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(54) **A UNIT FOR APPLYING A LABEL ON A RELATIVE ARTICLE**

EINHEIT ZUM ANBRINGEN EINES ETIKETTS AUF EINEM ENTSPRECHENDEN ARTIKEL

UNITÉ DESTINÉE À APPLIQUER UNE ÉTIQUETTE SUR UN ARTICLE ASSOCIÉ

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Description

TECHNICAL FIELD

[0001] The present invention relates to a unit for applying a label on a relative article according to the preamble of claim 1. More particularly, the invention refers to a unit for applying a label made from heat-shrinking film on a bottle - or other generic container - which the following description will refer to, although this is in no way intended to limit the scope of protection as defined by the accompanying claims.

BACKGROUND ART

[0002] As it is generally known, labelling machines are used to apply labels to containers or articles of all sorts. Typically used with beverage bottles or vessels 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 opposite vertical edges thereof overlap one another; and
- welding the overlapped edges of each cylindrically configured label.

[0003] A particular type of labelling machine is known which serves to bend and weld labels in a tubular configuration and to produce insertion of containers into the thus formed tubular labels. This type of machine basically comprises a carousel rotating about a vertical axis to define a circular path, along which a succession of unlabelled containers is received. Furthermore, this machine is designed to receive a corresponding succession of rectangular or square labels from respective input wheels; to produce application of the labels in a tubular configuration onto respective containers; and to release the labelled containers to an output wheel.

[0004] More specifically, the carousel comprises a number of labelling units which are equally spaced about the rotation axis, are mounted along a peripheral edge of the carousel and are moved by the latter along the above-mentioned circular path.

[0005] Each labelling unit comprises a bottom supporting assembly adapted to support the bottom wall of a relative container and an upper retainer adapted to cooperate with the top portion of such container to hold it in a vertical position as the carousel rotates about the vertical axis.

[0006] Each supporting assembly comprises a vertical hollow supporting mount, secured to a horizontal plane of a rotary frame of the carousel, and a cylindrical movable member, engaging the supporting mount in sliding and rotating manner with respect to its axis, and adapted to carry a relative container on its top surface and a relative label on its lateral surface.

[0007] Each movable member can be displaced between a raised position and a fully retracted position within the relative supporting mount.

[0008] In the raised position, each movable member protrudes from a top surface of the relative supporting mount and is adapted to receive a relative label on its lateral surface from the label input wheel; in particular the label is wrapped around the movable member such that opposite vertical edges of the label overlap one another.

[0009] In order to produce this complete wrapping, the movable member is rotated about its axis during the transfer of the label from the label input wheel.

[0010] In the fully retracted position, which is reached at the container input and output wheels, the top surface of each movable member is flush with the top surface of the supporting mount so that containers are transferred onto and from the carousel along the same transfer plane.

[0011] After welding of the overlapped edges of a tubular label, the displacement of the relative movable member from the raised position to the fully retracted position produces the insertion of the relative container inside the label, making the thus obtained labeled container ready to be transferred to the output wheel.

[0012] To summarize, as the carousel rotates about the vertical axis, in different operative steps of the labelling machine each movable member is:

- axially displaced from the fully retracted position to the raised position, after a container has been transferred to (i.e. fed into) the relative labelling unit;
- rotated about its axis to receive a relative label from the label input wheel and to allow bending of said label into the desired cylindrical or tubular configuration; and
- axially displaced from the raised position to the fully retracted position to allow insertion of the container within the label welded in the tubular configuration.

[0013] Currently, the rotational movement of each movable member is controlled by an electric motor, whilst the translational motion of said movable member is obtained through use of a cam having a given profile.

[0014] This solution has the drawback that the cam profile needs to be changed every time the height of the processed labels varies, which results in high costs and long replacement times.

[0015] WO 2010/040337 discloses a labelling unit as defined in the preamble of claim 1.

DISCLOSURE OF INVENTION

[0016] It is an object of the present invention to provide a labelling unit which makes it possible to overcome the above drawback in straightforward and inexpensive fashion.

[0017] This object is achieved by a labelling unit as

claimed in claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] A non-limiting embodiment of the present invention will be described in the following by way of example and with reference to the accompanying drawings, in which:

Figure 1 shows a schematic plan view, with parts removed for clarity, of a labelling machine provided with a plurality of labelling units in accordance with the teachings of the present invention;

Figures 2 and 3 show larger-scale views in perspective of some labelling units of the Figure 1 labelling machine in proximity of a label transfer station;

Figures 4 and 5 show a larger-scale sectional view in perspective of a detail of a labelling unit according to the present invention in two different operative conditions; and

Figure 6 shows a larger-scale view in perspective, with parts removed for clarity, of another detail of the labelling unit of Figures 1 to 5.

BEST MODE FOR CARRYING OUT THE INVENTION

[0019] Number 1 in Figure 1 indicates as a whole a labelling machine for applying labels 2 (Figures 2 and 3) to respective articles or more specifically containers, particularly bottles 3, each of which (Figures 1 to 3) has a given longitudinal axis A, is bonded at the bottom by a bottom wall 4 substantially perpendicular to axis A, and has a top neck 5 substantially coaxial with axis A.

[0020] Machine 1 comprises a conveying device that serves to bend and weld labels 2 in a tubular configuration (Figure 3) and to produce insertion of bottles 3 into the so formed tubular labels 2.

[0021] In the preferred embodiment as illustrated in the Figures, the conveying device comprises a carousel 7, which is mounted to rotate continuously (anticlockwise in Figure 1) about a respective vertical axis B perpendicular to the plane of Figure 1.

[0022] The carousel 7 receives a succession of unlabelled bottles 3 from an input wheel 8, which cooperates with carousel 7 at a first transfer station 9 and is mounted to rotate continuously (clockwise in Figure 1) about a respective longitudinal axis C parallel to axis B.

[0023] The carousel 7 also receives a succession of rectangular or square labels 2 from an input drum 10, which cooperates with carousel 7 at a second transfer station 11 and is mounted to rotate continuously about a respective longitudinal axis D parallel to axes B and C.

[0024] The carousel 7 releases a succession of labelled bottles 3 to an output wheel 12, which cooperates with carousel 7 at a third transfer station 13 and is mounted to rotate continuously (clockwise in Figure 1) about a respective longitudinal axis E parallel to axes B, C and D.

[0025] As shown in Figure 1, transfer station 11 is arranged, along path P, downstream from transfer station 9 and upstream from transfer station 13.

[0026] The carousel 7 comprises a number of operating or labelling units 15, which are equally spaced about axis B, are mounted along a peripheral edge of carousel 7, and are moved by carousel 7 along a circular path P extending about axis B and through transfer stations 9, 11 and 13.

[0027] With reference to Figures 2 to 6, the units 15 are secured to a horizontal rotary table 14 of carousel 7, have respective axes F parallel to axes B, C, D, E and extend coaxially through respective holes 16 of the rotary table 14 and on both sides of such table.

[0028] Each unit 15 is adapted to receive a relative bottle 3 from input wheel 8 in a vertical position, i.e. coaxially with the relative axis F, and to hold said bottle 3 in such position along path P from transfer station 9 to transfer station 13.

[0029] Units 15 being all identical to each other, only one of them is described herebelow for the sake of simplicity and clarity; it shall be apparent that the features described hereafter with reference to one labelling unit 15 are common to all of them.

[0030] In particular, labelling unit 15 comprises, above the rotary table 14 of carousel 7, a supporting assembly 17 adapted to support the bottom wall 4 of a relative bottle 3 and an upper retainer 18 adapted to cooperate with the top neck 5 of the bottle 3.

[0031] In particular, supporting assembly 17 comprises:

- a hollow supporting mount 20 of axis F, which is secured to a top surface of rotary table 14 around the relative hole; and
- a cylindrical movable member 22, engaging the supporting mount 20 in sliding and rotating fashion with respect to axis F, and adapted to carry coaxially a relative bottle 3 on its top end 23 and a relative label 2 on its lateral surface 24.

