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(54) **A rocking chair.**

(57) A rocking chair comprising a support stand (10), and a seat assembly (12) capable of being pivotally mounted on the stand (10) about any one of a plurality of axes is disclosed. An apertured locking bar (52) and peg (56) are operable to prevent rocking, if desired, by securing the seat assembly (12) relative to the stand (10) in any one of a plurality of orientations.

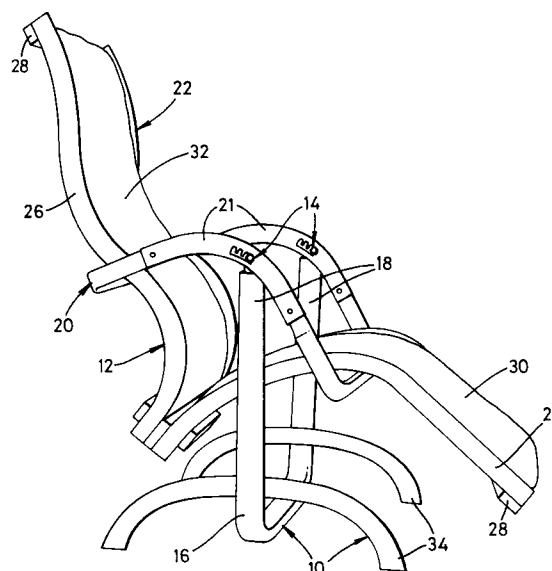


Fig. 1

This invention relates to a rocking chair.

Rocking chairs commonly consist of a conventional seat, usually provided with a back-rest, mounted on a pair of arcuate rockers. Such a rocking chair is usually able to be displaced by only a relatively small angle from its equilibrium position without becoming unstable.

The instability of these chairs is, as will be appreciated from the application of elementary mechanics, due to its centre of gravity passing through the vertical plane which contains the points at which the rockers contact the ground, as its maximum stable angular displacement is reached. This situation is clearly undesirable, e.g. if the chair is to be used by a person of limited mobility or an infirm person.

In addition, the rather limited extent to which the chair can rock tends to spoil the occupant's enjoyment of the chair and limit the relaxational effect of the chair. Furthermore, the prevalence of carpeting greatly increases the effort involved.

In order to provide a chair of increased stability, it has been proposed to provide a base board or pair of base runners upon which the rockers stand. At the ends of each rocker, a tension/compression spring joins it to the board or runner. In this way, a stable rocking chair is provided, but the extent to which it can rock is even further limited as compared with a standard rocking chair.

Additionally, the springs, if sufficiently resilient to perform their function, necessarily have an effect on the characteristics of the chair. In particular, for oscillations of large amplitude, which would be expected to give rise to greater relaxation effects, the effect of the springs is noticeably to reduce the period of its oscillations. This is undesirable, and can give rise to discomfort. Furthermore, the "feel" of the chair, from the occupant's point of view, is tarnished, and this is particularly evident at the extremes of its oscillation.

The present invention seeks to provide a rocking chair in which the occupier is virtually unable to cause instability during normal use of the chair, but in which the extent to which the chair may rock is not detrimentally affected. In fact, the extent to which a chair according to the present invention may rock may be substantially enhanced as compared with standard or sprung rocking chairs.

Accordingly, a rocking chair is provided which comprises a support stand; a seat assembly; and pivot means for pivotally mounting the seat assembly on the stand about any one of a plurality of axes of the seat assembly.

Stability of the chair is ensured by the fact that the moving parts, i.e. the seat assembly, are isolated from those parts which touch the ground, i.e. the support stand. So long as the stand defines an area within whose bounds the vertical from the centre of gravity of the occupied chair reaches the ground, whatever the orientation of the seat assembly, then the chair will

be relatively stable. Larger stands ensure better stability, although it is, of course, perfectly possible for the stand to be rigidly attached to the floor, which would have the same effect. Furthermore, given a high enough stand, the chair should be much easier than prior chairs for the elderly or infirm to get into and out of.

The chair is capable of oscillations of relatively large amplitude since the motion of the seat assembly is not fettered by contact with the ground. Indeed, it is possible to construct the chair according to the invention which is capable of executing a complete revolution.

In order for the oscillations of the chair to possess a natural period of the order of a few seconds which represents a typical and preferred period, and in order for the effort required to force the oscillations to be kept to a minimum, it is desirable for the centre of gravity of the seat assembly, when occupied, to be within a distance of 2.5-5.1cm from the axis about which the seat assembly is mounted on the stand. To ensure that this criterion can be met for a wide variety of shapes and sizes of occupant, a plurality of possible pivot axes are provided, the occupant choosing the particular axis which suits his requirements best. This set up offers the longest oscillation. Some people may however prefer a shorter, more rapid oscillation, in which case a simple mechanical device could lower the seat assembly so that the centre of gravity is more than 5.1cm from the pivot axis for the seat assembly. The preferred embodiment of the invention possesses such a device.

The chair may also comprise locking means operable to prevent relative motion of the seat assembly and the stand. Preferably, the locking means are operable with the seat assembly in any one of a plurality of orientations. With this arrangement, not only may the chair be used as a rocking chair, but it may also be used as an adjustable reclining chair.

These locking means may comprise an arcuate locking bar provided on either the seat assembly or the stand and engaging means on the other of the seat assembly and the stand for engaging the locking bar. Preferably the locking bar includes a plurality of apertures spaced along its length and the engaging means comprises a bolt or peg movable between an extended position, in which it is adapted to be inserted into the apertures, and a retracted position. If desired instead of using an arcuate locking bar, a straight bar with apertures arranged in an arc could be used.

