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(54) **A LABELING MODULE AND RELATED CONTAINER-HANDLING MACHINE**

(57) There is described a labeling module (18) and a container-handling machine (1) comprising a carousel (3) rotating around a first axis (A) and peripherally conveying a plurality of containers (2), and at least one such labeling module (18) arranged peripherally with respect to the carousel (3); the labeling module (18) comprises a static frame (21) secured to a supporting frame (8) of

the carousel (3) in a position radially protruding therefrom along a second axis (D) transversal to axis (A), and a labeling unit (22) configured to feed labels to the carousel (3); the labeling unit (22) is carried by the static frame (21) and is mounted in a movable manner along the second axis (D) with respect to the static frame (21).

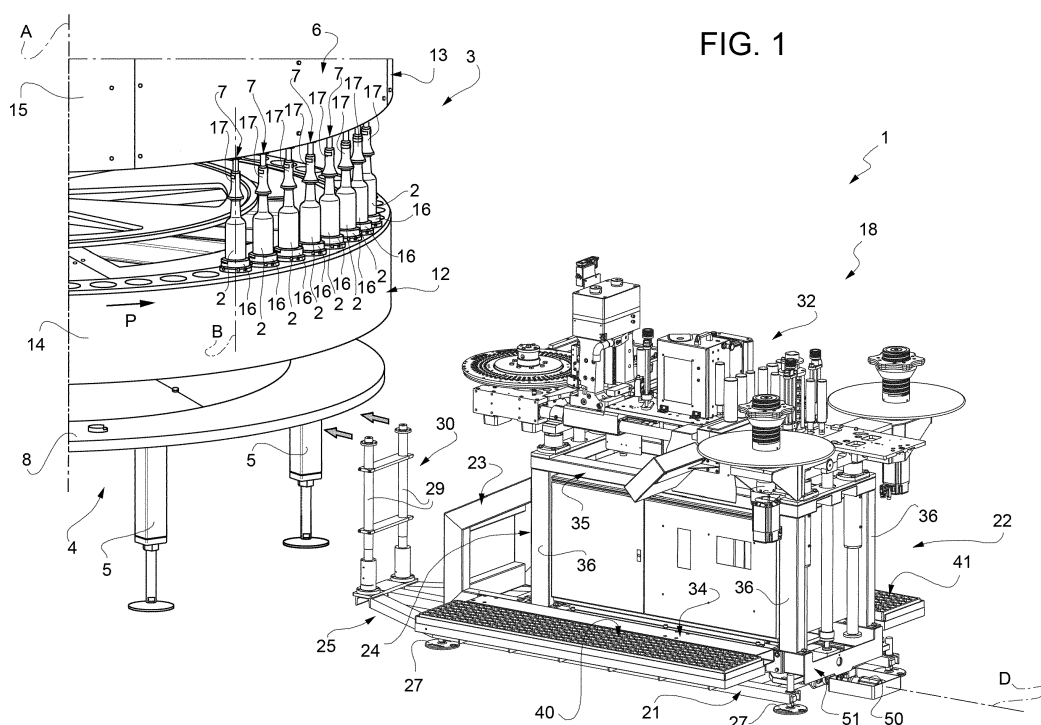


FIG. 1

Description

TECHNICAL FIELD

[0001] The present invention relates to a container-handling machine with an improved labeling module, such as a labeling machine for applying labels onto containers, bottles or the like, or a labeling and filling machine configured to both fill and apply labels onto containers, bottles or the like.

BACKGROUND ART

[0002] As it is generally known, the packaging of food or non-food products into respective containers, such as bottles, receptacles or the like, comes along with the labeling of the containers by means of respective labels, in particular paper or plastic labels, during a labeling process run with a labeling or a labeling/filling machine.

[0003] In this kind of machine, the containers are driven by a conveying carousel along a predetermined path, or track, which guides the containers towards an application station, at which each label is applied by a labeling module onto the respective container.

[0004] In particular, the essential units (carousel, conveying devices, labeling modules for feeding labels to the carousel, etc.) of this known machine are typically arranged on a common structure, which defines a support for the machine itself; this kind of structure is configured to support:

- a carousel, typically round-shaped and arranged in a central position of the machine, configured to advance the containers along a peripheral path thereof;
- an input star wheel for feeding the containers to be handles to the carousel;
- an output star wheel for removing the labeled and optionally filled containers from said carousel; and
- a labeling module configured to feed labels to the carousel, arranged in a position such that, in use, a label applicator unit of the labeling module is tangent to the above-mentioned path.

[0005] Structures like the one hereby described tend to be cumbersome and expensive. Moreover, they are not particularly keen to flexible modifications of the complex machine configuration, which are typically required with frequency in the packaging field of food products, for example when the need to adapt the machine to new, different production demands, or to variations in the container dimension and/or shape, arises.

[0006] The European Patent application n° EP2712820, filed by the same applicant, discloses a container-handling machine, in particular a labeling machine, including a labeling module provided with a supporting structure directly standing on the floor plane and coupled to the carousel in a releasable manner by means of a coupling device.

