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(11) EP 0 773 162 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.05.1997 Bulletin 1997/20

(51) Int. Cl.⁶: B65B 11/02

(21) Application number: 96117472.9

(22) Date of filing: 31.10.1996

(84) Designated Contracting States:
CH DE ES FR GB IT LI

(30) Priority: 10.11.1995 IT BO950529

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(54) Method and apparatus for feeding and wrapping chocolates

(57) The chocolates (1), initially upright, are tilted and inserted horizontally into the seats (17) of the disc (18) that transfers them to the wrapping station. Here the chocolate is raised with its overlaid wrapping material (20) and passes through a folder (23) that folds down the opposite lateral portions (120, 220) of said wrapper and then folds, onto the base of the chocolate, firstly the middle portion (32) and then the lateral portions (420, 520) of the section of wrapper projecting from the base of the chocolate. The chocolate and the wrapper are then gripped by a pincer (30), after which there act in succession a folder (31), which folds up underneath the chocolate the projecting middle portion of the portions of wrapper (320, 420, 520) that have already been folded over the base of the chocolate, and a folder (33, 133), which folds up underneath the chocolate one of the lateral portions of the wrapper (220) previously folded down; after which said first folder moves to its rest position and the pincer holding the chocolate with its wrapper rotates and causes the other lateral portion of said wrapper (120) to be acted on by a fixed folder (34) which folds this portion up underneath the chocolate. While the pincer is stationary, a gripper (35) closes the other end of the wrapper into a twist (620).

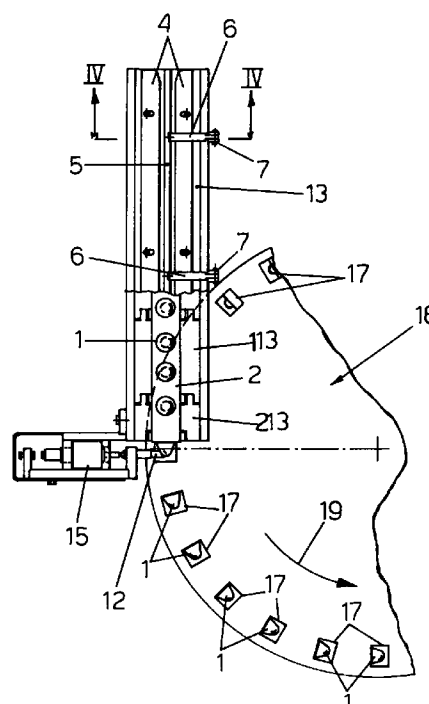


Fig. 1

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Description

The invention relates to a method and corresponding apparatus for feeding and wrapping domed chocolates (such as chocolate-coated cherry) or other products that require the wrapper to be closed by folding the edges over each other at one end and by screwing the other end into a twist.

The present method and apparatus differ from known systems by a more delicate treatment of the product, which is laid horizontally as early as the point where they are fed to the disc in which they are transferred to the wrapping station, as well as by a greater simplicity of execution and, more generally, a greater technological reliability.

The features of the invention and the advantages that flow therefrom will be clear from the following description of a preferred embodiment of the same, illustrated purely by way of non-restrictive example in the figures of the seven attached sheets of drawings, in which:

- Fig. 1 is a diagrammatic plan view from above of the conveyor which inserts the chocolates in phase and in the correct orientation into the seats of the disc which then transfers them to the wrapping station;
- Fig. 2 illustrates in greater detail and with parts cut away and in section, the feed conveyor of Figure 1;
- Fig. 3 illustrates further details of the conveyor shown in Figure 1, in a side view;
- Fig. 4 shows the conveyor of Figures 1 and 2 in transverse section on the plane IV-IV;
- Fig. 5 is a plan view from above of the compound folder that operates in the chocolate wrapping station, for folding one end of the wrapper onto the base of said chocolate;
- Figs. 6 and 7 shown further details of the compound folder of Figure 5 in section on planes VI-VI and VII-VII, respectively, as marked in Figure 5;
- Figs. 8, 9 and 10 show the compound folder as in Figure 6 during subsequent operations on the chocolate wrapper;
- Fig. 11 shows the compound folder as in Figure 7 and in the same operating stage as in Figure 10;
- Figs. 12 and 13 show the compound folder as in Figure 11, in a final working stage, and illustrate the subsequent operation of a dynamic folder;
- Figs. 14 and 15 show the compound folder as in Figure 6 and show the action of other known folders which complete the closure of the wrapper; and
- Fig. 16 is a diagrammatic side view of the final closing of one end of the chocolate wrapper into a twist.

Figures 1 to 4 show that the chocolates 1 are fed in single file on a conveyor belt 2 whose top side passes along an initial straight horizontal guide 13, an intermediate curved descending guide 113 and a final straight descending guide 213, which has a slope of approximately 60°. The conveyor can be adjusted by means of

the extendable telescopic construction of the end part 13' with which the guide 13 is connected to the guide 113 (Figs. 2 and 3). Between the guides 13, 113 and 213 are idle joining rollers 3. The bottom side of the conveyor 2 is fed around a pair of idle rollers 103, one of which acts as a take-up device, and around a drive roller 203.

The chocolates 1 stand base down on the top side of the conveyor 2, advance in the direction of the arrow F and are controlled, laterally by guides 4 whose distance from each other can be adjusted, and from above by a middle guide 5 divided into two sections at the point where the conveyor descends. The horizontal section of the guide 5 is mounted on arms 6 connected pivotably to adjustable supports 7 (Fig. 4) to allow for adaptation to the shape of the product and in such a way that this guide can be removed quickly if some unusual action should be required on the flow of the products for wrapping. The descending section of the guide 5 is however connected to a support 8 via an adjustment device 9, and downstream of this guide is an idle wheel 10 that accompanies the chocolates in the final stage as they leave the feed conveyor. The wheel 10 is mounted on the end of a lever 38 which pivots at 39 on a projection integral with the support 8, this lever being urged by a spring 40 towards the conveyor 2 and fitted with an adjusting screw 41 to enable the interference of said wheel with the chocolates to be adjusted.

Upstream of the wheel 10 it is possible to have a nozzle 11 connected to a pipe supplying compressed air which in response to a signal emits a blast of air perpendicularly at the conveyor 2 (see later). At the end of the conveying channel formed by the final sloping section of the conveyor 2, by the lateral guides 4 and by the abovementioned guide 9, 109 is a transverse bolt 12 which arrests the flow of chocolates with its rounded end, is movable on the guide 14 and is controlled by a rectilinear actuator 15 supported by a support 16 mounted on the frame of said conveyor.

