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(54) **MACHINE FOR MAKING FILTER-BAGS WITH STACKING STATION**

MASCHINE ZUR HERSTELLUNG VON FILTERBEUTELN MIT STAPELSTATION

MACHINE DE FABRICATION DE SACHETS-FILTRES AVEC STATION D'EMPILAGE.

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Description

Technical field

[0001] This invention relates to a machine for forming filter-bags containing infusion products.

[0002] The expression "infusion products" means products such as tea, coffee, camomile (in powder, granules, or leaves).

Background art

[0003] Advantageously, a machine according to the invention is used for forming filter-bags of the so-called two-lobed type, that is to say, filter-bags comprising a single piece of filter paper defining two separate and closed chambers. Each chamber contains a dose of infusion product. The two chambers are folded towards each other forming a single upper end (in the shape of an upturned "V") and a bottom end in the shape of a "W".

[0004] For example, the filter-bag may be equipped with a thread for association with a gripping tag.

[0005] A type of machine for forming this type of filter-bag is known from patent document EP765274 (in the name of the same Applicant).

[0006] That patent document describes a machine structured along a forming and feeding line on which are positioned:

- a station for feeding a web of filter paper along a feed surface;
- a station for feeding doses of product on the web of filter paper at predetermined distances;
- a station designed to close the web on itself, wrap the doses of product and, subsequently, longitudinally join the web;
- a station for folding individual pieces of filter paper with double chamber;
- a carousel equipped with radially protruding grippers, positioned beneath the folding station and configured to receive individual pieces of folded filter paper; the carousel, moved stepwise about a horizontal axis, moves each piece of filter paper in the proximity of stations arranged one after another to associate to the piece of filter paper a thread, suitably wrapped around the piece of filter paper, and a tag in turn associated with the thread.

[0007] In some machine solutions, depending on the type of filter-bag, there may be:

- a further station for transversal closing of the ends of the piece before or at the same time as the separation from the remaining film; or
- a station for folding the open ends of the two chambers of the piece along the path of the carousel.

[0008] If necessary, there may also be a station for

applying an overwrapping material to the filter-bag thus obtained along the path of the carousel.

[0009] Moreover, the carousel transfers the filter-bag thus formed on a release and orientation unit configured to release the filter-bag to a stacking unit. Of particular interest in this specification is the latter release and orientation unit.

[0010] The orientation and releasing unit (shown from patent document EP762973 in the name of the same Applicant) comprises:

- a drum, positioned alongside the carousel, comprising a plurality of housing pockets, arranged circumferentially and each designed to house and retain by interference a filter-bag whilst the drum rotates in a stepwise fashion;
- a conveyor unit which picks up the filter-bag from a gripper of the carousel, and conveys (with substantially rectilinear motion) above the drum;
- means for placing the filter-bag in a corresponding pocket of the drum when the pocket is in a predetermined transfer position during rotation of the drum.

[0011] The drum, moved stepwise about an axis parallel to the axis of the carousel, has, precisely, the duty of receiving, rotating and releasing the filter-bags inside the stacking unit for preparing groups of filter-bags for their final packaging.

[0012] The stacking unit comprises a fixed tubular conduit oriented in a radial direction relative to the drum, and having an end opening positioned facing the surface of the drum.

[0013] The placing means comprise a compacting head positioned above the drum which is able to push the filter-bag into the pocket.

[0014] Lastly, the orientation and release unit comprises an element for ejection of the filter-bag, when the respective pocket of the drum is positioned facing the stacking unit.

[0015] The ejector element has a pushing head and an actuator element configured to couple the pushing head to the bottom of each pocket, when the latter is facing the stacking unit.

[0016] Each pocket has a plurality of through holes in it, made on its bottom, which can be engaged by the pushing head to allow contact with the filter-bag and the consequent ejection thrust from the pocket towards the stacking unit.

[0017] Both for market strategies and in order to increase the infusion quality of each single filter-bag, it is necessary in every chamber to increase the quantity of product which constitutes the single dose which, in effect, has created drawbacks on the machine.

[0018] In effect, this modification has generated a significant increase in the weight of the filter-bag in its entirety (by summing the weight of the two chambers) and, for this reason, operational difficulties have been encountered.

[0019] More specifically, the structure of the orientation and release unit is designed to obtain a positioning and a corresponding release of the single filter-bag using the partial elastic deformability of the filter-bag, that is, the guarantee of a correct housing of the filter-bag is left to the snap fitting force generated on the filter-bag.

[0020] The latter, in fact, is forced to enter into the pocket of the drum and, subsequently, pushed out from the pocket itself to drop into the stacking unit.

[0021] Now, an increase in the weight of the filter-bag may create problems for positioning the filter-bag inside the pocket of the drum during stepwise rotation of the latter due to centrifugal forces applied to the filter-bag. Similarly, in the step for ejection of the filter-bag, an incorrect positioning of the filter-bag or a greater resistance of the filter-bag to the thrust generated by the ejection head may create breakages on the filter-bag.

[0022] In other words, the current structure of the orientation and release unit does not guarantee a correct stability of the filter-bag in the pocket of the drum and its integrity during release towards the stacking unit.

Disclosure of the invention

[0023] The aim of this invention is to provide a machine for forming filter-bags for infusion products which can overcome the above-mentioned drawbacks. More specifically, the aim of this invention to provide a machine for forming filter-bags for infusion products which is able to operate at high production speed even with heavy and large filter-bags.

[0024] These aims are fully achieved by the machine for forming filter-bags containing infusion products according to this invention as characterised in the appended claims.

Brief description of the drawings

[0025] The features of the invention will become more apparent from the following detailed description of a preferred, non-limiting embodiment of it, with reference to the accompanying drawings, in which:

- Figure 1 schematically illustrates a front view, with some parts cut away to better illustrate others, of a machine for forming filter-bags containing infusion products according to this invention;
- Figure 2 illustrates a front perspective view of part of the machine of Figure 1, in particular a drum for orientation of the filter-bags;
- Figure 3 illustrates a rear perspective view of the drum of Figure 2;
- Figures 4 and 5 show the drum of the previous drawings, with an ejector element in two different configurations;
- Figure 6 shows a perspective view, with some parts cut away to better illustrate others, of a kinematic diagram of the control means present on the drum;

- Figures 7 to 9 illustrate front views of an operational diagram of the drum of the above-mentioned drawings in corresponding operating positions.

Detailed description of preferred embodiments of the invention

[0026] With reference to the accompanying drawings, in particular Figure 1, the machine according to the invention, labelled 100 in its entirety, is used for forming filter-bags 1 containing infusion products.

[0027] The expression "infusion products" means products such as tea, coffee, camomile (in powder, granules, or leaves).

[0028] Preferably, but not necessarily, the filter-bag 1 formed by a machine according to the invention comprises a piece of filter paper with an elongate shape (tubular) having at least two chambers 3, 30 with corresponding doses D1 and D2 of infusion product separate from each other along the piece of filter paper.

[0029] More specifically, in an area of the machine 100 the two chambers 3, 30 are folded towards each other forming an upper end 1a (in the shape of an upturned "V") and a bottom end 1b in the shape of a "W".

[0030] The machine 100 comprises a forming unit 2 (schematically illustrated with a block in Figure 1) configured to form individual pieces of tubular filter paper, each having at least one chamber 3 containing the dose D1 of infusion product (preferably two chambers 3, 30 with corresponding doses D1, D2) distributed between the upper end 1a and the closed bottom end 1b of the piece of filter paper.

