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(54) MANUAL TILE CUTTING MACHINE

(57) A manual tile-cutting machine is described, comprising
a base frame (1, 100) equipped with two supporting posts (1a, 1b) whereto a guide sliding bar (3) is constrained, which guide sliding bar defines a cutting line
floating plates (2) arranged on an upper portion of said base frame (1, 100),
a tool holder (4) slidingly mounted on said guide sliding bar (3), and
a scaled abutment ruler body (7), rotatingly mounted on a rotation axis arranged on a front portion of said base frame (1, 100) on a longitudinal symmetry axis coinciding with said cutting line, said abutment ruler body (7) having at least one central goniometric body (71), provided with a lower articulation pin (7a) coupled with the base frame on said rotation axis and wherefrom a major arm (72) and a minor arm (73) project opposite to each other defining a same rectilinear abutment plane (A-A'),
said goniometric central body (71) being positioned in the proximity of said front post (1a), wherein
said front post (1a) has a prismatic shape with a triangular cross-section, non-symmetrical with respect to said longitudinal symmetry axis of the machine and has a single prong (1a') and, at a side thereof, a triangular horizontal resting surface (1a"), and wherein
said guide sliding bar (3) is laterally constrained against said prong (1a') by means of disengageable fastening means and rests with a lower edge thereof at least on a portion of said triangular horizontal resting surface (1a"), in particular on a widest portion which extends away from said rotation axis of the ruler body (7).

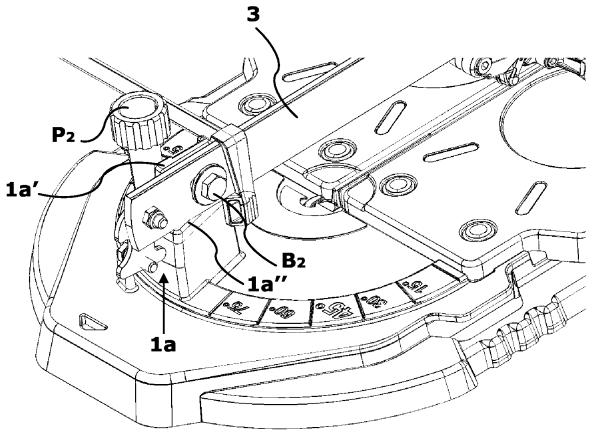

Fig. 5A

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Description

Field of the invention

[0001] The present invention relates to a cutting machine for tiles or slabs, in particular a tile cutting machine with a single guiding bar and abutment ruler body pivoted on the cutting axis.

Background

[0002] As is known, tile cutting machines are divided into two broad categories: manual and electrically operated. In the present specification, only the field of manual tile cutters will be addressed, which constitute a very specialised field of activity, where few skilled builders have the necessary knowledge to identify the peculiar solutions which are needed to determine the success of a simple product which is however optimised with attention to the specific function they must perform.

[0003] Among the most significant tile-cutting machines, there is a great interest in lightweight professional tile cutters, manufactured by exploiting the lightness of particular metallic materials (for example aluminium alloys) - so as to make them particularly appreciated for manual use - and with a clever combination of unique features, which make the use thereof efficient and convenient for meeting the needs also of a professional user.

[0004] A typical example of these devices is represented by patent EP 608,476 in the name of the same Applicant, which is considered included herein as a reference.

[0005] In this type of tile cutter, a base frame obtained from die-cast aluminium is provided, wherefrom two support columns project, on which a guide sliding bar is engaged and locked, typically a steel draw profile.

[0006] A tool holder is slidingly mounted on the guiding bar, which has a characteristic axe shape, with a main body sliding on the bar and a handle located above the bar to be handled by an operator. The tool itself, typically a hard-material engraving wheel, is housed in the lower portion of the tool holder, where a pressure splitting foot is also normally arranged.

[0007] Floating support plates are also provided on the base frame - from the two parts of a longitudinal rib arranged in correspondence with the cutting line - on which the tile/slab to be engraved and then cut is placed. Further, a scaled ruler body for measuring and adjusting the position of the tiles during the engraving is located on the base frame.

[0008] To safeguard the operation of the tool holder and the integrity of the base frame and the scaled ruler body, the latter is pivoted at a point offset from the cutting line.

[0009] In WO2004030883, the scaled ruler body is instead mounted pivoted on the cutting line, despite the fact that it is advantageously provided with a central goniometer well and two wide side wings. It should be noted, in particular, that in what is known as "push" cutting machine, i.e., those in which the tool holder is pushed away from the user during the cutting, in the end area of the cutting line (precisely in correspondence with the point where the scaled line is pivoted) the central goniometer must have a shallow recessed portion to allow the cutting tool to descend below the tile resting surface, when bringing the splitting foot of the tool holder with pressure on the tile itself.

[0010] However, it should be noted that modern tiles or cladding slabs consist of increasingly tougher materials and have considerable dimensions (even well over 1 m wide), whereby they require a long guide sliding bar of the tool and, at the same time, the application of considerable pressure on the tool to be able to accurately complete the cutting and the splitting of tile. In these new operating conditions, it becomes increasingly critical to offer a large tile cutting machine which is robust enough not to bend (which would introduce alignment and cutting errors), while remaining light enough to be transportable, comfortable to use and optimised to maintain low costs.

[0011] Other known tile cutting machines are disclosed in KR101048166, FR1139167, JPH10166352, offering various arrangements for the purpose of accurately cutting the tiles.

[0012] However, there are a number of areas in which the tile cutting machines of the prior art require improvement to achieve the aforesaid results.

[0013] Firstly, the overall configuration of the base frame would require greater modularity, without compromising the robustness thereof.

[0014] Furthermore, the pivotable scaled ruler body still suffers from a certain weakness, due to its structural slenderness. The classic goniometer body configuration, from which the abutment and measuring arms protrude and reinforced by an external arch - as illustrated in WO2004030883 - is still very effective, but requires improvement. In particular, the need is felt to make the structure more robust, while maintaining a configuration which allows folding the extended parts inside the footprint of the base frame when they are not in use, without the need to disassemble some components; it is further desired to seek a solution to reduce assembly costs.

[0015] Finally, it is desirable to be able to strengthen the tool holder itself, preferably safeguarding its manoeuvrability and ease of use.

Summary of the invention

[0016] Therefore, the object of the present invention is to provide a manual tile cutting machine, of the type described in WO2004030883, provided with a series of features which, together as a harmonious and synergic assembly, solve the above drawbacks and make it particularly robust, durable and comfortable in use with respect to the prior art.

[0017] Such an object is achieved with a tile cutting machine as described, in its essential features, in the appended claims.

Brief description of the drawings

[0018] Further details about the characteristics and advantages of the machine according to the invention will be more apparent from the following description of a preferred embodiment thereof, given by way of example and illustrated on the accompanying drawings, in which:

fig. 1 is a perspective top view of a first embodiment of the machine according to the invention in use;
fig. 2 is a view similar to fig. 1, but in a folded condition;
fig. 3 is a perspective bottom view of the machine of fig. 1;
fig. 4 is a perspective view of the machine of fig. 1 sectioned according to a longitudinal symmetry axis;
fig. 5A is a perspective view from one side of the head part of the machine of fig. 1;
fig. 5B is a perspective view from the opposite side of fig. 5A;
figs. 6A and 6B are interrupted perspective views of some details of the machine of fig. 1;
figs. 7 and 8 are perspective views, respectively from above and below, of an abutment ruler body according to the invention;
fig. 8A is a detailed view of what is depicted in the circle A of fig. 8;
fig. 9A is an interrupted perspective bottom view of a detail of the ruler body of fig. 8;
fig. 9B is a view similar to that of fig. 9A, but in folded condition;
fig. 10 is an sectional view enlarged with respect to fig. 4, of a detail of the rotation seat of the ruler body;
fig. 11 is a perspective bottom view of the same area shown in fig. 10;
fig. 12A is a partial perspective view of a detail of the ruler body of fig. 7;
fig. 12B is similar to fig. 12A and shows the articulation pin without fastening screw;
fig. 13 is a partial perspective view of the ruler body of fig. 7;
fig. 14A is a perspective detailed view of a detail of fig. 13;
figs. 14B-14C are views similar to fig. 14A with removed parts;
fig. 15A is a perspective side view of a tool holder according to the invention;
fig. 15B is a top plan view of the tool holder of fig. 15A;
fig. 15C is a partial perspective view of the main body of the tool holder;
fig. 15D is a view similar to that of fig. 15C according to a different perspective;
fig. 16 is a perspective top view of a second embodiment of the invention in operating conditions;
fig. 17A is a view similar to fig. 16, according to a different perspective, in folded condition;
fig. 17B is a photographic view of a machine according to the invention, in which an alignment mark is shown;
fig. 17C is an enlarged view of the mark enclosed in the circle C of fig. 17B;
fig. 18 is a perspective bottom view of the embodiment of fig. 16;
fig. 19A is a perspective side view of a detail of fig. 16; and
fig. 19B is a view similar to that of fig. 19a, in folded condition.

Detailed description of preferred embodiments

[0019] As depicted in the accompanying figures, a tile-cutting machine is including, in a manner known per se, a base frame 1, die-cast for example by a aluminium alloy, from which a pair of front 1a and rear 1b posts project and on which floating resting plates 2 are mounted.

[0020] The base frame 1 is preferably assembled in a modular manner by multiple modules which can be coupled to each other. In the first embodiment illustrated in figs. 1-14C, the base frame is formed by a head plate-shaped body, from which the front post 1a projects, and a tail plate-shaped body, from which the rear post 1b projects. In the second embodiment, which will be better described below with reference to figs. 16-19B, an intermediate plate-shaped body is provided between the head plate-shaped body and the tail plate-shaped body. But it is understood that with this approach it is possible to build even longer machines by adding more than one intermediate plate-shaped body.

[0021] Between the two posts 1a and 1b, a guide sliding bar 3 is installed longitudinally to the base frame, on which a tool holder 4 provided with a cutting tool V such as a special steel wheel is slidably guided (partially visible only in fig. 15A).

[0022] The shape of the tool holder determines its operation, i.e., "pushing" or "pulling", according to the jargon used in this field. But such a shape does not affect the general teaching offered here - since the machine can be equipped with one or the other tool holder - and therefore will not be further described in detail.

[0023] The coupling between the tool holder 4 and the respective guide sliding bar 3 also determines the position of the cutting line, commonly arranged exactly below and along the longitudinal axis of the sliding bar 3, in correspondence with a rib or ribbing 1c of the base frame.

[0024] In the proximity of the front post 1a, the base frame 1 also has a housing seat S in which a pivot pin 7a of a scaled ruler body indicated overall with the index 7 is rotatingly engaged.

[0025] The scaled ruler body 7 is made by of a single cast piece consisting of a central goniometric body 71 from which two opposing arms 72 and 73 project defining a single rectilinear abutment plane A-A'.

[0026] The central goniometric body 71 has an upper shallow recessed area 71a and lower area provided with ribbed portions 71b. The pivot pin 7a projects from the

lower area.

[0027] Numerical references are provided on the two arms 72 and 73, for example metric references, which define a scaled line and allow to correctly position a tile to be engraved with respect to the longitudinal cutting line which is passing through the centre of rotation of the pivot pin 7a.

[0028] A major arm 72 has significant length, for example 450-650 mm. A linear guide 8 is provided thereon, comprising a circular-section rod 81, on which an abutment nib 82 is mounted to slide longitudinally and rotate on its axis (which will not be further described because it is known per se).

[0029] A minor arm 73 is shorter - in particular of a length less than the half-width of the base frame 1 - and ends with articulation means for a pivotable appendix 74 defining an extension of the scaled ruler body and of the rectilinear abutment plane A-A'.

[0030] The ruler body 7 also has a stiffening arch 75, which extends over a circle arc of about 180° and is fastened at its ends, by removable fastening means (for example screws with an Allen head), to two constraint points 75a and 75b of the two arms 72 and 73.

[0031] The stiffening arch 75 is designed so as to pass behind the front post 1a with respect to the pivot pin 7a, as clearly depicted in fig. 5B.

