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(54) APPARATUS FOR MACHINING PROFILED BARS

(57) An apparatus comprises a machining unit (2) for machining a profiled bar (B), a feed conveyor (4) for advancing the profiled bar (B) towards the machining unit (2) in a first direction (X), a labelling unit (7) for applying a label on the profiled bar (B). The labelling unit (7) comprises an applicator head (15) for bringing the label into contact with the profiled bar. The applicator head (15) comprises an applicator (22) delimited by a working surface (23).

The applicator (22) has at least one suction opening (25) opening onto the working surface (23) and connectable to a source of suction for keeping the label in contact with the working surface (23) whilst the label is conveyed towards the profiled bar (B).

The labelling unit (7) further comprises a support (32) for supporting the applicator (22). At least one elastic element (31) is interposed between the support (32) and the applicator (22), the elastic element (31) being deformable when the applicator (22) is pressed against the profiled bar (B) to apply the label.

The applicator (22) may comprise blowing means which can be selectively activated for sending on the label a pressurised fluid which helps the label to detach from the working surface (23) and to adhere to the profiled bar (B).

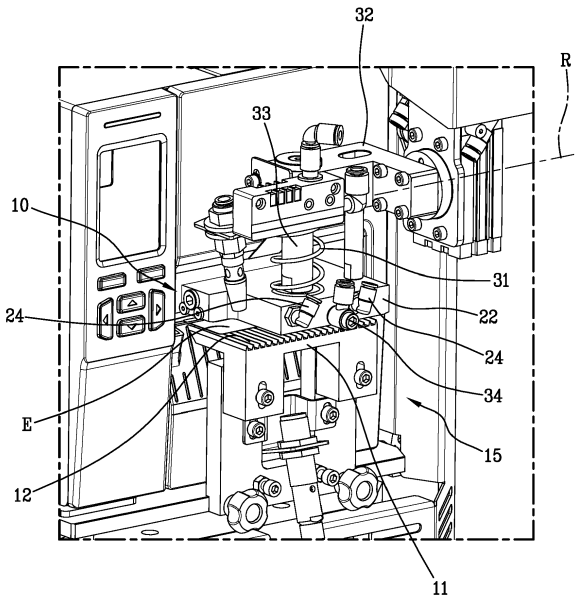

Fig.6

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Description

[0001] The invention relates to an apparatus for machining profiled bars, for example profiled bars made of metallic materials, such as aluminium, steel or other, synthetic polymeric materials, such as polyvinyl chloride (PVC) or composite materials.

[0002] The profiled bars may be intended to form doors and windows frames but they may also be used for other applications, such as the construction of supporting frames or other products.

[0003] The apparatus according to the invention allows one or more labels, particularly self-adhesive labels, to be applied on each profiled bar.

[0004] The labels which the apparatus according to the invention allows to be applied on the profiled bars may have a code, for example a bar code or a QR code, containing information on each profiled bar, for example the batch number, the operations to which the profiled bar must be subjected, indications for the shipment and delivery of the manufactured product in which each profiled bar is incorporated.

[0005] EP 3175950 discloses a machine for machining profiled bars, comprising a labelling unit for applying labels on the profiled bars. The profiled bars are advanced in an advancement direction to be carried to a work station. The labelling unit is movable parallel to the advancement direction for following each profiled bar so as to apply the corresponding label whilst the profiled bar moves along the advancement direction.

[0006] The machine disclosed in EP 3175950 comprises a gripping member connected to a suction source for picking up the labels and bringing them into contact with the profiled bar. EP 3175950 does not contain details on the structure of the gripping member or on how the gripping member picks up and transports the labels.

[0007] Machines of the type disclosed in EP 3175950 are known, in which the gripping member is provided with a plurality of suction cups, connected to a suction source, arranged to pick up the labels and transport them towards the profiled bars.

[0008] These machines have the drawback that, when the gripping member is brought into contact with the profiled bar for applying the label on it, the suction cups apply a non-uniform pressure on the label, which may damage the label.

[0009] Moreover, the machines disclosed in EP 3175950 are rather complicated because they must also move the labelling unit in the advancement direction in which the profiled bars are advanced, which increases the complexity of the driving and control devices associated with the labelling unit.

[0010] In the machines disclosed in EP 3175950, the gripping member is rotatable between a first operating position and a second operating position. In the first operating position, the gripping member is positioned parallel to a horizontal surface. In the second operating position, the gripping member is positioned parallel to a vertical surface. In order to pass from the first operating position to the second operating position, the gripping member can rotate by 90° about a horizontal axis.

[0011] By rotating the gripping member, it is thus possible to apply a label on an upper face of the profiled bar, or on a side face of the profiled bar, the side face being arranged in a position closer to the labelling unit, that is to say, in a position facing the labelling unit.

[0012] However, the labelling unit disclosed in EP 3175950 does not allow labels to be applied on a further side face of the profiled bar furthest away from the labelling unit, that is to say, on a side face which delimits the profiled bar on the opposite side relative to the side face facing towards the labelling unit. This significantly limits the positions in which the labels can be applied by the machine disclosed in EP 3175950.

[0013] US 2022/0185527 discloses a label applicator used in the packaging sector, that is to say, in a sector very far from that of machining profiled bars.

[0014] An object of the invention is to improve the apparatuses for machining profiled bars, which are capable of applying labels on the profiled bars being machined.

[0015] Another object is to provide an apparatus for machining profiled bars, which is capable of applying labels on the profiled bars, without damaging the labels during transport and application.

[0016] Another object is to provide an apparatus for machining profiled bars which is capable of applying labels on the profiled bars with aesthetically pleasant results.

[0017] A further object is to provide an apparatus for machining profiled bars which is capable of applying labels on the profiled bars, while limiting complications in the structure of the apparatus.

[0018] Another object is to provide an apparatus for machining profiled bars, which is capable of applying labels on an increased number of faces of the profiled bar.

[0019] According to the invention, there is provided an apparatus comprising a machining unit for machining a profiled bar, a feed conveyor for advancing the profiled bar towards the machining unit in a first direction, a labelling unit for applying a label on the profiled bar, wherein the labelling unit comprises an applicator head for bringing the label into contact with the profiled bar, the applicator head comprising an applicator delimited by a working surface, the applicator having at least one suction opening which opens onto the working surface and is connectable to a source of suction for keeping the label in contact with the working surface whilst the label is conveyed towards the profiled bar, the labelling unit further comprising a support for supporting the applicator, wherein between the support and the applicator at least one elastic element is interposed which is deformable when the applicator is pressed against the profiled bar for applying the label.

[0020] Owing to the invention, it is possible to apply labels on profiled bars with high quality results. The suction openings which open directly on the working surface

avoid the use of suction cups and allow the labels to be applied on the profiled bars, eliminating, or at least minimising, creases and other unwanted deformations of the labels. The label is held on the applicator directly in contact with the working surface, which makes it possible to keep the label extended both whilst the latter is transported towards the profiled bar and whilst the label is applied on the profiled bar. The elastic element interposed between the support and the applicator makes it possible to modify the position of the applicator when the latter is pressed against the profiled bar to avoid the label. This allows the position of the applicator to be adapted to the position and shape of the profiled bar, making the pressure applied by the applicator on the profiled bar uniform. Moreover, the elastic element acts as a shock absorber avoiding a violent impact between the applicator and the profiled bar when the applicator is brought into contact with the profiled bar. In this way it is possible to minimise the risks of damaging the profiled bars during application of the labels.

[0021] In an embodiment, the labelling unit comprises an arm, the applicator head being supported by the arm and being rotatable relative to the arm, so that the applicator head can be positioned at least in a first position for applying the label on a side face of the profiled bar, in a second position for applying the label on an upper face of the profiled bar, and in a third position for applying the label on a further side face opposite said side face.

[0022] In particular, the applicator head is rotatable about an axis of rotation by at least 180°, so as to apply the label on the upper face, on the side face and on the further side face of the profiled bar.