[0031] The machine 100 comprises a carousel 4 designed to receive the pieces of filter paper from the forming unit 2. The carousel 4 is positioned downstream of the forming unit 2 with respect to a feed direction of the filter-bag 1 being formed.

[0032] The carousel 4 rotates about a first axis 4X to bring the piece of filter paper to a plurality of stations arranged one after another (not illustrated) and configured to form a filter-bag 1. Advantageously, the stations in succession are designed to apply to the piece of filter paper a thread and a tag to obtain a filter-bag 1.

[0033] In light of this, the carousel 4 is moved by intermittent or stepwise movement, and rotates in an anti-clockwise direction looking at Figure 1.

[0034] It should be noted that the carousel 4 comprises a plurality of radial gripping arms 4a defining individual housings for the pieces of filter paper. As illustrated, the machine 100 comprises a drum 5 for orientation of the filter-bags 1, positioned alongside the carousel 4 and rotating about a second axis 5x Parallel to the first axis 4X of the carousel 4.

[0035] The drum 5 comprises a plurality of pockets 6 designed to house a corresponding filter-bag 1. The pockets 6 are arranged circumferentially on the drum 5.

[0036] Preferably, the drum 5 comprises four pockets 6 spaced at equal angular intervals from each other along

the drum 5.

[0037] It should be noted that the drum 5 is moved intermittently, or in a stepwise fashion, and rotates about the second axis X5 synchronised with the carousel 4 in a direction, preferably, clockwise anticlockwise (in the same direction as the direction of the carousel 4).

[0038] Moreover, the machine 100 comprises a conveyor unit 7 configured to pick up from the carousel 4 (in particular from a gripper 4a), convey and release the filter-bag 1 to a free pocket 6 located in a receiving position during the rotation of the drum 5 (see Figures 1 to 3).

[0039] The machine 100 also comprises a stacking element 8 positioned beneath the drum 5, at a pocket 6 located in a release position. The release position is rotated by an angle α relative to the receiving position.

[0040] The stacking unit 8 having an open area 8a for receiving the filter-bag 1.

[0041] As illustrated, the drum 5 comprises, for each pocket 6, a first retaining element 9 and a second retaining element configured to retain the filter-bag 1 inside the pocket 6 between the receiving position and the release position.

[0042] Again as illustrated, a first retaining element 9 of a given pocket 6 and a second retaining element 11 of an adjacent pocket 6 are movable in rotation about a shared axis X9b of rotation.

[0043] Preferably, the first retaining element 9 and the second element comprise, for each pocket 6, respective active portions 9a, 11a, which are configured to retain corresponding opposite portions of the filter-bag 1.

[0044] Preferably, the drum 5 comprises control means 10 connected to respective of support and drive portions 9b and 11b of the first 9 and second 11 retaining element of each pocket 6 for allowing a synchronised movement of the respective active portions 9a, 11a.

[0045] In light of this, the control means 10 are configured for moving, in synchrony with the rotation of the drum 5, between a first operating position, wherein the active portions 9a, 11a are spaced apart from the pocket 6 and allow to the latter to receive or release the filter-bag 1, and a second operating position, wherein the active portions 9a, 11a are configured to retain the filter-bag 1 inside the pocket 6.

[0046] Thanks to the retaining elements 9, 11, the positioning and retaining of the filter-bag 1 is secure irrespective of the dimensions and the weight of the filter-bag 1.

[0047] The presence of the retaining elements 9, 11 guarantees a high stability of the filter-bag 1 inside the pocket 6 even at high operating speeds (with rotation of the drum).

[0048] Preferably, the first 9 and the second 11 retaining element make contact with and retain using the respective active portions 9a, 11a, respectively, an upper end 1a and a bottom end 1b of the filter-bag 1 housed in the pocket 6.

[0049] Advantageously, the first 9 and the second 11 retaining element are positioned circumferentially on the

drum 5, mutually facing the ends of the pocket 6 (see Figures 1 to 9).

[0050] Advantageously, the active portion 11a of the second retaining element 11 is designed to come into contact with the bottom end 1b of the filter-bag 1. In an alternative embodiment not illustrated, the active portion 9a of the first retaining element 9 comes into contact with bottom end 1b of the filter-bag 1, whilst the active portion 11a of the second retaining element 11 comes into contact with the upper end 1a of the filter-bag.

[0051] Basically, the first retaining element 9 and the second retaining element 11 of a pocket 6 form a pair designed to retain a filter-bag 1 housed in the pocket 6 with any orientation.

[0052] Each retaining element 9, 11 of each pair is connected to the control means 10 configured to allow a synchronised movement of the respective active portions 9a, 11a between the first and second operating position of the first 9 and the second 11 retaining element. In other words, the control means 10 allow movement of the active portions 9a, 11a of the retaining elements 9, 11 to receive and release (first operating position of the retaining elements 9 and 11, or retain (second operating position of the retaining elements 9 and 11) the filter-bag 1 housed in the pocket 6.

[0053] As already mentioned, a first retaining element 9 of a given pocket 6 and a second retaining element 11 of an adjacent pocket 6 are movable in rotation about a shared axis X9b of rotation.

[0054] The shared axis X9b of rotation is defined by at least one shaft 12 to which corresponding support and drive portions 9b, 11b of the first retaining element 9 of a pocket 6 and of the second retaining element 11 of an adjacent pocket 6 are connected.

[0055] The active portion 9a, 11a comprises at least one prong 13, 14 and the supporting and drive portion 9b, 11b comprises at least one flanged body 15, 16 connected to the control means 10 and to the at least one prong 13, 14.

[0056] Advantageously, the active portion 9a of the first retaining element 9 comprises a plurality of first prongs 13.

[0057] Advantageously, the active portion 11a of the second retaining element 11 comprises a plurality of second prongs 14.

[0058] Advantageously, the at least one prong 13 of a first retaining element 9 of a pocket 6 and the at least one prong 14 of a second retaining element 11 of an adjacent pocket 6 are positioned mutually alternated.

[0059] In other words, the first prongs 13 and the second prongs 14 are positioned in such a way as to create an alternation of empty and full spaces wherein the empty spaces defined by the first prongs 13 are engaged by the second prongs 14 and vice versa.

[0060] Preferably, each prong (13 or 14) has an arc-shape in such a way as to reach or leave the filter-bag 1 (with a rotating movement) passing beyond the outer perimeter profile of the pocket 6.

[0061] Preferably, the machine 100 comprises an ejector element 17 designed to eject the filter-bag 1 from a pocket 6 of the drum 5 in the direction of the stacking unit 8 when the pocket unit 6 is positioned in the release position. In light of this, the pocket 6 has a bottom 6a with at least one groove 18. In the embodiment illustrated, the bottom 6a has two grooves 18.

[0062] The ejector element 17 is movable between a non-operating position away from the at least one groove 18 and an operating position wherein the ejector element 17 engages the at least one groove 18 for pushing the filter-bag 1 towards the stacking unit 8. The retaining elements 9, 11 are positioned in the first operating position when the ejector element 17 is in an operating position.

[0063] In other words, the grooves 18 can be engaged by the ejector element 17; more specifically, in the second operating position the ejector element 17 engages the grooves 18, passing beyond them.

