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(54) Installation and method for packaging a product in film material

(57) The invention relates to an installation by means of which slices of, for example, a cheese product or a meat product can be packed in a film material from a strip. The strip is pulled over a preparation surface (6) by means of a gripper device (10). In the installation a piece of film material which during the further packing operation will have to form the top of the pack is reserved first of all. The product is then placed on a prepared piece of film material. By moving said piece stepwise, the slices can, for example, be placed stepwise on top of one another. Both the first and the second piece are then pulled into the installation and the first piece is moved back to above the second piece of film material with the slices thereon. Finally, the first and second pieces of film material lying on top of one another are sealed together.

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Description

[0001] The present invention relates to an installation and a method for packing materials in film.

[0002] A known type of film packing machines makes use of one roll of film. The packing principle is based on the movement of closing a book: the film is folded around the product. The product is first manually placed on the film, which is supported by ribbed foam rubber. The machine then closes by one flap moving upwards and folding the film around the product. As soon as the flap has been completely closed, the pack is sealed on three sides by two fixed U-shaped elements, one of which is heated, pressing onto one another. The fourth side is closed by the fold. At the same point in time the film is also cut and transferred to the clamping device. The flap then opens again and the product can be removed.

[0003] A disadvantage of this form is that this type of machines cannot be incorporated in a production line. In addition it is a disadvantage that it is more difficult to make such a system suitable for various sizes of pack. The thickness of the product to be packed is limited by the method of support: ribbed foam rubber.

[0004] Packing machines that can be used in a packing line have the characteristic that the product is fed into the machine via a conveyor belt. It is not possible in this way to pack foodstuffs in film only, without using a product carrier such as, for example, a plastic dish.

[0005] When packing products in film, with automatic throughout of the product, in general use is made of two rolls of film, the one roll being used for the bottom layer, whilst the other roll is used for the top layer. The consequence of this is that fusing the two layers of film together (known as sealing) has to be carried out on four sides of the product.

[0006] After packing, the film is then cut off the roll. Sealing on four sides has the consequence that at least 2 cm more film is required than when folding round the product.

[0007] In order to be able to process various sizes of the material to be packed, use can be made of a number of methods, such as the use of fixed, but interchangeable sealing bars or cutting between the two front edges and the side edges during sealing by means of sealing rollers.

[0008] Another problem with such machines is the interchanging of two rolls, as a result of which the risk of malfunctions becomes greater. Usually at least one of these rolls is not readily accessible.

[0009] The aim of the present invention is to provide an installation and a method for packing products in film which is not dependent on the way in which the product to be packed is fed (with or without product carrier) and is also able to process single item packs without additional film waste being generated as a result. Furthermore, the thickness of the material to be packed must not act as an impediment to the packaging itself.

[0010] Said aim is achieved by means of an installation for packing a product, such as one or more slices of a cheese product or a meat product, in film material, comprising a base frame with:

- a station for a roll of film material,
- a preparation station for placing a product on a strip of film material,
- a conveyor adjoining the preparation surface for transporting the finished pack away from the preparation surface,
- a sealing station for sealing two pieces of film material, positioned on top of one another, with respect to one another, which sealing station has upper and lower sealing bars between which the strip of film material can be transported on the conveyor,
- guide means for guiding the strip of film material from the roll to the preparation station,
- gripper means for gripping the strip of film material, which gripper means can be moved along a first path for feeding a length of the strip equal to the sum of the lengths of the two pieces through the sealing station, a first piece of film material being moved beyond said sealing station and the second piece of film material coming to lie between the sealing bars in the sealing station,
- which gripper means can be moved along a second path located above the first path, and in a direction opposed to that in the first path, for feeding the first piece of film material back to above the second piece of film material,
- which gripper means can be moved downwards to bring the first piece of film material onto the second piece of film material, thus forming the fold line between these pieces of film material,
- which upper and lower sealing bars of the sealing station can be moved towards one another in order to seal the pieces of film material to one another at the three edges other than the edge where the fold line is located, forming a pack,
- which sealing bars can be moved away from one another,
- means for detaching the pack from the strip of film material, and a conveyor adjoining the preparation surface for transporting the finished pack away from the preparation surface.

[0011] According to the present invention the film is used as transport medium and is transported such that the film is first pulled through and then pulled back over the product, so that the machine repeatedly returns to the starting position. This is in contrast to the method that is employed according to the state of the art of conventional flow packers. Compared with film packing machines which seal on 4 sides, this method will save at least 2 cm film per pack because one sealed seam (5 - 8 mm sealed seam plus 5 mm margin) is dispensed with because the seal at the front of the product is provided

by a fold.

[0012] As a result of this method only one film roll has to be used for feeding material, as a result of which a saving in film can be achieved compared with a system with two rolls, where the rolls do not contain identical lengths of film. In addition, changing the stock roll will take less time.

[0013] The gripper means are fixed to a carriage which is movably accommodated on an auxiliary frame having a guide for the carriage, which auxiliary frame is attached to the base frame such that it can pivot about a horizontal pivot axis, which pivot axis is located at that end of the conveyor remote from the preparation surface, which auxiliary frame can be moved between a position in which the guide is parallel to the conveyor and a position in which the guide runs obliquely upwards.

[0014] Preferably, the lower sealing bar of the sealing installation is fixed with respect to the base frame and the upper sealing bar is accommodated on a tilting arm, the tilt shaft of which is located close to or coincident with the pivot axis of the auxiliary frame.

[0015] For the purpose of forming the quantity of film material required for one pack, with two pieces which can be sealed together, there is a carrier element between the preparation surface and the conveyor, which carrier element enables movement of the strip of film material transversely to the preparation surface, such that when a strip of film material is gripped in the gripper device this film material can be pulled into the form of a loop. The carrier element comprises a guide positioned transversely to the preparation surface, as well as a carriage that can be moved along said guide and which carries a horizontal roller positioned transversely to the conveyor.

[0016] By means of this carrier element, a first piece of film material can be drawn aside which subsequently can be positioned on top of the adjoining second piece of film material with the product thereon.

[0017] The invention also relates to a method for operating the installation described above, comprising the following steps:

- gripping a strip of film material by means of the gripper means,
- moving the strip of film material transversely to the preparation surface by means of the carrier element, forming a loop, such that the length of the film material in the loop is equal to a first piece of film material,
- placing a product on the second piece of film material located on the preparation surface,
- moving the gripper means while moving back the carrier element and then moving the second piece of film material, with product, located on the preparation surface to the sealing station,
- pivoting the auxiliary frame upwards,
- moving the gripper means in a direction opposed to the previous direction of movement and bringing the first piece of film material above the second piece of film material, with product,
- moving the gripper means downwards, thus forming a fold line between the first and the second piece of film material,
- moving the sealing bars towards one another and forming a sealed seam along the three pairs of edges of the pieces of film material lying on top of one another.

[0018] The known folding method mentioned in the preamble has the disadvantage that it is not possible to place a new product ready when the pack is being sealed. In the preferred embodiment of the invention the installation is suitable for placing the film ready and transporting it while the pack is being sealed closed. This transport can also be used to move the product in small steps in the case of a combination with an automatic slicing machine, so that the cut slices can be put down stepwise. The layout of the film path has been so chosen that the machine can be positioned next to a fully automatic slicing machine in such a way that the film surface can be used as ejection surface.

[0019] The invention will be discussed in more detail below with reference to the drawings, in which:

Figure 1 shows a spatial overview of one embodiment of the present invention inside a packing machine with the various components; and

Figures 2 to 12 show, diagrammatically, a number of cross-sections of one embodiment of the present invention, each individual drawing showing one situation in the course of the process.

