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(54) APPARATUS FOR CUTTING FABRICS WITH IMPROVED CONTROL

(57) An apparatus (100) for cutting fabrics is described, which comprises a housing area (4) configured to house a roll (R) of material to be cut, and configured to allow to unwind said roll (R) along an unwinding direction (D), a movement system (11) configured to control a movement of the roll (R) housed in the housing area (4), a working area (5) configured to provide an abutment for at least one portion of the material to be cut which has been unwound along the unwinding direction (D), and cutting means (6) arranged at the working area (5) and configured to be guided transversely with respect to the unwinding direction (D). Suitably, the apparatus (100) comprises a command system (20) configured to manage the operation thereof, said command system (20) comprising at least one manual command element (21) configured to generate, based on a manual input of the user, control commands (Cmd) which are output to the movement system (11) of the roll (R), said control commands (Cmd) being adapted to control the operation of said movement system (11).

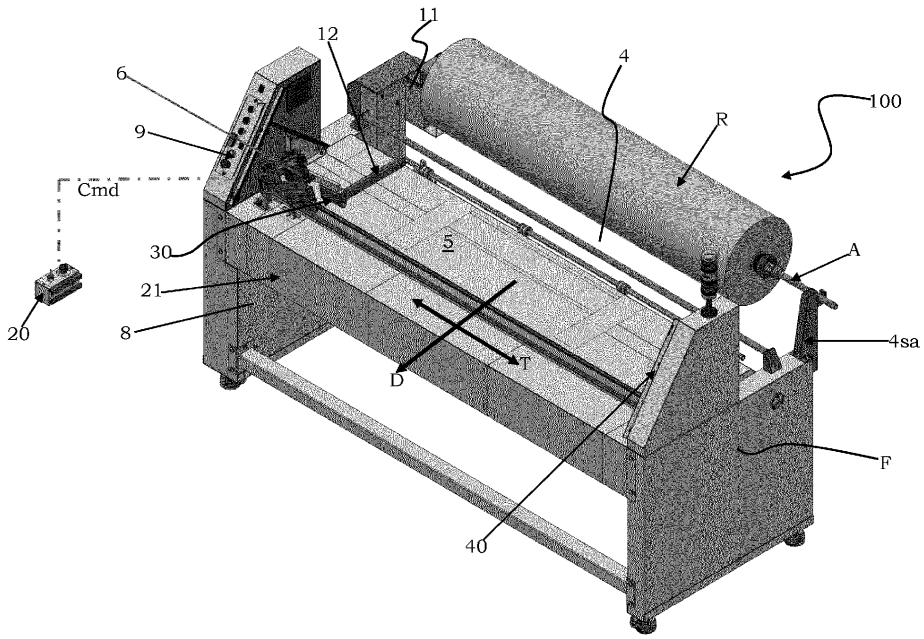

FIG. 1

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Description

Field of application

[0001] The present invention refers to an apparatus for cutting fabrics, in particular to allow the unwinding of a fabric roll and the following cutting of the unwound material in order to form a multilayer of sheets stacked on each other. The material to be cut can be for example synthetic leather, soft PVC, technical or synthetic material, etc., and in general materials adopted in the textile industry for the mass production of various components (footwear, leather goods, car interiors, clothes and similar). The following description is made with reference to this field of application with the sole purpose of simplifying the exposition thereof.

Prior art

[0002] In the present field, there has been for a long time an ever-increasing development of devices and apparatuses for automatizing and optimizing the production processes, by reducing or eliminating the need for unnecessarily laborious and/or time-consuming operations and the number of involved operators.

[0003] Very often, overlapping sheets of material are used, thereby forming a multilayer which is also known in the sector as "mattress", which is fed in specific numeric control cutting machines for cutting thereof according to pre-set patters.

[0004] Generally, the single sheets of the mattress are formed from a roll of material which is subsequently sectioned in various portions. In the step of sectioning the roll, it is very important to correctly position the unwound material which has to be cut.

[0005] The prior art currently provides cutting apparatuses which substantially comprise a motorized cutter whose blade slides through a guide arranged in a working area onto which the fabric is unwound. The cutter is activated along the guide between a rest position and an end position, thereby sectionizing the roll.

[0006] In many cases, after a roll portion to be cut was arranged on the working area for cutting it (for example by manually unwinding the roll), an operator always manually carries out the alignment of said portion, for example in order to eliminate folds which formed during the unwinding of the roll and such that said portion is perfectly overlapping the underlying portion. After said alignment operation, the fabric is cut by the movement of the cutter, whose blade automatically returns in the rest position; successively, the operator must again unwind the roll and slide a further portion of fabric on the working area, reposition the free end of the fabric to be cut in the desired position and realign the material acting on said free end before proceeding to a new sectioning transversal cut.

[0007] The operation of aligning the portion of fabric to be cut is of crucial importance for correctly cutting and forming a homogeneous multilayer, which is the reason why it is desirable to have a system which facilitates and makes this preliminary step even more precise. It can be in fact observed that the above-described manual alignment is particularly laborious and inconvenient for the operator, so much so that currently in many cases the presence of two operators is provided at opposite sides of the laying-off table; there are also automatic alignment systems, which are, however, very expensive and complex.

[0008] The technical problem of the present invention is to devise an apparatus for cutting fabrics having functional and structural characteristics such as to allow to overcome limits and inconveniences complained with respect to the prior art, in particular which is able to allow in an extremely simple and efficient manner the correct positioning and alignment of a portion of a roll of fabric, which is still to be cut, on a working area, in order to then proceed to the subsequent cut thereof in order to form a sheet of material.

Summary of the invention

[0009] The solution idea underlying the present invention is to provide an apparatus for cutting fabrics wherein the alignment of portions of unwound fabric from a roll to be cut is easily controlled by the operator by acting on a manual command element (such as, for example, a joystick), whose movement is able to give the desired alignment by controlling suitable alignment and movement means of the roll, in particular for a movement thereof in a direction which is substantially transverse to the unwinding direction of the roll, said unwinding being previously manually carried out by the operator. In this way, only one operator is able to position a free end of the material to be cut on a specific plane and to proceed in a simple and efficient way to the alignment thereof before commanding a cutting; the adjusting of the positioning of the portion of material which is still to be cut (that is the unwound portion of the roll) is thus performed in a very simple way by acting on the positioning and/or winding of the same roll and, after cutting said portion to form a single sheet, only one operator is able to (manually) slide a new portion of the sheet which was already cut and to proceed again to a correct alignment of said portion to be cut simply by acting on the joystick. It is furthermore possible to perform, still by joystick, a rewinding of the roll when desired by the above-mentioned alignment and movement means, which is particularly useful if, during the manual laying off, the fabric is excessively stretched, as well as to eliminate folds caused by excess material. Preferably, the alignment is given by motorized means controlled by the manual command element, wherein there is a first motor for aligning and a second motor for rewinding.

[0010] Based on said solution idea, the above-mentioned technical problem is solved by an apparatus for cutting fabrics, comprising:

- a housing area configured to house a roll of material to be cut, and configured to allow to unwind said roll along an unwinding direction;

- a movement system configured to control a movement of the roll housed in the housing area (for example at least to define and adjust the position thereof, in particular a movement in a direction which is substantially transversal to the unwinding direction, as well as possibly a rotation for a rewinding thereof). In other words, said movement being in a direction which is substantially transversal to the unwinding direction of the roll, and/or being a rotation (for example partial) of the roll;

- a working area configured to provide an abutment for at least one portion of the material to be cut which has been unwound along the unwinding direction;

- cutting means arranged at the working area and configured to be guided transversely with respect to said unwinding direction; and

- a command system configured to manage the operation of the apparatus, said command system comprising at least one manual command element configured to generate, based on a manual input of the user, control commands which are output to the movement system of the roll, said control commands being adapted to control the operation/movement of said movement system.

[0011] More in particular, the invention comprises the following additional and optional characteristics, taken singularly or in combination, if necessary.

[0012] According to an aspect of the present invention, the manual command element can be a joystick which is manoeuvrable by the user in order to adjust the adjustment movement of the alignment system.

[0013] According to an aspect of the present invention, the command system can further comprise at least one button for activation of the cutting means.

[0014] According to an aspect of the present invention, the movement system can comprise a retention element configured to be at least partially inserted in the core (that is in a tubular support) of the roll and to abut onto a free surface of the core of the roll, the retention element being thereby configured to make the roll integral with the movement system, wherein a movement of said retention element corresponds to a movement of the roll.

[0015] According to an aspect of the present invention, the movement system can comprise means for aligning the roll including a first motor and a shifting element which are operatively coupled with each other, wherein the first motor is adapted to guide the movement of the shifting element substantially in a direction which is transverse to the unwinding direction of the roll, wherein the shifting element is configured to cause, due to the movement thereof, a corresponding shift of the roll, and wherein the first motor is configured to receive the control commands generated by the manual command element of the command system and can be driven based on said control commands.

[0016] According to an aspect of the present invention, the means for aligning the roll can comprise a worm screw which is put in rotation by the first motor and is configured to cause the movement of the shifting element.

[0017] According to an aspect of the present invention, the retention element can be connected to the shifting element and can be configured to be shifted by it.

[0018] According to an aspect of the present invention, the movement system can further comprise a second motor operatively coupled with a system of gears which are adapted to be put in rotation by said second motor and are configured to cause a rotation of the roll, said system of gears comprising a first gear, a second gear, and a freewheel which is arranged between the first gear and the second gear, wherein the second motor is configured to receive the control commands generated by the manual command element of the command system and can be driven based on said control commands.

[0019] According to an aspect of the present invention, the second gear can be connected to the retention element in such a way that a rotation thereof causes a rotation of said retention element and thus a corresponding rotation of the roll.

[0020] According to an aspect of the present invention, the movement system can be a kit of parts directly or indirectly connected with each other and which can be integrally associated with a support element of the roll in the housing area, or which provides itself a support element of the roll in the housing area.

[0021] According to an aspect of the present invention, the movement system can comprise a first guide element and a second guide element, the housing area being configured so that the roll can be positioned between the first guide element and the second guide element in the alignment area, said guide elements being movable in a direction which is substantially transversal to the unwinding direction of the roll and being configured to abut onto opposite sides of the roll, the apparatus further comprising motorized means configured to move the first and second guide elements along said transversal direction, wherein said motorized means are configured to receive the control commands generated by the manual command element of the command system and can be driven based on said control commands.

[0022] According to an aspect of the present invention, the apparatus can further comprise a worktable which extends as a prolongation of the working area and is configured to support the material which is unwound and then cut by the cutting means. It is also possible to consider, in some embodiments, the working area and the worktable as a single working area, however taking into account that the above-mentioned worktable is not a necessary component of the apparatus of the present inven-

tion and can be removably associated with the apparatus.

[0023] According to an aspect of the present invention, the command system can comprise a body adapted to movably engage with the worktable.

[0024] According to an aspect of the present invention, the worktable can comprise a guide to which the body of the command system engages by means of coupling means, substantially providing a pad system.

[0025] According to an aspect of the present invention, the body of the command system can be in the form of a box.

[0026] According to an aspect of the present invention, the worktable can have a variable and adjustable length. For example, a portion thereof can be reclinable.

[0027] According to an aspect of the present invention, the working area can be arranged in a support frame and is angularly movable with respect to the support frame by a lifting movement that is substantially drawbridge-like.

[0028] According to an aspect of the present invention, the apparatus can comprise a track configured to transversely guide the cutting means, said track being arranged at a side of the working area which is not bound (for example not hinged) to the support frame.

[0029] According to an aspect of the present invention, the angular movement of the working area can be activated by motorized means controlled by the command system.

[0030] According to an aspect of the present invention, the apparatus can comprise an alignment guide adapted to act as a reference for the operator, said alignment guide being configured to allow an edge of the unwound portion of roll to be cut to slide on a surface thereof and being arranged at a set position corresponding to an optimal alignment, for example protruding from the working area at said set position corresponding to an optimal alignment (which can correspond for example to a position in which there are no folds of the material to be cut).

[0031] According to an aspect of the present invention, the apparatus can comprise, at the cutting means, holding means of a portion of roll which abuts on the working area, said holding means being configured to switch from a rest configuration to a holding configuration, and vice versa, wherein, in the rest configuration, the holding means do not hold the unwound portion of the roll, and, in the holding configuration, the holding means abut onto and hold the unwound portion of the roll through an abutment portion thereof, and wherein said holding means are configured to switch from the rest configuration to the holding configuration by a movement actuated by the movement of the cutting means.

[0032] The characteristics and advantages of the apparatus of the present invention will result from the description, made hereinbelow, of an indicative and non-limiting example of implementation with reference to the attached drawings.