[0064] Preferably, the ejector element 17 comprises an operating head 17a having two walls configured to engage the grooves 18.

[0065] The operating head 17a is connected to at least one arm 17b connected and controlled by control means for moving the head 17a, in synchrony with the movement of the drum 5, between the non-operating away position and the operating position.

[0066] Again as illustrated, the control means 10 are arranged inside the drum 5 and are configured for synchronising the movement of the first 9 and of the second 11 retaining element of a pocket 6 along opposite directions V9, V11 of rotation to reach the corresponding first and second operating positions.

[0067] Again as illustrated, the control means 10 are configured for determining the movement of the first 9 and the second 11 retaining element located on the shared axis X9b according to directions V9, V11, of rotation opposite to each other to reach the corresponding first and second operating positions.

[0068] Advantageously, the control means 10 are configured to rotate all the first retaining elements 9 according to a first direction V9 and all the second retaining elements 11 according to a second direction V11. Advantageously, the first direction V9 is opposite the second direction V11.

[0069] It should be noted that the control means 10 of the retaining elements 9, 11 are positioned circumferentially inside the drum 5.

[0070] In a preferred, but non-limiting, embodiment, the control means 10 comprise two series of kinematic mechanisms serving a single operating component.

[0071] More specifically, each first retaining element 9 (in the case illustrated there are four) is keyed to the shaft 12 with the flanged body 15.

[0072] The shaft 12 has, at one end, a crank 19 equipped with a cam follower roller 20 constrained and slidable along a cam track 21 formed on a plate 22 lateral to the drum 5 and fixed relative to the drum 5.

[0073] In light of this, the crank 19 and cam follower

roller 20 form the first control mechanism.

[0074] The cam track 21 is configured for moving the first retaining element 9 from the first to the second operating position and vice versa upon reaching a predetermined angular position of the cam follower roller 20 and to maintain this position until reaching a subsequent angular position. It should be noted that the control means 10 comprise a second kinematic mechanism comprising, for each shaft 12, a connecting body 23 keyed on the shaft 12 and alongside the flanged body 15 of the first retaining element 9.

[0075] The first end of a connecting rod 24 is articulated on the connecting body 23. The second end of the connecting rod 24 is articulated to the flanged body 16 of the second retaining element 11 which together with the first retaining element 9 forms a pair.

[0076] In light of this, the rotation of the shaft 12 allows a direct command (that is, of rotation) of the first retaining element 9 and an indirect command of rotation of the second retaining element 11: in this way, the pair of retaining elements is synchronised to obtain the first or the second operating position.

[0077] This description clearly shows how, thanks to the machine structured in this way, the filter-bag 1 is always kept in a secure condition inside the pocket 6, between the receiving position and the release position.

[0078] In addition, the entire conveyor and orientation unit of the filter-bag is compact and has a reduced size.

Claims

1. A machine for forming filter-bags (1) containing infusion products, comprising:

- a forming unit (2) configured to form individual pieces of tubular filter paper having at least one chamber (3) containing a dose (D1) of infusion product;
- a carousel (4) rotating about a first axis (4X) designed to receive from the forming unit (2), and carry, the pieces of filter paper to a plurality of stations arranged one after another and configured for forming a filter-bag (1);
- an orientation drum (5), positioned alongside the carousel (4) and rotating about a second axis (5X) parallel to the first axis (4X), and comprising a plurality of pockets (6), each pocket (6) being designed to house a filter-bag (1) and being movable between a receiving position and a release position rotated by an angle (α) relative to the receiving position;
- a conveyor unit (7) configured to pick up from the carousel (4), convey and release the filter-bag (1) at one of the plurality of pockets (6) in the receiving position;
- a stacking unit (8) having an open area (8a) for receiving the filter-bag (1) in the release po-

sition;

characterised in that the drum (5) comprises, for each pocket (6), a first retaining element (9) and a second retaining element (11) configured to make contact with and retain the filter-bag (1) inside the pocket (6) between the receiving position and the release position; a first retaining element (9) of a given pocket (6) and a second retaining element (11) of a pocket (6) adjacent to the given pocket (6) being movable in rotation about a shared axis (X9b) of rotation.

2. The machine according to claim 1, wherein the first (9) and the second (11) retaining element, comprise, for each pocket (6), respective active portions (9a, 11a) which are configured to retain corresponding opposite portions of the filter-bag (1); control means (10) being connected to respective support and drive portions (9b, 11b) of the first (9) and second (11) retaining element of each pocket (6) to allow a synchronised movement of the respective active portions (9a, 11a) between a first operating position, wherein the active portions (9a, 11a) are spaced apart from the pocket (6) and allow the latter to receive or release the filter-bag (1), and a second operating position, wherein the active portions (9a, 11a) are configured to retain the filter-bag (1) inside the pocket (6).
3. The machine according to claim 2, wherein the shared axis (X9b) of rotation is defined by at least one shaft (12) to which corresponding support and drive portions (9b, 11b) of the first retaining element (9) of a given pocket (6) and the second retaining element (11) of an adjacent pocket (6) are connected.
4. The machine according to claim 2 or 3, wherein the control means (10) are arranged inside the drum (5) and are configured for synchronising the movement of the first (9) and of the second (11) retaining element of a pocket (6) along opposite directions (V9, V11) of rotation to reach the corresponding first and second operating positions.
5. The machine according to any one of claims 2 to 4, wherein the active portion (9a, 11a) comprises at least one prong and the supporting and drive portion (9b, 11b) comprises at least one flanged body (15, 16) connected to the control means (10) and to the at least one prong.
6. The machine according to claim 5, wherein the at least one prong (13) of a first retaining element (9) of a given pocket (6) and the at least one prong (14) of a second retaining element (11) of a pocket (6) adjacent to the given pocket (6) are positioned mutually alternated.

7. The machine according to any one of the preceding claims, comprising an ejector element (17) configured to ejecting the filter-bag (1) from a pocket (6) of the drum (5) in the direction of the stacking unit (8) when the pocket (6) is positioned in the release position.
8. The machine according to claim 7, wherein each pocket (6) has a bottom (6a) with at least one groove (18), and wherein the ejector element (17) is movable between a non-operating position away from the at least one groove (18) and an operating position wherein the ejector element (17) engages the at least one groove (18) for pushing the filter-bag (1) towards the stacking unit (8); the retaining elements (9, 11) being spaced from the pocket (6) for allowing the latter to release the filter-bag (1) when the ejector element (17) is in the operating position.
9. The machine according to any one of the preceding claims, wherein the pockets (6) are arranged circumferentially on the drum (5).
10. The machine according to any one of claims 2 to 6, wherein the control means (10) are positioned circumferentially inside the drum (5).

