



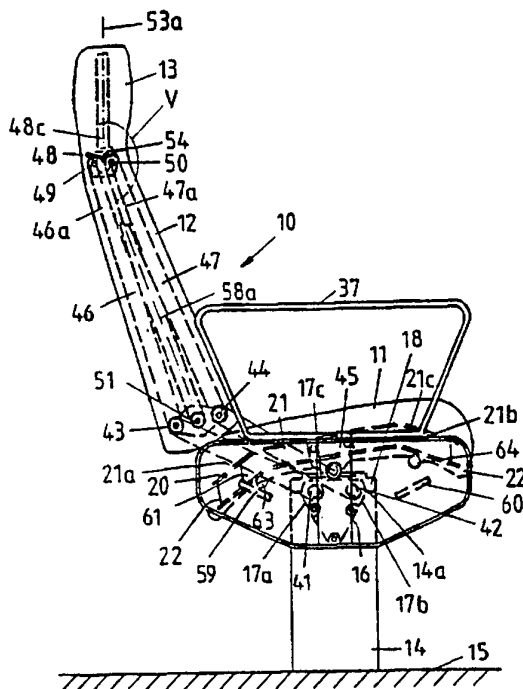
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<p>(21) International Application Number: PCT/NO94/00061</p> <p>(22) International Filing Date: 18 March 1994 (18.03.94)</p> <p>(30) Priority Data:</p> <table border="0"> <tr> <td>931069</td> <td>23 March 1993 (23.03.93)</td> <td>NO</td> </tr> <tr> <td>932058</td> <td>4 June 1993 (04.06.93)</td> <td>NO</td> </tr> </table> <p>(71) Applicant (for all designated States except US): GEORG EKNES INDUSTRIER A/S [NO/NO]; N-5160 Eikangervåg (NO).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): BJØRGE, Karstein [NO/NO]; N-5160 Eikangervåg (NO).</p> <p>(74) Agent: A/S BERGEN PATENTKONTOR; Strandgt. 191, N-5000 Bergen (NO).</p>	931069	23 March 1993 (23.03.93)	NO	932058	4 June 1993 (04.06.93)	NO	<p>(81) Designated States: AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, LV, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report. In English translation (filed in Norwegian).</p>
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(54) Title: ARRANGEMENT OF CHAIR, BENCH, OR THE LIKE, WITH PIVOTABLE BACK REST AND ASSOCIATED NECK SUPPORT

(57) Abstract

A chair (10) has pivotable back rest (12) and associated neck rest (13). The chair provides an arm chair or a combined arm chair and lounge chair or single chair, double chair, sofa or the like. The neck support (13), which is pivotable an angle v in relation to the back rest (12), is arranged by means of joint arms (46, 47) to be forcibly controlled in a pivot movement in a pivot direction deviating from the back rest pivot direction. The joint arms (46, 47) converges upwards from a common lower intermediate piece (48) on either side of an intermediary plane that forms a center main plane (53a) for a rigid frame portion (53) of the back rest (12).



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Arrangement of chair, bench, or the like, with pivotable back rest and associated neck support.

The present invention relates to an arrangement of chair, bench, or the like, with pivotable back rest with associated rigid frame portion and with neck support with associated frame portion, where the neck support is pivotable an angle v in relation to the back rest by means of joint arms and where the neck support is arranged to be forcibly controlled by a pivot movement in a pivot direction which deviates from the pivot direction of the back rest by pivoting of the back rest in relation to a chair bottom part.

The seat device can be used onboard in different types of vehicles and vessels, such as boats, ships, airplanes, railway wagons, buses, etc. Specially, the solution is intended to be used in connection with vehicles which are to be used in two opposite driving directions, for example onboard in a railway wagon or another rail-going vehicle, that is to say in such cases where the seat device is desired to be transposed from driving position to driving position.

It is generally known in connection with rail-going vehicles to be able to pivot the back rest of the seat device to position of use in opposite driving directions. In such cases it is problematic to use neck support and simultaneously to adapt the position of the neck support in a correct way in relation to the back rest. In some cases it can be used separate adjustable neck support; however, such neck supports are easily destroyed or damaged during use. In other cases it can be used securely fastened neck supports, which extend substantially outwards in the driving direction as well as in direction opposite to the driving direction, something which in most cases increases the place demand of the seat device and limits the use of the space behind the back rest and

thereby limits desired passibility and possibilities of use at the back side of the back rest.

From Japanese Utility Model application No. 3-77748 of 30/11-89 it is known a chair corresponding to the one stated in the preamble. The joint arms in the pivot arm mechanism form parts of parallelogram joints. This involves problems for adaptation of the joint arm mechanisms within the volume of the back rest as well as problems with the upholstery of the joint arm mechanisms within the volume of the back rest. In addition, the joint arm mechanisms may during use be exposed to extra heavy loads which may deform or break in pieces the joint arms. In addition, the frame of the back rest is not well adapted to the geometric shape of the pivot arm mechanisms and cannot, therefore, cooperate in an effective mutual support of the pivot arm mechanisms.

With the present invention the aim is a solution, where the neck support together with the back rest can be formed with a simple and practically favourable industrial design so that it is obtained a geometrically favourable location and dimensioning of the pivot arm mechanism.

Generally, the aim is that the neck support in itself and the upper part of the back rest, respectively, shall occupy least possible space on the back side of the back rest during use. This last-mentioned matter is specially the case onboard in vehicles or vessels where the seat device is intended to be used in respectively opposite outer positions.

The arrangement according to the invention is characterized in that the joint arms converge upwards from a common lower intermediate piece to an upper intermediate piece on respective sides of an interfacial plane which forms the centre main plane of a rigid frame portion in the back rest.

The aim is a solution which can be used generally in connection with different types of seat devices, for example as arm chair, combined arm chair and lounge chair as well as more or less securely fastened single chairs, double chairs, benches or sofas or the like, the back rest of which is pivotable between two opposite outer positions.

With the proposed solution it is an advantage, but not a necessity that also the chair seat itself can be pivoted to a certain degree in order to adapt sitting or lying position in relation to the current use positions of the back rest.

According to the invention it will be possible by simple means to obtain a neck support which can be given different degree of neck and/or head support, with relatively little space demand, and which simultaneously can be given an esthetically attractive appearance as well as sufficient strength and associated good use qualities during use, for example by use in public transport means and generally indoor in public places.

Further features of the invention will appear from the following description with reference to the accompanying drawings, which show a few preferred embodiment examples and wherein:

Fig. 1 shows in a first embodiment example an one-seat chair according to the invention, shown partly in front view and partly in cross-section.

Fig. 2 and 3 show in side view the same chair, as shown in Fig. 1, with the back rest shown in two mutually opposite outer positions.

Fig. 4 shows the same as in Fig. 2 and 3 with the back rest shown in an intermediate position between the outer positions.

Fig. 5 shows a section of Fig. 3, shown partly in side view and partly in cross-section.

Fig. 6 shows in a second embodiment example a frame work for a two-seat chair according to the invention, shown partly in front view and partly in cross-section.

Fig. 7 and 8 show in side view and in front view, respectively, a preferred embodiment of a joint arm which is used as upper joint arms in a pair of opposite pivot arm mechanisms.

Fig. 9 shows in side view a section of the upper ends of the upper joint arms in the one outer position of the pivot arm mechanism.

Fig. 10 shows in side view a section of the lower ends of the upper joint arms and the upper ends of the lower joint arms in the one outer position of the pivot arm mechanism.

Fig. 11 shows in a vertical cross-section a preferred embodiment of an upholstery for back rest and neck support.

Figs. 12 and 13 show in detail and in side view respectively in front view a forcibly controlled means for the neck support.

Fig. 14 shows schematically in detail and partially in sectional view parts of the forcibly controlled means according to Figs. 12 and 13.

Fig. 15 shows in detail a control component of the forcibly controlled means according to Figs. 12-14.

It is in Fig. 1-5 shown a free-standing, permanently located one-seat chair 10 in a first embodiment example according to the invention, intended for being able to be transposed to a condition ready for use in two opposite outer positions, as shown in Fig. 2 and 3, by pivoting past a vertically set intermediate position, as shown in fig. 4.

In Fig. 2 the chair 10 is shown in a first outer position with a seat 11, a back rest 12 and a neck support 13 in associated first outer position. In Fig. 3 the chair 10 is shown in a second, opposite outer position with the seat 11, the back rest 12 and the neck support 13 in associated second outer position. In Fig. 4 the chair 10 is shown in a centre intermediate position between said outer positions, as shown in Fig. 2 and 3.

The chair 10 is provided with a pair of vertically running, box-shaped chair bottom parts 14, which below are fastened more or less permanently, in a manner not shown further, to a floor base 15. The chair bottom parts 14 can below be equipped with control and/or support lugs (not shown) which can be securely attached with suitable clamping members in a manner known per se, for example to rail-shaped anchor members which are fastened to the floor base 15.

