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(54) **CUTTING UNIT AND CUTTING METHOD FOR A LABELLING MACHINE**

(57) The present invention relates to a cutting unit (1) configured to carry out, in the context of a labelling machine, a cutting method which improves the precision of the cut and reduces the risk of damaging the web.

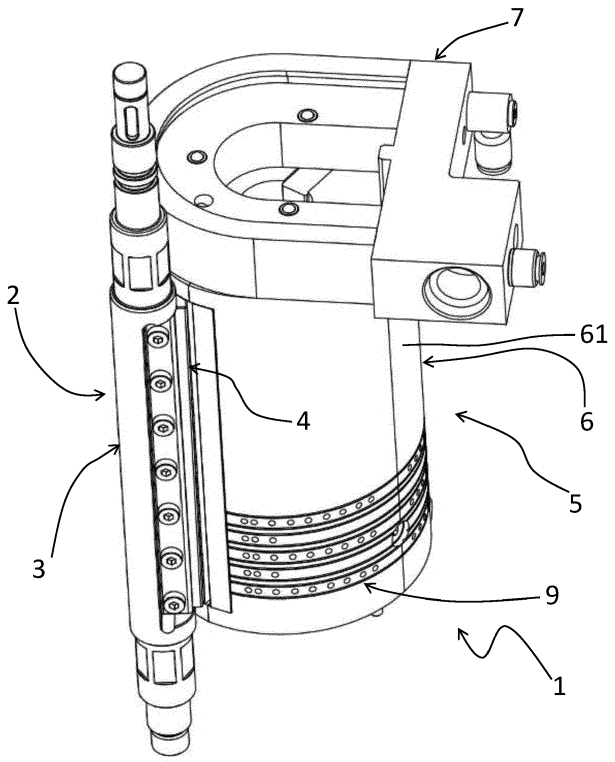

Fig. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to a cutting unit configured to carry out, in the context of a labelling machine, a cutting method which improves the precision of the cut and reduces the risk of damaging the web.

BACKGROUND ART

[0002] A known type of labelling machine comprises a cutting unit for cutting a web of labelling material. The cutting unit comprises a cutter roller carrying a blade and a tensioning roller configured to exert a tensioning action on the web for conveying the web through the cutting point and along a lateral surface of the tensioning roller.

[0003] With the cutting unit of existing labelling machines, there is the risk that the web is not correctly positioned on the cutting point. This could affect the precision of the cutting and could lead to the risk of damaging the web.

DISCLOSURE OF INVENTION

[0004] A cutting method according to present description or according to any of the appended method claims allows for obtaining a better precision in the cutting of the web of labelling material while preventing the risk of damaging the web of labelling material.

[0005] A cutting unit according to present description is configured for carrying out a cutting method according to present description.

[0006] A labelling machine according to present description comprises a cutting unit according to present description. A cutting unit according to any of the appended cutting unit claims is configured for carrying out a cutting method according to any of the appended method claims.

[0007] A labelling machine according to any of the appended labelling machine claims comprises a cutting unit according to any of the appended cutting unit claims.

[0008] The following brief description of the drawings and detailed description are referred to a possible exemplary embodiment of a cutting method according to present description. In the following, with the term "method" it is intended said exemplary embodiment of the method.

[0009] The following brief description of the drawings and detailed description are referred to a possible exemplary embodiment of a cutting unit according to present description. In the following, with the term "unit" it is intended said exemplary embodiment of the unit.

[0010] The following brief description of the drawings and detailed description are referred to a possible exemplary embodiment of a labelling machine according to present description. In the following, with the term "machine" it is intended said exemplary embodiment of the machine.

[0011] The unit is configured for carrying out the method. The method is specially adapted to be carried out by the unit. The machine comprises the unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The following detailed description refers to the accompanying drawings, in which:

Figure 1 is a perspective view of the unit;
Figure 2 is a perspective view of a tensioning device of the unit;
Figures 3 and 4 show a transversal cross section of the unit in a first position during a cutting displacement of the unit;
Figures 5 and 6 show a transversal cross section of the unit in a second position during said cutting displacement; Figure 5A is a detail of a part of Figure 5;
Figures 7 and 8 show a transversal cross section of the unit in a third position during said cutting displacement;
Figure 9 shows a longitudinal cross section of a tensioning roller of the unit;
Figure 10 shows a tensioning device of the unit in a situation such a that a component of the tensioning device has been removed.

[0013] The unit 1 comprises a cutting device 2. The cutting device 2 comprises a cutter roller 3 and a blade 4 carried by the cutter roller 3.

[0014] The cutting device 2 is configured to carry out a cutting phase during which the blade 4 cuts a web of labelling material by means of a rotational displacement of the cutter roller 3 around its axis Y. The axis Y of the cutter roller 3 is showed only in Figure 3 and is orthogonal to the plane of Figure 3. Figures 3 and 4 show the cutter roller 3 adopting a first position during said rotational displacement. Figures 5, 5A and 6 shows the cutter roller 3 adopting a second position during said rotational displacement. Said second position occurs after the first position and is different from the first position. Figures 7 and 8 show the cutter roller 3 adopting a third position during said displacement. The third position occurs after the second position and is different from the first position and from the second position. Said displacement and positions of the cutter roller 3 have to be considered with respect to the web which is not showed. The second position of the cutter roller 3 corresponds to the cut of the web. The cutting phase is carried out while the cutter roller 3 is in the respective second position.

[0015] The unit 1 comprises a tensioning device 5. The tensioning device 5 comprises a tensioning roller 6. The tensioning device 5 is configured to carry out, during the cutting phase, a tensioning phase, during which the web is tensioned by means of a rotational displacement of the tensioning roller 6 around its axis X. The axis X of the tensioning roller 6 is showed only in Figures 3 and 9 and

is orthogonal to the plane of Figure 3 and parallel to the plane of Figure 9. Figures 3 and 4 shows the tensioning roller 6 adopting a first position during the rotational displacement of the tensioning roller 6. Figures 5, 5A and 6 show the tensioning roller 6 adopting a second position during the rotational displacement of the tensioning roller 6. Said second position of the tensioning roller 6 occurs after the respective first position and is different from the respective first position. Figures 7 and 8 show the tensioning roller 6 adopting a third position during the rotational displacement of the tensioning roller 6. Said third position of the tensioning roller 6 occurs after the respective second position and is different from the respective first position and the respective second position. Said displacement and positions of the tensioning roller 6 have to be considered with respect to the web which is not showed. The second position of the tensioning roller 6 corresponds to the cut of the web. The cutting phase is carried out while the tensioning roller 6 is in the respective second position.

[0016] Figure 3, 5 and 7 are cross sectional views on a plane transversal to the axis X of the cutter roller 3 and to the axis Y of the tensioning roller 6. Figures 3 and 4 refer to a situation in which the cutter roller 3 and the tensioning roller 6 adopt the respective first positions during the respective rotational displacements. Figures 5, 5A and 6 refer to a situation in which the cutter roller 3 and the tensioning roller 6 adopt the respective second positions during the respective displacements. Those respective second positions correspond to the cut of the web. Figures 7 and 8 refer to a situation in which the cutter roller 3 and the tensioning roller 6 adopt the respective third positions during the respective displacements.

[0017] The web is not showed in the appended drawings.

