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(54) Title: A DUAL FUNCTIONAL CHAIR

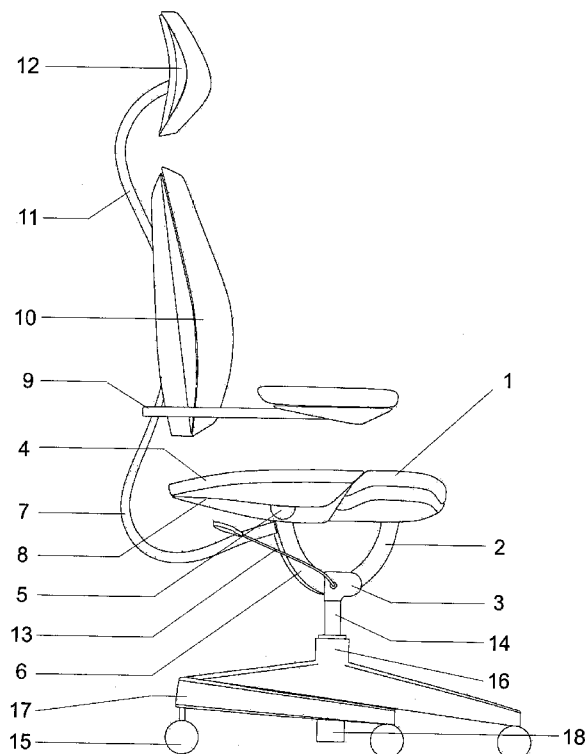


Fig.1

(57) Abstract: The object of the invention is a dual functional chair with a dividable seat to be used in a sitting and kneeling-sitting configuration, in which the seat consists of a front part (1) of the seat convertible into a knee rest and connected rotationally and slidably or rotationally only to a movable front arm of a base of the seat, rotating on the axis of a rotational mechanism (3), and of the rear part (4) of the seat having a variable angle of inclination, connected via a rotational mechanism (5) to a rear arm (6) of the base of the seat.

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## A DUAL FUNCTIONAL CHAIR

The object of the invention is a dual functional chair with a dividable seat, for sitting and kneeling, offering a possibility of changing a position and relieving the spinal column during a prolonged work in a sitting position.

5           Chairs of this type are disclosed in the Polish utility model No. 640081. A rehabilitation chair intended mostly for kneeling, without the backrest, built in the form of the letter X is known.

Also known are other solutions of a similar purpose, for example a convertible piece of furniture disclosed in the description of the Polish patent application No. 10 P.390736 intended for sitting and kneeling, in which the two-piece set of knee rests is supported on arms mounted rotationally and with reclining ability in clasps of a cross-piece.

There are known other solutions of a similar purpose, as for example those disclosed in the European patent application No. EP 0 570 550, in which the seat, knee 15 rest and backrest are suspended on an appropriate mechanism placed on the supporting column mounted on a base with wheels. These mechanisms are levers allowing for movement in space of usable parts of the chair, depending on the needs. In such a way the chair may be converted into the sitting, sitting-kneeling and similar configurations. Fixing of the position of the seat, knee rest and backrest is achieved by means of locking 20 and backstopping mechanisms.

Furthermore, from the description of the Polish patent application No. P.387898 there are known pieces of furniture of a similar type. The described chair has a seat, a two-piece knee rest, a backrest and armrests. The knee rest set consists of two parts and each one of them may be moved to recline the knee rest and push it backward.

25           The essence of the invention consists in that the seat of the chair is dividable and its front part is convertible into a knee rest, the chair has a double arm seat support and its first one moving arm supports the front part of the seat convertible into a knee rest, while the second arm supports the rear part of the seat and the backrest, the chair having a base with three specifically formed arms and each one of the two rear arms is 30 supported on two wheels while the front arm is supported on one wheel, whereby the

base allows the user to place his feet comfortably under the seat while in a kneeling-sitting position.

The utilization of bevel gear mechanisms or transmissions based on cogged belts or chains, or else tie rods system in the chair structure results in that the chair  
5 automatically converts from the sitting configuration into the kneeling configuration by means of a spring action started after releasing the lock, whereas the conversion of the chair back into the sitting configuration is effected by means of the user weight pressing on the seat. These are semi-automatic versions of the chair. In event of attaching a drive in the form of an electrical motor and drive control to the transmission mechanisms, the  
10 conversion into both configurations is effected automatically. These are fully automatic versions.

Including in the chair structure a mechanism regulating the angle of inclination of the backrest with automatic correction of the angle during conversion causes that the angle of inclination of the backrest in relation to the vertical remains unchanged during  
15 the conversion of the chair and needs no correction.

Including in the basic version of the chair a lock mechanism with a latch blockade causes the seat to be locked in the kneeling configuration by a latch after being lifted, and a repeated lifting of the seat causes the release of the lock and automatic lowering of the seat into the sitting configuration. The knee rest is also unlocked with  
20 one gentle upward movement after releasing the arm rotation lock. It is re-locked automatically after returning it to the initial position.

An advantageous effect of the invention is the integration of the knee rest in the seat, which makes the chair similar to a standard chair and causes the dual functional chair to be fully universal. Such a solution provides discretion to the users by not  
25 exposing the rehabilitative nature of the furniture, which allows for a wider use of the invention in offices and public space. The special structure of the base allows for comfortable placement of feet under the seat, which considerably increases the user's comfort.

An advantageous effect of the utilization of individual variants of transmission  
30 mechanisms or tie rods is the possibility of semi-automatic, and with the addition of an

engine - fully automatic conversion of the chair with no need for the user to bow, which is especially significant for persons with spine problems.

An advantageous effect of the utilization of the mechanism regulating the angle of inclination of the backrest with automatic correction of the inclination angle is the ability of the backrest to remain in the position proper for the user after converting the chair without any need for manual correction.

An advantageous effect of the utilization of the rotation lock mechanism with a latch blockade in the basic, economic version of the chair is the facility of unlocking the seat and the knee rest from the sitting position into the kneeling position by their gentle lifting without the need to use any additional levers or locks.

The object of the invention in its embodiment has been illustrated in the drawing.

Fig. 1 illustrates the chair in the sitting configuration.

Fig. 2 illustrates the chair in the first stage of conversion.

Fig. 3 illustrates the chair in the kneeling configuration.

Fig. 4 is a top view of the base.

Fig. 5 is a perspective view of the chair in the sitting configuration.

Fig. 6 is a perspective view of the chair in the kneeling configuration.

Fig. 7 illustrates the chair with a conversion mechanism based on bevel gears in the sitting configuration.

Fig. 8 illustrates the chair with a conversion mechanism based on bevel gears in the kneeling configuration.

Fig. 9 illustrates the chair with a conversion mechanism based on cogged belt gears and cogged belts in the sitting configuration.

Fig. 10 illustrates the chair with a conversion mechanism based on cogged belt gears and cogged belts in the kneeling configuration.

Fig. 11 illustrates the chair with a conversion mechanism based on cogwheels and chains in the sitting configuration.

Fig. 12 illustrates the chair with a conversion mechanism based on cogwheels and chains in the kneeling configuration.

Fig. 13 illustrates the chair with a conversion mechanism based on tie rods in the sitting configuration.

5 Fig. 14 illustrates the chair with a conversion mechanism based on tie rods in the kneeling configuration.

Fig. 15 illustrates the chair with rotation lock and latch blockade mechanisms in the sitting configuration.

10 Fig. 16 illustrates the chair with rotation lock and latch blockade mechanisms in the kneeling configuration.

Fig. 17 illustrates the mechanism regulating the inclination angle of the backrest with automatic correction of the inclination angle during conversion.

Fig. 18 illustrates the rotation mechanism with rotation lock and latch blockade in consecutive stages of action.

15 Figs. 1-3 and Figs. 5-6 illustrate the chair with a dividable seat consisting of a front part 1 of the seat convertible into a knee rest, and of a rear part 4 of a variable angle of inclination. A rear arm 6 of a seat base is mounted rotationally on a column 14, which arm is connected to a plate 8 supporting the rear part 4 of the seat by means of a rotational mechanism 5 with a rotation lock. A front arm 2 of the seat base is mounted to  
20 the lower part of the rear arm by means of a rotational mechanism 3 with rotation lock. The front part 1 of the seat is mounted to the upper part of the front arm 2 by means of a rotational and sliding mechanism with rotation limiter and allowing horizontal sliding movement (not shown), or by means of a rotational mechanism only with rotation lock (not shown either). A backrest support 7 supports a backrest 10 and a set of armrests 9.  
25 A headrest support 11 supporting a headrest 12 is mounted to the backrest. A column 14 is slipped into a sleeve 16 of a three-arm base (Fig. 4) supported on five wheels 15 arranged on a circle and spaced apart from each other of ca. 72°, whereby the front arm 17 is supported on one wheel and each one of the rear arms 19 and 20 is supported on two wheels. A mechanism 18 for regulating the height of the chair, released by means of  
30 a lever 13 is located in the sleeve 16.

In the semi-automatic version of the chair, with bevel gears (Figs.7-8), the movement of unfolding the chair is transmitted by means of bevel gears from the rear part 4 of the seat to the front part 1 of the seat, converting the latter part into a knee rest. The larger cogwheel of the bevel gear 21 is connected coaxially to the rear part 4 of the seat. The smaller cogwheel of the gear 21 is mounted on roller 22. The cogwheel of the bevel gear 23 is mounted on the opposite end of the roller 22. The second cogwheel of gear 23 is connected to and coaxial with the front arm 2. The cogwheel of the gear 24 is mounted on a mutual axis with the larger cogwheel of the gear 23. The cogwheel of gear 23 and the arm 2 are rotationally mounted on the axis and the cogwheel of gear 24 is connected to the axis being non-rotationally mounted in the casing. The second cogwheel of the gear 24 is mounted on roller 25, while on its opposite end the cogwheel of gear 26 is situated. The larger cogwheel of gear 26 is coaxially connected to the knee rest 1.

