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(54) **A device for lifting vehicles**

(57) A device (1) for lifting vehicles, comprising: a support frame (10) for supporting a guide column (22), a supporting platform (30) for the vehicle associated to the guide column (22) and able to slide along the axis of the column, and sliding activating means (60) of the support platform (30) on the guide column (22); wherein the support platform (30) is hinged to a connecting element (40) which is slidably coupled to the guide column (22), wherein the hinge axis between the platform (30) and the connecting element (40) is arranged perpendicularly to the axis of the guide column (22), wherein the support platform (30) comprises an abutting element (52) able to remain in contact with the external surface of the guide column (22) during the sliding of the support platform (30), and wherein the external surface of the guide column (22) is tapered in proximity of and towards the base of the guide column (22).

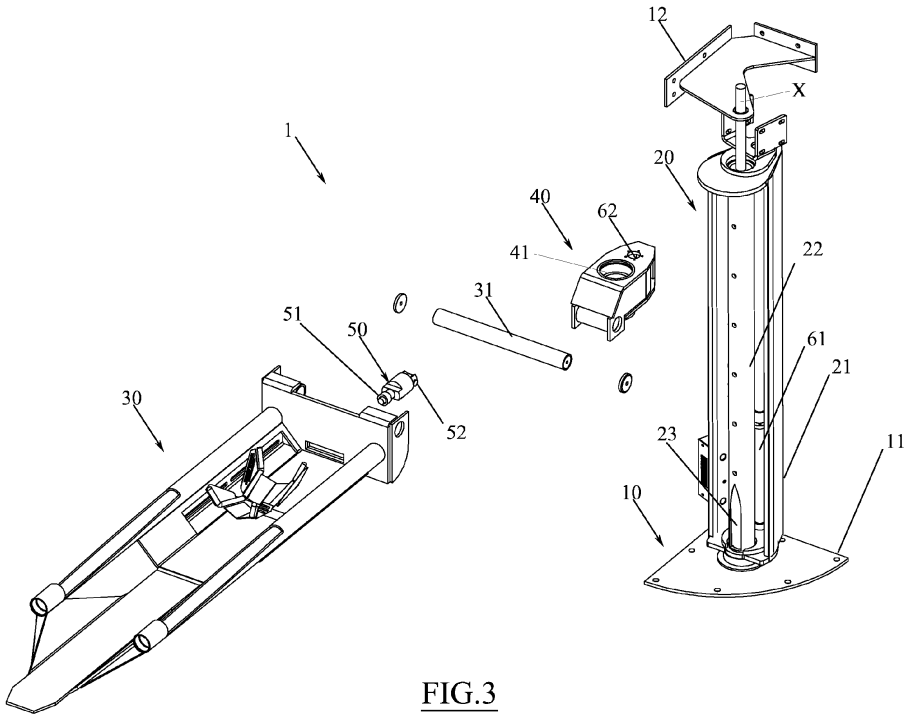


FIG.3

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Description

TECHNICAL FIELD

[0001] The present invention relates to a device for lifting vehicles, such as motor vehicles, motor cars, quad bikes and others besides.

BACKGROUND ART

[0002] As is known, garages, especially in tenements and in particular in large cities, are often small environments, sufficient for parking one motor car only but not suitable for contemporary parking of more than one vehicle, such as for example a motor car and a motor cycle or a quad bike.

[0003] With the aim of obviating this drawback, solutions have been proposed that involve use of a device for lifting vehicles, which comprises: a support frame able to support a guide column, a support platform of the vehicle, associated projectingly to the guide column and able to slide along the axis of the column, and sliding activating means of the support platform on the column. Thanks to these devices, it is thus possible to park a first vehicle on the support platform and raise it from the floor, freeing-up underlying space for parking a second vehicle too, such as a motor car.

[0004] Lift devices such as the one described above can also be used in repair workshops, with the aim of lifting the vehicle from the ground and enabling operators to perform the necessary maintenance operations.

[0005] A drawback of these lift devices consists, however, in the fact that due to the weight of the vehicle the support platform is subjected to a strong flexure stress which tends to incline it from above in a downwards direction with respect to the guide column; this also causes the vehicle to tilt and in this way the stability thereof is reduced.