Preferably, the stand includes a pair of support columns, each having a bearing assembly at its upper end. In one aspect of the invention, each bearing assembly includes an axle, and the seat assembly includes a pair of arms, each arm having a pair of spaced side plates and each side plate including a plurality of slots, each axle being receivable in any one of the respective plurality of slots.

Preferably, the seat assembly comprises a cradle and a detachable seat unit and the pivot means are for pivotally mounting the cradle on the stand. In this way, a number of different styles of seat can be accommodated in the overall structure of a single rocking chair. For example, the cradle may be dispensed with, and the chair may consist of a detachable seat assembly having a pair of generally triangular side frames with suitable upholstery supported thereon like a deck-chair, mounted on a pair of spaced A-frames which may be collapsible, the cross pieces of which comprise an apertured locking bar. The overall width of the chair can be reduced by keeping the arms of the respective side frames of the seat assembly, which support the seat, above their respective A-frame stands. A "waisted" effect can be created by constructing the arms of each side frame which provide the seat and back of the seat assembly so that they taper to their meeting point, in order to clear the stands during rocking. As oscillation of the seat assembly reaches its limit fore and aft, the back and seat make contact with the stands, to provide safety stops.

In a second and preferred aspect of the invention, the chair includes adjustment means for raising and lowering the centre of gravity of the seat assembly with respect to its pivotal connection to the stand and/or for adjusting the angle at which the seat assembly is at rest.

Preferably the adjustment means comprises an adjustment member pivotally attached directly or indirectly to the seat assembly at a mid point, one end of which member is adapted to be adjustably attached directly or indirectly to the seat assembly, the other end of which is adapted pivotally to be connected directly or indirectly to the stand.

The said one end of the adjustment member may be adapted to be bolted to the seat assembly in a number of different relative positions; but in preference, the said one end is movably connected to the seat assembly.

For example, the seat assembly may be provided with a worm screw, which carries a threaded cooperating element, held against rotation with respect to the seat assembly, the said one end of the adjustment member being linked to the said element.

The worm screw may be manually rotatable, eg. by means of a knurled knob, or may be motorized, eg. by a stepping motor controlled in response to input to a control panel by the occupant of the chair.

Finally, it is most preferred that the seat assembly include two, laterally spaced such adjustment members, linked to move in unison.

Three embodiments of rocking chairs according to the first aspect and one according to the second aspect of the present invention will now be described with reference to Figs. 1-8 and Fig. 9 respectively of the accompanying schematic drawings, wherein:

Fig. 1 is a side perspective view of a first embodiment

of a rocking chair in an upright position;

Fig. 2 is a side perspective view of the chair of Fig. 1, and an occupant, in a reclining position;

Fig. 3 is a detail of the chair of Fig. 1 showing in perspective, the pivotal mounting between the seat assembly and the support stand;

Fig. 4 is a perspective view of one of the bearing assemblies of the chair of Fig. 1;

Fig. 5 is an exploded view of the assembly of Fig. 4;

Fig. 6 is a side elevation of an alternative embodiment of rocking chair;

Fig. 7 is a side elevation of a third embodiment of rocking chair,

Fig. 8 is a front view of one version of the embodiment of fig 7 with the seat assembly tipped right forward, and

Fig. 9 is a part cut-away partial view of an embodiment of chair according to the second aspect of the invention showing the adjustment means in schematic detail.

Referring to the drawings, the rocking chair consists of a support stand (10) and a seat assembly (12) pivotally mounted thereon about a pair of bearing assemblies (14). The support stand (10) consists of a U-shaped member, (16) which provides a pair of support columns (18) each having a bearing assembly (14) at its upper end, and a pair of inverted, shallow U-shaped feet (34).

The seat assembly consists of a cradle (20) having a detachable seat unit (22) mounted thereon. In the particular embodiment shown, the seat unit (22) is formed of a rigid frame, constructed from wooden frame members (24, 26, 28), and upholstery (30, 32). As will be described in detail with reference to Figs. 3-5, the bearing assemblies (14) may be mounted in any one of a plurality of transverse slots (36, 36') provided in arms (21) the cradle (20).

The reclining position of the rocking chair illustrated in Fig. 2 and positions between the two shown in Figs. 1 and 2, may be maintained by suitable shifts of weight by the occupant. The position in which the chair most easily remains stable is determined by the particular slots in which the bearing assemblies are located and by the weight distribution of the occupant. As can be seen, the degree to which the chair of Figs. 1 and 2 may rock is limited only by the cradle (20) making contact with the support columns (18). Of course, with different bearings, the chair may potentially rotate completely.

The bearing assembly (14) and associated slots (36, 36') are shown in more detail in Figs. 3-5. The portion of the cradle (20) which forms the pivotal mounting with the support column (18) is formed from sheet metal, which is bent into a channel section and provides a pair of side plates (38; 40).

The slots (36, 36') are provided in each side plate (38; 40), and an axle (42) is fixed into one of the slots

(36, 36') in one side plate (38) and a corresponding one of the slots in the remaining side plate (40). The axle (42), in the form of a bolt, is fixed into the slots by a nut (44). The axle passes through, and rotates within, the cross-piece (58) of a generally T-shaped assembly (48) at the top of the support column (18), and is free to rotate therein on bearings (50). The bolt has a washer (46) on each end. The upright (60) of the T-shaped assembly engages a circular projection, provided for the purpose on the top of its support column (18), and is retained thereby.