[0018] The unit 1 comprises at least one first hole 9. The at least one first hole 9 is located on an external lateral surface 61 of the tensioning roller 6. The lateral surface 61 of the tensioning roller 6 extends around the axis X of the tensioning roller 6. The lateral surface 61 defines a recess 62 located on the lateral surface 61. The recess 62 is indicated in Figure 2, 3 and 5A.

[0019] The unit 1 comprises least one second hole 10. The at least one second hole 10 is located on said lateral surface 61. The at least one second hole 10 is located on the lateral surface 61. The recess 62 is located, with respect to an angular direction around said axis X of the tensioning roller 6, between said at least one first hole 9 and said at least one second hole 10. In this way the at least one second hole 10 can be positioned with respect to the recess 62 so that an appropriate tensioning action can be exerted locally on the web and during the cutting phase of the web.

[0020] The unit comprises a valve 7. The valve 7 is indicated in Figures 1, 2, 4, 6 and 8. The valve 7 comprises a first suction conduit 71 and a second suction conduit 72 which are fluidically or hydraulically independent from each other. The unit 1 is configured so that the first conduit 71 is in fluidic communication with a first suction source. The first suction source can be a first vacuum source. The unit 1 is configured so that the second conduit 72 is in fluidic communication with a second suction source. The second suction source can be a second vacuum source. Said first suction source and said second suction source are independent from each other. The first suction or vacuum source and the second suction or vacuum source are independent from each other at least in the sense that they can be at respective pressures which can be different from each other. The unit 1 comprises the first suction source and the second suction source.

[0021] The unit 1 is configured so that the cut of the web occurs while the blade 4 is inserted in the recess 62. The unit 1 is configured so that the cutting phase occurs or is carried out by means of insertion of the blade 4 in the recess 62. The second position of figures 5 and 6 corresponds to the blade 4 being inserted in the recess 62. Figure 5A shows in detail the blade 4 inserted in the recess 62.

[0022] The tensioning device 5 is configured so that the at least one first hole 9 is in communication with said first conduit 71 during at least a first part of the rotational displacement of the tensioning roller 6. The communication between the at least one first hole 9 and the first conduit 71 is established so that, during said first part, the first suction source exerts a tensioning action on the web through the at least one first hole 9. Said first part of the rotational displacement of the tensioning roller 6 comprises at least the first position of Figures 3 and 4, the second position of Figures 5, 5A and 6, and the third position of Figures 7 and 8. The first position, the second position, and the third position of the tensioning roller 6 occur during said first part of the rotational displacement of the tensioning roller 6.

[0023] The tensioning device 5 is configured so that the at least one second hole 10 is in communication with said second conduit 72 during only a second part of said rotational displacement of the tensioning roller 6, so that, during said second part, the second suction source exerts a tensioning action on the web through the at least one second hole 10. The second part of the rotational displacement of the tensioning roller 6 comprises at least the second position of the tensioning roller 6 to which Figures 5, 5A and 6 refer. Said second part does not comprise the first position of Figures 3 and 4 and does not comprise the third position of Figures 7 and 8. None of the first position and of the third position of the tensioning roller 6 occurs during the second part of the rotational displacement. The second position of the tensioning roller 6 occurs during the second part of the rotational displacement of the tensioning roller 6. The device 1 is configured so that said first part is greater than said second part and said second part corresponds at least to the insertion of the blade 4 in the recess 62. The unit 1 is configured so that the insertion of the blade 4 in

the recess 62 occurs during said second part. The first part of the rotational displacement of the tensioning roller 6 comprises the second part.

[0024] In this way, thanks to the fact that the recess 62 is located between the at least one first hole 9 and the at least one second hole 10, the second suction or vacuum source can be dedicated to make an additional tensioning of the web near the recess 62, and therefore closer to the cutting point, during the cut of the web. The first part is greater than the second part because the tensioning action exerted by the at least one second hole 10 is an additional local tensioning action exerted during the cutting phase and closer to the cutting point, while the tensioning action exerted by the at least one first hole 9 aims mainly to convey the web.

[0025] The tensioning roller 6 comprises a first channeling 11. The first channeling 11 defines said at least one first hole 9. The tensioning roller 6 comprises a second channeling 12. The second channeling 12 defines said at least one second hole 10. The first channeling 11 extends from the at least one first hole 9 to an external transversal surface 63 of the tensioning roller 63. The second channeling 12 extends from the at least one second hole 10 to said external transversal surface 63 of the tensioning roller 63. The external transversal surface 63 is indicated in Figures 9, 4, 6 and 8. In Figure 9 only the lateral profile of the transversal surface 63 can be seen. In Figures 4, 6 and 8 the transversal surface 63 is seen from above and is only partially visible. The first channeling 11 and the second channeling 12 are indicated in Figure 3.

[0026] The tensioning device 5 is configured so that the fluidic communication between the first conduit 71 and the at least one first hole 9 is established by the fluidic communication between the first conduit 71 and the first channeling 11. The tensioning device 5 is configured so that the fluidic communication between the second conduit 72 and the at least one second hole 10 is established by the fluidic communication between the second conduit 72 and the second channeling 12.

[0027] In this way the communication between the at least one first hole 9 and the first conduit 71 and the communication between the at least one second hole 10 and the second conduit 72 can be regulated by a component, which is the valve 7, located on the external surface 63 of the tensioning roller 6. In this way the mechanical complexity of the unit 1 is reduced.

[0028] The external transversal surface 63 defines a longitudinal end of the tensioning roller 6 along the axis X.

[0029] The valve 7 is positioned on said transversal surface 63 so that the tensioning roller 6 and the valve 7 are positioned one after the other along the axis X of the tensioning roller 6. This improves the compactness of the unit 1.

[0030] The second channeling 12 comprises a distributor conduit 121. The distributor conduit 121 extends at least mainly along a direction parallel to the axis X of the tensioning roller 5. This can be seen on Figure 9.

[0031] Figure 9 is a longitudinal cross section of the tensioning roller 6. The cross section of Figure 9 passes through the axis X of the tensioning roller 6. Figure 9 shows that the distributor conduit 121 extends mainly along a direction parallel to the axis X of the tensioning roller 6.

[0032] Figure 9 shows a longitudinal cross section of the distributor conduit 121 from a lateral point of view. Figures 3, 5, 6 and 7 show a transversal cross section of the distributor conduit 121.

[0033] The second channeling 12 comprises at least a connection conduit 122. The connection conduit 122 is fluidic interposed between the distributor conduit 121 and the at least one second hole 10. The at least one connection conduit 122 extends at least mainly transversally to said direction.

[0034] Figure 9 shows a longitudinal cross section of the connection conduit 122 from a lateral point of view. Figures 3, 5 and 7 show from above a longitudinal cross section of the connection conduit 122. Figures 3 and 9 show that the connection conduit 122 extends mainly transversally to said direction.

[0035] The second suction conduit 72 defines an opening 721.

[0036] The tensioning device 5 is configured so that the fluidic communication between the second suction conduit 72 and the second channeling 12 is established by the fluidic communication between the distributor conduit 121 and the opening 721 of the second suction conduit 72.