[0032] The abutment plane A-A' - when the ruler body 7 is at 0° - is arranged orthogonal to the guide sliding bar 3 and thus to the cutting line and falls a short distance from a front edge of the floating plates 2. When the machine is in folded condition - typically for transport or storage - the ruler body 7 is rotated by its maximum possible angle (fig. 2), ideally as close as possible to 90°, so as to align the arms 72 and 73 as much as possible to the guide sliding 3 and reduce the lateral dimensions of the machine, without having to disassemble the ruler body 7 from its seat.

[0033] According to an original aspect of the invention, the ruler body has been strengthened with respect to the prior art, enlarging the width of the arms 72 and 73. While the minor or shorter arm 73, which is less stressed by loads, has a modest width d, for example of 20 mm, the major or longer arm 72 has a greater width D, for example of about 30 to 40 mm cm, as can be appreciated in fig. 8.

[0034] In order to be able to rotate the ruler body by as wide an angle as possible, the front post 1a is not identical to the rear post 1b.

[0035] The guide sliding bar 3 is assumed to be a rectilinear profiled bar having rectangular cross-section.

[0036] The rear post 1b has a symmetrical prism shape, as seen from a top plane view, with respect to the longitudinal axis of the machine and has two prongs 1b' which hold the guide sliding bar 3 by the two sides thereof, locking it in position with a releasable bolt B_1. A traditional rectangular resting surface for the flat lower edge of the guide sliding 3 is defined between the two prongs.

[0037] The front post 1a has a prism shape, as seen from a top plane view, with a triangular cross-section, non-symmetrical with respect to the longitudinal symmetry axis of the machine (which coincides with the cutting line of the tool holder defined by the guide sliding bar 3). Furthermore, the front post 1a has a single prong 1a' and a triangular resting surface 1a" (fig. 5A).

[0038] The triangular cross-section of the prismatic front post 1a has a vertex in the direction of the rotation axis of the ruler body 7. Thereby, on one side the post 1a has a single prong 1a' and a service land P_1 on which a knob P_2 is engaged for clamping the arch 75 (fig. 5B), but on the other side (fig. 5A) the lateral thickness is very thin. The guide sliding bar 3 is laterally constrained against the single prong 1a' by means of disengageable fastening means, such as a retaining bolt B_2, and rests with its lower edge on at least a part of the triangular resting surface 1a", in particular on the widest part which extends away from the rotation axis of the ruler body 7.

[0039] This appropriately designed thickness reduction of the front post 1a does not compromise the fastening stability of the guide sliding bar 3, but allows the abutment ruler body 7 greater rotation space in the maximum folded condition (fig. 2). In fact, the arm 73 - although it has a greater width than in the prior art, approaching the post 1a on the reduced-thickness side, still manages to come very close to the longitudinal symmetry axis of the machine. Thereby, as seen in fig. 2, the opposing arm 72 can be kept completely within the lateral dimensions of the base body 1.

[0040] To this end, the base frame 1 is provided with a side recess R from the part in which the long arm 72 is arranged. Thereby, a possible terminal support foot 77 which should be provided projecting below the long arm 72, can be accommodated in the recess R without interfering with the upper plane of the base frame in the folded condition.

[0041] An abutment shoulder (not visible) is also defined in the recess R, against which the distal end of the arm 72 is intended to abut, so as to prevent that the same arm 72 abuts with its proximal end against the front post 1a. Thereby, in the event of a lateral impact of the machine, a high bending moment can be avoided which would stress the abutment ruler body 7 around the rotation pin 7a.

[0042] The short arm 73 - having a length less than the half-width of the base frame 1 - falls within the perimeter outline of the base frame even in the folded condition (fig. 2). Conversely, the pivotable appendix 74 is rotated about its hinge axis, to take a folded position of more than 90° as seen in figs. 2 and 9B.

[0043] To allow a wide rotation of the appendix 74 and at the same time maintain a good rigidity of the constraint and high torsional strength of the arm 73, the coupling of the appendix 74 is defined as illustrated in figs. 9A and 9B.

[0044] The appendix 74 has a constraint end 74a consisting of a small C-shaped arm, at the end of which a constraint eyelet 74b is provided. The arm 73 correspondingly has a box-like housing compartment 73a, with

at least one perimeter side open to allow the exit of the small C-shaped arm. The compartment 73 is preferably obtained in the lower side of the arm 73. Inside the compartment 73a there is a rotation stud 73b on which the eyelet 74b is rotatably coupled, constrained to each other by a fastening pin 73c. Two opposing abutment surfaces 73 'and 73" are also defined on the edge of the open perimeter side. The two opposing abutment surfaces 73' and 73'' are designed geometrically to form corresponding stopping points for the small C-shaped arm 74a, respectively in both the unfolded position (fig. 9A), in which the appendix 74 is aligned with the arm 73 to give continuity to the abutment plane A-A', and in the folded position (fig. 9B).

[0045] To ensure a perfect alignment of the abutment surface of the movable appendix 74 with respect to the abutment plane A-A' of the arm 73, alignment adjusting means are preferably provided. In particular, in correspondence with the abutment surface 73' for the unfolded position, an adjusting grubscrew 73d is provided. The grubscrew 73d can be inserted more or less fully in one of its seats during an adjustment step of the machine, so as to move the abutment plane of the small C-shaped arm 74a with respect to the arm 73 and thus correctly align the abutment surfaces on the abutment plane A-A'.

[0046] Referring to figs. 10-12B, it should be noted that the rotation pin 7a of the abutment ruler body 7 has a slightly conical shape and couples in a corresponding through-hole S1 obtained in the thickness of the base frame 1. The lower area of the base frame 1, in correspondence with the through-hole Si, has a stiffening cup S which allows access to the hole S_1 from the bottom or lower side.

[0047] The articulation pin 7a is constrained in the seat S_1 from the bottom or lower side. In particular, constraint means 7b, for example a wide-headed threaded screw, are coupled to the articulation pin 7a and hold it in the seat Si, acting on an abutment surface S_2, on the bottom of the cup S around the hole S_1, by means of a compression spring (not illustrated) . The spring, for example a cup spring or a coil spring, is thus able to recover any clearance which may arise between the pin 7a and the seat Si, allowing the free rotation between the two.

[0048] The presence of the spring also ensures a certain mobility between the rotating abutment ruler body and the base frame: this is advantageous in those cases in which the ruler body suffers an impact (for example the accidental resting of a foot on the ruler) which goes to tilt the arms with respect to the base frame and therefore the orthogonal seat axis of the rotation pin 7a. In the absence of the spring, the impact forces would discharge onto the rotation pin 7a, risking bending the pin itself or the lateral arms. Conversely, the presence of the spring absorbs the bending forces without loading the structure.

[0049] A movable nib 82 is provided on the long arm 72 of the abutment ruler body 7. As mentioned above, the nib 82 is longitudinally slidingly mounted on a guide 81, around which it can also tilt to descend on the working plane (arrangement shown in fig. 13) or be tilted back so as not to clutter the working plane.

[0050] According to an innovative feature, the two ends of the guide 81 are engaged in a holding fork F which acts as a bearing. The fork F has a generally omega shape, with a main eyelet portion F_1 in which the end of the guide 81 engages and two flexible arms F_2, F_3. The material of the fork F must fulfil the function of flexibility for the arms F_2 and F_3 and the function of bearing for the eyelet body; a suitable material is for example nylon™ or Teflon™.

[0051] The flexible arms F_2, F_3 are intended to snap engage in receiving seats 78a and 78b obtained in the upper part of the arm 72. In particular, the seats 78a and 78b are in the form of studs protruding upwards from the arm 72 and have a cavity open upwards in which the flexible arms F_2 and F_3 are snap-fit. As depicted in figs. 14A and 14B, the seats 78a and 78b also have opposing semicircular openings which serve as saddles for the free insertion of the bar 81.

[0052] This configuration is advantageous because it allows to obtain seats 78a and 78b cast together with the arm 72, without the need to then drill aligned holes for the insertion of the bar 81.

[0053] Figs. 15A and 15B illustrate in detail the tool holder 4 which is slidingly mounted on the guide sliding bar 3.

[0054] According to a well-established tradition of the applicant, the tool holder has a generic axe shape, with a main body 4a from which an ergonomic handle 4b protrudes. The main body 4a is longitudinally crossed by a through cavity, for the insertion of the guide sliding bar 3, while in the lower part it has the engraving tool V and a possible splitting foot K.

[0055] The splitting foot K has an original configuration, provided with two similar portions K_1 and K_2, arranged at 90° from each other with respect to an axis perpendicular to the sliding axis on the bar 3. Each of the two portions K_1 and K_2 is shaped according to two opposing wedges in the direction of the width, so as to define progressively thicker wings, which are then used to make pressure on the contact surface of the tile in two points spaced apart from each other (which is particularly effective for bending the plate to be cut with respect to the cutting line). The splitting foot K is also mounted tilting around a hinge K_R arranged between the tool V and the back side of the tool holder.

[0056] In the raised position (figs. 15C and 15D), the splitting foot exposes the underlying tile to a first splitting portion K_1, closer to the engraving plane of the tool V; in the lowered position, tilted around the hinge K_R, the splitting foot exposes the underlying tile to a second splitting portion K_2, farther away from the engraving plane of the tool V. Thereby, also by virtue of the presence of the shallow well 71a which receives the tool V, at the end of the engraving line it is already possible to split the tile using the first splitting portion K_1; when it is necessary to work in an area farther from the abutment ruler body, it

is sufficient to lower the splitting foot K to be able to apply pressure with the second splitting portion K_2.

[0057] A small tank with lubricating liquid L is also installed on the main body 4a of the tool holder 4, provided with a wick suitable to keep the underlying tool V lubricated by capillarity. Preferably the tank L is snap engaged to the main body 4a so as to be easily replaced.

[0058] According to an innovative feature, the handle 4b of the tool holder 4 has a larger cross-section with respect to the prior art, but it is partially emptied on two opposing sides, in particular by means of deep lateral recesses 41 (only one is shown in fig. 15A) which laterally reduce the volume bulk of material and thus also its moment of inertia. Furthermore, as can be clearly seen in fig. 15B, the back free end portion of the handle has a progressive enlargement as seen in plan view, for example passing from a width of 30 mm in the central area to a width of 40 mm in the terminal area.

[0059] This unique configuration allows to define a more pleasant handle shape from an ergonomic point of view, keeping the overall weight within reasonable limits and above all locating the centre of gravity in a backward position (i.e., towards the rear end of the handle) with respect to the prior art. The centre of gravity is located backward at least beyond the connecting area with the main body 4a.

[0060] The position of the centre of gravity is particularly advantageous, because it makes the tool holder more balanced, causing less fatigue in the operator's hand and maintaining a better balance of the tool holder with respect to the rotation fulcrum in the resting area on the guide sliding bar 3.

[0061] A series of lever markings are advantageously arranged within the recesses 41, for example three markings 42, 43 and 44 spaced apart from each other. Corresponding markings are obtained in the form of notches 42', 43' and 44' engraved on the upper part of the handle 4b (fig. 15B). In correspondence with the markings 42-44, the amplification values of the lever arm (e.g., x4, x7, x10) with respect to a split rotation fulcrum (i.e. the rotation fulcrum employed when a splitting action on the tile shall be applied through the splitting foot k) of the tool holder are plotted. These marks are useful to the operator to understand what engraving and/or splitting pressure he/she can exert, acting with his hand in the corresponding positions along the handle. This feature contributes to the pleasant use of the tool holder, because it helps the operator's activity, who must engrave plates of different thicknesses and materials with different toughness.

[0062] Figs. 16-18 show a second embodiment of the invention, in which a base frame 100 is longer than the first embodiment because, as mentioned above, an intermediate plate-shaped body, also provided with floating plates, is provided between the head plate-shaped body and the tail plate-shaped body. The guide sliding bar 30 is also correspondingly longer. The other components are substantially the same as those described above.

[0063] To give greater rigidity to the machine, in view of its wide longitudinal extension, a longitudinal steel profile 101 is fit in the lower part of the base frame 100. The profile 101 has an inverted U-shaped section, with two flat lateral flanges joined to the aluminium structure of the plate-shaped bodies of the base frame 100 by fastening means, such as screws 101a-101d.

