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(54) APPARATUS FOR WORKING METALLIC BODIES

VORRICHTUNG ZUR BEARBEITUNG METALLISCHER KÖRPER

APPAREIL DE TRAITEMENT DE CORPS MÉTALLIQUES

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Description

[0001] The present invention relates to an apparatus for working metallic bodies, such as for example cylindrical metallic containers for spray cans or aerosol cans, according to the preamble of claim 1. Apparatuses are known for working containers, typically made of aluminum or steel and constituted by blanks having a cylindrical cross-section, obtained by extrusion or drawing and provided, at a longitudinal end, with a bottom wall and, at the opposite end, with a free edge on which a tapering operation is to be performed in order to obtain usually a mouth on which for example a thread adapted to be associated with a plug for closing the container or a rim is provided.

[0002] Usually, these apparatuses are constituted by a supporting frame for a carousel that can rotate intermittently about a main rotation axis and forms, at its peripheral region, a plurality of supporting seats for the respective metallic bodies to be worked, which are fed to the carousel by means of a feeder.

[0003] Furthermore, the apparatus comprises a front table which is parallel to the carousel and faces it, and can move with an alternating translational motion along a direction that is substantially parallel to the main axis of rotation of the carousel.

[0004] In particular, the front table supports a plurality of working stations, which are intended to engage sequentially the metallic bodies supported by the carousel.

[0005] The apparatus is provided with a motor, which is connected, by way of kinematic connection means that comprise, among others, a rod-and-crank assembly, both to an elongated element, which supports the front table for the movement of said front table with an alternating motion, and to the carousel in order to allow its intermittent rotation about the main rotation axis.

[0006] Typically, the supporting frame is provided with a footing that supports the elongated element in a cantilever arrangement.

[0007] This embodiment does not always ensure sufficient rigidity to the apparatus and in many cases forces the provision of expensive technical solutions to ensure correct relative motion between the supporting frame and the elongated element.

[0008] In other known solutions the supporting frame comprises two lateral uprights, which are arranged on opposite sides with respect to the front table and are adapted to support slidably the elongated element.

[0009] In order to ensure the relative movement of the elongated element with respect to the uprights bearings are provided which however are complicated to fit and are expensive.

[0010] FR2912332 discloses a machine for shaping the side wall of a metal container, such as a can for an aerosol spray can or a bottle, comprising

- a frame carrying a column driven by means of a first actuator in an alternating translational motion;

- a first base holder plate extending perpendicularly to the column, holding bases evenly distributed over the circumference thereof, and driven by means of a second actuator in a discontinuous rotational motion around the axis of the column, the bases being intended to receive the blanks of the metal containers;

- a tool holder plate extending perpendicularly to the column, integral with said column, and comprising on the face thereof oriented towards the first base holder plate, seats allowing to fasten a die or any other tool adapted to deform the transverse wall of a blank opposite the bases of the first base holder plate; and

- a second base holder plate, placed so that together with the first base holder plate it mounts the tool holder plate, also holding bases evenly distributed over the circumference thereof, and driven by means of a third actuator in a discontinuous rotational motion around the axis of the column;

- the tool holder plate also comprising on the face thereof oriented towards the second base holder plate, seats allowing to fasten a die or any other tool adapted for deforming the transverse wall of a blank opposite the bases of the second base holder plate.

[0011] The aim of the present invention is to solve the problems and obviate the drawbacks described above, by providing an apparatus for working metallic bodies by plastic deformation that is extremely reliable in use.

[0012] Another object of the present invention is to provide an apparatus for working metallic bodies by plastic deformation that has a competitive production cost, so as to make its use advantageous also from the economic standpoint.

[0013] This aim, as well as these and other objects that will become better apparent hereinafter are achieved by an apparatus for working metallic bodies by plastic deformation according to the provisions of claim 1.

[0014] Further characteristics and advantages of the invention will become better apparent from the description of some preferred but not exclusive embodiments of an apparatus for working metallic bodies by plastic deformation according to the invention, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figure 1 is a top view of an apparatus for working metallic bodies by plastic deformation according to the invention;

Figure 2 is a longitudinal sectional view of the apparatus shown in Figure 1.

