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(54) **Built-in footrest mechanism in combination with a chair**

Fusstützenmechanismus in Kombination mit einem Stuhl

Mécanisme d'un repose-pieds en combinaison avec une chaise

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Description

[0001] The invention concerns a built-in footrest mechanism in combination with a chair, said mechanism comprising a support which can be moved between a folded-in position in which it is situated under the seat and a position in which it is situated in front of the seat; a frame which is mounted under the seat in the chair; an auxiliary frame which is telescopic in relation to said frame and upon which the support is movably mounted; and a common drive for sliding the above-mentioned auxiliary frame in and out and for moving the support in relation to this auxiliary frame.

[0002] Such a footrest mechanism makes it possible to bring the support, upon which is provided a cushion or such, in front of the seat, so that a person resting in the chair can put his feet on this cushion.

[0003] With known footrest mechanisms, the support is a part of the front of the chair situated under the seat which can be folded out forward, for example by means of a shear mechanism.

[0004] A footrest mechanism of this kind is for example disclosed in US-A-3.794.381. The support is pivotally connected to the front and the drive can pivot the support from its vertical position in the front of the chair to a horizontal position just in front of the seat.

[0005] As the support is part of the chair itself, its construction and dimensions will depend of the chair, so that these footrest mechanisms are not universal.

[0006] Moreover, in folded-out position, the support is situated practically against the seat, which in many cases is not an ideal position to support the feet. Mostly, the calves rather than the feet rest on the support, which is for example undesirable for people suffering from varicose veins.

[0007] The invention aims to provide a built-in footrest mechanism in a chair which fits in several chairs and which can bring the support in the suitable place in relation to the seat and yet has quite a simple construction.

[0008] According to the invention, this aim is reached because the support is connected to the telescopic auxiliary frame by the intermediary of a tilting connection containing on each side a pair of arms whose ends are connected in a hinged manner to the auxiliary frame and in a hinged manner to the support, whereby the drive is connected to the tilting connection

[0009] EP-A-0.534.908 discloses a footrest mechanism comprising a support connected by the intermediary of two pair of arms to a telescopic auxiliary frame mounted on a fixed frame. However, this mechanism does not comprise any drive and as well the telescoping of the auxiliary frame as the tilting of the support are manually.

[0010] Preferably, the footrest mechanism according to the invention contains means which, when the drive extends this auxiliary frame, hold the support in its lowest position on this auxiliary frame until this auxiliary frame is almost completely extended.

[0011] These means may consist of clamping means, in particular of at least a spring.

[0012] The invention also concerns the footrest mechanism as such which is fit to be built-in in a chair.

[0013] In order to better explain the characteristics of the invention, the following preferred embodiment of a built-in footrest mechanism in a chair and of a footrest mechanism designed for it according to the invention is described as an example only without being limitative in any way, with reference to the accompanying drawings, in which:

figure 1 is a schematic side view of a footrest mechanism according to the invention mounted in a chair in folded-in position;

figure 2 shows a side view analogous to that in figure 1, but to a larger scale and with the auxiliary frame of the footrest mechanism in folded-out position and the support in its lowest position;

figure 3 shows a side view analogous to that in figure 2, but with the footrest mechanism in service position, i.e. with the auxiliary frame folded out and the support in its topmost position;

figure 4 shows a part of the side view of figure 2 to a larger scale;

figure 5 shows a part of the side view of figure 3 to a larger scale;

figure 6 shows a top view of the footrest mechanism of the preceding figures;

figure 7 shows a front view of the footrest mechanism according to the preceding figures.

[0014] Figure 1 schematically represents a chair 1 which mainly consists of an underside 2 carrying a seat 3, a back 4 and two armrests 5.

[0015] A footrest mechanism is built-in in the underside 2 which mainly consists of a frame 6 which is fixed in the underside 2, an auxiliary frame 7 which is telescopic in relation to said frame 6, a support 8 which is mounted adjustable in height on the auxiliary frame 7 and a common drive 9 to slide the auxiliary frame 7 in and out and to move the support 8 up and down in relation to the auxiliary frame.

