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(54) **Tile cutter with height-adjustable tool carrier**

Fliesenschneider mit verstellbarer Werkzeugaufnahme

Dispositif à couper les carreaux ayant un support d'outil réglable

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(56) References cited:
EP-A1- 0 216 707 EP-A1- 2 014 431
EP-B1- 0 490 268 FR-A- 737 243

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Description

FIELD OF THE INVENTION

[0001] The present invention refers to a machine for tile cutting, or tile cutter, provided with an adjustable tool-carrier.

BACKGROUND

[0002] As known for some time, manual tile cutters occupy a very specialised sector, wherein few manufacturers have the necessary expertise to manufacture improved cutting systems which meet market requirements.

[0003] The manual tile cutters traditionally on the market consist of a base whereon a tile-resting area is provided, wherefrom two end posts project which support one or two guiding bars for a tool carrier. Said tool carrier is shaped to be able to slide freely on the bars and generally has a handle portion and, below, an engraving tool (usually comprising a wheel made of an extremely hard material) apt to engrave the tile.

[0004] The engraving occurs by pressure application by the operator, of the tool on the tile.

[0005] In order to facilitate the next tile-breaking operation, i.e. separating the tile along the engraving line, the base typically comprises a pair of floating plates on both sides of a central longitudinal rib, arranged in a lowered position in correspondence of the engraving line. Thereby, once the engraving has been completed, it is possible to impart a pressure on the tile - with a suitable tile-breaking device integral with the tool carrier - to bring it in abutment with the longitudinal rib and cause the opening of the engraving.

[0006] Single-bar manual tile cutters are traditionally divided into so-called pull-type or push-type machines, depending on the shape of the tool carrier which is intended to perform the engraving while the user pulls or pushes it, respectively.

[0007] In the following of the description the pull-type machine will be addressed.

[0008] The shape of the tool carrier, in particular of the handle thereof, is defined by taking into account rather stringent ergonomic requirements, since the operator must be able to perform a traction and at the same time a forward torsion on the tool carrier to be able to perform correctly the tile engraving. The shape and especially the inclination of the handle of the tool carrier therefore play a very important role for the acceptance by the user.

[0009] However, the ideal handle attitude is maintained only when design technical requirements are met, i.e. when the thickness of tile matches the one considered during the design phase. However, it is intuitive to realise that for all other tile thicknesses the handle does not take on the ideal design attitude.

[0010] As a matter of fact, the attitude of the tool carrier during the engraving is determined by two resting points,

one defined by the engraving wheel on the tile top surface and the other defined by a lower guiding wheel which rests on the lower edge of the sliding bar. Clearly, if these two points come closer to each other (upon tile thickness increase) or move away from each other (upon tile thickness decrease) a corresponding variation of the inclination of the entire tool carrier and of the corresponding handle is also determined.

[0011] Furthermore, there is to be noted that on the rear of the engraving tool (wheel) - i.e. in the user's direction - there is normally provided an tile-breaking foot integral with the tool carrier. When the tile is very thick, the inclination taken up by the tool carrier can be such to cause the tile-breaking foot to come excessively close to the tile, up to a measure which makes the machine unusable (beyond a certain thickness, the tile-breaking foot and not the engraving tool would come in contact with the tile). On the other hand, the tile-breaking foot cannot be mounted too high either, because one could not manage to break small-thickness tiles. As a matter of fact, with low-thickness tiles, the tile-breaking travel would become so large that the handle of the tool carrier would end up interfering with the guiding bar before the tile-breaking foot manages to rest on the tile.

[0012] In order to solve this problem, according to the prior art it has been suggested to arrange a mechanism for the raising/lowering of the longitudinal guiding bar. Thereby, the user can act to raise/lower the upper resting point of the tool carrier, i.e. the resting point against the lower edge of the bar, and hence to restore the design distance between the two resting points of the tool carrier, even in case of tile thickness changes.

[0013] However, this solution provides to lessen somewhat the constraint between the bar and of two end posts of the base, which makes the support structure labile. Therefore, in order to avoid undesired plays in the machine, the sizing and stiffness thereof must be increased, or complicated locking means must be provided, which affect negatively machine weight and economy.

[0014] EP-A1-216707, which discloses a tool-carrier for a tile cutter machine, wherein a bearing pin, apt to slide on the lower edge of the guiding bar, can be removed and displaced between two different positions, respectively in front and behind an engraving tool, so as to let the tool-carrier work either as a pull-type or as a push-type sliding carrier, disclose as well the preamble of claim 1.

[0015] The object of the present invention is hence to solve the problems set forth above without acting on the height adjustment of the longitudinal guiding bar.

[0016] Such object is achieved by providing a tool carrier for a tile-cutting machine which has the features set forth in the attached claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] Further features and advantages of the device according to the invention will in any case be more evi-

dent from the following detailed description of some preferred embodiments of the same, given by way of example and illustrated in the accompanying drawings, wherein:

fig. 1 is a perspective view with parts removed, of a first embodiment of the invention;
fig. 2 is an elevation side view of the sole tool-carrier of fig. 1;
figs. 3 and 4 are perspective views of a tool-carrier according to a further embodiment similar to the one of fig. 1, in the engraving phase of a tile and of a thicker one, respectively;
fig. 5 is an elevation side view, partly in section, of a third embodiment of a tool-carrier according to the invention;
figs. 6 and 7 are perspective side and front views, respectively, of a fourth embodiment similar to that of fig. 5; and
figs. 8 and 9 are elevation side and exploded views, respectively, of a further embodiment similar to that of fig. 5.

[0018] Fig. 1 shows part of the components forming a tile cutter. It consists, in a manner known per se, of a base 1 whereon a pair of support plates 2 are floatingly mounted. At one end of the base there is rotatably mounted a scaled abutting square 3.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0019] At the two ends of base 1 there are further provided two posts 4 (fig. 1 shows one only) which securely support a longitudinal guiding bar B. Bar B typically is a thin elongated steel plate, having a rectilinearity and parallelism of the two opposite sides suited to act as precise sliding guide for a tool carrier P.

[0020] Tool carrier P consists, in a manner known per se, of a main body 5, from the upper portion whereof a handle 6 projects. The main body is shaped so as to precision-slide along bar B, with a wide play in a vertical direction (i.e. on the lying plane of bar B). Typically, body 5 has a through-cavity or slot 5a, which runs through it longitudinally, within which bar B is intended to slide.

[0021] In the lower portion of body 5 the actual engraving tool 7 is mounted, typically in the shape of a small hard-steel wheel. On the rear of tool 7 - i.e. in the direction in which also handle 6 prolongs - a tile-breaking foot 8 is provided.

[0022] As stated, tool-carrier P can slide on bar B with a remarkable vertical play; the limit of these displacements being determined, downwards, by an upper support wheel 9 and, upwards, by a lower support wheel 10.

[0023] Wheels or pins 9 and 10 run through main body 5 of tool-carrier P and are partially housed within inner cavity 5a: thereby they are intended to cooperate with the upper and lower edges, respectively, of guiding bar B.

[0024] In this embodiment there is furthermore a third

support point, not visible in figs. 1 and 2, which consists of a front abutment block or pin, which is arranged inside slot 5a, immediately above the position of tool 7.

[0025] Traditionally, the average distance between these upper and lower support points is greater by 20 mm than the height of bar B. Thereby a freedom of vertical movement of tool carrier P on bar B is guaranteed, which allows to cause the tool-carrier to take up at least the two extreme attitudes of engraving and of tile-breaking.

