DESCRIPTION

The invention relates to a seat bracket for chairs, in particular swivel work chairs, which is connectable by way of a column to a base structure of the chair and for the purpose of this connection is provided with a bearing block receiving the projecting end of the column, in particular in a force-locking manner, the seat bracket having a U-shaped base member, and this bearing block being immovably inserted in this base member, and this seat bracket being equipped with a supporting member to support a seat surface resting thereon as well as the seat surface being arranged for adjusting its inclination relative to the base member, and the base member being provided with a series of functional parts for its vertical adjustment on the one hand and the adjustment of the inclination of its seat surface on the other hand, these functional parts, with the exception of the parts for their manual control, being arranged inside the limbs of the U-shaped parts of the seat bracket and the seat bracket having the U-shaped parts of both the base member and the supporting member connected hingedly to each other as well as by way of intermeshing plates, of longitudinal and transverse plate stacks, of which one part is connected hingedly to the base and supporting members and a further part to the base member and the supporting stirrup of the back-rest support, and the inclination of the base and supporting members, and also that of the supporting stirrup of the back-rest bracket being arrestable in the inclined positions thereof by means of a clamping member holding the plates together in a force-locking manner.

In the case of chairs, and here in particular in the case of rotary work chairs, it is known to place the seat surface of such a chair on a seat bracket and to connect both this by way of a a column to the base structure of the chair, and this seat bracket to a holder which carries a rest. The seat bracket is, in this respect, formed by two functional parts, as a rule by a base member and a supporting member carrying the seat surface, which are connected together hingedly and can be mutually adjusted in the inclined position thereof. Analogously to this inclined position of the supporting member, and thus also of the seat surface with regard to the base member, usually also the holder for the rest can be designed so as to be adjustable in inclination, and this seat bracket is provided with locating parts, in order to be able to set and retain the desired inclined position.

In the case of a seat bracket, known as a result of the German Gebrauchsmuster DE-GM 72 39 551, for a swivel work chair of this kind, the supporting member for the seat surface is connected to the base member by way of a hinged connection, and the supporting member is additionally supported by way of a transverse plate stack in a force-locking manner on a longitudinal plate stack of the base member. The plates of these plate stacks, which are guided in an intermeshing manner, can be constrained by means of a compression member in the respectively desired immersion

depth, whereby also the supporting member is varied with regard to the base member in the inclination thereof. The compression member, which in the case of this version is designed as a nut which can be screwed on a threaded bolt, can by rotation of this nut in the clockwise direction constrain the plates, but in the anti-clockwise direction relieve these plates, so that the plates of the transverse plate stack can move through the plates of the longitudinal plate stack. The nut of the compression member is embedded in a knob and can be screwed with this on the threaded bolt. The stirrup for the rest is guided vertically on a clamping head, which is connected by way of a hinge to the base member. The clamping head can be tilted about this hinge, for which the plates of the longitudinal plate stack hinged to this clamping head are arranged so as to be longitudinally displaceable in a sleeve which retains them. By means of this compression member the inclinations of the seat surface and the rest can be adjusted simultaneously, but the constraining of the plates needs fairly great manual force, in order to screw the nut securely on the threaded bolt or respectively to be able to release it again.

In order to carry out the constraining of two mutually movable parts on a swivel chair with less manual force, in accordance with DE-OS 29 02 622 it is known to insert the base member of the seat bracket between the limbs of a U-shaped supporting member for the seat surface bracket and to connect this base member hingedly to the supporting member. About this hinged connection of the base member and the supporting member the latter can be inclined, so that also the seat surface can if necessary be correspondingly inclined. The base member, which is connected by way of a column to the base structure of the chair, maintains its position and cannot follow the inclination adjustments of the seat surface. In order, in this respect, to fix the respective inclination, in the base member an eccentric is arranged about an adjusting shaft, which by appropriate rotation of its eccentric surfaces applies itself to the base member in a force-locking manner or respectively lifts away therefrom. In the case of this constraint merely wall surfaces of the base member and the supporting member are pressed against one another or respectively lifted away from one another, and it is doubted whether these surfaces can be pressed so strongly against one another that they no longer slip on one another.

The problem underlying the invention is to provide a seat bracket for chairs in the case of which the parts that are to be adjusted are adjusted without great expenditure of effort, and after the adjustment thereof are restrained in the desired inclined position and in the case of which additionally these parts can be accommodated in a space-saving manner and not directly accessible from the outside on the seat bracket, and the pressure applied for constraining the parts can be adjusted simply.