[0007] In particular, the coupling device comprises a first coupling interface linked to the lower surface of the carousel at a position radially inward with respect to the carousel external perimeter, and a second coupling interface linked to a frontal portion of the labeling module, and configured to be coupled in a releasable manner to the first coupling interface.

[0008] More specifically, the coupling between the labeling module and the carousel is performed in a fixed position underneath the plane of the carousel where containers are advanced, and at a certain distance radially inwards with respect to the carousel external perimeter.

[0009] However, in the configuration mentioned above, maintenance, inspection, and cleaning operations of the labeling machine are difficult and time-consuming to carry out, since they involve: decoupling the whole labeling module from the carousel; moving it away from the external perimeter thereof with considerable effort, at least at a certain minimum distance necessary to carry out the maintenance operations; move back the labeling module to its working position; and coupling again the labeling module to the carousel.

[0010] Moreover, after a certain time of use of the machine, difficulties could arise during the process of mounting and dismounting the coupling interfaces, due to the presence of processing waste material in correspondence of the coupling interfaces themselves.

DISCLOSURE OF INVENTION

[0011] It is therefore an object of the present invention to provide a container-handling machine with an improved labeling module, which is designed to overcome the above-mentioned drawbacks in a straightforward and low-cost manner.

[0012] This object is achieved by a container-handling machine as claimed in claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] 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 container-handling machine in accordance with the teachings of the present invention;

Figure 2 shows a schematic lateral view, with parts removed for clarity, of the machine shown in Figure 1; Figure 3 shows a larger-scale, first schematic perspective view, with parts removed for clarity, of a labeling module of the machine shown in Figure 1; Figure 4 shows a smaller-scale, second schematic perspective view of the labeling module shown in Figure 3; and

Figure 5 shows a larger-scale, schematic bottom view of a detail of the labeling module of Figure 4.

BEST MODE FOR CARRYING OUT THE INVENTION

[0014] With reference to Figures 1 and 2, number 1 indicates as a whole a container-handling machine, in particular a labeling machine, configured to apply labels (known per se and not illustrated) onto containers 2 presenting respective axes B, such as bottles or the like.

[0015] According to a possible alternative not shown, the container-handling machine according to the present invention may also be a labeling and filling machine.

[0016] Machine 1 essentially comprises a carousel 3 configured to receive containers 2 to be labeled from respective input conveying means (known per se and not shown), advancing the containers 2 themselves along a path P substantially defined by a circumference arc of vertical axis A, and transferring containers 2, after being labeled, to respective output conveying means (also known per se and not shown).

[0017] Input and output conveying means typically consist of star wheels.

[0018] Carousel 3 presents a substantially circular shape, is coaxial to axis A and comprises a supporting fixed chassis 4, supported in turn on the floor basement by a plurality of legs 5, and a rotating group 6 mounted on chassis 4 in a rotatable manner around axis A and provided with a plurality of peripheral operating units 7 configured to receive corresponding containers 2 to be labeled, with their axes B parallel to the axis A itself.

[0019] In particular, chassis 4 essentially comprises a peripheral portion 8 supported by legs 5, substantially presenting the shape of an annular plate, and a central portion 9 (Figure 2) linked to peripheral portion 8 by means of a plurality of substantially radial arms (not shown) carrying, in a rotating manner, a shaft 10 (Figure 2) coaxial to axis A. Shaft 10 is configured to command the rotation movement around axis A of rotating group 6.

[0020] Rotating group 6 essentially includes a lower supporting structure 12 and an upper supporting structure 13, which are both peripherally delimited by respective cylindrical walls 14, 15 of axis A, are fixed to shaft 10 in positions spaced between each other along the axis A itself, and define the plurality of peripheral operating units 7.

[0021] More specifically, lower supporting structure 12 is peripherally provided, along path P, with a plurality of receiving elements 16 extending at evenly spaced angular positions around axis A and configured to coaxially receive bottom portions of respective containers 2. Similarly, upper supporting structure 13 is peripherally provided with a plurality of retaining elements 17 extending at evenly spaced angular positions around axis A and configured to coaxially cooperate in a releasable manner with upper portions of respective containers 2.

[0022] Each receiving element 16 cooperates with the corresponding retaining element 17 in order to keep the relative container 2 in a stable position during its advancement along path P.

[0023] Therefore, each receiving element 16 defines

together with the corresponding retaining element 17 the relative peripheral operating unit 7.

[0024] As shown in Figures 1 and 2, machine 1 further comprises a labeling module 18 arranged peripherally with respect to carousel 3, and configured to feed and apply the labels onto respective containers 2 advanced by carousel 3.

[0025] In particular, labeling module 18 comprises a self-supporting static frame 21, extending radially outwards from carousel 3 along an horizontal axis D, and a labeling unit 22, provided with a label feeding device 32 (only schematically shown) for feeding the labels to carousel 3 and apply them onto the respective containers 2; in use, label feeding device 32 is arranged in a position substantially tangent with respect to path P of carousel 3.