[0015] The present invention relates to an apparatus,

generally designated by the reference numeral 1, for working metallic bodies by plastic deformation.

[0016] The apparatus 1 comprises a supporting frame 2 for a carousel 3 that can rotate intermittently about a main rotation axis 100.

[0017] The carousel 3 forms a plurality of supporting seats 3a for respective metallic bodies to be worked, which are fed to the carousel 3 by means of a feeder 20.

[0018] Conveniently, the worked parts are unloaded from the carousel 3 by means of an unloading device 21. According to the invention, the supporting seats 3a are arranged substantially at the peripheral region of the carousel 3 and are mutually angularly spaced evenly about the main rotation axis 100.

[0019] The apparatus 1 comprises further a front table 5, which can move with an alternating translational motion along a direction that is substantially parallel to the main rotation axis 100 of the carousel 3, as indicated by the arrow 101.

[0020] The front table 5 supports a plurality of working stations, which are intended to engage sequentially the metallic bodies supported by the carousel 3.

[0021] The front table 5 is moved with an alternating translational motion and the carousel 3 is moved intermittently about the main rotation axis 100.

[0022] There can be a single motor for moving the front table 5 and the carousel 3 or two motors, one motor for the movement of the front table 5 and one for the movement of the carousel 3.

[0023] With particular reference to the embodiment according to the invention shown in Figure 2, the front table 5 is supported by a longitudinal element 6 that is extended substantially parallel to the main rotation axis 100.

[0024] According to the present invention, the supporting frame 2 comprises a first lateral supporting element and at least one second lateral supporting element 8, 9 for the longitudinal element 6, which are arranged on opposite sides with respect to the front table 5.

[0025] In greater detail, between the first and second supporting elements 8, 9 and the longitudinal element 6 there is at least one respective guiding element 10 that is extended substantially parallel to the rotation axis 100. According to the invention, the supporting frame 2 comprises at least two guiding elements 10, which are angularly spaced between each supporting element 8, 9 and the longitudinal element 6.

[0026] In particular, the at least two guiding elements 10 are mutually angularly spaced about the rotation axis 100.

[0027] Preferably, the supporting frame 2 has at least three guiding elements 10, which are angularly mutually spaced between each supporting element 8, 9 and the longitudinal element 6.

[0028] With reference to the embodiment shown in the figures, the supporting frame is provided with four guiding elements 10, which are angularly mutually spaced (by 90° about the longitudinal axis of the longitudinal element 6) and are arranged between each supporting element

8, 9 and the longitudinal element 6.

[0029] The supporting elements 8, 9 conveniently comprise a central element 9 that is arranged proximate to a rod-and-crank assembly 12 that is connected kinematically to the longitudinal element 6 and is intended for its movement, and an end element 8.

[0030] In greater detail, and according to the invention, the guiding elements 10 comprise at least one first longitudinal guiding portion 10a, which is integral with the longitudinal element 6, and such first longitudinal guiding portion 10a can be engaged slidingly by a respective first longitudinal seat 10b defined on the respective supporting element 8, 9.

[0031] The longitudinal seat 10b preferably comprises a slider, preferably of the ball or roller type.

[0032] Conveniently, the apparatus 1 comprises means for adjusting the position of the front table 5 along the extension of the longitudinal element 6.

[0033] In particular, the adjustment means comprise at least one adjustment guide 11 that is extended between the longitudinal element 6 and the front table 5 and is extended substantially parallel to the rotation axis 100.

[0034] In this regard, there are means for locking the movement of the front table 5 along the adjustment guide or guides 11. According to the invention, the apparatus comprises at least two adjustment guides 11 which are angularly spaced and are extended between the longitudinal elements 6 and the front table 5.

[0035] Preferably, the apparatus is provided with at least three adjustment guides which are angularly mutually spaced and are extended between the longitudinal element 6 and the front table 5.

[0036] With reference to the embodiment shown in the figures, the apparatus is provided with four adjustment guides 11, which are angularly mutually spaced (by 90° about the longitudinal axis of the longitudinal element 6) and are arranged between the longitudinal element 6 and the front table 5.