[0020] Figure 1 shows the following components in a packing machine such as is constructed in an arbitrary embodiment:

1. Film stock roll
2. Drive roller (not visible, arrow indicates position)
3. Feed opening
4. Sensor roller for film tension
5. Film guide roller
6. Supporting surface
7. Film guide roller
8. Film reversing system
9. Bar transport system (pivots about tilt shaft 15)
10. Film transport bar
11. Height-adjustable discharge belt
12. Sealing U (heated element)

12a. Bottom U to provide support during sealing

13. Operating flap of sealing mechanism (pivots about tilt shaft 15)
14. Height adjustment control
15. Central tilt shaft
16. Cutting mechanism

[0021] A description of the mode of operation of the

principle is now given below with reference to Figures 2 to 12.

[0022] Figure 2 shows the situation after manually inserting the film. Manual insertion of the film is facilitated in that the film can be guided through the feed opening (3) from the sides. After the film has been fed through the opening (3) it is guided around the rollers (4, 5, 7) to the supporting surface (6).

[0023] Figure 3 shows the situation immediately after starting the initialisation cycle. The operating flap of the sealing mechanism (13) has been pivoted downwards until it is just in contact with the bar transport system (9).

[0024] Figure 4 shows the situation where the film is clamped between the top and bottom sections. The operating flap of the sealing mechanism (13) has been pivoted downwards until the sealing U (12) is in contact with the bottom U (12a). The bar transport system (9) is carried along by the movement of this flap (13). After the top and bottom sections have been brought together a movement by the cutting mechanism (16) ensures that the film is cut off and is clamped in the film transport bar (10). At this point in time the machine has been initialised and the machine will continue with the operations in a normal cycle.

[0025] Figure 5 shows the situation where the film has been brought to the correct length by the film reversing system (8), so that the product to be packed can be placed on the table with the supporting surface (6).

[0026] Figure 6 shows that the operating flap of the sealing mechanism (13) with the sealing U (12) has been moved upwards, whilst the bar transport system (9) has remained in the lowest position. In this position, the packed product will be removed via the height-adjustable conveyor belt (11).

[0027] Figure 7 shows how the film is pulled through by the film transport bar (10) whilst, at the same time, the film reversing system (8) moves back so that the film on the supporting surface (6) does not move. By applying a difference in speed between the transport bar (10) and the film reversing system (8), it is nevertheless possible to make a suitable controlled movement when this is needed for positioning of the product to be packed. As soon as the film reversing system (8) has returned to the starting position, the system will wait until there is a product ready to be packed. In the interim the transport bar (10) can be used to move the product if the machine is coupled to, for example, an automatic slicing machine.

[0028] In Figure 8 the situation has been reached where the film has been pulled through to such an extent that the product is located above the discharge belt (11).

[0029] In Figure 9 the bar transport system (9) has been pivoted back into the starting position.

[0030] In Figure 10 the film transport bar has been transported back to the original position and the film has been pulled back with it over the product to be packed. This position corresponds to the situation in Figure 2 except that there is now a product ready to be sealed.

[0031] In Figure 11 the operating flap of the sealing mechanism (13) has been pivoted downwards until it is just in contact with the bar transport system (9). This situation is comparable to the situation in Figure 3.

[0032] In Figure 12 the product is sealed and at the same time is separated, by means of the cutting mechanism (16), from the roll of film and the film at the other side of the cut is again clamped in the film transport bar (10). At this point in time the machine has returned to the initialisation position and the machine will continue with the operations from Figure 6.

Claims

1. Installation for packing a product, such as one or more slices of a cheese product or a meat product, in film material, comprising a base frame with:

   - a station for a roll (1) of film material,
   - a preparation station (6) for placing a product on a strip of film material,
   - a conveyor (11) adjoining the preparation surface (6) for transporting the finished pack away from the preparation surface (6),
   - a sealing station (12, 13) for sealing two pieces of film material, positioned on top of one another, with respect to one another, which sealing station has upper (12) and lower (12a) sealing bars between which the strip of film material can be transported on the conveyor (11),
   - guide means (4, 5, 7) for guiding the strip of film material from the roll (1) to the preparation station (6),
   - gripper means for gripping the strip of film material, which gripper means (10) can be moved along a first path for feeding a length of the strip equal to the sum of the lengths of the two pieces through the sealing station, a first piece of film material being moved beyond said sealing station (12 - 13) and the second piece of film material coming to lie between the sealing bars (12, 12a) in the sealing station (12 - 13),
   - which gripper means (10) can be moved along a second path located above the first path, and in a direction opposed to that in the first path, for feeding the first piece of film material back to above the second piece of film material,
   - which gripper means (10) can be moved downwards to bring the first piece of film material onto the second piece of film material, thus forming the fold line between these pieces of film material,
   - which upper (12) and lower (12a) sealing bars of the sealing station (12 - 13) can be moved towards one another in order to seal the pieces of film material to one another at the three edges other than the edge where the fold line is

located, forming a pack,

- which sealing bars (12, 12a) can be moved away from one another,
- means (16) for detaching the pack from the strip of film material.

2. Installation according to Claim 1, wherein the gripper means (10) are fixed to a carriage which is movably accommodated on an auxiliary frame (9) having a guide for the carriage, which auxiliary frame (9) is attached to the base frame such that it can pivot about a horizontal pivot axis (15), which pivot axis (15) is located at that end of the conveyor (11) remote from the preparation surface (6), which auxiliary frame (9) can be moved between a position in which the guide is parallel to the conveyor and a position in which the guide runs obliquely upwards.

3. Installation according to Claim 2, wherein the lower sealing bar (12a) of the sealing installation (12 - 13) is fixed with respect to the base frame and the upper sealing bar (12) is accommodated on a tilting arm (13), the tilt shaft (15) of which is located close to or coincident with the pivot axis of the auxiliary frame (9).

4. Installation according to one of the preceding claims, wherein the conveyor (11) is a belt.

5. Installation according to one of the preceding claims, wherein there is a carrier element (8) between the preparation surface (6) and the conveyor (11), which carrier element (8) enables movement of the strip of film material transversely to the preparation surface (6), such that when a strip of film material is gripped in the gripper device (10) this film material can be pulled into the form of a loop.

6. Installation according to Claim 5, wherein the carrier element (8) comprises a guide positioned transversely to the preparation surface, as well as a carriage that can be moved along said guide and which carries a horizontal roll positioned transversely to the conveyor.

7. Method for operating an installation according to Claim 1, comprising the following steps:

- gripping a strip of film material by means of the gripper means (10),
- moving the strip of film material transversely to the preparation surface by means of the carrier element (8), forming a loop, such that the length of the film material in the loop is equal to a first piece of film material,
- placing a product on the second piece of film material located on the preparation surface (6),
- moving the gripper means (10) while moving back the carrier element (8) and then moving the second piece of film material, with product, located on the preparation surface (6) to the sealing station (12 - 13),
- pivoting the auxiliary frame (9) upwards,
- moving the gripper means (10) in a direction opposed to the previous direction of movement and bringing the first piece of film material above the second piece of film material, with product,
- moving the gripper means (10) downwards, thus forming a fold line between the first and the second piece of film material,
- moving the sealing bars (12, 12a) towards one another and forming a sealed seam along the three pairs of edges of the pieces of film material lying on top of one another.

8. Method according to Claim 7, comprising the stepwise movement of the strip of film material transversely to the preparation surface (6) and the deposition of, in each case, one slice of the product on the second piece of film material, located on the preparation surface, and/or on a slice deposited beforehand, after each movement step of the film material, with the formation of a quantity of slices stacked stepwise.

