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(54) **APPARATUS FOR SUPPORTING A BICYCLE**

(57) Apparatus (10) for supporting a bicycle (100) comprising a base (11) and a strut element (12) fixed to said base (11) and configured in such a way that said strut element (12) extends at least in a vertical direction when said base (11) is rested on the ground.

The apparatus (10) comprises:

- a support member (13) fixed to said support element (12) and configured to be engaged by a bottom bracket shell (14) of a bicycle (100), supporting the bicycle from

below;

- a first retaining member (15) and a second retaining member (16) fixed to said strut element (12) and configured to engage a frame (101) of a bicycle (100).

The support member (13) said first retaining member (15) and said second retaining member (16) are connected to said strut element (12) and are mutually positioned in order to define the vertices of a triangle (A).

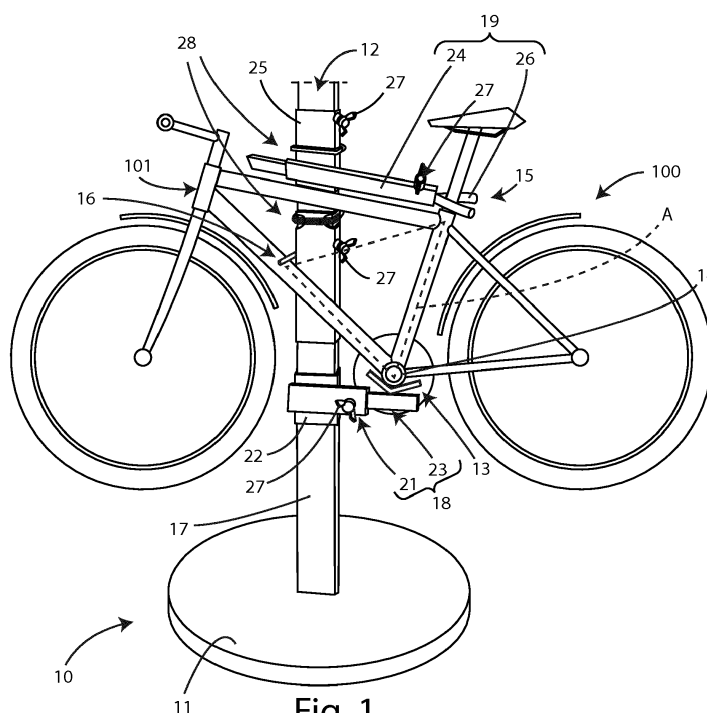


Fig. 1

Description

[0001] The present invention relates to an apparatus for supporting a bicycle.

[0002] In particular, the present invention refers to a support able to keep a bicycle raised from the ground in a position suitable for facilitating the carrying out of mechanical repair activities thereon.

[0003] The apparatus for supporting a bicycle according to the present invention is specially adapted to allow a high stability of attitude of the supported bicycle, in order to avoid undesired movements during maintenance or adjustment operations carried out on it.

[0004] Nowadays, in the field of bicycle repair, apparatuses are known for supporting a bicycle consisting of a base provided with a plurality of adjustable legs which support a main rod.

[0005] The main rod carries a clamp suitable to be fixed to a portion of the bicycle frame, generally to the crossbar, to restrain it hanging from the main rod. A further type of conventional support has, in addition to the gripper or an equivalent gripping element, a supporting portion adapted to be engaged by the frame portion which houses the bottom bracket shell.

[0006] In this case, the bicycle is resting on the support portion and held by the gripper or the gripping element.

[0007] A drawback of these traditional supports consists in the poor stability obtained.

[0008] In fact, in the event of strong stresses exerted on the bicycle during adjustment or maintenance operations, it can move with respect to the support apparatus, hindering the operator's activity or, also, unbalancing the support.

[0009] The problem underlying the present invention is that of increasing the safety of the apparatus for supporting a conventional bicycle.

[0010] The main task of the present invention is to provide an apparatus for supporting a bicycle which provides a solution to this problem by solving the alleged inconveniences of the apparatuses for supporting a bicycle described above.

[0011] Within the scope of this aim, it is an object of the present invention to provide an apparatus for supporting a bicycle which allows a bicycle to be positioned more easily on the apparatus itself.

[0012] Another object of the present invention is to provide an apparatus for supporting a bicycle that is easily adaptable to bicycles of different sizes and shapes.

