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(71) Applicant: **Kabushiki Kaisha TPO Bed**
Yokohama-shi, Kanagawa 233 (JP)

(72) Inventors:

- **Kashima, Hiroshi,**
c/o K.K. TPO Bed
Yokohama-shi, Kanagawa 223 (JP)
- **Kashima, Osamu,**
c/o K.K. TPO Bed
Yokohama-shi, Kanagawa 223 (JP)

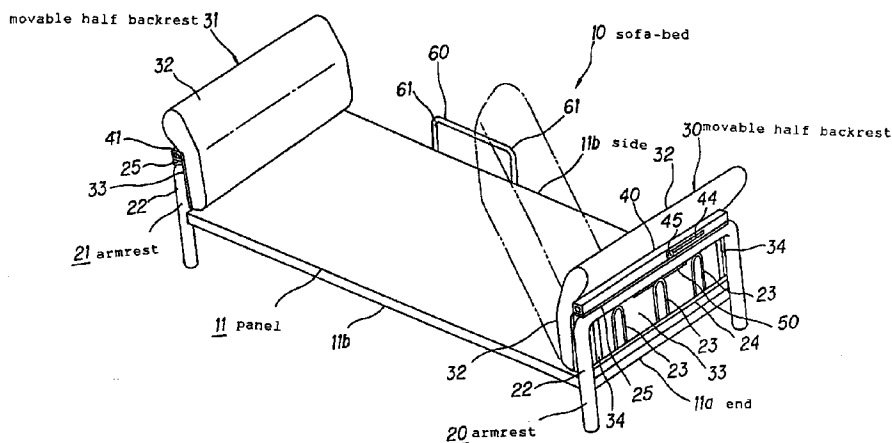
(74) Representative: **Winkler, Andreas, Dr.**
FORRESTER & BOEHMERT
Franz-Joseph-Strasse 38
D-80801 München (DE)

(54) **Sofa-bed**

(57) A sofa-bed 10 having movable half backrests 30, 31 supported movably on arm rests 20, 21 and held in given positions in a bed-mode and a sofa-mode, said movable half backrests 30, 31 are movable between a

first position where they are located along said ends of the panel 11 in the bed-mode and a second position where they are directed to be widened toward one side of said panel 11 thereon in the sofa-mode.

Fig. 1



Description

BACKGROUND OF THE INVENTION

1. Field of the invention

This invention relates to a sofa-bed which has movable half backrests that can be held in respective given positions when the sofa-bed is used as a bed (a bed-mode) or a sofa (a sofa-mode). Although the respective movable half backrests are mounted on both sides of a panel of the sofa-bed, only one movable half backrest may be mounted on one of said sides of the panel.

2. Description of the Prior Art

Many types of sofa-bed have been sold. The applicant of this application has been proposed many new types of sofa-beds, for example Japanese Patent Opening No. 237020 of 1993 and Japanese Patent Application No. 334188 of 1992, that can be changed between the bed-mode and the sofa-mode.

As shown in Figs. 26 and 27, these new types of sofa-beds comprises basically a panel 1, a headboard 2 and a footboard 3 fixed at both ends of the panel 1, and movable half backrests 4, 5 supported movably on said boards 2, 3 by supporting mechanisms.

In the bed-mode, as shown in Fig. 26, each movable half backrest 4, 5 is held in the position where the boards 2, 3 do not cover said panel 1. On the other hand, in the sofa-mode, as shown in Fig. 27, the movable half backrests 4, 5 are held respectively in the positions where the backrests 4, 5 become parallel to the longitudinal direction of said panel 1. In the sofa-mode, the movable half backrests 4, 5 are coupled each other by inserting a slidable bolt 7 of the movable half backrests 5 into a pipe 8 the movable half backrests 4, and so the movable half backrests 4, 5 can support weight of users sitting on the sofa-bed.

As above-mentioned description, the sofa-beds that have been proposed by the applicant are novel in their movable half backrests. Furthermore, it is convenient that the movable half backrests 4, 5 can be located in the positions, where the movable half backrests are not nuisances, when they are not used by users.

But respective movable half backrests 4, 5 of said sofa-beds can be held only in the positions where the movable half backrests 4, 5 become parallel to the longitudinal direction of said panel 1, and so the shapes of the sofa-beds in the sofa-mode are very common; therefore, a newly designed sofa-bed is desired.

Although it is well known through experience that a comfortable atmosphere arises between people sitting at an angle 45° with respect to each other, the faces of users sitting on said sofa-bed are usually turned toward the same direction if they sit down on the sofa-bed in a comfortable position because of the movable half backrests 4, 5 paralleled the longitudinal direction of said panel 1.