[0037] In the first positions of Figures 3 and 4, the opening 721 of the second conduit 72 is not in communication with the distributor conduit 121, and therefore the second conduit 72 is not in communication with the second channeling 12, so that the at least one second hole 10 is not in communication with the second source. The distributor conduit of the second channeling is not visible in Figure 4 because it is covered by the structure of the valve 7 and it is not in communication with opening 721 of second conduit 72. In the second positions of Figures 5 and 6, which corresponds to the cut of the web and to the insertion of the blade 4 in the recess 62, the opening 721 of the second conduit 72 is in communication with the distributor conduit 121 of the second channeling 12, and therefore the second conduit 72 is in communication with the second channeling 12, so that the at least one second hole 10 is in communication with the second source. The distributor conduit 121 is visible in Figure 6. In the third positions of Figures 7 and 8, the opening 721 of the second conduit 72 is again not in communication with the distributor conduit 121, and therefore the second conduit 72 is again not in communication with the second channeling 12, so that the at least one second hole 10 is again not in communication with the second source. The distributor conduit is not visible in Figure 8 because it is covered by the structure of the valve 7 and it is not in communication with opening 721 of the second conduit 72. In this way the structural configuration of the valve 7

is designed to exploit efficiently the rotation of the tensioning roller 6 to regulate the fluidic communication between the second conduit 72 and the at least one second hole 10.

[0038] The first channeling 11 comprises a distributor conduit 111 extending at least mainly along a direction parallel to the axis X of the tensioning roller 6. Figures 3, 5, and 7 show a transversal cross section of the distributor conduit 111 of the first channeling 11. The first channeling 11 comprises at least a connection conduit 112. The connection conduit 112 of the first channeling 11 is fluidic interposed between the distributor conduit 111 of the first channeling 11 and the at least one first hole 9.

[0039] The connection conduit 112 of the first channeling 11 extends at least mainly transversally to said direction parallel to the axis X of the tensioning roller 6. Figures 3, 5, and 7 show from above a longitudinal cross section of the connection conduit 112 of the second channeling 12.

[0040] The first suction conduit 71 defines an opening 711.

[0041] The external transversal surface 63 of the tensioning roller 6 defines a longitudinal end of the tensioning roller 6 and the valve 7 is positioned on said transversal surface 63. The end transversal surface 63 can be seen partially through the first opening 711 of the first suction conduit 71 in Figures 4, 6 and 8.

[0042] The tensioning device 5 is configured so that the fluidic communication between the first suction conduit 71 and the first channeling 11 is established by the fluidic communication between the distributor conduit 111 of the first channeling 11 and the opening 711 of the first suction conduit 71.

[0043] It can be considered that, in the first position of Figures 3 and 4, in the second position of Figures 5 and 6, and in the third position of figures 7 and 8, by means of the conformation of the valve in the zone of the first suction conduit 71, the opening 711 of the first suction conduit 71 is always in fluidic communication with the distributor conduit 111 of the first channeling 11.

[0044] The distributor conduit 121 of the second channeling 12 is radially closer with respect to the axis X of the tensioning roller 6 than the distributor conduit 111 of the first channeling 11.

[0045] The opening 721 of the second suction conduit 72 is radially closer with respect to the axis X of the tensioning roller 6 than the opening 711 of the first suction conduit 71.

[0046] In this way the valve 7 is structurally configured so that the opening 711 of the first suction conduit 71 is never in communication with the distributor conduit 122 of the second channeling 12. Therefore, it is obtained a reduction of the mechanical complexity of the unit 1 with the function of additional web tensioning during the cut, which is performed by means of the at least one second hole 10, with the second suction source being dedicated for the local tensioning of the web near the recess 62 through the at least one second hole 10.

[0047] The tensioning roller 6 comprises an insert 64. The insert 64 is indicated in Figures 2, 3 and 9. The insert 64 is housed in a seat 65 defined by the remaining part of the tensioning roller 6. The insert 64 defines said at least one second hole 10. The insert 64 is removable from the remaining part of the tensioning roller 6. Figure 10 shows a situation in which the insert 64 is removed from the seat 65.

[0048] The insert 64 defines at least a part 122a of said at least one connection conduit 122 of the second channeling 12. The remaining part of the tensioning roller 6 defines the remaining part 122b of the at least one connection conduit 122 of the second channeling 12.

[0049] It is to be considered that the at least one second hole 10 can comprise a plurality of second holes 10 distributed along a direction parallel to the axis X of the tensioning roller 6.

[0050] In this case the second channeling 12 comprises a plurality of connection conduits 122 each of which is fluidic interposed between the distributor conduit 121 of the second channeling 12 and a respective second hole 10.

[0051] In this case it can be that the number of respective parts of connection conduits 122 defined by the remaining part of the tensioning roller 6 is different from the number of the respective parts of connection conduits 122 defined by the insert 64. In this way the effective number of connection conduits 122 is selected by the remaining part of the tensioning roller 6, so that the same insert 64 can be used for more than one type of tensioning roller defining different numbers of parts of connection conduits 122.

[0052] The at least one second hole 10 comprises at least one main opening 101 and at least one auxiliary opening 102. The auxiliary opening 102 is closer to the recess 62 than the main opening 101. In this way the auxiliary opening 102 can help in tensioning the web closer to the cutting point, so that to furtherly lower the risk of any stretching of the web during the cut.

[0053] The second channeling 12 comprises at least one auxiliary branch 123 putting in fluidic communication the connection conduit 122 of the second channeling 12 with the at least one auxiliary opening 102.

[0054] The local tensioning exerted by the at least one second hole 10 can be used for tensioning the web near the cut, so that to obtain a more correct positioning of the web during the cutting phase and lower the risk of damaging the web during the cut, while the at least one first hole 9 can be exploited to convey the web along the lateral surface 61 of the tensioning roller 6. The at least one first hole 9 can comprise a plurality of holes. The unit can be considered a double vacuum cutting unit, because at least two vacuum or suction sources are used for conveying the web and tensioning the web very close to the cutting point.

[0055] The method comprises the phases described above.

[0056] The machine comprises the unit 1. The machine

is for labelling a plurality of containers with respective labels obtained from the web. The machine is configured for applying respective obtained labels on respective containers. The containers are for containing a pourable product. The pourable product can be for example a pourable food product. Clearly, changes may be made to the method, the unit and the machine, without, however, departing from the scope of protection as defined in the accompanying claims.