Patentansprüche

1. Maschine zur Herstellung von Filterbeuteln (1), enthaltend Aufgussprodukte, umfassend:
 - eine Formungseinheit (2), die ausgelegt ist, um einzelne Stücke eines röhrenförmigen Filterpapiers zu formen, aufweisend mindestens eine Kammer (3), die eine Dosis (D1) eines Aufgussprodukts enthält;
 - ein Karussell (4), das sich um eine erste Achse (4X) dreht und ausgestaltet ist, um von der Formungseinheit (2) die Stücke aus Filterpapier zu empfangen und zu einer Vielzahl an Stationen zu führen, die nacheinander angeordnet und ausgelegt sind, um einen Filterbeutel (1) zu formen;
 - eine Ausrichtungstrommel (5), die neben dem Karussell (4) platziert ist und sich um eine zweite Achse (5X) dreht, die parallel zur ersten Achse (4X) angeordnet ist und eine Vielzahl an Taschen (6) umfasst, wobei eine jede Tasche (6) ausgestaltet ist, um einen Filterbeutel (1) aufzunehmen, und zwischen einer Empfangsposition und einer Freigabeposition, gedreht um einen Winkel (α) relativ zur Empfangsposition, bewegbar ist;
 - eine Fördereinheit (7), die ausgelegt ist, um den Filterbeutel (1) vom Karussell (4) aufzunehmen, zu fördern und an einer der Vielzahl an

- Taschen (6) in der Empfangsposition freizugeben;
 - eine Stapeleinheit (8), die einen offenen Bereich (8a) für das Empfangen des Filterbeutels (1) in der Freigabeposition aufweist, **dadurch gekennzeichnet, dass** die Trommel (5) für jede Tasche (6) ein erstes Halteelement (9) und ein zweites Halteelement (11) umfasst, ausgelegt um einen Kontakt mit dem Filterbeutel (1) herzustellen und diesen in der Tasche (6) zu halten, zwischen der Empfangsposition und der Freigabeposition, wobei ein erstes Halteelement (9) einer bestimmten Tasche (6) und ein zweites Halteelement (11) einer an die bestimmte Tasche (6) angrenzenden Tasche (6) in Drehung um eine gemeinsame Rotationsachse (X9b) bewegbar sind.
2. Maschine nach Anspruch 1, wobei das erste (9) und das zweite (11) Halteelement für eine jede Tasche (6) jeweilige aktive Abschnitte (9a, 11a) umfassen, die ausgelegt sind, um entsprechende entgegengesetzte Abschnitte des Filterbeutels (1) zu halten, Steuermittel (10), die mit jeweiligen Halterungs- und Antriebsabschnitten (9b, 11b) des ersten (9) und zweiten (11) Halteelements einer jeden Tasche (6) verbunden sind, um eine synchrone Bewegung der jeweiligen aktiven Abschnitte (9a, 11b) zwischen einer ersten Betriebsposition, in der die aktiven Abschnitte (9a, 11a) von der Tasche (6) beabstandet sind und dieser erlauben, den Filterbeutel (1) zu empfangen oder freizugeben, und einer zweiten Betriebsposition, in der die aktiven Abschnitte (9a, 11a) ausgelegt sind, um den Filterbeutel (1) in der Tasche (6) zu halten, zu erlauben.
 3. Maschine nach Anspruch 2, wobei die gemeinsame Rotationsachse (X9b) durch mindestens eine Welle (12) definiert ist, mit der entsprechende Halterungs- und Antriebsabschnitte (9b, 11b) des ersten Halteelements (9) einer bestimmten Tasche (6) und des zweiten Halteelements (11) einer angrenzenden Tasche (6) verbunden sind.
 4. Maschine nach Anspruch 2 oder 3, wobei die Steuermittel (10) in der Trommel (5) angeordnet und für das Synchronisieren der Bewegung des ersten (9) und des zweiten (11) Halteelements einer Tasche (6) in entgegengesetzte Drehrichtungen (V9, V11) ausgelegt sind, um eine entsprechende erste und zweite Betriebsposition zu erreichen.
 5. Maschine nach einem der Ansprüche 2 bis 4, wobei der aktive Abschnitt (9a, 11a) mindestens eine Zinke umfasst und der Halterungs- und Antriebsabschnitt (9b, 11b) mindestens einen geflanschten Körper (15, 16) umfasst, verbunden mit den Steuermitteln (10) und der mindestens einen Zinke.
 6. Maschine nach Anspruch 5, wobei die mindestens eine Zinke (13) eines ersten Halteelements (9) einer bestimmten Tasche (6) und die mindestens eine Zinke (14) eines zweiten Halteelements (11) einer Tasche (6), die an die bestimmte Tasche (6) angrenzt, gegenseitig abgewechselt positioniert sind.
 7. Maschine nach einem der vorhergehenden Abschnitte, umfassend ein Auswurfelement (17), das ausgelegt ist, um den Filterbeutel (1) aus der Tasche (6) der Trommel (5) in Richtung der Stapeleinheit (8) auszuwerfen, wenn die Tasche (6) in der Freigabeposition positioniert ist.
 8. Maschine nach Anspruch 7, wobei eine jede Tasche (6) einen Boden (6a) mit mindestens einer Nut (18) aufweist, und wobei ein jedes Auswurfelement (17) zwischen einer Nichtbetriebsposition wegführend von der mindestens einen Nut (18) und einer Betriebsposition, in der das Auswurfelement (17) in die mindestens eine Nut (18) eingreift, um den Filterbeutel (1) hinführend zur Stapeleinheit (8) zu schieben, bewegbar ist, wobei die Halteelemente (9, 11) von der Tasche (6) beabstandet sind, um dieser zu erlauben, den Filterbeutel (1) freizugeben, wenn sich das Auswurfelement (17) in der Betriebsposition befindet.
 9. Maschine nach einem der vorhergehenden Ansprüche, wobei die Taschen (6) umfangseitig an der Trommel (5) angeordnet sind.
 10. Maschine nach einem der Ansprüche 2 bis 6, wobei die Steuermittel (10) umfangseitig in der Trommel (5) angeordnet sind.

Revendications

1. Machine de formation de sachets-filtres (1) contenant des produits d'infusion, comprenant :
 - une unité de formation (2) configurée pour former des éléments individuels de papier-filtre tubulaire comportant au moins une chambre (3) contenant une dose (D1) de produit d'infusion ;
 - un carrousel (4) tournant autour d'un premier axe (4X) conçu pour recevoir de l'unité de formation (2), et transporter, les éléments de papier-filtre vers une pluralité de postes disposés les uns après les autres et configurés pour former un sachet-filtre (1) ;
 - un tambour d'orientation (5) positionné le long du carrousel (4) et tournant autour d'un second axe (5X) parallèle au premier axe (4X), et comprenant une pluralité de poches (6), chaque poche (6) étant conçue pour loger un sachet-filtre (1) et étant mobile entre une position de récep-