In a mainly V-shaped cavity 16, which is formed at the upper end of each of the chair bottom parts 14, it is adopted

a tubular chair support portion 17 with corresponding triangular tube profile, the chair support portion 17 having lower side surfaces 17a, 17b which extend in corresponding V-shape with effective support in the V-shaped cavity 16. The top surface 17c of the chair support portion 17 supports a pair of clamping members 18 which are secured to the top 14a of their respectively associated chair bottom parts 14 by means of associated fastening screws 19. By means of the clamping members 18 the chair support portion 17 can easily and in a safe way be attached securely in a desired position in relation to the chair bottom parts 14. As shown in Fig. 1, the chair support portion 17 extends laterally freely outwards on opposite sides of a respective one of the chair bottom parts 14. Possibly, said two chair bottom parts 14 can be formed in one piece and/or formed in another way than shown herein. Alternatively, one chair bottom part 14 can be arranged to be supported direct against the floor base 15, whereas a second chair bottom part (not shown further) can be fastenable laterally to an adjacent wall base or another suitable fastener. For example, it can be referred to the left chair bottom part as shown in Fig. 6 in connection with a two-seat chair.

The seat 11 is provided with a seat frame portion 20 with associated locally surrounding support bands 65a, which form a part of an upholstery 65, which surrounds the seat frame portion. The seat frame portion 20 is annular and is formed with a pair of longitudinal frame members 21, which run planely at the centre member 21a and which run downwardly curved at opposite end members 21b and 21c at the transition to a pair of transversely running frame members 22. The seat frame portion 20 is at the centre of the frame members 21 provided with a vertically set bearing bracket 23. At the top the bearing bracket 23 is secured in place on the frame portion 20 by means of fastening taps 24. At the bottom the bearing bracket 23 is, via a U-profile member 25, pivotably suspended on the top surface 17c of the chair support portion 17 around a longitudinal axis 26a through a pivot tap 26 which

is secured to the top of the chair support portion 17 and which runs horizontally transversely of the longitudinal direction of the chair. In order to dismantle the seat 11 from the chair support portion 17 in an easy manner, without having to loosen the screws or similar fastening means, the U-profile member 25 of the bearing bracket is, as shown in Fig. 1, provided with a pair of parallel fork members 25a with their respective interfacial control grooves 25b (Fig. 5), which can be threaded in place on the pivot tap 27. Consequently, the seat 11 rests freely pivotably suspended on the pivot tap 26 on the chair support portion 17 via the upper bottom end member of the control grooves 25b. The chair seat 11 is consequently arranged to be pivoted unhindered around said pivot axis 26 between the outer positions as shown in Fig. 2 and 3. Hereby the user will, depending on the weight load in front or in back on the chair seat by change of sitting position, be able to regulate the angle relation between the seat 11 and the back rest 12, as required. In practice, one can thereby to a certain degree regulate the sitting position in an easy manner to different positions during continuous use of the chair over a long time, based on one and the same back rest position. Alternatively, the chair seat can be pivoted to definite, opposite outer positions in the respective outer positions of the back rest, controlled by special, for example axially movable locking taps or by means of a self-stopping stopping mechanism, as shown in Fig. 10. It is shown pitch-circle formed cavities 39a, 40a on the underside of the joint arms 39, 40 in order to make mutual support between the respective stopping members 61, 62 on the chair seat frame and the respective joint arm 39, 40 in the outer positions of the joint arms. By means of the cavities 39a, 40 it can, in addition, be effectively hindered undesired pivoting of the chair seat in relation to the back rest and in relation to the chair bottom part, as the course of the cavities 39a, 40a can effectively hinder that the respective stopping member 61, 62 can force the back support part out of intended outer position. In other words, the cavities can secure a self-

stopping locking position for the back rest in relation to the chair seat. On the other side it is by means of support lugs 39b, 40b, which extend laterally outwards from the upper ends of the joint arms 39, 40, secured an extra bracing between the joint arm 39 and the joint arm 46 in the one outer position and an extra bracing between the joint arm 40 and the joint arm 47 in the second outer position, so that it is secured that the joint arms 46, 47 are pivoted exactly in place in intended outer position in the respective outer position of the back rest.

The tubular chair support portion 17 is at opposite ends provided with an armature 27, which at the one end can be inserted in the hollow space of the chair support portion 17 and secured to the lower side surfaces 17a, 17b of the chair support portion 17 by means of fastening bolts 28a, 28b via associated support members 29 and 30, respectively. In the embodiment example shown in Fig. 5 the armature 27 is divided in two separate armature portions, that is to say a lower armature portion 27' and an upper armature portion 27", each of which is fastenable to the chair support portion 17 with their respective set of fastening bolts 28a and 28b, respectively, via their respective support members 29, 30, the support members 29, 30 also supporting each other in use position mutually via abutting support surfaces 29a, 30a.

The support member 29 of the armature portion 27' extends in the axial direction of the chair support portion 17 laterally inwards in a lower V-shaped member of the triangular profile of the chair support portion 17, whereas the support member 30 of the armature portion 27" extends correspondingly inwards in the upper member of the triangular profile of the chair support portion 17. The armature portion 27" is provided with two associated, axially running, mutually separated bores which form pivot bearings 41, 42 and which shall be described further below in connection with associated joint arm mechanisms for pivoting of the back rest 12 with associated neck support 13.

From the other end member 27b of the armature portion

27' it extends in opposite direction outwards three mutually separated bolt fastening members 31, 32. To the bolt fastening members 31, 32 it is with bolts 33 fastened a side string 34. The side string 34 comprises a lower housing portion 35 with associated, easily removable cover portion 36 and an upper arm rest 37. By division of the armature 27 in two mutually separated armature portions 27' and 27" it is possible to dismantle the armature portion 27' and associated side string 34 and arm rest 37, as a connecting part, by release of the fastening bolts 28a. This implies that one relatively easily can handle, that is to say mount and dismantle, the back rest 12 with associated joint arm mechanisms correspondingly separately.

In the shown embodiment example the back rest 12 and associated neck support 13 are pivotable in relation to the seat 11 by means of a pair of opposite joint arm mechanisms 39, 40, 45-48, which are arranged each on its side of the chair. It shall be described below the one joint arm mechanism 39, 40, 45-48, as the other joint arm mechanism is formed correspondingly reflection-shaped.

It is shown a first joint arm mechanism 39, 40, 45 which controls the pivoting of the back rest in relation to the chair bottom part 14 or the pair of chair bottom parts 14, which are secured to the base and a second joint arm mechanism 45, 46, 47, 48 which controls the pivoting of the neck support 13 in relation to the back rest 12. The first and second joint arm mechanism constitute in practice a connecting pivot arm mechanism, which comprises a first pair of lower joint arms 39, 40 and an upper pair of joint arms 46, 47 which are in pairs connected with each other by means of a first, lower intermediate piece 45 and a second, upper intermediate piece 48.

More detailed explained it is in the intermediate space 38 between the housing portion 35 of the side string 34 and the armature 27 pivotably suspended the first pair of joint arms 39, 40 which are released for free movement on the underside of the back rest 12 and which extend partly inwards

in the back rest itself. The lower end of the joint arms 39, 40 is provided with a first laterally directed pivot tap 39a and 40a, respectively, which is pivotably suspended around mutually parallel, horizontal pivot axes 41a, 42a in corresponding bearings 41, 42 in the armature portion 27'. The opposite upper end of the joint arms 39, 40 is pivotably suspended around mutually parallel, horizontal pivot axes 43a, 44a in pivot taps 43, 44, which are fastened to the first intermediate piece 45.

On the pivot taps 43, 44 it is furthermore pivotably suspended the lower ends of the second pair of joint arms 46, 47. The upper end of the joint arms 46, 47 are pivotably suspended in the second intermediate piece 48 via horizontal, mutually parallel pivot axes 49a, 50a in pivot taps 49, 50.

It is used a simple rectangular back rest frame 53 which is constructed of tube pieces and which consists of a horizontal lower frame member 52 and a horizontal upper frame member 55 as well as two frame members 56, 57 transversely running at opposite ends of the frame members 52, 55. Correspondingly, it is used a simple hoop-shaped neck support frame 58 of tube profile. The back rest frame 53 is arranged in a region between said pair of intermediate pieces 45, 48, with the lower frame member 52 arranged close above the seat 11 and fastened pivotably suspended on the intermediate piece 45, whereas the neck support frame 58, which is fastened to the intermediate piece 48, is pivotably suspended in relation to the back rest frame 53 at the upper frame member 55 thereof. By means of the shown upwards converging joint arms 46, 47 and the associated intermediate pieces 45, 48 it is obtained effective support and bracing members for the back rest frame 53. More detailed explained it is centrally on the intermediate piece 45, around a horizontal pivot axis 51a in a pivot tap 51, pivotably suspended the lower frame member 52 of the back rest frame 53, whereas the upper frame member 55 of the back rest frame 53 is correspondingly pivotably suspended around a horizontal pivot axis 54a in a pivot tap 54, which is fastened centrally on the intermediate piece 48.