Furthermore, the movable half backrests need to be a pair since, in the sofa-mode, a pair of movable half backrests must be moved to the position where they aligned with each other and must be coupled with each other; therefore, it has caused great hindrance to a cost reduction.

Furthermore, the applicant has studied an improvement such as a sofa-bed equipped with a table matched to the sofa-bed.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a newly designed sofa-bed enables users to sit down thereon in a comfortable sitting position.

It is another object of the present invention to provide a sofa-bed which can be easily equipped with a table and whose manufacturing cost is low.

The subject of the invention, in one point of view, to achieve above objects consists in following sofa-beds.

[1] A sofa-bed (10) comprising a panel (11) and movable half backrests (30, 31) supported movably at least on one end of both ends of the panel (11) and held in given positions in a bed-mode and a sofa-mode, said movable half backrests (30, 31) are movable between a first position where they are located along said ends of the panel (11) in the bed-mode and a second position where they are directed to be widened toward one side of said panel (11) thereon in the sofa-mode.

[2] A sofa-bed (10) comprising a panel (11) and movable half backrests (30, 31) supported movably at least on one end of both ends of the panel (11) and held in given positions in a bed-mode and a sofa-mode, said movable half backrests (30, 31) are movable among a first position where they are located along said ends of the panel (11) in the bed-mode, a second position where they are directed to be widened toward one side of said panel (11) thereon in the sofa-mode and a third position where they are nearly parallel to the longitudinal direction of said panel (11).

[3] A sofa-bed (10A) as in item [1], further comprising an arm member (50) for supporting said movable half backrests (30, 31) rotatably at a level on one end of said panel (11) and a lock mechanism for holding said movable half backrests (30, 31) in said second position, said lock mechanism has a caught portion (61) mounted on one side of said panel (11) behind said movable half backrests (30, 31) in the sofa-mode and a catching portion (48) fixed on one end of said movable half backrests (30, 31) which can be engaged with said caught portion (61) when said movable half backrests (30, 31) turn to said second position.

[4] A sofa-bed (10B) as in item [2], further comprising an arm member (50) for supporting said movable half backrests (30, 31) rotatably at a level on one end

of said panel (11) and a lock mechanism for holding said movable half backrests (30, 31) in said second position and said third position, said lock mechanism has a caught portin (61) mounted on one side of said panel (11) behind said movable half backrests (30, 31) in the sofa-mode, a catching portion (48) fixed on one end of said movable half backrests (30, 31) which can be engaged with said caught portin (61) when said movable half backrests (30, 31) turn to said second position and a catching arm (49) mounted on the back side of said movable half backrests (30, 31) movably which can be engaged with said caught portin (61) when said movable half backrests (30, 31) turn to said third position.

[5] A sofa-bed (10C) comprising a panel (11) and movable half backrests (130, 131) supported movably at least on one side of both sides of the panel (11) and held in given positions in a bed-mode and a sofa-mode, said movable half backrests (130, 131) are movable between a first position where they are located along said side of the panel (11) in the bed-mode and a second position where they are directed to be widened toward one side of said panel (11) thereon in the sofa-mode.

[6] A sofa-bed (10C) comprising a panel (11) and movable half backrests (130, 131) supported movably at least on one side of both sides of the panel (11) and held in given positions in a bed-mode and a sofa-mode, said movable half backrests (130, 131) are movable among a first position where they are located along said side of the panel (11) in the bed-mode, a second position where they are directed to be widened toward one side of said panel (11) thereon in the sofa-mode and a third position where they are nearly parallel to said first position and are directed to be widened toward one side of said panel (11) thereon.

[7] A sofa-bed (10C) as in item [5], further comprising an arm member (50) for supporting said movable half backrests (130, 131) rotatably at a level on one end of the side of said panel (11) and a lock mechanism for holding said movable half backrests (130, 131) in said second position, said lock mechanism has a catching portin (80A) mounted on the end of said panel (11) and a caught portion (84) mounted on one end of said movable half backrests (130, 131) which can be engaged with said catching portin (80A) when said movable half backrests (130, 131) turn to said second position.

[8] A sofa-bed (10C) as in item [6], further comprising an arm member (50) for supporting said movable half backrests (130, 131) rotatably at a level on one end of the side of said panel (11) and a lock mechanism for holding said movable half backrests (130, 131) in said second position and said third position, said lock mechanism has two catching portins (80A, 80B) mounted on each end of said panel (11) and a caught portion (84) mounted on one end of said movable half backrests (130, 131) which can be

engaged with one (80A) of said catching portins (80A, 80B) when said movable half backrests (130, 131) turn to said second position and can be engaged with the other (80B) of said catching portins (80A, 80B) when said movable half backrests (130, 131) turn to said third position.

