport direction Q by the fixing rolls 38 and 39.

For an unequivocal identification of the separate piece goods units 3 a marking 40, designed as a text element according to the proposed embodiment, is preferablyapplied to the one belt element 50 by means of a marking device 4, which, for example, comprises a laser printing device 41. The marking

device 4 may also take the form of a printer. The invention allows to the characteristics of marking 40 to be applied to be determined, and hence also of the applied marking 40, by control device 12 according to the characteristics of the associated piece goods unit 3 with piece good 7. In this case the control device 12 can make use of information from the registering device 11 and/or of information from the separating device 10 in order to determine the characteristics of the associated piece goods unit 3 and the associated piece good 7.

For this purpose the control device 12 can also incorporate a memory with a file of characteristics of the piece good 7 and associated characteristics which are to be added to piece goods unit 3 by means of marking device 4. These associated characteristics may, for example, be entered manually in the control unit 12 or processed by the control unit 12. These associated characteristics may, for example be related to the destination of the piece good 7, and more particularly, for example, to the patient, the patient's room and/or the department where the patient is located in the hospital. The control device 12 may form part of a computer.

The proposed device 1 further comprises cutting devices 42 and 43 by which the respective recesses 54 and 55 are made in belt elements 50 and 51 for the piece goods units 3. The cutting devices 42, 43 consist, for example, of an air jet cutting device or a laser cutting device. A thereby produced waste material is collected by a waste reservoir 60, 61 respectively.

The belt elements 50, 51 are guided by suitable positioning devices 56 which incorporate rolls 57, 68 and at least one actuator 59. The actuator 59 shown can interact with the roll 58 for bending the belt element 50 and consists, for example, of an

actuator controlled by a control unit 12, more particularly a pneumatically operated actuator.

The device 1 also comprises a cutting device 46, by which piece goods units 3, which form part of a marked unit 9 with markings 40 applied to it, can be separated from a string 45 which comprises belt elements 50, 51 attached to one another. The cutting device 46 can be controlled by a control unit 12. According to the present embodiment a separation follows each time after four piece goods units 3. The piece goods units 3 can be collected in a reservoir 62. A separation can of course take place after each piece goods unit or after a different number of piece goods units.

According to this embodiment a perforation or another material weakening is produced by a first cutting device 44 or the like, because of which piece goods units 3 are separable from the string 45 with belt elements 50, 51 as necessary. For this purpose the cutting device 44 may, for example, comprise a toothed knife with which perforations can be applied. According to this embodiment a second cutting device 46, as shown in figure 1, can completely cut through the string 45, for example after every four piece goods units 3. In this case the cutting device 44 can only apply a line of separation 47 formed by perforations after each piece goods unit 3 installed between them.

Device 1 comprises a registering device 11 by which information relating to the piece good present in storage pack 2 is recordable. Information to be recorded includes, for example, the characteristics of the piece good and/or a positioning of the piece good in storage pack 2. This information is processed and thus can be made available, for example, to the separating

device 10 and/or to the marking device 4. According to the proposed embodiment a control device 12 is provided for this purpose making the process on the device 1 controllable. The data transmission between separate stations of the device 1 takes place, for example, along conductors not shown and/or wirelessly.

The device 1 further comprises various transport devices by which storage packs 2 and the separate piece goods units 3 are fed to the respective devices of the device 1. A feed device 22 with a screw conveying device is provided for transporting storage packs 2 , wherein storage packs 2, which are stacked on top of one another in a magazine element 14, are guided to the registering device 11 and to the separating device 10. The storage packs 2 are guided in transport direction R by lateral guide rails 15 of feed device 22. The distance between the guide rails 15 can be adapted to the dimensions of the storage packs 2. A driving of the screw conveying device 13 is performed by a motor 16, which can be controlled by the control unit 12. Empty storage packs 20, from which the piece goods units 3 have been separated, are collected in a waste reservoir 6.

The device 1 further comprises a transport device 17 which comprises a conveyor belt 18 for transporting the piece goods units 3 in transport direction P to the packing device 5 provided with belt elements 50, 51. A driving of the conveyor belt 18 is performed by a motor 19 controllable by a control unit 12. To ensure a corresponding alignment of piece goods units 3 and the recesses 54, 55 provided in belt elements 50, 51, an aligning device 30 is provided with guiding elements 31, 32 and a stopper 33. The stopper 33 is driven by an actuator 34 which allows one piece goods unit 3 at a time suitably to be released to enable

this piece goods unit 3 to be clamped between belt elements 50, 51, wherein actuator 34 can be controlled by a control unit 12.

Figure 2 shows a top view of the device 1 according to figure 1, an alignment of the piece goods units 3 by guiding elements 31, 32 being clearly visible in figure 2, more particularly that the piece goods units 3 are rotated almost 90° in the proximity of the aligning device 30 and fit with limited play between guiding elements 31, 32. The distance between the guiding elements 31, 32 may also be adjustable and may be adapted to the piece goods units 3 to be guided.

Figure 3 shows schematically transport device 17 with a conveyor belt 18 and piece goods units 3 arranged on it. The conveyor belt 18 is also guided by bending rolls 35 and 36, the bending roll 35 being driven by motor 19. Here it can be seen that the belt element 51 runs underneath the conveyor belt 18, whilst the belt element 50 runs above the conveyor belt 18. The belt element 50 can receive a piece goods unit 3 which has been released at a suitable moment by the stopper 33. In the alternative embodiment shown in figures 3 and 4 a stop 37 is also fitted to the aligning device 30, which stop 37 is of a thin design, which enables a piece goods unit 3 to be positioned in the transport direction of the conveyor belt 18 relative to the belt element 50. In the embodiment shown in figures 1 and 2 such a stop 37 is not provided and the function of such a stop 37 can be performed by for example controlling the motor 19 stepwise and suitably, possibly by means of a positioning sensor, so that piece goods unit 3 can be positioned in the proximity of the belt elements 50, 51.

As shown in more detail in figure 4, the piece goods units 3 each time show a part 8 of the storage pack 2 surrounding the

commissioned piece good 7, wherein the piece good 7 in this part 8 is packed reliably hygienically between an upper part 63 and a lower part 64, which are joined together in the proximity of the part 8. The piece goods units 3 are received in sandwich fashion between the belt elements 50, 51. For this purpose the piece goods unit 3 is placed in the recess 54 produced as a through opening.

In the embodiment shown in figure 3 a device 69 is installed to feed the separated piece goods units 3 to the conveyor belt 18. This device 69 comprises a support plate 70 which is rotatably mounted about an axis 71, and which can be controlled by an actuator 72. During the time of separation of the piece goods units 3 the support plate 70 is mounted at a short distance from the storage pack 20, so that the separated piece goods unit 3 can be caught. Amongst other things this prevents the piece goods unit 3 from being incorrectly separated, from being suspended at an extremely oblique angle during separation and/or from remaining suspended in the storage pack 20 after separation. When the piece goods unit 3 has been separated from the storage pack 20 and rests on the support plate 70, the support plate 70 is rotated about the axis 71 by the actuator 72, for example an electric and/or linear motor, and then moved towards the conveyor belt 18 so that the separated piece goods unit 3 is fed to conveyor belt 18.

Figure 5 shows schematically a section of the packing device 5. In this case the belt elements 50, 51 are unwound from storage rolls 48, 49 or the like, respectively. As illustrated in figure 1, recesses 54, 55 can be produced in the belt elements 50, 51 by cutting devices 42, 43 respectively. The dimensions and shape of the recesses 54, 55 can be determined by the

control device 12 as a function of the dimensions and shape of the piece goods unit 3 and/or the piece good 7, wherein the control unit 12 can suitably control the cutting devices 42, 43. According to other embodiments corresponding recesses 54, 55 are previously produced in the belt elements 50, 51 stored on storage rolls 48, 49. The belt element 51 is in this case located underneath the conveyor belt 18, whilst the belt element 50 is located above the conveyor belt 18 and allows the piece goods unit 3 to be received.

According to the embodiment presented in figures 4 and 6 recesses 54, 55 are provided in both belt elements 50, 51. Recess 55 allows the piece good 7 to be removed from the piece goods unit 3 along the recess 55. According to alternative embodiments a recess 54, 55 is only provided in one of the belt elements 50, 51. According to a further variant a recess 54 can be provided in the belt element 50 as a through opening for the piece goods unit 3, whilst a weakening is provided in the belt element 51 at points in the belt element 51 opposite the piece good 7 in order to facilitate the removal of the piece good 7 through the belt element 51.

In order to facilitate the receiving of the piece goods units 3 between the belt elements 50, 51, the belt element 50 can be controlled with the positioning device 56 in the embodiment represented in figure 5. The piece goods unit 3 can easily be placed underneath the belt element 50, whilst the roll 58 of the positioning device 56 is located in the position represented by a dashed line, whilst the piece goods unit 3 is received through a recess 54 in the belt element 50, whilst the roll 58 of the positioning device 56 is located in the position represented by a

solid line. This allows the piece goods units 3 to be received easily and in sandwich fashion between the belt elements 50, 51.

The piece goods units 3 are separated from the rest of storage packs 2 by means of a separating device 10 according to figure 1. Figure 7 shows schematically possible lines of separation 21 along which the piece goods units 3 may conceivably be cut out. The choice of a suitable line of separation 21 depends in this case on the characteristics of storage pack 2, on the piece goods 7 arranged or ordered in it and/or on a desired method of separation. It is clear that it can be ensured, during a separation, that any corners of the cut-out piece goods units 3 are slightly rounded to enable an easy transport. In this case the piece good 7 should indeed be surrounded by an adequately surrounding part 8. Of course, other lines of separation are also possible, for example lines of separation where the entire storage pack 2 forms part of piece goods units 3 after cutting, which means that there no empty storage pack 20 arises. Figure 8 shows schematically a number of piece goods units 3 which have been removed from the storage pack 2 in figure 7, whilst figure 9 shows the associated empty storage pack 20.

Figures 10 and 11 show schematically a section of a side view of piece goods units 3 which have been received in sandwich fashion between two belt elements 50, 51. The piece goods unit 3 comprises an upper part 63 which is, for example, manufactured from a plastic material and a lower part 64 which is, for example, manufactured from foil and a piece good 7, the top part 63 and bottom part 64 being attached to one another in the proximity of the surrounding part 8. The belt elements 50, 51 are connected to one another, for example are welded and/or

glued together. The piece goods units 3 are received between two common belt elements 50, 51, belt elements 50, 51 having a perforation 54, 55 in the proximity of the separate piece goods units 3. As can be seen, the piece goods units 3 are clamped between belt elements 50, 51 in the proximity of their part 8, that surrounds the piece goods 7, wherein the surrounding part 8 packs the piece good 7 hygienically and securely.

