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(54) **IMPROVED TOOL HOLDER HEAD FOR A CUTTING PLOTTER**

(57) The present invention relates to a tool holder head (1) for a cutting plotter comprising a first (2) and a second (3) tool holder which are configured to accommodate a first (4) and second (5) tool, respectively, wherein the tool holder head (1) is adjustable between a first position of use, in which the tool holder head (1) is equipped to perform a treatment using the first tool (4), and a second position of use, in which the tool holder head (1) is equipped to perform a treatment using the second tool (5), wherein the first (2) and second (3) tool holders are couplable to each other, and wherein the uncoupled state is the first position of use and the coupled state is the second position of use, wherein, in the coupled state, the first tool holder (2) is coupled with the second tool holder (3) in such a way that the second tool holder (3) follows the movement of the first tool holder (2). The tool holder head (1) according to the invention makes it possible to switch easily and quickly between the two tools.

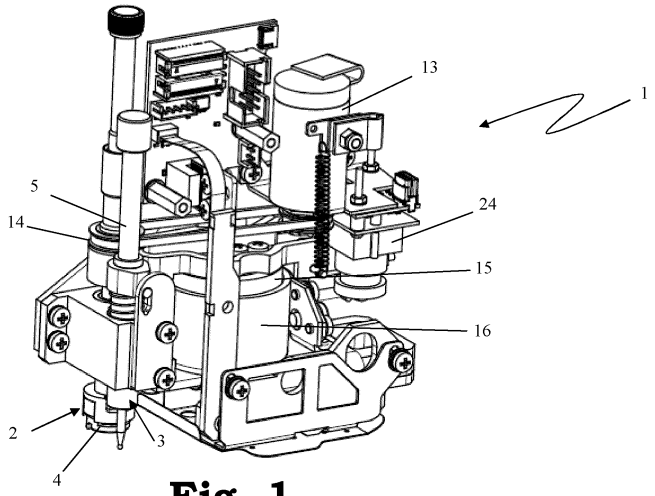

Fig. 1

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Description

[0001] The present invention relates, on the one hand, to a tool holder head for a cutting plotter comprising a first and a second tool holder which are configured to accommodate a first and second tool, respectively, wherein the tool holder head is adjustable between a first position of use, in which the tool holder head is equipped to perform a treatment using the first tool, and a second position of use, in which the tool holder head is equipped to perform a treatment using the second tool. On the other hand, the present invention relates to a cutting plotter provided with such a tool holder head.

[0002] The respective cutting plotter is preferably a computer-controlled (CNC) cutting plotter for cutting and creasing material. In particular, the respective cutting plotter is a computer-controlled (CNC) roll-fed cutting plotter.

[0003] The known computer-controlled (CNC) cutting plotters, such as for example the roll-fed cutting plotters, are used to treat, such as for example cutting or creasing, material, such as for example (cutting) films, paper, box or corrugated cardboard, and the like. The treated material can then be used for both decorative purposes, for example cut-out figures or characters for decorating objects, and functional purposes, for example assemblable cardboard boxes.

[0004] Cutting plotters treat the material by moving a tool holder head containing a tool across a work surface in a controlled manner, based on instructions or commands from a processing unit, generally in accordance with a predetermined pattern. Depending on the material to be treated and the type of treatment, the person skilled in the art may opt to fit a different type of tool to the tool holder head. In principle, there are two fundamental treatments, namely cutting out a desired shape by means of a cutting knife and creasing the material by means of a so-called creasing tool, which means that one or more grooves or fold lines are produced in a sheet of material in order to be able to fold the respective material more easily and produce the desired shape.

[0005] A large number of the known cutting plotters require the manual fitting of a different type of tool to the tool holder head if the type of treatment is to be changed, which may have a negative impact on the quality of the treatment, due to the fact that the relative position of the treatment end of the newly fitted tool with respect to a reference position of the tool holder head is different compared to the previous tool. In addition, the processing speed is also negatively affected if the tool has to be changed manually.

[0006] In order to prevent having to fit another tool manually, it is known to provide the tool holder head with both a cutting knife and a creasing tool, which tools are each provided in a different tool holder. A tool holder head which is configured in this way makes it possible to automatically switch between the respective tools, based on the set pattern. Such a tool holder head is used by the company Graphtec on their flat-bed cutting plotter. The respective tool holder head comprises two independently operating systems which are movable up and down and which are configured to each move a tool holder up and down. A drawback of a tool holder head which is designed in this way is the fact that the system used to move both tool holders up and down is relatively expensive and occupies a large amount of space.

[0007] American patent publication US 2014/274643 A1 describes a device having a computer-controlled cutting and creasing tool which is configured to move only in an X direction during use, and a cutting and creasing platform having an elastically deformable creasing section which is configured to support a sheet during contact with the creasing point and a non-deformable cutting section which is configured to support the sheet during contact with a cutting knife. Displacing the tools, i.e. the creasing or cutting tool, to a position of use is carried out by means of solenoids.

[0008] The object of the present invention is to provide a tool holder head for a cutting plotter, preferably a roll-fed cutting plotter, which makes it possible to select a first or second tool, depending on the treatment to be performed, in an easy, quick and precise manner, in order to be able to carry out a specific treatment in an automated manner, in particular based on instructions which are transmitted by means of computer software suitable for the purpose.

[0009] The object of the invention is achieved by providing a tool holder head for a cutting plotter comprising a first and a second tool holder which are configured to accommodate a first and second tool, respectively, wherein the tool holder head is adjustable between a first position of use, in which the tool holder head is equipped to perform a treatment using the first tool, and a second position of use, in which the tool holder head is equipped to perform a treatment using the second tool, wherein the first and second tool holders are provided with complementary coupling means, so that the first and second tool holders are couplable to each other, and wherein the uncoupled state is the first position of use and the coupled state is the second position of use, wherein, in the coupled state, the first tool holder is coupled to the second tool holder in such a way that the second tool holder follows the movement of the first tool holder, wherein the one tool holder is provided with a projection and the other tool holder comprises a groove or channel cooperating with the projection in order to bring about the coupling. By means of a tool holder head configured in this manner, it is possible, when used in a cutting plotter, to switch quickly and accurately between the tools fitted in the tool holder. In addition, a tool holder head configured in this way is compact and less expensive, since no separate mechanism is required to move the second tool holder, preferably up and down, since, in the coupled state, the latter follows the movement of the first tool holder.

[0010] In a preferred embodiment, the first tool holder

is configured to perform a rotating movement and an up and down movement, and the second tool holder only follows the up and down movement. The first tool holder is configured to rotate in the first position of use in order to allow the tool fitted in the tool holder to co-rotate when the treatment is being performed, so that the tool is in each case situated in the correct position, or to allow the tool holder to rotate to a well-defined position, so that it can be coupled to the second tool holder. The innovative aspect of the respective tool holder head is the fact that the rotating movement of the first tool holder can be used to select the second tool, so that said second tool can perform a treatment.

[0011] The tool is preferably a cutting tool or a creasing tool. The creasing tool usually consists of a thin, rounded bar which presses on the surface of the material, preferably cardboard, in order to produce the desired fold lines. A bar which is shaped in this way offers the advantage that it is always correctly positioned, independently of the processing direction. In an alternative embodiment, the creasing tool comprises a rotatable wheel which presses on the surface of the material in order to produce the desired fold lines.

[0012] The cutting tool is preferably either a knife of the tangential type or a so-called drag knife. A tangential knife is rotated, so that the knife is always precisely in the correct position during cutting. A drag knife is not driven, the knife follows the rotation of the cutting movement since the knife is mounted and the tip of the knife is situated slightly behind the centre of the mounting (eccentric). As a result, the tip of the knife is situated behind and follows the cutting movement.

[0013] Rotation of the first tool holder is effected by means of a motor, preferably a DC motor, with the encoder providing the feedback. The motor and first tool holder have a toothed belt disc, both are connected via a toothed belt.

[0014] Preferably, the first tool is the cutting tool and the second tool is a creasing tool. In an alternative embodiment, both the first and the second tool are cutting tools. This alternative embodiment is particularly suitable for treating self-adhesive material. In this case, the first cutting tool may may only cut the upper side of the material, for example the self-adhesive portion, while the second cutting tool then cuts the remaining part, for example the carrier material. Instead of the second tool being a creasing tool, the second tool may also be a marker pen by means of which cut pieces can be marked.

[0015] In a preferred embodiment of the tool holder head according to the invention, the treatment end of the second tool extends beyond the treatment end of the first tool in the coupled state. In this way, the first tool does not form an impediment for the second tool, and only the second tool will come into contact with the material to be treated.