[0037] According to the invention, the adjustment guide 11 comprises at least one second longitudinal guiding portion 12a that is integral with the longitudinal element 6 and can engage slidingly in a respective second longitudinal seat 12b defined on the front table 5.

[0038] Such longitudinal seat 10b also is constituted preferably by a slider, preferably of the ball or roller type.

[0039] Conveniently, the first guiding portion 10a and the second guiding portion 12a are defined on an elongated element that is extended parallel to the rotation axis 100.

[0040] With reference to the embodiment shown in Figure 2, the supporting elements 8, 9 comprise a respective first and second upright elements.

[0041] Advantageously, the first and second upright elements are mutually connected by at least one longitudinal connecting body.

[0042] The longitudinal connecting body comprises a connecting crossmember.

[0043] In practice it has been found that the invention has achieved the intended aim and objects in all of the embodiments.

[0044] In practice, the dimensions may be any according to requirements and to the state of the art.

Claims

1. An apparatus (1) for working metallic bodies by plastic deformation, comprising a supporting frame (2) for a carousel (3) that can rotate intermittently about a main rotation axis (100) and defines a plurality of supporting seats (3a) for respective metallic bodies to be worked (4), which are fed to said carousel (3) by means of a feeder, a front table (5) being provided which can move with an alternating translational motion along a direction that is substantially parallel to said main rotation axis (100) of said carousel (3), said front table (5) supporting a plurality of working stations (5a) intended to engage sequentially the metallic bodies (4) supported by said carousel (3), said front table being supported by a longitudinal element (6) that is extended substantially parallel to said main rotation axis (100), said supporting frame (2) comprising a first lateral supporting element and at least one second lateral supporting element (8, 9) for said longitudinal element (6) which are arranged on opposite sides with respect to said front table (5), between said first supporting element and said second supporting element (8, 9) and said longitudinal element (6) there being at least one respective guiding element (10) that is extended substantially parallel to said rotation axis (100), the apparatus comprising at least two said guiding elements (10) that are angularly spaced between each supporting element (8, 9) and said longitudinal element (6), said guiding elements (10) comprising at least one first longitudinal guiding portion (10a) that is integral with said longitudinal element (6) and can engage slidingly in a respective first longitudinal seat (10b) defined on the respective supporting element (8, 9), the apparatus further comprising means for adjusting the position of said front table (5) along the extension of said longitudinal element (6), said adjustment means comprising at least one adjustment guide (11) that is extended between said longitudinal element (6) and said front table (5) that is extended substantially parallel to said rotation axis (100), the apparatus **characterised by** comprising at least two said adjustment guides (11) that are angularly spaced and are extended between said longitudinal element (6) and said front table (5), said adjustment guides (11) comprising at least one second longitudinal guiding portion (12a) that is integral with said longitudinal element (6) that can engage slidingly in a respective second longitudinal seat (12b) defined on the front table (5).

2. The apparatus (1) according to claim 1, **characterized in that** it comprises four guiding elements (10) that are angularly mutually spaced between each supporting element (8, 9) and said longitudinal element (6).
3. The apparatus (1) according to one or more of the preceding claims, **characterized in that** it comprises means for the movement of said front table (5) along said adjustment guide (11) and means for locking in position said front table (5) along said adjustment guide (11).
4. The apparatus (1) according to one or more of the preceding claims, **characterized in that** it comprises four adjustment guides (11) that are mutually angularly spaced and are extended between said longitudinal element (6) and said front table (5).
5. The apparatus (1) according to one or more of the preceding claims, **characterized in that** said first guiding portion and said second guiding portion are defined on an elongated body that is extended parallel to said rotation axis (100).
6. The apparatus (1) according to one or more of the preceding claims, **characterized in that** said supporting elements (8, 9) comprise respective first and second upright elements.
7. The apparatus (1) according to one or more of the preceding claims, **characterized in that** said first and second upright elements are mutually connected by at least one longitudinal connecting body.
8. The apparatus (1) according to one or more of the preceding claims, **characterized in that** said at least one longitudinal connecting body comprises a connecting crossmember.

