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**Description**

The present invention relates to a device for labelling single packages, having an advancing installation for transporting the respective package in a transportation direction, having a dispensing installation for dispensing a label in a dispensing position, having an application installation for applying the dispensed label to the respective package, wherein the application installation has a punch, having a punch shaft and a punch foot, for moving the dispensed label from a receiving position, in which the label is received by the punch foot, to a dispensing position in which the label is capable of being applied by the punch foot to the package, wherein the punch shaft is mounted so as to be pivotable about at least one first pivot axis that runs transversely to the transportation direction, wherein the punch shaft is movable axially in a guide element, and wherein the application installation has a lifting installation having a lifting element that is movable in the reciprocating manner parallel with a direction which is at an angle to the transportation direction and a first drive having a motor which drives the lifting element.

In addition, the invention relates to a method for labelling single packages while using such a device.

A corresponding device according to the preamble of Claim 1 and a corresponding method are disclosed, for example, in DE 197 27 648 A1. The disclosed device has an advancing installation in the form of a plurality of conveyor belts arranged one behind another in the transportation direction, a gap being provided between two adjacent conveyor belts. A package, which, for example, contains a product, is conveyed on the conveyor belts in the transportation direction, which runs horizontally, additionally also called the X direction. As soon as the package is situated vertically above the gap, a label that has been printed and dispensed beforehand is applied from below through the gap to the underside of the package.

The labels to be applied to the single packages are first of all applied so as to be detachable to a material strip which is made available as roll material in the form of a carrier strip. The roll material with the labels is unwound in a dispensing installation for dispensing a label and is redirected many times, finally at a dispensing edge that is formed by a plate around which the material strip runs. As a result of the redirecting at the dispensing edge, the label to be applied in each case is detached from the material strip and is received by a suction foot, which is arranged at the vertically upper end of a punch shaft of a punch, by negative pressure being generated in the suction foot. The punch shaft, which is connected to the suction foot, is arranged in a guide tube so as to be axially movable. It is only possible to move the punch shaft axially in a marginal manner inside the guide tube. It can carry out so-called short strokes in order to receive a label on the dispensing edge from the material strip by way of the suction foot that is connected to the punch shaft.

Once the suction foot has received the label and the punch shaft has been moved back again in the axial direction somewhat from the plate and the material strip, the guide tube is pivoted about a pivot axis, which extends transversely to the transportation direction, from the dispensing edge into the region below the gap between the two conveyor belts. To this end, the guide tube is fastened so as to be pivotable and axially movable in a guide element which is connected to an adjustment installation which carries out alternating horizontal movements and brings about the pivoting movement of the guide tube. As soon as the suction foot is situated below said gap, the entire guide tube is moved in a direction substantially perpendicular to the transportation direction in the direction of the gap such that the suction foot with the label adhering thereto is guided through the gap to the underside of the package. During said movement of the guide tube, no axial movement of the punch shaft and suction foot

relative to the guide tube takes place - the latter axial relative movements serve exclusively for receiving the label at the dispensing position.

As soon as the label has been transferred from the suction foot to the underside of the package, the guide tube is moved back again substantially perpendicularly to the conveyor belt, additionally also called the Y direction, and is pivoted back into to starting position again in order to enable the suction foot to receive a new label at the dispensing edge. At this position, as stated, a short stroke movement of the punch shaft is carried out again relative to the guide tube in order to remove the new label from the material strip.

The afore-described installation is designed in a relatively complicated manner and the labelling operation requires a relatively large amount of time.

Consequently, it is an object of the present invention to provide a device and a method with which the labelling of single packages is simplified.

The object introduced and demonstrated previously is achieved according to a first teaching of the present invention with a device for labelling single packages according to Claim 1, which, among other things, has:

an advancing installation for transporting the respective package in a transportation direction, a dispensing installation for dispensing an, in particular printed, label in a dispensing position, an application installation for applying the dispensed label to the respective package, wherein the application installation has a punch, having a punch shaft and a punch foot, which can be realized as a suction and/or blower foot, for moving the dispensed label from a receiving position, in which the label is received by the punch foot to a dispensing position in which the label is capable of being applied by the punch foot to the package,

wherein the punch shaft is mounted so as to be pivotable about at least one first pivot axis that runs transversely to the transportation direction, wherein the punch shaft is (mounted so as to be) movable axially, that is to say along the longitudinal axis thereof, in a guide element and wherein the application installation has a lifting installation having a lifting element that is movable in the reciprocating manner parallel with the direction which is at an angle, in particular perpendicularly, to the transportation direction and a first drive having a motor which drives the lifting element or brings about the movement of the lifting element that is at an angle to the transportation direction, wherein the punch shaft of the punch is connected by way of a joint to the lifting element of the lifting installation. Said joint therefore allows the pivoting movements of the punch shaft about the at least one first pivot axis.

By the punch shaft of the punch being connected according to the invention in an articulated manner to a lifting element, the punch shaft is able to transmit both the lifting movements and the pivoting movements to the punch foot. In this case, the lifting element transmits the alternating lifting movements directly by way of the joint to the punch shaft and not, as in the prior art, initially to a guide tube which is once again displaceable, in turn, in a guide element. Neither is a separate installation, as in the prior art, any longer necessary to move the punch shaft in an alternating manner inside a guide tube. As a result, the device according to the invention for labelling single packages is designed in a simpler manner than in the prior art. A labelling operation is correspondingly also designed in a simpler manner as, according to the invention, the punch no longer has to consist of a guide tube and a punch shaft which have to be moved independently of one another.

The device according to the invention functions, which will be explained in more detail below, as follows. First of all, a label is moved into a dispensing position by the dispensing

installation. In the dispensing position, the label is situated, in particular, on the side that points to the advancing installation (e.g. the underside) of a holding foot of the dispensing installation. In said dispensing position, the label, at least the predominant part of the label, is not (any longer) connected to a material strip or carrier strip. The label is then received by the punch foot, in a preferred manner directly in the dispensing position, which then matches the receiving position. However, the case where the label is first of all moved from the dispensing position into a receiving position, which is spaced apart from the dispensing position parallel with the transportation direction (e.g. in the horizontal direction), is principally also conceivable, the punch foot then receiving the label in said receiving position which is different from the dispensing position. The label is held in the dispensing position and/or receiving position, e.g. as a result of negative pressure, in particular by negative pressure that is generated inside the holding foot. During the application movement of the punch, the label is preferably also held at the punch foot as a result of negative pressure. Once the label has been received in the receiving position, the punch foot is then moved in the direction of the advancing installation and a package transported thereon. As soon as the punch foot with the label is situated in the vicinity of the package (distance between punch foot and package 1 to 60 mm, preferably 5 to 50 mm, particularly preferably 10 to 40 mm) or when the label and/or the punch foot contact the package, the label is applied to the package. In the case of a contactless application, the punch foot remains in particular at a spacing from the package and transfers the label, for example, by means of a blast of compressed air that emerges from the punch foot (said operation is also designated as blowing down the label). Once the label has been applied to the package, the punch is moved back again into the starting position to receive a new label. The individual possible movement sequences of the application installation and in particular of the punch are explained in more detail below.

According to one design of the device according to the invention, the punch foot (in the operating state) is connected to the punch shaft so as to be immovable. In other words, when the device is operating, the punch foot cannot be moved relative to the punch shaft in the case of said design. Nevertheless, the punch foot can be, in particular, releasably connected to the punch shaft in the case of said design, which has the advantage of the punch foot being able to be exchanged for a different one. In principle, however, it is also conceivable according to another design for the punch foot to be mounted so as to be rotatable about the longitudinal axis of the punch shaft relative to the punch shaft. In the case of said design too, it is possible for the punch foot to be, in particular, detachably connected to the punch shaft. In the latter case, in particular, no further relative movements are possible between punch foot and punch shaft, in particular no axial or tilting movements. A rotary movement of the punch foot relative to the punch shaft can be desired, for example, when the label is to be aligned more precisely prior to application on the package. Such alignment of the label can also be carried out, however, when the punch foot is immovable relative to the punch shaft in operation, the punch shaft then having to be mounted so as to be rotatable about the longitudinal axis thereof.

In order to ensure this latter, according to a further design of the device the joint is a Cardan joint. A Cardan joint has, in particular, two joint axes (pivot axes) which extend at an angle to one another, in particular extend perpendicularly to one another, preferably intersect and, as a result when said joint is the rest state, when it is therefore not extended, lie in the same plane. Such a Cardan joint allows for a pivoting movement of the punch or of the punch shaft in a plane in which the transportation direction also runs, even when the punch or the punch shaft is rotated about the longitudinal axis thereof during the pivoting movement.

According to another further design of the device according to the invention, the punch shaft and/or the punch foot and/or the joint is/are mounted so as to be rotatable, namely in order to enable said previously mentioned alignment of the label. In particular, punch shaft and/or punch foot and/or joint is/are rotatable about an axis which extends in the direction which is at an angle (in particular perpendicular) to the transportation direction in which the lifting element is movable in the reciprocating manner, and/or about the longitudinal axis of the punch shaft. In order to enable the rotary movement, the application installation, according to one design, has a rotary installation having a second drive which drives the joint or the punch shaft or the punch foot. The rotary movement of joint and/or punch shaft and/or punch foot about the aforementioned axis is therefore brought about by the drive. To this end, the second drive can have a motor which is immovable relative to the motor of the first drive (this means, in each case, that the motor housing is immovable with respect to the respectively other motor housing). In other words, the motor of the second drive, which is responsible for the rotary movements, is not entrained with the reciprocal (alternating) movements of the lifting element. The lifting element is consequently moved relative to the motor (motor housing) of the second drive. The advantage is that the weight of the second motor does not load the alternatingly movable lifting element, as a result of which the lifting element is able to be moved in a more precise manner.

The motor of the first drive and/or the motor of the second drive can be a linear or step motor and/or a DC motor (direct current motor) or EC motor (electronically commutated motor, brushless direct current motor).

According to yet another design, the joint and/or the punch shaft and/or the punch foot, in particular when the motor of the second drive is a step motor, is/are rotatable in steps in a range from 0.5 to 2.5°, preferably in a range from 0.5 to

2°, particularly preferably in a range from 1 to 1.5°. 1° steps are preferable. In this way, a label can be aligned (adjusted) optimally with respect to the package as soon as it has been received by the punch foot.

According to yet another design of the device according to the invention, the guide element is mounted so as to be pivotable about a second pivot axis which runs transversely to the transportation direction and is, in particular, spaced apart from the joint and/or from the at least one first pivot axis. The direction transversely to the transportation direction, precisely as in the case of the transportation direction, means in a preferred manner a horizontal direction. In other words, the advancing installation or a conveyor belt or the like of the advancing installation extends in the transportation direction and in said direction transversely to the transportation direction, also called the Z direction below.

According to the invention, the guide element conjointly with the second pivot axis is movable in the reciprocating manner parallel with the transportation direction, wherein, according to one design, the application installation has an adjustment installation having an adjustment element that is movable in the reciprocating manner parallel with the transportation direction, and a third drive having a motor which drives the adjustment element. In other words, the third drive brings about the movement of the adjustment element that is parallel with the transportation direction. The motor of the third drive can be a linear or step motor too. In particular, the motor of the third drive is also immovable relative to the motor of the first drive (the motor housing is meant here too in each case).