[0006] To reduce this drawback, the guide column is generally coupled to one of the long sides of the support platform, about halfway along the length thereof, such as to limit the projecting dimension of the support platform.

[0007] This arrangement however increases the overall volume of the device and makes the loading operations of the motor vehicle on the platform complex, also in consideration of the limited manoeuvring spaces internally of garages and/or maintenance and repair workshops.

[0008] A further known solution is to mount the support platform on the guide column such that the support platform is normally inclined upwards. In this way, when the vehicle is loaded onto the support platform, the platform flexes downwards and thus tends to assume a horizontal configuration.

[0009] A drawback of this solution consists however in the fact that when the support platform is lowered to receive the vehicle, the end thereof is raised from the ground, primarily creating a poor visual effect and further requiring the application of appropriate inclined pedestals such as to enable loading the vehicle onto the platform.

[0010] An aim of the present invention is to obviate the above-mentioned drawbacks in the prior art, with a solution that is simple, rational and relatively inexpensive.

[0011] The aims are attained by the characteristics of the invention as reported in the independent claim. The dependent claims delineate preferred and/or especially advantageous aspects of the invention.

DISCLOSURE OF INVENTION

[0012] In particular, the invention discloses a device for lifting vehicles which comprises:

a support frame for supporting
a guide column,
a supporting platform for the vehicle associated to the guide column and able to slide along the axis of the column, and
sliding activating means of the guide platform on the guide column,
wherein the support platform is hinged to a connecting element which is slidably coupled to the guide column,
wherein the hinge axis between the platform and the connecting element is arranged perpendicularly to the axis of the guide column,
wherein the support platform comprises an abutting element able to remain in contact with the external surface of the guide column during the sliding of the support platform and,
wherein the external surface of the guide column is tapered in proximity of and towards the base of the guide column, i.e. it is inclined from above in a downwards direction such as to near the axis of the column.

[0013] Thanks to this solution, the platform is able to slide along the guide column while varying the inclination thereof according to the conformation of the guide column itself. In particular, when at the base of the column, the support platform is tilted in a downwards direction so that the free end thereof is in contact with the floor surface, thus facilitating the loading of the vehicle. When raised, the platform can return automatically into the horizontal position.

[0014] In a further aspect of the invention, the support platform comprises regulating means of the inclination of the support platform.

[0015] Thanks to this solution it is possible to modify the inclination of the platform such as to prevent drawbacks due to the weight of the vehicle, and in particular such as to compensate for the flexion of the platform due to the vehicle's weight.

[0016] In a further aspect of the invention, the regulat-

ing means are able to vary the position of the above-mentioned abutting element with respect to the support platform in a perpendicular direction to the hinge axis.

[0017] By varying the position of the abutting element it is advantageously possible to create a preload which compensates for the weight of the vehicle, thus guaranteeing that the raised platform is perfectly horizontal, or nearly so.

[0018] By way of example, the regulating means can comprise at least a regulating screw rotatably coupled to the platform and solidly constrained to the abutting element.

[0019] In this way the regulation of the inclination of the platform is obtained with a solution that is simple and economical.

[0020] In a further aspect of the invention, the support platform has a prevalent dimension along a predetermined longitudinal direction and is associated to the guide column such that the prevalent dimension is projecting with respect to the guide column.

[0021] In this way the volume of the whole lift device is optimised.

[0022] In a further aspect of the invention, the guide column and the support platform are coupled such as to rotate solidly with respect to the support frame about a parallel axis to the axis of the guide column.

[0023] In this way the platform can be orientated such as to facilitate the lifting and lowering manoeuvres of the vehicle. In particular, it is possible to orientate the platform at the centre of the garage, when it is lowered to receive the vehicle. After the vehicle has been lifted, the platform can then be swivelled such as to place the vehicle against a wall, reducing space taken up thereby. In a further aspect of the invention, the sliding activating means comprise a linear actuator.

[0024] The linear actuator can comprise, for example, a screw parallel to the axis of the column and able to rotate about the axis thereof and a nut screw solidly constrained to the support platform.

[0025] The screw can be activated, for example, by a suitable electric motor.