Brief description of the drawings

[0033] In said drawings:

- figure 1 is a prospective view of an apparatus according to the present invention;
- figure 2 represents a detail of the apparatus of figure 1, with visible a command system thereof;
- figures 3A and 3B represent prospective views of the apparatus of the present invention in two distinct operational configurations;
- figures 4A and 4B are prospective views of details of a movement system of a roll according to embodiments of the present invention;
- figures 5A and 5B are prospective views of further details of the movement system of the roll according to embodiments of the present invention;
- figure 6 is a sectional view of a portion of the apparatus according to embodiments of the present invention;
- figure 7 is a prospective view of an apparatus according to an alternative embodiment of the present invention;
- figure 8 illustrates the command system according to an exemplary embodiment of the present invention;
- figure 9 is a prospective view of the apparatus according to an embodiment of the present invention, wherein a portion of a worktable thereof is in a folded position; and
- figures 10A and 10B are prospective views of details of cutting means according to embodiments of the present invention, wherein holding means configured to hold the unwound roll are highlighted.

Detailed description

[0034] With reference to the accompanying figures, 100 globally and schematically indicates an apparatus for cutting fabrics according to the present invention.

[0035] It should be noted that the figures represent schematic views and are not drawn to scale, but they are instead drawn so as to emphasize the important characteristics of the invention. Further, in the figures, different pieces are represented in a schematic way, their form can vary according to the desired application. It should be furthermore noted that, in the figures, identical reference numbers refer to elements which are identical with respect to form and function. Finally, particular devices

described with respect to an illustrated embodiment in a figure can be used also for the other embodiments illustrated in the other figures.

[0036] It can be furthermore observed that, when sequences of process steps are illustrated, they do not necessarily follow the indicated sequence, said steps can be inverted unless it is expressly indicated otherwise.

[0037] The apparatus 100 allows the unwinding of a roll of fabric on a worktable and the following cutting of the unwound material in order to form a multilayer of sheets stacked on each other, said stacked sheets being for example successively fed in a numeric control cutting machine for providing various types of components. Apparatuses of this type are indicated in the sector also as spreaders or spreading machine.

[0038] The material to be cut in sheets can be for example synthetic leather, soft PVC, technical or synthetic material and many others; in general, they are materials adopted in the textile industry for the mass production of components (footwear, leather goods, car interiors, clothes and similar). Obviously, the present invention is not limited to the above-mentioned application and many other applications of the apparatus 100 are possible. It can be furthermore observed that, in the present description, the term "fabric" is in no way limiting the material to be cut.

[0039] Referring to figure 1, the apparatus 100 comprises a support structure or support frame (indicated herein with the reference F), which forms the load-bearing structure adapted to support the main components thereof. In an embodiment, the support frame F is provided with wheels 3, preferably with a locking system, in order to allow the shift of the entire apparatus 100 on wheels.

[0040] The apparatus 100 comprises a housing area 4 configured to house a roll (indicated herein with the reference R) of material to be cut, and configured to allow to unwind said roll R along an unwinding direction indicated with the reference D (which can correspond with the longitudinal axis of the unwound fabric). It can be observed that the present invention is not limited by a particular form and/or arrangement of the housing area 4, which identifies only a portion of the apparatus 100 in which the roll R is arranged in any suitable way (for example supported by specific supports in said housing area 4 or simply abutting thereon) without further limits of the scope of the present invention.

[0041] In an embodiment of the present invention, the housing area 4 is provided in a set portion of the support frame F, for example at a back portion thereof with reference to the working position of the operator designated to the unwinding and cutting of the roll R.

[0042] In a preferred embodiment of the present invention, the housing area 4 comprising supporting means of the roll R, such as for example supports present at the sides of the roll R and adapted to support a rod (indicated in the following with the reference A) around which the roll R to be cut is arranged, said support means being indicated with the references 4sa and 4sb. In this case, the roll R is not directly abutting onto the support frame F but is supported by the rod A, which is in turn supported by side supports 4sa and 4sb. It can be observed that, although the figures show a pair of side supports, a different number of supports can be provided, for example it is possible to use a single side support. In general, the present invention is thus not limited to the configuration of the housing area 4, which, in the present context, simply indicates the area in which the roll R is arranged, which can be set in abutment or maintained suspended or housed in any other way.

[0043] The rod A can be inserted in a central passage of the roll R, more in particular inside a tubular element (indicated herein as core of the roll R) around which the roll R is wound and which thus represents the solid support around which the roll R to be cut is to be wound.

[0044] The apparatus 100 further comprises a working area 5 adapted to provide an abutment for a portion of the material to be cut which was unwound along the unwinding direction D. Accordingly, after being unwound, the material to be cut abuts onto the working area 5 and can be then suitably cut. In other words, the working area 5 provides an abutment plane (or working plane) to allow the cutting of the material and, during the unwinding of the roll, said abutment plane lies in a plane which is substantially parallel to the ground.

[0045] In the working area 5, the unwinding of the fabric of the roll R and the following cutting thereof in order to form a single sheet of material take thus place. For this purpose, the apparatus 100 comprises suitable cutting means 6 arranged at the working area 5.

[0046] In a preferred embodiment of the present invention, the cutting means 6 are in the form of a cutter which includes at least one cutting lamina 6' which is movably guided transversally with respect to the unwinding direction D. Furthermore, as illustrated in the exemplary detail of figure 2, the cutter can comprise a support and protection structure 6" of the cutting lamina, said support and protection structure 6" being also movable integrally together with the cutting lamina 6'. The support and protection structure 6" can be configured to partially cover the cutting lamina 6' (it is substantially a covering carter) and is not limited by a particular form.

[0047] In general, the cutting means 6 are thus configured to be guided transversally with respect to the unwinding direction D, so as to suitably section the portions of fabric unwound from the roll R and to form the sheets to be stacked on each other.

[0048] The apparatus 100 comprises a track 7 configured to guide the cutting means 6 in the working area 5. The track 7 is overlapped by the fabric or flexible material to be cut after being unwound from the roll R before the cutting thereof. As illustrated in the figures, the track 7 is in particular a guide configured to transversally guide the cutting means 6, that is in a direction (indicated with the reference T) which is substantially orthogonal to the unwinding direction D.

[0049] A compartment 8 can be furthermore provided, for example obtained in the support frame F, preferably in a side portion, in which control components of the apparatus 100 can be housed. Command switches 9 are also provided to activate said control components, being for example arranged on an upper portion of the support frame F.

[0050] In an embodiment, the working area 5 is arranged in the support frame F and is angularly movable with respect thereto by a lifting movement that is substantially drawbridge-like. In other words, in this embodiment, the working area 5 is not a fixed portion of the support frame F but is a movable portion, which is able to unwound the above-mentioned angular movement.

[0051] In an embodiment, the working area 5 has a rectangular form in which one of the two major sides is hinged to the support frame F while the opposite side is free and is lifted (shifted) during the above-mentioned angular movement. Obviously, it is not necessary that the form of the working area 5 is rectangular, it can be of any form and hinged to the frame in the suitable way as described above.

[0052] More in particular, in an embodiment of the present invention, the working area 5 substantially has a form of a cross member arranged in the support frame F, even if, as previously said, the present invention is not limited by particular forms and configurations.

[0053] As better illustrated in figures 3A and 3B, it is thus provided that the working area 5 is configured so as to switch from a first configuration, in which it lies in a first plane (which is for example parallel to the ground, figure 3A), and a second configuration, in which it is lifted forming a certain angle with respect to the first plane (and thus lies in a second plane, which is sloping with respect to the first plane, figure 3B as well as the previous figure 1), and vice versa. In general, it can be thus said that the working area 5 is a plane which can be slopped in the support frame F.

[0054] Suitably, the track 7 is arranged on the working area 5 and thus moves integrally together with said working area 5. In an embodiment, the track 7 is arranged at a side of the working area 5 which is not bound to the support frame F, that is the opposite side with respect to the hinged side (or more in general the track 7 is placed closer to said side opposite the hinged side).

[0055] In this way, thanks to the above-mentioned angular movement, at the end of the cutting of the material, it is possible to obtain a physical separation between the ends of the portions of roll which are separated by the cutting, wherein the end of the separated sheet of the roll R is no more arranged on the working area 5 and is slidden therefrom (it abuts for example in a worktable, as will be described in the following), while the end of the roll, which must be still cut, remains abutting onto said working area 5. Furthermore, the lifting is such as not to compromise the positioning of the material which is still to be cut. Once the working area 5 and the truck 7 are repositioned in the cutting position (that is substantially parallel to the ground), the material to be cut can be thus simply unwound and advanced also by only one operator in a new cutting position without the need for time-consuming operations, such as for the recovering and repositioning of the flap of fabric which is connected to the roll and is still to be cut.

[0056] In other words, as can be seen in the example of Figure 3B, the working area 5 can be thus lifted with respect to a plane (for example substantially parallel to the abutment pavement of the apparatus 100), thus producing a visible division between a cut portion of material and the material which is still to be cut. It is thus possible to obtain a clean and rapid division of the material which was already cut from the one which is still to be cut. This solution is thus particularly efficient in preparing multilayer mattresses since it guarantees a correct positioning of the material which is still to be cut after the separation of the portion which was already cut such that only one operator can easily slide a new sheet above the sheet which was already cut in order to prepare said multilayer mattress, without the need to extract a flap of a new portion to be cut from underneath the track 7 since said flap always abuts on the lifted working area 5.

[0057] Preferably, said angular movement can be activated by a command of the operator, as will be detailed in the following, so as to activate suitable automatic lifting means of the working area 5.

[0058] In addition or alternatively, in an embodiment, at least one gripping element 10 is also present in order to allow the manual lifting of the working area 5. The gripping element 10 can be for example a handle placed at a short side of the working area 5.

[0059] Furthermore, in an embodiment, the working area 5 can optionally comprise a vanishing supporting mechanism (not illustrated in the figures), so as to be maintained in position when lifted without the need to continue exerting any force. Said vanishing supporting mechanism can be in the form of a simple support plate which is hinged to the working area 5.

[0060] The apparatus 100 furthermore comprises, at the housing area 4, a movement system 11 configured to define and adjust the position of the roll R housed in said housing area 4, as well as to possibly control the rotation thereof in a set direction. In general, the movement system 11 is thus configured to carry out (control) a movement of the roll R.

[0061] The movement system 11 is detailed in figures 4A-4B and 5A-5B, which represent prospective views of said system, and in figure 6, which represents a section of a portion of the apparatus 100. Another embodiment of the movement system 11 is illustrated in figure 7; it can be furthermore observed that what has been illustrated above for the angular movement of the working area 5 applies to each movement system illustrated herein.

[0062] In a preferred embodiment of the present invention (detailed in figures 4A-4B and 5A-5B and 6), the movement system 11 comprises means for aligning the

roll R configured to carry out a fine adjustment of the position thereof in the housing area 4. In particular, the above-mentioned alignment means comprise at least the following components: a first motor 11a, a worm screw 11b and a shifting element 11c which are operatively connected to each other and are configured to cause a shift of the roll R, for example to adjust the position thereof in the housing area 4 in a direction which is substantially transversal to the unwinding direction D of said roll R, that is substantially along the direction T. The worm screw 11b is put in rotation by the motor 11a, for example by a motion transmission system of the motor which comprises a belt. As will be detailed in the following, the shifting element 11c is connected to an end of the worm screw 11b and is shifted from it during its rotation.

[0063] In an embodiment, in order to carry out the actual shift of the roll R, the presence of a retention element 11r of said roll R is provided, said retention element 11r being for example configured to be arranged around the rod A which supports the roll R and at the same time abuts against the internal surface of said roll R, in particular against the core of the roll R. As illustrated in the non-limiting example of the figures, the retention element 11r is for example provided with a body composing a through hole for the coupling thereof with the rod A (wherein the diameter of the hole substantially corresponds with the diameter of the rod A). It can be in fact observed that, as previously mentioned, the roll R is arranged with a certain clearance around the rod A, while the retention element 11r is on one hand bound to the rod A (for example inserted with sliding around it and bound to it in any other suitable way), on the other hand it is in contact with the inside of the roll R (for example abuts onto the core of the roll R) and this remains bound thereto due to mechanical interference; in this way, the retention element 11r is integral with the roll R and a movement thereof causes a corresponding movement of the roll R.

[0064] It can be observed that, in an embodiment, the retention element 11r can be integrally formed with the rod A, and it can be thus structured so as to provide a protruding portion of said rod A (for example a conical portion) and can be configured to abut onto the core of the roll R as illustrated above and to make the roll R integral with the movement system 11.