[0016] The auxiliary frame 7 can be slid in and out in relation to the frame 6 by means of two horizontal telescopic arms 10 which each consist of two rails 11 and 12 which can slide into one and other with a C-shaped section and a profile 13 with an L-shaped section which can slide in the rails 11 and 12.

[0017] The rails 11 are fixed to or are part of the frame 6 which is connected to the underside 2 of the chair 1 as represented in figure 7. The L-shaped profiles 13 are fixed to or are part of the auxiliary frame 7 and they are connected to one another with their ends by means of a cross piece 14.

[0018] Between the rails 11 and 12 and the profile 13 can be mounted wheels to simplify the sliding in and out. These rails 11 and 12 and the profile 13 are provided

with stops which restrict the sliding out.

[0019] The distance between the telescopic arms 10 can, as represented in the figures, be smaller than the width of the underside 2, in which case these arms 10 are fixed by the frame 6 to this underside 2.

[0020] The support 8 is mounted adjustable in height on the cross piece 14 by means of a tilting connection 15 which mainly consists of two pair of arms 16-17 on either side of the footrest mechanism.

[0021] The arms 16 and 17 of each pair are two laths which, together with two L-shaped profiles 18 and 19 form a deformable polygon which hinges in its corners. The ends of these arms 16 and 17 are connected in a hinged manner by horizontal hinge pens 20 which are directed in the cross direction in relation to the telescopic arms 10, to the L-shaped profile 18 on the one hand and to the L-shaped profile 19 on the other hand.

[0022] The profiles 18 and 19 which are parallel to the telescopic arms 10 are directed such than hinge pens 20 belonging to a profile 18 or 19 are situated one after the other at the same height in the longitudinal direction of the arms 10.

[0023] The L-shaped profile 18 is fixed to the cross piece 14 whereas the other L-shaped profile 19 is fixed to the underside of the support 6.

[0024] The drive 9 consists of an electric jack which is fixed to the frame 6 under the telescopic arms 10 by means of a hinge pen 21 and an L-shaped profile 22 on the one hand, and which is hinge-mounted to the arms 16 of the two pairs 16-17 of the tilting connection 15 by means of a fork 23 and a shaft 24 sticking through it whose ends are borne in L-shaped pieces 25 which are fixed to the arms 16 on the other hand.

[0025] The shaft 24 is situated somewhat higher than the lowest hinge pens 20 with which the arms 16 hinge in relation to the cross piece 14, so that the arms 16 can be tilted by sliding the drive 9 in or out.

[0026] The support 6 mainly consists of a cross plate 26 which is carried by the two L-shaped profiles 19 and a forwardly directed arm 27 which is fixed to the cross plate 26 and is situated almost in line with the L-shaped profile 19 on one side.

[0027] On this arm 27 act clamping means which consist of a spring 28 which is fixed to this arm 27 on the one hand and to a protrusion of the arm 16 of one of the pairs 16-17 of the tilting connection 15 on the other hand. This spring 28 is a draw spring which draws the arm 27 towards the arm 16, as a result of which the tilting connection 15 tends to tilt downward. Consequently, the spring 28 forms means which try to bring the support 6 into a bottommost position and oppose the tilting upward of the tilting connection 15.

[0028] The tractive effort can be adjusted by removing the fastening point of the spring 28 to the arm 27. This arm 27 is provided to this end with a number of openings in which an end of the spring 28 can catch.

[0029] A cushion 29 can be fixed on the support 8. The drive 9 formed by the electric jack can be protected

by a U-shaped cap 30.

[0030] In folded-in position, the footrest mechanism is in the position as represented in the figures 1, 6 and 7, whereby the telescopic arms 10 are slid in and the support 8 is situated in its lowest position on these telescopic arms 10. The entire footrest mechanism is then situated in the underside 2 of the chair 1 under the seat 3.

[0031] In order to extend the footrest mechanism, the drive 9 is activated. Although this drive 9 acts on the arms 16 of the tilting connection 15 through the medium of the shaft 24, these arms 16 will not be tilted immediately due to the presence of the spring 28.

[0032] The support 8 remains in its lowest position and only the telescopic arms 10 are extended first.