Fig 1

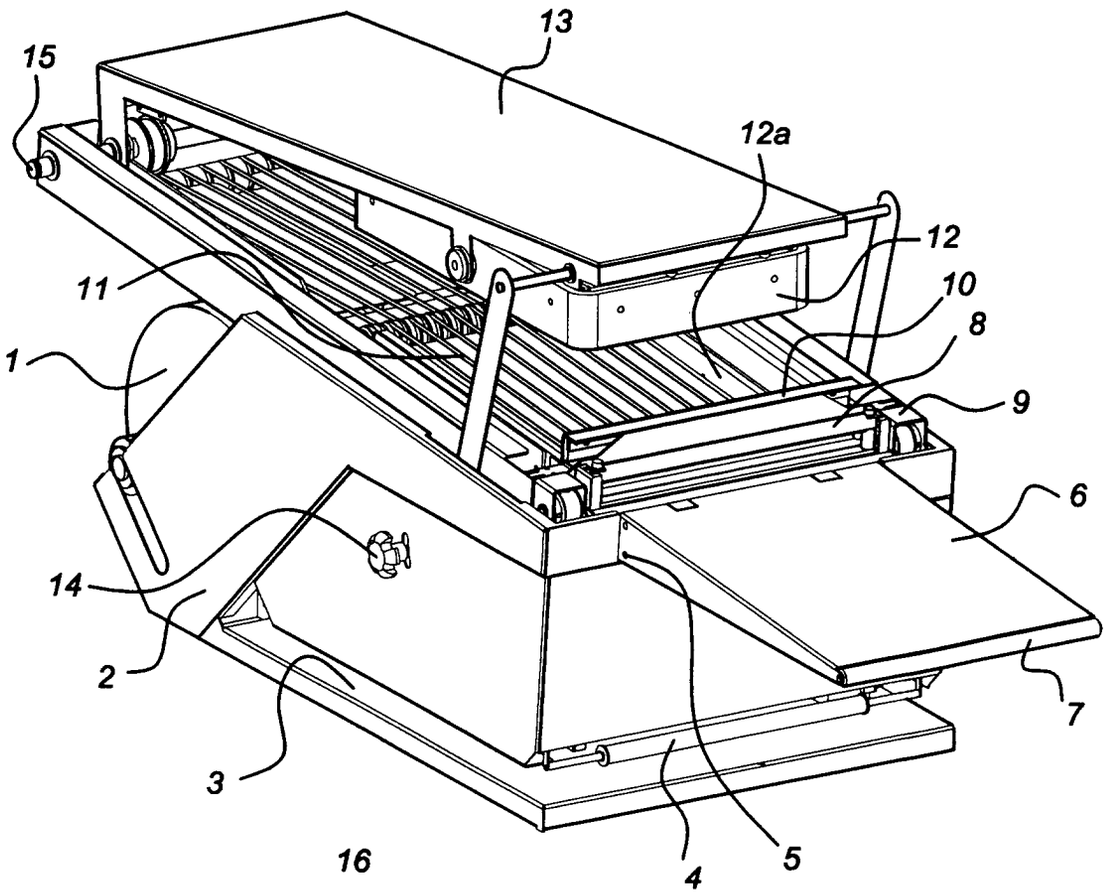


Fig 2

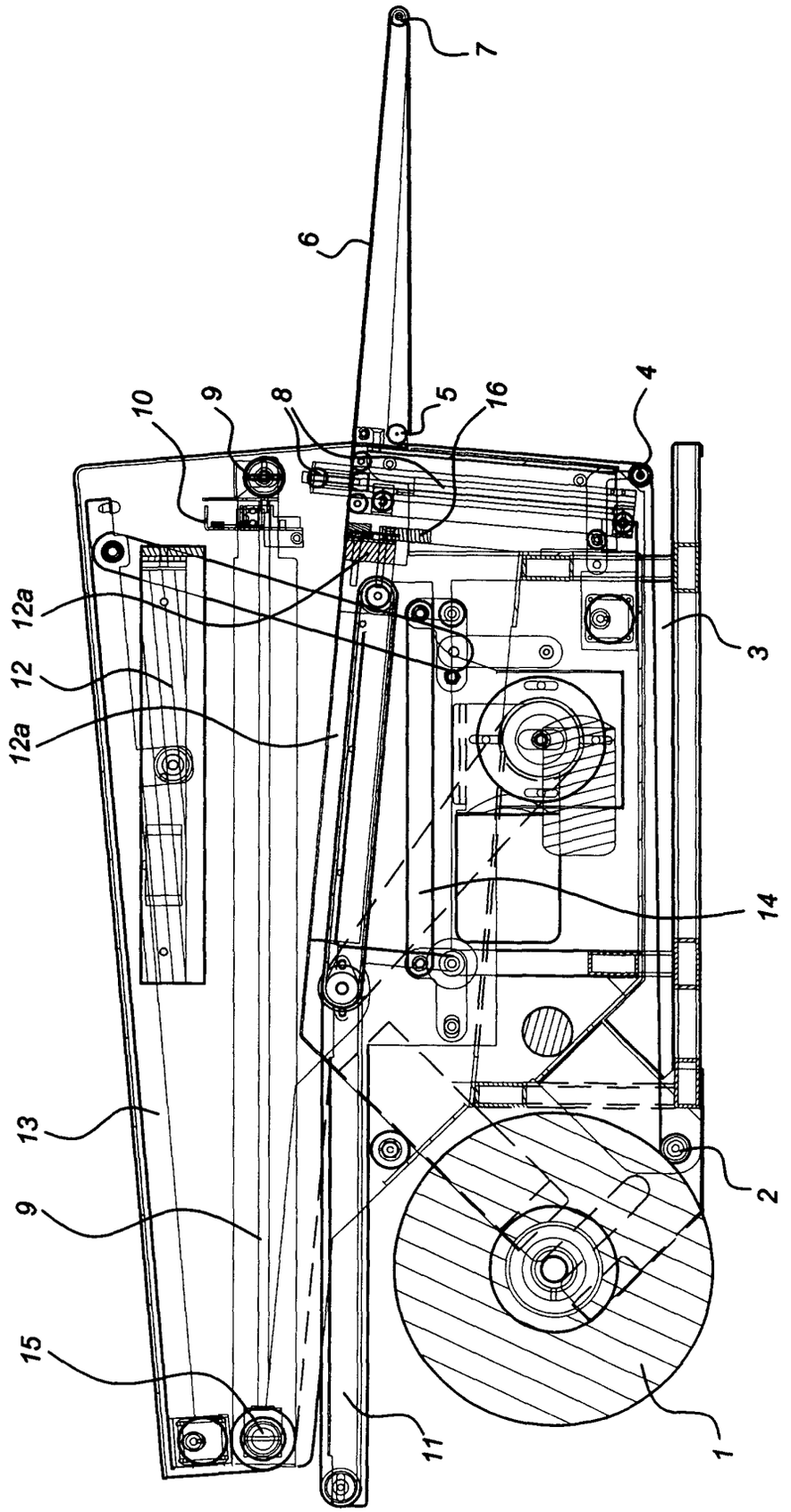


Fig 3

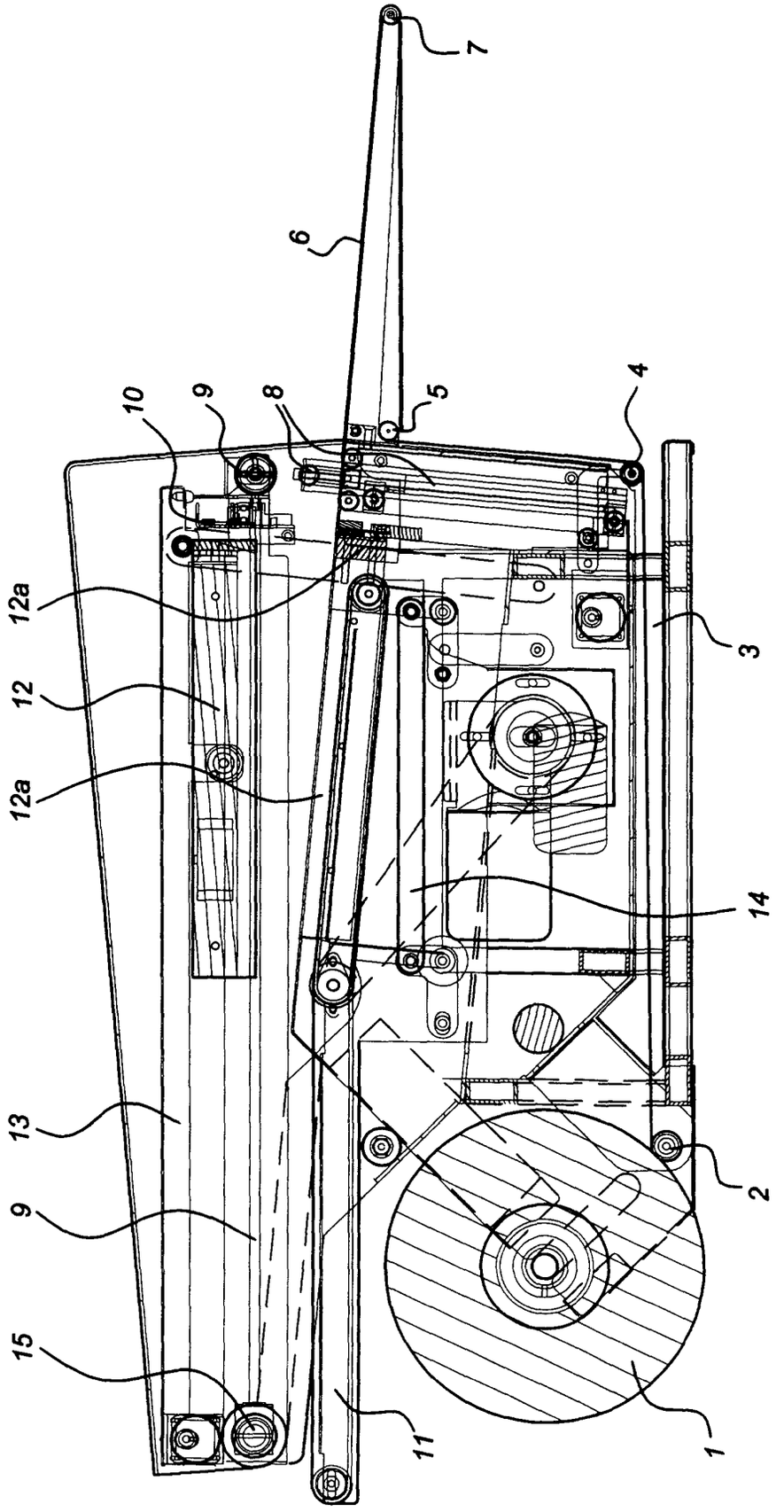


Fig 4

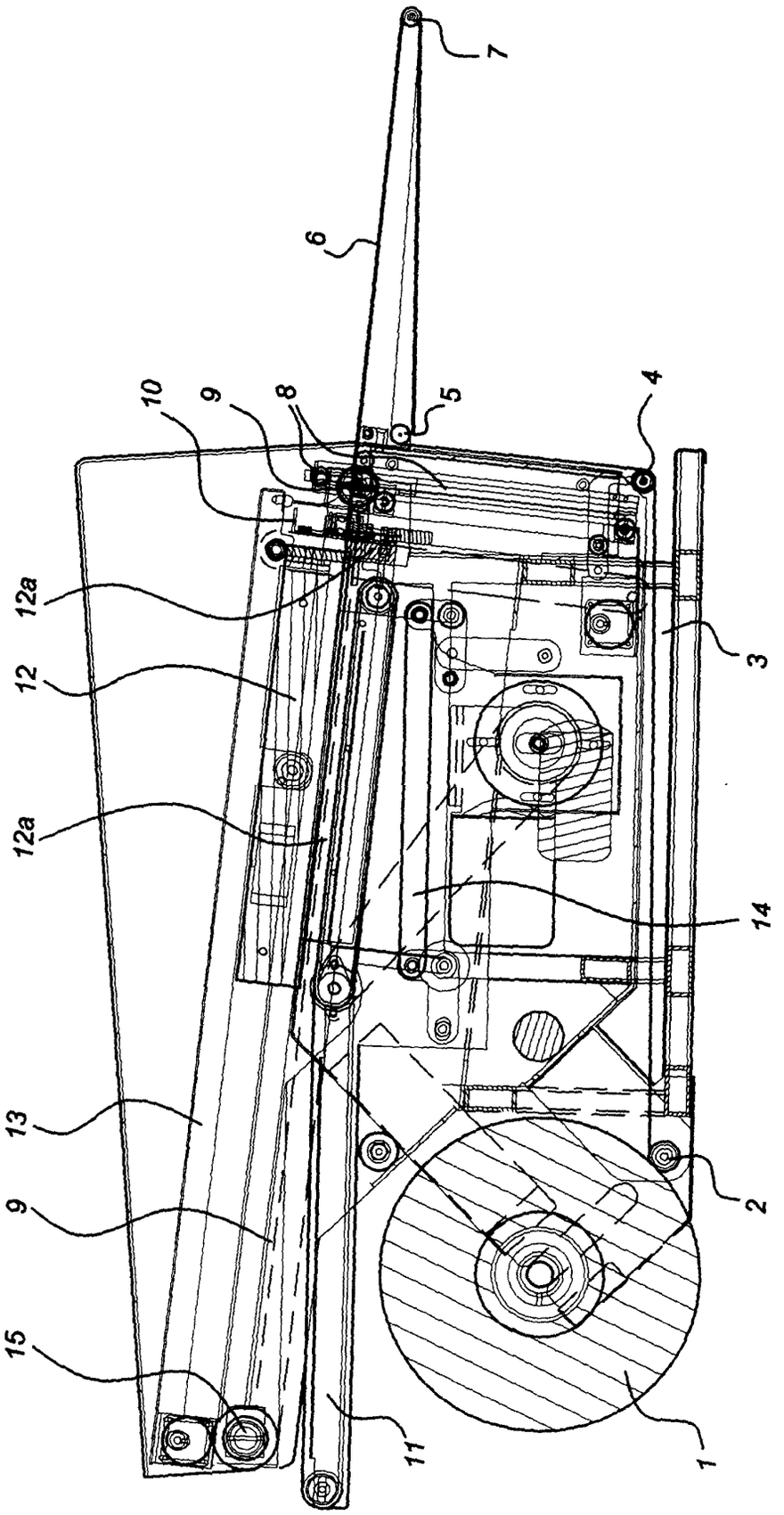


