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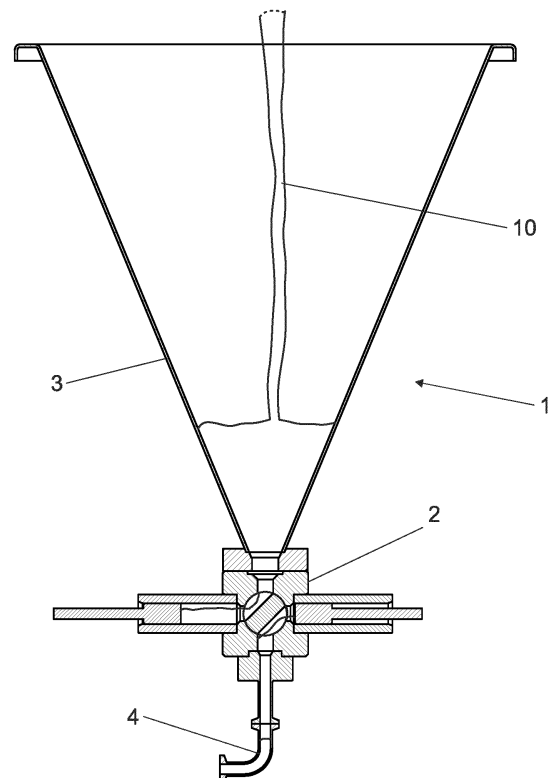
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(54) TRANSFER DEVICE

(57) Device (1) for transferring a liquid product (10) comprising: an inlet portion (3), at least one dispensing unit (2) defining at least one inlet opening (20), and an outlet opening (21); an outlet portion (4) and each said dispensing unit (2) comprising a first conveying element (22), defining a first housing (22a), and configured to convey a predetermined quantity of said product (10) from said inlet opening (20) to said first housing (22a) and to transfer product (10) from said first housing (22a) to said outlet opening (21), a second conveying element (23), defining a second housing (23a), and configured to convey a predetermined quantity of said product (10) from said inlet opening (20) to said second housing (23a) and to transfer said predetermined quantity of said product (10) from said second housing (23a) to said outlet opening (21), a movable separation element (24) configured at least to separate said first housing (22a) from said second housing (23a), define a first configuration in which said inlet opening (20) is in fluid passage connection with said first housing (22a) and in which simultaneously said second housing (23a) is in fluid passage connection with said outlet opening (21), define a second configuration in which said inlet opening (20) is in fluid passage connection with said second housing (23a) and in which simultaneously said first housing (22a) is in fluid passage connection with said outlet opening (21), change from said first configuration to said second configuration and vice versa.

**Fig. 2**

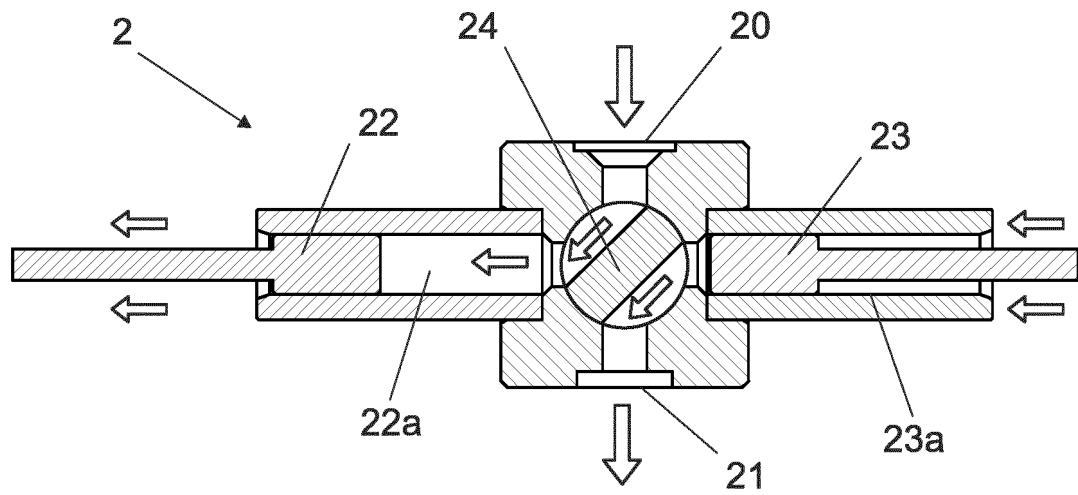


Fig. 3

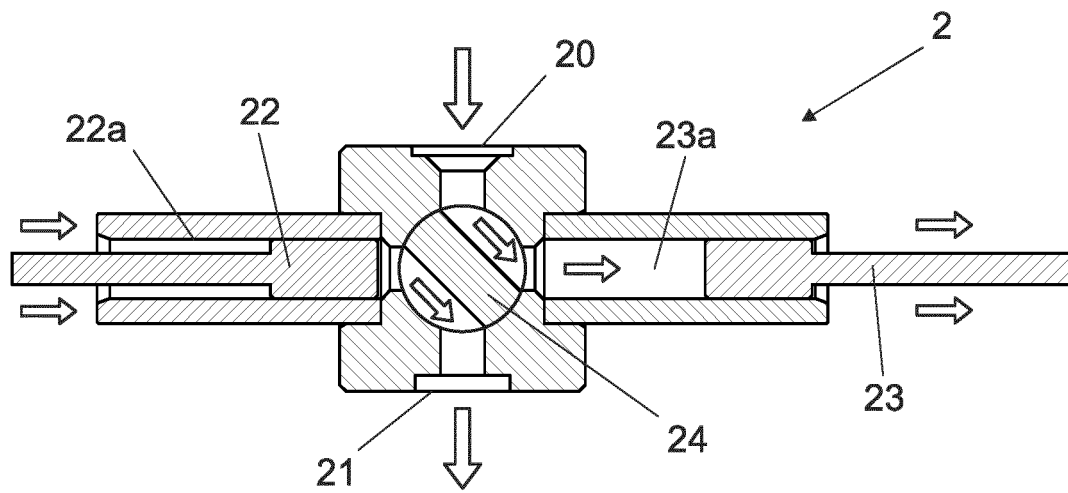


Fig. 4

Description

[0001] This invention relates to a transfer device of the type specified in the preamble of the first claim.

[0002] The object of this invention is a transfer device that finds application primarily, but not exclusively, in the industrial production of bagged products. In particular, it finds application in the production of food products in sealed sachets.