Patentansprüche

1. Ein Apparat (1) zum Bearbeiten von metallischen Körpern durch plastische Deformation, umfassend einen Stützrahmen (2) für ein Karussell (3), das intermittierend um eine Hauptrotationsachse (100) rotieren kann und eine Vielzahl von tragenden Aufnahmen (3a) definiert für entsprechende metallische Körper, die bearbeitet werden sollen (4), welche auf das genannte Karussell (3) mit Hilfe einer Aufgabevorrichtung aufgegeben werden, eine Vorderplatte (5), die bereitgestellt wird, welche sich mit einer abwechselnden translationalen Bewegung entlang einer Richtung bewegen kann, die im Wesentlichen parallel zu der genannten Hauptrotationsachse (100) von dem genannten Karussell (3) ist, wobei die genannte Vorderplatte (5) eine Vielzahl von Ar-

beitsstationen (5a) trägt, die dafür vorgesehen sind nacheinander die metallischen Körper (4), die von dem genannten Karussell (3) getragen werden, einzulegen, wobei die genannte Vorderplatte durch ein längsstehendes Element (6) gestützt wird, das im Wesentlichen parallel zu der genannten Hauptrotationsachse (100) verlängert ist, wobei der Stützrahmen (2) ein erstes seitliches Stützelement und mindestens ein zweites seitliches Stützelement (8, 9) für das genannte längsstehende Element (6) umfasst, welche auf gegenüberliegenden Seiten in Bezug auf die genannte Vorderplatte (5) angeordnet sind, wobei zwischen dem genannten ersten stützenden Element und dem genannten zweiten stützenden Element (8, 9) und dem genannten längsstehenden Element (6) es mindestens ein entsprechendes Führungselement (10) gibt, das im Wesentlichen parallel zu der genannten Rotationsachse (100) verlängert ist, wobei der Apparat mindestens zwei der genannten Führungselemente (10) umfasst, die winkelig beabstandet sind zwischen jedem Stützelement (8, 9) und dem genannten längsstehenden Element (6), wobei die genannten Führungselemente (10) mindestens einen ersten längsstehenden Führungsanteil (10a) umfassen, der fest verbaut ist mit dem genannten längsstehenden Element (6) und schiebbar in eine entsprechende erste längsstehende Aufnahme (10b), definiert auf dem entsprechenden Stützelement (8, 9) eingreifen kann, wobei der Apparat weiter Mittel umfasst, zum Einstellen der Position der genannten Vorderplatte (5) entlang der Verlängerung des genannten längsstehenden Elements (6), wobei das genannte Einstellungsmittel mindestens eine Einstellungsführung (11) umfasst, die sich zwischen dem genannten längsstehenden Element (6) und der genannten Vorderplatte (5) erstreckt, welche im Wesentlichen parallel zu der genannten Rotationsachse (100) verlängert ist, wobei der Apparat **dadurch gekennzeichnet ist, dass**

er mindestens zwei der genannten Einstellungsführungen (11) umfasst, die winkelig beabstandet sind und sich zwischen dem genannten längsstehenden Element (6) und der genannten Vorderplatte (5) erstrecken, wobei die Einstellungsführungen (11) mindestens einen zweiten längsstehenden Führungsanteil (12a) umfassen, der fest verbaut ist mit dem genannten längsstehenden Element (6), das schiebbar in eine entsprechende zweite längsstehende Aufnahme (12b) definiert auf der Vorderplatte (5) eingreifen kann.