It can be seen in Figure 4 that the conveyor 2 is arranged tangentially to the ring of through seats 17 of the disc 18 whose axis is vertical. This disc rotates in the direction of the arrow 19 and with each step brings one of said seats underneath the end of the above-mentioned conveyor 2, to receive from the latter one chocolate and then transfer it to the wrapping station. By means of the conveyor 2, the chocolates are conveyed in single file, initially in a vertical arrangement and then increasingly tilted. When a seat 17 in the disc 18 is underneath the end of the conveyor 2, the bolt 12 is retracted and the chocolate drops into the seat 17 where it lies and remains on its side owing to the special shaping of this seat for this purpose. At the right moment the optional nozzle 11 is activated and emits a blast of compressed air to slow the descent of the chocolates sufficiently to allow the bolt 12 to retract first and then return to the active position without interfering dangerously with the chocolates. Once the bolt 12 is reset, the nozzle 11 stops emitting the blast of compressed air

and the disc 18 turns one step to bring a new empty seat 17 under the end of the conveyor 2 for the repeat of the cycle described above.

In Figures 5, 6 and 7 it can be seen that the disc 18 positions the chocolates 1 one by one in the wrapping station where known means place the wrapping material 20 over the chocolate. In this station the chocolate is located between a lifter 21 and a complementary lifter 22, these also being of known type, which at the appropriate moment grip the chocolate with its overlaid wrapper and raise them together on a vertical course to be acted on by a fixed compound folder 23 that comprises:

- a pair of vertical parallel walls 24, 124 separated from each other by a distance slightly greater than the diameter of the base of the chocolate, between which walls the chocolate passes with its axis horizontal and parallel with the walls. The opposite portions 120, 220 of the wrapper interfere with the walls 24, 124 and are folded down, giving the wrapper the shape of an upturned U (Figs. 7, 8, 9). The walls 24, 124 are fixed at one end to, and project from, a common wall 25 which is fixed to some suitable supporting structure (not illustrated);
- a folder 26 fixed to and projecting from said wall 25, in a position equidistant from the walls 24, 124, which interferes with the portion 320 of the wrapper so as to fold it down. Fixed to the free end of the folder 26 is the lower end of a vertical spatula 27 whose width is slightly less than the diameter of the base of the chocolate: this folds said portion 320 of the wrapper and keeps it in contact with said base of the chocolate;
- a pair of opposing folders 28, 128 presenting sloping plains and attached sideways on to the inside flanks of the walls 24, 124 at different heights and at the rear and a short distance from said spatula 27, in order to fold across, over the portion 320, the opposite lateral portions 420 and 520 of the wrapper, as can be deduced from the sequence of Figures 9, 10 and 11. In Figures 7 and 11 it will be seen that the folders 28, 128 slope not only in the direction of their width but also in the direction of their thickness, so that their folding of these portions of the wrapper is gradual; and
- a vertical wall 29 positioned above the spatula 27 at an exact distance and coplanar with the latter, against which the chocolate is stopped at the end of its rise. The wall 29 maintains the abovementioned portions 320, 420, 520 correctly positioned after they have ceased to be acted upon by the folders 28, 128 and by the spatula 27. The wall 29 may for instance be attached via uprights 129 to the folders 28, 128 discussed earlier.

At the end of its rise (Fig. 12), the chocolate with its wrapper is gripped laterally by the opposing jaws of one of the pincers 30 of the known hub, which is designed to index round on a horizontal axis 130 (Fig. 15), after

which the lifter 21 and complementary lifter 22 release the chocolate and return to their starting positions to repeat the work cycle. Figure 12 also shows that as the process continues, a pivoting or translationally movable folder 31 connected to means (not shown) which in response to a signal insert this folder under the wall 29, comes into operation to fold a middle part of the abovementioned portions 320, 420, 520 up underneath the chocolate, as shown in Figures 13 and 14. After the action of said folder 31, there acts a side folder 33, mounted for example with the ability to pivot about the same axis 130 of rotation as the pincers 30 and connected to means which in response to a signal insert it underneath the chocolate in order to fold the lateral portion 220 of the wrapper up underneath it (see Fig. 15). The folder 33 positions itself in part also underneath the folder 31 and is provided with a finger 133 which is inserted above this folder against the wrapper portions 320, 420, 520 folded over the base of the chocolate (Figs. 13, 14 and 15) so that when the folder 31 is later withdrawn and returned to the rest position, said wrapper portions remain correctly arranged on the chocolate. The vertical wall 29, as shown in Figure 13, contains a lower recess 32 so as not to interfere with said finger 133 of the folder 33.

As the process continues, the pincer holding the chocolate with its wrapper executes a clockwise rotation of precise amplitude and causes the other lateral portion 120 of the wrapper to be acted on by a known fixed arcuate folder 34, which folds this portion up underneath the chocolate. At the end of these folding operations, the wrapper encloses the chocolate with a tubular shape which is closed on the base of the chocolate. It is in this form that the chocolate and its wrapper arrive at a station where the pincer 30 pauses, and a gripper 35 of known type grasps the wrapper by its open end in its concave and convex prehensile parts and performs a rotation as shown by the arrow 36 and a simultaneous axial movement 37 towards the chocolate, thereby also closing the other end of the wrapper into a twist 620. The gripper 35 then returns to its rest position, after which the pincer 30 rotates, opens and discharges the wrapped product onto collecting and dispatching means (not illustrated because known).