[9] A sofa-bed (10D or 10E) comprising a panel (11), movable half backrests (30, 31) supported movably at least on one end of both ends of the panel (11) and held in given positions in a bed-mode and a sofa-mode, an arm member (50A) for supporting said movable half backrests (30, 31) at the end of said panel (11) rotatably at a level, and angle adjustable positioning mechanisms (70A, 70B) fitted to the coupled portions where a base end of said arm member (50A) is coupled to the end of said panel (11) and a top end of said arm member (50A) is coupled to said movable half backrests (30, 31), said movable half backrests (30, 31) are supported and moved by said angle adjustable positioning mechanisms (70A, 70B) among a first position where they are located along said ends of the panel (11) in the bed-mode, a second position where they are directed to be widened toward one side of said panel (11) thereon in the sofa-mode and a third position where they are nearly parallel to the longitudinal direction of said panel (11).

[10] A sofa-bed (10F) comprising a panel (11) and movable half backrests (30, 31) supported movably at least on one side of both sides of the panel (11) and held in given positions in a bed-mode and a sofa-mode, an arm member (50A) for supporting said movable half backrests (30, 31) at the side of said panel (11) rotatably at a level, and angle adjustable positioning mechanisms (70A, 70B) fitted to the coupled portions where a base end of said arm member (50A) is coupled to the side of said panel (11) and a top end of said arm member (50A) is coupled to said movable half backrests (30, 31), said movable half backrests (30, 31) are movable among a first position where they are located along said side of the panel (11) in the bed-mode, a second position where they are directed to be widened toward one side of said panel (11) thereon in the sofa-mode and a third position where they are nearly parallel to said first position and are directed to be widened toward one side of said panel (11) thereon.

[11] A sofa-bed (10H) as in item [1] or [2], further comprising a supporting member (60) mounted on nearly center of the side of said panel (11) behind said movable half backrests (30, 31) and a table (90) fitted to said supporting member (60) which can be moved between a using position in front of said supporting member (60) where the table (90) is supported at a level and a receiving position where the table (90) is folded up nearly upright along said supporting member (60).

[12] A sofa-bed (10H) as in item [3], in which said caught portion (61A) is mounted on a supporting

member (60) which is mounted on nearly center of the side of said panel (11) behind said movable half backrests (30, 31), and further comprises a table (90) fitted to said supporting member (60) which can be moved between a using position in front of said supporting member (60) where the table (90) is supported at a level and a receiving position where the table (90) is folded up nearly upright along said supporting member (60).

[13] A sofa-bed (10I) as in item [4], in which said caught portion (61A) is mounted on a supporting member (60) which is mounted on nearly center of the side of said panel (11) behind said movable half backrests (30, 31), and further comprises a table (90) fitted to said supporting member (60) which can be moved between a using position where the table (90) is supported at a level in front of said supporting member (60) and a receiving position where the table (90) is folded up nearly upright along said supporting member (60), and a catching portin (95) of said table, replaced the catching arm (49) of said lock mechanism, which is mounted on the end of said table (90) and which can be engaged with a catching portin (38) of said movable half backrests (30, 31) when they turn to said third position and said table (90) is in the using position.

[14] A sofa-bed (10I) as in item [13], in which said movable half backrests (30, 31) can be changed their tilt angles when they are held in said third position.

According to the sofa-bed (10, 10A, 10B) of the present invention, the movable half backrests (30, 31) are held in the first position along the end of the panel (11) in bed-mode, and so they do not cover the panel (11) inconveniently. Furthermore, when a user sits up in the sofa bed for reading, he can lean on the movable half backrests (30, 31), as a headboard, along the end of said panel (11), and so the sofa bed is practical.

When the user wants to change the mode of the sofa-bed (10, 10A, 10B) from the bed-mode to the sofa-mode, he only needs to move the movable half backrests (30, 31) to the second position where they are directed to be widened toward one side of said panel (11) thereon.

If the sofa-bed has the lock mechanism, the movable half backrests (30, 31) can be fixed in the second position by engaging the catching portion (48) formed on one end of the movable half backrests (30, 31) to the caught portin (61) mounted on the side of the panel (11).

The movable half backrests (30, 31) may be mounted on both ends of the panel respectively. Alternatively, only one movable half backrest may be mounted on one end of the panel. It is not always necessary to couple a set of the movable half backrests (30, 31).