Claims

1. Cutting unit (1) for a labelling machine, comprising:

a cutting device (2) comprising a cutter roller (3) and a blade (4) carried by the cutter roller (3), the cutting device (2) being configured to carry out a cutting phase during which the blade (4) cuts a web of labelling material by means of a rotational displacement of the cutter roller (3) around its axis (Y);
a tensioning device (5) comprising a tensioning roller (6) and configured to carry out, during the cutting phase, a tensioning phase, during which the web is tensioned by means of a rotational displacement of the tensioning roller (6) around its axis (X);
at least one first hole (9) located on an external lateral surface (61) of the tensioning roller (6), said lateral surface (61) extending around the axis (X) of the tensioning roller (6) and defining a recess (62) located on the lateral surface (61);
at least one second hole (10) located on said lateral surface (61), the recess (62) being located, with respect to an angular direction around said axis (X) of the tensioning roller (6), between said at least one first hole (9) and said at least one second hole (10);
a valve (7) comprising a first suction conduit (71) and a second suction conduit (72) hydraulically or fluidically independent from each other, the first conduit (71) and the second conduit (72) being configured to be in fluidic communication with a first suction source and a second suction source, respectively, which are independent from each other;
wherein:

the unit (1) is configured so that the cutting phase is carried out by means of insertion of the blade (4) in the recess (62);
the tensioning device (5) is configured so that the at least one first hole (9) is in fluidic communication with said first conduit (71) during at least a first part of the rotational displacement of the tensioning roller (6), so that, during said first part, the first suction source exerts a tensioning action on the web by means of the at least one first hole (9);
the tensioning device (5) is configured so that the at least one second hole (10) is in fluidic communication with said second conduit (72) during only a second part of said rotational displacement of the tensioning roller (6), so that, during said second part, the second suction source exerts a tensioning action on the web by means of the at least one second hole (10);
the device (1) is configured so that said first part is greater than said second part and said second part corresponds at least to the insertion of the blade (4) in the recess (62).

2. Cutting unit (1) according to claim 1, wherein:

the tensioning roller (6) comprises a first channeling (11) defining said at least one first hole (9) and a second channeling (12) defining said at least one second hole (10), each of said channelings (11, 12) extending in said tensioning roller (6) from the respective at least one hole (9; 10) to an external transversal surface (63) of the tensioning roller (6) which is transversal to said axis (X);
the tensioning device (5) is configured so that the fluidic communication between said first conduit (71) and said at least one first hole (9) is established by the fluidic communication between said first conduit (71) and said first channeling (11) and the fluidic communication between said second conduit (72) and said at least one second hole (10) is established by the fluidic communication between said second conduit (72) and said second channeling (12).

3. Cutting unit (1) according to claim 2, wherein:

- said external transversal surface (63) defines a longitudinal end of the tensioning roller (6) along the axis (X) of the tensioning roller (6);
- said valve (7) is positioned on said external transversal surface (63) so that the tensioning roller (6) and the valve (7) are positioned one after the other along the axis (X) of the tensioning roller (6).

4. Cutting unit (1) according to claim 2 o 3, wherein:

- the second channeling (12) comprises a distributor conduit (121) extending at least mainly along a direction parallel to the axis (X) of the tensioning roller (6), and at least a connection conduit (122) being fluidically interposed between the distributor conduit (121) and the at

least one second hole (10), said connection conduit (122) extending at least mainly transversally to said direction;
- the second suction conduit (72) defines an opening (721);
- the tensioning device (5) is configured so that the fluidic communication between the second suction conduit (72) and the second channeling (12) is established by the fluidic communication between said distributor conduit (121) of the second channeling (12) and said opening (721) of the second suction conduit (72).

5. Cutting unit (1) according to claim 4, wherein:

- the first channeling (11) comprises a distributor conduit (111) extending at least mainly along a direction parallel to the axis (X) of the tensioning roller (6), and at least a connection conduit (112) being fluidically interposed between the distributor conduit (111) of the first channeling (11) and the at least one first hole (9), said connection conduit (112) of the first channeling (11) extending at least mainly transversally to said direction;
- the first suction conduit (71) defines an opening (711);
- the tensioning device (5) is configured so that the fluidic communication between the first suction conduit (71) and the first channeling (11) is established by the fluidic communication between said distributor conduit (111) of the first channeling (11) and said opening (711) of the first suction conduit (71);
- the distributor conduit (121) of the second channeling (12) is radially closer with respect to the axis (X) of the tensioning roller (6) than the distributor conduit (111) of the first channeling (11);
- the opening (721) of the second suction conduit (72) is radially closer with respect to the axis (X) of the tensioning roller (6) than the opening (711) of the first suction conduit (71).

6. Cutting unit (1) according to claim 4 or 5, wherein:

- the tensioning roller (6) comprises an insert (64) housed in a seat (65) defined by the remaining part of the tensioning roller (6) and defining said at least one second hole (10), said insert (64) being removable from the seat (65) ;
- the insert (64) defines at least a part (122a) of said at least one connection conduit (122) of the second channeling (12) and the remaining part of the tensioning roller (6) defines the remaining part (122b) of the at least one connection conduit (122) of the second channeling (12).

7. Cutting unit (1) according to any of claims from 2 to 6, wherein:

- the at least one second hole (10) comprises at least a main opening (101) and at least an auxiliary opening (102), the auxiliary opening (102) being closer to the recess (62) than the main opening (101);
- the second channeling (12) comprises at least one auxiliary branch (123) putting into fluidic communication the connection conduit (122) of the second channeling (12) with the at least auxiliary opening (102).

8. Labelling machine for applying labels on respective containers, said containers being for containing a pourable product, wherein:

- said machine comprises a cutting unit (1) according to any of the previous claims;
- said labels are obtained from said web of labelling material.

9. Cutting method (1) for cutting a web of labelling material, comprising:

a cutting phase during which a blade (4) cuts the web by means of a rotational displacement of a cutter roller (3) around its axis (Y);
during the cutting phase, a tensioning phase, during which the web is tensioned by means of a rotational displacement of a tensioning roller (6) around its axis (X);
wherein:

during at least a first part of the rotational displacement of the tensioning roller (6), at least one first hole (9) is in fluidic communication with a first conduit (71), so that, during said first part, a first suction source with which the first conduit (71) is in fluidic communication exerts a tensioning action on the web by means of the at least one first hole (9), said at least one first hole (9) being located on an external lateral surface (61) of the tensioning roller (6), said lateral surface (61) extending around the axis (X) of the tensioning roller (6) and defining a recess (62) located on the lateral surface (61);
during only a second part of the rotational displacement of the tensioning roller (6), at least one second hole (10), located on said lateral surface (61), is in fluidic communication with a second conduit (72) which is fluidically or hydraulically independent from the first conduit (71), so that, during only said second part, a second suction source with which the second conduit (72) is in fluidic communication exerts a tensioning ac-

tion on the web by means of the at least one second hole (10), the second source being independent from the first source;
the cutting phase occurs by means of insertion of the blade (4) in the recess (62) defined by the lateral surface (61), the recess (62) being located, with respect to an angular direction around said axis (X) of the tensioning roller (6), between said at least one first hole (9) and said at least one second hole (10);
wherein said first part is greater than said second part and said second part corresponds at least to the insertion of the blade (4) in the recess (62).