In the top view in figure 12 it can be seen that the belt elements 50, 51 together with the piece goods units 3 received between belt elements 50, 51, form marked units 9. Each marked unit 9 is here marked with a marking 40 in the proximity of each piece goods unit 3. Here the whole also comprises lines of separation 47 between which a marking 40 and a piece goods unit 3 are applied. From the whole of figures 12 and 13 a number of marked units 9 can be formed, each of which comprises at least one piece goods unit 3 and at least one associated marking 40. If a separation takes place in the proximity of each line of separation 47, four marked units can be formed or separated, each of which comprises one piece goods unit 3 and one associated marking 40, as shown in figure 14.

If different piece goods units 3 are received in a marked unit 9, a marking 40 can be applied in the proximity of each piece goods unit 3. In this case it is advantageous for the marking 40 also to comprise lines of separation 47, so that it becomes clear which marking 40 relates to which piece goods unit 3 with associated piece good 7.

Figure 15 shows schematically an alternative embodiment in which the same references are used for the same parts as in the embodiment shown in figure 2, but no description is given of these parts. In this case, in addition to the feed device 22, other

feed devices 23, 24 and 25 are provided to enable piece goods units 3, 26, 27 and 28, which derive from feed devices 22, 23, 24 and 25 respectively, to be placed on the conveyor belt 18 so that they can be fed to belt elements 50, 51 of packing device 5. Here it is both conceivable that the same type of piece good is fed by all feed devices 22, 23, 24 or 25, and that a different type of piece good, for example, is fed by some of feed devices 22, 23, 24 or 25. The control unit 12 may be common to all the feed devices.

In the embodiment shown in figure 15 different types of marked units 9 are formed. For example, figure 15 shows a marked unit 9 with only one single piece goods unit 3 and a marked unit 9, with, for example, piece goods units 3, 26, 27 and/or 28, a marking 40 being applied, for example, in the proximity of each piece goods unit 3, 26, 27 and/or 28. This is, for example, applicable, if a certain patient only requires the medicinal product from piece goods unit 3, whilst another patient requires the medicinal products from piece goods units 3, 26, 27 and/or 28. In this case, for example, the name of the patient can also be included in the marking 40. Of course other combinations are also possible. Here the cutting devices 44 and 46 can be suitably controlled by the control device 12.

If a different type of piece good is fed from the different feed devices 22, 23, 24 or 25, the marking device 4 is actuated by the control device 12 in such a manner that a corresponding marking 40 is each time applied to an associated part of a belt element 50. This means that the control device 12 controls the marking device 4 in such a manner that a marking 40 is applied which relates to piece goods unit 3, 26, 27 or 28, which is arranged in the associated marked unit 9, more particularly in

the proximity of a part of a belt element which is arranged near the associated piece goods unit 3, 26, 27 or 28. As shown in figure 15, the marking device 4 is in this case installed between the transport device 17 and the fixing device 52.

In the case of a defect, for example a power failure, the device 1 should be restarted. This should preferably take place with a limited spoilage of unidentifiable piece goods units. If a recording device 73 is installed in the proximity of the aligning device 30, which can determine what type of piece goods unit 3, 26, 27 or 28 is present, the spoilage of piece goods units can be limited in the event of a defect. In order to be able to identify more easily the piece goods units present in the proximity of the recording device 73, provision can be made for a piece goods unit 3, 26, 27, 28 from a certain feed device 22, 23, 24, 25 to have its own shape, more particularly a shape which has been determined by the associated separating device 10.

The marked unit 9, shown in figures 11 and 14, is formed by a marked unit 9, wherein a piece goods unit 3 is individually separated. The marked unit 9 comprises two connected sections of a belt element 50 and 51, a piece goods unit 3 which is fixed with the surrounding part 8 of the piece good 7 between belt elements 50, 51, and a marking 40, which relates to the piece good 7. In this case the piece good 7 remains separated from the surrounding area via piece goods unit 3, more particularly via the upper part 63 and the lower part 64, which are connected together in the proximity of the surrounding part 8 of piece goods unit 3. A marked unit 9 allows a marking 40 to be added by a marking device 4 to a piece goods unit 3, 26, 27, 28. In this case the marking device 4 is controlled by the control device 12 of the device 1 according to the invention.

Figure 16 shows schematically a further embodiment of a device 1 according to the invention, which comprises a feed device 22. For the same parts of the embodiment in figure 1 the same references are used, but there is no description of these parts. In this case provision is additionally made for piece goods units 66 to be placed on the conveyor belt 18 by a manual feed device 80. The piece goods units 66 can in this case correspond to the piece goods units 3 or deviate therefrom either in terms of their characteristics or in terms of their size. The piece goods units 66 may comprise a piece good 7 and a part 8 surrounding the piece good. In the embodiment in figure 16 the marking device 4 is arranged in the proximity of the frame 65 of transport device 17. In this case the marking device 4 can, for example, take the formof a printer 29 which is suitably controlled by the control unit 12 in order to apply the required information as marking 40 to the belt element 50.

In this embodiment the cutting device 46 can, for example, both produce perforations and cut completely through the belt elements 50, 51, so that the cutting device 46 can also perform the function of the cutting device 44 in figure 1. For example, if the cutting device 46 can also produce perforations, it is advantageous that the cutting device 46 be controlled so that the perforations are produced in the proximity of the line of separation 47, which line of separation 47 can also be applied with marking device 4. This allows the piece goods units 3 to be used as part of a marked unit 9. For this purpose the cutting device 46 may, for example, comprise a toothed knife 44 which is moved along a limited course by an actuator to apply perforations, and which is moved along its full course by the actuator for cutting.

In the embodiment in figure 17 the separating device 10 also acts as a marking device 4. In this case the separating device 10 and hence also the marking device 4 comprise, for example, a laser device 67 which is both able to carry out the separation of the piece goods units 3 from storage packs 2 and the application of a marking 68 on piece goods units 3 themselves. A marked unit 9 can also be formed with such a piece goods unit 3 by means of a packing device 5. A piece goods unit 3 provided with a marking 68 which is applied by means of a laser device 67 and which forms part of a marked unit 9 is shown in figure 18. In the case of this marked unit 9 the marking 68 is applied, for example, to the upper part 63 of piece goods unit 3. Such marking 68 comprises, for example, a barcode or a normal text. A marking 68 applied with a laser device 67 is possible, for example, if the upper part 63 of piece goods unit 3 is manufactured from a synthetic material, for example a polymer or plastic, which enables markings 68 to be applied with a laser beam from the laser device 67. It is clear that the power or strength of the laser beam is in this case suitably adjusted so that a marking 68 can be applied to the piece goods unit 3 without cutting through and/or damaging the piece goods unit 3.

Of course, as shown in figure 19, it is also possible, for example, for a marking 40 to be applied to the piece goods unit 9 in the proximity of the belt element 50, in addition to a marking 68, as shown in figure 18, in a similar fashion to the exemplary embodiment in figure 1 or 14, for example. Both markings 40, 68 can comprise the same information, overlapping information or different information. If both markings 40, 68 comprise an overlapping information, a check can also be made

for the correctness of markings 40 and 68. To form a piece goods unit 9 as shown in figure 19, use can be made of a device 1, as shown in figure 16, with the provision of a number of marking devices 4, more particularly a marking device 4 with a printer 29 and a marking device 4 with a laser device 67.

A marking 68 which is applied with a laser device 67, as shown in figure 17, can also be used to interact with a recording device 73 as shown in figure 15. This allows an additional check to be made on the piece goods units, more particularly on the sequence or presence of them. This also allows the number of piece goods units and/or the number of different piece goods units to be determined which are to be fixed with the fixing device 52.

A recording device 73, as shown in Figure 15, may also allow the quality of a line of separation 21 of a piece goods unit to be determined. If this quality is not acceptable, the piece goods unit concerned can be discharged via the conveyor belt 18 to a waste holder 74.

Figure 20 shows a unit 9 where a piece goods unit 3 is connected to the underside of a belt element 50 in the proximity of the surrounding part 8 of the piece goods unit 3 and extends through the belt element 50 in the proximity of the recess 54, a marking 40 being applied to belt element 50. Figure 21 shows a unit 9 where a piece goods unit 3 is connected with the surrounding part 8 of piece goods unit 3 to the top of a belt element 51, and where a marking 40 is applied to the belt element 50. According to an embodiment not shown, a marking 68 can also be applied to the piece goods unit 3 in the embodiments shown in figures 20 and 21. The aforementioned

belt elements 50, 51 can, for example, be formed by a thin plate.

According to a variant such as that shown in figure 22, a marked unit 9 can be provided with two piece goods units 3 and with one single associated marking 40, which relates to the piece good 7 of each piece goods unit 3. According to a further variant such as that shown in figure 23 a marked unit 9 can be provided with three piece goods units 3 and one single associated marking 40, relating to the piece good 7 of each piece goods unit 3. In this case each piece goods unit 3 comprises, for example, the same type of piece good 7.

According to a variant such as that shown in figure 24, the marked unit 9 can also be provided with an opening 79 which allows the marked unit 9 to be suspended. Of course other combinations are possible. For example, figure 25 shows a marked unit 9 which comprises two piece goods units 3 with an associated marking 40, and which also comprises three piece goods units 26 with an associated marking 40. This marked unit 9 can be divided into a further two marked units along line of separation 47. In the exemplary embodiment shown in figure 26, two different piece goods units 3 and 26 are, for example, placed next to each other in two rows, each row being provided with a suitable marking 40. Of course further variants are possible, for example where a plurality of piece goods units is provided in a marked unit next to each other, in rows or according to a certain pattern.

Of course the marking device 4 can also be arranged at other points relative to a belt element 50, 51 or unit 9 in order to apply a marking 40, 68 for a piece goods unit 3. The marking device 4 may consist of any device which is capable of applying a

marking 40 to a belt element 50, 51 or to another point, notwithstanding the the preference for applying a marking 40 which is reliably permanent, such as a marking applied by a laser beam.

The belt elements 50, 51 need not necessarily, of course, derive from storage rolls 48, 49. According to a variant, not shown, each belt element can be formed by a plate. Such a belt element, designed as a plate, may in this case, for example, be fed to the fixing device 52 in the proximity of the transport device 17, so that consecutive piece goods units can be fitted on at least one plate or between two plates.