[0026] In particular, by bringing fully forward handle 6 - i.e. according to arrow F - lower wheel 10 is brought resting on the lower edge of the bar, which wheel acts as rearward fulcrum to bring tool 7 in pressure on the top plane of an underlying tile. On the contrary, by rotating backwards the handle (direction opposite to arrow F), the front abutment block surface or pin (not shown) arranged immediately above tool 7 is brought to rest on the lower edge of bar B, so as to cause it to act as forward fulcrum to pressurise the rear tile-breaking foot 8 on the tile. Upper wheel 9 guarantees, in this tile-breaking phase, a lower end-of-travel, so that the tile-breaking foot does not drop excessively, which would cause tile shattering.

[0027] According to the invention, engraving tool 7 and lower support wheel 10 are mounted relatively mobile with respect to each other in a substantially vertical direction, so as to be able to adjust their mutual distance.

[0028] According to a first embodiment shown in fig. 1, lower support wheel 10 is rotatably mounted at the lower end of a fork 11 outside body 5 of the tool carrier. The two side walls or cheeks of body 5 further have, in correspondence of the position of lower wheel 10, guiding slots 12 (fig. 2) wherein the rotation axis of wheel 10 can slide in a guided manner.

[0029] Fork 11 ends above in a small block 11a which is constrained, free in rotation, to a threaded stem 13. At the other end of threaded stem 13 there is integrally provided a manoeuvring knob 14. Threaded stem 13 is furthermore engaged with a threaded hole (not shown) obtained in a front protrusion 15 of handle P.

[0030] The engagement of stem 13 with protrusion 15 determines and maintains fixed the coupling also of fork 11, and hence of wheel 10, with the tool-carrying body 5. By rotating manoeuvring knob 14 a displacement of threaded stem 13 is determined with respect to handle P and hence also a translation of wheel 10 inside its guiding slot 2.

[0031] By acting on knob 14 it is hence possible to adjust the mutual distance between support wheel 10 and engraving tool 7, advantageously without affecting the mutual position of tool 7 and tile-breaking foot 8. This makes it possible to reestablish the desired attitude of the tool carrier based on the tile height to be engraved, i.e. based on the distance which tool 7 takes up with respect to guiding bar B when it rests on the tile, without this negatively affecting the operativity of tile-breaking foot 8.

[0032] Fig. 3 shows a tool-carrier according to an embodiment similar to the one just described. The elements

corresponding to the ones of fig. 1 have like reference numbers.

[0033] In this case, actuating fork 11' is shaped as a rocker arm and is hinged on a horizontal pivot 11a' fixed with respect to the tool-carrier.

[0034] The operation principle is equivalent to the one described for the previous embodiment. The rotation of knob 14 determines the displacement of threaded stem 13 and hence of the end of the rocker-arm fork 11': a rotation about pivot 11a' is thus determined which drops or raises the support wheel (not visible) carried at the lower end of the rocker-arm fork 11'.

[0035] In fig. 3 it is shown that the distance between the lower edge of bar B and the tile is of 4 cm and threaded stem 13 is substantially unthreaded, i.e. raised. In fig. 4 the tile is of a greater thickness and hence stem 13 has been threaded to lower the upper end of the rocker-arm lever 11' and to raise the support wheel with respect to engraving wheel 7.

[0036] Fig. 5 shows a third embodiment of the invention.

[0037] In this case, a lower support wheel 110 is mounted integral with body 105 of the tool carrier, i.e. in a fixed position. Integral with body 105 there is also a front abutment pin 110', intended to act as fulcrum against the lower edge of bar B during the tile-breaking phase (inverse rotation with respect to arrow F). In this case too, a lower end-of-travel is defined - which intervenes in the tile-breaking phase - due to the presence of an upper edge of the cavity of tool-carrier 105 which is intended to rest on the upper edge of bar B.

[0038] According to this embodiment, the tool-carrier has a substantially vertical, linear-movement, guided sliding element 111, said guided movement being obtained by the engagement of two upper and lower slots, 111a and 111b respectively in an upper pin 105a and in a lower pin 105b integral with body 105. Preferably, the lower guiding pin 105b coincides with the pin whereon the lower support wheel 110 is mounted and upper pin 105a coincides with the upper support pin of tool-carrier P.

[0039] With sliding member 111 there are integral, in the lower portion, both engraving tool 107 and tile-breaking foot 108.

[0040] According to a preferred embodiment, the vertical adjustment of sliding member 111 with respect to tool-carrier body 105 is accomplished through a threaded pin 113 provided with an upper manoeuvring knob 114 engaged with a threaded hole of tool-carrier 113a. In order to simplify the cooperation between pin 113 and sliding member 111, with respect to the previous embodiment, the end of pin 113 is simply resting on the upper end of member 111, which determines the upper end-of-travel thereof. An elastic member 120 is furthermore provided, fastened on one side to body tool-carrying body 105 and, on the other side, to sliding member 111, which keeps said sliding member raised and abutting against the inner end of pin 113, as shown in fig. 3.

[0041] Sliding member 111 can be mounted on one side only of tool-carrier P or, preferably it is fork-shaped, so as to arrange itself across the tool-carrier.

[0042] As can be guessed, in this case too it is possible to adjust the distance between lower support wheel 110 and engraving tool 107 without affecting the mutual position of said engraving tool with respect to tile-breaking foot 108.

[0043] Fig. 6 shows a further embodiment of the invention.

[0044] This embodiment is fully similar to the first embodiment. In this case fork member 211 is arranged entirely across the tool-carrier and ends above the handle. Fork 211 is further guided in its movement relative to the tool-carrier by guiding members 211a and 211b obtained externally on body 205.

[0045] Tile-breaking foot 208 in this case has two side legs.

[0046] According to this embodiment, the support wheel bearing on the lower edge of bar B is a single one, shown by the pin 210 thereof.

[0047] In figs. 8 and 9 another embodiment operating similarly with that of fig. 5 is instead shown.

[0048] On the tool-carrier there is provided a single lower fulcrum wheel 310, integral with the tool-carrier body and with the handle thereof. In the inner upper portion of the tool-carrier there is provided an abutting body 305, intended to cooperate with the upper edge of bar B to define, among other things, the lower end-of-travel in the tile-breaking phase. In particular, due to the relative fixed position of body 305 and of lower support wheel 310, the rotation of the tool-carrier in the tile-breaking phase is always constant, regardless of the height adjustment of the engraving wheel: this prevents tile shattering during the dropping/breaking phase.

[0049] As in fig. 5, in this case too an engraving wheel 307 and the tile-breaking foot 308 are mounted integral with the same support bracket 311 which embraces externally the main body of tool-carrier P. Bracket 311 is slidably mounted on the tool-carrier body and the relative position thereof is determined by a threaded stem 313 which is introduced more or less entirely into the tool-carrier by means of a knob 314. Bracket 311 is kept upwards by an elastic member 320 which is inserted in a seat P' of the tool carrier and operates in opposition to threaded stem 313. The adjustment operation, in substance, is fully equivalent to the one relative to fig. 5

[0050] As can be guessed from the above-reported description, the tool-carrier according to the invention allows to fully achieve the desired object, i.e. to define an adjustment which adapts the cutting conditions to the chosen tile height, without affecting the relative arrangement between cutting tool and tile-breaking foot and without having to intervene to change the position of the guiding bar.

[0051] However, it is understood that the invention is not limited to the particular arrangements illustrated above, which represent only non-limiting examples of the

scope of the invention, but that a number of changes can be made, all within the reach of a person skilled in the field, without departing from the scope of the invention as defined in the appended claims.

[0052] For example, although the support elements bearing on the guiding bar have always been shown in the form of cylindrical pins or wheel, it is not ruled out that they are configured with different surfaces, for example planar or cam-like.