Claims

1. Method for wrapping domed chocolates or other products having similar requirements, characterized by the following succession of operating stages:
 - the chocolates are lined up and conveyed in single file, base down, and gradually tilted so that they can be inserted in the seats of the subsequent disc (18) that transfers them to the wrapping station, their disposition being rotated by ninety degrees relative to their original position and thus with their axes horizontal;

- the chocolate is positioned with its axis horizontal, below the wrapping material, which is spread flat and horizontal;
 - the chocolate and the overlaid wrapper, both being held from above and below, at opposite points, is raised by the specific raising means;
 - during the raising of the chocolate with its wrapper, the latter is acted on by means that: fold down the lateral portions (120, 220) of the wrapper (20); fold down the upper portion of the wrapper (320) projecting from the base of the chocolate; and fold across, over the portion previously folded onto the base of the chocolate, those portions (420, 520) of the wrapper that are projecting laterally from the said base;
 - after the abovementioned raising, the chocolate with its wrapper is held laterally at opposite points, while the previous raising means disengage; in this stationary stage the intermediate part of all said portions folded onto the base of the chocolate that was projecting below this base are folded up underneath the chocolate; in the next stage, while the chocolate is still stationary, one of the lateral portions (220) of the wrapper that had initially been folded down, is folded up underneath said chocolate;
 - the chocolate with its wrapper is rotated about a horizontal axis and the other lateral portion (120) of said wrapper is folded so that the wrapper is closed laterally and against the base of the chocolate; and
 - while the chocolate with its wrapper is held stationary, the end of the wrapper that was open is closed by screwing it into a twist (620), after which the chocolate with its definitively closed wrapper is discharged.
2. Apparatus for wrapping domed chocolates or other products having similar requirements, especially for performing the method described in Claim 1, characterized in that it comprises:
- means (2) for the guidance and conveyance in single file of the chocolates, base down and carried by said means along a descending path formed by an initial horizontal section, an intermediate curved section and a final sloping section that is almost vertical, and downstream of these guiding and conveying means are means (12) that arrest the flow of chocolates and in response to a signal allow one chocolate to fall off at a time;
 - the guiding and conveying means described in the previous point are situated tangentially to and above a disc (18) whose axis is vertical and which has a concentric ring of seats (17) of suitable shape, open at the bottom and angularly equidistant from each other, which disc is rotated stepwise in order with each step to

- position one of said seats under the end of the above-mentioned means which insert into said seat a chocolate, which, because of the special shape of these seats (17), positions itself and remains in its seat with its axis arranged horizontally and thus with its base on an imaginary vertical plane that intersects said disc diametrically or approximately diametrically;
- known means for positioning the wrapping material (20) in a station where said disc (18) is stationary, its seats each containing one chocolate, horizontally over said chocolate;
- a lifter (21) and a complementary lifter (22) of known type, which at the right moment grip the chocolate, with its wrapper on top, from below and above and carry the two together on a vertical upward course of defined amplitude;
- a fixed compound folder (23) which, as the chocolate with its wrapper on top is raised: folds down the opposite portions (120, 220) of the wrapper; folds down the upper portion of the wrapper (320) projecting from the base of the chocolate; and folds across, over said portion (320), those portions (420, 520) of the wrapper that are projecting laterally from said base;
- a hub that rotates stepwise on a horizontal axis (130) located on an imaginary plane containing the axis of the chocolate in the wrapping station, which hub is fitted radially and at equal angular intervals with pincers (30) which with each step position themselves open in the wrapping station in order to grasp the sides of the chocolate with its wrapper after it has been raised by the lifter and complementary lifter, which return to their start-of-cycle position;
- a folder (31) that acts when the chocolate is being held by said pincer (30), so as to fold up underneath the chocolate the middle part of all the portions previously folded onto the base of the chocolate, which was projecting below this base;
- a partly known folder (33) that acts transversely after the folder described in the previous point, which then returns to its rest position, so as to fold up underneath the chocolate one of the lateral portions (220) of the wrapper, which were pointing down;
- during the next turn of the hub with the pincers (30), a fixed arcuate folder (34) whose centre of curvature is on the axis of rotation of said hub, folds up underneath the chocolate the other lateral portion (120) which was previously pointing down, said folder (33) being returned to its rest position at the appropriate moment;
- during a pause of the hub with its pincers (30) each holding one chocolate with its wrapper closed laterally and at the end against the base of the chocolate, the other end of the wrapper

is acted on by a gripper of known type (35), which in response to a signal closes, rotates and moves axially to close this end of the wrapper by forming it into a twist (620); and

- means of known type which, after the final operation of closing the wrapper, and while the hub with its pincers holding the wrapped product is stationary, at a moment synchronized with the opening of a pincer, discharge and remove said wrapped product.
3. Apparatus according to Claim 2, in which the means that feed the chocolates to the seats of the disc (18), which then transfers these chocolates to the wrapping station, comprise a powered conveyor belt (2), the top side of which travels along an initial straight horizontal guide (13), an intermediate curved descending guide (113) and a final straight sloping guide (213) that forms an angle of approximately 60° with the horizontal, while idle joining rollers (3) are situated between these guides, the row of chocolates fed along the top side of said conveyor being controlled laterally by adjustable parallel guides (4) and controlled from above by a central guide (5) that is likewise adjustable and includes a final section (9) for making independent adjustments, at least one transverse bolt (12) being arranged at the end of said conveyor to arrest the flow of chocolates, which bolt is connected to actuating means (15) which in response to a signal retract it so that one chocolate falls into the subjacent seat (17) of the transfer disc (18) and which then return it to the active position to arrest the following chocolate before said disc has rotated one step for the repeat cycle.
4. Apparatus according to Claim 3, in which the first (13) of the guides along which the top side of the conveyor belt (2) travels is connected to the succeeding guide (113) by a length-adjustable part (13'), in order that the slope of the final guides (113, 213) and of the descending section of said conveyor can be adjusted.
5. Apparatus according to Claim 3, in which the end of the upper guide (5) that controls the flow of chocolates towards the transfer disc (18) is fitted with a nozzle (11) connected to means such that, at a moment synchronized with the feeding of one chocolate into a seat in said disc, said nozzle emits a short blast of air that acts on the chocolate immediately following to slow its fall and allow the interception bolt (12) to execute the movements assigned to it without interfering dangerously with the chocolates.
6. Apparatus according to Claim 3, in which, in a tangential position immediately downstream of the upper guide (5) that controls the flow of chocolates

toward the transfer disc (18), there is at least one idle spring-mounted adjustable wheel that accompanies the chocolate delicately as it leaves the feed channel and drops into one of the seats (17) in said transfer disc.