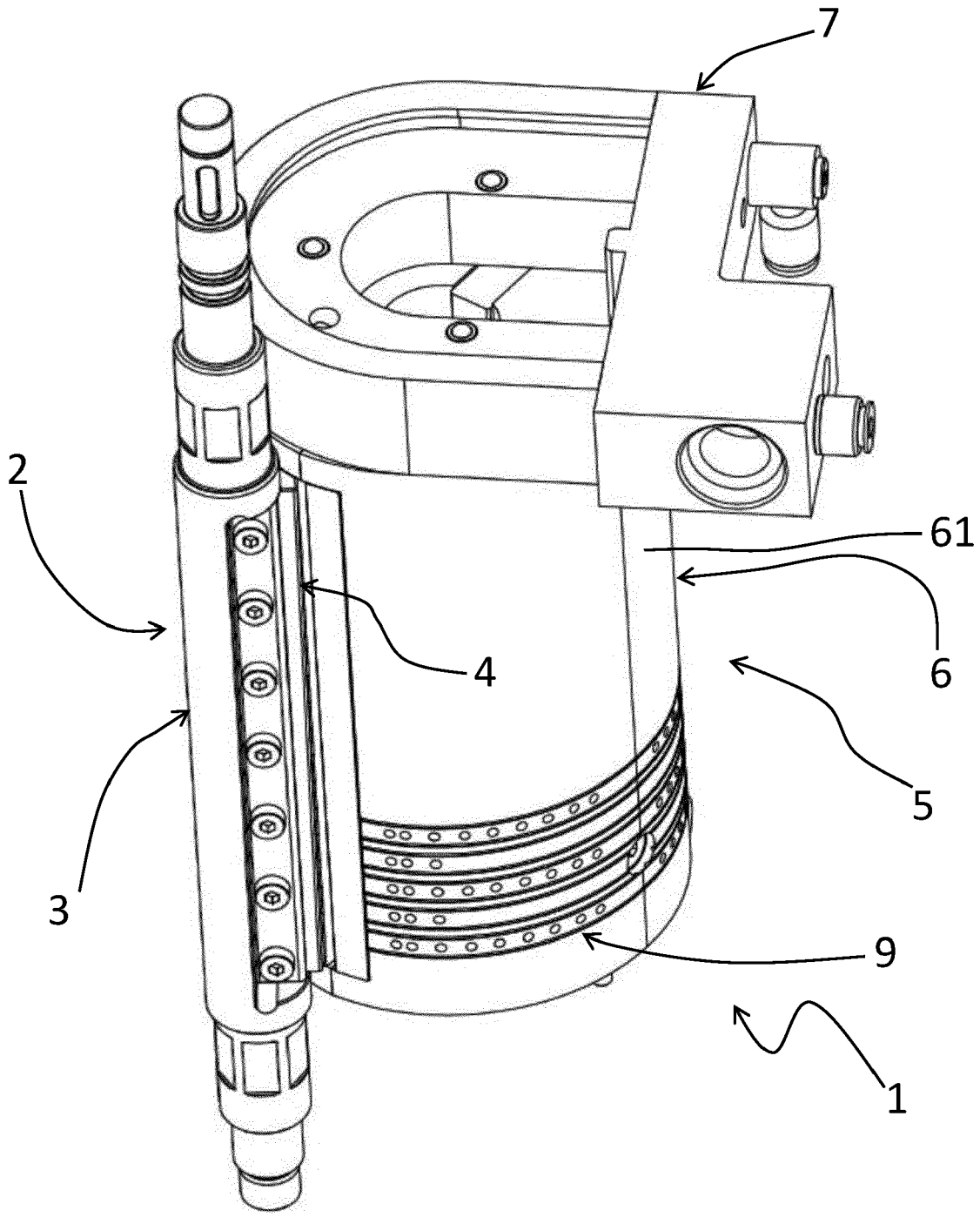


Fig. 1

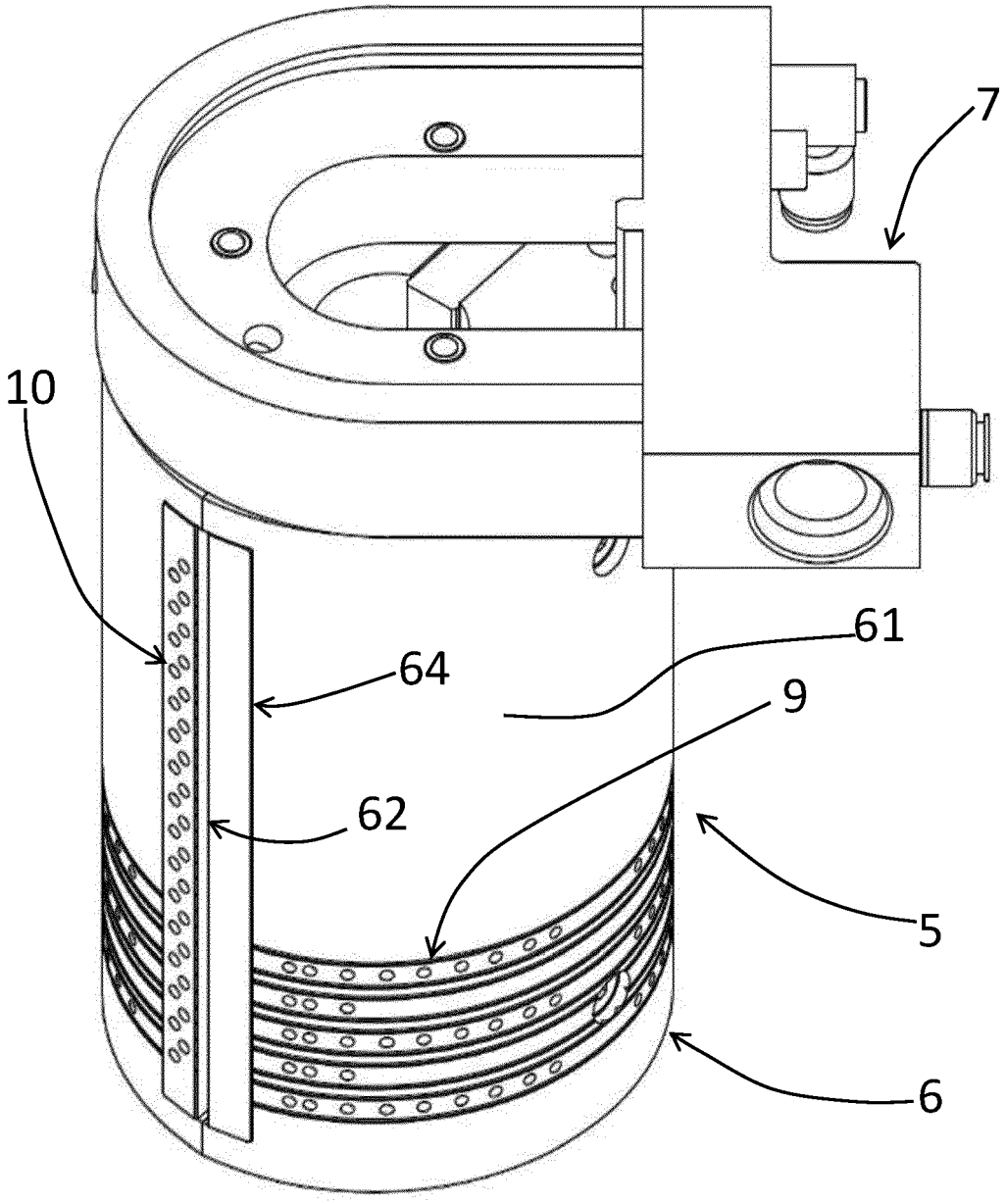
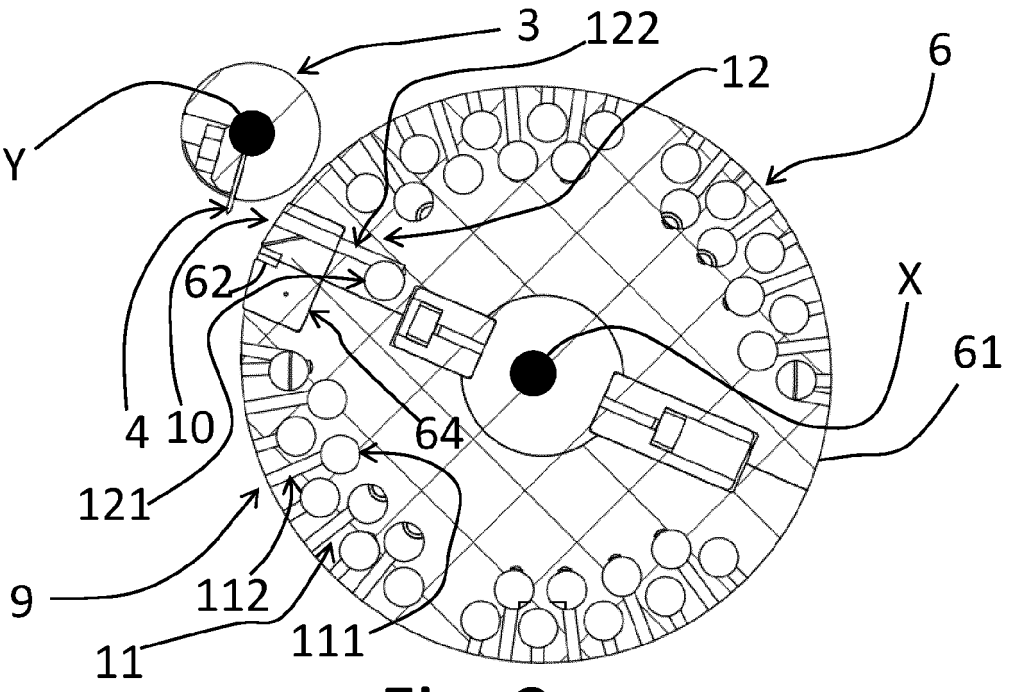