[0026] In this way the sliding of the platform (i.e. the lifting and lowering of the motorcycle) is obtained by means of a simple, effective and precise mechanism.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] Further characteristics and advantages of the invention will emerge from a reading of the following description, provided by way of non-limiting example, with the aid of the figures illustrated in the accompanying tables of drawings.

Figure 1 is an axial section of the device with the platform in the lowered position.

Figure 2 is an axial section of the device with the platform in a raised position.

Figure 3 is an exploded view of the device.

Figure 4 is an axial section of the regulating means.

BEST WAY OF CARRYING OUT THE INVENTION

[0028] With particular reference to figure 3, 1 denotes in its entirety a device for lifting vehicles, such as for example motor cycles, quad bikes, motor cars or others besides, which is particularly suitable for being located in the garage of a dwelling such as to be used as a vehicle park.

[0029] The device 1 is provided with a support frame 10, which comprises a base 11 able to be rested on the floor, and an upper bracket 12 fixable to the garage wall. The bracket 12 is advantageously fixable to the corner walls of the garage, so as to occupy as small a space as possible. A vertically-developing upright, denoted in its entirety by numeral 20, is rotatably associated to the support frame 10. In particular, the upright 20 is interposed between the base 11 and the bracket 12 and is rotatably coupled thereto, such as to be rotatable about a vertical rotation axis X.

[0030] The upright 20 comprises a casing 21 able to enclose a central guide column 22, the axis of which coincides with the rotation axis X of the whole upright 20. The guide column 22 is cylindrical and is rotatably coupled to the frame 10, solidly constrained to the casing 21. The lower end of the guide column 22 is advantageously tapered such as to become narrower towards the base 11. In particular, the guide column 22 comprises a portion of external surface 23, which is inclined from above in a downwards direction such as to near the axis X of the column. The inclined surface 23 can be advantageously and economically realised by means of a milling realised at the lower end of the guide column 22. Alternatively, the inclined surface 23 can be economically realised by plastic deformation of the lower end of the guide column 22: for example two cuts can be made at the base of the column, the cuts being parallel to the axis X, such as to define a flap, which can then be bent in an internal direction of the guide column 22 and welded.

[0031] In any case, it is important that the longitudinal section of the column 22 exhibits, at the lower end thereof, an inclined profile which nears the axis X, proceeding from above in a downwards direction.

[0032] The guide column 22 is able to slidingly support a support platform 30. The support platform 30 has a generally narrow and elongate shape, the prevalent dimension of which (larger) is the one which develops longitudinally. The support platform 30 is associated to the upright 20 such that the prevalent dimension is projecting with respect to the guide column 22.

[0033] In the illustrated example, the support platform 30 is able to restingly receive a motor cycle with the wheels aligned along the prevalent dimension, i.e. in such a way that the motorcyle also substantially projects relatively to the guide column 22.

[0034] In greater detail, the support platform 30 is connected to the guide column 20 by means of a connecting

element 40, which is hinged to one of the longitudinal ends of the support platform 30 and is slidably coupled to the guide column 20. In particular, the connecting element 40 comprises a through-hole 41 able to insert on the guide column 22, realising a sliding couple. The connecting element 40 is hinged to the support platform 30 by means of a pivot 31 an axis of which is arranged perpendicularly to the axis X of the guide column 20 and the longitudinal direction of the support platform 30. In this way, the support platform 30 is able to rotate about the pivot 31, selectively inclining upwards or downwards.

[0035] The support platform 30 further comprises an abutting element 52 able to stay in continual contact on the external surface of the guide column 22 during the sliding of the platform 30. In the embodiment illustrated in the figures, the abutting element 52 is a wheel located in a position below the pivot 31, rolling in contact with the lateral surface of the guide column 22. In other embodiments, the abutting element 52 might be a simple profiled rod or any other support body.

[0036] The support platform 30 further comprises means 50 for regulating the inclination. In particular, the regulating means 50 can vary the position of the abutting element 52 on the support platform 30, displacing it into a perpendicular direction to the axis of the hinge pivot 31, i.e. in a parallel direction to the longitudinal direction of the support platform 30. In this way, as the abutting element 52 is in any case able to remain in contact with the external surface of the guide column 22, varying the position of the abutting element 52 automatically also varies the inclination of the support platform 30.