[0065] As mentioned above, in an embodiment, the retention element 11r has a portion with conical form and is also called "towing cone", wherein the tapered portion of the cone is inserted in the core of the roll R to carry out the mechanical retention, even if it can be observed that said retention element 11r is not limited by a particular form.

[0066] As illustrated above, in an embodiment, the first motor 11a is configured to move the worm screw 11b, which is connected to the shifting element 11c (which can be for example in form of plate which is connected in one point, for example a lower end, with the worm screw 11b) and causes the shifting of the latter, in particular a translation in a direction which is substantially orthogonal to the unwinding direction D of the roll R. The shifting element 11c is connected to the retention element 11r (for example, it can be shaped to house a portion of the retention element 11r or more in general to couple therewith) and, by shifting, it causes the shift of said retention element 11r and thus of the roll R.

[0067] In this way, in an exemplary embodiment, a face of the retention element 11r (for example the base of the cone) is in direct contact with a face of the shifting element 11c (for example a face of the plate). Obviously, this configuration is not limiting the scope of the present invention and also other configurations are possible.

[0068] The first motor 11a thus allows a first translation of the roll R, allowing a fine alignment of the material to be cut. Suitably, in an embodiment of the present invention, the movement system 11 also comprises a second motor 11d operatively coupled with a system of gears adapted to be put in rotation by said second motor 11d and configured to cause a controlled rotation of the roll R, so as to have a further adjustment degree of the material to be cut.

[0069] More in particular, this system of gears comprises a first gear 11e, a second gear 11f and a freewheel 11g, which is arranged between the first gear 11e and the second gear 11f and is configured to engage both with said first gear 11e and with said second gear 11f, which are thus connected by said freewheel 11g. The first gear 11e, called "driving", is put in rotation by a rotation shaft 11h, which is in turn put in rotation by the second motor 11d. The second gear 11f, called "driven", is instead connected to the retention element 11r such that the rotation thereof causes the rotation of said retention element 11r and thus the corresponding rotation of the roll R.

[0070] For example, the retention element 11r can be shaped so as to comprise a portion inserted inside a through hole of the second gear 11f, so as to be directly bound thereto; in this way, a rotation of the second gear 11f corresponds to a rotation of the retention element 11r and thus of the roll R.

[0071] The freewheel 11g is configured to make the roll R idle in a rotation direction (for example to allow an idle movement of rotation of the rod A in a direction), and, at the same time, to drive in rotation, by activating the second motor 11d, said roll R in an opposite direction of rotation, in particular in the rotation direction corresponding to the rewinding of said roll R. In other words, under the action of the second motor 11d, the unwound portion of the roll R is dragged in a direction opposite the direction of unwinding D, while the operator is always able to manually unwind the roll without the opposition of the motor thanks to the freewheel 11g. In this way, advantageously according to the present invention, the user has no obstacle in manually unwinding the roll, while it is possible to command a rewinding thereof when desired, for example in order to eliminate undesired folds.

[0072] In an embodiment of the present invention, not

illustrated in the figures, a second freewheel can also be added in addition to the freewheel which is illustrated above, in particular a first freewheel, which is working in a rotation direction, (for example a clockwise freewheel) and a second freewheel with an opposite rotation direction (for example a counterclockwise freewheel) can be provided. This embodiment is useful since it allows to manage different types of rolls, characterized by a different spooling and thus by an opposite mode of unwinding. According to the roll arranged on the rod, it is thus possible to engage one freewheel or another one. For example, it is possible to provide the presence of selection means configured to allow the engagement with the desired freewheel; for example, in an embodiment, in addition to the gears 11e and 11f, also second gears can be provided, which are connected to the second freewheel, which are put in rotation when desired in place of the gears 11e and 11f, or a shifting mechanism of the gears 11e and/or 11f can be provided to engage each time the desired freewheel.

[0073] Furthermore, according to an embodiment of the present invention, all the above-mentioned components of the movement system 11 can be seen as a kit of components coupled to the apparatus 100, for example connected to a side support element 4sb which is in turn bound to the frame F; in this way, the movement system 11 also provides for the support of the roll R, thanks to the connection with the element 4sb. This kit of components is thus associable to the apparatus 100 in order to provide it with a suitable movement system 11 which is able to adjust the position of the roll R in the housing area 4 and possibly a rewinding thereof, wherein, in the preferred embodiment, the first motor 11a causes a translation of the roll R, by translation of the shifting element 11c and possibly also of the retention element 11r, while the second motor 11b causes the rewinding of the roll R by rotation of said retention element 11r.

[0074] In other words, the movement system 11 is a kit of parts directly or indirectly connected with each other and can be integrally associated to a support element 4sb of the roll R in the housing area 4, or which provides itself a support element of the roll R in the housing area 4. It is furthermore possible to provide apparatuses, which already exist, with the movement system 11.

[0075] Obviously, the above-mentioned configuration is only a preferred embodiment and is not limiting the scope of protection of the present invention.

[0076] In the configuration shown in the figures, the movement system 11 mechanically supports the roll, but, as previously mentioned, this is not strictly necessary and said system can be associated to the roll in any other suitable way.

[0077] Furthermore, according to less preferred but anyway advantageous embodiments, other modes of movement of the roll R can be implemented. For example, as shown in figure 7, the movement system 11 can comprise a first guide element G1 and a second guide element G2 (also called sideboards). The housing area 4 and the movement system 11 can be thus configured such that the roll R of material can be positioned in said housing area 4 between the first guide element 11a and the second guide element G2. The guide elements G1 and G2 are movable so as to be able to adapt the apparatus 100 to various types of rolls R with different longitudinal dimensions and to be then able to carry out an adjustment of the positioning thereof. The guide elements G1 and G2 can be moved in opposite directions in order to preliminary define and set the positioning of the roll R in the housing area 4. In general, the guide elements G1 and G2 are substantially movable along the transverse direction T with respect to the unwinding direction D and are configured to abut onto opposite sides of the roll R, thus defining the initial position (adjustment) of the roll 4. In other words, the guide elements G1 and G2 are moving transversally with respect to the unwinding direction D of the fabric and can be moved closer/moved away with respect to each other to adapt to the length of the roll R to be cut. The guide elements G1 and G2 can be moved by suitable motorized means, which can be activated, for example, by pressing a suitable button by the operator, as will be observed in the following. For the initial tuning-up of the roll R, only one motor can be present to which the guide elements G1 and G2 are connected through connecting means which are independent from each other, or, preferably, two separate motors can be present (that is a motor for each single guide element), which can be possibly synchronized with each other. In any case, the present invention is not limited by the particular type and by the particular configuration adopted for the movement means of the guide elements G1 and G2. What matters is that the guide elements G1 and G2 are movable, in particular by moving them closer to each other for the initial attachment of the roll R and moving them away from each other for the removal thereof. In the initial step of arrangement and adjustment of the roll R in the housing area 4, the movement of a guide element can thus also be independent from the movement of the other guide element, or more in general said movement takes place in opposite directions, preferably by the above-mentioned motorized means.

[0078] Furthermore, in an embodiment, as illustrated in figure 7, the housing area 4 can be shaped as a cradle formed in the support frame F, in which the roll R is suitably arranged, from which a free end (indicated with the reference Ra) is taken out for the unwinding along the unwinding direction D. In this case, the roll R is simply arranged (for example abutting) in the housing area 4, from which the free end Ra is taken out for the unwinding and following cutting thereof, wherein the form of said housing area 4 is such as to allow an easy unwinding of the roll (for example, it can have a transversal section with semi-circular or rectangular trapezoid shape or any suitable form). It should also be observed that, even if this embodiment is illustrated in combination with the guide elements G1 and G2, it can be adopted also with

other movement systems, such as for example the preferred movement system illustrated in figures 4A-4B, 5A-5B and 6, wherein in this case the rod A is not present but the retention element 11r can anyway be provided. Analogously, it can be observed that all the further expedients with respect to the movement system 11 illustrated in relation to the figures 1-6, can also be introduced in the embodiment of figure 7.

[0079] Once the position of the roll R in the modes indicated above is defined, and once a portion thereof to be cut is taken out, folds and surface defects can appear which must be corrected by an alignment procedure of the roll. Advantageously according to the present invention, in order to align the material to be cut and make said material more suitable for cutting, the apparatus 100 comprises a command system, identified herein with the reference 20, which includes at least one manual command element 21 configured to generate, based on a manual input of a user (for example based on a movement given by the user), control commands, indicated with the reference Cmd, towards the movement system 11 of the roll R. In this way, suitably, the control commands Cmd generated by the movement of the manual command element 21 are adapted to control the movement of the movement system 11, which can be thus driven based on said control commands Cmd given by the user.

[0080] In general, the command system 20 is configured to manage the operation of the apparatus 100, giving new functionalities useful for said apparatus 100. It can be observed that the command system 20 is a general characteristic of the invention present in each of the above-discussed embodiments of the movement system, said command system 20 generating the control commands Cmd which are output to the respective movement means of the roll R.

[0081] As better indicated in figure 8, in a preferred embodiment of the present invention, the manual command element 21 of the command system 20 is a joystick (or command lever) which is manoeuvrable by the user to control the adjustment movement of the movement system 11.

[0082] As illustrated in the figures, the command system 20 can furthermore comprise at least one button 22, for example for activation of the cutting means 6, as well as it can also comprise further buttons (not illustrated), for example for activating the angular movement of the working area 5. In this latter case, the angular movement of the working area 5 can be thus activated by motorized means controlled by the command system 20. Obviously, the above-mentioned angular movement can be manually generated by the operator, as previously observed. In an embodiment, the angular movement takes place automatically, at the end of the cutting.

[0083] As described above, the movement system 11 comprises suitable motorized means to allow various movements of the roll R. Advantageously according to the present invention, in the preferred embodiment, the first motor 11a and the second motor 11d are adapted to receive the control commands Cmd generated by the manual command element 21 of the command system 20 and can be driven based on said control commands Cmd. The first motor 11a can be activated after a movement (for example to the right and/or to the left, substantially transversally to the direction of unwinding of the roll) of the manual command element 21, causing a corresponding movement of the roll R (for example to the right and/or to the left, substantially transversally to the direction of unwinding of the roll, wherein the terms right and left should not be understood as limiting the scope of the present invention, but they mean indeed a movement in a direction which is substantially transversal to the direction of unwinding of the roll and with a particular direction). Analogously, the second motor 11d can be moved following a movement (for example forwards) of the manual command element 21, with a corresponding unwinding of the roll R.

[0084] In other words, the first motor 11a is configured to receive the control commands Cmd generated by the manual command element 21 of the command system 20 and can be driven based on said control commands Cmd, as well as the second motor 11d is configured to receive the control commands Cmd generated by the manual command element 21 of the command system 20 and can be driven based on said control commands Cmd. More in general, the motorized means of the movement system 11 are configured to receive the control commands Cmd generated by the manual command element 21 of the command system 20 and can be driven based on said control commands Cmd.

[0085] The first motor 11a is thus configured to allow the movement of the roll R along the transversal direction T. In particular, the first motor 11a is adapted to receive the command given by the movement of the joystick 21 in order to carry out the movement of transversal alignment of the roll R, while the second motor 11b is adapted to receive the command given by the movement of the joystick 21 in order to carry out the movement of rewinding of said roll R, allowing in this way the user to fix the imperfections of the unwound material in an efficient way by simple commands given via the joystick 21.

[0086] In the less preferred embodiment in which the movement system 11 comprises the guide elements G1 and G2, as previously mentioned, motorized means are present which are configured to move the first G1 and second G2 guide elements along the transversal direction T. The motorized means are thus adapted to receive the control commands Cmd generated by the manual command element 21 of the command system 20 and can be driven based on said control commands Cmd. For example, in this less preferred embodiment, as already mentioned, each guide element can be moved by its own motor, said motors being synchronously moved based on the command of the user in order to obtain the desired alignment; in this case, the guide elements G1 and G2 synchronously move with respect to each other

in a same direction, so as to move the roll R in the desired direction: each of them is adapted to receive the same command given by the movement of the joystick 21 in order to carry out a same movement. In other words, both the initial adjustment step and the following fine adjustment are carried out by the motorized means, wherein it can be provided that each guide element G1 and G2 is moved by an independent motorized means, said motorized means being then synchronously controlled for the fine adjustment by the command system 20. In an embodiment, the guide elements G1 and G2, which, as seen, are connected to motors, can also switch to a configuration in which they are idle, so as to facilitate the initial fixing of the position of the roll R.

[0087] The embodiment in which the movement means 11 comprise the first motor 11a and the worm screw 11b (that is the embodiment of figures 4A-4B, 5A-5B and 6) is preferable since there is a single motor which provides for the translation of the roll R.