[0023] In this way it is possible to obtain an apparatus which is more versatile than the prior art apparatuses, since it is possible to apply the label both on the side face closest to the labelling unit, and on the further side face furthest from the labelling unit, as well as on the upper face.

[0024] The upper face is interposed between the side face and the further side face.

[0025] In an embodiment, blowing means are provided for sending a pressurised fluid, for example compressed air, on the label, so as to help the label detach from the working surface of the applicator and adhere to the profiled bar. The fluid sent by the blowing means allows the label to adhere to the profiled bar even if the profiled bar is delimited by a surface that is not perfectly regular.

[0026] The blowing means may comprise a source of pressurised fluid, for example compressed air, which can be connected to a blowing opening provided on the working surface of the applicator.

[0027] In an embodiment, at least one edge of the applicator which delimits the working surface transversally to the first direction is chamfered.

[0028] Owing to the chamfer formed on the edge of the applicator, contact between the applicator and the profiled bar can be made gentler, thereby preventing the bar from being damaged during application of the label.

[0029] In an embodiment, the working surface is delimited by two edges of the applicator which extend in sequence along the first direction and are arranged transversely to the first direction, said edges being chamfered.

[0030] In an embodiment, the labelling unit is arranged in a fixed position along the first direction.

[0031] This enables the structure and operation of the apparatus to be simplified, since it is not necessary to provide a driving device for moving the labelling unit in the direction in which the profiled bars are advanced.

[0032] The labelling unit may be configured for applying the label on the profiled bar whilst the profiled bar is stationary, for example because it is subjected to operations in the machining unit.

[0033] In alternative embodiment, the labelling unit is configured for applying the label on the profiled bar whilst the profiled bar is moved in the first direction. This is made possible owing to the shape of the working surface of the applicator, which is smooth and does not comprise suction cups. This allows the profiled bar to slide easily in contact with the applicator head.

[0034] This improves the efficiency of the apparatus according to the invention, since it is not necessary to stop the profiled bar for applying the label on it. It may also happen that the labelling unit is configured for applying the label whilst the profiled bar is moved along the first direction and its speed is increased, that is to say, the profiled bar is accelerated.

[0035] This is made possible owing to the smooth surface which delimits the working surface of the applicator, making it possible to slide the profiled bar, and owing to the adhesive applied on the face of the label facing towards the profiled bar, which ensures that the label remains attached to the profiled bar even if the latter moves.

[0036] The invention can be better understood and implemented with reference to the accompanying drawings which illustrate a non-limiting example embodiment of it and wherein:

Figure 1 is a schematic perspective view showing an apparatus for machining profiled bars;

Figure 2 is a perspective view showing a labelling unit of the apparatus of Figure 1;

Figure 3 is a side view showing a portion of the labelling unit, whilst a label is applied on a side face of a profiled bar;

Figure 4 is a side view like that of Figure 3, wherein a label is applied on an upper face of a profiled bar;

Figure 5 is a side view like that of Figure 3, wherein a label is applied on a further side face of a profiled bar;

Figure 6 is a perspective view showing an applicator head of the labelling unit of Figure 2;

Figure 7 is a perspective view showing a part of the applicator head of Figure 6, taken from a different angle.

[0037] Figure 1 shows an apparatus 1 for machining

profiled bars B. The profiled bars may be made of different types of materials, for example metallic materials such as aluminium, synthetic polymeric materials such as polyvinyl chloride (PVC), composite materials and the like. The profiled bars may have a full transversal cross-section, or a hollow transversal cross-section.

[0038] As shown in Figure 1, the apparatus 1 comprises a machining unit 2, which includes an operating head for machining the profiled bars. The operating head may be included in a machine tool, in particular a numerical control machine tool such as a machining centre. The operating head is able to perform machining operations of various types, for example drilling, milling, cutting and the like, on the profiled bars.

[0039] The apparatus 1 further comprises a feed section 3 for feeding profiled bars to be machined to the machining unit 2. An outfeed section is furthermore provided, which is not illustrated, arranged downstream of the machining unit 2 for moving away from the machining unit 2 the profiled bars which have already been machined.

[0040] The feed section 3 comprises a feed conveyor 4 for advancing each profiled bar towards the machining unit 2 moving the profiled bar in a first direction X, parallel to a longitudinal dimension of the profiled bar. The feed conveyor 4 may comprise a gripping element, for example shaped like a gripper, for engaging with an end of the profiled bar and pushing the profiled bar in the first direction X towards the machining unit 2.

[0041] The feed section 3 also comprises an infeed conveyor 5 for feeding the profiled bars towards the feed conveyor 4. The infeed conveyor 5 may be configured to receive and support the profiled bars and to move them transversely, in particular perpendicularly, to their longitudinal dimension. According to the example shown, the infeed conveyor 5 is configured to move the profiled bars horizontally along a second direction Y, perpendicular to the first direction X. In this way, the profiled bars can be delivered to the feed conveyor 4, for example positioning the profiled bars in a position in which they can be gripped by the gripping element of the feed conveyor 4.

[0042] The infeed conveyor 5 may comprise a plurality of conveyor belts 6, parallel with each other. Each conveyor belt 6 extends mainly in the second direction Y.

[0043] The apparatus 1 comprises a labelling unit 7 for applying on each profiled bar at least one self-adhesive label, on which there may be information, for example encoded in a bar code or other type of code, relating to the history of the profiled bar, such as, for example, batch number, type of operations which must be performed on the profiled bar, information relating to the type of profiled bar in which the profiled bar will be incorporated, customer and delivery address, and the like.

[0044] According to the example shown, the labelling unit 7 is positioned upstream of the machining unit 2 along the first direction X.

[0045] It is, however, also possible to provide for other locations for the labelling unit 7. For example, according to an alternative version, the labelling unit 7 might be positioned downstream of the machining unit 2 along the first direction X.

[0046] According to a further alternative version, the apparatus 1 may comprise two or more machining units 2 positioned in sequence along the direction X. The labelling unit 7 may in this case be positioned in any position along the direction X, for example in a position interposed between two consecutive machining units 2.

[0047] Figure 2 shows the labelling unit 7, which comprises a supporting structure 8 which supports a printer 9 for dispensing printed self-adhesive labels. The inside of the printer 9 may house a reel, not illustrated, of self-adhesive labels, initially adhering to a supporting ribbon. The printer 9 is configured for printing the desired information on the self-adhesive labels and detaching each label from the supporting ribbon.

[0048] The printer 9 comprises an outfeed 10, shown in Figure 6, from which the self-adhesive printed labels E leave, detached from the supporting ribbon, which may be, for example, oriented with a printed face facing upwards and a self-adhesive face facing downwards. The outfeed 10 may comprise a supporting element 11 for temporarily supporting a label which is printed and detached from the supporting ribbon. The supporting element 11 may be delimited by a supporting surface 12 having non-adhesive properties to prevent the self-adhesive face of the printed label from stably adhering to the supporting element 11. For example, the supporting surface 12 may have a surface finish intended to make the adhesion of the printed labels difficult, thanks, for example, to a surface scoring, or a relatively high surface roughness. It is also possible to provide a non-stick coating on the supporting surface 12.

[0049] The supporting surface 12 may be substantially horizontal, or it may define a plane inclined relative to the horizontal direction.

[0050] The printer 9 is mounted inside a housing 13 which can be moved forwards and backwards along the second direction Y so as to move the printer 9 towards the profiled bar on which the label must be applied or alternatively move the printer 9 away from the profiled bar.

[0051] More specifically, there is an actuator 14, which may be of the pneumatic type, for moving the housing 13 in the second direction Y. The actuator 14 allows the housing 13 to be moved, together with the printer 9 received in it, outside the dimensions of the feed conveyor 4, for example when it is necessary to perform maintenance or repair operations.

[0052] The labelling unit 7 also comprises an applicator head 15 for applying the labels on the profiled bars. The applicator head 15 is configured for picking up from the supporting surface 12 the printed labels E, already detached from the supporting ribbon, and for transferring each label E in contact with a profiled bar B, so as to apply the label E on the profiled bar B.