Fig. 2



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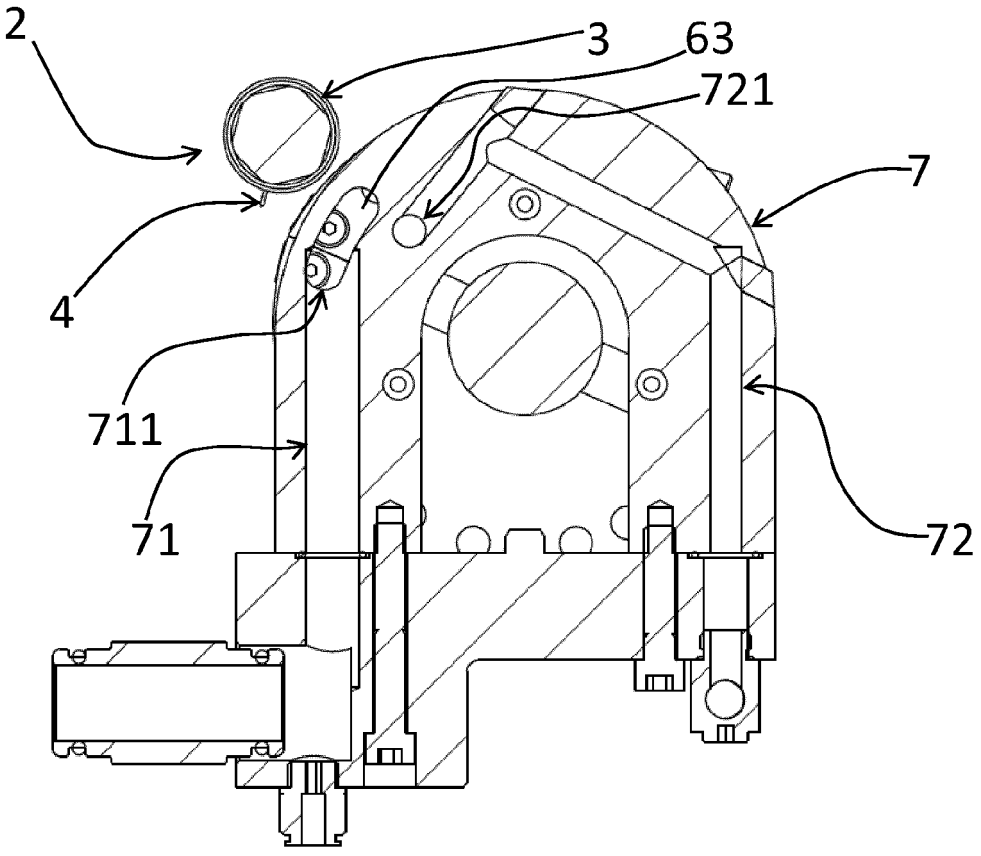

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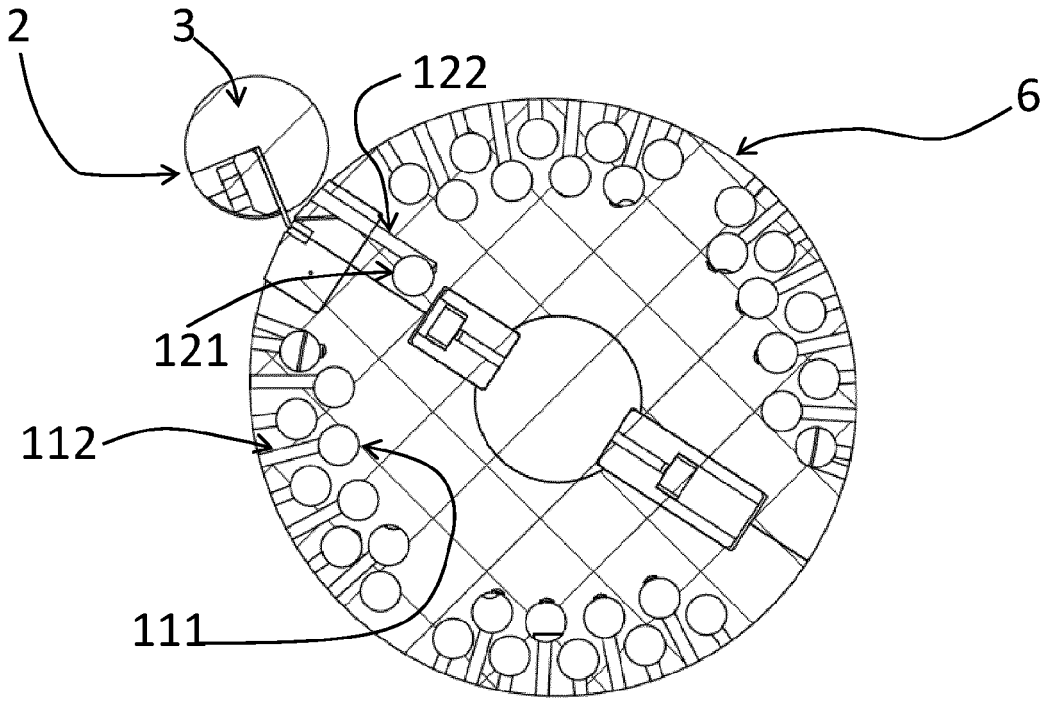

