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

(11) **EP 2 886 476 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.06.2015 Bulletin 2015/26

(51) Int Cl.:
B65C 9/00 *(2006.01)*

(21) Application number: **14199854.2**

(22) Date of filing: **22.12.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **23.12.2013 IT VR20130291**

(71) Applicant: **P.E. Labellers S.p.A.**
46047 Porto Mantovano (MN) (IT)

(72) Inventor: **Schinelli, Nicola**
46100 Mantova (IT)

(74) Representative: **Modiano, Micaela Nadia et al**
Modiano & Partners (IT)
Via Meravigli, 16
20123 Milano (IT)

(54) **Device for cutting labels for labeling machines with sleeve labels**

(57) A device for cutting labels for labeling machines with sleeve labels, which comprises a base frame (2) that supports a supporting element (3) for a plurality of blades (4) that are arranged about an area (5) for the passage of a tubular element (6) to be cut which is fed by entrainment means; each one of the blades (4) being mounted on a respective blade holder arm (14) that is fixed, by way of locking means, to a respective supporting shaft (15) that is mounted rotatably, about its axis, on the supporting element (3); the locking means comprising at least one lever locking body (16) that has a first portion (16a) that is fixed to the supporting shaft (15) and a second portion (16b) that is fixed to the blade holder arm (14), the first portion (16a) being spaced apart from the second portion (16b) along a direction that is substantially perpendicular to the axis of the supporting shaft (15).

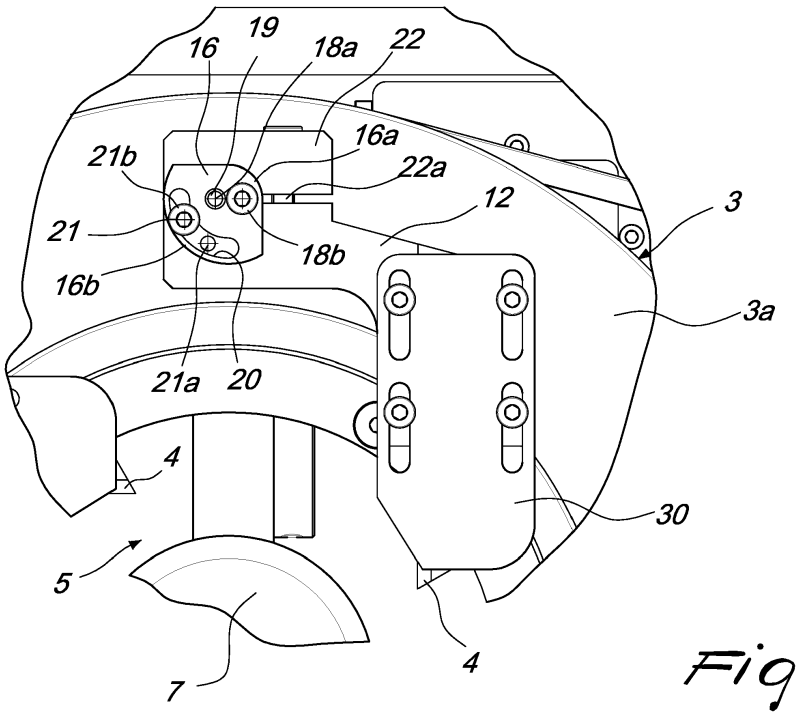

Fig. 4

EP 2 886 476 A1

Description

[0001] The present invention relates to a device for cutting labels for labeling machines with sleeve labels.

[0002] Labeling machines are known in which the labels, which are sleeve-shaped, are fitted around the containers to be labeled and subsequently heat-shrunk, in order to make them adhere to the containers.

[0003] Such machines have, usually, a cutting device that makes it possible to obtain the labels to be applied on the containers by way of cutting a continuous tubular element, made of an adapted plastic material, which is unrolled, in a flattened condition, from a coil and which is opened, by way of an adapted spreader element, before the cutting is performed.

[0004] The cutting devices have, typically, a base frame that supports means for the entrainment of the tubular element in the open condition, and on which a supporting element is mounted for a plurality of cutting blades that are distributed around a passage area that is defined in the supporting element and is intended to be axially crossed by the tubular element that is moved by the entrainment means.

[0005] In particular, such supporting element is actuated rotationally by motor means, with respect to the base frame, about a rotation axis that is substantially parallel to the axis of the tubular element, in order to allow the blades to cut the tubular element along a circumferential line, so as to remove from it, in succession, the sleeve labels which are, thus, fitted over the containers below which are in transit on a conveyor.

[0006] Each cutting blade is mounted on a respective blade holder arm that can move rotatably, with respect to the supporting element, about a corresponding rotation axis, which is substantially parallel to the axis of the tubular element, in order to move the cutting blades from a retracted rest position, in which they do not engage the tubular element, to an extended position for work, in which they are in contact with the tubular element, so as to perform the cut on it, and vice versa.

[0007] In particular, each blade holder arm is fixed to a corresponding supporting shaft that is substantially parallel to the axis of the tubular element to be cut and which, in turn, is rotatably supported by the supporting element about its own axis.

[0008] The rotation of the blade holder arms from the retracted position to the extended position is obtained by way of conical drive wheels, which are connected to one end of respective movement levers, which are fixed, at their other end, to the shafts for supporting the blade holder arms, and which engage, with their lateral surface, on the complementarily shaped outer surface of an annular cam, which is substantially coaxial to the axis of the tubular element and is translationally moved along its axis by adapted pneumatic cylinders, so that the sliding of the complementarily shaped outer surface of the annular cam on the lateral surface of the conical drive wheels can produce a movement of the movement levers with consequent rotation, about their axis, of the shafts for supporting the blade holder arms.

[0009] The angular motion of the blade holder arms returning from the extended position for work to the retracted rest position is instead obtained by way of adapted elastic means of return.

[0010] Typically, the locking of the blade holder arms to the corresponding supporting shaft is carried out by way of a clamp that is tightened against the supporting shaft by way of a locking bolt that is screwed in the corresponding blade holder arm.

[0011] This way of executing the locking of the blade holder arms to the corresponding supporting shafts has not however been found to be capable of preventing, following the impacts and torque moments involved, the blade holder arms from being subjected to unwanted angular slippages with respect to their supporting shafts, with consequent compromising of the correct operation of the cutting device.

[0012] The aim of the present invention is to provide a valid solution to the problem described above, by devising a device for cutting labels for labeling machines with sleeve labels in which the blade holder arms are locked stably and safely to the corresponding supporting shafts.

[0013] Within this aim, another object of the invention is to provide a device for cutting labels for labeling machines with sleeve labels which makes it possible to execute the fixing of the blade holder arms to the respective supporting shafts with the ability to adjust their relative position, as a function of the dimensions.

[0014] Another object of the invention is to provide a device for cutting labels for labeling machines with sleeve labels which offers a high level of reliability of operation.