[0032] More specifically, the bottle 3 rests on a support plate 21 (only dimly visible in Figures 2 and 3), which is carried by top end 23 of movable member 22 through interposition of a relative bearing (not visible), so as to be rotatably independent of movable member 22. Thus, rotational movements of movable member 22 around axis F are not transmitted to the bottle 3.

[0033] Movable member 22 can be moved along axis F between a fully retracted position within the relative supporting mount 20 and a raised position (Figures 2 and 3).

[0034] In the fully retracted position, movable member 22 is completely housed within the relative supporting mount 20 so that support plate 21 is flush with a top surface 25 of the supporting mount 20.

[0035] In the raised position, movable member 22 protrudes from the top surface 25 of the supporting mount 20 and is adapted to receive, on its lateral surface 24, a

relative label 2 from input drum 10.

[0036] More specifically labels 2 are cut in a known manner from a web 26 (Figure 1) by a cutting device 27 (only schematically shown in Figure 1) and fed to input drum 10 to be then transferred to the relative movable members 22 in the raised position.

[0037] As shown in Figures 2 and 3, the cut labels 2 are retained on a lateral surface 30 of input drum 10 by suction; in fact, the lateral surface 30 of input drum 10 is divided into a given number - three in the embodiment shown - of suction regions 31, which are equally spaced about axis D, are each provided with a plurality of through holes 32 connected to a pneumatic suction device (known per se and not shown) and are adapted to cooperate with respective labels 2.

[0038] In a completely analogous manner, the lateral surface 24 of the movable member 22 is provided with a plurality of through holes 33, in turn connected to a pneumatic suction device (known per se and not shown) so as to retain the relative label 2 by suction.

[0039] At the transfer station 11, movable member 22 can be rotated about the relative axis F in order to produce the complete wrapping of the relative label 2, coming from input drum 10, on lateral surface 24. More specifically, each label 2, fed by input drum 10, is wrapped around the relative movable member 22 in the raised position so as to form a cylinder with opposite vertical edges 34 overlapping one another.

[0040] To summarize, while being advanced along path P with the other components of unit 15, movable member 22 is subjected to distinct movements in different operative steps of the labelling machine 1:

- a displacement along axis F from the fully retracted position to the raised position, after a bottle 3 has been transferred to unit 15;
- a rotational movement about axis F to receive a relative label 2 from input drum 10 and to allow bending of said label in the cylindrical/tubular configuration; and
- a displacement from the raised position to the fully retracted position to allow insertion of the bottle 3 within the label 2 welded in the tubular configuration.

[0041] All the above distinct movements are obtained basically through an electric motor 35 (Figure 6), carried by the rotary table 14, and a driving shaft 36 coaxially coupled to the movable member 22 and actuated by the motor 35.

[0042] In particular, motor 35 is arranged underneath rotary table 14 and is secured to a bottom surface of the rotary table 14 through the interposition of a further hollow supporting mount 38 of axis F. More specifically, the supporting mount 38 has one end 39 secured to the bottom surface of the rotary table 14 around the relative hole 16 and coaxially with supporting mount 20, and an opposite end 40, from which motor 35 coaxially projects downwards.

[0043] As shown in Figures 4 to 6, driving shaft 36 extends coaxially through motor 35, supporting mounts 20, 38 and hole 16 of rotary table 14; more specifically, driving shaft 36 is angularly and axially fastened to movable member 22, is angularly coupled to motor 35 and is supported by such motor 35 in an axially free manner.

[0044] More particularly, unit 15 comprises first transmission means 90 for angularly coupling motor 35 and driving shaft 36.

[0045] As shown in greater detail in Figures 4 and 5, driving shaft 36 comprises a screw portion 43 which is defined by an externally threaded surface 45 provided on a longitudinal region of driving shaft 36. Furthermore, driving shaft 36 has (see, in particular, Figure 6) a plurality of longitudinal grooves 91 provided on the externally threaded surface 45 and extending at least over the whole of said screw portion 43.

[0046] Preferably, grooves 91 are angularly equally spaced about the axis of driving shaft 36. By way of example, in the embodiment shown in the accompanying Figures, driving shaft 36 comprises three longitudinal grooves 91 spaced apart from one another of 120°.

[0047] First transmission means 90 are axially fixed relative to rotary table 14 through supporting mount 38, whilst being at a time rotatable relative to axis F of supporting mount 38. More particularly, first transmission means 90 comprise a collet 92 internally provided with a plurality of ribs (not shown) for engaging and cooperating with the relative longitudinal grooves 91 of driving shaft 36.

[0048] It shall be apparent that the ribs shall also preferably be angularly equally spaced about the axis of collet 92 and in a number corresponding to the number of longitudinal grooves 91.

[0049] At its bottom end, collet 92 is fastened, e.g. releasably, to the rotor of motor 35. At its top end, collet 92 is likewise releasably fastened to an axial coupling portion 93 of first transmission means 90. The axial coupling portion 93 is rotatable over a corresponding first axial coupling portion 38a of supporting mount 38.

[0050] Advantageously, first transmission means 90 are radially fixed with respect to supporting mount 38 and, consequently, to rotary table 14.

[0051] Advantageously, the unit 15 further comprises second transmission means 41, which can be selectively actuated to transform the rotational movement imparted by motor 35 to driving shaft 36 in a resulting movement of the relative movable member 22 having a translational component along axis F, said second transmission means 41 being radially fixed with respect to the supporting mount 38 and, consequently, to rotary table 14.

[0052] More particularly, the second transmission means 41 are movable between a first axial position wherein they are kinematically integral with the first transmission means 90 and a second axial position wherein they are kinematically independent of the first transmission means 90 and integral with supporting mount 38 and, consequently, with rotary table 14.

[0053] With reference to Figures 4 and 5, second transmission means 41 comprise a tubular lead screw member 42, which internally engages with the screw portion 43 of driving shaft 36.

[0054] Furthermore, second transmission means 41 comprise an axial coupling portion 94 to which lead screw member 41 is directly or indirectly releasably fastened. The axial coupling portion 94 is rotatable over a corresponding second axial coupling portion 38b of supporting mount 38.

[0055] In particular, the axial coupling portion 94 of second transmission means 41 is arranged between the second axial coupling portion 38b and the axial coupling portion 93 of first transmission means 90.

[0056] In practice, in the embodiment shown in the Figures, second transmission means 41 are movable between a first axial position wherein they are kinematically integral with the axial coupling portion 93 of first transmission means 90 and a second axial position wherein they are kinematically independent of the first transmission means 90 and kinematically integral with the second axial coupling portion 38b and, therefore, with supporting mount 38 (i.e. with rotary table 14).

[0057] When second transmission means 41 are in the first axial position, they are kinematically integral with the first transmission means 90, hence they shall rotate integrally with driving shaft 36 when the latter is driven to rotate by motor 35.

[0058] On the other hand, when second transmission means 41 are in the second axial position, they are kinematically integral with supporting mount 38 and the rotary table 14. As a consequence, through cooperation of the screw portion 43 of driving shaft 35 with the lead screw 43 of second transmission means 41, transformation of the pure rotational movement imparted by motor 35 to the driving shaft 36 into a rotational-translational movement of the same shaft 36 along axis F is obtained.

[0059] Movable member 22 being axially connected with driving shaft 36, translational movement of movable member 22 along axis F is also produced.

[0060] Advantageously, as shall be explained in greater detail in the following, displacement of the second transmission means 41 between the relative first and second axial positions may be achieved by selective actuation of electromagnetic means.

[0061] To this purpose, first and second axial coupling portions 38a and 38b may advantageously consist of independently and selectively actuatable electromagnets, the axial coupling portion 94 of second transmission means 41 being made of a material capable of being attracted by an electromagnet.

[0062] Alternatively, movement of second transmission means 41 may be obtained by pneumatic means, or by means of cams and the like.

