(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 250 207 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **87305331.8**

(51) Int. Cl.[4]: **A47C 1/032** , A47C 3/026

(22) Date of filing: **16.06.87**

(30) Priority: **16.06.86 GB 8614651**

(43) Date of publication of application:
23.12.87 Bulletin 87/52

(84) Designated Contracting States:
AT BE CH DE ES FR GB IT LI NL SE

(71) Applicant: **Reed, Adrian Michael**
63 Columbia Point Canada Estate
Rotherhithe London SE16 1BG(GB)

(72) Inventor: **Reed, Adrian Michael**
63 Columbia Point Canada Estate
Rotherhithe London SE16 1BG(GB)

(74) Representative: **Harrison, Philippa Dinah et al**
A. A. THORNTON & CO Northumberland
House 303-306 High Holborn
London WC1V 7LE(GB)

(54) Improvements in and relating to adjustable chairs.

(57) The seat (2) of a chair is mounted on a base (1) by pivotal support members (10,11) which form, together with the seat and base, a quadrilateral linkage having generally horizontal axes extending transversely of the seat, the linkage extending generally between the front and rear of the seat. The spacing of the pivot axes of the support members (10,11) are selected so that the seat is movable relative to the base. Specifically, the seat portion (3) of the seat is movable between a rearwardly inclined lower position and a forward upper position. The back rest portion (4) of the seat (2) may be connected for movement with the rear-most one of the support members (11) so that it inclines relative to the seat portion (3) as the seat portion moves relative to the base.

Resilient biassing means, as shown in the form of a gas spring (16), is provided for biassing the seat portion (3) to its forward upper position and for counterbalancing the weight of the user, the user then being able to move the seat portion (3) to its rearward position by adjustment of the user's position on the chair. Locking means may be provided separately or in association with the biassing means, operable by the user to lock the chair in a desired position.

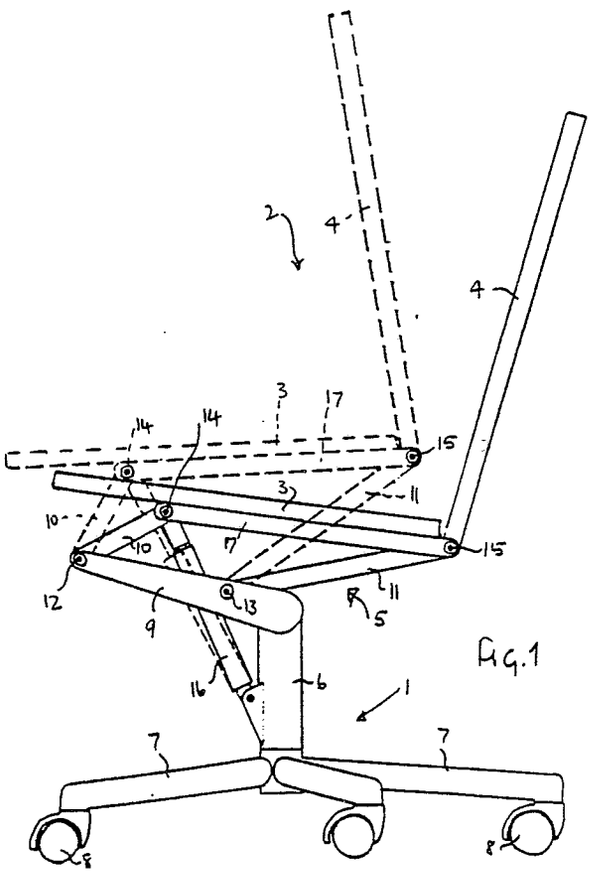

Fig.1

EP 0 250 207 A2

Improvements in and relating to Adjustable Chairs

The present invention relaes to improvements in adjustable chairs.

According to the present invention, there is provided a chair comprising a base, a seat and means adjustably mounting the seat on the base, the seat comprising a seat portion and a back rest portion, and the adjustable mounting means comprising a first support member and a second support member, each support member being pivotally connected to the base and the seat portion for pivotal movement relative to the base and the seat portion about generally horizontal axes extending transversely of the seat portion, the support members forming opposite sides of a quadrilateral linkage, the other sides of which are provided by the base and seat portion, which extends generally between the front and rear of the seat portion and which permits movement of the seat portion relative to the base.