[0064] Since this embodiment is designed to be able to engrave larger tiles, the head and intermediate plate-shaped bodies are advantageously provided with lateral support legs 102 provided with support feet 103. The lateral legs 102 are hinged on lateral portions 104 extending from the plate-shaped bodies of the base frame, preferably by rotation hinges 102a provided with elastic suspension means (not depicted) which allow the legs 102 to slightly bend perpendicularly to the plane of the base body 100. Thereby, the risk that the hinge 102a is overstressed and may break is reduced. Furthermore, the lateral legs 102 can be rotated and placed flush with the perimeter side of the base frame 100 (fig. 19B), lowering them slightly and engaging them below a roof portion 105 projecting laterally from the base frame 100 at top of the lateral portions 104.

[0065] The return elasticity of the elastic suspension means in the rotation hinges 102a pushes the legs 102 to remain engaged with the roof portions 105, ensuring that they do not rotate freely back in the extended operating position as in fig. 19A.

[0066] From the comparison between fig. 19A and fig. 6A, it is noted that the plate-like bodies of the base frame in the two embodiments are the same, but the floating resting plates have a different shape. In the machines having larger extent, the large tiles to be cut are supported laterally by the support legs 102. Conversely, in the smaller machine, where the support legs are not provided, the floating plates 2 have a lateral enlargement 2a, which occupies the space not occupied by the lateral legs 102 when they are folded: this enlargement 2a better supports the smaller tiles laterally, in the absence of the lateral legs 102.

[0067] Finally, according to a preferred embodiment, applicable to any machine size, a scaled marking 200 is provided on the base frame 1 or 100, located in the rear portion of the frame. The marking 200 shows a measuring scale (ISO or in inches) which corresponds and is registered (i.e., it falls on the same planes parallel to the guide bar 3) with the scaled line shown on the abutment ruler body 7 when it is in the 0° position. Thereby, placing a front edge of a tile against the abutment ruler body, at a certain measurement on the scaled line of the arms 72 and 73, it is possible to have a correct alignment acknowledgment also of the back edge of the tile in correspondence with the scaled marking 200.

[0068] As can be understood from the description provided herein, the invention offers a series of original expedients which allow the tile-cutting machine built according to the above teachings to fully achieve the objects

stated in the introduction, so as to achieve excellent results in terms of strength, lightness and ease of use.

[0069] In particular, the scaled abutment ruler body can always be kept inserted in its rotation seat and folded optimally within the lateral outline of the base frame for transport. The coupling system on the rotation axis absorbs any bending of the arms 72 and 73 without leading to excessive stresses in the structure.

[0070] The mounting arrangement of the tilting abutment nib is particularly effective and cost-effective. The tool holder has been optimised to make the operator's work more comfortable and efficient. The construction modularity of the base frame allows to cope with engraving tiles of even very large dimensions, using industrial production economies for large machines, against a few additional elements (lateral support arms and stiffening profile) with respect to the versions of machines for smaller tiles.

[0071] The efficient foldability of the appendix and the possibility of rotating the entire ruler body near the front post, although with a more robust structure, make it possible to maintain the overall dimensions of the extendable parts within the perimeter of the base frame in the folded condition. The resulting compactness (which can be defined as "all-in-one") is particularly appreciated by users, not only because of the dimensions during transport, but also because it reduces the risks of accidental impacts.

[0072] It is however understood that the invention is not limited to the particular embodiments illustrated above, which represent only a non-limiting example of its scope, but that numerous variants are possible, all within the reach of a person skilled in the art, without thereby departing from the scope of the invention.

Claims

1. Manual tile-cutting machine, comprising

a base frame (1, 100) equipped with two supporting posts (1a, 1b) whereto a guide sliding bar (3) is constrained, which guide sliding bar defines a cutting line
floating plates (2) arranged on an upper portion of said base frame (1, 100),
a tool holder (4) slidingly mounted on said guide sliding bar (3), and
a scaled abutment ruler body (7), rotatingly mounted on a rotation axis arranged on a front portion of said base frame (1, 100) on a longitudinal symmetry axis coinciding with said cutting line, said abutment ruler body (7) having at least one central goniometric body (71), provided with a lower articulation pin (7a) coupled with the base frame on said rotation axis and wherefrom a major arm (72) and a minor arm (73) project opposite to each other defining a same rectilinear abutment plane (A-A'),
said goniometric central body (71) being positioned in the proximity of said front post (1a),
characterised in that
said front post (1a) has a prismatic shape with a triangular cross-section, non-symmetrical with respect to said longitudinal symmetry axis of the machine and has a single prong (1a') and, at a side thereof, a triangular horizontal resting surface (1a"), and **in that**
said guide sliding bar (3) is laterally constrained against said prong (1a') by means of disengageable fastening means and rests with a lower edge thereof at least on a portion of said triangular horizontal resting surface (1a"), in particular on a widest portion which extends away from said rotation axis of the ruler body (7).

2. Manual tile-cutting machine as in claim 1, wherein said minor arm (73) is provided with an appendix (74) pivotable on a plane perpendicular to said articulation pin (7a).

3. Machine as in claim 2, wherein said appendix (74) has a constraint end consisting of a C-shaped arm (74a) at the end of which a constraint eyelet (74b) is provided coupled in rotation with a rotation stud (73b) of said minor arm (73) by means of a fastening pin (73c).

4. Machine as in claim 3, wherein said rotation stud (73b) is arranged in a box-shaped housing compartment (73a) of said minor arm (73), having at least one open perimeter side to allow said C-shaped arm (74a) to pass through.

5. Machine as in claim 4, wherein on edges of said open perimeter side, two opposite abutment surfaces (73', 73") are furthermore defined, geometrically designed to make up corresponding stopping points for said C-shaped arm (74a) in an extended position and in a folded position, respectively, an adjustable grubscrew (73) being furthermore provided to adjust said abutment surface (73') determining said extended position.

6. Machine as in any one of the preceding claims, wherein said rotation pin (7a) has a slightly tapered shape and is coupled with a through-hole (Si) pierced in said base frame (1, 100), a constraint means (7b) integral with said rotation pin (7a) acting on an abutment surface (S_2) of said through-hole (Si) by means of a compression spring.

7. Machine as in claim 6, wherein the lower side of the base frame (1, 100), in correspondence of said through-hole (Si) has a stiffening cup (S).

8. Machine as in any one of the preceding claims,

wherein said major arm (72) of the abutment ruler body (7) is provided with a movable abutment nib (82) longitudinally slidingly mounted on a guiding rod (81), wherein opposite ends of said guiding rod (81) are engaged with supporting forks (F) which act as a bearing and which are snap engaged with corresponding seats (78a, 78b) of said major arm (72).

9. Machine as in claim 8, wherein said fork (F) has a general omega shape, with a main eyelet-shaped portion (F_1) and two opposite flexible arms (F_2, F_3).

10. Machine as in any one of the preceding claims, wherein a handle (4b) of said tool holder (4) has a cross-section with opposite lateral recesses (41) and a free rear end portion having a progressive plan-view widening, so as to locate a centre of gravity backward at least beyond a connecting area to a main body (4a) of the tool holder.

11. Machine as in any one of the preceding claims, wherein a handle (4b) of said tool holder (4) has a series of mutually distanced lever markings (42, 43, 44) which represent amplification values of a lever arm with respect to a split rotation fulcrum of the tool holder (4).

12. Machine as in any one of the preceding claims, wherein a scaled marking (200) is furthermore provided on said base frame (1, 100) in the proximity of a tail portion thereof opposite to said front portion of base frame (1, 100), said marking (200) bearing a scale corresponding to and aligned to a measuring scale applied on said major and minor arms (72, 73) of the abutment ruler body (7).