[0013] Another object of the invention is to provide an apparatus for supporting a bicycle that is structurally simple and easy to use, which can be achieved by means of materials and components which are easy to find.

[0014] This task, as well as these and other objects which will become better apparent hereinafter, are achieved by an apparatus for supporting a bicycle according to the attached claim 1.

[0015] Detailed features of an apparatus for supporting a bicycle according to the invention are reported in the

corresponding dependent claims.

[0016] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of an apparatus for supporting a bicycle according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

- figure 1 shows an embodiment of an apparatus for supporting a bicycle, according to the present invention, on which a bicycle is placed;
- figure 2 illustrates an enlarged detail of the apparatus for supporting a bicycle of figure 1;
- figures 3 and 4 illustrate a particular variant of the apparatus for supporting a bicycle of figure 1.

[0017] With particular reference to the above figures, it is generally indicated with 10 an apparatus for supporting a bicycle comprising a base 11 and a strut element 12 fixed to the base 11 and configured in such a way that the strut element 12 extends at least in a vertical direction when said base 11 is rested on the ground.

[0018] Preferably, the base 11 has a plurality of supports or a support face, suitable for engaging the ground.

[0019] These supports or the support face define a supporting plane and the strut element 12 advantageously extends at least predominantly in a direction perpendicular to said supporting plane.

[0020] The base 11 is exemplified in figure 1 in the form of a disc-shaped plate, but it can equivalent instead comprise a plurality of supporting legs, at least three or preferably four or five to allow a high stability of the apparatus 10.

[0021] According to the present invention, the apparatus 10 has a particular peculiarity in the fact of comprising:

- a support element 13 fixed to the strut element 12 and configured to be engaged by a bottom bracket shell 14 of a bicycle, to support it from below;
- a first retaining member 15 and a second retaining member 16 fixed to the strut element 12 and configured to engage a frame 101 of bicycle 100. In accordance with the present invention, the support element 13, the first retaining member 15 and the second retaining member 16 are connected to the strut element 12 and are mutually positioned so as to define the vertices of a triangle A.

[0022] Preferably, the apparatus 10 is configured in such a way that the support element 13, the first retaining member 15 and the second retaining member 16 are mutually positioned in such a way as to be intercepted by a common plane orientation.

[0023] In other words, the triangle A preferably lies on a plane which, when the apparatus is in use, is substantially vertical.

[0024] The strut element 12 is advantageously obtained by means of a fork provided with a V-shaped seat

apt to define a stable support seat for the bottom bracket shell 14.

[0025] In the following, some possible embodiments of the present invention are described, proposed purely by way of non-limiting example.

[0026] In the description that follows, the technical and functional characteristics common to the embodiments described are by conciseness indicated with the same references.

[0027] According to a first embodiment of the invention, exemplified in figure 1, the strut element 12 can comprise:

- a principal element 17;
- a first arm 18 to which the strut element 12 is fixed and which is associated, in a slidable manner to the principal element 17;
- a second arm 19 to which the first retaining member 15 is fixed and which is associated, in a slidable manner to the principal element 17;
- a slider 20 to which the second retaining member 16 is fixed and which is associated, in a slidable manner to the principal element 17.

[0028] Advantageously, the principal element 17 can, for example, consist of a substantially rectilinear rod extending from the base 11, the first and the second arm 18 and 19 preferably extending from the rod in a direction substantially perpendicular to the direction in which this develops. Preferably, the first arm 18 comprises:

- a first element 21 provided with a first sleeve 22 engaged in a slidable manner by the principal element 17;
- a second element 23 to which the support element 13 is fixed and telescopically coupled to the first element 21 so as to be able to be reversibly extended by the latter to adjust the position of the support element 13 with respect to the strut element 12.

[0029] Advantageously, the second arm 19 comprises, similarly to the first arm 18:

- a third element 24 provided with a second sleeve 25 engaged in a slidable manner by the principal element 17;
- a fourth element 26 to which the first retaining member 15 is fixed and telescopically coupled to the third element 24 so as to be able to be reversibly extended by the latter to adjust the position of the first retaining member 15 with respect to the strut element 12.

[0030] Preferably, the slider 20 is tubular and slidably engaged by the principal element 17.