[0033] When the position is reached in which the footrest mechanism is represented in the figures 2 and 4, the telescopic arms 10 cannot be extended any further.

[0034] When the drive 9 is extended further, the above-mentioned arms 16 are tilted forward and upward against the action of the spring 28 since the shaft 24, also when the connection 15 is in its downward tilted position, is situated somewhat higher, closer to the backside than the hinge pens 20 with which the arms 16 are fixed to the cross piece 14 by means of the profiles 13.

[0035] Thus, the spring 28 forms means which not only try to move the support 8 downward, but which also prevent the support 8 from being moved upward by the drive 9 as long as the auxiliary frame 7 is not fully extended and the support 8 is not situated in front of the underside 2.

[0036] The upward tilting of the tilting connection 15 is restricted thanks to the maximum extension of the jack which forms the drive 9. This connection 15 is represented in figures 3 and 5 in its maximally tilted position.

[0037] In this position, the support 8 is in its highest position, in front of the seat 3, almost in line with this seat.

[0038] In order to move the footrest mechanism back in its initial position, the jack which forms the drive 9 is slid in again. Due to the spring 28, the support 8 will hereby be brought down first, after which the auxiliary frame 7 is slid in due to the sliding in of the telescopic arms 10.

[0039] The design of the above-described footrest mechanism is quite simple. The support 8 and thus also the cushion 29 mounted upon it cannot only be put in the required height, but also at the required distance in front of the seat 3.

[0040] The footrest mechanism is relatively compact and can be built-in in different chair models. The total width of this footrest mechanism without the frame 6 is smaller than the width of the underside 2 of a normal chair. By means of an adjusted frame 6 it can be fixed to the broader underside.

[0041] The present invention is by no means limited to the above-described embodiment represented in the accompanying drawings. On the contrary, such a foot-

rest mechanism can be made in various forms and dimensions while still remaining within the scope of the invention.

[0042] In particular, the auxiliary frame 7 must not necessarily have a cross piece 14. The two pair of arms 16 and 17 of the tilting connection 15 can be fixed directly to the telescopic arms 10, so that the auxiliary frame 7 can be practically restricted to the telescopic profiles 13 of these arms 10.

Claims

1. A built-in footrest mechanism in combination with a chair (1) said mechanism comprising a support (8) which can be moved between a folded-in position in which it is situated under the seat (3) and a position in which it is situated in front of the seat (3); a frame (6) which is mounted under the seat (3) in the chair (1); an auxiliary frame (7) which is telescopic in relation to said frame (6) and upon which the support (8) is movably mounted; and a common drive (9) for sliding the above-mentioned auxiliary frame (7) in and out and for moving the support (8) in relation to this auxiliary frame (7), characterized in that the support (8) is connected to the telescopic auxiliary frame (7) by the intermediary of a tilting connection (15) containing on each side a pair of arms (16 and 17) whose ends are connected in a hinged manner to the auxiliary frame (7) and in a hinged manner to the support (8), whereby the drive (9) is connected to the tilting connection (15).
2. Footrest mechanism according to claim 1, characterized in that it contains means (28) which, when the drive (9) extends this auxiliary frame (7), hold the support (8) in its lowest position on this auxiliary frame (7) until this auxiliary frame (7) is almost completely extended, said means (28) opposing the tilting upward of the tilting connection (15).
3. Footrest mechanism according to claim 2, characterized in that these means (28) contain a spring (28).
4. Footrest mechanism according to claim 3, characterized in that the support (8) contains a forward directed arm (27) and in that the spring (28) is a draw spring which is fixed to this arm (27) on the one hand and to the tilting connection (15) on the other hand.
5. Footrest mechanism according to any one of the preceding claims, characterized in that the drive (9) is an electric jack which is mounted between the frame (6) and the tilting connection (15).
6. Footrest mechanism according to claims 4 and 5, characterized in that the spring (28) is mounted be-

tween a front arm (16) of the tilting connection (15) and the arm (27) of the support (8), whereas the jack of the drive (9) is hinge-mounted to the above-mentioned front arm (16) around a pivot which is situated higher than the hinge pin (20) with which this arm (16) hinges in relation to the auxiliary frame (7).