On the axis of the arm 2 and connected to this arm 2 there is situated also the arm 43, which interacts with spring 42 connected to said axis. The rotation of the entire mechanism is blocked by the rotation lock 41.

After releasing the lock 41 the spring 42 via the arm 43 causes rotation of the gear 23 and then the entire mechanism. In such a way the chair is converted to the kneeling-sitting configuration. The lock 41 maintains the mechanism in both configurations.

After releasing the lock 41, the user's hand pressing on the seat will cause rotation of the seat to the horizontal position and via the consecutive gears the movement is transmitted to the arm 2 and the knee rest causing their return to the initial configuration, and simultaneously the arm 43 puts the spring 42 under tension again.

In the semi-automatic version of the chair with cogged belt gears and cogged belt (Figs. 9-10) the rear part 4 of the seat is mounted coaxially with a cogged belt wheel 27, which is connected to the cogged belt wheel 29 by means of a cogged belt 28. On a mutual axis with the wheel 29 two cogwheels 30a and 30b of a double cogged gear 30 are mounted and the first one of the two cogwheels turns along with the wheel 29 while the second one 30b is locked on a fixed unmoving axis. While turning, the cogwheel 30a turns a cogwheel 30c being coaxial with and connected to the arm 2. While turning, the cogwheel 30c causes rotation of the arm 2 connected thereto. The cogwheel 30b is

connected to a non-rotational axis. By blocking a cogwheel 30d it causes rotation of the cogwheel 30d in relation to the arm 2 at the moment when the arm 2 starts rotating.

On a mutual axis with cogwheel 30d there is a cogged belt wheel 31 connected thereto and connected by means of a cogged belt 32 with a cogged belt wheel 33 being  
5 coaxial with and connected to the knee rest 1. Coaxially with the wheel 29 and connected thereto there is arranged the arm 43 interacting with the spring 42. After releasing the lock 41 the spring causes rotation of the arm 43 and rotation of the arm causes rotation of the wheels 29 and 30a. In turn, rotation of the wheels causes rotation of further mechanisms of wheels, changing the position of the rear part 4 of the seat and  
10 of the knee rest 1 into the kneeling-sitting configuration.

As in the embodiment shown on Figs. 7-8, after releasing the lock 41, the user's hand pressing on the rear part 4 of the seat causes its rotation to the horizontal position and via the consecutive gears the movement is transmitted to the arm 2 and the knee rest 1 causing their return to the initial configuration, and simultaneously the arm 43 puts the  
15 spring 42 under tension again. The rotation lock 41 maintains the mechanism in this configuration.

In the semi-automatic version of the chair with cogwheels and chains (Figs. 11-12) the rear part 4 of the seat is mounted coaxially with a cogwheel 34, which is connected to a cogwheel 36 by means of a chain 35. On a mutual axis with the wheel 36  
20 two cogwheels 37a and 37b of a double cogged gear 37 are arranged and the first one of the two cogwheels turns along with the wheel 36 while the second one 37b is locked on a fixed unmoving axis. While turning, the cogwheel 37a interacts with a cogwheel 37c being coaxial with and connected to the arm 2. While turning, the cogwheel 37c causes rotation of the arm 2 connected thereto. The cogwheel 37b is connected to a non-  
25 rotational axis. By blocking a cogwheel 37d it causes rotation of the cogwheel 37d in relation to the arm 2 at the moment when the arm 2 starts rotating.

On a mutual axis with the wheel 37d there is a cogwheel 38 connected thereto and connected by means of a chain 39 with the cogwheel 40 being coaxial with and connected to the knee rest 1. Coaxially with the wheel 36 and connected thereto there is  
30 mounted the arm 43 interacting with the spring 42. After releasing the lock 41 the spring 42 causes rotation of the arm 43 and rotation of the arm causes rotation of the wheels 36 and 37a. In turn, rotation of the wheels causes rotation of further mechanisms of wheels,

changing the position of the rear part 4 of the seat and of the knee rest 1 into the kneeling-sitting configuration.

After releasing the lock 41, the user's hand pressing on the rear part 4 of the seat causes its rotation to the horizontal position and via the consecutive gears the movement is transmitted to the arm 2 and the knee rest 1 causing their return to the initial configuration, and simultaneously the arm 43 puts the spring 42 under tension again. The rotation lock 41 maintains the mechanism in this configuration.

In the semi-automatic version of the chair with tie rods (Figs. 13-14) after releasing the rotation lock 41, the rotational movement of the rear part 4 of the seat is transmitted by means of a tie rod 60 and an axis 61 to the arm 2 which will cause its rotation around an axis 62 until it reaches the kneeling configuration. Simultaneously the same rotational movement of the rear part 4 of the seat 4 causes the movement of a tie rod 63, which is then transmitted to a crank 64. The rotational movement of the crank around the axis causes in turn the movement of a tie rod 65. This tie rod, while causing rotation of the crank 66, causes in turn rotation of the knee rest 1 being coaxial therewith on axis 67 and connected thereto. The spring 42 forcing the unfolding movement may be replaced in this embodiment by a spring coiled around the axis 62.

In the basic version of the chair (Figs. 15-16) a rotational mechanism with rotation lock 5 and 53 may be employed, the mechanism being constructed such (Fig. 18) that a cam 57 is situated coaxially with an arm 54 with a cog and connected to the arm by means of a bolt 56. The rotational movement of the arm 54 is temporarily blocked by a latch 55 which is pressed against the arm 54 by means of a spring 58 and the cam 57 temporarily blocks functioning of the latch 55 by lifting and supporting it. The movement of the arm 54 forces the cam 57 to rotate by means of the bolt 56, which is permanently connected with the arm 54 and moves in a slot 59 in the form of a sector of a ring within the cam 57. The rotation of the cam is forced by the rotating arm 54, when the bolt forcing the rotation reaches the terminal point of the slot 59. When the bolt 56 reaches the terminal point of the slot 59, the arm 54 moving clockwise, pulls the cam 57 and the moving cam 57 lifts the latch 55. Starting from the moment, when the arm 54 moves counter-clockwise the cog of the arm 54 passes below the lifted latch 55, which remains lifted until the bolt reaches the opposite terminal point of the slot 59 and forces the cam to rotate and thus it is removed from below the latch. Repeated counter-

clockwise movement of the arm will take place with the unsupported latch pushed by the spring towards the arm, and it will cause the latch to function.

The chair may be equipped with a mechanism for regulating the angle of inclination of the backrest (Fig. 17) with an automatic correction of the angle during conversion, the mechanism being constructed such that the tie rod 45 is rotationally  
5 connected to the backrest support 7 rotating on the axis 44. The tie rod is rotationally mounted on a slider 46 with a slide lock 47. This slider is mounted on a sleeve 48. Together with a spring 49 and an element 50 into which the sleeve 48 is slid permanently, they form the backrest inclination set. This set is slidably mounted on a  
10 roller 51 in such a manner that the movement of inclining the rear part 4 of the seat transmitted by means of a tie rod 52 to the element 50 shifts the entire backrest inclination set mounted on the sleeve 48 along the roller 51 and by means of the tie rod 45 corrects the angle of inclination of the backrest support 7. Releasing the slide lock 47 allows for regulating the inclination of the backrest. In such case the slider 46 moves  
15 along the sleeve 48 allowing for rotational movement of the backrest support 7. Repeated locking of the lock 47 stops the movement of the backrest in the chosen position.

## LIST OF REFERENCE NUMERALS:

1. Front part of the seat convertible into an armrest.
2. Front arm of the base of the seat.
3. Rotational mechanism with rotation lock.
4. Rear part of the seat.
5. Rotational mechanism with rotation lock.
6. Rear arm of the base of the seat.
7. Support of the backrest.
8. Plate supporting the rear part of the seat.
9. Set of armrests.
10. Backrest.
11. Support of the headrest.
12. Headrest.
13. Lever of the height regulation mechanism.
14. Column.
15. Wheels of the chair base.
16. Sleeve of the base.
17. Front arm of the base of the chair.
18. Height regulation mechanism.
19. Rear arm of the base of the chair.
20. Rear arm of the base of the chair.
21. Bevel gear.
22. Roller.
23. Bevel gear.
24. Bevel gear.
25. Roller.
26. Transmission.
27. Cogged belt wheel.
28. Cogged belt.
29. Cogwheel.
30. Double cogged gear.
- 30a-d. Cogwheels of the double cogged gear 30.
31. Cogged belt wheel.
32. Cogged belt.
33. Cogged belt wheel.
34. Cogwheel.

35. Chain.
36. Cogwheel.
37. Double cogged gear.
- 37a-d. Cogwheels of the double cogged gear 37.
38. Cogwheel.
39. Chain.
40. Cogwheel.
41. Lock.
42. Spring.
43. Arm.
44. Rotation axis.
45. Tie rod.
46. Slider.
47. Slide lock.
48. Sleeve.
49. Spring.
50. Sleeve mounting element.
51. Roller.
52. Tie rod.
53. Rotation lock.
54. Arm with cog.
55. Latch.
56. Bolt.
57. Cam.
58. Spring.
59. Slot in the form of a section of a ring.
60. Tie rod.
61. Axis.
62. Rotation axis.
63. Tie rod.
64. Crank.
65. Tie rod.
66. Crank.
67. Rotation axis.