The rocking chair illustrated in Fig. 6 is substantially identical to that of Figs. 1 and 2, but an arcuate locking bar (52) is secured to each of its support columns 18, just above the respective feet 34. A plurality of apertures (54, 54') are provided in each locking bar, and the seat assembly (12) is provided with a movable peg (56) which may locate in any one of the apertures (54, 54') to lock the chair in an upright or an inclined position.

Naturally, forms of rocking chair other than that described above are within the scope of the invention. It is contemplated, for example, that the chair may consist of a generally detachable tubular metal seat assembly (60) made of a pair of spaced, generally triangular side frames with stretched canvas upholstery, in the manner of a deck-chair, mounted on a stand formed from two spaced collapsible A-frames (62) as shown in Figure 7. The cross-pieces of the A-frames may constitute an arcuate locking bar, similar to that described above, or be straight with arcuately located apertures, as shown at (64) in Figure 7. The seat assembly may be generally rectangular in plan, with outboard bearing assemblies, or for example as shown in Figure 8. In this construction, each generally triangular side frame (60) has a first arm (66) overlying the apex of its respective A-frame (62), with its bearing assembly (14) located beneath the arm (66), and its other two arms (68) and (70) taper inwardly to their meeting points (72), so that they clear the A-frame stands (62). As oscillation of the seat assembly, which includes an upholstered or canvas seat (74) and back (76), reaches its limit, the arms (68) and (70) make contact with the A-frames, thus providing safety stops. A locking bar is also provided, as described with reference to Figure 7. The chair may also be provided with an adjustable head rest (77).

If a rocking chair as described above is to be used by children or in places to which children have access, it would normally be preferred that the lateral clearance between the seat assembly and the stand be sufficiently large to accommodate the fingers or hand. This substantially reduces the likelihood of injury due to the fingers etc. being caught between moving parts. The outboard bearings mentioned above represent one way of ensuring a sufficient clearance.

Furthermore, it is also preferred that there are no apertures in the sides of the seat assembly in the

neighbourhood of the bearings or the stand, for similar reasons. In the chair of Fig. 7, for example, this may be accomplished by providing solid triangular side pieces retained by and coextensive with the triangular side frames.

This arrangement, in conjunction with outboard bearings would remove the need for large lateral clearances as above, particularly if the stand also had no apertures near the bearings.

Turning now to Fig. 9, there is illustrated the preferred mechanism for adjusting the axis about which the seat assembly pivots, according to the second aspect of the invention. One side only is illustrated, but it will be apparent that the other side is identical, but a mirror image. In reality, the mechanism shown would be enclosed behind a shield or guard to minimise potential hazards.

As can be seen, the mechanism includes an elongate adjustment member (100) pivotally attached to the seat assembly (12), at a pivot (101), the assembly (12) being cut away to allow the mechanism to be seen. One end (104) of the adjustment member carries an elongate aperture (106); the other end (102) is adapted to provide a pivotal connection (not shown) to the stand.

To either the bottom of the seat assembly (12) (as illustrated) or to the back of the assembly (corresponding to rotation of Fig. 9 anti-clockwise by 90°) is attached a worm screw (108), held in place by brackets (110), one of which is illustrated. The worm screw (108) in turn carries a circular nut (112) which is provided with a connecting rod (114) on either side. The connecting rods (114) slide against rails (not shown) at the sides of the seat assembly (12), hence preventing rotation of the circular nut (112) with respect to the seat assembly (12). Accordingly, rotation of the worm screw (108), whether manually or by a stepping motor (not shown), is converted into translation of the connecting rods (114).

At its free end, each connecting rod (114) first passes through the elongate aperture (106) in its respective adjustment member (100) and then terminates in a brazed-on or welded-on washer (116).

It can readily be seen that rotation of the worm screw (108) is simply converted into arcuate motion of the said other end (102) of the adjustment member (100) about the pivot (101), thereby varying the distance between the centre of gravity of the seat assembly (12) and its pivotal connection to the stand or alternatively the angle at which the seat assembly is at rest.

It is also contemplated that the chair should include two mechanisms as illustrated in Fig. 9, one having its associated worm screw attached to the base of the seat assembly, the other to the back. The mechanisms would be "nested" in the sense that the inner mechanism is not directly pivotally attached to the stand, but provides the pivot, equivalent to pivot

(101), for the outer mechanism. As many mechanisms as may be desired can be nested in this way.

It will, of course, be understood that the present invention has been described above purely by way of example and that modifications of detail may be made without departing from its scope.

Claims

1. A rocking chair comprising a support stand (10);
a seat assembly (12); and pivot means (14) for
pivotally mounting the seat assembly (12) on the
stand (10) about any one of a plurality of axes of
the seat assembly. 10
2. A rocking chair according to Claim 1 including ad-
justment means to raise or lower the centre of
gravity of the seat assembly (12) with respect to
its pivotal connection to the stand or to adjust the
angle at which the seat assembly is at rest. 15
3. A rocking chair according to claim 2, wherein the
adjustment means comprises an adjustment
member (100) pivotally attached directly or indir-
ectly to the seat assembly (12) at a mid point
(101), one end (104) of which member is adapted
to be adjustably attached directly or indirectly to
the seat assembly (12), the other end (102) of
which is adapted pivotally to be connected direct-
ly or indirectly to the stand (10). 25
4. A rocking chair according to claim 3, in which the
seat assembly (12) is provided with a worm screw
(108), which carries a threaded cooperating ele-
ment (112), held against rotation with respect to
the seat assembly (12), the said one end (104) of
the adjustment member (100) being linked to the
said element (112). 30
5. A rocking chair according to Claim 1 in which the
stand (10) includes a pair of support members
(18,62), each having a bearing assembly at its up-
per end. 35
6. A rocking chair according to Claim 5 wherein the
seat assembly includes a pair of arms, each arm
having a complementary assembly to cooperate
with the respective bearing assembly in any one
of a plurality of positions. 40
7. A rocking chair according to any preceding Claim
1 including locking means (52, 56) operable to
prevent relative motion of the seat assembly (12)
and the stand (10). 45
8. A rocking chair according to Claim 7 wherein the
locking means (52,56) is operable with the seat 50

assembly (12) and the stand (10) in any one of a
plurality of relative orientations.