Claims

1. Pull-type tool-carrier for a tile-cutter of a type comprising a tool-carrier body (5, 105), apt to slide on a guiding bar (B), provided above with a handle (6, 106) and below with an engraving tool (7, 107) and with a tile-breaking foot (8, 108), behind the engraving tool (7, 107) a lower support pivot (10, 110) being further arranged, apt to act as fulcrum against the lower edge of said guiding bar (B), **characterised in that** the relative position between said lower support pivot (10, 110) and said engraving tool (7, 107) with said tile-breaking foot (8, 108) is adjustable.
2. Tool-carrier as claimed in claim 1), wherein said lower support pivot (10, 110) is shaped as a pin running across said tool-carrier body (5) and is slidingly mounted in opposite guiding slots (12) on both sides of said body (5).
3. Tool-carrier as claimed in claim 2), wherein said pivot (10) is fastened to the opposite ends of a fork element (11) which partly embraces said body (5) and ends with a connecting element (11a) which is joined to a portion of said handle (6) through adjustment means.
4. Tool-carrier as claimed in claim 3), wherein said adjustment means comprise a threaded stem (13) joined to said fork element (11a, 11) in a freely rotatable manner and provided at one end with a manoeuvring knob (14), said threaded stem (13) engaging with a corresponding threaded hole in a front protruding portion (15) of said handle.
5. Tool-carrier as claimed in claim 1), wherein said lower support pivot (110, 310) is integral with said tool-carrier body (105) and a sliding element (111, 311) is further provided, apt to slide on said tool-carrier body (105) which carries on a lower end below said engraving tool (107) and said tile-breaking foot (108).
6. Tool-carrier as claimed in claim 5), wherein said sliding element (111) is height-adjustable with respect to the tool-carrier body (105) through guiding means (111a, 111b, 105a, 105b) and adjusting means (113, 114, 113a, 120, 313, 314, 320).

7. Tool-carrier as claimed in claim 6), wherein said guiding means comprise an upper slot (111a) and a lower slot (111b) obtained in said sliding body (111) and guided by an upper pivot (105a) and by a lower pivot (105b), respectively, which are integral with the tool-carrier body (105).
8. Tool-carrier as claimed in claim 5), wherein said adjusting means comprise a threaded stem (113, 313), engaged with a threaded hole (113a) provided in said tool-carrier body (105), which determines an upper abutment position and an elastic element (120, 320) constrained between said tool-carrier body (105) and said sliding element (111, 311) apt to push said sliding element (111, 311) towards said threaded stem (113, 313).
9. Tool-carrier as claimed in any one of the preceding claims, wherein a lower end-stop element (9, 305) is further provided, intended to come in contact with said guiding bar (B) upon a rotation of the tool-carrier opposite to the one produced for the engraving.
10. Pull-type, manual tile-cutting machine comprising a base wherefrom two end posts (4) rise, between which a guiding bar (B) of a tool-carrier (P) extends, **characterised in that** said tool-carrier (P) is as claimed in any one of the preceding claims.

Patentansprüche

1. Werkzeugträger vom Zugtyp für einen Fliesenschneider, in einer Bauart, die einen Werkzeugträgerkörper (5, 105) umfasst, geeignet zur Verschiebung auf einer Führungsstange (B), oben mit einem Handgriff (6, 106) und unten mit einem Ritzwerkzeug (7, 107) versehen, und mit einem eine Fliese zerbrechenden Fuß (8, 108), wobei hinter dem Ritzwerkzeug (7, 107) ein unterer Stütz-Drehpunkt (10, 110) angeordnet ist, der geeignet ist, um als Drehpunkt gegenüber dem unteren Rand der genannten Führungsstange (B) zu wirken, **dadurch gekennzeichnet, dass** die relative Position zwischen dem genannten unteren Stützpunkt-Drehpunkt (10, 110) und dem genannten Ritzwerkzeug (7, 107) mit dem eine Fliese zerbrechenden Fuß (8, 108) einstellbar ist.
2. Werkzeugträger nach Anspruch 1, **dadurch gekennzeichnet, dass** der genannte untere Stütz-Drehpunkt (10, 110) als Zapfen ausgebildet ist, der quer durch den Werkzeugträgerkörper (5) verläuft und verschieblich in gegenüberliegenden Führungsschlitzen (12) auf beiden Seiten des genannten Körpers (5) gehalten ist.
3. Werkzeugträger nach Anspruch 2, **dadurch ge-**

- kennzeichnet, dass** der genannte Drehpunkt (10) an den gegenüberliegenden Enden eines Gabelelements (11) befestigt ist, das den genannten Körper (5) teilweise umfasst und mit einem Verbindungselement (11a) endet, das mit einem Teil des genannten Handgriffs (6) über Einstellmittel verbunden ist.
4. Werkzeugträger nach Anspruch 3, **dadurch gekennzeichnet, dass** das genannte Einstellmittel einen mit Gewinde versehenen Schaft (13) aufweist, der mit dem genannten Gabelelement (11a, 11) in frei drehbarer Weise verbunden ist und an einem Ende mit einem Betätigungsknopf (14) versehen ist, wobei der genannte mit Gewinde versehene Schaft (13) mit einer entsprechenden, mit Gewinde versehenen Bohrung in einem vorderen vorstehenden Abschnitt (15) des genannten Handgriffs in Eingriff steht.
5. Werkzeugträger nach Anspruch 1, **dadurch gekennzeichnet, dass** der genannte untere Stütz-Drehpunkt (110, 310) einteilig mit dem genannten Werkzeugträgerkörper (105) ausgebildet ist, wobei weiterhin ein Schiebeelement (111, 311) vorgesehen ist, das geeignet ist, auf dem genannten Werkzeugträgerkörper (105) verschoben zu werden, welches auf einem unteren Ende unten das genannte Ritzwerkzeug (107) und den eine Fliese zerbrechenden Fuß (108) trägt.
6. Werkzeugträger nach Anspruch 5, **dadurch gekennzeichnet, dass** das genannte verschiebbliche Element (111) in Bezug auf den Werkzeugträgerkörper (105) über Führungsmittel (111a, 111b, 105a, 105b) und Einstellmittel (113, 114, 113a, 120, 313, 314, 320) in der Höhe einstellbar ist.
7. Werkzeugträger nach Anspruch 6, **dadurch gekennzeichnet, dass** das genannte Führungsmittel einen oberen Schlitz (111a) und einen unteren Schlitz (111b) umfasst, die in dem genannten Schiebekörper (111) gebildet sind und von einem oberen Drehpunkt (105a) und einem unteren Drehpunkt (105b) geführt sind, die einteilig mit dem Werkzeugträgerkörper (105) sind.
8. Werkzeugträger nach Anspruch 5, **dadurch gekennzeichnet, dass** die genannten Einstellmittel einen mit Gewinde versehenen Schaft (113, 313) aufweisen, der mit einer mit Gewinde versehenen Bohrung (113a) in Eingriff steht, die in dem genannten Werkzeugträgerkörper (105) ausgebildet ist, wodurch eine obere Anschlagposition festgelegt ist, und ein elastisches Element (120, 320), das zwischen dem genannten Werkzeugträgerkörper (105) und dem genannten Schiebeelement (111, 311) festgehalten ist und geeignet ist, das genannte Schiebeelement (111, 311) in Richtung auf den ge-

nannten, mit Gewinde versehenen Schaft (113, 313) zu drücken.

9. Werkzeugträger nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** ein unteres Endanschlagelement (9, 305) vorgesehen ist, welches dazu dient, in Kontakt mit der genannten Führungsstange (B) zu kommen, bei einer Drehung des Werkzeugträgers entgegen der Drehung, die zum Ritzten ausgeführt wird.
10. Handbetätigte Fließschneidvorrichtung vom Zugtyp, mit einem Grundelement, auf dem zwei endseitige Pfosten (4) stehen, zwischen denen sich eine Führungsstange (B) eines Werkzeugträgers (P) erstreckt, **dadurch gekennzeichnet, dass** der Werkzeugträger (P) wie in einem der vorangehenden Ansprüche ausgebildet ist.