## Claims

1. A dual functional chair with a dividable seat, **characterized in that** the dividable seat consists of a convertible into a knee rest front part (1) of the seat rotationally and slidably connected to a movable front arm (2) of a base of the seat, which arm  
5 rotates on an axis of the rotational mechanism (3), and of the rear part (4) of the seat having a variable angle of inclination and connected to a rear arm (6) of the base of the seat by means of a rotational mechanism (5).
2. The chair according to claim 1, **characterized in that** a chair base is constructed in such a manner that a sleeve (16) of a column (14) is supported on three bottom arms  
10 of the chair base (17,19,20) supported on five wheels (15) arranged on a arranged on a circle and spaced apart from each other of ca. 72°, whereby the bottom front arm (17) is supported on one wheel and each of the rear arms (19,20) is supported on two wheels (15).
3. The chair according to claim 1, **characterized in that** any known in the art  
15 rotational and sliding mechanism that connects the knee rest (1) with the arm (2) may be replaced – when its functions are limited to rotation only, by any rotational mechanism.
4. The chair according to claim 1 or 3, **characterized in that** the rotational movement  
20 of the front part (1) of the seat may be transmitted by a bevel gear (21) by means of a roller (22) to a bevel gear (23) forcing the rotational movement of the arm (2), and then the movement of the gear (23) forces the movement of a roller (25) by means of a bevel gear (24) placed coaxially on the same mutual axis with the gear (23), whereas said movement of the roller (25) forces the rotational movement of a gear  
25 (26) that changes – while turning, a position of the front part (1) of the seat giving it the function of the knee rest.
5. The chair according to claims 1 or 3, **characterized in that** the movement of the  
front part (1) of the seat may be transmitted to a cogged belt wheel (27), which by means of a cogged belt (28) transmits the rotational movement to a cogwheel (29); two cogwheels (30a and 30b) of a double cogged gear (30) are placed on a mutual  
30 axis with the cogwheel (29) and the first one of the two cogwheels turns along with the wheel (29) while the second one (30b) is blocked on a fixed unmoving axis;

while turning, the cogwheel (30a) turns a cogwheel (30c) which is coaxial with and connected to the arm (2); while turning, the cogwheel (30c) causes rotation of the arm (2); the cogwheel (30b) connected to a fixed unmoving axis - while blocking the wheel (30d), causes rotation of the wheel (30d) in relation to the arm (2) at the moment, when the arm (2) starts rotating; simultaneously, a cogged belt wheel (31) being connected to the cogwheel (30d) a rotates coaxially therewith and transmits the movement by means of a cogged belt (32) to a cogged belt wheel (33) turning coaxially with the knee rest (1); whereas an arm (43) is arranged coaxially with and connected to the wheel (29) and a spring (42) interacts with the arm (43); after releasing the lock (41) the seat rotates upon pressing to the horizontal position and by means of consecutive gears the movement is transmitted to the arm (2) and the knee rest (1) causing their return to the initial configuration; at the same time the arm (43) puts the spring (42) under tension again and the rotation lock maintains the mechanism in this configuration.

6. The chair according to claims 1 or 3, **characterized in that** the movement of the rear part (4) of the seat may be transmitted to a cogwheel (34) which by means of a chain (35) transmits the rotational movement to a cogwheel (36); two cogwheels (37a and 37b) of a double cogged gear (37) are arranged on a mutual axis with cogwheel (36), the first one of the two cogwheels turns along with cogwheel (36) while the second one (37b) is blocked on a fixed unmoving axis; while turning, the cogwheel (37a) turns a wheel (37c) being coaxial with and connected to the arm (2); while turning, the cogwheel (37c) causes rotation of the arm (2) connected therewith; the cogwheel (37b) is connected to a non-rotational axis, and while blocking the wheel (37d) it causes rotation of the wheel (37d) in relation to the arm (2) at the moment when the arm (2) starts rotating; a cogged belt wheel (38) being connected to the wheel (37d) turns coaxially with the wheel (37d) and transmits the movement by means of a chain (39) to a cogwheel (40) turning coaxially with the knee rest (1); an arm (43) is arranged coaxially with and connected to the wheel (29) and a spring (42) interacts with the arm (43); after releasing the lock (41) the rear part (4) of the seat rotates upon pressing to the horizontal position and by means of consecutive gears the movement is transmitted to the arm (2) and the knee rest (1) causing their return to the initial configuration; at the same time the arm (43) puts

the spring (42) under tension again and the rotation lock maintains the mechanism in this configuration.

7. The chair according to any of the preceding claims 1-6, **characterized in that** the movement causing unfolding and folding the chair is forced by a slow-speed electrical engine attached to any one of the elements of the unfolding mechanism, and in particular to the gear (21 or 23) or to the roller (22).
8. The chair according to the claims 1 or 3, **characterized in that** after releasing the rotation lock (41) the rotational movement of the rear part (4) of the seat is transmitted by means of a tie rod (63) and an axis (64) to the arm (2) and causes its rotation on the axis (62); at the same time the rotational movement of the rear part (4) of the seat is transmitted by means of the movement of the tie rod (63) to a crank (64), the rotational movement of which is subsequently transmitted to the movement of a tie rod (65) that while causing rotation of the crank (66) around an axis (67) causes rotation of the knee rest (1) being coaxial with and connected to the crank.
9. The chair according to claim 1 or 3, **characterized in that** it is equipped with a mechanism for regulating an angle of inclination of the backrest with an automatic correction of the angle during conversion of the chair into the kneeling-sitting configuration, operating in such a manner that the position of the support (7) of the backrest (10) rotating on an axis (44) is determined by a tie rod (45) rotationally mounted to the backrest support, which is rotationally connected to a slider (46) with slide lock (47), which is in turn slidably mounted on a sleeve (48), that together with a spring (49) and a mounting element (50) into which the sleeve (48) is slid permanently, form the backrest inclination set slidably arranged on a roller (51) in such a manner that the inclining movement of the rear part (4) of the seat being transmitted by a tie rod (52) to the mounting element (50), shifts the entire set for inclination the backrest (10) mounted on the sleeve (48) along the roller (51) and by means of the tie rod (45) corrects the angle of inclination of the support (7) of the backrest (10).
10. The chair according to claim 1 or 3, **characterized in that** the rotational mechanism with rotation lock (5 and 53) may be constructed such that a cam (57) is arranged coaxially with an arm (54) with a cog and connected to the arm by means of a bolt (56), the movement of the arm may be blocked by a latch (55); the cam may

temporarily block functioning of the latch (55) by lifting and supporting it; the latch being pressed against the arm (54) by means of a spring (58); the wheel (54) forces rotation of the cam (57) by means of the bolt (56) which is permanently connected to the wheel (54), and moves in a slot (59) in the form of a sector of a ring within the cam (57); rotation of the cam (57) is forced by the turning wheel (54) when the bolt (56) forcing the rotation reaches the terminal point of the slot (59); the wheel (54) moving clockwise pulls the cam (57) when the bolt (56) reaches the terminal point of the slot (59), while in turn the cam (57) lifts the latch (55); starting from the moment when the wheel (54) moves counter-clockwise its cog passes below the lifted latch (55) which remains lifted until the bolt (56) reaches the opposite terminal point of the slot (59) and forces rotation of the cam (57) causing its removal from below the latch; repeated counter-clockwise movement of the arm will take place with the unsupported latch pushed by the spring (58) towards the arm and it will cause the latch to function.

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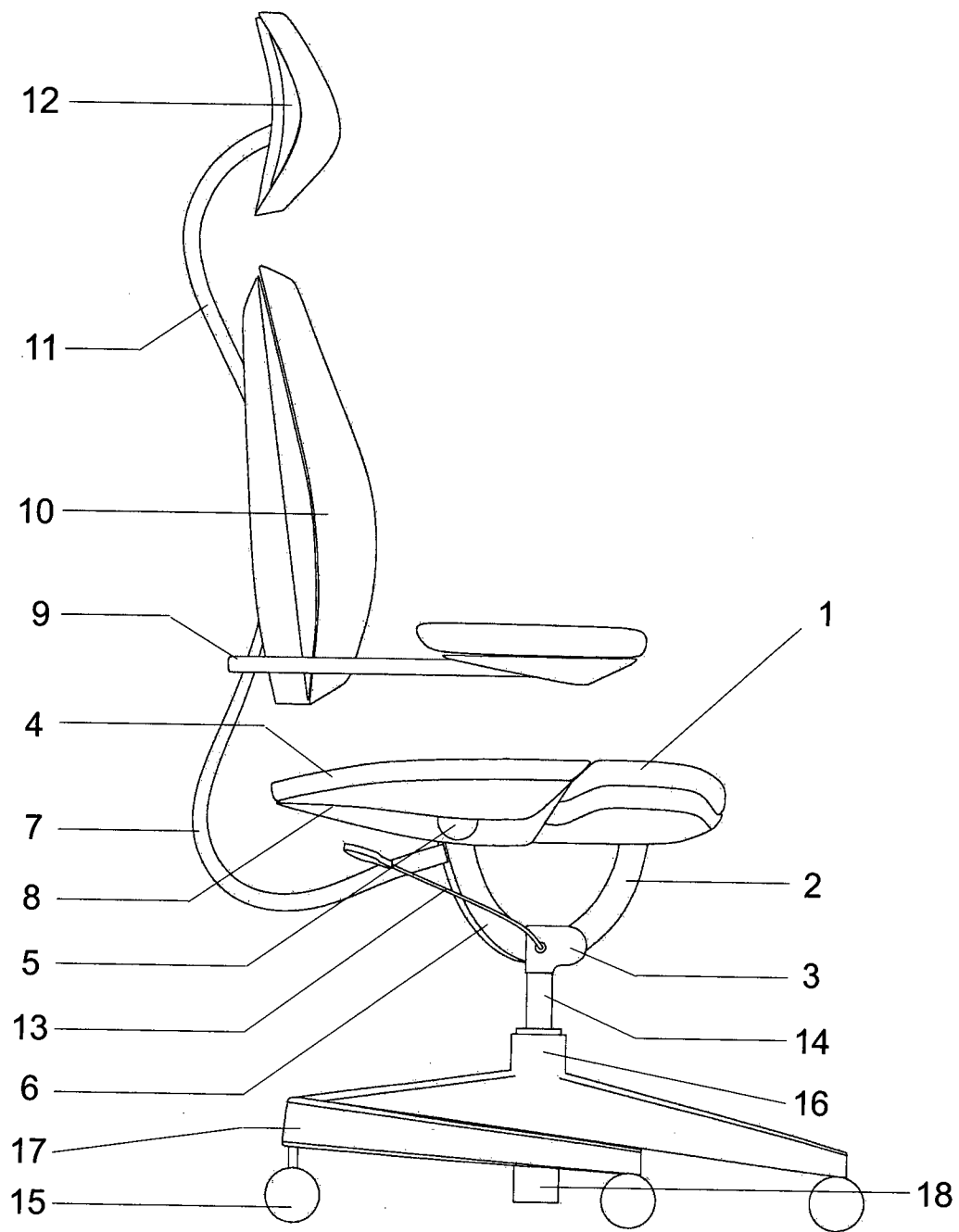