In accordance with the invention this problem is solved, in the case of a seat bracket of the kind mentioned at the

beginning hereof, in that the U-shaped supporting member is provided with at least one crossbar extending perpendicular thereto, in that the plates of the longitudinal plate stack extending in the direction of the longitudinal central axis of the seat bracket are supported on the one hand on the pivot pin of the clamping member and, on the other hand, on at least one bearing pin of the clamping head, in that the plates of the transverse plate stack extending perpendicular to the direction of the longitudinal central axis of the seat bracket are supported on the one hand on the same pivot pin of the clamping member and, on the other hand, on a bearing pin of the base member, in that the clamping member is formed by at least one spring seated on a pin and bearing against the limb of the supporting member and a releasing device actuating it, in that a bearing block is arranged between the plate stacks and the limb of the supporting member for transmitting the tensional force of the spring to the plates of the plate stacks, and in that to actuate this bearing block a release lever is connected thereto, the extension of which is variable by means of a length-adjusting device for adjusting the tensional force of the spring.

As a result of these measures, a seat bracket is provided which, besides the functional separation of supporting and adjustment, combines in it all necessary functional parts and largely deprives these of access from outside. The functional parts of the seat-surface and back-rest adjustment can, as a result of this design, be designed in an extremely compact manner, and they have, moreover, the advantage that, as a result of their functional separation from one another, they are not mutually influenced in a disadvantageous manner. A further advantage of the functional parts of the seat inclination adjustment and rest adjustment can be seen in the fact that the plate stacks acting on one another are held under constant force-locking, and that this force-locking is cancelled only when an adjustment appears to be necessary. The design of the plate stacks, i.e. of the longitudinal and transverse plate stacks, is in form and enclosure made such that they also ensure stability against torsion, so that, even upon the wobbling of the seat surface, a cancellation of the force-locking connection is hardly made possible and the parts that are to be adjusted cannot mutually cant. The clamping member for the force-locking connection of the individual plate stacks can be designed in a very compact manner, and it nevertheless has sufficient stiffness in order to exert a high surface pressure by way of the adjacent pressure plate thereof on the individual plates of the plate stacks. As a result of the mounting of the plate stacks on the bearing pins which also retain the bearing block, these are fixed sufficiently accurately in their position, so that they can be moved only in a scissors-like manner into one another, without in so doing impairing their fixing.

Further advantageous further developments of the invention can be gathered from the remaining sub-claims.

One of the possible exemplified embodiments of the invention is shown diagrammatically in the drawings.

Fig. 1 shows a side view of a seat bracket in a ready-for-use version with a seat surface which is arranged thereon but is only indicated in dot-dash lines,

Fig. 2 shows a top view of the seat bracket in accordance with Figure 1,

Fig. 3 shows a top view of the base member with the base part and clamping head removed,

Fig. 4 shows a top view of the base part and the clamping head together with plate stacks, but with the covering part of the base part cut out in the region of the plate stacks and with the base member only indicated in dot-dash lines,

Fig. 5 shows an enlarged side view of the plate stacks, but with the one limb of the U-shaped base part cut away member and with the clamping head only partially shown,

Fig. 6 shows a top view of the base part and the clamping head in accordance with Fig. 5, in which respect also the release lever for the clamping member is hinged to the base part, and this release lever with the parts for the longitudinal constraint thereof and a cap sleeve shortly prior to the insertion thereof onto the clamping parts (translator's note: German makes no sense), in which respect the cap sleeve is shown on one side in section and

Fig. 7 shows a section through the longitudinal plate stack and the gripping device in the direction of sight of the section arrows in Fig. 6.

The seat bracket 1 in accordance with the invention is formed substantially by a base member 2, a base part 3, a clamping member in the form of a clamping device 4 together with constraint system 5 for the inclination of a seat surface 6 and a back-rest which is not shown in the drawing and which is hinged to a supporting stirrup 7, the supporting stirrup being guided axially in a clamping head 8. The seat bracket 1 and, thus, the base member 2 thereof is, in this respect, formed from a U-shaped sheet-metal part, which is provided with a series of recesses 9 and bores 10 for the passage and mounting of levers 11 and shafts 12, and also with a bearing block 13 for the form-locking connection of the column 14 of the chair. Whilst the bores 10 and recesses 9 are provided predominantly on the U-shaped limbs 15, 16 of the base member 2, the bearing block 13 is provided in the region of the one end of this base member, and this is formed from a sheet-metal part which has a bore 17. Coaxially with this bore 17, a further bore 18 of a different diameter is provided for the free end of the column which is provided with a conicity 19. In the region of the free end 20 of the base member 2 and, thus, in the vicinity of this bearing block 13 the base member has cramp-shaped projections 21, which serve for an additional stabilisation of the bearing block on this base member. At this same end 20 of the base member 2, in the vicinity of the bearing block 13 bores 10 are provided on the limbs 15, 16 of the U-shaped base member, of which the one bore 10' provided at the corner of the limbs serves for the passage of the pivot 12' of a base part 3 that is to be connected to the base member 2 and a bore 10" adjacent thereto serves for the insertion of a release lever 23 for the actuation of an elevating mechanism of the column 14 of the seat. Approximately in the centre of the base