[0015] This aim and these and other objects which will become better apparent hereinafter are achieved by the device for cutting labels for labeling machines with sleeve labels, according to the invention, as defined in claim 1.

[0016] Further characteristics and advantages of the invention will become better apparent from the description of a preferred, but not exclusive, embodiment thereof, which is illustrated by way of non-limiting example in the accompanying drawings wherein:

Figure 1 is a side elevation view of the control device according to the invention;
Figure 2 is a sectional view taken along the line II-II in Figure 1;
Figure 3 is a plan view from below of the device according to the invention;
Figure 4 shows an enlarged-scale detail of Figure 3;
Figure 5 shows an enlarged-scale detail of Figure 2;
Figures 6, 7 and 8 show different steps of the operation of the device according to the invention.

[0017] With reference to the figures, the device for cutting labels for labeling machines with sleeve labels, according to the invention, generally designated with the reference numeral 1, comprises a base frame 2, with

which a supporting element 3 is associated on which a plurality of blades 4 are mounted.

[0018] In particular, the blades 4 are arranged about a passage area 5, through which a tubular element 6 to be cut in order to obtain sleeve labels 6a is made to pass, and, as will be better explained hereinafter, they are moved about the axis of the tubular element 6 in order to execute the cut.

[0019] In particular the tubular element 6 is fed to the cutting device by entrainment means, which comprise, conveniently, a guide shaft 7, which passes through the passage area 5 and on which the tubular element 6 is made to slide by movement rollers 8.

[0020] Upstream of the guide shaft 7, with respect to the direction of advancement of the tubular element 6 on the guide shaft 7, there is, advantageously, a spreader element 9, which is constituted, for example, by an elongated body with mutually opposite walls that mutually diverge as they proceed along a direction in keeping with the direction of advancement of the tubular element 6. The spreader element 9 makes it possible to take the tubular element 6 from a flattened condition, in which it is found when it originates from a feed reel, not shown, to a widened or open condition, so as to be able to slide onto the guide shaft 7, assuming a substantially cylindrical shape structure with circular cross-section.

[0021] Preferably, the guide shaft 7 is arranged substantially vertically and, below it, the containers 10 to be labeled are made to pass, which receive the sleeve labels 6a that are cut in each instance from the tubular element 6, by way of, conveniently, a pair of entrainment wheels 11, which make it possible to entrain the sleeve labels 6a taken from the tubular element 6, so that they can be fitted over the containers 10 below.

[0022] Conveniently, the supporting element 3 is constituted by an annular body 3a, which is arranged substantially coaxially to the axis of the shaft guide 7 and, therefore, substantially coaxially to the axis of the tubular element 6 and which, in essence, laterally delimits the passage area 5.

[0023] In particular, the supporting element 3 is mounted rotatably on the base frame 2, about a rotation axis that is substantially parallel to the axis of the guide shaft 7 i.e. to the advancement direction of the tubular element 6 along the guide shaft 7, and can be actuated in rotation about the aforementioned rotation axis by way of motor means that comprise, for example, an electric motor, not shown, which is functionally connected to a pulley 12 with its axis substantially parallel to the axis of the guide shaft 7, which engages a belt 13 that is wound around the supporting element 3.

[0024] Each blade 4 is mounted on a respective blade holder arm 14 that is fixed, by way of locking means, to a respective supporting shaft 15, which is substantially parallel to the advancement direction of the tubular element 6 along the guide shaft 7 and is, in its turn, mounted rotatably, about its own axis, on the supporting element 3, in order to allow the angular movement of the blades 4 between a retracted rest position, in which the blades 4 are disengaged from the tubular element 6, which is arranged on the guide shaft 7, and an extended position for work, in which the blades 4 are in contact with the tubular element 6 in order to perform the cut on it.

[0025] According to the invention, the above mentioned means for locking the blade holder arm 14 to the respective supporting shaft 15 comprise at least one lever locking body 16, which has a first portion 16a that is fixed to the supporting shaft 15 and a second portion 16b that is fixed to the blade holder arm 14.

[0026] In particular, the first portion 16a is spaced apart from the second portion 16b along a direction that is substantially perpendicular to the axis of the supporting shaft 15.

[0027] In this manner, the lever locking body 16 can act positively between the supporting shaft 15 and the blade holder arm 14 in order to prevent the possibility of unwanted relative angular slippages between the supporting shaft 15 and the blade holder arm 14, during the operation of the cutting device.

[0028] In more detail, the lever locking body 16 can be constituted, as in the example shown, by a plate and is, conveniently, fixed, with its first portion 16a, to one end 15a of the supporting shaft 15 and, with its second portion 16b, to an area of the corresponding blade holder arm 14 which is arranged laterally to the supporting shaft 15.

[0029] With particular reference to the embodiment shown, it can be seen that the end of the supporting shaft 15 to which the lever locking body 16 is fixed, with its first portion 16a, corresponds to the lower end of the supporting shaft 15, while the area of the blade holder arm 14 to which the second portion 16b of the lever locking body 16 is fixed is arranged on the face of the blade holder arm 14 facing downwardly.

[0030] Advantageously, the fixing of the lever locking body 16 to the end 15a of the supporting shaft 15 is performed by way of at least one fixing screw 18, substantially parallel to and spaced apart from the axis of the supporting shaft 15, so as to be eccentric with respect to the latter.

[0031] More preferably, the lever locking body 16 is fixed to the end 15a of the supporting shaft 15 by way of at least a pair of fixing screws 18, which are substantially parallel to the axis of the supporting shaft 15 and are arranged mutually opposite with respect to the axis of the supporting shaft 15.

[0032] As illustrated, each fixing screw 18 is inserted in a respective reception hole 19, defined in the lever locking body 16, in order to be screwed into a corresponding female thread 18a, which is defined along the supporting shaft 15, and be engaged, with a head 18b thereof, against the face of the lever locking body 16 which is directed away from the corresponding blade holder arm 14.

[0033] Advantageously, the lever locking body 16 is associated with means of adjusting its position with respect to the blade holder arm 14.

[0034] Conveniently, such adjustment means comprise an arc-like slot 20, with its center substantially at the axis of the supporting shaft 15 and which is defined in the supporting body 16 at the second portion 16b.

[0035] In particular, the arc-like slot 20 accommodates at least one locking screw 21, which is fixed, by way of screwing in a corresponding threaded hole 21 a, to the blade holder arm 14 and which extends substantially parallel to the axis of the supporting shaft 15, thus engaging, conveniently, with its abutment head 21b, the lateral edges of the arc-like slot 20 which are arranged on the face of the lever locking body 16 that is directed away from to the corresponding blade holder arm 14.

[0036] Conveniently, the means for locking each blade holder arm 14 to the corresponding supporting shaft 15 can, optionally, also comprise a clamp, which is constituted, advantageously, by a block 22, which is tightened laterally against the supporting shaft 15 by way of a locking screw 22a that is screwed in the corresponding blade holder arm 14.