In a preferred manner, the lifting installation for the movements that are at an angle to the transportation direction and/or the rotary installation for the rotary movements and/or the adjustment installation for the movements (pivoting

movements) that are parallel with the transportation direction therefore act on the punch or punch shaft. By means of the lifting installation and the adjustment installation, the punch foot can be guided along a circular path which passes the receiving position (the label is received here) and the dispensing position (the label is applied to the package here). In a preferred manner, the punch foot, in this case, passes the receiving position in only one direction, in particular in the direction from the receiving position to the advancing installation. In the case of the return movement, which begins at the dispensing position, the punch foot preferably does not pass the receiving position, which has the advantage of a new label already being able to be moved into the receiving position or positioned there during the return movement.

According to another further design of the device according to the invention, the dispensing installation, as stated, has a holding foot for holding the dispensed label in the dispensing position and, in particular, also in the receiving position. The holding foot is immovable in particular relative to the motor or motor housing of the first drive. The holding foot has on that side thereof that faces the advancing installation or the package at least one bearing face for the dispensed label. In other words, the dispensing position and the receiving position lie on the side of the holding foot that faces the advancing installation. The label then lies against the respective bearing surface preferably with the side which is not provided with an adhesive. The adhesive side, in contrast, points to the advancing installation or package.

According to one design, the holding foot has two skids which are spaced apart transversely to the transportation direction, of which each, in particular on that side thereof that faces the advancing installation or package, has a bearing face for the dispensed label. The holding foot and/or a skid and preferably both skids can have openings in the region of the bearing surface, through which openings the label that has

been dispensed and is to be applied is able to be sucked up as a result of negative pressure. Corresponding openings can also be provided in the punch foot in order to suck up the label by means of negative pressure and/or to blow it down by means of negative pressure.

The spacing between the skids is preferably modifiable in the direction that is transverse to the transportation direction (Z direction). As a result of modifying the spacing, in particular horizontal spacing, between the skids, the holding foot can be adapted optimally to different sizes of labels. In addition to this or as an alternative to it, it is also possible to adjust the punch or the application installation, at least part of the application installation to which the punch is connected, relative to the holding foot and/or the skids in the direction that is transverse to the transportation direction. The punch or the application installation or the part of the application installation that is connected to the punch is preferably alignable centrally with respect to the two skids in said Z direction. This supports adaptation of the device or of the application installation to different label sizes, in particular label widths. It is thus particularly advantageous when the punch comes into contact with the label in the centre of the label. In principle, the device or the application installation can also be adapted to different label lengths for this purpose, in particular by the punch shaft (and as a result also the punch foot) being positionable individually for each label length in the X direction or in the direction of the pivoting movement of the punch shaft.

According to yet another design, the punch foot can also be replaceable for adaptation to different label sizes. In this case, it is also connected to the punch shaft so as to be immovable during the operation of the device, that is to say in the operating state, but can also be dismantled, for example unscrewed.

As has already been indicated beforehand, in a preferred manner the label is received by the punch foot in the receiving position in a state in which the label is no longer connected to a material or carrier strip. In this way, the punch or punch foot can be guided directly through the receiving position in the direction of the advancing installation and does not, first of all, as in the prior art, have to be guided past the receiving position in the horizontal direction before it can then be moved in the direction of the advancing installation. In this way, the application operation is clearly shortened compared to the prior art.

The object introduced and demonstrated beforehand is additionally achieved according to a second teaching of the present invention with a method for labelling single packages according to Claim 12 using a device as previously described, in that the punch foot for applying the dispensed label, proceeding from the receiving position, is moved directly in a direction which runs at an angle to the transportation direction and, once the label in the dispensing position has been applied to the package, the punch foot is guided past the dispensing installation on the front side, in particular the holding foot, in relation to the transportation direction.

On the front side means that the punch foot is guided passed the end of the dispensing installation or of the holding foot that points in the transportation direction.

The advantage of the latter is that during the return movement of the punch, the punch foot cannot collide with a new label which is already situated in the dispensing position and/or receiving position.

According to one design of the method according to the invention, it is provided that the punch foot is guided during the entire movement thereof from the receiving position by way of the dispensing position and back again to the receiving

position along a path which does not contact or intersect itself at any point and which in particular is substantially oval. In the portions in which it has a curvature, the path is in particular always curved in the same direction. In a preferred manner, the entire path is curved. Such a path is achieved as a result of a pivoting movement of the punch shaft (or translatory movement of the adjustment element of the adjustment installation) and a translatory movement of the lifting element of the lifting installation being carried out at the same time, preferably when the punch foot is moving from the receiving position to the dispensing position (application movement) and/or when the punch foot is moving from the dispensing position to the receiving position (return movement).

According to yet another design of the method according to the invention, it is provided that the punch foot, for transferring or during transfer of the label onto the package, that is to say in the dispensing position, is spaced apart from the package by 1 to 60 mm, preferably 5 to 50 mm, particularly preferably 10 to 40 mm, in the direction which is at an angle to the transportation direction and in particular blows the label down onto the package.

In addition, according to yet another design of the method according to the invention, it is provided that the punch foot during the movement thereof from the receiving position to the dispensing position and/or during the movement thereof from the dispensing position to the receiving position, is rotated, in particular in steps, about the longitudinal axis of the punch shaft.

Finally, according to yet another design of the method according to the invention, it is provided that the spacing between the skids and/or between at least one of the skids and the plane in which the punch shaft carries out the pivoting movement thereof (plane parallel with the transportation direction), is modified before the punch foot comes into

contact with the respective (dispensed) label (receives the label).

There are then a plurality of possibilities to design and develop further the device according to the invention and the method according to the invention. In this regard, reference is made, on the one hand, to the claims that are subordinate to Claims 1 and 12, and, on the other hand, to the description of an exemplary embodiment in conjunction with the drawing. The drawing is as follows:

Figs. 1a) and b) show two schematic views that are orthogonal to one another of a device according to the invention prior to receiving a label,

Figs. 2a) and b) show two schematic views that are orthogonal to one another of the device at the point of receiving a label,

Figs. 3a) and b) show two schematic views that are orthogonal to one another of the device during the application movement,

Figs. 4a) and b) show two schematic views that are orthogonal to one another of the device during the application of the label to a package,

Figs. 5a) and b) show two schematic views that are orthogonal to one another of the device after the application of the label during a first portion of a return movement,

Figs. 6a) and b) show two schematic views that are orthogonal to one another of the device after the application of the label during a second portion of the return movement and

Figs. 7a) and b) show two schematic views that are orthogonal to one another of the device after the application

of the label during a third portion of the return movement.

Fig. 1a) shows a side view of a device 1 for labelling packages 2 which can contain goods.

The device 1 has a dispensing installation 4 for dispensing a printed label 5 in a dispensing position. The dispensing position is defined here as the position in which the label 5 is singled out and has been detached at least predominantly or entirely from a, where applicable, present carrier strip on which it had been mounted beforehand with other labels. Of the dispensing installation 4, the figures only show a holding foot 23, to which the respective label 5 to be applied adheres by means of negative pressure that has been generated in the holding foot. However, the dispensing installation can also have a printer and/or a dispensing edge for deflecting a possible carrier strip.

In addition, the device 1 has an application installation 6 for applying the dispensed label 5 to the respective package 2. The application installation 6 is explained in more detail below.

Finally, an advancing installation 3 (only shown in Figures 4a) to 7b)), which serves for transporting the packages 2 to be labelled in a transportation direction X, is also a component part of the device 1. The advancing installation can have, for example, one or a plurality of conveyor belts on the top surface of which the packages 2 rest.

The application installation 6 has a punch 9, a lifting installation 11, a rotary installation 16 and an adjustment installation 19.

The punch 9 has a punch shaft 7 which extends along a longitudinal axis $A_2$ and a punch foot 8 and serves for moving a dispensed label 5 from a receiving position (of the label or punch foot) to a dispensing position (of the label or punch

foot). The receiving position is the position in which the label 5 is received from the punch foot 8 and can be identical to the dispensing position in which the label 5 is provided once it has been singled out and, where applicable, detached from a carrier strip. The dispensing position is the position in which the label 5 is capable of being applied to the package 2 by the punch foot 8 (Figs. 4a) and b)).

The punch shaft 7 is mounted so as to be pivotable about a first pivot axis $S_1'$ that runs transversely to the transportation direction X. The pivot axis $S_1'$is formed by a Cardan joint 15. If the Cardan joint 15 is rotated by 90° about the axis $A_1$, the punch shaft 7 is then pivotable about the first pivot axis $S_1$ that also extends transversely to the transportation direction X. The pivoting movement can also be effected about a virtual first pivot axis when neither of the two pivot axes $S_1$ and $S_1'$ extends precisely transversely to the transportation direction X.

In addition, the punch shaft 7 is mounted so as to be axially movable in a guide element 10, that is to say the punch shaft 7 can be moved in the direction of the longitudinal axis $A_2$ thereof relative to the guide element 10. The guide element 10 is the single guide element for the punch 9 and along with the joint 15 the single further bearing (fixing element) for the punch 9 or punch shaft 7.

The application installation 6 has a lifting installation 11 in order to bring about such an axial movement of the punch shaft 7 inside the guide element 10. The lifting installation 11 has a lifting element 12 which is movable parallel with the direction Y which runs perpendicularly to the transportation direction X. In addition, a drive 13 is a component part of the lifting installation 11. The drive 13 has a motor 14 and serves for driving the lifting element 12. This latter can be easily seen in a comparison of Figures 1b), 2b) and 3b), etc. The motor 14 thus drives a toothed belt 26 to which the lifting element 12 is fastened. The lifting element 12 has a

horizontal portion 12a which, on the one hand, is guided on a guide rod 27 which runs in the Y direction and on which, on the other hand, is arranged the joint 15. If the drive 13 is then actuated, the toothed belt 26 is moved either in or in opposition to the Y direction and consequently brings about a corresponding movement of the portion 12a of the lifting element 12 and furthermore of the punch 9.

The punch 9 is also able to carry out a pivoting movement at the same time as the translatory movement in or in opposition to the Y direction. To this end, the guide element 10 is mounted so as to be pivotable about a second pivot axis $S_2$ which runs transversely to the transportation direction X, that is to say in a direction Z, and is at a spacing from the joint 15 and the first pivot axis $S_1$ or $S_1'$. The guide element 10 is connected rotatably to an adjustment element 20 of an adjustment installation 19 and, as a result, can be moved conjointly with the second pivot axis $S_2$ in a reciprocating movement parallel with the transportation direction X. The adjustment device 19 has a drive 21 having a motor 22 and a toothed belt 28 for this purpose. The adjustment element 20 is, on the one hand, guided in a guide which extends parallel with the transportation to the transportation direction and, on the other hand, is connected fixedly to the toothed belt 28. If the drive 21 is actuated, the toothed belt 28 and consequently the adjustment element 20 is moved in or in opposition to the transportation direction X. Said movement is transmitted to the guide element 10, which, on account of the punch shaft 7 guided therein which is connected fixedly to the joint 15, carries out a pivoting movement about the axis $S_2$. The movements of the adjustment element 20 and guide element 10 are particularly clear in a comparison of Figures 2a), 3a) and 5a), etc.

