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(54) Apparatus and method for sealing bags

Vorrichtung und Verfahren zum Verschliessen von Beuteln

Dispostif et procédé pour fermer des sacs

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(56) References cited:
EP-A- 0 728 666
DE-A1- 2 419 072
DE-U1- 8 808 394
NL-C1- 1 013 103
US-A- 3 783 585
US-A- 4 545 185

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Description

[0001] The invention relates to an apparatus and method for sealing bags. The invention more specifically relates to an apparatus and method for wrapping at least an adhesive strip of tape around at least part of the neck of a bag, especially for industrial and semi industrial packaging of products in bags.

[0002] US 4,545,185 discloses an apparatus according to the preamble of claim 1.

[0003] It is know to gather the neck of a bag in an industrial closure device and provide a clip around the neck, closing the bag. The clip can for example be a plastic or metal strip, folded around the neck, or a plastic plate shaped clip with a slit forced over the neck.

[0004] An aim of the present invention is to provide an alternative to these known apparatus and methods. Another aim of the present invention is to provide a method and apparatus for sealing a bag without the necessity of adding metal or relatively stiff plastic plate shaped elements.

[0005] There is furthermore a desire to provide a closure device or method which can process containers substantially at a continuous pace. Moreover it would be desirable to have an apparatus or method for closing containers using tape, especially adhering tape, which closure can easily be opened again, preferably without the necessity to use cutlery, tools or a users teeth.

[0006] One or more of these and other aims are obtained with an apparatus according to claim 1 and a method according to claim 11.

[0007] By way of example an apparatus and method shall be described hereafter, schematically and in relative detail, with reference to the drawing, in which:

Fig. 1 schematically shows a top view of an apparatus, interpose between feeding means and discharge means for containers, such as bags;
Fig. 2 in perspective view an apparatus for sealing containers, from first side;
Fig. 3 an apparatus according to fig. 2, with at least part of the gathering means removed;
Fig. 4 an apparatus according to fig. 2 and 3, from an opposite second side;
Fig. 5 in a side view an apparatus according to the description;
Fig. 6 a cross section view of an apparatus of fig. 5, taken along the line A - A in fig. 5;
Fig. 7 in perspective view part of the gathering means;
Fig. 8 in frontal view gathering means of fig. 7;
Fig. 9 part of an apparatus according to the description, showing a roll of foil strip and a knife assembly;
Fig. 10 in simplified form in four steps sealing of a bag during transport through the star wheel; and
Fig. 11A, B and C in frontal view the star wheel engaged by a rotary element, for rotating the star wheel over a predetermined angle, prevented from rotating by the rotating element and the rotating element and part of the star wheel in side view respectively.

[0008] In this description the same or similar or corresponding parts can have the same or corresponding reference signs. The embodiments shown and described are exemplary embodiments only and should by no means be understood as limiting the scope of protection sought as defined by the claims. The apparatus and methods according to the invention are described in relation to flexible containers such as bags. These can for example be plastic or paper bags. This should not be considered limiting.

[0009] In fig. 1 a top view of part of an apparatus 1 for sealing containers is shown, between feeding means 2 and discharge means 3 for containers, such as bags 4. The feeding means 2 can for example comprise an endless belt, chain, mat or other transporting devices for transporting bags 4 in a feeding direction F. In fig. 1 the bags 4 are shown lying on a side, with a neck 5 and an open side 6 thereof facing in one direction T, substantially perpendicular to the feeding direction F_{in}. The discharge means 3 can for example comprise an endless belt, chain, mat or other transporting devices for transporting bags 4 in a discharge direction F_{out}. In the bags 4 a product P or several products can be provided, to be enclosed in the bag. In this respect sealing should be understood at least as comprising the meaning of providing a seal around a gathered neck of the bag, closing off the open side 6 thereof substantially, preferably entirely, by tape and/or foil.

[0010] Substantially between and extending partly above and partly below facing ends 2A, 3A of the feeding means 2 and discharge means 3 respectively, a gathering assembly 7 is provided, comprising a star wheel 8, as will be discussed hereafter. The star wheel 8 is in this embodiment largely positioned between a first wheel 9 and a second wheel 10 substantially above a guide surface 11 over which the bags 4 can be guided from the feeding means 2 to the discharge means 3. The wheels 9, 10 can be part of transport means 13. The aim of the gathering assembly 7 is at least to grab a neck 5 of a bag 4 and gather this into a bundle within a cell 12 of the star wheel 8 as schematically shown in fig. 10 in cross sectional view. Providing the wheels 9, 10 at opposite sides of the star wheel 8 allows the bag 4 to be grabbed at both sides of the wheel 8, such that gathering is improved. In the embodiment shown in e.g. fig. 2, 7 and 8 in the transport means 13 a third wheel 14 is provided, upstream from and in front of the second wheel 10. A snare or band 15 is guided over the second wheel 10 and third wheel 14. The third wheel 14 is mounted on an axis 16 between a first bracket 17 and a second bracket 18. The second bracket 18 can extend along the band 15 and be connected to or carry the axis 20 of the second wheel 10. The first bracket 17 can extend on the opposite side of the star wheel 8 and be connected to an axis 19 of the first wheel 9. The brackets 17, 18 can be pivotally mount-

ed on an arm 21 connected to the housing by a spring loaded mount 22, such that the wheels 9, 10 and/or the band 15 are pushed in the direction of the guide surface 11. The band 15 and third wheel 14 can extend above the feeding means 2, such that at least the band 15 can grab the necks 5 of the bags 4 first, especially when the are slightly open or upstanding.

[0011] Fig. 2 shows in perspective view an apparatus 1. The apparatus comprises a housing 23 with a wider lower part 24 and a narrower upper part 25, such that a platform 26 is formed at the top of the lower part 24, next to the upper part 25. The guide surface 11 has been partly removed, as well as some protective plating. The platform 26 can be used as or support a guide surface 11. As can be seen the wheels 9, 10, 14 are at levels to one side of the platform 26, here above the platform 26, whereas at levels to the opposite side of the platform 26, here below, there are two drive wheels 27, 28, driven by a motor 29 (shown in fig. 4). A first drive wheel 27 can be, when no bag 4 is provided, close to or in engagement with the first wheel 9, whereas a second 28 of the drive wheels can be, when no bag 4 is provided, close to or in engagement with the second wheel 10. The drive wheels 27, 28 can be positioned on a common axis 30 and can be driven at a constant speed, for periods of time defined by a control 31 connected to for example a sensor 32 sensing presence of a bag 4 and activating the motor 29 for a period of time necessary for feeding the bag 4 passed the star wheel, as will be discussed hereafter. The drive wheels 27, 28 are spaced apart seen in the length direction of the axis 30, such that between the drive wheels space is created for the star wheel 8 and a knife construction 33 to be discussed. The drive wheels 27, 28 and/or the snare or band 15, the first and/or the second wheel 9, 10 can have a friction surface for engagement with the bags 4.

[0012] In fig. 3 an apparatus according to fig. 2 is shown, in which the drive wheels 27, 28 have been removed. This shows the star wheel 8, partly, part of the knife construction 33 and a guide block 36 for a foil strip 34 to be dispensed during use from a foil dispense roll 35. Also visible in fig. 3 is a rotating element 37, which is normally connected to the second drive wheel 28, such that it rotates with the second drive wheel 28 around the same axis 30. The rotating element 37 is in this embodiment a ring comprising a profile 38, such as a circular outer surface 39 with a lip 40 extending radially outward, between two notches 41 extending radially inward.

[0013] As is shown in more detail in fig. 11A and B, the star wheel 8 is provided with a number of elements 42 extending from a side surface 43 of the star wheel 8, each element 42 positioned between two adjacent cells 12. The lip 40 of the rotating element extends during rotation of the ring 37 around the axis 30 in a path extending along the star wheel 8, such that when the ring 37 is rotated at least one of the elements 42 of the star wheel 8 is, as a coupling element, engaged by the extending lip 40 for rotating the star wheel 8 around an axis 44. Assuming a rotation direction R_r of the ring 37 clockwise, in fig. 11A a position is shown in which the lip 40 has engaged the element 42A in front of a first cell 12A and is halfway a rotation angle α imposed by the ring 37 on the star wheel 8. Obviously other numbers of cells can be provided, as well as other numbers of coupling elements 42 and/or other numbers of lips 40. In each of these variations the construction can be designed such that upon rotation of the rotating element 37 over a first angle β the star wheel can be rotated over a second angle α, in opposite direction, to be chosen as desired. The ring 37 is part of the transport means or can at least be coupled to the transport means.

