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(72) Inventors:
• **GIULIANI, Mattia**
43126 Parma (IT)
• **SALAMI, Alessandro**
43126 Parma (IT)
• **FERRI, Marco**
43126 Parma (IT)

(71) Applicant: **Sidel Participations**
76930 Octeville-sur-Mer (FR)

(74) Representative: **Siloret, Patrick**
Sidel Participations
Avenue de la Patrouille de France
CS60627 Octeville-sur-mer
76059 Le Havre Cedex (FR)

(54) **LABELING MACHINE WITH AN IMPROVED LABEL TRANSFER DRUM**

(57) Labeling machine (1) comprising a carousel (4) rotating about a first axis (A) and conveying a plurality of articles (3) along a given path (P); the labeling machine (1) further comprises at least one labeling group (5, 6) arranged peripherally with respect to the carousel (4) and comprising a transfer drum (22); the transfer drum (22) is rotatable about a second axis (C), parallel to first axis (A) and is configured to receive labels (2) on its outer lateral surface (24) and to feed them to the carousel (4) at an application station (K); the transfer drum (22) carries at least one leading pad (26) configured to cooperate

with a leading portion of one respective label (2), and at least one trailing pad (27) configured to cooperate with a trailing portion of the respective label (2); the leading pad (26) is movable between an operative position, in which it protrudes from the outer lateral surface (24), outwardly from axis C, and feeds the respective label (2) to the carousel (4) at the application station (K); and an idle position, in which the leading pad (26) is retracted towards the second axis (C) with respect to the operative position.

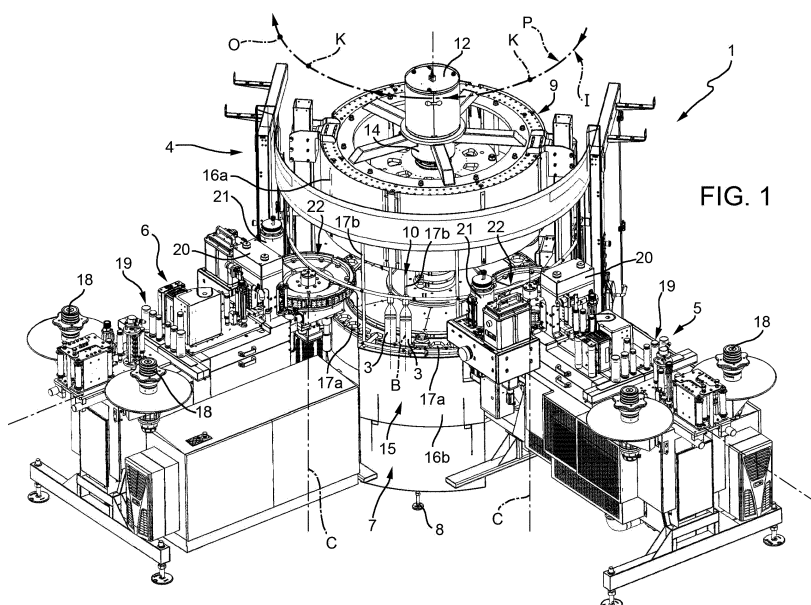


FIG. 1

Description

TECHNICAL FIELD

[0001] The present invention relates to a labeling machine for applying labels onto articles, such as bottles or containers of all sort.

[0002] In particular, the present invention relates to a labeling machine equipped with an improved label transfer drum for receiving and transferring labels.

BACKGROUND ART

[0003] As it is generally known, the packaging of food or non-food products into respective articles, such as bottles, containers or the like, comes along with the labeling thereof by means of respective labels, in particular paper or plastic labels, during a labeling process run with a labeling machine.

[0004] Typically used with beverage bottles are tubular labels (commonly called "sleeve labels"), which are obtained by:

- cutting a web unwound from a supply roll into a plurality of rectangular or square labels;
- bending each label in a cylindrical configuration such that the opposite vertical edges overlap one another; and
- welding the overlapped edges of each cylindrical label.

[0005] Also widespread used are gluing labels, which, after being cut from a web at appropriate lengths, are glued by gluing means, such as a gluing roller, spray and injector systems or the like, and are finally transferred to respective containers or articles.

[0006] Whatever is the solution adopted for applying the labels on the articles, a typical labeling machine substantially comprise:

- a rotary carousel, which conveys along a horizontal, arch-shaped path a succession of articles to be labelled from an input station to an application station and conveys labeled articles from the application station to an output station;
- an input star wheel for feeding the articles to be labeled to the carousel in correspondence with the input station;
- an output star wheel for removing the labeled articles from the carousel in correspondence with the output station; and
- a labeling group arranged peripherally with respect to the carousel and configured to feed and apply a plurality of labels on the respective articles at the application station of the carousel.

[0007] The labeling group substantially comprises:

- a shaft for rotatably supporting a reel off which a web of labels is unwound and fed along a feed path;
- a plurality of unwinding rollers for guiding the web along a rectilinear portion of the feed path;
- a cutter for cutting a sequence of single labels from the web; and
- a label transfer drum for advancing each label which has been previously cut.

[0008] Generally, the labels are retained by suction on an outer lateral surface of the transfer drum; the latter has an approximately cylindrical lobed configuration and is rotatable about a vertical axis. The outer lateral surface of the transfer drum receives a succession of cut labels and releases such labels at the application station after a rotation of a certain angle about its own axis.

[0009] In greater detail, the transfer drum advances the cut labels along a horizontal arch-shaped path, which is tangent to the lateral surface of the respective articles to be labeled, in correspondence with the application station.

[0010] Transfer drums of the above-described type usually comprise a plurality of pads, which are carried on a peripheral portion thereof, slightly protrude from the outer lateral surface of the drum itself and have the function to engage with the leading and the trailing edges of the labels to be transferred.

[0011] More precisely, the outer lateral surface of the transfer drum is provided with a plurality of air ports, which form a number of conveying sections bounded, each, by a respective pair of the above-mentioned pads.

[0012] Furthermore, the transfer drum is rotatably mounted on a distribution member, which is fluidly connected to a vacuum source and to the air ports of the outer lateral surface.

[0013] The air ports, in turn, are fluidly connected with the source of vacuum, as the label advances towards the application station. In this way, the label is retained onto the outer lateral surface.

[0014] When each label reaches the application station, the fluidic connection between the air ports and the vacuum source is interrupted, so that the labels can be released and wound onto the respective article.

[0015] In particular, each label typically lies on the outer lateral surface with its leading edge held on one leading pad and its trailing edge held on one trailing pad.

[0016] For this purpose, pads also are provided with air ports, and the distance between each pair of pads (namely the distance between each leading pad and each trailing pad, the latter arranged downstream of the leading pad with respect to the direction of rotation) is substantially equal to the length of the label to be processed.

[0017] Each pad is connected to the transfer drum by elastic means, such as springs, permitting a limited displacement of the pad itself in a direction transversal to the drum axis. In this way, each pad is damped when receiving and applying the labels. In practice, each pad

can oscillate about its idle position, substantially radially with respect to the drum axis.

[0018] Labeling machines of the above-described type may have, for productivity purposes, a plurality of labeling groups, for example two labeling groups, each one including a respective transfer drum feeding labels to alternate articles, respectively.

[0019] In this case, the arch-shaped path followed by the articles conveyed by the carousel comprises a number of application stations corresponding to the number of labeling groups, i.e. transfer drums. Moreover, the number of articles conveyed by the carousel is larger than the one in the single-drum configuration; this results in the distance between the articles to be reduced.

[0020] As a consequence, interference may occur between the label being transferred onto one article from one transfer drum, and the following article to be labeled by the other transfer drum.

[0021] This problem may become worse when using gluing labels, i.e. wherein the labels are first spread with glue prior to reach the application station, and then stuck directly onto the articles. In this situation, the article following the one being labeled, and interfering with the label being applied, may be contaminated with glue, so prejudicing the proper application of the label itself, or even being discharged at the end of the line.

[0022] Thus, a loss of articles and labels can occur.

[0023] Furthermore, these interference problems are particularly felt when operating articles having non-cylindrical shapes.

DISCLOSURE OF INVENTION

[0024] It is therefore an object of the present invention to provide a labeling machine, which is designed to overcome the above-mentioned drawback in a straightforward and low-cost manner.