[0026] Static frame 21 comprises (Figure 4) a plurality of horizontal longitudinal beams 33a extending for the most part parallel to axis D, a plurality of horizontal transversal beams 33b fixed to beams 33a orthogonally to axis D, and a plurality of feet 27 protruding downwards from respective beams 33a and apt to rest, in use, on the floor.

[0027] As visible in Figures 1 and 2, axis D extends radially with respect to axis A.

[0028] Static frame 21 of labeling module 18 is configured to be coupled to carousel 3 by means of a releasable coupling device 20.

[0029] In particular, (Figure 1 and 2) coupling device 20 includes a first coupling interface 28 fixed to the underside of peripheral portion 8 of chassis 4 of carousel 3 and located at a certain distance radially inwards of the carousel perimeter with respect to axis A.

[0030] More specifically, coupling interface 28 comprises a pair of hollow receiving members 31 projecting downwards from peripheral portion 8 of chassis 4, parallel to axis A.

[0031] Coupling device 20 also includes a second coupling interface 30 attached to a front-end portion 25 of static frame 21; coupling interface 30 is configured to be coupled in a releasable manner with coupling interface 28.

[0032] More specifically, coupling interface 30 comprises a pair of columns 29 projecting upwards from front-end portion 25 of static frame 21 towards carousel 3, and extending parallel to axis A.

[0033] Columns 29 have telescopic configurations in order to engage respective receiving members 31.

[0034] According to an important aspect of the present invention, labeling unit 22 further comprises a slide 23 (shown as a whole in Figures from 1 to 3) having a structure 24, arranged on static frame 21 and configured to move reciprocally onto static frame 21 along axis D.

[0035] In particular, structure 24 has a frame-like configuration and comprises a substantially horizontal lower frame 34, a substantially horizontal upper frame 35, and a plurality of substantially vertical struts 36 connecting lower frame 34 with upper frame 35.

[0036] Structure 24 is adapted to support label feeding

device 32; in particular, label feeding device 32 is mounted onto upper frame 35.

[0037] In other words, slide 23 allows a radial movement of labeling unit 22 and, thus, label feeding device 32, along axis D with respect to axis A of carousel 3.

[0038] As shown in figures from 1 to 4, slide 23 moves along static frame 21 by means of guiding devices 37a, 37b arranged in correspondence with respective opposite lateral sides 40, 41 of lower frame 34 and fixed to the latter preferably by means of a plurality of screws 39. Guiding devices 37 are configured to enable the movement of the slide 23 itself along axis D. In some alternative machine configurations the guiding devices could be symmetrical.

[0039] In particular, according to this preferred embodiment, guiding device 37a comprises a set of wheels, preferably a front wheel 38a and a rear wheel 38b, the front wheel 38a being closer to carousel 3 than the rear wheel 38b. Wheels 38a, 38b are arranged in correspondence with lateral side 40 of lower frame 34, in particular, they are mounted below lower frame 34 by means of screws, and are configured to roll onto a top planar surface of the corresponding longitudinal beam 33a of static frame 21.

[0040] Guiding device 37b comprises an engagement rod 42 (Figure 3) substantially parallel to axis D, arranged in correspondence with lateral side 41 of lower frame 34 and mounted onto the corresponding longitudinal beam 33a of static frame 21. Guiding device 37b further comprises an engagement member 43 presenting an hollow shaped cross section complementary to the cross section of engagement rod 42 coupled thereon for guiding slide 23 during its linear movement.

[0041] Preferably, engagement rod 42 and engagement member 43 define together a dovetail guide 44.

[0042] Advantageously, the use of non-symmetric guiding devices 37, defined in turn by wheels 38a, 38b on one side and dovetail guide 44 on the other side, allows avoiding a hyperstatic constraint for slide 23 with respect to static frame 21.

[0043] Static frame 21 further comprises a stop arrangement 26, preferably arranged in correspondence with one of lateral sides 40, 41 of lower frame 34, in the example shown, mounted onto the same longitudinal beam 33a of static frame 21 whereon wheels 38a and 38b roll.

[0044] Preferably, stop arrangement 26 comprises two stops 45, 46, each presenting a substantially cylindrical shape, with the respective longitudinal axis parallel to axis D; in particular, stop 45 is arranged in a position closer to carousel 3 than stop 46.

[0045] Stops 45, 46 are configured to cooperate with front and rear wheel 38a, 38b defining, in this way, two limit positions for slide 23 and, therefore, for labeling unit 22:

- a working position (schematically represented in Figure 2), where rear wheel 38b is in contact with stop

46, slide 23 is at a minimum distance from carousel 3 along axis D, and label feeding device 32 is arranged in a position substantially tangent to container path P and ready for the process of labeling; and

- a maintenance position (not represented), where front wheel 38a is in contact with stop 45, slide 23 is at a maximum distance from carousel 3, and label feeding device 32 is in an idle state.