[0031] Locking screws, generally indicated with reference numeral 27, are advantageously engaged in threaded holes respectively provided on the slider 20 and on the first and second sleeves 22 and 25, so that a tightening of the corresponding locking screws 27 causes the

position of the slider 20 to be locked and of the first and second sleeves 22 and 25 respectively, along the principal element 17.

[0032] Vice versa, the unscrewing of the locking screws 27 causes the release of the slider 20 and of the first and second sleeves 22 and 25 respectively so that they can move along the principal element 17.

[0033] Advantageously, the apparatus 10 comprises restraining means 28 adapted to determine a frictional effect, respectively between the slider 20 and the principal element 17 and between each of the first and second sleeves 22 and 25 and the principal element 17.

[0034] These restraining means 28 are configured to exert between the slider 20 and the principal element 17 and between each of the first and second sleeves 22 and 25 and the principal element 17 a force such as to prevent their reciprocal movement due to the force of gravity allowing, however, that this movement is implemented by the action of an operator.

[0035] Figure 2 shows an exemplary but non-limiting embodiment of the restraining means 28 associated with the slider 20, which are described below in more detail.

[0036] Clearly, this description is, mutatis mutandis, applicable to the restraining means applicable to sleeves 22 and 25.

[0037] Advantageously, in detail, the restraining means 28 comprise an elongated element 29 which is preferably elastically extensible and which, more preferably, is or comprises a helical spring.

[0038] The elongated element 29 extends around the slider 20.

[0039] The elongated element 29 advantageously forms a closed ring and has at least one point fixed to the slider 20.

[0040] Otherwise, the elongated element has two extremes that are both fixed to the slider 20.

[0041] Two through holes 30 and 31 are advantageously provided on the slider 20 and the elongated element 29 is arranged in such a way that it engages the surface of the principal element 17 through the through holes 30 and 31.

[0042] The tension of the elongated element 29 is set, and optionally adjustable so that the resultant form which it exerts on the principal element 17 is such as to cause a sufficient frictional force to prevent the slider 20 from running along the principal element 17 due to gravity alone.

[0043] In general, the apparatus 10 is preferably configured in such a way that the position of the support element 13 and of the retaining members 15 and 16 can be adjusted with respect to the strut element 12.

[0044] Figure 3 shows, by way of non-limiting example, a second embodiment of the present invention.

[0045] An apparatus 10 according to this second embodiment differs from the first embodiment described above in that the apparatus 10 advantageously comprises:

- a primary arm 32 which extends along a developing direction and has a first portion B which is fixed to the strut element 12, the first retaining member 15 is fixed to a second portion C of the primary arm 32;
- connecting means connected to the second retaining member 16 and to the primary arm 32 and operable to lock, in a reversible manner, the second retaining member 16 to a third portion D of the primary arm 32. The third portion D is positioned along said development direction between the first portion B and the second portion C.

[0046] Advantageously, said connection means comprising:

- a slidable member 33 to which the second retaining member 16 is solidly fixed; the slidable member 33 and the primary arm 32 being configured such that the slidable member 33 is slidable along the primary arm 32 according to the said developing direction to adjust the position of the second retaining member 16 on the primary arm 32;
- a stop device 34, advantageously screwed, operable to lock the slidable member 33 to the primary arm 32 to prevent its mutual movement. Preferably the slidable member consists of, or comprises, a tubular body internally engaged by the primary arm 32.

[0047] Figure 4 illustrates a third embodiment of the present invention, proposed purely by way of non-limiting example.

[0048] This third embodiment differs from those previously described in that preferably the apparatus 10 comprises fastening means which are configured to fix the first portion B to the strut element 12 such that the first portion B is slidable along the strut element 12 and, with respect to the latter, non-rotatable about said direction of development.

[0049] In accordance with this third embodiment of the present invention, the primary arm 32 comprises:

- a first part 35 slidable with respect to the strut element 12;
- a second part 36 which is slidable with respect to the first part 35. Advantageously, the first retaining member 15 is slidable on the second part 36 and the second retaining member 16 is slidable on the second part 36, to adjust the mutual position of the retaining members 15, 16 and of the latter with respect to the support element 13 so as to adapt the apparatus 10 to bicycles of different shapes and/or dimensions.

[0050] The first retaining member 15 preferably comprises a wishbone structure adapted to be engaged by a first tube 102 of frame 101 of bicycle 100 which extends from the bottom bracket shell 14.