The back rest portion may be connected for movement with one of the support members so as to move relative to the seat portion with movement of the seat portion relative to the base.

The quadrilateral linkage is advantageously arranged to enable the seat portion to move between a rearward lower position and a forward upper position. Where the back rest portion is connected for movement with one of the support members, the quadrilateral linkage may be arranged so that the angle between the seat and back rest portions decreases as the seat portion moves forwardly.

The chair may include stop means for limiting movement of the seat portion relative to the base. Resilient means for biassing the seat portion to its forward position may also be provided. The resilient means may be adjustable to adjust the biassing force and may be lockable to lock the chair in any desired position. Alternatively, the locking means may be provided separately from the biassing means.

An embodiment according to the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a diagrammatic side elevation of an embodiment of a chair in accordance with the present invention, showing the chair in two positions; and

Figure 2 is a diagrammatic front elevation of the chair of Figure 1, showing the chair in the position shown in solid lines in Figure 1.

The chair shown in the drawings comprises a base 1, a seat 2, comprising a seat portion 3 and a back rest portion 4, and adjustable mounting means 5 for adjustably mounting the seat 2 on the base 1 and permitting the seat to move between the positions shown in full and broken lines in Figure 1.

In Figures 1 and 2, the seat and back rest portions 3,4 are shown diagrammatically and in use of the invention may comprise a load bearing part, which may be in the form of a frame work or, as shown, a shell, which may for example be moulded. The load bearing part may be cushioned and upholstered.

As shown, the base 1 comprises an upright 6 which is supported on the ground by any suitable means. As shown, upright 6 is supported by a plurality of generally radially extending legs 7 provided at their ends with castors or glides 8. Upright 6 may be rotatable and adjustable in length relative to legs 7. Cantilevered from the upper end of upright 6 is a pair of fixed support members 9 between which and the seat portion 3 the adjustable mounting means 5 are connected. It will be appreciated that the base 1 may take other conventional forms. For example, it may comprise four legs interconnected by a framework which provides one or two fixed support members equivalent to members 9.

The adjustable mounting means 5 comprise two support members 10,11, each of which is connected to the member 9 of the base and to the seat portion 3 for pivotal movement relative thereto about generally horizontal axes 12,13,14 and 15 which extend transversely of the seat portion 3. Support members 10,11 form the opposite sides of a quadrilateral linkage of which the other sides are provided by base support member 9 and seat portion 3 and which, as shown, extends generally centrally between the front and rear of the seat portion 3. The distances between axes 12 and 13, 13 and 15, 15 and 14, and 14 and 12 are arranged so that seat portion 3 will, as shown in Figure 1, move relative to base 1 between a lower rearward position, shown in full lines in Figure 1 in which the seat portion may be generally rearwardly inclined, and a raised forward position, shown in broken lines in Figure 1, in which the seat portion may be substantially horizontal or slightly forwardly inclined.

The back rest portion 4 is advantageously connected for movement with the rearward support member 11 so that it has a fixed orientation relative to member 11 and as a consequence pivots relative to seat portion 3 as seat portion 3 is moved

relative to base 1. The quadrilateral linkage is designed so that, as seat portion 3 moves from its rear ward position to its forward position, the angle between the seat portion and the back rest portion decreases. When the seat portion is in its forward position, the back rest portion may be generally vertical.

As shown, resilient biassing means are provided, for biassing the seat portion to its forward position and counterbalancing the weight of the user so that the seat portion will move to its rearward position under the control of the user and specifically by the user repositioning himself in the chair. As shown, the resilient biassing means 16 acts generally between axes 13 and 14 of the quadrilateral linkage, and is in the form of a "gas spring", one end of which is pivotally connected to the seat portion 3 in the region of axis 14 and the other end of which is pivotally connected to upright 6 with the line of action of the "gas spring" approximately passing through axis 13. The gas spring may be arranged to provide an adjustable bias, for adjustment by the user depending on the user's weight, and it may also be provided with a manually operable lock so that the user can lock the seat portion in a required position relative to the base. The gas spring 16 incorporates limits on its extension and contraction and these provide stops for limiting movement of the seat portion 3 relative to the base.