9. A rocking chair according to Claim 7 or Claim 8 in
which the locking means (52, 56) comprises a
locking bar (52) provided on either the seat as-
sembly (12) or the stand (10) and engaging
means (52) on the other for engaging the locking
bar (52). 10
10. A rocking chair according to Claim 9 wherein the
locking bar (52) includes a plurality of apertures
(54,54') spaced along its length and the engaging
means (56) comprises a bolt or peg to be inserted
therein. 15
11. A rocking chair according to Claim 10 in which the
bolt or peg is movable between an extended pos-
ition, in which it is adapted to be inserted into the
apertures, and a retracted position. 20

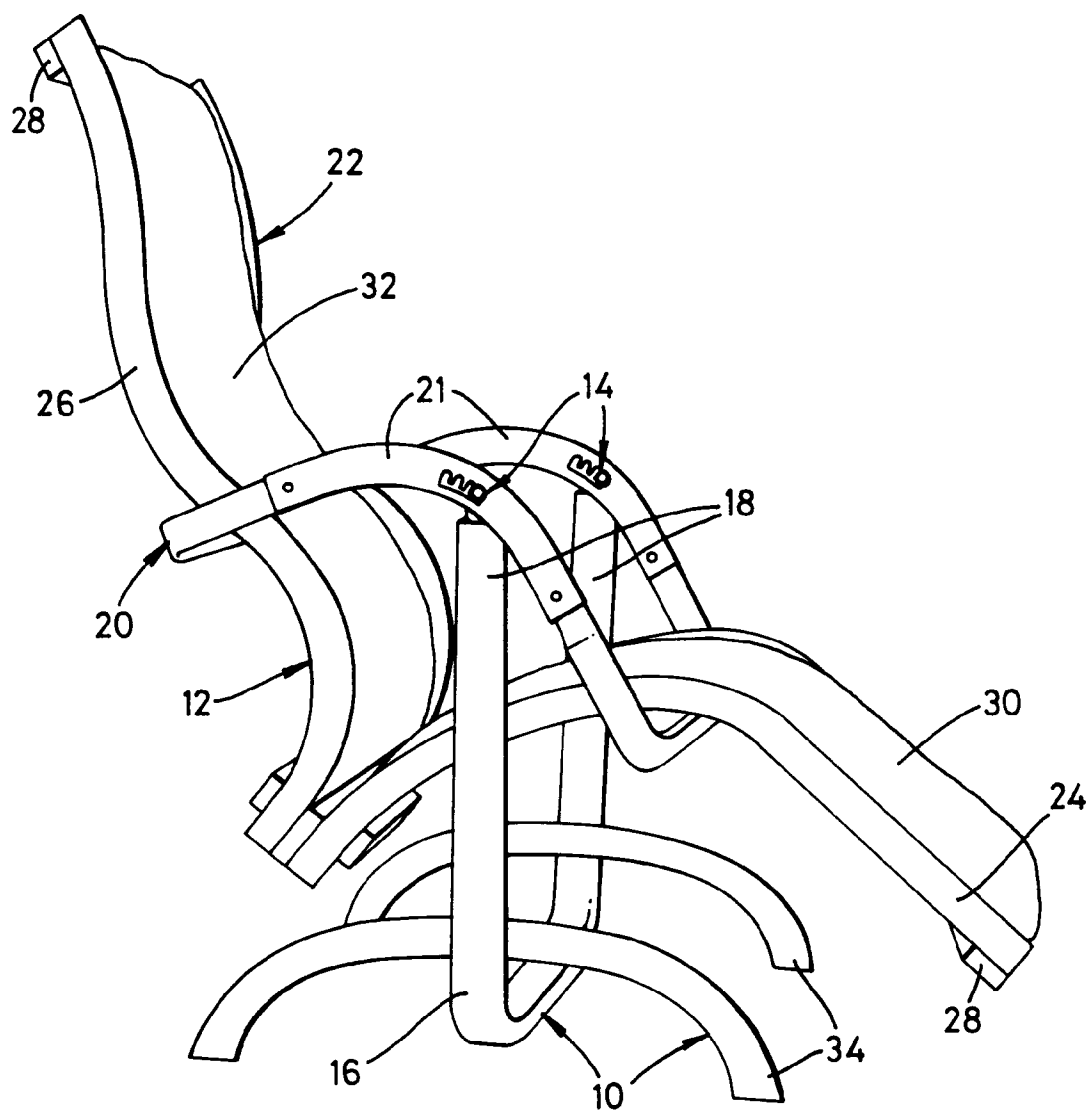


Fig. 1

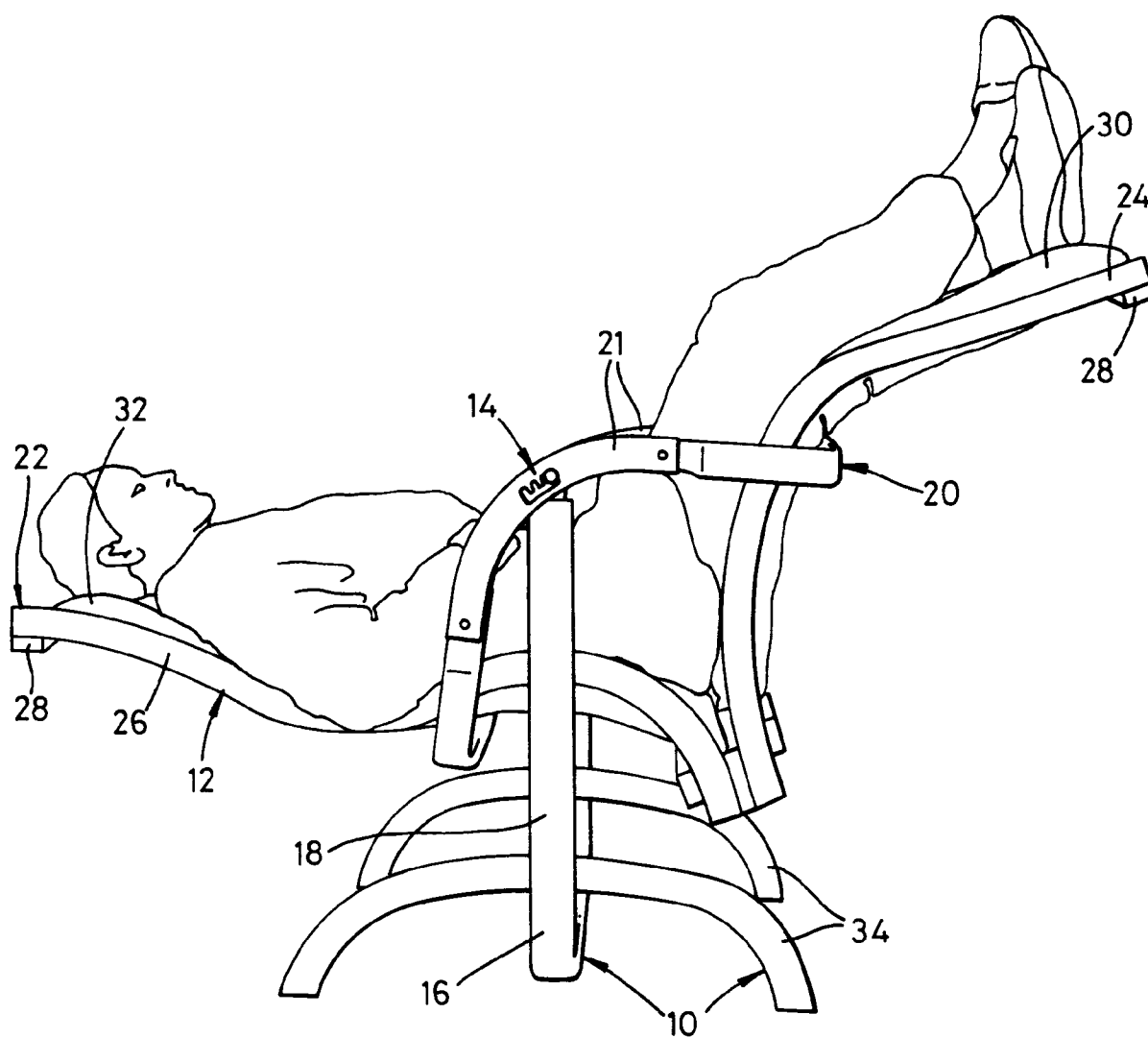


Fig. 2

