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(54) Workpiece support device and system

(57) A workpiece support device comprises a support arrangement 12, for example in the form of three legs 14 second to a head 10, supporting an angularly adjustable arm 32. The arm 32 is provided with a pair of clamp arrangements 48 to permit a workpiece to be secured thereto. A lock arrangement, comprising a pin 42 co-operable with openings 38 provided on a locking ring 34 moveable with the arm 32, is provided to permit the arm 32 to be locked to the support arrangement against angular movement. A support system comprising a pair of support devices and means permitting a workpiece/component to be secured to the support devices is also disclosed.

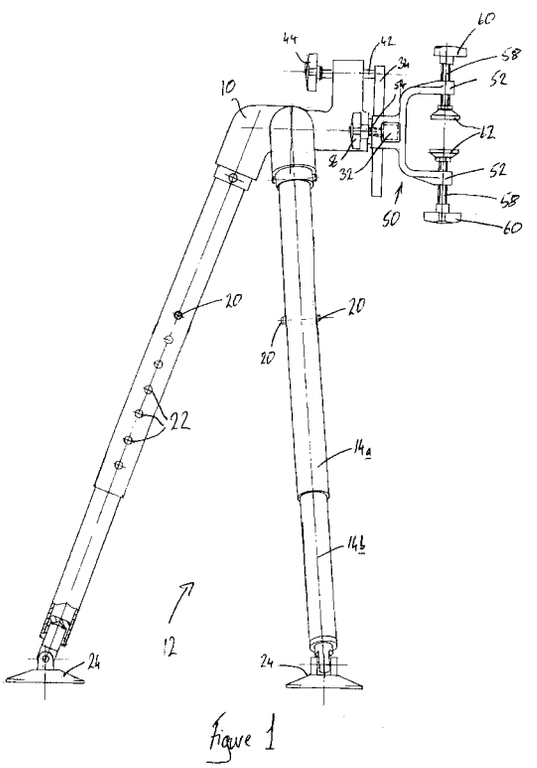

figure 1

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Description

[0001] This invention relates to a support device for use in supporting a workpiece, and to a workpiece support system using at least one such support device.

[0002] It is known to support a workpiece using a workbench, and using suitable clamps to secure the workpiece to the workbench. Although such a support technique is advantageous in that a workpiece is well supported leaving both of an operator's hands free to work on the workpiece, the technique has the disadvantages that the size of workpiece that can be supported is limited and that access is limited only to those parts or faces of the workpiece which are not obscured by the workbench. Thus, for example, where the workbench is used to support a workpiece which is being painted, one face of the workpiece can be painted, but then the workpiece must be left for the paint to dry before the workpiece can be turned over to allow painting of the opposite face thereof. Clearly, this is inconvenient and it is an object of the invention to provide a workpiece support system and a support device for use therein in which these disadvantages are overcome.

[0003] According to the first aspect of the invention there is provided a workpiece support device comprising a support arrangement arranged to support a workpiece support member, the support member being angularly adjustable relative to the support arrangement, means permitting a workpiece to be secured to the support member, and a lock arrangement for selectively locking the support member against angular movement relative to the support arrangement.

[0004] The support arrangement conveniently comprises a plurality of legs. Conveniently, three legs are provided. Each leg is conveniently of adjustable length, for example being telescopic form.

[0005] The means permitting a workpiece to be secured to the support member conveniently comprises at least one clamp arrangement. The clamp arrangements may be slidable relative to the support member. Each clamp arrangement may comprise a pair of moveable clamp members, each clamp member being moveable towards the other clamp member of the pair by adjustment of a respective actuator. Alternatively, or additionally, the means permitting a workpiece to be secured to the support member may include at least one opening provided in the support member through which a screw or other connector may extend to secure a workpiece to the support member.

[0006] The lock arrangement conveniently comprises a locking pin co-operable with openings formed in a locking member associated with the support member. The locking member conveniently comprises a ring provided with a plurality of openings. The openings and the locking pin are preferably of screw-threaded form.

[0007] According to another aspect of the invention there is provided a workpiece support system comprising first and second support devices spaced apart from one another, and means permitting a workpiece or other to be secured to the first and second support devices.