- tion et une position de libération entraînée en rotation selon un angle (a) par rapport à la position de réception ;
- une unité de convoyage (7) configurée pour saisir à partir du carrousel (4), convoier et libérer le sachet-filtre (1) en correspondance d'une pluralité de poches (6) dans la position de réception ;
 - une unité d'empilement (8) comportant une zone ouverte (8a) pour recevoir le sachet-filtre (1) dans la position de libération ;
- caractérisée en ce que** le tambour (5) comprend, pour chaque poche (6), un premier élément de retenue (9) et un second élément de retenue (11) configurés pour se mettre en contact avec, et retenir le sachet-filtre (1) à l'intérieur de la poche (6) entre la position de réception et la position de libération ; un premier élément de retenue (9) d'une poche (6) donnée et un second élément de retenue (11) d'une poche (6) adjacente à la poche (6) donnée étant mobiles en rotation autour d'un axe partagé (X9b) de rotation.
2. Machine selon la revendication 1, dans laquelle le premier (9) et le second (11) élément de retenue comprennent, pour chaque poche (6), des portions actives (9a, 11a) respectives étant configurées pour retenir des portions opposées correspondantes du sachet-filtre (1) ; des moyens de commande (10) étant reliés à des portions de support et d'entraînement (9b, 11b) respectives du premier (9) et du second (11) élément de retenue de chaque poche (6) pour permettre un mouvement synchronisé des portions actives (9a, 11a) respectives entre une première position fonctionnelle, dans laquelle les portions actives (9a, 11a) sont espacées de la poche (6) et permettent à cette dernière de recevoir ou de libérer le sachet-filtre (1), et une seconde position fonctionnelle, dans laquelle les portions actives (9a, 11a) sont configurées pour retenir le sachet-filtre (1) à l'intérieur de la poche (6) .
 3. Machine selon la revendication 2, dans laquelle l'axe partagé (X9b) de rotation est défini par au moins un arbre (12) auquel sont reliés des portions de support et d'entraînement (9b, 11b) correspondantes du premier élément de retenue (9) d'une poche donnée (6) et le second élément de retenue (11) d'une poche adjacente (6).
 4. Machine selon la revendication 2 ou 3, dans laquelle les moyens de commande (10) sont disposés à l'intérieur du tambour (5) et sont configurés pour synchroniser le mouvement du premier (9) et du second (11) élément de retenue d'une poche (6) le long de directions opposées (V9, V11) de rotation pour atteindre les première et seconde positions fonctionnelles correspondantes.
 5. Machine selon l'une quelconque des revendications de 2 à 4, dans laquelle la portion active (9a, 11a) comprend au moins une dent et la portion de support et d'entraînement (9b, 11b) comprend au moins un corps à bride (15, 16) relié aux moyens de commande (10) et à l'au moins une dent.
 6. Machine selon la revendication 5, dans laquelle l'au moins une dent (13) d'un premier élément de retenue (9) d'une poche (6) donnée et l'au moins une dent (14) d'un second élément de retenue (11) d'une poche (6) adjacente à la poche (6) donnée sont positionnées mutuellement de façon alternée.
 7. Machine selon l'une quelconque des revendications précédentes, comprenant un élément éjecteur (17) configuré pour éjecter le sachet-filtre (1) d'une poche (6) du tambour (5) dans la direction de l'unité d'empilement (8) lorsque la poche (6) est positionnée dans la position de libération.
 8. Machine selon la revendication 7, dans laquelle chaque poche (6) comporte un fond (6a) avec au moins une rainure (18), et dans laquelle l'élément éjecteur (17) est mobile entre une position non fonctionnelle éloignée de l'au moins une rainure (18) et une position fonctionnelle dans laquelle l'élément éjecteur (17) se met en prise avec au moins une rainure (18) pour pousser le sachet-filtre (1) vers l'unité d'empilement (8) ; les éléments de retenue (9, 11) étant espacés de la poche (6) pour permettre à cette dernière de libérer le sachet-filtre (1) lorsque l'élément éjecteur (17) se trouve dans la position fonctionnelle.
 9. Machine selon l'une quelconque des revendications précédentes, dans laquelle les poches (6) sont disposées sur la circonférence du tambour (5).
 10. Machine selon l'une quelconque des revendications de 2 à 6, dans laquelle les moyens de commande (10) sont positionnés sur la circonférence à l'intérieur du tambour (5).