7. Footrest mechanism according to any of the preceding claims, characterized in that the auxiliary frame (7) can slide in and out in relation to the frame (6) by means of two telescopic arms (10) whose extendable parts (13) are part of or are fixed to the auxiliary frame (7) and whose parts (11) are part of or are fixed to the frame (6).

Patentansprüche

1. Ein eingebauter Fußstützenmechanismus in Kombination mit einem Stuhl (1), wobei besagter Mechanismus eine Stütze (8) umfaßt, die zwischen einer eingeklappten Position, worin sie sich unter dem Sitz (3) befindet, und einer Position, worin sie sich vor dem Sitz (3) befindet, bewegt werden kann; ein Gestell (6), das unter dem Sitz (3) im Stuhl (1) montiert ist; ein Zusatzgestell (7), das in Bezug zu besagtem Gestell (6) teleskopartig ausschiebbar ist und worauf die Stütze (8) bewegbar montiert ist; und einen gemeinsamen Antrieb (9) zum Ein- und Ausziehen des oben erwähnten Zusatzgestells (7) und zum Bewegen der Stütze (8) in Bezug zu diesem Zusatzgestell (7), dadurch gekennzeichnet, dass die Stütze (8) mit dem teleskopartig ausziehbaren Zusatzgestell (7) durch das Dazwischentreten einer Kippverbindung (15) verbunden ist, die an jeder Seite ein Paar Arme (16 und 17) umfaßt, deren Enden scharnierbar mit dem Zusatzgestell (7) und scharnierbar mit der Stütze (8) verbunden sind, wobei der Antrieb (9) mit der Kippverbindung (15) verbunden ist.
2. Fußstützenmechanismus gemäß Anspruch 1, dadurch gekennzeichnet, dass er Mittel (28) umfaßt, die, wenn der Antrieb (9) dieses Zusatzgestell (7) ausfährt, die Stütze (8) in ihrer niedrigsten Position auf diesem Zusatzgestell (7) halten, bis dieses Zusatzgestell (7) nahezu vollständig ausgefahren ist, wobei besagte Mittel (28) dem Aufwärtsskippen der Kippverbindung (15) entgegenwirken.
3. Fußstützenmechanismus gemäß Anspruch 2, dadurch gekennzeichnet, dass diese Mittel (28) eine Feder (28) umfassen.
4. Fußstützenmechanismus gemäß Anspruch 3, dadurch gekennzeichnet, dass die Stütze (8) einen nach vorn gerichteten Arm (27) umfaßt und dass

die Feder (28) eine Zugfeder ist, die einerseits an diesem Arm (27) und andererseits an der Kippverbindung (15) befestigt ist.

5. Fußstützenmechanismus gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, dass der Antrieb (9) eine elektrische Schraubenwinde ist, die zwischen dem Gestell (6) und der Kippverbindung (15) montiert ist.
6. Fußstützenmechanismus gemäß den Ansprüchen 4 und 5, dadurch gekennzeichnet, dass die Feder (28) zwischen einem vorderen Arm (16) der Kippverbindung (15) und dem Arm (27) der Stütze (8) montiert ist, während die Schraubenwinde des Antriebs (9) scharnierbar an dem oben erwähnten vorderen Arm (16) montiert ist, um einen Scharnierpunkt, der höher angeordnet ist als der Schwenkzapfen (20), womit dieser Arm (16) in Bezug zu dem Zusatzgestell (7) schwenkt.
7. Fußstützenmechanismus gemäß einem der vorangehenden Ansprüche, dadurch gekennzeichnet, dass das Zusatzgestell (7) in Bezug zum Gestell (6) mittels zweier teleskopartig ausschiebbarer Arme (10) ein- und ausgeschoben werden kann, deren ausschiebteile (13) Teile des Zusatzgestells (7) darstellen oder daran befestigt sind und deren Teile (11) Teile des Rahmens (6) darstellen oder daran befestigt sind.