Fig.1

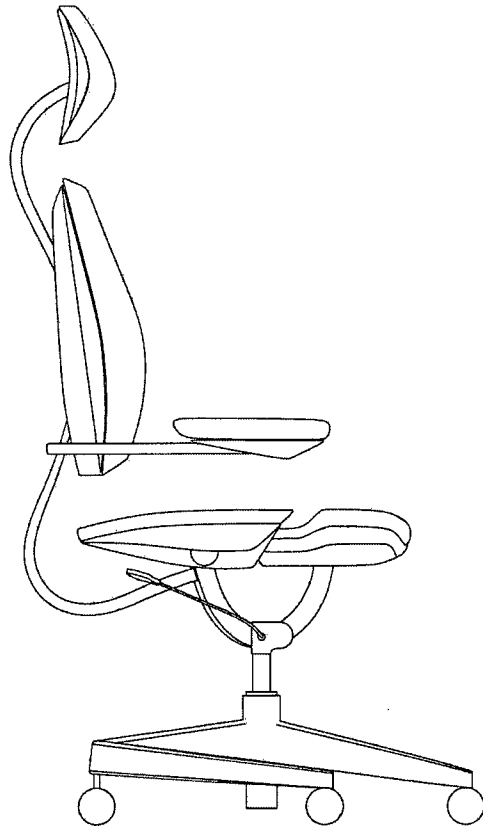


Fig.2

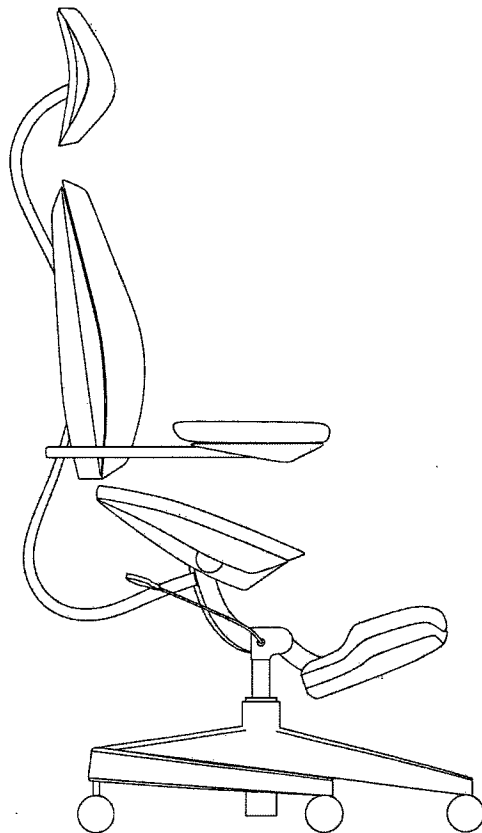
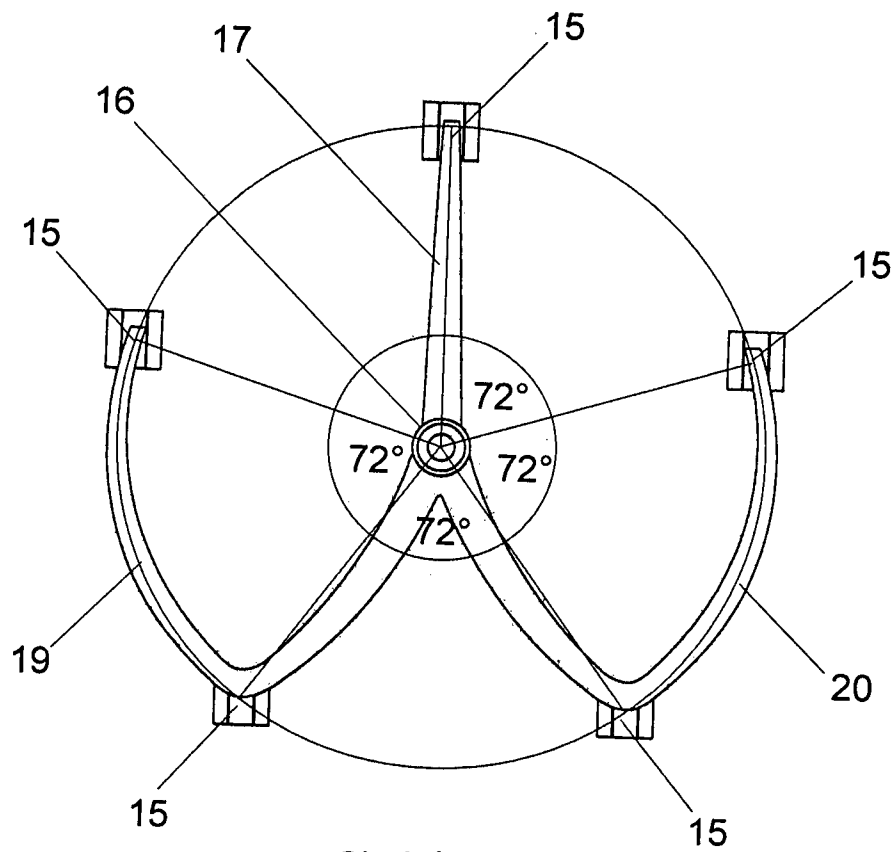