[0063] To summarize, the pure rotational movement of driving shaft 36 and the relative movable member 22 about axis F is obtained by maintaining second transmission means 41 in the first axial position wherein they are also driven to rotate with the driving shaft 36, the rotational movement being transmitted to the second transmission means 41 through collet 92 and the axial coupling portion 93 of first transmission means 90, with which they are maintained kinematically integral. Kinematic coupling of second transmission means 41 and first transmission means 90 is preferably achieved through activation of the electromagnet of the first axial coupling portion 38a of supporting mount 38.

[0064] Conversely, the translational movement of driving shaft 36 and the relative movable member 22 along axis F is obtained by maintaining the second transmission means in the second axial position wherein they are kinematically independent of the first transmission means 90 and angularly and axially integral supporting mount 38 and rotary table 14. Kinematic uncoupling of second transmission means 41 relative to first transmission means 90 is preferably achieved through activation of the electromagnet of the second axial coupling portion 38b of supporting mount 38.

[0065] In practice, as unit 15 travels along path P, the driving shaft 36 is alternatively operatively coupled with first transmission means 90 alone (when second transmission means 41 are in the first axial position) with both first and second transmission means 90, 41 (when second transmission means are in the second axial position).

[0066] Coming back now to Figures 2 and 3, the retainer 18, corresponding to the described supporting assembly 17, comprises, in a known manner, a cylindrical movable member 65, which protrudes vertically from an upper rotary portion 66 of carousel 7, can be displaced along the relative axis F and has a bell-shaped free end portion 67 adapted to cooperate with the top neck 5 of the bottle 3 carried by such supporting assembly 17.

[0067] More specifically, the displacements of each movable member 65 are controlled in a known manner so as to maintain the same distance between its end portion 67 and the corresponding plate 21, during the movement of the relative unit 15 along the portion of path P from transfer station 9 to transfer station 13, and to increase such distance at transfer stations 9, 13 and during the portion of path P from station 13 to station 9. In this way, bottles 3 are securely hold in their vertical positions during the travel from station 9 to station 13 and are free to be transferred at such stations 9 and 13 from input wheel 8 and to output wheel 12, respectively.

[0068] With reference to Figure 1, labelling machine 1 further comprises a plurality of welding devices 70, each of which arranged in front of, and in a radially inner position than, the relative unit 15 and adapted to cooperate, in a known manner, with the label 2 wrapped around the corresponding movable member 22 for welding the overlapped edges 34 and to produce a tubular configuration of such label.

[0069] After completion of the welding of a tubular label 2, the downward movement of the relative movable member 22 towards the fully retracted position within the relative supporting mount 20 produces the insertion of the

relative bottle 3 inside said tubular label. The so formed labelled bottle 3 is then fed to a shrinking tunnel (known per se and not shown), where shrinking and adhesion of the label 2 to the external surface of the bottle 3 occurs.

[0070] The duration of the most significant operating steps of the machine 1 is schematically shown in Figure 1 by indicating the corresponding angles of rotation of the carousel 7 about axis B, along which said steps are performed; in particular, angle α refers to the lifting movement of the movable members 22 from the fully retracted position to the raised position, angle β refers to the label transfer from the input drum 10 to the relative movable member 22, angle γ refers to the welding operation on the overlapped edges 34 of the tubular labels 2, and angle δ refers to the downward movement of the movable members 22 to produce insertion of the bottles 3 within the corresponding tubular labels 2.

[0071] Operation of machine 1 will now be described with reference to the labelling of one bottle 3, and therefore to one labelling unit 15, and as of the instant in which the movable member 22 of said unit 15 is in the fully retracted position within the relative supporting mount 20 and has just received the unlabelled bottle 3 from input wheel 8.

[0072] In this condition, the bottle 3, which rests on plate 21 carried by the movable member 22, is held in the vertical position by the combined action of the movable member 22 and the relative upper retainer 18.

[0073] During the subsequent movement of unit 15 along path P (angle α in Figure 1), the second transmission means 41 are moved to their second axial position, preferably through activation of the electromagnet of the second axial coupling portion 38b of supporting mount 38, and the motor 35 is actuated. Thanks to the coupling between the lead screw member 42 of the second transmission means 41 and driving shaft 36, the lead screw member 42 being kinematically integral with the rotary table 14, the driving shaft 36 moves along and about axis F thereby producing a corresponding rotational-translational movement of the movable member 22 towards the desired raised position.

[0074] At the transfer station 11, the input drum 10 reaches an angular position around axis D adapted to put the label 2 into contact with the movable member 22 passing through such station; in this condition (angle β), a pure rotational movement of movable member 22 around axis F is required to produce complete wrapping of the label 2 in a known manner around such movable member 22 (Figure 3). More specifically, the label 2 reaches a cylindrical configuration with the opposite vertical edges 34 overlapped one another.

[0075] In order to obtain the above-mentioned rotation, the second transmission means 41 are moved to their first axial position, preferably through activation of the electromagnet of the first axial coupling portion 38a of supporting mount 38, and the motor 35 is actuated. The second transmission means 41 having thus been made kinematically integral with the first transmission means 90, a purely rotational movement is imparted by the motor 35 to the driving shaft 36. Said purely rotational movement is thus transferred to the movable member 22.

[0076] In practice, the sleeve element, which is axially locked between the seat of motor 35 and end 40 of supporting mount 38, prevents any displacement of driving shaft 36 along axis F.

[0077] At this point, the label 2 is ready to be welded along the edges 34 by activation of the welding device 70 (angle Y).

[0078] During the last part of the path P (angle δ), the movable member 22 must be returned to the fully retracted position within the relative supporting mount 20, so as to produce the insertion of the bottle 3 inside the so formed tubular label 2.

[0079] This movement is once again obtained by moving the second transmission means 41 into their second axial position, preferably through activation of the electromagnet of the second axial coupling portion 38b of supporting mount 38, and by actuating motor 35 in the direction opposite the one for producing the upward movement of the driving shaft 36 and the movable member 22.

[0080] Heat-shrinking (the implementation of which is not illustrated) can be subsequently performed on the bottles 3 exiting the carousel 7 to cause shrinking and adhesion of the label 2 to the external surface of the relative bottle.

[0081] The advantages of the labelling units 15 according to the present invention will be clear from the above description.

[0082] In particular, the new solution makes it possible to use one single motor 35 for controlling both rotational and translational movements of each movable member 22. As a consequence, cam means for lifting and lowering movable members 22 are no longer necessary, whereby a significant reduction of costs for the manufacture of the labelling machine 1 is achieved.

[0083] Besides, since the translational movements of each movable member 22 is produced through actuation of motor 35 and not through use of fixed cam means, the height of the movable member 22 protruding from the relative supporting mount 20 can be set in accordance with the height of the processed labels 2 simply by controlling the time of actuation of the motor 35. In this manner, the labelling units 15 makes it possible to apply a large variety of labels 2 of different heights to respective bottles 3 without requiring that machine parts, such as fixed cam means, be replaced with every change in label height.

[0084] Furthermore, selective activation of first and second transmission means 90 and 41 requires only a small displacement of parts of the labelling unit 15 along the axial direction, which means that radial encumbrance of the labelling unit 15 is kept at a minimum.

[0085] On top of that, since both first and second transmission means 90 and 41 operatively engage the same portion of driving shaft 36 - namely the screw portion 43

which is, by design and construction, adapted to engage with both transmission means, in that it is provided with both longitudinal grooves and screwed outer surface - also the overall vertical encumbrance of labelling unit 15 is advantageously restrained.

[0086] Clearly, changes may be made to labelling machine 1 and labelling units 15 as described and illustrated herein without, however, departing from the scope of protection as defined in the accompanying claims.

