

Description

Seating furniture, in particular office chairs

5 The invention relates to a chair, in particular an office chair.

So-called synchronization mechanisms are known from prior art. They constitute assemblies in the substructure of an office chair seat that facilitate a correlated movement of seat and backrest. For this purpose, the seat support and the backrest support are flexibly coupled so that a backward tilt of the backrest, caused e.g. by a chair user leaning against the backrest, induces a lowering of the rear edge of the seat. This brings with it a considerable degree of comfort and is desirable for orthopaedic reasons. A disadvantage of such synchronization mechanisms is their comparatively complicated mechanical structures. This makes synchronization mechanisms relatively expensive to produce as well.

The object of the present invention is to offer a solution, which at comparatively low constructive effort and expense provides an advantage of comfort comparable with that of a synchronization mechanism.

This object is accomplished by a chair according to claim 1. It features a chair that consists of only two principal structural assemblies, namely a preferably fixed seating element and a back element, whereby the seating element has a seating surface and the back element is pivotable around a lateral axis and linked in a jointed manner to the seating element. According to the invention, the seating surface is designed in a way that a user, when the backrest pivotes backwards, such as happens when the user leans against it,

performs a movement, which follows the movement of the back element. In other words, due to the design of the seating surface, a backward tilt of the backrest leads to the user sinking down towards the back, without the seating element itself moving. As a result, a synchronous movement of the user's body with the movement of the back element is facilitated, without the whole seating element imitating the said synchronous movement. Consequently, there is a shift of the user's centre of gravity as well as a shift of movement in the sense that the invention allows the user to accomplish a movement resembling, to a large extent, the movement a user would make if an appropriate synchronization mechanism were employed. In a constructively simple and therefore also very economical manner the invention thus facilitates a degree of comfort to be achieved similar to that achievable with a significantly more expensive synchronization mechanism. A particular advantage is that the so-called "shirt stripping effect" is effectively prevented.

Advantageous embodiments of the invention are given in the dependent claims.

In a particularly advantageous embodiment of the invention the seating surface comprises at least two different seating areas arranged behind one another in longitudinal direction of the seat, such seating areas differing with regard to the way they are upholstered. The term 'upholstery' is understood to mean any type of flexible design of the seating surface, regardless of the material employed. Apart from formed foams, basically any other elastic materials may be used, such as spring packets, or combinations of materials, such as e.g. foam in conjunction with silicon cushions. The use of e.g. dual zone foam is possible as well.

It is of particular advantage if at least one of the rear seating areas contains a type of upholstery, which, compared with a front seating area, permits the user to sink in to a greater extent. Thus, when the user moves backwards and by
5 doing so is putting weight on the rear section of the seat, there is a simultaneous "yielding" of the seat. In other words, the seating area is designed so that when pressure is put on the backrest, the user's pelvis glides into the upholstery in the form of rolling. The result is a highly
10 synchronised sequence of movements between the back element and the user.

In addition, it is of particular advantage when the back element is linked with the seating element via a swivel axis, which, seen in longitudinal direction of the chair, is
15 positioned in front of the attachment of the chair post to the seating element. The position of the swivel axis contributes greatly to facilitating an ergonomically beneficial seating position.

20 A particularly flat design can be achieved where spring elements, arranged in essentially horizontal position in the seating element, are provided for pre-stressing the back element. Depending on the design of the model, any type of
25 springs, e.g. tension springs or compression springs, can be used to serve as spring elements,

Other advantageous designs of the invention will be described by means of an exemplary embodiment and explained in detail
30 with reference to the drawings. In the figures:

Fig. 1 shows a perspective view of the seating element without seating surface (first spring position),
Fig. 2 shows a cross section through the seating element
35 (first spring position),

Fig. 3 shows a cross section through the seating element (second spring position),

Fig. 4 shows a further cross section through the seating element (first spring position), with seating pad,

5 Fig. 5 shows a further cross section through the seating element (second spring position).

The office chair of the invention comprises a seating element 1 and a back element 2. As shown in Fig. 2, the seating
10 element 1 arranged in essentially horizontal position is hinged to the back element 2 at a bearing point 3. In other words, the back element 2 is hinged to the underside 4 of the seating element 1 so that if, for instance, the user leans against the back element 2, it performs a tilting movement 5
15 around the swivel axis 6 that runs at right angle to the longitudinal direction 7 of the chair.