The control device 12 can also interact with the registering devices 11 and 73 and with input devices which are operated by an operator in order to record how many piece goods units, which types of piece goods units and at what rate the piece goods units are commissioned with device 1. Other parameters may also be determined or monitored which are representative of the operation of device 1.

As shown in figure 15, a plurality of reservoirs 62, 76, 77, 78 can be provided which can be transported backwards and forwards in transport direction S by means of a conveying device 75. The conveying device 75 may, for example, comprise a conveyor belt or a turntable for suitably displacing the reservoirs relative to the fixing device 52. Of course such reservoirs 62, 76, 77, 78 may also be provided with a marking, for example a number, their destination, their position in a warehouse and the like, which may, for example, derive from the control device 12. This enables the device 1 to operate continuously. It is clear that when such a conveying device 75 is used, the different reservoirs 62, 76, 77, 78 can be suitably filled with marked units 9. This

permits, for example, different types of marked units 9 to be formed in a certain sequence and suitably fed to different reservoirs 62, 76, 77, 78. This results in reservoirs 62, 76, 77, 78 being filled with different types of marked units 9. The conveying device 75 can be suitably controlled by the control device 12 for this purpose. This is particularly advantageous if, for example, more types of piece goods units 9 are to be commissioned than there are feed devices 22 to 25 present. Of course variant possibilities and combinations are also possible.

According to a variant, not shown, different waste reservoirs 6 can also be provided on a conveying device, which reservoirs interact at desired times with the associated feed device. This is advantageous, for example, if certain storage packs have been assessed by the registering device 11 as defective, since in this case these storage packs can be removed separately and are not, for example, to be considered as waste. This is also applicable if only a limited number of piece goods units are separated from a storage pack. If, for example, the registering device 11 establishes that a certain piece good has been damaged, the control unit 12 may control the separating device 10 in such a manner that this piece good is not separated and is removed with the storage pack 20. Of course, it is advantageous for all possible piece goods units from each storage pack to be commissioned according to the invention and, subsequently, can the commissioned piece goods units be suitably stored.

According to an embodiment, not shown, piece goods units 3 are received between two belt elements 50, 51 which are, for example, elastic. The two belt elements 50, 51 can in this case be fixed to each other by means of a stamp or pressing element,

not shown, and more particularly they can be connected to each other around piece goods unit 3. In this case the belt elements 50, 51 need have no recesses 54, 55, and the piece goods unit 3 can be enclosed by the belt elements 50, 51. Here the two belt elements can be glued or welded together, among other things. The belt elements and the adhesive for fastening the belt elements to one another should of course be suitably chosen so that the characteristics of the piece goods unit are not influenced by the adhesive or the belt elements. In this case the belt elements can be manufactured from stretchable and/or shrinkable material.

The method, the device, the marked unit and the piece goods unit according to the invention represented in the claims are not limited to the exemplary embodiments described and presented as examples, but may also comprise variants and combinations thereof which fall under the claims.

Claims

1. Method for the commissioning of piece goods from a storage pack (2), wherein a piece goods unit (3, 26, 27, 28) which comprises a piece good (7) to be commissioned and a part (8) of the storage pack (2) surrounding the piece good (7) is separated from the rest of the storage pack (2), characterised in that a marking (40, 68) is added to the piece goods unit (3, 26, 27, 28), thus enabling the piece good (7) to be unequivocally identified.

2. Method according to claim 1, characterised in that a marking (40, 68) is added to the piece goods unit (3, 26, 27, 28) by means of a marking device (4), more particularly a marking (40, 68) for an unequivocal identification relating to the piece good (7).

3. Method according to claim 2, characterised in that piece goods units (3, 26, 27, 28), which derive from different feed devices (22, 23, 24,25), are supplied and in that a control device (12) controls the marking device (4) in such a manner that a marking (40, 68) is added to the supplied piece goods units (3, 26, 27, 28), which relates to the piece goods unit (3, 26, 27, 28) supplied, which unit derives from an associated feed device (22, 23, 24, 25).

4. Method according to claim 2 or 3, characterised in that piece goods units (3, 26, 27, 28) which derive from different feed devices (22,23, 24, 25) are placed on a conveyor belt (18) so as to feed these to at least one belt element (50, 51) of a

packing device (5), wherein the control device (12) controls the marking device (4) in such a manner that a corresponding marking (40) is each time applied to an associated part of a belt element (50, 51).

5. Method according to any one of claims 2 to 4, characterised in that information relating to the piece good (7) is recorded from the storage pack (2) by means of a registering device (11) of the storage pack (2), and in that the marking (40, 68) is added to the piece goods unit (3, 26, 27, 28) by means of a marking device (4) in accordance with the recorded information.

6. Method according to any one of claims 1 to 5, characterised in that a separating device (10) is controlled by a control unit (12) according to information from a registering device (11, 73) which can interact with the control unit (12).

7. Method according to any one of claims 1 to 6, characterised in that to add the marking (40), the piece goods unit (3, 26, 27, 28) is connected to at least one belt element (50, 51).

8. Method according to claim 7, characterised in that a marking (40) is added to the piece goods unit (3, 26, 27, 28) by connecting the piece goods unit (3, 26, 27, 28) to a belt element (50, 51) provided with a marking (40).

9. Method according to claim 7 or 8, characterised in that a marking (40) is applied to the belt element (50, 51) by means of a marking device (4).

10. Method according to any one of claims 7 to 9, characterised in that a plurality of separate piece goods units (3, 26, 27, 28) is connected to at least one common belt element (50, 51).

11. Method according to any one of claims 7 to 10, characterised in that one or more piece goods units (3, 26, 27, 28) are received in sandwich fashion between two belt elements (50, 51) running in parallel.

12. Method according to any one of claims 7 to 11, characterised in that a recess (54) is produced in the at least one belt element (50, 51) for the at least one piece goods unit (3, 26, 27, 28).

13. Method according to any one of claims 7 to 12, characterised in that piece goods units (3, 26, 27, 28) from different storage packs (2) are connected to at least one common belt element (50, 51), wherein parts of the belt element (50, 51) are marked corresponding to the associated piece goods unit (3, 26, 27, 28).

14. Method according to any one of claims 1 to 13, characterised in that the marking (68) is applied to the piece goods unit (3, 26, 27, 28), more particularly by means of a laser device (67).

15. Method according to any one of claims 1 to 14, characterised in that the separation of a piece goods unit (3, 26, 27, 28) from a storage pack (2) is carried out by cutting, in particular by means of laser cutting, by means of air jet cutting, by punching and/or by means of a knife blade.

16. Device for the commissioning of piece goods (7) from a storage pack (2), wherein a piece goods unit (3, 26, 27, 28) which comprises a piece good (7) to be commissioned and a part (8) of the storage pack (2) surrounding the piece good (7), is separable from the rest of the storage pack (2) by means of a separating device (10), characterised in that a marking (40, 68) is added by the device (1) to the piece goods unit (3, 26, 27, 28) for an unequivocal identification which relates to the piece good (7).

17. Device according to claim 16, characterised in that the device (1) comprises a marking device (4) by which a marking (40, 68) is added to the piece goods unit (3, 26, 27, 28) for an unequivocal identification which relates to the piece good (7).

18. Device according to claim 17, characterised in that the device (1) comprises a control device (12) which controls the marking device (4) in such a manner that a marking (40, 68) is applied which relates to the piece goods unit (3, 26, 27, 28).

19. Device according to claim 17 or 18, characterised in that the marking device (4) applies a marking (40) to a belt element (50, 51) which relates to a piece goods unit (3, 26, 27, 28)

connected to the belt element (50, 51), more particularly in the proximity of a part of a belt element (50, 51) which is arranged close to the associated piece goods unit (3, 26, 27, 28).

20. Device according to any one of claims 17 to 19, characterised in that the device (1) comprises a control device (12) and different feed devices (22, 23, 24, 25) for feeding piece goods units (3, 26, 27, 28), wherein the control device (12) controls a marking device (4) in such a manner that a corresponding marking (40, 68) is each time added to a piece goods unit (3, 26, 27, 28) supplied, which derives from an associated feed device (22, 23, 24, 25).

21. Device according to any one of claims 16 to 20, characterised in that the device (1) comprises different feed devices (22, 23, 24, 25) for feeding piece goods units (3, 26, 27, 28) and a recording device (73) which can determine which type of piece goods unit (3, 26, 27, 28) is present, and more particularly a type of piece goods unit (3, 26, 27, 28) deriving from an associated feed device (22, 23, 24, 25).

22. Device according to any one of claims 16 to 21, characterised in that the device (1) comprises a recording unit (11), by which information relating to the piece good (7), in particular the characteristics and/or a positioning of the piece good (7) in the storage pack (2), is recordable from the storage pack (2).

23. Device according to any one of claims 16 to 22, characterised in that the device (1) comprises a packing device

(5) with a fixing device (52), by which a piece goods unit (3, 26, 27, 28) can be connected to at least one belt element (50, 51).

24. Device according to any one of claims 16 to 23, characterised in that a plurality of separate piece goods units (3, 26, 27, 28) is connectable to at least one common belt element (50, 51) by means of a packing device (5) with a fixing device (52).

25. Device according to claim 23 or 24, characterised in that the packing device (5) comprises guiding elements (57, 58) for the guiding of two belt elements (50, 51), wherein a piece goods unit (3, 26, 27, 28) can be arranged in sandwich fashion between the belt elements (50, 51).

26. Device according to any one of claims 23 to 25, characterised in that the device (1) comprises a packing device (5) for receiving in sandwich fashion one or more piece goods units (3, 26, 27, 28) between two belt elements (50, 51) running in parallel.

27. Device according to any one of claims 16 to 26, characterised in that the device (1) comprises a packing device (5) which comprises a positioning device (56) for guiding a belt element (50, 51) which is connectable to a piece goods unit (3, 26, 27, 28).

28. Device according to claim 27, characterised in that the positioning device (56) comprises rolls (57, 58) and at least one

actuator (59), more particularly an actuator (59) which is controlled by a control unit (12).

29. Device according to any one of claims 16 to 28, characterised in that the device (1) comprises a packing device (5) and a transport device (17), by which piece goods units (3, 26, 27, 28) can be conveyed in transport direction (P) to a packing device (5).

30. Device according to any one of claims 16 to 29, characterised in that the device (1) comprises an aligning device (30) for guaranteeing an alignment of a piece goods unit (3, 26, 27, 28) and a recess (54, 55) provided in a belt element (50, 51), more particularly an aligning device (30) with guiding elements (31, 32) and a stopper (33).