[0008] By using two separate support devices positioned at locations spaced apart from one another, workpieces of a range of sizes can be supported. Where a small workpiece is to be supported, the support devices are positioned relatively close to one another, the support devices being spaced apart by a greater distance when a larger workpiece is to be supported.

[0009] The support devices are conveniently of the type defined hereinbefore. The use of such support devices is advantageous in that, in order to gain access to, for example, the lower surface of a workpiece, the lock arrangements are released and the angular positions of the support members adjusted until the desired part of the workpiece is exposed. Once the desired angular position has been reached, the support members are locked in position thereby locking the workpiece against angular movement and rigidly supporting the workpiece to allow work to be carried out thereon.

[0010] The invention will further be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side view illustrating a support device in accordance with an embodiment of the invention;
Figure 2 is a view, from the front, of the support device of Figure 1; and
Figure 3 is a sectional view, to an enlarged scale, illustrating part of the support device of Figures 1 and 2.

[0011] The support device illustrated in the accompanying drawings comprises a cast steel head 10 which is supported by a support arrangement 12 comprising three legs 14. Each leg 14 is received, at its upper end, within a respective tubular support bush 16 mounted within the head 10. Each support bush 16 is provided with a pair of openings arranged to receive a respective spring loaded retainer element 18 carried by the leg 14 to permit releasable connection of each leg 14 to the head 10.

[0012] Each leg 14 is of telescopic form, each leg 14 comprising an upper part 14a of relatively large diameter, and a smaller diameter lower part 14b, the upper end of which is received within the upper part 14a. The upper end of each lower part 14b carries a pair of spring loaded retainer elements 20. Each upper part 14a is provided with a series of openings 22 with which the retainer elements 20 are registerable. In use, in order to adjust the length of one of the legs 14, the retainer elements 20 thereof are pushed inwards, against the action of the spring loading, and the upper and lower parts 14a, 14b moved relative to one another to change the length of the leg 14. Once the desired length has been achieved, the parts 14a, 14b are moved relative to one another by a small distance to align the retainer elements 20 with the nearest ones of the openings 22 whereon the retain-

er elements 20 move under the action of the spring loading to extend through the associated ones of the openings 22 and lock the leg 14 at that length.

[0013] The lower end of each leg 14 carries a foot 24 which is pivotally mounted to the associated leg 14. It will be appreciated that by using a support arrangement having three legs 14, each being of adjustable length and each having a pivotal foot 24, the support arrangement 12 permits the head 10 to be stably supported in a range of locations including those having uneven floor surfaces.

[0014] As best illustrated in Figure 3 the head 10 is provided with a further support bush 26 which rotatably supports a spindle arrangement 28. The spindle arrangement 28 includes a threaded bolt 30 which rotatably secures a workpiece support arm 32 to the head 10. The bolt 30 further secures a locking ring 34 to the arm 32 such that the arm 32 and locking ring 34 are moveable with one another relative to the head 10. As shown in Figure 2, two further bolts 36 secure the arm 32 to the locking ring 34, but these bolts do not cooperate with the head 10.

[0015] The locking ring 34 is provided with a series of openings 38 (see Figure 2). Each opening 38 is internally screw threaded. As shown in Figure 3, the head 10 includes an extension having a support bush 40 provided therein, the bush 40 carrying a locking pin 42. The pin 42 is permitted to move axially and to rotate relative to the head 10 but is held captive to the head 10. One end of the pin 42 is externally threaded, the other end of the pin 42 being provided with a knob 44 to assist in manipulation of the pin 42. As illustrated in the drawings, the threaded end of the pin 42 is in threaded engagement with one of the openings 38, thereby locking the ring 34 and the arm 32 against angular movement relative to the head 10. In the event that it is desired to adjust the angular position of the arm 32, then the pin 42 is rotated to release the threaded end thereof from the opening 38. The ring 34 and arm 32 can then be moved, angularly, to align another of the openings 38 with the pin 42. The arm 32 can then be locked in position relative to the head 10 by rotating the pin 42, bringing the threaded end thereof into engagement with the screw threads associated with the selected opening 38, and continuing to rotate the pin 42 until the locking ring 34 is secured, firmly, against angular movement.