In the context of the invention it is immaterial what type of back element 2 is used. The back element 2 can for example
20 have the shape of a shell or a net or similar.

The back element 2 can be moved from its normal position as shown in the drawings to a position further back and returned again. To vary the backward tilting resistance of the back
25 element 2, a spring tension adjustment facility 8 is provided, the exact functioning of which will be explained later.

The seating element 1 comprises, on the one hand, the actual
30 seat bearing with the hinge attachment for the back element 2, as well as the spring tension adjustment facility 8. Due to the pivotal point of the mechanism being positioned closely below the seating surface 9, the sequence of movements in connection with a backward tilt of the back
35 element 2 is similar to that facilitated by a synchronization

mechanism. It reduces, in particular, the so-called "shirt-stripping effect". In other words, the horizontal and vertical positions of the swivel axis 6 relative to the seating element 1 and the back element 2, respectively, are
5 decisive for the achievable sequence of movements.

Moreover, all other mechanical components are integrated in the seating element 1, including e.g. the receptacles 10 for the armrests (not shown). In other words, the functional
10 components of the seat bearing and the mechanism form a single structural unit. The integrated and compact construction of the seating element 1 is particularly evident from Fig. 1. A special advantage of this design is that production costs are low. In addition, the number of
15 separate components required is significantly reduced, which further reduces the manufacturing costs and also increases the safety from failure.

The seating element 1 features a more or less centrally
20 positioned taper socket 11 serving for receiving the upper end of a chair post, for example a gas spring (not shown).

The base element 12 of the seating element 1 consists essentially of a plastics base plate with a number of wall
25 elements 14 in both longitudinal direction 7 and transverse direction 13 of the chair. The said wall elements 14 serve not only for providing the necessary stability of the seating element 1. At the same time, considerable savings in material can be achieved. Furthermore, some of the wall
30 elements 14 have additional functions. Thus they provide e.g. guide or retaining elements for the release bar 15 that serves for a height adjustment of the gas spring, with the release bar 15 being operated by a key 16 also integrated in the base element 12. Another function of the wall elements

14 is to guide or retain the driving axle 17 of the spring tension adjustment 8, whereby an operating element, e.g. in the form of a hand wheel, not shown in Fig. 1, is attached to the free end 18 of the driving axle 17.

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A spring arrangement serves to return the back element 2 from a position further back to its normal position. The said spring arrangement comprises two compression springs 19 of circular cross section sitting in corresponding spring
10 holders 20 provided in the base element 12.

Apart from the fact that the spring angle can be altered by a movement of the spring hinge when the spring tension adjustment 8 is operated, the compression springs 19 are
15 arranged in essentially horizontal position in the seating element 1, which permits a fairly flat design. The shallow construction height facilitates, on the one hand, an optically particularly attractive design of the chair. Furthermore, it permits the use of various chair posts, or
20 gas springs, so that even unusual requirements in respect of the seating height, can be met.

The position of the two compression springs 19 is altered by means of a U-shaped round iron 21, the U-shanks 22 of which
25 are inserted in the two round-bar spiral springs 19. By moving the "U-base" 23 of the round iron 21 in the direction of the lateral deflection 24, the compression springs 19 are lifted or lowered on one side, whilst the opposite ends of the compression springs 19 remain in their original
30 positions, due to the ends 25 of the round iron 21 being fixed to the base element 12. For this purpose, the rounded ends 25 sit in a type of ball cup 26 in the base element 12.

When pressure is put on the back element 2, i.e. when it
35 tilts to a position further back, hinged nozzles 28, which

are fitted to the axle 27 and reach through the base element 12 from below to the round iron 21, press against the compression springs 19 and thereby establish an effective connection between the compression springs 19 and the back
5 element 2. The hinged nozzles 28 are designed as U-shaped guides in an appropriate form to accept the U-shanks 22 of round iron 21.