Fig.3



Chair base

Fig.4

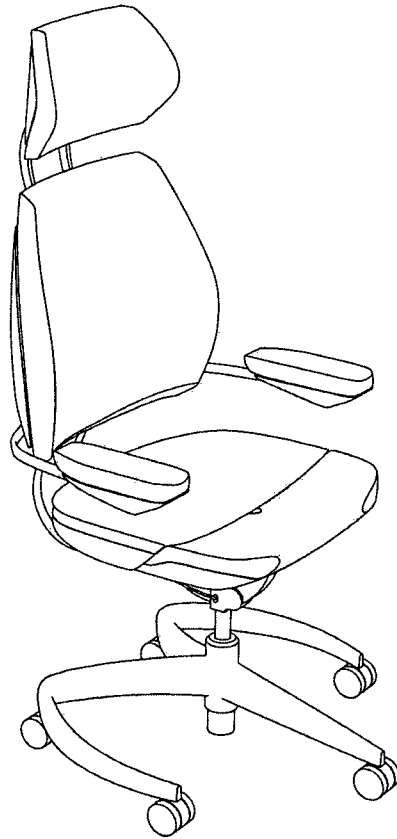


Fig.5

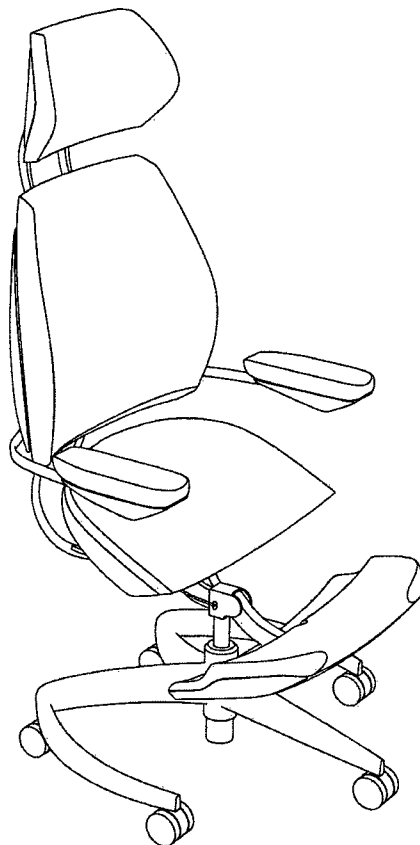


Fig.6

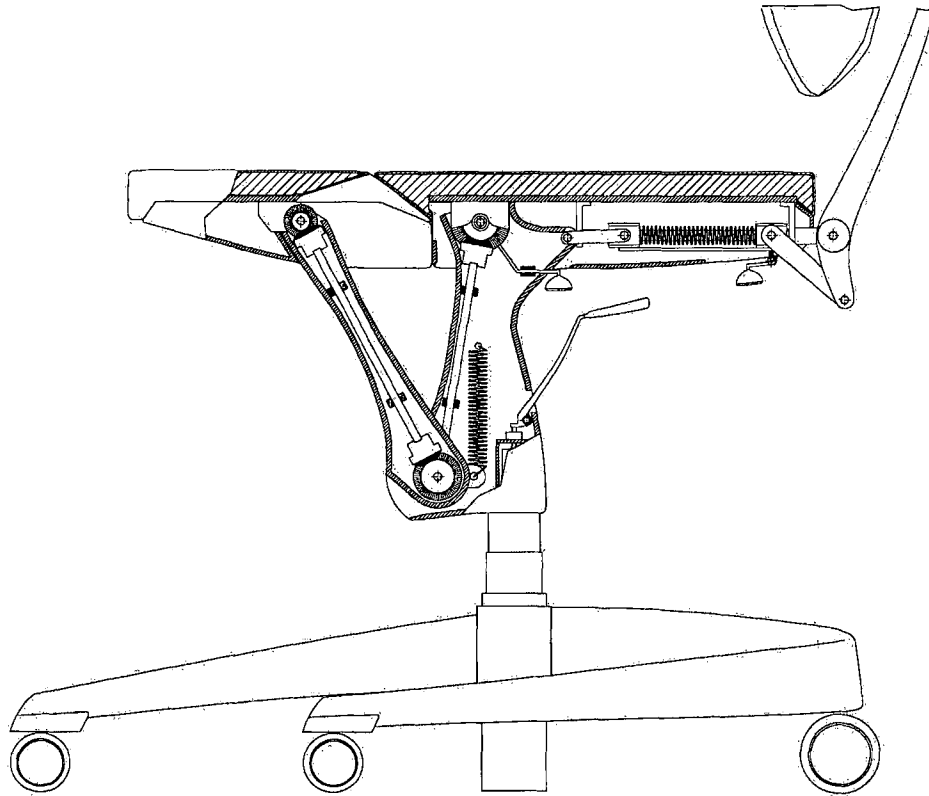


Fig.7

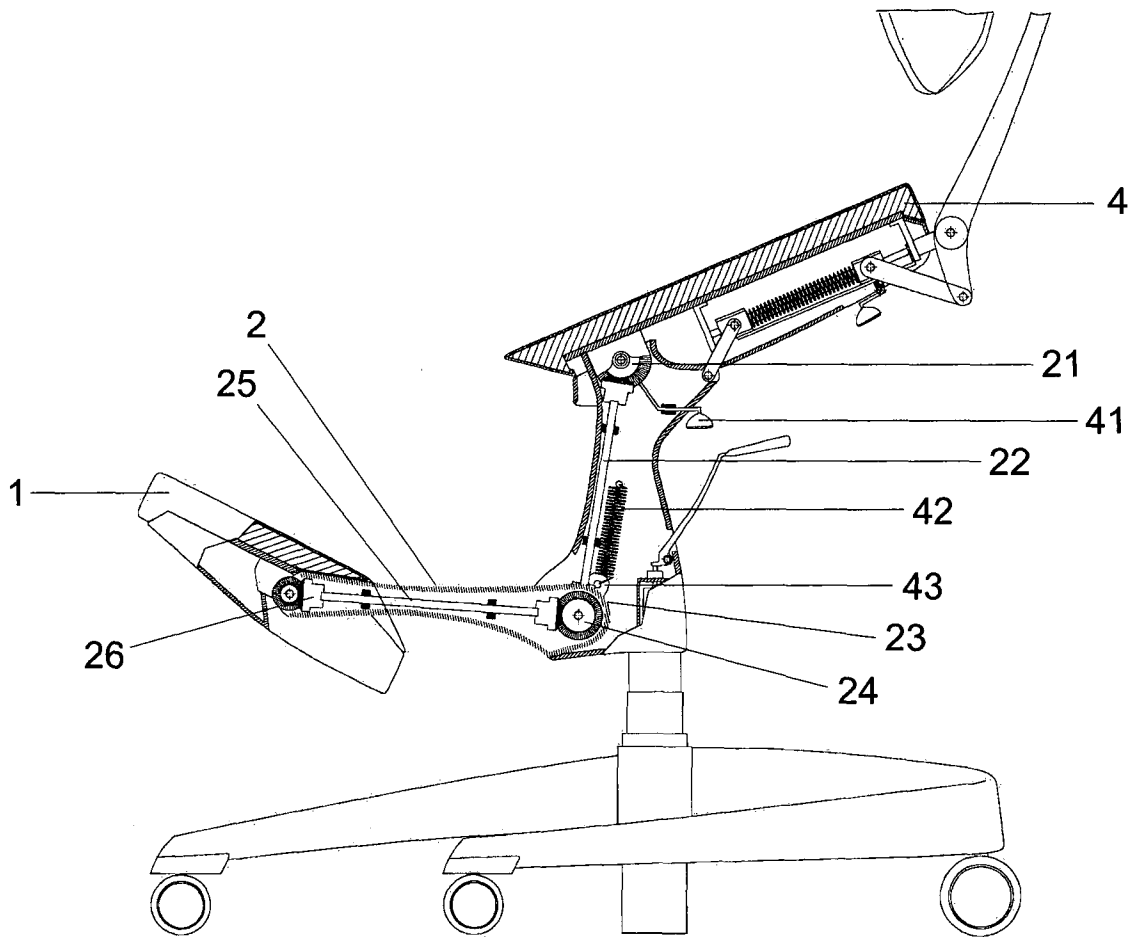


Fig.8

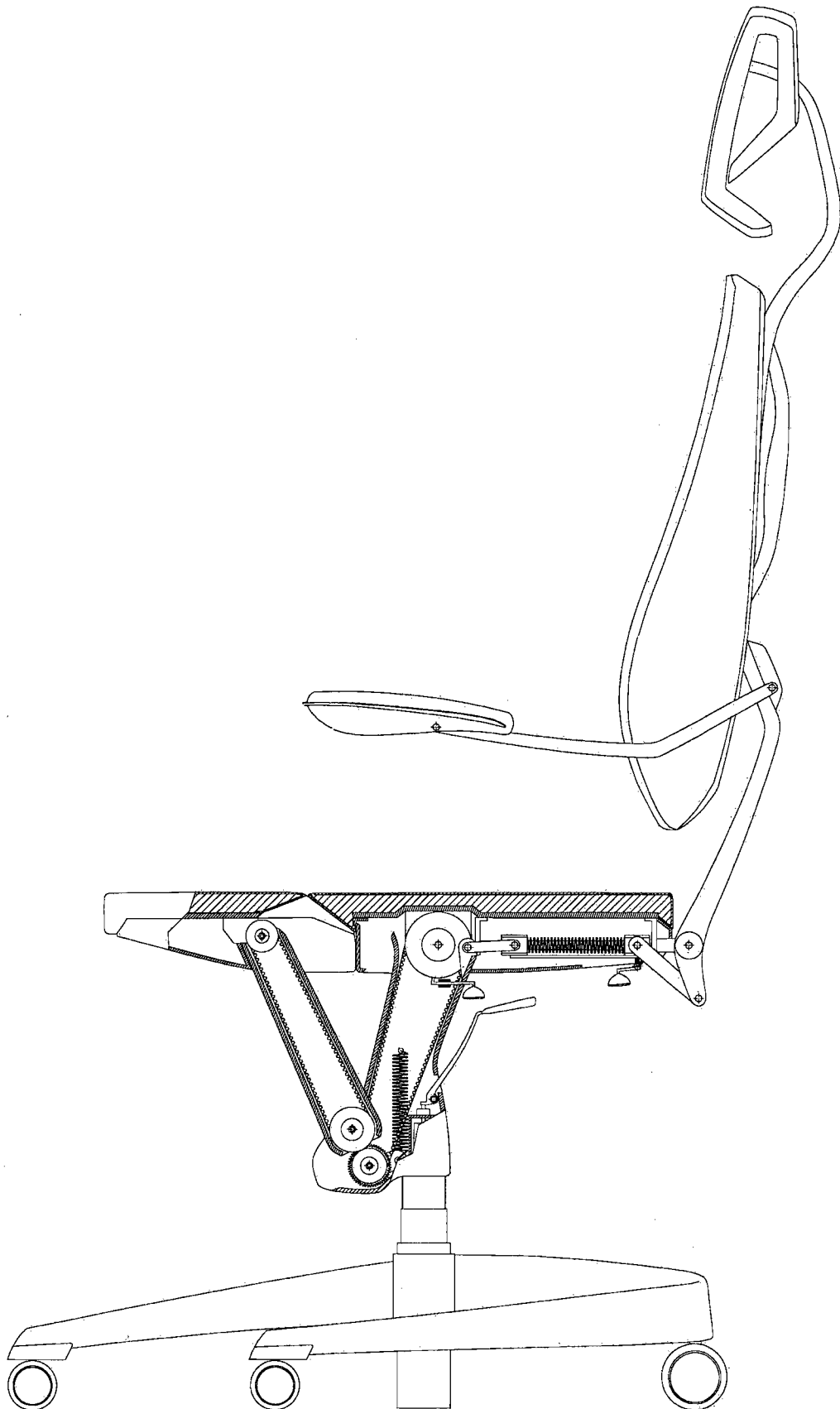


Fig.9

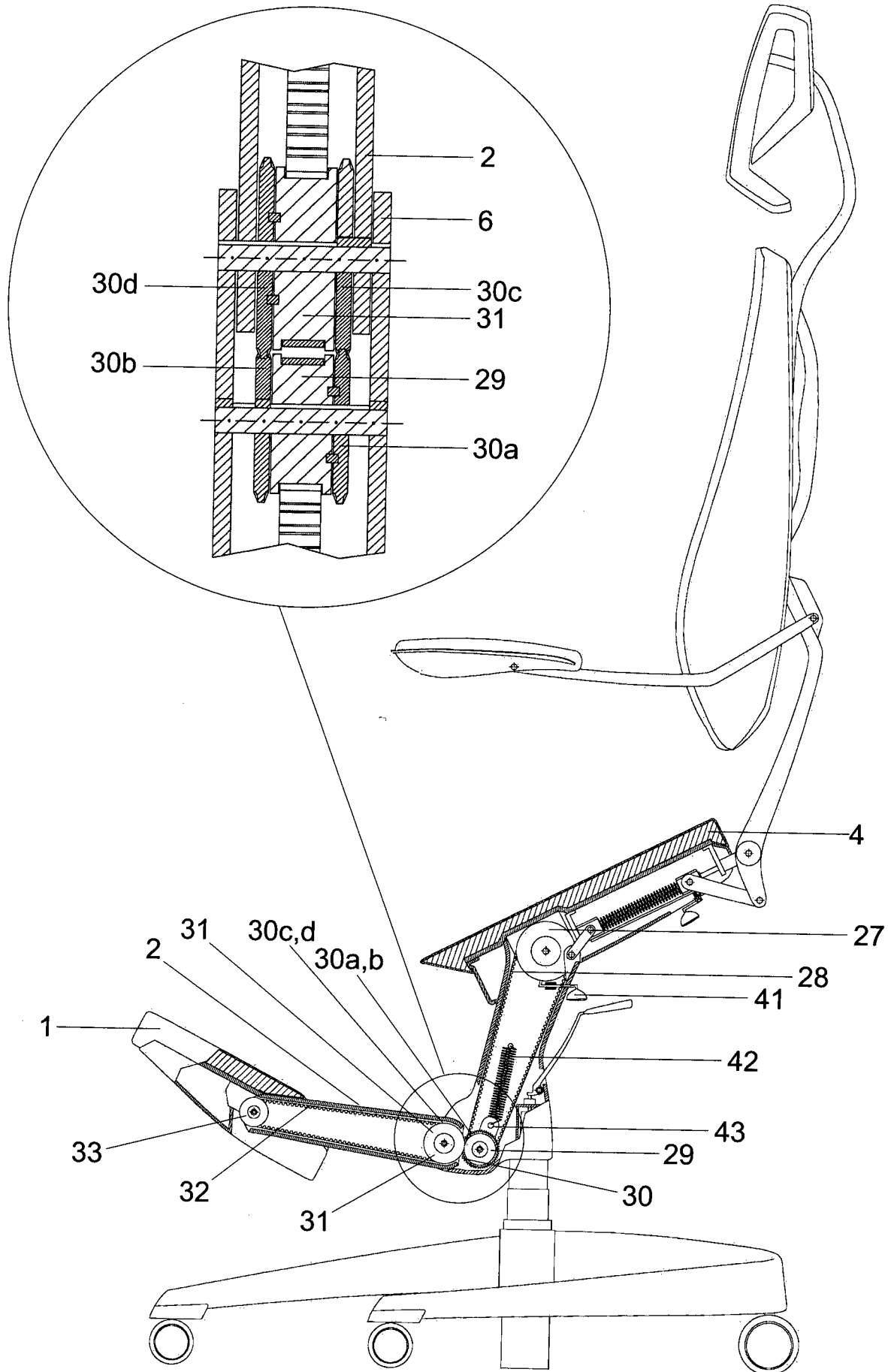


Fig.10

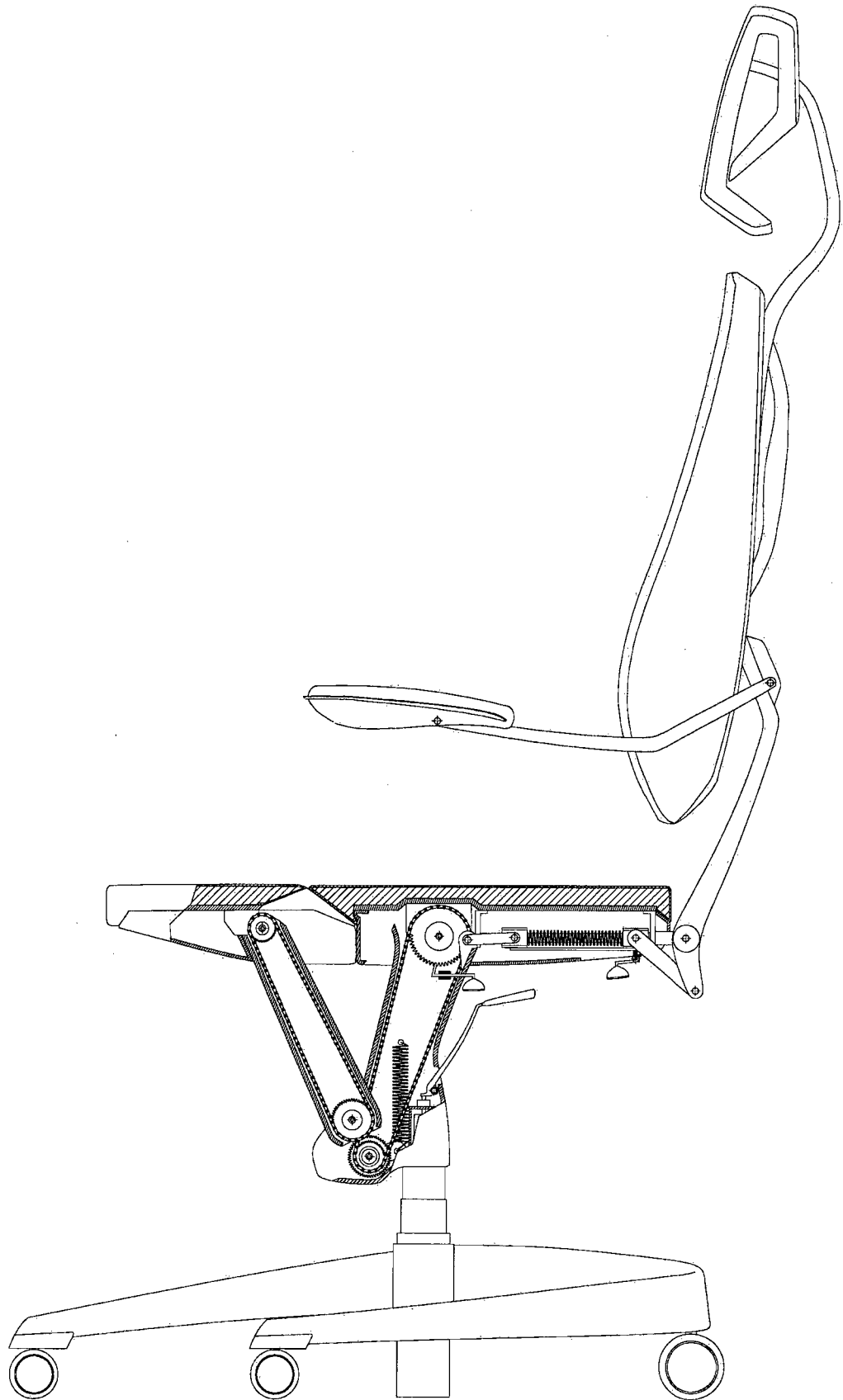


Fig.11

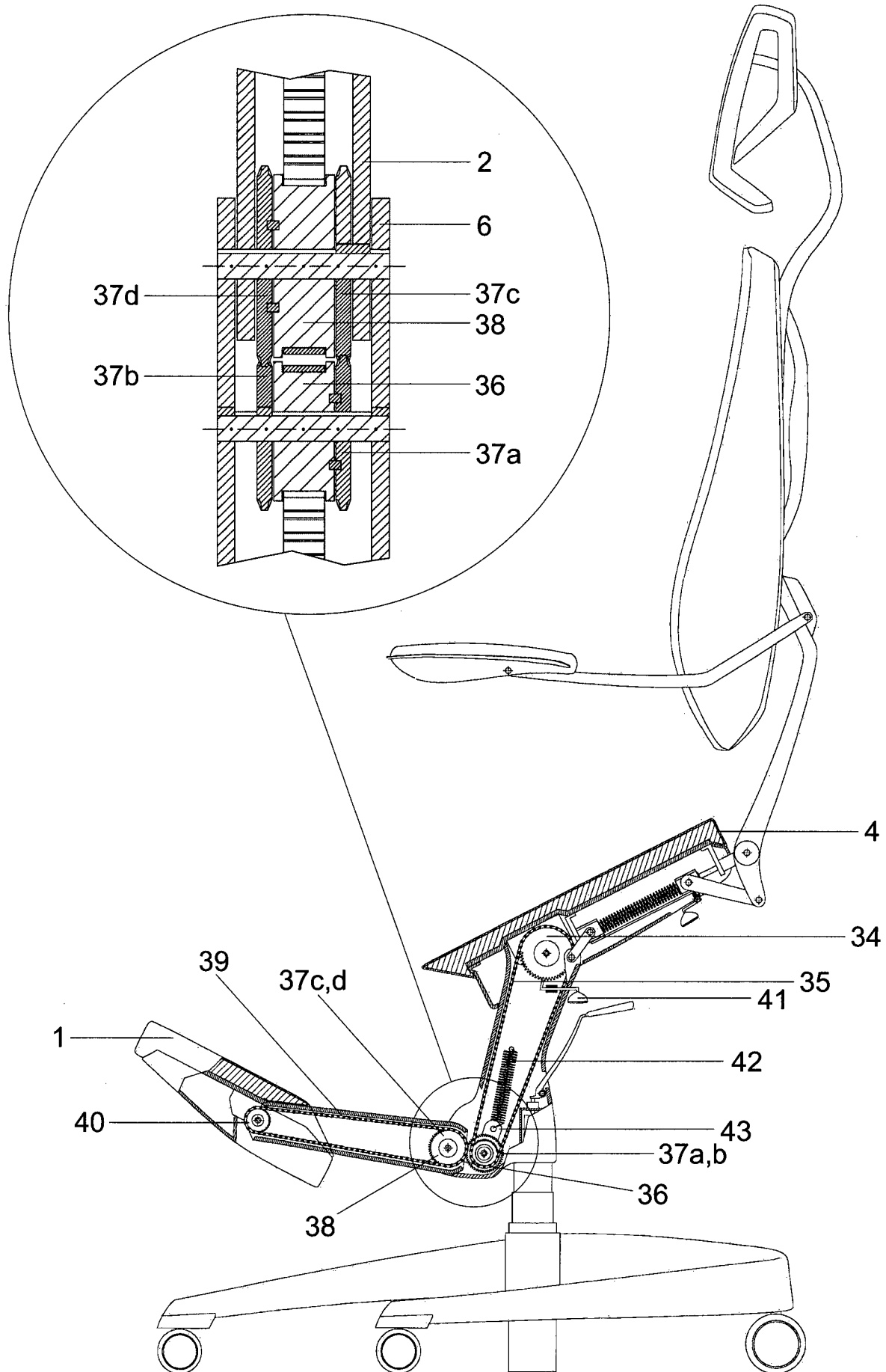


Fig.12

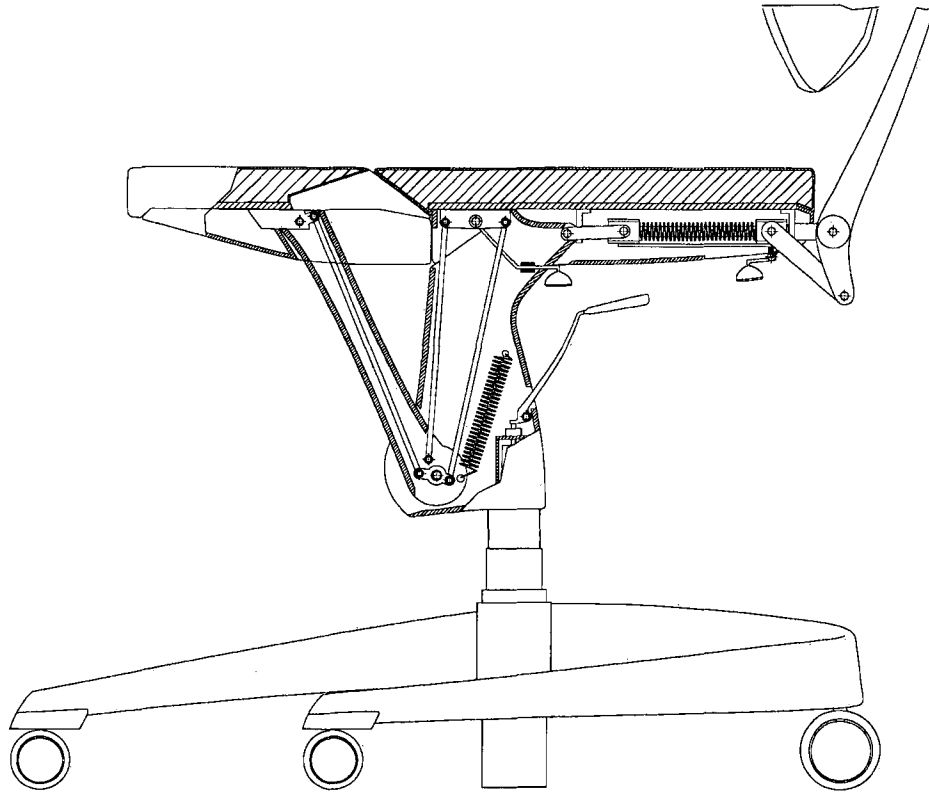


Fig.13