[0014] In the embodiment shown in fig. 11 the star wheel 8 has six cells 12 and six coupling elements 42, which can for example be pins, bolts, integrally formed protrusions or other means for engagement. The diameters D_1 and D_2 of the ring 37 and the star wheel 8 and the position of the elements 42 and the length of the lip 40 extending from the ring 37 are designed such that upon rotation of the rotating element 37 such that the lip is brought from one side of the star wheel to the opposite side, the star wheel is rotated over an angle α of 120 degrees. During use this will mean that upon one full rotation of the ring over 360 degrees, the star wheel 8 will be rotated over 120 degrees, meaning two cells. The coupling element 42 engaged by the lip 40 will during rotation enter into and subsequently move out of the notch 41 in front of the lip 40, seen in the direction of movement, whereas the trailing coupling element 42 will move into and out of the trailing notch 41, thus allowing the rotation over the angle α.

[0015] As can be seen in fig. 11B when the lip 40 is not engaging any coupling element 42, two of these coupling elements 42 will lay against the outer profile 39 of the ring 37, thus preventing rotation of the star wheel 8. This effect is used during gathering of the neck 5 of a bag 4 and feeding the neck 5, during gathering, into the cell 12A in the direction F_{in} and/or during moving the neck 5 of another bag 4 out of a cell 12C in the discharging direction F_{out}. Due to the configuration in an embodiment of fig. 11 only cells 12A, 12C and 12E will be used for gathering and closing necks 5.

[0016] Referring to fig. 3, 4 and 9 mainly, the knife construction 33 comprises a hammer block 45 mounted on an axis 46. The block 45 comprises a first arm 47 extending above a cylindrical wall 51 around the axis 30, carrying a knife 48 that extends from the free end of the first arm 47 upward. A second arm 49 is provided extending downward from the axis 46 and carrying a follower 50 extending substantially parallel to the first arm 47. In the cylindrical wall 51 an opening 52 is provided, positioned at an angle Υ relative to the lip 40. When the cylindrical wall 51 is rotated together with the ring 37 the follower 50 will move over the outer surface of the wall 51, until the follower 50 can enter into the opening 52, rotating the block 45 around the axis 46. This moves the knife 48 upward into a cell 12 facing downward at that time. This

can in an embodiment as shown in fig. 11 be a cell 12B following a cell 12C in which a neck 5 of a bag 4 has been gathered and sealed by a seal 53 formed by tape or tape and foil, as will be discussed hereafter. Tape and/or foil, extending as a trailing part over said following cell 12B will then be cut by the knife 48, releasing the sealed bag 5, in fig 1 shown at the right hand side. The angle γ shall in this embodiment be chosen such that the star wheel 8 is driven over half the angle α before the knife 48 is forced into the empty following cell 12B. In that position the cell 12A in fig. 11B is ready to receive a next neck 5 of a bag 4 to be gathered. The knife block 45 can be rotated by gravity and engagement of the follower 50 with the cylindrical wall 51. In another embodiment the knife 48 can be moved up by a profile on the cylindrical wall 51, in stead of the opening 50, in which case the follower could be removed. In still another embodiment the knife 48 could be moved by a separate drive mechanism, such as an individual motor, rod mechanisms, drive belt or any other solution readily available to the person skilled in the art. In an embodiment of fig. 4 a pin 54 can be mounted on an end of the axis 46, engaging a toothed wheel 55. The wheel 55 is designed such that each time the knife 48 has to be moved up the pin 54 is moved over a tooth of the wheel 55, thus forcing the axis 46 to rotate back and forth, forcing the knife 48 into and out off the relevant cell 12 for cutting the tape and/or foil. The wheel 55 will rotate at a slower speed than the drive wheels 27, 28 and can be coupled to the same motor 31, for example by a gear mechanism (not shown).

[0017] As can be seen in fig. 2 a roll 56 of tape 57 can be mounted on an arm 58 extending from the housing 13. This is preferably adhesive tape 57 with an adhesive layer 61 facing inward to a core 59 of the roll 56. During use the tape 57 is fed from the roll 56 over a guide mechanism 70 towards the star wheel 8. In the embodiment of fig. 2, of which part is shown in fig. 7 and 8 is more detail, a guide roller 60 is shown over which the tape 57 is guided. Fig. 7 shows the relevant part from a first side, substantially corresponding with the view of fig. 2 and 3, whereas fig. 8 shows the opposite side. In fig. 8 schematically the tape 57 and the foil strip 34 are shown, feeding towards the star wheel 8. As can be seen in for example fig. 5 and 6, the foil dispense roll 35 is positioned such that the foil strip 34 is led in between the first and second drive wheel 27, 28 and along the guide surface 11 under the star wheel in fig. 1. The tape 57 is fed over the guide roller 60 and the star wheel 8.

[0018] Fig. 10A - D schematically show in four steps applying a seal 53 around the neck 5 of a bag 4 or such flexible container. The container has to be flexible enough for part thereof, such as a neck, to be gathered in a cell 12 of the star wheel 8. In fig. 10A the star wheel 8 is shown in a first position, stationary with a cell 12 open to the feeding means 2, for feeding a neck 5 into the cell. As can be seen in fig. 10A the neck is gathered into a substantially closed bundled up position by the gathering means as discussed before. The neck 5 is grabbed between the first wheel 9 and the first drive wheel 27 and between the second wheel 10 or band 15 and the second drive wheel 28 and pushed towards the cell 12 C. Adhesive tape 57 is led over the outer circumference of part of the star wheel 8, with the adhesive layer 61 facing outward, such that it extends at least over the opening 61 of the cell 12C. A foils strip 34, for example a paper strip is led from a lower side to the star wheel 8 and is attached to a forward end 62 of the adhesive tape 57. In fig. 10B the gathered neck 5 has been fed into the cell 12C, forcing the tape 57 into the cell, substantially against the inner wall 63 thereof, the star wheel still in the same position. It can be held in this position by the rotating element, as discussed before. The neck 5 is thus almost entirely surrounded by the adhesive tape 57. In fig. 10C the star wheel is shown in a position in which it has been rotated counter clockwise over about 60 degrees, for example by engagement of the star wheel 8 by the rotating element or ring 37. The tape 57 can have been pulled further around the neck 5, for example but not necessarily to such extend that it is attached to itself, forming a joint 65, fully circumventing the neck 5. As can be seen the foil strip 34 has been drawn off the roll 35 further and has been attached to the tape 57 over such length that it traverses the joint 65. In fig. 10D a position is shown in which the star wheel 8 has been rotated further, counter clockwise, over for example substantially another 60 degrees, such that the opening 61 of the cell 12C extends above the guide surface 11 or at least to such extend that the bag 4 can be discharged from the cell 12A. The knife 48 can, for example as discussed before, be driven upward, into the cell 12B, cutting through the combined tape 57 and strip 34, cutting the seal 53 off from the tape 57 and foil 34. At the same time the adjacent cell 12A has become available for feeding a further neck 5 into it.

[0019] The foil strip can be made of paper or plastic or another material. Preferably it can easily be torn by a user, preferably easier than the tape 57, such that the seal 53 can be broken easily. In an alternative embodiment the foil strip could be left out, the seal formed by tape only. In still another embodiment the foil strip could be replaced by a strip of individual elements to be adhered to the tape 57 at one or opposite sides of the joint 65, such that the ends of the tape on opposite sides of said joint will not adhere to each other. These individual elements can for example be carried on a strip like backing. In another embodiment a substantially non adhesive tape can be used, which is provided with adhesive only in the parts that have to enclose the neck 5 of a bag 4, but not the parts that form the free ends of the seal, distanced over a certain distance from the joint. The adhesive can for example be applied to the non adhesive tape in blocks prior to delivery or near or at the star wheel, before feeding the neck into the cell 12.

[0020] In fig. 1 a control 31 is shown, for example connected to a sensor 32 for sensing a bag in a desired proximity of the star wheel 8, such that the gathering can be advanced and the rotating element should be rotated.

The control can also be provided with a communication means 67 and/or positioning means 68, such as but not limited to wireless communication means and/or wired communication means, such as a telephone, GPS or GPRS. The communication means 67 can be designed to communicate with for example a computer of telephone network, with a supplier of tape and/or foil, with a maintenance firm or the like. Further sensors can be connected to the control, such as one or more sensors for sensing the amount of tape 57 and/or foil 34 strip dispensed and/or used and/or sensing a remaining amount of tape 57 and/or strip 34 remaining on the respective rolls 35, 56. The rolls 35 and/or 56 can be provided with indicators, such as but not limited to RFID chips, bar codes or other means that can be physically or electronically read by sensors in the apparatus, for identification of the rolls and setting a mode of the apparatus through the control 31, for example the length of tape to be dispensed, tension of the strip 34 and/or tape 57 to be applied, or even bringing the apparatus in a working or non working mode. The positioning means 68 can be provided for sensing and communicating location and/or location changes of the apparatus 1, such that it is easy to keep track of the apparatus. Counting means can be provided for counting the number of seals manufactured with the apparatus, for example by counting the number of revolutions of the star wheel 8 and/or of one of the drive wheels and/or of the rotating element 37.