7. Apparatus according to Claim 2, in which the compound folder (23) that first operates on the wrapper (20) when this is raised with its chocolate by the lifter and complementary lifter, comprises a pair of vertical walls (24, 124) parallel with each other and with the axis of the chocolate being wrapped, and connected at one end to a common supporting wall (25), the distance between them being slightly greater than the diameter of the base of the chocolate and conveniently diverging in the downward direction at their bottom edges, arrangements being made for the chocolate to be raised between these walls, which interfere with the opposite portions (120, 220) of the wrapper and fold them down, an L-shaped folder being arranged centrally between said walls with its horizontal section (26) fixed to said supporting wall (25) and its vertical section (27) being flat, the whole being such that this folder interferes with the middle upper part of the section of wrapper (320) projecting from the base of the chocolate and folds this part of the wrapper down onto said base; behind which vertical part (27) of said folder is a pair of folders (28, 128) presenting sloping planes, staggered relative to each other in order to interfere one after the other with the opposing lateral sections of wrapper (420, 520) projecting from the base of the chocolate, in order to fold these one over the other onto said base; and, above these last folders and at a suitable distance from them, a fixed vertical wall (29) being provided, against which are pressed the portions of the wrapper folded onto the base of the chocolate after having moved away from the action of said folders.
8. Apparatus according to Claim 7, in which the sloping-plane folders (28, 128) are fixed to the inside flanks of the vertical parallel walls (24, 124) of the compound folder (23) and are provided with little uprights (129) with which they support said final wall (29) used to hold the folded portions (320, 420, 520) of the wrapper against the base of the chocolate.
9. Apparatus according to Claim 2, in which the folder (33) that acts in a known way to fold one of the lateral portions of the wrapper (320), that was pointing down, up underneath the chocolate, is fitted with a lateral finger (133) which it places on the base of said chocolate above the previously deployed transverse folder (31) in order to keep the wrapper correctly arranged when this transverse folder returns to its rest position.