[0003] Equipment is currently known for producing bagged products such as, for example, sachets containing liquid food products such as sauces (such as mayonnaise, mustard, ketchup) or oil. These devices perform the dual function of producing the sachets that serve the function of containing the product, as well as packaging, and inserting the product inside the sachet.

[0004] Equipment for producing bagged products typically consists of an inlet, such as a hopper, a dispensing device, product conveying channels, and a unit for producing and filling sachets.

[0005] The inlet can be a hopper into which the product to be conveyed to subsequent units is introduced.

[0006] The dispensing unit performs the function of transferring the selected quantity to the next units to properly fill the sachets. Downstream of the dispensing unit, conveying channels allow the transfer of the metered product to the filling units. It typically consists of elements that can convey the portions that will make up the sachets, such as sheets. These can be arranged in pairs and carried by side-by-side, counter-rotating cylinders that carry the two sheets so that they face each other at the gap between the cylinders. The sachets are sealed along the edges and filled with product from the conveying channels.

[0007] The prior art just described includes some important drawbacks.

[0008] In particular, equipment for the production of products contained in sealed sachets has the disadvantage of not allowing high productivity.

[0009] In this situation, the technical task underlying this invention is to devise an improved transfer device capable of substantially overcoming at least part of the aforementioned drawbacks.

[0010] In the context of this technical task, it is an important aim of the invention to obtain a transfer device having high productivity.

[0011] Another important aim of the invention is to realize a transfer device that can reduce the energy expenditure associated with use.

[0012] In addition, another important aim of the invention is to realize a transfer device having lower component complexity.

[0013] The technical task and the specified aims are achieved by a transfer device as claimed in the annexed claim 1.

[0014] Preferred embodiments are highlighted in the dependent claims.

[0015] The characteristics and benefits of the invention

will be clarified in the following detailed description of some preferred embodiments of the invention, with reference to the accompanying drawings, wherein:

Fig. 1 shows a transfer device and a machine according to the invention;

Fig. 2 illustrates a section of a transfer device according to the invention;

Fig. 3 shows a section of a transfer device according to the invention in a first configuration;

Fig. 4 shows a section of a transfer device according to the invention in a second configuration;

Fig. 5 shows a machine according to the invention; and

Fig. 6 shows a section of a portion of a machine according to the invention. In this document, when measurements, values, shapes, and geometric references (such as perpendicularity and parallelism) are associated with words like "approximately" or other similar terms, such as "almost" or "substantially", they shall be understood as except for errors of measurement or imprecisions due to errors of production and/or manufacturing and, above all, except for a slight departure from the value, measurement, shape, or geometric reference with which it is associated. For instance, these terms, if associated with a value, preferably indicate a divergence of not more than 10% of the value.

[0016] Moreover, when used, terms such as "first", "second", "higher", "lower", "main" and "secondary" do not necessarily identify an order, a priority of relationship or a relative position, but can simply be used to clearly distinguish between their different components.

[0017] Unless otherwise specified, as reflected in the following discussions, terms such as "processing", "computing", "determination", "computation", or the like are considered to refer to the action and/or processes of a computer or similar electronic computing device that manipulates and/or transforms data represented as physical, such as electronic quantities of records of a computer system and/or memories, in other data similarly represented as physical quantities within computer systems, records, or other information storage, transmission, or display devices.

[0018] The measurements and data reported in this text are to be considered, unless otherwise indicated, as performed in the International Standard Atmosphere ICAO (ISO 2533:1975).

[0019] With reference to the figures, the transfer device according to the invention is globally indicated with the number **1**. It is a device designed to transfer a product **10**. It can be a liquid product. In detail, product **10** can be a food product such as, for example, ketchup, mayonnaise, etc.

[0020] Device **1** includes an inlet portion **3**. This is suitable for receiving and transporting the product **10**. In detail, the inlet portion **3** preferably includes a hopper. It

is advantageous since it allows product 10 to be conveyed more efficiently.

[0021] Device 1 includes at least one dispensing unit 2. It performs the function of enabling the transfer of a predetermined quantity of product 10. Dispensing unit 2 defines at least one inlet opening 20. It is the opening through which the product is introduced into dispensing unit 2. Inlet opening 20 is in fluid passage connection with inlet portion 3. In addition, dispensing unit 2 defines an outlet opening 21. The outlet opening is the opening that allows the transfer of the predetermined quantity of product 10, once selected and transported, outside the dispensing unit 2.

[0022] Each dispensing unit 2 advantageously includes a first conveying element 22. It defines a first housing 22a. The first housing 22a is a volume within which product 10 can be introduced. In fact, the first conveying element 22 is configured to convey a predetermined quantity of product 10 from the inlet opening 20 to the first housing 22a. In addition, first conveying element 22 is configured to transfer the first predetermined quantity of product 10 from the first housing 22a to the outlet opening 21.

[0023] Dispensing unit 2 also advantageously includes a second conveying element 23. It can be entirely analogous to the first conveying element 22. In fact, it defines a second housing 23a. The second conveying element 23 is configured to convey a predetermined quantity of product 10 from the inlet opening 20 to the second housing 23a. In addition, it is configured to transfer the second predetermined quantity of product 10 from the second housing 23a to the outlet opening 21.

[0024] In this regard, at least one between the first conveying element 22 and the second conveying element 23 preferably includes a piston. It can be a single-acting piston or a double-acting piston.

[0025] In embodiments in which the first conveyance element 22 is a piston, the first housing 22a corresponds to the inner chamber of the piston. Therefore, the first housing 22a has variable volume depending on the position of the moving wall of the piston. When the predetermined quantity of product 10 is introduced inside the first housing 22a, there is an increase in the volume of the first housing 22a. When the predetermined quantity of product 10 is transported through the outlet opening 21, the moving wall of the piston reduces the volume of the first housing 22a, consequently moving the predetermined quantity of product 10 out of the first housing 22a and towards the outlet opening 21.

[0026] Similarly, in embodiments in which the second conveying element 23 is a piston, the second housing 23a corresponds to the inner chamber of the piston. Therefore, the second housing 23a has variable volume depending on the position of the moving wall of the piston. When the predetermined quantity of product 10 is introduced inside the second housing 23a, there is an increase in the volume of the second housing 23a. When the predetermined quantity of product 10 is transported

through the outlet opening 21, the moving wall of the piston reduces the volume of the second housing 23a, consequently moving the predetermined quantity of product 10 out of the second housing 23a and towards the outlet opening 21.