[0025] This object is achieved by a labeling machine as claimed in claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic perspective view, with parts removed for clarity, of a labeling machine in accordance with the teachings of the present invention;

Figure 2a shows a schematic, larger-scale top view, with parts removed for clarity, of the labeling machine of Figure 1 in a particular operating condition;

Figure 2b shows a schematic, larger-scale top view, with parts removed for clarity, of the labeling machine of Figure 1 in another particular operating condition; Figure 3 shows a schematic, larger-scale top view, with parts removed for clarity, of one labeling group

of the labeling machine of Figure 1;

Figure 4 shows a schematic, larger-scale perspective view, with parts removed for clarity, of a label transfer drum of the labeling machine of Figure 1;

Figures 5 and 6 show schematic, larger-scale sections along line V-V of Figure 4, with parts removed for clarity and in different operating conditions;

Figure 7 shows a schematic, larger-scale top perspective view, with parts removed for clarity, of a detail of the label transfer drum of Figure 4; and Figure 8 shows a schematic top view, with parts removed for clarity, of a portion of a labeling machine in accordance with a different embodiment of the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

[0027] With reference to Figure 1, number 1 indicates as a whole a labeling machine configured to apply labels 2 onto articles 3, in the present case bottles, only schematically shown and presenting respective axes B. In this preferred embodiment, articles 3 present a circular cross-section and are suitable for being filled with pourable food products.

[0028] As a possible alternative not shown, articles 3 may be other types of containers.

[0029] Labeling machine 1 essentially comprises a carousel 4, rotating in use about a vertical axis A, configured to receive articles 3 to be labeled from respective input conveying means (known per se and not shown), advancing articles 3 along a horizontal arch-shaped path P, and transferring them, after being labeled, to respective output conveying means (also known per se and not shown).

[0030] Labeling machine 1 also comprises two or more labeling groups 5, 6, which are arranged at distinct angular position around the periphery of carousel 4 and are configured to feed labels 2 thereto.

[0031] Input and output conveying means typically consist of star wheels.

[0032] Carousel 4 presents a substantially circular shape, is coaxial to axis A and comprises a supporting fixed chassis 7, supported in turn on the floor basement by a plurality of legs 8; carousel 4 further comprises a rotating group 9 mounted on chassis 7 in a rotatable manner around axis A and provided with a plurality of peripheral operating units 10 configured to receive the corresponding articles 3 to be labeled, with their axes B parallel to axis A.

[0033] In particular, rotating group 9 essentially comprises an upper peripheral portion 11 delimited by a cylindrical wall 16a. Rotating group 9 further comprises a central portion 12 linked to peripheral portion 11 by means of a plurality of substantially radial arms 13 carrying, in a rotating manner, a shaft 14 coaxial to axis A.

[0034] More specifically, shaft 14 is configured to control the rotation movement around axis A of rotating group 9, in a manner known and not described in detail.

[0035] Rotating group 9 further includes a lower supporting structure 15 limited by a cylindrical wall 16b. Upper peripheral portion 11 and lower supporting structure 15 are fixed to shaft 14 in positions spaced from each other along the axis A itself, and define the plurality of peripheral operating units 10.

[0036] In particular, lower supporting structure 15 is provided, along path P, with a plurality of receiving elements 17a extending at evenly spaced angular positions around axis A and configured to coaxially receive respective bottom portions of articles 3. Similarly, upper peripheral portion 11 is provided with a plurality of retaining elements 17b extending at evenly spaced angular positions around axis A and configured to coaxially cooperate in a releasable manner with respective upper portions of articles 3.

[0037] Each receiving element 17a cooperates with the corresponding retaining element 17b in order to keep the relative article 3 in a stable position during its advancement along path P.

[0038] Therefore, each receiving element 17a defines together with the corresponding retaining element 17b the relative peripheral operating unit 10.

[0039] As visible in Figures 1, 2a and 2b, path P comprises:

- an input station I, at which carousel 4 is fed with articles 3 to be labeled;
- an output station O, at which carousel 4 outputs labeled articles 3; and
- two application stations K, which are interposed between input station I and output station O.

[0040] In particular, application stations K are defined by interaction of each labeling group 5, 6 with carousel 4 and path P.

[0041] As shown in Figures 1 and 3, labeling groups 5, 6 are identical to one another and each comprises:

- a pair of shafts 18 for rotatably supporting respective reels (not shown) off which a web (not shown) of labels 2 is unwound and fed along a feed path towards the relative application station K;
- a plurality of unwinding rollers 19 for guiding the web along the feed path;
- a cutting element 20 for cutting, one after the other, labels 2 from the respective web;
- a roller 21 for applying glue onto cut labels 2;
- a label transfer drum 22 rotatable about an axis C, parallel to axis A, and configured to transfer labels 2 along an arc-shaped path Q, having center on axis C, from an input station J to a transfer station H.

[0042] Since the labeling groups 5, 6 are identical to one another, only one of them, i.e. labeling group 5, is described in detail hereafter; it is clear that the same features described relative to labeling group 5 apply to the other labeling group 6.

[0043] As visible in Figure 4, drum 22 of labeling group 5 comprises a substantially toroidal body 23 externally delimited by an outer lateral surface 24, the latter retaining, in use and by suction, the labels 2 to be transferred.

[0044] Drum 22 is rotatably mounted on a stationary distribution member 29 of labeling group 5; distribution member 29 is of known type and is provided with air passages (not shown) and connected to a vacuum source (only schematically shown in Figure 1).

[0045] Outer lateral surface 24 has an approximately cylindrical configuration and is provided with a plurality of air ports 25, fluidly connected to the air passages of distribution member 29, configured to cooperate, in use, with labels 2.

[0046] In particular, outer lateral surface 24 comprises four first sections 24a equally spaced angularly from each other around axis C, and adapted to cooperate with respective labels 2 by means of suction through air ports 25.

[0047] It is pointed out that a different number of sections 24a can be provided depending on the capacity of the labeling machine 1 and mainly on the length of labels 2 to be processed, the minimum number of such sections 24a being one.

[0048] As shown in particular in Figures 4 and 7, each section 24a is delimited, at opposite angular ends, by a respective pair of pads 26, 27, i.e. by one leading pad 26 and one trailing pad 27, carried by drum 22.

[0049] In particular, each leading pad 26 is configured to cooperate, in use, with the leading edge of the respective label 2, while each trailing pad 27 is configured to cooperate, in use, with the trailing edge of the respective label 2.

[0050] For this purpose, also pads 26, 27 are provided with a plurality of air ports 25, fluidly communicating with the above-mentioned air passages of distribution member 29, and configured to retain labels 2 by means of suction.

[0051] In practice, pads 26, 27 define the zones of the periphery of drum 22 where the label transfers occur.

[0052] The distance between each leading pad 26 and the relative trailing pad 27 is, thus, substantially equal to the length of the label 2 to be processed.

[0053] Outer lateral surface 24 of drum 22 further comprises four second sections 24b which are equally spaced angularly from each other around axis C and are provided also with air ports 25. Each section 24b extends between two pair of pads 26, 27, acting in use on distinct labels 2, and is in a downstream relationship with one relative section 24a with respect to the direction of rotation, in use, of drum 22 around axis C.

[0054] Also in this case, it is pointed out that a different number of sections 24b can be provided depending on the capacity of the labeling machine 1 and mainly on the length of labels 2 to be processed, the minimum number being one.

[0055] Each section 24b has a smaller angular extension around axis C than the one of the relative section 24a and is configured to start to attract the relative label

2 at the input station J of the above-mentioned path Q, so that such label 2 is then received on the upstream section 24a and on the relative pads 26, 27.

[0056] In greater detail, air ports 25 of leading pad 26 of each section 24a are fluidly connected with the vacuum source in correspondence with input station J, so as to apply a suction on the leading edge of the respective label 2.

[0057] As each section 24a rotates about axis C from input station J to transfer station H, the respective air ports 25 of that specific section 24a, and of the relative trailing pad 27, become fluidly connected with the vacuum source, so as to progressively apply a suction on the remaining portion, and on the trailing edge, of the respective label 2.

[0058] In this way, each label 2 is advanced from input station J to transfer station H with its leading edge held on the relative leading pad 26 and its trailing edge held on the relative trailing pad 27.