Since the movable half backrests (30, 31) are located not in parallel to the longitudinal direction of the panel (11) but in oblique to it as above-mentioned in the sofa-bed, the design of the backrests are new and a decorative impression of the sofa-bed (10, 10A, 10B) can be

made better. When the sofa-bed is equipped with only one movable half backrest, its manufacturing cost can be greatly lowered. When the sofa-bed is equipped with a set of movable half backrests (30, 31), users can sit on the sofa-bed face to face in a comfortable position, and a comfortable atmosphere arises between them naturally.

When the movable half backrests (30, 31) can be positioned not only said first position and said second position but also the third position where the movable half backrests (30, 31) are parallel to the longitudinal direction of the panel (11), the sofa-bed in the sofa-mode has more variety. When the sofa-bed is equipped with the lock mechanism which holds the movable half backrests (30, 31) in the third position, the user can engage the catching arms (49) fixed to the backside of the movable half backrests (30, 31) to the caught portin (61) mounted on the side of the panel (11) by pulling up the catching arms (49) when the movable half backrests (30, 31) move to the third position. Thus the movable half backrests (30, 31) can be surely fixed in the third position.

According to another sofa-bed (10C) of the present invention, the movable half backrests (130, 131) are not held on the end of the panel (11) but are held in the first position along one of the side of the panel (11); therefore, the ends of the panel (11) can be free and dead space along the ends is not generated, and so a wider lying space is gained. Therefore, also a tall man can use the sofa-bed comfortably without a sense of oppression near his head caused by the movable half backrests (130, 131).

According to another sofa-bed (10D, 10E) of the present invention, the movable half backrests (30, 31) are supported at the end of said panel (11) rotatably at a level by the arm member (50A), and angle adjustable positioning mechanisms (70A, 70B) are fitted to the coupled portions where a base end of said arm member (50A) is coupled to the end of said panel (11) and a top end of said arm member (50A) is coupled to said movable half backrests (30, 31) so that the movable half backrests (30, 31) can be moved and held by said positioning mechanisms (70A, 70B).

Therefore, said movable half backrests (30, 31) can be moved more freely and precisely to desired positions in respective modes. Furthermore, the movable half backrests (30, 31) may be supported not only on ends of the panel (11) but also on one end of one side of the panel (11).

Furthermore, when the supporting member (60) is mounted on nearly center of the side of said panel (11) behind said movable half backrests (30, 31) and the table (90) fitted to said supporting member (60) so as to be possible to move between a horizontal using position and a vertical receiving position, the sofa-bed becomes a new type of sofa-beds (10H, 10I) equipped with a convenient table. The table is held in a using position in using, and is folded up in a receiving position without being a hindrance.

Such table (90) which can be folded and the supporting member (60) which supports the table (90) may be equipped with the caught portion (61A) of said lock mechanism or the caught portion (95) of said table alternative to said catching arms (49), thereby operating as not only a table (90) and its supporting member (60) but also principal portion of said lock mechanism, furthermore they serve to prevent a quilt on the panel from dropping therefrom.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view illustrating a sofa-bed of the first embodiment of this invention using as a bed.

Fig. 2 is a partial perspective view illustrating a movable half backrest, placed in the second position, which is mounted on the sof-bed of the first embodiment of this invention.

Fig. 3 is a perspective rear view illustrating the sofa-bed of the first embodiment of this invention using as a sofa.

Fig. 4 is an enlarged perspective view illustrating a coupling portion of the lock mechanism for holding the movable half backrest mounted on the sof-bed of the first embodiment of this invention placed in the second position.

Fig. 5 is a perspective rear view illustrating a sofa-bed of the second embodiment of this invention using as a sofa.

Fig. 6 is a partial perspective view illustrating a movable half backrest, placed in the second position, which is mounted on the sof-bed of the second embodiment of this invention.

Fig. 7 is a partial perspective view illustrating a movable half backrest, placed in the second position, which is mounted on a sof-bed of the third embodiment of this invention.

Fig. 8 is a perspective view illustrating a sofa-bed of the fourth embodiment of this invention (only one movable half backrest is shown.).

Fig. 9 is a schematic plan view illustrating a movable half backrest, placed in the first position, which is mounted on the sof-bed of the fourth embodiment of this invention.

Fig. 10 is a schematic plan view illustrating the movable half backrest, placed in the second position, which is mounted on the sof-bed of the fourth embodiment of this invention.

Fig. 11 is a schematic plan view illustrating the movable half backrest, placed in the third position, which is mounted on the sof-bed of the fourth embodiment of this invention.