[0037] As illustrated, at its opposite end 15b from the end 15a that is connected to the lever locking body 16, the supporting shaft 15 of each blade holder arm 14 is connected to a movement lever 23, which extends radially with respect to the supporting shaft 15 and makes it possible to execute the movement of the blade holder arms 14 in order to move the blades 4 between their retracted rest position and their extended position for work.

[0038] In particular, at one of its free ends, the movement lever 23 of each blade holder arm 14 supports a respective control roller 24, which is mounted rotatably idle on a rotation pin 24a with its axis substantially parallel to the supporting shaft 15.

[0039] As illustrated, each control roller 24 has lateral walls that have a progressively convergent orientation toward the axis of that control roller, going in the opposite direction to the movement lever 23, so as to give the control roller 24 a substantially conical or frustum shape structure.

[0040] Resting against the lateral walls of each of the control rollers 24 is the outer perimetric edge of an annular cam 25, which is supported by the base frame 2 substantially coaxially to the axis of the guide shaft 7 and is, conveniently, arranged above the supporting element 3.

[0041] In particular, the outer perimetric edge of the annular cam 25 has a shape that matches the lateral walls of the control rollers 24 and, more specifically, has a profile with an orientation that progressively approaches the axis of the annular cam 25, going in the direction of the movement levers 23.

[0042] The annular cam 25 is mounted on the base frame 2 with the ability to perform a translational motion axially towards and away from the supporting element 3.

[0043] The translational movement of the annular cam 25 is driven by actuators 26, which are constituted for example by pneumatic cylinders which act between the supporting frame 2 and the annular cam 25.

[0044] The sliding of the outer perimetric edge of the annular cam 25 on the lateral walls of the control rollers 24, following a translational movement of the annular cam 25 along its axis toward the supporting element 3, causes the rotation of the movement levers 23 about the axis of the supporting shaft 15 and the consequent angular movement of the blade holder arms 14, again about the axis of the corresponding supporting shaft 15, so as to bring the blades 4 from the retracted rest position to the extended position for work.

[0045] Advantageously, there are elastic means of return of the blade holder arms 14, which are adapted to precipitate the return of the blades 4 from the extended position for work to the retracted rest position, following the movement of the annular cam 25 away from the supporting element 3, and which are constituted, for example, by radial springs 27, which are interposed between the control rollers 24 and the movement levers 23 of the blade holder arms 14.

[0046] For completeness, it should be noted that the blades 4 can be, conveniently, fixed to the corresponding blade holder arms 14 by way of protective plates 30 that are screwed to the blade holder arms 14.

[0047] Operation of the device according to the invention is the following.

[0048] The supporting element 3 is moved constantly in rotation by its motor means about the axis of the guide shaft 7.

[0049] The tubular element 6 unrolls in flattened form from a spool and it arrives in this form at the spreader element 9, which opens it by way of the sliding of the tubular element 6 on the spreader element 9.

[0050] The tubular element 6 is, thus, entrained to slide on the guide shaft 7 by the movement rollers 8 until it reaches and goes past, with its lower free edge 6b, the passage area 5, where the blades 4 are in the retracted rest position, and is brought, again with the lower free edge 6b, substantially at or below the area for contact with the entrainment rollers 11.

[0051] At this point, the movement rollers 8 are deactivated, so as to keep the tubular element 6 in the locked position during execution of the cut.

[0052] The annular cam 25 is, then, moved by its actuators 26 toward the supporting element 3 so as to cause a movement, with a radial motion component, of the control rollers 24, so as to determine the rotation of the corresponding movement levers 23 about the axis of the corresponding supporting shaft 15 and the consequent angular movement of the respective blade holder arms 14, so as to bring the blades 4 from their retracted rest position to the extended position for work.

[0053] The motion of the blades 4 around the tubular element 6 by way of the rotation of the supporting element 3 about the axis of the guide shaft 7 produces the cutting of the tubular element 6, with consequent removal of a sleeve label 6a, which is entrained by the entrainment wheels 11 along the lower part of the guide shaft 7, in

order to be fitted onto an underlying container 10 which is being transported below the cutting device.

[0054] At this point, the annular cam 25 is brought by its actuators 26 to a position away from the supporting element 3, so that the movement levers 23, under the thrust of the elastic means of return, can produce the rotation of the blade holder arms 14 about the axis of the corresponding supporting shaft 15 and bring the blades 4 back to the retracted rest position.

[0055] The cycle resumes with the activation of the movement rollers 8 which again entrain the tubular element 6 by making it slide along the guide shaft 7 until its lower free edge 6b is brought substantially at or below the area of contact with the entrainment rollers 11.

[0056] The actuation of the annular cam 25, with consequent angular movement of the blade holder arms 14 and the returning of the blades 4 to the retracted rest position, makes it possible to execute a new cut of the tubular element 6 with removal of another sleeve label 6a, which will be entrained by the entrainment rollers 7 in order to be fitted over a successive container 10 that is being transported below the cutting device.

[0057] In practice it has been found that the device according to the invention fully achieves the set aim and objects and, in particular, attention is drawn to the fact that the presence of the lever locking body makes it possible to ensure a solid locking of the blade holder arms to the respective supporting shafts, thus preventing the possibility of unwanted angular slippages between the blade holder arms and the corresponding supporting shafts.

[0058] All the characteristics of the invention, indicated above as advantageous, convenient or similar, may also be missing or be substituted by equivalent characteristics.

[0059] The individual characteristics set out in reference to general teachings or to specific embodiments may all be present in other embodiments or may substitute characteristics in such embodiments.

[0060] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0061] In practice the materials employed, provided they are compatible with the specific use, and the dimensions and shapes, may be any according to requirements.

[0062] Moreover, all the details may be substituted by other, technically equivalent elements.

[0063] The disclosures in Italian Patent Application No. VR2013A000291 from which this application claims priority are incorporated herein by reference.

[0064] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device for cutting labels for labeling machines with sleeve labels which comprises a base frame (2) that supports a supporting element (3) for a plurality of blades (4) that are arranged around an area (5) for the passage of a tubular element (6) to be cut which is fed by entrainment means, each one of said blades (4) being mounted on a respective blade holder arm (14) that is fixed, by way of locking means, to a respective supporting shaft (15) that is mounted rotatably, about its axis, on said supporting element (3), in order to allow the angular movement of said blades (4) between a retracted rest position, in which said blades (4) are disengaged from said tubular element (6), and an extended position for work, in which said blades (4) are in contact with said tubular element (6) in order to perform the cut on it and as a consequence obtain, in each instance, a sleeve label (6a), **characterized in that** said locking means comprise at least one lever locking body (16) that has a first portion (16a) that is fixed to said supporting shaft (15) and a second portion (16b) that is fixed to said blade holder arm (14), said first portion (16a) being spaced apart from said second portion (16b) along a direction that is substantially perpendicular to the axis of said supporting shaft (15).