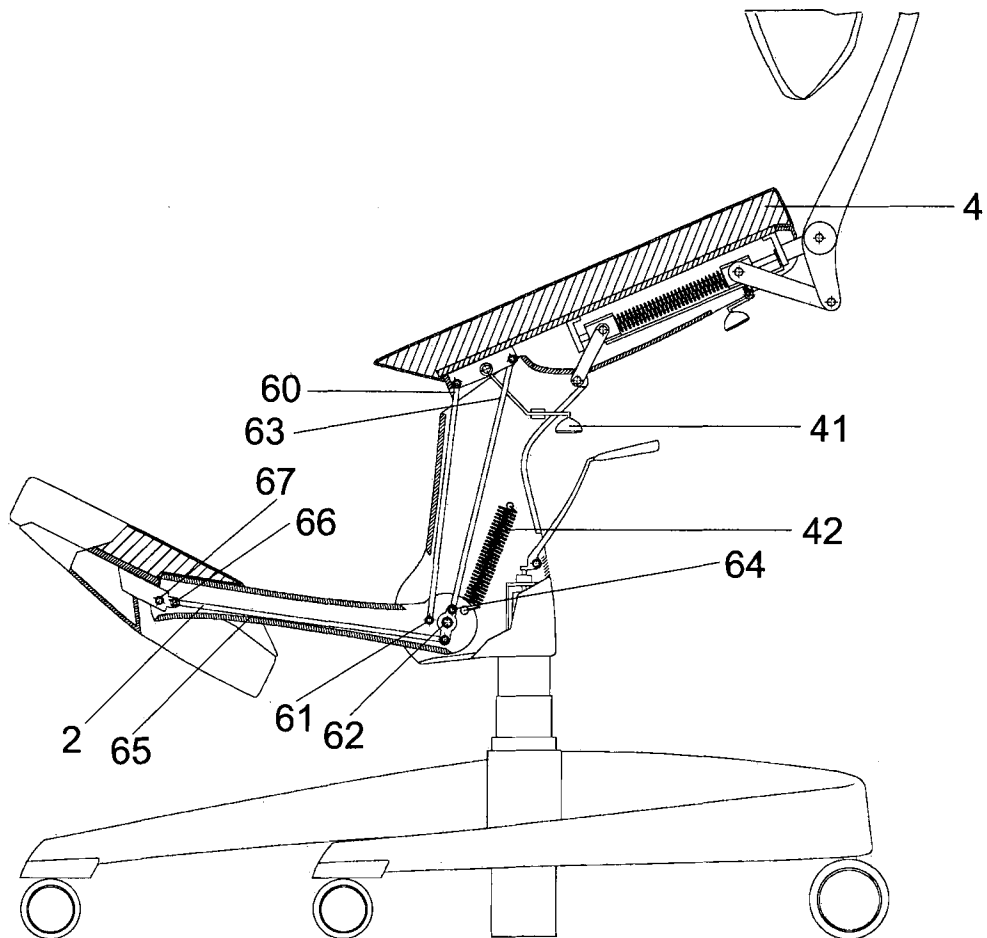


Fig.14

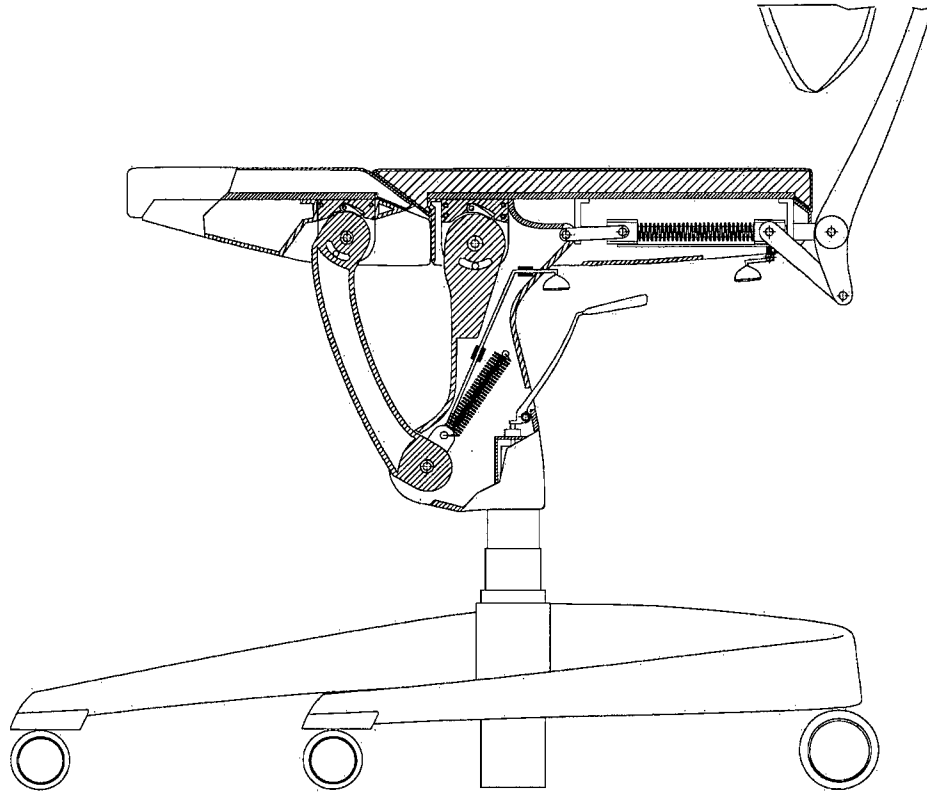


Fig.15

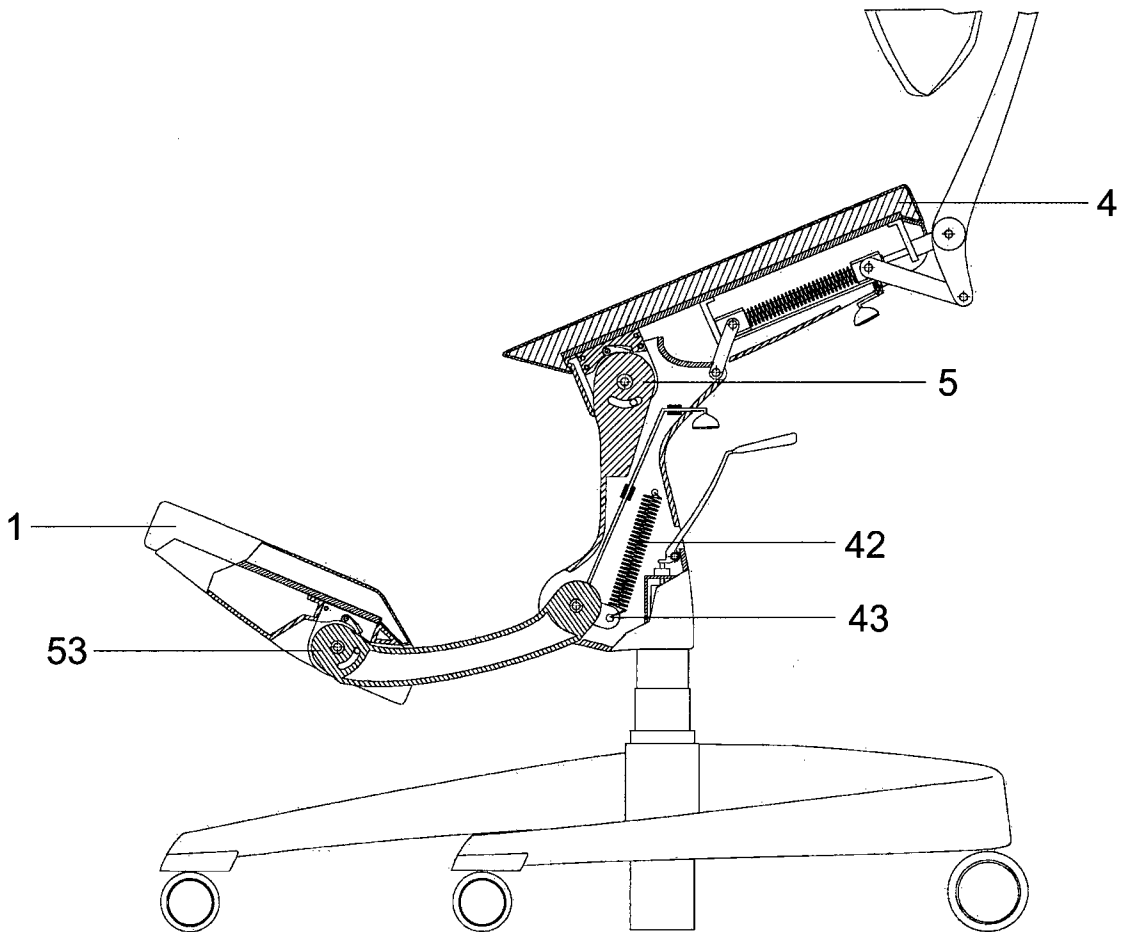


Fig.16

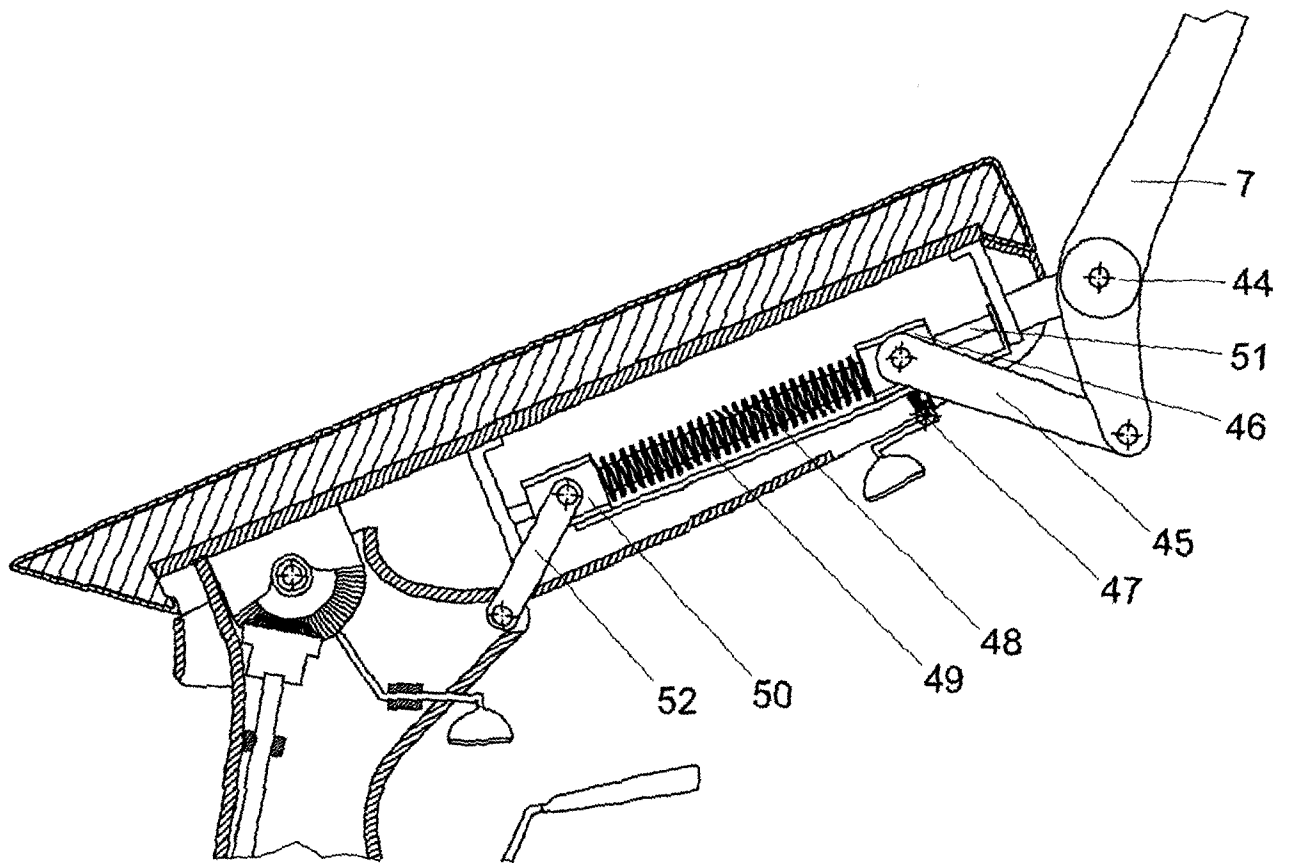


Fig.17

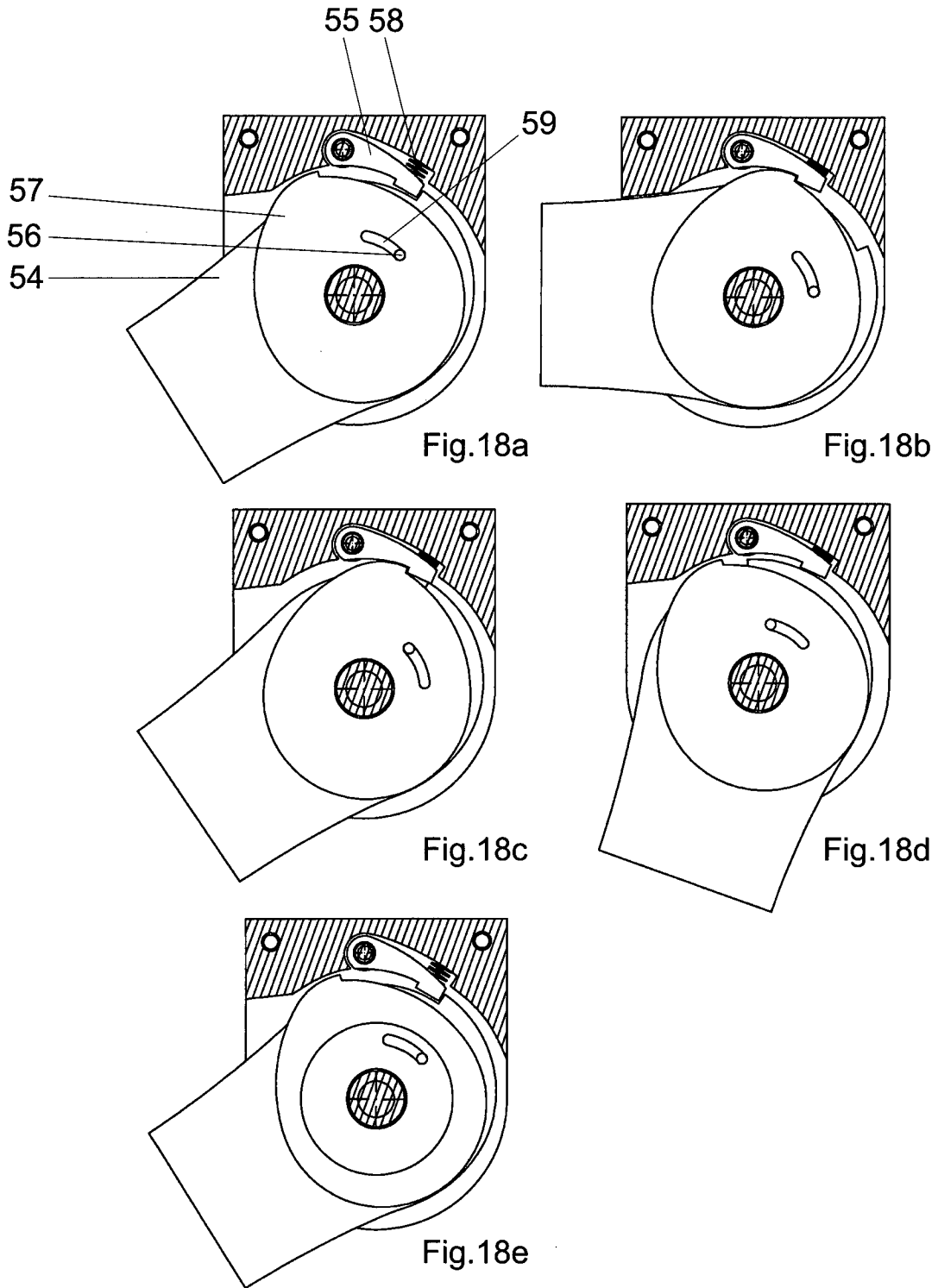


Fig.18

**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/IB2013/000114

**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. A47C9/00 A47C7/02  
 ADD.  
 According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**  
 Minimum documentation searched (classification system followed by classification symbols)  
 A47C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
 EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2011/193383 A1 (GUISSIN RAMI) 11 August 2011 (2011-08-11) abstract; figures 8a-8h page 1, paragraph 11 - page 2, paragraph 18 page 8, paragraph 99-104	1
A	WO 85/00275 A1 (MENSHOEL HANS CHR) 31 January 1985 (1985-01-31) abstract; figure 2 page 1, lines 26-38 page 3, lines 1-18	1

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

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- "O" document referring to an oral disclosure, use, exhibition or other means
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Date of the actual completion of the international search  
 19 April 2013

Date of mailing of the international search report  
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 Tempels, Marco

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2013/000114

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