[0016] According to a more preferred embodiment of the tool holder head according to the invention, the first tool holder comprises a cylindrical main body, the sleeve surface of which is provided with a receiving channel with an access opening and a detaining edge, wherein the second tool holder comprises a cylindrical base body which is provided with a projection which extends radially from the end of the base body, and wherein the second tool holder is releasably couplable to the first tool holder by a mating coupling of said projection behind the detaining edge of said receiving channel. The receiving channel is preferably an L-shaped recess which is provided in the sleeve surface of the cylindrical main body, the short leg of which forms an access slot. The access opening which forms part of said access slot preferably ends in the upper surface of the cylindrical main body. Said detaining edge forms part of the long leg.

[0017] According to an alternative embodiment of the tool holder head according to the invention, the first tool holder comprises a cylindrical main body which is provided with a radially extending projection on its sleeve surface, wherein the second tool holder comprises a cylindrical base body which is provided with a receiving groove with a detaining edge, and wherein the second tool holder is releasably couplable to the first tool holder by a mating coupling of said projection behind the detaining edge of said receiving groove. The receiving groove is preferably a recess, preferably U-shaped, which is preferably provided along the entire circumference of the sleeve surface of the cylindrical base body.

[0018] In a particular embodiment of the tool holder head according to the invention, the first tool holder is movable up and down between a rest position, an in-use position and a coupling position in which the first tool holder is couplable to the second tool holder. In the rest position, the first tool holder will extend at a certain height, e.g. a first height, wherein the tool which has been fitted in the first tool holder is situated at a certain distance from the work surface, whereas, in the in-use position, the tool holder extends at a second height which is situated closer to the work surface and wherein the tool which has been fitted in the first tool holder makes contact with the work surface, so that the material is treatable. In the coupling position, the tool holder will extend at a third height which is situated further from the work surface than the first height.

[0019] More particularly, the first tool holder is movable up and down by means of a lifting mechanism, wherein the tool holder head comprises drive means for moving the lifting mechanism up and down, which drive means are suitable for generating a magnetic field. Said drive means preferably comprise a coil and a magnet which cooperates therewith. Depending on the current which is passed through the coil, the electromagnetic forces generated by the magnet will move the first tool holder up or down.

[0020] According to a particularly advantageous embodiment, the tool holder head is adjustable from its first to its second position of use by an upward movement of the first tool holder to the coupling position and a subsequent rotating movement of the first tool holder, as a

result of which the radially extending projection engages the second tool holder behind the detaining edge of the receiving channel which is provided in the first tool holder. In practice, two rotating movements will take place when adjusting from the first to the second position of use, namely a first rotating movement which will take place before the first tool holder moves upwards in order to correctly position the access opening of the receiving channel of the first tool holder with respect to the projecting (coupling) part of the second tool holder. Once the upward movement into the coupling position has taken place, the second rotating movement will take place in order to position the projection of the second tool holder in the receiving channel in such a way that the respective projection is positioned behind the detaining edge and the second tool holder is coupled to the first tool holder. In order to switch back to the first position of use, the first tool holder is rotated again, so that the projection is again positioned at the location of the access opening of the receiving channel. When the first tool holder then moves downwards, the projection moves out of the receiving channel and the first and second tool holders are uncoupled, as a result of which the first tool holder can again move up and down and rotate separately.

[0021] In the second position of use, the first and second tool holder will move up and down together. In a preferred embodiment, the tool holder head comprises a linear guide bush for a linear up and down movement, wherein the movement of the second tool holder is guided and delimited by a guide plate which forms part of the tool holder head according to the invention.

[0022] Another subject of the present invention relates to a cutting plotter, preferably for cutting and creasing material, comprising a work surface, a tool holder head suitable for accommodating at least one tool, which tool holder head is movable across the work surface according to a predetermined pattern, preferably a predetermined cutting pattern and predetermined creasing pattern, wherein said tool holder head is configured and comprises the features as described in the respective claims or in this patent text. The cutting plotter according to the invention is preferably a computer-controlled roll-fed cutting plotter. With roll-fed cutting plotters, the tool holder head moves from left to right across the material to be treated and the material moves from the front to the back under the tool holder head. However, the tool holder head according to the present invention is also suitable for use with a computer-controlled flat-bed cutting plotter or (X-Y) plotter, so that, in an alternative embodiment of the cutting plotter according to the invention, the respective cutting plotter is a computer-controlled flat-bed cutting plotter or (X-Y) plotter. With a flat-bed cutting plotter, the tool holder head moves from left to right and from the front to the back across the work surface.

[0023] The cutting plotter according to the invention is equipped in such a way that switching between the first and second position of use will take place automatically on the basis of the data which have been input into the processing unit of the cutting plotter.

[0024] The present invention will now be explained in more detail by means of the following detailed description of a preferred embodiment of a cutting plotter, for example a roll-fed cutting plotter according to the present invention. The sole aim of this description is to give illustrative examples and to indicate further advantages and features, and can therefore by no means be interpreted as a limitation of the area of application of the invention or of the patent rights defined in the claims.

[0025] In this detailed description, reference numerals are used to refer to the attached drawings, in which:

- ***Fig. 1:*** *is a perspective view of a tool holder head according to the invention;*
- ***Fig. 2:*** *shows a different view of the tool holder head illustrated in Fig. 1;*
- ***Fig. 3:*** *in Figs. 3.1 to 3.3 a number of possible tools are shown which can be fitted in the first tool holder;*
- ***Fig. 4:*** *illustrates the operation of the tool in the first tool holder in the first position of use, in which Fig. 4.1 shows the tool in the rest position, and Fig. 4.2 shows the tool in the position of use;*
- ***Fig. 5:*** *is a representation of the tool holder head in the second position of use;*
- ***Fig. 6:*** *shows a detail view of the tool holder head according to the invention in which the receiving channel provided in the first tool holder and the projection of the second tool holder are clearly visible;*
- ***Fig. 7:*** *shows the first step of the coupling between the first and second tool holder, in which Fig. 7.1 shows the bottom side of the tool holder head, Fig. 7.2 is a detail view of the area A circled in Fig. 7.1, and Fig. 7.3 is a representation of a part of the lifting mechanism which forms part of the tool holder head and is provided to move the first tool holder up and down;*
- ***Fig. 8:*** *illustrates the displacement of the first tool holder to its coupling position;*
- ***Fig. 9:*** *shows the state of a part of the lifting mechanism when the first tool holder is in its coupling position;*
- ***Fig. 10:*** *illustrates the rotational displacement of the first tool holder as a result of which the projection is positioned in the receiving channel behind the detaining edge, so that the first and second tool holders are coupled to each other;*
- ***Fig. 11:*** *illustrates the raised position of the first and second tool holder when the coil has been activated;*
- ***Fig. 12:*** *illustrates the downward movement of the coupled first and second tool holder, as a result of which the second tool can perform a treatment;*
- ***Fig. 13:*** *shows the state of a part of the lifting mechanism when the second tool is able to perform a treatment as is illustrated in Fig. 12;*
- ***Fig. 14:*** *is a detail view of the first and second tool holders in the coupled state during the downward*

movement;

- ***Fig. 15:*** *shows the second tool holder in combination with the guide plate;*
- ***Figs. 16 to 18:*** *illustrate the coupling between the first and second tool holder in an alternative embodiment of the tool holder head according to the invention.*

[0026] The present invention relates to a tool holder head (1) for a cutting plotter. A cutting plotter is a device which is used to perform precise cutting operations on different materials, such as paper, cardboard, vinyl, etc. It operates on the basis of digital instructions which are given by a computer or another digital device. Cutting plotters are used for different applications, such as making stickers, stencils, textile prints, and the like.

[0027] The process of a cutting plotter comprises the following: placing the material to be treated on a work surface and inputting a digital design or a vector file in the associated software. The cutting plotter then uses a fine knife to cut the material according to the specifications of the design. This makes it possible for the users to produce detailed and accurate cuts, varying from simple shapes to complicated designs.

[0028] In addition to its use for cutting a desired shape by means of a cutting knife, the cutting plotter can also be used for other treatments such as, for example, creasing the material by means of a so-called creasing tool or applying markings by means of a marker tool. The respective tools are provided in a so-called tool holder head for this purpose.