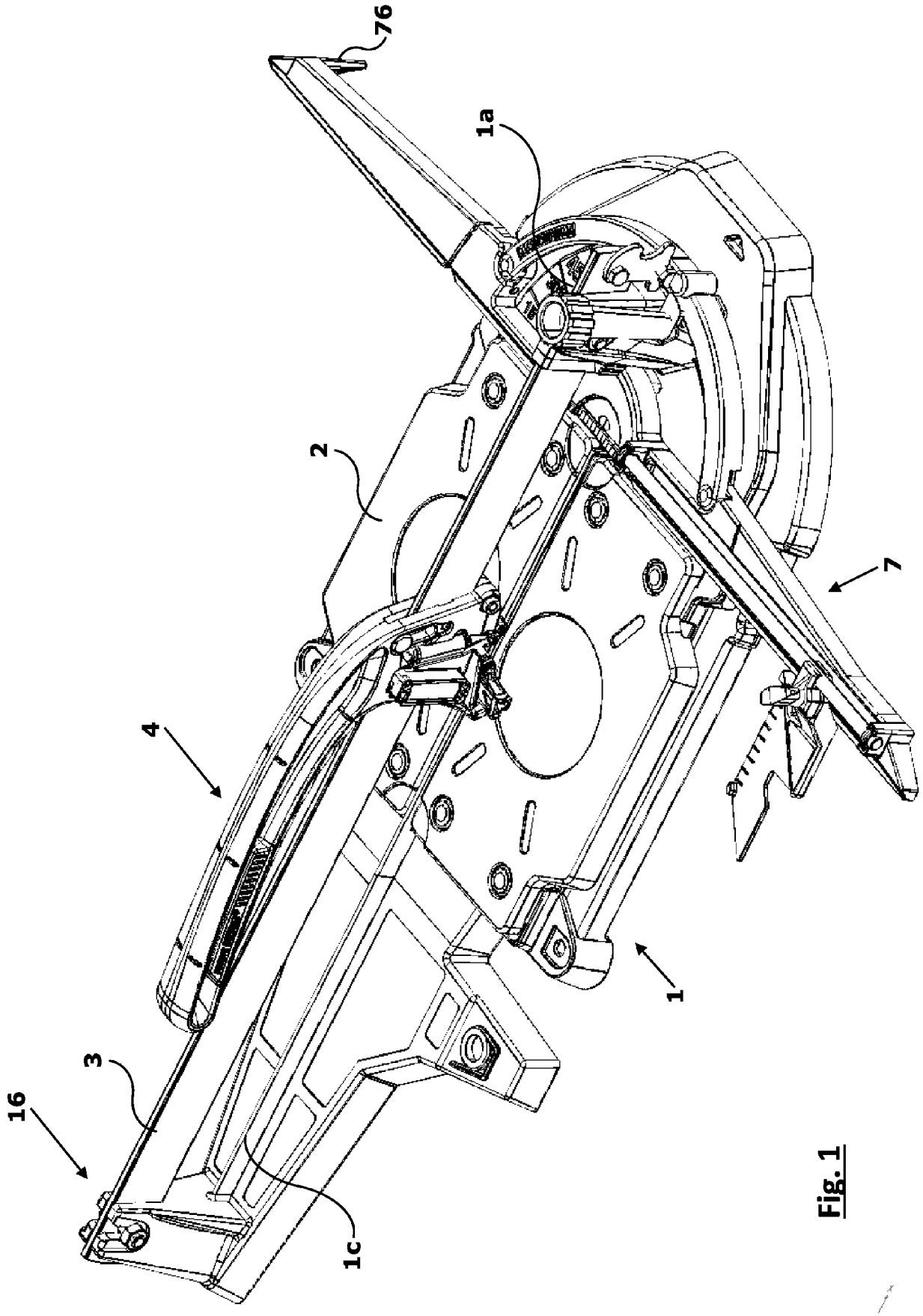

Fig. 1

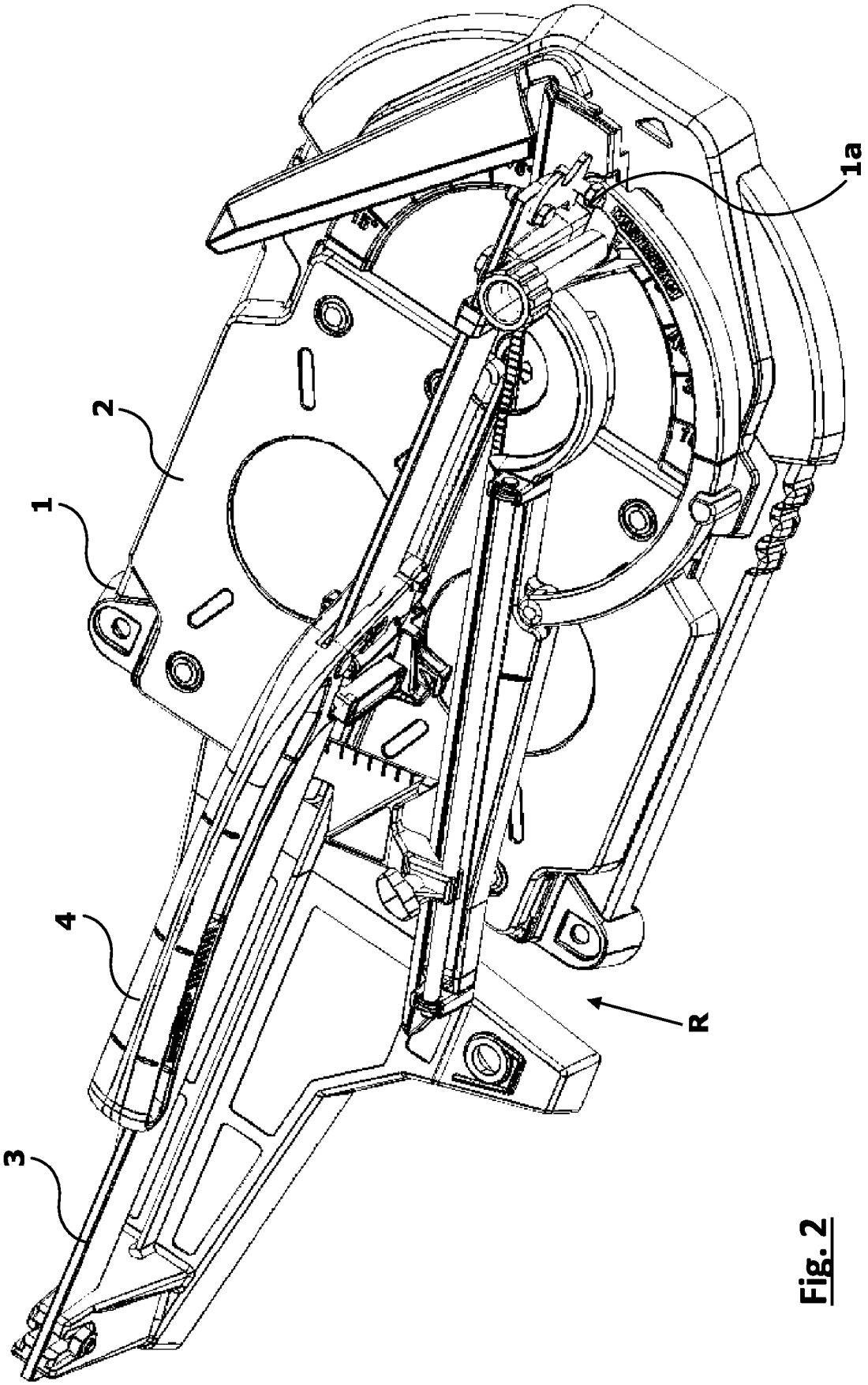

Fig. 2

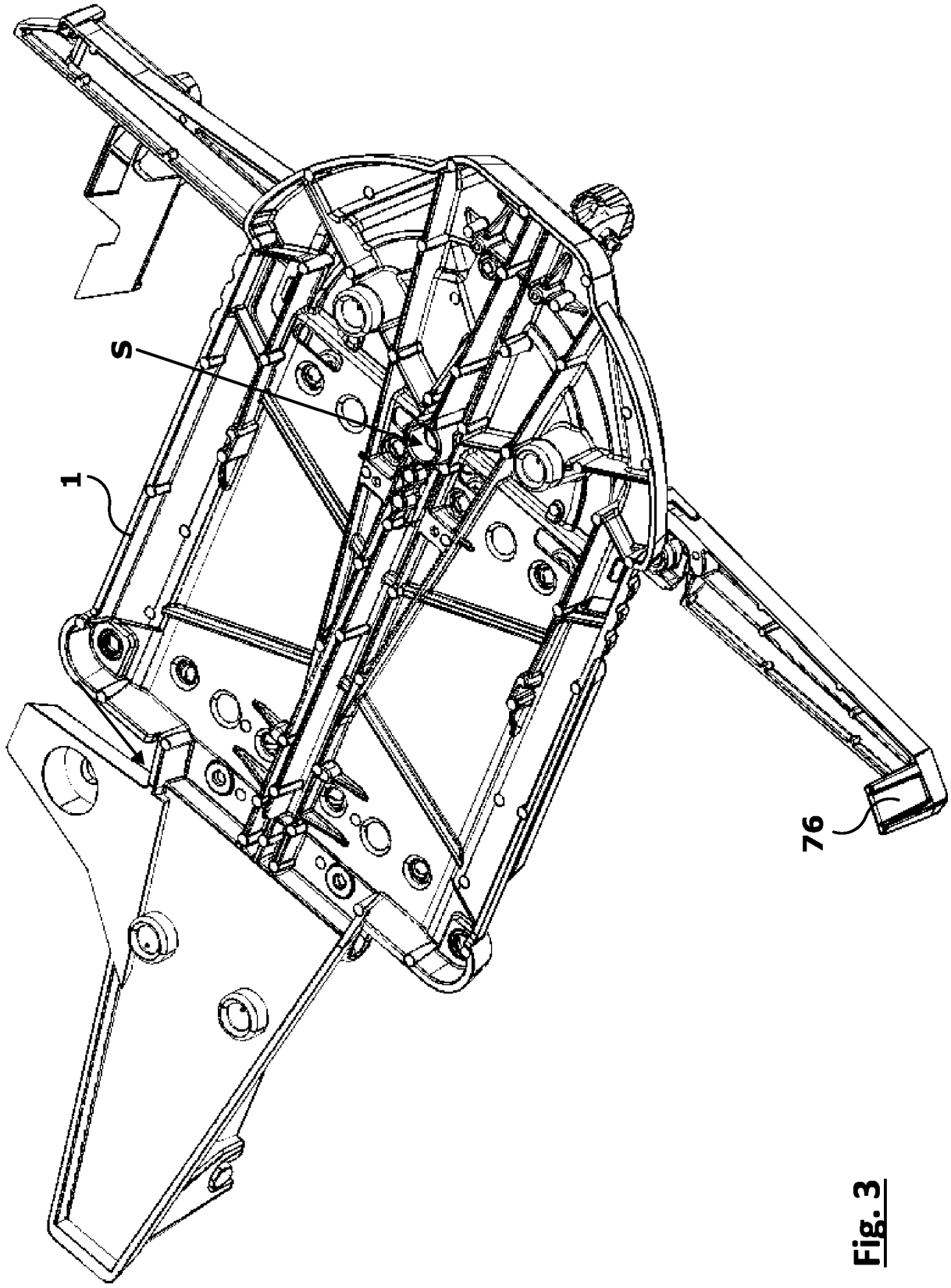

Fig. 3

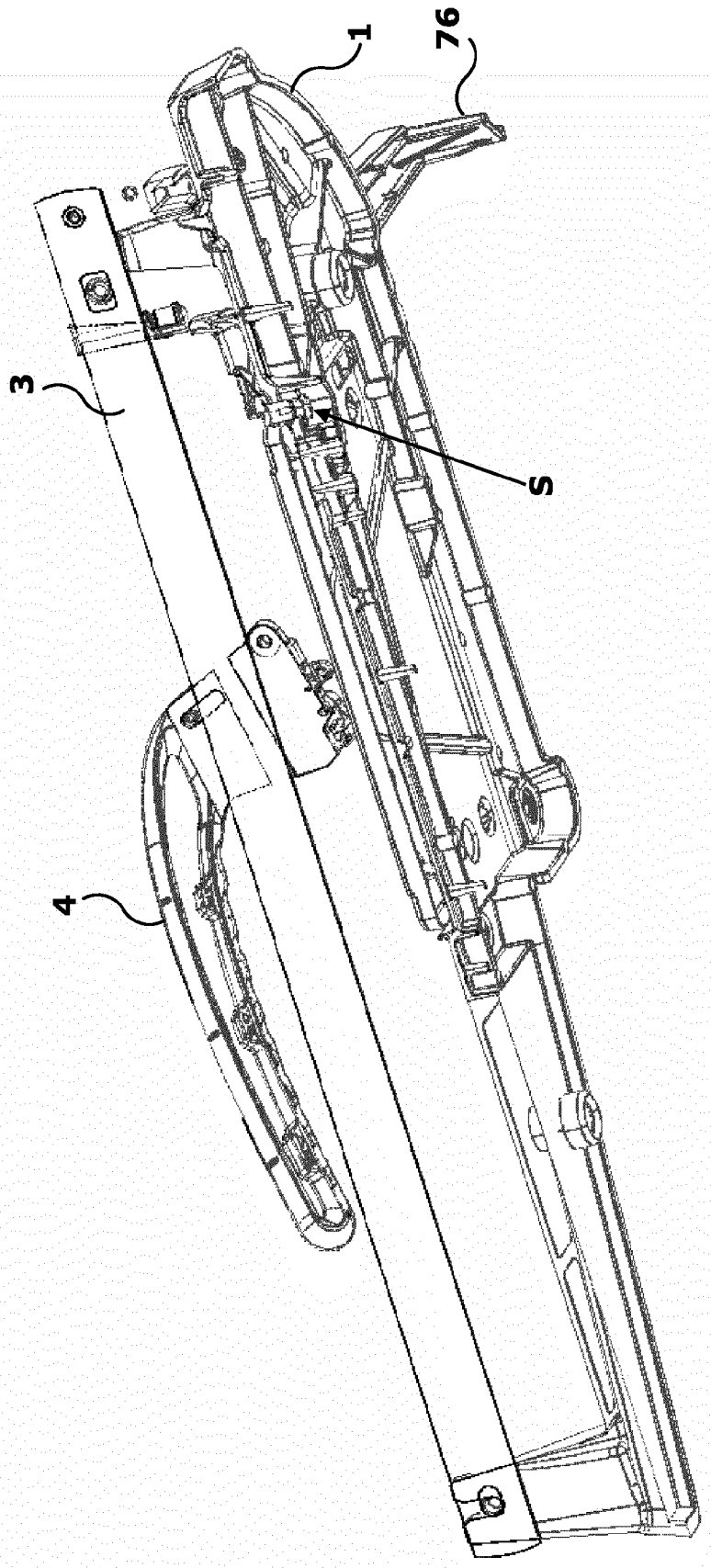

Fig. 4

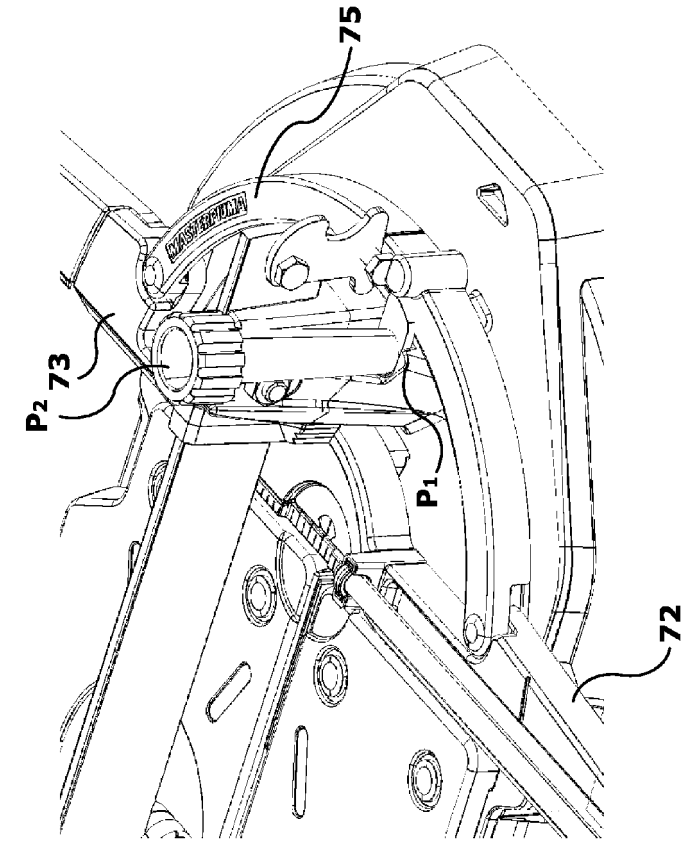

Fig. 5B

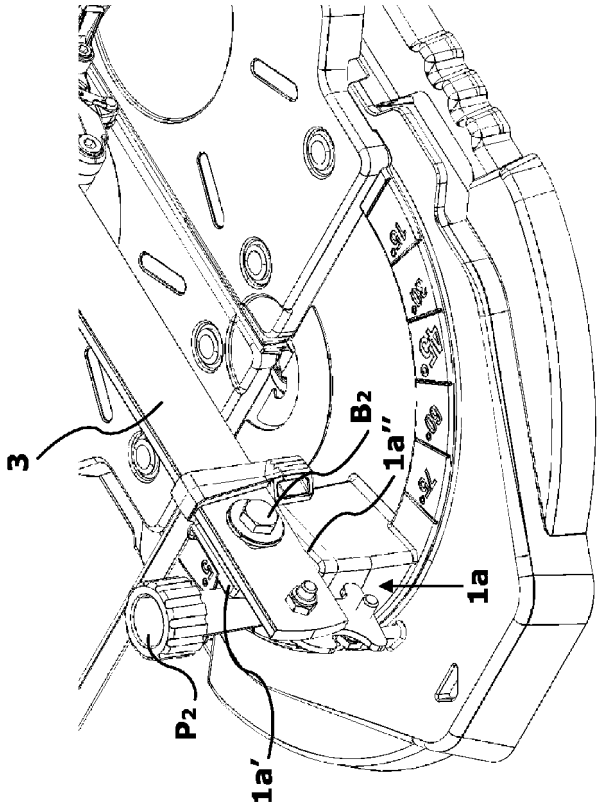

Fig. 5A

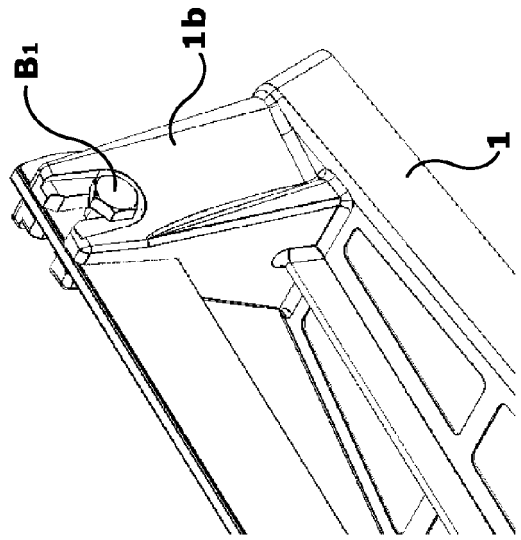

Fig. 6B

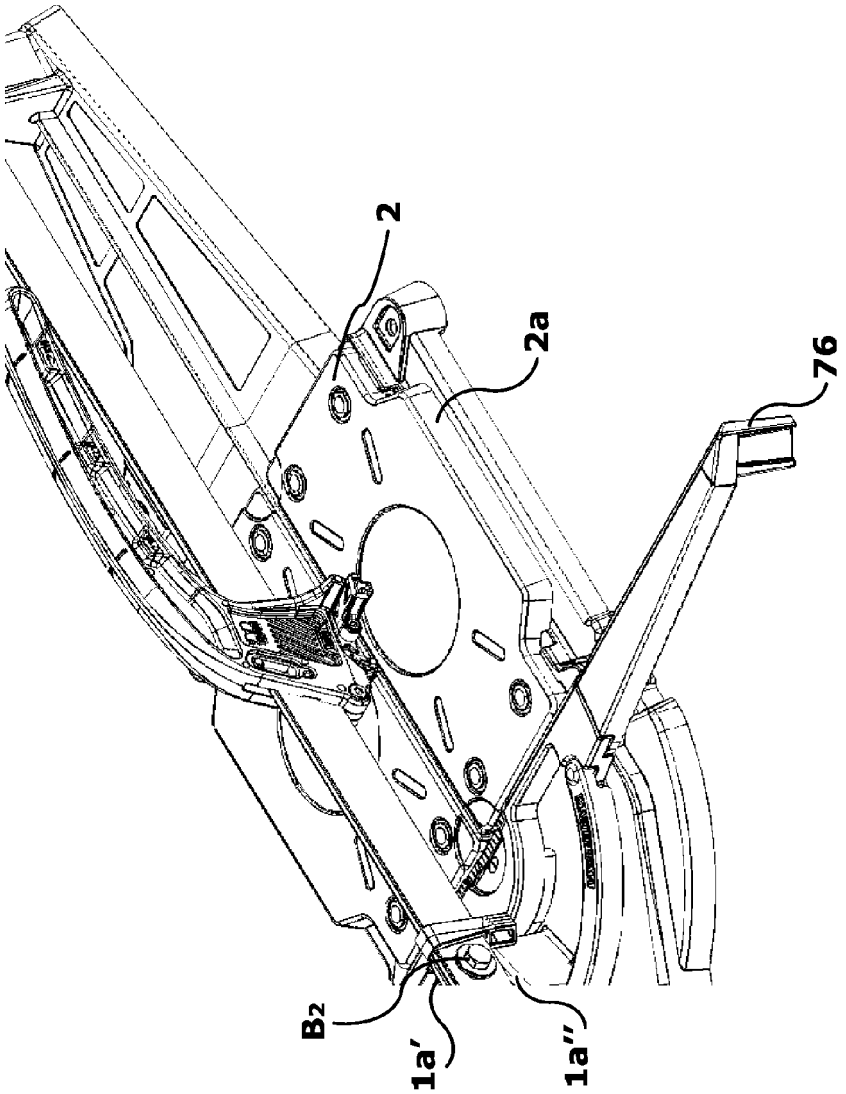

Fig. 6A

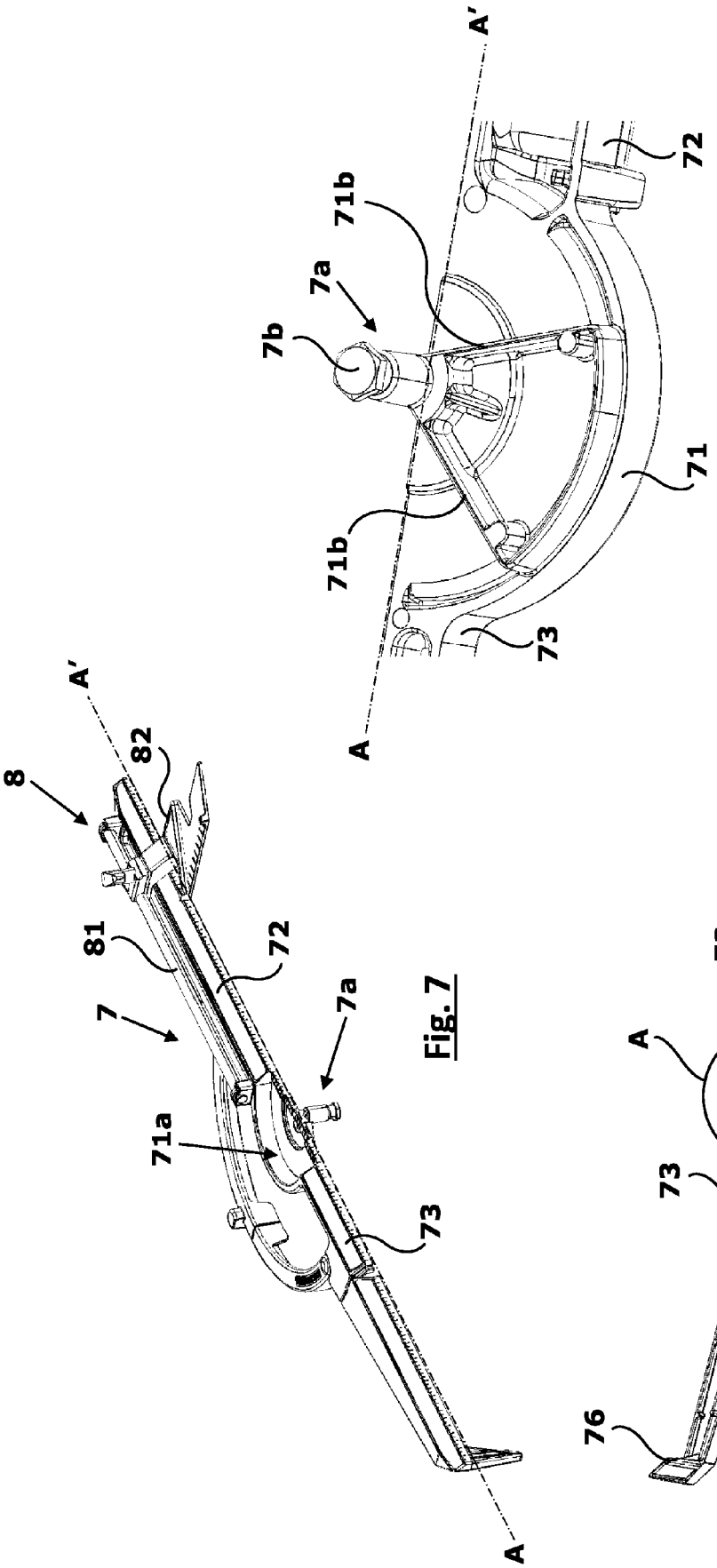

Fig. 8A

Fig. 7

Fig. 8

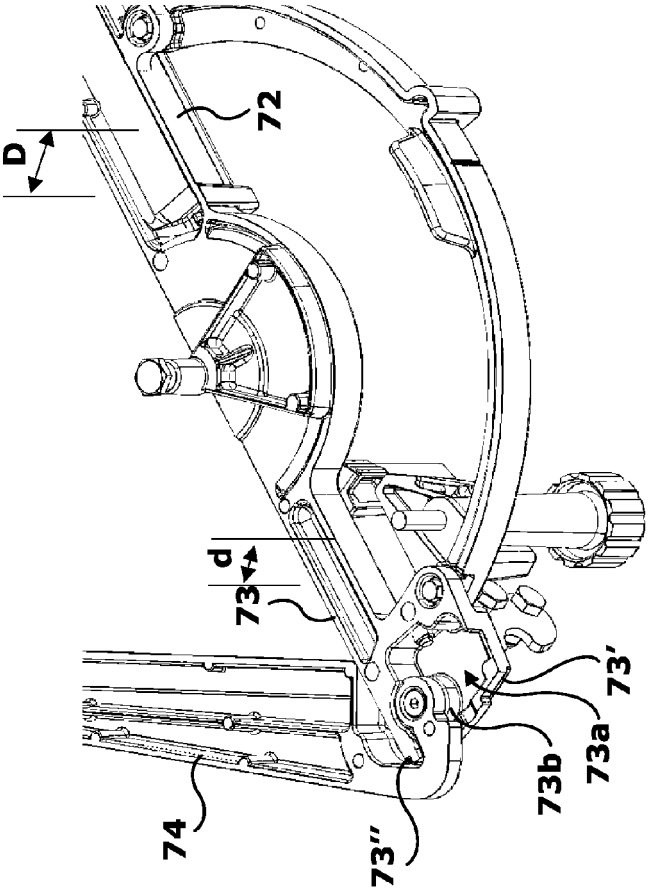