Fig 5

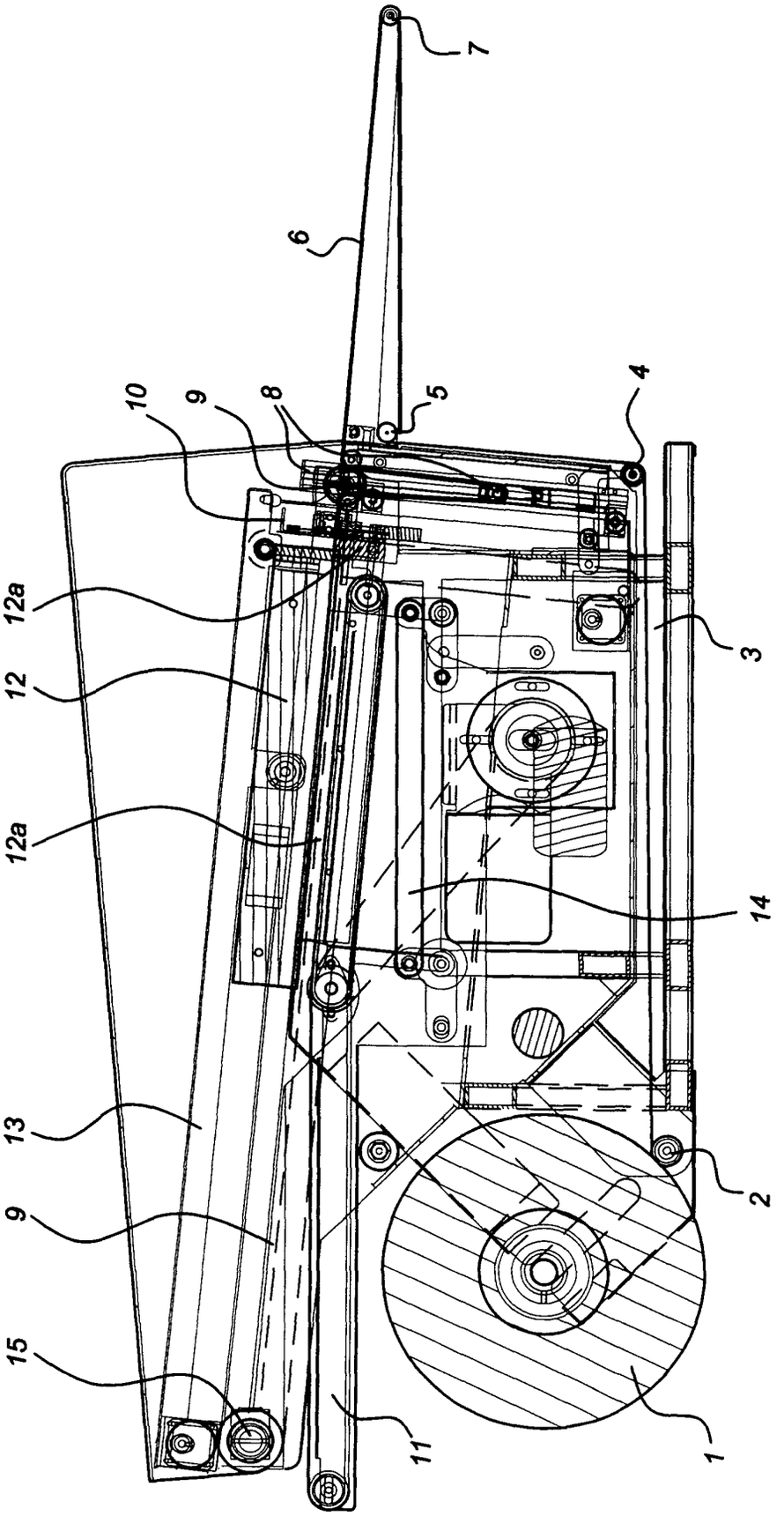


Fig 6

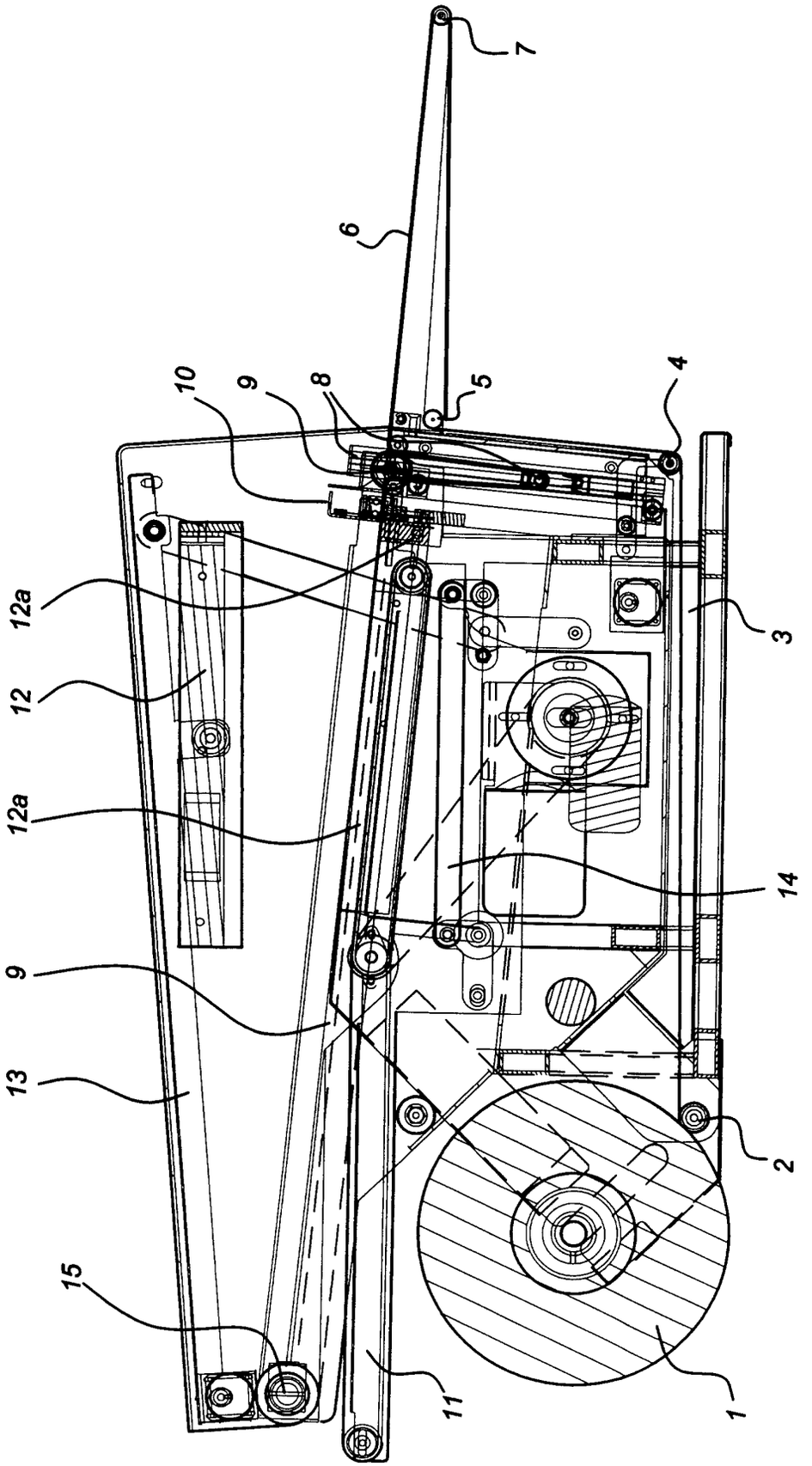


Fig 7

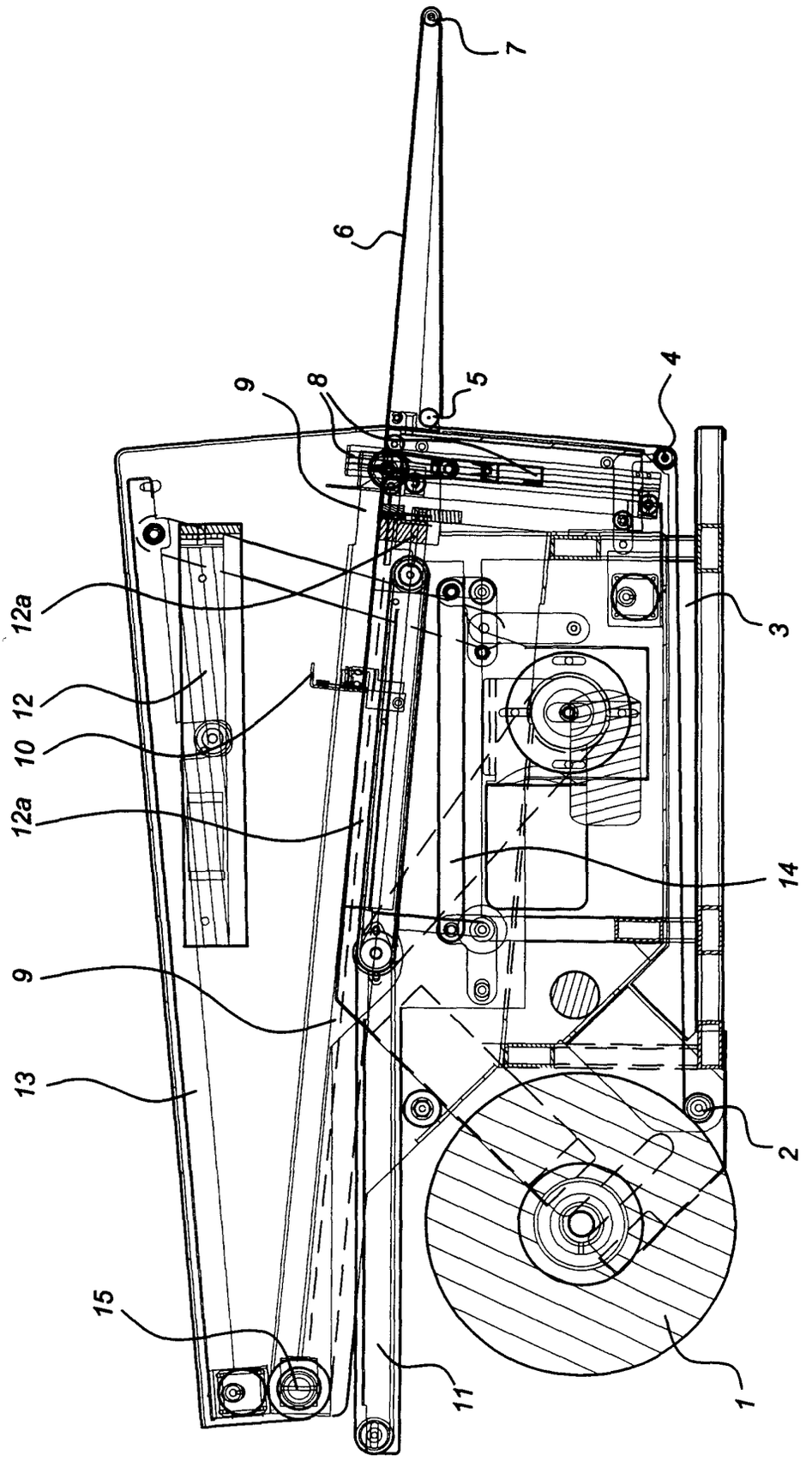


Fig 8

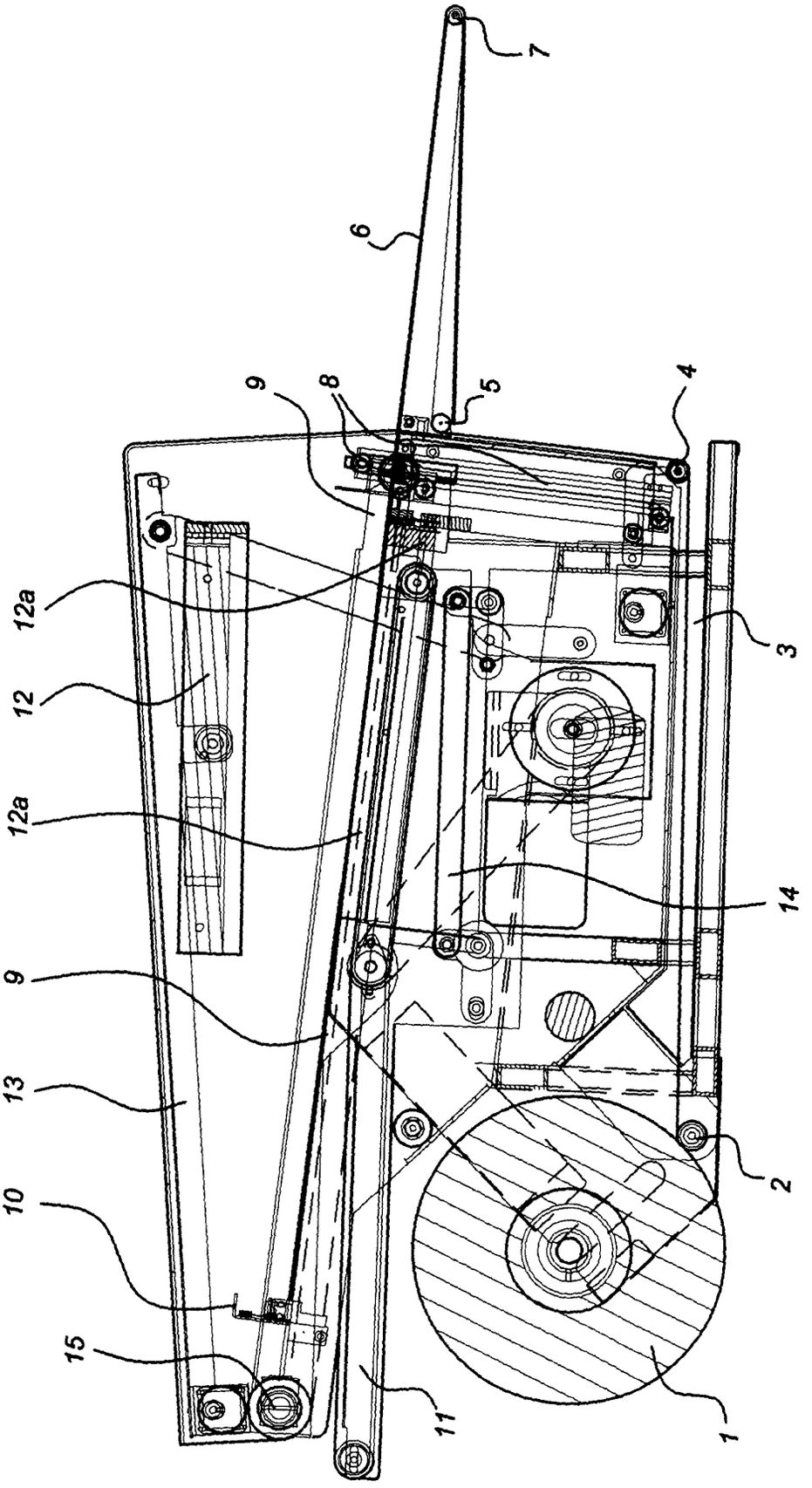