The intermediate piece 48 is in the shown embodiment example formed with two parallel fork-forming brackets 48a, 48b, where the pivot tap 54 for the back rest frame 53 is fastened to the one bracket 48a, whereas the pivot taps 49, 50 of the pivot arms 46, 47 are fastened to the second bracket 48b. The intermediate piece 48 has a stem member 48c upwards directed from the brackets 48a, 48b for fastening in the hoop ends of the neck support frame 58. It is, for example, shown that the stem member 48c is provided with an external screw thread 56 which is screwed securely to a corresponding internal screw thread in the associated hoop end in the neck support frame 58. The neck support frame 58 and the opposite intermediate pieces 48 constitute consequently in practice a connecting construction part.

During use the back rest frame 53 is arranged to be pivoted, as shown to the right in Fig. 1 and Fig. 2 and 3, respectively, together with the pair of intermediate pieces 45 and the back rest frame 53, but also to a certain degree in relation to the intermediate pieces 45.

The intermediate piece 45 has a substantially larger length, that is to say an extension in horizontal direction, than the intermediate piece 48, and in the shown embodiment example the intermediate piece 45 is twice as long as the intermediate piece 48. This is done from several different reasons.

In the first place, it is desirable to let the joint arms 46, 47 converge upwards under a certain angle W in order that the joint arms in the outer positions can form mutually stopping and support portions as shown in Fig. 9. In the outer positions the upper end members 46a, 47a of the joint arms 46, 47 form mutual support against each other along corresponding support surfaces 46a', 47a'. In the positions between the outer positions said interfacial angle is reduced, so that there in positions between the outer positions between the end members of the joint arms will be an open slot which secures that the joint arms can be pivoted freely in relation to each other during the pivoting between said outer positions.

In the second place, it is from loading and geometric reasons desirable that the upper pivot axes 49a, 50a lie relatively close up to each other, whereas their lower pivot axes 43a, 44a ought to lie relatively far from each other. The upwards converging joint arms result in that one in the respective two outer positions of the back rest in practice gets an interfacial angle W between the joint arms 46, 47, which in an effective manner can relieve the stretch and pressure loads which occur in the arms 46, 47 during use. In the shown embodiment example the angle W is shown of about 6.5° , that is to say that the arms 46, 47 form an angle $W/2$ of about 3.2° in relation to an interfacial plane which forms the central main plane 53a of the back frame portion.

In Fig. 7 it is shown a side view of the one joint arm 46, and in Fig. 8 it is shown a front view of the joint arm 46. During use it can in certain cases by blow load of, for example, 200-300 kg angularly against the main plane 53a of the back rest frame 53, as shown by the arrow P1 in Fig. 11, be exerted a pressure load in a size order of 1000 kg as shown by the arrow P2 through the pressure absorbing joint arm 46. A corresponding stretch load of 1000 kg is then exerted through the stretch absorbing joint arm 47, as shown in the one outer position in Fig. 11. Correspondingly, the interfacial back rest frame, which is suspended centrally in the respective intermediate piece 45, 48, can give an effective side support for opposite pairs of joint arms 46, 47, simultaneously as the back rest frame 53 forms a force neutralizing component between the pairs of joint arms 46, 47.

One has with the above-mentioned arrangement to a high degree prevented that an axial clenching together of the arm 46 shall cause bending out/cracking out of the arm 46. As shown in Fig. 7 and 8, the arm 46 (correspondingly as the arm 47) is mainly formed with a cylindric cross-section in order to be able to counteract a tendency to bending out/cracking out. Further explained, the arms 46, 47 are over a large portion 46b of its axial extension formed with tubular cross-section. In the shown embodiment example the tubular portion

46b is at opposite ends is fastened to the end piece 46a and 46c, respectively, via tap/sleeve connections, but may in practice possibly be cast in one piece or in another way be rigidly connected with each other.

The frame portion 53 is made of tube stumps for bracing of the frame portion in itself, whereas the frame portion 53 thereby, in addition, can give effective side support for and can neutralize the forces which might arise in the different joint arms 46, 47.

It is shown a pair of stopping plates 59, 60, which are secured to the housing portion 35 in each of the side strings 34 and corresponding stopping members 61, 62 which extend laterally outwards each from its joint arm 39, 40. The back rest 12 forms consequently via the pair of joint arms 39, 40 with associated stopping members 61, 62 support against the stopping plates 59, 60 in each of the outer positions as shown in Fig. 2 and 3. Correspondingly, the seat 11 forms via tap-shaped stoppers 63, 64 support against the stopper plates 59, 60 in each of the outer positions, as shown in Fig. 2 and 3.

The seat 11 can alternatively be pivoted partly by load against upholstery 65 in the seat 11 from upholstery 66 in the back rest 12 and partly by weight load from the user of the chair in different sitting positions on the seat 11. Alternatively, the stoppers 63 and 64 can extend inwards in the pivot path of the joint arms 39, 40 so that the chair seat 11 is forcibly controlled by the joint arms 39, 40 to tilted position in the outer positions as shown in Fig. 2 and 3.

In the embodiment example shown in Fig. 1-4 it is used a mould cast upholstery 65 in the seat 11 and a mould cast upholstery 66 in the back rest 12 and in the neck support 13, respectively. The upholstery can consist of foamed plastic, which is cast around the frame portions and transverse, annular support bands 65a and 66a, respectively, which surround opposite frame portions. Consequently, the support bands 65a, 66a support and brace the upholstery 65 and 66, respectively, in the frames in the chair seat 11, the back rest 12 and the neck support 13, respectively. In addition, it

can on the inside of the chair cover itself, that is to say on the cover 67 in the chair seat 11 and on the cover 68 in the back rest 12 and the neck support 13, in a manner known per se be sewed on further upholstery material (not further shown) with associated seam lines (not shown) for specially person supporting industrial design of and for esthetic forming of the chair seat 11 and the back rest 12 and the neck support, respectively.

It is used a special upholstery 66 in the back rest 12 and the neck support 13 (see Fig. 11), as the upholstery 66 in addition to the back rest frame 53 itself and the neck support frame 58 also surrounds the intermediate pieces 45 and 48 as well as the joint arms 46, 47. For this purpose the joint arms 46, 47 are adopted in special guiding sleeves 72, 73 of rubber or other suitable material, which on its side is imbedded in the upholstery material itself in the upholstery 66. Said guiding sleeves 72, 73 allow a certain movement of the joint arms 46, 47 and the intermediate pieces 45, 48 in relation to the surrounding upholstery.

It is dimensioned the intermediate pieces 45, 46 so that the joint arms 46, 47 with upper edge members 46a, 47a form mutual support in the two outer positions of the back rest 12, as shown in Fig. 2 and 3. In intermediate positions between said outer positions the edge members 46a, 47a are pivoted out of the support construction, so that one avoids sliding movement between the joint arms mutually during the pivot movements of the joint arms 46, 47. During such pivoting of the joint arms 46, 47 these can be moved relatively unhindered by the surrounding upholstery.

In Fig. 4 it is shown the back rest 12 and the neck support 13 in an intermediary position between the outer positions which are shown in an intermediary position between the outer positions which are shown in Fig. 2 and 3. From Fig. 4 it appears that a centre plane 58a through the neck support frame 58 coincides with a centre plane 53a through the back rest frame 53, whereas the centre planes 58a and 53a in the outer positions as shown in Fig. 2 and 3 form an interfacial

angle v of, for example, $160-170^\circ$, depending on the pivot angle of the back rest 12 and applied upholstery in the neck support 13. The angle v can be changed, as required, by corresponding change of the distance between the upper pivot axes 49a, 50a of the joint arms 46, 47 by larger or smaller oblique position, respectively, of the back rest in the outer positions as shown in Fig. 2 and 3.

In an alternative, not shown construction, the chair can be formed as combined sitting and lounge chair. In such a case the one outer position can, for example, be as shown in Fig. 2, whereas the second outer position then can have pivoted the back rest a further angle in the same oblique direction, for example $20-45^\circ$, further downwards towards horizontal position. It can be used separate locking means for blocking of the back rest in each of the last-mentioned outer positions. Possibly, the outer positions shown in Fig. 2 and 3 may constitute intermediate positions between two outer positions which may have an interfacial angle of, for example, $140-170^\circ$, so that one may choose lying position in two opposite outer positions, for example in two opposite driving directions.