[0021] The invention is by no means limited to the embodiments shown and discussed here above. Many amendments and variations are possible within the scope of the invention. For example the orientation of the apparatus can be different, such that for example the bags are fed through the apparatus vertically, for example hanging from transport means or carried on transport means with the necks upward, wherein the axis 44 of the star wheel can include an angle with a horizontal directed, can be inclined or disposed vertically. The rotating element 37 and especially the lip 40 can be positioned such that it engages the star wheel 8 at a side spaced apart from the area where the neck is gathered an fed into a cell, for example in fig. 10 on the upper side of the star wheel 8 or at least at a side of the star wheel opposite the guide surface 11. The star wheel can also be driven differently, for example through a step motor engaging the axis 44 or by the feeding and/or discharging means, the ring 37 only used for blocking and allowing rotation of the star wheel 8 over a specific angle. In stead of the star wheel 8 in the present form, rotatable around an axis 44, a star wheel can be in the form of an endless star belt, formed as a belt having a series of cells in an outwardly facing surface, guided over at least two end wheels, such that a series of cells 12 is fed along the guide surface, allowing a series of bags to be handled at the same time. The position of the tape roll 56 and the foil strip roll 35 can be changed, for example changed over. Means can be provided to print information on and/or in the tape and/or the foil strip, such as sealing date, expiration date of the product P, packing apparatus identification, advertisements or other information. In the embodiments shown the width of the strip of foil 34 is about the same as the width of the tape 57. These widths can be different, for example when the foil strip 34 should have a greater with in order to provide further information, such as user information, warranties and other communications.

Claims

1. Apparatus (1) for sealing flexible bags (4), comprising a gathering assembly (7) for a neck of the bag (4), including at least a transport means (2, 3) and at least one tape dispenser (35, 56), wherein the gathering assembly (7) comprises a star wheel (8) and the tape dispenser (35, 56) comprises a guide for guiding tape from the tape dispenser (35, 56) over part of the star wheel (8), the transport means (2, 3) extending into or along at least a cell (12) of the star wheel (8), wherein the star wheel (8) is driven intermittently, **characterized in that** the star wheel (8) is coupled to the transport means (2, 3), such that when the transport means is driven, gathering the neck (5) and feeding the neck (5) of the bag (4) into a cell (12) of the star wheel (8),, the star wheel (8) is kept stationary.

2. Apparatus according to claim 1, wherein the transport means (2, 3) comprise two sets of transport elements such as wheels and/or transport bands, substantially parallel to each other at a distance from ach other, the star wheel (8) extending at least partly between said two sets.

3. Apparatus according to claim 1 or 2, wherein the transport means (2, 3) comprise or are coupled to a rotating element (38) comprising at least one extending element (40), said element (38) during use moving in a path extending through or along a side of the star wheel (8), such that when the rotating element (38) is rotated over a first angle, the star wheel (8) is engaged by the extending element (40) for rotating the star wheel (8) over an second angle ,

4. Apparatus according to claim 3, wherein the star wheel (8) is provided with at least one coupling element (42) engaging said rotating element (38), said rotating element (38) being provided with at least one profile (41), such as an opening or notch into or onto which said coupling element (42) can move during rotation of said rotating element (38), such that the star wheel (8) is rotated over said second angle, before releasing said coupling element (42).

5. Apparatus according to claim 3 or 4, wherein the star wheel (8) has a number of cells (12), wherein the

transport means (2, 3) are designed such that if said first angle is 360 degrees, the second angle is such that the star wheel (8) is rotated over a second angle defined by a discreet number of cells (12), preferably two or three cells.

6. Apparatus according to any one of claims 1-5, wherein a proximity sensor (32) is provided near the transport means (2, 3) and/or the gathering means (7).

7. Apparatus according to any one of claim 1-6, wherein means are provided for guiding a foil strip along part of the star wheel (8) and/or a guide surface extending along the star wheel (8), for engagement with tape led over the star wheel (8).

8. Apparatus according to any one of the previous claims, wherein a communication device (67) is provided for communication between the apparatus and a control device, preferably wireless communication.

9. Apparatus according to any one of claims 1-8, wherein a positioning device (68) is provided for sensing and communicating location and/or location changes of the apparatus.

10. Apparatus according to any one of the previous claims, wherein further a control device (31) is provided, connected to at least one sensor for detecting presence of the tape and/or the foil.

11. Method for sealing flexible containers (4), comprising the steps of:

- leading a strip of adhesive tape along part of a star wheel (8), such that the tape extends over an opening of at least one cell (12) of said star wheel (8);
- gathering neck material of a container (4) by feeding the neck material into the cell (12) of the star wheel (8) in a first direction;
- rotating the star wheel (8) over an angle, such that the gathered neck material, tied into a closed state by at least the tape, is moved out of the cell (12) in a second direction;
- adhering a foil strip to part of the tape; and
- during or following said rotation of the star wheel (8) feeding and/or holding tape over an opening of a next cell (12) of the star wheel (8), **characterized by** the step of keeping the star wheel (8) substantially stationary during said gathering and feeding of the neck (6) into said cell (12), such that the tape is forced against an inside wall of said cell (12) and around the gathered neck material.

12. Method according to claim 11, wherein said gathering is done using at least one gathering wheel or band, driven by a drive mechanism, wherein a rotating element is provided, coupled to the drive mechanism and/or the gathering means, which rotating element is rotated and brought into and out of engagement of the star wheel or an element associated therewith, for intermittently rotating the star wheel over an angle.

13. Method according to claim 12, wherein the star wheel is kept in the stationary position by the rotating element during part of a rotation of the rotating element.

14. Method according to any one of claims 11 - 13, wherein container necks are fed into the gathering means in substantially flat position.

15. Method according to any one of claims 11 - 14, wherein a container neck approaching the gathering means is detected, on the bases of which the gathering of the container neck is started and a rotating element for rotating the star wheel over said angle is made to be driven in a rotating direction.

Patentansprüche

1. Vorrichtung (1) zum Verschließen flexibler Beutel (4), umfassend eine Aufnahmegruppe (7) für einen Hals des Beutels (4), die mindestens ein Transportmittel (2, 3) und mindestens einen Bandspender (35, 56) aufweist, wobei die Aufnahmegruppe (7) ein Sternrad (8) umfasst und der Bandspender (35, 56) eine Führung umfasst, um Band von dem Bandspender 835, 56) über einen Teil des Sternrads (8) zu leiten, wobei die Transportmittel (2, 3) in oder entlang von mindestens einer Zelle (12) des Sternrads (8) verlaufen, wobei das Sternrad (8) intermittierend angetrieben wird, **dadurch gekennzeichnet, dass** das Sternrad (8) so an die Transportmittel (2, 3) gekoppelt ist, dass, wenn die Transportmittel angetrieben werden, um den Hals (5) aufzunehmen und den Hals (5) des Beutels (4) in eine Zelle (12) des Sternrads (8) zu transportieren, das Sternrad (8) ortsfest bleibt.

2. Vorrichtung nach Anspruch 1, wobei die Transportmittel (2, 3) zwei Sets von Transportelementen wie beispielsweise Räder und/oder Transportbänder umfassen, die im Wesentlichen parallel zueinander in einem Abstand voneinander sind, wobei das Sternrad (8) mindestens teilweise zwischen den zwei Sets verläuft.

3. Vorrichtung nach Anspruch 1 oder 2, wobei die Transportmittel (2, 3) ein Drehelement (38) umfassen oder mit diesem gekoppelt sind, das mindestens ein Verlängerungselement (40) umfasst, wobei sich

das Element (38) bei Verwendung in einer Bahn bewegt, die durch eine und entlang einer Seite des Sternrads (8) verläuft, sodass, wenn das Drehelement (38) über einen ersten Winkel gedreht wird, das Verlängerungselement (40) in das Sternrad (8) eingreift, um das Sternrad (8) über einen zweiten Winkel zu drehen.

4. Vorrichtung nach Anspruch 3, wobei das Sternrad (8) mit mindestens einem Kopplungselement (42) versehen ist, das in das Drehelement (38) eingreift, das Drehelement (38) mit mindestens einem Profil (41) wie beispielsweise einer Öffnung oder einer Kerbe versehen ist, in der oder auf der sich das Kopplungselement (42) beim Drehen des Drehelements (38) bewegen kann, sodass das Sternrad (8) über den zweiten Winkel gedreht wird, bevor das Kopplungselement (42) freigegeben wird.

5. Vorrichtung nach Anspruch 3 oder 4, wobei das Sternrad (8) eine Anzahl von Zellen (12) aufweist, wobei die Transportmittel (2, 3) so konzipiert sind, dass bei einem ersten Winkel von 360 Grad der zweite Winkel so ist, dass das Sternrad (8) über einen zweiten Winkel, definiert von einer diskreten Anzahl von Zellen (12), vorzugsweise zwei oder drei Zellen, gedreht wird.

6. Vorrichtung nach einem der Ansprüche 1-5, wobei ein Näherungssensor (32) nahe der Transportmittel (2, 3) und/oder der Aufnahmemittel (7) bereitgestellt ist.