[0037] In the embodiment illustrated in figure 4, the regulating means 50 comprise a screw 51 rotatably coupled and axially constrained to the support platform 30, and arranged substantially parallel to the longitudinal direction of the platform 30. An end of the regulating screw 51 is screwed to a block 53 to which the abutting element 52 is solidly associated. An end of the regulating screw 51 is screwed to a block 53 to which the abutting element 52 is solidly associated. The opposite end of the regulating screw 51 can be associated to an activating element (not illustrated), such as for example a knob, a handle or possibly a small electric motor, for rotatingly activating the regulating screw 51. In this way, by rotating the regulating screw 51 about the axis thereof, the abutting element 52 is activated in translation along the longitudinal direction of the support platform 30, modifying the inclination thereof.

[0038] As illustrated in figures 1 and 2, the support platform 30 is activated to slide by appropriate activating means 60 contained within the casing 21.

[0039] In particular, the activating means 60 comprise a linear actuator of a screw/nut screw type. In other words, the activating means 60 comprise a threaded shaft 61, which is mounted internally of the casing 21 and is arranged parallel to the axis X of the guide column 22, and at least a nut screw 62, which is solidly associated to the connecting element 40 and screwed on the threaded shaft 61. The threaded shaft 61 can be set in rotation about the axis thereof in both directions, such as to cause a raising or a lowering of the nut screw 62 and thus of the whole support platform 30. The rotation of the threaded shaft 61 can be activated for example by an electric motor 63 mounted externally or internally of the casing 21, the drive shaft of which is mechanically connected with the threaded shaft 61.

[0040] Thanks to this coupling type, since the connecting element 40 is coupled both to the guide column 22 and to the threaded shaft 61, the support platform 30 is also solidly constrained to the guide column 20 with respect to the rotation about the axis thereof X.

[0041] In the light of what is described above, the functioning of the device 1 is as follows.

[0042] The device 1 is ready for use when the support platform 30 is in the substantially horizontal position, i.e. the prevalent longitudinal dimension is substantially perpendicular to the axis X of the guide column 22 and the abutting element 52 is in contact with the lateral surface of the column 22.

[0043] In particular, the position of the abutting element 52 is regulated with the regulating means 50 such that the support platform 30 is substantially horizontal when the abutting element 52 is in contact with the cylindrical surface of the column 22, above the inclined surface 23 (figure 2).

[0044] In this way, when the support platform 30 is lowered, the abutting element 52 follows the tapered profile of the inclined surface 23 and the support platform 30 inclines downwards (figure 1). In other words, the end of the support platform 30 hinged to the connecting element 40 is slightly raised from the ground while the opposite end is at a lower level, for example in contact with the ground. In this inclined configuration it is possible to load the vehicle onto the support platform 30 in a very simple and easy way.

[0045] When the vehicle is loaded on the support platform 30, the activating means 60 are activated and the platform 30 starts to slide along the guide column 22 upwards, up to the desired height. As the support platform 30 gradually slides upwards, the abutting element 52 follows the tapered profile of the inclined surface 23, up to returning into contact with the overlying cylindrical surface of the guide column 22. In this way, the support platform 30 progressively modifies the inclination thereof, up to newly taking on a substantially horizontal configuration.

[0046] When a predetermined raised position is reached, the support platform 60 can be swivelled about the vertical axis X of the upright 20, for example such as to near the vehicle to a wall and thus enable parking a motor car below it. It is specified that although a lift has been described that is mainly used as a parking device, a lift having the same innovative characteristics might be used for any other reason, for example in vehicle maintenance workshops.

[0047] It is further specified that although the above-

described lift is designed to raise a motor cycle, a lift having the same innovative characteristics might be designed for raising other vehicles, such as for example quad bikes, motor cars or other vehicles besides.

[0048] The invention as it is conceived is susceptible to numerous modifications and variants, all falling within the scope of the inventive concept. Further, all the details are replaceable by other technically equivalent elements. In practice, the materials used, as well as the contingent forms and dimensions, can be any according to needs, without its forsaking the protective scope of the following claims.