[0046] Preferably, stops 45, 46 are formed in elastomeric material, i.e. rubber, and are adjustable along axis D for adapting to different possible distances between wheels 38a, 38b.

[0047] As shown in Figures 4 and 5, labeling module 18 is preferably equipped with means for moving the module 18 with respect to the static frame 21, which preferably comprise an electric motor 50, e.g. a three-phase asynchronous electric motor, projecting from a rear-end portion 51 of slide 23.

[0048] Electric motor 50 is configured to control the movement of slide 23 in an automated manner.

[0049] More specifically, electric motor 50 has an output shaft (not visible) angularly coupled to a worm gear 52 which extends parallel to axis D. Worm gear 52 engages a nut screw 53 secured to static frame 21.

[0050] When electric motor 50 is operated, it produces rotation of worm gear 52 which, by its coupling with nut screw 53, brings in motion slide 23 along axis D; slide 23 can therefore move radially with respect to axis A as described above.

[0051] The advantages of labeling machine 1 according to the present invention will be clear from the foregoing description.

[0052] In particular, slide 23 allows easy, practical and time-saving maintenance, inspection and cleaning operations for labeling machine 1.

[0053] In fact, in order to perform the above-mentioned operations, it is sufficient, after stopping the labeling process, to activate electric motor 50 so that slide 23 and, therefore, the whole labeling unit 22, are arranged in the maintenance position described above.

[0054] Furthermore, there is no need to ever decouple labeling module 18 from carousel 3, namely decoupling interface 30 from interface 28, within the normal lifespan of labeling machine 1.

[0055] 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.

Claims

1. A container-handling machine (1) comprising:

- a carousel (3) rotating around a first axis (A) and peripherally conveying a plurality of containers (2); and

- at least a labeling module (18) arranged peripherally with respect to said carousel (3);

said labeling module (18) comprising a static frame (21) secured to a supporting frame (8) of said carousel (3) in a position radially protruding therefrom along a second axis (D) transversal to said first axis (A), and a labeling unit (22) carried by said static frame (21) and configured to feed labels to said carousel (3);

characterized in that said labeling unit (22) is mounted in a movable manner along said second axis (D) with respect to said static frame (21).

- The container-handling machine as claimed in claim 1, wherein said labeling module (18) comprises a guiding arrangement (37a, 37b) for guiding a slide (23) of said labeling unit (22) along said second axis (D).
- The container-handling machine as claimed in claim 2, wherein said guiding arrangement comprises guide-and-slide devices (37a, 37b) acting on opposite lateral sides (40, 41) of said slide (23).
- The container-handling machine as claimed in claim 3, wherein said guide-and-slide devices (37a, 37b) include a prismatic guide (44) arranged on one of said lateral sides (41), and a plurality of rollers (38a, 38b) moving on a planar fixed surface of said static frame (21) arranged on another of said lateral sides (40).
- The container-handling machine as claimed in any one of the claims from 2 to 4, wherein said static frame (21) includes a stop arrangement (26) cooperating, in use, with said slide (23) to define a working position, wherein said slide (23) is at a minimum distance from said carousel (3), and a maintenance position, wherein said slide (23) is at a maximum distance from said carousel (3).
- The container-handling machine as claimed in claim 5, wherein said stop arrangement (26) is configured to cooperate with said rollers (38a, 38b) for limiting movement of said slide (23) between said working and maintenance positions.
- The container-handling machine as claimed in any one of the claims from 2 to 6, wherein said labeling module (18) is equipped with a motor (50) configured to automatically control the movement of said slide (23) along said second axis (D).
- A labeling module (18) for a container-handling machine (1), the machine (1) including a carousel (3) rotating around a first axis (A) and peripherally conveying a plurality of containers (2);

said labeling module (18) comprising a static frame (21) configured to be secured to a supporting frame (8) of said carousel (3) in a position radially protruding therefrom along a second axis (D) transversal to said first axis (A), and a labeling unit (22) carried by said static frame (21) and configured to feed labels to said carousel (3);

characterized in that said labeling unit (22) is mounted in a movable manner along said second axis (D) with respect to said static frame (21).

- The labeling module as claimed in claim 8, wherein said labeling module (18) comprises a guiding arrangement (37a, 37b) for guiding a slide (23) of said labeling unit (22) along said second axis (D).
- The labeling module as claimed in claim 9, wherein said guiding arrangement comprises guide-and-slide devices (37a, 37b) acting on opposite lateral sides (40, 41) of said slide (23).
- The labeling module as claimed in claim 10, wherein said guide-and-slide devices (37a, 37b) include a prismatic guide (44) arranged on one of said lateral sides (41), and a plurality of rollers (38a, 38b) moving on a planar fixed surface of said static frame (21) arranged on another of said lateral sides (40).
- The labeling module as claimed in any one of the claims from 9 to 11, wherein said static frame (21) includes a stop arrangement (26) cooperating, in use, with said slide (23) to define a working position, wherein said slide (23) is at a minimum distance from said carousel (3), and a maintenance position, wherein said slide (23) is at a maximum distance from said carousel (3).
- The labeling module as claimed in claim 12, wherein said stop arrangement (26) is configured to cooperate with said rollers (38a, 38b) for limiting movement of said slide (23) between said working and maintenance positions.
- The labeling module as claimed in any one of the claims from 9 to 13, wherein said labeling module (18) is equipped with a motor (50) configured to automatically control the movement of said slide (23) along said second axis (D).