2. The device according to claim 1, **characterized in that** said lever locking body (16) is fixed, with said first portion (16a), to one end (15a) of said supporting shaft (15) and, with the second portion (16b), to an area of said blade holder arm (14) which is arranged laterally to said supporting shaft (15).

3. The device according to one or more of the preceding claims, **characterized in that** said lever locking body (16) has means of adjusting its position with respect to said blade holder arm (14).

4. The device according to one or more of the preceding claims, **characterized in that** said lever locking body (16) comprises a plate.

5. The device according to one or more of the preceding claims, **characterized in that** said lever locking body (16) is fixed to said end (15a) of said supporting shaft by way of at least one fixing screw (18) that is substantially parallel to and spaced apart from the axis of said supporting shaft (15).

6. The device according to one or more of the preceding claims, **characterized in that** said lever locking body (16) is fixed to said end (15a) of said supporting shaft (15) by way of at least a pair of fixing screws (18) that are substantially parallel to the axis of said supporting shaft (15) and are arranged mutually opposite with respect to the axis of said supporting shaft

(15).

7. The device according to one or more of the preceding claims, **characterized in that** said adjustment means comprise an arc-like slot (20), with its center substantially at the axis of said supporting shaft (15), that is defined in said lever locking body (16) at said second portion (16b) and which accommodates at least one locking screw (21) that is fixed to said blade holder arm (14) and which extends substantially parallel to the axis of said supporting shaft (15).