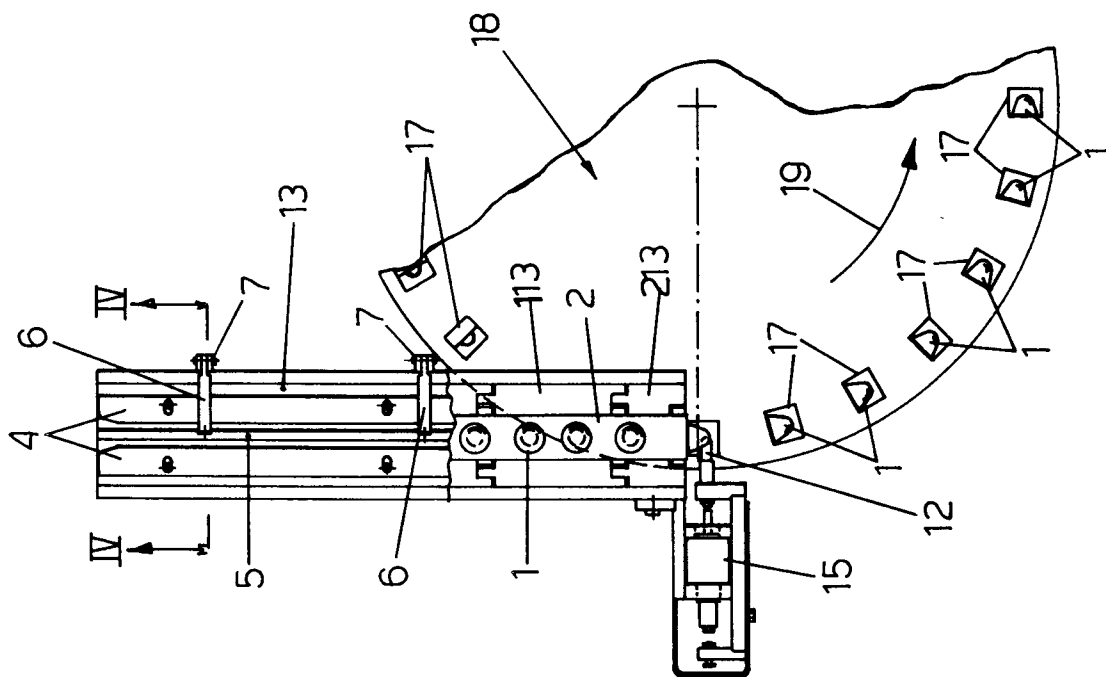


Fig. 1

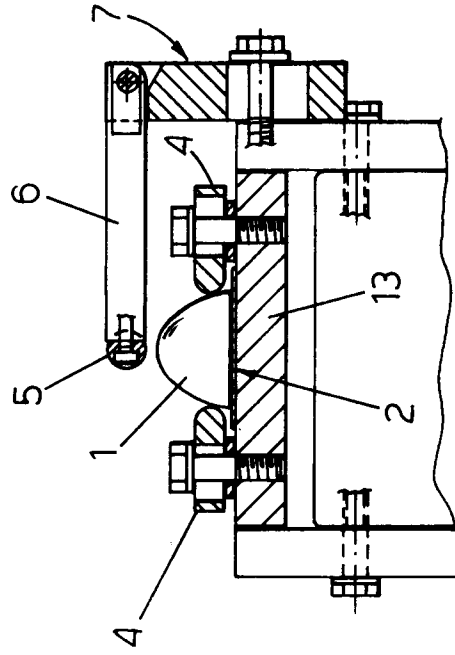
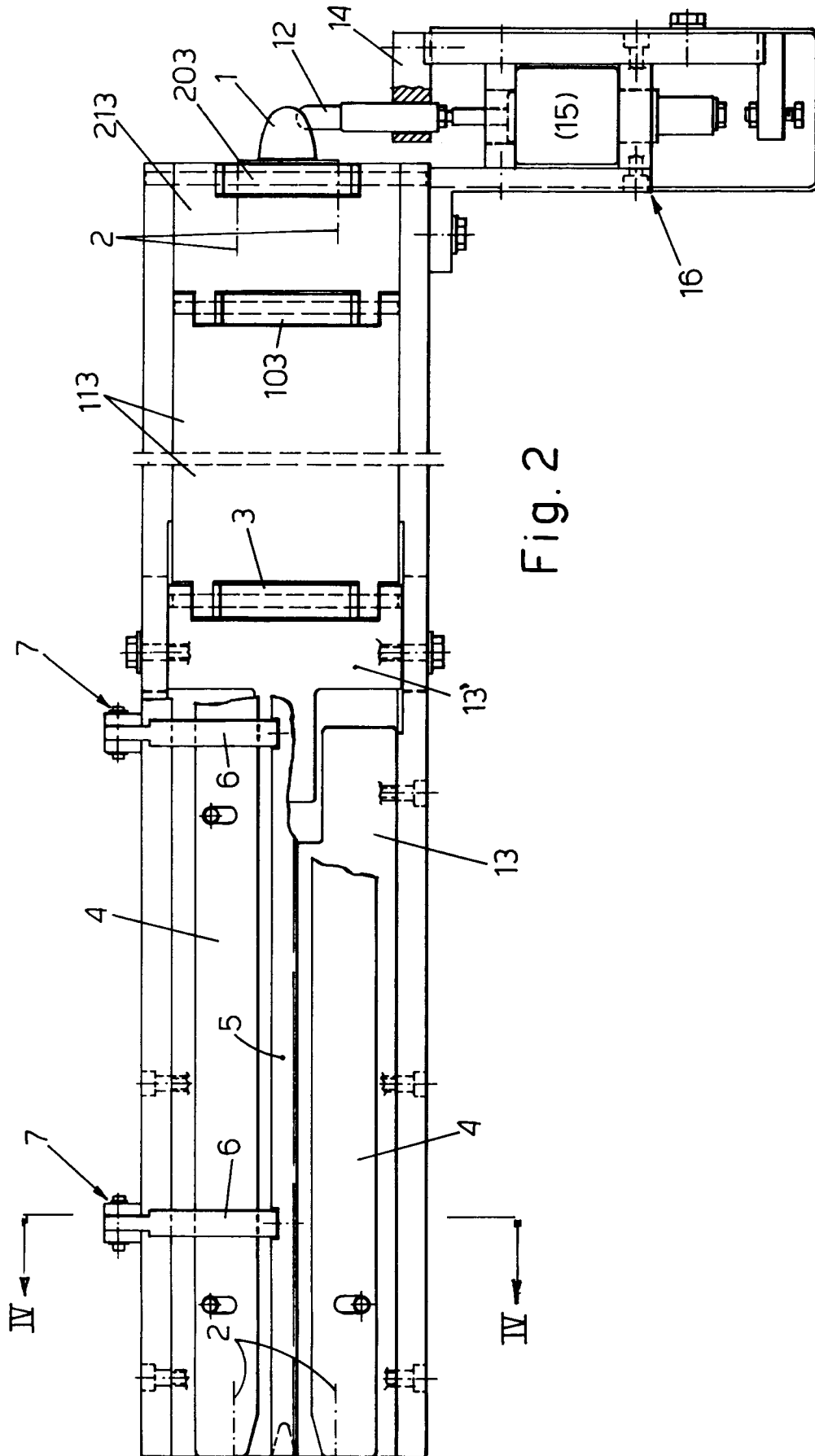