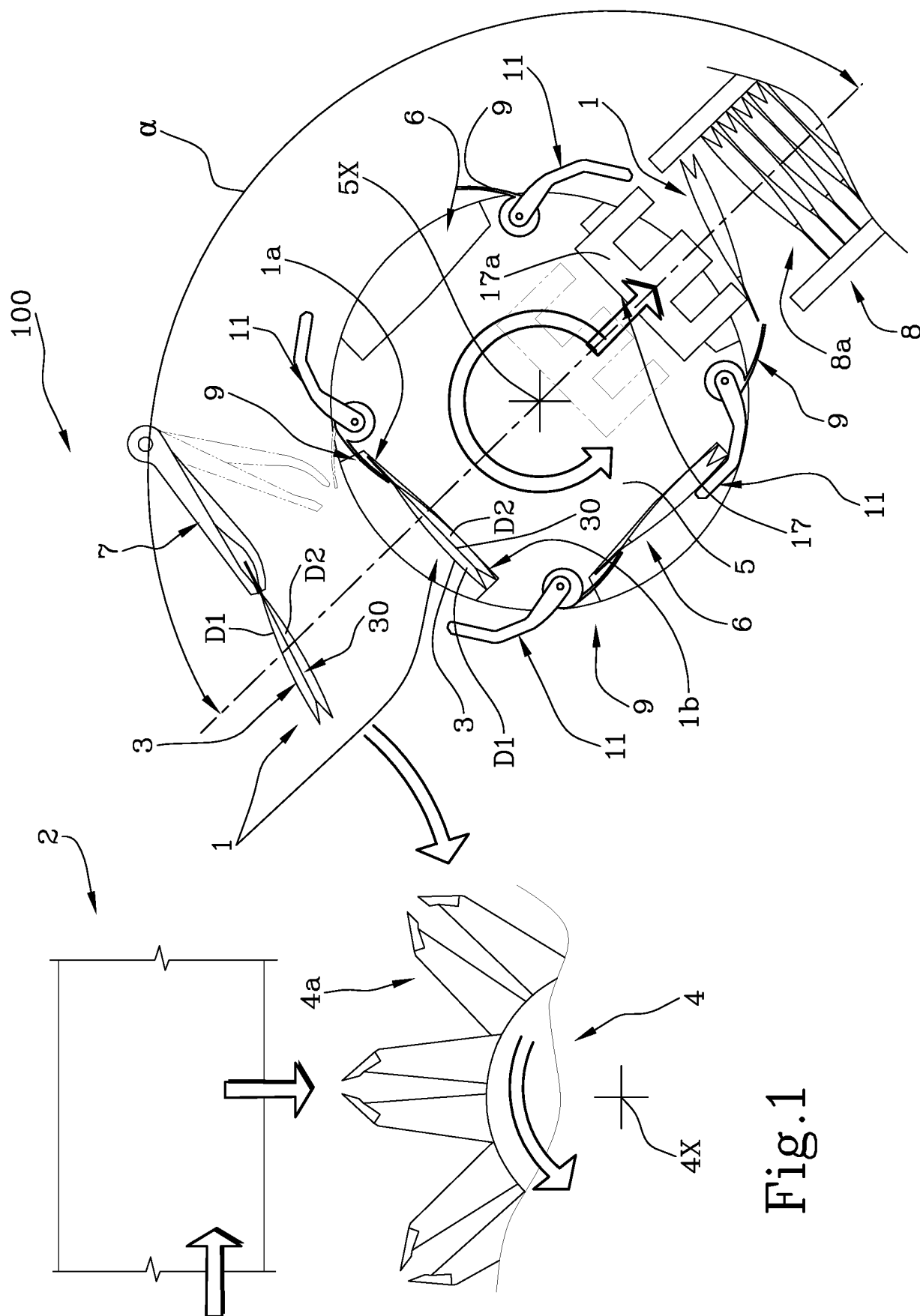


Fig. 1

Fig.2

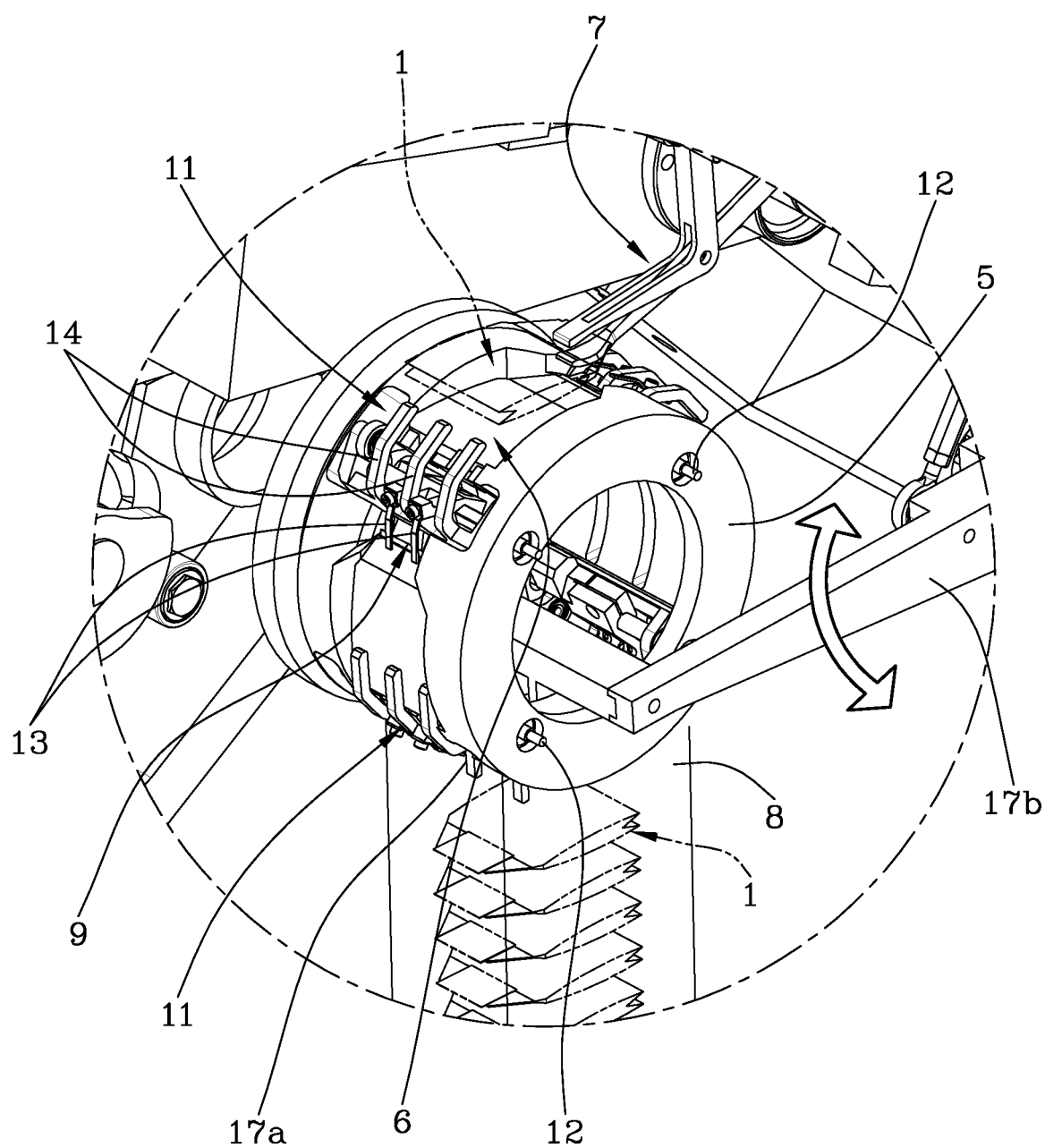


Fig.3

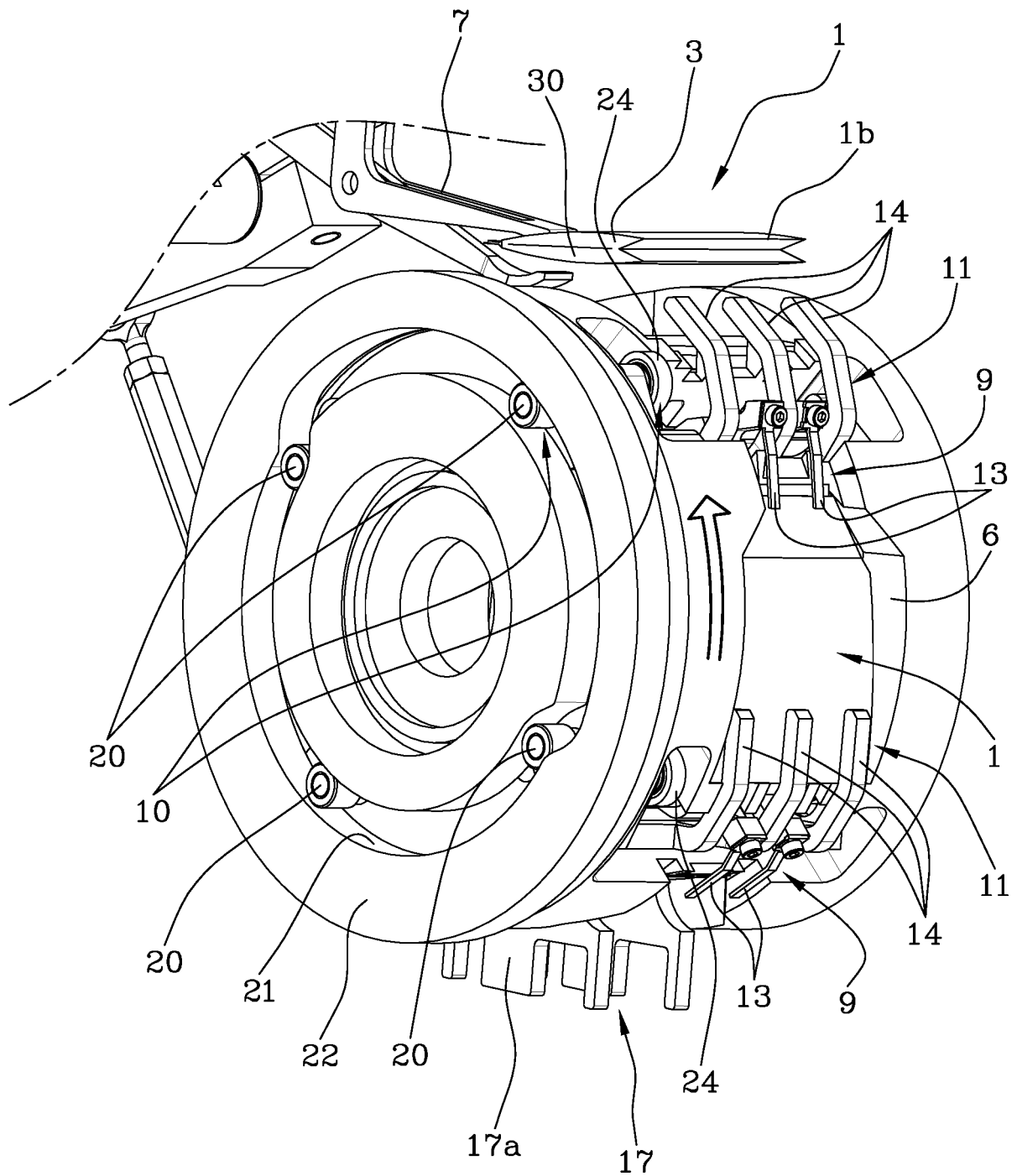


Fig.4

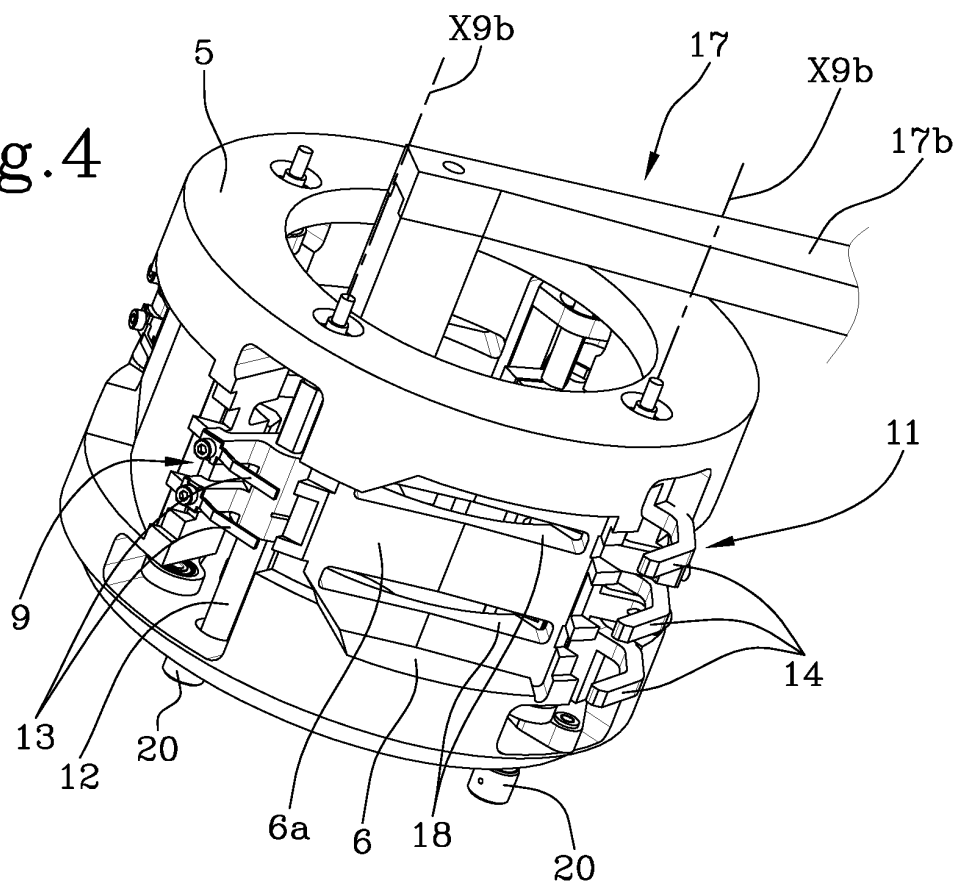