Revendications

1. Porte-outils du type à traction pour un coupe-carreaux d'un type comprenant un corps de porte-outils (5, 105), apte à glisser sur une barre de guidage (B), pourvu sur le dessus d'une poignée (6, 106) et sur le dessous, d'un outil à graver (7, 107) et d'un pied de freinage de carreau (8, 108), derrière l'outil à graver (7, 107) étant en outre prévu un pivot de support inférieur (10, 110), apte à servir de point d'appui contre le bord inférieur de ladite barre de guidage (B), **caractérisé en ce que** la position relative entre ledit pivot de support inférieur (10, 110) et ledit outil à graver (7, 107) avec ledit pied de freinage de carreau (8, 108) est réglable.
2. Porte-outils selon la revendication 1, dans lequel ledit pivot de support inférieur (10, 110) a la forme d'une goupille s'étendant en travers dudit corps de porte-outils (5) et est monté coulissant dans des fentes de guidage (12) opposées sur les deux côtés dudit corps (5).
3. Porte-outils selon la revendication 2, dans lequel ledit pivot (10) est fixé aux extrémités opposées d'un élément fourche (11) qui englobe en partie ledit corps (5) et se termine par un élément de connexion (11a) qui est raccordé à une partie de ladite poignée (6) par l'intermédiaire d'un moyen de réglage.
4. Porte-outils selon la revendication 3, dans lequel ledit moyen de réglage comprend une tige filetée (13) reliée audit élément fourche (11a, 11) en rotation libre et pourvue, à une extrémité, d'un bouton de commande (14), ladite tige filetée (13) s'engageant avec un trou taraudé correspondant dans une partie saillante avant (15) de ladite poignée.

5. Porte-outils selon la revendication 1, dans lequel ledit pivot de support inférieur (110, 310) est formé d'un seul tenant avec ledit corps de porte-outils (105) et un élément glissant (111, 311) est en outre prévu, apte à glisser sur ledit corps de porte-outils (105) qui porte sur une extrémité inférieure au-dessous dudit outil à graver (107) et dudit pied de freinage de carreau (108). 5

6. Porte-outils selon la revendication 5, dans lequel ledit élément glissant (111) est réglable en hauteur par rapport au corps de porte-outils (105) par le biais de moyens de guidage (111a, 111b, 105a, 105b) et de moyens de réglage (113, 114, 113a, 120, 313, 314, 320). 10 15

7. Porte-outils selon la revendication 6, dans lequel lesdits moyens de guidage comprennent une fente supérieure (111a) et une fente inférieure (111b) obtenues dans ledit corps glissant (111) et guidées par un pivot supérieur (105a) et par un pivot inférieur (105b), respectivement, qui sont formés d'un seul tenant avec le corps de porte-outils (105). 20

8. Porte-outils selon la revendication 5, dans lequel lesdits moyens de réglage comprennent une tige filetée (113, 313), engagée avec un trou taraudé (113a) prévu dans ledit corps de porte-outils (105), qui détermine une position de butée supérieure et un élément élastique (120, 320) contraint entre ledit corps de porte-outils (105) et ledit élément glissant (111, 311) apte à pousser ledit élément glissant (111, 311) vers ladite tige filetée (113, 313). 25 30

9. Porte-outils selon l'une quelconque des revendications précédentes, dans lequel un élément de fin de course inférieur (9, 305) est en outre prévu, destiné à venir en contact avec ladite barre de guidage (B) lors d'une rotation du porte-outils en sens inverse de celle produite pour la gravure. 35 40

10. Machine à couper les carreaux, manuelle, du type à traction, comprenant une base à partir de laquelle partent deux montants d'extrémité (4), entre lesquels s'étend une barre de guidage (B) d'un porte-outils (P), **caractérisée en ce que** ledit porte-outils (P) est tel que défini selon l'une quelconque des revendications précédentes. 45

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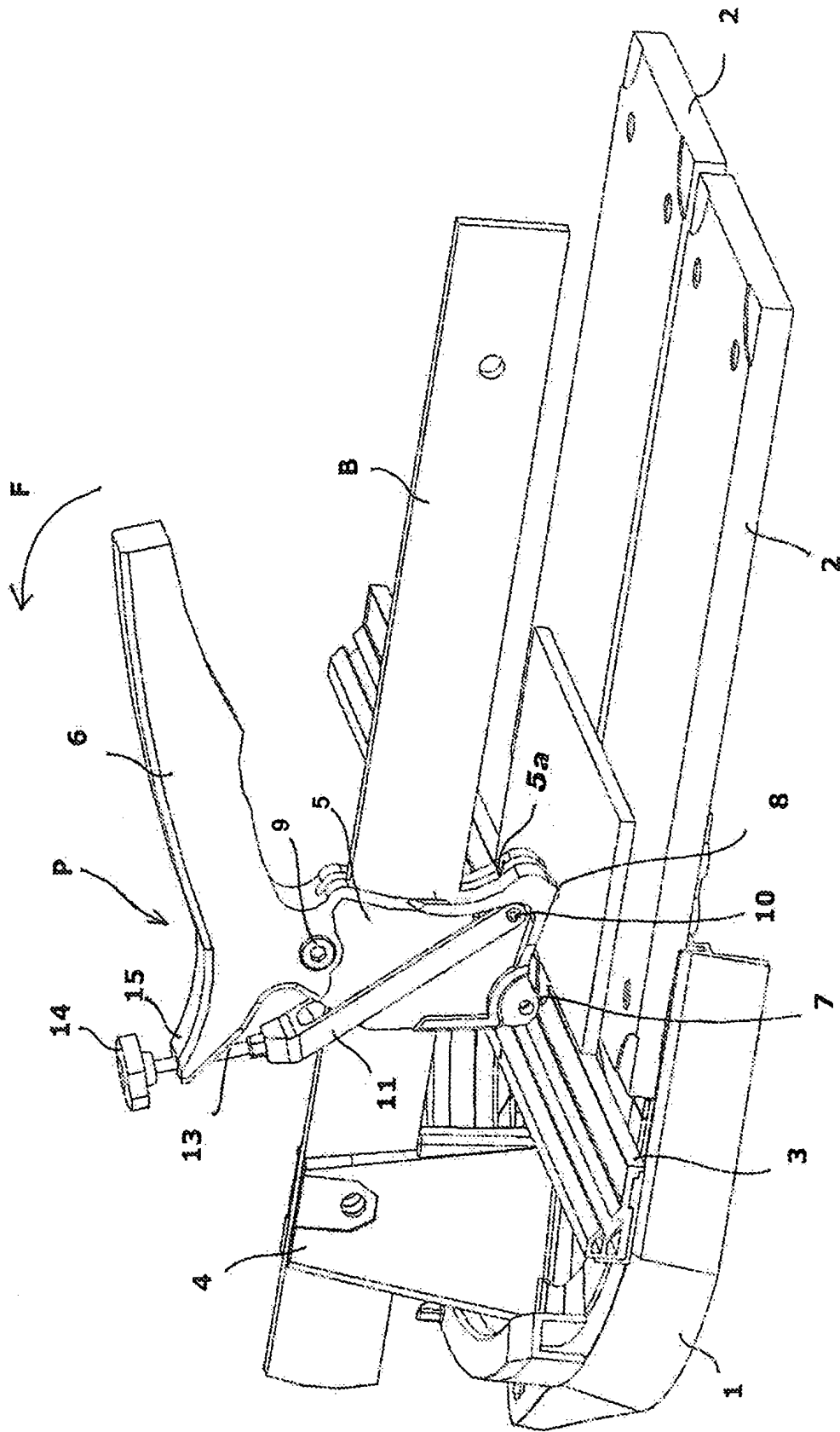