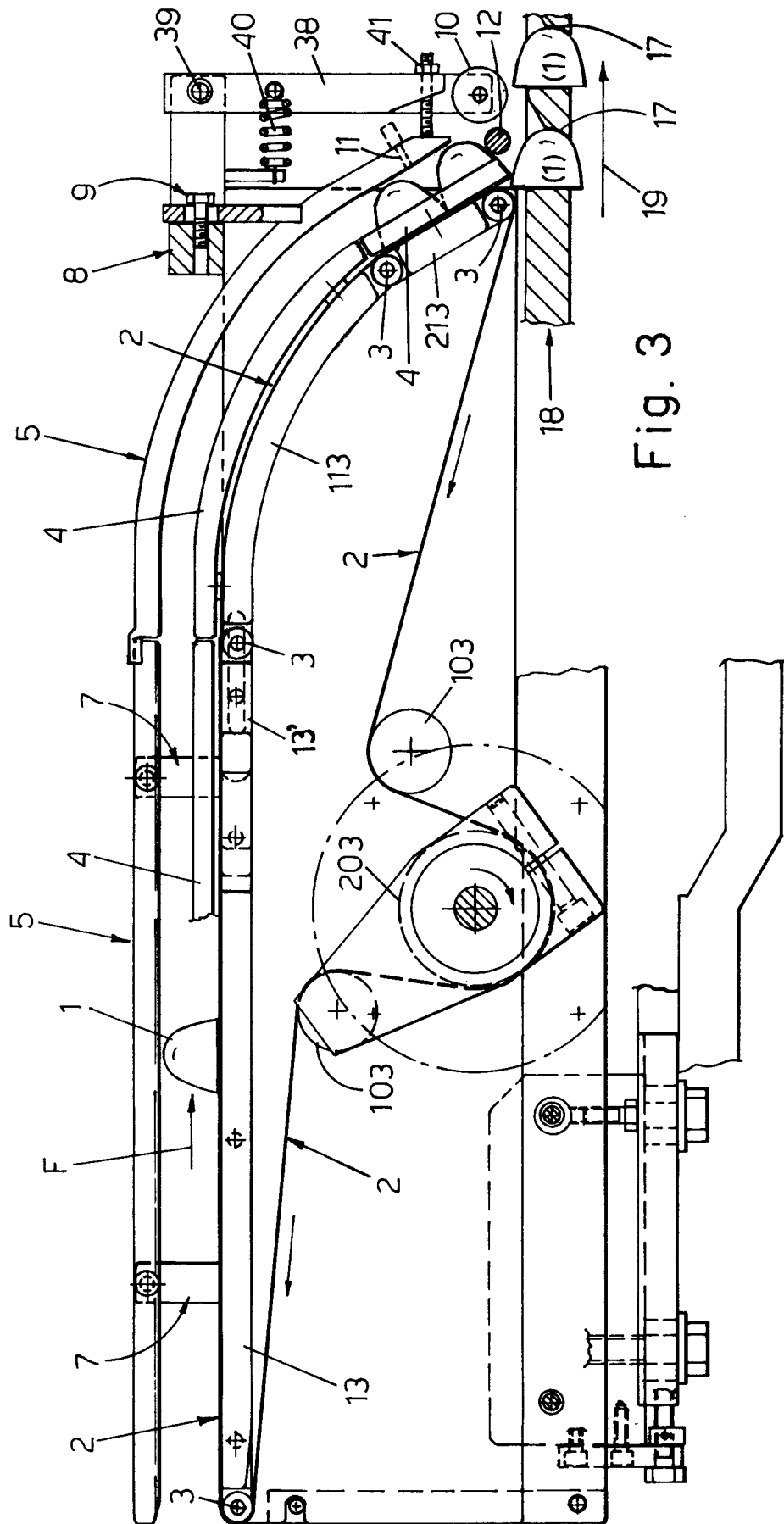
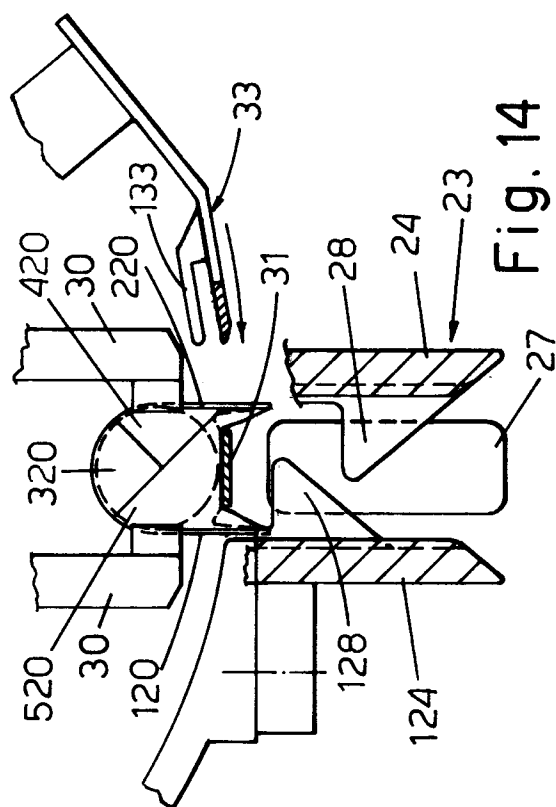
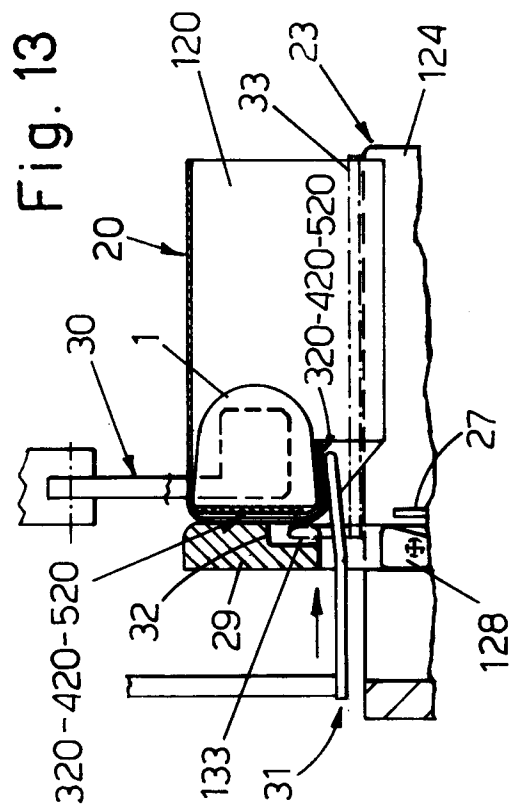
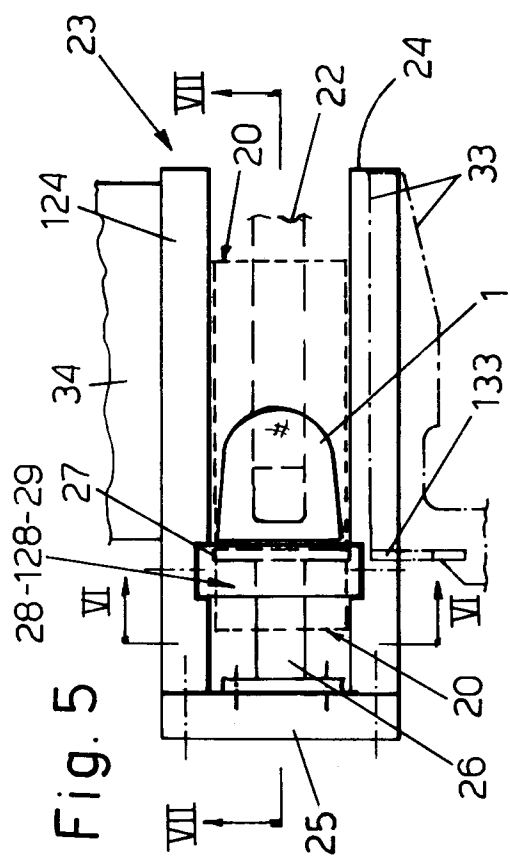