Claims

1. A labelling unit (15) movable along a given path (P) for receiving an article (3) and a label (2) and for applying said label (2) onto said article (3), said unit (15) comprising:

- support means (20, 38);
- a movable member (22) adapted to carry said article (3) and supported by said support means (20, 38) in a sliding and rotating manner with respect to a given axis (F); and
- actuator means (35, 36, 41) for producing distinct movements of said movable member (22) in different operative steps of said labelling unit (15); said distinct movements comprising a pure rotation about said axis (F) and a translation along the same axis (F); said actuator means comprising:
- one motor (35);
- a driving shaft (36) coaxially coupled to said movable member (22) and actuated by said motor (35) to rotate about said axis (F);
- first transmission means (90) for angularly coupling said motor (35) with said driving shaft (36);

characterised in that said actuator means further comprise second transmission means (41) which can be selectively actuated to transform the rotational movement imparted by motor (35) to driving shaft (36) in a resulting movement of the relative movable member (22) having a translational component along said axis (F); said second transmission means (41) being movable between: a first axial position, wherein they are kinematically integral with said first transmission means (90); and a second axial position, wherein they are kinematically independent of said first transmission means (90) and integral with said support means (38).

2. A unit as claimed in claim 1, wherein said second transmission means (41) are radially fixed with respect to said support means (38).

3. A unit as claimed in claim 2, wherein said pure rotation of said movable member (22) around said axis (F) is obtained by moving said second transmission means (41) into their first axial position and actuating said motor (35).

4. A unit as claimed in claim 2 or 3, wherein said translation of said movable member (22) along said axis (F) is obtained by moving said second transmission means (41) into their second axial position and actuating said motor (35).

5. A unit as claimed in any one of claims 2 to 4, wherein, as unit 15 travels along path P, said driving shaft (36) is alternatively operatively coupled with said first transmission means (90) alone, said second transmission means (41) being in said first axial position, and with both first and second transmission means (90, 41), said second transmission means being in said second axial position.

6. A unit as claimed in any one of the foregoing claims, wherein said driving shaft (36) comprises: a screw portion (43) which is defined by an externally threaded surface (45) provided on a longitudinal region of said driving shaft (36); and a plurality of longitudinal grooves (91) provided on said externally threaded surface (45) and extending at least over the whole of said screw portion (43).

7. A unit as claimed in any one of the foregoing claims, wherein said first transmission means (90) comprise a collet (92) internally provided with a plurality of ribs (93) for engaging and cooperating with relative longitudinal grooves (91) of driving shaft (36).

8. A unit as claimed in claim 7, wherein said collet (92) is fastened to a rotor of said motor (35) and to an axial coupling portion (93) of said first transmission means (90), said axial coupling portion (93) being rotatable over a corresponding first axial coupling portion (38a) of said support means (38).

9. A unit as claimed in any one of claims 6 to 8, wherein said second transmission means (41) comprise a tubular lead screw member (42), which is internally fastened to the said screw portion (43) of said driving shaft (36).

10. A unit as claimed in claim 9, wherein said second transmission means (41) comprise an axial coupling portion (94) to which said lead screw member (41) is fastened, said axial coupling portion (94) being rotatable over a corresponding second axial coupling portion (38b) of said support means (38).

11. A unit as claimed in claim 10, wherein said axial coupling portion (94) of said second transmission means (41) is arranged between said second axial coupling portion (38b) and said axial coupling portion (93) of said first transmission means (90).

12. A unit as claimed in any one of the foregoing claims, wherein movement of said second transmission means (41) between said first and second axial positions is achieved by selective actuation of electromagnetic means.

13. A unit as claimed in any one of claims 10 to 12, wherein said first and second axial coupling portions (38a, 38b) respectively consist of independently and selectively actuatable electromagnets, the axial coupling portion (94) of said second transmission means (41) being made of a material capable of being attracted by an electromagnet.

14. A unit as claimed in any one of the foregoing claims, wherein said support means include at least a fixed hollow supporting mount (20) coaxially crossed by said driving shaft (36) and engaged by said movable member (22).

Patentansprüche

1. Etikettiereinheit (15), die zum Aufnehmen eines Artikels (3) und eines Etiketts (2) und zum Aufbringen des Etiketts (2) auf den Artikel (3) entlang eines gegebenen Weges (P) bewegbar ist, wobei die Einheit (15) umfasst:

- eine Trägereinrichtung (20, 38);
- ein bewegliches Element (22), das so ausgebildet ist, dass dieses den Artikel (3) tragen kann, und durch die Trägereinrichtung (20, 38) in einer gleitenden und rotierenden Weise mit Bezug auf eine gegebene Achse (F) gehalten wird; und
- eine Betätigungseinrichtung (35, 36, 41) zum Erzeugen einzelner Bewegungen des beweglichen Elements (22) in unterschiedlichen Betriebsschritten der Etikettiereinheit (15), wobei die einzelnen Bewegungen eine reine Rotation um die Achse (F) und eine Translation entlang der gleichen Achse (F) umfassen, wobei die Betätigungseinrichtung umfasst:
- einen Motor (35),
- eine Antriebswelle (36), die mit dem beweglichen Element (22) koaxial gekoppelt ist und durch den Motor (35) betätigt wird, so dass diese um die Achse (F) dreht;
- eine erste Übertragungseinrichtung (90) zum winkelförmigen Ankoppeln des Motors (35) an die Antriebswelle (36),
- **dadurch gekennzeichnet, dass** die Betätigungseinrichtung ferner eine zweite Übertragungseinrichtung (41) umfasst, welche wahlweise betätigt werden kann, um die vom Motor (35) übermittelte Rotationsbewegung auf die Antriebswelle (36) in eine resultierende Bewegung des jeweiligen beweglichen Elements (22) mit einer Translationskomponenten entlang der Achse (F) umzuwandeln, wobei die zweite Übertragungseinrichtung (41) beweglich ist zwischen: einer ersten axialen Position, in welcher diese mit der ersten Übertragungseinrichtung (90) kinematisch einstückig sind, und einer zweiten axialen Position, in welcher diese von der ersten Übertragungseinrichtung (90) kinematisch unabhängig und mit der Trägereinrichtung (38) einstückig sind.

2. Einheit nach Anspruch1 in welcher die zweite Übertragungseinheit (41) in Bezug zu der Trägereinrichtung (38) radial fixiert ist.

3. Einheit nach Anspruch 2, in welcher die reine Rotation des beweglichen Elements (22) um die Achse (F) durch ein Bewegen der zweiten Übertragungseinrichtung (41) in ihre erste axiale Position und ein Betätigen des Motors (35) erhalten wird.

4. Einheit nach Anspruch 2 oder 3, in welcher die Translation des beweglichen Elements (22) entlang der Achse (F) durch Bewegen der zweiten Übertragungseinrichtung (41) in ihre zweite axiale Position und Betätigen des Motors (35) erhalten wird.

5. Einheit nach einem der Ansprüche 2 bis 4, in welcher, wenn sich die Einheit 15 entlang des Weges P bewegt, die Antriebswelle (36) betrieblich gekoppelt ist alternativ mit der ersten Übertragungseinrichtung (90) alleine, wobei sich die Übertragungseinrichtung (41) dann in der ersten axialen Position befindet, und mit sowohl der ersten als auch mit der zweiten Übertragungseinrichtung (90, 41), wobei sich die zweite Übertragungseinrichtung dann in der zweiten axialen Position befindet.

6. Einheit nach einem der vorstehenden Ansprüche, in welcher die Antriebswelle (36) umfasst: einen Schraubenbereich (43), welcher durch eine Außengewindefläche (45) gebildet wird, die auf einem Längsbereich der Antriebswelle (36) vorgesehen ist, und eine Mehrzahl von Längsrillen (91), die auf der Außengewindefläche (45) vorgesehen sind und sich wenigstens über die Gesamtheit des Schraubenbereichs (43) erstrecken.

7. Einheit nach einem der vorstehenden Ansprüche, in welcher die Übertragungseinrichtung (90) eine Klemmhülse (92) umfasst, die innen mit einer Mehrzahl von Rippen (93) versehen ist, um in die jeweiligen Längsrillen (91) der Antriebswelle (36) einzugreifen und mit diesen zusammenzuwirken.