The gimballed joint 9 can be moved purely by means of the previously described lifting installation 11 and adjustment installation 19 such that the punch foot 8 or the label 5 adhering thereto can carry out a circumferential movement

initially from the receiving position (Figures 1a) to 2b)) by way of the dispensing position (Figures 3a) to 4b)) and back again by way of a plurality of return positions (5a) to 7b)) until renewed achievement of the starting position (Figures 1a) and b)).

From the starting position in Fig. 1a), the punch 9 moves initially to the centre of the label 5 (Figures 1a) and b)). The punch foot 8, which is realized here as a suck- and-blow foot, then takes over the label 5 by generating negative pressure (Figures 2a) and b)). The punch 9 is then moved further such that label 5 and punch foot 8 are situated perpendicularly above a package 2, the punch shaft 7 in said position, which is designated here as the dispensing position, preferably being aligned precisely perpendicularly to the transportation direction X and transverse direction Z and/or the label 5 being aligned parallel with the transportation direction X. In said dispensing position, in which the punch foot 8 is, for example, at a spacing of between 10 and 40 mm from the top surface of the package 2, a sudden overpressure, which results in the label 5 being blown down and as a result being transferred to the top surface of the package 2 (Figures 4a) and b)), is generated in the punch foot 8. Once the label 5 has been applied to the top surface of the package 2, a return movement is carried out which moves the punch foot 8 initially further in the transportation direction X and at the same time vertically upward in the Y direction (Figures 5a) and b)). The punch foot 8, in this case, describes an arc and continues to follow the already previously mentioned circular path. In the case of said return movement, the punch foot 8 is moved past the outer (front) edge of the dispensing installation 4 or of the holding foot 23 which points in the transportation direction X such that, during the return movement, the punch foot 8 is not able to collide with a new label 5 that is already adhering to the holding foot 23 (Figures 6a) and b)). The advantage of this latter is also that labels 5 that are longer than those shown in the Figures are also able to adhere to the holding foot 23 during the

return movement. Finally, during the return movement, the punch 9 is moved in opposition to the transportation direction X again (Figures 7a) and b)) and ultimately reaches the starting position again (Figures 1a) and b)).

Figures 1b) 2b), etc. additionally show that the holding foot 25 can have two skids 25 and 25′ which are spaced apart from one another in the transverse direction Z and each of which has, on the underside thereof that faces the advancing installation 3, a bearing surface 24 or 24′ for the dispensed label. The skids 25 and 25′ can be displaced conjointly in the transverse direction Z by way of a holding rail 29 that is shown here as an example. It is also possible to modify, where necessary, the spacing between the skids 25 and 25′ manually, pneumatically or by motor. The punch 9 or punch shaft 7 can then be aligned, also in the transverse direction Z, centrally with respect to the two skids 25 and 25′.

In this way, it is possible to enable adaptation of the device 1 or of the application installation 6 to different label widths such that the punch foot 8 is always – for each label width – able to receive a label 5 in the centre (with reference to the direction Z). As already mentioned previously, adaptation of the device 1 or of the application installation 6 to different label lengths can also be effected. This can be achieved as a result of positioning the punch 9 or punch shaft 7 individually for each label length in the transportation direction X or in the direction of the pivoting movement of the punch shaft 7 such that the punch foot 8 is always – for any label length – able to receive a label 5 in the centre (with reference to the direction X).

Finally, a brief look is to be taken at the rotary installation 16, by means of which the punch 9 and consequently the punch foot 8, which is connected in one piece to the punch shaft 7 here, can be rotated about the longitudinal axis $A_2$ of the punch shaft 7. The rotary movement serves for aligning a label 5, which adheres to the underside

of the punch foot 9, and is consequently carried out in a preferred manner during the application movement of the punch 9 (that is to say between the receiving position and the dispensing position). It is not absolutely necessary to rotate the punch 9 back about the axis $A_2$ during the return movement, but it can also be carried out in principle where necessary.

To carry out the rotary movement, the rotary installation 6 has a drive 17 having a motor 18. The motor 18 is a step motor which enables rotation of the joint 15 and consequently of the punch 9 in steps of 1°. As can be seen in Fig. 1a), the guide rod 27 is non-rotatably connected to the motor 18 of the rotary installation 16 such that the motor 18 is able to set the guide rod 27 into rotation. The rotary movement of the guide rod 27 is then transmitted by way of a drive wheel 30 and from there by means of a toothed belt 31 to an output wheel 32, the output wheel 32 being once again connected non-rotatably to the joint 15. In this way, the rotary movement of the motor 18 or of the guide rod 27 is transmitted to the punch 9.

As becomes clear when comparing Figures 1b), 2b) and 3b), etc., the drive wheel 30 and the output wheel 32 are fastened conjointly with the toothed belt 31 on the portion 12a of the lifting element 12 and are movable with this latter in the Y direction. The motor 18 is arranged, in contrast, so as to be immovable relative to the motor 14 and consequently does not follow the lifting movement of the lifting element 12. Nevertheless, in any position of the lifting element 12 relative to the guide rod 27 (Fig. 1b), Fig. 2b), Fig. 3b), etc.), the described rotary movement of the motor 18 can be transmitted by way of the (rotatable) guide rod 27 to the punch 9. In order to accomplish this latter, the guide rod 27 is simply connected non-rotatably to the drive wheel 30, the drive rod 30, however, (conjointly with the output wheel 32 and the portion 12a of the lifting element 12) nevertheless being able to be displaced axially relative to the guide rod 27.

Patentkrav

1. Anordning (1) til etikettering af enkeltvise pakninger (2)
- med en fremføringsindretning (3) til transport af den respektive pakning (2) i en transportretning (X),
- med en dispenseringsindretning (4) til dispensering af en etiket (5) ind i en dispenseringsposition,
- med en påføringsindretning (6) til påføring af den dispenserede etiket (5) på den respektive pakning (2),
hvor påføringsindretningen (6) har et stempel (9), der har et stempelskaft (7) og en stempelfod (8), til bevægelse af den dispenserede etiket (5) fra en optageposition, i hvilken etiketten (5) optages af stempelfoden (8), til en afgivelsesposition, i hvilken etiketten (5) kan påføres af stempelfoden (8) på pakningen (2),
hvor stempelskaftet (7) er lejret svingbart omkring i det mindste en første svingakse ($S_1$,$S_1$'), der forløber på tværs af transportretningen (X),
hvor stempelskaftet (7) er aksialt bevægeligt i et føringselement (10), hvilket føringselement (10) er det eneste føringselement for stemplet (9) og kan bevæges frem og tilbage parallelt med transportretningen (X), og hvor påføringsindretningen (6) har en løfteindretning (11) med et løfteelement (12), der kan bevæges frem og tilbage parallelt med en retning (Y), der er vinklet i forhold til transportretningen (X),
kendetegnet ved, at løfteindretningen har en første drivmekanisme (13) med en motor (14), der fremdriver løfteelementet (12), og at stemplets (9) stempelskaft (7) er forbundet med løfteindretningens (11) løfteelement (12) via et led (15).

2. Anordning (1) ifølge krav 1, kendetegnet ved, at stempelfoden (8) er forbundet ubevægeligt og/eller løsbart med stempelskaftet (7).

3. Anordning (1) ifølge et af de foregående krav,

kendetegnet ved, at stempelfoden (8) er en suge- og/eller blæsefod (8).

4. Anordning (1) ifølge et af de foregående krav, kendetegnet ved, at leddet (15) er et kardansk led (15).

5. Anordning (1) ifølge et af de foregående krav, kendetegnet ved, at stempelskaftet (7) og/eller stempelfoden (8) og/eller leddet (15) er lejret drejeligt, især omkring en akse ($A_1$), der strækker sig i den i forhold til transportretningen (X) vinklede retning (Y), i hvilken løfteelementet (12) kan bevæges frem og tilbage, og/eller omkring stempelskaftets (7) længdeakse ($A_2$).

6. Anordning (1) ifølge krav 5, kendetegnet ved, at påføringsindretningen (6) har en rotationsindretning (16) med en anden drivmekanisme (17), der fremdriver leddet (15) eller stempelskaftet (7) eller stempelfoden (8), hvor fortrinsvis den anden drivmekanisme (17) har en motor (18), der er ubevægelig relativt i forhold til den første drivmekanismes (13) motor (14), og hvor yderligere foretrukket leddet (15) og/eller stempelskaftet (7) og/eller stempelfoden (8) er drejelig i trin i et område fra 0,5 til 2,5°, foretrukket i et område fra 0,5 til 2°, særligt foretrukket i et område fra 1 til 1,5°.

7. Anordning (1) ifølge et af de foregående krav, kendetegnet ved, at føringselementet (10) er lejret svingbart omkring en anden svingakse ($S_2$), der forløber på tværs af transportretningen (X) og især har en afstand fra leddet (15) og/eller fra den i det mindste ene første svingakse ($S_1$,$S_1$').

8. Anordning (1) ifølge et af de foregående krav, kendetegnet ved, at føringselementet (10) sammen med den anden svingakse ($S_2$) er bevægeligt frem og tilbage parallelt med transportretningen (X), hvor påføringsindretningen (6) har en indstillingsindretning (19) med et indstillingselement (20), der kan bevæges frem og tilbage parallelt med

transportretningen (X), og en tredje drivmekanisme (21) med en motor (22), der fremdriver indstillingselementet (20).

9. Anordning (1) ifølge et af de foregående krav, kendetegnet ved, at dispenseringsindretningen (4) har en holdefod (23) til fastholdelse af den dispenserede etiket (5) i dispenseringspositionen og især også i optagepositionen, hvilken holdefod især på sin mod fremføringsindretningen (3) vendte side har i det mindste en anlægsflade (24,24') for den dispenserede etiket (5).

10. Anordning (1) ifølge krav 9, kendetegnet ved, at holdefoden (23) har to meder (25,25'), der har en afstand fra hinanden på tværs af transportretningen (X), og af hvilke hver især på sin mod fremføringsindretningen (3) vendte side har en anlægsflade (24,24') for den dispenserede etiket (5), hvor fortrinsvis afstanden mellem mederne (25,25') og/eller mellem i det mindste en af mederne (25,25') og det plan, i hvilket stempelskaftet (7) udfører sin svingbevægelse, kan ændres i en retning (Z) på tværs af transportretningen (X).

11. Anordning (1) ifølge et af de foregående krav, kendetegnet ved, at i det mindste en med stemplet (9) forbundet del af påføringsindretningen (6) og/eller stemplet (9) kan forskydes i retningen (Z) på tværs af transportretningen (X) relativt i forhold til fremføringsindretningen (3).

12. Fremgangsmåde til etikettering af enkeltvise pakninger (2) under anvendelse af en anordning (1) ifølge et af de foregående krav, kendetegnet ved, at stempelfoden (8) med henblik på påføringen af den dispenserede etiket (5) udgående fra optagepositionen bevæges umiddelbart i en retning, der forløber vinklet i forhold til transportretningen (X), og stempelfoden (8), efter at etiketten (5) i afgivelsespositionen er blevet påført på pakningen (2), føres forbi dispenseringsindretningen (4) på forsiden, relateret til transportretningen (X).

