

Backrest and Chair

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The invention relates to a backrest, in particular for an office chair, comprising a backrest shell support and a backrest shell which protrudes from the backrest shell support in a curved manner.

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A backrest with a curve that serves as a lumbar support is known for seating furniture, in particular for an office chair. For example, in EP 1 566 120 A1, an office chair with a backrest is proposed that features parallel support ribs arranged one above the other, serving as lumbar supports, each of which is pre-curved in an elastic manner. Using an adjustment element comprising a tension cable, the curvature of the lumbar support can be adjusted.

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The underlying object of the invention is to disclose a backrest that is as easily adjustable as possible, and that can be adjusted to the individual shape of the lumbar area. A further underlying object of the invention is to disclose a chair with such a backrest.

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The former object is achieved by the invention with a backrest, in particular for an office chair, comprising a backrest shell support and a backrest shell which protrudes from the backrest shell support in a curved manner. Said backrest shell has an upper and lower securing area, in addition to a plurality of flexible areas which are arranged therebetween. The backrest shell

is securely connected to the backrest shell support in the upper securing area. In the lower securing area, the backrest shell is connected to the backrest shell support in such a manner that it can be displaced in the longitudinal direction, such that the curvature of the backrest shell modifies by means of the flexible areas when displaced.

The backrest shell is fixed at the upper securing area. To adjust the grade of curvature relative to the backrest shell support, the lower securing point of the backrest shell simply needs to be moved in the longitudinal direction. At a position of the lower securing point approximately at the lower end of the backrest shell support, the curvature is relatively less pronounced. The backrest shell protrudes slightly from the plane of the backrest shell support. The elasticity of the backrest shell is increased locally at the desired locations by the flexible areas, such that the curvature increases when the lower securing point is moved. The flexible areas thus allow variable curvature of a backrest that is otherwise stiff. As a consequence, no moveable element is needed at the upper securing point of the backrest shell to balance out tensions. This allows a simple design of the backrest, where the backrest shell is attached to the backrest shell support in a fixed manner at the upper securing point, and in a moveable manner at the lower securing point, thanks to the flexible areas.

The particular advantage here is that the curvature of the curve can be individually adjusted in a lumbar area with little effort and using simple technical means. Thanks to the adjustable shape of the backrest, the

spinal column of a seated person remains in the correct position, so that back pain due to poor positioning can be prevented.

- 5 The backrest advantageously features two flexible areas. This can enable an approximately S-shaped curvature of the backrest shell, which matches the natural shape of the human spine.
- 10 The upper securing area, the middle portion located between the two flexible areas, and the remaining lower portion of the backrest shell advantageously each extend over one-third of the overall length of the backrest shell. This arrangement allows a supporting curvature of
- 15 the backrest shell, in particular in the area of the lumbar spine, to support the seated person, without any possibly undesirable curvature of the backrest shell in the upper area.
- 20 According to the preferred variant, the backrest shell is made from a fundamentally rigid elastic material, which has sufficient stability of shape at a low elasticity to embody a supporting backrest shell. In particular, the backrest shell is made out of a hard plastic. Thanks to
- 25 its hardness, the material can bear with sufficient elasticity the compressive force that the user causes when leaning against the backrest, without the shape of the backrest changing significantly.
- 30 According to a further preferred variant, at least one of the flexible areas is formed by cutouts. The material of the backrest shell generally has limited elasticity, in order to provide sufficient reaction force on the seated

person. The elasticity in the flexible areas is increased in a simple manner by removing material, without affecting the strength of the backrest. The bending properties can be adjusted here by the size, shape, and spacing of the cutouts.

According to yet another preferred variant, at least one of the flexible areas is formed by a single cutout running orthogonally to the longitudinal direction. The cutout is, in particular, oblong-shaped or rectangular. Bars thus remain on the two opposite sides of the cutout, which make the backrest shell bendable or flexible in this area. The cutout is sized and located such that the bars can support, without breaking, the bending moment when a person leans against the backrest.

A lower flexible area is preferably constructed at a distance from the lower securing area. In particular, the lower flexible area is positioned such that the extreme point of the curvature, preferably located in the area of the flexible area, is at an orthopaedically beneficial location. A particularly comfortable and orthopaedically effective design of the backrest shell is ensured if the lower flexible area is located approximately in the lower third of the length of the backrest shell, measured from the lower securing area.

In a preferred embodiment, an upper flexible area is constructed adjacent to the upper flexible area. The backrest shell is securely and immovably mounted to the backrest shell support in the upper securing area, for example by means of screws or an adhesive. Any material stress produced there by the curvature due to the rigid

attachment is reduced by the upper flexible area. This eliminates the need for a complex joint element.