8. Einheit nach Anspruch 7, in welcher die Klemmhülse (92) an einem Rotor des Motors (35) und an einem

axialen Kupplungsbereich (93) der ersten Übertragungseinrichtung (90) befestigt ist, wobei der axiale Kupplungsbereich (93) über einen korrespondierenden ersten axialen Kupplungsbereich (38a) der Trägereinrichtung (38) drehbar ist.

9. Einheit nach einem der Ansprüche 6 bis 8, in welcher die zweite Übertragungseinrichtung (41) ein rohrförmiges Leitspindelelement (42) umfasst, welches innen an dem Schraubenbereich (43) der Antriebswelle (36) befestigt ist.

10. Einheit nach Anspruch 9, in welcher die zweite Übertragungseinrichtung (41) einen axialen Kupplungsbereich (94) umfasst, an welchen das Leitspindelelement (41) befestigt ist, wobei der axiale Kupplungsbereich (94) über einen korrespondierenden zweiten axialen Kupplungsbereich (38b) der Trägereinrichtung (38) drehbar ist.

11. Einheit nach Anspruch 10, in welcher der axiale Kupplungsbereich (94) der zweiten Übertragungseinrichtung (41) zwischen dem zweiten axialen Kupplungsbereich (38b) und dem axialen Kupplungsbereich (93) der ersten Übertragungseinrichtung (90) angeordnet ist.

12. Einheit nach einem der vorstehenden Ansprüche, in welcher eine Bewegung der zweiten Übertragungseinrichtung (41) zwischen der ersten und zweiten axialen Position durch eine wahlfreie Betätigung einer elektromagnetischen Einrichtung erreicht wird.

13. Einheit nach einem der Ansprüche 10 bis 12, in welcher der erste und zweite axiale Kupplungsbereich (38a, 38b) jeweils aus unabhängigen und wahlfrei betätigbaren Elektromagneten besteht, wobei der axiale Kupplungsbereich (94) der zweiten Übertragungseinrichtung (41) aus einem Material hergestellt ist, das durch einen Elektromagneten angezogen werden kann.

14. Einheit nach einem der vorstehenden Ansprüche, in welcher die Trägereinrichtung wenigstens einen fixierten hohlen Trägerpfosten (20) umfasst, der durch die Antriebswelle (36) koaxial durchquert wird und an den das bewegliche Element (22) angreift.

Revendications

1. Unité d'étiquetage (15) déplaçable le long d'une trajectoire donnée (P) pour recevoir un article (3) et une étiquette (2) et pour appliquer ladite étiquette (2) sur ledit article (3), ladite unité (15) comprenant :

- des moyens de support (20, 38) ;
- un élément mobile (22) adapté pour porter ledit article (3) et supporté par lesdits moyens de support (20, 38) de manière coulissante et rotative par rapport à un axe donné (F) ; et
- des moyens d'actionnement (35, 36, 41) pour produire des mouvements distincts dudit élément mobile (22) dans différentes étapes opérationnelles de ladite unité d'étiquetage (15) ; lesdits mouvements distincts comprenant une rotation pure autour dudit axe (F) et une translation le long du même axe (F) ; lesdits moyens d'actionnement comprenant :
  - un moteur (35) ;
  - un arbre menant (36) couplé coaxialement audit élément mobile (22) et actionné par ledit moteur (35) pour tourner autour dudit axe (F) ;
  - des premiers moyens de transmission (90) pour coupler angulairement ledit moteur (35) avec ledit arbre menant (36) ;

  caractérisée en ce que lesdits moyens d'actionnement comprennent en outre des seconds moyens de transmission (41) qui peuvent être actionnés de manière sélective pour transformer le mouvement rotatif communiqué par le moteur (35) à l'arbre menant (36) en un mouvement résultant de l'élément mobile relatif (22) présentant un composant translationnel le long dudit axe (F) ; lesdits seconds moyens de transmission (41) étant mobiles entre : une première position axiale, dans laquelle ils sont cinématiquement solidaires des premiers moyens de transmission (90) ; et une seconde position axiale, dans laquelle ils sont cinématiquement indépendants desdits premiers moyens de transmission (90) et solidaires des moyens de support (38).

2. Unité selon la revendication 1, dans laquelle lesdits seconds moyens de transmission (41) sont fixés radialement par rapport auxdits moyens de support (38).

3. Unité selon la revendication 2, dans laquelle ladite rotation pure dudit élément mobile (22) autour dudit axe (F) est obtenue par le déplacement desdits seconds moyens de transmission (41) dans leur première position axiale et par l'actionnement dudit moteur (35).

4. Unité selon la revendication 2 ou 3, dans laquelle ladite translation dudit élément mobile (22) le long dudit axe (F) est obtenue par le déplacement desdits seconds moyens de transmission (41) dans leur seconde position axiale et par l'actionnement dudit moteur (35).

5. Unité selon l'une quelconque des revendications 2 à 4, dans laquelle lorsque l'unité (15) se déplace le long de la trajectoire (P), ledit arbre menant (36) est

alternativement couplé en fonctionnement uniquement avec lesdits premiers moyens de transmission (90), lesdits seconds moyens de transmission (41) étant dans ladite première position axiale, et avec les premiers et seconds moyens de transmission (90, 41), lesdits seconds moyens de transmission étant dans ladite seconde position axiale.

6. Unité selon l'une quelconque des revendications précédentes, dans laquelle ledit arbre menant (36) comprend : une partie de vis (43) qui est définie par une surface filetée à l'extérieur (45) prévue sur une région longitudinale dudit arbre menant (36) ; et une pluralité de rainures longitudinales (91) prévues sur ladite surface filetée à l'extérieur (45) et s'étendant au moins sur l'ensemble de ladite partie de vis (43).

7. Unité selon l'une quelconque des revendications précédentes, dans laquelle lesdits premiers moyens de transmission (90) comprennent un collet (92) doté en interne d'une pluralité de nervures (93) pour l'engagement et la coopération avec des rainures longitudinales (91) relatives de l'arbre menant (36).

8. Unité selon la revendication 7, dans laquelle ledit collet (92) est fixé à un rotor dudit moteur (35) et à une partie de couplage axial (93) desdits premiers moyens de transmission (90), ladite partie de couplage axial (93) étant rotative sur une première partie de couplage axial (38a) correspondante desdits moyens de support (38).

9. Unité selon l'une quelconque des revendications 6 à 8, dans laquelle lesdits seconds moyens de transmission (41) comprennent un élément de tige filetée tubulaire (42) qui est fixé en interne à ladite partie de vis (43) dudit arbre menant (36).

10. Unité selon la revendication 9, dans laquelle lesdits seconds moyens de transmission (41) comprennent une partie de couplage axial (94), à laquelle ledit élément de tige filetée (41) est fixé, ladite partie de couplage axial (94) étant rotative sur une seconde partie de couplage axial (38b) correspondante desdits moyens de support (38).

11. Unité selon la revendication 10, dans laquelle ladite partie de couplage axial (94) desdits seconds moyens de transmission (41) est agencée entre ladite seconde partie de couplage axial (38b) et ladite partie de couplage axial (93) desdits premiers moyens de transmission (90).

12. Unité selon l'une quelconque des revendications précédentes, dans laquelle le mouvement desdits seconds moyens de transmission (41) entre lesdites première et seconde positions axiales est obtenu par l'actionnement sélectif de moyens électromagnétiques.

13. Unité selon l'une quelconque des revendications 10 à 12, dans laquelle lesdites première et seconde parties de couplage axial (38a, 38b) se composent respectivement d'électroaimants actionnables indépendamment et sélectivement, la partie de couplage axial (94) desdits seconds moyens de transmission (41) étant constituée d'un matériau capable d'être attiré par un électroaimant.