member 2 one of the limbs 16 thereof has the one U-shaped recess 9 for the passage of the release lever 11 of the constraint system 5. Likewise, the limbs 15, 16 of the U-shaped base member 2 at their end remote from the bearing block 13 have diverse bores 10"', of which two end bores are intended for the passage of a bearing shaft 12"' for the clamping head 8 and the bores 10 adjacent to these bores "' are intended for the passage of a further pivot 24 for a cap 25. Analogously to these arrangements of diverse passages 9, 10, on the intermediate web of the U-shaped base member 2 further recesses 26 are provided, of which an approximately square one serves for the fixing through of several plates 27 of a transverse plate stack, and for the hingeing of this plate stack bearing lugs 28 for a hinge pin 29 are positioned on this base member 2.

The base part 3, which acts functionally with the base member 2, is preferably T-shaped in design, in which respect the one part thereof, i.e. the supporting member 30 thereof, is formed by a U-shaped metal sheet and the other part thereof, i.e. the crossbar 31 thereof, is formed by an angular further metal sheet. The two parts, i.e. the supporting member 30 and the crossbar 31, are preferably connected undetachably by welding, and the crossbar 31 is provided with recesses 32 for the fastening thereof to the seat surface 6 that is to be supported. The U-shaped supporting member 30 of the base part 3 is provided on the limbs 15, 16 thereof with bores 10 for the passage of hinge-shafts 12 and/or of the release lever 23, the hinge-shaft 12 being provided immediately in the vicinity of the crossbar 31 and the other recesses 34, 35 for the release lever 23 being positioned along the limbs 36, 37 of the U-shaped base member 2. Provided in the region of the freely projecting end of this base part 3 are the clamping device 4 and the constraint system 5 for the inclination adjustment of the seat surface 6 and the rest surface, i.e. the supporting stirrup 7, in which respect this consists substantially of the two plate stacks 27, 38 and the constraint system 5 which acts in a force-locking manner on these stacks. The plate stacks 27, 38 are, in this respect, formed by a longitudinally-extending plate stack 38 and a transverse stack 27 extending transversely thereto, the plates of which are held against one another in a force-locking manner through the individual plate meshings through base plates 57, 58 and through the clamping pressure of the constraint system 5. The constraint system 5 itself consists of a bearing block 39 which is held in hinge pins 40, 41, which are in turn mounted in the limbs 36, 37 of the U-shaped base part 3, and which bearing block 39 has between the mountings thereof on the bearing pins a recess 42 for the free end 43 of the release lever 11. The recess 42 for this free end 43 is designed in the form of a groove, and provided around the bearing pins 40, 41 are compression springs 44, which are supported resiliently between the one limb 37 of the base part 3 and the bearing block 39 itself. Between the bearing block 39 and the longitudinally-extending plate stack 38, on the one hand, and this stack and the other limb 36 of the U-shaped base part 3, on the other hand, pressure plates 45,

46 are provided, through which also the bearing pins 40, 41 are conducted and which remain held by means of these pins on the U-shaped base part 3. The bearing block 39 acts in a force-locking manner on one of these pressure plates, and this bearing block can be lifted off from the pressure plate only when pressure is applied at the release lever 11 with a force acting against the force of the springs 44. The release lever 11, which is of angular design at its free end 43, is grasped with this angular extension in the recess 42, and this end is supported in such a way on the outer jacket of the U-shaped limb 37 of the base part 3 that, upon the actuation of the release lever 11, this lever pulls the bearing block 39 towards the limb 37, in order in this way to lift the bearing block away from the pressure plate 45 thereof. In order, in so doing, to cause the releasing lever 11 to act on this bearing block 39, a length-adjusting device is provided on the release lever, this length-adjusting device being formed by sleeves 47, 48 having conical run-up surfaces 49 and a cap sleeve which arrests these sleeves. Provided between the sleeves 47, 48 themselves and the U-shaped limb 37 of the base part 3 is a spacing, which is preferably filled (with) a metallic disc 51 which is seated on protuberances 52. In order, in this respect, to prevent longitudinal displacement of the sleeves 47, 48 on the releasing lever 11, the release lever is provided with knobs 53, against which the sleeves are supported after adjustment of the longitudinal spacing thereof. The cap sleeve 50 as well as the sleeves 47, 48 themselves are provided with longitudinal grooves 54 which, after the setting of the length spacing, intermesh in a form-locking manner and prevent the sleeves from rotating back on their conical run-up surfaces 49.