[0088] In an embodiment, the command Cmd coming from the command system 20 is sent directly to the motors; alternatively, said command can be sent to specific control systems connected to the motors, which provide for the movement thereof for the fine alignment of the roll; also in this case, the present invention is not limited by a particular configuration and other suitable control systems can be implemented.

[0089] In general, the possibility to control the transversal movement caused by the movement system 11 via the command system 20 (which can be connected, directly or indirectly, to the movement means of the movement system 11) is very advantageous since it allows only one operator to align the material to be cut in a simple and effective way, by eliminating the undesired folds via a simple movement of the joystick 21. It is furthermore possible for said operator to work always in the best working position, as will be observed also in the following. Further advantage is given by the possibility to slightly rewind the roll R when necessary, by simply acting on the joystick 21 in order to activate the second motor 11d.

[0090] Furthermore, in order to facilitate the alignment of the roll R and thus of the portion of material to be cut, an alignment guide 12 is present in the working area 5 which acts as a reference for the operator designated to the unwinding and cutting of the roll; in this way, when the optimal alignment of the fabric unwound from the roll is reached, an edge of said fabric slides along the alignment guide 12 without creating folds, which are instead present in case of non-perfect alignment, which can be suitably corrected by the joystick 21 of the present invention, which allows the shift of the roll until the fold has disappeared. The alignment guide 12 thus acts as a spatial reference, allowing the detection and following correction of the error, and is arranged at the optimal position of the fabric, corresponding to no error, any deviation of the edge of the fabric from this position (that is a condition which is different from a sliding of the edge) representing an alignment error and resulting in folds which can be corrected.

[0091] In other words, the apparatus 100 can comprise the alignment guide 12 which acts as a reference for the operator, said alignment guide 12 being configured to allow sliding an edge of the unwound portion of roll to be cut on a surface thereof and being arranged at a set position corresponding to an optimal alignment, for example protruding from the working area 5 at said optimal position.

[0092] In a preferred embodiment of the present invention, the apparatus 100 comprises a worktable 18 on which part of the unwound material to be cut is placed and on which the portions, which are already cut and overlapping, remain positioned. The worktable 18 extends as a prolongation of the working area 5 and is thus configured to support the unwound material which has been cut by the cutting means 6.

[0093] The worktable 18 is preferably placed in front of the support frame F and is in contact therewith so as to form an extension of the working area 5.

[0094] As illustrated in figure 9, in an embodiment of the present invention, the worktable 18 has a variable length in order to be able to adapt to the various dimensions required for the sheets of the mattress to be formed. Obviously, in the scope of the present invention, length means the dimension of the worktable 18 measured along a longitudinal axis thereof, that is an axis which is substantially parallel to the unwinding direction D. The adjustment of the length of the worktable 18 can take place in various ways, as known in the art, without being limited to a particular mode. For example, a portion thereof 18' can be reclinable, as illustrated in figure 9, or said portion can be sliding or it can be still physically separated from the rest of the worktable 18.

[0095] It should be furthermore observed that, even if the worktable 18 is illustrated in figure 9 as associated to the guide elements G1 and G2, it can be used with any movement system 11, without limiting the scope of the present invention.

[0096] As illustrated in the figures, suitably, the command system 20 can be associated to the worktable 18, preferably in a removable way. Obviously, the present invention is not limited to the above-mentioned embodiment and the figures are provided only by way of example. It can be in fact observed that the command system 20 can be associated to the apparatus 100 in any suitable way.

[0097] In an embodiment, the command system 20 comprises a body 20' adapted to movably engage with the worktable 18, so as to be able to adapt the position of said command system 20 based on the specific needs.

[0098] More in particular, the worktable 18 comprises a guide 19 to which the body 20' of the command system 20 is able to engage by means of suitable coupling means 20m, substantially forming a sliding pad on said guide 19. Preferably, the guide 19 is a linear guide and is preferably formed on a side of the worktable 18.

[0099] The guide 19, engaging with the coupling

means 20m, supports and allows the sliding of the command system 20 to allow an operator to easily shift the body 20' in the position along the guide 19 which is more suitable and convenient in order to efficiently carry out the alignment and cutting operations. As previously mentioned, the present invention allows each operator to always work in the front of the worktable 18, that is in the more suitable position for controlling the alignment of the material.

[0100] Advantageously, the adjustable dimensions of the worktable 18 and/or the possibility to easily shift the body 20' of the command system 20 in the more suitable position makes the cutting apparatus 100 very versatile and adaptable for any specific cutting need.

[0101] The body 20' of the command system 20 is preferably in the form of a box, even if other forms and configurations are obviously possible and fall within the scope of the present invention. It can be furthermore observed that, in general, the coupling means 20m of the command system 20 to the guide 19 can be any mechanism known in the art which allows a suitable positioning and sliding of the command system 20, without being limited to a particular solution.

[0102] Advantageously, it is possible to implement the command system 20 on pre-existing cutting apparatuses by simple integration, for example on a side of the worktable 18, carrying out the operational connections with the movement system 11.

[0103] Furthermore, in an embodiment of the present invention, the apparatus 100 comprises a compartment (not illustrated in the figures) adapted to house an additional cellophane roll to be arranged on the mattress once the multilayer is formed.

[0104] In an embodiment, the command system 20 furthermore has a passage 23 to allow the cables, which connect the command lever 21 to the control components of the apparatus 100, to exit.

[0105] In other embodiments, the command system 20 can be connected to the components of the apparatus 100 by a wireless connection such as for example Wi-Fi, Bluetooth, etc.

[0106] Furthermore, in an embodiment of the present invention, as illustrated in figures 10A and 10B, in order to facilitate the cutting operation, holding means of the unwound roll are present, which are indicated herein with the reference 30.

[0107] In general, to this end, the apparatus 100 comprises, at a position (for example a rest position) of the cutting means 6 and of the track 7, the above-mentioned holding means 30, which are able to hold a portion of the roll R abutting onto the working area 5. Advantageously, the above-mentioned holding means 30 are configured to shift from a rest configuration (or first configuration) to a holding configuration (or pressure configuration, or second configuration), and vice versa. In particular, in the rest configuration, the holding means 30 are not holding the unwound portion of the roll R, while, in the holding configuration, the holding means 30 abut onto and hold the unwound portion of the roll R. The holding of the unwound portion of the roll R is carried out by an abutment or pressure portion 31 of the holding means 30, which can be for example made of rubber or other materials suitable for this purpose.

[0108] Suitably, the holding means 30 are configured to shift from the rest configuration to the holding configuration by a movement actuated by the movement of the cutting means 6 which slide along the track 7.

[0109] In an embodiment, the holding means 30 comprise a first holding element 30a and a second holding element 30b, each provided with a body 30' having an end hinged to the working area 5 and an opposite end comprising the abutment portion 31, substantially forming a lever which carries out a partial rotation around a hinging point P, said partial rotation being caused by the movement of the cutting means 6 along the track 7. Obviously, also a single holding element can be provided, even if an optimal holding is obtained with two holding elements, for example arranged at the opposite sides of the track 7, that is on opposite parts of the cutting means 6. It can be furthermore observed that the abutment portion 31 can be also arranged at other parts of the body 30' and not necessarily at the opposite end of the hinged end.

[0110] As illustrated in the figures, at the hinged end of the holding elements, a pushing element 32 (such as for example a spring) is present which is configured to push the body 30' in the holding configuration abutting onto the working area 5. In an embodiment, the pushing element 32 comprises a portion which is (directly or indirectly) bound to the working area 5 and a portion which is bound to the body 30' of the holding elements and is shaped so as to provide the force which is necessary for holding the portion of roll R which is unwound on the working area 5.

[0111] In an embodiment, the cutting means 6 comprise an impact element 33 (such as for example a protruding appendix, for example cylindrical but not limited to particular shapes) and the body 30' is shaped such that, in the holding configuration, when the cutting means 6 move coming back in the starting position, it comes in contact with the impact element 33 and is shifted therefrom in the rest configuration, overcoming the force exerted by the pushing element 32. The impact element can move integrally with the cutting blade 6' and the body 30' can comprise, in some embodiments, a protruding portion which is adapted to impact against said impact element 33 during the movement of the cutting means 6. In other words, when the cutting means 6 are stationary in the rest position, they force, by means of the impact element 33, the holding means 30 in the rest configuration, while, as soon as said cutting means 6 move, the pushing element 32 is no more opposed by a force which balances its own elastic force and thereby forces the holding means 30 in the holding configuration before the cutting blade 6' impacts against the material to be cut.

[0112] This solution is very advantageous since it al-

lows an optimal cutting by the cutting means 6, avoiding for example jams and inaccuracies due to fact that the cutting blade, at the moment of the impact with the roll, causes a shift of the unwound material. These advantages are furthermore obtained with a very simple and economic system.

[0113] It should be finally observed that the solution explained above, which provides the presence of holding means 30, is a general and independent characteristic and can possibly be applied also in other apparatuses, for example not comprising the above-described drawbridge-like mechanism and/or movement means of the roll and/ the command system.

[0114] Finally, in an embodiment of the present invention, also one or more photocells 40 are provided which act as a safety element, for example to detect the presence of the hand of a user at the cutting means and, if they are moving, to block the operation thereof.

[0115] A method for cutting according to the invention, using the apparatus 100, will be explained below, the method for cutting substantially comprises the following step:

- positioning a portion of material to be cut unwound from a roll R on a working area 5 of a cutting apparatus 100 provided with cutting means 6;

- aligning the material to be cut by means of alignment means 11, said alignment being guided by the operator by acting on the joystick 21 of the command system 20, which causes the activation of the motors 11a and/or 11d, or (in a less preferred embodiment) the synchronous shift of the guide elements G1 and G2;

- transversally cutting the material by the cutting means 6 which slide in the track 7 transversally with respect to the unwinding direction D.

[0116] Once the cutting is carried out, two material portions are physically divided but substantially still contiguous. For this reason, a step of angular lifting of the working area 5 is provided, causing a clear separation of said portions; the cut portion remains in this way on the worktable 18.

[0117] To conclude, the present invention provides an apparatus for cutting fabrics in which the alignment of portions of fabric unwound from a roll is easily controlled by the operator by acting on manual command element (such as for example a joystick), whose movement is able to give the desired alignment by control of suitable alignment and movement means of the roll. In this way, only one operator is able to position a free end of the material to be cut on a specific plane and proceed in a simple and efficient way to the alignment thereof before commanding the cutting; the adjustment of the positioning of the portion of material which is still to be cut (that is of the unwound portion of the roll) is thus carried out in a very simple way by acting on the positioning and/or wounding of the roll itself and, after the cutting of said portion in order to form a single sheet, only one operator is able to slide a new portion above the sheet which is already cut, and proceed again to a correct alignment of said portion to be cut simply by acting on the joystick. It is furthermore possible to carry out, still via joystick, a rewinding of the roll when desired. Preferably, the alignment is given by motorized elements controlled by the manual command element, in which there is a first motor for the alignment and a second motor for the rewinding.

[0118] Advantageously according to the present invention, it is possible to form in a very simple and precise way a multilayer of sheets to be cut, wherein the single sheets are stacked on each other with a form which is substantially identical and without imperfections. All this is obtained thanks to the correct alignment of the portion of roll to be cut which is carried out by the operator via the joystick (or more in general via the manual command element), which commands the fine adjustment of the position of the roll.

[0119] Suitably, the device adopted in the present invention allows the operator to work always in the front of the worktable, thus maintaining a correct overall view without the need to shift to the sides of the table and without the need for a second operator designated to the alignment, thereby obtaining an operational simplification in the step of positioning and aligning the material which is still to be cut. All these advantages are furthermore obtained without sacrificing the simplicity of the apparatus, since the alignment is carried out simply by acting on the joystick which commands the precise shift of the roll.

[0120] It is furthermore possible to obtain in an extremely simple way the rewinding of the roll, by commanding a specific motor still via the joystick, so as to eliminate undesired folds in the material to be cut and obtain a more precise and regular cut.

[0121] The movement system, in combination with the joystick, thus allows a simple, efficient and complete control for the operator.

[0122] Suitably, there is the possibility to associate the movement system also to apparatuses which already exist, by reconfiguring them, said system being essentially very compact and simple.

[0123] It is thus clear that the apparatus described herein solves the technical problem of the present invention, by simply allowing a rapid and efficient alignment and regulation of the fabric to be cut by only one operator. Furthermore, the invention is simple to carry out and does not need particular competences or abilities by the operator.

[0124] It can be furthermore observed that, as a whole, the apparatus of the present invention can be applied as accessory also on pre-existing worktables by means of modest changes and therefore without the need of complete substitutions.