[0016] The arm 32 is of generally square cross-section and is provided at its ends with end caps 46. The arm 32 carries a pair of clamp arrangements 48. Each clamp arrangement 48 comprises a bracket 50 including a pair of arms 52. The bracket 50 is provided with an opening of generally square cross-section, and of dimensions slightly larger than those of the arm 32, the arm 32 extending through the opening. The fit of the arm 32 within the opening is such as to permit sliding movement of the bracket 50 along the arm 32, but to prevent, or restrict to a very low level, angular movement of the bracket 50 relative to the arm 32. The bracket 50 is provided with a threaded opening within which a lock member 54 is received, the lock member 54 being engageable with the arm 32 to lock the bracket 50 against sliding movement along the arm 32. As illustrated in Figure 1, the lock member 54 is provided with a knob 56 to assist in manipulation thereof.

[0017] Each of the arms 52 is provided with a threaded opening through which a respective screw threaded rod 58 passes. Each rod 58 is provided with a knob 60. Each rod 58 further carries a clamp member 62, the clamp member 62 conveniently being angularly moveable relative to the associated rod 58. As illustrated, the clamp members 62 are aligned with one another, rotation of the knobs 60 causing the clamp members 62 to be moved towards or away from one another.

[0018] In use, two support devices of the type described hereinbefore are used, the support devices being positioned at spaced locations. The legs 14 of the devices are adjusted to compensate for any unevenness of the surface upon which they are stood, and to bring the heads 10 thereof to a convenient working height, taking into account the dimensions of the workpiece. The separation of the devices is chosen such that a workpiece to be supported will fit between the devices when clamped to the arms 32.

[0019] If necessary, the angular positions of the arms 32 are adjusted to align the arms with one another. The clamp arrangements 48 are moved to appropriate positions on the arms 32 and secured in position using the knobs 56. The positions chosen for the clamp arrangements 48 will depend upon the shape and size of the workpiece. The knobs 60 are rotated to move the clamp members 62 away from one another by a distance sufficient to permit the workpiece to be received therebetween. The workpiece is then introduced between the clamp members 62 of each clamp arrangement 48. Once correctly positioned, the clamp members 62 of each clamp arrangement 48 are moved towards one another, thereby securing the workpiece to the support devices.

[0020] The workpiece is then ready to be worked upon.

[0021] If it is desired to adjust the angular position of the workpiece, then the locking pins 42 are released from the openings 38 as hereinbefore described, the workpiece is moved towards the desired position and, once each pin 42 is aligned with one of the openings 38, the pins 42 are used to secure the workpiece against further movement.

[0022] Clearly, the clamp arrangements 48 obscure parts of the workpiece. If desired rather than use the clamp arrangements, a workpiece may be secured to the arm 32 using, for example, screws which pass through openings (not shown) provided in the arm 32.

[0023] It will be appreciated that the support device is suitable for use in a wide range of applications, supporting a number of different objects, and the invention is not limited to the use of the device in supporting doors

or window frames which require painting or varnishing.

[0024] It is envisaged that, in some applications, the arm 32 and locking ring 34 may be removed, and an elongate member, for example a steel tube, may be secured to each head 10. The elongate member could carry, for example, a pulley, the assembly being used, for example, in lifting manhole covers. In such an arrangement, the steel tube may be regarded as the "workpiece".

[0025] As the legs 14 are releasable from the head 10, each support device can be disassembled for storage or transportation purposes.

Claims

1. A workpiece support device comprising a support arrangement arranged to support a workpiece support member, the support member being angularly adjustable relative to the support arrangement, means permitting a workpiece to be secured to the support member, and a lock arrangement for selectively locking the support member against angular movement relative to the support arrangement.

2. A workpiece support device as claimed in Claim 1, wherein the support arrangement comprises a plurality of legs.

3. A support device as claimed in Claim 2, where the support arrangement includes three legs.

4. A support device as claimed in Claim 2 or Claim 3, wherein the legs are of adjustable length.

5. A support device as claimed in Claim 4, wherein the legs are of telescopic form.

6. A support device as claimed in any one of the preceding claims, wherein the means permitting a workpiece to be secured to the support member comprises at least one clamp arrangement.

7. A support device as claimed in Claim 6, wherein the or each clamp arrangement is slidable relative to the support member.