31. Device according to claim 30, characterised in that a recording device (73) is arranged in the proximity of the aligning device (30), which can determine what type of piece goods unit (3, 26, 27, 28) is present.

32. Device according to any one of claims 16 to 31, characterised in that the device (1) comprises cutting devices (42, 43) for applying recesses (54, 55) in at least one belt element (50, 51) for a piece goods unit (3, 26, 27, 28) to be received.

33. Device according to any one of claims 17 to 32, characterised in that the device (1) comprises a marking device

(4) , which applies a marking (40) relating to a piece good (7) to at least one belt element (50, 51).

34. Device according to any one of claims 16 to 33, characterised in that the separating device (10) for separating a piece goods unit (3, 26, 27, 28) from the rest of the storage pack (2) is designed as a laser cutting device, an air jet cutting device, shears, punch or the like.

35. Device according to any one of claims 16 to 34, characterised in that the device (1) comprises feed devices (22, 23, 24, 25, 80) and/or conveying devices (17) for conveying a storage pack (2) and/or a piece goods unit (3, 26, 27, 28, 66).

36. Device according to any one of claims 16 to 35, characterised in that the device (1) comprises a control unit (12) which is programmable for carrying out a method according to any one of claims 1 to 15.

37. Marked unit comprising at least one belt element (50, 51), at least one piece goods unit (3, 26, 27, 28, 66) which is fixed with a surrounding part (8) of a piece good (7) to the belt element (50, 51) and at least one marking (40, 68) which relates to the at least one piece good (7) of the piece goods unit (3, 26, 27, 28, 66), characterised in that the marked unit (9) is formed according to a method according to any one of claims 1 to 15 and/or is formed by means of a device according to any one of claims 16 to 36.

38. Marked unit according to claim 37, characterised in that the marked unit (9) comprises two connected belt elements (50, 51), at least one piece goods unit (3, 26, 27, 28, 66) which is fixed with a surrounding part (8) of a piece good (7) between the belt elements (50, 51), and a marking (40, 68) which relates to the at least one piece good (7) of the piece goods unit (3, 26, 27, 28, 66).

39. Piece goods unit comprising at least one piece good (7) and a surrounding part (8) associated with the at least one piece good (7), wherein the piece goods unit (3, 26, 27, 28, 66) comprises a marking (40, 68) which relates to the at least one piece good (7) of the piece goods unit (3, 26, 27, 28, 66), characterised in that the piece goods unit (3, 26, 27, 28, 66) is used according to a method according to any one of claims 1 to 15 and/or in that the piece goods unit (3, 26, 27, 28, 66) is used in a device according to any one of claims 16 to 36.

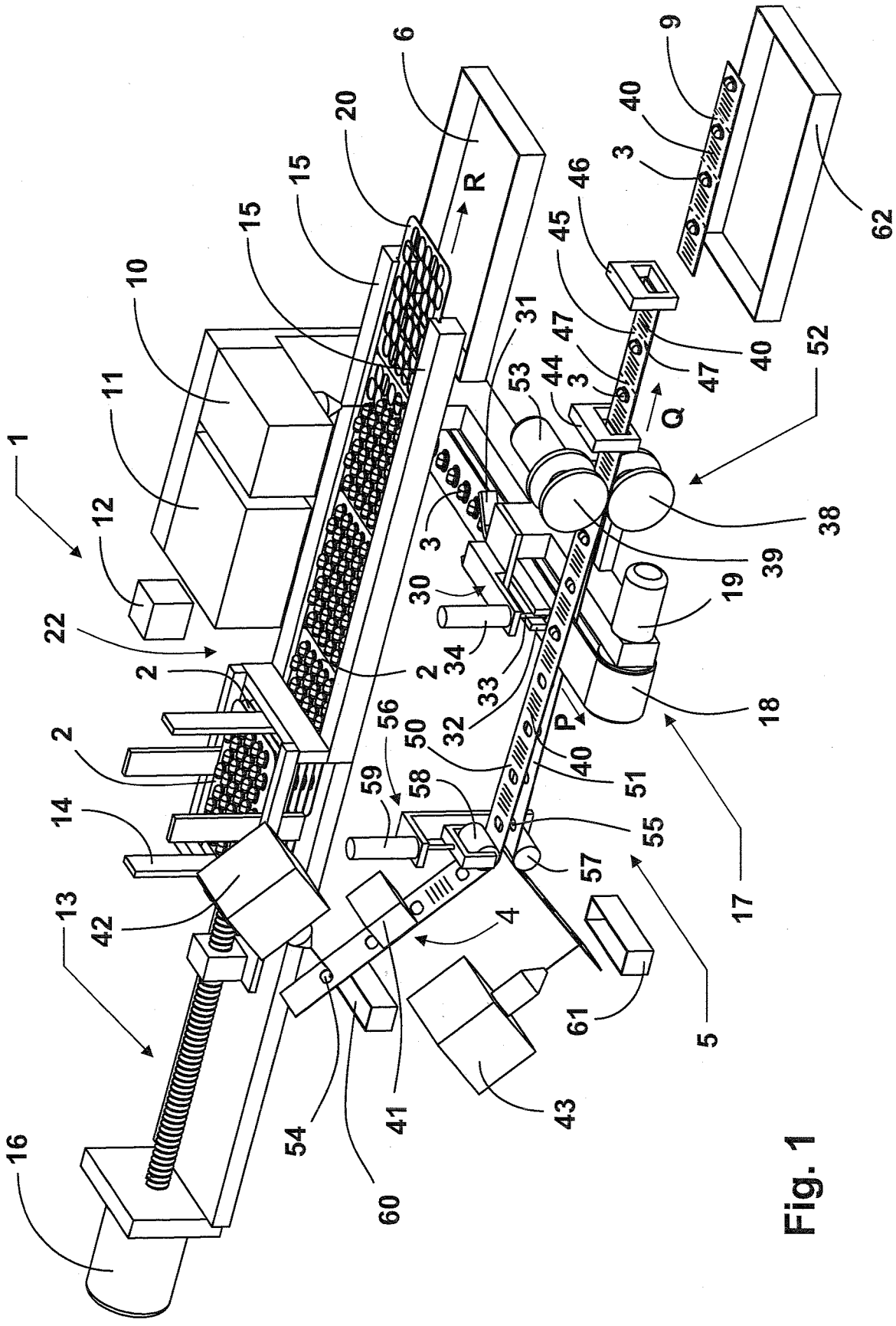
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Fig. 1

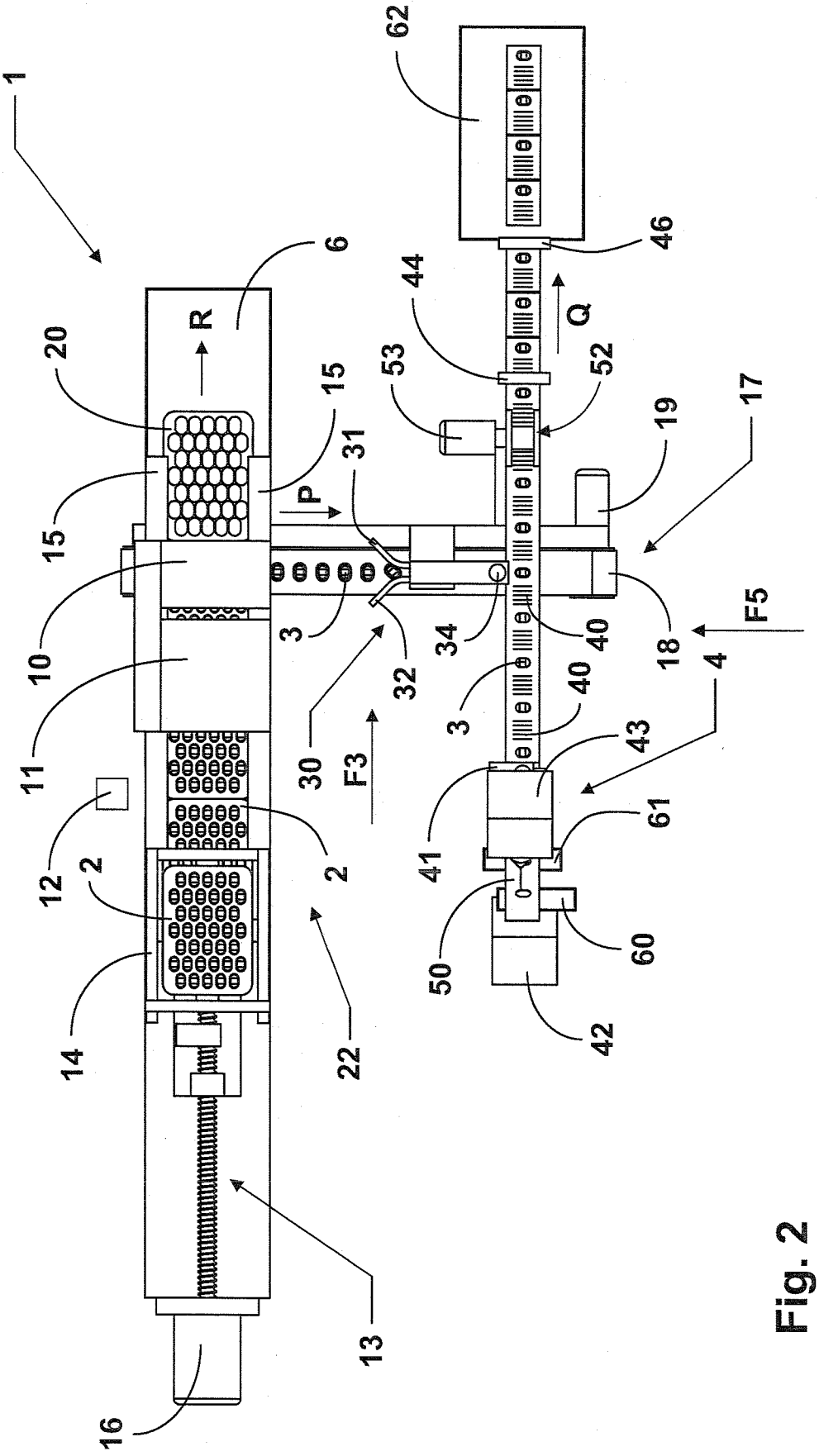
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Fig. 2