[0059] When the respective label 2 reaches transfer station H, the fluidic connection between the relative air ports 25 and the vacuum source is interrupted. Thus, the respective label 2 is gradually released by drum 22 and transferred from transfer station H of path Q to the relative application station K of path P.

[0060] Furthermore, at transfer station H, air ports 25 eject an air jet on respective label 2 so as to ease the release of the label 2 itself.

[0061] In practice, for some prefixed angular positions of drum 22, a fluid connection is established between air passages and air ports 25. Thus, air is suctioned by means of the vacuum source so as to produce an attractive force on the relative label 2 towards outer lateral surface 24 of drum 22 where such air ports 25 are formed. The relative label 2 is, in this way, retained by drum 22.

[0062] For some other prefixed angular positions of drum 22, air ports 25 are fluidly disconnected from air passages and, therefore, from the vacuum source, so they do not exert any attractive force on the relative label 2.

[0063] Preferably, drum 22 is independently driven by a motor (not shown), such as a brushless motor or the like, or is driven by a motor (not shown) of labeling machine 1 through suitable gears or transmissions.

[0064] Body 23 of drum 22 presents a plurality of seats 30a, 30b (Figures 4 and 7) arranged angularly in a peripheral portion thereof.

[0065] According to this preferred embodiment, seats 30a, 30b present prismatic configurations, each delimited by two respective side walls 31a, 31b and a respective rear wall 32a, 32b, and each configured to house one respective pad 26, 27.

[0066] Preferably, each pad 26, 27 has a prismatic configuration so as to fit inside the respective seat 30a, 30b and is preferably formed of polymeric material.

[0067] In particular (Figure 7), each trailing pad 27 is delimited by a flat rear surface 28b which faces rear wall 32b of the corresponding seat 30b, and is further delimited

by two flat lateral surfaces 34b which respectively face side walls 31b of the corresponding seat 30b. Trailing pad 27 is also delimited by a front face 35b opposite to rear surface 28b, which is substantially parallel to outer lateral surface 24 and is configured to cooperate with the trailing edge of the respective label 2, in the manner described above.

[0068] Furthermore, each trailing pad 27 is mounted inside the respective seat 30b by means of elastic connecting means 36, configured to allow a small displacement of the trailing pad 27 itself, in a direction transversal to axis C. In practice, elastic means 36 act as dampers, as each trailing pad 27 can oscillate about its idle position, in a direction substantially radial with respect to axis C.

[0069] Each leading pad 26 is housed into one respective seat 30a of body 23 and comprises a front portion 38, designed to cooperate in use with the leading edge of a respective label 2, and a rear portion 39.

[0070] Advantageously, each leading pad 26 is movable between two positions:

- an operative position (Figures 2a and 5), in which the relative leading pad 26 protrudes from outer lateral surface 24, outwards from axis C, and feeds the respective label 2 to carousel 4 at application station K; and
- an idle position (Figures 2b and 6), in which the relative leading pad 26 is retracted towards axis C with respect to the operative position.

[0071] Preferably, the movement of each leading pad 26 between the above-described operative and idle positions is automatized by means of an interaction between a respective cam follower 42a, carried by rear portion 39 of the leading pad 26 itself, and a horizontal cam 40 fixed in correspondence with a central position inside the toroidal body 23 of drum 22.

[0072] In this configuration, cam 40 is mounted on distribution member 29 coaxially to axis C, and is stationary with respect to drum 22, while the latter rotates about the axis C itself.

[0073] In particular, cam 40 presents a substantially lobed circular profile, with a single lobe 50 protruding with respect to the circular profile and facing the corresponding application station K.

[0074] In practice, each leading pad 26 cooperates with cam 40 by means of the relative cam follower 42a, the latter being configured to roll onto the lateral surface of cam 40 so as to follow the lobed profile thereof.

[0075] In particular, each cam follower 42a is rotatably mounted on a respective pivot 41, which is carried by rear portion 39 of the respective leading pad 26.

[0076] Front portion 38 presents a configuration similar to that of each trailing pad 27: front portion 38 is delimited by a flat rear surface 28a, which faces rear wall 32a of the corresponding seat 30a, and is further delimited by two flat lateral surfaces 34a, which respectively face side walls 31a of the corresponding seat 30a. Front portion

38 of each leading pad 26 is also delimited by a front face 35a opposite to rear surface 28a, which is substantially parallel to outer lateral surface 24 and is configured to cooperate, in use, with the leading edge of the respective label 2.

[0077] Front portion 38 and rear portion 39 of each leading pad 26 are connected by two or more linking rods 43 (Figures 5 and 6).

[0078] In particular, each linking rod 43 engages a respective through hole 33 formed on rear wall 32a of the respective seat 30a and passing through a relative inwardly protruding radial portion 37 of body 23. Furthermore, each linking rod 43 carries an elastically deformable device 49, preferably a spring, configured to apply a restoring force on the respective cam follower 42a carried by pivot 41 of rear portion 39 of the respective leading pad 26.

[0079] Therefore, as shown in Figures 2a and 2b, when leading pad 26 approaches transfer station H, its rear portion 39 starts to move outwards from axis C, by means of the interaction between the relative cam follower 42a and lobe 50 of cam 40. As a consequence, front portion 38, linked to rear portion 39 by linking rods 43, and, thus, front face 35a, protrude from outer lateral surface 24 of drum 22. In this way, leading pad 26 moves toward the corresponding application station K of path P.

[0080] Preferably, front face 35a of each leading pad 26 protrudes from outer lateral surface 24, in correspondence with transfer station H, by a prefixed distance ranging between 8 and 12 mm, and preferably set at 10 mm.

[0081] As visible in Figure 7, front face 35a of each leading pad 26 presents a beveling 45 formed on a trailing edge 46 thereof and configured to engage the leading edge of the respective label 2 in order to avoid a stretching of the same when the relative leading pad 26 is in the operative position. In the idle position, front face 35a is substantially aligned with outer lateral surface 24.

[0082] According to this preferred embodiment, each drum 22 is positioned with respect to carousel 4 so that a given gap is defined between the peripheries thereof.

[0083] In greater detail, outer lateral surface 24 of the drum 22 presents a gap with respect to the lateral surface of the respective article 3 to be labeled, in correspondence with the relative application station K, so as to maintain a substantial tangency between front face 35a of the respective leading pad 26 in the operative position and the lateral surface of the respective article 3 to be labeled, i.e. substantial tangency between path Q and path P.

[0084] Preferably, the above-mentioned gap is substantially equal to the linear distance between front face 35a of the respective leading pad 26 and outer lateral surface 24, when such leading pad 26 is in the operative position.

[0085] As shown in Figure 4, labeling group 5 further comprises a horizontal recovery cam 44 mounted onto cam 40 coaxially to axis C and configured to cooperate with a cam follower 42b rotatably mounted on pivot 41 of rear portion 39 of the respective leading pad 26, in

case the latter is blocked in the operative position, thus forcing it back to the idle position.

[0086] Recovery cam 44 is therefore stationary with respect to drum 22, while the latter rotates about axis C.

[0087] In particular, recovery cam 44 comprises an annular sector 52 mounted coaxially onto cam 40 by means of a plurality of uprights 51. In greater detail, annular sector 52 presents, in correspondence with its outer periphery, a protruding edge 53 which protrudes towards cam 40, and is configured to cooperate in rolling manner with cam follower 42b.

[0088] The operation of labelling machine 1 is described hereafter, with reference to one single article 3 advanced by carousel 4, and one single label 2 to be applied on such article 3 by labeling group 5.

[0089] Prior to reaching application station K, the label 2 is retained on the respective section 24a of drum 22, by means of suction through air ports 25, and has its trailing edge and leading edge respectively superimposed onto trailing pad 27 and leading pad 26.

[0090] In this position, leading pad 26 is in idle position and has its front face 35a substantially aligned with outer lateral surface 24 of the respective drum 22.

[0091] In the meantime, the article 3 moves towards the application station K relative to labeling group 5 and the respective drum 22 of labeling group 5 rotates about its own axis C.