[0051] The second retaining member 16 preferably comprises a hook appendix 37 for engaging a second

tube 103 of bicycle 100 which extends from said bottom bracket shell 14.

[0052] The primary arm 32 is preferably configured in such a way that when the bicycle 100 has the bottom bracket shell 14 engaging the support element 13 and the tubes 102 and 103 engaging the respective retaining members 15, 16, the bicycle 100 it is firmly fixed to the apparatus 10.

[0053] Preferably, the strut element 12 extends along a substantially straight and advantageously vertical extension direction in use, the first support element 13 and the first retaining member 15 being intercepted by said extension direction.

[0054] Functionally, an operator, to fix a bicycle 100 to the apparatus 10, raises and rests the bottom bracket shell 14 on the strut element and, substantially at the same time, engages the first tube 102 in the first retaining member 15.

[0055] In this way, the center of gravity of the bicycle 100 is displaced before the vertical passing through the support element 13 so that the bicycle would tend, by gravity to rotate, with respect to the support element 13 forward (i.e. in an anticlockwise direction in figure 1).

[0056] This rotation is however prevented by the fact that the first tube 102 engages the first retaining member 15 so that the bicycle 100 is in a condition of equilibrium, albeit precarious, but stable.

[0057] In order to secure the bicycle 100 to the apparatus 10, it is therefore sufficient to move the second retaining member 16 until it engages the second tube 103, or the crossbar 104 of the bicycle in the case of a very small bicycle, for example for children.

[0058] When the bicycle 100 is simultaneously resting on the strut element 12 and engaged by both the retaining members 15 and 16, it results stably fixed to the apparatus 10.

[0059] In particular, to impede any rotation about a horizontal axis, so as to prevent it from overturning.

[0060] In possible embodiments of the present invention, the apparatus 10 can be configured to allow rotation of the bicycle about a vertical axis, for example by envisaging that the strut element 12 can rotate with respect to the base 11 with respect to an axis which in use, is vertical.

[0061] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of protection of the appended claims.

[0062] Furthermore, all the details may be replaced by other technically equivalent elements.

[0063] In practice, the materials used, as well as the contingent shapes and dimensions, may be varied according to the contingent requirements and the state of the art.

[0064] Where the constructional features and techniques mentioned in the following claims are followed by signs or reference numbers, such reference marks or numbers have been affixed with the sole purpose of increasing the intelligibility of the claims themselves and,

consequently, they do not constitute in no restriction on the interpretation of each element identified, purely by way of example, by such signs or reference numbers.

Claims

1. Apparatus (10) for supporting a bicycle (100) comprising a base (11) and a strut element (12) fixed to said base (11) and configured in such a way that said strut element (12) extends at least in a vertical direction when said base (11) is rested on the ground; said apparatus (10) being **characterized in that** it comprises:

- a support member (13) fixed to said support element (12) and configured to be engaged by a bottom bracket shell (14) of a bicycle (100), supporting the bicycle from below;
- a first retaining member (15) and a second retaining member (16) fixed to said strut element (12) and configured to engage a frame (101) of a bicycle (100);

where said support member (13), said first retaining member (15) and said second retaining member (16) are connected to said strut element (12) and are mutually positioned in order to define the vertices of a triangle (A).

2. Apparatus (10) according to claim 1 **characterized in that**, it is configured in such a way that said support member (13), said first retaining member (15) and said second retaining member (16) is mutually positioned so as to be intercepted by a common plane orientation.

3. Apparatus (10) according to one of the preceding claims, **characterized in that** said strut element (12) may comprise:

- a principal element (17);
- a first arm (18) to which said strut element (12) is fixed and associated, in a slidable manner, to said principal element (17);
- a second arm (19) to which said first retaining member (15) is fixed and associated, in slidable manner, to said principal element (17);
- a slider (20) to which said second retaining member (16) is fixed, associated in a slidable manner, to said principal element (17).

4. Apparatus (10) according to claim 3 **characterized in that** said first arm (18) comprises:

- a first element (21) provided with a first sleeve (22) slidably engaged by said principal element (17);

- a second element (23) to which the support member (13) is fixed and coupled like the sliding structure of telescope to said first element (21) in order to be able to be reversibly

extended by the latter, to adjust the position of said support member (13) with respect to said strut element (12);

where said second arm (19) comprises:

- a third element (24) provided with a second sleeve (25) slidably engaged by said principal element (17);
- a fourth element (26) to which said first retaining member (15) is fixed and coupled like the sliding structure of telescope to said third element (24) in order to be able to be reversibly extended by the latter, to adjust the position of said first retaining member (15) with respect to said strut element (12);

where said slider (20) is tubular and slidably engaged by said principal element (17).