Fig. 9B

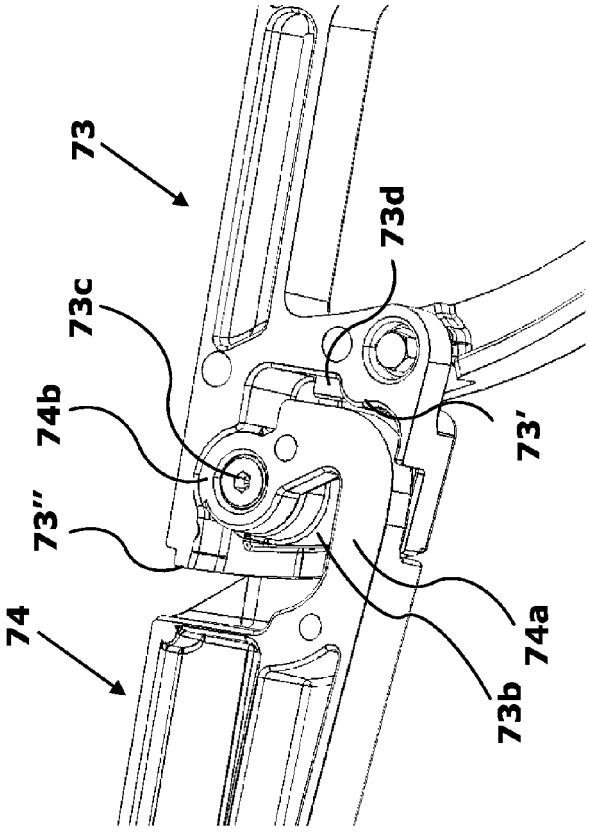

Fig. 9A

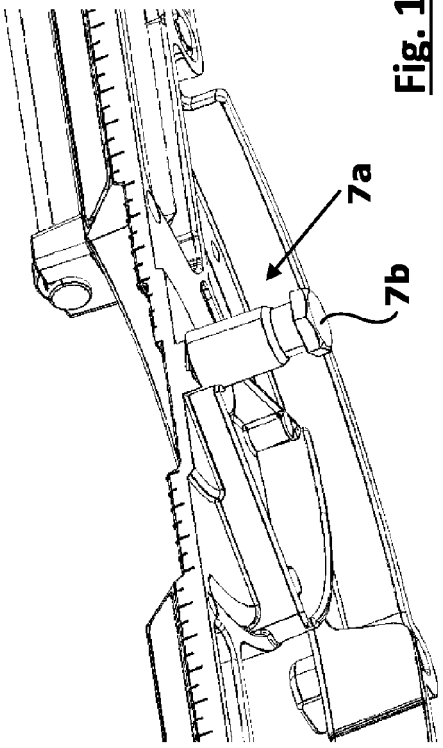

Fig. 12A

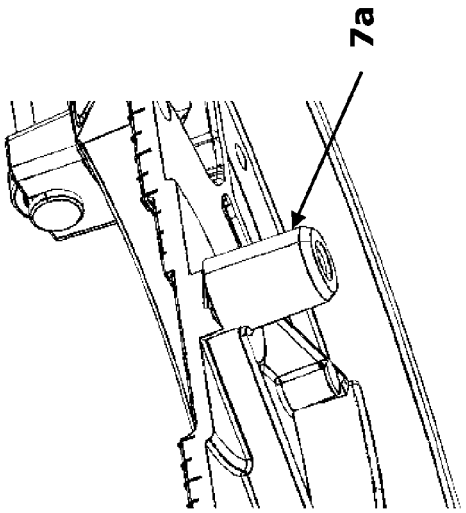

Fig. 12B

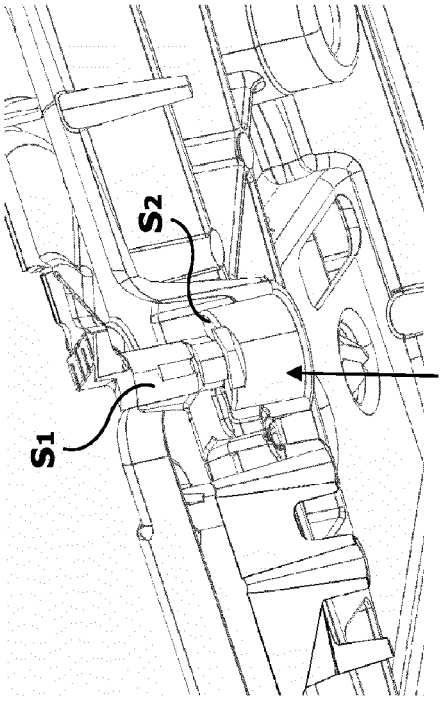

Fig. 10

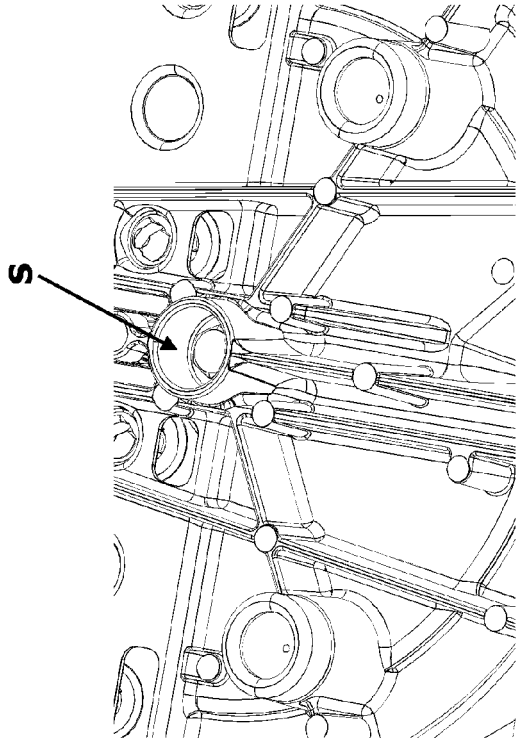

Fig. 11

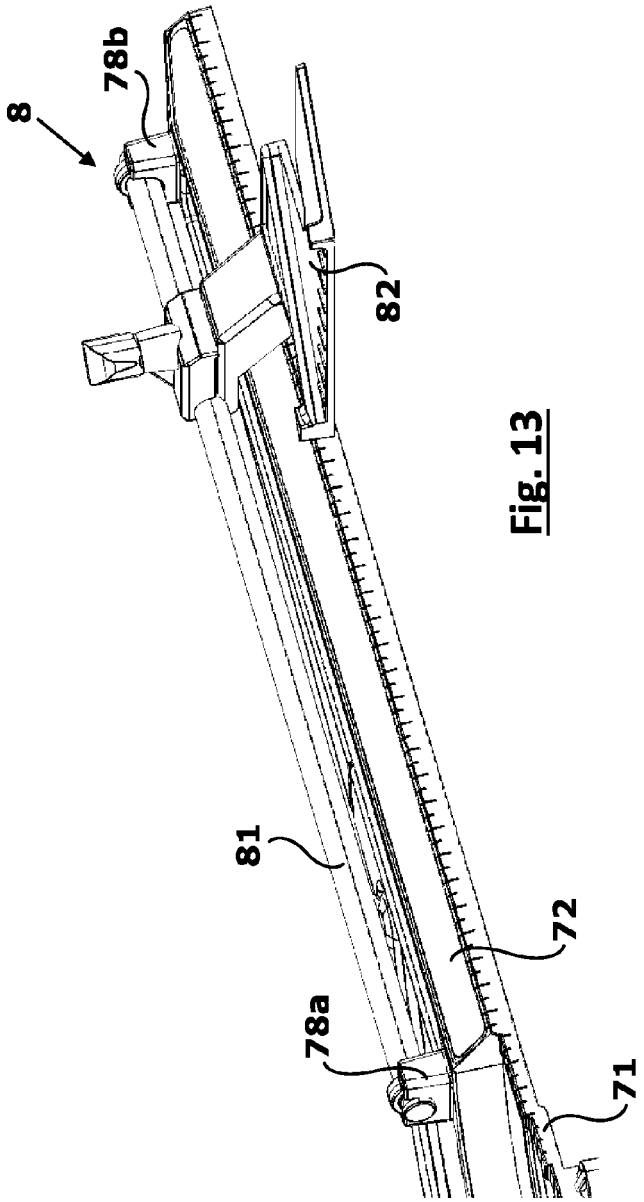

Fig. 13

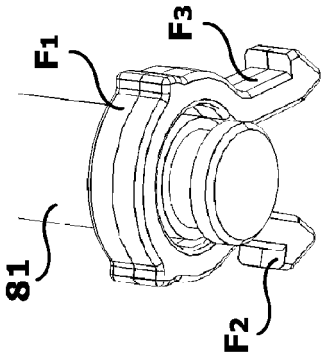

Fig. 14C

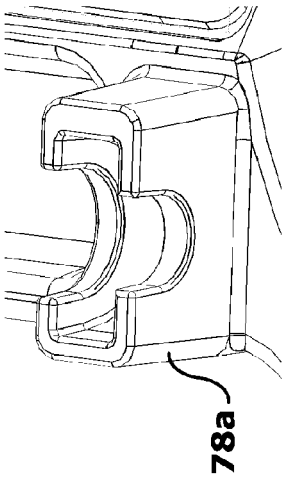

Fig. 14B

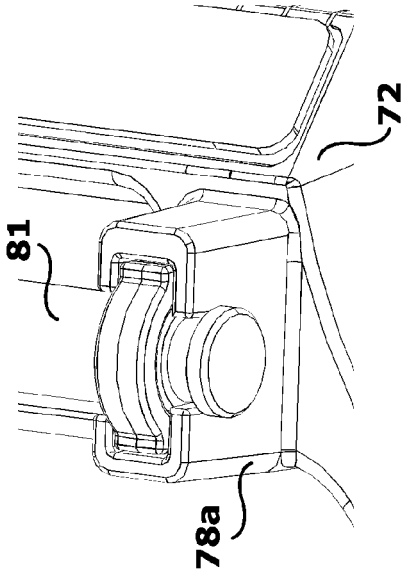

Fig. 14A

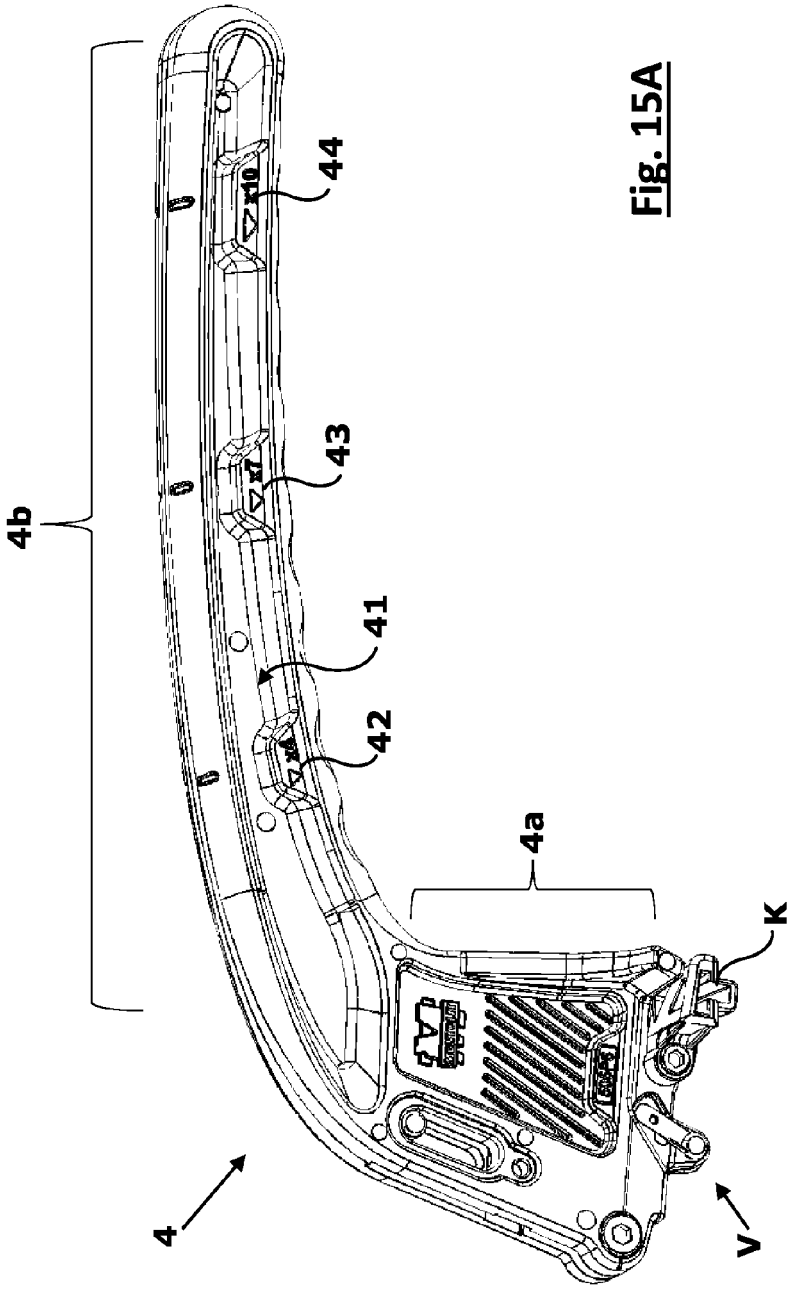