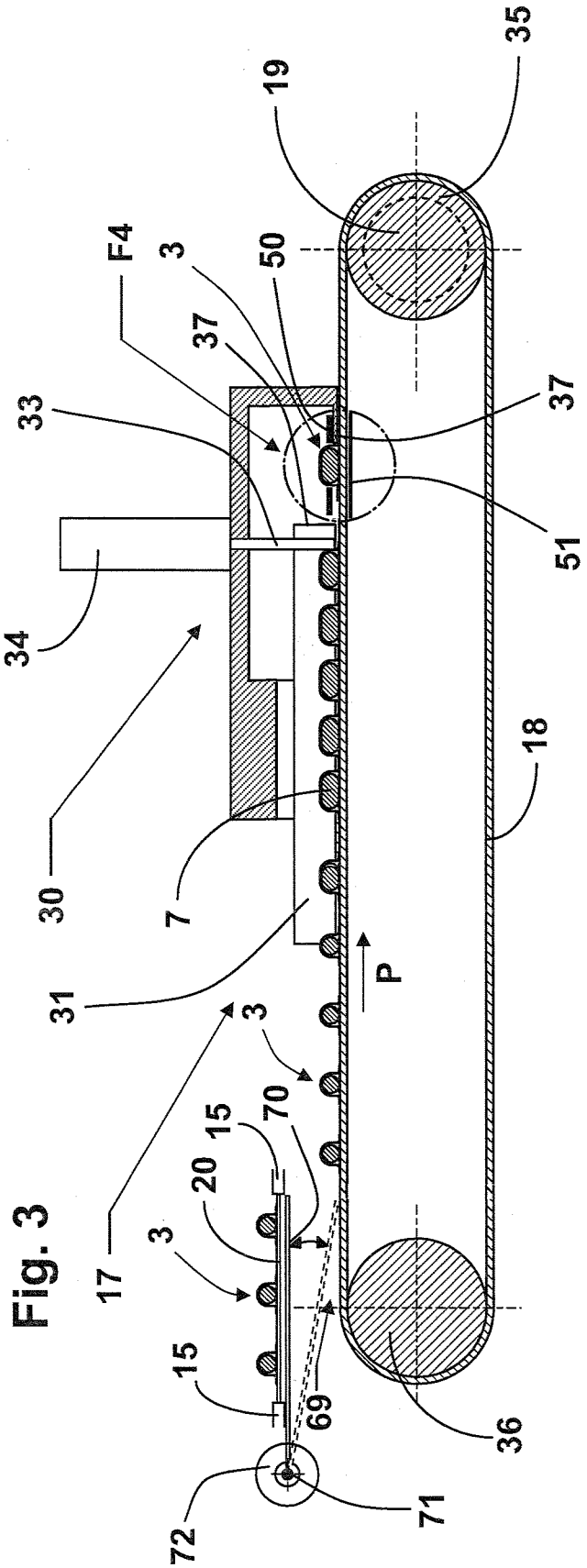
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Fig. 3

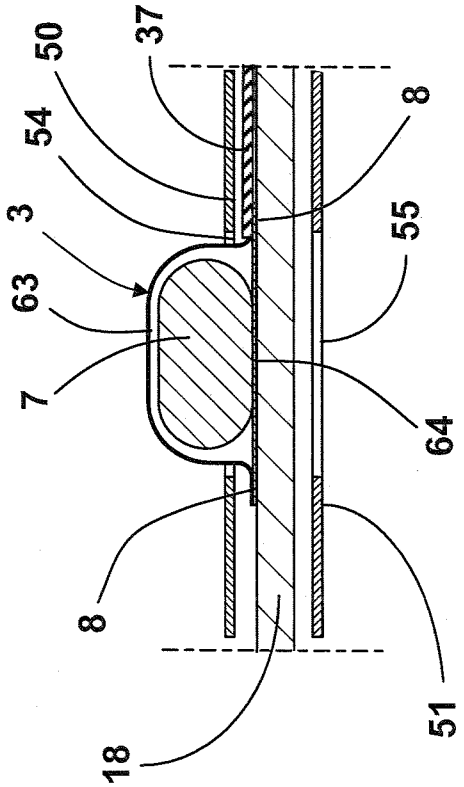
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Fig. 4

Fig. 6

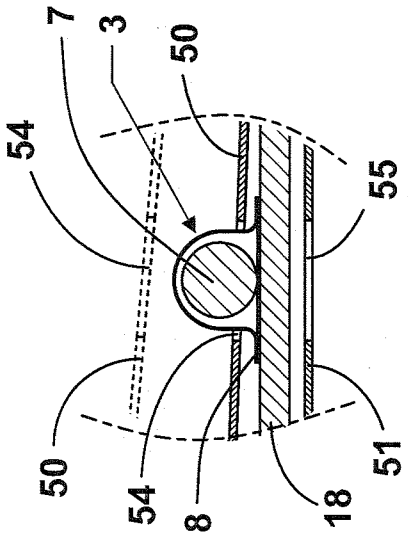
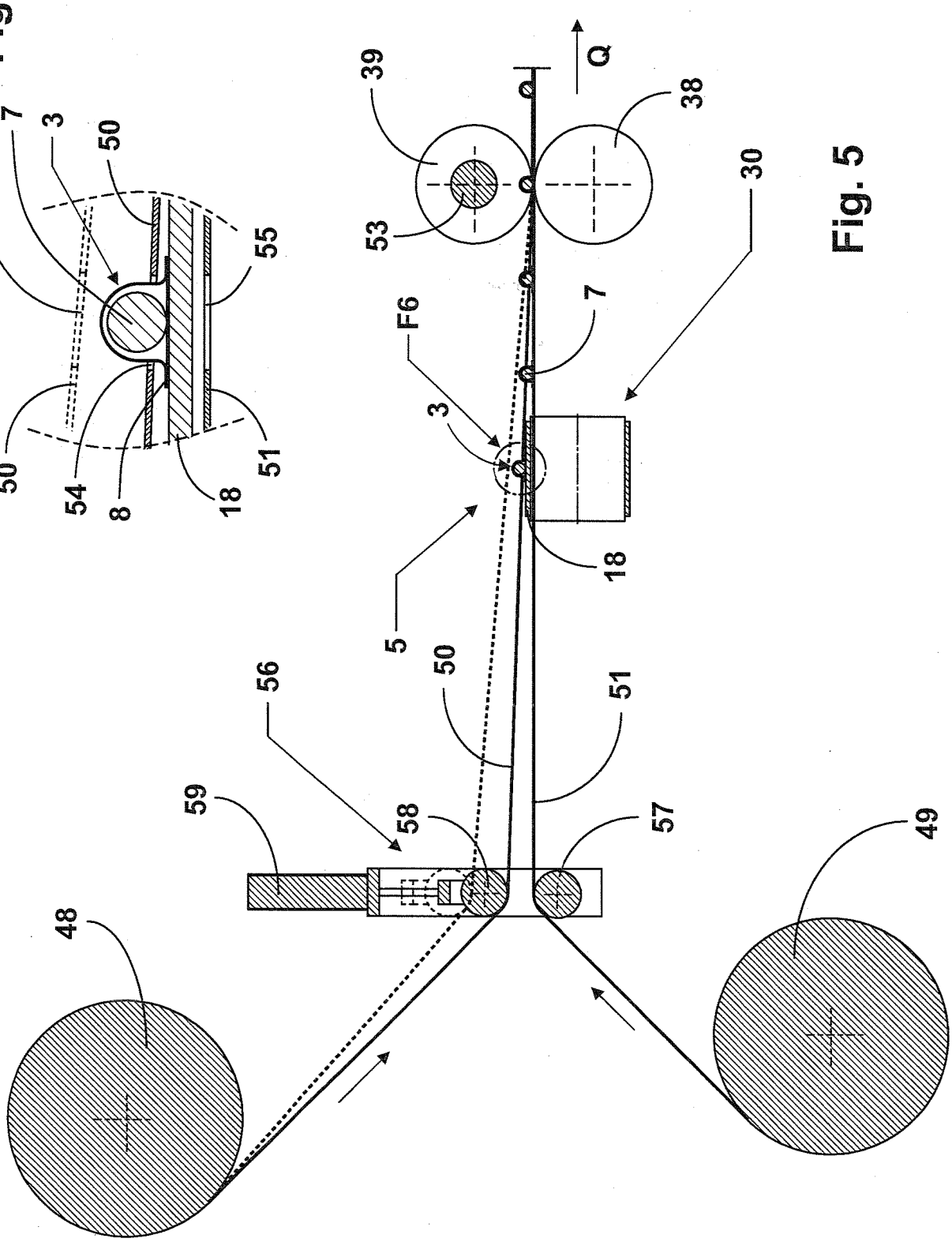


Fig. 5



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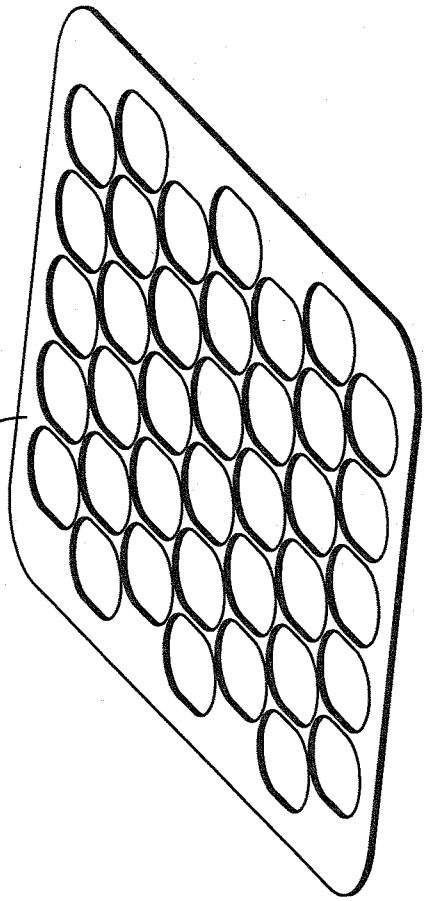