7. Vorrichtung nach einem der Ansprüche 1-6, wobei Mittel bereitgestellt sind, um einen Folienstreifen an einem Teil des Sternrads (8) entlang zu führen und/oder eine Führungsfläche am Sternrad (8) entlang verläuft, zum Eingreifen mit einem Band, das über das Sternrad (8) geleitet wird.

8. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei eine Kommunikationsvorrichtung (67) für die Kommunikation, vorzugsweise eine drahtlose Kommunikation, zwischen der Vorrichtung und einer Steuervorrichtung bereitgestellt ist.

9. Vorrichtung nach einem der Ansprüche 1-8, wobei eine Positioniervorrichtung (68) zum Abtasten und Kommunizieren des Standorts und/oder einer Änderung des Standorts der Vorrichtung bereitgestellt ist.

10. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei ferner eine Steuervorrichtung (31) bereitgestellt ist, die mit mindestens einem Sensor verbunden ist, um die Anwesenheit des Bands und/oder der Folie zu detektieren.

11. Verfahren zum Versiegeln flexibler Behälter (4), umfassend folgende Schritte:

- Leiten eines Streifens von Klebeband entlang eines Teils eines Sternrads (8), sodass das Band über eine Öffnung von mindestens einer Zelle (12) des Sternrads (8) läuft;
- Aufnehmen von Halsmaterial eines Behälters (4) durch Einführen des Halsmaterials in die Zelle (12) des Sternrads (8) in einer ersten Richtung;
- Drehen des Sternrads (8) über einen Winkel, so dass das aufgenommene Halsmaterial, gebunden in einen geschlossenen Zustand durch mindestens das Band, aus der Zelle (12) in einer zweiten Richtung bewegt wird;
- Befestigen eines Folienstreifens an einem Teil des Bandes; und
- während oder nach dem Drehen des Sternrads (8), Einführen und/oder Halten des Bandes über eine Öffnung einer nächsten Zelle (12) des Sternrads (8), **gekennzeichnet durch** den Schritt, dass das Sternrad (8) während des Aufnehmens und Einführens des Halses (6) in die Zelle (12) ortsfest bleibt, sodass das Band gegen die Innenwand der Zelle (12) und um das aufgenommene Halsmaterial forciert wird.

12. Verfahren nach Anspruch 11, wobei das Aufnehmen unter Verwendung von mindestens einem von einem Antriebsmechanismus angetriebenen Aufnahmerad oder -band erfolgt, wobei ein Drehelement bereitgestellt ist, das an den Antriebsmechanismus und/oder die Aufnahmemittel gekoppelt ist, wobei das Drehelement gedreht wird, um zum Eingreifen in das oder Ausgreifen aus dem Sternrad oder einem damit verbundenen Element gebracht zu werden, um das Sternrad intermittierend über einen Winkel zu bewegen.

13. Verfahren nach Anspruch 12, wobei das Sternrad in der ortsfesten Position durch das Drehelement während eines Teils einer Drehung des Drehelements gehalten wird.

14. Verfahren nach einem der Ansprüche 11-13, wobei Behälterhälse in einer im Wesentlichen flachen Position in die Aufnahmemittel eingeführt werden.

15. Verfahren nach einem der Ansprüche 11-14, wobei ein Behälterhals, der sich den Aufnahmemitteln nähert, detektiert wird, woraufhin das Aufnehmen des Behälterhalses beginnt und ein Drehelement zum Drehen des Sternrads über den Winkel in einer Drehrichtung angetrieben wird.

Revendications

1. Appareil (1) destiné à sceller des sacs souples (4), comprenant un ensemble d'assemblage (7) pour un col du sac (4), comprenant au moins des moyens de transport (2, 3) et au moins un distributeur de bande (35, 56), dans lequel l'ensemble d'assemblage (7) comprend une roue en étoile (8) et le distributeur de bande (35, 56) comprend un guide pour guider la bande à partir du distributeur de bande (35, 56) sur une partie de la roue en étoile (8), les moyens de transport (2, 3) s'étendant dans une, ou le long d'une, cellule (12) au moins de la roue en étoile (8), dans lequel la roue en étoile (8) est entraînée de manière intermittente, **caractérisé en ce que** la roue en étoile (8) est couplée aux moyens de transport (2, 3), de telle sorte que lorsque les moyens de transport sont entraînés, en assemblant le col (5) et en introduisant le col (5) du sac (4) dans une cellule (12) de la roue en étoile (8), la roue en étoile (8) soit maintenue fixe.

2. Appareil selon la revendication 1, dans lequel les moyens de transport (2, 3) comprennent deux ensembles d'éléments de transport tels que des roues et/ou des bandes de transport, sensiblement parallèles l'une à l'autre à une distance l'une de l'autre, la roue en étoile (8) s'étendant au moins en partie entre lesdits deux ensembles.

3. Appareil selon la revendication 1 ou 2, dans lequel les moyens de transport (2, 3) comprennent, ou sont couplés à, un élément rotatif (38) comprenant au moins un élément d'extension (40), ledit élément (38) se déplaçant en service dans un chemin s'étendant à travers un, ou le long d'un, côté de la roue en étoile (8), de telle sorte que, lorsque l'élément rotatif (38) est tourné d'un premier angle, la roue en étoile (8) soit mise en prise par l'élément d'extension (40) afin de faire tourner la roue en étoile (8) d'un second angle.

4. Appareil selon la revendication 3, dans lequel la roue en étoile (8) est dotée d'un élément de couplage (42) au moins qui vient en prise avec ledit élément rotatif (38), ledit élément rotatif (38) étant doté d'un profil (41) au moins, tel qu'une ouverture ou une encoche dans laquelle ou sur laquelle ledit élément de couplage (42) peut se déplacer au cours de la rotation dudit élément rotatif (38), de telle sorte que la roue en étoile (8) soit tournée dudit second angle, avant de libérer ledit élément de couplage (42).

5. Appareil selon la revendication 3 ou 4, dans lequel la roue en étoile (8) présente un certain nombre de cellules (12), dans lequel les moyens de transport (2, 3) sont conçus de telle sorte que, si ledit premier angle est égal à 360 degrés, le second angle soit tel que la roue en étoile (8) soit tournée d'un second angle défini par un nombre discret de cellules (12), de préférence deux ou trois cellules.

6. Appareil selon l'une quelconque des revendications 1 à 5, dans lequel un capteur de proximité (32) est disposé à proximité des moyens de transport (2, 3) et/ou des moyens d'assemblage (7).

7. Appareil selon l'une quelconque des revendications 1 à 6, dans lequel des moyens sont prévus pour guider une bande de feuille le long d'une partie de la roue en étoile (8) et/ou d'une surface de guidage s'étendant le long de la roue en étoile (8), pour une mise en prise avec une bande amenée au-dessus de la roue en étoile (8).

8. Appareil selon l'une quelconque des revendications précédentes, dans lequel un dispositif de communication (67) est prévu pour une communication entre l'appareil et un dispositif de commande, de préférence une communication sans fil.

9. Appareil selon l'une quelconque des revendications 1 à 8, dans lequel un dispositif de positionnement (68) est prévu pour détecter et communiquer l'emplacement et/ou des changements d'emplacement de l'appareil.

10. Appareil selon l'une quelconque des revendications précédentes, dans lequel un autre dispositif de commande (31) est prévu, connecté à un capteur au moins, pour détecter la présence de la bande et/ou de la feuille.

11. Procédé destiné à sceller des contenants souples (4), comprenant les étapes consistant à :

    - amener une bande de ruban adhésif le long d'une partie d'une roue en étoile (8), de telle sorte que la bande s'étende au-dessus d'une ouverture d'une cellule (12) au moins de ladite roue en étoile (8) ;
    - assembler le matériau de col d'un contenant (4) en introduisant le matériau de col dans la cellule (12) de la roue en étoile (8) dans une première direction ;
    - faire tourner la roue en étoile (8) d'un angle, de telle sorte que le matériau de col assemblé, attaché dans un état fermé par la bande au moins, soit déplacé hors de la cellule (12) dans une seconde direction. ;
    - coller une bande de feuille sur une partie de la bande ; et
    - au cours de, ou après, ladite rotation de la roue en étoile (8), fournir et/ou tenir la bande au-dessus d'une ouverture d'une cellule suivante (12) de la roue en étoile (8) ;

caractérisé par l'étape consistant à maintenir la roue en étoile (8) sensiblement fixe au cours dudit assemblage et de ladite introduction du col (6) dans ladite cellule (12), de telle sorte que la bande soit forcée contre une paroi intérieure de ladite cellule (12) et autour du matériau de col assemblé.

12. Procédé selon la revendication 11, dans lequel ledit assemblage est effectué en utilisant une roue ou une bande d'assemblage au moins, entraînée par un mécanisme d'entraînement, dans lequel est fourni un élément rotatif, couplé au mécanisme d'entraînement et/ou aux moyens d'assemblage, lequel élément rotatif est tourné et mis en prise et hors de prise avec la roue en étoile ou avec un élément associé à celle-ci, pour une rotation de manière intermittente de la roue en étoile d'un angle.