[0125] Furthermore, the command box comprising the

joystick can be quickly adapted on pre-existing apparatuses, as well as it is possible to shift said command box in the most convenient position for the operator based on the specific cutting operation to be carried out and/or based on the dimension of the worktable.

[0126] Finally, the possibility for the drawbridge-like lifting of the working area comprising the track allows to optimize the step of separating the cut material from the material which is still to be cut, thus obtaining, together with the previously-illustrated advantages, a combination of synergic characteristics which allows an optimal control of each step, for example by means of the above-mentioned command system.

[0127] Obviously, a person skilled in the art, in order to meet contingent and specific needs, can make numerous modifications and variations to the equipment described above, all of which are comprised in the scope of protection of the invention as defined by the attached claims.

Claims

1. An apparatus (100) for cutting fabrics, comprising:

- a housing area (4) configured to house a roll (R) of material to be cut, and configured to allow to unwind said roll (R) along an unwinding direction (D);
- a movement system (11) configured to control a movement of the roll (R) housed in the housing area (4), said movement being in a direction which is substantially transverse to the unwinding direction (D) of the roll, and/or being a rotation of the roll;
- a working area (5) configured to provide an abutment for at least one portion of the material to be cut which has been unwound along the unwinding direction (D);
- cutting means (6) arranged at the working area (5) and configured to be guided transversely with respect to said unwinding direction (D); and
- a command system (20) configured to manage the operation of said apparatus (100), said command system (20) comprising at least one manual command element (21) configured to generate, based on a manual input of the user, control commands (Cmd) which are output to the movement system (11) of the roll (R), said control commands (Cmd) being adapted to control the operation of said movement system (11).

2. The apparatus (100) according to claim 1, wherein the manual command element (21) is a joystick which is manoeuvrable by the user to control the movement of the movement system (11).

3. The apparatus (100) according to claim 1 or 2, wherein the command system (20) furthermore comprises at least one button (22) for activation of the cutting means (6).

4. The apparatus (100) according to any one of the preceding claims, wherein the movement system (11) comprises a retention element (11r) configured to be at least partially inserted in the core of the roll (R) and to abut onto a free surface of said core of the roll (R), said retention element (11r) being thereby configured to make said roll (R) integral with said movement system (11), and wherein a movement of said retention element (11r) corresponds to a movement of said roll (R).

5. The apparatus (100) according to any one of the preceding claims, wherein the movement system (11) comprises means for aligning the roll (R), said means including a first motor (11a) and a shifting element (11c) which are operatively coupled with each other, wherein the first motor (11a) is adapted to guide the movement of the shifting element (11c) substantially in a direction (T) which is transversal to the unwinding direction (D) of the roll (R), wherein said shifting element (11c) is configured to cause, due to the movement thereof, a corresponding shift of the roll (R), and wherein the first motor (11a) is configured to receive the control commands (Cmd) generated by the manual command element (21) of the command system (20) and can be driven based on said control commands (Cmd).

6. The apparatus (100) according to claim 5, wherein the means for aligning the roll (R) comprise a worm screw (11b) which is put in rotation by the first motor (11a) and is configured to cause the movement of the shifting element (11c).

7. The apparatus (100) according to claims 4 and 5, or according to claims 4 and 6, wherein the retention element (11r) is connected to the shifting element (11c) and is configured to be shifted by it.

8. The apparatus according to any one of the preceding claims, wherein the movement system (11) further comprises a second motor (11d) operatively coupled with a system of gears which are adapted to be put in rotation by said second motor (11d) and are configured to cause a rotation of the roll (R), said system of gears comprising a first gear (11e), a second gear (11f), and a freewheel (11g) which is arranged between the first gear (11e) and the second gear (11f), wherein the second motor (11d) is configured to receive the control commands (Cmd) generated by the manual command element (21) of the command system (20) and can be driven based on said control commands (Cmd).

9. The apparatus (100) according to claims 4 and 8, wherein the second gear (11f) is connected to the retention element (11r) in such a way that a rotation thereof causes a rotation of said retention element (11r) and thus a corresponding rotation of the roll (R).

10. The apparatus (100) according to any one of the preceding claims, wherein the movement system (11) is a kit of parts directly or indirectly connected with each other and which can be integrally associated with a support element (4sb) of the roll (R) in the housing area (4), or which provides itself a support element of the roll (R) in the housing area (4).

11. The apparatus (100) according to any one of claims 1 to 3, wherein the movement system (11) comprises a first guide element (G1) and a second guide element (G2), the housing area (4) being configured so that the roll (R) of material is positioned between said first guide element (G1) and said second guide element (G2) in said alignment area (4), said guide elements (G1, G2) being movable in a direction (T) which is substantially transversal to the unwinding direction (D) of the roll (R) and being configured to abut onto opposite sides of said roll (R), said apparatus (100) further comprising motorized means configured to move said guide elements (G1, G2) along said transversal direction (T), and wherein said motorized means are configured to receive the control commands (Cmd) generated by the manual command element (21) of the command system (20) and can be driven based on said control commands (Cmd).

12. The apparatus (100) according to any one of the preceding claims, further comprising a worktable (18) which extends as a prolongation of the working area (5) and is configured to support the unwound material which has been cut by the cutting means (6).

13. The apparatus (100) according to claim 12, wherein the command system (20) comprises a body (20') adapted to movably engage with the worktable (18).

14. The apparatus (100) according to claim 13, wherein the worktable (18) comprises a guide (19) to which the body (20') of the command system (20) engages by means of coupling means (20m), and/or wherein the body (20') of the command system (20) is in the form of a box.

15. The apparatus (100) according to any one of claims 12 to 14, wherein the worktable (18) has an adjustable length.

16. The apparatus (100) according to any one of the preceding claims, wherein the working area (5) is arranged in a support frame (F) and is angularly movable with respect to said support frame (F) by a lifting movement that is substantially drawbridge-like.

17. The apparatus (100) according to claim 16, comprising a track (7) configured to transversely guide the cutting means (6), said track (7) being arranged at a side of the working area (5) which is not bound to the support frame (F).

18. The apparatus (100) according to claim 16 or 17, wherein the angular movement of the working area (5) can be activated by motorized means controlled by the command system (20).

19. The apparatus (100) according to any one of the preceding claims, comprising an alignment guide (12) adapted to act as a reference for the operator, said alignment guide (12) being configured to allow an edge of the unwound portion of roll (R) to be cut to slide on a surface thereof and being arranged at a set position corresponding to an optimal alignment.

20. The apparatus (100) according to any one of the preceding claims, comprising, at the cutting means (6), holding means (30) of a portion of roll (R) which abuts onto the working area (5), said holding means (30) being configured to switch from a rest configuration to a holding configuration, and vice versa, wherein, in the rest configuration, the holding means (30) do not hold the unwound portion of the roll (R), and, in the holding configuration, the holding means (30) abut onto and hold the unwound portion of the roll (R) through an abutment portion (31) thereof, and wherein said holding means (30) are configured to switch from the rest configuration to the holding configuration by a movement actuated by the movement of the cutting means (6).