Fig. 12 is a perspective rear view illustrating a sofa-bed of the fifth embodiment of this invention using as a sofa.

Fig. 13 is a schematic plan view illustrating the sof-bed of the fifth embodiment of this invention.

Fig. 14 is a plan view illustrating positioning mechanisms of the fifth embodiment of this invention.

Fig. 15 is a schematic plan view illustrating the sof-bed of the sixth embodiment of this invention.

Fig. 16 is a schematic plan view illustrating the sof-bed of the seventh embodiment of this invention.

Fig. 17 is a schematic plan view illustrating the sof-bed of the eighth embodiment of this invention.

Fig. 18 is a perspective view illustrating a sofa-bed of the ninth embodiment of this invention using as a bed.

Fig. 19 is a partial perspective view illustrating a table, placed in using position, which is mounted on the sof-bed of the ninth embodiment of this invention.

Fig. 20 is a partial enlarged perspective view illustrating a principal part of the sof-bed of the tenth embodiment of this invention.

Fig. 21 is an enlarged perspective view illustrating an arm member of the tenth embodiment of this invention.

Fig. 22 is an perspective view illustrating an operation for changing the sofa-bed of the tenth embodiment of this invention in a sofa-mode.

Fig. 23 is a partial perspective view illustrating a table, placed in using position in the sofa-mode, which is mounted on the sof-bed of the tenth embodiment of this invention.

Fig. 24 is a side view for explaining angle adjustment of the movable half backrest which is mounted on the sof-bed of the tenth embodiment of this invention.

Fig. 25 is a side view for explaining angle adjustment of the movable half backrest which is mounted on the sof-bed of the tenth embodiment of this invention.

Fig. 26 is a perspective view illustrating a sofa-bed of the prior art using as a bed.

Fig. 27 is a perspective view illustrating a sofa-bed of the prior art using as a sofa.

DETAILED DESCRIPTION OF THE INVENTION

The various embodiments of the present invention are shown in the drawings.

The first embodiment of a sofa-bed of the present invention is shown in Figs. 1~4.

As shown in Fig. 1, the sofa-bed 10 comprises basically a panel 11 supporting a mattress thereon and a set of armrests 20, 21, also serving as a footboard and a headboard, fixed to both ends 11a, 11a of said panel 11; furthermore, it is equipped with a set of movable half backrests 30, 31 which can be moved to given positions in a bed-mode and a sofa-mode.

Respective movable half backrests 30, 31 are supported at the ends of said armrests 20, 21 (or panel 11) rotatably at a level by an arm member 50. Said respective movable half backrests 30, 31 are supported movably that can be moved between a first position (see Fig. 1) where they are located along said armrests 20, 21 and a second position (see Figs. 1 and 2) where they are directed to be widened toward one side 11b of said panel 11 thereon.

Furthermore, said respective movable half backrests 30, 31 can be moved to a third position (see Fig. 3) where they are nearly parallel to the side 11b of said panel 11. Thus the sofa-bed 10 will be in the bed-mode by moving said respective movable half backrests 30, 31 to the first position shown in Fig. 1, and will be in the sofa-mode by moving said respective movable half backrests 30, 31 to the second position shown in Figs. 1 and 2 or the third position shown in Fig. 3.

Said armrests 20, 21 are bent pipes 22 that have enough diameter to sustain users weight, and designed pipes 23, 24 are fixed to the pipes 22. The pipes 22 are equipped with stabilizing boards 25 to gain area for resting the arms of user and to support said respective movable half backrests 30, 31 stably.

Movable half backrests 30, 31 comprise a cushion pad 32 which is equipped with a thin board 33 on its back side and square pillars 34, 34 that are fixed to the both ends of the thin board 33. Furthermore, reinforcing members 40, 41 made from a pipe are fixed to the thin board 33 along its longitudinal direction. As shown in Fig. 3, said reinforcing members 40, 41 are aligned when said respective movable half backrests 30, 31 are in the third position. Said respective reinforcing members 40, 41 are coupled with each other by a coupling mechanism described hereinafter. Mounting means 51, 52, which have hinges and are rotatable, are fitted to the base end and the top end of the arm member 50 respectively. The mounting means 51 fitted to the base end are fixed to upper portions of armrests 20, 21 with sandwiching brackets 53. On the other hand, the mounting means 52 fitted to the top end are fixed to the thin boards 33 of back sides of the movable half backrests 30, 31. Thus the movable half backrests 30, 31 are supported on the armrests 20, 21 rotatably at a level by such arm member 50.