Claims

1. A device (1) for lifting vehicles, comprising:

a support frame (10) for supporting
a guide column (22),
a supporting platform (30) for the vehicle associated to the guide column (22) and able to slide along the axis of the column, and
sliding activating means (60) of the guide platform (22) on the guide column (22),
characterised in that the support platform (30) is hinged to a connecting element (40) which is slidably coupled to the guide column (22), wherein the hinge axis between the platform (30) and the connecting element (40) is arranged perpendicularly to the axis of the guide column (22), wherein the support platform (30) comprises an abutting element (52) able to remain in contact with the external surface of the guide column (22) during the sliding of the support platform (30), and wherein the external surface of the guide column (22) is tapered in proximity of and towards the base of the guide column (22).

2. The device (1) of claim 1, comprising regulating means (50) of the inclination of the support platform (30).

3. The device (1) of claim 2, wherein the regulating means (50) are able to vary the position of the abutting element (52) with respect to the support platform (30) in a perpendicular direction to the hinge axis.

4. The device (1) of claim 3, wherein the regulating means (50) comprise at least a regulating screw (51) rotatably coupled to the support platform (30) and solidly constrained to the abutting element (52)

5. The device (1) of claim 1, wherein the support platform (30) has a prevalent dimension along a predetermined longitudinal direction and is associated to the guide column (22) such that the prevalent dimension is projecting with respect to the guide column (22).

6. The device (1) of claim 1, wherein the guide column (22) and the support platform (30) are coupled such as to rotate solidly with respect to the support frame (10) about a parallel axis to the axis of the guide column (22).

7. The device (1) of claim 1, wherein the sliding activating means (60) comprise a linear actuator (61, 62).

8. The device (1) of claim 7, wherein the linear actuator (61, 62) comprises a screw (61) parallel to the axis of the column (22) and able to rotate about an axis thereof, and a nut screw (62) screwed on the screw (61) and solidly constrained to the support platform (30).

9. The device (1) of claim 8, wherein the sliding activating means (60) comprise an electric motor able to activate the screw (61) in rotation.