In practice it is preferred that the upholstery 66 is somewhat constricted or specially elastically yielding in the transition portion between the neck support frame 58 and the back rest frame 53. In order to secure intended industrial design in the cover itself in the transition portion between neck support and back rest the cover is provided with sewed in elastic band (not shown) which constricts the transition portion in an intended manner.

In Fig. 6 it is shown a two-seat seat device, which comprises two chairs 10' and 10", each of which corresponds mainly to the chair 10 as shown in Fig. 1-5. It is in this case used common chair bottom parts 14, 14' and common chair support portion 17, only with the difference that the chair support portion 17 has correspondingly larger length and that the one chair bottom part 14 is fastened to a floor base 15, whereas the second chair bottom part 14' is fastened to a wall base 15'. For this purpose the housing portion 35 in the

string portion 34 is adapted to the wall base 15' for forming of the chair bottom part 14' itself and is for this purpose provided with external fastening flanges 35a which are fastened by means of fastening bolts 35b to the wall base 15'. In this embodiment example it is used a string portion 34 with associated arm rest 37 only at opposite ends of the two-seat chair and not between the chair parts 10' and 10". From practical reasons the back rests 12' and 12" of the two chair parts 10' and 10" are coupled together to a connecting rigid unit which is pivoted joined between associated two outer positions, for example correspondingly as shown in Fig. 2-4. It is used above and below two coupling parts 70, 71 and 72, 73, respectively. The one coupling part 70, 72 is provided with coupling flange 70a and 72a, respectively, whereas the second coupling part 71, 73 is provided with a corresponding end support surface 71a and 73a, respectively. Said second coupling part 71, 73 is provided with external threads which carry pivotably suspended a locking nut 74 and 75, respectively, which with an internal locking flange tighten the flange 70a (72a) correspondingly against the end support surface 71a (73a). By means of the locking nuts 74, 75 one can easily release the chair parts in relation to each other in cases where this is desirable. It will alternatively also be possible to use common arm rest between each chair part or separate arm rests (not shown) on opposite sides of each chair part in case where this is desirable. Correspondingly, it can in cases where it is desirable also be used two joint arm mechanisms for each chair part, correspondingly as shown for the chair according to Fig. 1-5.

It is obvious that one can alternatively use three or more corresponding chair parts coupled together in a row to a connecting unit and then possibly with joint arm mechanisms between each pair of chair parts in addition to the joint arm mechanisms at the ends of the chair part row.

It is not shown a concrete example of this, but it is obvious that a chair or a row of chair parts, instead of being fastened to the base, can consist of loose chair or a loose

chair row, in cases where this is preferred.

The neck support frame is in the shown embodiment examples pivotable via a pair of intermediate pieces 48, which are controlled directly and forcibly by the pivot movement of the back rest itself in relation to the chair bottom parts and the chair support portion via the joint arms 46, 47. Alternatively, the neck support frame can for special use, in a manner not shown further, be controlled by means of manually controllable or automatically controllable pivot arms (corresponding to the joint arms 46, 47) with associated extra control mechanisms. This alternative can in certain cases be used in addition to or possibly independent of the position and pivot movement of the back rest.

The solution can be used for one-seat or more-seat chairs which are used in public transport means, such as in vehicle or vessel, which, for example, are intended to be driven in two opposite driving directions. This applies specially in a railway wagon or other rail-going vehicle, bus, airplane, boat or ship. A similar need can also occur, for example, in public waiting halls and other stationary places to stay for the public in different connections, where it may be of current interest by simple means to change the orientation direction of the chairs.

It can instead of the joint arms 39, 40 between the chair support portion 17 and the back rest 12 be used a wagon-forming part (not further shown) which can be moved along a curved guiding path, which is supported by the chair support portion. In such a case the joint arms 46, 47 can be axially moved or pivoted by means of a control arrangement not further shown, for example by the wagon-forming part being controlled by control grooves to a corresponding tilted position at the outer position(s) of the back rest.

It is preferred that the cover of the chair extends continuously over the neck support and the back rest. In practice the cover of the back rest and the associated neck support, due to the solidity of the cover per se or due to the friction between the cover and the underlying neck support and back rest members, will have a tendency to withstand pivotation of the neck support in relation to the the back rest. This may result in a delayed pivotation of the back rest and the neck support and an unsatisfying pivotation of the associated mechanism. Said withstanding of pivotation may be transferred from the neck support via the back rest to the chair seat and accordingly to the associated joint arms and the joints in the joint arm mechanism of the chair. It is an aim according to the present invention to avoid such unsatisfying effect by arranging a forcibly control of the neck support to its outer positions by passing a dead point therebetween.

In Figs. 12-15 is illustrated details of a preferred mechanism for forcibly control of the neck support from one outer position to another via a dead point. It is illustrated an intermediate piece 48' which is provided with the pivot pins 49a and 50a for the upper end portions 46a', 47a' of the joint arms 46, 47 and intermediate pivot pin 54' between the upper portion of the back rest frame and the intermediate piece 48'.

An upper end 80a of a band shaped arm 80 is arranged for pivotation at the pivot pin 54', whereas a lower end 80b thereof carries rigidly connected thereto and at right angle therefrom a control means 81. The control means 81 is at its first, rigidly fixed end 81a provided with a head portion 82 with a transvers extending cavity 82a. As being illustrated in Figs. 14 and 15 the cavity has an oval cross section with its greatest length extending crosswise of the axial direction of the control means 81. At a second, free outward extending end 81b of the control means 81 a stop forming annular portion 83 is illustrated, which is arranged to be supported in a caved guiding

groove forming recess 46a", 47a" at the reverse side of the upper end portions 46a', 47a' of the joint arms 46, 47, such as illustrated in Figs. 12 and 13. The annular portion 83 is arranged to be moved along the guiding groove forming recesses 46a", 47a" during pivotation of the intermediate piece 48' between its outer positions (see Figs. 2 and 3). Between the head portion 82 and the annular portion 83 is arranged a stem portion 84 which extends unrestricted through a slit provided between the end portions 46a', 47a'.

At the underside of the intermediate piece 48' there is arranged a concavely bent groove 85, which is forming a recess for a cylindrical head portion 86a, which is provided at the upper end 86b of a guiding pin 86. The lower stem shaped portion 86c of the guiding pin 86 is arranged to move in unrestricted manner in the cavity 82a of the head portion 82 of the control means 81, such as illustrated in scratched respectively in full lines in Fig. 14. As illustrated in Figs 12 and 13 a compression spring 87 is located between the head portion 86a of the guiding pin 86 and a recess 82b at the circumferential face of the head portion 82 of the control means 81.

By pivotation of the intermediate piece 48' between the outer positions, such as indicated in Figs. 2 and 3, the guiding pin is pivoted correspondingly between the outer positions, such as illustrated with scratched respectively full lines in Fig. 14. The compression spring 87 is being compressed from one outer position towards the intermediary position, as indicated with the scratched-dotted line 88 in Fig. 14, and by means of the loaded spring force the compression spring 87 forcibly moves the intermediate piece 48' towards its other outer position.

PATENT CLAIMS.

1. Arrangement of chair (10; 10', 10"), bench or the like with pivotable back rest (12) with associated rigid frame portion (53) and with neck support (13) with associated frame portion, where the neck support (13) is pivotable and angle v in relation to the back rest (12) by means of joint arms (46, 47) and where the neck support (13) is arranged to be forcibly controlled with a pivot movement in a pivot direction which deviates from the pivot direction of the back rest (12) by pivoting of the back rest (12) in relation to a chair bottom part, characterized in

that each pair of joint arms (46,47) converges upwards from a common lower intermediate piece (45) to an upper intermediate piece (48) each on its respective side of an intermediary plane which forms central main plane (53a) for a rigid frame portion (53) in the back rest (12),

whereas the upper and lower intermediate piece (45,48) is arranged at a specific mutual spacing in said intermediary plane by means of the rigid frame portion (53) of the back rest (12).

2. Arrangement in accordance with claim 1, characterized in

that the frame portion (53) of the back rest (12) via the intermediate pieces (45, 48) forms bracing member for opposite pairs of joint arms (46, 47),

the frame portion (53) and the joint arms (46, 47) by opposite ends being fastened to a lower and upper intermediate piece (45, 48), respectively,

whereas the upper pivot axes of the joint arms (46, 47) are arranged in the upper intermediate piece (48) in the same plane as the upper pivot axes of the frame portion (53),

and the lower pivot axes (46, 47) of the joint arms are arranged in the lower intermediate piece (45) in the same plane as the lower pivot axes of the frame portion (53).