[0053] The applicator head 15 is movable relative to

the printer 9 in a horizontal direction perpendicular to the direction in which the profiled bars are advanced towards the machining unit 2, that is to say, in the second direction Y, and in a third direction Z, which in the example shown is vertical. As described in more detail below, the applicator head 15 is also rotatable about an axis of rotation R, which, in the example shown, is parallel to the first direction X.

[0054] The applicator head 15, on the other hand, is located in a fixed position along the first direction X, that is to say, it is not movable in the horizontal direction in which the profiled bars are advanced in order to move them into the machining unit 2.

[0055] The applicator head 15 is supported by a pair of arms, which comprise a first arm 16 and a second arm 17. The first arm 16 is supported by the housing 13 and is movable with respect to the housing 13 in the second direction Y. More specifically, the housing 13 is connected to a supporting member 18 which slidably supports the first arm 16. The first arm 16 can slide relative to the supporting member 18 in the second direction Y, thanks to an actuation device which may comprise a first actuator 19, shown in Figure 3, which may comprise, for example, an electric motor, a pneumatic cylinder or other.

[0056] A further supporting member 20, which slidably supports the second arm 17, is fixed to an end of the first arm 16. The latter may slide forwards and backwards in the third direction Z, relative to the supporting member 20, thanks, for example, to a second actuator 21, which may comprise an electric motor, a pneumatic cylinder or other.

[0057] The applicator head 15 is connected rotatably to the second arm 17. More precisely, as mentioned above, the applicator head 15 may rotate about the axis of rotation R, shown in Figure 6, which may be parallel to the first direction X. As described in detail below, by rotating the applicator head 15 about the axis of rotation R, it is possible to apply the label on different faces of the profiled bar, which can be selected by the operator.

[0058] As shown in Figures 6 and 7, the applicator head 15 comprises an applicator 22, for picking up the printed labels, one after the other, from the supporting surface 12 and for transferring the printed labels to the profiled bars. The applicator 22 is a suction applicator, for example a suction plate, that is to say, it is connected to a suction source to keep the label E in contact with a relative working surface 23 thanks to a suction action. The applicator 22 is connectable to the suction source by means of connectors 24, shown in Figures 6 and 7.

[0059] As described in more detail below, the applicator 22 may also be connected to a source of pressurised fluid for generating a jet of pressurised fluid to be applied on the label in order to favour the adhesion to the profiled bar.

[0060] On the working surface 23 there is a plurality of suction openings 25 through which it is possible to apply a suction action on the label to be applied.

[0061] According to the example shown, there are eight suction openings, positioned along the sides of a rectangle. The maximum linear dimension of the rectangle is parallel to the larger dimension of the label E and is, in this example, oriented parallel to the first direction X. This condition is not however necessary, and it is possible to provide a number of suction openings 25 different from eight. It is also possible to position the suction openings 25 according to any desired arrangement on the working surface 23.

[0062] The suction openings 25 may be shaped like holes having a circular transversal section, as shown in Figure 7, or as slots.

[0063] Formed in the thickness of the applicator 22 is a circuit, not illustrated, for connecting the suction source, and in particular the connectors 24, with the suction openings 25.

[0064] According to a version, there may be blowing means for sending a pressurised fluid, for example compressed air, on the label, in such a way that the label detaches more easily from the working surface 23 and adheres better to the profiled bar B.

[0065] According to the example shown, the blowing means comprise a plurality of blowing openings 26, shown in Figure 6, which lead to the working surface 23.

[0066] The blowing openings 26 may have an elongate shape, for example shaped like slots. It is, however, also possible to adopt other shapes for the blowing openings 26, for example a circular shape.

[0067] According to the example shown, there are three blowing openings 26. The number of blowing openings 26 may, however, be selected as desired, and may also be different from three.

[0068] The blowing openings 26 may be arranged along a row, which in the example shown is parallel to the first direction X. More generally speaking, the blowing openings 26 may be arranged along a row parallel to a larger dimension of the label.

[0069] According to the example shown, the suction openings 25 are positioned along two rows, which may be parallel to the first direction X or, more generally, to the larger dimension of the label.

[0070] The row of blowing openings 26 may be interposed between the two rows of suction openings 25.

[0071] More generically, the blowing openings 26 may be positioned in such a way as to act on a central region of the label, whilst the suction openings 25 may be positioned in such a way as to act in peripheral regions of the label. This helps the label to detach in an optimum manner from the working surface 23 and makes it possible to minimise, or even avoid, defects in the adhesion of the label to the profiled bar.

[0072] Through the thickness of the applicator 22 there is formed an arrangement of conduits, not illustrated, by means of which the blowing openings 26 can be connected to the source of pressurised fluid, by means of a connector element 34.

[0073] According to the example shown, the working surface 23 is a substantially flat surface. This geometry

of the working surface 23 is suitable for applying labels on a flat face of the profiled bar. The working surface 23 may also not be flat, depending on the shape of the face of the profiled bar on which the label must be applied. For example, if the label must be applied on a curved face of the profiled bar, the working surface 23 may have a curved geometry.

[0074] If the applicator 22 has the blowing means, the pressurised fluid dispensed through the blowing openings 26 makes it possible to also apply the label on a surface of the profiled bar having a shape which is not perfectly shaped to match the shape of the working surface 23. For example, if the working surface 23 is flat, the blowing means may also allow the label to be applied on a surface of the profiled bar which is not perfectly flat and regular.

[0075] A chamfer 28 is formed along an edge 27 of the applicator 22. The chamfer 28 may be delimited by a flat or rounded surface. The edge 27 is positioned transversally, in particular perpendicularly, to the first direction X. The edge 27 minimises the risks of damaging the profiled bar when the applicator 22 is pushed against the profiled bar for applying the label on it.

[0076] A further chamfer 30 may be formed on a further edge 29 of the applicator 22. The further edge 29 is also positioned transversally, in particular perpendicularly, to the first direction X. The edge 27 may be positioned upstream of the further edge 29 relative to the advancement direction of the profiled bars along the first direction X. The further chamfer 30 may be delimited by a flat or rounded surface. The further chamfer 30 is also intended to minimise the damage which may be produced on the profiled bar when the applicator 22 is pushed against the profiled bar for applying the label on it.

[0077] The applicator 22 is not mounted in a fixed position on the applicator head 15. The applicator 22 is supported by one or more elastic elements 31, which may be deformed when the applicator 22 is pushed into contact with the profiled bar. In that way, it is possible to dampen the impact between the profiled bar and the applicator 22 and adapt the position of the applicator 22 to the position of the profiled bar.

[0078] More in detail, the applicator 22 is supported by a support 32, which, in the example illustrated, is L-shaped but which may also have other shapes. Interposed between the support 32 and the applicator 22 there is an elastic element 31, which in the example shown comprises a helical spring.

[0079] The elastic element 31 may be positioned around a pin 33 which is fixed relative to the applicator 22 and slidable inside a hole made in the support 32. In this way, the elastic element 31 may be compressed when the applicator 22 is pushed against the profiled bar for applying the label.

[0080] The applicator head 15 may optionally comprise a nozzle 37 for dispensing a jet of pressurised fluid, particularly compressed air, on a face of the profiled bar on which the label must be applied, before the latter is brought into contact with the profiled bar. The jet of pressurised fluid acts like a cleaning jet, which allows any dirt particles which contaminate that face to be removed from the face of the profiled bar and which could prevent the label from adhering correctly to the profiled bar.

[0081] During operation, the profiled bars to be machined are loaded onto the infeed conveyor 5. The latter moves the profiled bars in the second direction Y, in such a way as to move each profiled bar to a position in which the gripping element of the feed conveyor 4 can grip the profiled bar for moving it towards the machining unit 2.