Fig. 1

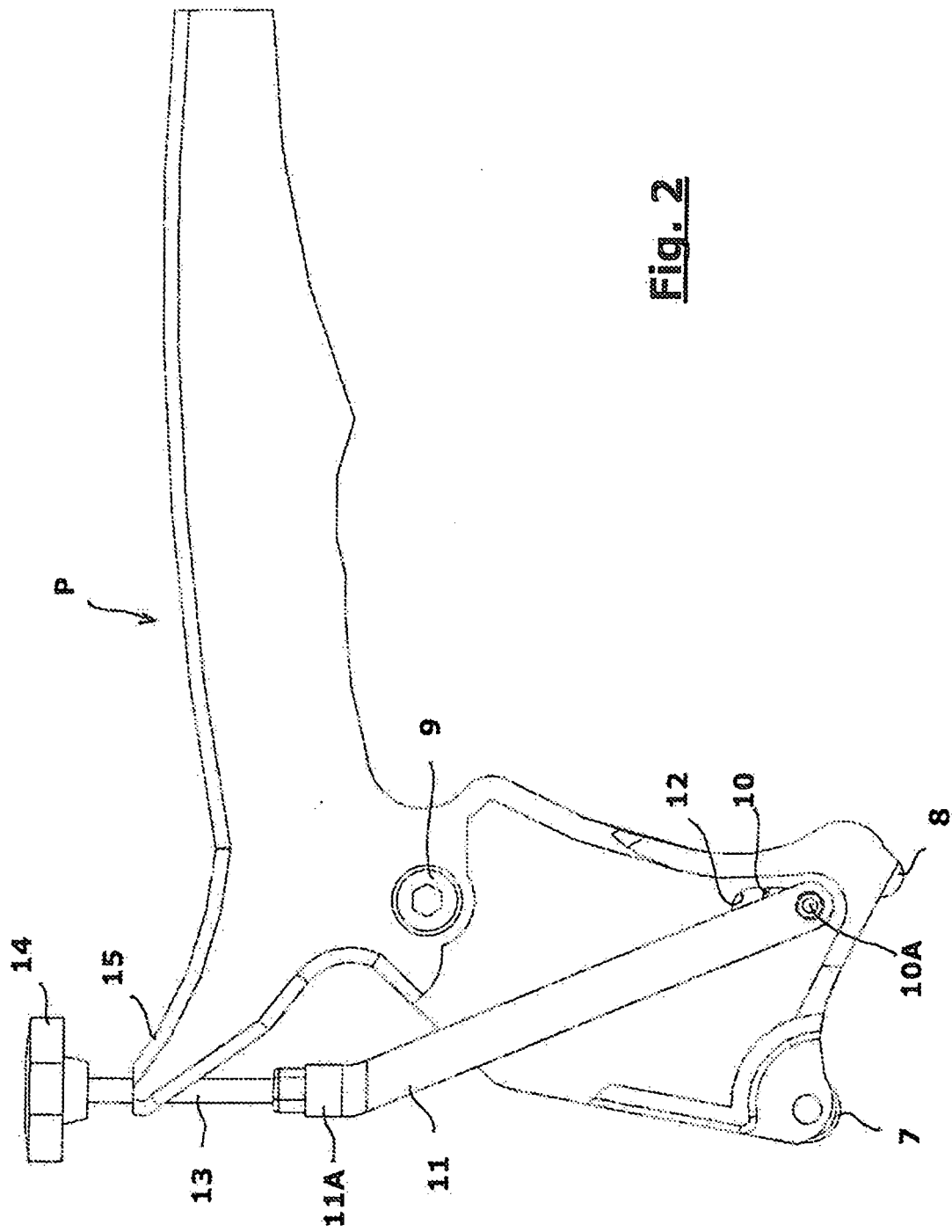


Fig. 2

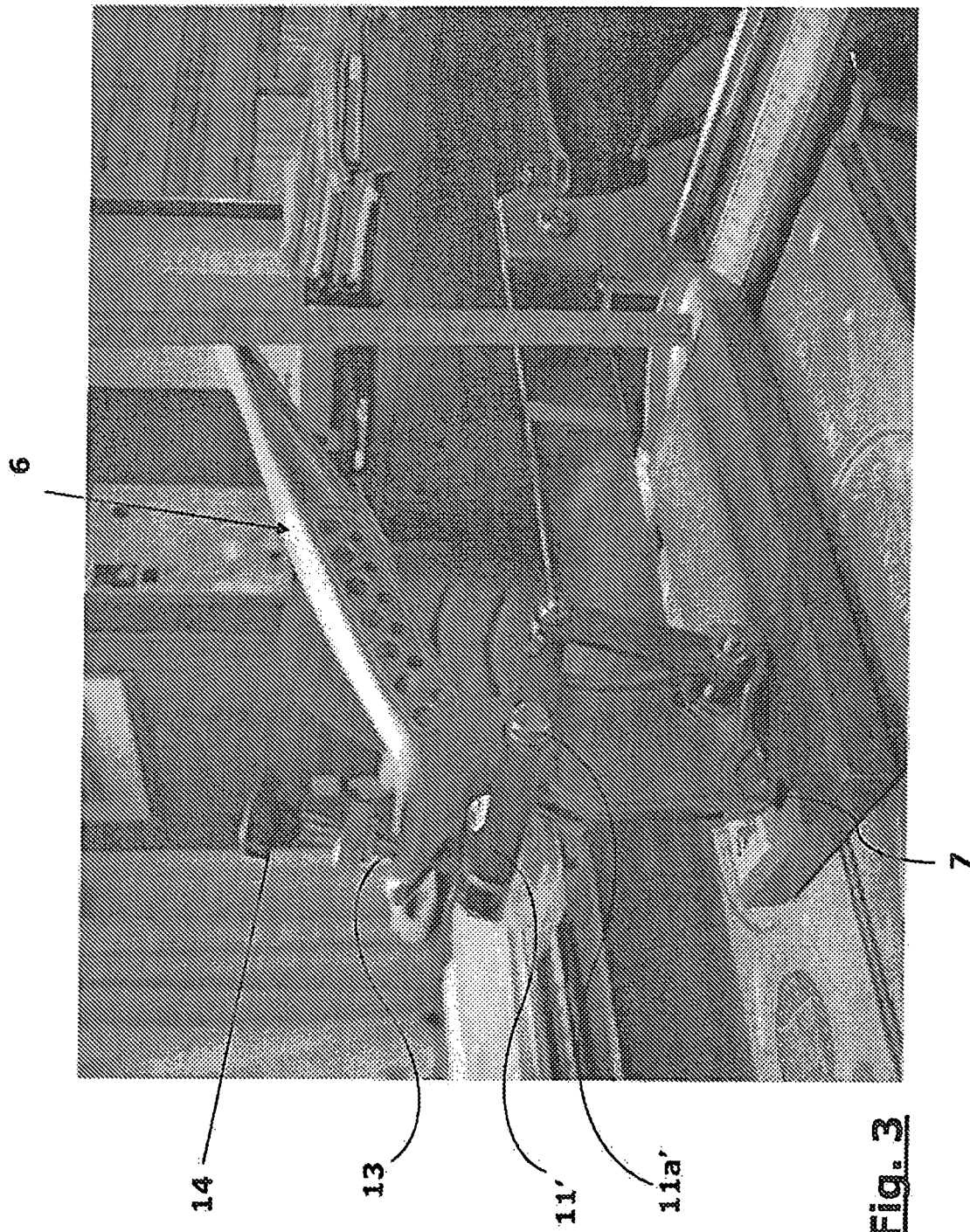


Fig. 3