FIG. 1

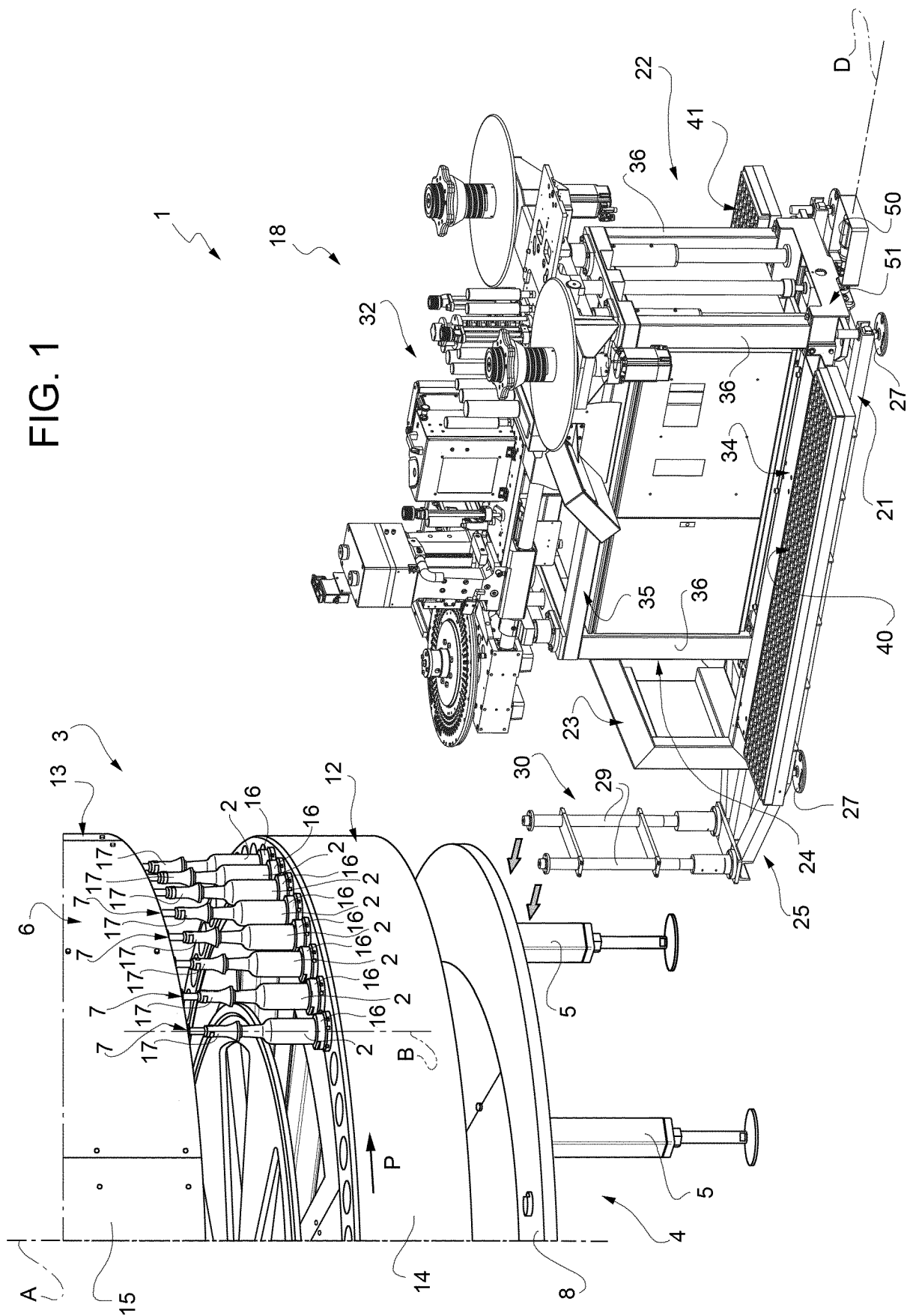