[0092] As drum 22 rotates, leading pad 26 starts to protrude from the respective outer lateral surface 24, thanks to the interaction of cam follower 42a with the respective cam 40. Eventually, leading pad 26 reaches the operative position at transfer station H of the respective path Q, where its front face 35a is at maximum linear distance from outer lateral surface 24. At this point, leading pad 26 contacts the lateral surface of the article 3 in correspondence with the application station K; the relative label 2 is thus unwound from the drum 22 and applied completely on the article 3, as the relative trailing pad 27 transfers the trailing edge of the label 2 onto the article 3 itself.

[0093] Then, leading pad 26 starts to retract due to the particular profile of cam 40, until it reaches again the idle position, in which the initial condition of the drum 22 is re-established.

[0094] It is specified that the whole above-described process described for drum 22 of labeling group 5 is repeated for drum 22 of labeling group 6 relative to the article 3 following the article 3 already labeled by labeling group 5.

[0095] In normal condition of operation, every pair of adjacent articles 3 conveyed by carousel 4 is labeled alternatively by labeling group 5 and 6 in a cyclic manner.

[0096] According to another preferred embodiment, labelling machine 1 is configured to apply labels 2 onto articles 3, in the present case bottles, presenting respective axes B and having a non-circular cross-sections.

[0097] In particular, Figure 8 shows articles 3 with a substantially squared cross-section, presenting four

rounded vertices 48.

[0098] In this case, the contact point between front face 35a of the respective leading pad 26 and the relative article 3 during the application of the relative label 2, is arranged in correspondence with one pre-established vertex 48 among the above-mentioned rounded vertices 48.

[0099] In this way, tangency between front face 35a of the respective leading pad 26, which is applying the relative label 2, and the lateral surface of the respective article 3 to be labeled, is maintained, i.e. substantial tangency between path Q and path P is maintained.

[0100] The advantages of labeling machine 1 according to the present invention will be clear from the foregoing description.

[0101] In particular, the protruding of each leading pad 26 of the respective drum 22 at transfer station H during its movement from the idle position to the operative position, along with the gap between outer lateral surface 24 and the lateral surface of the respective article 3 to be labeled, cause the relative label 2 to change its inclination angle with respect to axis C, when being applied on the respective article 3 to be labeled.

[0102] As a result, the relative label 2 applied by the respective drum 22 does not interfere with the following article 3 to be labeled by the other drum 22, avoiding a contamination thereof with glue, or label 2 not being applied properly, and therefore avoiding a loss of articles 3 and labels 2.

[0103] Clearly, changes may be made to labeling machine 1 as described herein without, however, departing from the scope of protection as defined in the accompanying claims. In particular, labeling machine 1 may also comprise one single labeling group.

[0104] In addition, cam 40 and cam follower 42a may be replaced by other types of actuators, such as linear motors, servomotors, etc.

Claims

1. A labeling machine (1) comprising:

- a carousel (4) in use rotating about a first axis (A) and conveying a plurality of articles (3), along a given path (P); and
- at least one labeling group (5, 6) arranged peripherally with respect to said carousel (4) and comprising a transfer drum (22);

said transfer drum (22) being rotatable about a second axis (C), parallel to said first axis (A), and being configured to receive labels (2) on its outer lateral surface (24) and to feed them to said carousel (4) at an application station (K); said transfer drum (22) carrying at least one leading pad (26) configured to cooperate, in use, with a leading portion of one respective label (2), and at least one trailing pad (27)

configured to cooperate, in use, with a trailing portion of said one respective label (2);

characterized in that said at least one leading pad (26) is movable between an operative position, in which said leading pad (26) protrudes from said outer lateral surface (24), outwardly from axis C, and feeds said one respective label (2) to said carousel (4) at application station (K); and an idle position, in which said leading pad (26) is retracted towards said second axis (C) with respect to said operative position.

2. The labeling machine as claimed in claim 1, wherein said labeling group (5, 6) further comprises actuator means (40, 42a) configured to move said leading pad (26) between said operative and said idle positions.
3. The labeling machine as claimed in claim 2, wherein said actuator means comprise a fixed cam (40) and a cam follower (42a) carried by said leading pad (26) and configured to cooperate, in use, with said cam (40) to control the movement of said leading pad (26) between said operative and idle positions.
4. The labeling machine as claimed in claim 3, wherein said cam has an operative portion (50) configured to move said leading pad (26) to said operative position; said operative portion (50) facing said application station (K).
5. The labeling machine as claimed in claim 4, wherein said drum (22) comprises a substantially toroidal body (23) externally delimited by said outer lateral surface (24); said cam (40) being positioned inside said toroidal body (23); said operative portion being defined by a lobe (50) of said cam (40).
6. The labeling machine as claimed in any one of the foregoing claims, wherein said outer lateral surface (24) of said transfer drum (22) presents a gap with respect to the lateral surface of the respective article (3) to be labeled, at said application station (K).
7. The labeling machine as claimed in any one of the foregoing claims, **characterized in that** said leading pad (26) presents a front face (35a); said front face (35a) being substantially aligned with said outer lateral surface (24), when said leading pad (26) is in said idle position; said front face (35a) being substantially tangent to the lateral surface of the respective article (3) to be labeled, when said article (3) and said leading pad (26) are at said application station (K), and when said leading pad (26) is in said operative position.
8. The labeling machine as claimed in claim 7, wherein said gap between said outer lateral surface (24) of said transfer drum (22) and the lateral surface of the

respective article (3) to be labeled is substantially equal to the linear distance between said front face (35a) of said leading pad (26) and said outer lateral surface (24), when said article (3) and said leading pad (26) are at said application station (K), and when said leading pad (26) is in said operative position. 5

9. The labeling machine as claimed in claims 7 or 8, wherein said gap ranges between 8 mm and 12 mm, and is preferably set as 10 mm. 10

10. The labeling machine as claimed in claims from 7 to 9, wherein said front face (35a) presents a beveling (45) formed on a trailing edge (46) of the leading pad (26) and configured to engage said leading portion of said respective label (2). 15

11. The labeling machine as claimed in claims from 2 to 10, wherein said labeling group (5, 6) is provided with a recovery cam (44); said leading pad (26) carrying a further cam follower (42b) configured to cooperate in rolling manner with said cam (44) to bring back said leading pad (26) to the idle position, in case said leading pad (26) is blocked in the operative position. 20 25