14. Unité selon l'une quelconque des revendications précédentes, dans laquelle lesdits moyens de support comprennent au moins une monture porteuse creuse fixe (20) traversée coaxialement par ledit arbre menant (36) et engagée par ledit élément mobile (22).

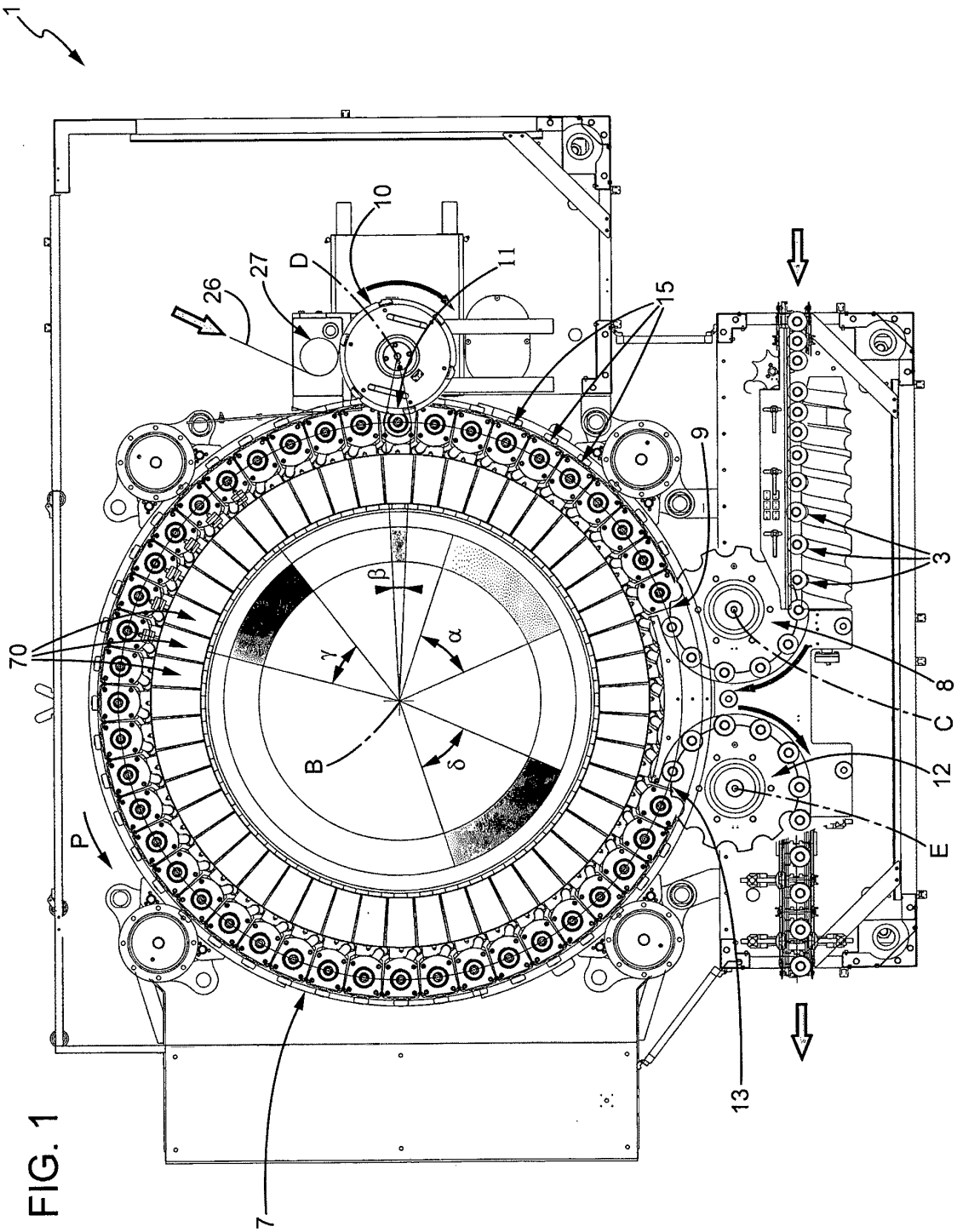
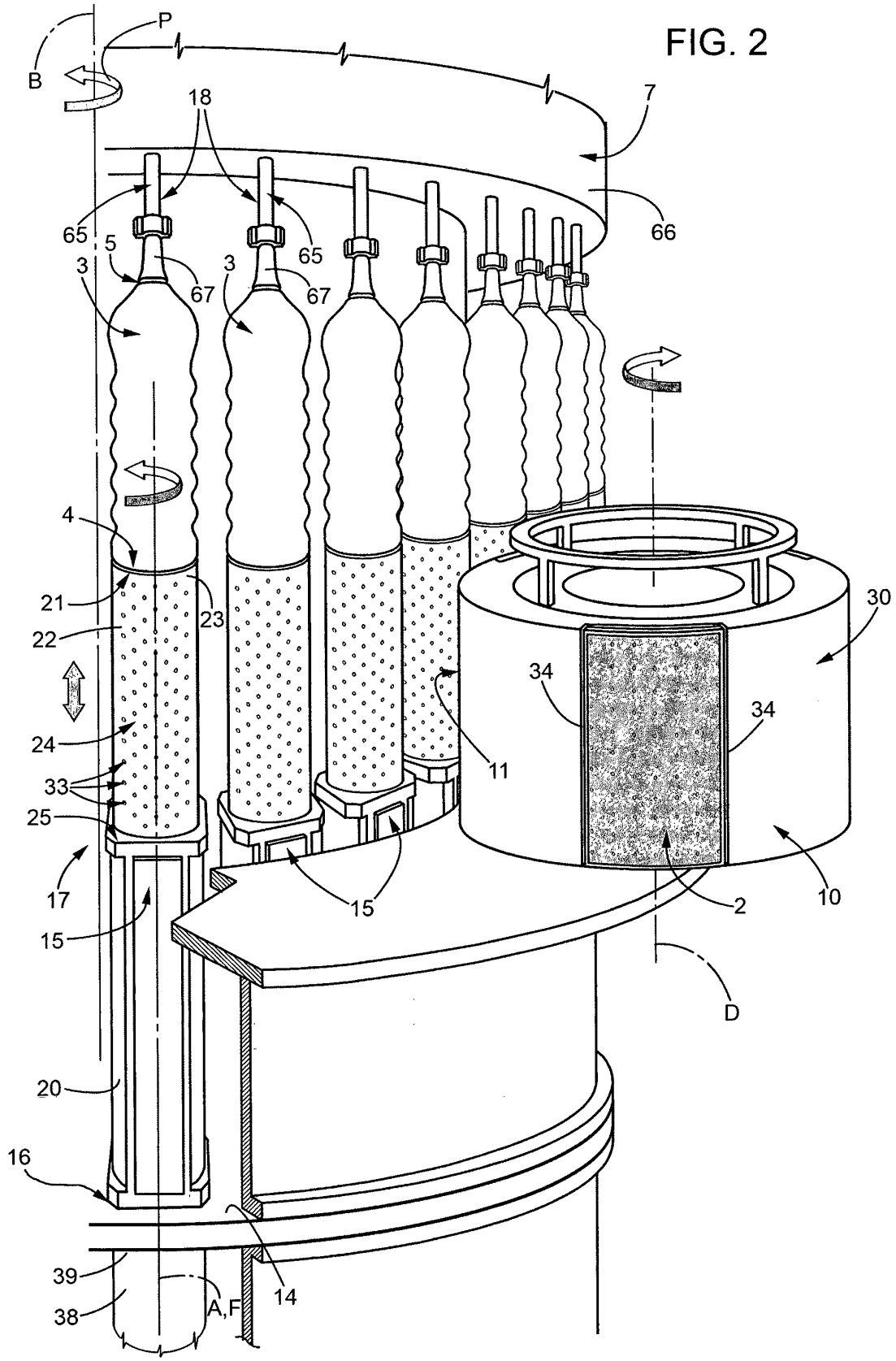