An alteration of the spring tension adjustment leads, via a
10 rotation of the driving axle 17, to a rotation of the worm gear 29 attached to it, which, in turn, leads to a rotation of a cogwheel 30 engaging in the said worm gear 29. The cogwheel 30 is mounted on a threaded shaft 31, which is arranged in the direction of lateral deflection 24, i.e.
15 vertically, and to which a cantilever 32 is fitted via a coil. The cantilever 32 features a U-shaped cam 33, which takes along the round iron 21 either upwards or downwards, depending on the direction of rotation of the driving axle 17. As a result, the position of the compression springs 19
20 is adjusted from a lower first spring position (Figs. 1, 2, 4) to an upper second spring position (Figs. 3, 5). In other words, a "forceless" spring tension adjustment is possible in this way. Only the position of the compression springs 19 and thus the hinge angle are changed. Expressed differently,
25 the spring tension adjustment is effected by incorporating the laws of the lever principle in that the compression springs 19 engage in different locations of the hinged nozzles 28. By shifting the pivotal points in outward lateral direction 24, the lever arm is lengthened or
30 shortened, respectively, so that the round-bar spiral springs 19 are compressed to a greater or lesser extent.

The upholstery 34 of the seating area 9, see Fig. 4, consists of formed foam and is attached to a seating base plate 39

that can be fitted to suitable receptacles 40 on the base element 12. As a result of the special design of the upholstery 34, the user more or less rolls down towards the back when the back element 2 is moved. He/she glides into
5 the foam. The foam should therefore be free towards the seating surface end 35 so as to be able to expand backwards. To achieve this, an open design of the upholstery 34 without any bordering elements at the back is preferred.

10 The seating surface 9 is divided into two different seating areas 36, 37, arranged behind one another in longitudinal direction 7 of the seat and differing with regard to the way they are upholstered. With the form of seating surface 9 of the present example, the front seating area 36, which
15 constitutes about 30% to 40% of the total length of the upholstery 34, is fitted with "standard" upholstery thickness, whilst the rear seating area 37 (between 70% and 60% of the total length) is fitted with variable upholstery 34 that permits the user to sink down towards the back. In
20 the example shown, the upholstery thickness of the rear seating area 37 is higher by at least 20 mm compared with the upholstery thickness of the front seating area 36. The transition from the front seating area 36 to the rear seating area 37 is preferably very soft and smooth without any
25 ridges. Particularly good results are achieved with a transition area 38 in the form of an elongated horizontal S. The transition from the front seating area 36 to the rear seating area 37 is so arranged that the user in a normal ("average") seating position will put his weight
30 predominantly on the front seating area. When pressure is put on the backrest, the user's pelvis rolls over the horizontal S into the rear seating area. The user thus follows the movement of the backrest downwards to the back

Reference list

	1	Seating element
	2	back element
5	3	bearing point
	4	underside of seating element
	5	tilt
	6	swivel axis
	7	longitudinal direction of chair
10	8	spring tension adjustment
	9	seating surface
	10	armrest receptacle
	11	taper socket
	12	base element
15	13	transverse direction of chair
	14	wall element
	15	release bar
	16	release key
	17	driving axle
20	18	free end of driving axle
	19	compression spring
	20	spring holder
	21	round iron
	22	U-shank
25	23	U-base
	24	direction of lateral deflection
	25	end of round iron
	26	ball cup
	27	axle
30	28	pivot nozzle
	29	worm gear
	30	cogwheel
	31	threaded shaft
	32	cantilever

- 33 cam
- 34 upholstery
- 35 seating surface end
- 36 front seating area
- 5 37 rear seating area
- 38 transition area
- 39 seating base plate
- 40 receptacle

Claims

1. A chair, in particular an office chair, comprising a seating element (1) with a seating surface (9) and a back
5 element (2) that is pivotable around a lateral axis (6) and linked in a jointed manner to the seating element (1), whereby the seating surface (9) of the seating element (1) is designed in a way that a user performs a movement, which follows the movement of the back element
10 (2), when the back element (2) is pivoting to a rear position.
2. A chair according to claim 1, whereby the seating surface (9) comprises at least two seating areas (36, 37)
15 arranged behind one another in longitudinal direction (7) of the seat, said seating areas (36, 37) differing with regard to the type of upholstery (34) used.
3. A chair according to claim 2, whereby at least one rear
20 seating area (37) comprises an upholstery (34) that allows the user to roll down backwards.
4. A chair according to one of the claims 1 to 3, whereby
25 the lateral axis (6) is arranged in front of the attachment (11) of the chair post, seen in longitudinal direction (7) of the seat.
5. A chair according to one of the claims 1 to 4, comprising
30 spring elements (19) arranged in essentially horizontal position in the seat element (1) for pre-stressing the back element(2).