[0029] The present invention provides an improved tool holder head (1), as illustrated, inter alia, in Figs. 1 and 2, by means of which it is possible automatically and simply to quickly select a different tool (4, 5) in order to perform a treatment. The tool holder head (1) according to the invention was developed specifically for a roll-fed cutting plotter. A roll-fed cutting plotter is a well-defined type of cutting plotter which is designed to cut materials from a roll instead of from individual sheets. Roll-fed cutting plotters offer the possibility of unwinding materials, such as vinyl, textiles, paper, films, and the like from a roll and then accurately treating them, such as e.g. cutting them according to the specifications of the digital design. However, the tool holder head (1) according to the invention may also be fitted to other cutting plotters, such as a flat-bed cutting plotter.

[0030] The tool holder head (1) according to the invention comprises a first (2) and a second (3) tool holder which are configured to accommodate a first (4) and second (5) tool, respectively. The tool holder head (1) is adjustable between a first position of use, in which the tool holder head (1) is equipped to perform a treatment using the first tool (4), and a second position of use, in which the tool holder head (1) is equipped to perform a treatment using the second tool (5).

[0031] The first tool (4) is often a cutting tool in the shape of a tangential knife, as illustrated in Fig. 3.1, a marker pen (see Fig. 3.2) or a drag knife, as illustrated in Fig. 3.3.

[0032] For rotation, the cutting tool in the first tool holder (2) is driven by a motor (13), often a DC motor with an encoder, in which the position of the motor shaft is controlled by the electronics of the device on the basis of the encoder signals, and which is in communication with the first tool holder (2) via a transmission mechanism (14) consisting of belts and pulleys.

[0033] According to the invention, the first (2) and second (3) tool holders are couplable to each other temporarily. In this case, the uncoupled state is the first position of use and the coupled state is the second position of use. In the coupled state, the first tool holder (2) is coupled to the second tool holder (3) in such a way that the second tool holder (3) follows the movement, in particular the up and down movement, of the first tool holder (2). What is special about this invention is the fact that the rotating movement of the first tool holder (2) is used to select the (second) tool which is fitted in the second tool holder (3).

[0034] In order to be able to bring about the temporary coupling, the first and second tool holders are provided with complementary coupling means, more particularly the one tool holder is provided with a projection and the other tool holder comprises a groove or channel cooperating with the projection in order to bring about the coupling. In the illustrated embodiments, the coupling means are formed as follows. The first tool holder (2) comprises a cylindrical main body (6) and the second tool holder comprises a cylindrical base body (11). In order to form the coupling means, the sleeve surface of the first tool holder is provided with a receiving channel (7) with an access opening (8) and a detaining edge (9), whereas the cylindrical base body of the second tool holder (3) is provided with a projection (10) which extends radially from the base body, as is clearly visible in Fig. 6. The receiving channel is formed by providing an L-shaped recess in the sleeve surface of the first tool holder (2).

[0035] The second tool holder (3) is releasably couplable to the first tool holder by means of a mating coupling of said projection (10) behind the detaining edge (9) of said receiving channel (7). Obviously, other embodiments which make it possible to couple the second tool holder to the first tool holder in such a way that it follows the up and down movement also fall within the scope of protection of the present invention. Such as for example an alternative embodiment in which the first tool holder is provided with a projection, and the second tool holder is provided with a receiving groove which extends over at least, preferably the entire, circumference of the sleeve surface of the second tool holder, and a detaining edge in order to produce a releasable mating coupling.

[0036] The first tool holder (2) is movable up and down by means of a lifting mechanism (12) which is movable up and down and is driven by drive means suitable for the purpose. The respective drive means are suitable for generating a magnetic field. Said drive means preferably

comprise a coil (15) and a magnet (16) cooperating therewith. Just like the motor, the lifting mechanism is controlled by electronics and control software. By sending electric pulses to the lifting mechanism, the control unit can control the position of the first tool holder (2).

[0037] The first tool holder (2) is movable up and down between a rest position, an in-use position and a coupling position, in which the first tool holder (2) is couplable to the second tool holder (3). In the rest position, illustrated in Fig. 4.1, the coil is not activated and the first tool holder (2) will extend at a certain height, e.g. a first height, wherein the tool which has been fitted in the first tool holder (2) is situated at a certain distance from the work surface, this is the rest position. The first tool holder is held at the respective height by a first spring body (21) which is visible in, inter alia, Figs. 4 and 5, and the current drive. The upward movement is limited by a lever (17) which is visible in, inter alia, Fig. 7.3. The lever (17) determines the height of the tool holder in the coupling position. As standard, the first tool holder is in the rest position and it is kept in this position by a second spring body (22) which is connected to the lever (17).

[0038] By now applying a current to the coil (15), the coil (15) moves downwards, towards the magnet, until the tool in the first tool holder presses against the material to be treated. This is the in-use position of the first tool holder (2) (see Fig. 4.2). In the in-use position, the first tool holder (2) extends at a second height which is situated closer to the work surface than said first height and wherein the tool which has been fitted in the first tool holder makes contact with the work surface, so that the material is treatable. In the coupling position, the tool holder will extend at a third height which is situated further from the work surface than the first height. In order to achieve this coupling position, the power of the coil is increased (by e.g. increasing the current), so that the spring force of the second spring body (22) is overcome and the contact surface of the lever (17) comes to lie higher, as is illustrated in Fig. 9.

[0039] Using the tool holder head (1) according to the invention, it is thus possible to select a second tool, such as, for example, a creasing tool, as is illustrated in Fig. 5, by adjusting the tool holder head (1) from its first to its second position of use, as is illustrated in Figs. 7 to 14 and described in more detail below.

[0040] When the coil is not activated and the first tool holder (2) is in its rest position, the following steps will be performed in order to bring the tool holder head (1) from the first to the second position of use:

- rotating the first tool holder (2) in such a way that the access opening (8) of the receiving channel (7) of the first tool holder (2) is correctly positioned with respect to the projecting (coupling) part (10) of the second tool holder (3), as is illustrated in Fig. 7.2;
- moving the first tool holder (2) to its coupling position by moving the lifting mechanism upwards under the action of the drive means, as is illustrated in Fig. 8. At this moment, the lever (17) is tilted, so that the tool holder is situated the furthest possible distance from the work surface (see Fig. 9);
- when the first tool holder (2) is in the coupling position, a second rotating movement will take place, as is illustrated in Fig. 10, in order to position the projection (10) of the second tool holder (2) in the receiving channel (7) in such a way that the respective projection (10) is positioned behind the detaining edge (9) and the second tool holder (3) is coupled to the first tool holder (2);
- as long as the second tool (5), which is fitted in the second tool holder (3), is not being used, the first tool holder (2) remains in the coupling position, as is illustrated in Fig. 11;
- when the second tool (5) has to perform a treatment, the first tool holder is pushed down by a combination of the force of the magnet and coil and of the lifting mechanism, as is shown in Figs. 12 to 14. Since the second tool holder is coupled to the first tool holder, the former will also be pushed down until it comes into contact with the material to be treated and is able to perform its treatment thereon. It should be noted that, in the coupled state, the treatment end of the second tool (5) extends beyond the treatment end of the first tool (4). The second tool holder acts as an axle which is axially movable up and down in a linear bush (19) which is provided in a guide plate (20) forming part of the tool holder head (1) according to the invention. The pin (18) provided on the second tool holder limits the linear movement. At rest, the second tool holder is held up by a third spring body (23) which is provided on the second tool holder and is visible, inter alia, in Figs. 6 and 15.
- In order to switch back to the first position of use, the first tool holder is rotated again, so that the projection is again positioned at the location of the access opening of the receiving channel. Due to the presence of the third spring body (23), it jumps upwards, thus removing the projection from the receiving channel.

[0041] Figs. 16 to 18 illustrate the coupling of an alternative embodiment of the tool holder head according to the invention, in which the first tool holder (2) comprises a cylindrical main body, the sleeve surface of which is provided with a spindle-shaped projection (25) which projects radially from the sleeve surface, and wherein the second tool holder comprises a cylindrical base body which is provided with a receiving groove (26) with a detaining edge (9). The receiving groove (16) may partly or completely extend over the circumference of the sleeve surface of the cylindrical base body of the second tool holder . In order to carry the second tool holder along, the second tool holder (3) is moved upwards, as is illustrated in Fig. 16. Subsequently, the first tool holder (see Fig. 17) is rotated so that the spindle-shaped projection (25) can be moved into the receiving groove (26) until it

engages behind the detaining edge (9) of the receiving groove (26). As is illustrated in Fig. 18, the spindle-shaped projection (25) is held in position and in this way the second tool holder (3) is carried along with the first tool holder (2) during an up and down movement.

[0042] The tool holder head (1) according to the invention may additionally be provided with an optical positioning system or a camera (24) in order to detect markings.