13. Procédé selon la revendication 12, dans lequel la roue en étoile est maintenue dans la position fixe par l'élément rotatif au cours d'une partie d'une rotation de l'élément rotatif.

14. Procédé selon l'une quelconque des revendications 11 à 13, dans lequel les cols de contenant sont introduits dans les moyens d'assemblage dans une position sensiblement à plat.

15. Procédé selon l'une quelconque des revendications 11 à 14, dans lequel l'approche d'un col de contenant vers les moyens d'assemblage est détectée, sur la base de quoi l'assemblage du col de contenant est démarré et un élément rotatif destiné à faire tourner la roue en étoile dudit angle, est entraîné dans une direction de rotation.

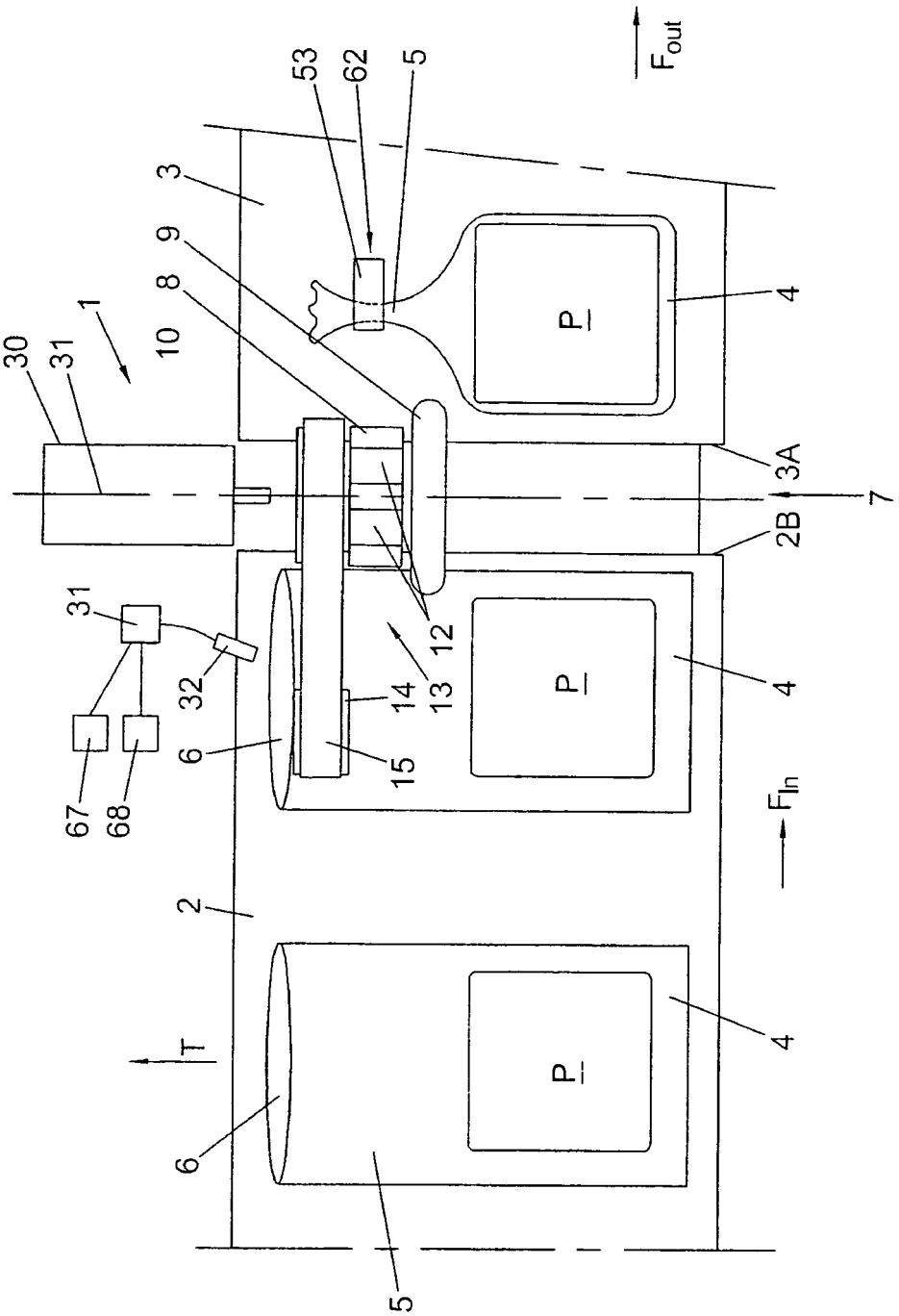
F_{out}
53
62
5
3
9
8
10
1
30
31
4
P
3A
7
2B
31
32
12
13
14
6
15
67
68
F_{in}
2
T
4
6
5