Fig.5

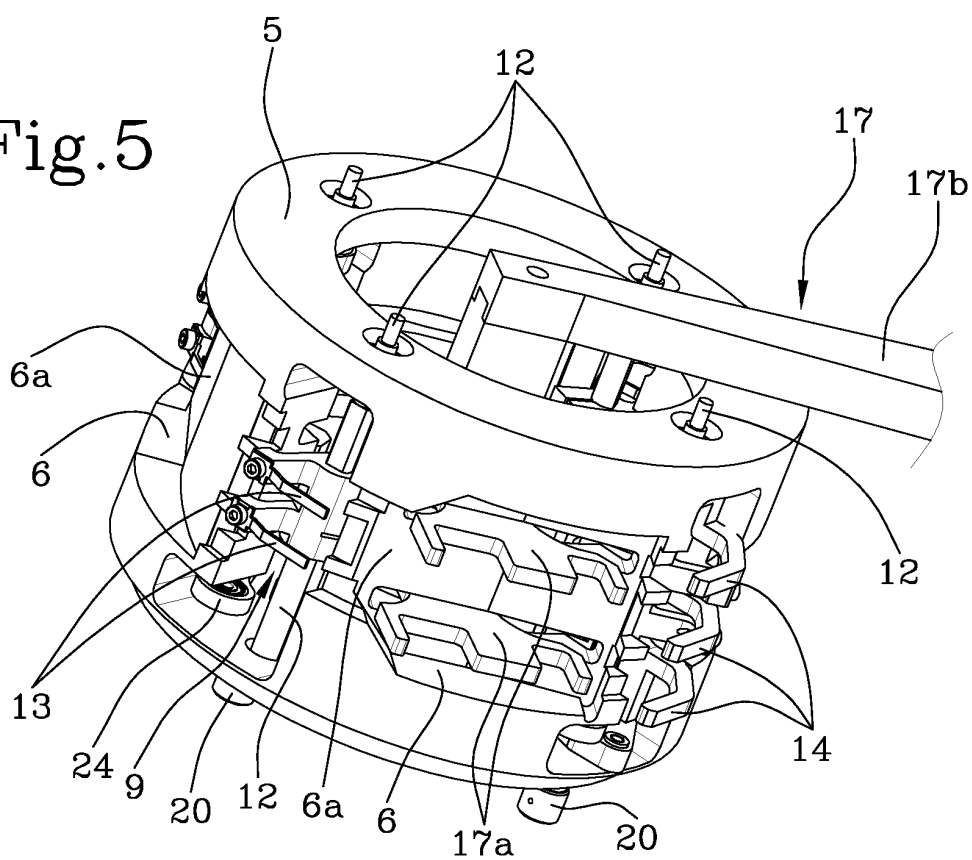


Fig.6

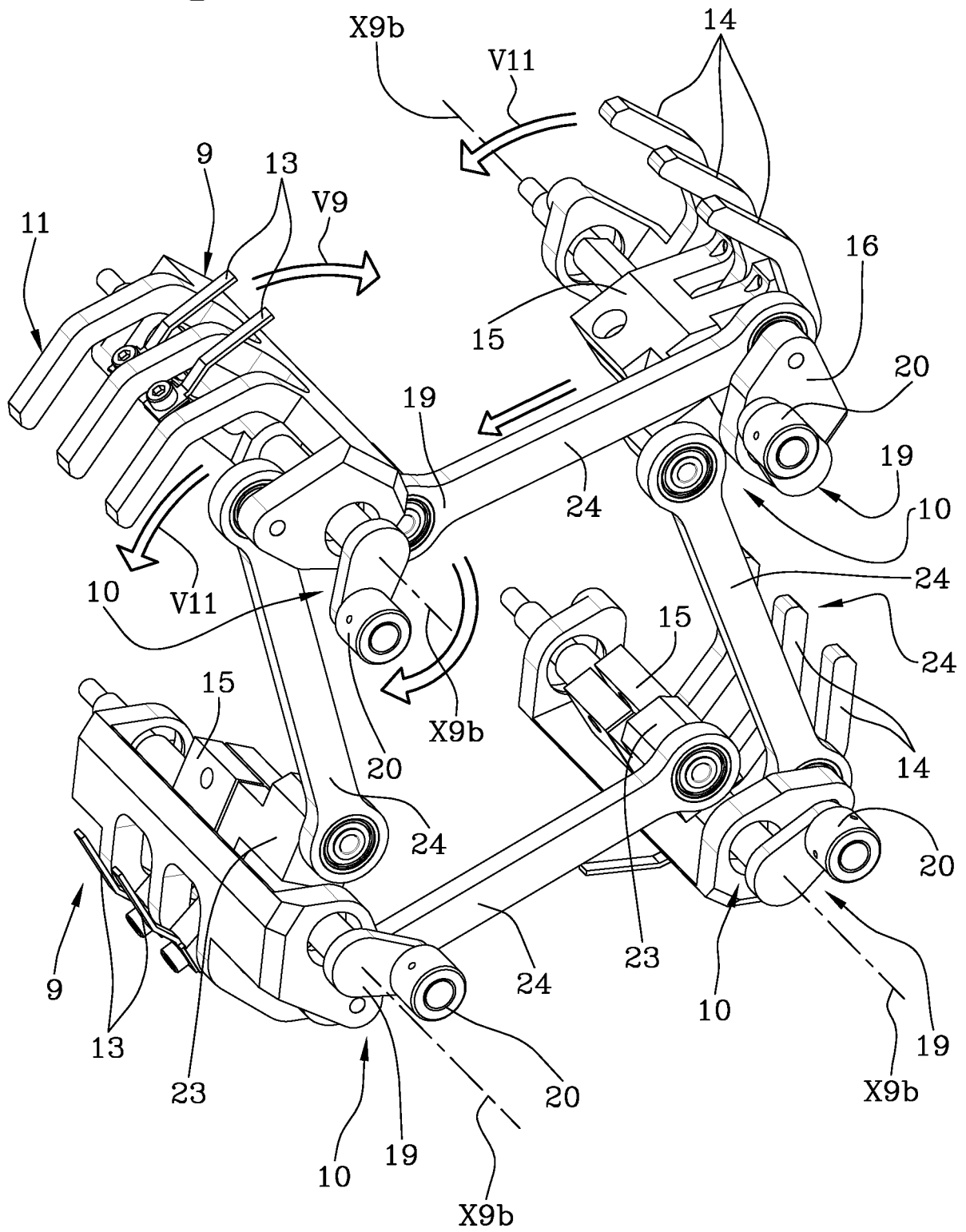


Fig. 9

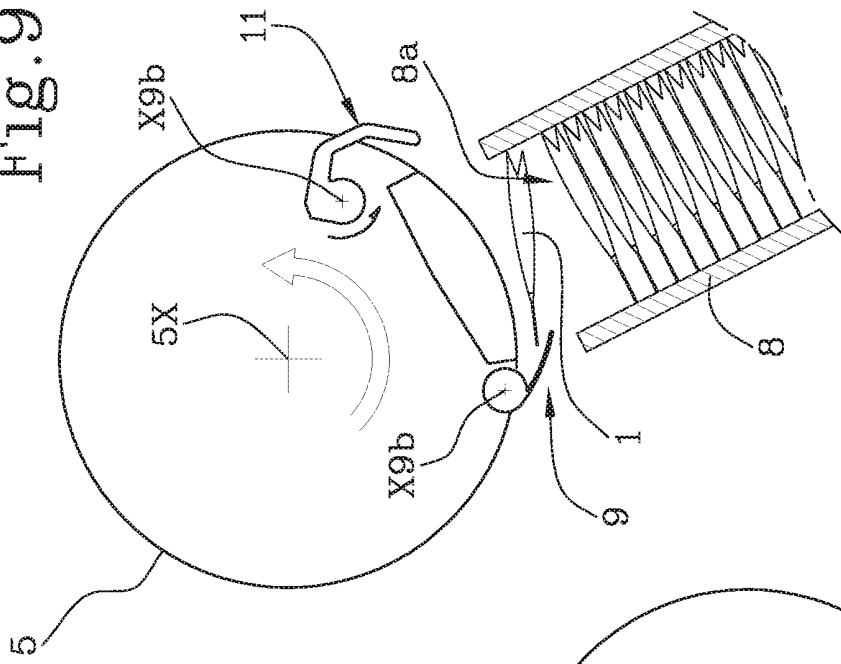


Fig. 8