Claims

1. Tool holder head (1) for a cutting plotter comprising a first (2) and a second (3) tool holder which are configured to accommodate a first (4) and second (5) tool, respectively, wherein the tool holder head (1) is adjustable between a first position of use, in which the tool holder head (1) is equipped to perform a treatment using the first tool (4), and a second position of use, in which the tool holder head (1) is equipped to perform a treatment using the second tool (5), **characterized in that** the first (2) and second (3) tool holders are provided with complementary coupling means, so that the first (2) and second (3) tool holders are couplable to each other, and **in that** the uncoupled state is the first position of use and the coupled state is the second position of use, wherein, in the coupled state, the first tool holder (2) is coupled to the second tool holder (3) in such a way that the second tool holder (3) follows the movement of the first tool holder (2), wherein the one tool holder is provided with a projection and the other tool holder comprises a groove or channel cooperating with the projection in order to bring about the coupling.

2. Tool holder head (1) according to Claim 1, **characterized in that** the first tool holder (2) is configured to perform a rotating movement and an up and down movement, and **in that** the second tool holder (3) only follows the up and down movement.

3. Tool holder head (1) according to Claim 1 or 2, **characterized in that** the treatment end of the second tool (5) extends beyond the treatment end of the first tool (4) in the coupled state.

4. Tool holder head (1) according to one of the preceding claims, **characterized in that** the first tool holder (2) comprises a cylindrical main body (6), the sleeve surface of which is provided with a receiving channel (7) with an access opening (8) and a detaining edge (9), **in that** the second tool holder (3) comprises a cylindrical base body (11) which is provided with a projection (10) which extends radially from the end of the base body, and **in that** the second tool holder (3) is releasably couplable to the first tool holder by a mating coupling of said projection (10) behind the detaining edge (9) of said receiving channel (7).

5. Tool holder head (1) according to one of the preceding claims, **characterized in that** the first tool holder (2) is movable up and down between a rest position, an in-use position and a coupling position in which the first tool holder (2) is couplable to the second tool holder (3).

6. Tool holder head (1) according to Claim 5, **characterized in that** the first tool holder (2) is movable up and down by means of a lifting mechanism (12), wherein the tool holder head (1) comprises drive means for moving the lifting mechanism (12) up and down, which drive means are suitable for generating a magnetic field.

7. Tool holder head (1) according to Claim 5 or 6, **characterized in that** it is adjustable from its first to its second position of use by an upward movement of the first tool holder (2) to the coupling position and a subsequent rotating movement of the first tool holder (2), as a result of which the radially extending projection (10) engages the second tool holder (3) behind the detaining edge (9) of the receiving channel (7) which is provided in the first tool holder (2).

8. Tool holder head (1) according to one of the preceding claims, **characterized in that** the tool is a cutting tool or a creasing tool.

9. Cutting plotter, comprising a work surface, a tool holder head (1) suitable for accommodating at least one tool (4; 5), which tool holder head (1) is movable across the work surface according to a predetermined pattern, **characterized in that** said tool holder head (1) is one according to one of Claims 1 to 8.

10. Cutting plotter according to Claim 9, **characterized in that** said cutting plotter is a computer-controlled roll-fed cutting plotter.