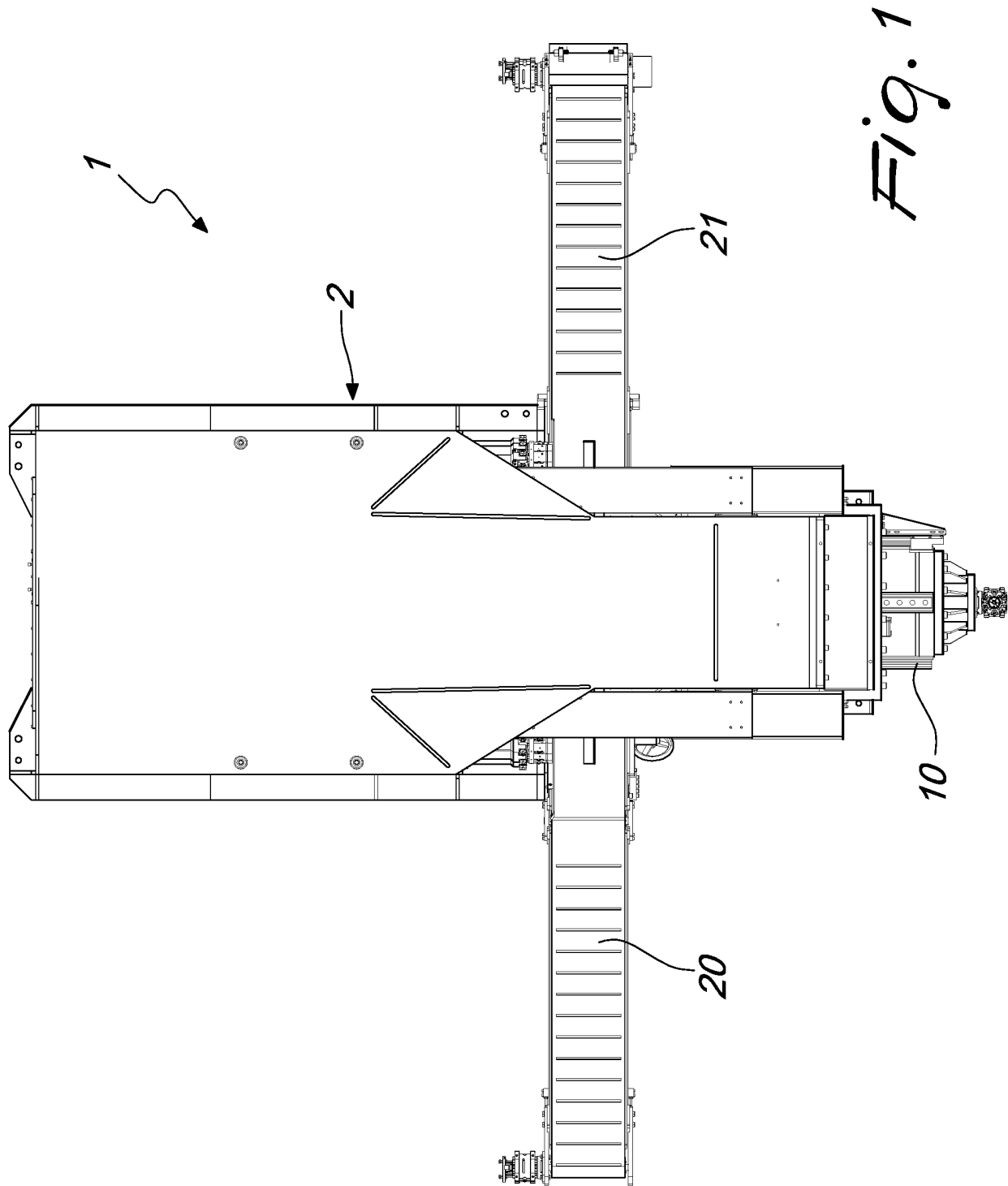
2. Der Apparat (1) gemäß Anspruch 1, **dadurch gekennzeichnet, dass** er vier Führungselemente (10) umfasst, die winkelig beidseitig zwischen jedem Stützelement (8, 9) und dem genannten längsstehenden Element (6) beabstandet sind.

3. Der Apparat (1) gemäß einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** er Mittel für die Bewegung der genannten Vorderplatte (5) entlang der Einstellungsführung (11) und Mittel zum Fixieren der Vorderplatte (5) entlang der Einstellungsführung (11) umfasst.
4. Der Apparat (1) gemäß einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** er vier Einstellungsführungen (11) umfasst, die beidseitig winkelig beabstandet sind und zwischen dem genannten längsstehenden Element (6) und der genannten Vorderplatte (5) verlängert sind.
5. Der Apparat (1) gemäß einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der genannte erste Führungsanteil und der genannte zweite Führungsanteil auf einem ausgedehnten Körper definiert sind, der parallel zu der genannten Rotationsachse (100) verlängert ist.
6. Der Apparat (1) gemäß einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die genannten Stützelemente (8, 9) entsprechende erste und zweiten aufrechte Elemente umfassen.
7. Der Apparat (1) gemäß einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die genannten ersten und zweiten aufrechten Elemente beidseitig durch mindestens einen längsstehenden Verknüpfungskörper verknüpft sind.
8. Der Apparat (1) gemäß einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der genannte mindestens eine längsstehende Verknüpfungskörper eine verknüpfende Querstrebe umfasst.