The gripping device, i.e. the clamping device 4 and the constraint system 5 itself, which has the longitudinal plate stack 38 and the transverse plate stack 27, is mounted and guided by way of these stacks both on the base part 3 and here in the bearing pins 40, 41, 29 and 56, in which respect one end of this longitudinal plate stack 38 is tiltably mounted in the one bearing pin 41 mounted and the adjacent portion of this plate stack is slidingly guided on the other bearing pin 40. The transverse plate stack 27, which has approximately the shape of a triangle, is held with the one tip thereof in the base member 2 and here about the bearing pin 29, which is mounted in the lugs 28 of the base member 2, and also on the further bearing pins 40, 41. The longitudinal plate stack 38, which is in turn rotatably mounted with its one end on the one bearing pin 41 and is slidingly guided on the adjacent bearing pin 40, is mounted with the other free end 55 thereof about a bearing pin 56 of the clamping head 8, so that with the same actuation of the constraint system 5 both the inclination of the seat surface 6 and the inclination of the rest surface or respectively of the supporting stirrup 7 can be varied.

In the example shown and described here, the base part 3 can be tilted about the hinge 10' thereof on the base member 2 in accordance with the variation of the clamping device 4

and constraint system 5 about the hinge thereof, whereby the individual position of the seat surface 6 and/or of the rest surface, i.e. the supporting stirrup 7, can be adjusted. In order to make possible an adequate force-locking between the individual plate packs 27, 38, it is advisable to make the plates rather thin in design, in order in this way to accommodate a large number of plates inside the limbs 36, 37 of the base part 22.

For better support of the plate stacks 27, 38, and here in particular of the longitudinal plate stack 38 and enclosure of the same, this can be held laterally by thicker base plates 57, 58, which also support this plate stack adequately against torsion. The force-locking constraint of the plate stacks 27, 38 by way of the clamping device 4 and constraint system 5 is, in this respect, made possible by the springs 44 which are stressable in compression and which press the bearing block 39 sufficiently strongly against the plate stacks. The compression springs 44 are, in this respect, placed concentrically about the bearing blocks 40, 41 and can be pressed with slight expenditure of effort merely by the action of the lever arm of the release lever 11.

In cases where, for example, a gas spring is provided as column 14 for the seat bracket 1 between this and a feet spider which is not shown in the drawing, and this gas spring, as is well known, has a releasing mechanism, in order to be able to actuate this mechanism an angular release lever 23 can be mounted rotatably in the base member 2, namely in such a way that this lever remains held tensioned by a spring 59 in a position shortly prior to the triggering of the gas spring. For the triggering of the gas spring it is, thus, necessary to move this lever 23 against the pressure of the spring 59 constraining it, whereby a crank 60 present on this lever presses onto the release pin of the gas spring and presses this inwardly until the desired height position of the column 14 has been reached. The lever 23 itself for the triggering of the gas spring is, thus, not held by the pressure of the gas spring in this so-called rest position, but this remains in this position through the action of the spring 59 constraining it, which is supported, on the one hand, against the release lever 23 and, on the other hand, against a bearing pin 61 on the base member 2.

The shape of the triangular and elongate plates 27, 38 of the individual plate stacks is indicated in Figs. 5 and 6, in which respect this does not preclude the use of other shapes of plates.

In cases where store is not placed on a simultaneous adjustment of the back-rest upon adjustment of the seat surface 6, the longitudinal plate stack 38 can accordingly be uncoupled, so that the transverse plate stack 27 and, thus, the plates thereof together with pressure plates 45, 46 survive, which can then be held by the same clamping device 4 and constraint system 5 in the closed or rest position respectively. In the version shown here, however, the base part 22 can be tilted about the hinged connection 10' thereof

against the base member 2, as is also indicated in the tilting chords 62 for the base part 22 or respectively the supporting stirrup 7 and the cap 25.