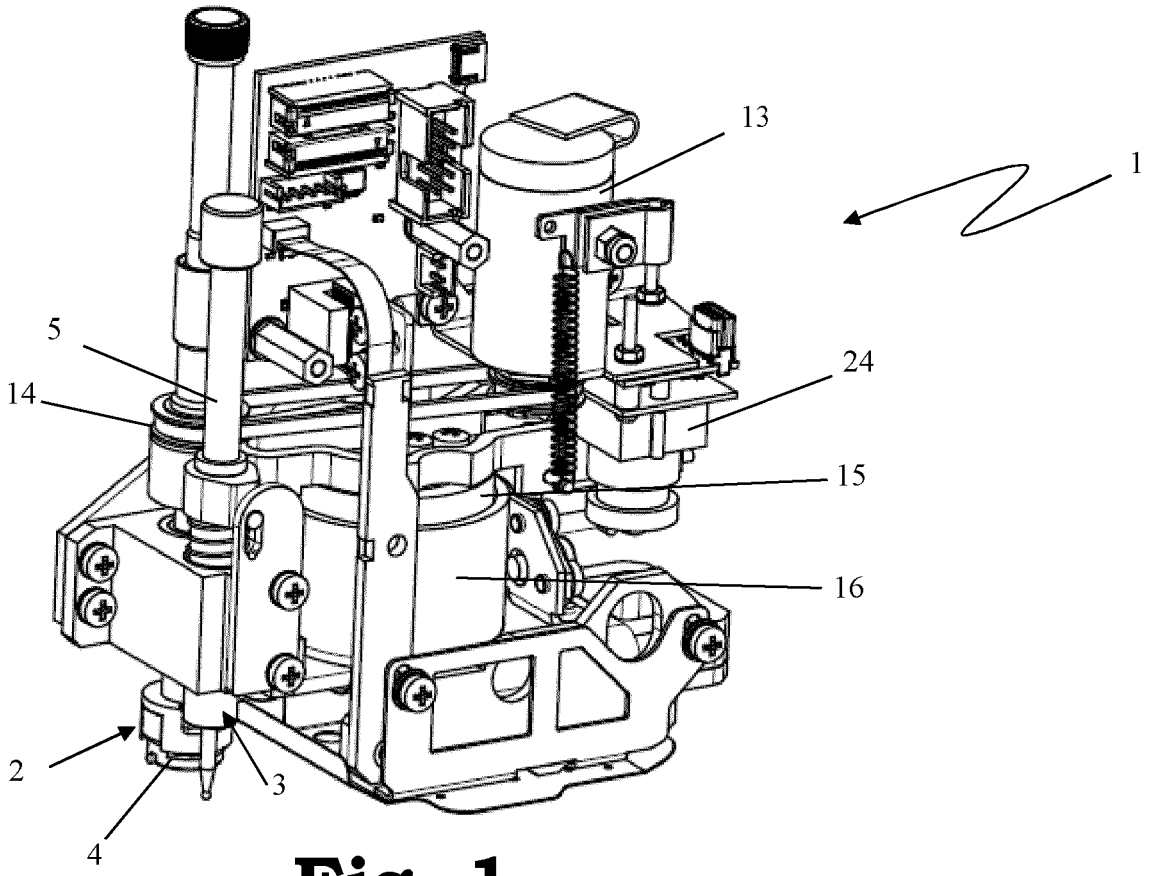


Fig. 1

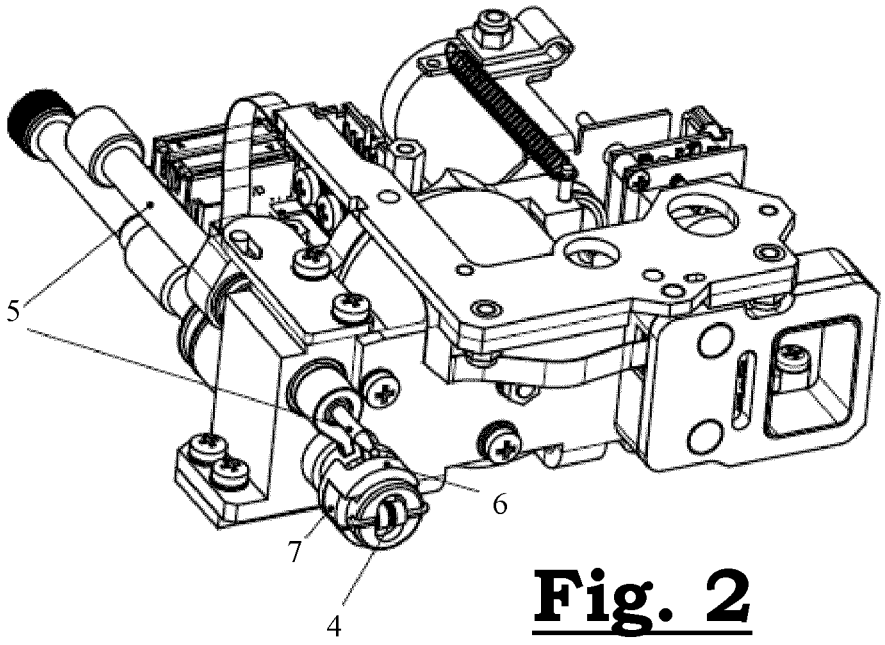


Fig. 2

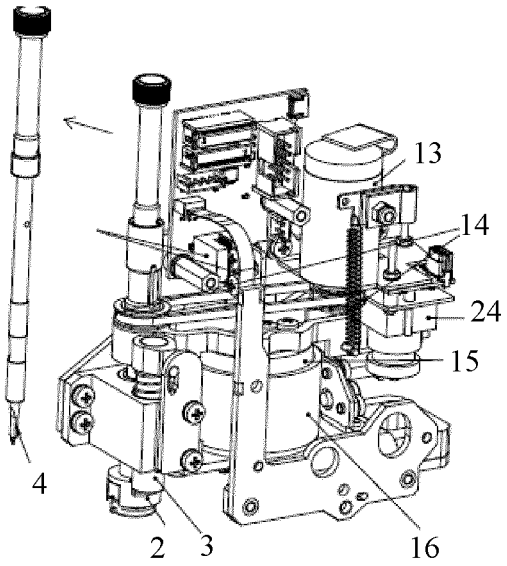


Fig. 3.1

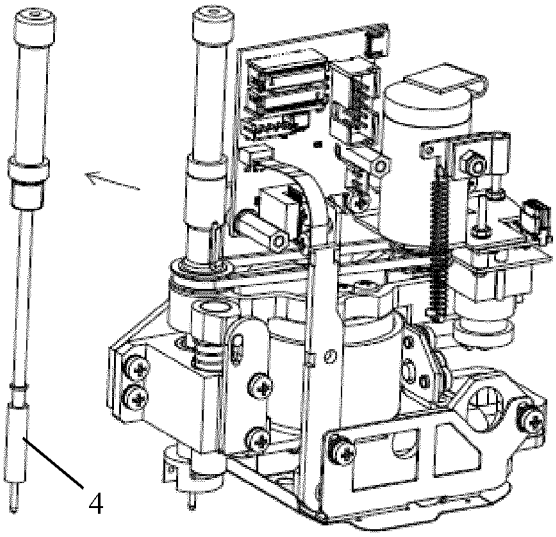


Fig. 3.2

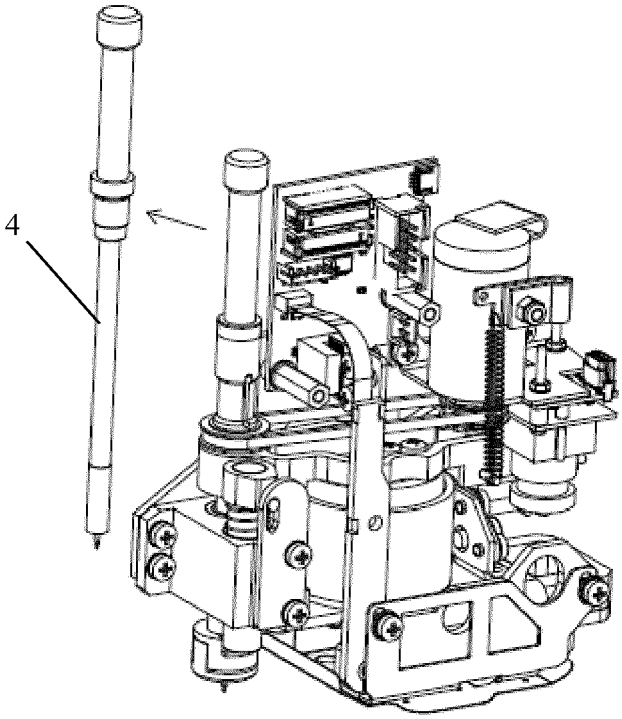


Fig. 3.3

Fig. 3

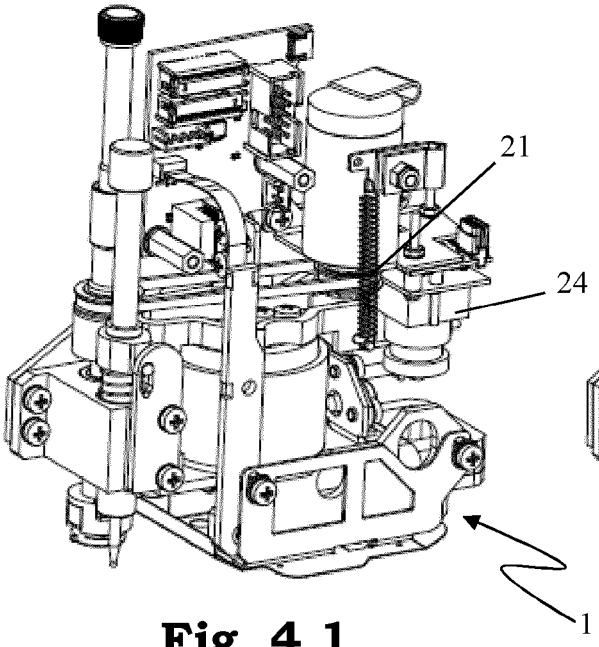


Fig. 4.1

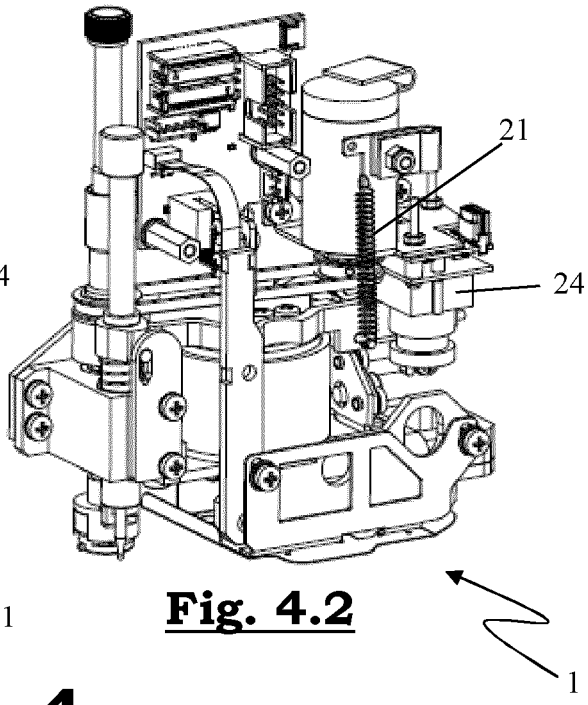