Revendications

1. Mécanisme de repose-pied intégré en combinaison avec un fauteuil (1), ledit mécanisme comprenant un support (8) qui peut passer d'une position rentrée à l'état replié dans laquelle il est situé en dessous du siège (3) et une position dans laquelle il est situé devant le siège (3); un cadre (6) qui est monté en dessous du siège (3) dans le fauteuil (1); un cadre auxiliaire (7) télescopique par rapport audit cadre (6) et sur lequel le support (8) est monté en mobilité; et une commande commune (9) pour faire glisser le cadre auxiliaire (7) susmentionné vers l'intérieur et vers l'extérieur et pour déplacer le support (8) par rapport à ce cadre auxiliaire (7), caractérisé en ce que le support (8) est relié au cadre auxiliaire télescopique (7) par l'intermédiaire d'une liaison de basculement (15) contenant de part et d'autre une paire de bras (16 et 17) dont les extrémités sont reliées en articulation au cadre auxiliaire (7) et en articulation au support (8), la commande (9) étant reliée à la liaison de basculement (15).
2. Mécanisme de repose-pied selon la revendication 1, caractérisé en ce qu'il contient des moyens (28) qui, lorsque la commande (9) étend ce cadre auxi-

liaire (7), maintiennent le support (8) dans sa position la plus basse sur ce cadre auxiliaire (7) jusqu'à ce que ce cadre auxiliaire (7) se soit étendu de manière pratiquement complète, lesdits moyens (28) s'opposant au basculement vers le haut de la liaison de basculement (15).

3. Mécanisme de repose-pied selon la revendication 2, caractérisé en ce que ces moyens (28) contiennent un ressort (28).
4. Mécanisme de repose-pied selon la revendication 3, caractérisé en ce que le support (8) contient un bras (27) orienté vers l'avant et en ce que le ressort (28) est un ressort de traction qui est fixé à ce bras (27) d'une part et à la liaison de basculement (15) d'autre part.
5. Mécanisme de repose-pied selon l'une quelconque des revendications précédentes, caractérisé en ce que la commande (9) est un vérin électrique qui est monté entre le cadre (6) et la liaison de basculement (15).
6. Mécanisme de repose-pied selon les revendications 4 et 5, caractérisé en ce que le ressort (28) est monté entre un bras antérieur (16) de la liaison de basculement (15) et le bras (27) du support (8), tandis que le vérin de la commande (9) est monté en articulation sur le bras antérieur (16) susmentionné autour d'un pivot qui est disposé plus haut que l'axe d'articulation (20) avec lequel ce bras (16) s'articule par rapport au cadre auxiliaire (7).

7. Mécanisme de repose-pied selon l'une quelconque des revendications précédentes, caractérisé en ce que le cadre auxiliaire (7) peut glisser à l'intérieur et à l'extérieur du cadre (6) à l'aide de deux bras télescopiques (10) dont les parties extensibles (13) font partie du cadre auxiliaire (7) ou sont fixées à ce dernier et dont les parties (11) font partie du cadre (6) ou sont fixées à ce dernier.