13. Fremgangsmåde ifølge krav 12, kendetegnet ved, at stempelfoden (8) under sin samlede bevægelse fra optagepositionen via afgivelsespositionen og igen tilbage til optagepositionen føres langs en omløbsbane, som på intet sted berører eller krydser sig selv, og som især er i det væsentlige oval.

14. Fremgangsmåde ifølge krav 12 eller 13, kendetegnet ved, at stempelfoden (8) med henblik på overgivelsen af etiketten (5) til pakningen (2) har en afstand fra pakningen (2) på 1 til 60 mm, foretrukket 5 til 50 mm, særligt foretrukket 10 til 40 mm, i den i forhold til transportretningen (X) vinklede retning (Y) og især blæser etiketten (5) ned på pakningen (2).

15. Fremgangsmåde ifølge et af kravene 12 til 14, kendetegnet ved, at stempelfoden (8) under sin bevægelse fra optagepositionen til afgivelsespositionen og/eller under sin bevægelse fra afgivelsespositionen til optagepositionen drejes, især trinvist, omkring stempelskaftets (7) længdeakse ($A_2$).

16. Fremgangsmåde ifølge et af kravene 12 til 15, kendetegnet ved, at afstanden mellem mederne (25,25') og/eller mellem i det mindste en af mederne (25,25') og det plan, i hvilket stempelskaftet (7) udfører sin svingbevægelse, ændres i retningen (Z) på tværs af transportretningen (X), før stempelfoden (8) kommer i kontakt med den respektive etiket (5).