Fig. 4.2

Fig. 4

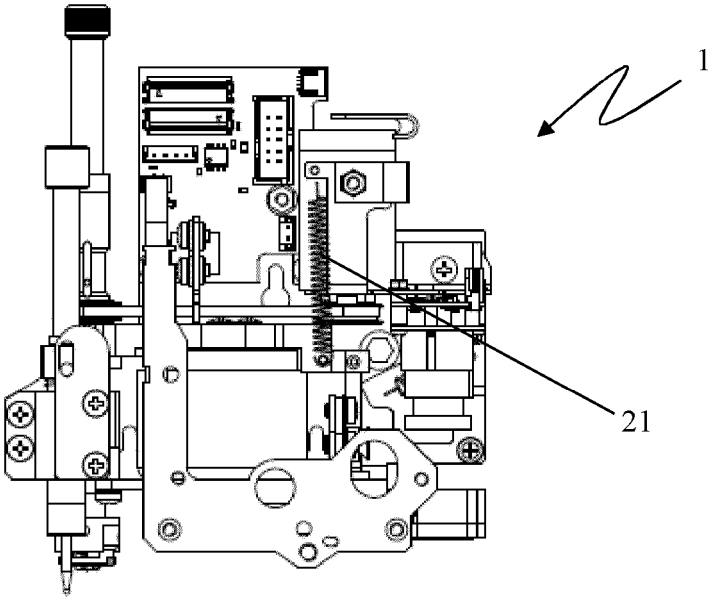


Fig. 5

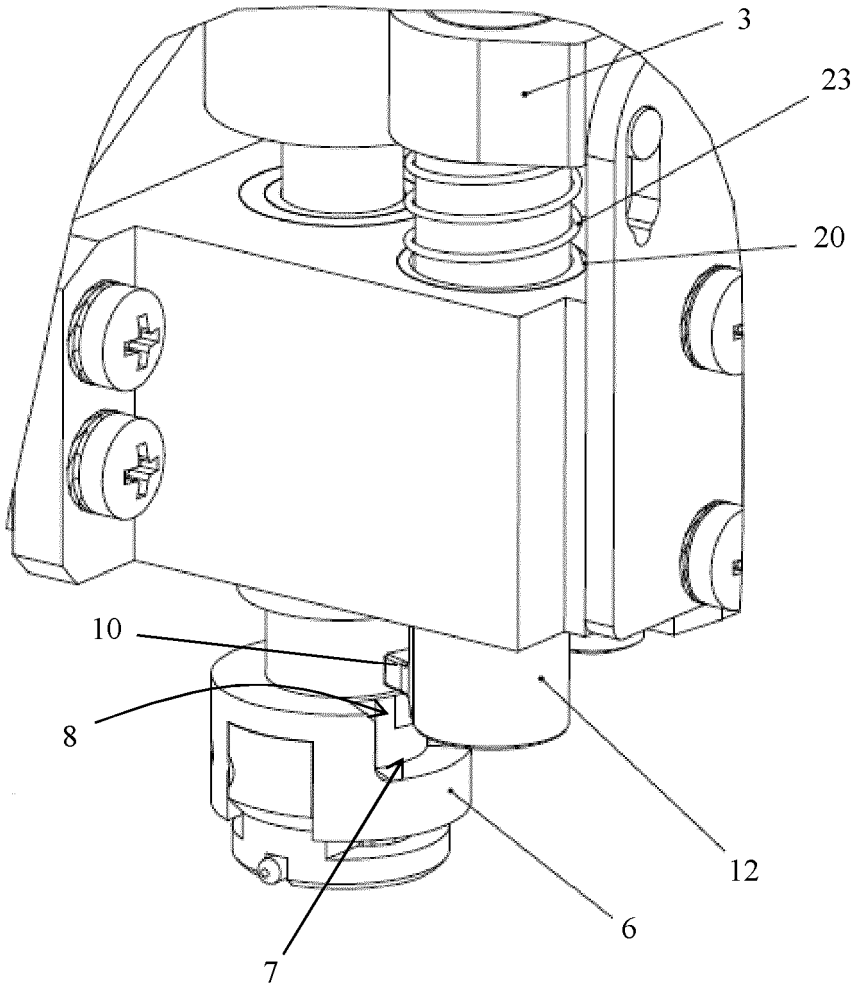


Fig. 6

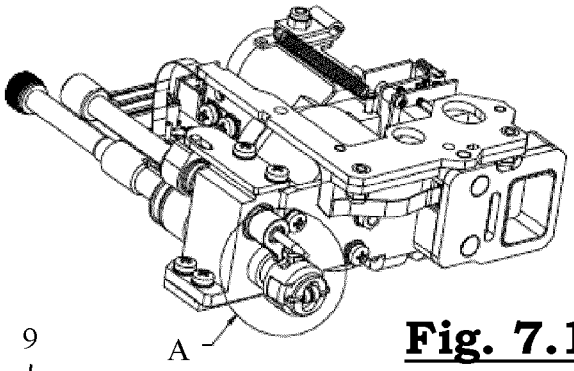


Fig. 7.1

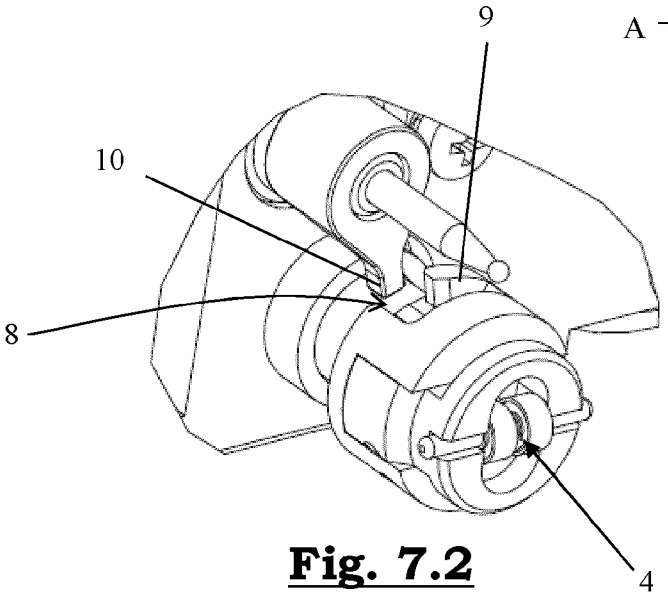


Fig. 7.2

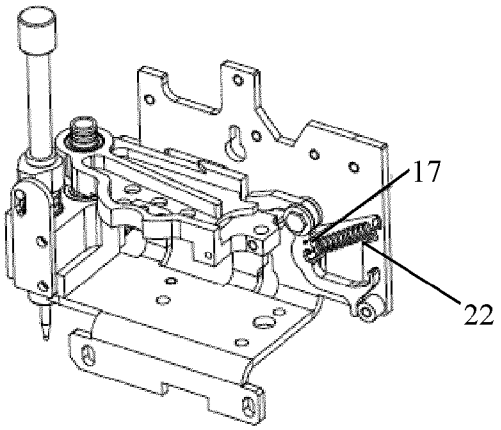


Fig. 7.3

Fig. 7

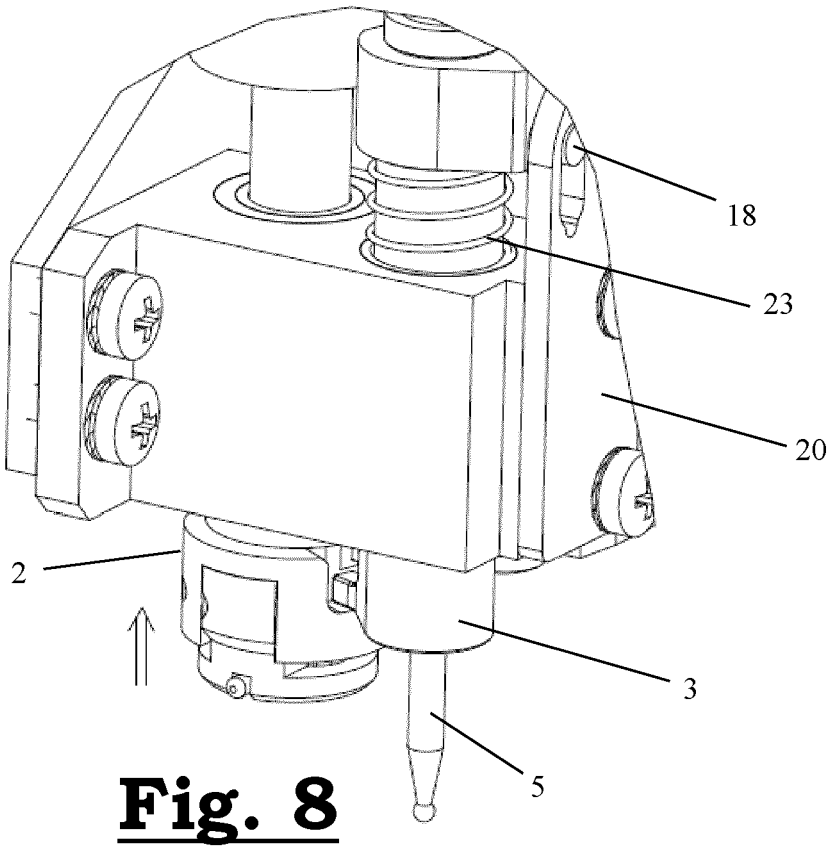


Fig. 8

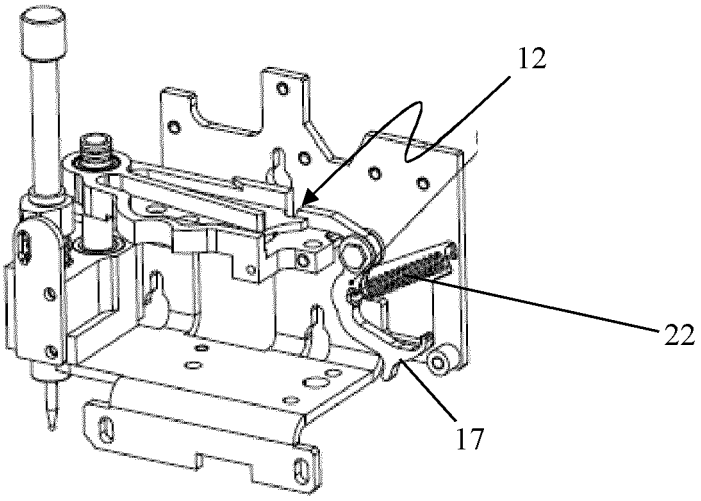