8. A support device as claimed in Claim 6 or Claim 7, wherein the or each clamp arrangement comprises a pair of moveable clamp members.

9. A support device as claimed in any one of the preceding claims, wherein the lock arrangement comprises a locking pin co-operable with openings provided in a locking member associated with the support member.

10. A support device as claimed in Claim 9, wherein the locking pin and the openings are provided with corresponding screw thread formations.

11. A support system comprising first and second support devices spaced apart from one another, and means permitting a workpiece or other component to be secured to both the first and the second support devices.

12. A support system as claimed in Claim 11, wherein the first and second support devices comprise support devices according to any of Claims 1 to 10.

13. A support system as claimed in Claim 11, wherein the workpiece or other component comprises an elongate member carrying a pulley.

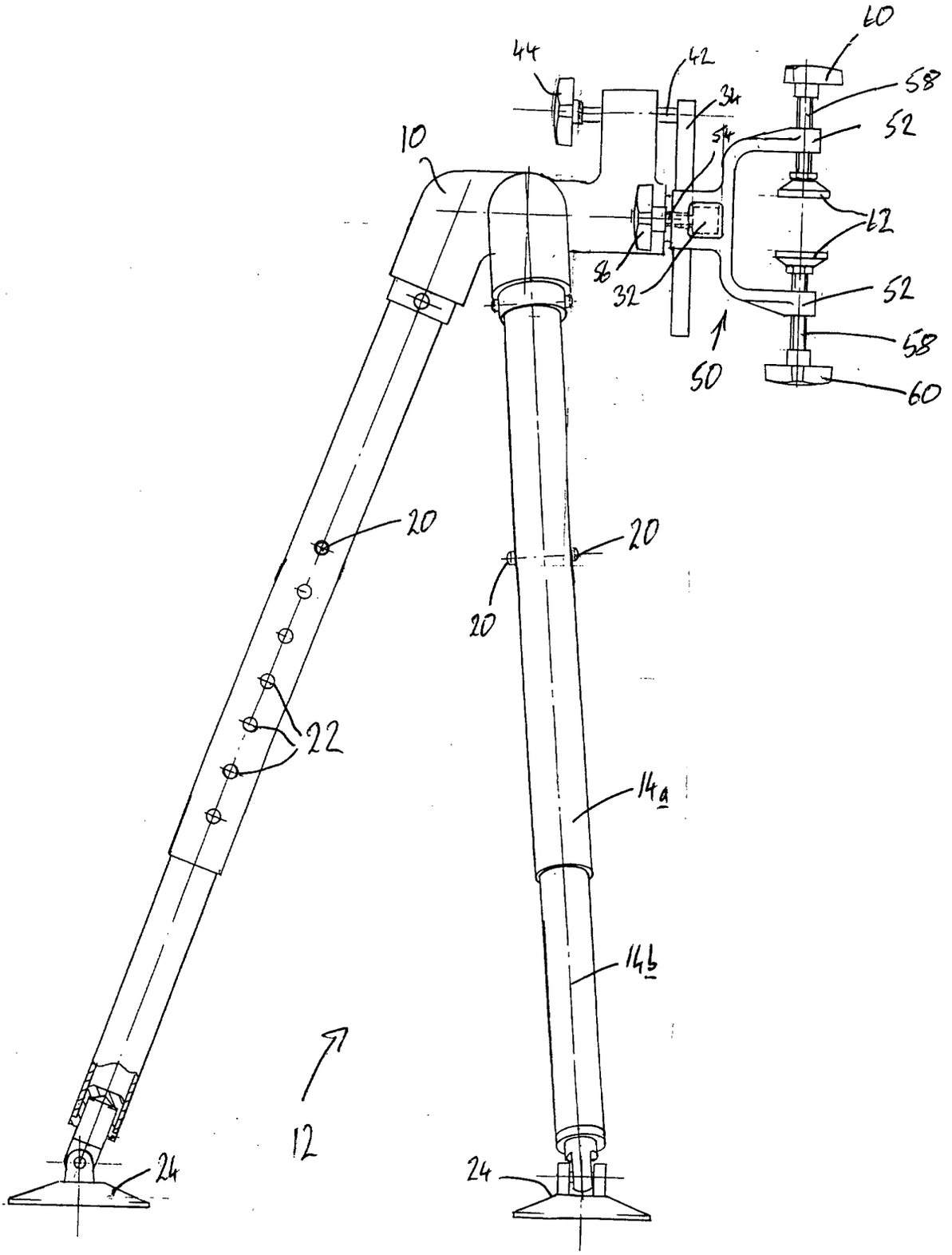
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Figure 1.