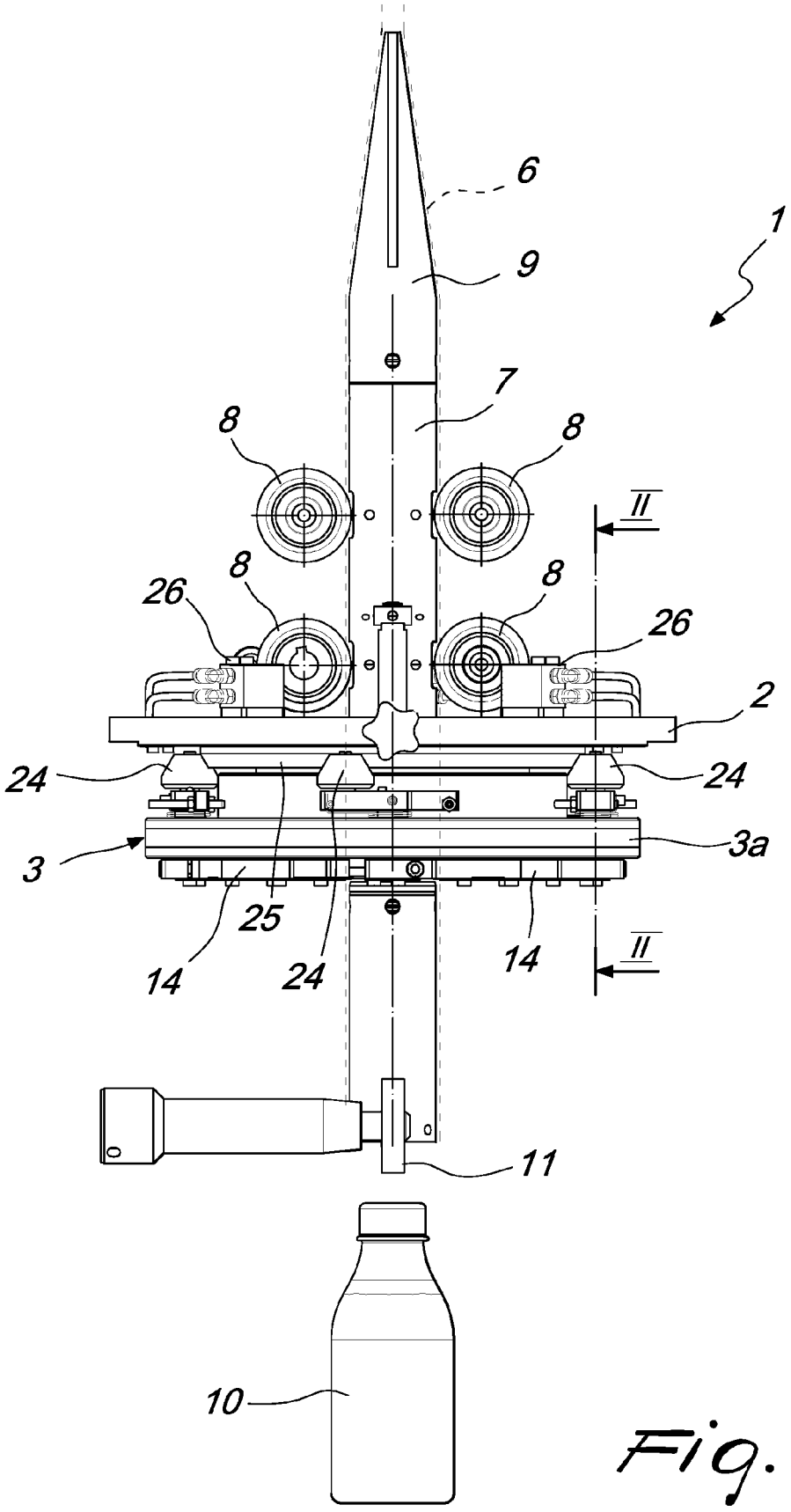

Fig. 1

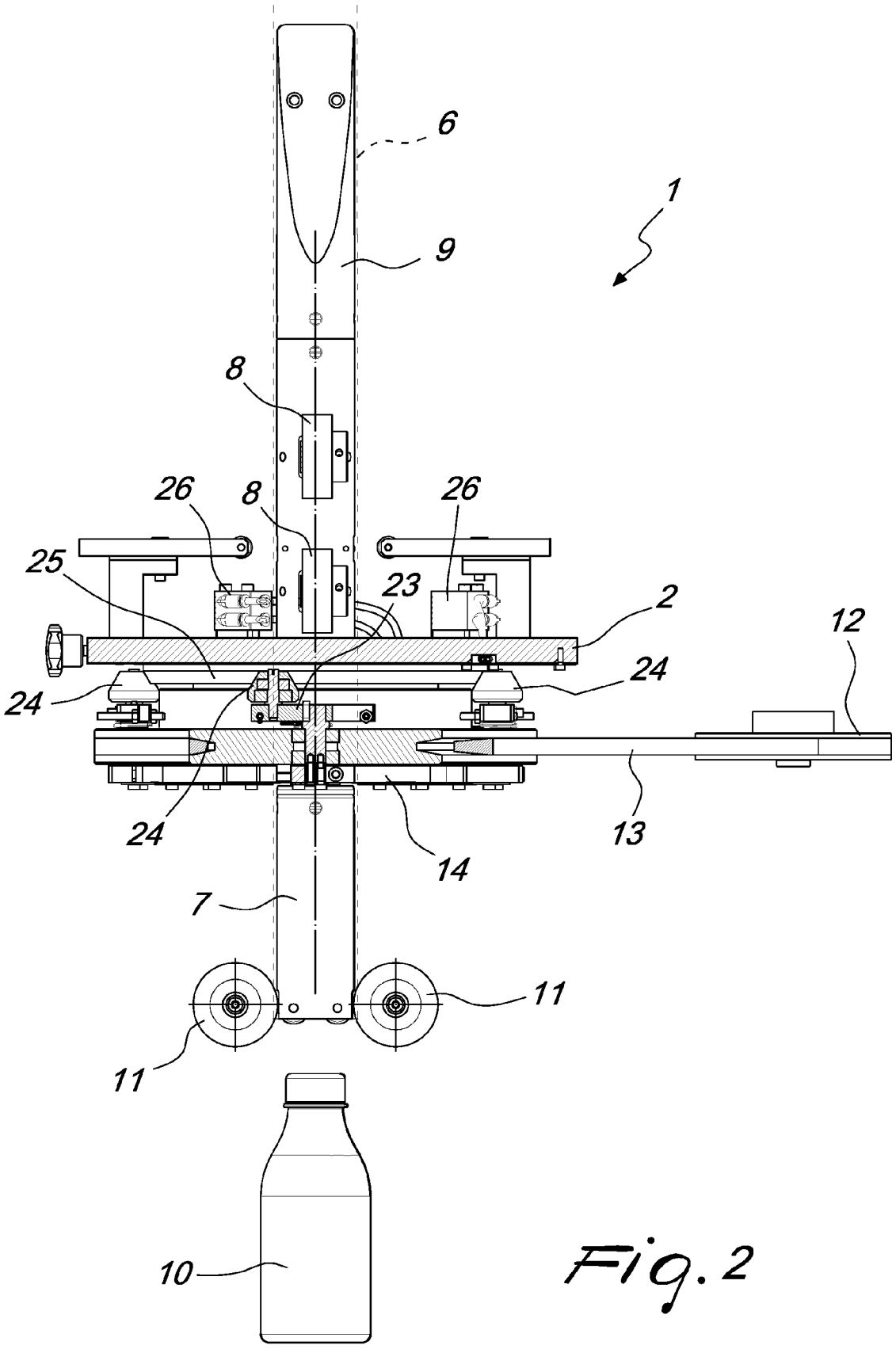

Fig. 2

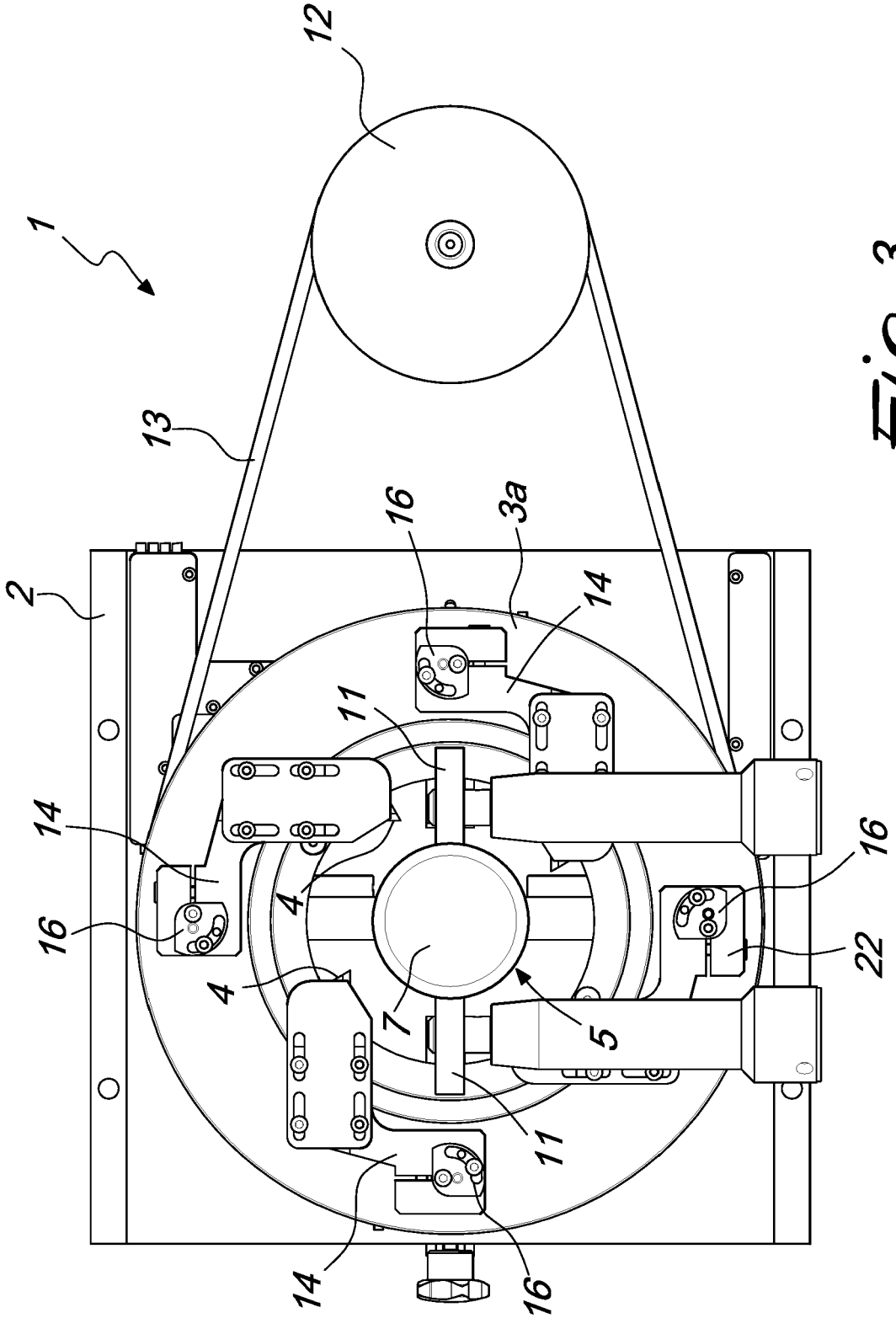

Fig. 3

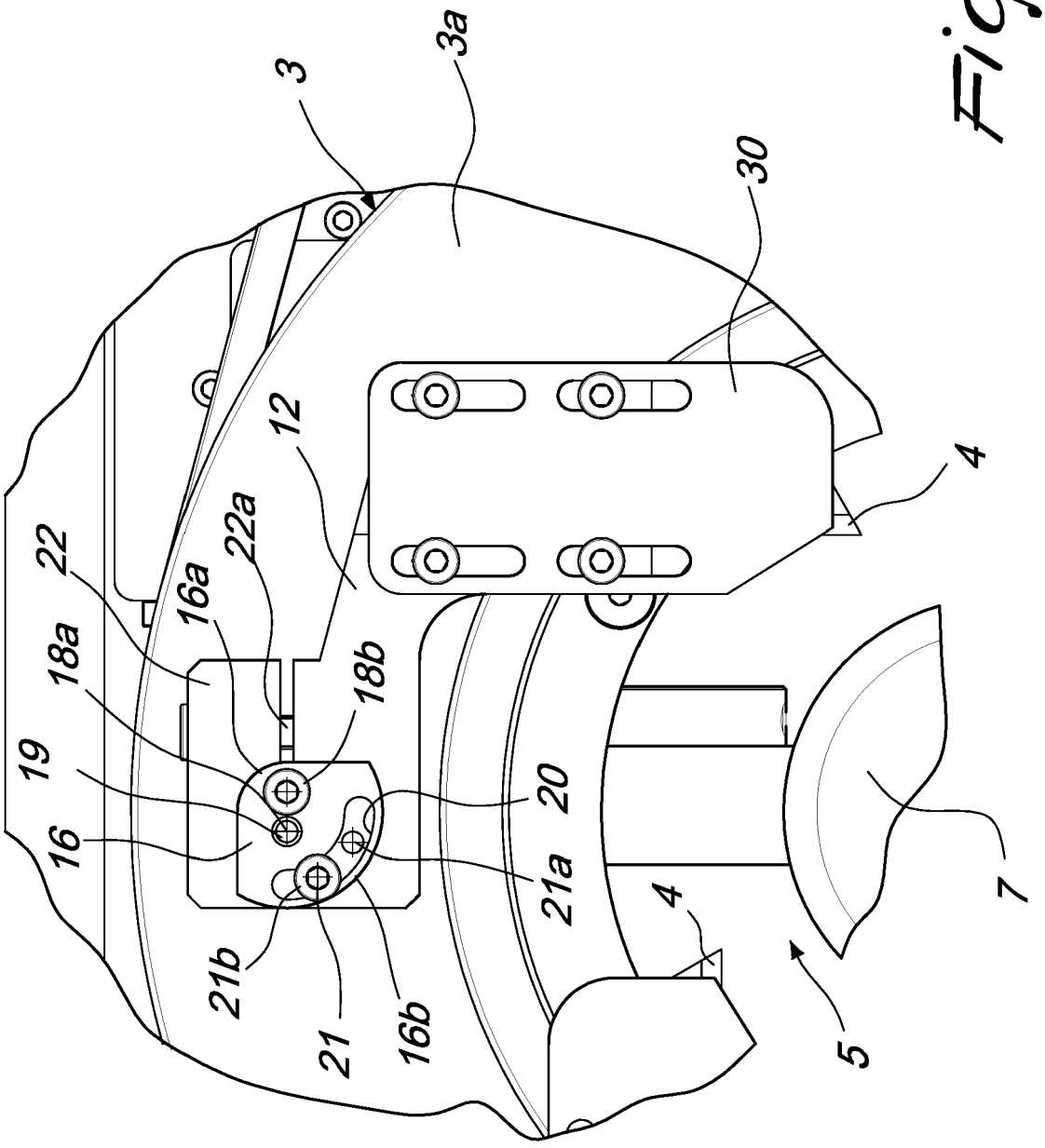

Fig. 4

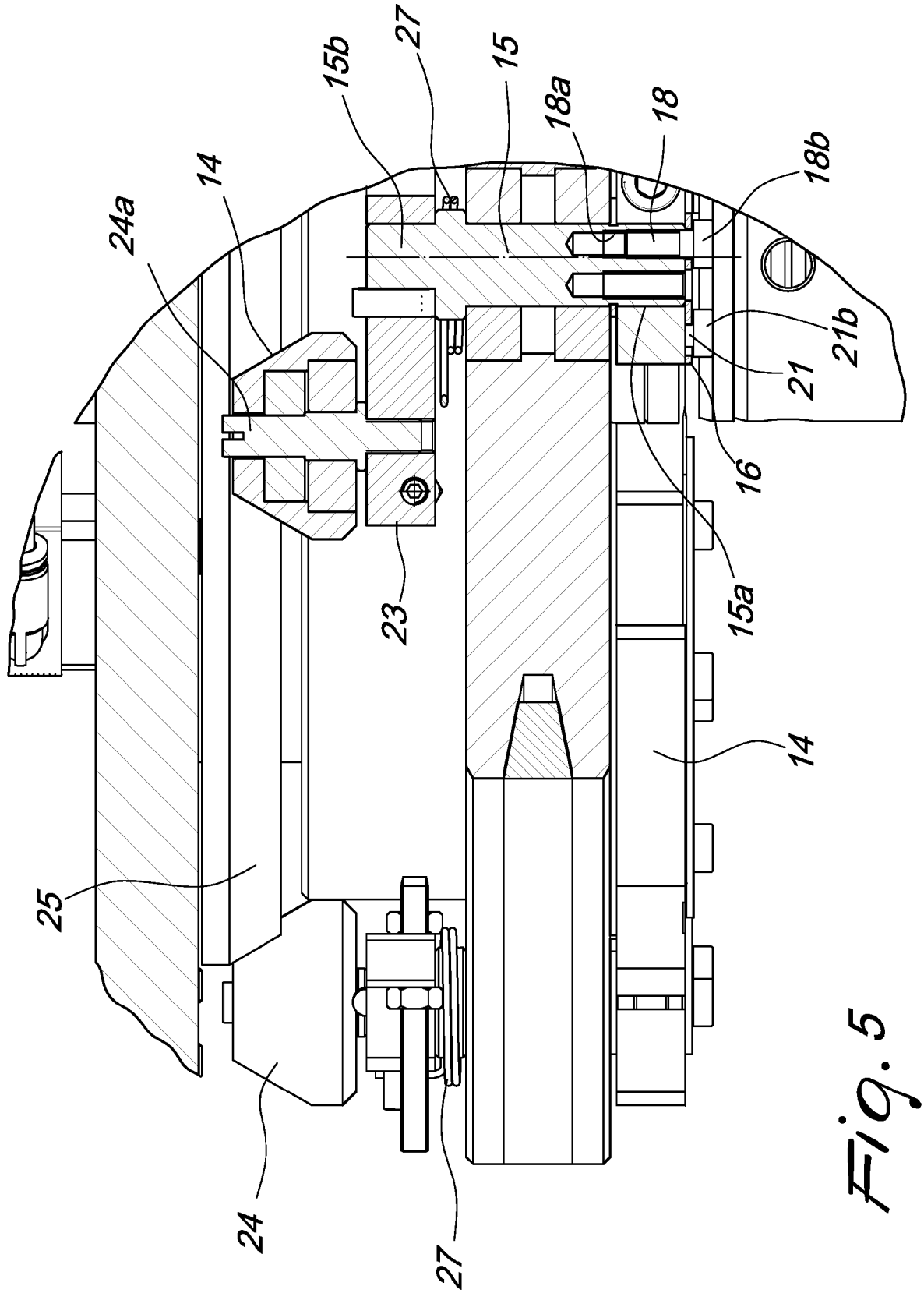

Fig. 5

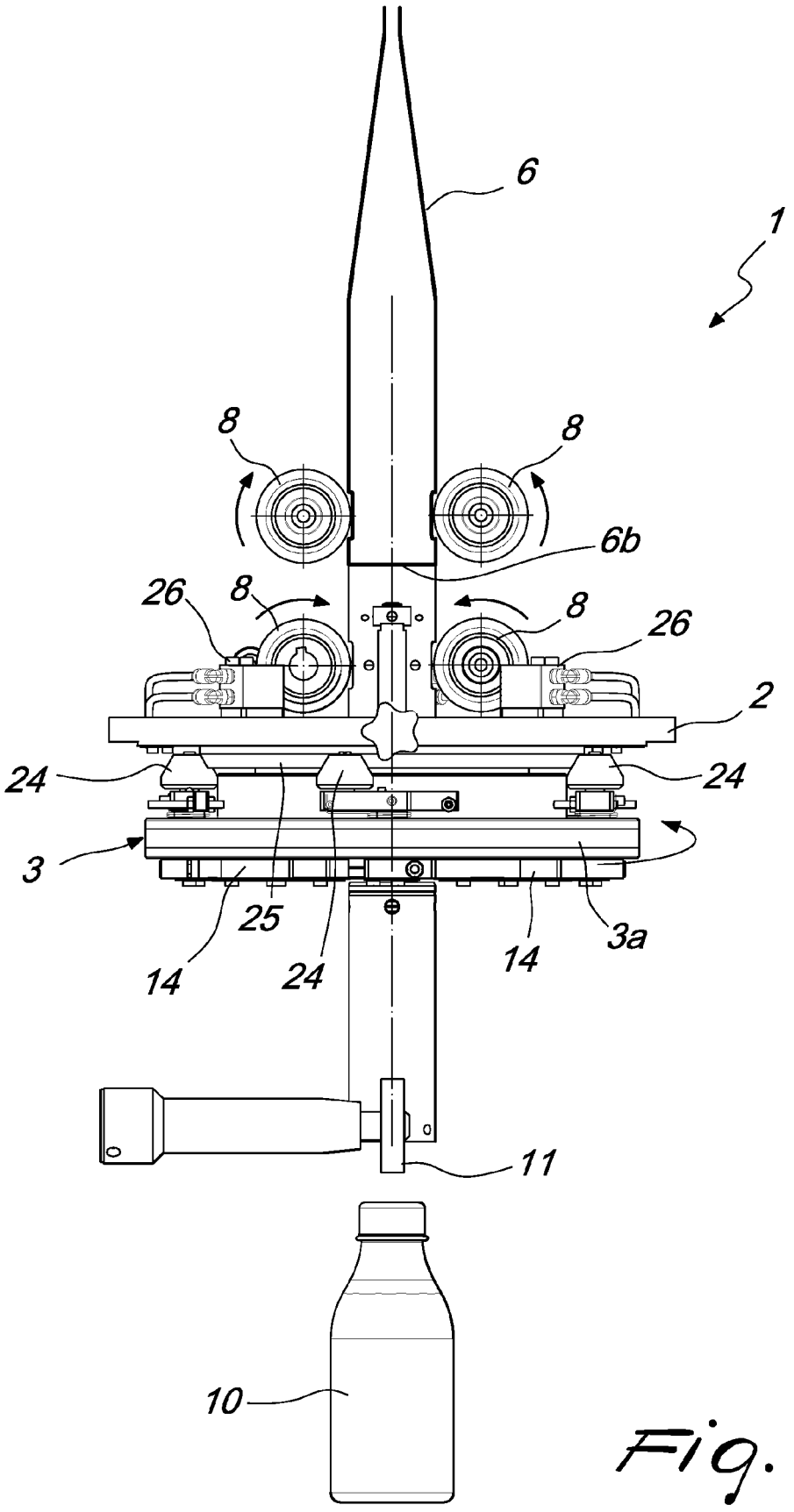

Fig. 6

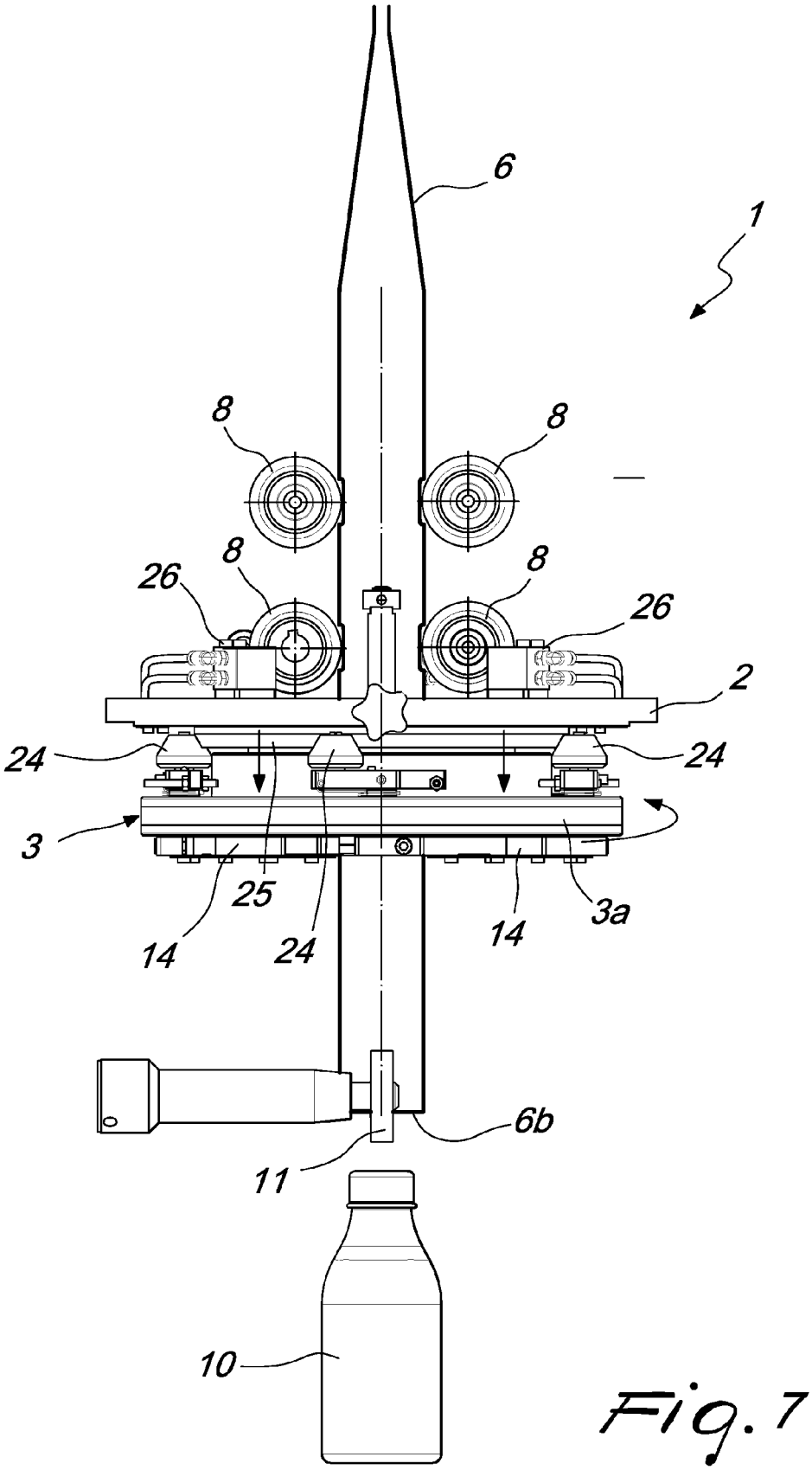

Fig. 7

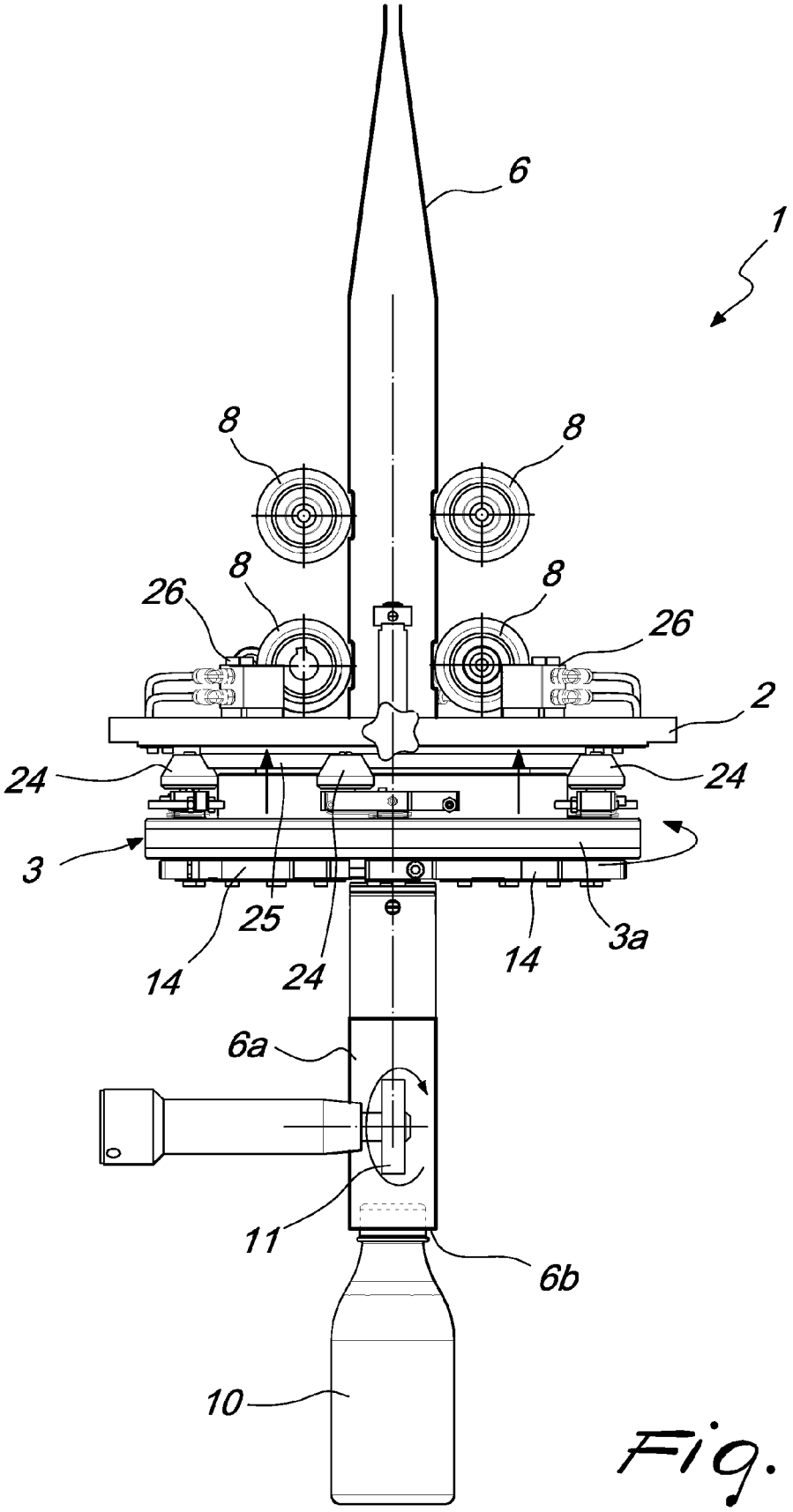

Fig. 8

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 14 19 9854