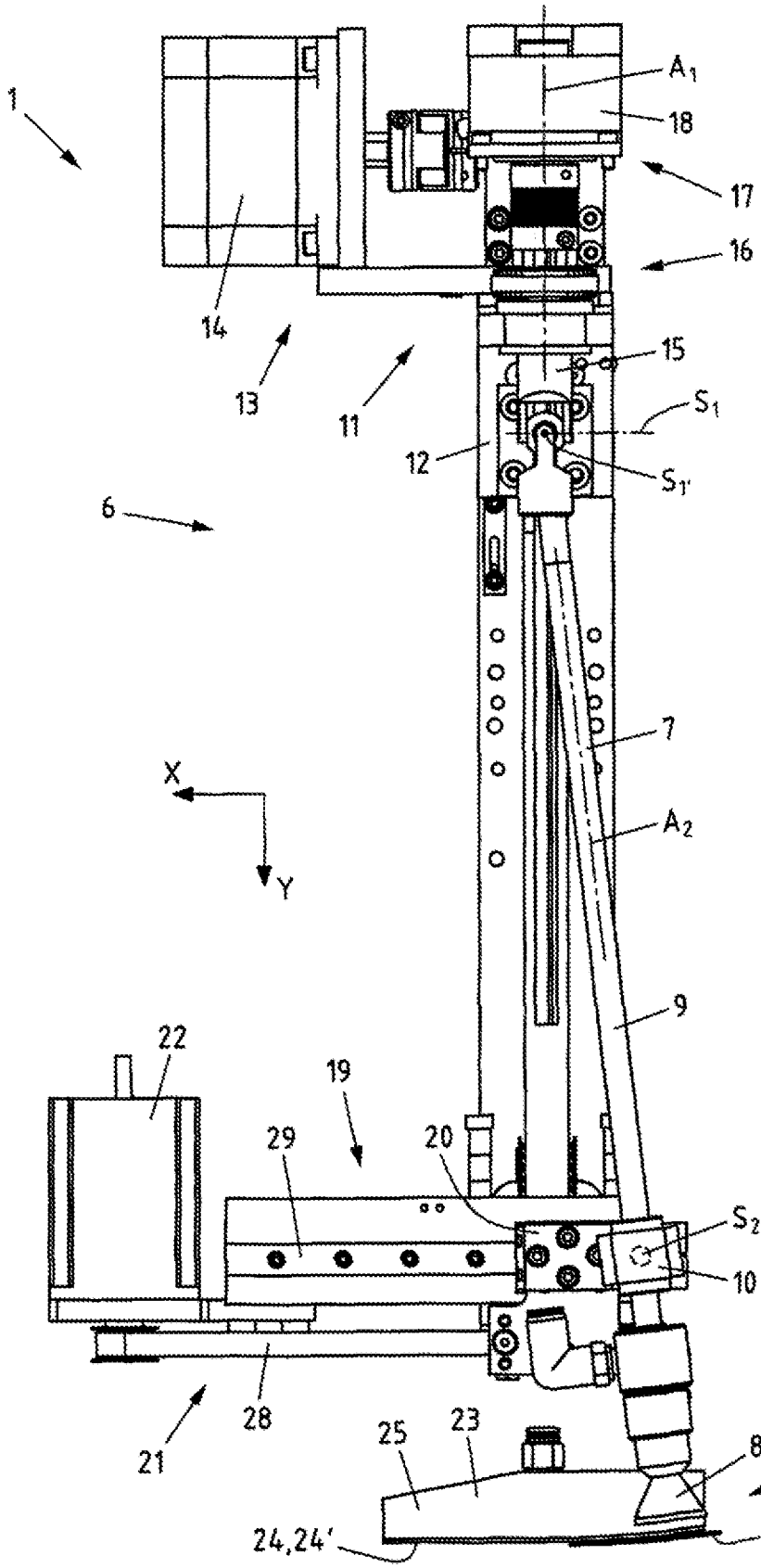

1
A1
18
17
16
14
13
11
15
S1
12
S1'
6
7
X
Y
A2
9
22
19
29
20
S2
10
28
21
25
23
8
4
24,24'
5

Fig.1a

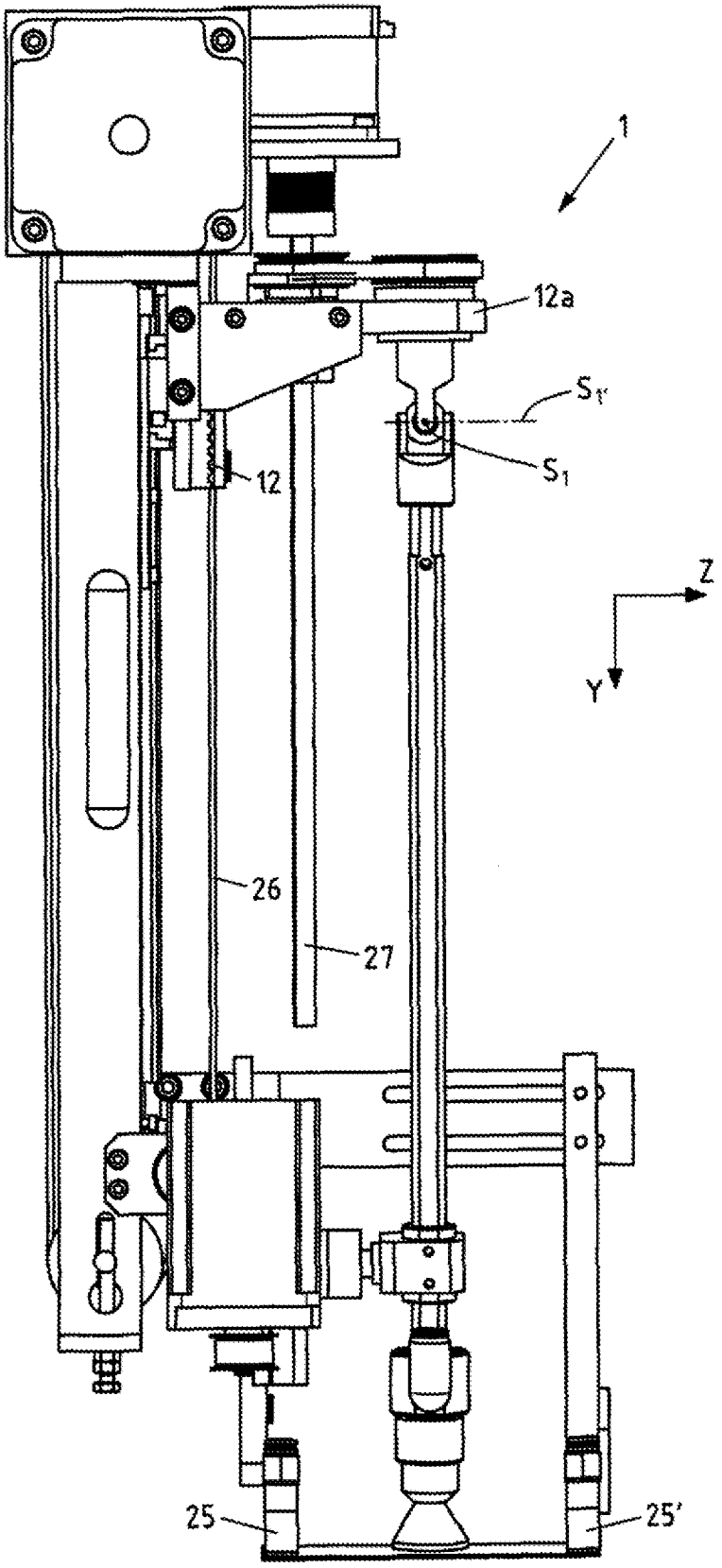



Fig.1b