5 The backrest shell is preferably connected pivotally at the lower securing area to an adjustment slide, which is guided by a guide track mounted in a longitudinal direction to the backrest shell support. Using the adjustment slide that can be moved along the guide track, adjustment of the curvature is provided in a particularly
10 simple manner, such that a given position of the adjustment slide corresponds to a desired level of curvature. The pivotal connection allows the backrest shell to bend as the adjustment slide is moved. The connection can in particular be constructed as a single-
15 axis joint, but also as a ball joint. The latter also allows corner loads on the backrest shell.

The guide track and the adjustment slide expediently feature interlocking engagement elements that lock and
20 can be released. The adjustment slide can thus be moved upward and downward along the guide track and locked in the desired position. Locking can be provided by, for example, teeth, ratchets, or a wheel.

25 According to an expedient extension, the adjustment slide is adjustable by means of a rotary mechanism that is easily adjusted by hand.

30 The guide track advantageously extends over approximately the lower third of the backrest shell support. This is enough to cause sufficient curvature that provides the required reaction force to support the spine of a seated person.

In a preferred construction, the backrest shell is fundamentally S-shaped in the longitudinal direction. This is achieved in that the area of the backrest shell above the upper flexible area is nearly concave relative to the backrest shell support in the longitudinal direction. The S-shaped backrest shell is ideally adapted to the spinal curvature, and, in addition to the comfort it provides, is an effective orthopaedic aid.

In a further preferred construction, the backrest shell is securely attached to the backrest shell support above the upper flexible area. This leads to stabilization of the backrest and maintains the shape of the backrest shell.

The second object named is solved according to the invention by a chair, in particular an office chair, with a backrest according to one of the preceding claims. The advantages and preferred constructions listed with regard to the backrest are to be applied to the chair in the same manner.

An example application of the invention is described in more detail in the drawing. Schematically shown are:

Fig. 1 a backrest with a backrest shell support and a backrest shell, shown in side view and including an office chair,
Fig. 2 the backrest as in Fig. 1, in a side view, and
Fig. 3 the backrest as in Fig. 1 and Fig. 2, in a front view.

Parts with the same function are labelled the same in all figures.

Fig. 1 shows an office chair 2 comprising a seat support
4 constructed as a rolling frame, a seat area 6 rotatably
5 mounted on the seat support 4, and a backrest 8.

The backrest 8 features a backrest shell support 10 on
the back side of the backrest extending in the
10 longitudinal direction L, and a backrest shell 12 on the
front side of the backrest. The backrest shell 12
comprises an upper securing area 14 and a lower securing
area 16 at which it is connected to the backrest shell
support 10. At the upper securing area 14, the backrest
15 shell 12 is immovable connected to the backrest shell
support. At the lower securing area 16, the connection is
made by an adjustable member, not shown in further detail
here, which can be moved in the longitudinal direction.
The backrest shell is constructed from a rigid elastic
20 plastic.

When the adjustment member is at its lowest position, the
backrest shell 12 has a curvature 18 that is formed via a
lower flexible area 20. Below the upper securing area 14
25 and adjacent to it, a second flexible area 22 is
constructed by means of which the material stresses that
result in the upper securing area 14 due to the curvature
are reduced. The orthopaedically beneficial shape drawn
for the backrest shell 12 results from the two flexible
30 areas 20 and 22, without complex shaping elements being
necessary.

In order to ensure a particularly comfortable design of the office chair 2, the backrest shell 12 is upholstered in the assembled position of the chair 2, in particular with a padded cover.

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The side view of the enlarged backrest 8 in Fig. 2 shows the adjustment of the curvature 19 of the backrest shell 12. The backrest shell 12 has limited elasticity that is increased locally by the two flexible areas 20, 22. The material is simultaneously strong enough to support the load acting on the backrest shell 12 by a person leaning against the backrest 8.

Individual, user-defined adjustment of the curvature 18 is possible by sliding the adjustable member in the longitudinal direction L, which is adjustable by means of a rotary mechanism 23. A second adjustment position of the adjustable member and greater curvature of the backrest shell 12 is indicated in the figure by dashed lines which extend between the two securing areas 14 and 16 on the front side of the backrest.

The portion 24 of the backrest shell 12 above the upper flexible area 22 features a slightly concave curvature in the longitudinal direction relative to the backrest shell support 10, and is rigidly constructed, so that this concave shape does not change even if a force acts on the backrest 8. Altogether, an S-shaped curvature of the backrest shell 12 results as shown, comprising an upper, rigid, concave portion 24 and a lower portion with a convex curvature 18, the degree of which can be changed depending on the position of the adjustable member.