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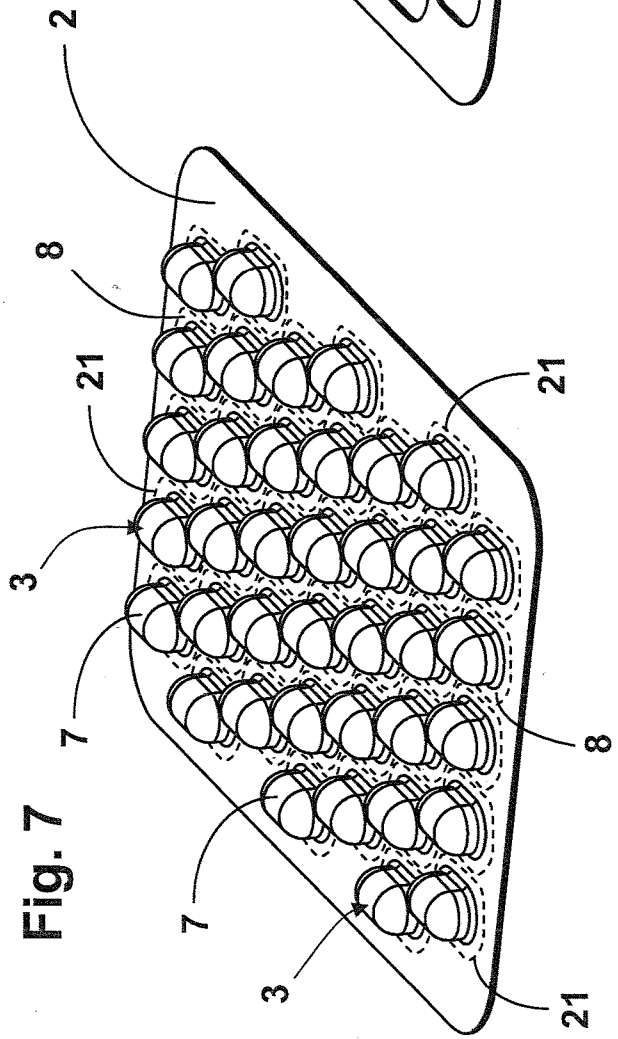

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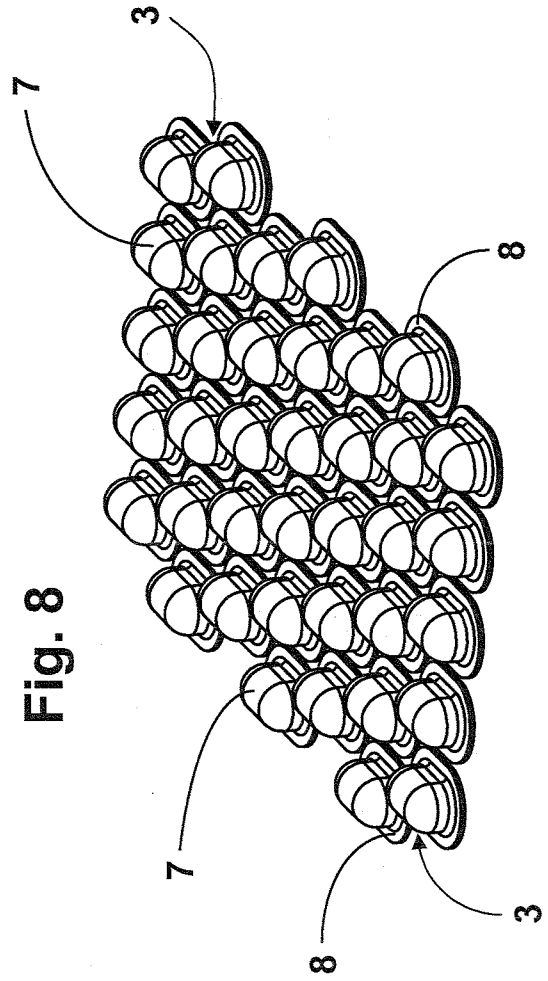

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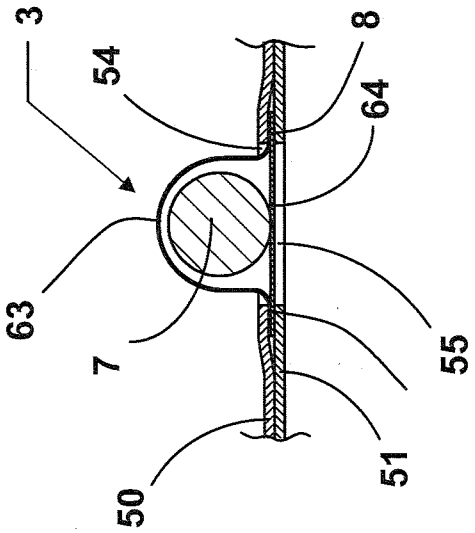

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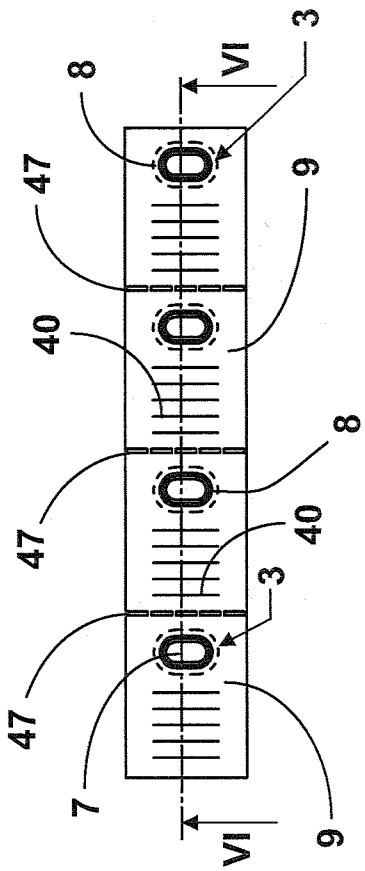

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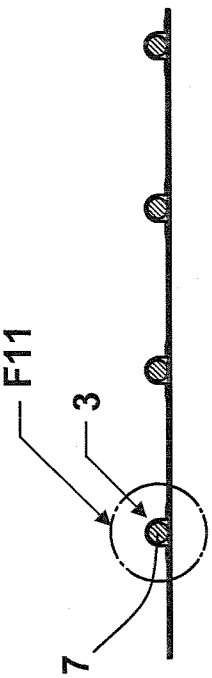

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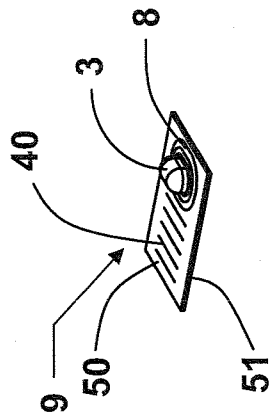

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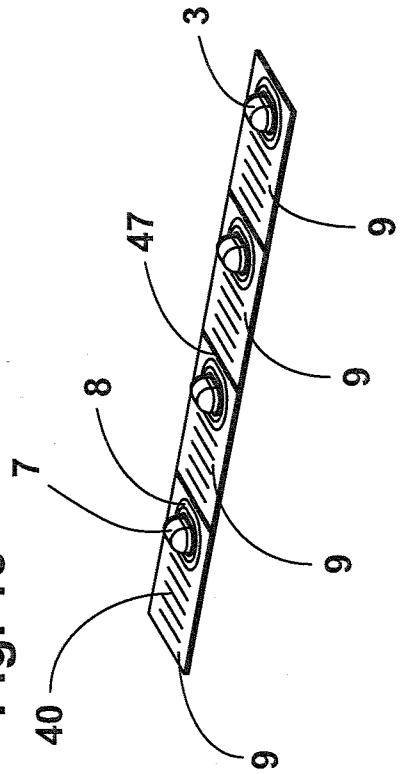

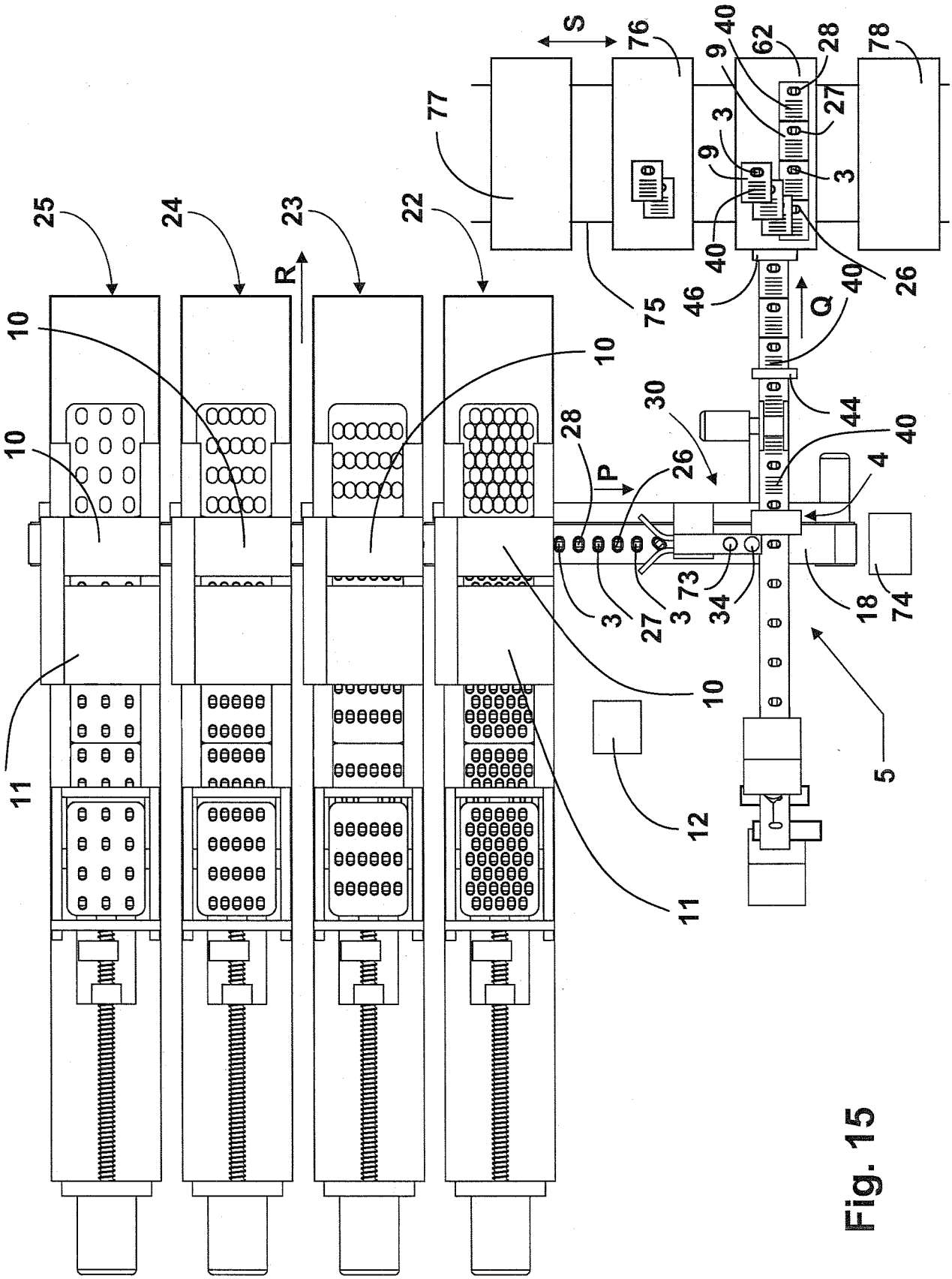
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Fig. 15