5. Apparatus (10) according to one of the claims 1-2 **characterized in that** it comprises:

- a primary arm (32) extending along a direction of development and having a first portion (B) which is fixed to said strut element, said first retaining member (15) being fixed to a second portion (C) of said primary arm (32);
- connecting means connected to said second retaining member (16) and to said primary arm (32) and operable to lock, in a way reversible, said second retaining member (16) to a third portion (D) of said primary arm (32);

where said third portion (D) is positioned along said direction of development between said first portion (B) and said second portion (C).

6. Apparatus (10) according to claim 5 **characterized in that** said connecting means comprise:

- a slidable member (33) to which said second retaining member (16) is firmly fixed; said slidable member (33) and said primary arm (32) being configured in such a way that said slidable member (33) is slidable along said primary arm (32) according to said direction of development;
- a stop device (34), which can be operated to block said slidable member (33) to said primary arm (32) to prevent it from moving.

7. Apparatus (10) according to one of claims 5 and 6, **characterized in that** it comprises fastening means configured to fasten said first portion (B) to said strut

element so that said first portion (B) is slidable along said strut element and, with respect to the latter, non-rotatable about said direction of development.

8. Apparatus (10) according to one of the claims from 5 to 7 **characterized in that** said primary arm (32) comprises:

- a first part (35) slidable with respect to said strut element; 10
- a second part (36) which is slidable with respect to said first part (35); said first retaining member (15) is slidable on said second part (36) and said second retaining member (16) is slidable on said second part (36), to adjust the mutual position of 15

said retaining members (15, 16) and of the latter with respect to said support member (13) in order to adjust said apparatus (10) to bicycles of different shapes and/or dimensions. 20