FIG. 1

FIG. 2


P
B
18
7
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66
5
3
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3
67
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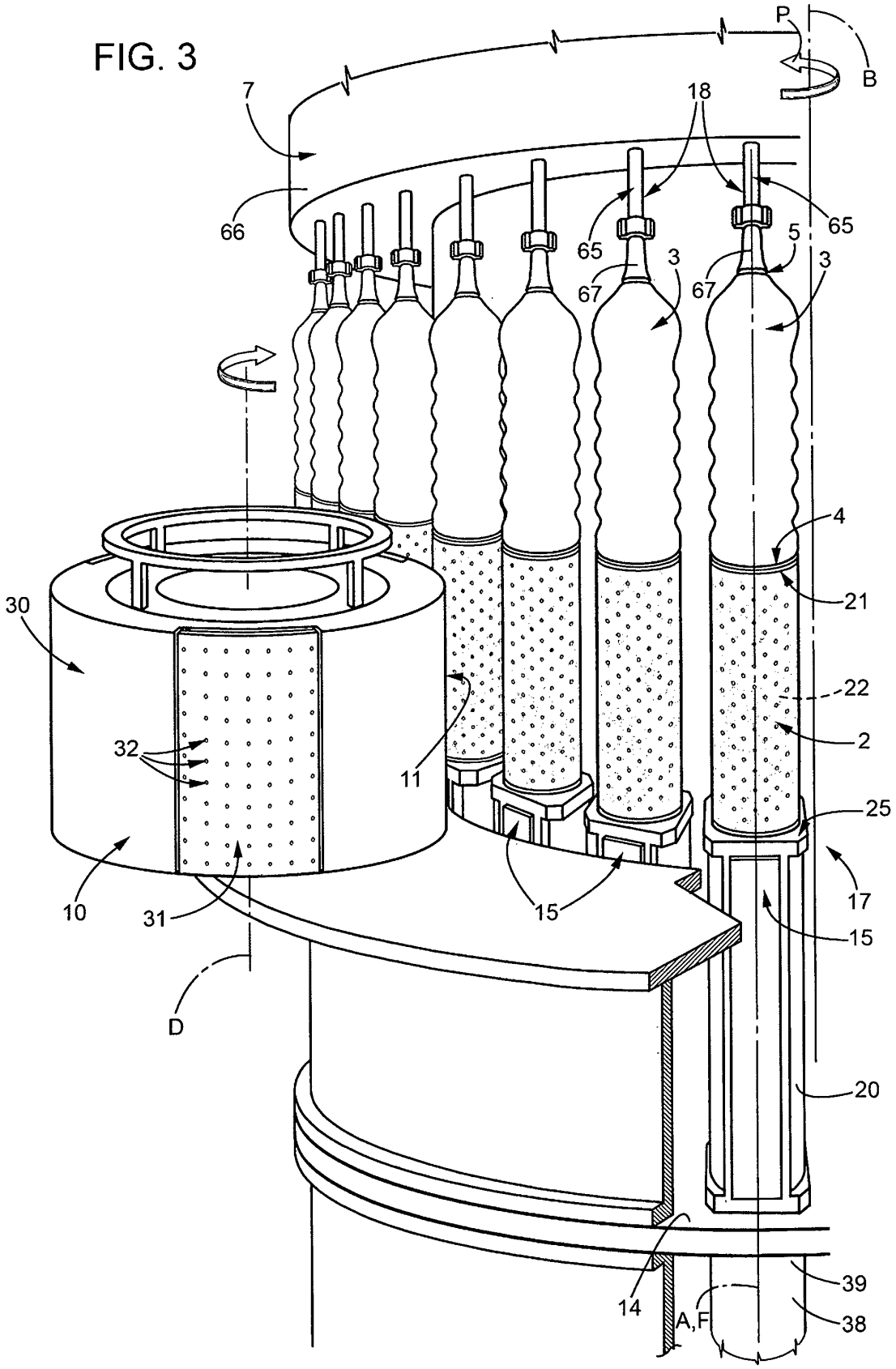
D
20
16
39
38
A,F
14

FIG. 3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17
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D
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A,F
38