The movable half backrests 30, 31 are held in said second position by a lock mechanism so that they do not move even if users lean on them. The lock mechanism, as shown in Figs. 2 and 4, comprises a corner portion (caught portin) 61 of the supporting member 60 fitted to the side 11b of the panel 11 behind the movable half backrests 30, 31 in the sofa-mode and a cutaway portion (catching portion) 48 formed at one end of the reinforcing members 40, 41 fixed to the back sides of the movable half backrests 30, 31.

As shown in Fig.2, when the movable half backrest 31 moves to the second position, it is held in the second position by engaging the cutaway portion 48 formed on one end of the movable half backrest 31 to the corner portin 61 of the supporting member 60. The supporting member 60 also serves to prevent a quilt on the panel 11 from dropping therefrom.

The movable half backrests 30, 31 are held in said third position by the coupling mechanism so that they do not move even if users lean on them. The coupling mechanism, as shown in Fig. 3, comprises a coupling rod 46 which slides along its axis at the end 42 of the reinforcing member 40 and can be inserted into the end 43 of the other reinforcing member 41. Hence, when the movable

half backrests 30, 31 move to the third position, respective movable half backrests 30, 31 are coupled each other and are held in the third position if the coupling rod 46 slides from the end 42 of the reinforcing member 40 into the end 43 of the other reinforcing member 41.

As shown in Fig. 3, a guide slot 44 is formed in the end of the reinforcing member 40 along its longitudinal direction, and a bolt is screwed into the base end of the coupling rod 46 so as to be guided by the guide slot 44. A knob 45 is fixed to the head of the screw. If the knob 45 is turned to clockwise, the coupling rod 46 is fastened. If the knob 45 is turned to counterclockwise, the coupling rod 46 can be slid along the guide slot 44. A guide opening 47 is formed at the end 43 of the reinforcing member 41 (see Fig. 4) for guiding the top of the coupling rod 46 from the right angle direction so as to match the axis directions of both ends 42, 43. As shown in Fig. 2, an engaging opening 54 is formed in the arm member 50, and a convex portion 35 is formed on the square pillar 34 fixed to the movable half backrest 31 for fastening the arm member 50 along the back side of the movable half backrest 31 by engaging to said engaging opening 54.

Operation of above-mentioned first embodiment will be described hereinafter.

As shown in Fig. 1, the respective movable half backrests 30, 31 are held in the first positions along the armrests 20, 21 by the arm member 50 when the sofa-mode 10 is in the sofa-mode. Therefore, the movable half backrests 30, 31 do not cover the panel (11) inconveniently. Furthermore, when a user sits up in the sofa bed for reading, he can lean on the movable half backrests 30, 31 along the armrests 20, 21. Respective movable half backrests 30, 31 are locked in the first positions by simple lock mechanisms (not shown).

The movable half backrests 30, 31 can be moved easily at a level by the arm member 50 if locks of the simple lock mechanisms are released. When the user wants to change the mode of the sofa-bed 10 from said bed-mode to said sofa-mode, firstly he needs only to turn the movable half backrest 31 to the second position where it is directed to be widened toward one side 11b of said panel 11 thereon. Next he needs only to hold the movable half backrest 31 in the second position by means of the lock mechanism; that is, he engages the cutaway portion 48 formed on one end of the movable half backrest 31 to the corner portin 61 of the supporting member 60. These operations are similar to the movable half backrest 30 (not shown in Fig. 2).

Since the movable half backrests 30, 31 are located not in parallel to the longitudinal direction of the panel 11 but in oblique to it nearly at 45 degrees in the sofa-bed as above-mentioned, the design of the backrests are new and a decorative impression of the sofa-bed 10 can be made better. Since users can sit on the sofa-bed face to face with nearly 45 degrees in a comfortable position, and a comfortable atmosphere arises between them naturally. Since the movable half backrests 30, 31 can be held in the second positions individually by said lock mechanisms, only one of the movable half backrests 30, 31 can

be held in the second position while holding the other in the first position.

The movable half backrests 30, 31 can be moved again easily at a level by the arm members 50, 50 if locks of the lock mechanisms are released by detaching the cutaway portion 48 formed on ends of the movable half backrests 30, 31 from the corner portions 61 of the supporting members 60. If user, as shown in Fig. 3, turns the movable half backrests 30, 31 to the third position where they are nearly parallel to the side 11b of said panel 11, the sofa-bed changes in a different sofa-mode.