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 2 338 671 A (HUANG FU CHAN [TW]; HUANG CHIEN TSAI [TW]; WU CHIN TSAI [TW]) 29 December 1999 (1999-12-29) * page 4, line 4 - page 8, line 8; figures 2, 4 * -----	1-6	INV. B65C9/00
X	US 2004/244559 A1 (HUANG CHIEN-TSAI [TW] ET AL) 9 December 2004 (2004-12-09) * paragraph [0037]; figures 8-13 * -----	1-7	
X	WO 2007/047011 A1 (AXON CORP [US]; CHEN KUO-RAID GRANT [US]) 26 April 2007 (2007-04-26) * last 7 lines; page 5 * * page 7, paragraph 3 * * figures 2, 3 * -----	1,2,4	
X	EP 2 653 398 A1 (KRONES AG [DE]) 23 October 2013 (2013-10-23) * paragraph [0030] - paragraph [0031]; figures 1, 2 * -----	1-5,7	
A	WO 00/27600 A1 (GRAHAM LABELLING SYSTEMS LIMIT [GB]; TAYLOR ALISTAIR MARK [GB]) 18 May 2000 (2000-05-18) * page 7, line 12 - line 19; figures 1-3 * -----	3,7	

TECHNICAL FIELDS SEARCHED (IPC)
B65C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	4 May 2015	Luepke, Erik

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 19 9854

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

04-05-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2338671 A	29-12-1999	NONE	
US 2004244559 A1	09-12-2004	NONE	
WO 2007047011 A1	26-04-2007	NONE	
EP 2653398 A1	23-10-2013	CN 103372888 A	30-10-2013
		DE 102012206431 A1	24-10-2013
		EP 2653398 A1	23-10-2013
WO 0027600 A1	18-05-2000	AT 229410 T	15-12-2002
		AU 6359299 A	29-05-2000
		DE 69904501 D1	23-01-2003
		DE 69904501 T2	24-07-2003
		EP 1131191 A1	12-09-2001
		GB 2360239 A	19-09-2001
		US 6502488 B1	07-01-2003
		WO 0027600 A1	18-05-2000

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- IT VR20130291 A **[0063]**