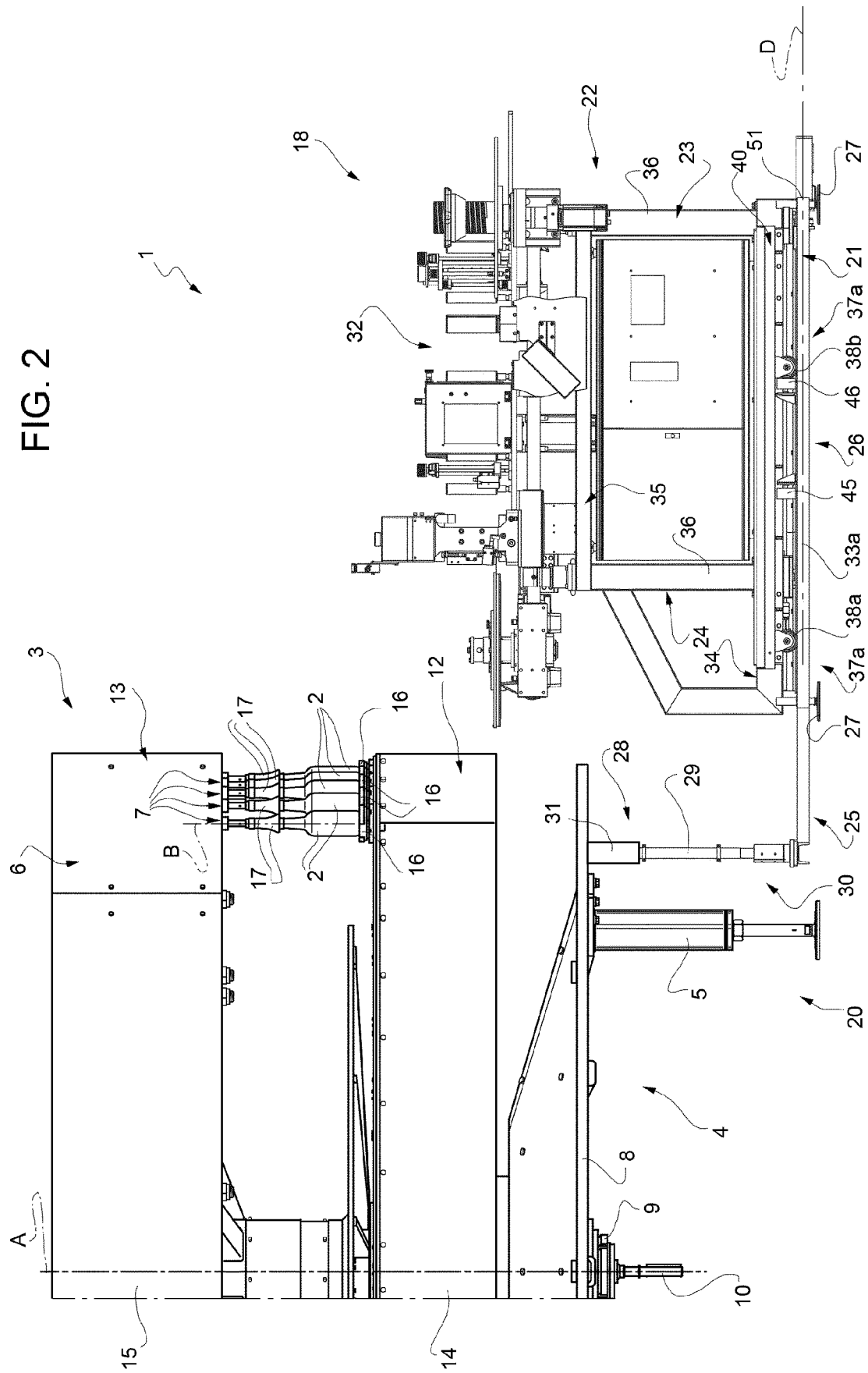
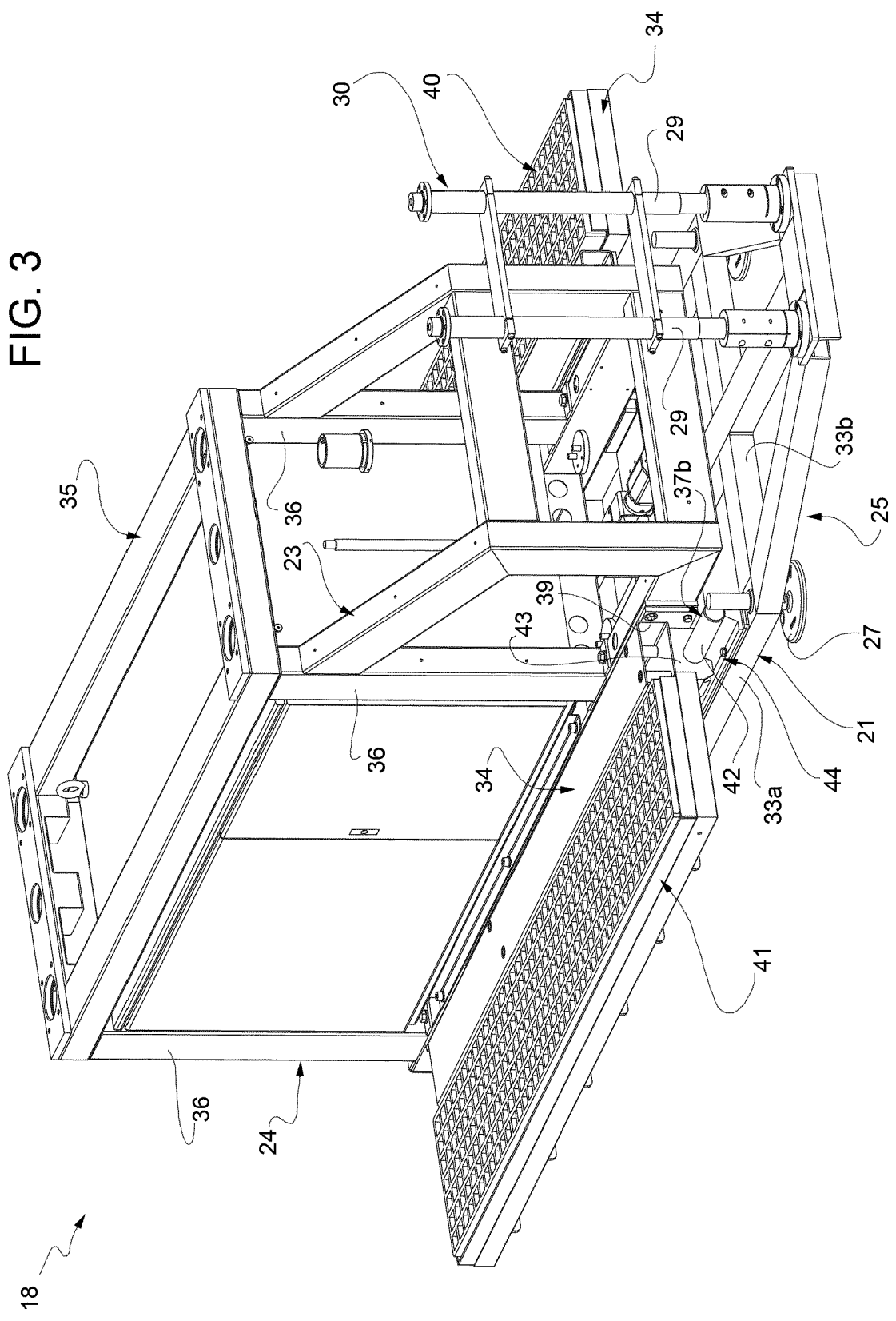