[0027] Pistons as conveying elements 22, 23 have the advantage that they can create a vacuum within their respective housings 22a, 23a. Therefore, the product 10 coming from the inlet opening 20 is effectively sucked into the corresponding housing 22a, 23a. This solution makes it possible to increase the speed at which the transport and dosing operation of product 10 is carried out. In fact, gravity is not used to carry out the transport, but the product 10 is conveyed mechanically. In addition, the presence of a piston makes it possible to advantageously select the predetermined quantity of product 10 in proportion to the stroke of the movable wall, which consequently establishes the size that the housing reaches when product 10 is introduced into it. This solution makes the device 1 more versatile and allows its application for different quantities of product 10. In addition, the presence of pistons also facilitates the application of the device 1 to different types of products 10.

[0028] Device 1 advantageously includes a separation element 24. It is a movable element and is configured at least to separate the first housing 22a from the second housing 23a. In fact, the two housings 22a and 23a perform their functions independently, and the quantity of product 10 that passes through one of the two housings does not preferentially pass through the other. In one embodiment of device 1, the separation element 24 can be in the form of a moving wall. It is therefore able to keep the first housing 22a and the second housing 23a separate at any stage of transport and dosing.

[0029] In particular, separation element 24 advantageously defines a first configuration. In the first configuration, the inlet opening 20 is in fluid passage connection with the first housing 22a. Simultaneously, the second housing 23a is in fluid passage connection with the outlet opening 21. Therefore, in the first configuration, the first conveying element 22 can realize the transport of product 10 within the first housing 22a until the predetermined quantity is reached, while the second conveying element 23 can transport product 10 from the second housing 23a to the outlet opening 21.

[0030] Separation element 24 also advantageously defines a second configuration. In the second configuration, the inlet opening 20 is in fluid passage connection with the second housing 23a. Simultaneously, the first housing 22a is in fluid passage connection with the outlet opening 21. Therefore, in the second configuration the second conveying element 23 can realize the transport of product 10 inside the second housing 23a until the predetermined quantity is reached, while the first conveying element 22 can transport product 10 from the first housing 22a to the outlet opening 21.

[0031] Both configurations advantageously allow for the simultaneous operation of introducing product 10 into

and exiting from dispensing unit 2. Consequently, device 1 enables increased productivity of product 10 dispensing and transport operations. In this regard, separation element 24 is configured to switch from the first configuration to the second configuration and vice versa. Therefore, switching between the two configurations causes the first conveying element 22 and the second conveying element 23 to alternately and simultaneously carry out the dosing operations at the inlet to the dispensing unit 2 and the conveying operations at the outlet from it, making the process faster. The movement of the separation element 24 allows switching between configurations and, thus, the repetition of simultaneous operations by the two conveying elements 22 and 23.

[0032] In this regard, at least one between the first conveying element 22 and the second conveying element 23 is preferably further configured to convey the predetermined quantity of product 10 into the first and second housings 22a and 23a respectively, when the separation element 24 is in the first and second configurations, respectively. In addition, at least one between the first conveying element 22 and the second conveying element 23 is preferably further configured to convey the predetermined quantity of product 10 into the first and second housings 22a and 23a respectively, at the outlet opening 21 when the separation element 24 is in the second and first configurations, respectively.

[0033] The predetermined quantity of product 10 can be the same for both conveying elements 22 and 23. In particular, the same quantity allows for increased dispensing speed when product 10 is the same for both conveying elements 22 and 23. Embodiments are possible in which the predetermined quantity can be different between the two conveying elements.

[0034] In device 1, when separation element 24 is in the first configuration, product 10 is loaded into the first housing 22a and product 10 is unloaded from the second housing 23a. Therefore, the dispensing unit allows you to load product 10 as described above, perform dosing, and unload the predetermined quantity of dosed product 10.

[0035] In addition, when separation element 24 is in the second configuration, product 10 is loaded into the second housing 23a and product 10 is unloaded from the first housing 22a.

[0036] Thus, in the first configuration, loading and dosing are done by the first conveying element 22, while unloading the predetermined amount of product 10 dosed is done by the second conveying element 23 and vice versa.

[0037] In some designs where the first conveying element 22 and the second conveying element 23 preferably both comprise mutually integrally constrained pistons. This embodiment is advantageous for making the movement of both conveying elements 22 and 23 simultaneous. These movements can then be synchronized with the movement of separation element 24, so that the predetermined quantity of product 10 desired can be dosed. The constraint that makes the first conveying

element 22 and the second conveying element 23 integral can be realized by constraining the moving elements of each piston respectively integral to the moving walls of housings 22a and 23a.

[0038] If both pistons have the same dimensions and shape, the predetermined quantities of product 10 are the same. During the transition to the first configuration, the piston corresponding to the first conveying element 22 moves the moving wall so as to increase the volume of the first housing 22a. Therefore, as a result of the integral constraint between the two pistons, the piston corresponding to the second conveying element 23 moves the corresponding moving wall so as to reduce the volume of the second housing 23a. Both moving walls can be moved in the same direction. For example, they can make a simultaneous translation movement. When the separation element 24 switches to the second configuration, the piston corresponding to the second conveying element 23 moves the moving wall so as to increase the volume of the second housing 23a. Therefore, as a result of the integral constraint between the two pistons, the piston corresponding to the first conveying element 22 moves the corresponding moving wall so as to reduce the volume of the first housing 22a. The simultaneous movement of the two pistons, in the second configuration, can take place in the opposite direction to that of the first configuration.

[0039] Sensors may be present to detect the position of the two pistons so that their movements enable loading and unloading operations as previously described depending on the configuration assumed by the separation element 24.

[0040] The separation element 24 switches from the first configuration to the second configuration and vice versa preferably by a rotational movement.

[0041] Rotational movement can occur around a rotation axis 2a. Rotational movement is imparted to the separation element 24 by a rotating shaft 6. It is preferably integral to the separation element 24. Shaft 6 can be aligned with rotation axis 2a. Shaft 6 can be integral to handling means. For example, handling means may include a motor capable of realizing shaft rotation 6.

[0042] In some embodiments of device 1, the dispensing unit may include a cylindrical-shaped chamber with an axis coincident with the rotation axis 2a. Separation element 24 can be a sealing wall, with ends counter-shaped to the chamber walls. In addition, the ends of the wall must be able to slide along the partitions of the chamber. The wall may develop mainly along plane parallel to the rotation axis 2a and be lying along the axis itself.