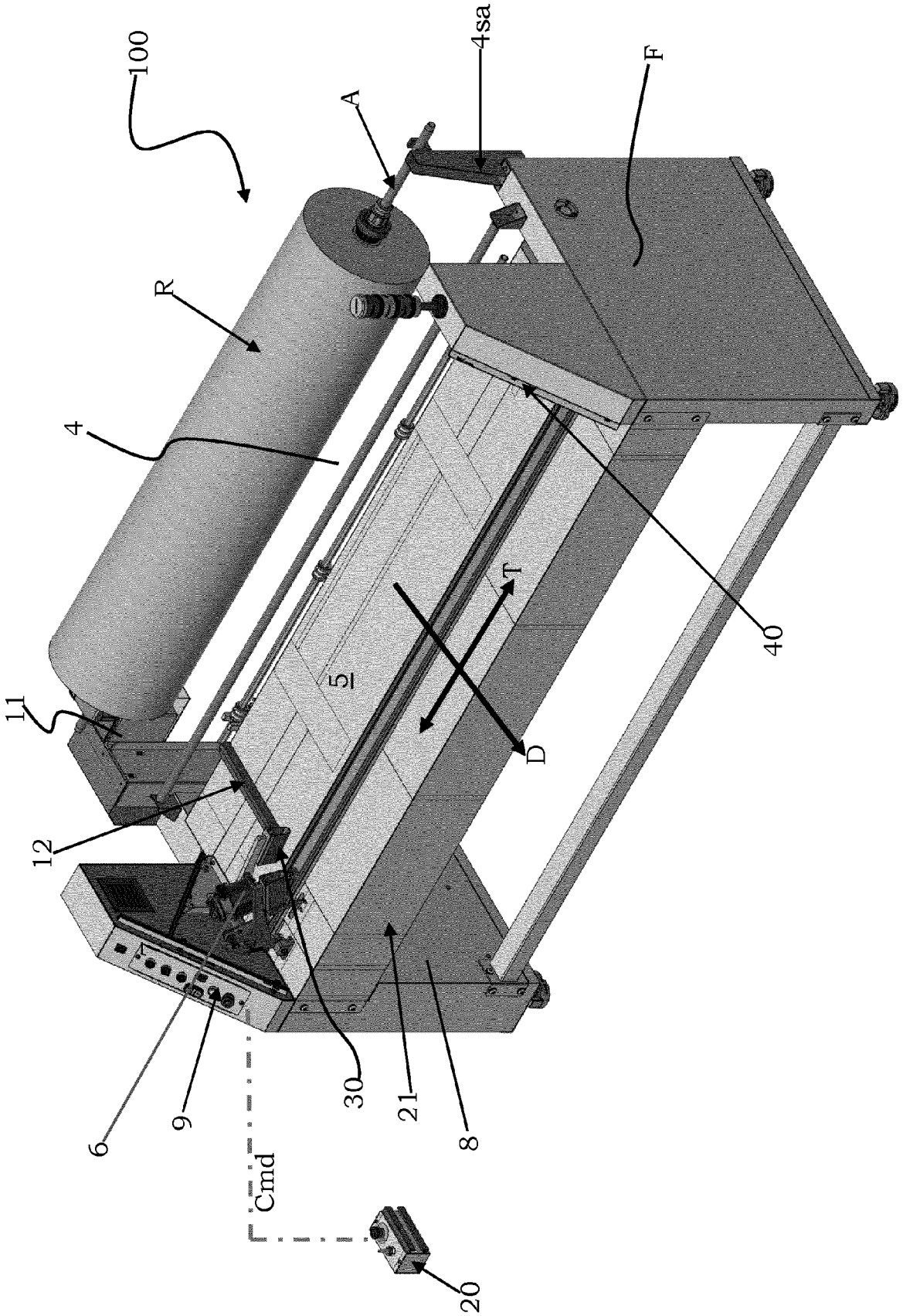


FIG. 1

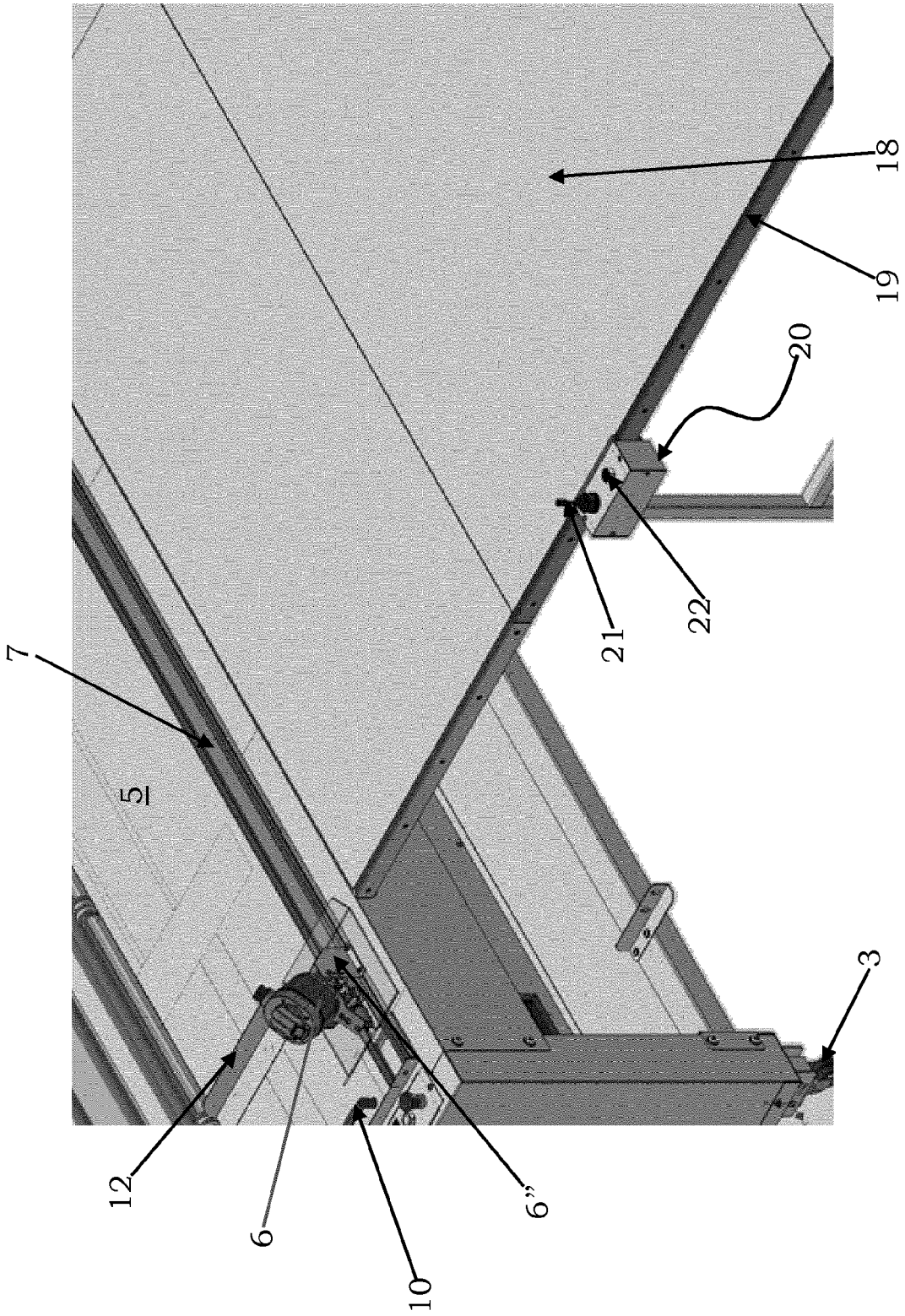


FIG. 2

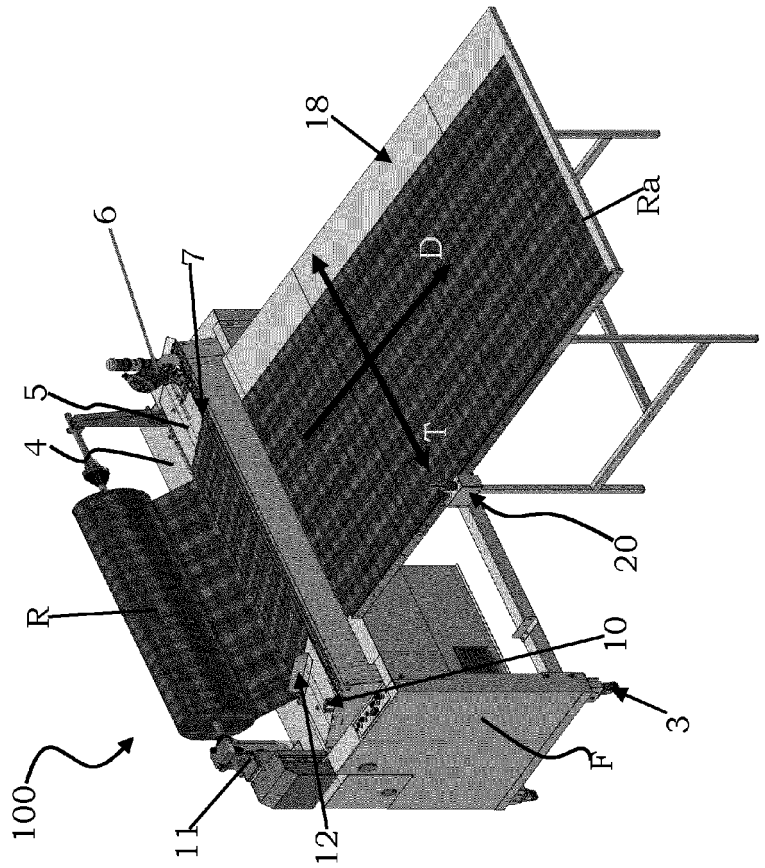


FIG. 3B

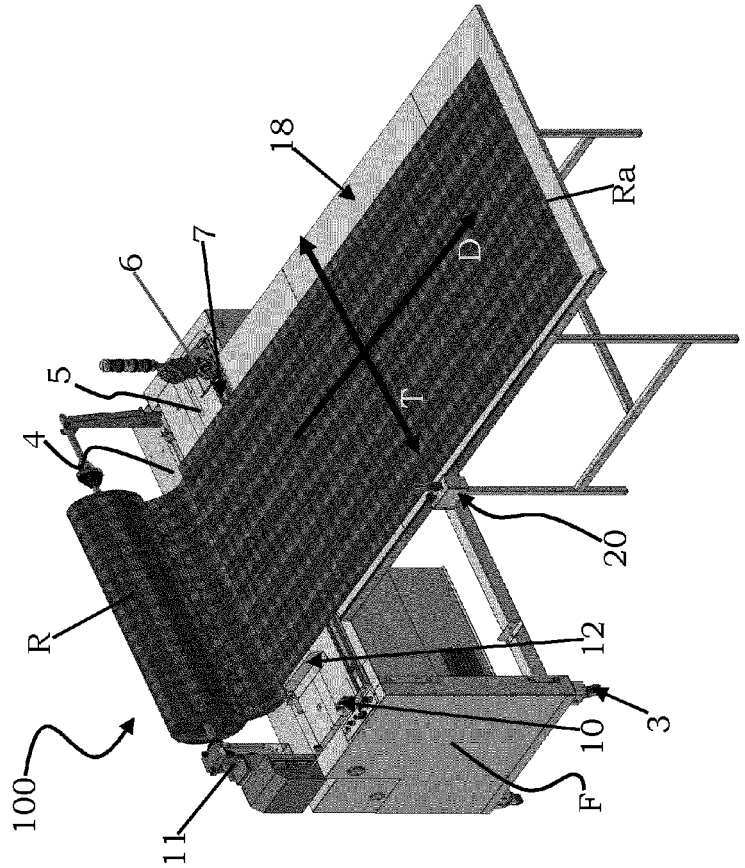
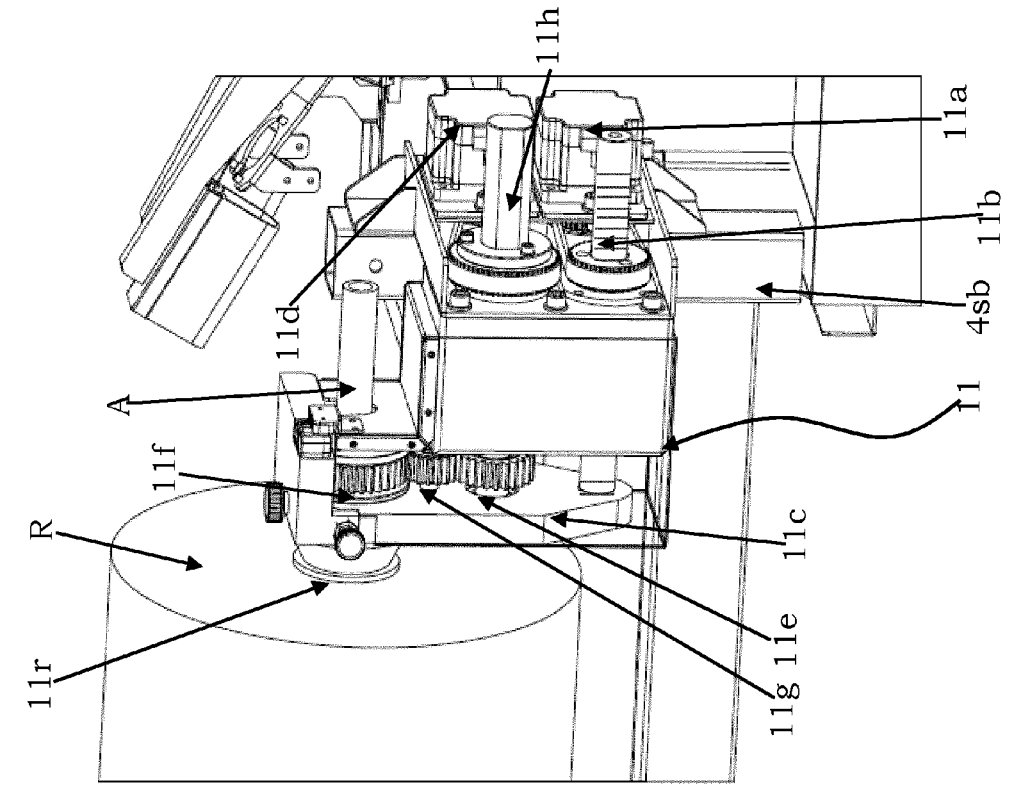


FIG. 3A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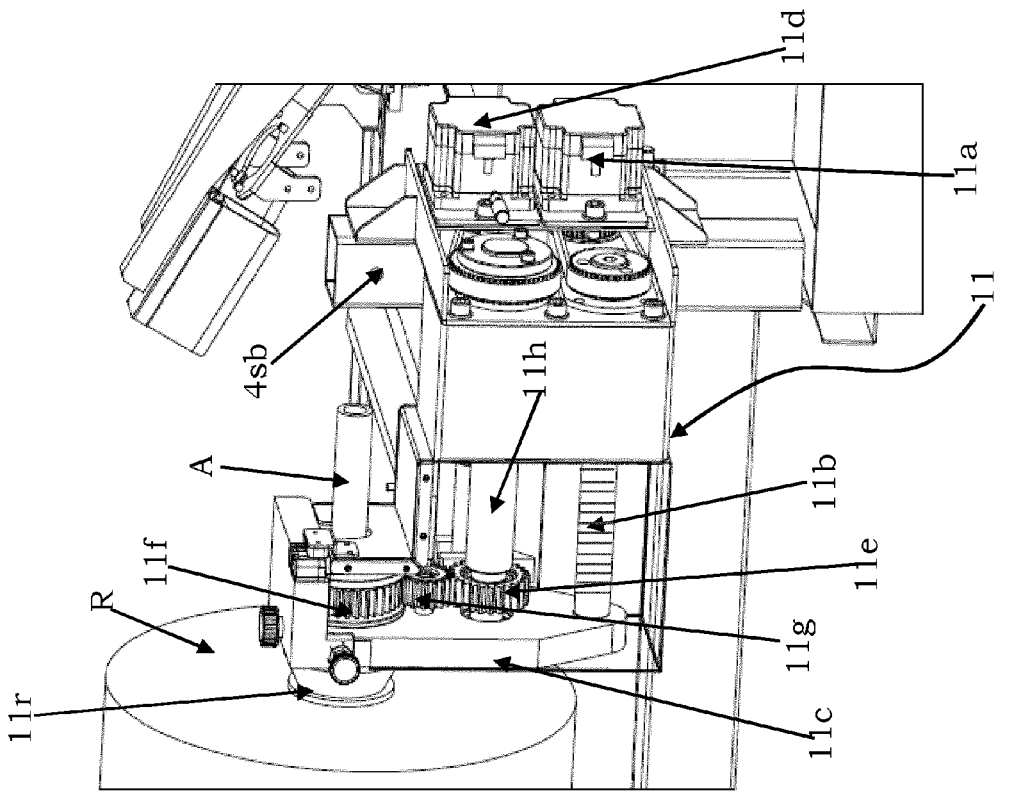
11b
4sb
11d
A
11
11f
R
11c
11r
11g
11e