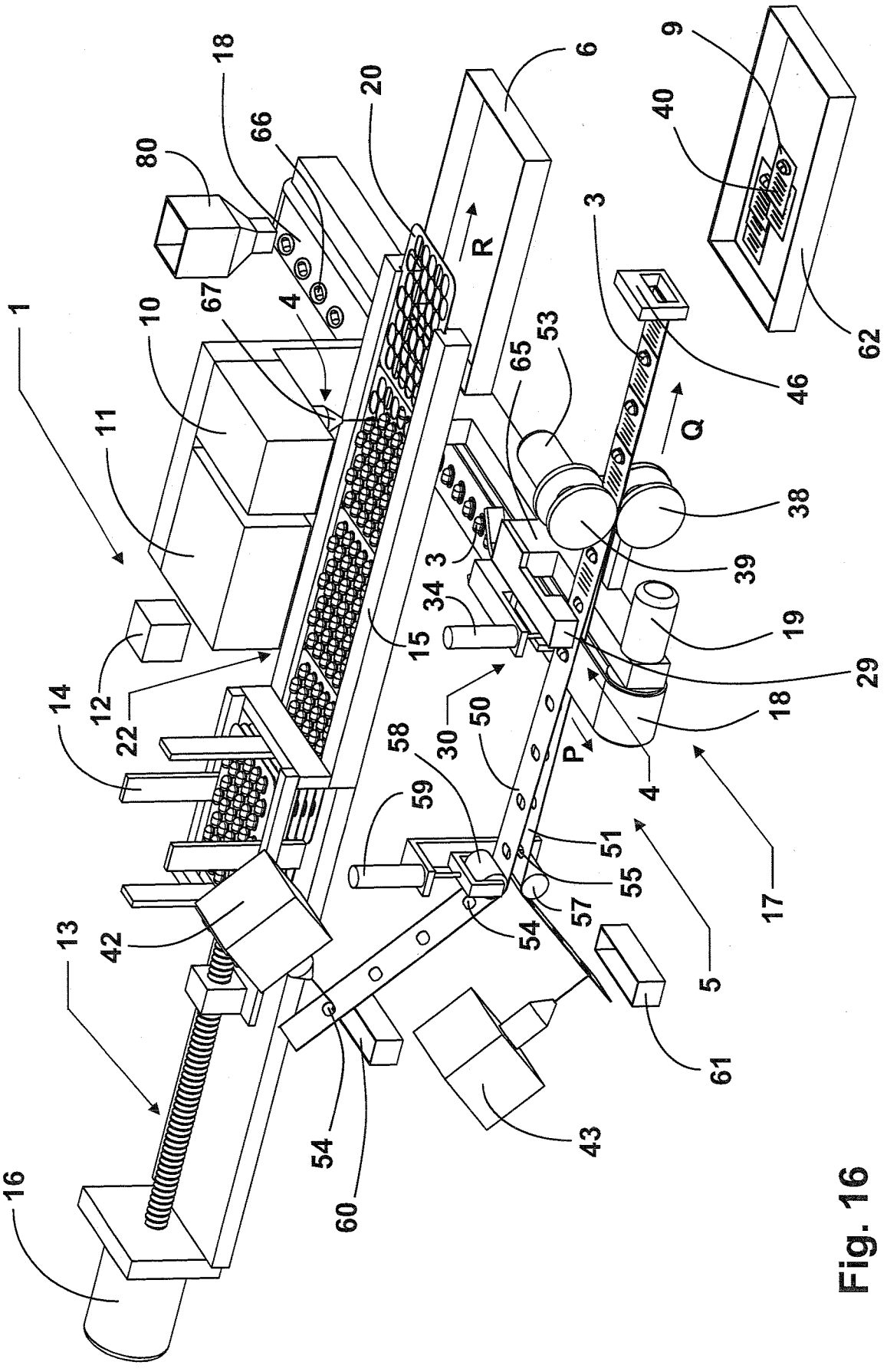
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Fig. 16

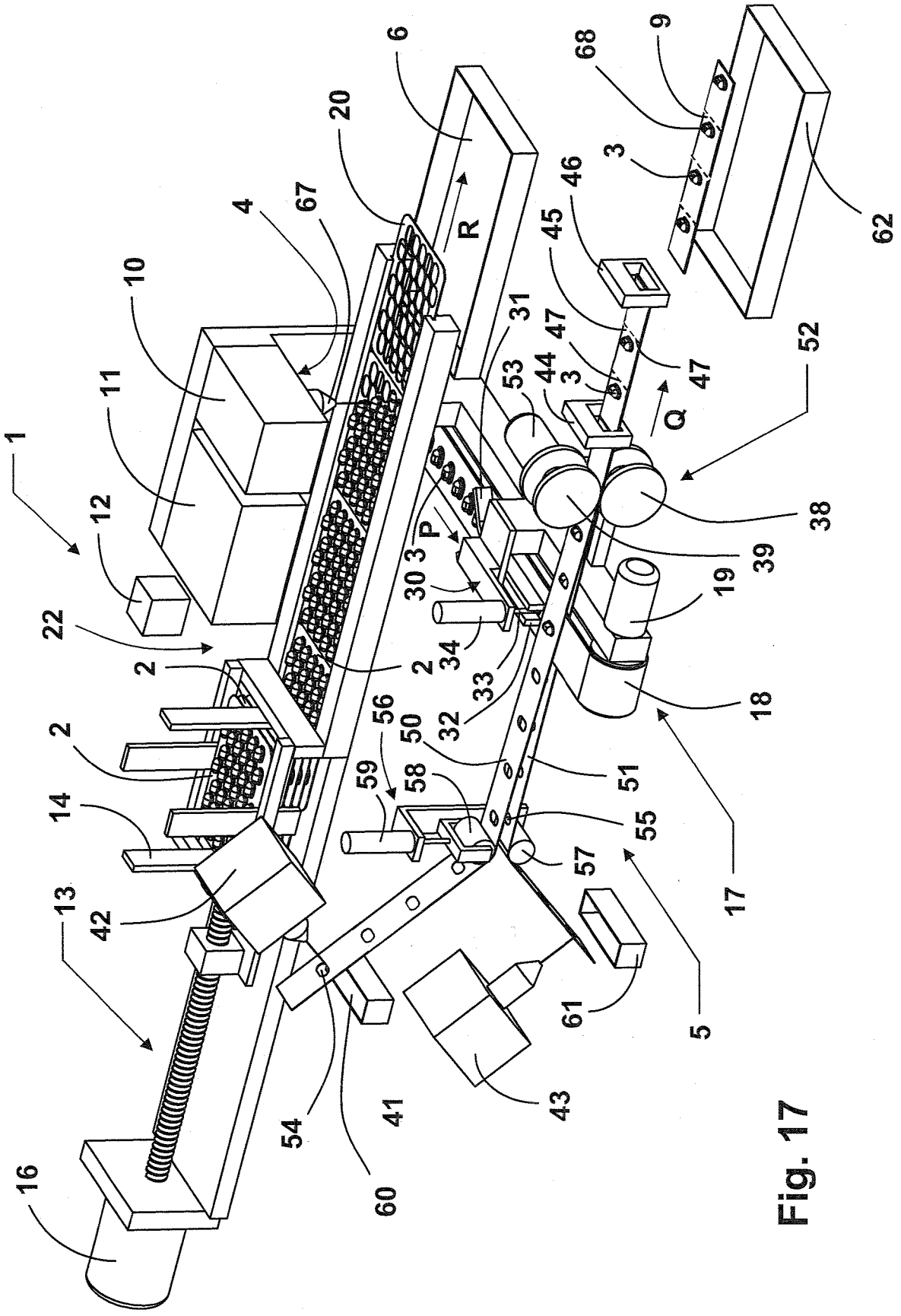
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Fig. 17

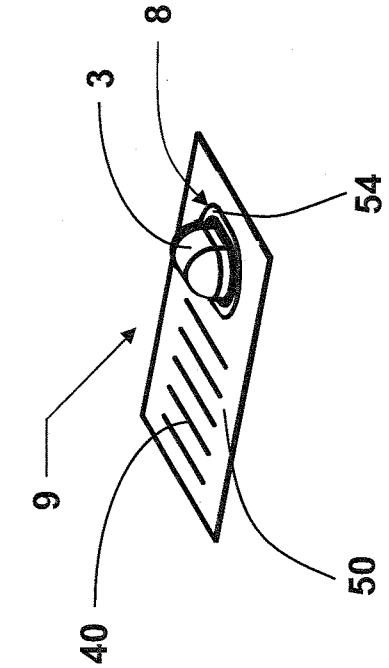
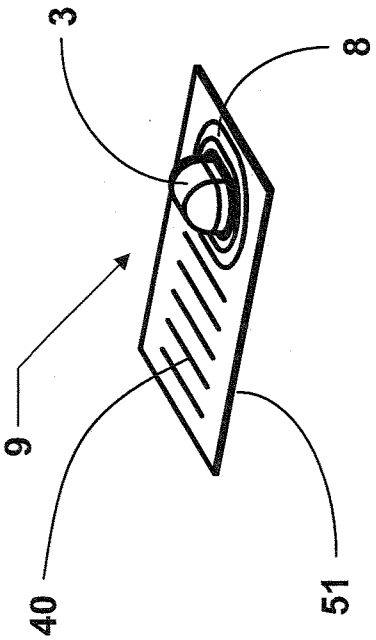


Fig. 20



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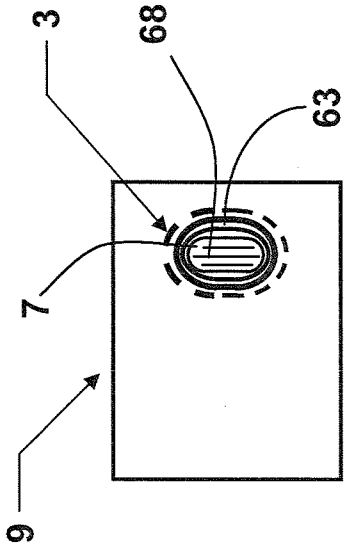