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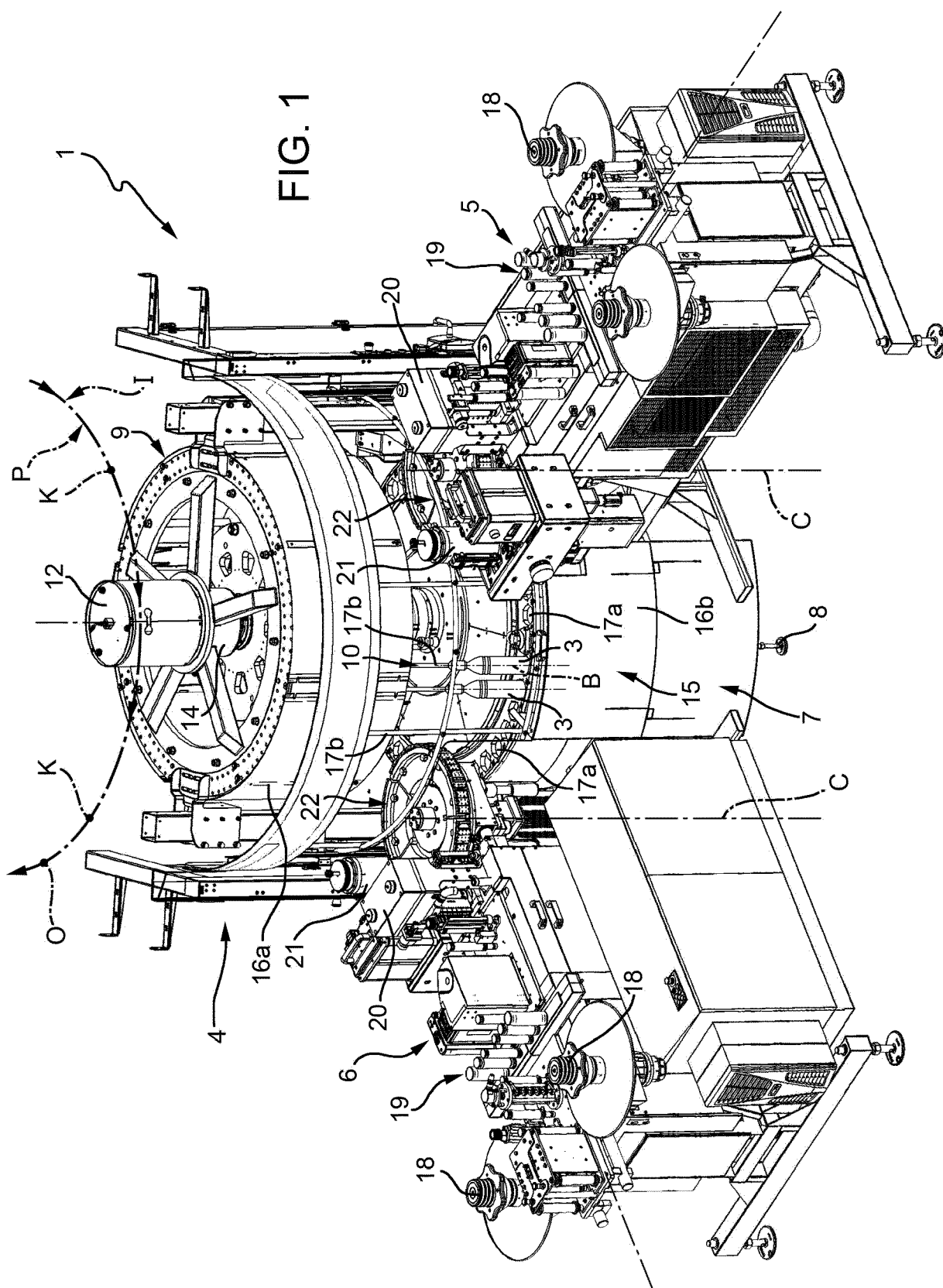
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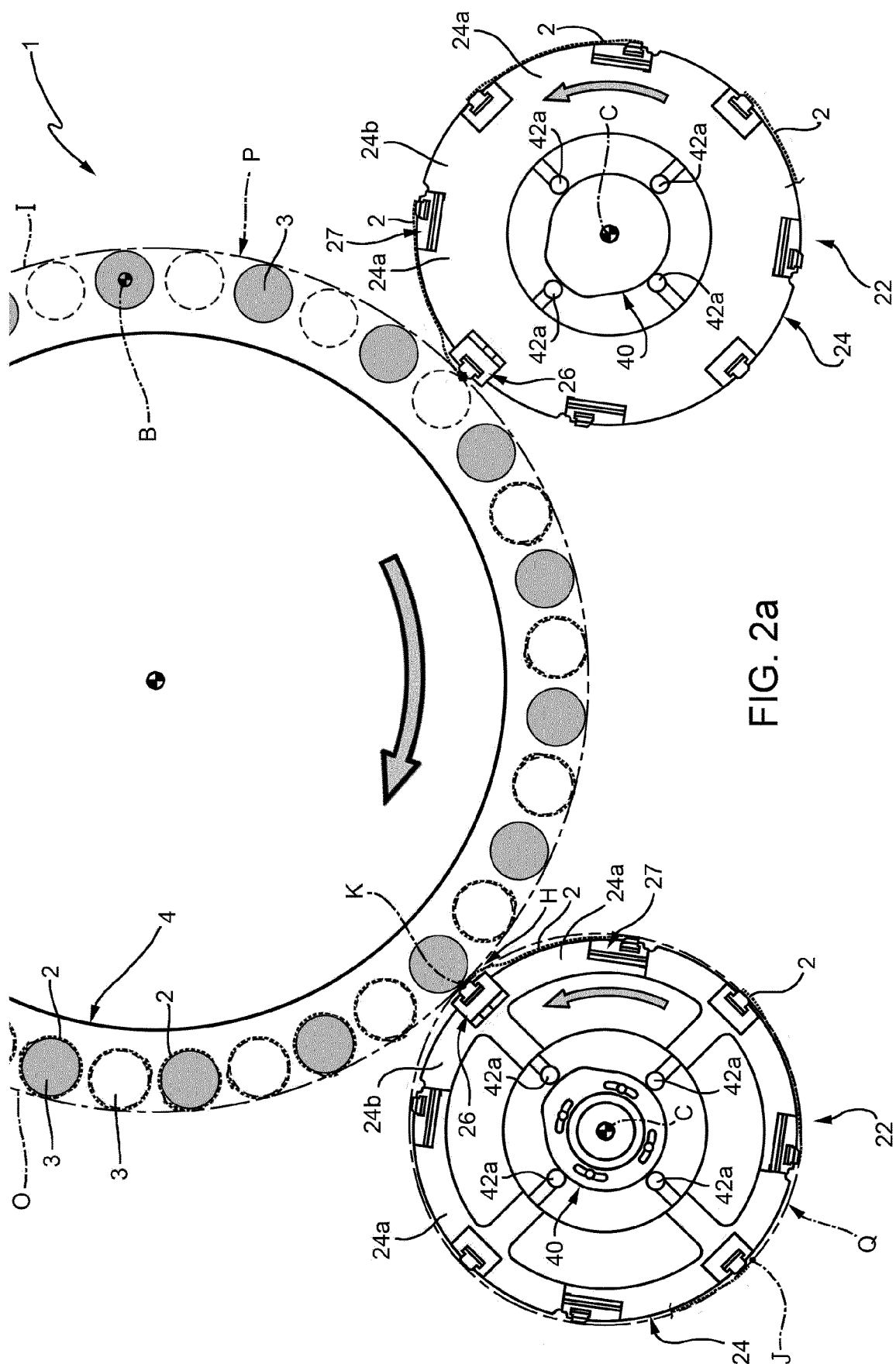