FIG. 1

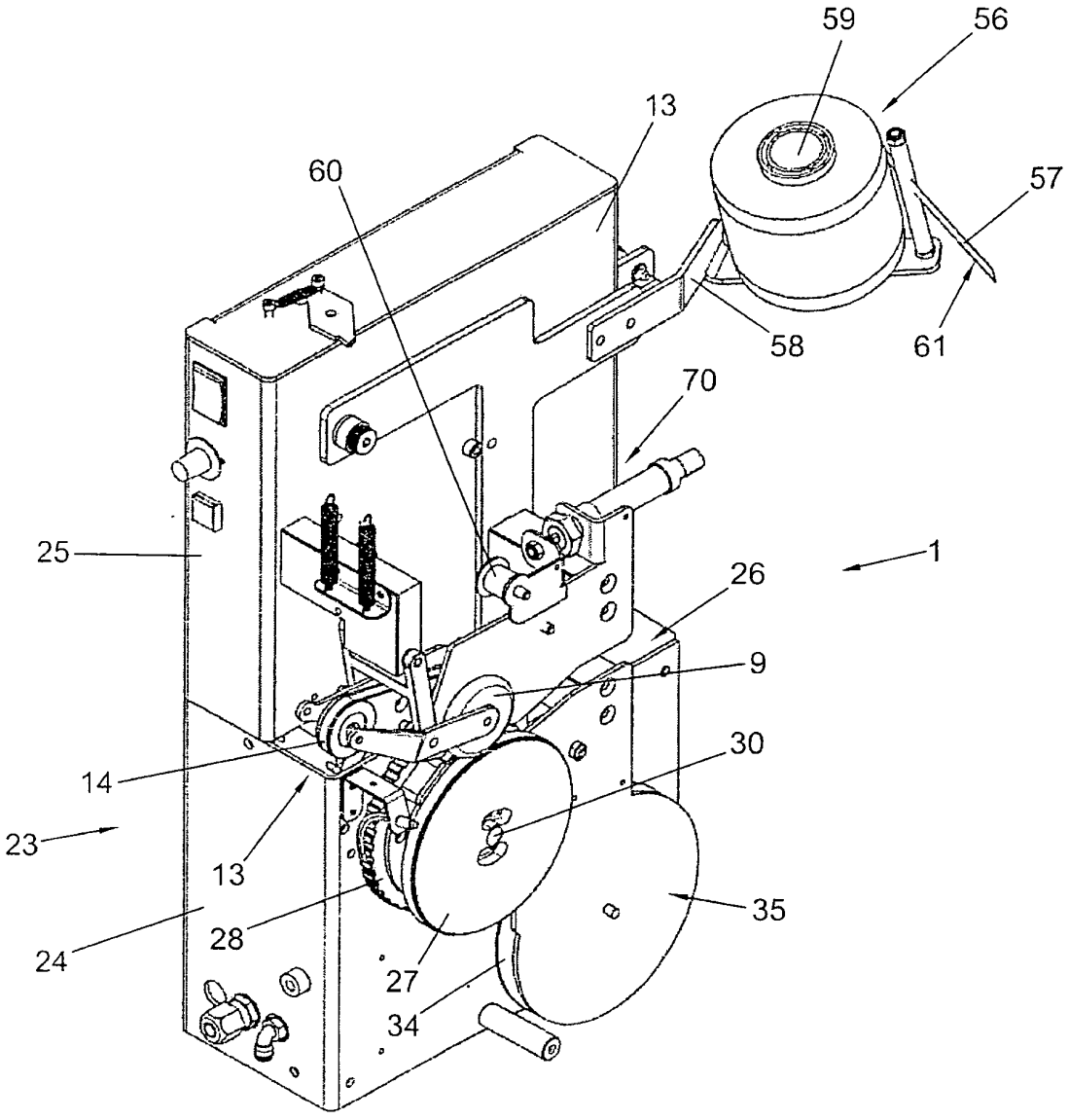

FIG. 2

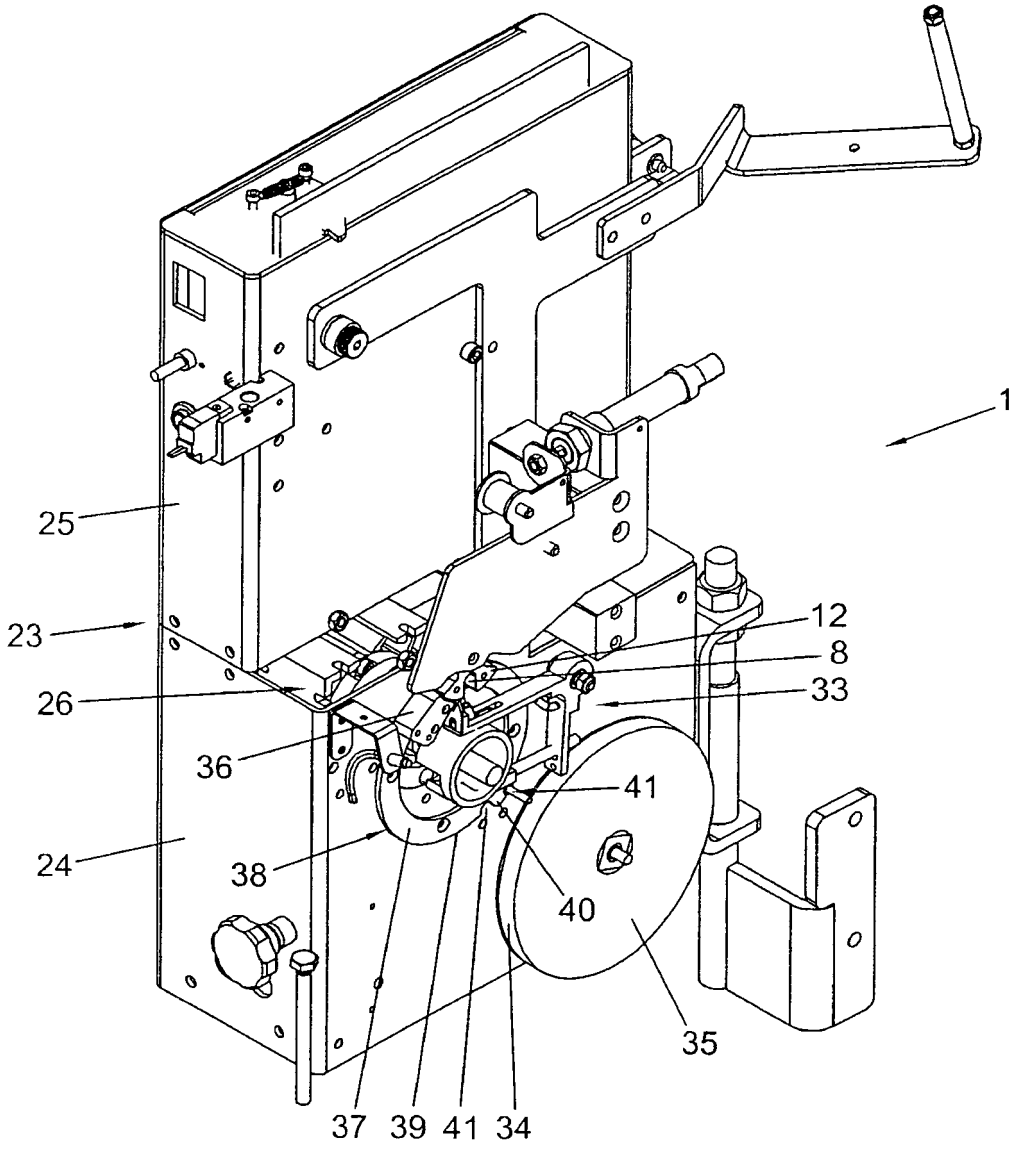

FIG. 3

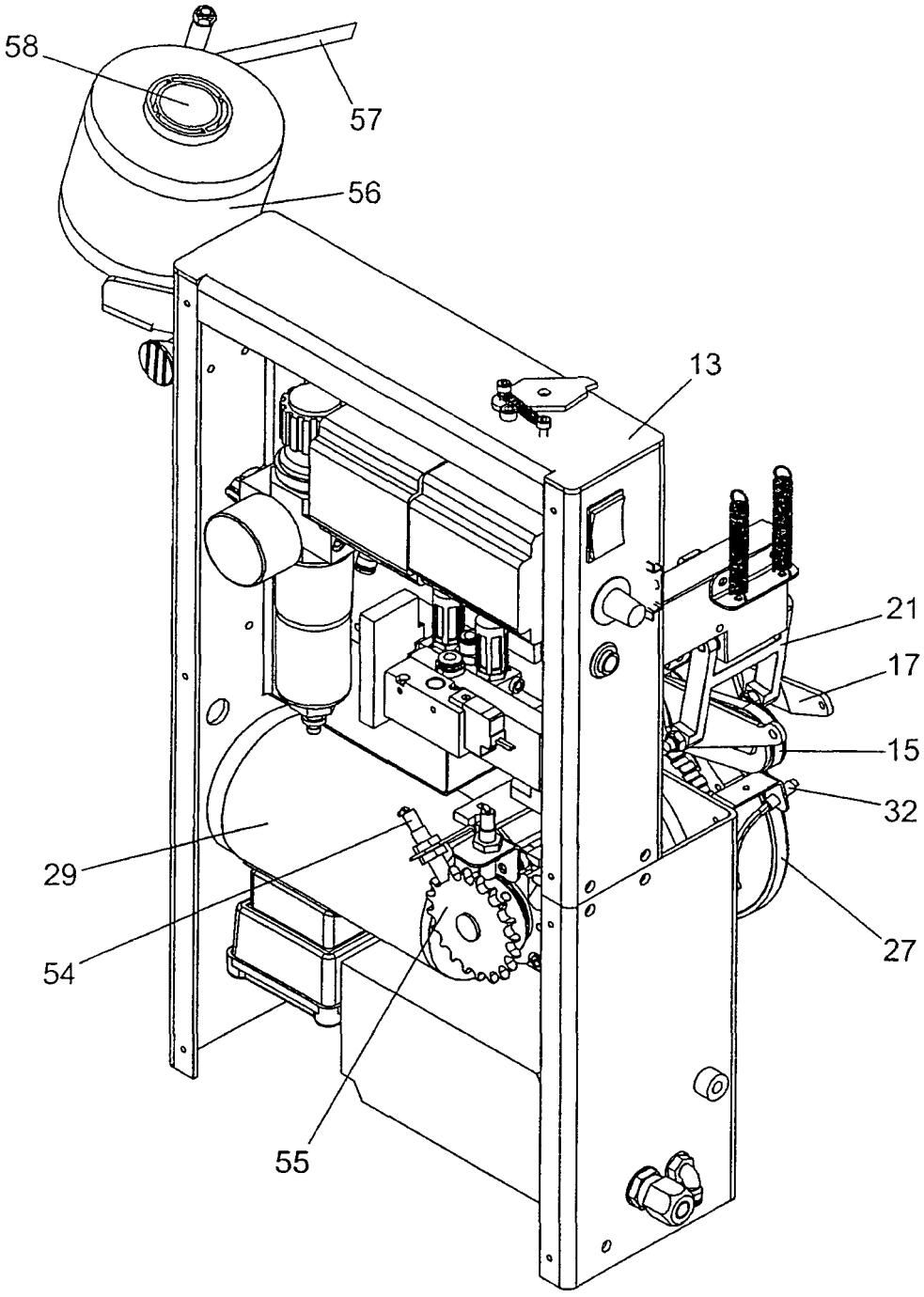

FIG. 4

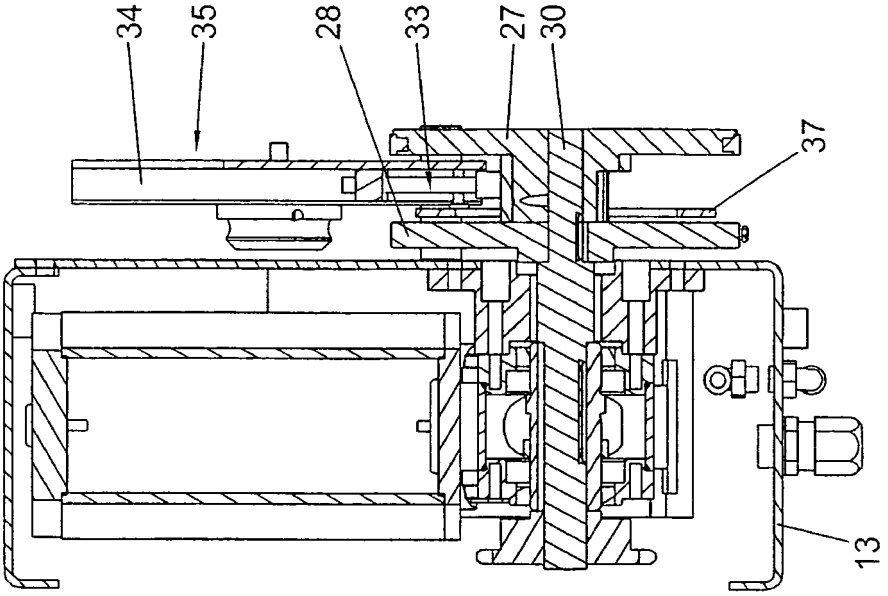

FIG. 6

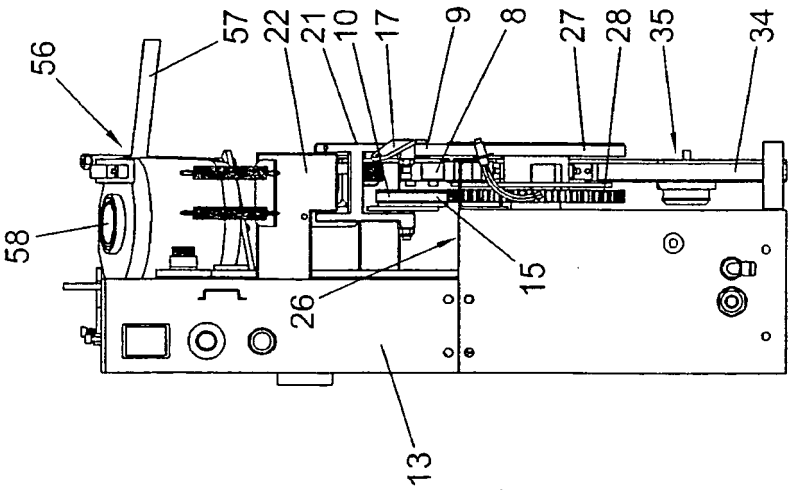