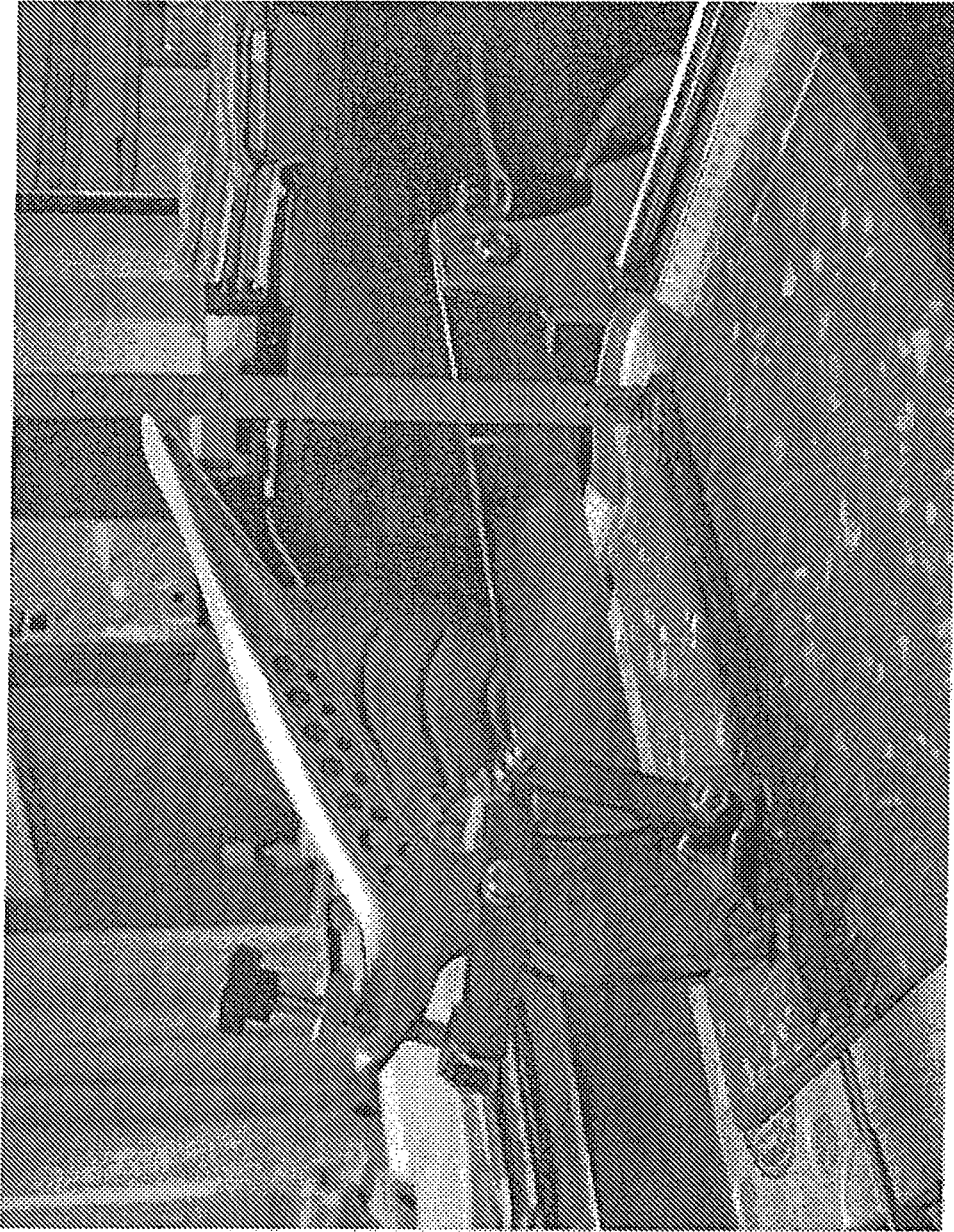


Fig. 4

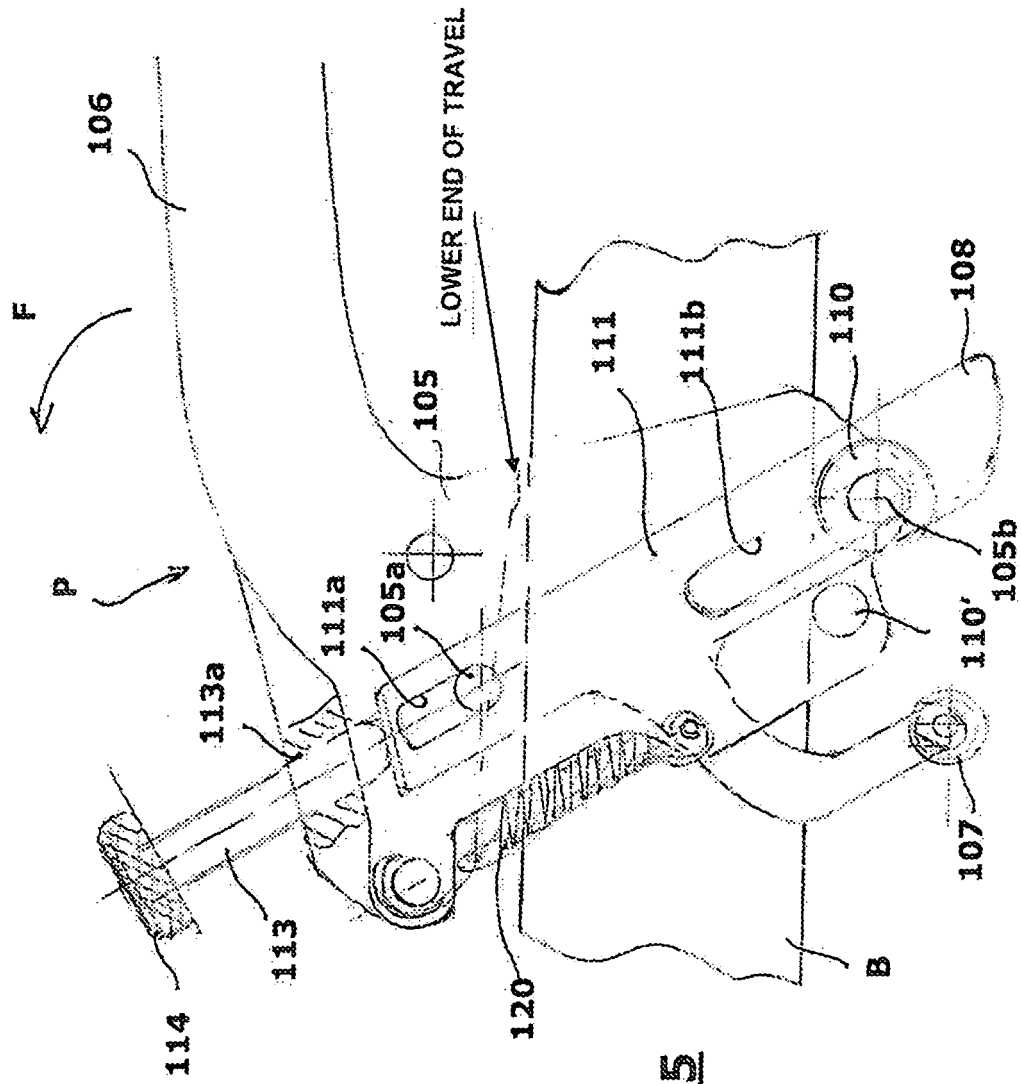
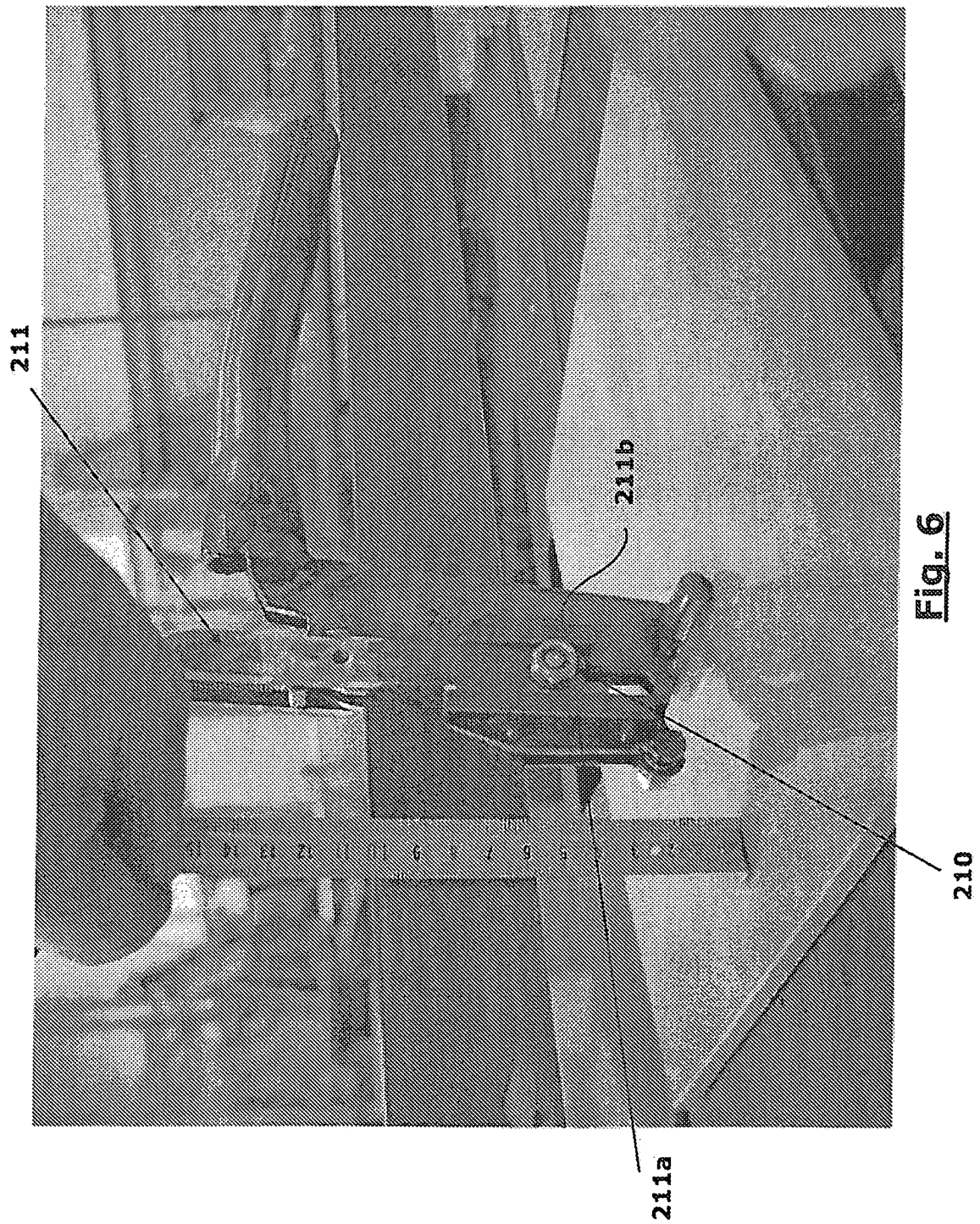