[0043] In some embodiments of device 1, conveying elements 22 and 23 may correspond only to the corresponding housings 22a and 23a. Specifically, each of the housings 22a and 23a can correspond to a portion of the cylindrical chamber bounded by the rotating separation element 24, as previously described in relation to the first and second configurations. Therefore, in these embodi-

ments, the predetermined quantity of product 10 can be loaded inside dispensing unit 2, which receives via inlet opening 20 the product 10 with a constant flow. Separation element 24 can rotate by such an angle to go from the first configuration to the second configuration and by the same angle in the opposite direction to go from the second configuration to the first configuration. The rotational movement of the separation element 24 can be overall oscillating around the rotation axis 2a.

[0044] Product 10 can be introduced inside dispensing unit 2 so that it enters inside one of the two housings 22a or 23a alternately depending on whether separation element 24 is in the first configuration or the second configuration. Simultaneously, the housing not in fluid passage connection with inlet opening 20 is in fluid passage connection with outlet opening 21 and can discharge the product 10 previously introduced in dosed quantity by gravity passing it through outlet opening 21. These embodiments have the advantage of comprising fewer components and less complexity of device 1.

[0045] In implementations of device 1 comprising the cylindrical chamber, previously described, in dispensing unit 2 and conveying elements 22 and 23 comprising pistons, the moving walls of the pistons can be moved along a direction perpendicular to the rotation axis 2a. In detail, the first housing 22 and the second housing 23 can be mainly extended along the direction perpendicular to the rotation axis 2a.

[0046] Also in these embodiments the separation element 24 can be moved alternately, as described above. Therefore, separation element 24 can be moved in such a way that the transition from the first configuration to the second configuration occurs by a rotational movement around the rotation axis 2a in the opposite direction to the rotational movement that allows the transition from the second configuration to the first configuration. Thus, also in these embodiments, the overall movement of the separation element 24 can be oscillatory.

[0047] In some alternative embodiments of device 1 in which pistons are present, separation element 24 can rotate continuously. Therefore, in these embodiments, the separation element 24 can rotate continuously in the same direction of rotation around the rotation axis 2a.

[0048] In general, the separation element 24 can stop the rotational movement when it reaches the positions corresponding to the first configuration and the second configuration, respectively, until the conveying elements 22 and 23 have carried out their respective conveying operations in the given configuration, and then resume the movement allowing the transition from one configuration to the other. Motion interruption can also be made for embodiments in which the separation element 24 always rotates in the same direction around the rotation axis 2a.

[0049] The device may include sensors to determine the rotational speed of shaft 6 in proportion to the translation movement of the moving walls of the pistons. In designs in which the moving walls are integrally con-

strained, the sensors can determine the unique translation speed for both walls in proportion to the rotational speed of shaft 6.

[0050] In general, device 1 may include control means.

5 They may include a processor and commands that can be operated by a user. The control means can operate the rotation of shaft 6, the translation of the moving walls of the pistons, and establish parameters such as the rotation speed of shaft 6 and the translation speed of the moving walls. In addition, control means can be operationally connected to the sensors. Control means can be programmed to change values to match predetermined reference values.

10 **[0051]** Device 1 preferably includes a plurality of dispensing units 2. They can operate simultaneously. Specifically, each inlet opening 20 of each of the plurality of dispensing units 2 is preferably in fluid passage connection with the inlet portion 3. In some embodiments, device 1 may include a hopper defining a bottom in fluid passage connection with each inlet opening 20. Thus, simultaneous feeding of each dispensing unit 2 with product 10 can be realized.

20 **[0052]** Each separation element 24 is preferably integral to shaft 6. Therefore, the rotational motion simultaneously moves each separation element 24. This can advantageously increase the productivity of device 1, since the same rotating shaft 6 can realize simultaneous dosing in each of the dispensing units 2. Thus, multiple doses of product 10 can be obtained simultaneously.

25 **[0053]** Device 1 includes an outlet portion 4. It is in fluid passage connection with outlet opening 21. In detail, outlet portion 4 performs the function of facilitating the transfer of the dose, or predetermined amount, of product 10 discharged through outlet opening 21. For example, outlet portion 4 may include a flexible tubular element for transport from outlet opening 21 to a zone distinct from device 1 in which subsequent processing stages can be performed on product 10.

30 **[0054]** In the embodiment of device 1 comprising multiple dispensing units 2, each of them includes a corresponding outlet portion 4. For example, device 1 may include flexible tubular elements each in fluid passage connection with an outlet opening 21. These flexible tubular elements can then convey product 10 to the next stages of processing.

35 **[0055]** In this regard, the invention further includes a machine 8. It can be, for example, a machine for further processing of products 10 once dosing has been carried out. Machine 8 includes device 1 and is preferably configured to produce sealed products 11. Therefore, the production of sealed products 11 is preferably done by inserting a product 10 into a container 12. Container 12 can perform the function of only containing the dosed product 10 or it can also perform the function of packaging with aesthetic properties.

40 **[0056]** Machine 8 can perform at least the function of placing each predetermined amount of the product 10 inside a container 12 to make the sealed product 11.

Machine 8 has the advantage of being able to produce sealed products 11 with high productivity.

[0057] In some embodiments, machine 8 can also make the container 12 in addition to filling it with dosed product 10. In this way, multiple processing stages can advantageously be carried out with the same machine 8.

[0058] In this regard, machine 8 preferably includes a sachet packaging machine. Therefore, sealed products 11 include filled sachets 110. They include sealed sachets 120 containing product 10. For example, they may be sachets designed to hold food products, such as sauces or oil.

[0059] In particular, machine 8 is preferably at least configured to turn at least one pair of sheets 121 into sachets 120. Therefore, machine 8 produces sachets 120 from sheets 121. In addition, machine 8 is configured to insert product 10 into sachets 120 in order to obtain filled sachets 110.

[0060] In detail, machine 8 comprises at least one handling unit 80. It is designed to move sheets 121 along a feed direction 8a. This is the direction along which product 10 is inserted.

[0061] Handling unit 80 may include a pair of rotating cylinders side by side and arranged so that their respective axes are parallel. The two cylinders are counter-rotating. In addition, cylinders can be arranged perpendicular to the feed direction 8a. Each of the two cylinders can carry one of the sheets 121. Therefore, the two sheets are transported in such a way that both are parallel to the feed direction 8a.

[0062] The sachet packaging machine includes a sealing unit 81. It is designed to perform a sealing operation of the sheets 121 so as to obtain each of the sachets 120. In particular, the sealing unit 81 can be housed on the same handling unit 80. In fact, the pair of cylinders, or rollers, can perform both the function of moving and sealing the pair of sheets 121.