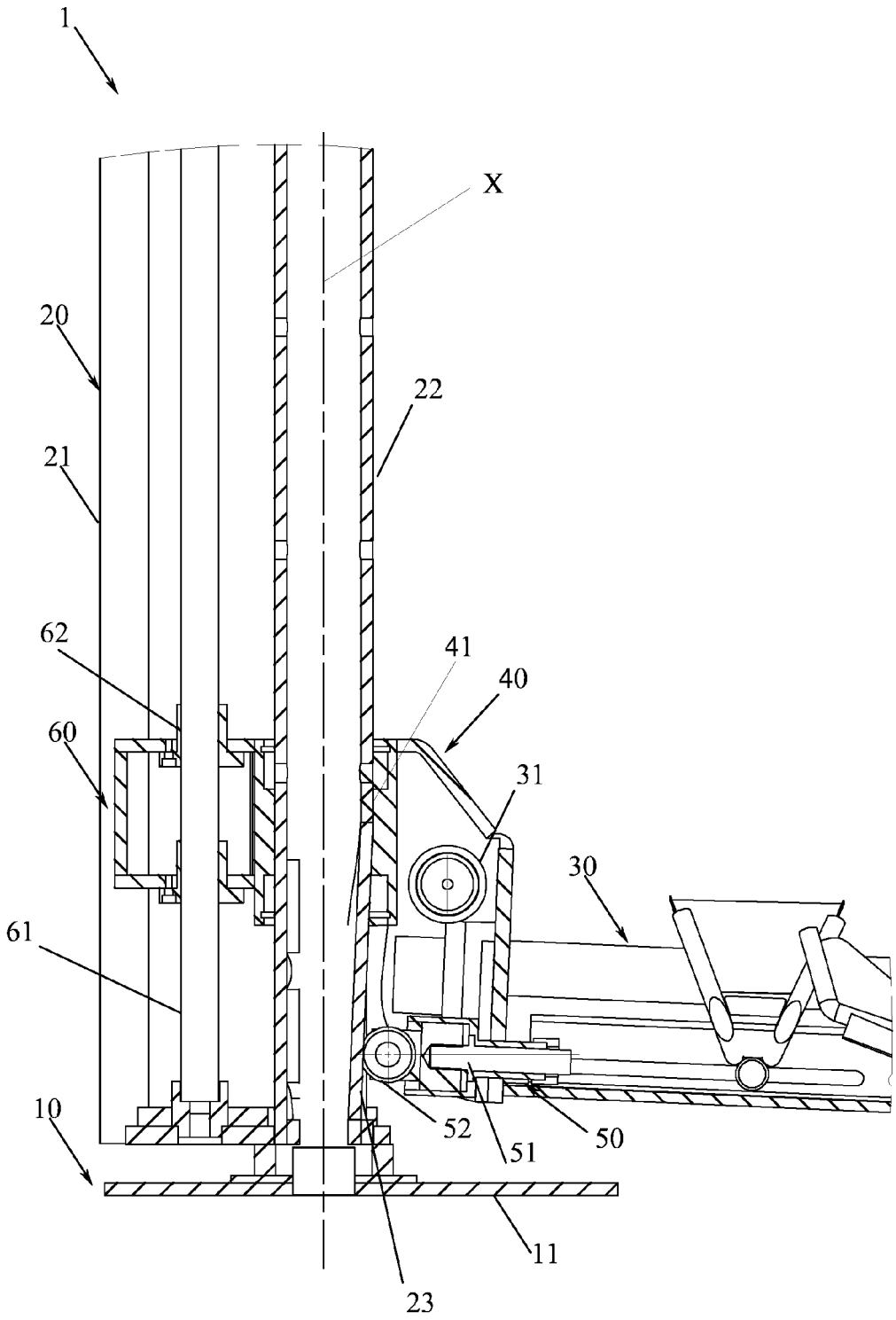


FIG.1

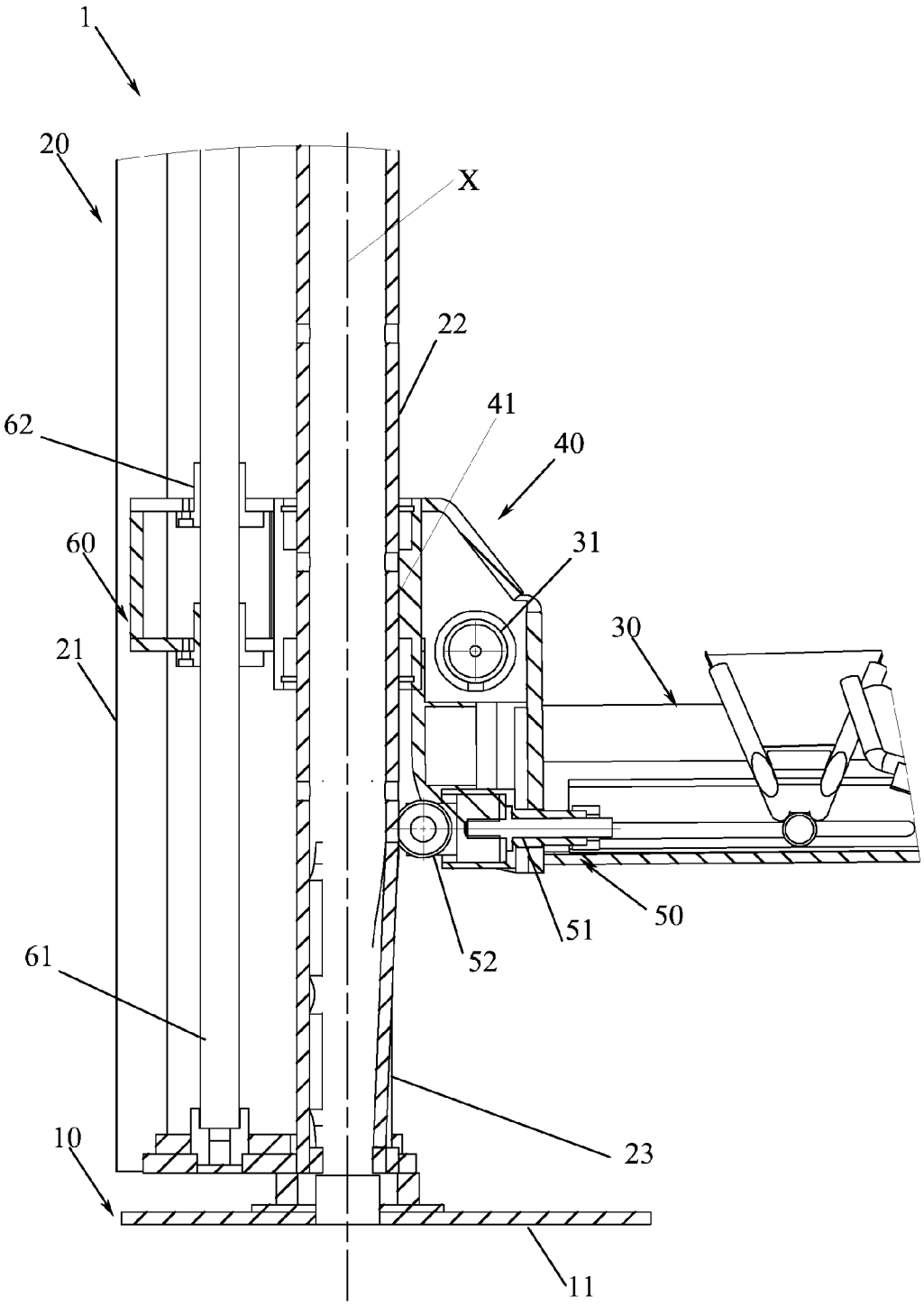


FIG.2

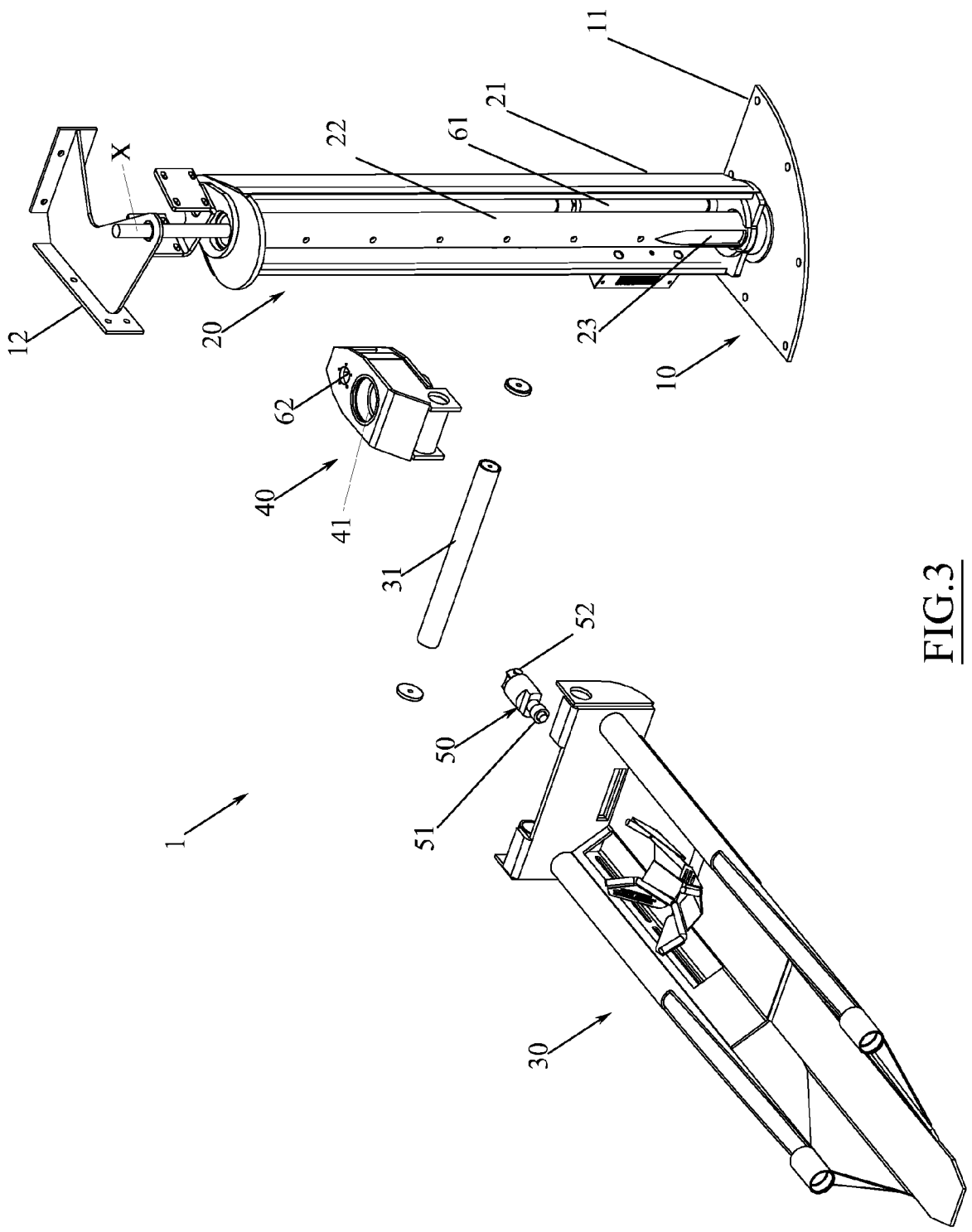


FIG.3

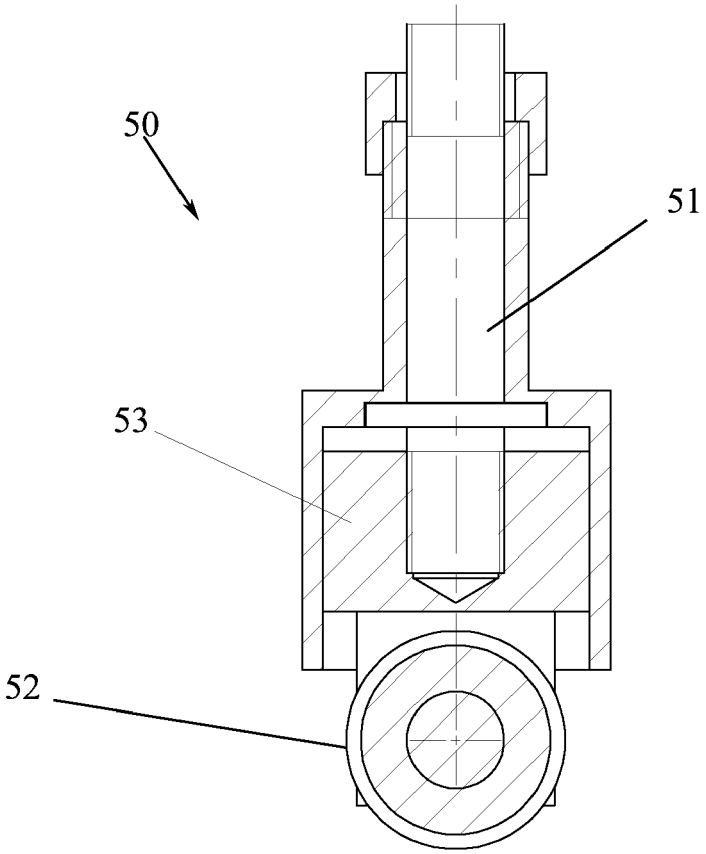


FIG.4

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EUROPEAN SEARCH REPORT

Application Number
EP 13 18 3494

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	CH 648 268 A5 (JULIO VILLARS) 15 March 1985 (1985-03-15) * abstract; figures 1-5 * -----	1	INV. B66F7/02 B66F7/28
A	GB 2 080 246 A (DICKENS CHARLES & SONS LTD) 3 February 1982 (1982-02-03) * abstract; figures 1,2 * -----	1	
A	DE 31 06 052 A1 (HOFMANN MASCHF DIONYS [DE]) 7 October 1982 (1982-10-07) * abstract; figures 1-4 * -----	1	
A	US 4 652 202 A (KERSTEN DONALD J [US]) 24 March 1987 (1987-03-24) * abstract; figures 1-3 * -----	1	

TECHNICAL FIELDS SEARCHED (IPC)

B66F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 February 2014	Rupcic, Zoran

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 18 3494

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05-02-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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