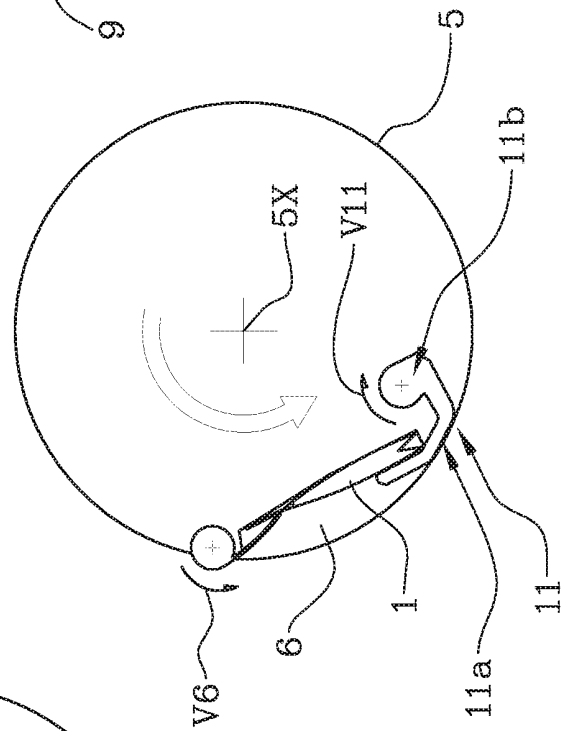
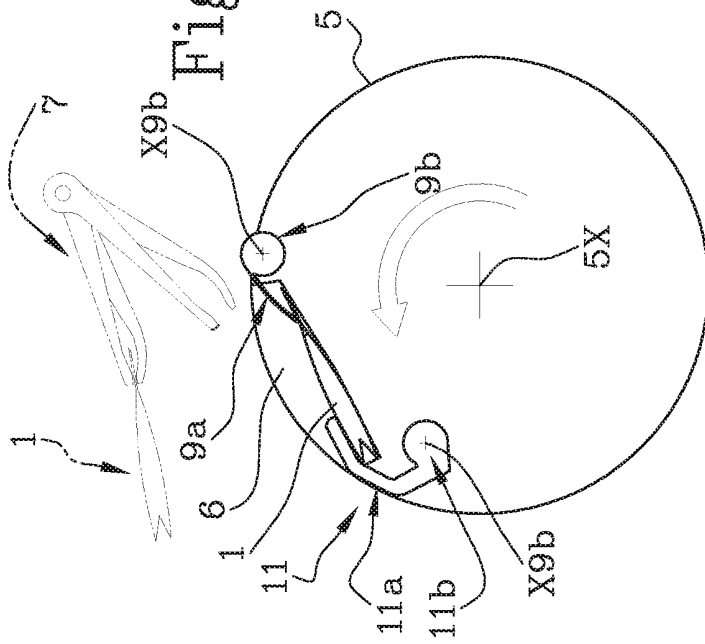


Fig. 7



REFERENCES CITED IN THE DESCRIPTION

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