Fig. 15A

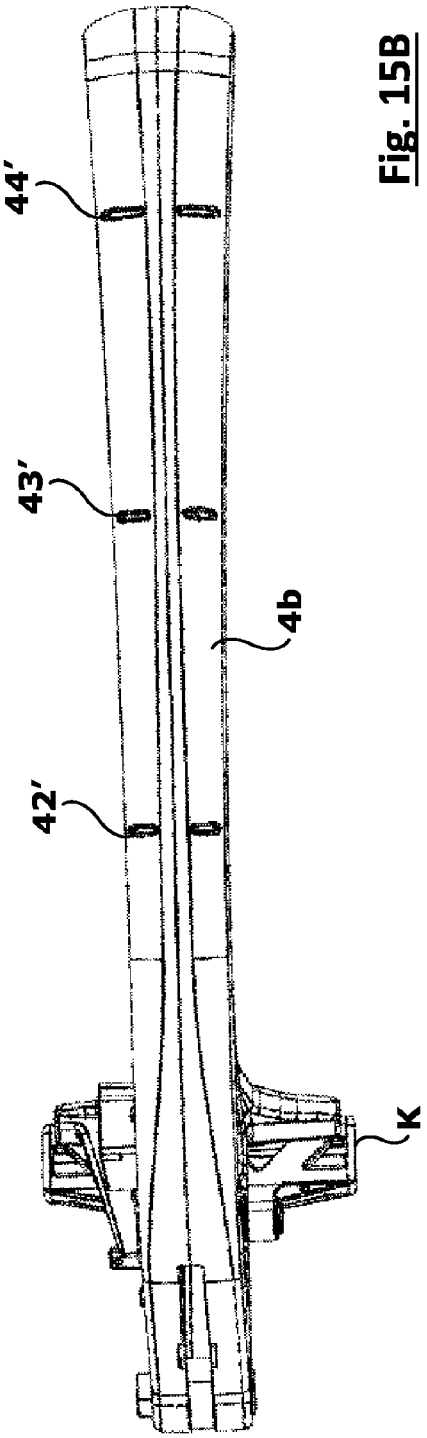

Fig. 15B

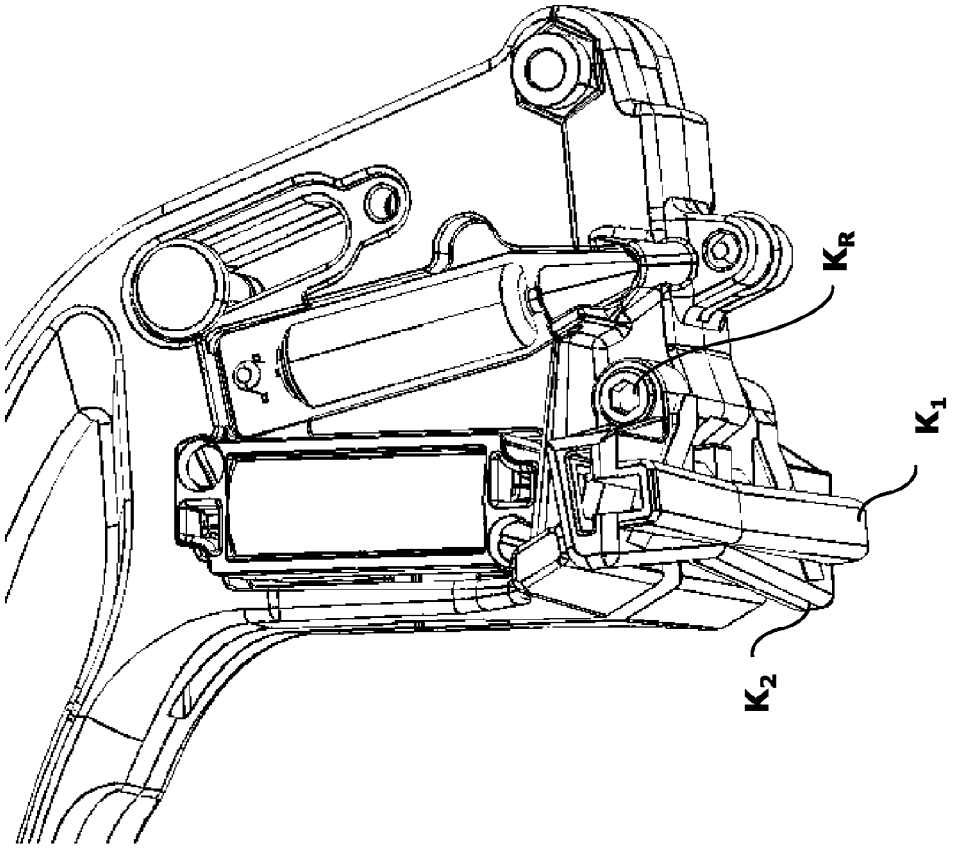

Fig. 15D

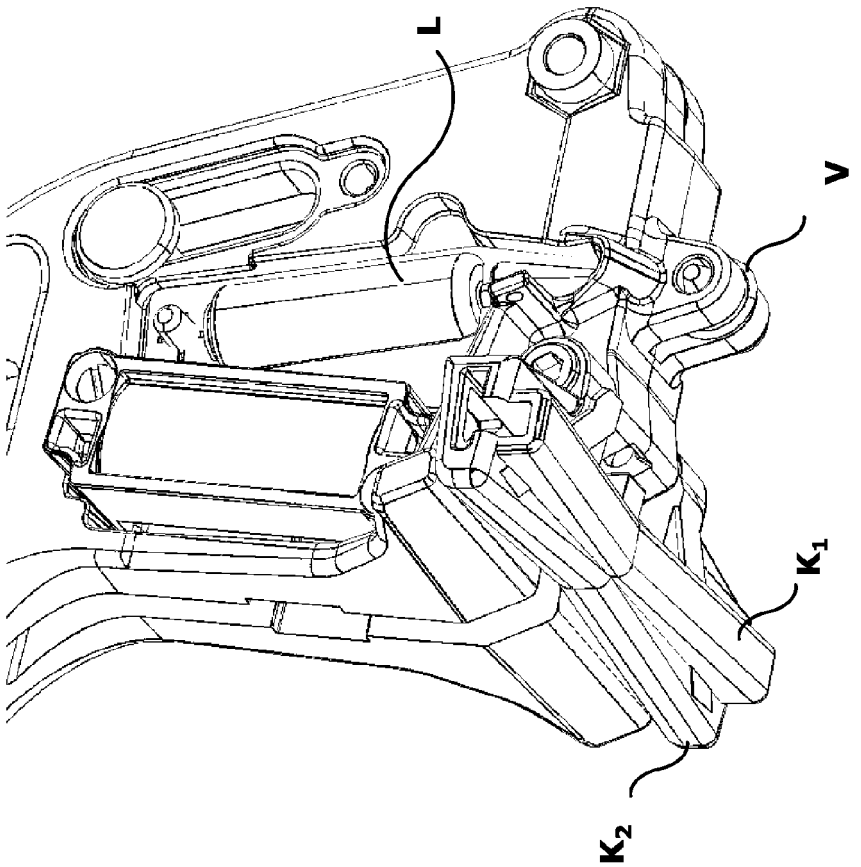

Fig. 15C

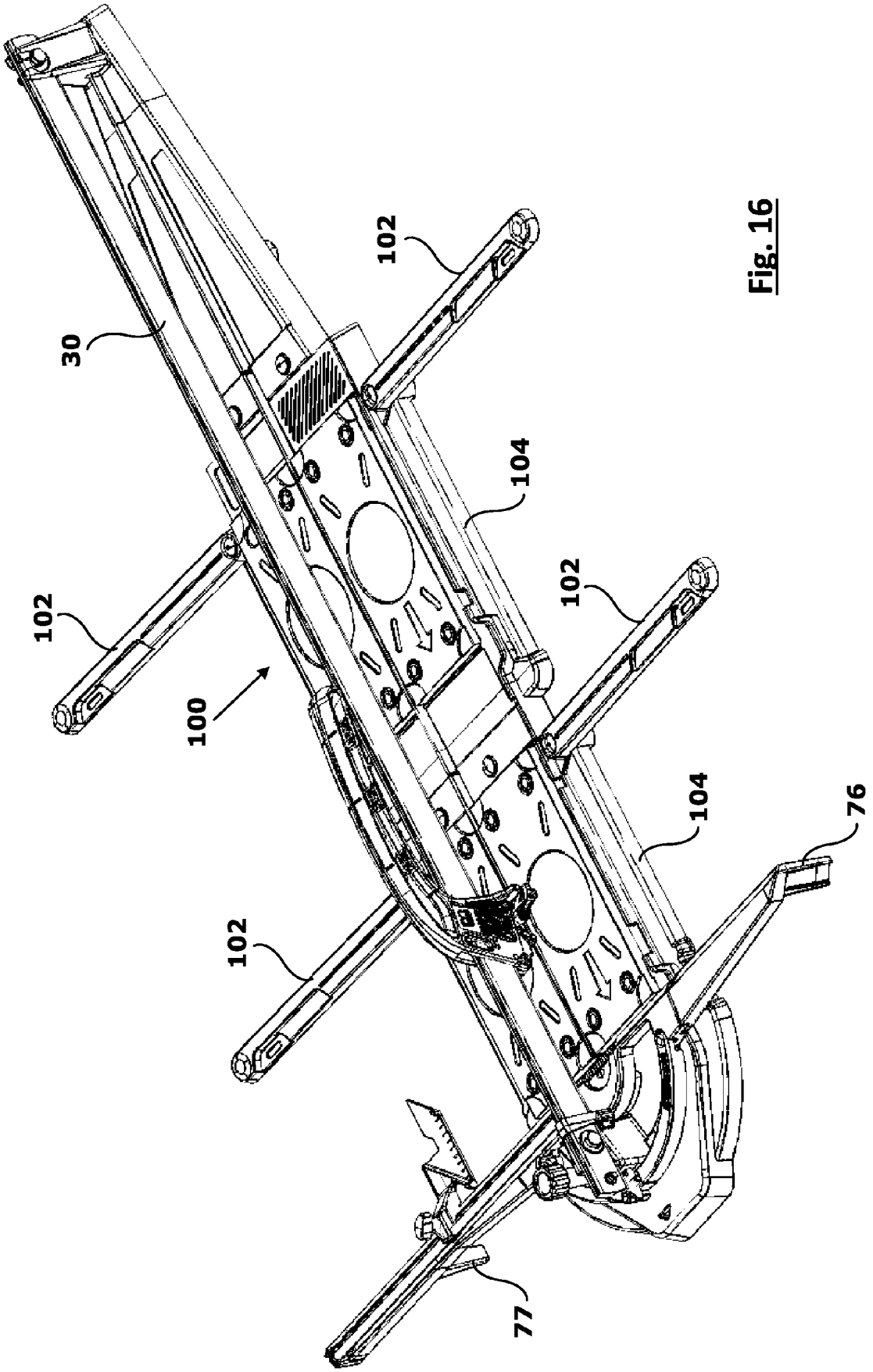

Fig. 16

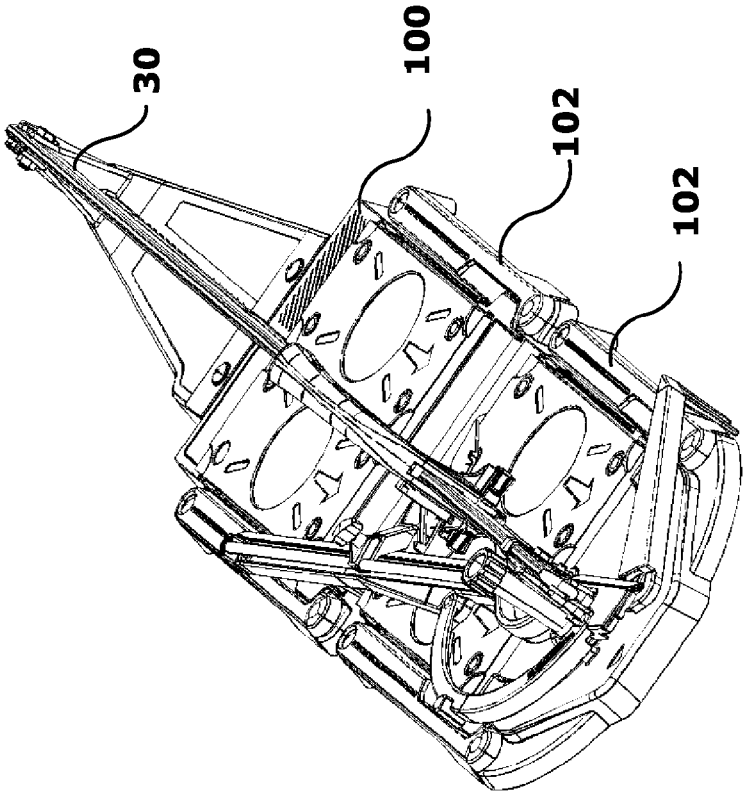

Fig. 17A

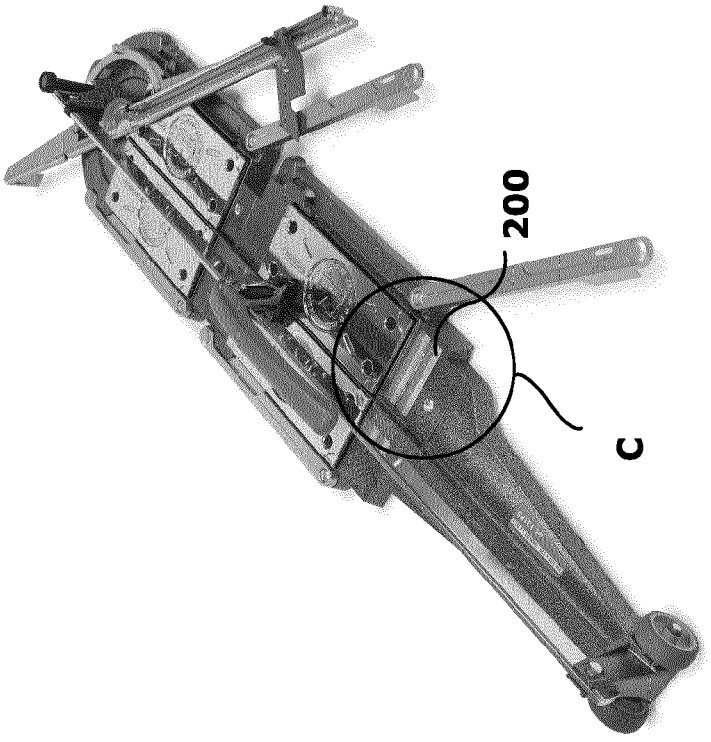

Fig. 17B

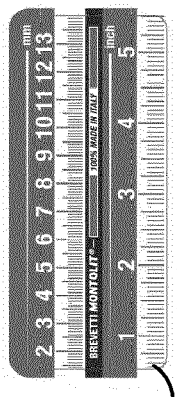

Fig. 17C

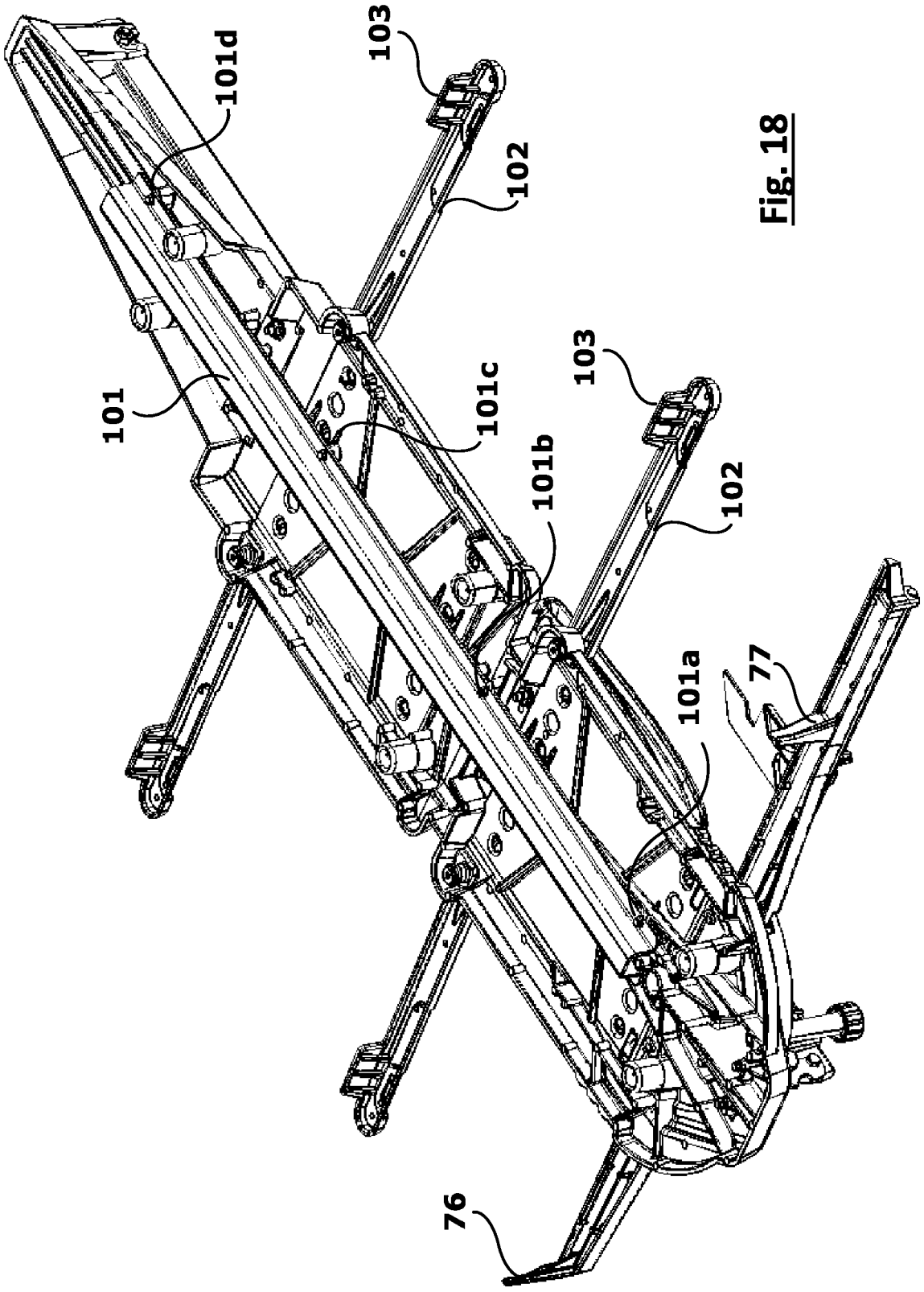

Fig. 18

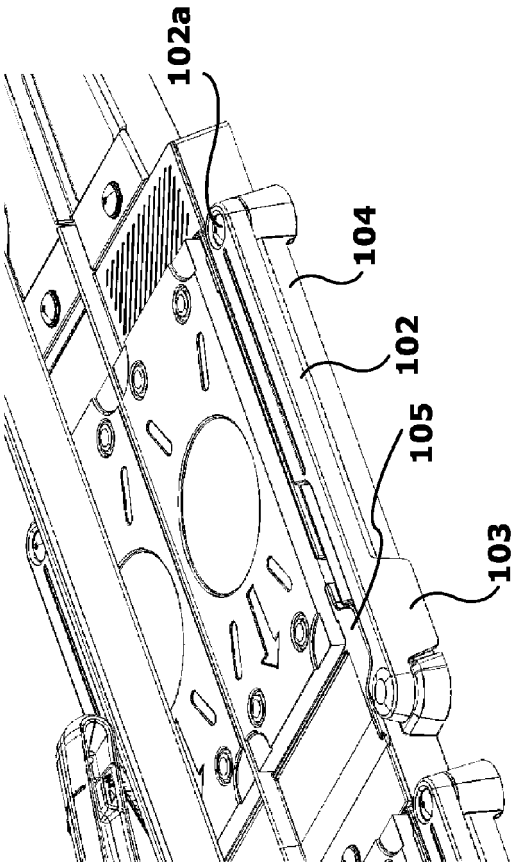

Fig. 19B