[0082] As shown in Figure 4, the feed conveyor 4 comprises a plurality of supporting rollers 35 for receiving and supporting the profiled bars whilst the latter are advanced towards the machining unit 2 along the first direction X. The supporting rollers 35 may be freely rotatable about respective horizontal axes. The supporting rollers 35 define a horizontal supporting surface which allows the profiled bars to be positioned uniquely and precisely in the third direction Z, that is to say, along the vertical direction.

[0083] The apparatus 1 also comprises a plurality of contact rollers 36, only one of which is shown in Figure 4, against which a side surface of each profiled bar may make contact. According to the example shown, the contact rollers 36 are freely rotatable about respective vertical axes. The contact rollers 36 therefore define a vertical contact plane which allows the profiled bars to be positioned uniquely and precisely in the second direction Y, that is to say, along a horizontal direction perpendicular to the first direction X.

[0084] When the feed conveyor 4 engages with a profiled bar B, the latter is located in a uniquely defined position both along the second direction Y and along the third direction Z.

[0085] The feed conveyor 4 carries the profiled bar B into the machining unit 2, to a predetermined position. The apparatus 1 comprises a control unit, not illustrated, in which are stored the operations which must be performed on each profiled bar B. Depending on the operation which must be performed, the profiled bar B is stopped in a suitable position in the machining unit 2. Whilst the profiled bar B is stationary, the labelling unit 7 may apply the label on the profiled bar B.

[0086] According to an alternative version, the label may be applied on the profiled bar B whilst the profiled bar B is advancing in the first direction X, provided the speed of the profiled bar B is not excessive. This is made possible by the substantially flat shape of the contact surface 23, which makes it easy for the profiled bar B to slide in contact with the applicator 22, whilst the label is applied.

[0087] According to another version, the applicator head 15 could apply the label on the profiled bar B whilst the profiled bar B is stationary, but the profiled bar B could start to move in the first direction X, that is to say, be accelerated, even whilst the applicator 22 is still pressing the label against the profiled bar. In this way, it is possible to reduce the time necessary for applying the label, sav-

ing the time necessary for withdrawing the applicator 22 detaching it from the profiled bar.

[0088] The labelling unit 7 is located in a position close to the machining unit 2, for example immediately upstream of the latter. Since the profiled bars have a considerably length, for example 6 metres or longer, the profiled bar B which is machined in the machining unit 2 normally protrudes from the machining unit 2 and may therefore interact with the labelling unit 7.

[0089] In the labelling unit 7, a label, still attached to the supporting ribbon, is printed by the printer 9 with the desired information, according to the provisions of the control unit. The printed label is then detached from the supporting ribbon and positioned on the supporting plate 11 of the printer 9, in such a way that the self-adhesive face of the label faces downwards, that is to say, resting on the supporting surface 12.

[0090] Simultaneously, the applicator head 15 is moved close to the supporting surface 12. For this purpose, the applicator head 15 may be moved along the second direction Y, making the first arm 16 slide relative to the supporting member 18. It is also possible to move the applicator head 15 along the third direction Z, sliding the second arm 17 relative to the further supporting member 20.

[0091] The applicator head 15 is also rotated about the axis of rotation R in such a way that the working surface 23 of the applicator 22 faces downwards, that is to say, it faces the printed face of the label. The working surface 23 is brought into contact with the printed face of the label and the suction is activated through the suction openings 25. The suction retains the label in contact with the working surface 23, favouring the detachment of the label from the supporting plate 11 of the printer 9.

[0092] The applicator head 15, together with the label retained by it, is now moved towards the profiled bar. For this purpose, use is made of the capacity of the applicator head 15 to be moved along the second direction Y and along the third direction Z, as described above. The applicator head 15 is also rotated about the axis of rotation R in such a way as to position the applicator 22 with the label facing towards the face of the profiled bar on which the label is to be applied.

[0093] Figure 3 shows a configuration wherein the applicator head 15 is in a first position, in which the label is applied on a side face F1, facing towards the printer 9, of the profiled bar B. According to the example shown, the side face F1 is a vertical face.

[0094] In this case, the applicator head 15 is rotated about the axis of rotation R, in such a way that the working surface 23 which delimits the applicator 22 is positioned vertically and faces towards the vertical face F1 of the profiled bar B.

[0095] The applicator 22 is pushed towards the side face F1 of the profiled bar B, which in the example of Figure 3 is performed by moving the first arm 16 along the second axis Y relative to the supporting element 18, in such a way that the label is pressed against the side face F1. On the self-adhesive face of the label, which faces towards the vertical face F1 of the profiled bar B, there is an adhesive substance which allows the label to be attached to the side face F1 of the profiled bar B. In this way, when the suction action exerted on the label through the openings 25 ends, the label remains attached to the side face F1 of the profiled bar B.

[0096] If the applicator head 15 comprises the blowing means, the flow of pressurised air through the blowing openings 26 is now activated. This allows the label to detach more easily from the working surface 23 and better adhere to the profiled bar B.

[0097] The label is in this way applied on the desired face of the profiled bar B, for example on the side face F1 in the case of Figure 3.

[0098] Figure 4 shows a configuration wherein the applicator head 15 is in a second position in which the applicator head 15 allows a label to be applied on an upper face F2 of the profiled bar B. According to the example shown, the upper face F2 lies on a substantially horizontal plane.

[0099] In this case, the applicator 22 is rotated in such a way that the working surface 23 is positioned horizontally and faces downwards, in such a way that the self-adhesive face of the label faces the upper face F2. By pressing the label against the upper face F2, it is thus possible to apply the label to the profiled bar B.

[0100] In the configuration of Figure 5, the applicator head 15 is positioned in a third position in such a way as to apply the label on a further side face F3 of the profiled bar B, located in a position furthest from the printer 9, that is to say, facing towards the infeed conveyor 5, on the opposite side relative to the printer 9. According to the example shown, the side face F3 defines a vertical plane.

[0101] In this case, the applicator 22 is rotated about the axis of rotation R in such a way that the working surface 23 is vertical and faces towards the side face F3, that is to say, towards the printer 9. At this point, the label may be applied to the side face F3 in the manner described above.

[0102] The applicator head 15 is therefore rotatable about the axis of rotation R by at least 180°, in such a way that it can be positioned in the three positions indicated in Figures 3 to 5.

[0103] Thanks to the capacity to rotate about the axis of rotation R, the applicator head 15 can therefore apply the label on three separate faces F1, F2, F3 of the profiled bar B.

[0104] According to the example shown, the side faces F1 and F3 are positioned vertically, whilst the upper face F2 is positioned horizontally.

[0105] According to a version not illustrated, the side faces F1 and/or F3 might be inclined with respect to the vertical direction. The upper face F2 might be inclined with respect to the horizontal direction.

[0106] The labelling unit 7 also allows in this case the labels to be applied on the side faces and on the upper

face of the profiled bar. For that purpose, the applicator 22 is positioned in such a way that the working surface 23 is oriented parallel to the face on which the label must be applied, which may be done by rotating the applicator 22 through an angle other than 90° relative to the horizontal and/or vertical direction.

[0107] According to the example shown, the printer 9 is positioned in a fixed position along the first direction X, that is to say, along the direction in which the profiled bars are moved to bring them into the machining unit 2. The applicator head 15 is also located in a fixed position along the first direction X.

[0108] This avoids excessive complications in the design, construction and assembly of the labelling unit 7, since the labelling unit 7 is mounted in a fixed position along the first direction X.

[0109] According to the example shown, the label was applied to a flat face of the profiled bar. It is also possible to apply the label on a non-planar face of the profiled bar, for example a face delimited by a curved surface.

[0110] The labelling unit 7 may be configured for applying one or more labels on each profiled bar.

[0111] In its most complete version, the apparatus 1 is therefore very flexible as regards the position of the labels on the profiled bars, the number of labels on each profiled bar, and the type of profiled bars that can be treated.

[0112] As mentioned above, the applicator head 15 may be positioned in a plurality of positions for applying a label on different faces of the profiled bar, in particular in a first position for applying the label on the side face F1, in a second position for applying the label on the upper face F2 and in a third position for applying the label on the further side face F3.