FIG. 4

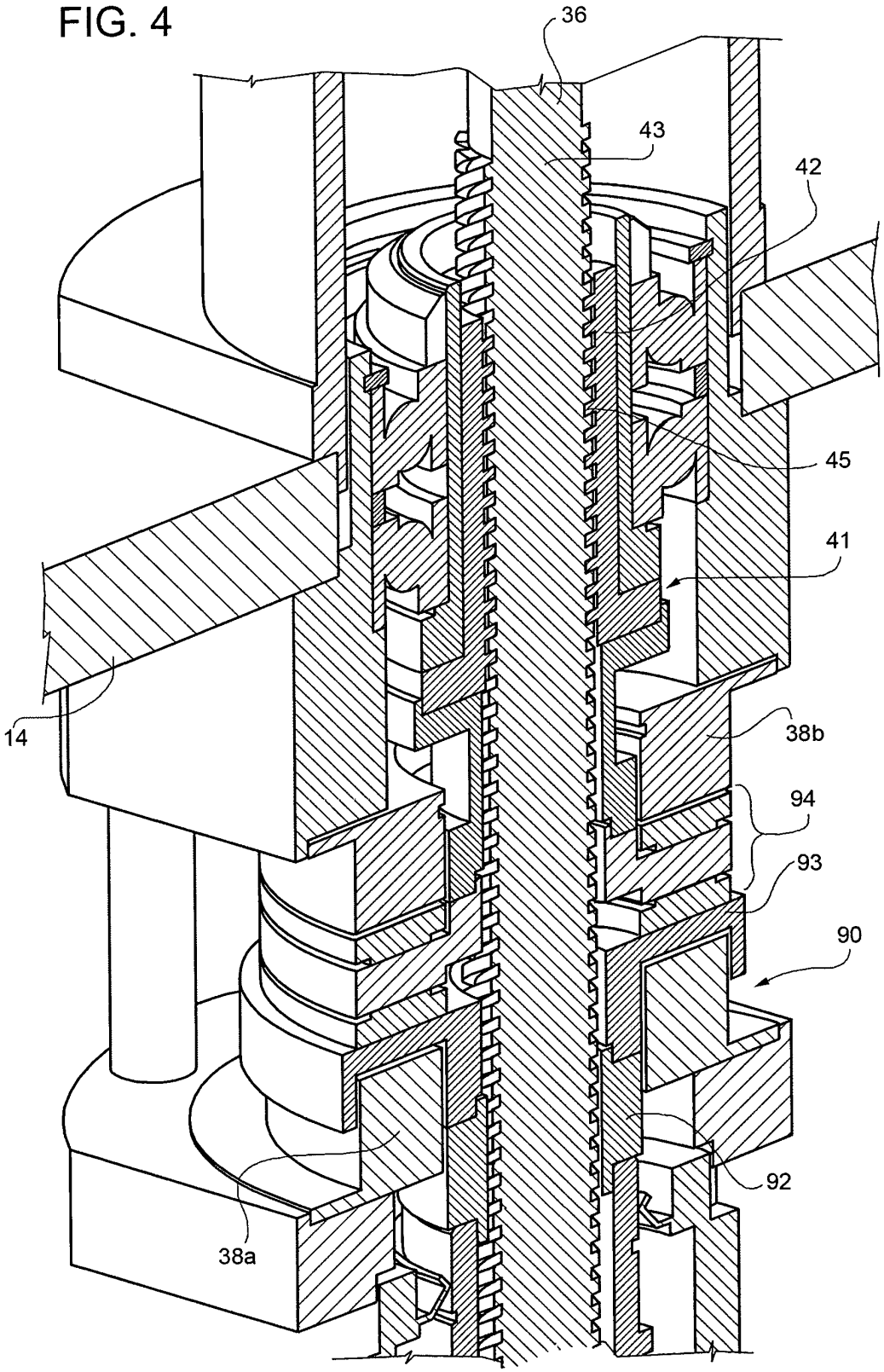


FIG. 5

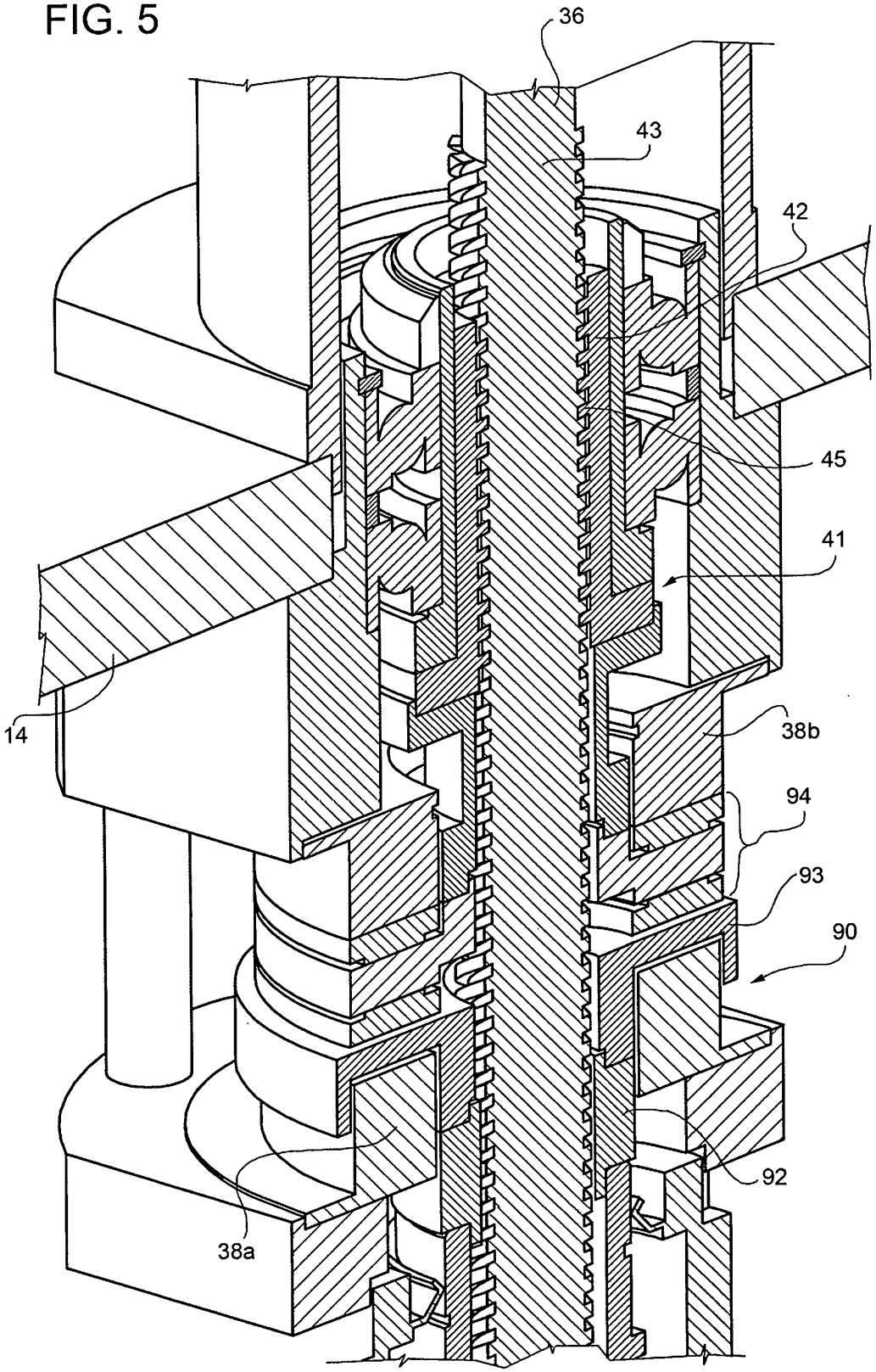
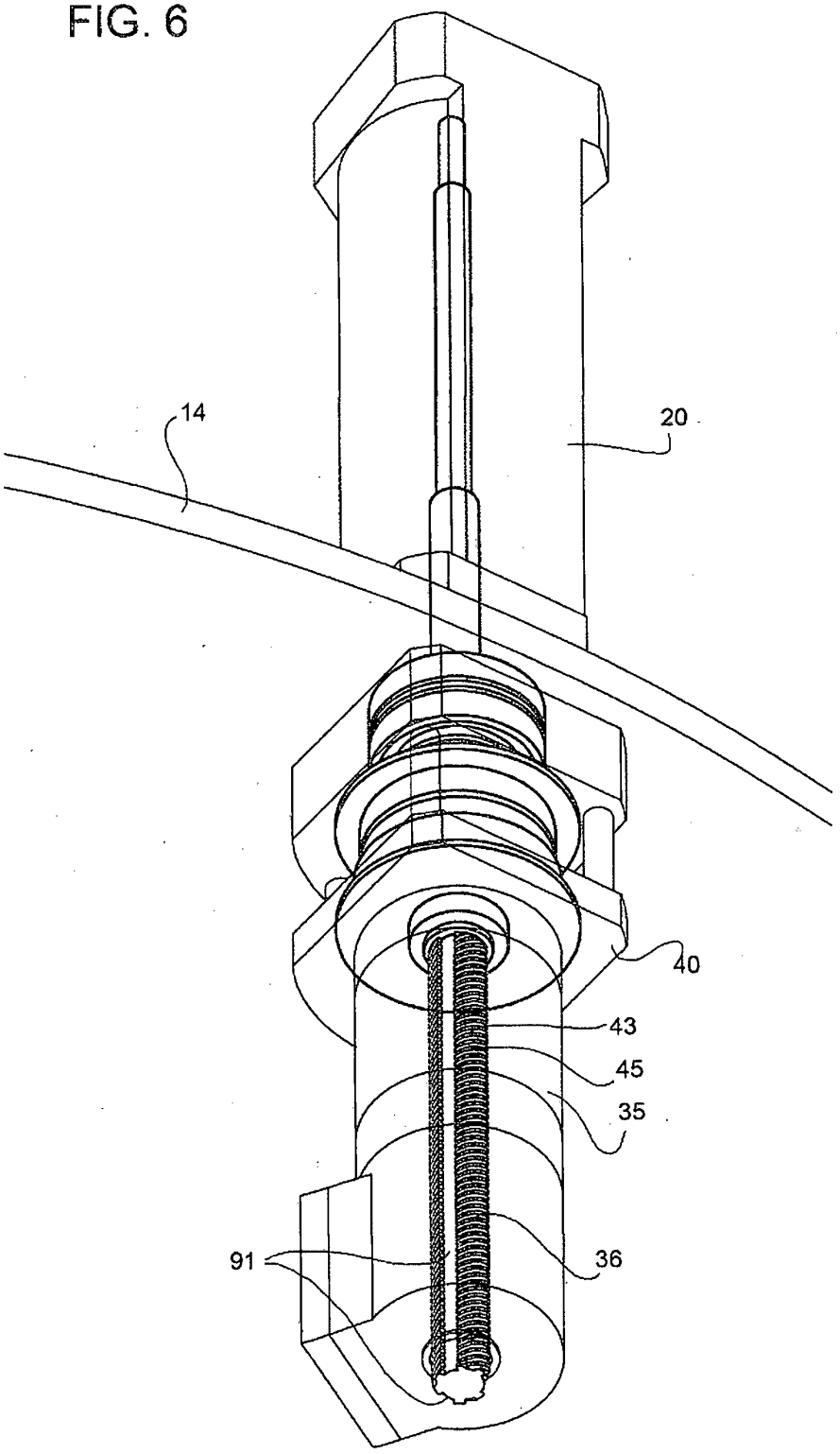


FIG. 6



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