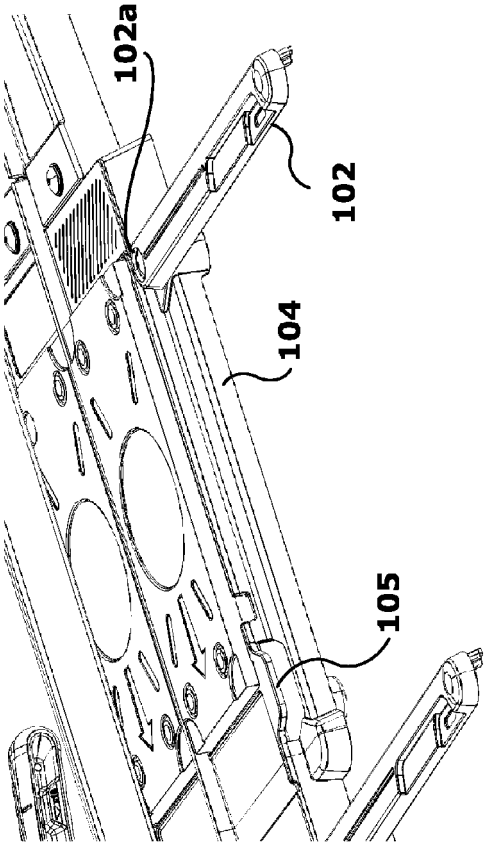

Fig. 19A

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EUROPEAN SEARCH REPORT

Application Number
EP 23 15 3976

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,D	EP 0 608 476 A2 (MONTOLIT BREVETTI [IT]) 3 August 1994 (1994-08-03) * figures 2,3,11 *	1-12	INV. B28D1/22
A	KR 101 048 166 B1 (JEON BYUNG KOOK [KR]) 8 July 2011 (2011-07-08) * paragraph [0032] * * figures 1,2 *	1-12	
A	FR 1 139 167 A (A. MULLER) 26 June 1957 (1957-06-26) * page 1, right-hand column, lines 19-39 * * figures 1-3 *	1-12	
A	JP H10 166352 A (IWATANI AYAKO) 23 June 1998 (1998-06-23) * abstract * * paragraphs [0012] - [0014] * * figures 5,7,8 *	1-12	
A,D	WO 2004/030883 A1 (MONTOLIT BREVETTI [IT]; CASARTELLI LUIGI [IT]; MONTOLI VINCENZO [IT]) 15 April 2004 (2004-04-15) * figure 1 *	1-12	TECHNICAL FIELDS SEARCHED (IPC) B28D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 May 2023	Chariot, David

CATEGORY OF CITED DOCUMENTS

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