Fig 9

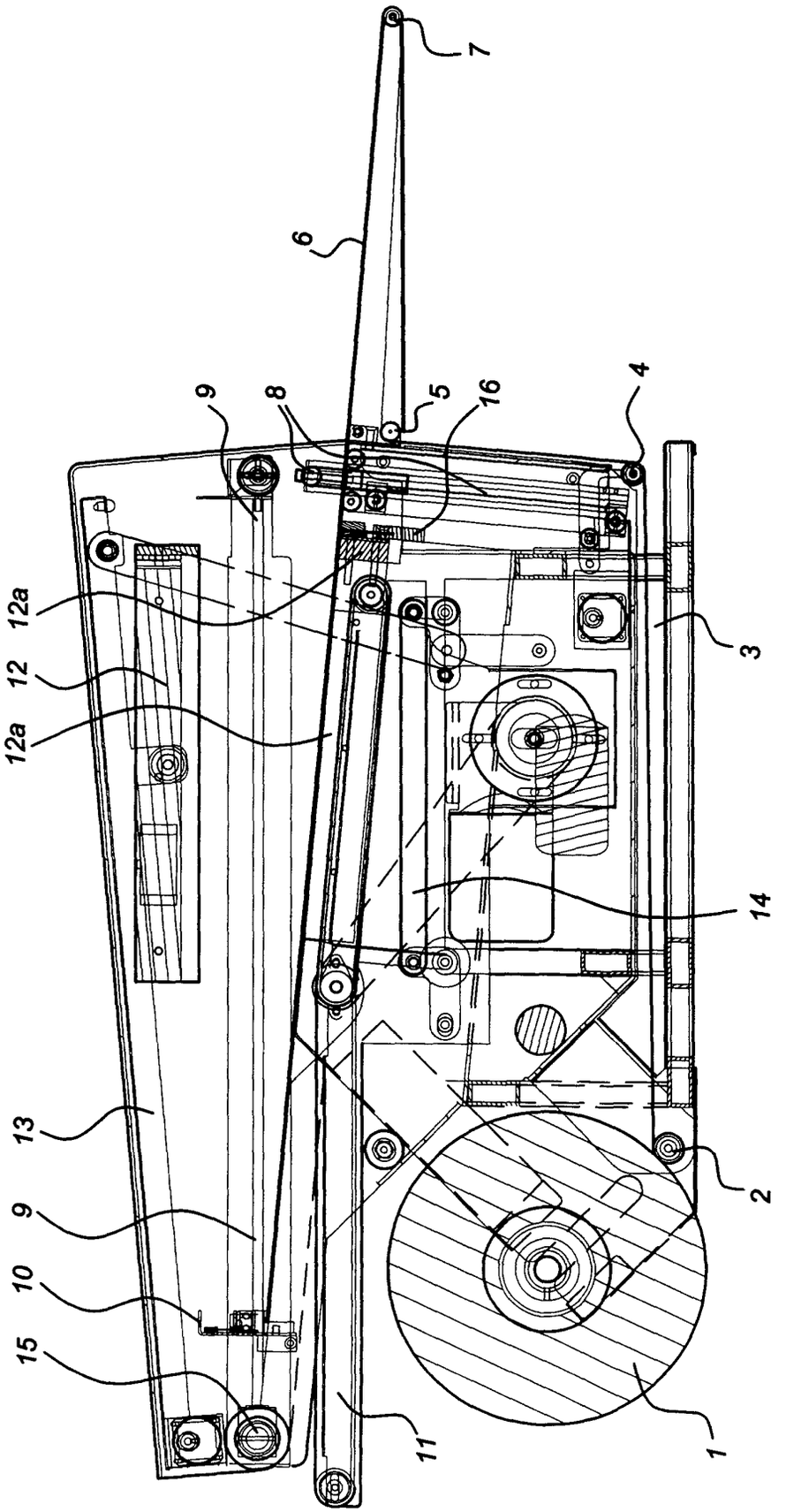


Fig 10

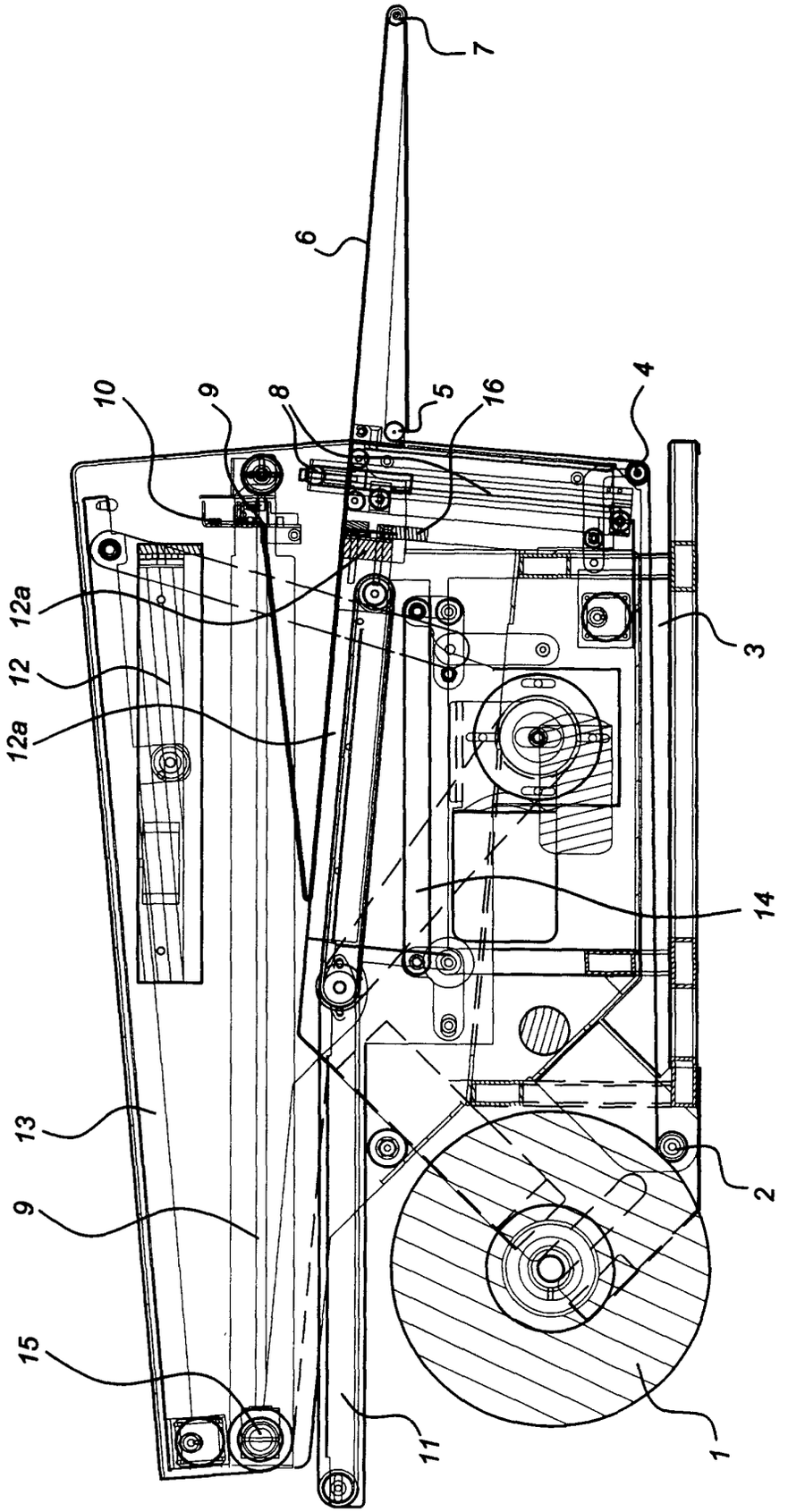


Fig 11

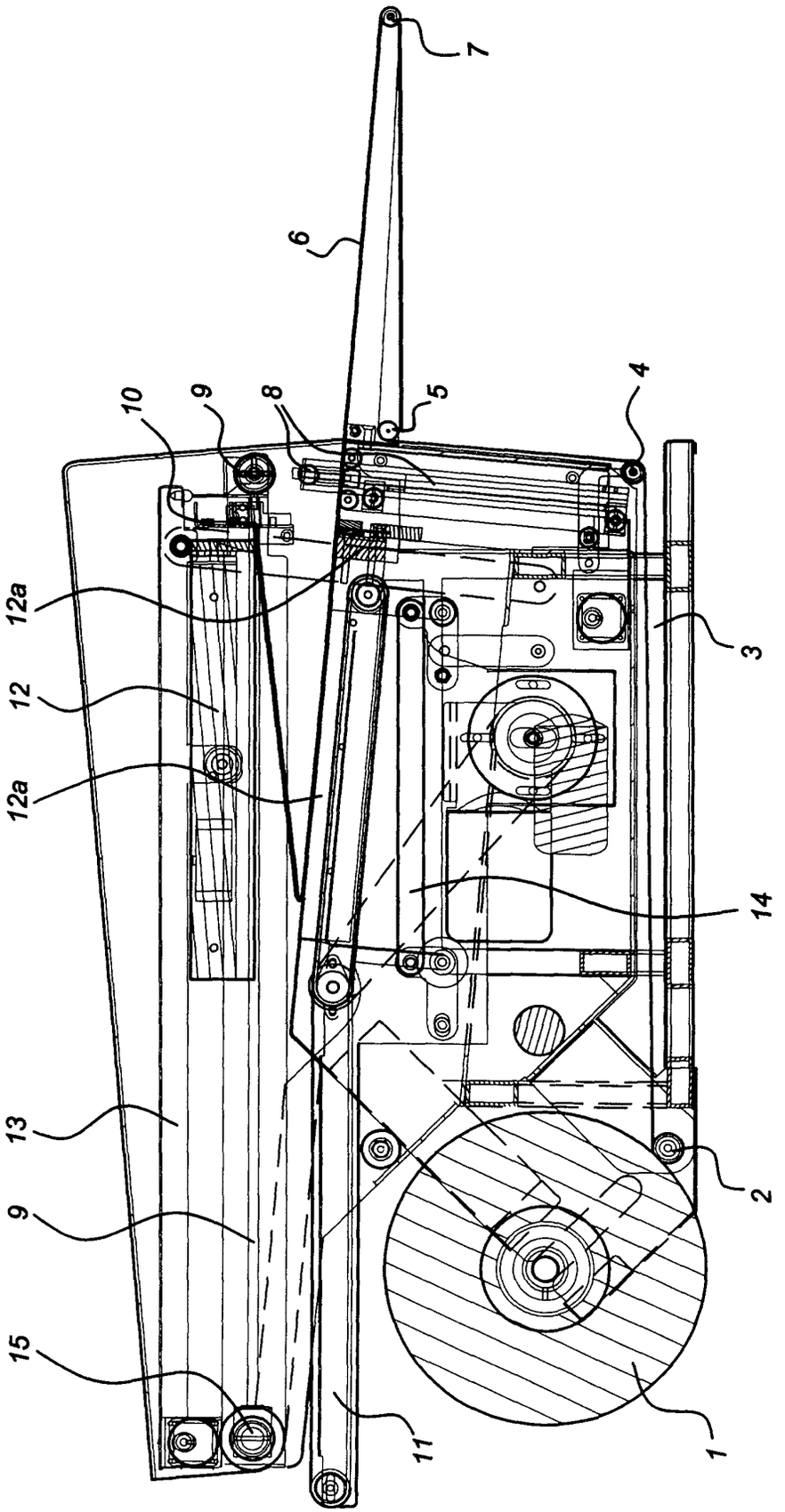
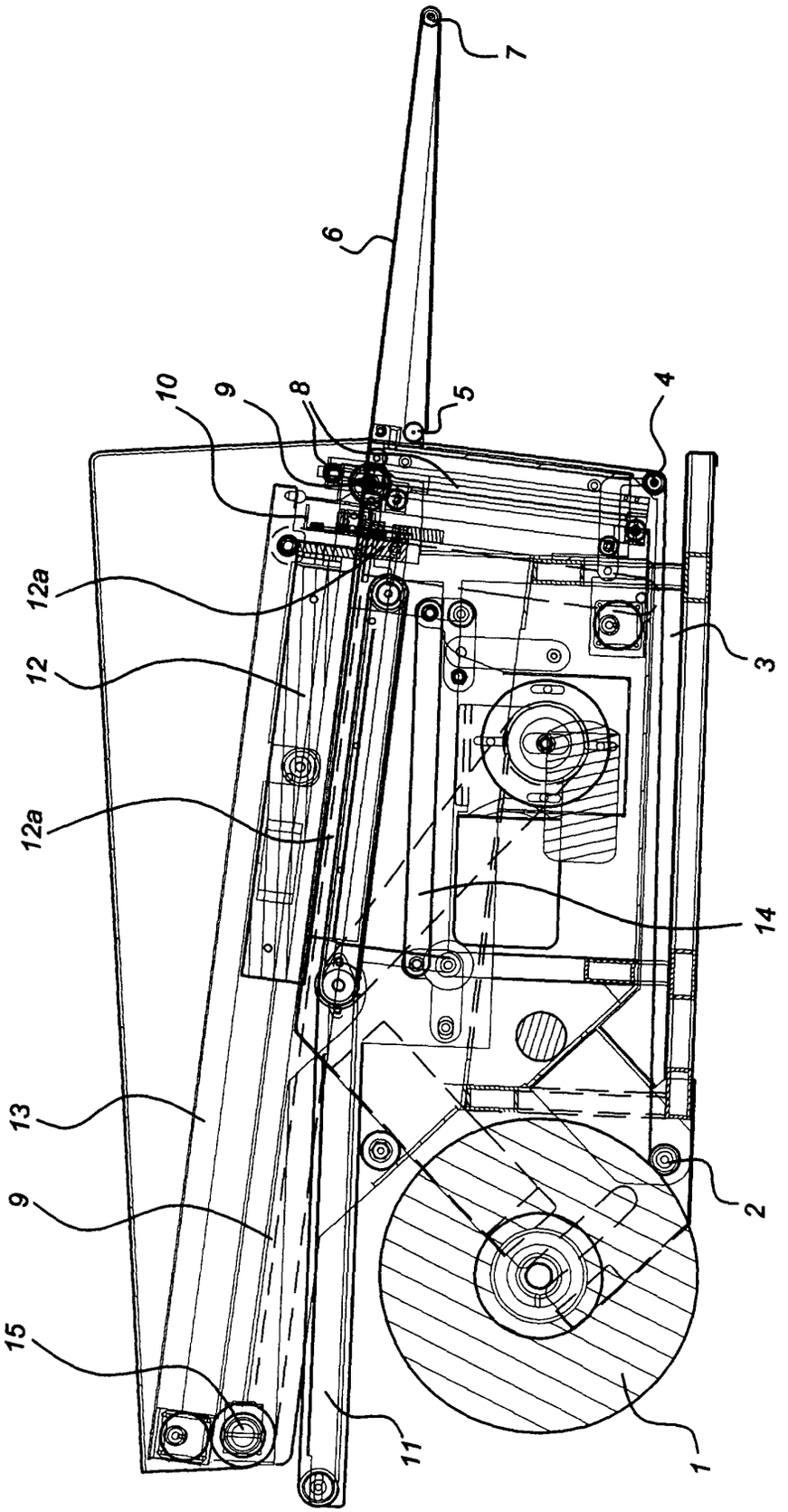


Fig 12



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EUROPEAN SEARCH REPORT

Application Number
EP 01 20 0584

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 3 016 673 A (J. PARKER) 16 January 1962 (1962-01-16) * column 2, line 5 - column 4, line 54; figures *	1,7	B65B11/48 B65B25/08
A	DE 86 12 555 U (H. QUERMANN) 24 July 1986 (1986-07-24) * page 6, line 8 - page 9, line 36; figures *	1,3,7	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	1 June 2001	Jagusiak, A

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01-06-2001

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