Then the reinforcing members 40, 41 fixed to the back sides of the movable half backrests 30, 31 are aligned, so that their ends 42, 43 are opposed to each other. At this time, user needs to turn the knob 45 to counterclockwise and to pull out the top of the coupling rod 46 in spite of the discrepancy between axis directions of the end 42 and the end 43. Then user needs only to insert the top of the coupling rod 46 into the reinforcing member 41 by guiding of the guide opening 47.

In the sofa-mode as shown in Fig. 3, user can sit on the sofa-bed 10 with leaning on the movable half backrests 30, 31 held in the third position, so that the user can use the sofa-bed 10 as a common sofa. Furthermore, the ends 42, 43 of the reinforcing members 40, 41 are coupled to each other; therefore, the set of movable half backrests 30, 31 is not deformed by the weight of the user sitting on the sofa-bed 10.

Although the movable half backrests 30, 31 can also be held in the third position by means of the coupling mechanisms, the sofa-bed which, is not equipped with such coupling mechanisms and whose movable half backrests 30, 31 are held only in the first positions and the second positions is enough useful.

The second embodiment of a sofa-bed of the present invention is shown in Figs. 5 and 6.

Although the construction and operation of a sofa-bed 10A of this embodiment is almost similar to those of the first embodiment, the sofa-bed 10A is not equipped with the coupling mechanisms for coupling the movable half backrests 30, 31 being in the third positions but equipped with lock mechanisms for holding respective movable half backrests 30, 31 not only in second positions but also in third position.

The lock mechanism comprises a corner portion (caught portion) 61 and an upper portion (caught portion) 62 formed on one side 11b of the panel 11, cutaway portions (catching portion) 48 formed on ends of the reinforcing members 40, 41 of the movable half backrests 30, 31 and catching arms 49 with hooks that can move from the positions in the reinforcing members 40, 41 to the positions where they elongate normal to the reinforcing members 40, 41.

The catching arms 49 are connected their base ends to the ends 42, 43 of the reinforcing members 40, 41 so as to rotate at a level, and as shown in Fig. 6, they enter the reinforcing members 40, 41 through openings along the longitudinal direction of the reinforcing members 41 and can be housed therein respectively. As shown in Fig.

5, a hook 49a which is detachable with the upper portion 62 of the supporting member 60 is fixed to the top of the catching arm 49. The members and portions similar to those of the first embodiment are designated by the same characters and their repeated explanation will be omitted.

Using such lock mechanism, as shown in Fig. 6, the cutaway portion 48 formed on one end of the movable half backrest 31 can be coupled to the corner portion 61 of the supporting member 60 when the movable half backrest 31 is turned to the second position.

Furthermore, if the catching arm 49 is taken out from the inside of the reinforcing member 40(41) when the movable half backrest 30(31) is turned to the third position, as shown in Fig. 5, the hook 49a at the top of the catching arm 49 can be engaged to the top portion 62 of the supporting member 60, thereby the movable half backrest 30(31) is held in the third position.

The movable half backrests 30, 31 can be moved independently, and so each of them can be moved independently from the first position to the second position or the third position. Therefore, movable half backrests 30, 31 located in the third position need not to be coupled each other, the sofa-bed that is equipped with only one movable half backrest 30(31) may be produced.

The third embodiment of a sofa-bed of the present invention is shown in Fig. 7.

The sofa-bed 10B of the present invention has a catching arm 49 as in the case with said second embodiment, and a hook 49b which can be detachable with the corner portion 61 of the supporting member 60 similar to the cutaway portion 48 of the reinforcing member 41 is fixed near the center of the arm 49.

The arm 49 of the present embodiment can be engaged its hook 49b to the corner portion 61 of the supporting member 60 by rotating at 180 degrees from the inside of the reinforcing member 41, so that the movable half backrest can be held in a second position different from the case that the cutaway portion 48 of the reinforcing member 41 is engaged to the corner portion 61 of the supporting member 60.

The fourth embodiment of a sofa-bed of the present invention is shown in Figs. 8~11.

A sofa-bed 10C of the present embodiment is not equipped with the ends of the panel 11 for laying a mattress thereon, but is equipped with a supporting member 65 on each side 11b of the panel 11 (only one supporting member 65 is shown in Fig. 8). Furthermore, a foot 25 is fixed to under side of the panel 11 at its each corner. The supporting members 65 support the movable half backrests 130, 131 rotatably at a level.

Said movable half backrests 130, 131 are movable between a first position, as shown in Fig. 9, where they are located along said side 11b of the panel 11 and a second position, as shown in Fig. 10, where they are directed to be widened toward the other side of said panel 11 thereon.