Fig. 9

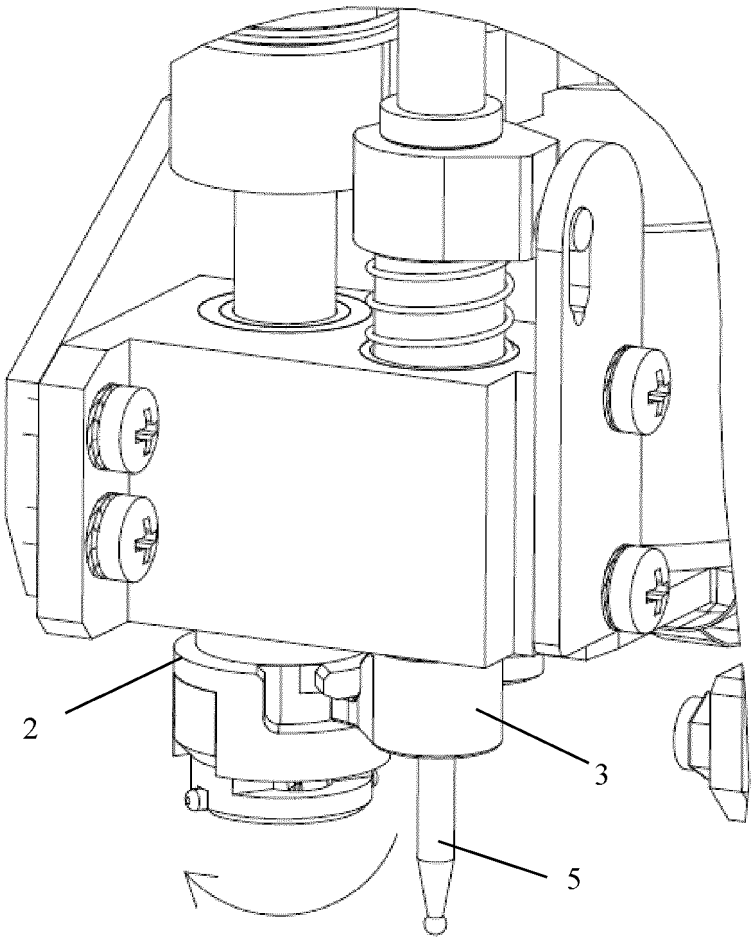


Fig. 10

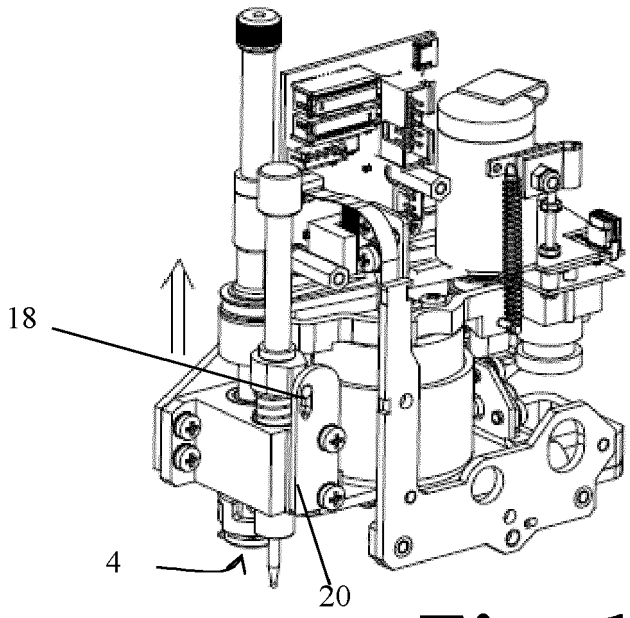
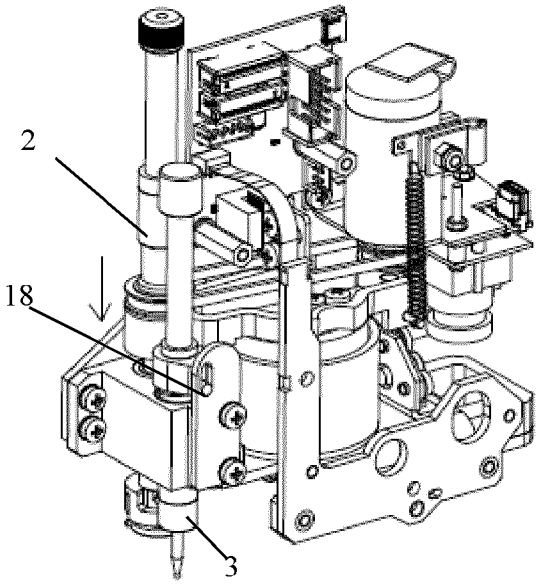


Fig. 11



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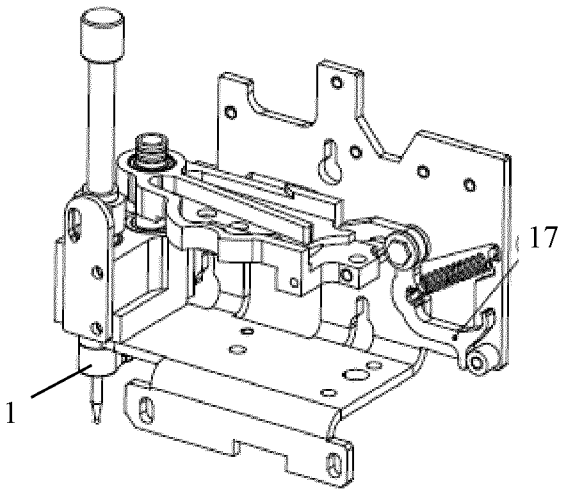


Fig. 13

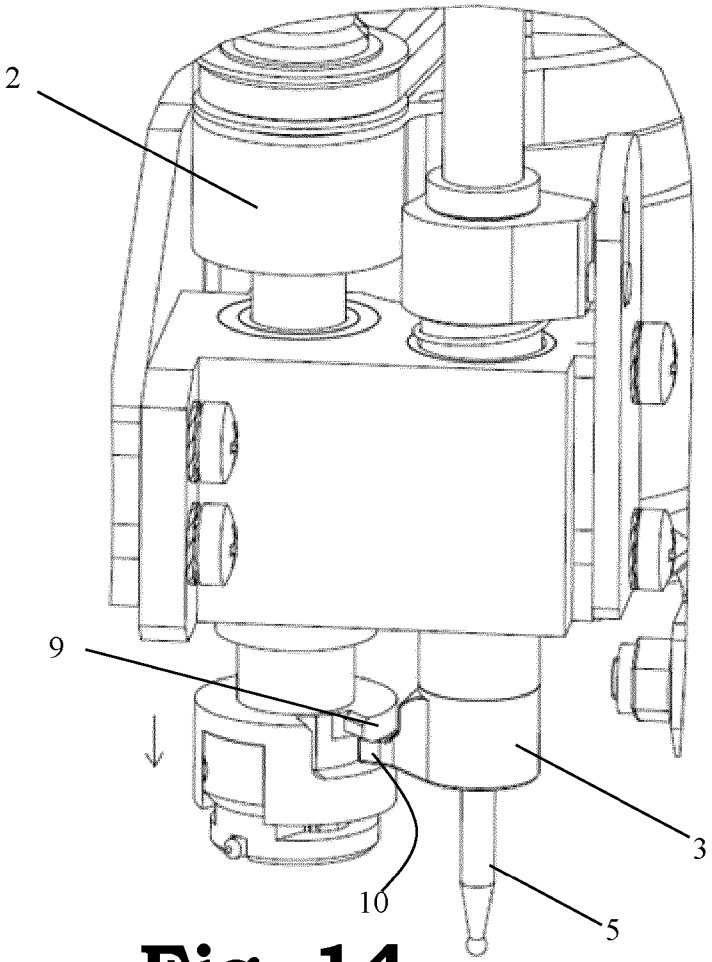
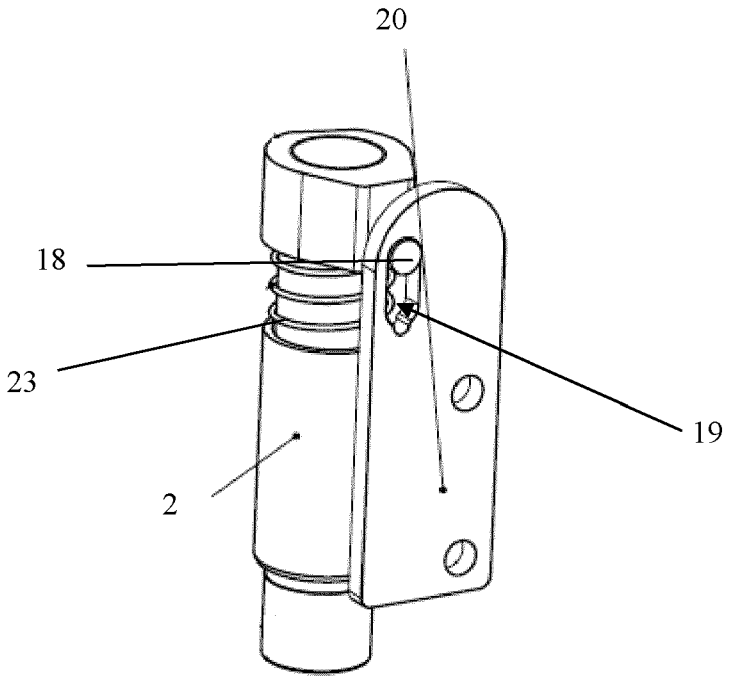