FIG. 4B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11e
R
11g
11r
11c

FIG. 4A

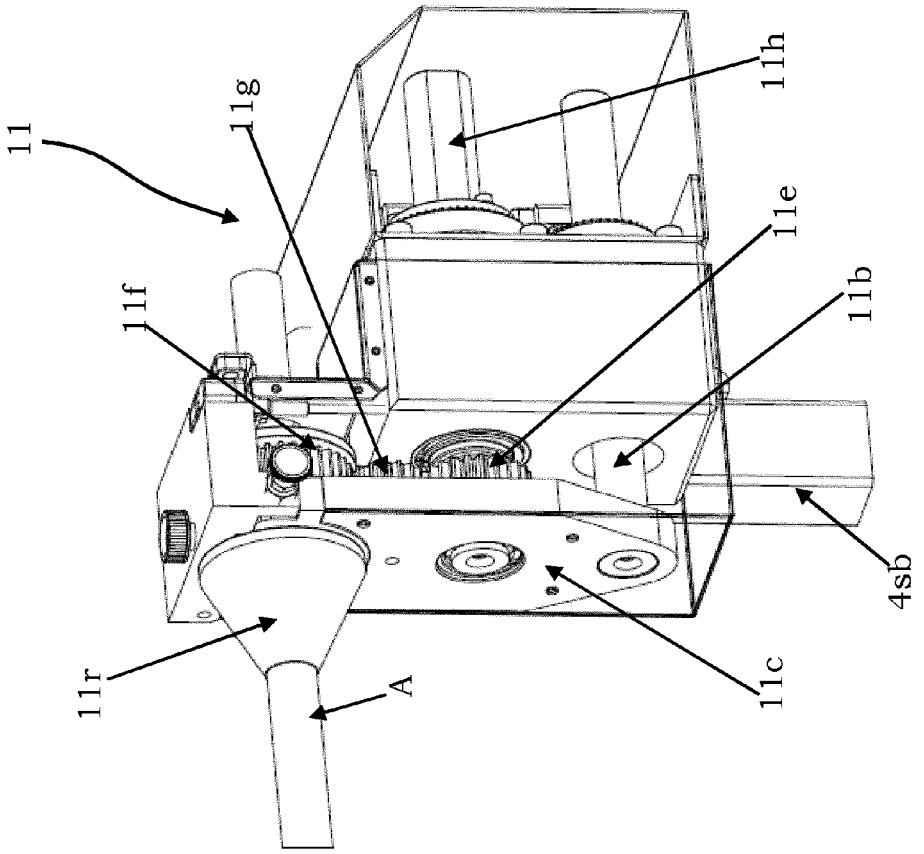
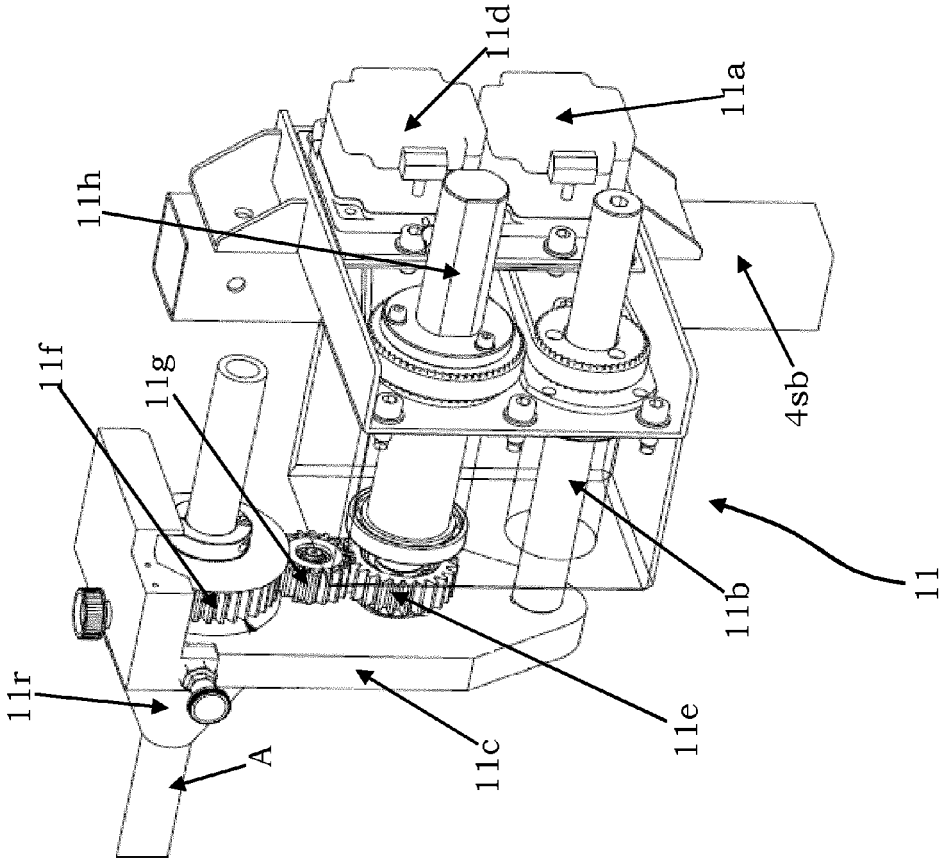

11
11g
11h
11e
11f
11b
4sb
11r
A
11c

FIG. 5B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11f
11g
11
11b
11r
A
11c
11e