[0063] For example, heat-sealing devices can be resistive elements arranged at the cylinders so that portions of the sheets 121 are sealed at the edges of the sheets 121. The orientations along which the heat-sealing is carried out can be, for example, the direction parallel to the axis of the cylinders and the direction parallel to the feed axis 8a. Different heat-sealing orientations are possible depending on the shape of the sachet 120 to be made.

[0064] In fact, sealing unit 8 can also include portions having different orientations from those described for performing heat sealing along transverse directions.

[0065] Therefore, sheets 121 are preferably sealed along the feed direction 8a and along a sealing axis 8b. The latter is transverse to the feed direction 8a. In this way, the sachet packaging machine makes a heat sealing. Each heat sealing corresponds to the area, typically along the edge of each of the sachets 120 and, then the filled sachets 110.

[0066] The sachet packaging machine comprises at least one filling unit 82. This is suitable for inserting

product 10 into each of said sachets 120.

[0067] The sachet packaging machine preferably includes device 1. Specifically, device 1 is designed to transfer product 10 to filling unit 82. In detail, device 1 performs the dosing of product 10 and the transfer to the filling unit 82 is done through the outlet portion 4. In some embodiments, filling unit 82 may coincide with outlet portion 4. The operation of the device 1 and of the machine 8 previously described in structural terms is as follows.

[0068] Product 10 is inserted within inlet portion 3. It enters dispensing unit 2 through inlet opening 20. Specifically, when separation element 24 is in the first configuration, the product 10 enters the first housing 22a and the first conveying element 22 causes product 10 to enter the first housing 22a until the predetermined quantity is reached. For example, the first conveying element 22 may be a piston that, through the movement of the moving wall causes a suction of the product 10 within the first housing 22a. At the same time, the second conveying element 23 can eject a previously predetermined quantity of product 10 by passing it from the second housing 23a to the outlet opening 21. This operation can also be carried out by means of a piston, the moving wall of which can slide so as to reduce the volume of the second housing 23a and convey the predetermined quantity of product 10 to the outlet of the dispensing unit 2. The movement of the moving walls of the two pistons can be simultaneous and in the same direction if they are aligned.

[0069] When the separation element 24 switches to the second configuration, the second conveying element 23 conveys product 10 inside the second housing 23a until the predetermined quantity of product 10 is reached. At the same time, the first conveying element 22 ejects the previously predetermined quantity of product 10. The transition from the first to the second configuration of separation element 24 can be made by rotation around the rotation axis 2a. The rotational movement of separation element 24 can be in one direction when moving from the first to the second configuration and in the opposite direction when moving from the second to the first configuration. The rotational movement is achieved by means of shaft 6, which is integral with separation element 24. The rotation shaft 6 can simultaneously rotate the separation elements 24 of each of a plurality of dispensing units 2. Therefore, the input product 10 in the inlet portion 3, is simultaneously dosed in each of the dispensing units 2. The dosed product 10 passes through each of the outlet openings 21. Product 10 is transferred from the outlet opening to outlet portion 4. For example, if outlet portion 4 is a tubular element, product 10 can be transferred to a machine 8. Once transferred to the machine 8, the dosed product 10 is placed inside a container 12.

[0070] Specifically, when the machine 8 is a sachet packaging machine, the handling unit 80 moves a pair of sheets 121 along the direction 8a. The sealing unit 81

performs heat sealing of the pair of sheets 121 along the feed direction 8a and along the sealing axis 8b to obtain a sachet 120. Dosed product 10 from outlet portion 4 is transferred to filling unit 82 and transferred, along feed direction 8a, inside sachet 120. The cylinders of the handling unit 80 rotate and make the missing heat-seal or heat-seals to seal the sachet 120 containing product 10 and obtain a filled sachet 110. The process of dosing, transporting, filling sachets and sealing the same can be repeated. In addition, when there are a plurality of dispensing units 2 a plurality of outlet portions 4 can be positioned to simultaneously convey a plurality of doses of the product 10 each into a filling unit 82 of the same machine 8. The same pair of cylinders, or rollers, can accomplish the handling and sealing of a plurality of sachets 120 and obtain a plurality of filled sachets 110. **[0071]** Device 1 according to the invention achieves important advantages.

[0072] In fact, device 1 achieves high productivity, thanks to the dosing process that can reduce the waiting time between one dosing step and the next. In particular, device 1 achieves twice the production speed of similar devices implementing a single conveying element.

[0073] Device 1, therefore, can reduce the energy expenditure associated with the process, which is related to increased productivity.

[0074] In addition, device 1 has the advantage of making the construction of dispensing units easier. In fact, the separation element can be a movable, or rotating, wall, unlike the known dispensing units, which take advantage of a rotating element within which channels are cut to align with the openings of the dispensing unit. In device 1, it is possible to have a larger tolerance on the alignment of the separation element in the possible configurations.

[0075] In addition, device 1 can be part of a sachet packaging machine that allows for increased productivity at the same process parameter values.

[0076] Variations may be made to the invention that fall within the scope of the inventive concept defined in the claims. In this context, all the details can be replaced by equivalent elements and any materials, shapes and dimensions can be used.

Claims

1. Device (1) for transferring a liquid product (10) comprising:

- an inlet portion (3) suitable for receiving and transporting said product (10);
- at least one dispensing unit (2) defining at least one inlet opening (20), in fluid passage connection with said inlet portion (3), and an outlet opening (21);
- an outlet portion (4) in fluid passage connection with said outlet opening (21); and **characterized by the fact that:**

- each said dispensing unit (2) comprises:

- a first conveying element (22), defining a first housing (22a), and configured to convey a predetermined quantity of said product (10) from said inlet opening (20) to said first housing (22a) and to transfer said first predetermined quantity of said product (10) from said first housing (22a) to said outlet opening (21);
- a second conveying element (23), defining a second housing (23a), and configured to convey a predetermined quantity of said product (10) from said inlet opening (20) to said second housing (23a) and to transfer said predetermined quantity of said product (10) from said second housing (23a) to said outlet opening (21);
- a movable separation element (24) configured at least to:

- separate said first housing (22a) from said second housing (23a);

- define a first configuration in which said inlet opening (20) is in fluid passage connection with said first housing (22a) and in which simultaneously said second housing (23a) is in fluid passage connection with said outlet opening (21);

- define a second configuration in which said inlet opening (20) is in fluid passage connection with said second housing (23a) and in which simultaneously said first housing (22a) is in fluid passage connection with said outlet opening (21);

- change from said first configuration to said second configuration and vice versa.