Fig. 5



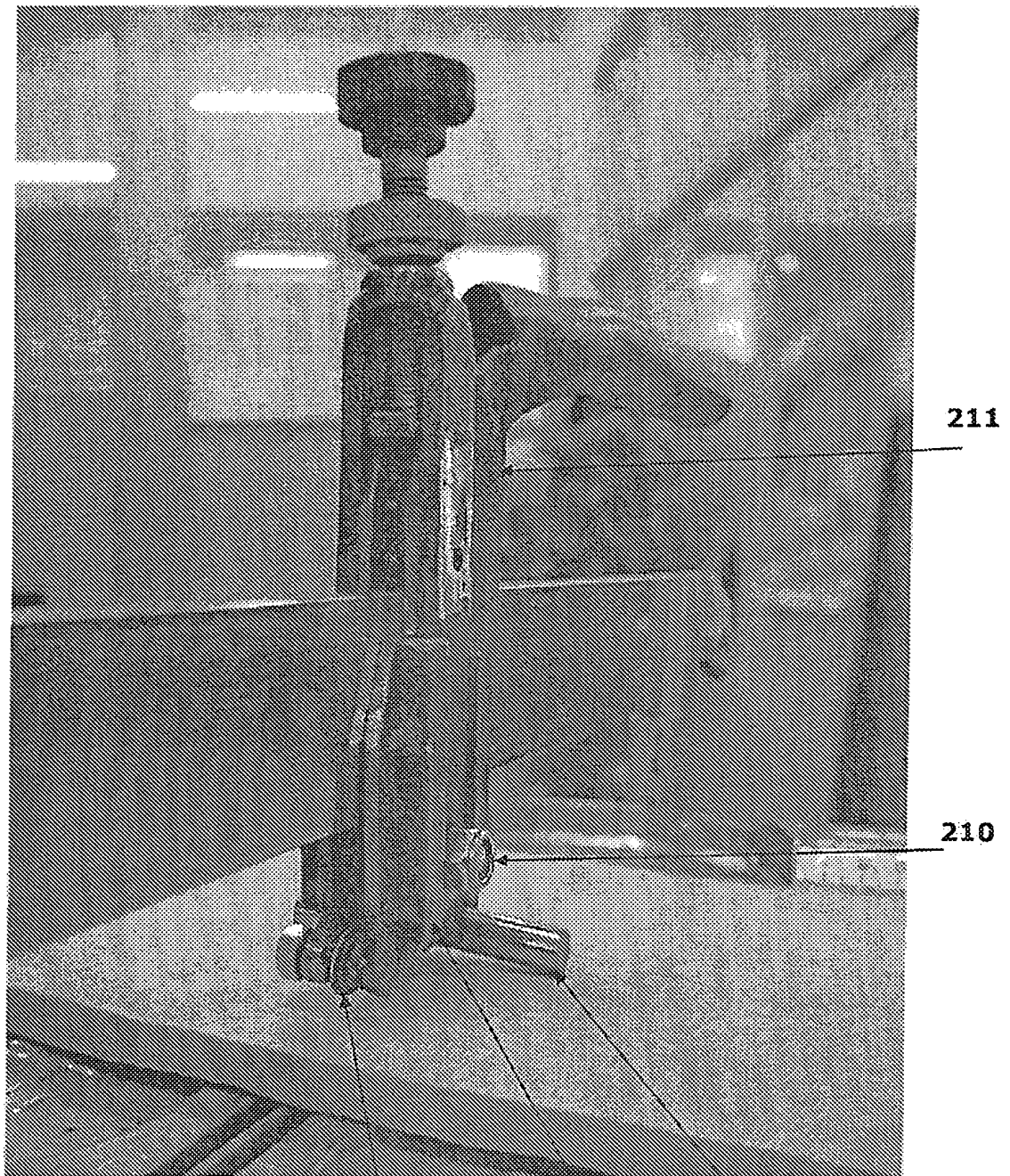


Fig. 7

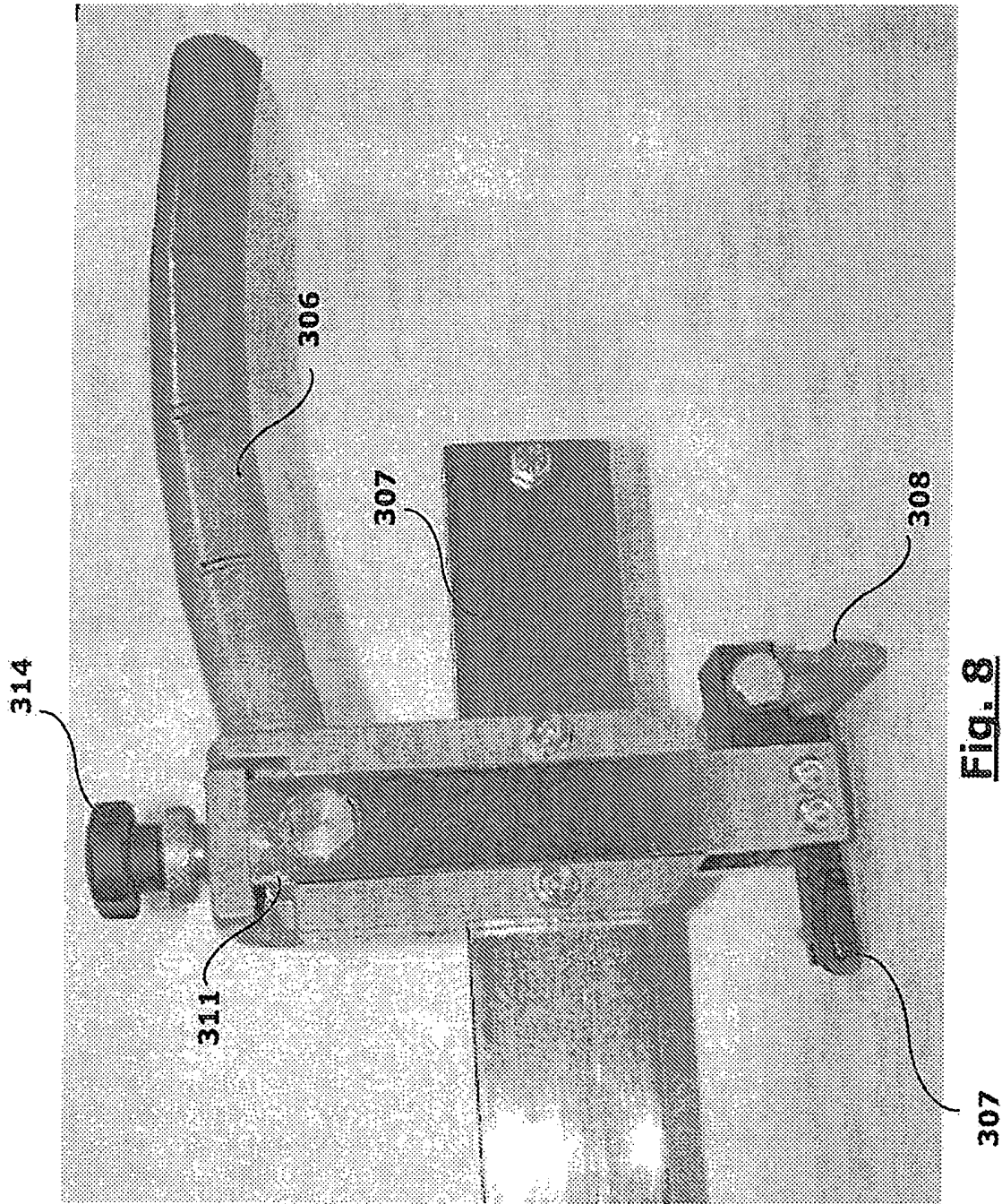
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