FIG. 2





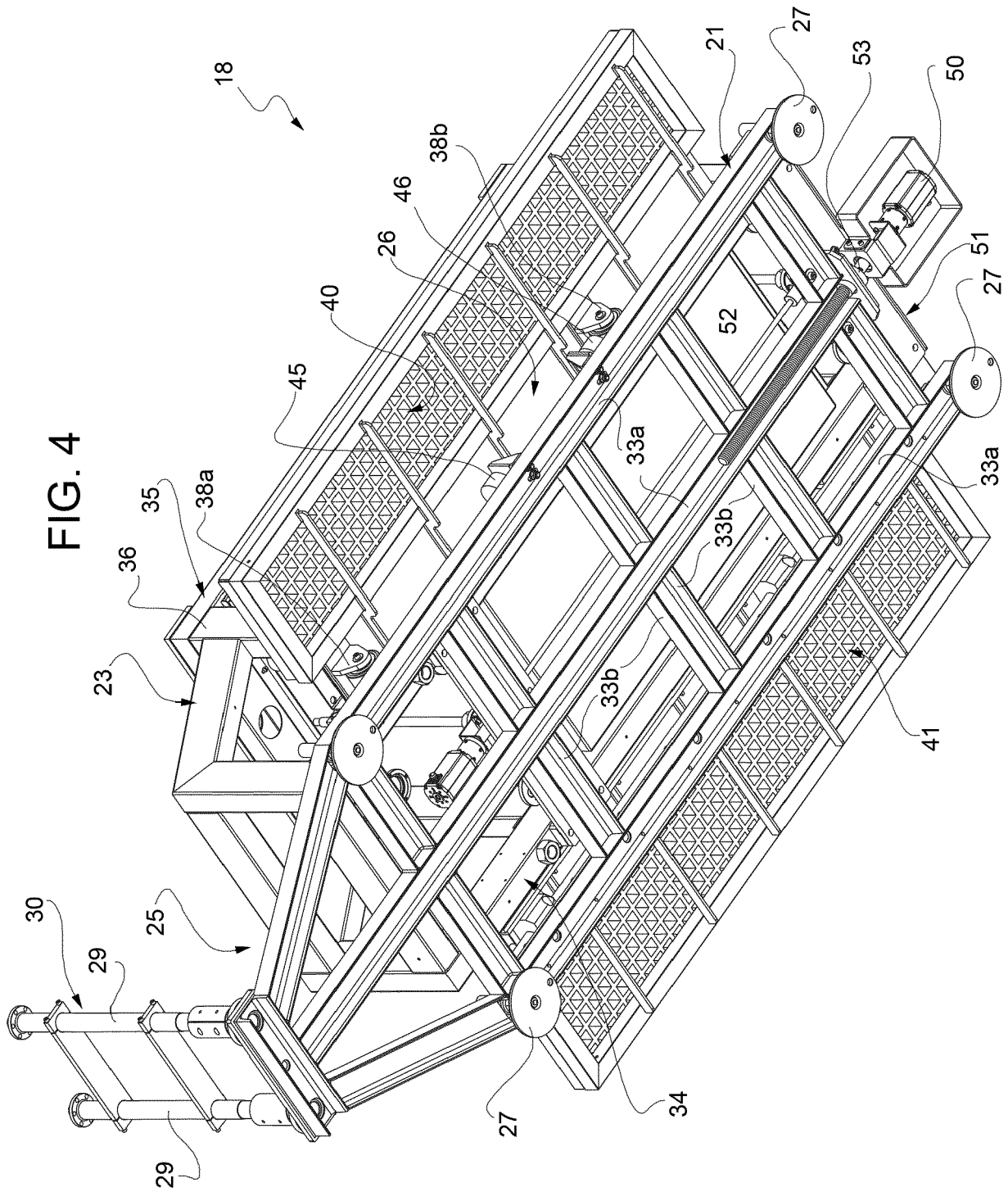
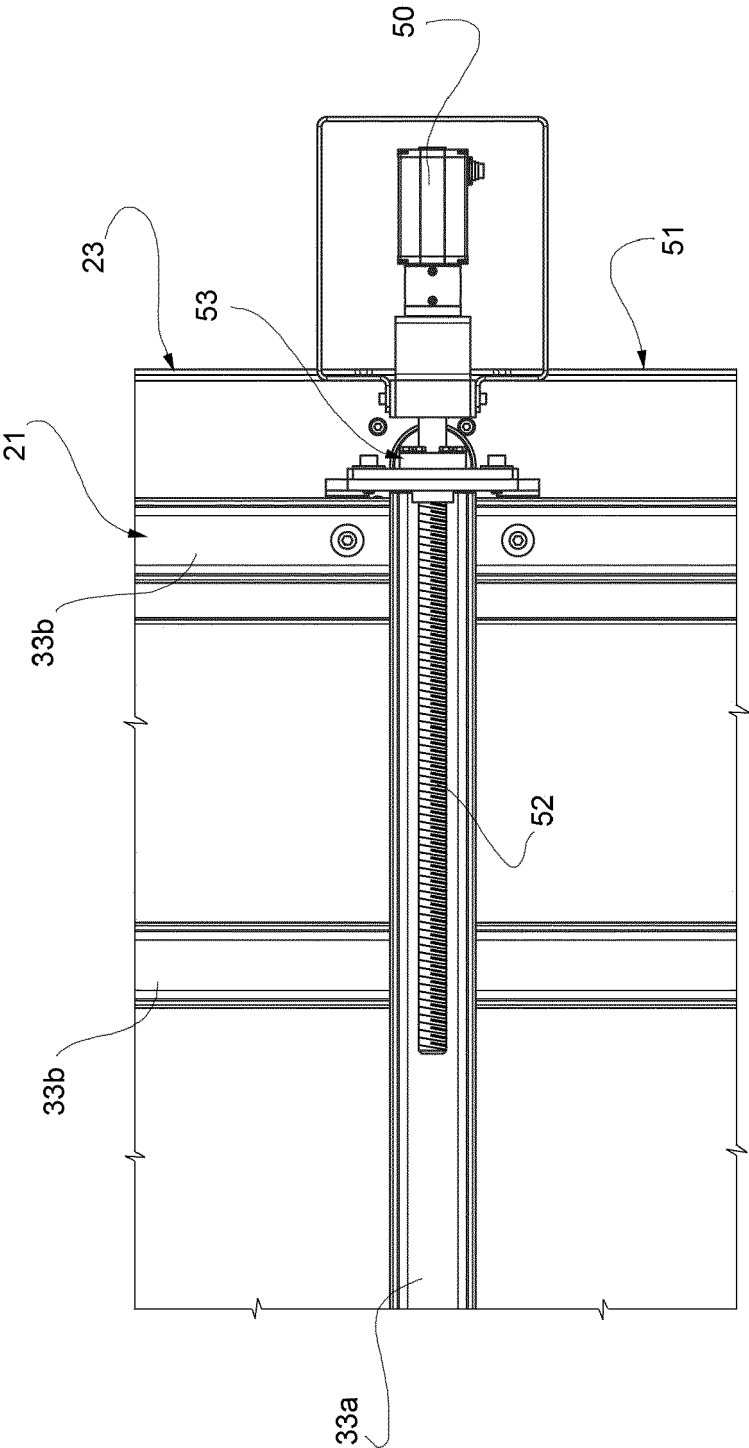


FIG. 5





EUROPEAN SEARCH REPORT

Application Number
EP 17 30 5691

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			TECHNICAL FIELDS SEARCHED (IPC)
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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 20 November 2017	Examiner Pardo Torre, Ignacio
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 17 30 5691

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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