Fig. 5

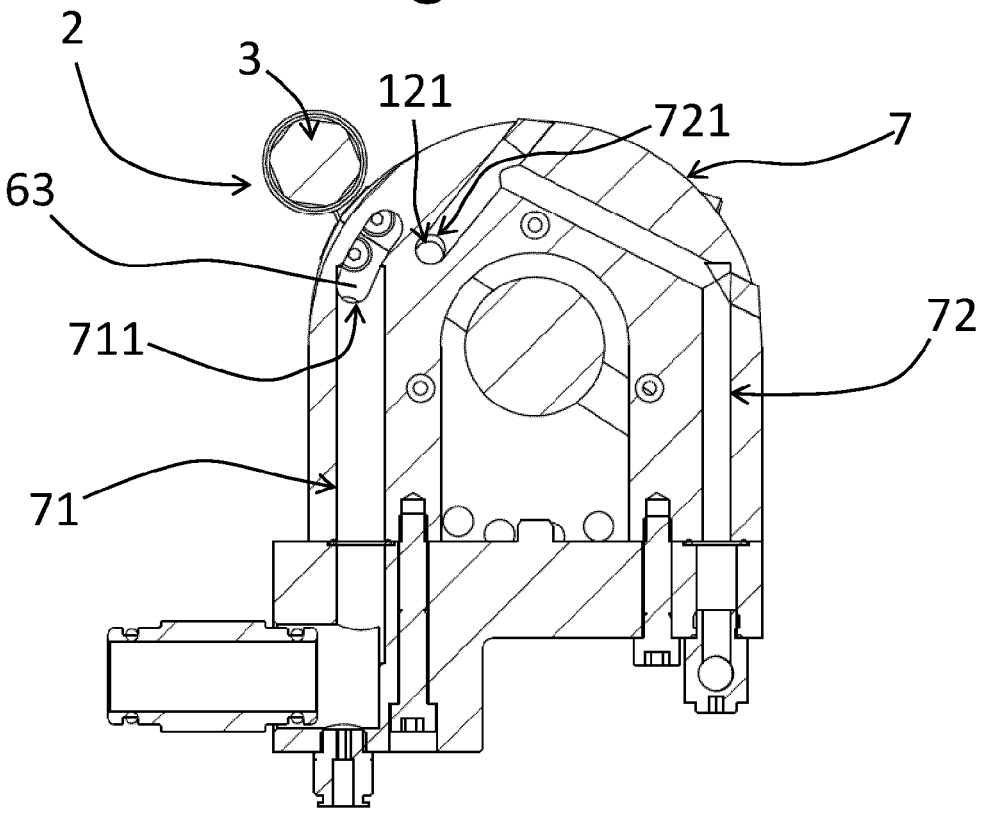

Fig. 6

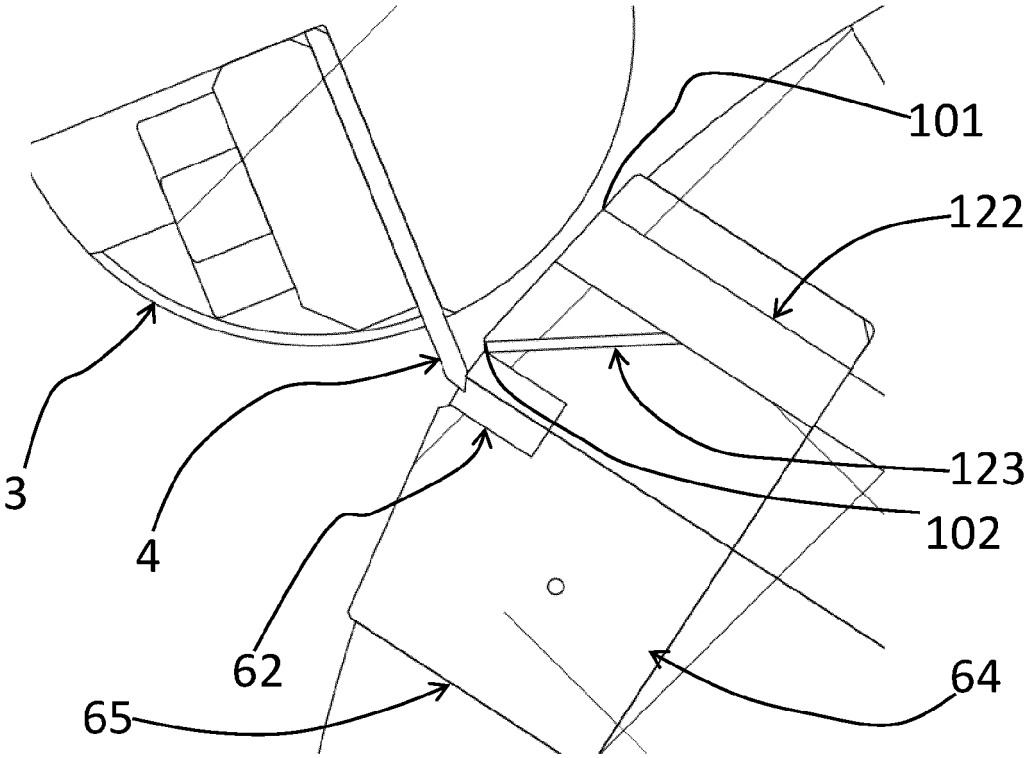

Fig. 5A

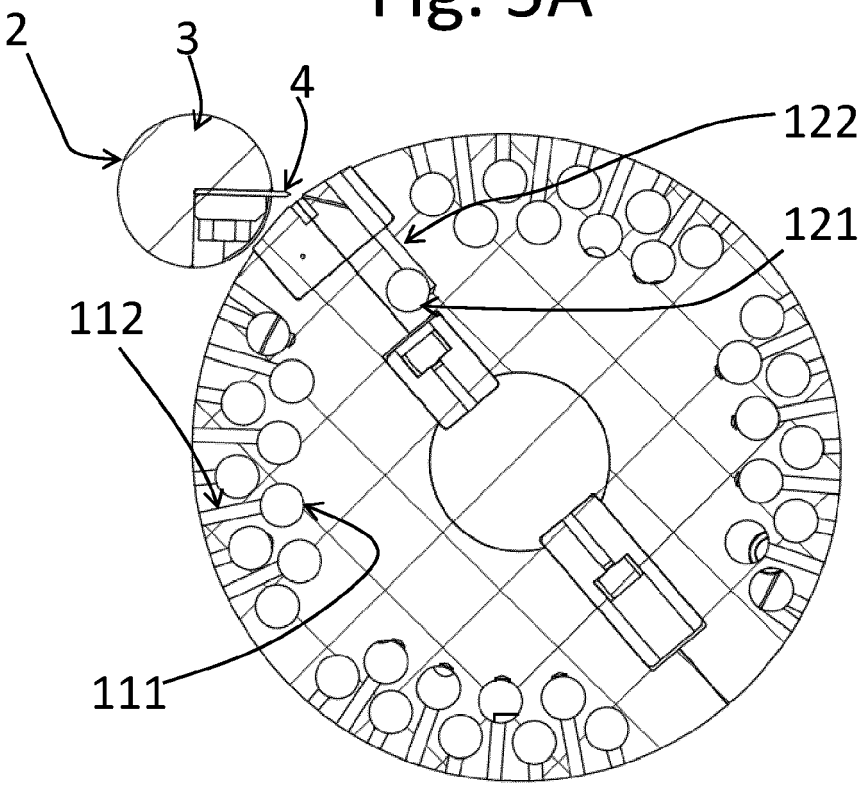

Fig. 7

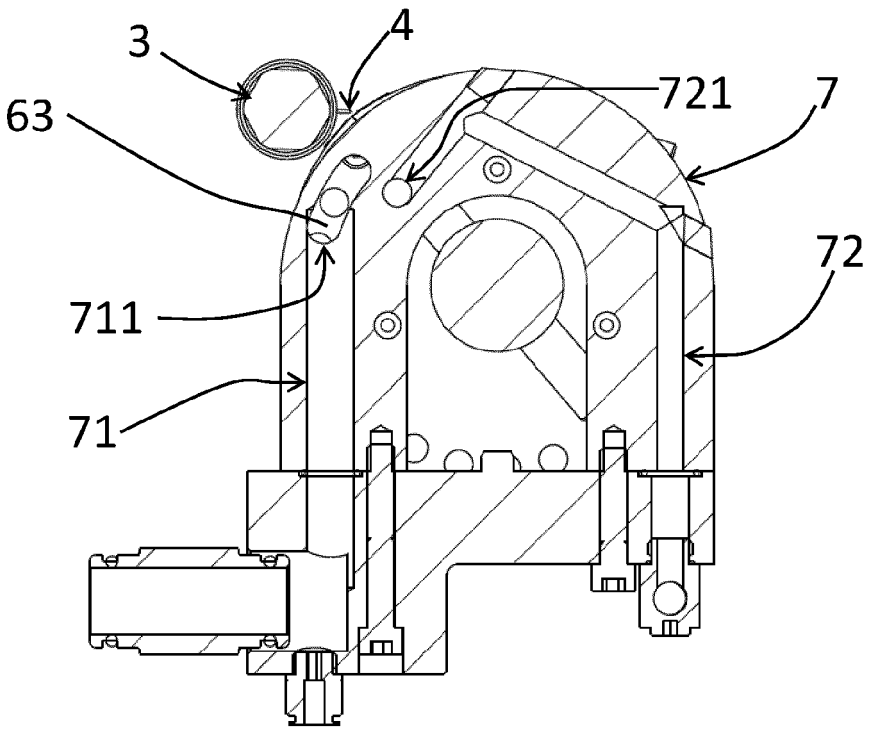

Fig. 8

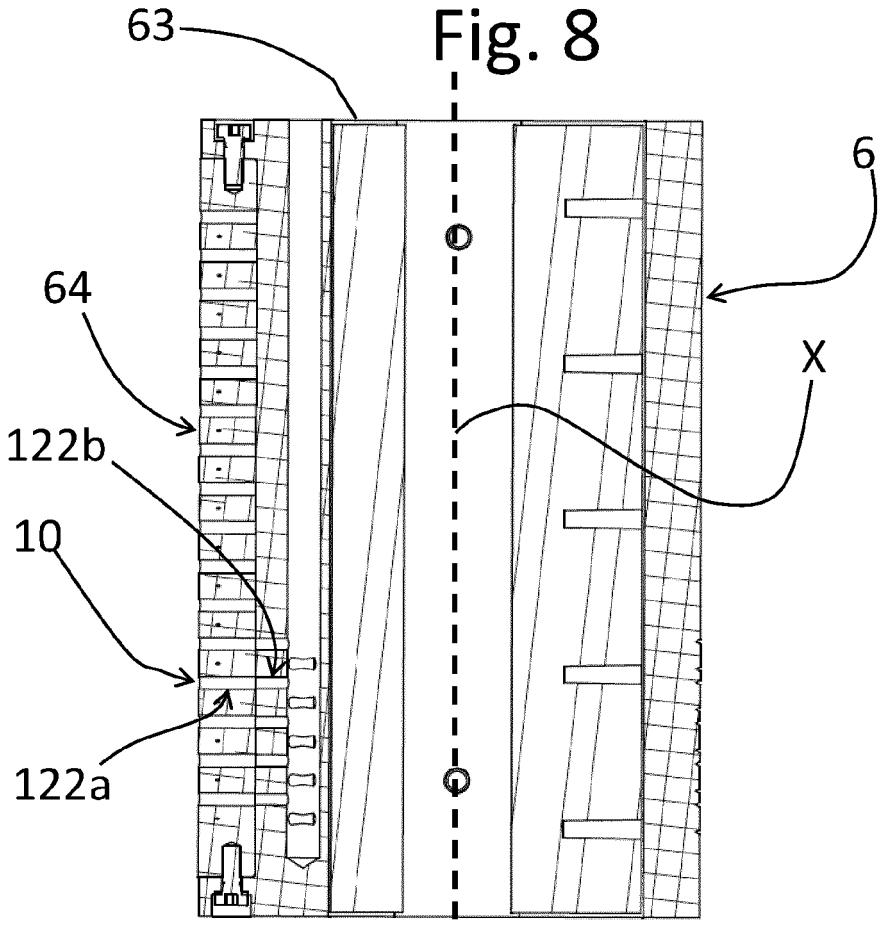