Fig. 14



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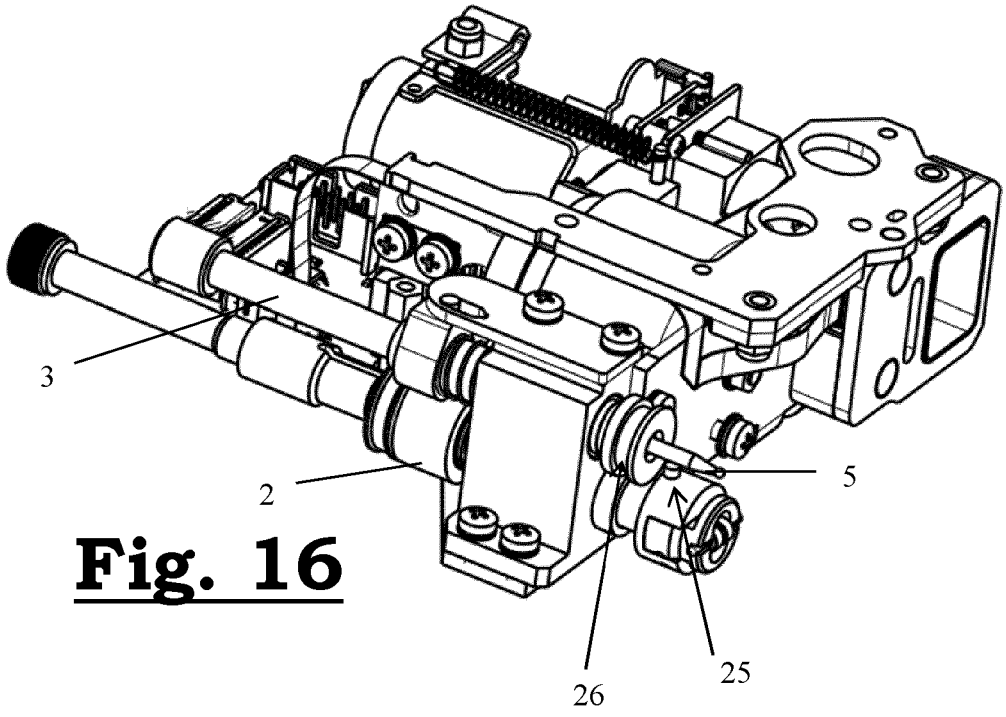

Fig. 16

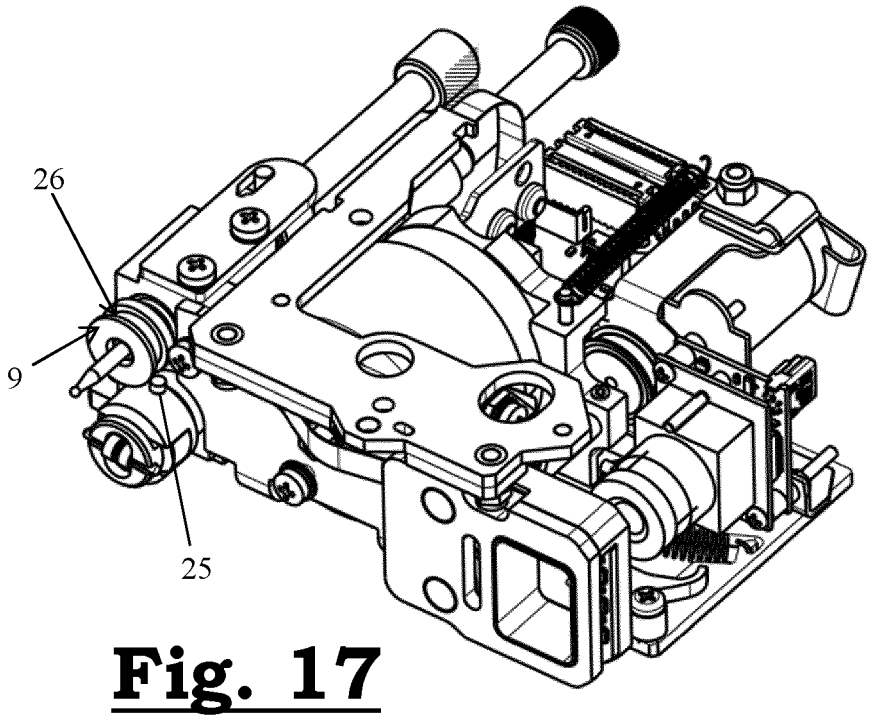

Fig. 17

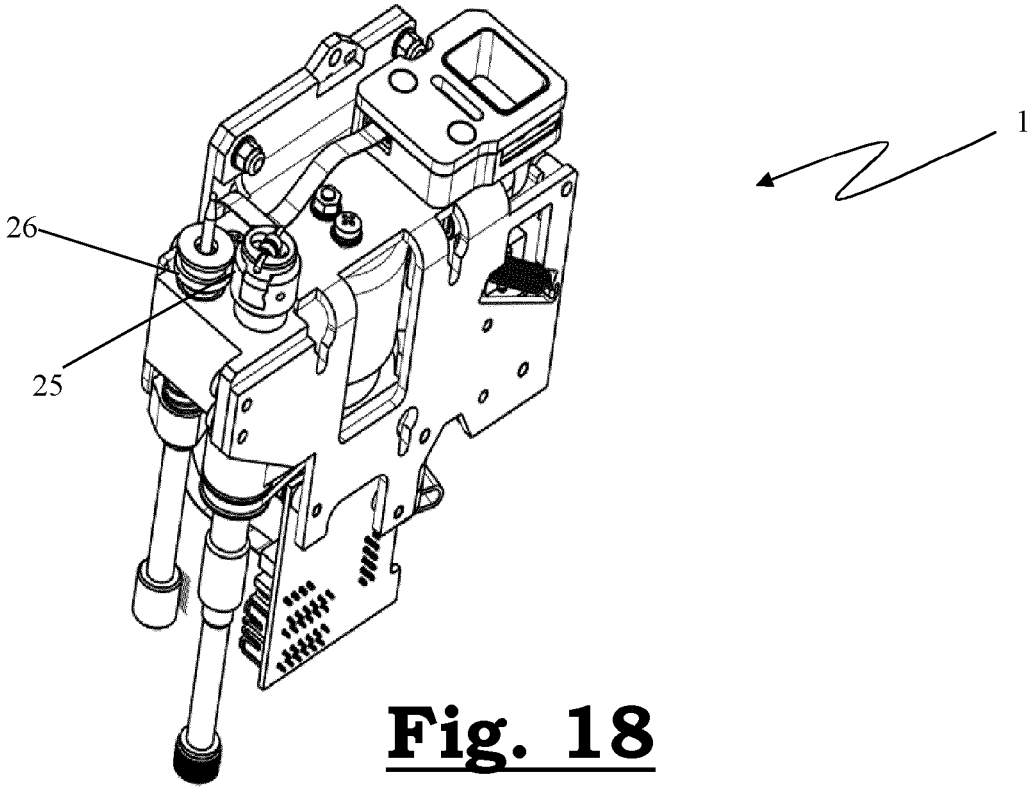

Fig. 18

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EUROPEAN SEARCH REPORT

Application Number
EP 24 19 5146

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2014/274643 A1 (CLARK ROBERT A [US] ET AL) 18 September 2014 (2014-09-18) * paragraph [0037] - paragraph [0038]; figures 1,3A-3B,4A-4B *	1-10	INV. B24B1/00 B26D3/08 B26D7/26 B26D7/27 B26F1/38
A	WO 2018/220645 A1 (SRINIVASAN VISWESH [IN]) 6 December 2018 (2018-12-06) * paragraph [0019] - paragraph [0035]; figures 1,2 *	1-10	

TECHNICAL FIELDS SEARCHED (IPC)

B24B
B24D
B26F
B26D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 January 2025	De Backer, Tom

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13-01-2025

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WO 2018220645 A1	06-12-2018	NONE	

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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- US 2014274643 A1 **[0007]**