3. Arrangement in accordance with claim 2, c h a r - a c t e r i z e d i n

that the frame portion (58) of the neck support (13) and the frame portion (53) of the back rest (12) are mutually jointed together,

the frame portion (58) of the neck support (13) being pivotably suspended around a first horizontal axis at the upper end of the frame portion (53) of the back rest, whereas the frame portion (58) of the neck support (13) via the upper intermediate piece (48) is connected to a joint arm mechanism (39, 40, 45-48) or a pair of joint arm mechanisms (39, 40, 45-48), which contain the joint arms (46, 47) and which are forcibly controlled by the pivot movements of the back rest.

4. Arrangement in accordance with claims 2 or 3, c h a r a c t e r i z e d i n

that the frame portion (58) of the neck support (13) and the frame portion (53) of the back rest as well as and at least certain parts (45-48), including the joint arms (46, 47), of the joint arm mechanisms (39, 40, 45-48) are imbedded, preferably cast in a common upholstery (66).

5. Arrangement in accordance with claim 4, c h a r - a c t e r i z e d i n

that said certain parts (45-48), including the joint arms (46, 47), of the joint arm mechanisms (39, 40, 45-48) are adopted in a guiding (guiding sleeve 72, 73), which is imbedded in the common upholstery (66).

6. Arrangement in accordance with one of the preceeding claims 1-5, characterised in

that the chair upholstery forms a continuous hood over the back rest and the neck support, and

that the intermediate piece (48'), which controls the movements of the neck support in relation to the back rest, is provided with a spring loaded forcibly controlled mechanism (86-87) which is arranged to forcibly control the pivotation of the neck support from a dead-point forming intermediate position towards a respective outer position.

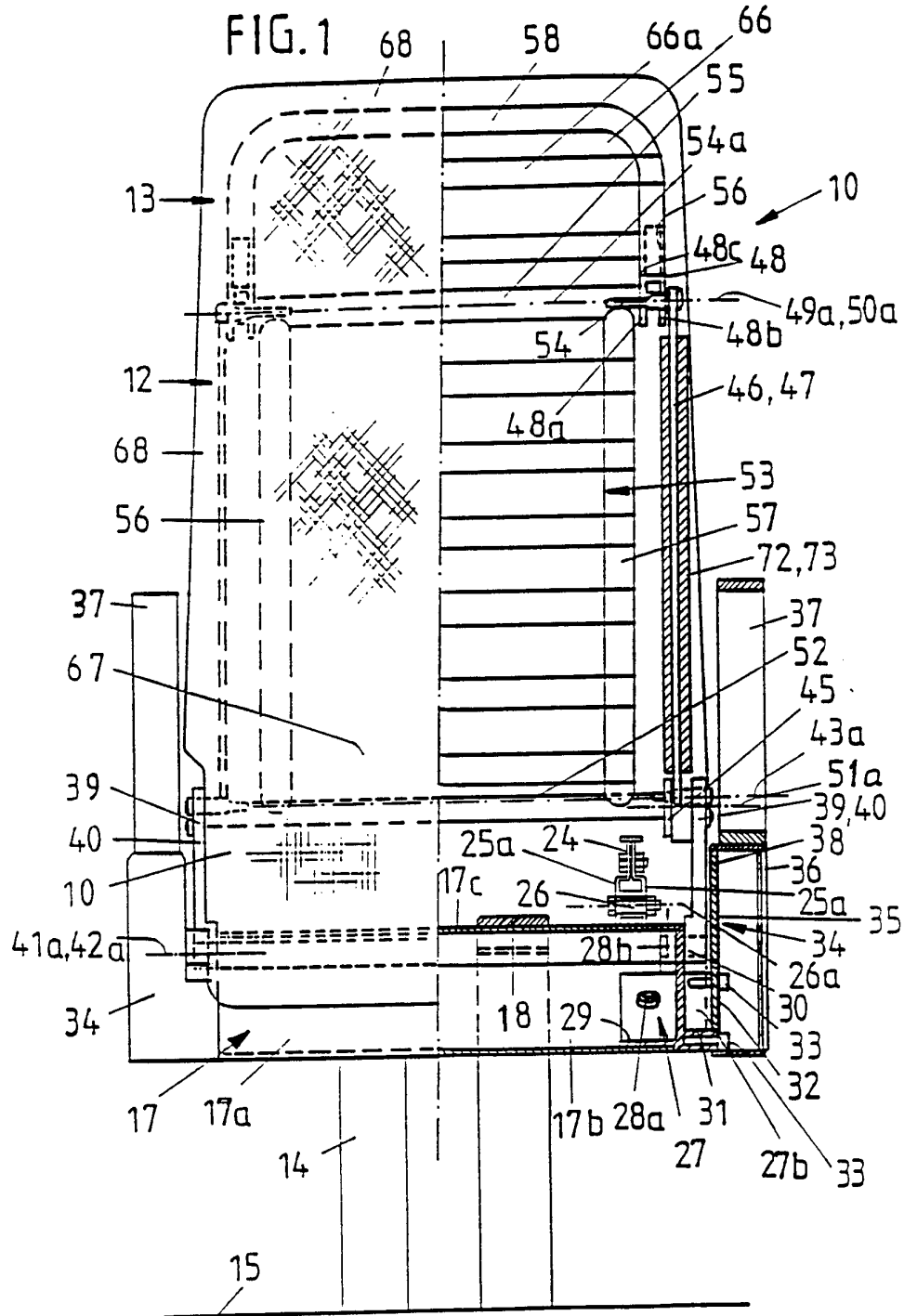
7. Arrangement in accordance with claim 6, characterised in

that the forcibly controlled mechanism (86-87) contains a compression spring (87) and a guiding pin (86), and

that the compression spring (87) surrounds a stem portion (86b) of the guiding pin (86) between a head portion (86a) at the upper end of the guiding pin and a spring recess (82b) at the guide means (81) head portion (82) which is providing a guide for the guiding pin (86),

the head portion (86a) of the guiding pin (86) being arranged to form a support in a groove (85) at the underside of the intermediate piece (48'),

whereas the stem portion (86b) of the guiding pin (86) is free to move with a restricted pivotation in a cavity (82a) in the guide means (81) head portion (82).