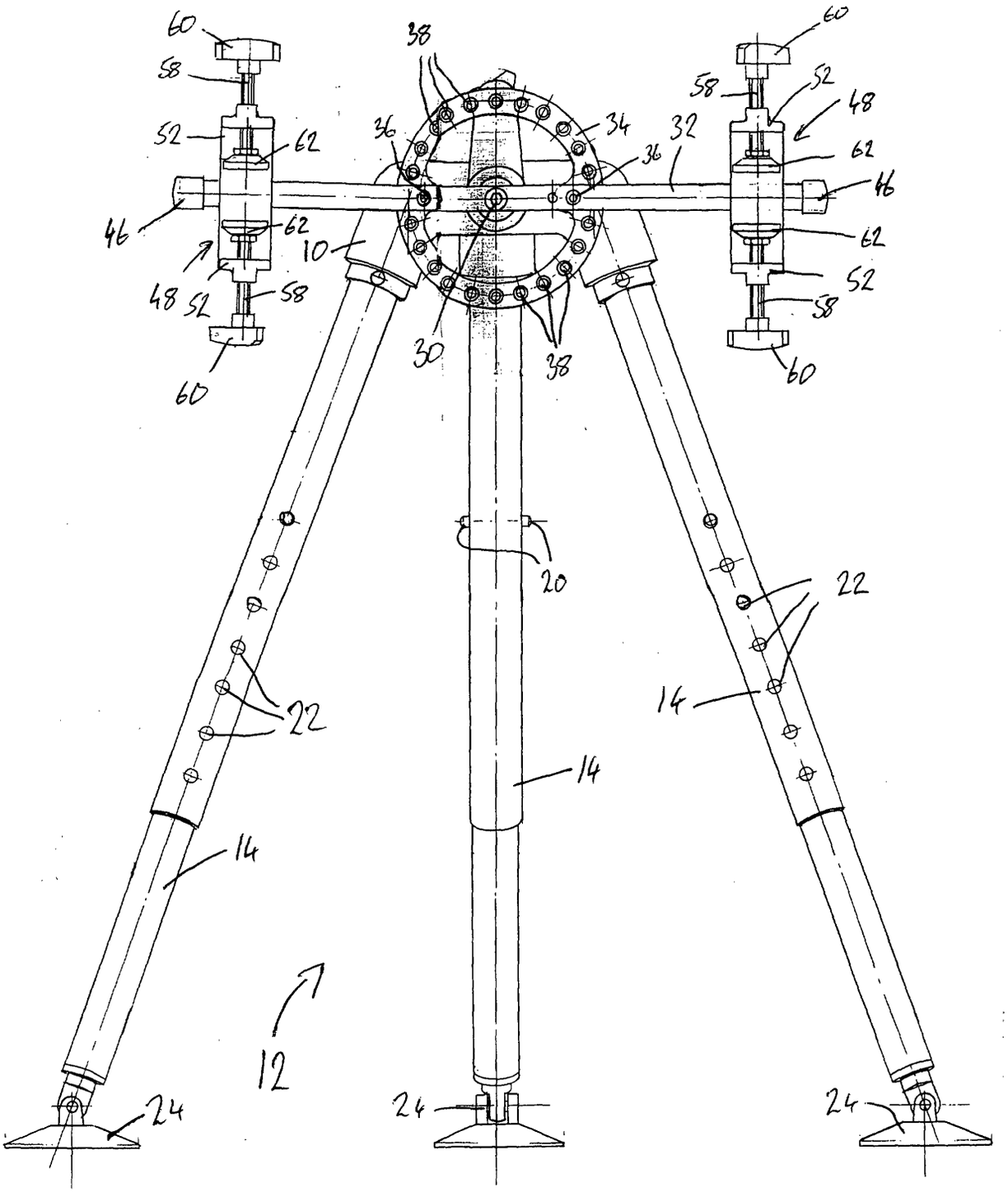

Figure 2

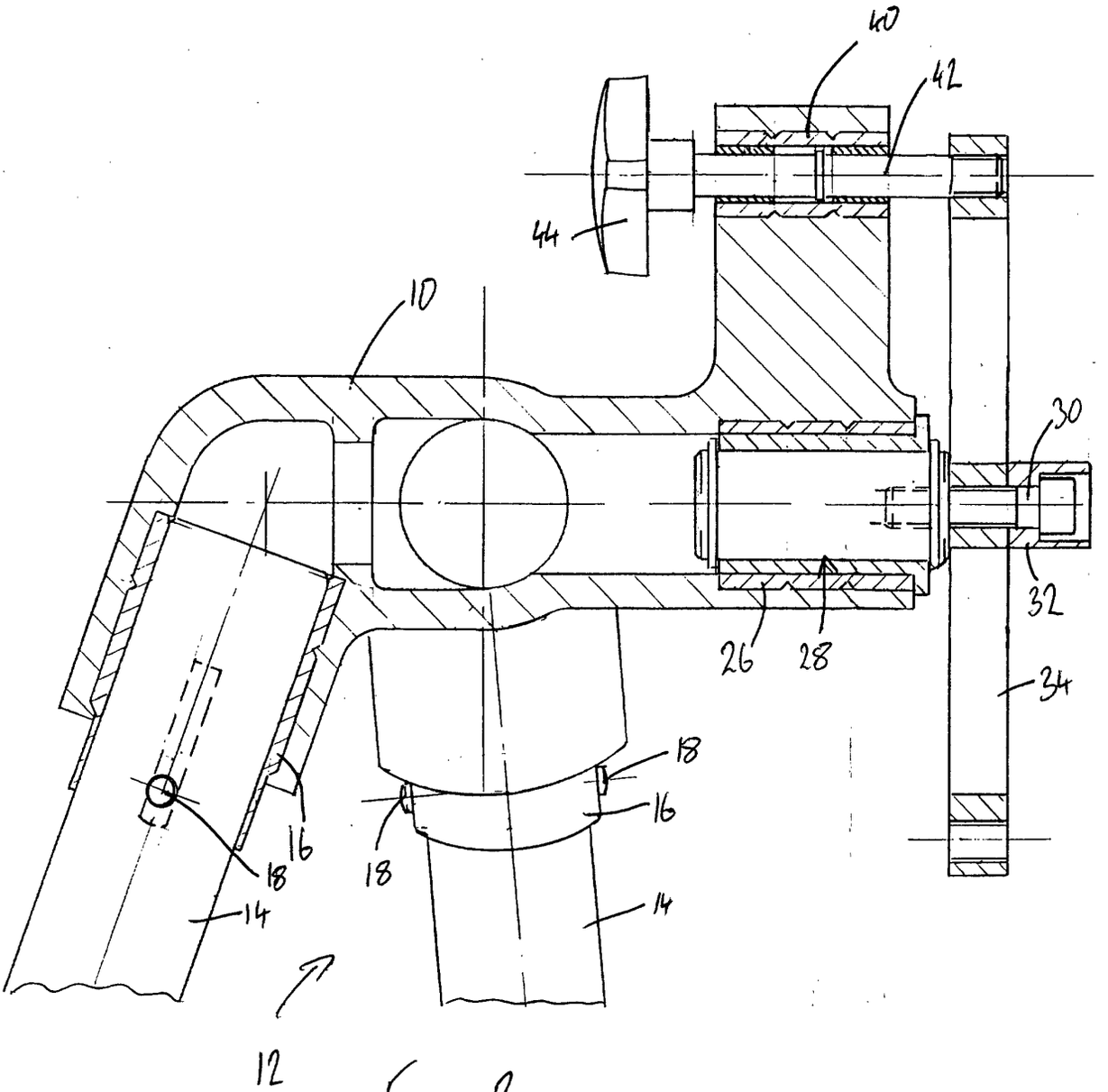

Figure 3

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EUROPEAN SEARCH REPORT

Application Number
EP 01 30 1735

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 June 2001	Matzdorf, U

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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