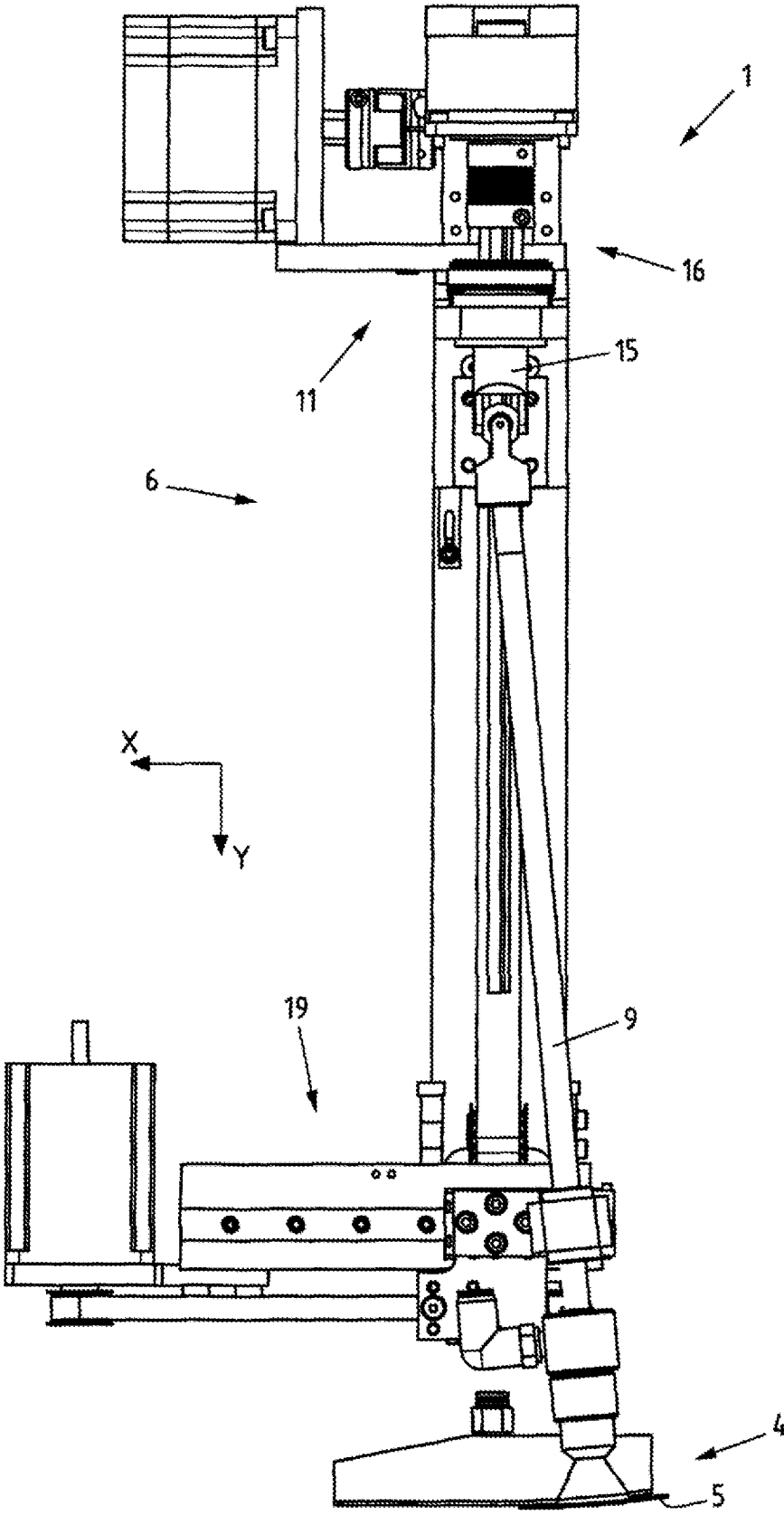



Fig.2a

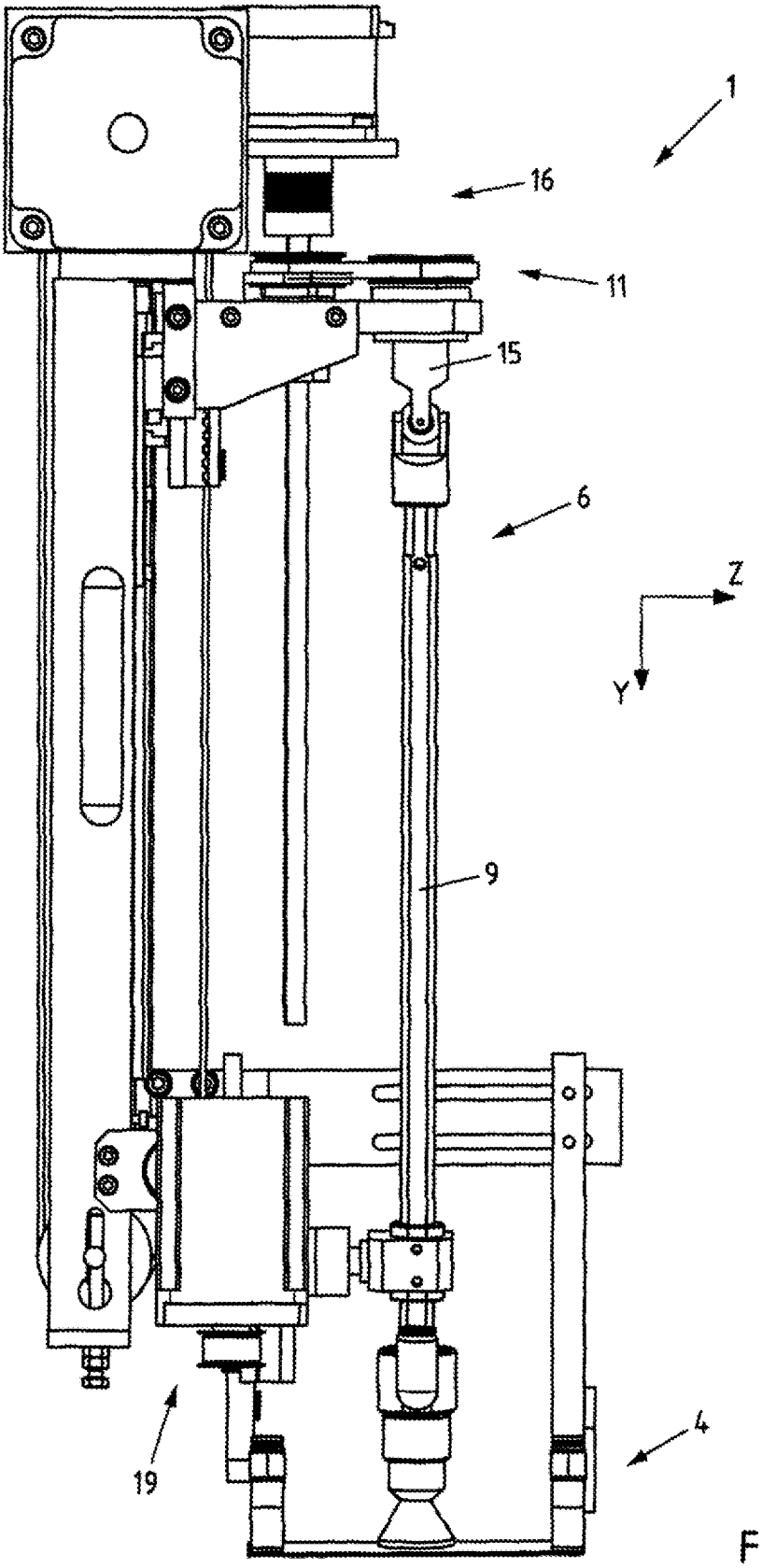



Fig.2b

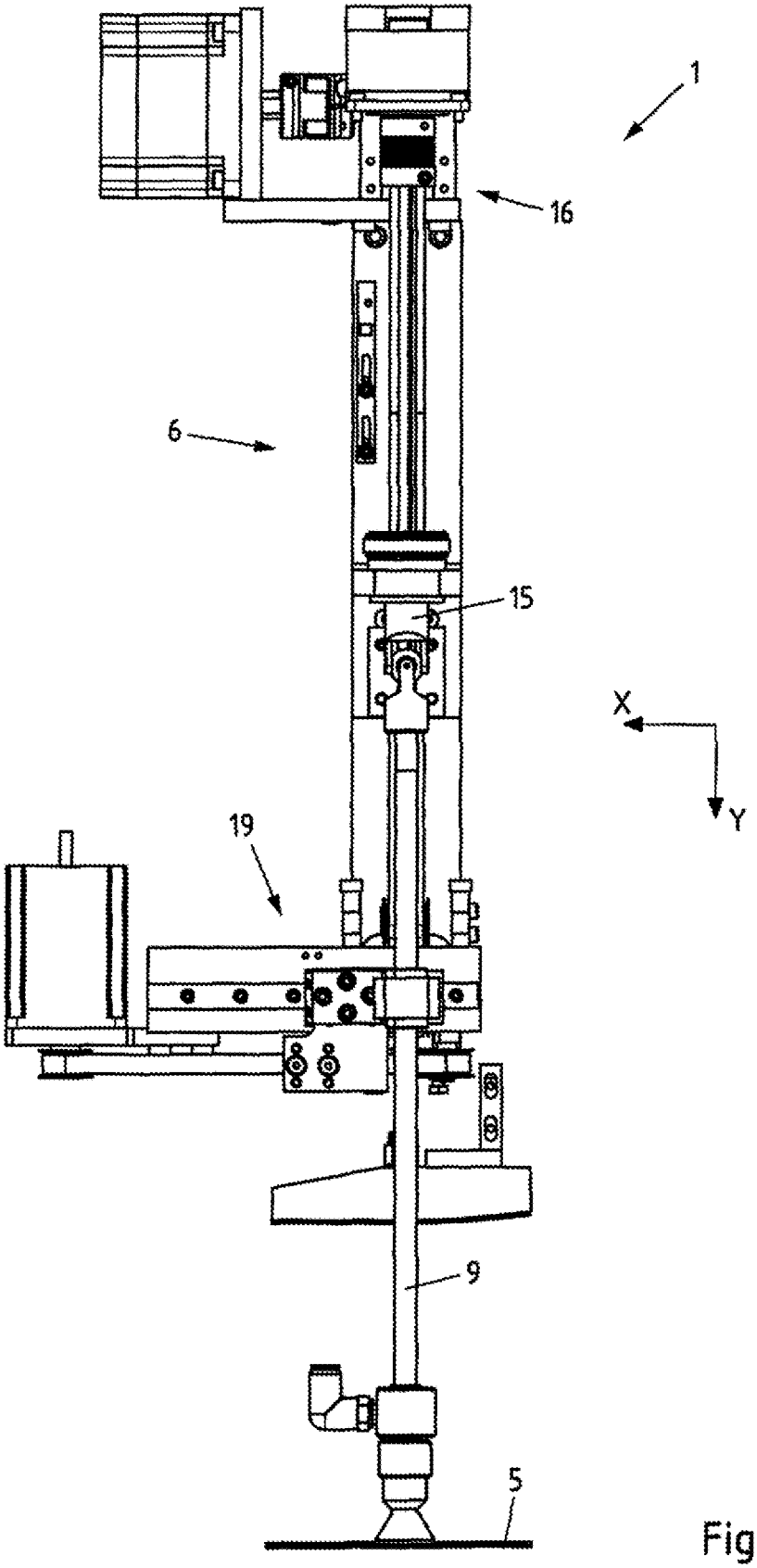



Fig.3a

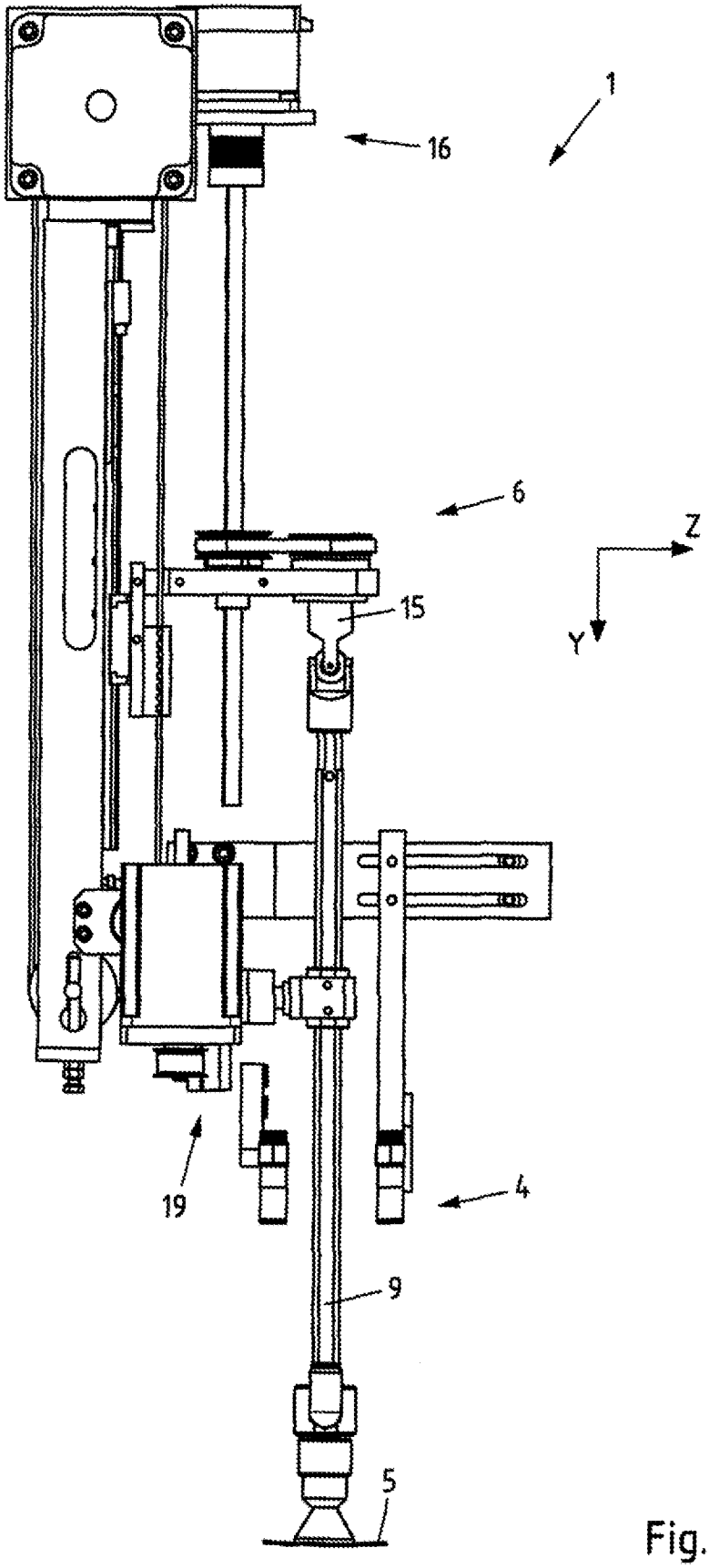



Fig.3b

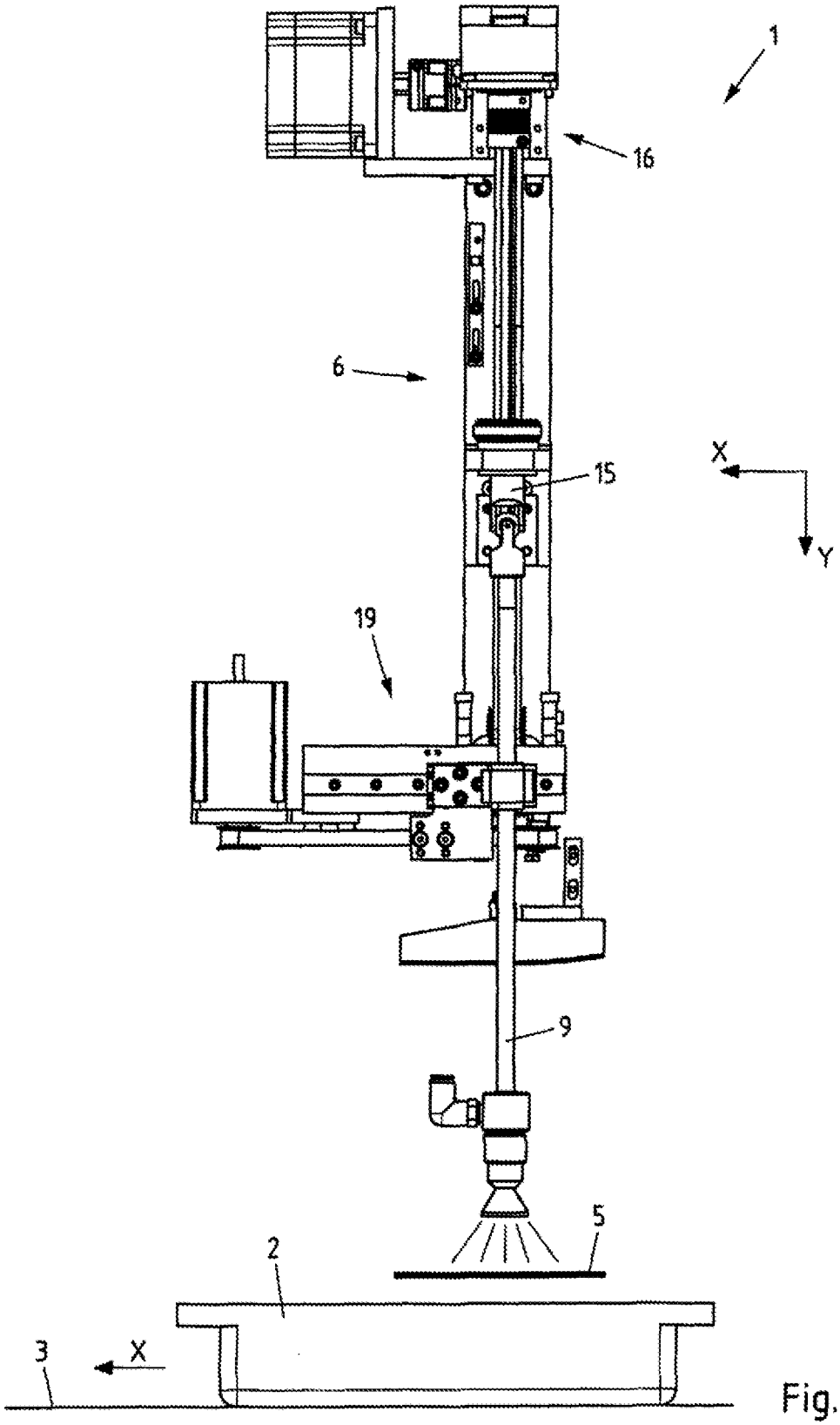