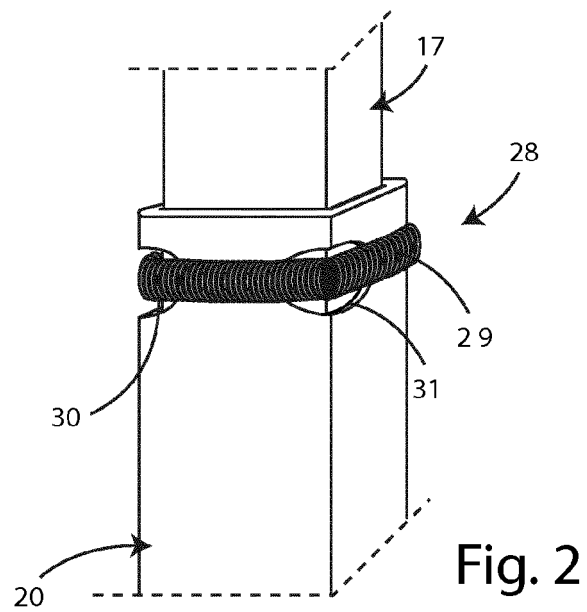
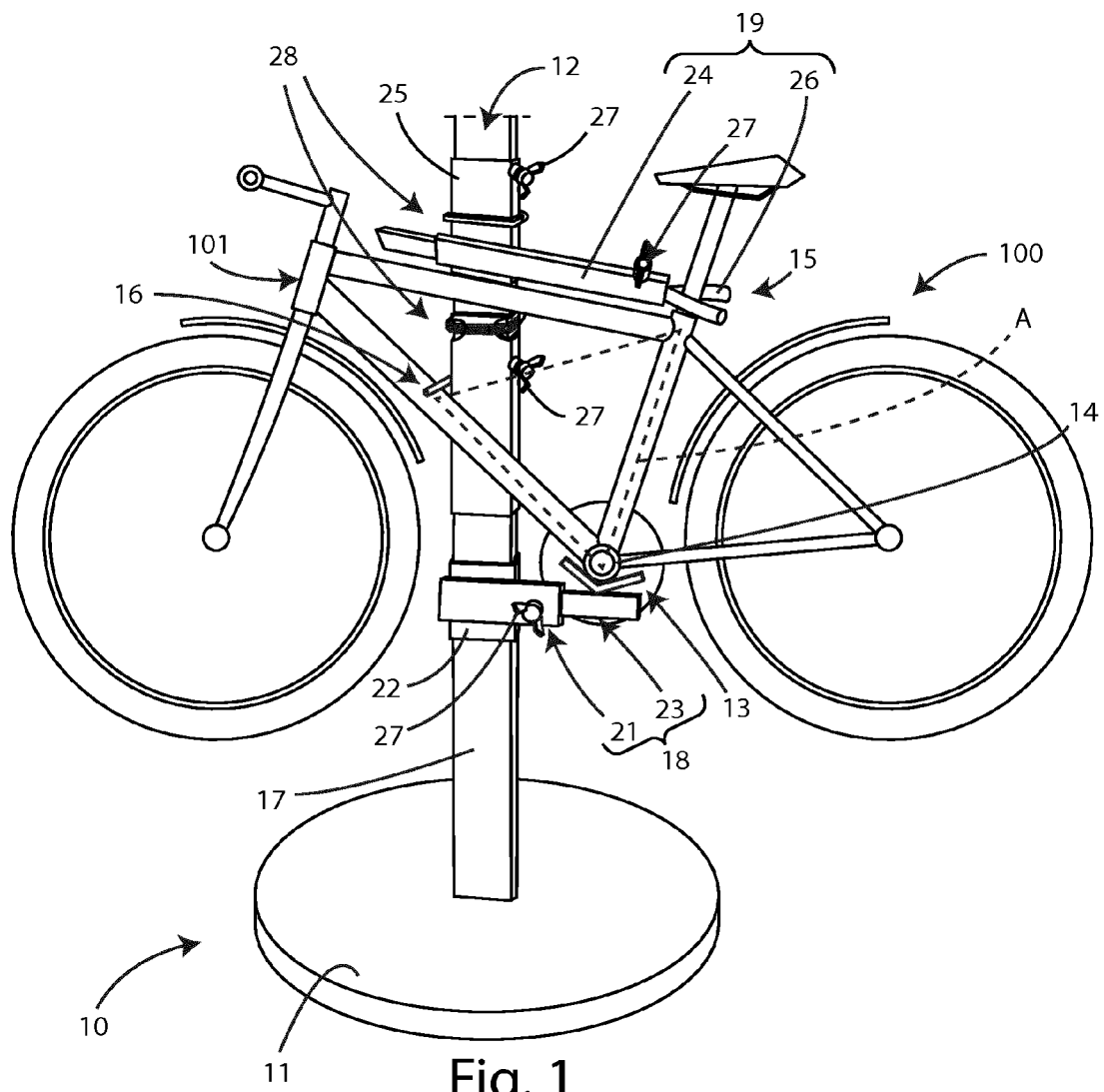
9. Apparatus (10) according to one of the claims from 5 to 8, **characterized in that** said first retaining member (15) comprises a wishbone structure suitable to be engaged by a first tube (102) of a frame (101) of a bicycle (100) extending from said bottom bracket shell (14); said second retaining member (16) comprising a hook appendix (37) able to engage a second bicycle tube (103) which extends from said bottom bracket shell (14); said primary arm (32) is configured that when said bicycle (100) has said bottom bracket shell (14) engaged to said support member (13) and said tubes engaged the respective said retaining members (15, 16), said bicycle (100) is firmly held to said apparatus (10). 25 30 35

10. Apparatus (10) according to one of the claims 5-9, **characterized in that** said strut element extends along a direction of extension substantially rectilinear, said first support member (13) and said first retaining member (15) are intercepted by said direction of extension. 40