Elements of the connection between the backrest shell 12 and the backrest shell support 10 are shown in Fig. 3. The two flexible areas 20, 22 are each formed by an oblong or rectangular cutout 26, running transverse to the longitudinal direction L. On both sides of the cutouts 26, opposite bars 28 remain, which make the backrest shell 12 flexible in this area. The strength of the bars 28 is designed such that they do not break when the material is subjected to a bending moment.

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The backrest shell 12 is securely attached to the backrest shell support 10 above the upper flexible area 22. This is achieved in particular by means of securing screws, not shown, for which four holes 30 are provided in the backrest shell 12.

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The adjustable member in the lower securing area 16 of the backrest shell 12 is constructed as an adjustable slide. In order to allow bending of the backrest shell 12, it is attached to the adjustable slide with a rotational joint. This is achieved by a loose or movable attachment of the backrest shell 12 to the adjustable slide in the manner of a ball joint. The journal 32 supporting the ball joint can be seen. A guide track 34 is mounted on the backrest shell support 10 to accept the adjustable slide. Said track extends in the longitudinal direction over approximately the lower third of the backrest shell support 10.

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The adjustable slide and the guide track 34 feature interlocking elements to lock the adjustable slide. The adjustable slide can travel upward and downward along in the guide track in a ratcheting manner, and be locked

into various positions. This connection can be released, so that a different level of curvature 18 can be set by means of the adjustable slide, with very little effort.

Reference Drawing List

	2	Office chair
	4	Seat support
5	6	Seat area
	8	Backrest
	10	Backrest shell support
	12	Backrest shell
	14	Upper securing area
10	16	Lower securing area
	18	Curvature
	20	Lower flexible area
	22	Upper flexible area
	23	Rotary mechanism
15	24	Concave portion
	26	Cutout
	28	Bar
	30	Hole
	32	Journal
20	34	Guide track
	L	Longitudinal direction

Claims

1. Backrest (8), in particular for an office chair (2),
comprising a backrest shell support (10) and a
5 backrest shell (12) which protrudes in the
longitudinal direction (L) from the backrest shell
support (10) in a curved manner, where said backrest
shell (12) has an upper and lower securing area (14
and 16), in addition to a plurality of flexible areas
10 (20, 22) which are arranged therebetween, and where
the backrest shell (12) is securely connected to the
backrest shell support (10) in the upper securing
area (14), and to the backrest shell support (10) in
the lower securing area (16) in such a manner that it
15 can be displaced in the longitudinal direction (L),
such that the curvature (18) of the backrest shell
(12) modifies by means of the flexible areas (20, 22)
when displaced.
- 20 2. Backrest according to claim 1, in which the backrest
shell (12) features two flexible areas (20, 22)
between the upper and lower securing areas (14 and
16).
- 25 3. Backrest according to claim 1 or 2, in which the
upper securing area (14), the middle portion of the
backrest shell (12) between the two flexible areas
(20, 22), and the remaining lower portion of the
backrest shell (12) each extend over approximately
30 one-third of the total length of the backrest shell
(12).

4. Backrest (8) according to one of the claims 1 through 3, in which the backrest shell (12) is made of a fundamentally rigid elastic material.
- 5 5. Backrest (8) according to one of the preceding claims, in which at least one of the flexible areas (20, 22) is constructed by cutouts.
- 10 6. Backrest (8) according to claim 5, in which at least one of the flexible areas (20, 22) is constructed by a single cutout (26), transverse to the longitudinal direction (L).
- 15 7. Backrest (8) according to one of the preceding claims, in which a lower flexible area (20) is located at a distance from the lower securing area (16).
- 20 8. Backrest (8) according to one of the preceding claims, in which an upper flexible area (22) is adjacent to the upper securing area (14).
- 25 9. Backrest (8) according to one of the preceding claims, in which the backrest shell (12) is pivotally connected at the lower securing area (16) to an adjustable slide, which is guided by a guide track (32) attached to the backrest shell support (10) in a longitudinal direction.
- 30 10. Backrest (8) according to claim 9, in which the guide track (32) and the adjustable slide feature interlocking engagement elements that lock and can be released.

11. Backrest (8) according to claim 9 or 10, in which the adjustable slide can be adjusted by means of a rotary mechanism (23).

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12. Backrest (8) according to one of the claims 9 through 11, in which the guide track (32) extends approximately over the lower third of the backrest shell support (10).

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13. Backrest (8) according to one of the preceding claims, in which the backrest shell (12) is fundamentally S-shaped in the longitudinal direction (L).

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14. Backrest (8) according to one of the preceding claims, in which the backrest shell (12) is securely attached to the backrest shell support (10) above the upper flexible area (22).

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15. Chair (2), in particular an office chair, with a backrest (8) according to one of the claims 1 through 14.