2. Device (1) according to claim 1, wherein at least one of said first and second conveying elements (22, 23) is further configured to convey said predetermined quantity of said product (10) into said first and second housings (22a, 23a) respectively, when said separation element (24) is respectively in said first and second configurations and to convey said predetermined quantity of said product (10) respectively from said first and second housings (22a, 23a) to said outlet opening (21) when said separation element (24) is respectively in said second and first configurations.

3. Device (1) according to any of the previous claims, wherein at least one of said first conveying element (22) and said second conveying element (23) comprises a piston.

4. Device (1) according to any of the previous claims, wherein:

- when said separation element (24) is in said first configuration, said product (10) is loaded into said first housing (22a) and said product (10) is unloaded from said second housing (23a);
 - when said separation element (24) is in said second configuration, said product (10) is loaded into said second housing (23a) and said product (10) is unloaded from said first housing (22a).

- a sealing unit (81) adapted for performing a sealing operation of said sheets (121) so as to obtain each of said sachets (120) and comprising at least a heat sealing device adapted for sealing said sheets (121) along said feed direction (8a) and along a sealing axis (8b), transverse to said feed direction (8a), realizing a heat seal;
 - a filling unit (82) suitable for inserting said product (10) into each of said sachets (120);
 - said device (1) suitable for transferring said product (10) to said filling unit (82).

5. Device (1) according to any of the previous claims, wherein said inlet portion (3) comprises a hopper.

6. Device (1) according to any of the previous claims, wherein said separation element (24) changes from said first configuration to said second configuration and vice versa by means of a rotational movement about a rotation axis (2a), said rotation movement being imparted to said separation element (24) by a rotation shaft (6) integral with said separation element (24) aligned with said rotation axis (2a).

7. Device (1) according to the previous claim, comprising a plurality of dispensing units (2), each inlet opening (20) of each of said plurality of dispensing units (2) being in fluid passage connection with said inlet portion (3) and each said separation element (24) being integral with said shaft (6), said rotational movement simultaneously moving each said separation element (24).

8. Device (1) according to at least claim 4, wherein said first conveying element (22) and said second conveying element (23) both comprise pistons mutually integral with each other.

9. Machine (8) configured to produce sealed products (11) by inserting a product (10) into a container (12) comprising a device (1) according to any of the previous claims.

10. Machine (8) according to the previous claim, comprising a sachet packaging machine, said sealed products (11) comprising filled sachets (110), said filled sachets (110) comprising sealed sachets (120) containing said product (10), said machine (8) being at least configured to convert at least one pair of sheets (121) into said sachets (120), to insert said product (10) into said sachets (120) so as to obtain said filled sachets (110);
 said machine (8) comprising at least:

- a handling unit (80), suitable for handling said sheets (121) along a feed direction (8a);