In the embodiment shown, support members 10 and 11 are provided at each end with transversely projecting portions 10a,11a, the ends of which have blind bores for receiving stub shafts about which the members 10,11 pivot and which define the axes 12 to 15. At the lower ends of the members 10,11, the stub shafts are mounted in base members 9 with the members 10,11 extending from between the members 9. At their upper ends, the stub shafts are mounted in a similar pair of support members 17 which are fixed to the underside of the seat portion 3.

It will be appreciated that the biassing means may take other forms. For example, they may be provided by an adjustable torsion spring or bar incorporated in one or more of the pivot axes 12 to 15 of the quadrilateral linkage, or a tension or compression spring acting between opposed pairs of axes of the linkage. Advantageously, the biassing means are adjustable to permit adjustment to take account of varying user weights. Additionally, stop means for limiting movement of the seat portion relative to the base may be, as shown, provided by the biassing means, or may be provided separately. For example, components of the quadrilateral linkage may be brought into abutment in the limit positions of the linkage. Additionally, locking means, where provided, for locking the seat portion in a desired position relative to the base portion, may, as shown be incorporated in the biassing means or may be provided separately, for example in the form of a mechanical lock acting on one or more of the pivot axes.

It will be appreciated from the foregoing that numerous modifications may be made to the dimensions of the quadrilateral linkage, in its positioning and orientation relative to the base 1, and in relation to the numbers of support members 10,11 which are used in the linkage.

In relation to the positioning and orientation of the linkage relative to the base 1, in a modification, both of axes 12 and 13 are positioned further to the rear of the chair with the members 10,11 extending forwardly therefrom to their pivotal connections with the seat portion, member 11 being longer than member 10. With such a modification, it is not possible to connect the back rest portion with one of the links 10,11 and it therefore has a fixed position relative to the seat portion.

In relation to the numbers of members 10,11 provided, it will be appreciated that members 10,11 may be duplicated and extend to either side of single members 9,17. In a further modification, member 11 may be replaced by a pair of members extending between pivot axes 13 and 15 but each shaped to form a loop between these pivot axes and which serve as the arm rests of the chair.

Claims

1. A chair comprising a base (1), a seat (2) and means (5) adjustably mounting the seat on the base, the seat comprising a seat portion (3) and a backrest portion (4) and the adjustable mounting means (5) comprising a first support member (10) and a second support member (11), each support member being pivotally connected to the base (1) and the seat portion (3) for pivotal movement relative to the base and the seat portion about generally horizontal axes (12,13,14,15) extending transversely of the seat portion (3), the support members forming opposite sides of a quadrilateral linkage, the other sides of which are provided by the base (1) and seat portion (3), which extends generally between the front and rear of the seat portion and which permits movement of the seat portion relative to the base.

2. A chair as claimed in claim 1, wherein the quadrilateral linkage is arranged to permit the seat portion (3) to move relative to the base (1) between a rearward lower position and a forward upper position.

3. A chair as claimed in either claim 1 or claim 2, wherein the back rest portion (4) is connected for movement with one of the support members

(11) so as to move relative to the seat portion (3) with movement of the seat portion relative to the base (1).

4. A chair as claimed in claim 3, wherein the quadrilateral linkage is arranged to cause the angle between the back rest portion (4) and the seat portion (3) to decrease as the seat portion moves from its rearward position to its forward position.

5. A chair as claimed in any one of the preceding claims, including stop means for limiting movement of the seat portion (3) relative to the base (1).

6. A chair as claimed in any one of the preceding claims, including biassing means for biassing the seat portion to its forward position and for permitting the seat portion to move to its rearward position in use.

7. A chair as claimed in claim 6, wherein the biassing means act on one of the pivotal connections of the support members (10,11).

8. A chair as claimed in either claim 6 or 7, wherein the biassing means act between an opposite pair of the pivotal connections of the support members (10,11).

9. A chair as claimed in any one of the preceding claims, including locking means for fixing the seat portion (3) relative to the base (1) in a desired position.

10. A chair as claimed in claim 9, wherein the locking means are associated with the biassing means.

11. A chair as claimed in any one of the preceding claims, wherein the biassing means comprises a member (16) having a variable length which is pivotally connected to the seating portion (3) in the region of the forward-most pivot axis (14) of the forward pivotal support member (10) on the seating portion (3) and to the base (1) in the region of the rear-most pivot axis (13) of the rear pivotal support member (11) on the base (1).