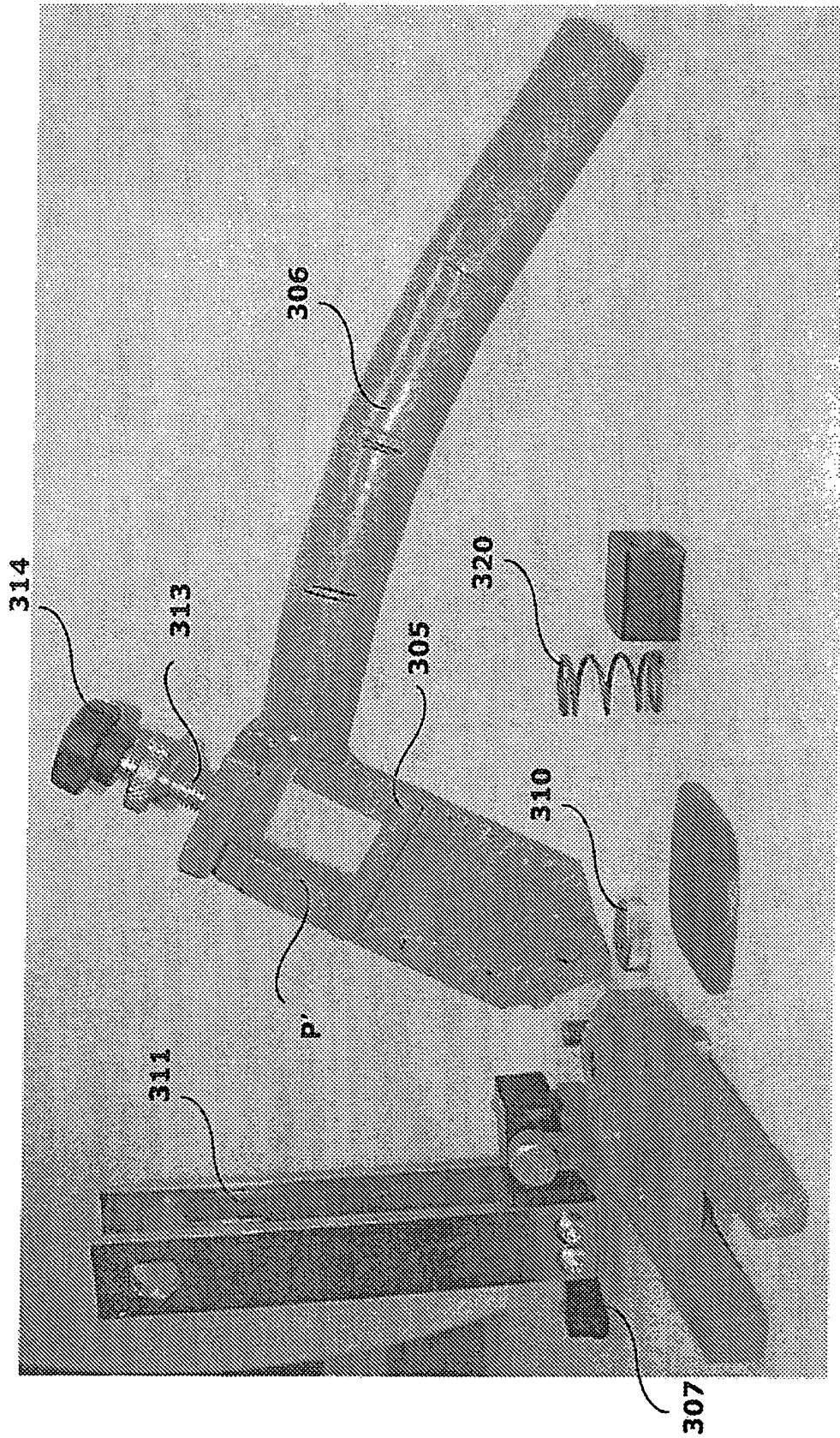


Fig. 9

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 216707 A1 [0014]