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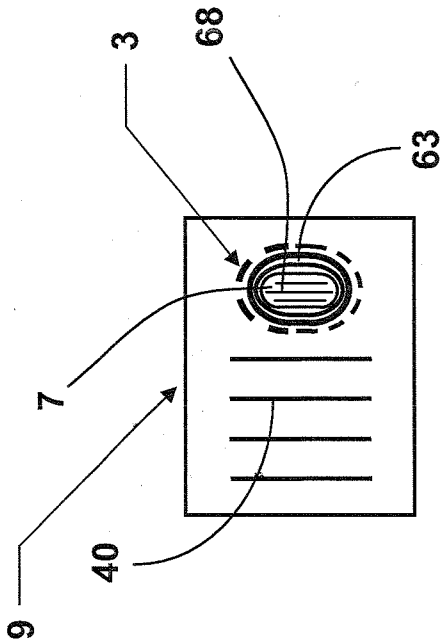
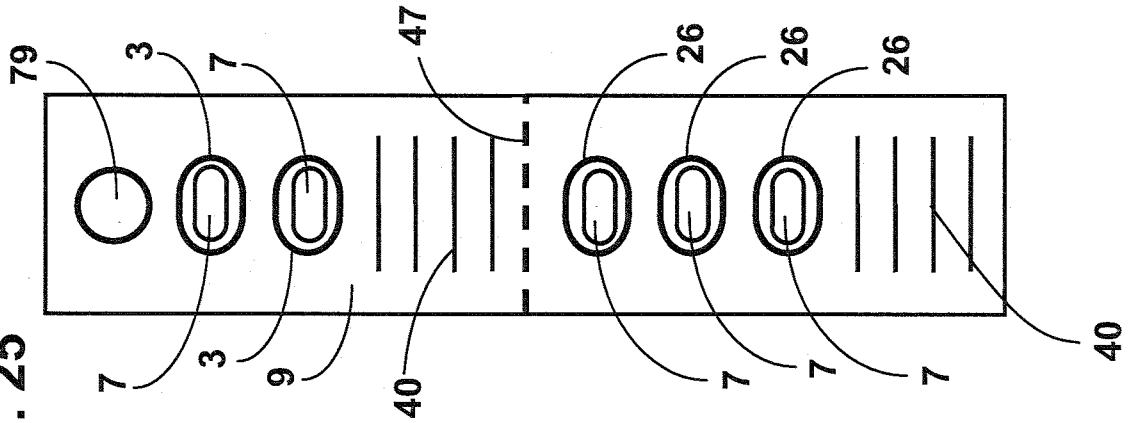


Fig. 19



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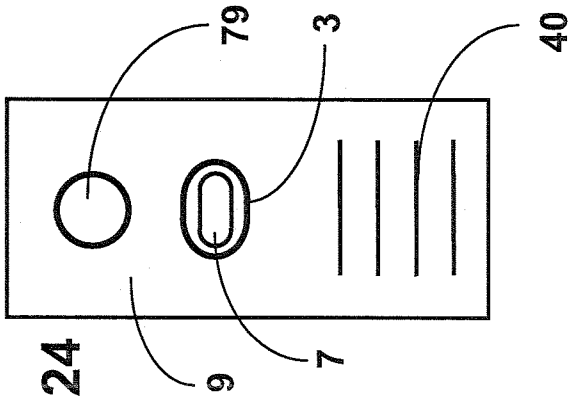
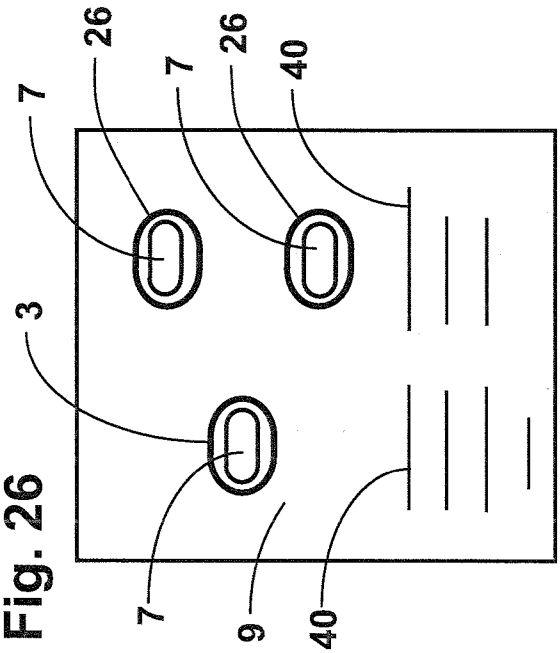


Fig. 24



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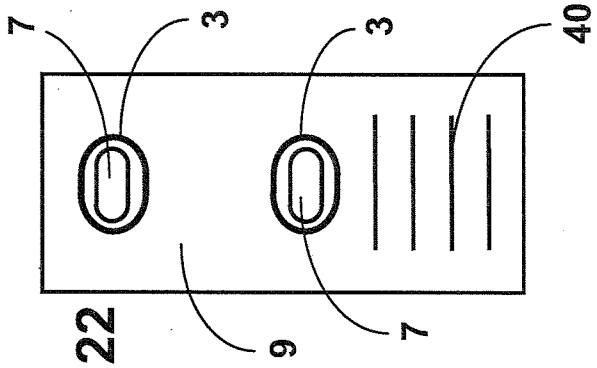

Fig. 22

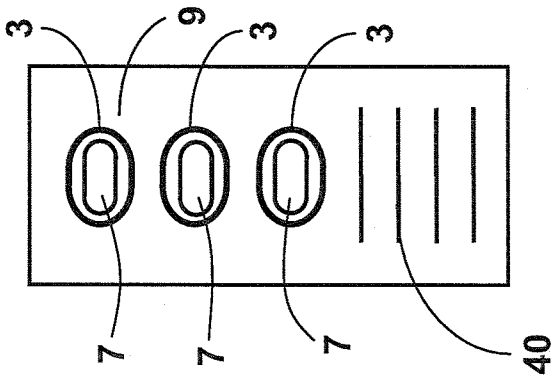

Fig. 23

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2010/050711

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65B5/10 B65B15/04 B65B61/02 B65B61/26 B65D75/32
A61J1/03
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65B G09F A61J B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	NL 1 033 807 C2 (4C CARE & CONSULTANCY B V [NL]) 6 November 2008 (2008-11-06) the whole document -----	1-3, 5-24,27, 30,33-39
X	EP 1 800 645 A1 (HAUNI WERKE KOERBER & CO KG [DE]) 27 June 2007 (2007-06-27) paragraph [0016] - paragraph [0025]; figures 3,6,7 -----	1-3, 6-13, 15-20, 23,24, 27,30, 33-39
X	US 6 244 442 B1 (INOUE ISAO [JP] ET AL) 12 June 2001 (2001-06-12) column 9, lines 53-63; claim 1; figures 1,11,12 -----	37,39
	-/--	

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
20 July 2010	29/07/2010

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Grentzius, Wim

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2010/050711

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 307 693 A (ERNST BITTNER) 7 March 1967 (1967-03-07) column 2, line 68 - column 3, line 12 column 1, lines 24-35; figures 1,8	37,39
X	US 5 842 325 A (GODLY MARGARET MARY R [US] ET AL) 1 December 1998 (1998-12-01) * abstract; figure 3	39
X	US 3 472 367 A (HELLSTROM HAROLD RICHARD) 14 October 1969 (1969-10-14) column 2, lines 14-16; figure 1	39
X	US 2005/237222 A1 (BOGASH ROBERT C [US] ET AL BOSSI CHRISTOPHER E [US] ET AL) 27 October 2005 (2005-10-27) paragraph [0029]; figure 2	39
X	WO 2007/137804 A1 (CRYOVAC INC [US]; GRANILI ANDREA [IT]; EVANGELISTI RICCARDO [IT]) 6 December 2007 (2007-12-06)	39
A	page 13, lines 11-21; figure 5	14
A	EP 1 145 864 A1 (MERCK PATENT GMBH [DE]) 17 October 2001 (2001-10-17) paragraph [0001] - paragraph [0006]	14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2010/050711

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
NL 1033807	C2	06-11-2008	NONE		
EP 1800645	A1	27-06-2007	AU	2006332069 A1	12-07-2007
			AU	2006332071 A1	12-07-2007
			CA	2634518 A1	12-07-2007
			CA	2634524 A1	12-07-2007
			EP	1973511 A1	01-10-2008
			EP	1978912 A1	15-10-2008
			WO	2007077032 A1	12-07-2007
			WO	2007077034 A1	12-07-2007
			JP	2009520651 T	28-05-2009
			JP	2009520536 T	28-05-2009
			US	2008302811 A1	11-12-2008
			US	2009188828 A1	30-07-2009
US 6244442	B1	12-06-2001	DE	69633971 D1	05-01-2005
			DE	69633971 T2	03-11-2005
			EP	0788979 A1	13-08-1997
			WO	9710159 A1	20-03-1997
US 3307693	A	07-03-1967	GB	1095734 A	20-12-1967
US 5842325	A	01-12-1998	AU	735118 B2	28-06-2001
			AU	1631299 A	28-06-1999
			CN	1281410 A	24-01-2001
			DE	69811943 D1	10-04-2003
			DE	69811943 T2	13-11-2003
			EP	1037806 A1	27-09-2000
			ES	2193593 T3	01-11-2003
			HK	1032571 A1	16-01-2004
			JP	2001525298 T	11-12-2001
			TW	383285 B	01-03-2000
			WO	9929576 A1	17-06-1999
US 3472367	A	14-10-1969	NONE		
US 2005237222	A1	27-10-2005	AU	2004319508 A1	17-11-2005
			CA	2564041 A1	17-11-2005
			CN	1953915 A	25-04-2007
			EP	1755985 A2	28-02-2007
			JP	2007534379 T	29-11-2007
			KR	20070012509 A	25-01-2007
			US	2009084702 A1	02-04-2009
			US	2006144749 A1	06-07-2006
			WO	2005109948 A2	17-11-2005
WO 2007137804	A1	06-12-2007	AT	467565 T	15-05-2010
			AU	2007267376 A1	06-12-2007
			EP	2021248 A1	11-02-2009
			ES	2342626 T3	09-07-2010
			US	2009288367 A1	26-11-2009
EP 1145864	A1	17-10-2001	CN	1318578 A	24-10-2001
			DE	10018600 A1	25-10-2001
			JP	2001302933 A	31-10-2001
			MX	PA01003758 A	04-06-2002
			US	2001030179 A1	18-10-2001

INTERNATIONAL SEARCH REPORT

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International application No
PCT/IB2010/050711

Patent document cited in search report	Publication date	Patent family member(s)	Publication date