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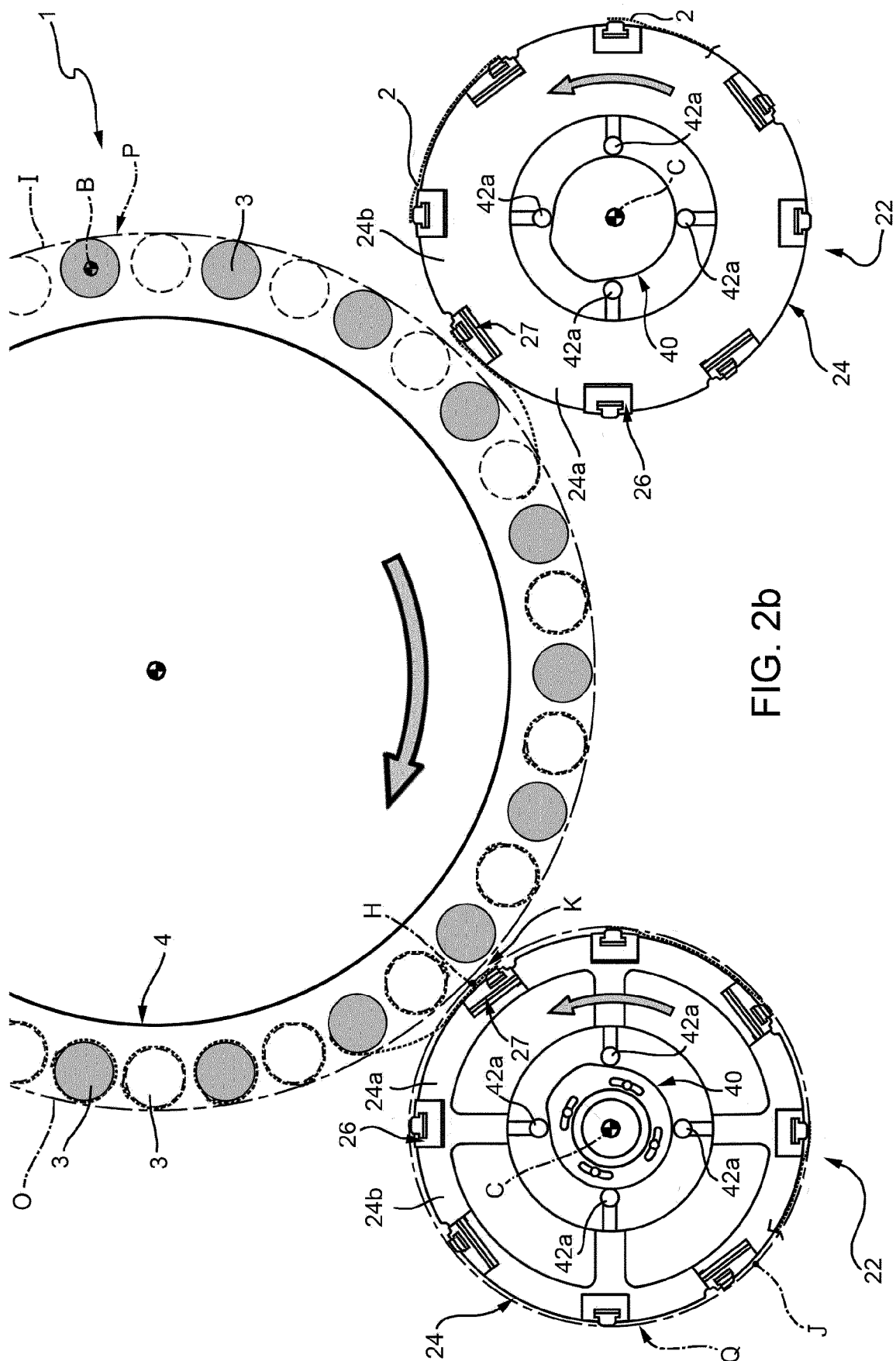
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