Revendications

1. Dispositif (1) pour façonner des corps métalliques par déformation plastique, comportant une structure de support (2) pour un carrousel (3) qui peut tourner par intermittence autour d'un axe de rotation principal (100) et définit une pluralité de logements de support (3a) pour des corps métalliques respectifs à façonner (4), lesquels sont acheminés jusqu'audit carrousel (3) à l'aide d'un chargeur, une table avant (5) mobile avec un mouvement de déplacement alterné dans une direction sensiblement parallèle audit axe de rotation principal (100) dudit carrousel (3) étant présente, ladite table avant (5) supportant une pluralité de postes de façonnage (5a) destinés à venir successivement au contact des corps métalliques

- (4) supportés par ledit carrousel (3), ladite table avant étant supportée par un élément longitudinal (6) qui s'étend sensiblement parallèlement audit axe de rotation principal (100), ladite structure de support (2) comprenant un premier élément de support latéral et au moins un deuxième élément de support latéral (8, 9) pour ledit élément longitudinal (6) qui sont disposés de part et d'autre de ladite table avant (5), entre ledit premier élément de support et ledit deuxième élément de support (8, 9) et ledit élément longitudinal (6) se trouvant au moins un élément de guidage respectif (10) qui s'étend sensiblement parallèlement audit axe de rotation (100), le dispositif comportant au moins deux dits éléments de guidage (10) espacés obliquement entre chaque élément de support (8, 9) et ledit élément longitudinal (6), lesdits éléments de guidage (10) comprenant au moins une première partie de guidage longitudinale (10a) qui fait corps avec ledit élément longitudinal (6) et peut venir par coulissement au contact d'un premier logement longitudinal respectif (10b) défini sur l'élément de support respectif (8, 9), le dispositif comportant en outre des moyens pour régler la position de ladite table avant (5) tout le long dudit élément longitudinal (6), lesdits moyens de réglage comprenant au moins un guide de réglage (11) qui s'étend entre ledit élément longitudinal (6) et ladite table avant (5) qui s'étend sensiblement parallèlement audit axe de rotation (100), le dispositif étant **caractérisé en ce qu'il** comporte au moins deux dits guides de réglage (11) qui sont espacés obliquement et s'étendent entre ledit élément longitudinal (6) et ladite table avant (5), lesdits guides de réglage (11) comprenant au moins une deuxième partie de guidage longitudinale (12a) qui fait corps avec ledit élément longitudinal (6) qui peut s'engager par coulissement dans un second logement longitudinal respectif (12b) défini sur la table avant (5).
2. Dispositif (1) selon la revendication 1, **caractérisé en ce qu'il** comporte quatre éléments de guidage (10) espacés obliquement les uns des autres entre chaque dit élément de support (8, 9) et ledit élément longitudinal (6).
3. Dispositif (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce qu'il** comporte des moyens pour le déplacement de ladite table avant (5) le long dudit guide de réglage (11) et des moyens pour immobiliser ladite table avant (5) le long dudit guide de réglage (11).
4. Dispositif (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce qu'il** comporte quatre guides de réglage (11) qui sont espacés obliquement les uns des autres et s'étendent entre ledit élément longitudinal (6) et ladite table avant (5).
5. Dispositif (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ladite première partie de guidage et ladite deuxième partie de guidage sont définies sur un corps allongé qui s'étend parallèlement audit axe de rotation (100).
6. Dispositif (1) selon une ou plusieurs des revendications précédentes, caractérisé en ce lesdits éléments de support (8, 9) comprennent des premier et second éléments verticaux respectifs.
7. Dispositif (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** lesdits premier et second éléments verticaux sont reliés l'un à l'autre par au moins un corps de liaison longitudinal.
8. Dispositif (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit/lesdits corps de liaison longitudinal/aux comprend/comprennent un élément de liaison transversal.