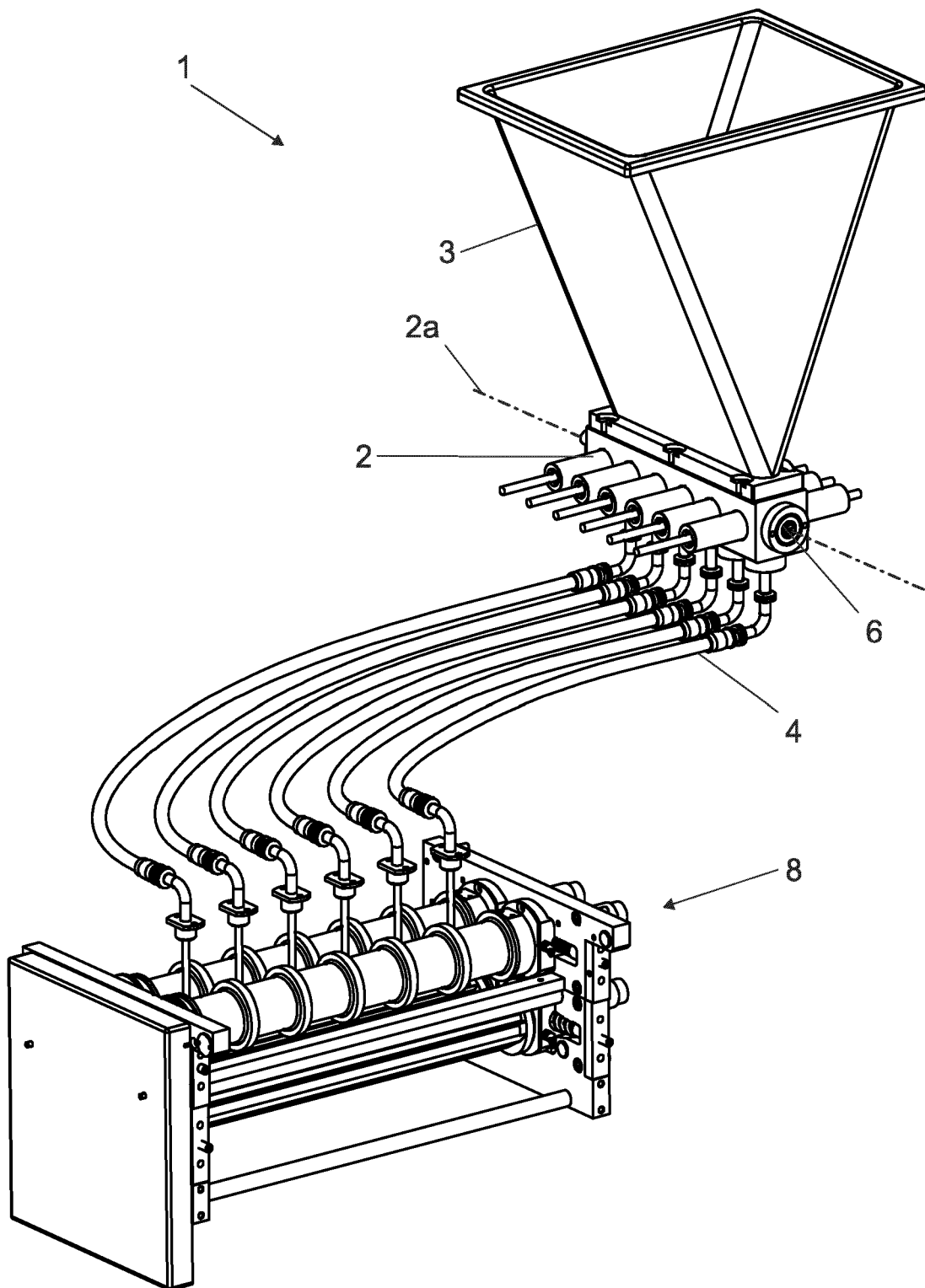


Fig. 1

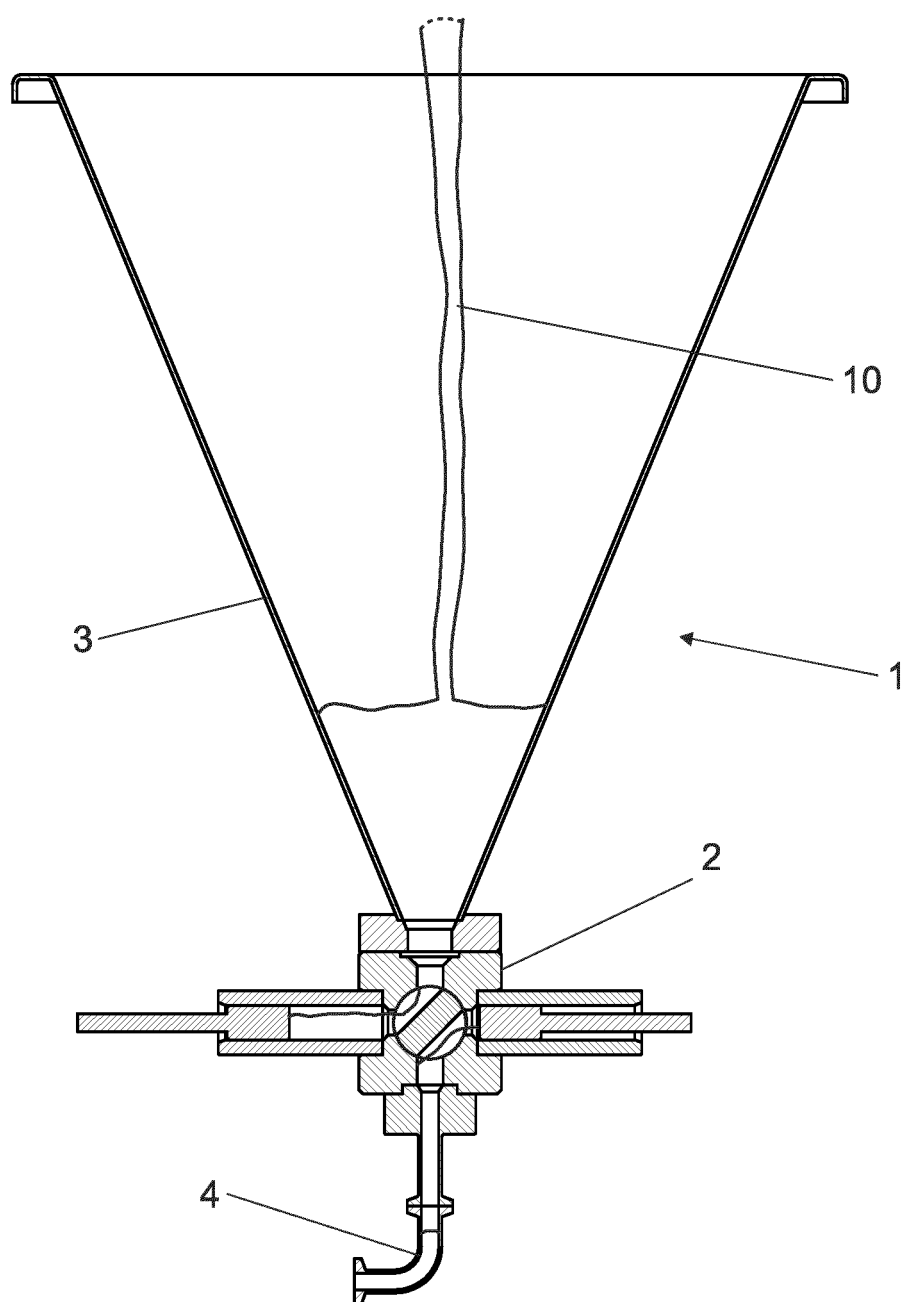


Fig. 2

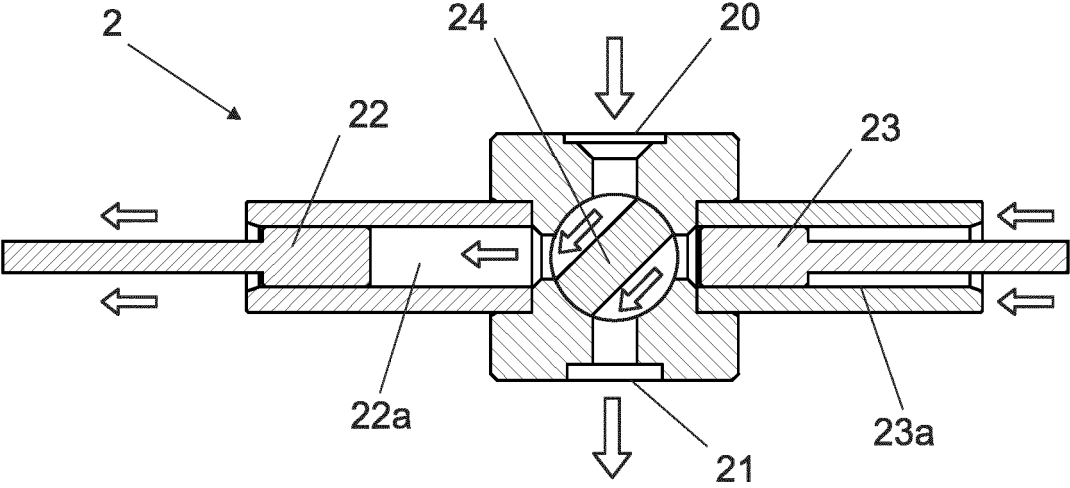


Fig. 3

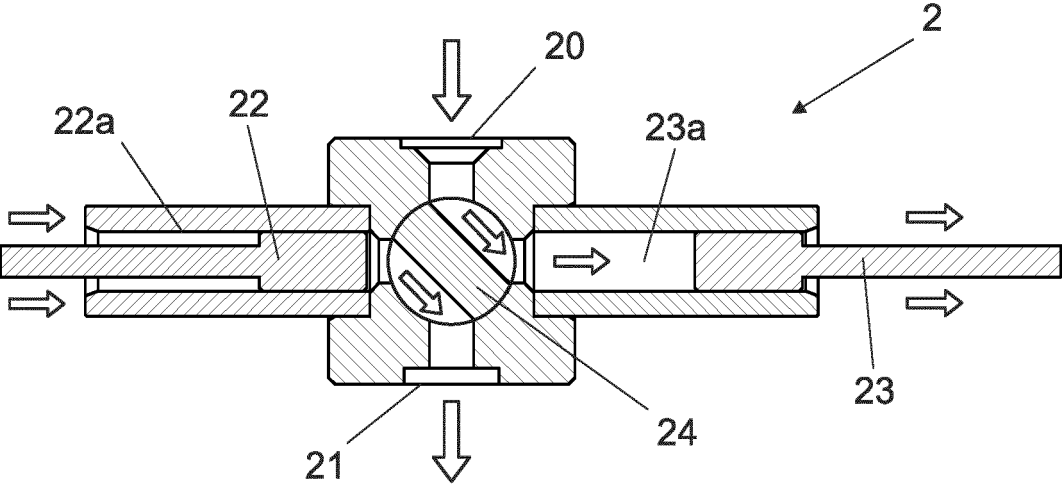


Fig. 4

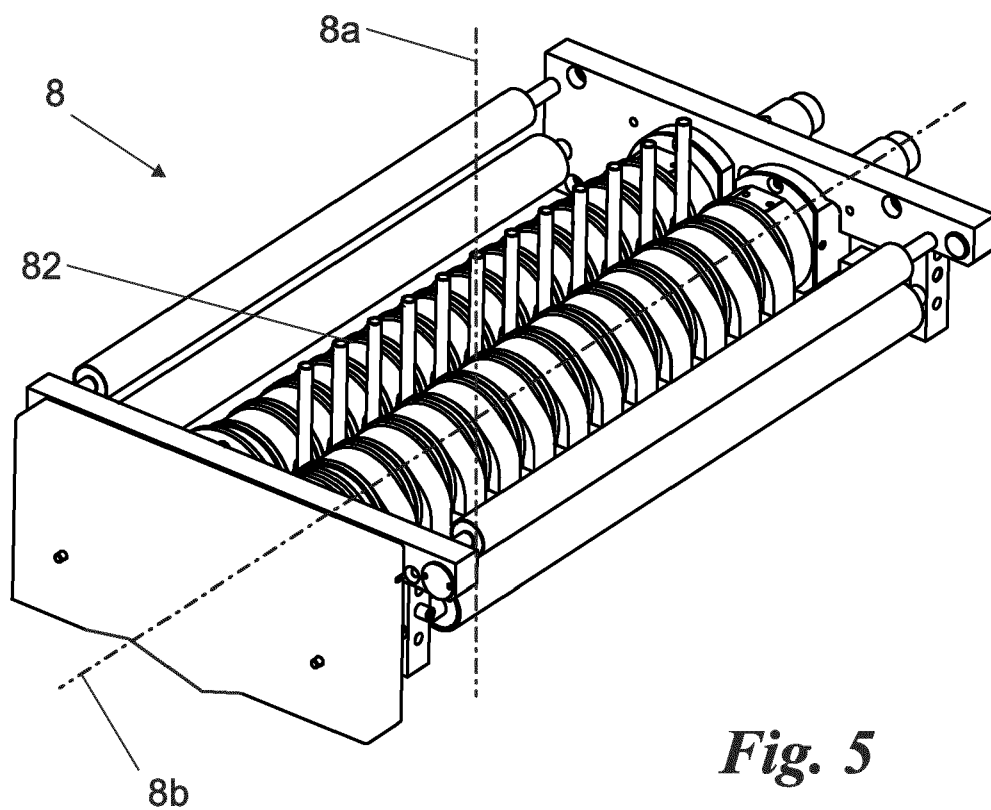


Fig. 5