Fig.4a

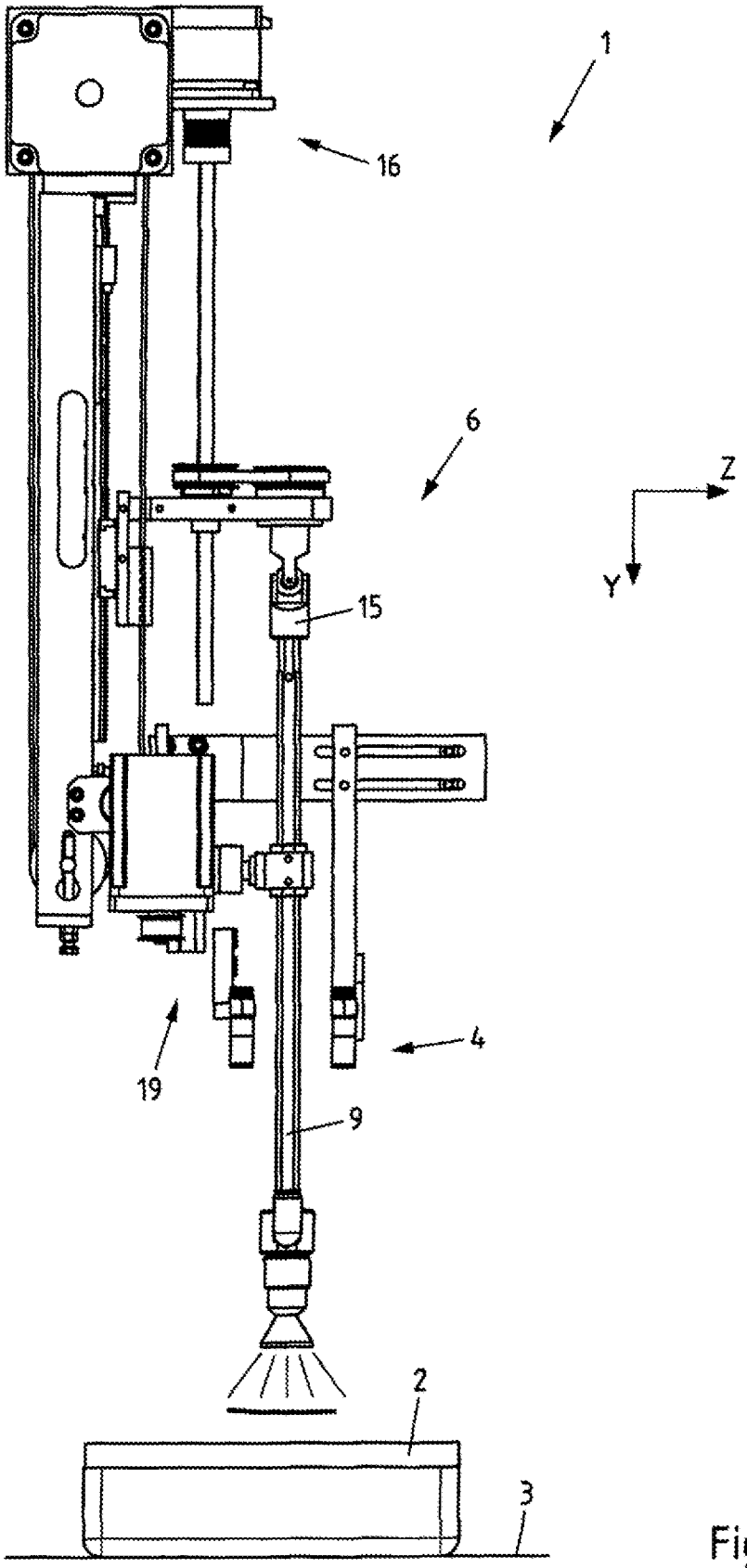



Fig.4b

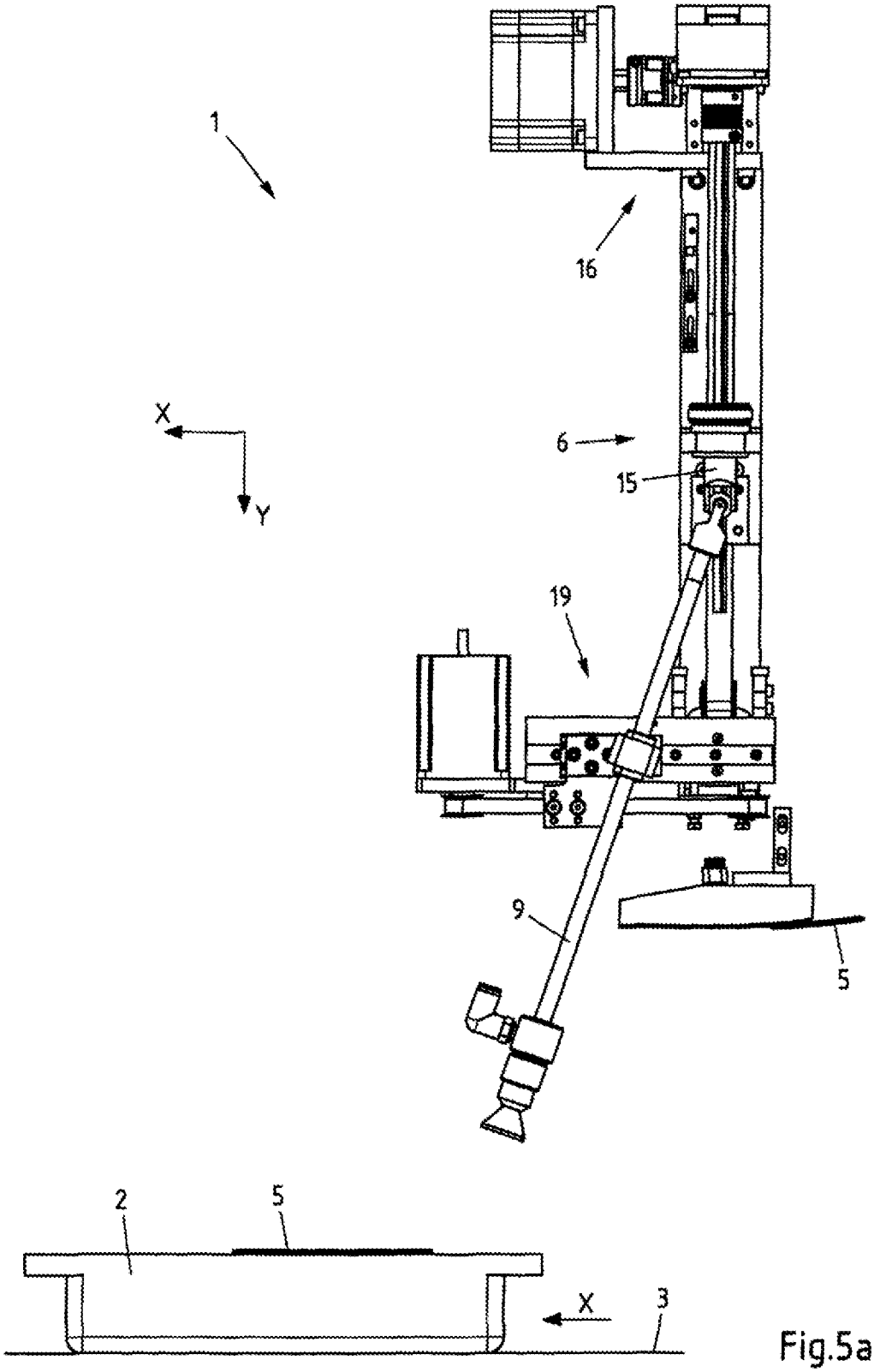



Fig.5a

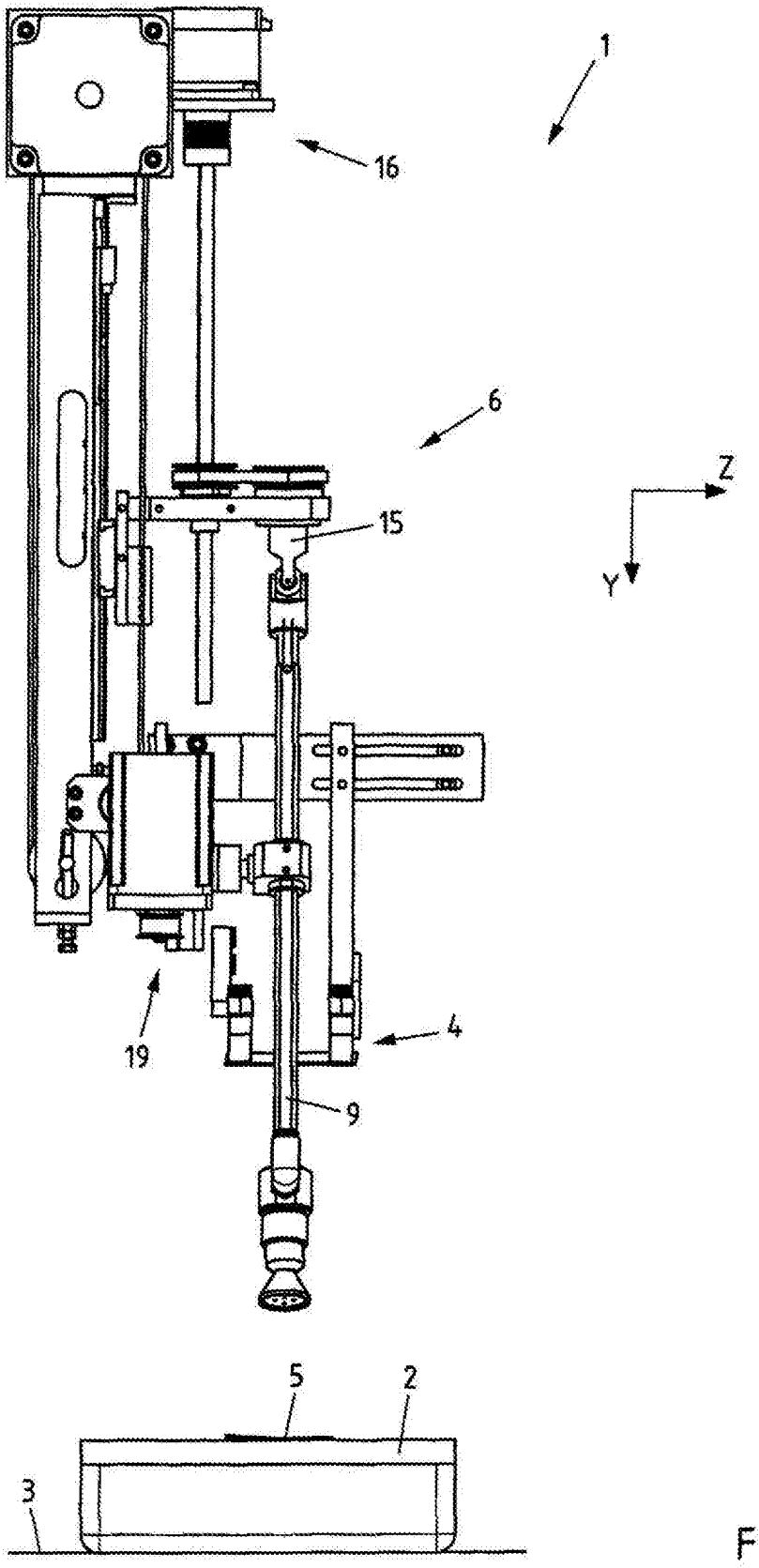
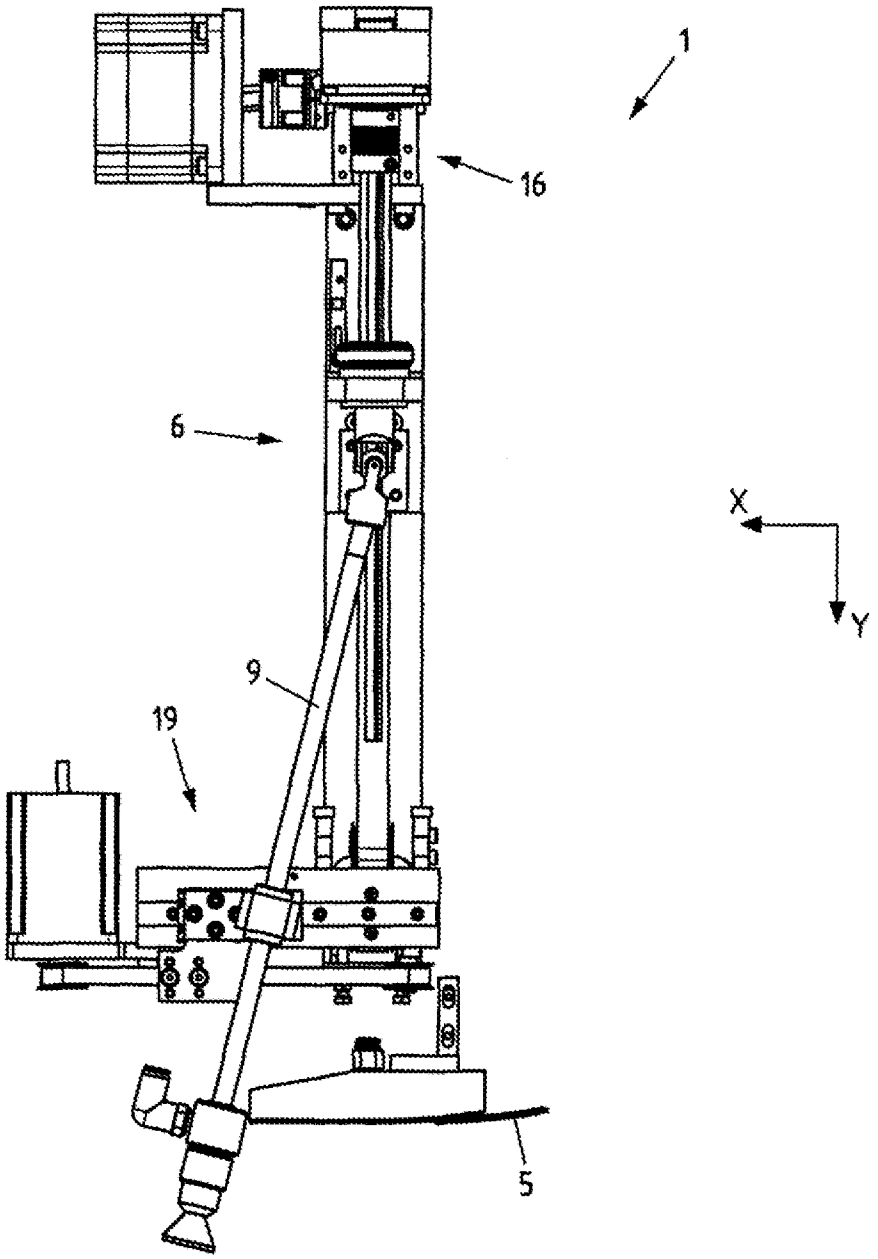