FIG. 5

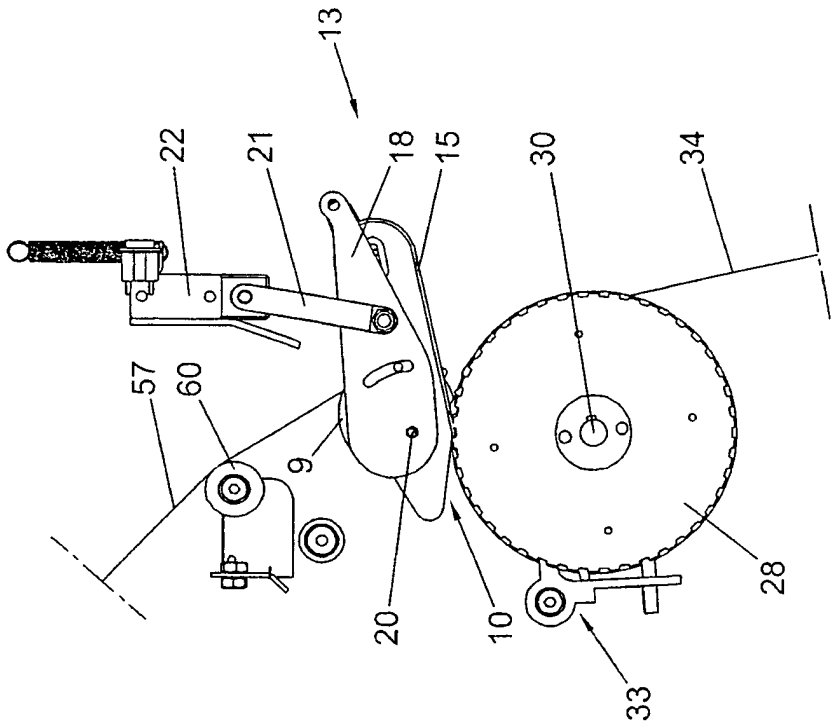
13
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FIG. 8

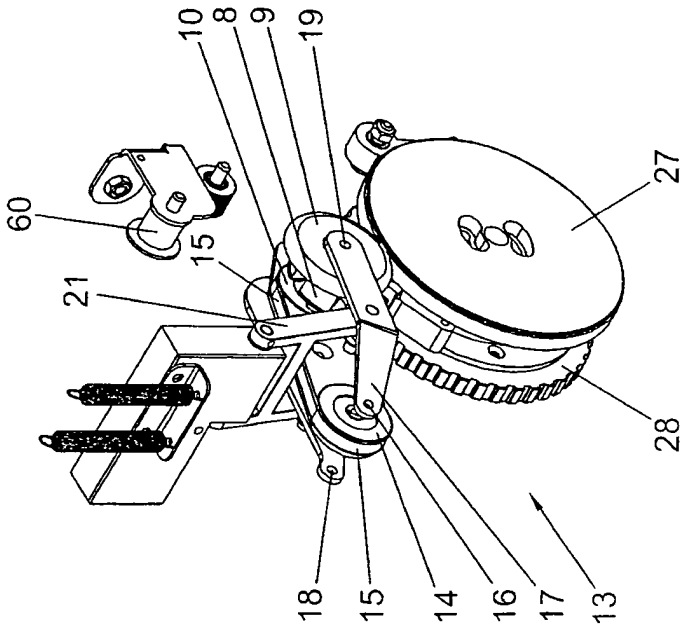
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FIG. 7