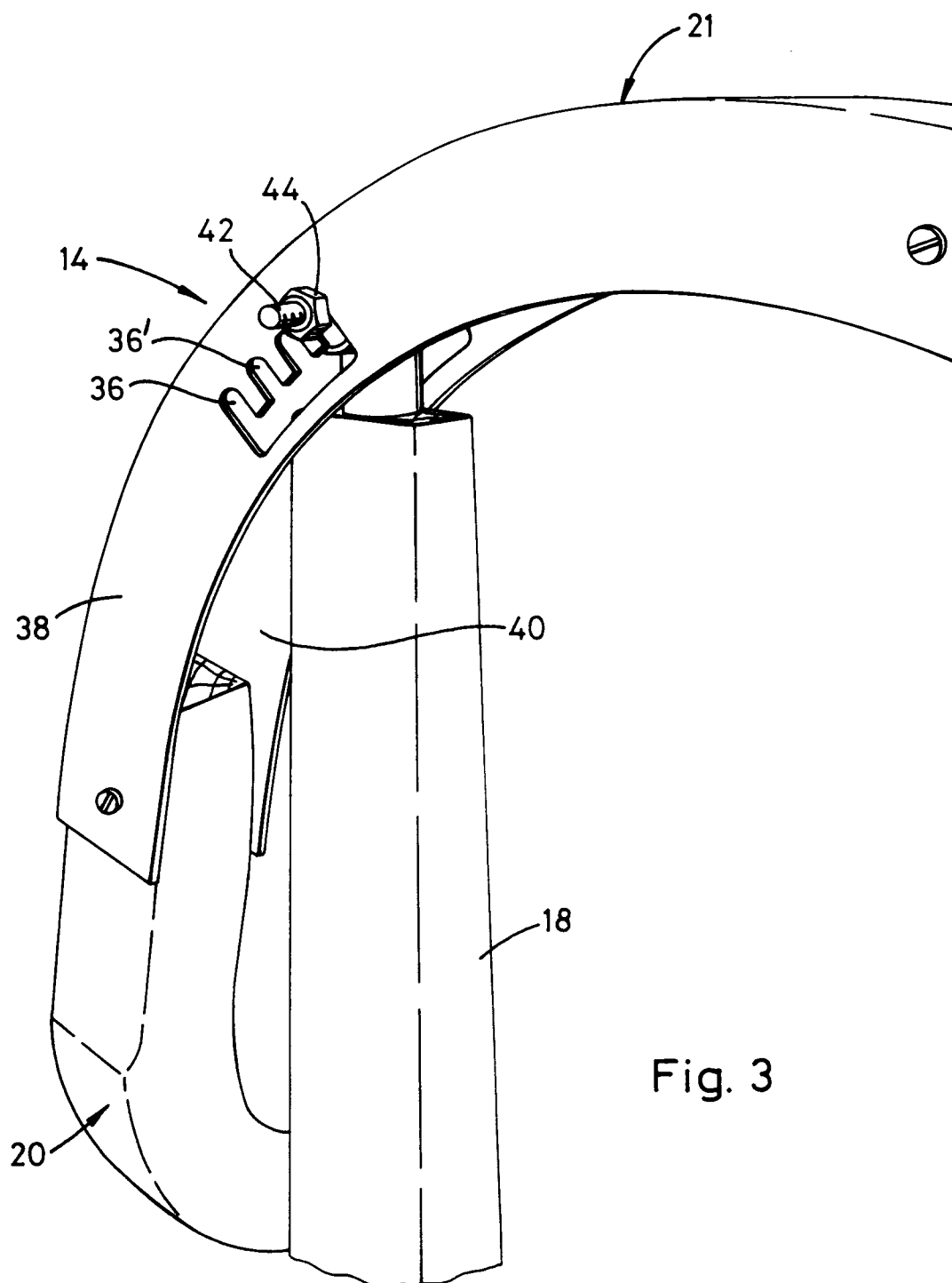


Fig. 3

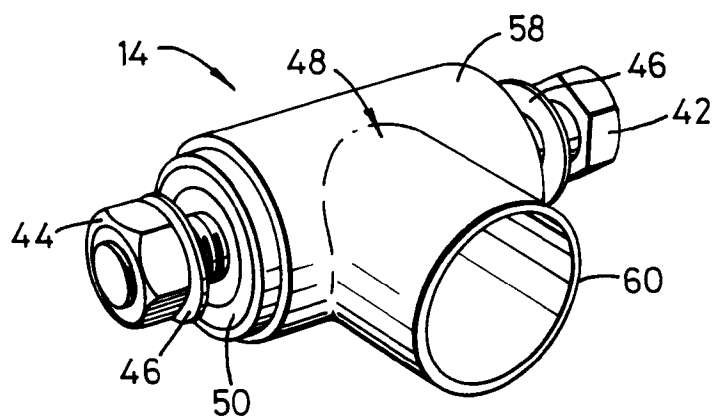


Fig. 4

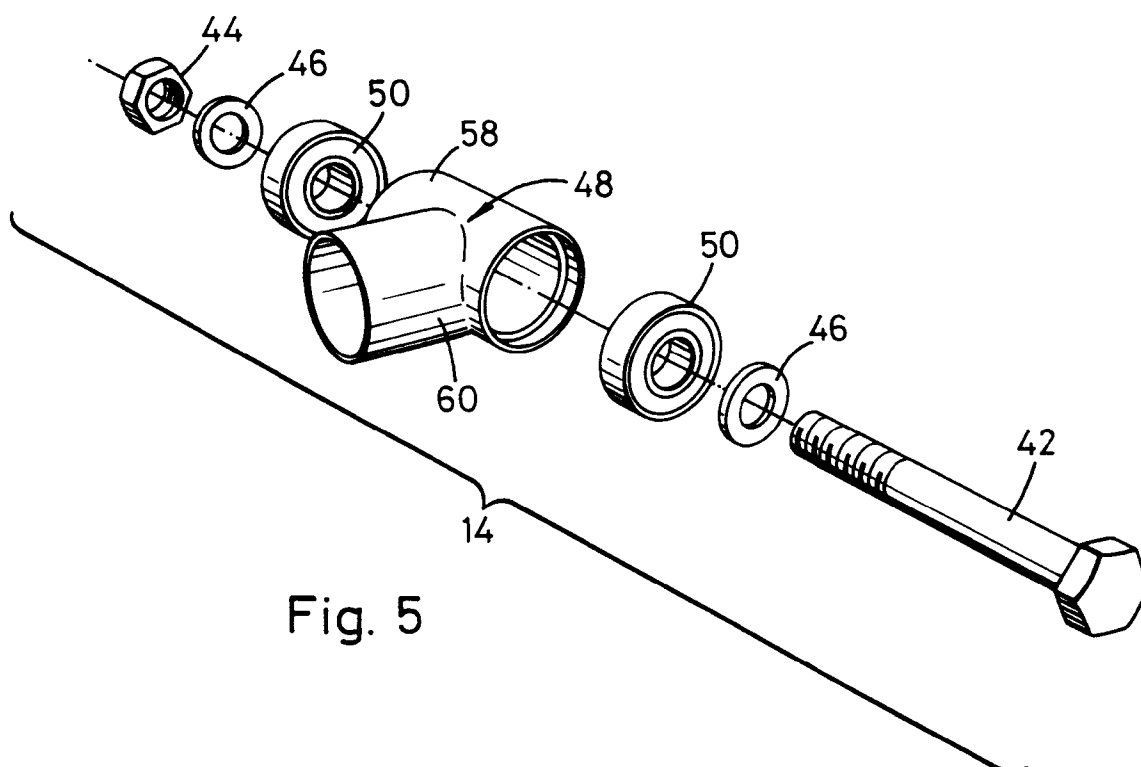


Fig. 5

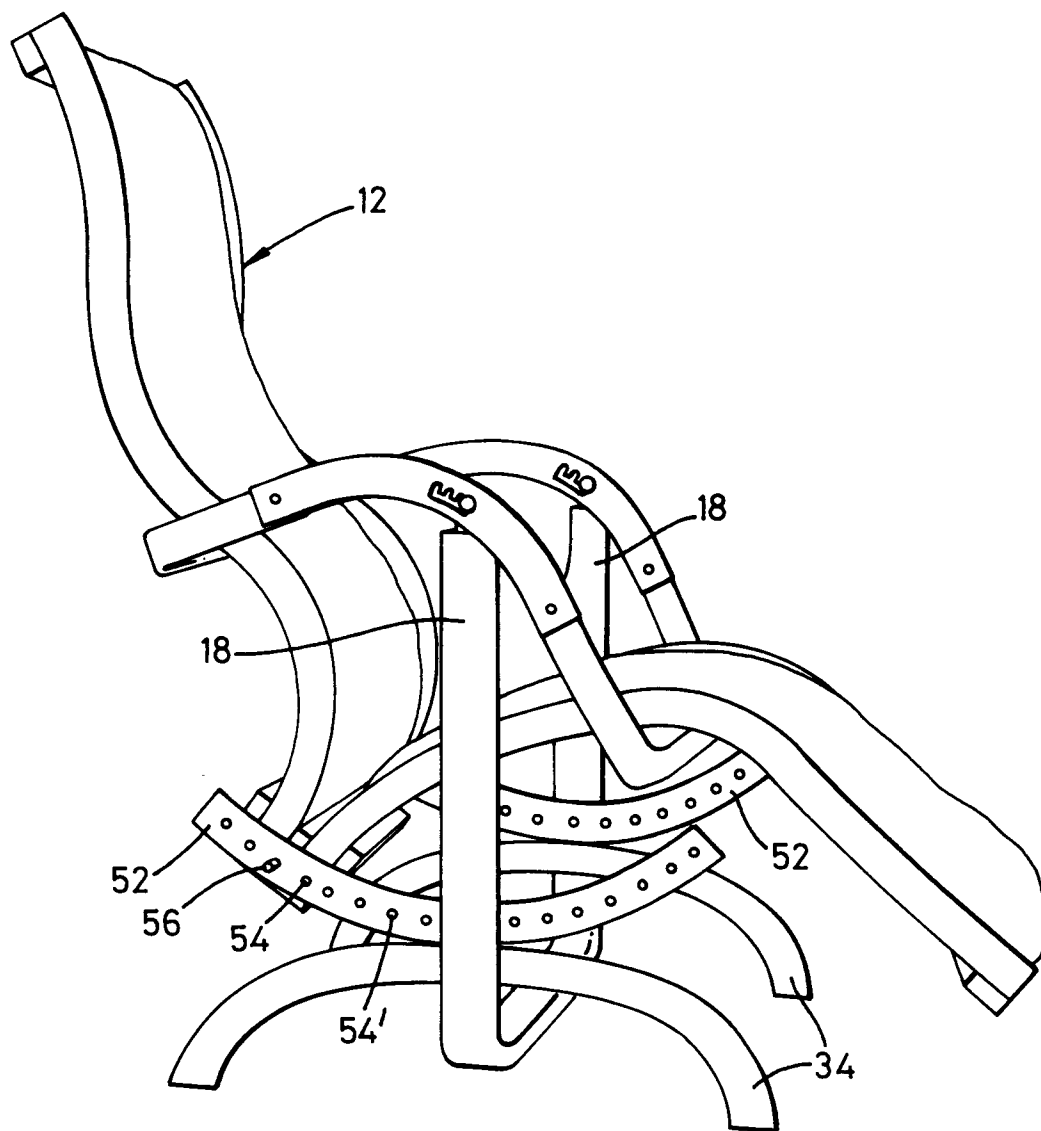
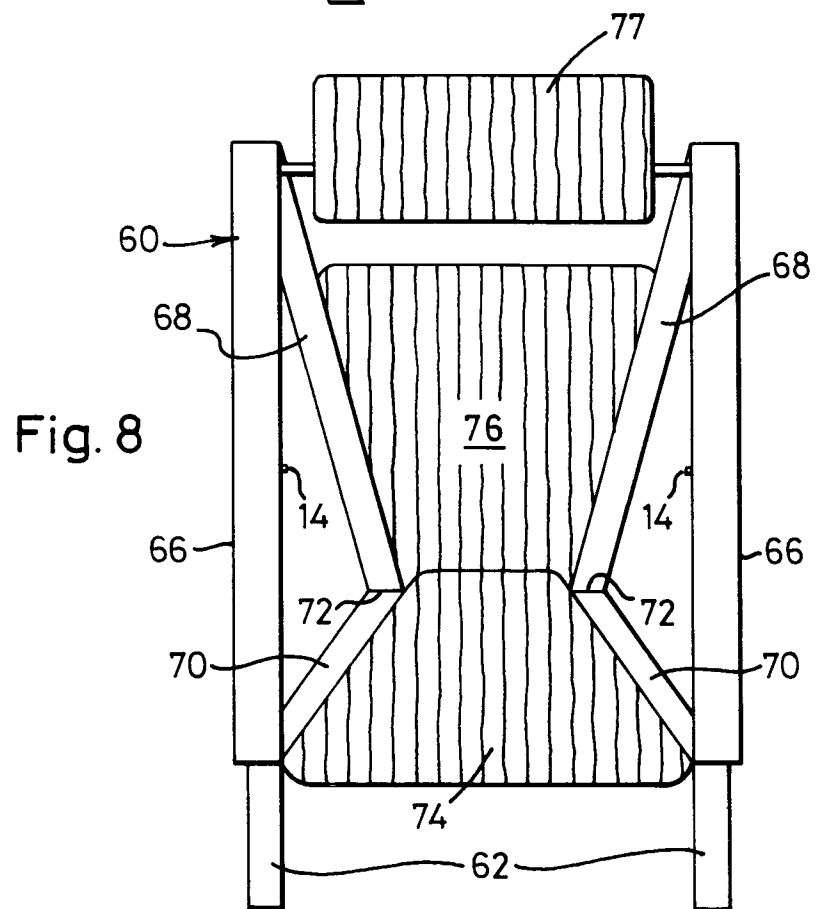
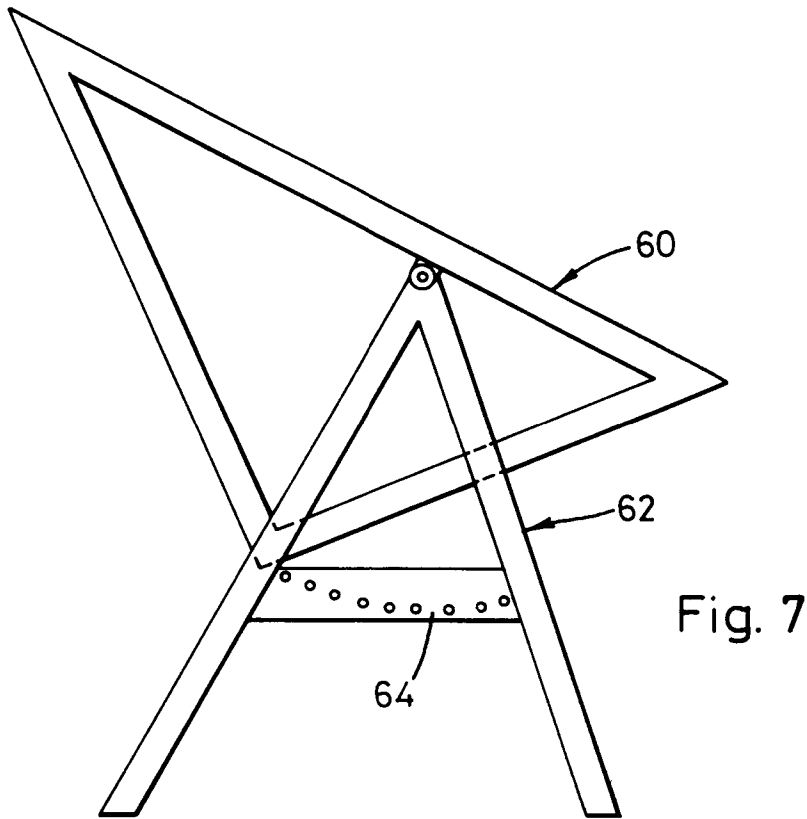