Fig.1

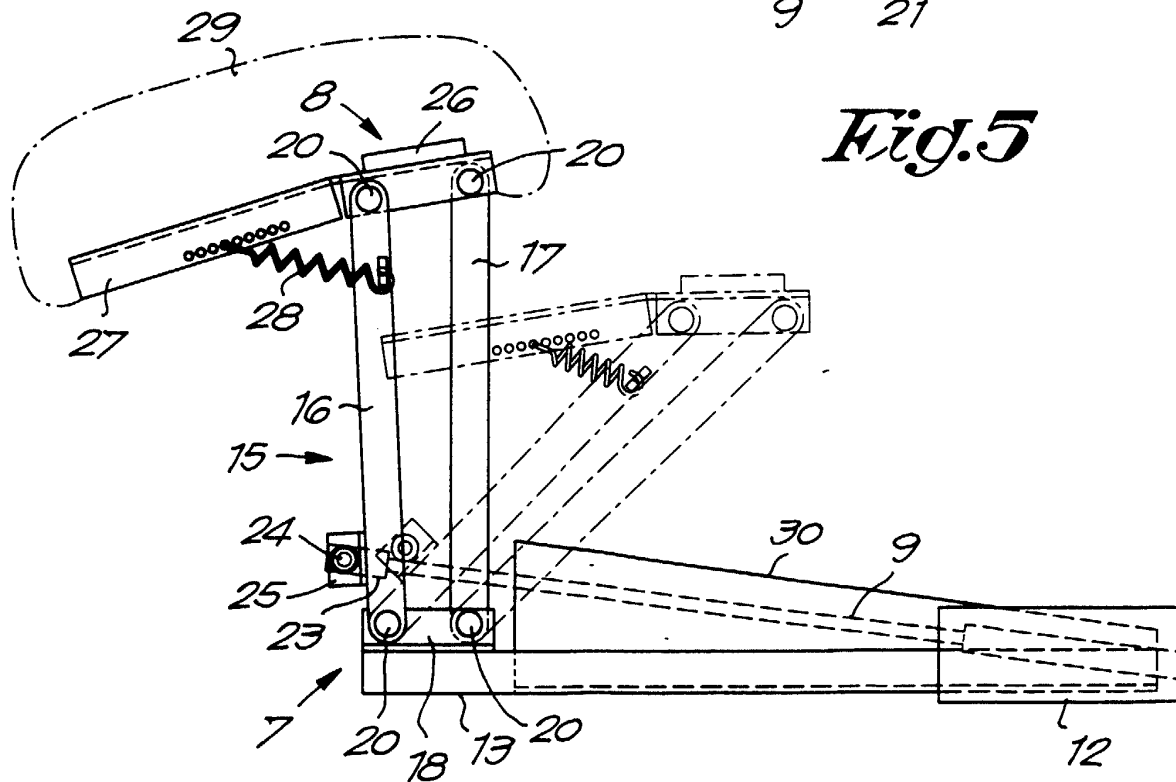
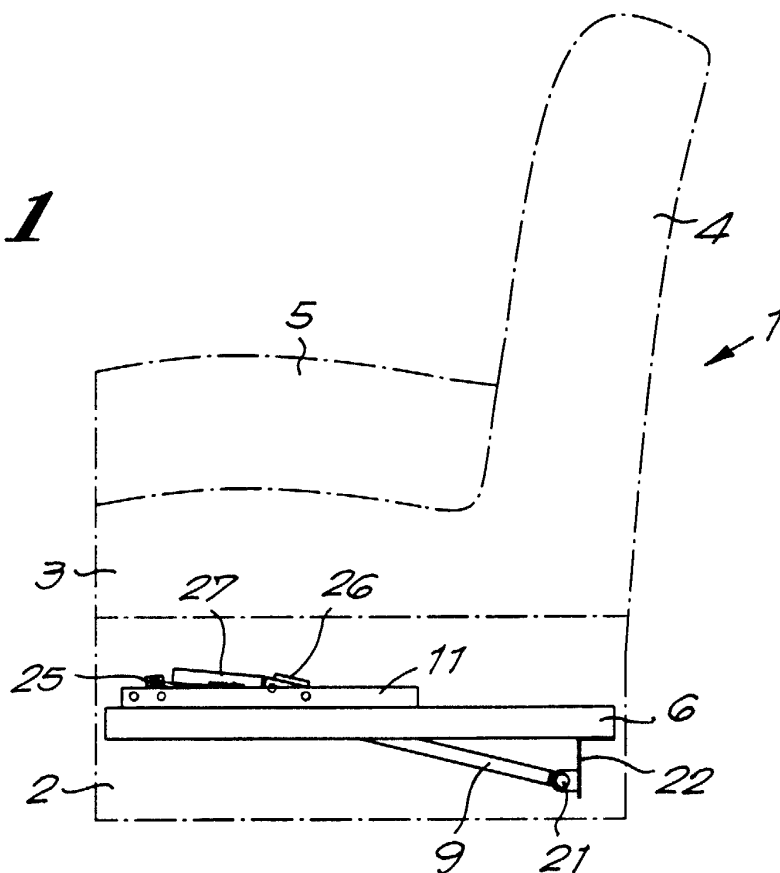


Fig.5