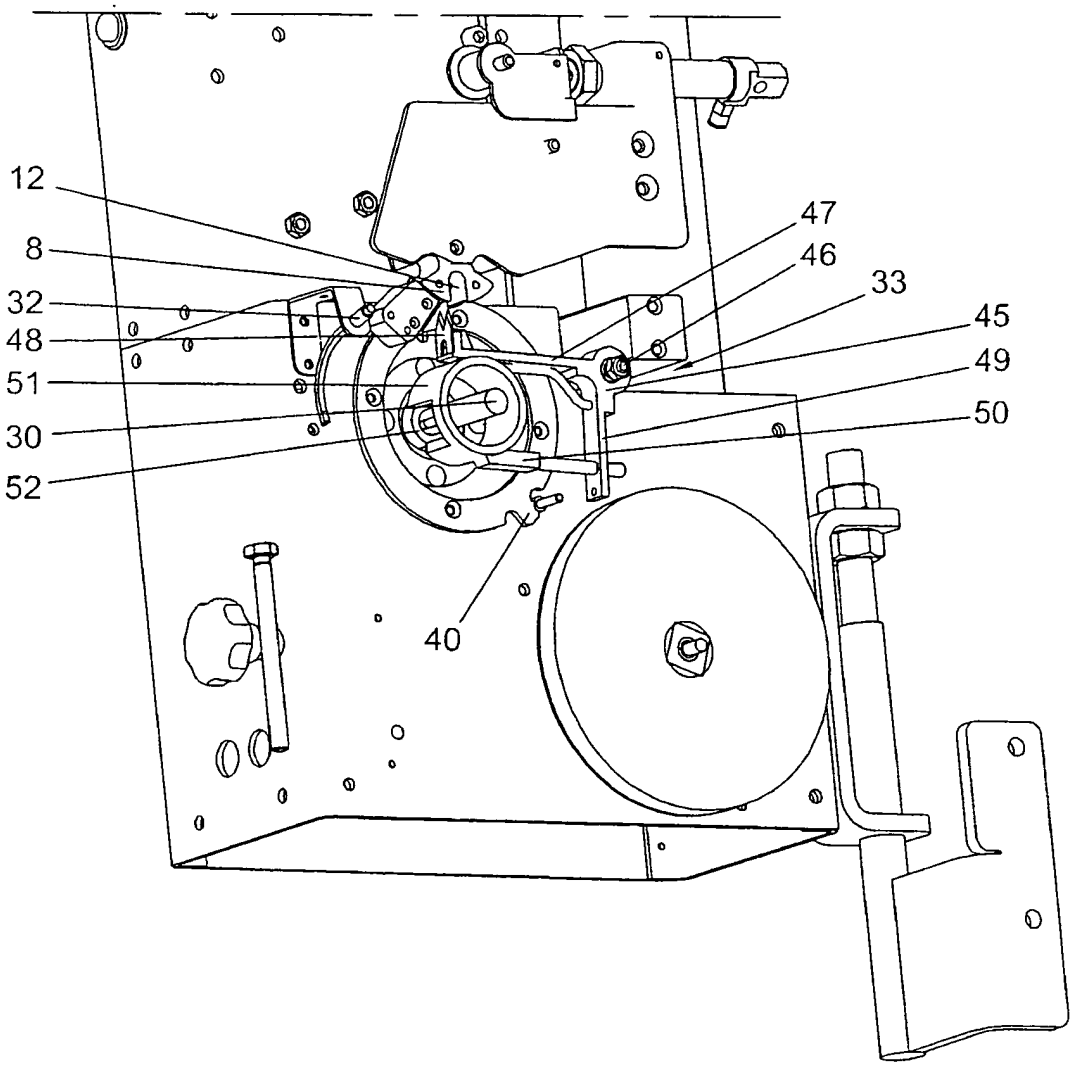

FIG. 9

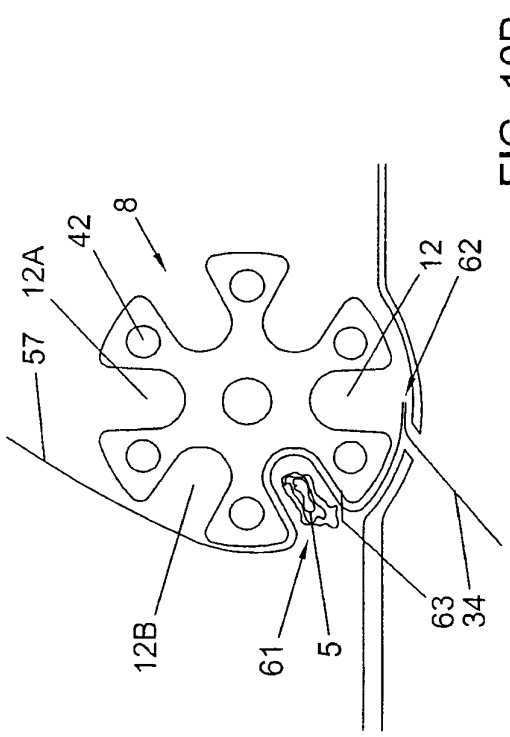

FIG. 10B

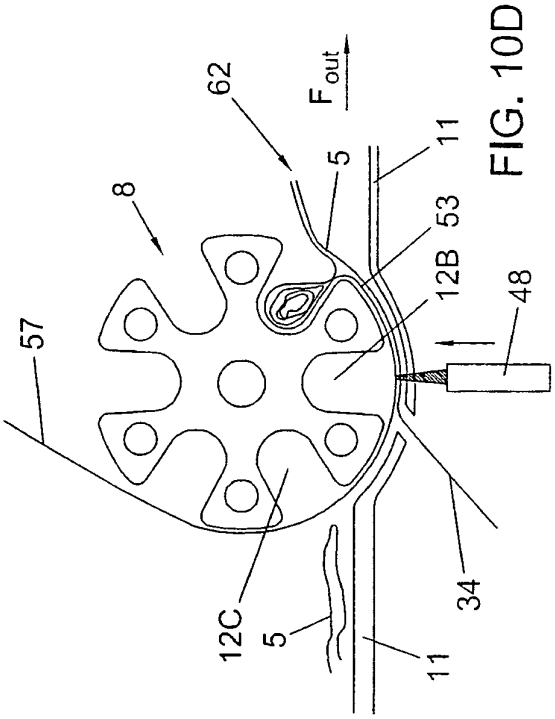

FIG. 10D

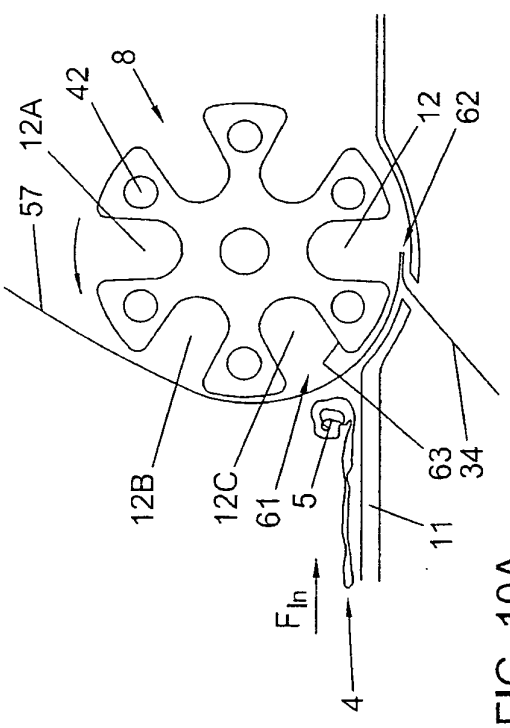

FIG. 10A

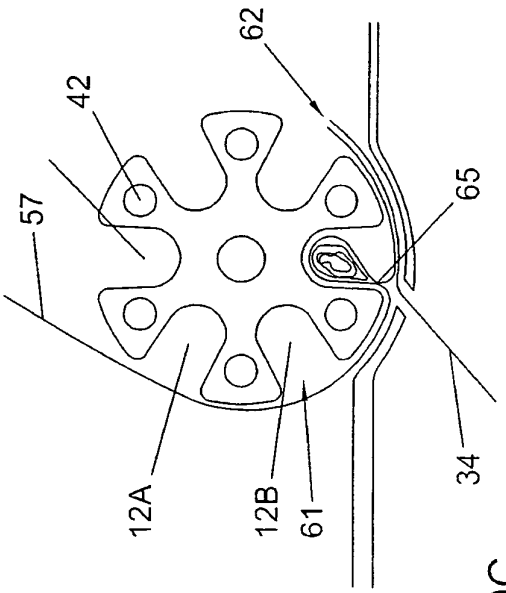

FIG. 10C

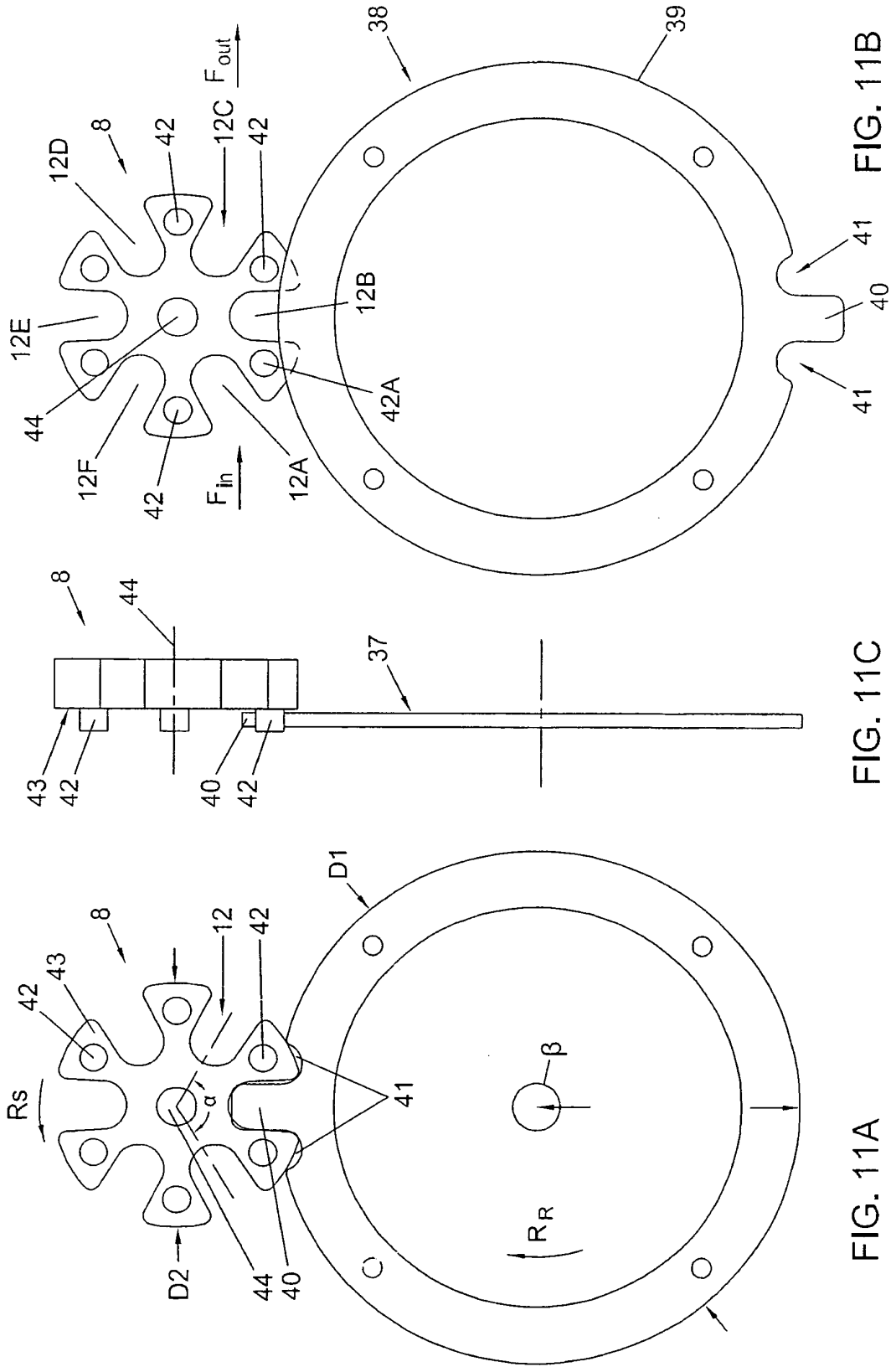

FIG. 11B

FIG. 11C

FIG. 11A

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4545185 A **[0002]**