[0113] The positions which the applicator head 15 may adopt may be preset positions, in the sense that the applicator head 15 may be positioned separately in a limited number of positions, for example in the above-mentioned three positions.

[0114] According to an alternative version, the applicator head 15 may be controlled, for example electrically, in such a way that it can be positioned continuously in a plurality of positions interposed between two or more limit positions.

[0115] For example, the position in which the applicator head 15 applies a label on the upper face F2 could be a reference position. Starting from this position, the applicator head 15 could be rotated about the axis of rotation R in a continuous fashion to be positioned in any angular position rotated by an angle of between 0 and 90°, both clockwise and anticlockwise, for applying the label on the side face F1 or on the further side face F3, even if the latter are oblique relative to a vertical direction. The total rotation of the applicator head 15 is also in this case at least 180°.

[0116] This makes it possible to apply labels also on profile bars having complex transversal sections.

Claims

1. An apparatus comprising a machining unit (2) for machining a profiled bar (B), a feed conveyor (4) for advancing the profiled bar (B) towards the machining unit (2) in a first direction (X), a labelling unit (7) for applying a label on the profiled bar (B), wherein the labelling unit (7) comprises an applicator head (15) for bringing the label into contact with the profiled bar (B), the applicator head (15) comprising an applicator (22) delimited by a working surface (23), the applicator (22) having at least one suction opening (25) which opens onto the working surface (23) and is connectable to a source of suction for applying a suction action which keeps the label in contact with the working surface (23) whilst the label is conveyed towards the profiled bar (B), the labelling unit (7) further comprising a support (32) for supporting the applicator (22), wherein between the support (32) and the applicator (22) at least one elastic element (31) is interposed which is deformable when the applicator (22) is pressed against the profiled bar (B) for applying the label, and wherein the labelling unit (7) comprises an arm (17), the applicator head (15) being supported by the arm (17) and being rotatable with respect to the arm (17), so that the applicator head (15) can be positioned at least in a first position for applying the label on a side face (F1) of the profiled bar (B), in a second position for applying the label on an upper face (F2) of the profiled bar (B), and in a third position for applying the label on a further side face (F3) opposite said side face (F1).

2. The apparatus according to claim 1, wherein the applicator head (15) is rotatable with respect to the arm (17) by an angle of at least 180° to pass from the first position to the third position.

3. The apparatus according to claim 1 or 2, wherein the applicator head (15) is rotatable relative to the arm (17) about an axis of rotation (R) arranged parallel to the first direction (X) to pass from the first position to the third position.

4. The apparatus according to any preceding claim, wherein the applicator (22) comprises blowing means which can be selectively activated for sending on the label a pressurised fluid which helps the label to detach from the working surface (23) and to adhere to the profiled bar (B).

5. The apparatus according to claim 4, wherein the blowing means comprise a plurality of blowing openings (26) which open onto the working surface (23).

6. The apparatus according to claim 5, wherein the blowing openings (26) are positioned along a central row, the suction openings (25) being positioned

along two peripheral rows, the central row being interposed between the two peripheral rows.

7. The apparatus according to any preceding claim, wherein the applicator (22) has at least one edge (27) which delimits the working surface (23) transversally to the first direction (X), said edge (27) having a chamfer (28).

8. The apparatus according to any one of claims 1 to 6, wherein the working surface (23) is delimited by two edges (27, 29) of the applicator (22) which extend in sequence along the first direction (X) and are positioned transversely to the first direction (X), each of said edges (27, 29) having a chamfer (28, 30).

9. The apparatus according to any preceding claim, wherein the labelling unit (7) is positioned in a fixed position along the first direction (X).

10. The apparatus according to any preceding claim, wherein the labelling unit comprises a further arm (16), the arm (17) being slidable with respect to the further arm (16) along a vertical direction (Z).

11. The apparatus according to claim 10, wherein the labelling unit (7) comprises a housing (13) in which the printer (9) is housed, the further arm (16) being slidably supported by the housing (13), so as to be movable in a second direction (Y), which extends horizontally transversally to the first direction (X).

12. The apparatus according to any preceding claim, wherein the labelling unit (7) is positioned upstream of the machining unit (2) relative to the first direction (X).

13. The apparatus according to any preceding claim, wherein the applicator head (15) further comprises a nozzle (37) for dispensing on the profiled bar a pressurised fluid acting as cleaning fluid.