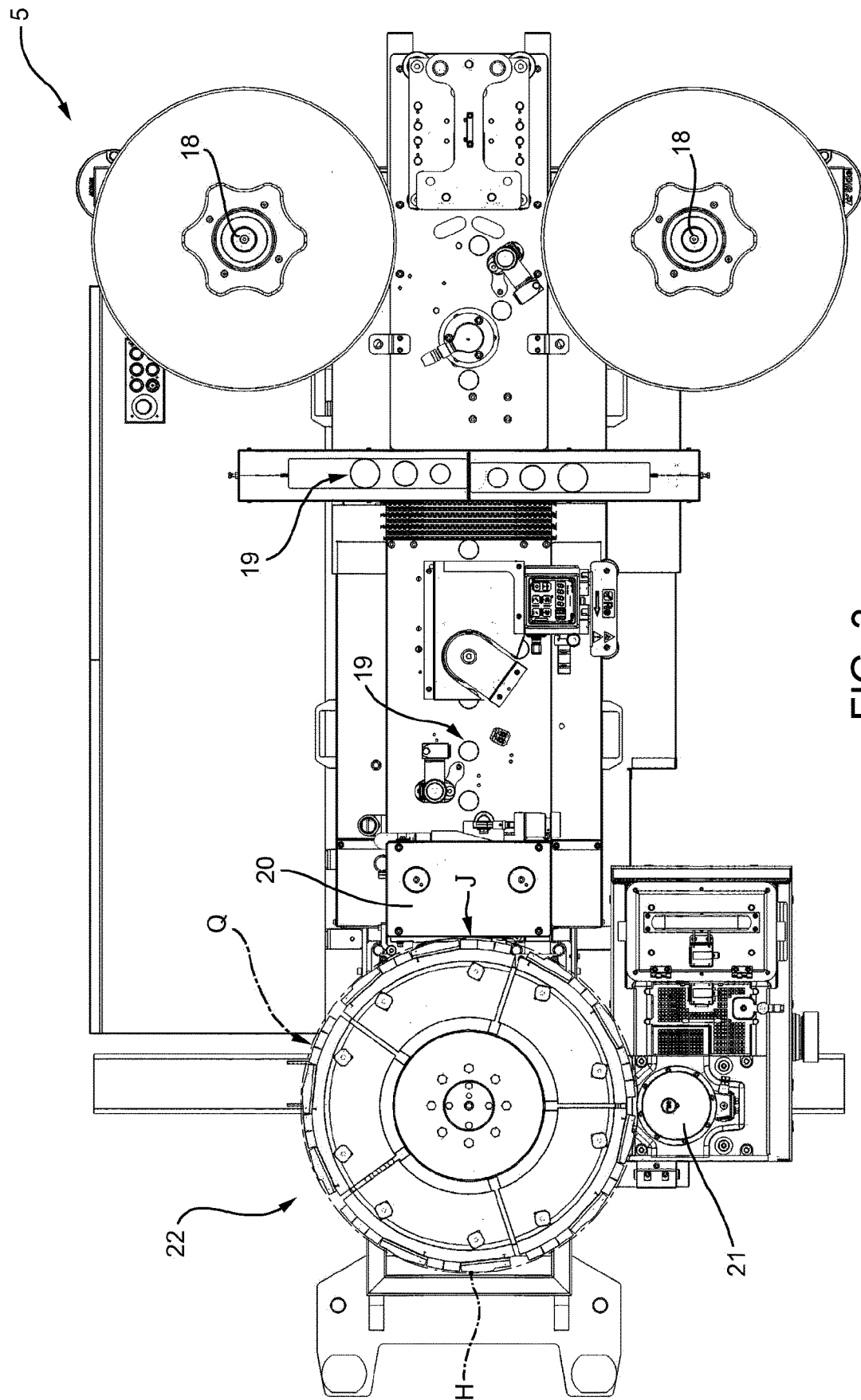
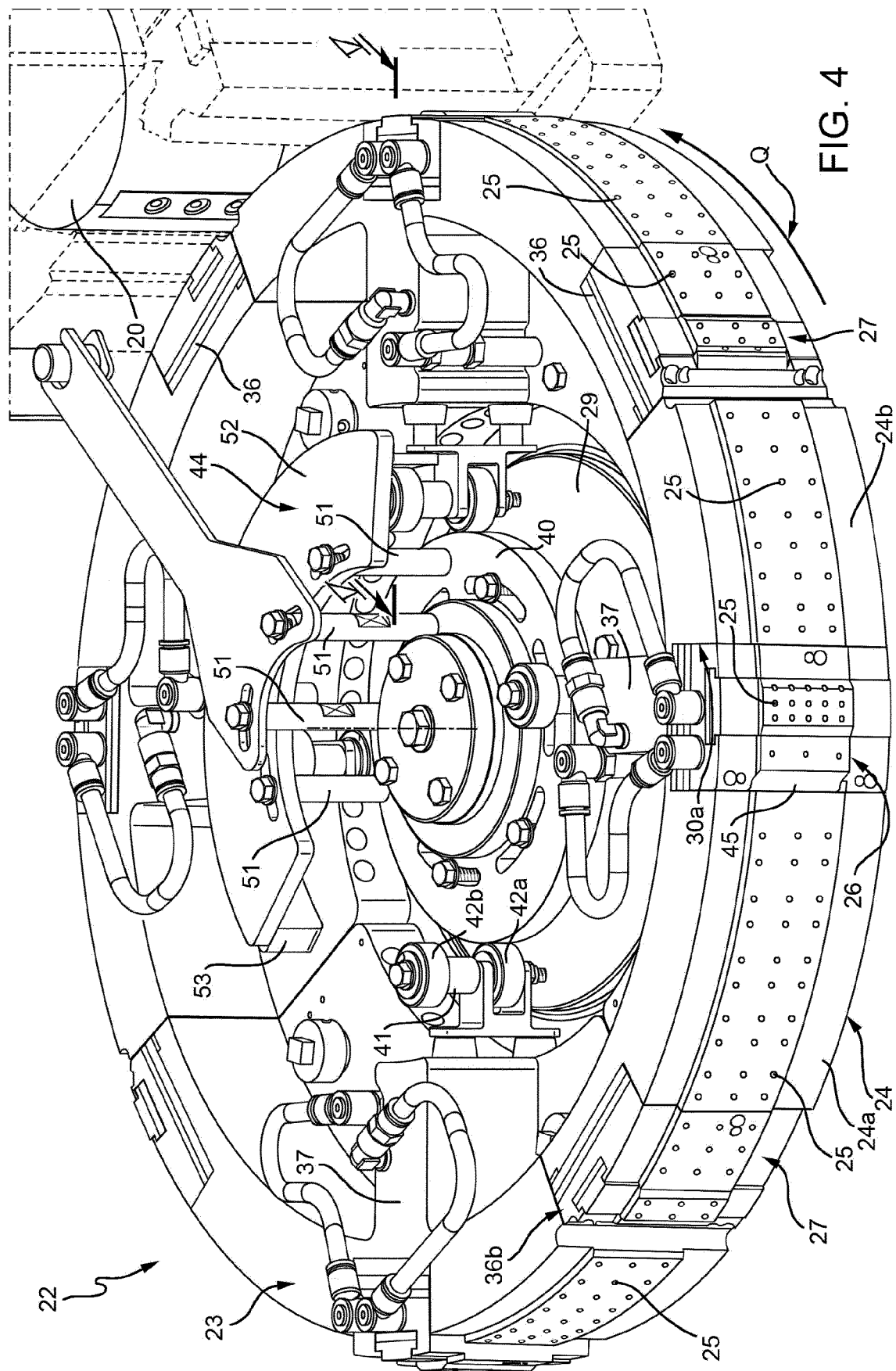
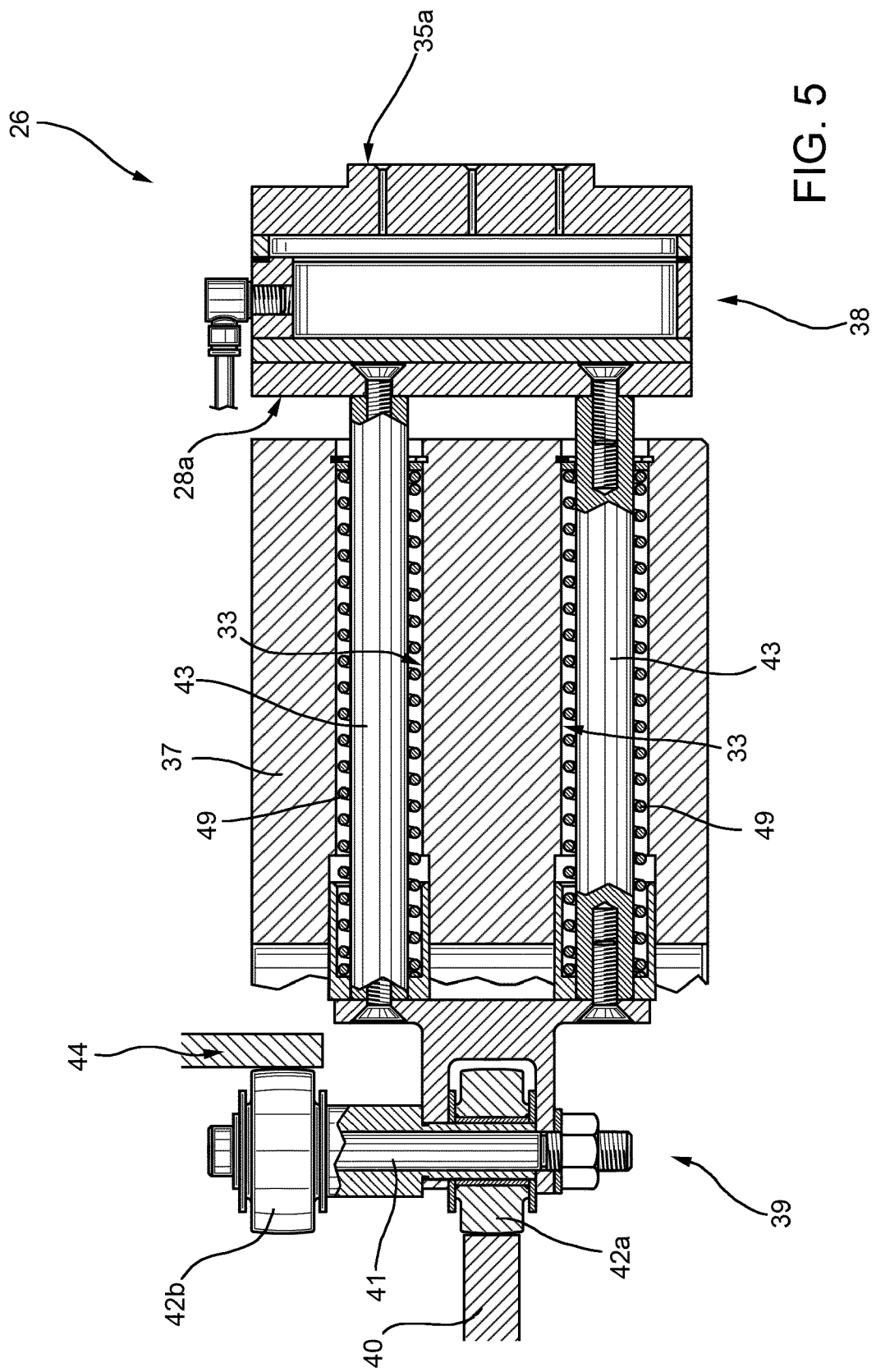
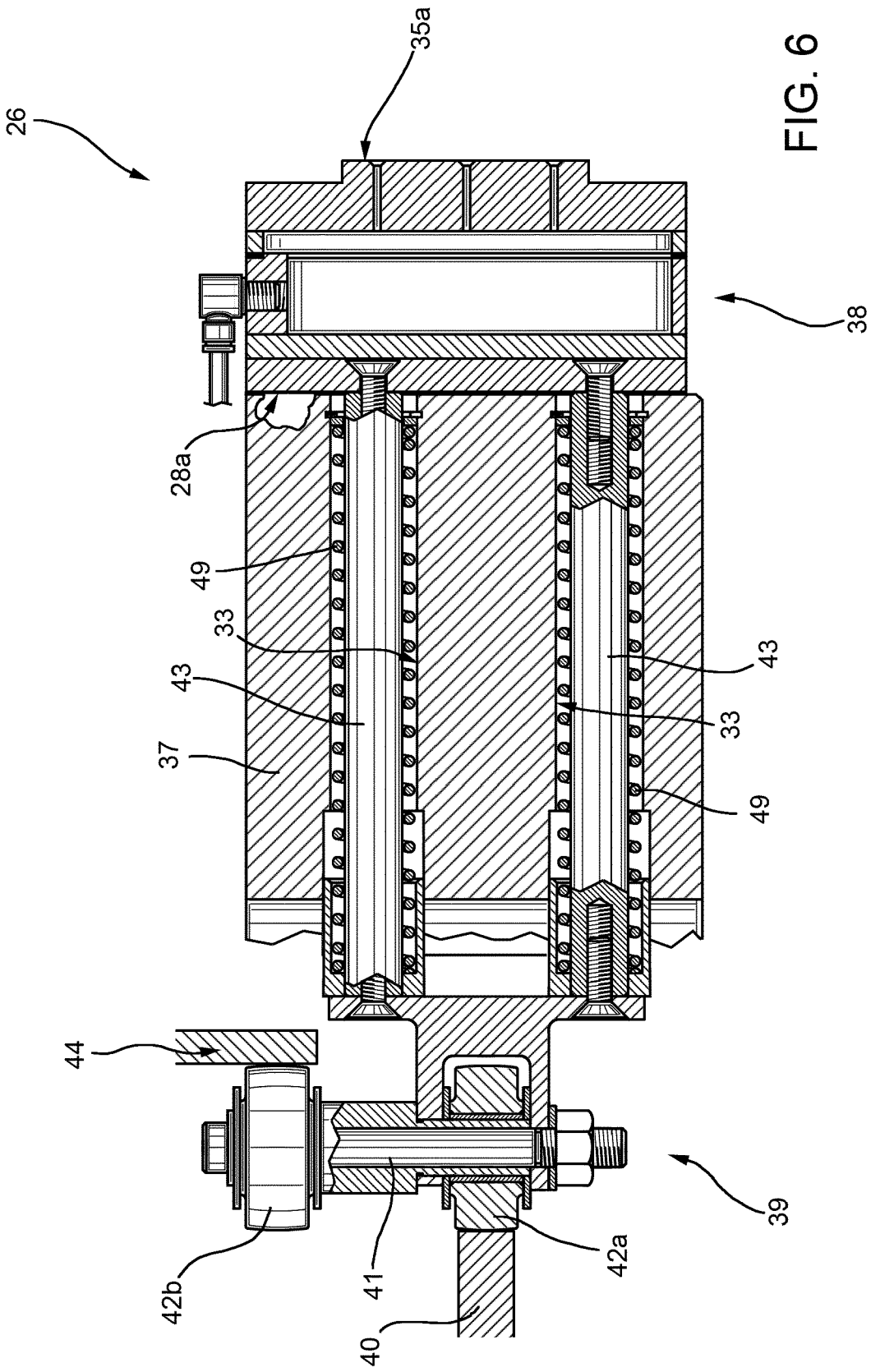