Fig.5b



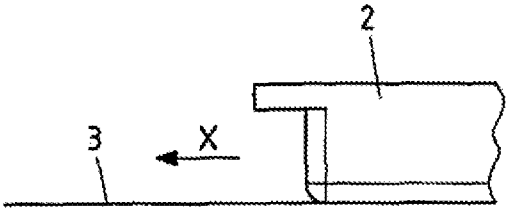




Fig.6a

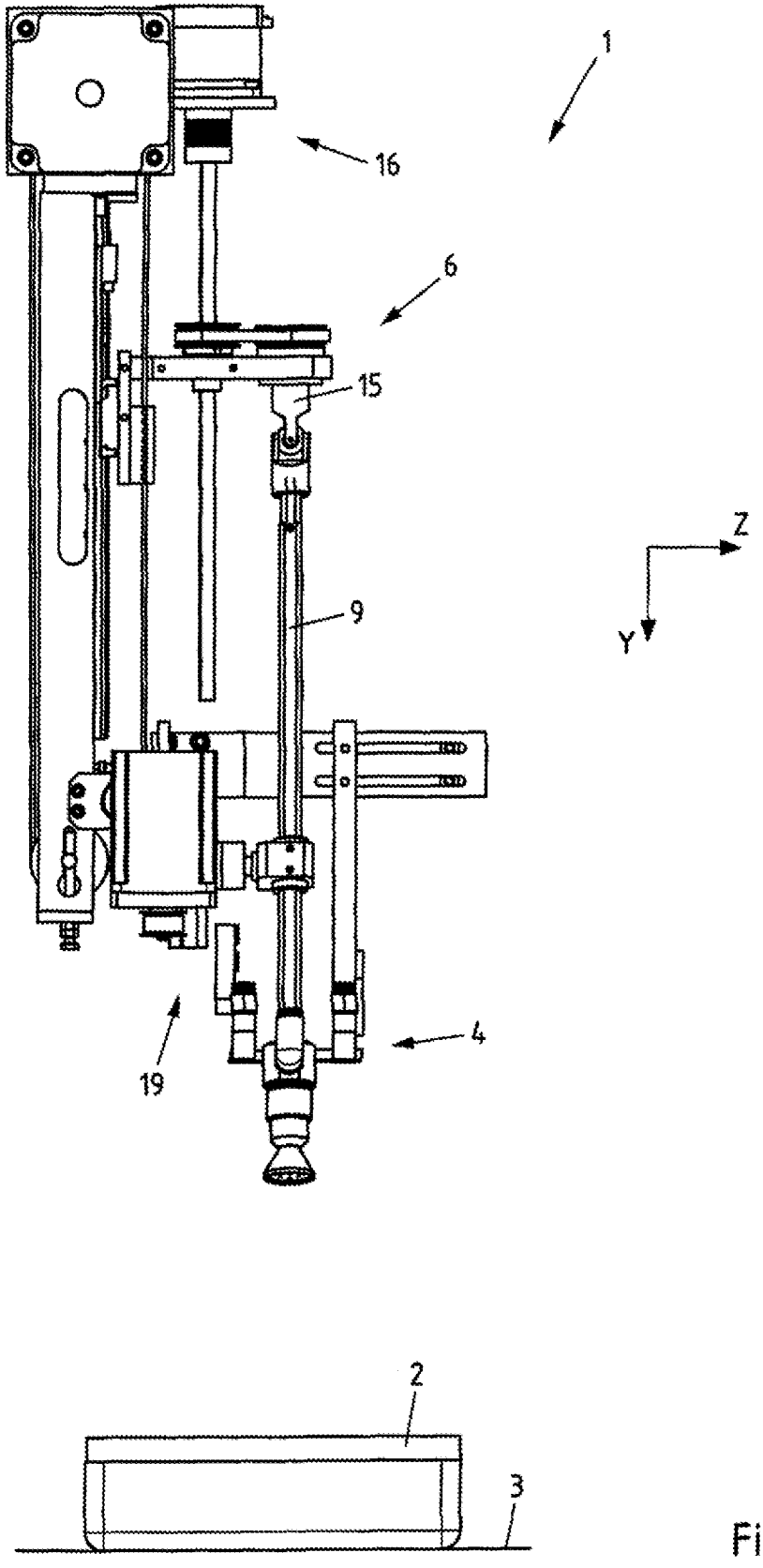
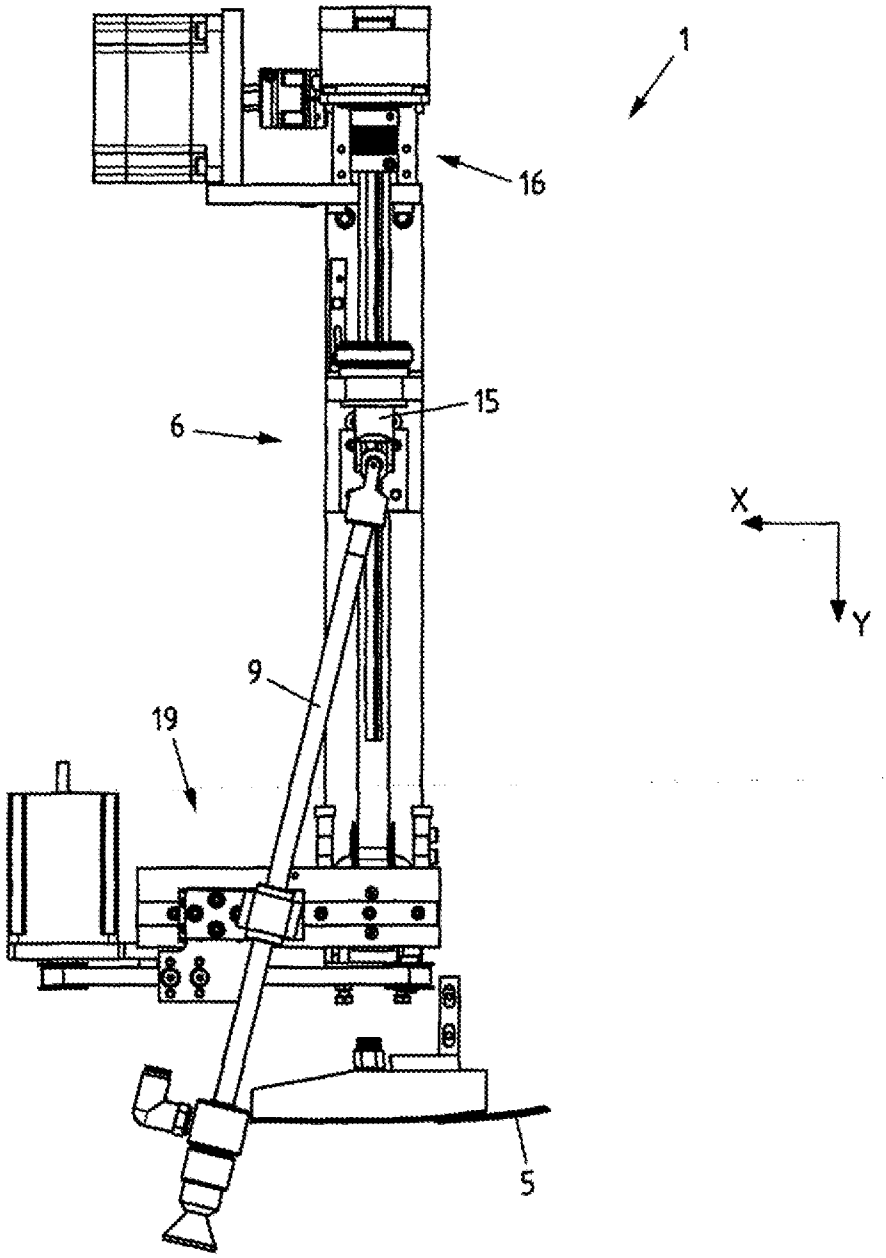



Fig.6b



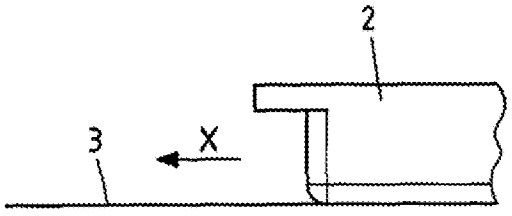




Fig.7a

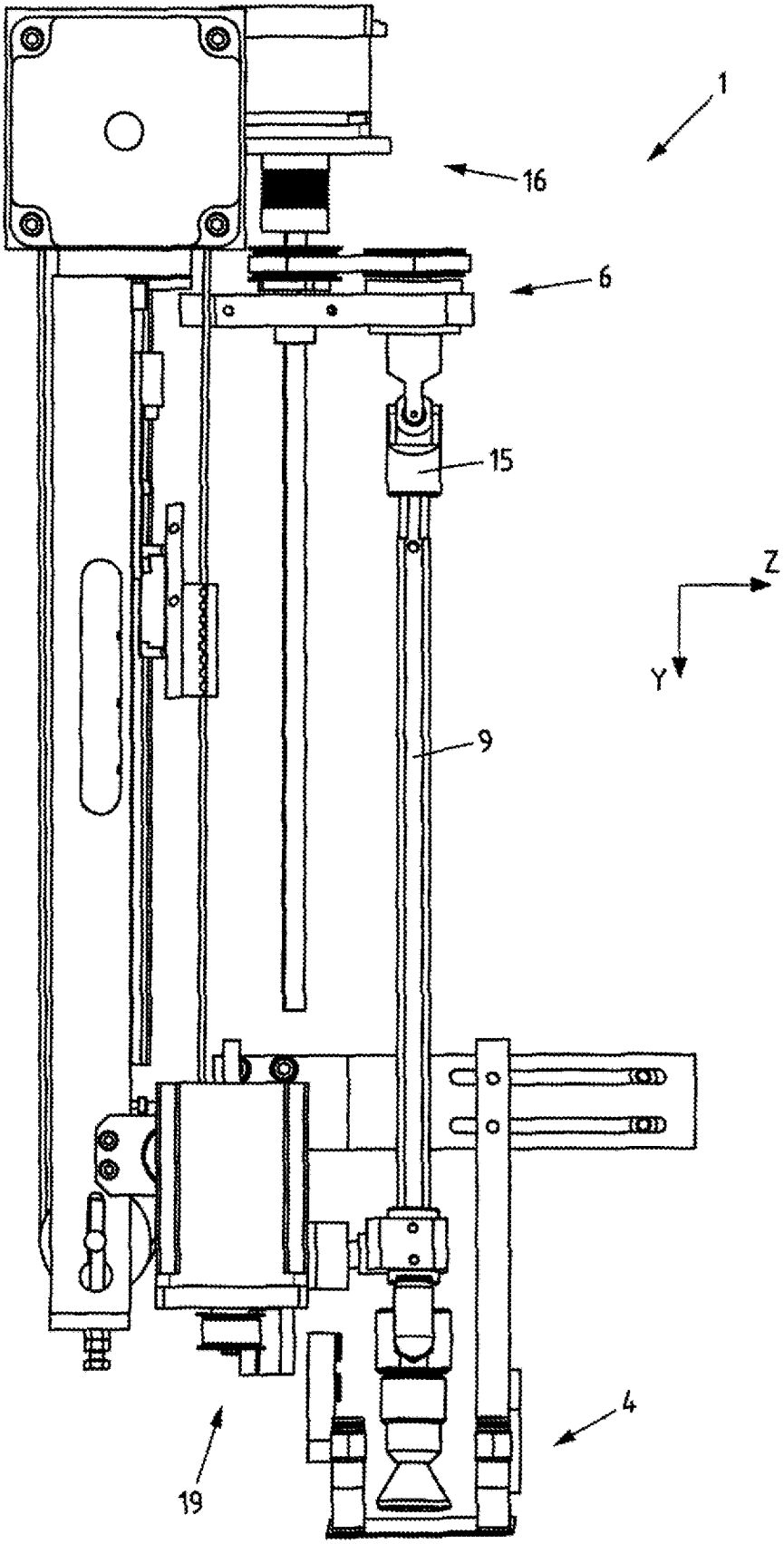



Fig.7b