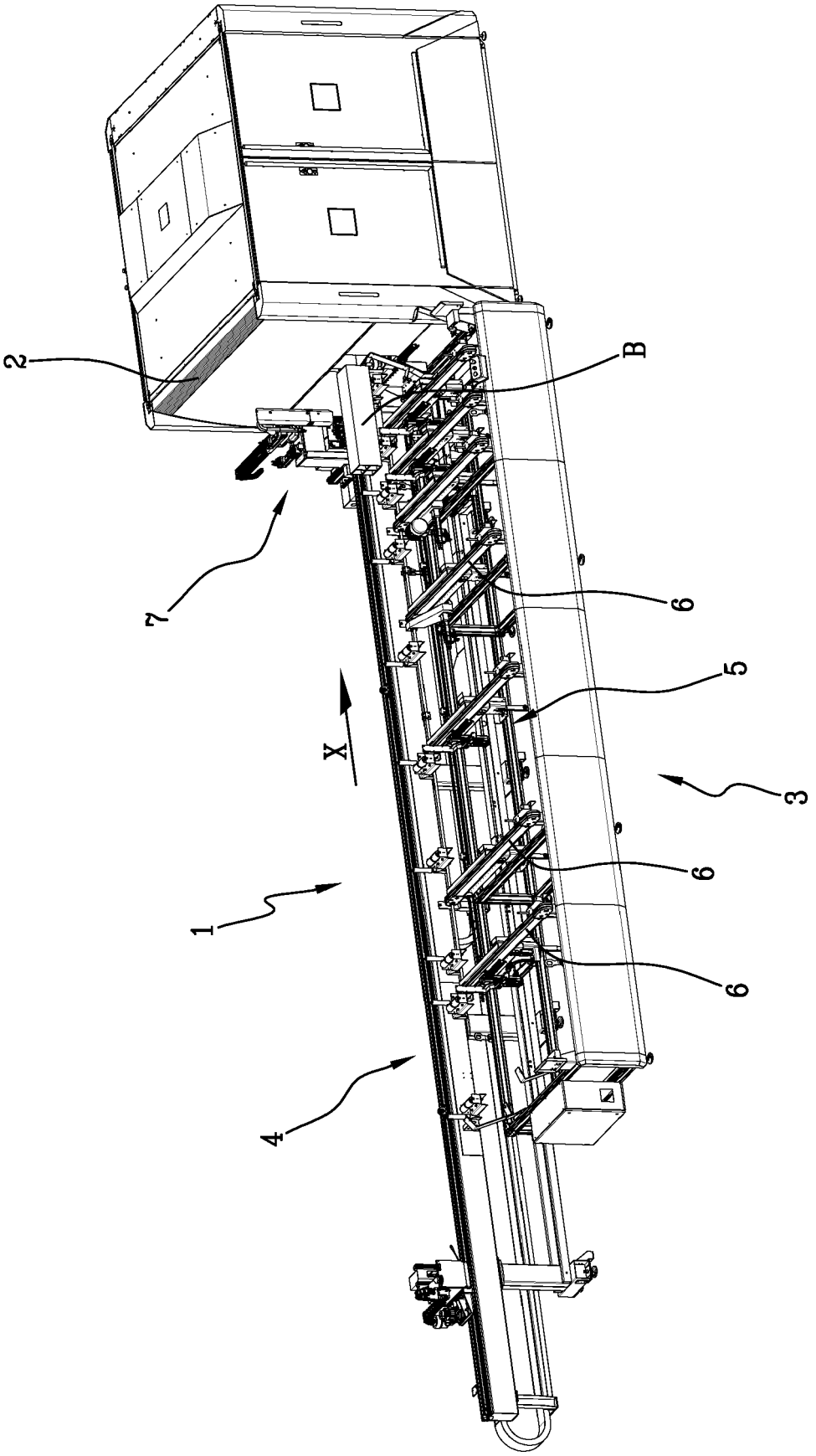
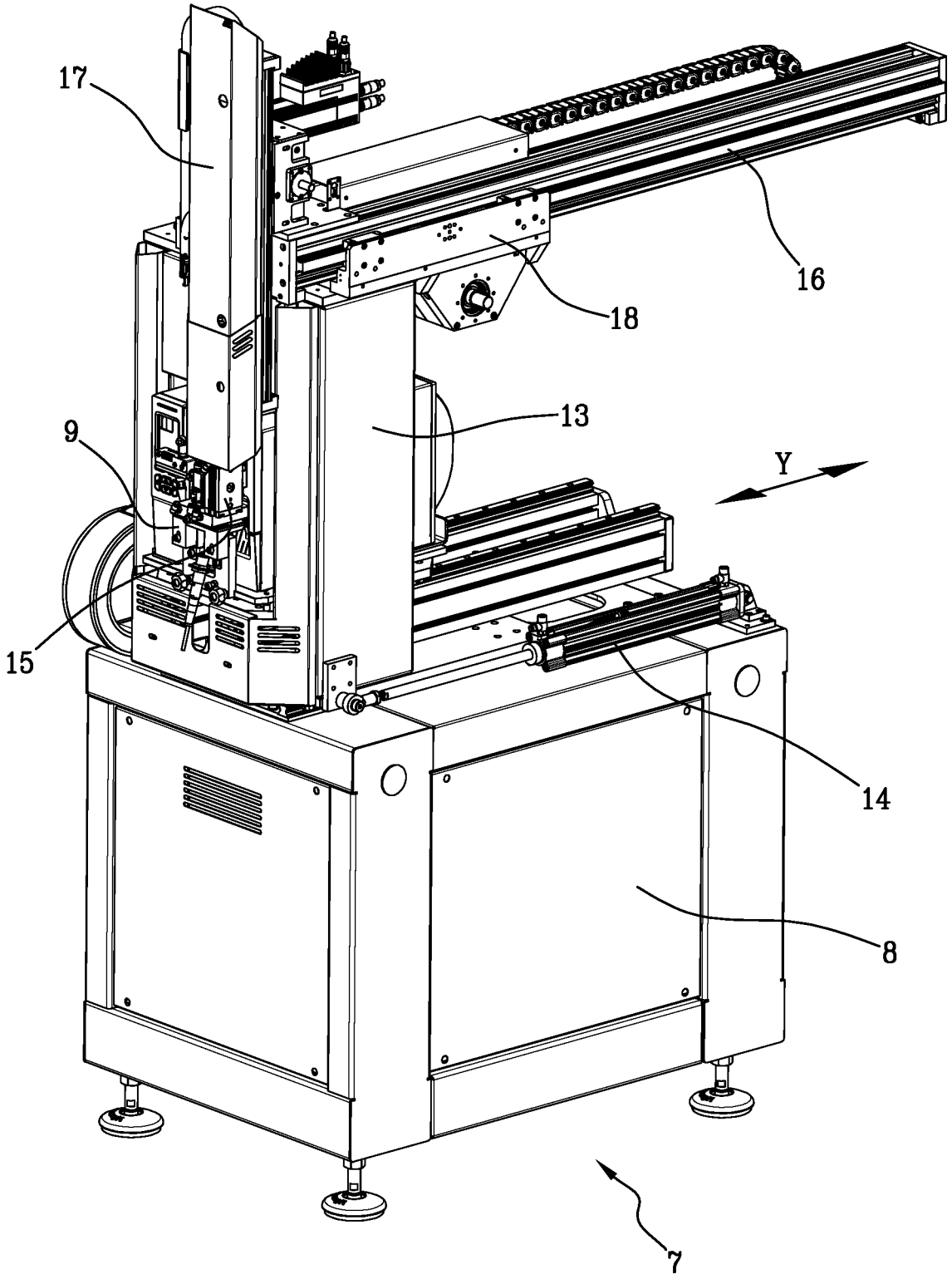