Fig. 9

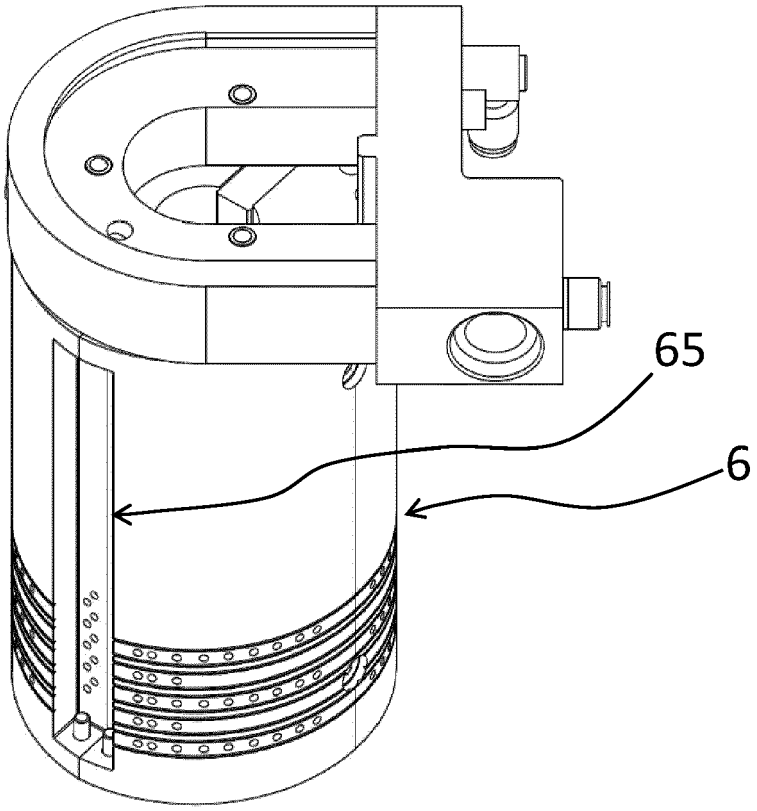

Fig. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 20 18 0652

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 November 2020	Canelas, Rui

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