Fig. 6



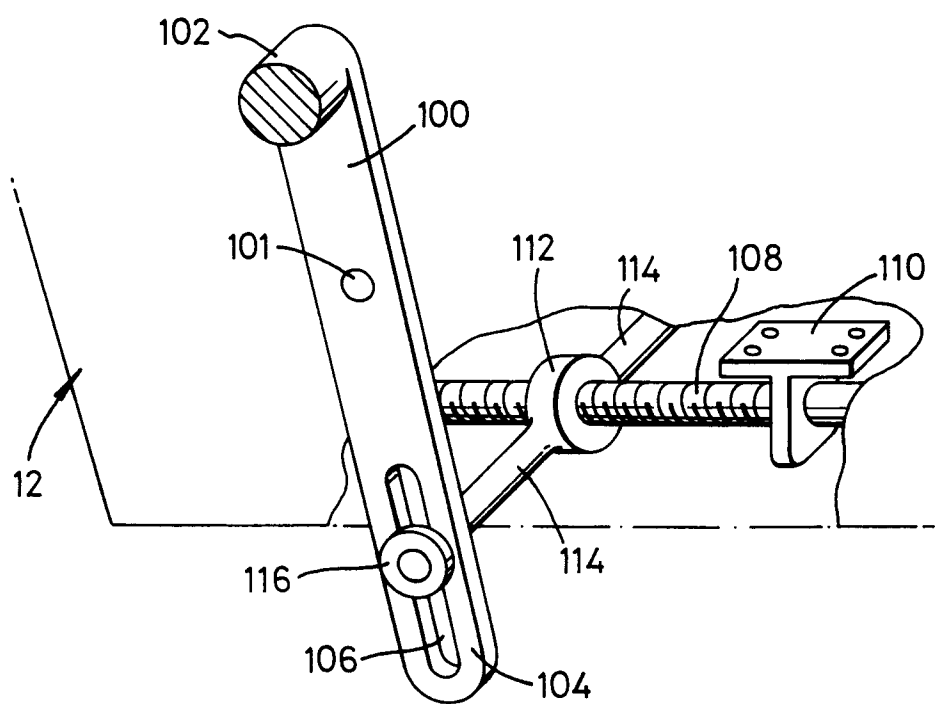


Fig. 9



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 30 4474

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US-A-2 611 419 (MCKINNEY ET AL.) * column 2, line 13 - column 3, line 28; figures 1,4 *	1	A47C3/02
A	US-A-4 341 420 (KNOWLES ET AL.) * column 2, line 56 - column 3, line 38; figures 1,3 *	1	
A	US-A-1 544 187 (SCHROEDER) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A47C A47D A63G
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 05 AUGUST 1992	Examiner MYSLIWETZ W. P.
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