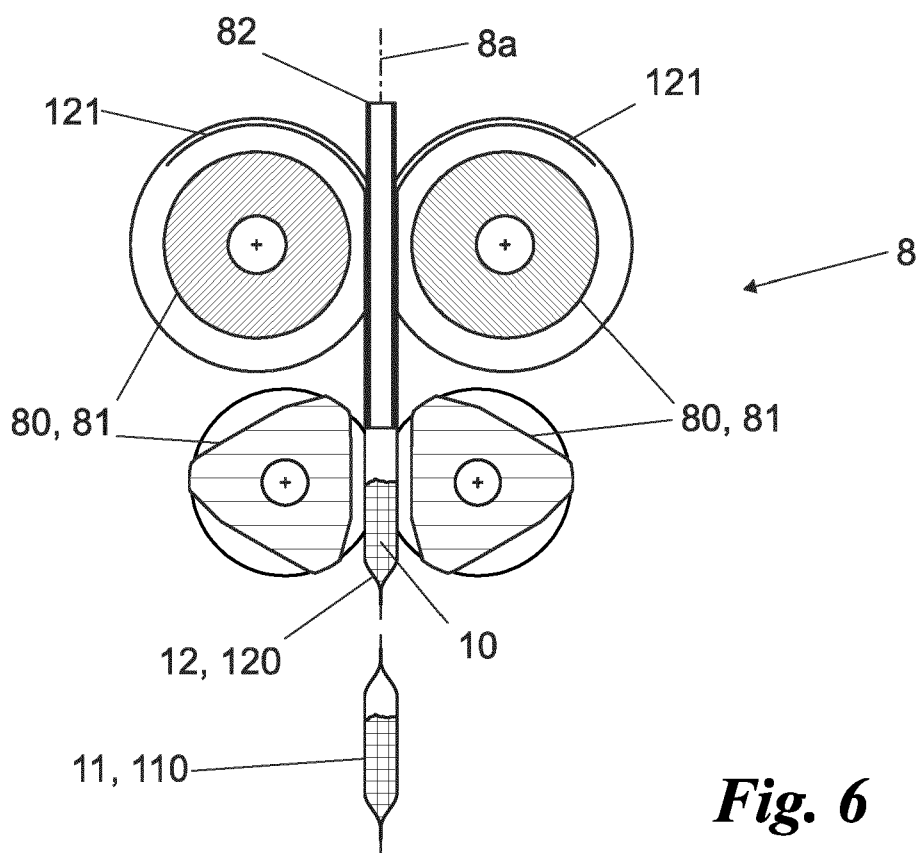


Fig. 6



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Place of search Munich		Date of completion of the search 17 November 2024	Examiner Ungureanu, Mirela
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