FIG. 3







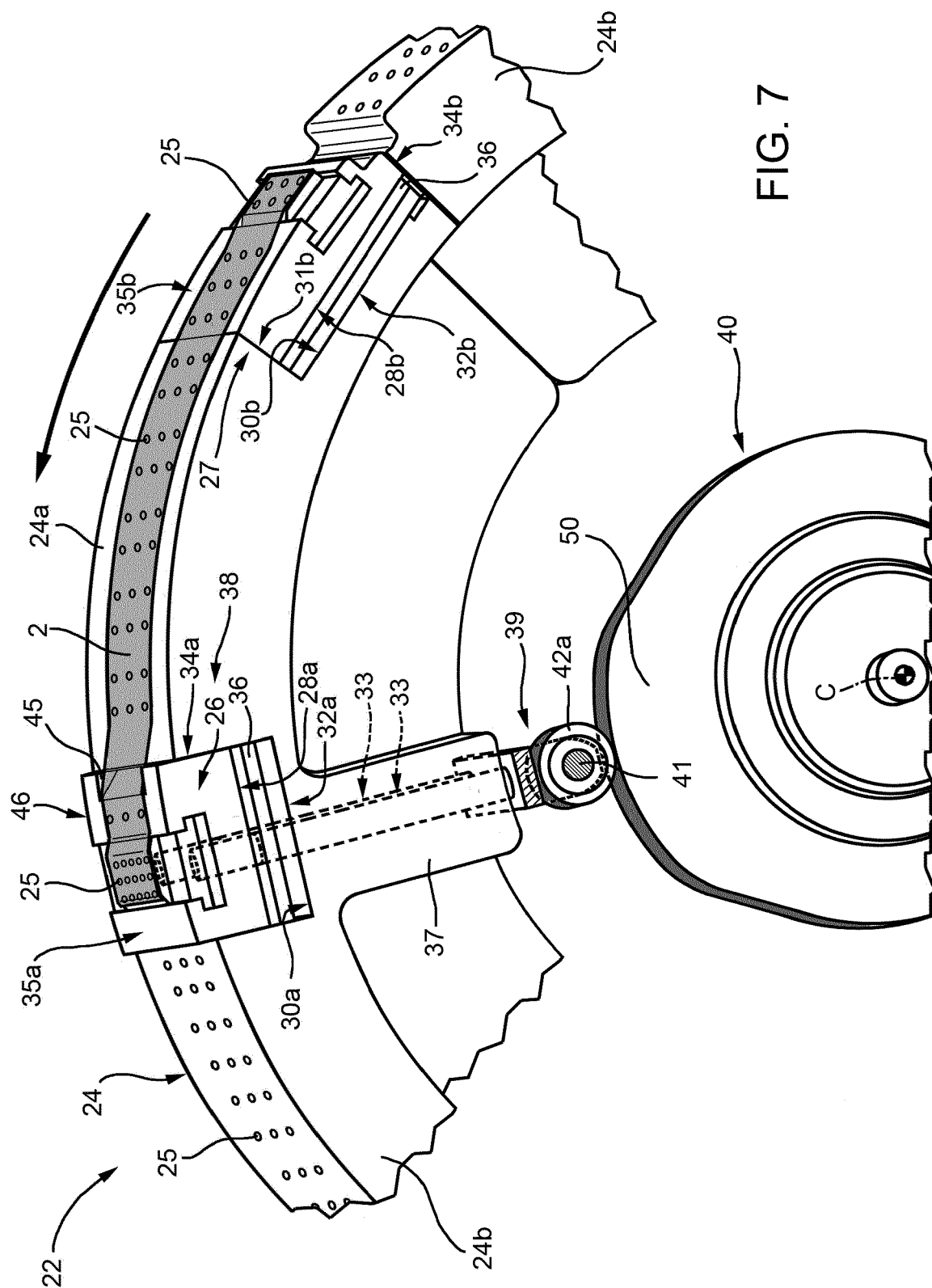


FIG. 7

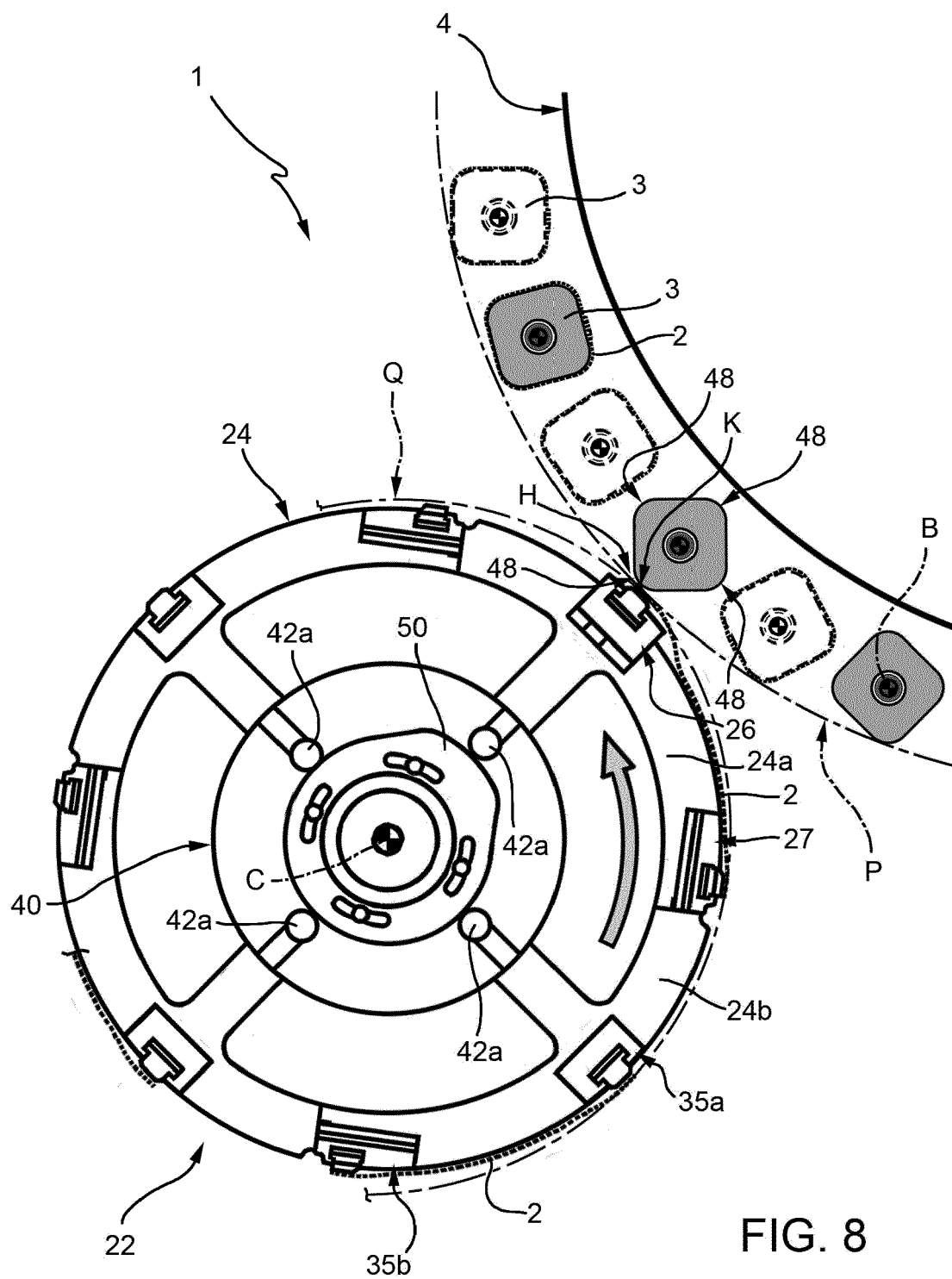


FIG. 8



EUROPEAN SEARCH REPORT

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 February 2018	Examiner Wartenhorst, Frank
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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The members are as contained in the European Patent Office EDP file on
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13-02-2018

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