CLAIMS

1. Seat bracket for chairs, in particular swivel work chairs, which is connectable by way of a column to a base structure of the chair and for the purpose of this connection is provided with a bearing block receiving the projecting end of the column, in particular in a force-locking manner, the seat bracket (1) having a U-shaped base member (2), and this bearing block (13) being immovably inserted in this base member (2), and this seat bracket (1) being equipped with a supporting member (30) to support a seat surface (6) resting thereon as well as the seat surface being arranged for adjusting its inclination relative to the base member (2), and the base member being provided with a series of functional parts for its vertical adjustment on the one hand and the adjustment of the inclination of its seat surface on the other hand, these functional parts, with the exception of the parts for their manual control, being arranged inside the limbs (15, 16) of the U-shaped parts of the seat bracket (1) and the seat bracket having the U-shaped parts of both the base member (2) and the supporting member (30) connected hingedly to each other as well as by way of intermeshing plates of longitudinal and transverse plate stacks (38, 27), of which one part is connected hingedly to the base and supporting members (2, 30) and a further part to the base member and the supporting stirrup (7) of the back-rest bracket and the inclination of the base and supporting members, and also that of the supporting stirrup of the back-rest bracket, being arrestable in the inclined positions thereof by means of a clamping member (4, 5) holding the plates together in a force-locking manner, characterized in that the U-shaped supporting member (30) is provided with at least one crossbar (31) extending perpendicular thereto, in that the plates of the longitudinal plate stack (38) extending in the direction of the longitudinal central axis (X) of the seat bracket (1) are supported on the one hand on the pivot pin (41) of the clamping member (clamping device 4, constraint systemn 5) and, on the other hand, on at least one bearing pin (56) of the clamping head (8), in that the plates of the transverse plate stack (27) extending perpendicular to the direction of the longitudinal central axis (X) of the seat bracket (1) are supported on the one hand on the same pivot pin (41) of the clamping member (4, 5) and, on the other hand, on a bearing pin (29) of the base member (2), in that the clamping member (4, 5) is formed by at least one spring (44) seated on a pivot pin (40, 41) and bearing against the limb (36, 37) of the supporting member (30) and a releasing device (47-54) actuating it, in that a bearing block (39) is arranged between the plate stacks and the limb (37) of the supporting member (30) for transmitting the tensional force of the spring (44) to the plates of the plate stacks (27, 38), and in that to actuate this bearing block a release lever (11) is connected thereto, the extension of which is variable by means of a length-adjusting device (47-49) for adjusting the tensional force of the spring (44).

2. Seat bracket according to Claim 1, characterized in that the bearing block (39) is arranged between the plate stacks

(27, 38) and the limb (37) of the supporting member (30), and in that this bearing block has a groove-shaped recess (42) for the free end (43) of the release lever (11) engaging into it.

3. Seat bracket according to Claim 2, characterized in that the bearing block (39) is located by two pivot pins (40, 41) arranged symmetrically to the recess (42) and is capable of being pressed by the springs (44) against pressure members (pressure plates 45, 46) of the plate stacks (27, 38).

4. Seat bracket according to Claim 2, characterized in that the bearing block (39) is connected in the rest position of the plate stacks (27, 38) by way of the pressure plates (45, 46) in a force-locking manner to these stacks.

5. Seat bracket according to Claim 1, characterized in that the release system (47-54) is formed by two sleeves (47, 48) capable of being axially constrained relative to each other and a collar (50) which is capable of being slid over and being connected to these sleeves in a form-locking manner, as well as a spacer (51, 52) which is capable of being clamped between the sleeves and the one limb (37) of the supporting member (30).

6. Seat bracket according to Claim 5, characterized in that, for the purpose of axially constraining the sleeves (47, 48), these have, on their sides pointing towards one another, run-up surfaces (49) together with end stops, and in that, by rotating at least one of the sleeves, these run-up surfaces produce the axial extension.

7. Seat bracket according to Claim 6, characterised in that the sleeves (47, 48), in addition to the end stops thereof, are also constrained between end stops (51, 52, 53) on the release lever (11).

8. Seat bracket according to Claim 1, characterised in that the plates of the transverse plate stack (27) extending perpendicular to the direction of the longitudinal central axis (X) of the seat bracket (1) are of triangular shape and supported and/or guided in the region of their corners on the bearing pins (40, 41, 29).