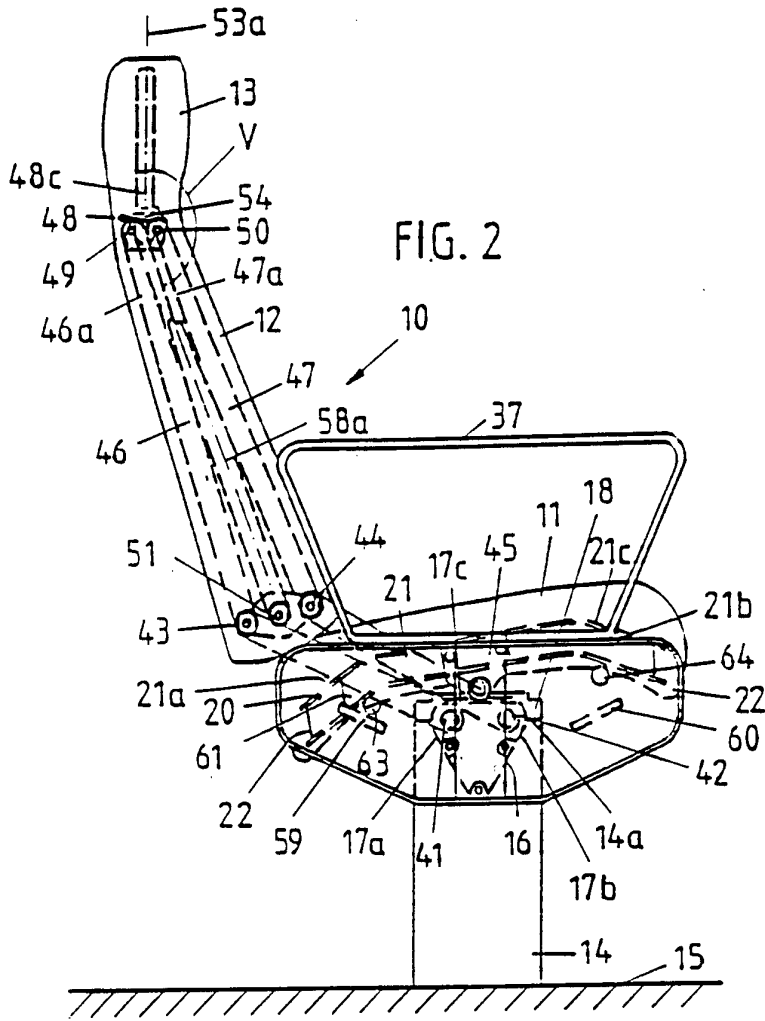


FIG. 2

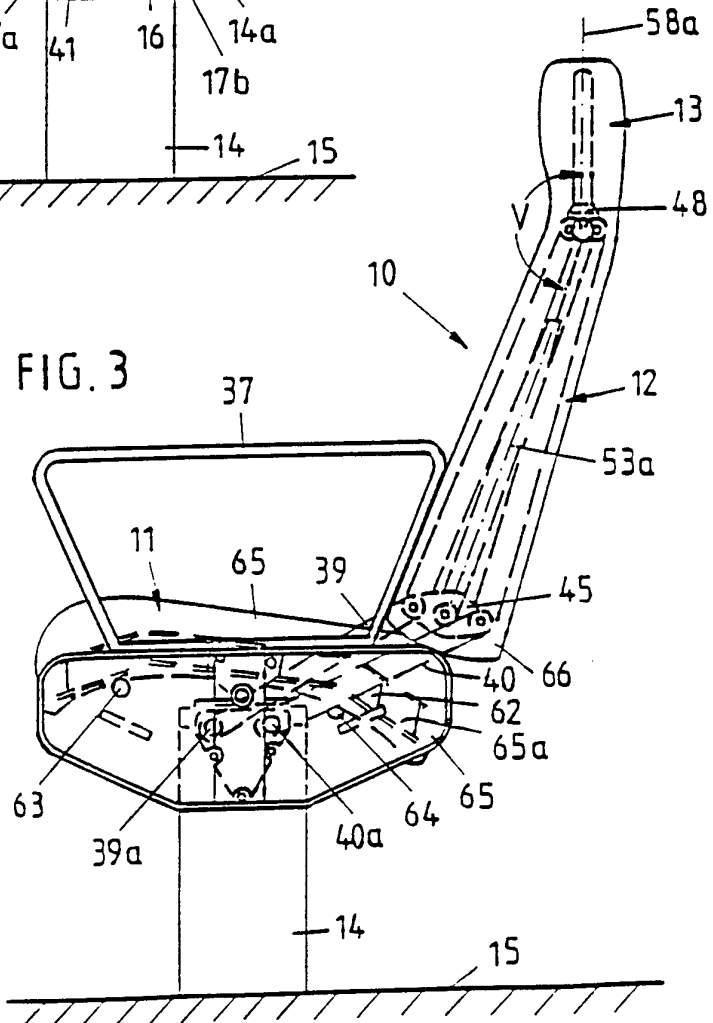


FIG. 3

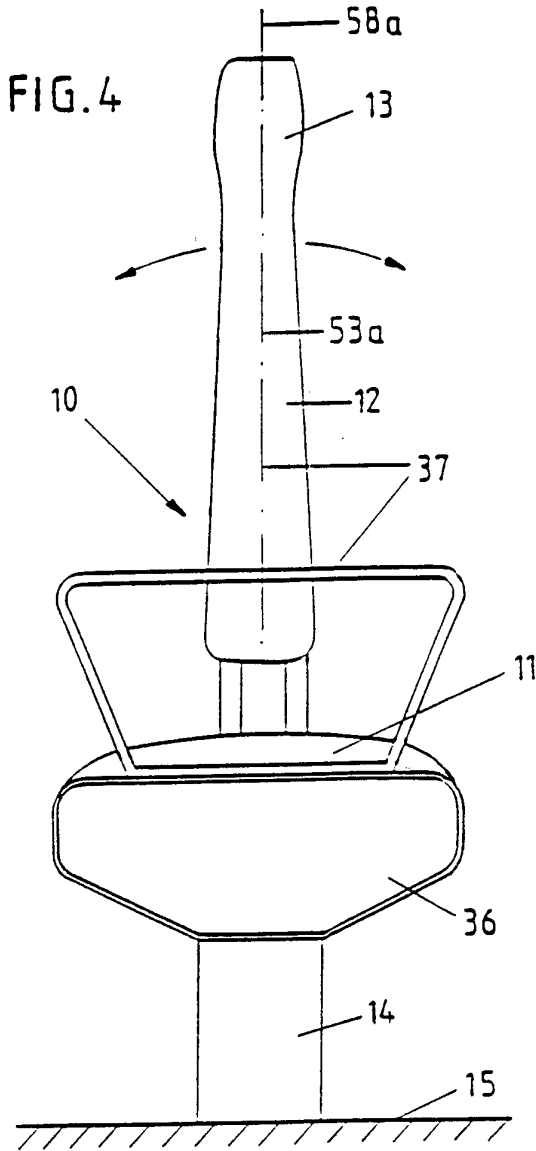


FIG. 7

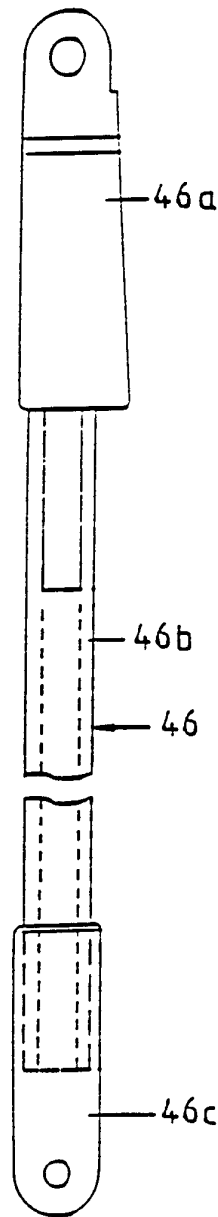


FIG. 8

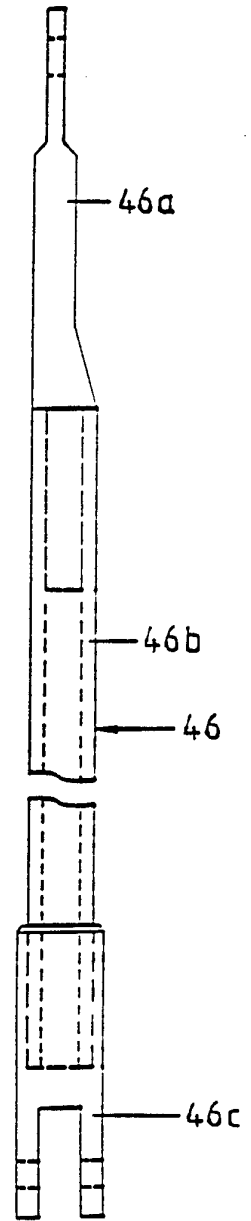
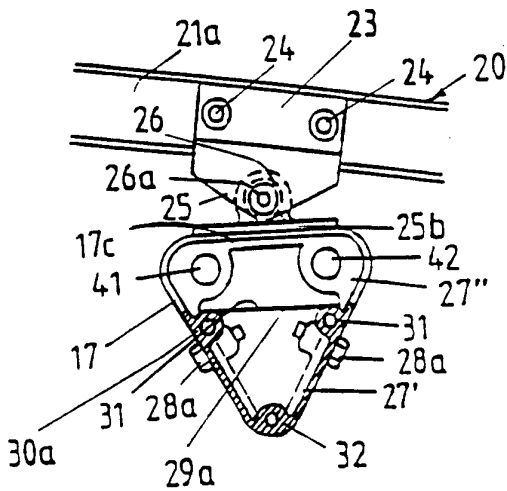
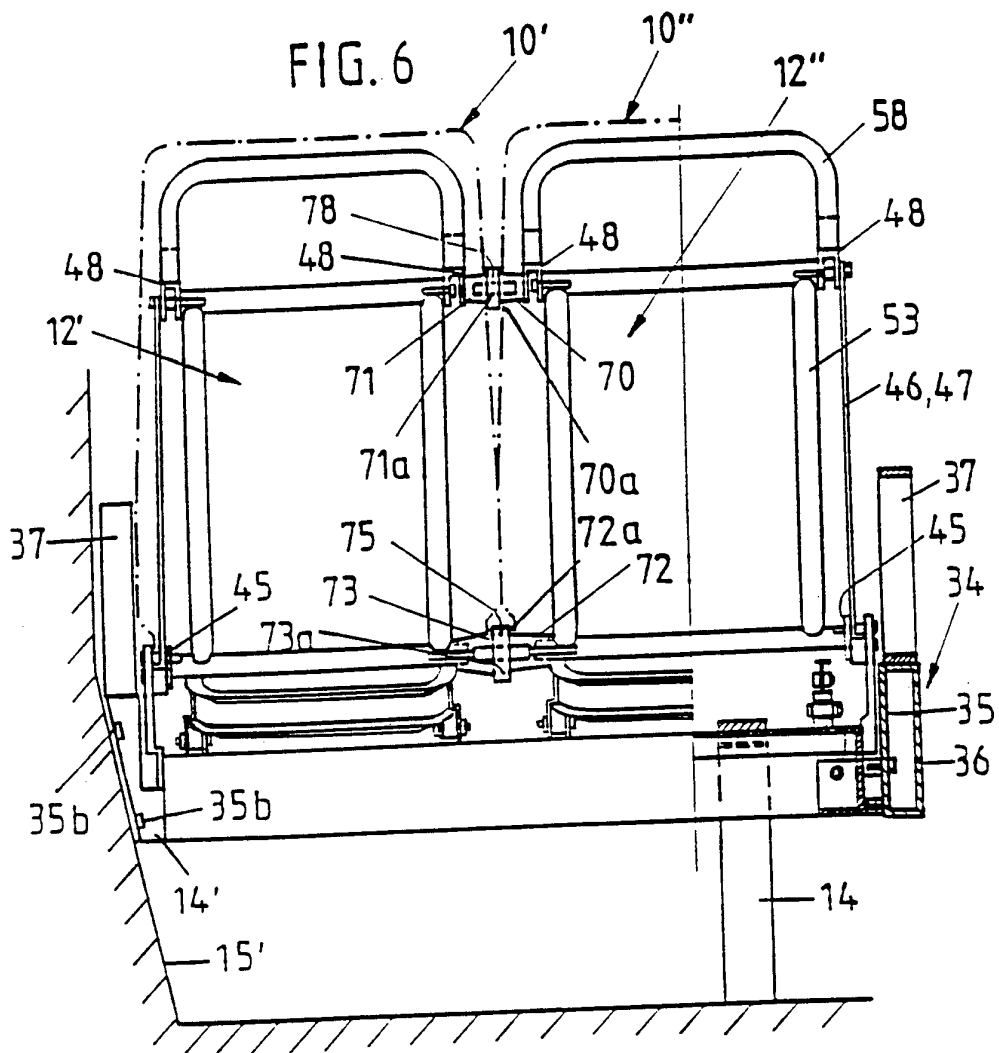