Fig.1

Fig.2



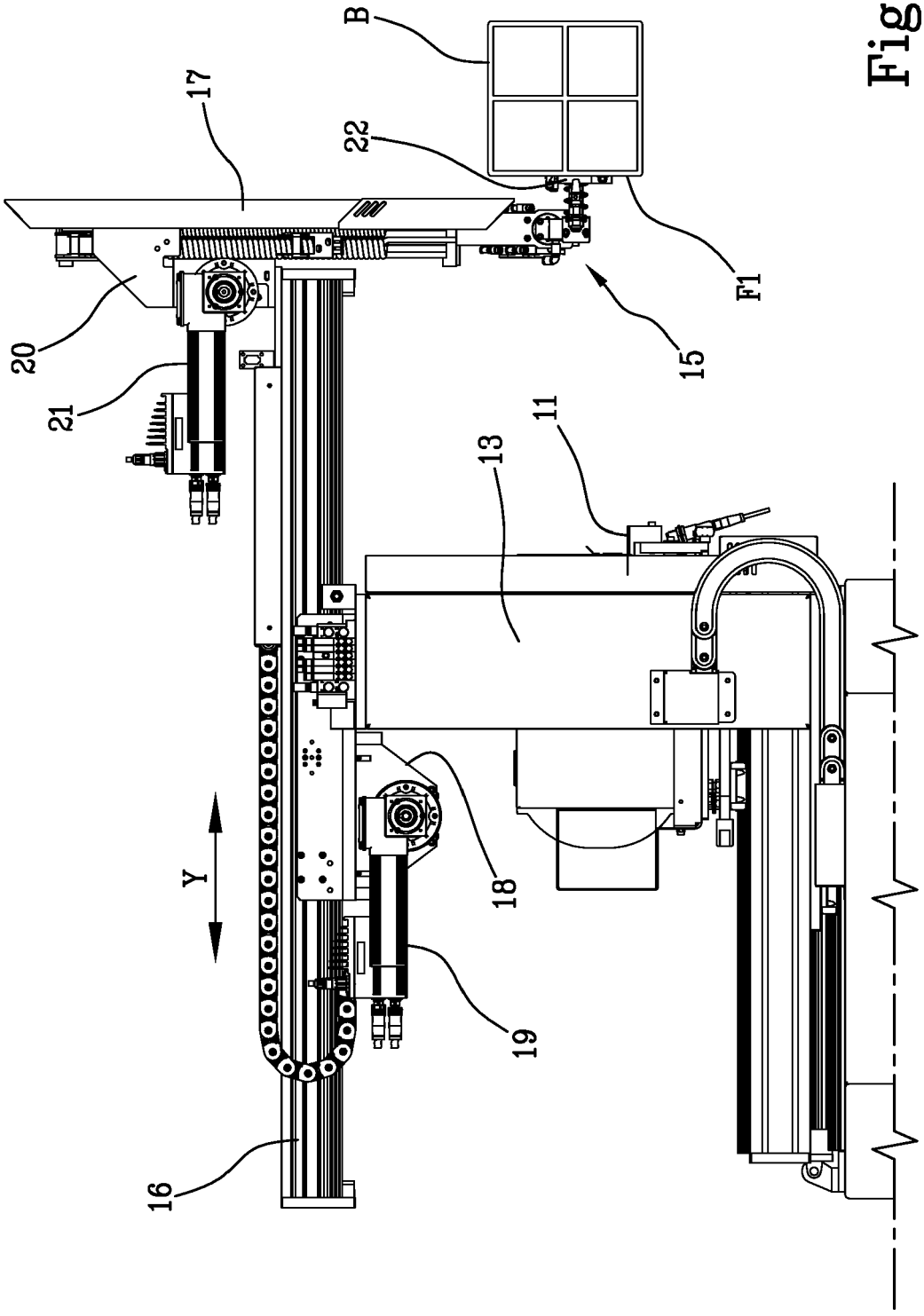


Fig.3

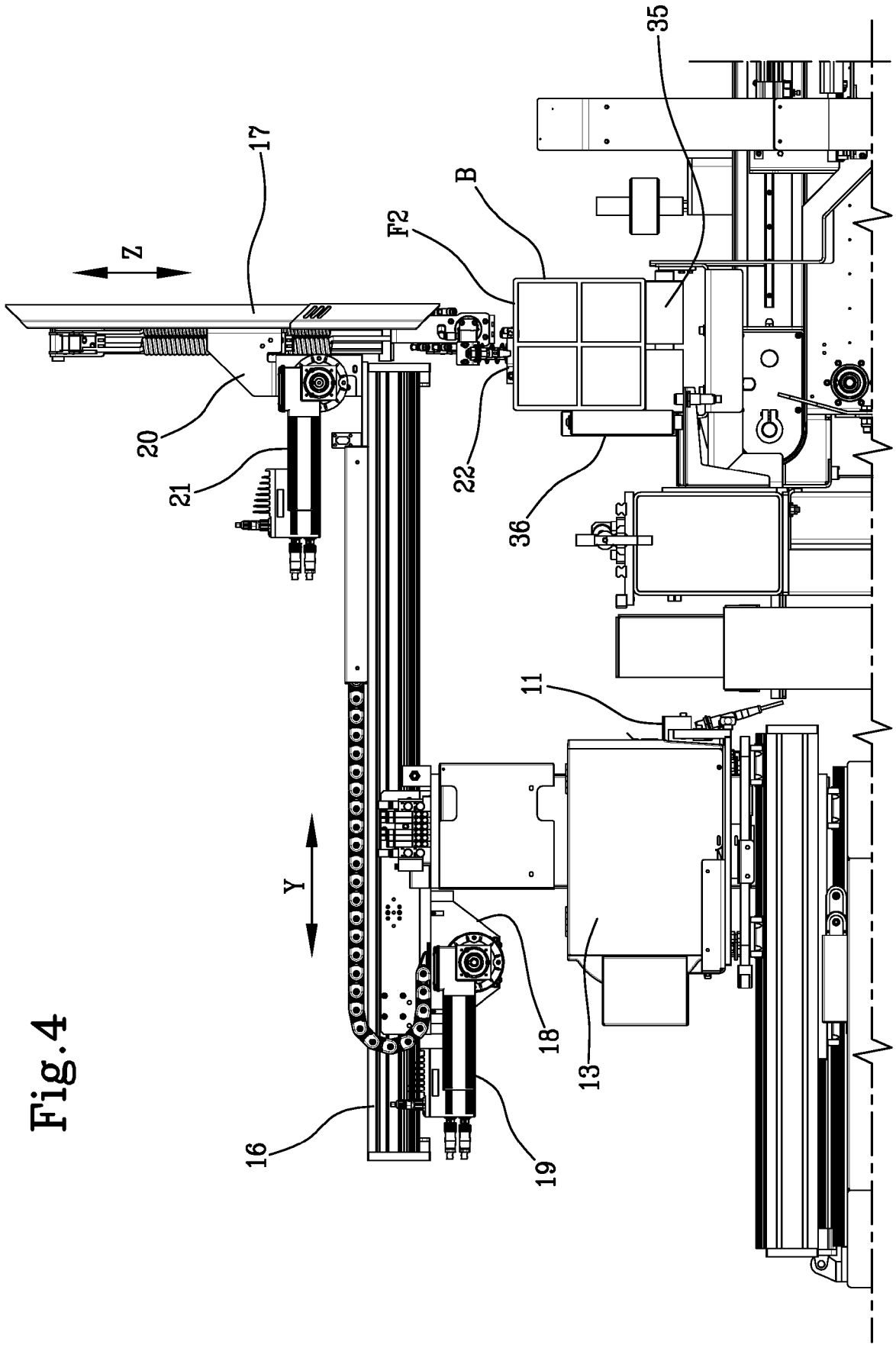


Fig.4

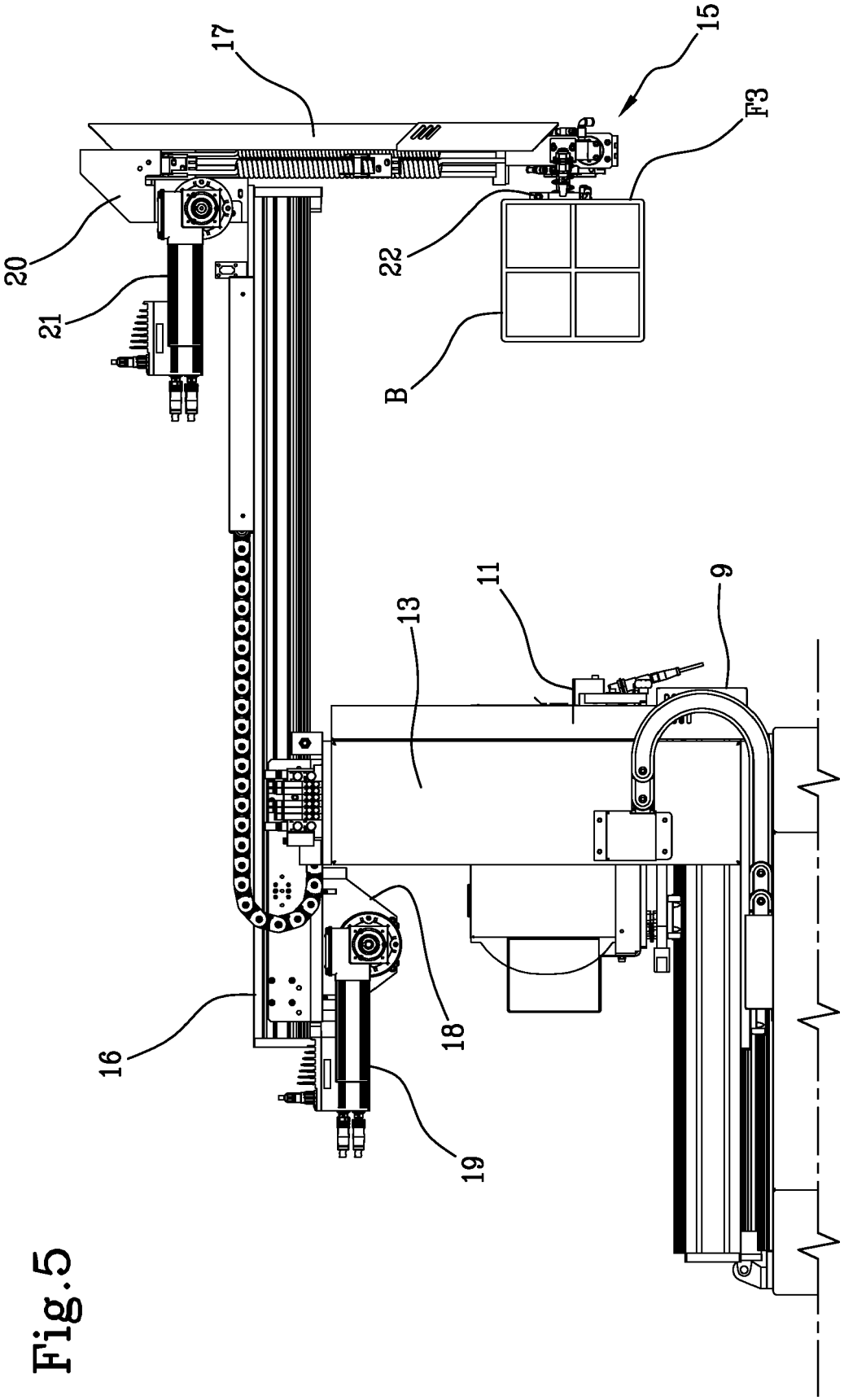


Fig.5

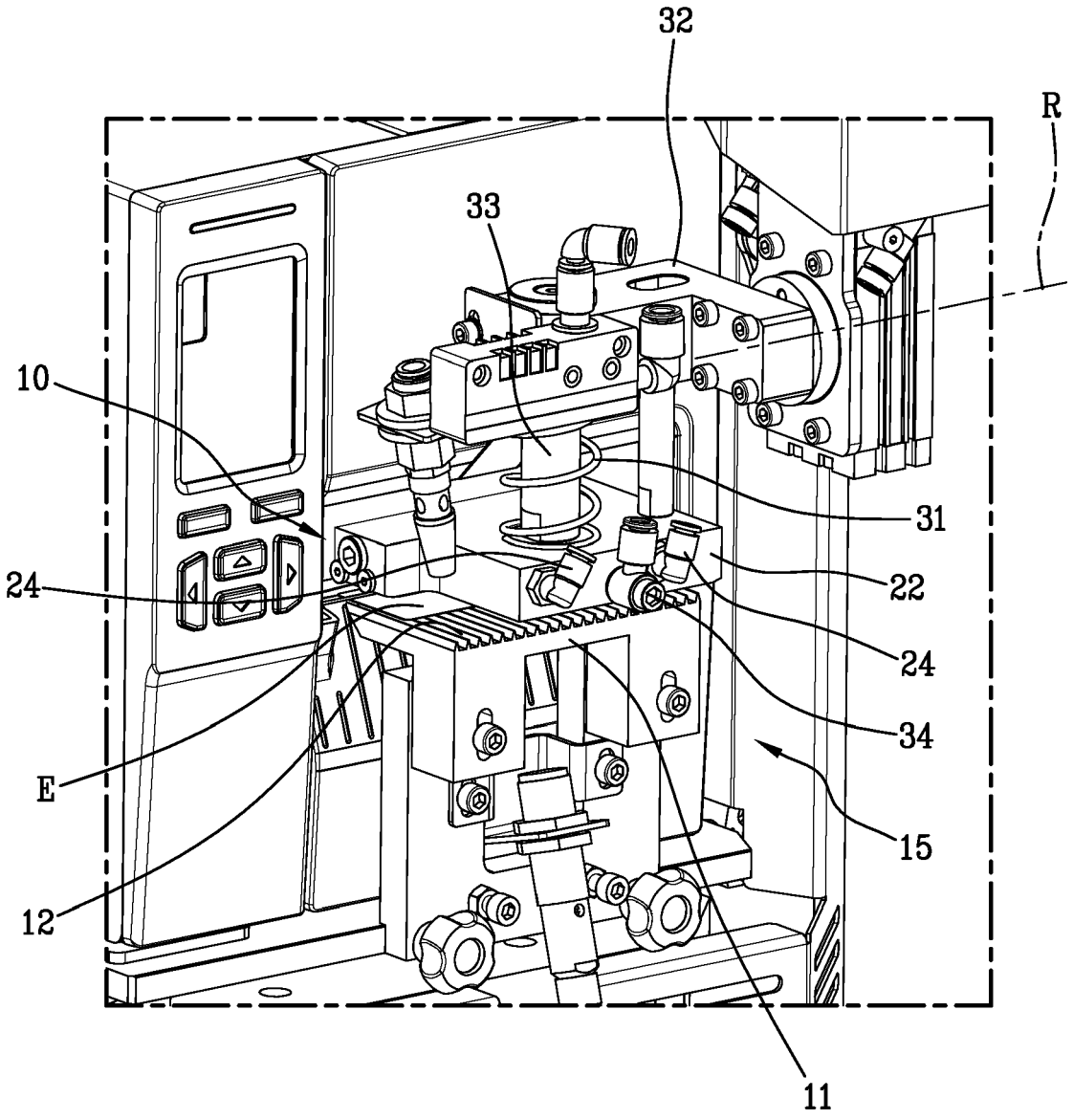
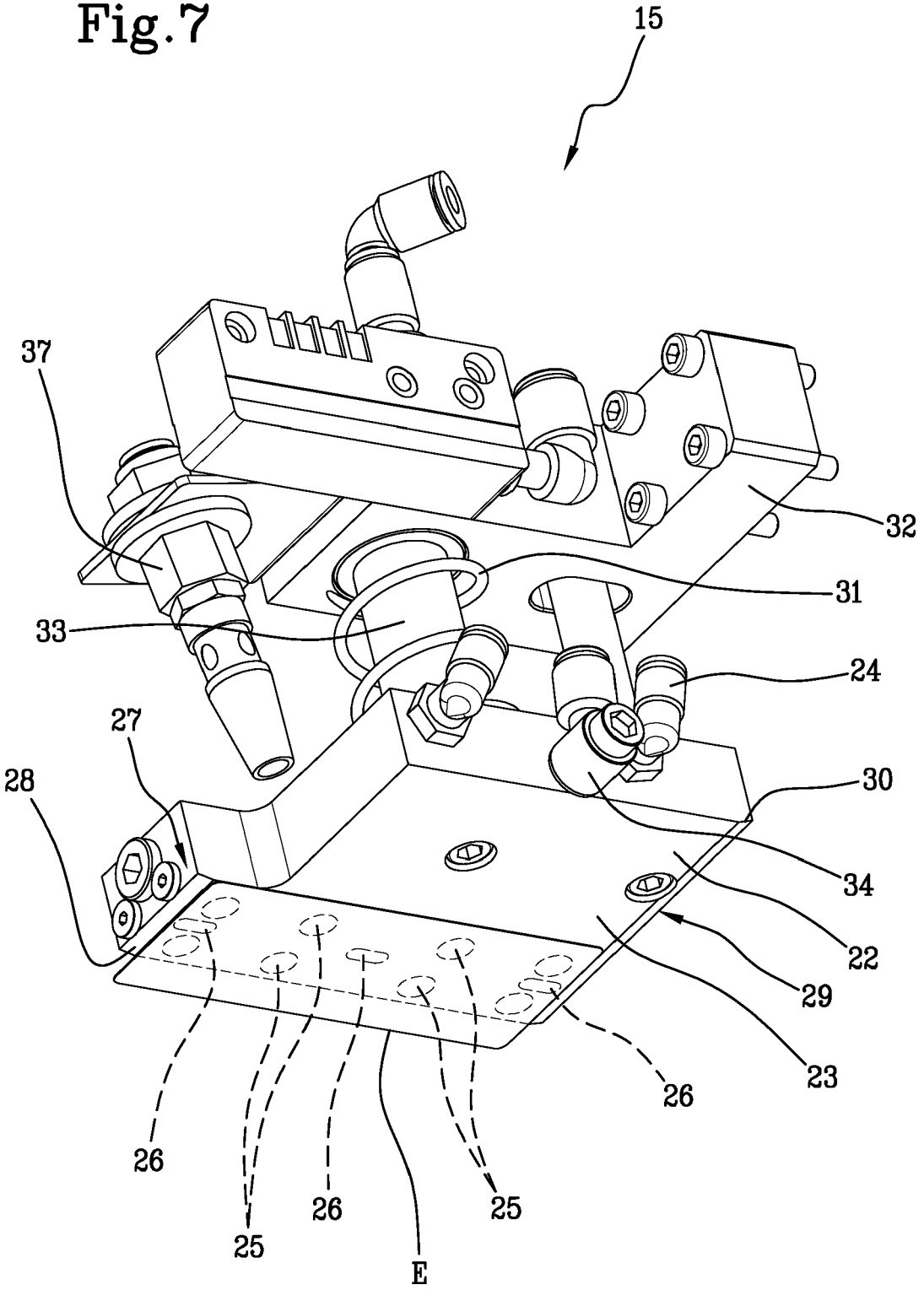


Fig.6

Fig.7



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EUROPEAN SEARCH REPORT

Application Number
EP 24 16 9606

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

B65C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 September 2024	de Miscault, Xavier

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