12. A chair as claimed in claim 11, wherein the biassing member (16) includes releasable locking means for preventing variation in the length thereof.

13. A chair as claimed in any one of the preceding claims, wherein the distance between the pivotal axes (13,15) of the rearward support member (11) is longer than the distance between the pivot axes (12,14) of the forward connecting member (10).

14. A chair as claimed in claim 13, wherein the pivotal support members (10,11) extend rearwardly from their pivotal connections with the base (1) to their pivotal connections with the seat portion (3).

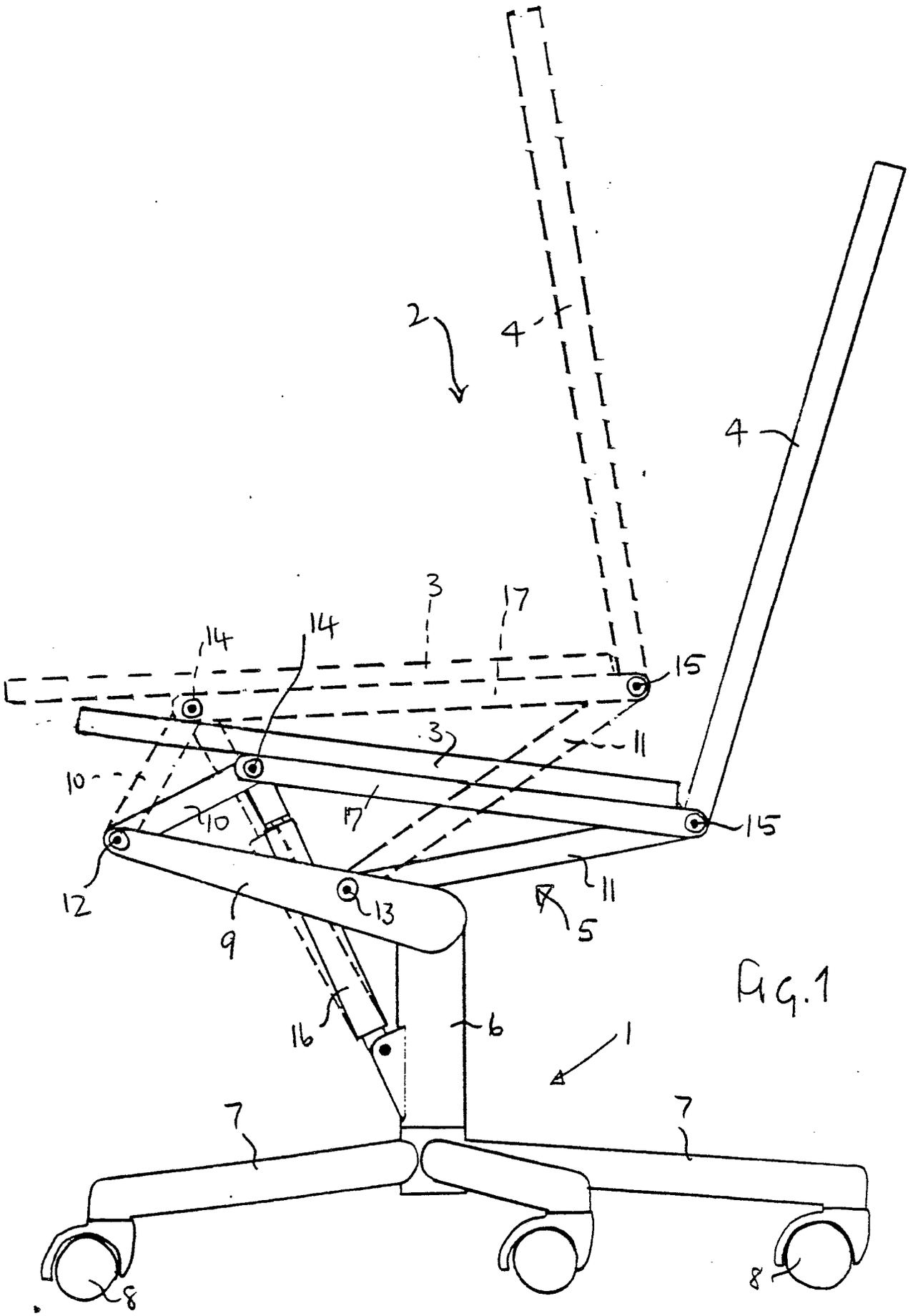

Fig.1

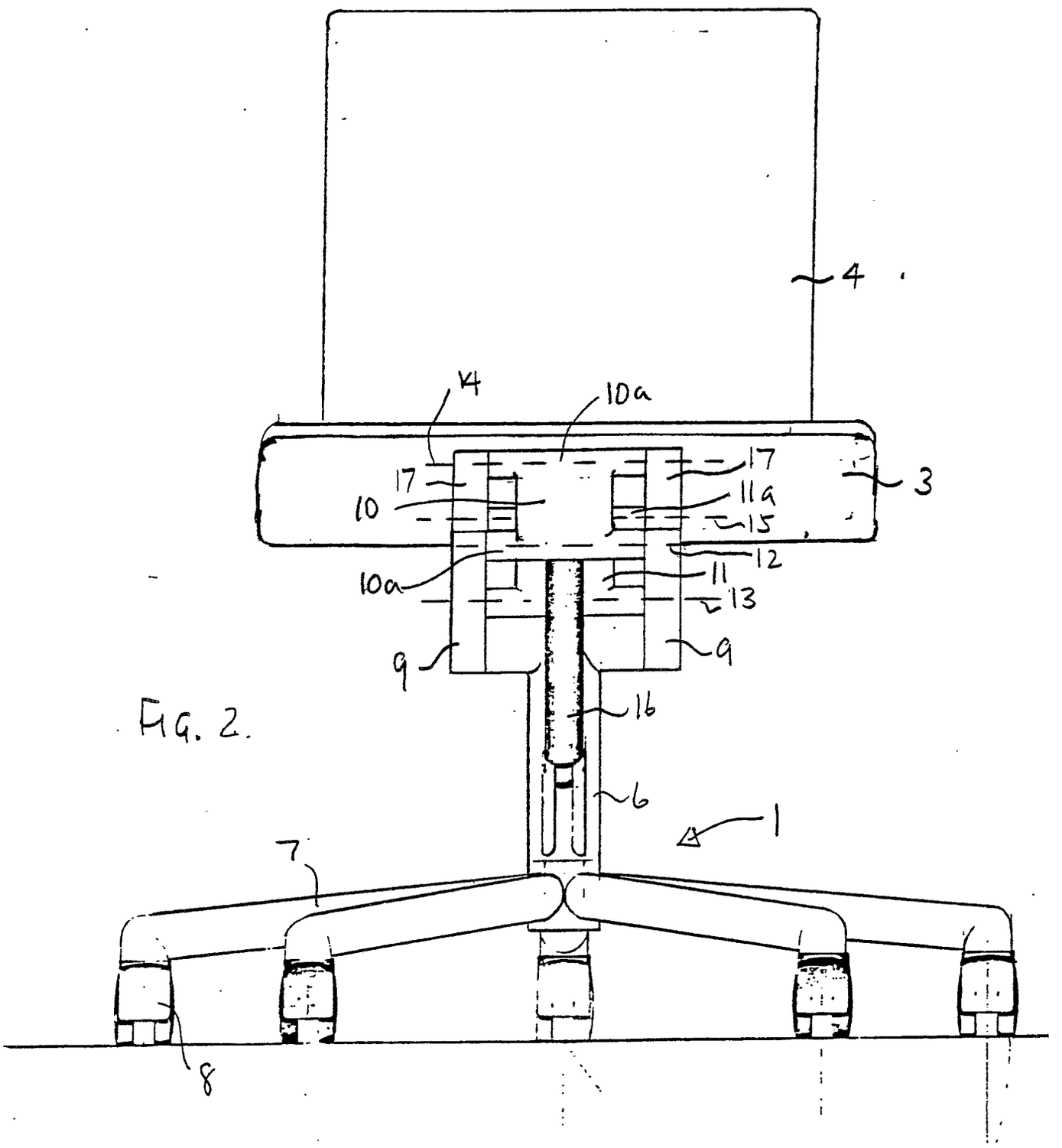

Fig. 2.