FIG. 5





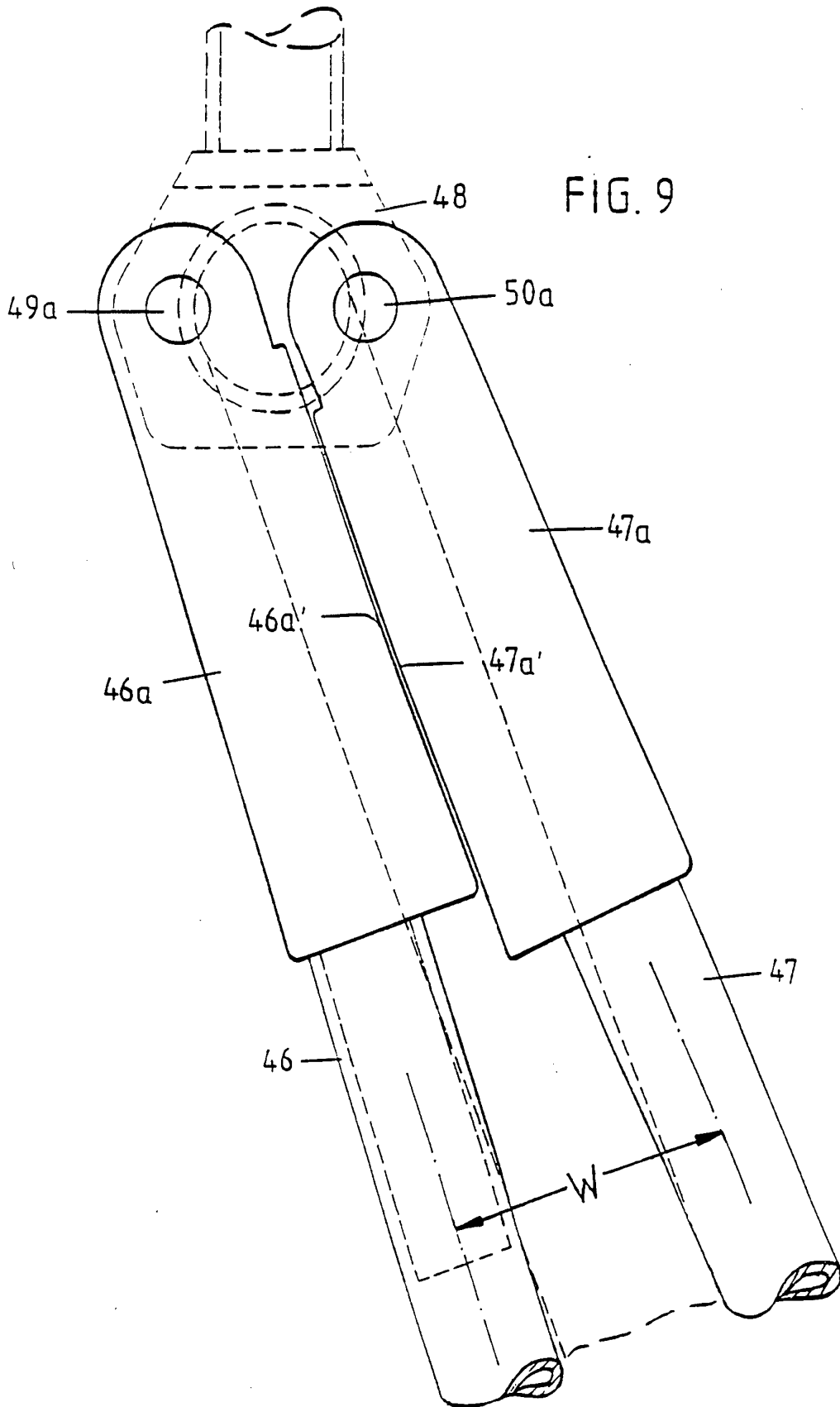


FIG. 10

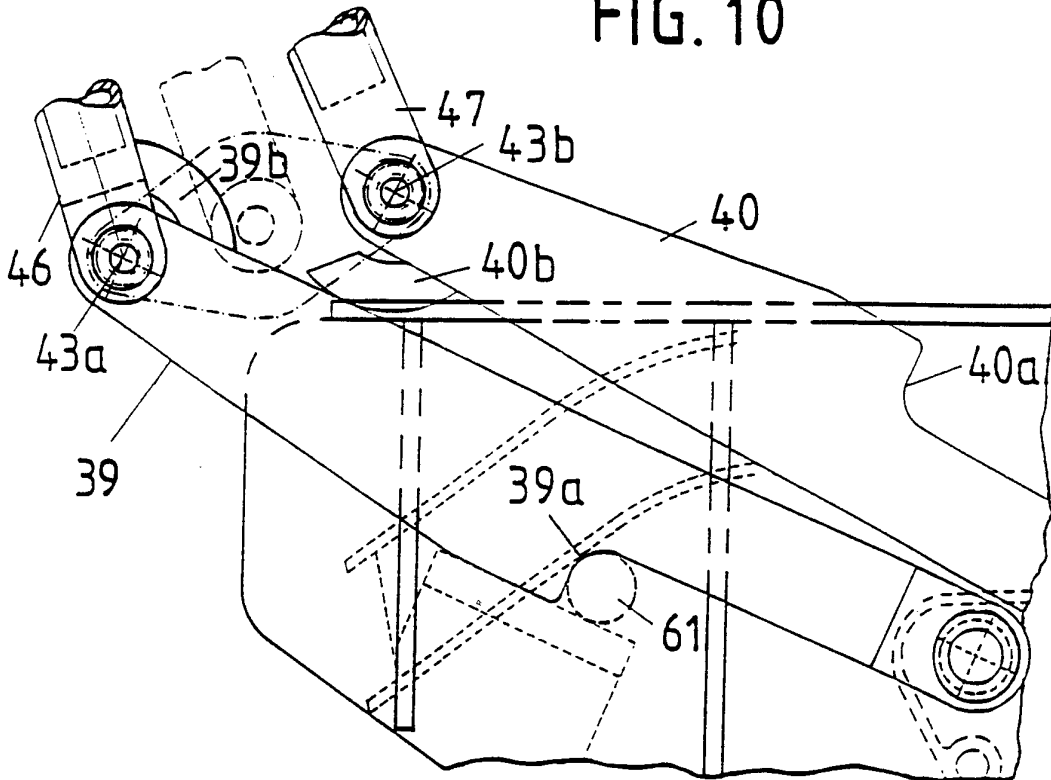


FIG. 11

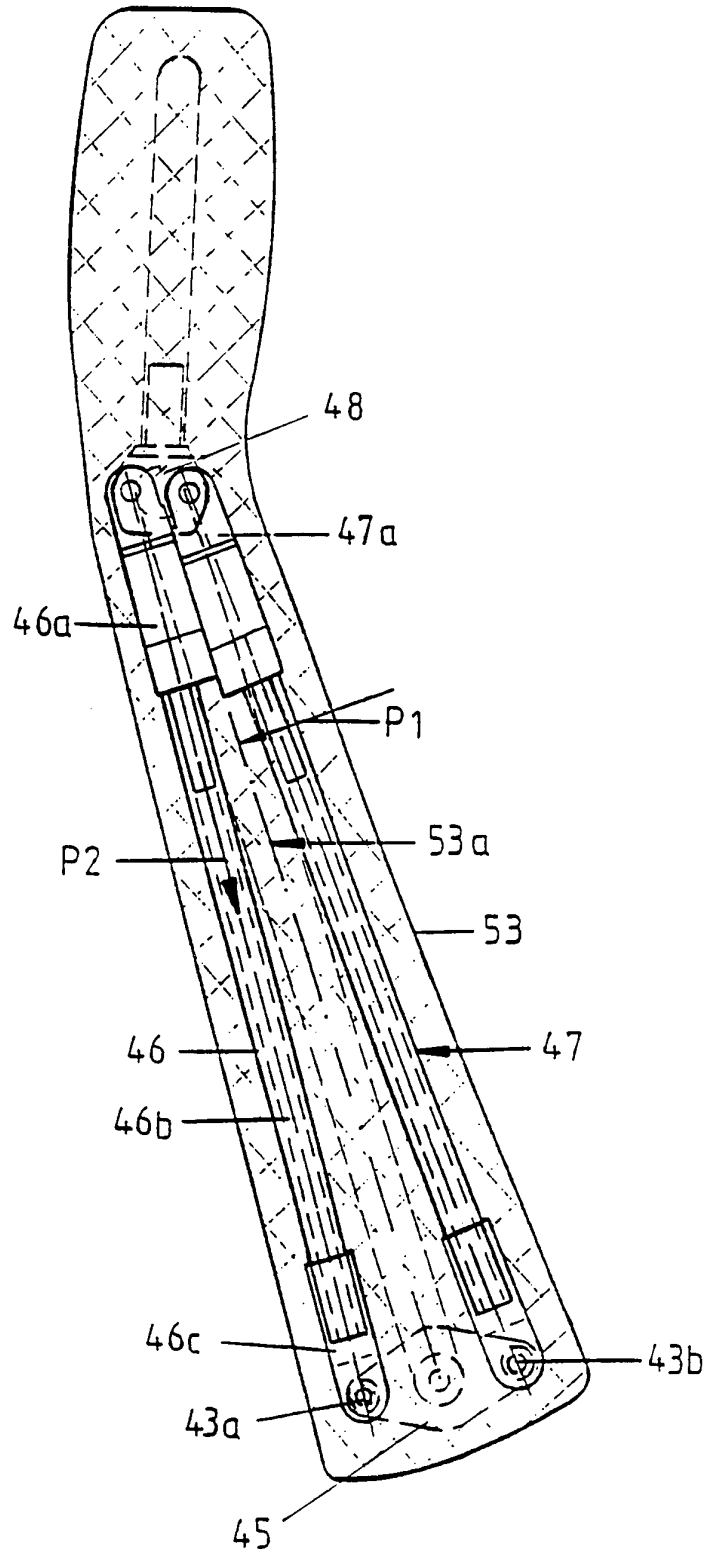


FIG. 12

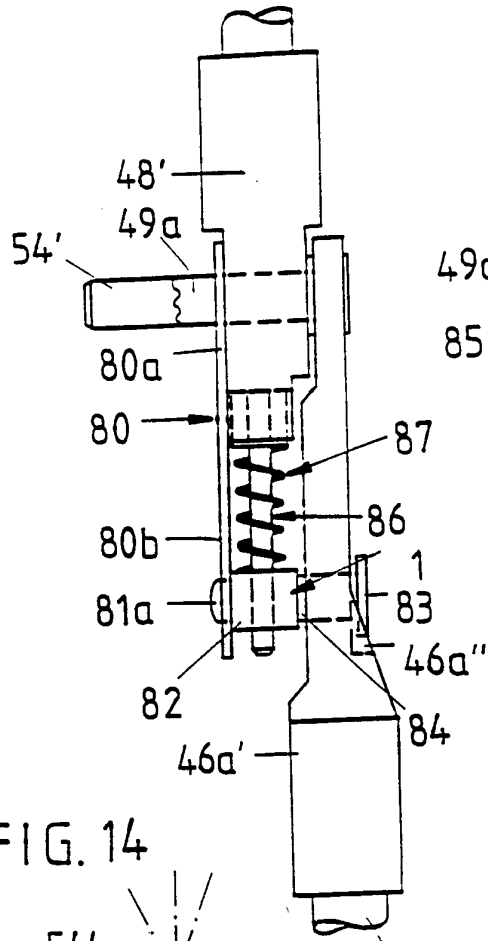


FIG. 13

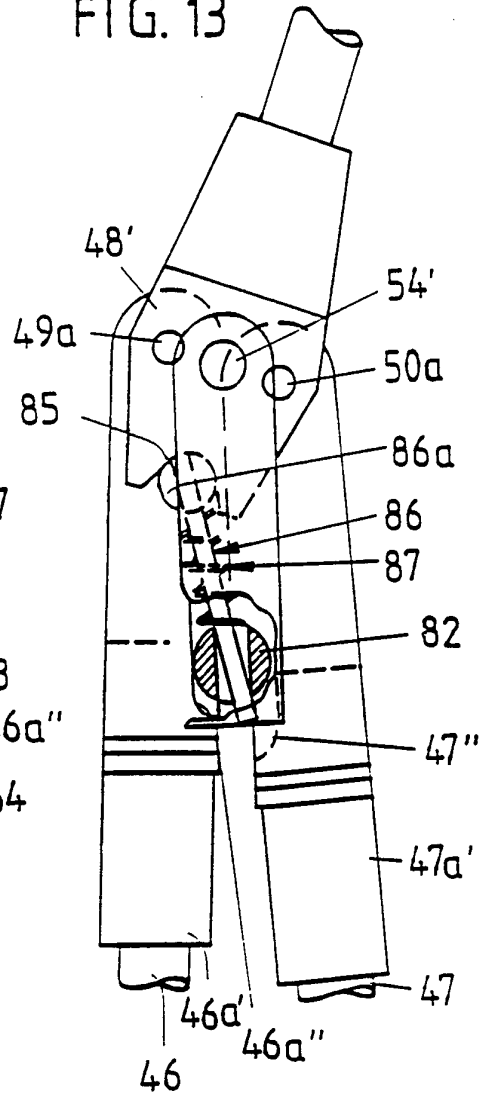


FIG. 14

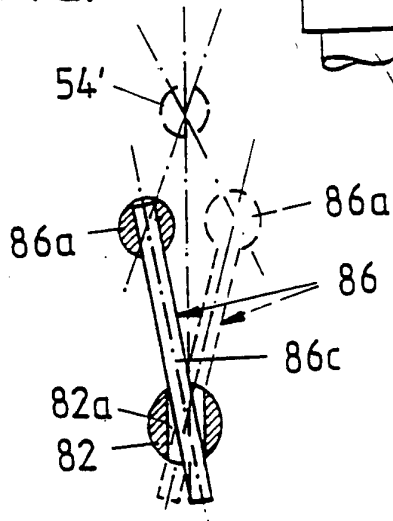
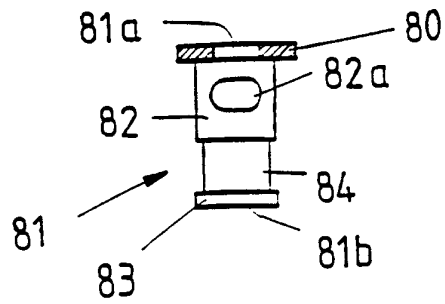


FIG. 15



INTERNATIONAL SEARCH REPORT

International application No.

PCT/NO 94/00061

A. CLASSIFICATION OF SUBJECT MATTER		
IPC ⁵ : A47C 1/036 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)		
IPC ⁵ : A47C		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
SE,DK,FI,NO classes as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	NO, B, 149337 (AMUND LINDBERGET), 27 December 1983 (27.12.83)	1
A	--	2-7
A	DE, A, 2057980 (GIROFLEX-ENTWICKLUNGS-AG), 24 June 1971 (24.06.71)	1-7
A	FR, A, 1256526 (FRIDTJOF FRANK SCHLIEPHACKE), 13 February 1961 (13.02.61)	1-7

<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
Date of the actual completion of the international search		Date of mailing of the international search report
22 June 1994		08 -07- 1994
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86		Authorized officer S-E Bergdahl Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT
 Information on patent family members

28/05/94

International application No.
 PCT/NO 94/00061

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
NO-B- 149337	27/12/83	NONE	
DE-A- 2057980	24/06/71	AT-A- 301789 BE-A- 760088 CH-A- 500688 FR-A- 2072977 GB-A- 1318950 NL-A- 7018265 US-A- 3712666	15/08/72 17/05/71 31/12/70 24/09/71 31/05/73 21/06/71 23/01/73
FR-A- 1256526	13/02/61	NONE	