Fig. 4







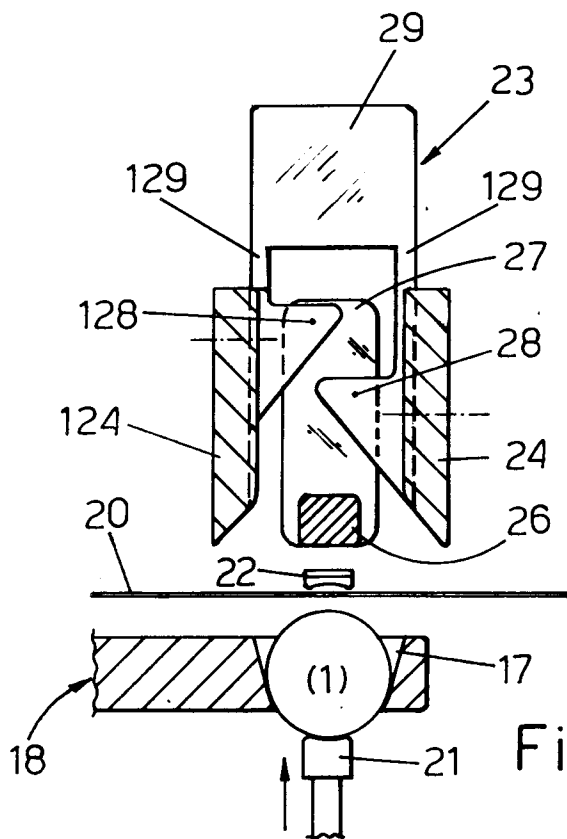


Fig. 6

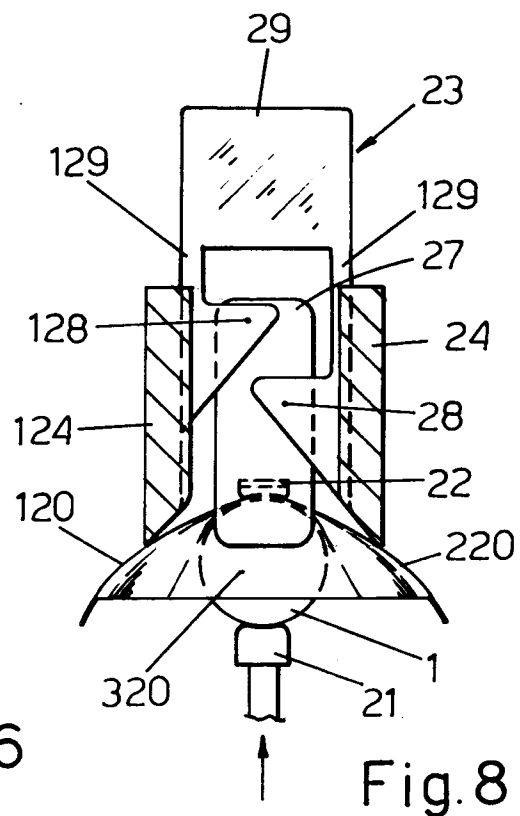


Fig. 8

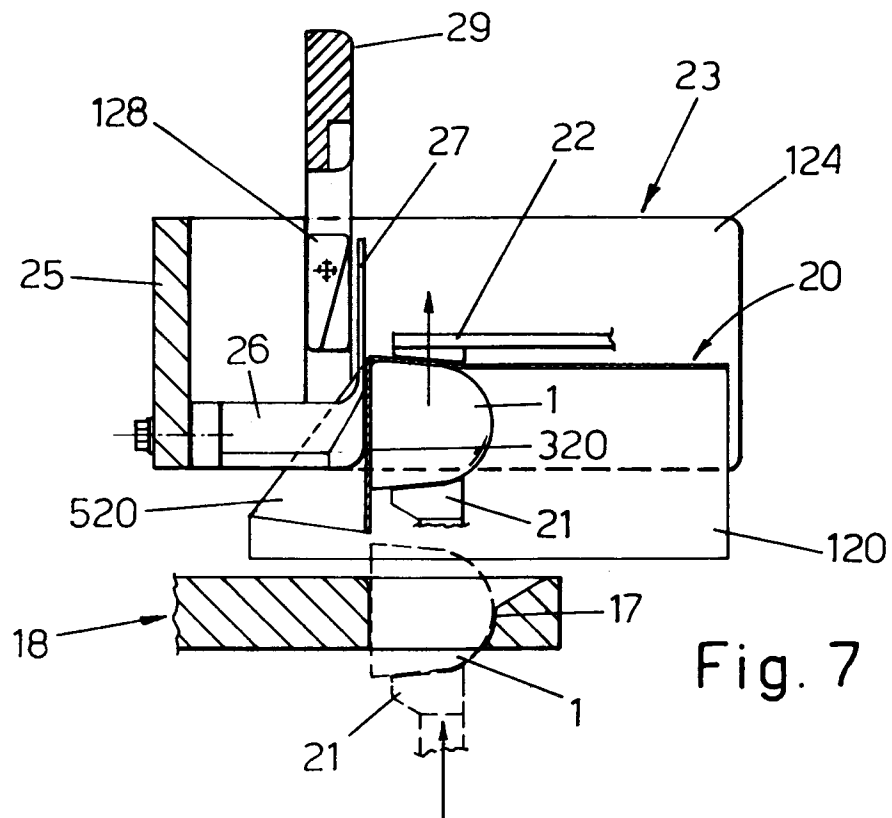


Fig. 7

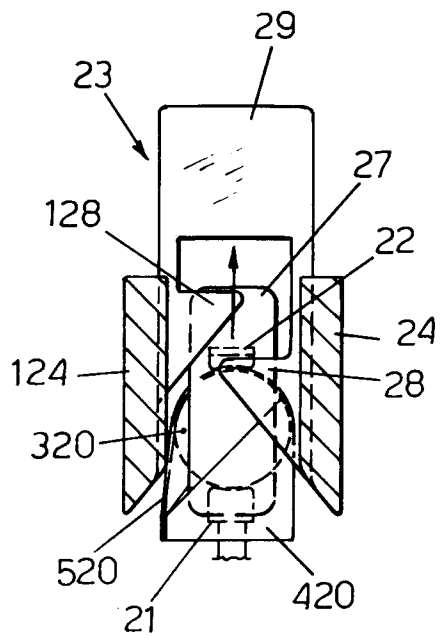


Fig. 9

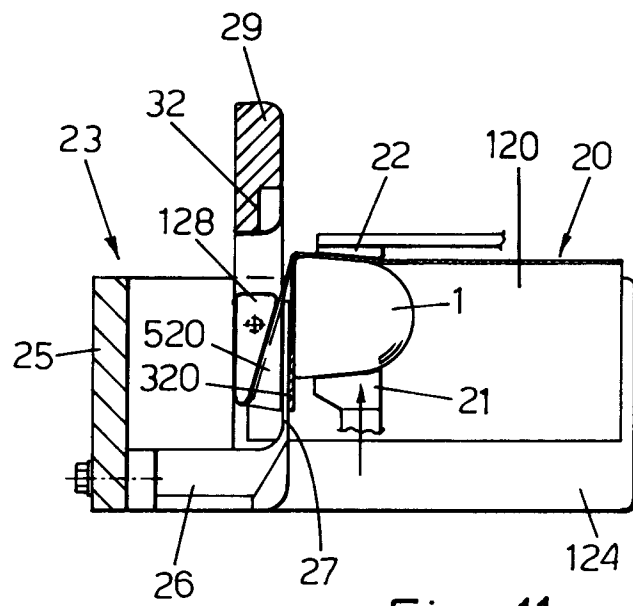


Fig. 11

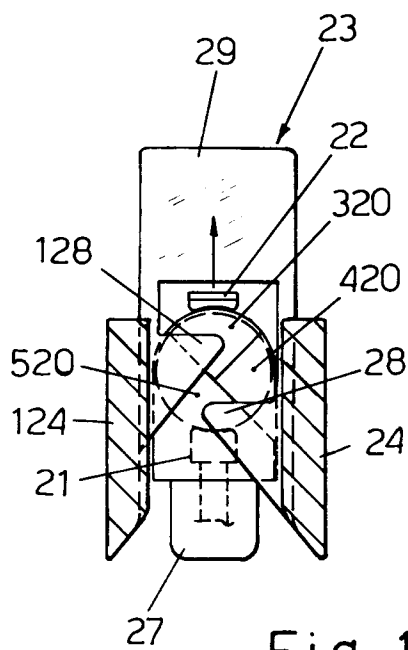


Fig. 10

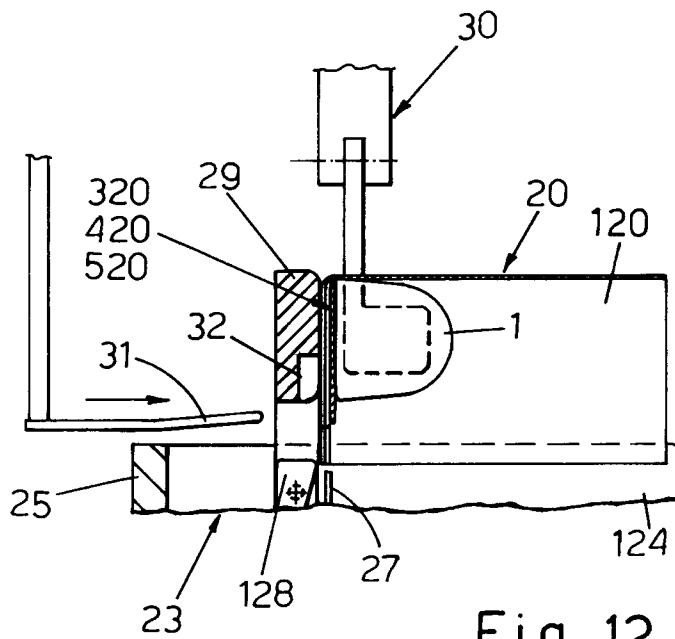


Fig. 12

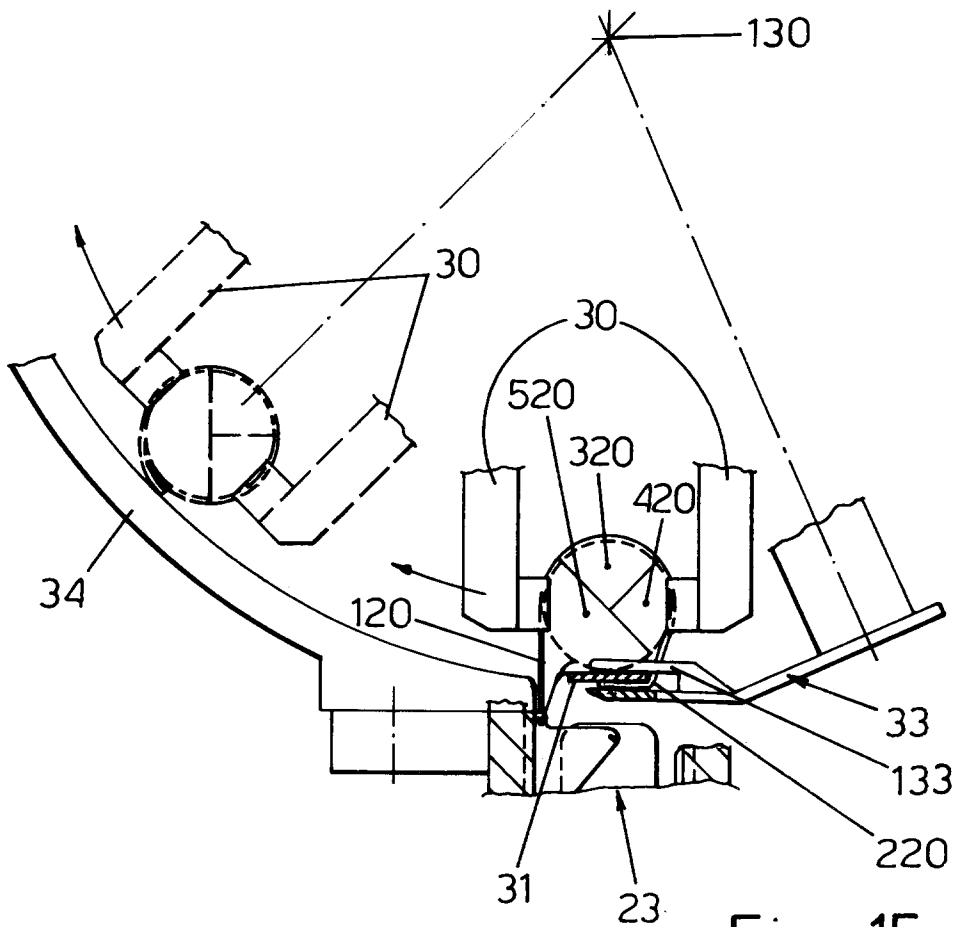


Fig. 15

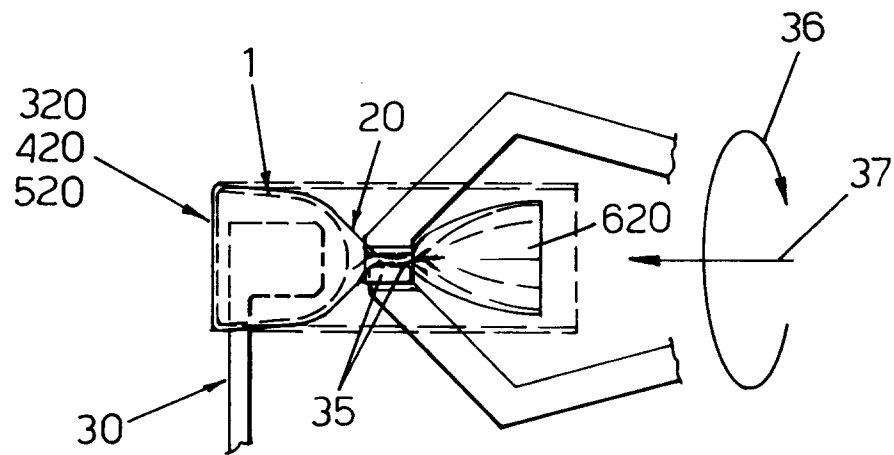


Fig. 16



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EUROPEAN SEARCH REPORT

Application Number
EP 96 11 7472

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.6)
A	NL 7 907 698 A (CARLE & MONTANARI) * page 4, paragraph 2; figures 1,6-8 *	1,2	B65B11/02
A	GB 2 224 709 A (FMC)		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		17 February 1997	Claeys, H
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