FIG. 5A

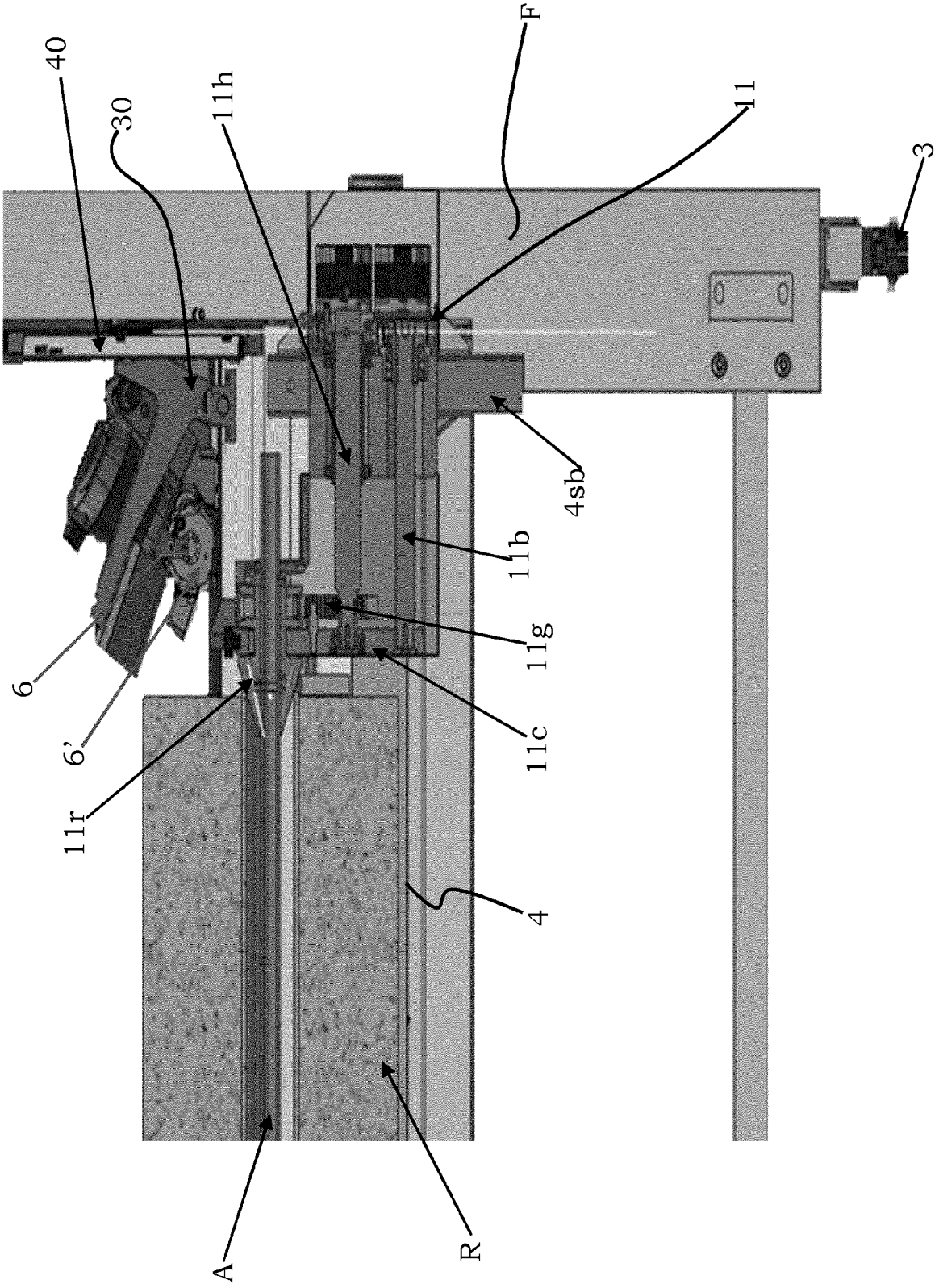

FIG. 6

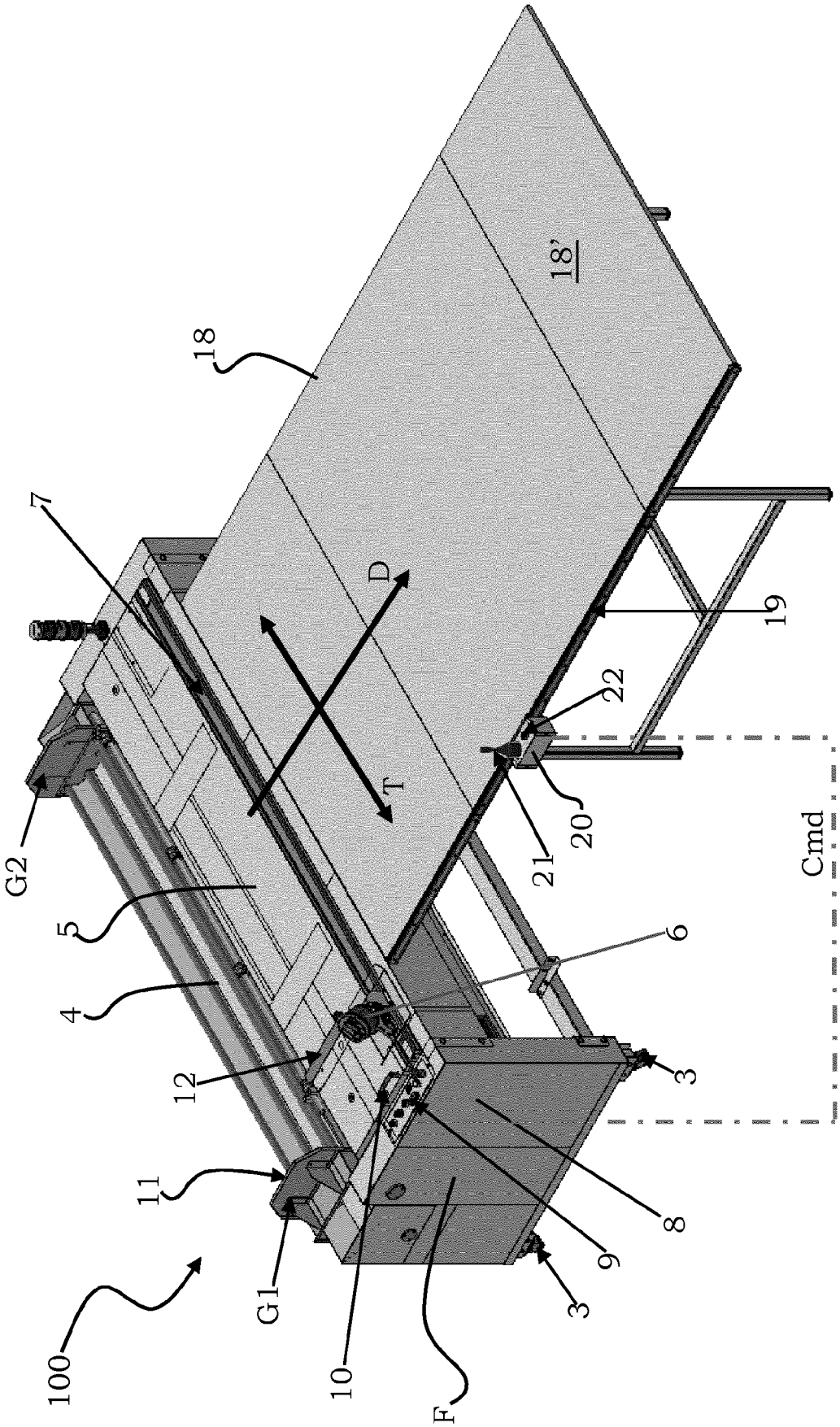

FIG. 7

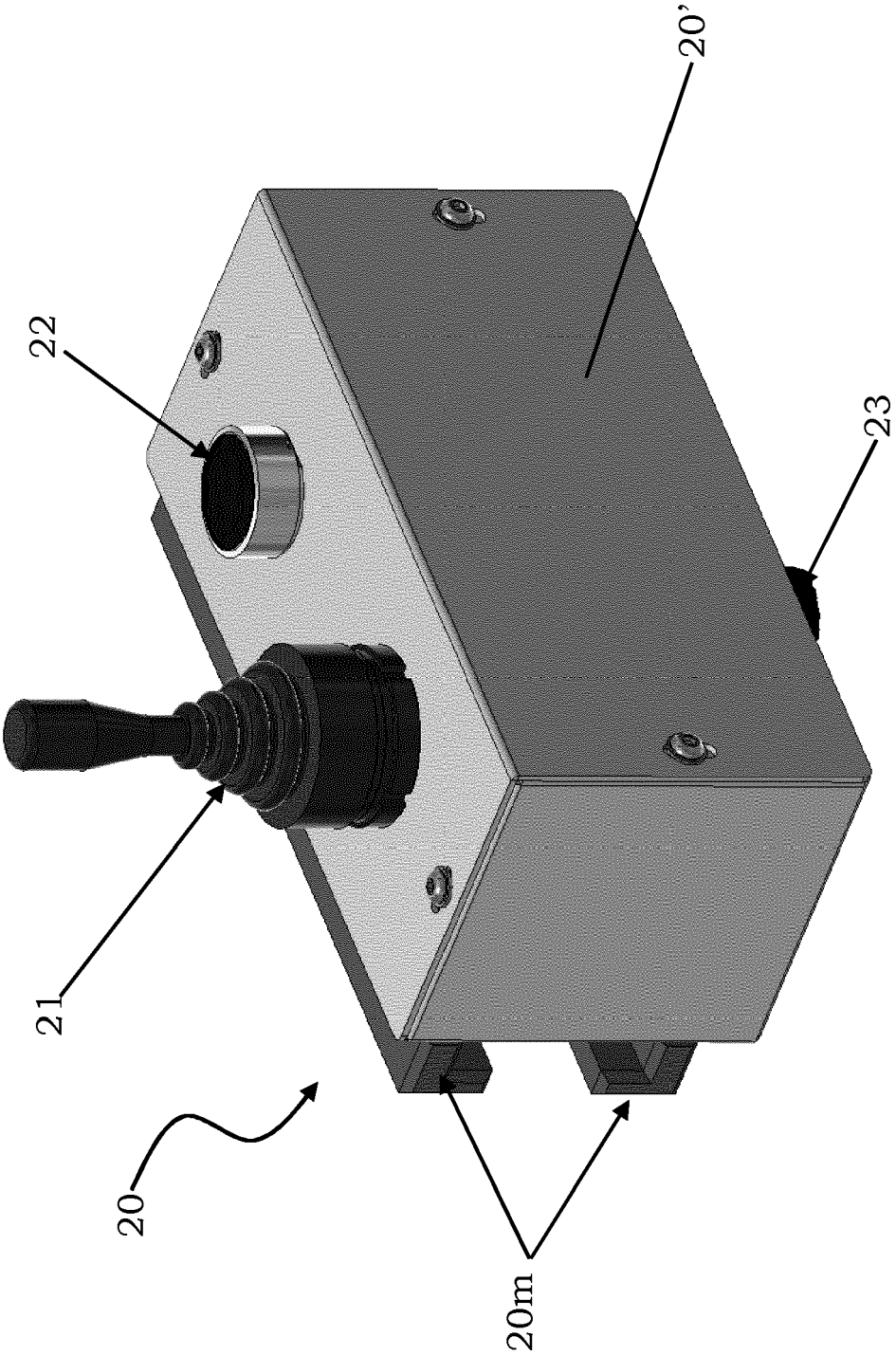

FIG. 8

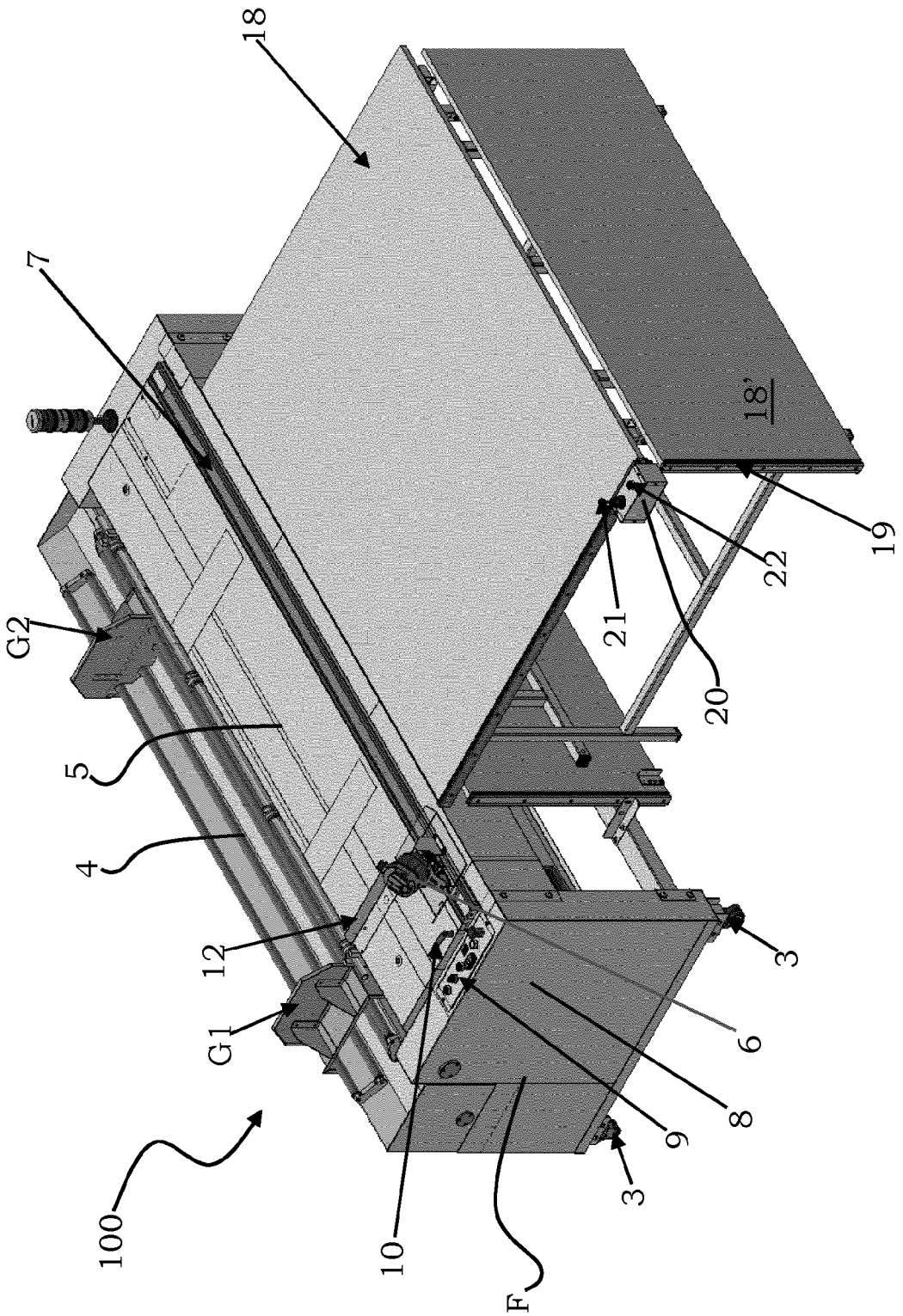

FIG. 9

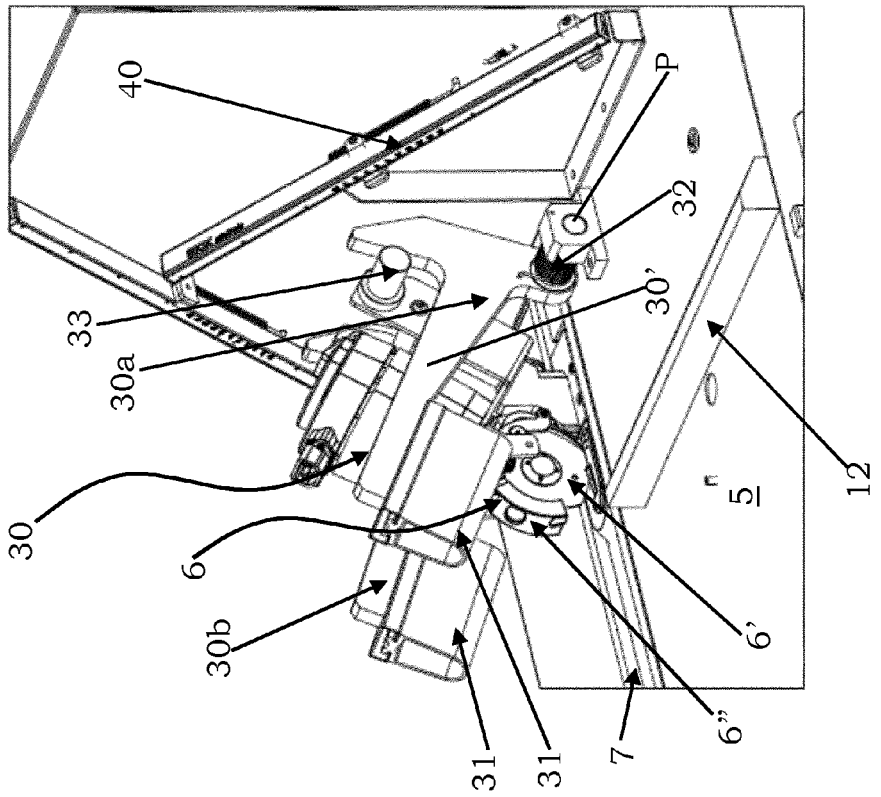

FIG. 10B

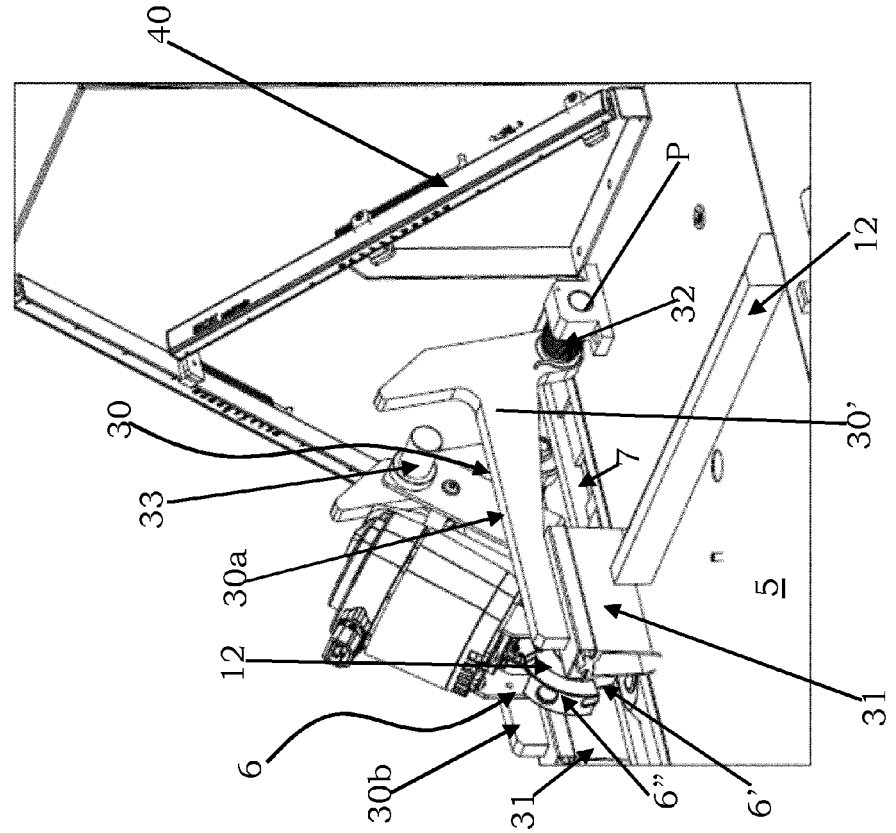

FIG. 10A

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EUROPEAN SEARCH REPORT

Application Number
EP 22 19 6406

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 5 806 396 A (WATANABE KENICHI [JP]) 15 September 1998 (1998-09-15) * column 5, line 51 - column 11, line 61; figures 1-29 *	1-6,10, 12,15,17 7-9,11, 13,14, 16,18-20	INV. B65H35/00 B65H16/10 B26F1/38 B26D5/00 B26D5/10
A	EP 0 518 473 A2 (GERBER GARMENT TECHNOLOGY INC [US]) 16 December 1992 (1992-12-16) * page 7, line 25 - line 37; figures 1,6-8 *	1-3	B26D5/06
A	US 4 519 595 A (ADACHI SHOICHI [JP]) 28 May 1985 (1985-05-28) * column 2, line 54 - column 3, line 59; figures 1,2 *	1	

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B65H B26F B26D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	2 February 2023	Maier, Michael

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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02-02-2023

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