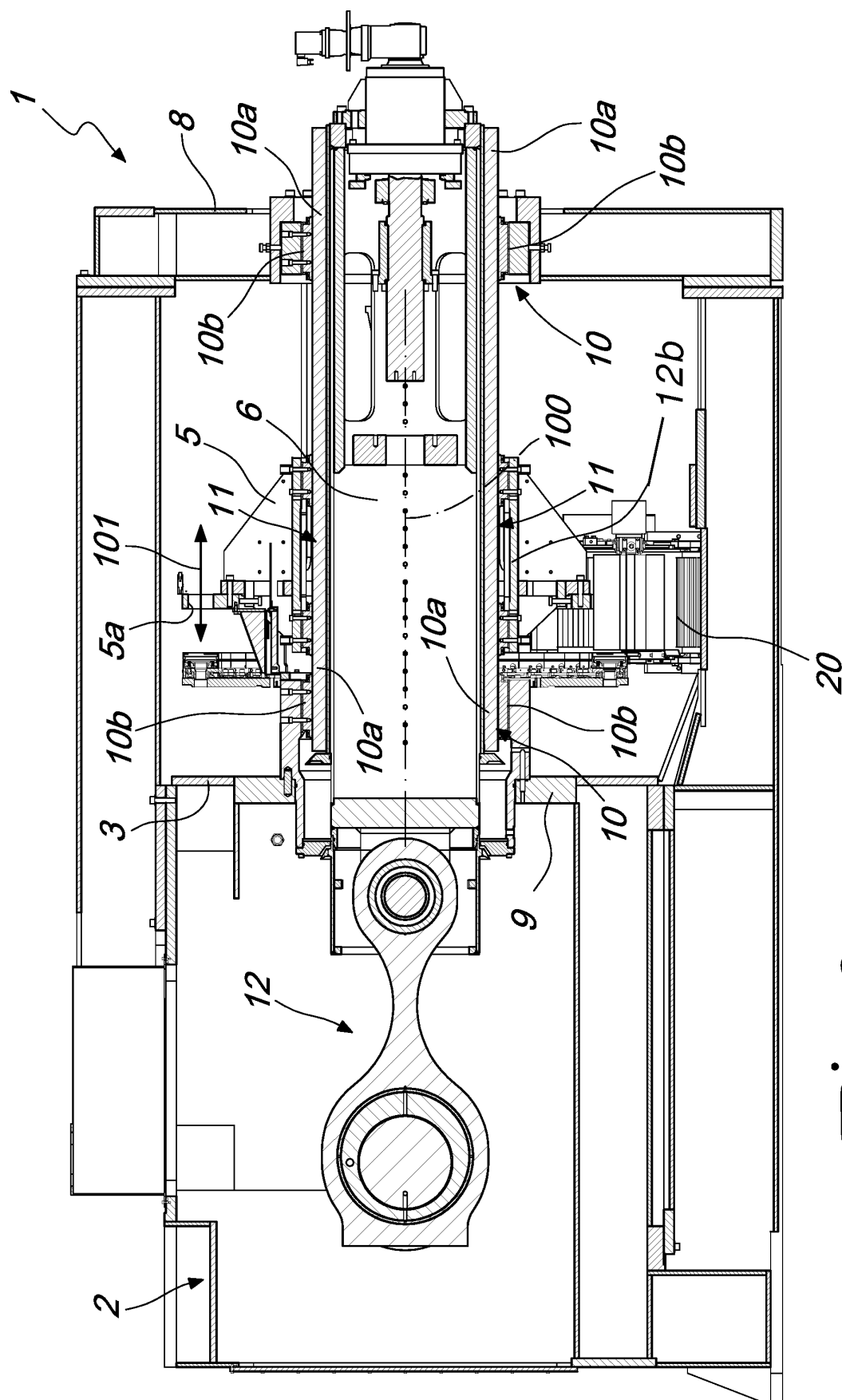


Fig. 2

REFERENCES CITED IN THE DESCRIPTION

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