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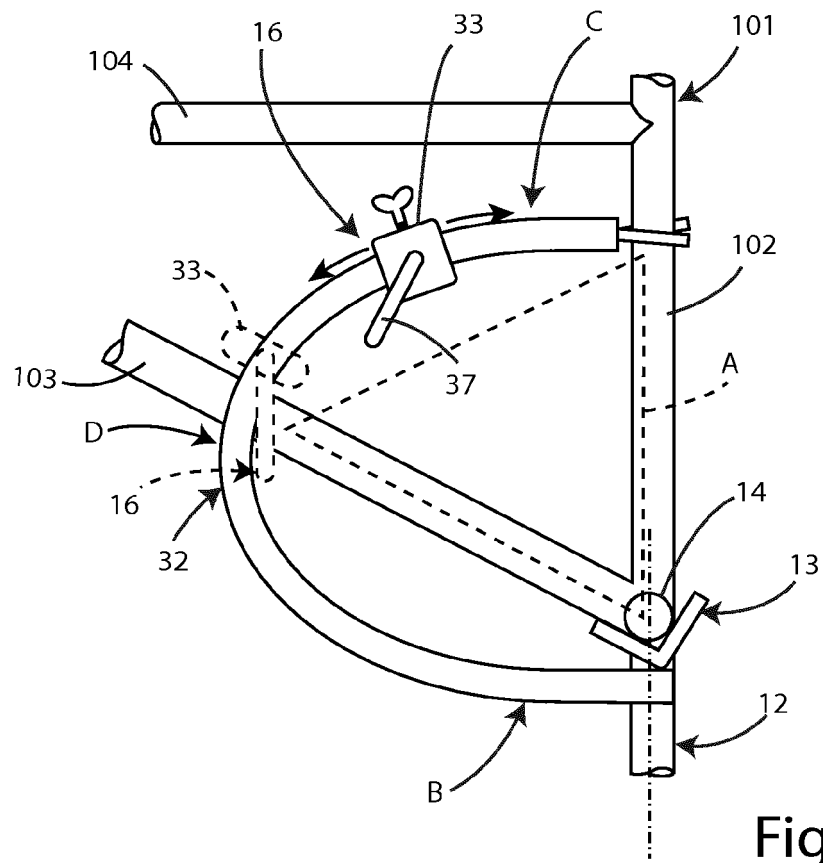


Fig. 3

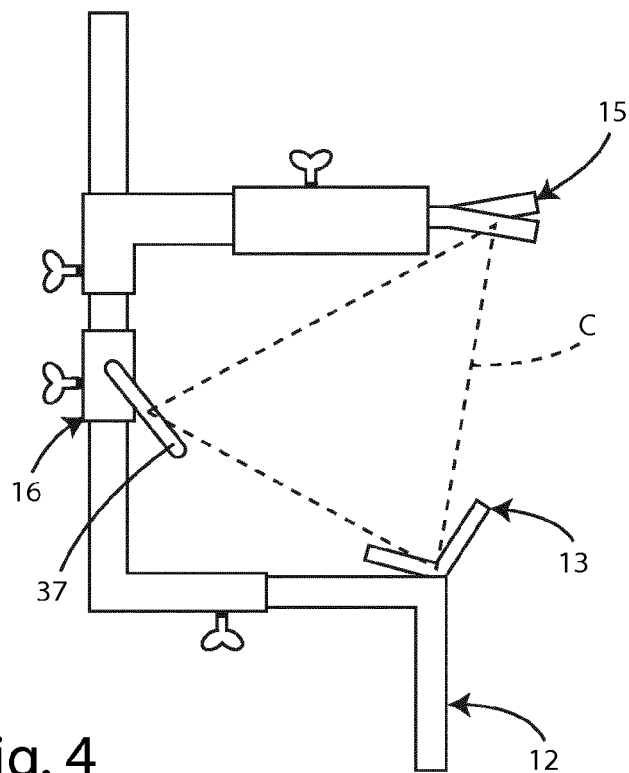


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 18 19 4875

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	AU 619 565 B2 (BORG NEILS HANSEN) 30 January 1992 (1992-01-30)	1-3,10	INV. B25H1/00
Y	* page 2, line 38 - page 3, line 31 * * figures 1,2 *	4-9	
Y	----- US 3 879 027 A (THURMOND JR MEREDITH T) 22 April 1975 (1975-04-22) * column 3, lines 24-31 * * column 4, lines 24-66 * * figures 1,4 *	4-9	
A	----- DE 94 10 384 U1 (CLESLE MARTIN [DE]) 15 September 1994 (1994-09-15) * page 3, line 32 - page 4, line 12 * * page 6, lines 6-20 * * page 7, lines 7-13 * * figures 2,3 *	1	
A	----- US 2005/056740 A1 (CHUANG LOUIS [TW]) 17 March 2005 (2005-03-17) * paragraphs [0022] - [0026], [0029] * * figures 1,3,7 *	1	TECHNICAL FIELDS SEARCHED (IPC)
			B25H B62H
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 February 2019	Examiner Bonnin, David
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 18 19 4875

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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22-02-2019

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