Furthermore, said movable half backrests 130, 131 can be moved on the panel 11 to a third position, in front

of the first position, where they are nearly parallel to themselves in the first position and can be held in the third position. Although a configuration of the movable half backrest 130(131) of this embodiment are slightly different from one of the movable half backrests 30, 31 of said embodiments, it is common to said embodiments that the movable half backrest 130(131) is equipped with a thin board on the back side of a cushion pad.

The movable half backrest 130, 131 are held and fixtured in the second positions or the third positions by a lock mechanism so as not to be moved by weight of leaning user. As shown in Fig. 8, the sofa-bed 10C is equipped with two coupling rods (catching portion) 80A, 80B fixed to one end 11a of the panel 11 and a coupling pipe (caught portion) 84 fixed at one end 11a of the movable half backrest 130.

The coupling rod 80A is fixed in a position on said end 11a so as to couple with said coupling pipe 84 of the movable half backrest 130 located in the second position. On the other hand, the coupling rod 80B is fixed in the other position on the said end 11a so as to couple with said coupling pipe 84 of the movable half backrest 130 located in the third position.

Each of coupling rod 80A, 80B is inserted into a cylinder 81 so as to be possible to slide vertically, and respective coupling rods 80A, 80B are fastened by turning a knob 82 to clockwise and can move by hand by turning the knob 82 to counterclockwise. In a state as shown in Fig. 10, the movable half backrest 130(131) is held in the second positions by inserting the coupling rod 80A into the coupling pipe 84; while in a state as shown in Fig. 11, the movable half backrest 130(131) is held in the second positions by inserting the coupling rod 80B into the coupling pipe 84.

In the bed-mode as shown in Fig. 9, the movable half backrests 130, 131 are not held on the end 11a of the panel 11 but are held in the first position along the side 11b of the panel 11; therefore, the ends 11a of the panel 11 is free and dead space along the ends 11a is not generated, and so a wider lying space is gained. Therefore, also a tall man can use the sofa-bed comfortably without a sense of oppression near his head caused by the movable half backrests 130, 131.

In the fourth embodiment, the sofa-bed may be equipped with only one coupling rod 80A for holding each of the movable half backrest 130, 131 in the second position. The fifth embodiment of a sofa-bed of the present invention is shown in Figs. 12~14.

Although the construction and operation of a sofa-bed 10A of this embodiment is almost similar to those of above-mentioned embodiments, the movable half backrests 30, 31 are held in given positions by positioning mechanisms 70A, 70B.

As shown in Fig. 12, the movable half backrests 30, 31 are supported rotatably at a level by arm members 50A mounted on the armrests 20, 21. The arm member 50A is equipped with positioning mechanisms 70A, 70B coupled to movable mounting means 51, 52 at the base end and the top end. The mounting means 51 fitted to

the base end are fixed to upper portions of armrests 20, 21 with sandwiching brackets 53. On the other hand, the mounting means 52 fitted to the top end are fixed to the boards 33 of back sides of the movable half backrests 30, 31.

Said movable half backrests 30, 31, as shown in Fig. 13, are supported and moved by the arm member 50A and the positioning mechanisms 70A, 70B among a first position where they are located along said ends 11a of the panel 11, a second position where they are directed to be widened toward one side of said panel 11 thereon and a third position where they are nearly parallel to the side 11b of said panel 11. The positioning mechanism 70A(70B) is one of hinges that can adjust an angle step by step or freely. One of such hinges will be described hereinafter.

As shown in Fig. 14, the positioning mechanism 70A(70B) has a flat portion 71 which is fixed to the arm member 50A and a flat portion 181 which is fixed to the mounting means 51(52) and supported rotatably on the flat portion 71 by a pivot 180. Teeth 72, 72, ... are formed on the periphery of the flat portion 71. A claw 182 which can interlock with said teeth 72, 72, ... successively when the flat portion rotates are supported on flat portion 181 movably by a pivot 183.

The claw 182 is forced to counterclockwise in Fig. 14 by a spring 184 so as to engage with a tooth 72 elastically. On the flat portion 71, a release member 73 for releasing the claw 182 from the tooth 72 is fixed to a cylindrical member 180a which can rotate around the pivot 180 which is inserted inside the cylindrical member 180a. The release member 73 takes the claw 182 on its periphery 73a and moves the claw 182 to the position against an urging force of the spring 184 where the claw 182 does not engage with the tooth 72. A guiding portion 73b is formed at the end of the periphery 73a so as to take the claw 182 on its periphery 73a smoothly.

As shown in Fig. 13, movable half backrests 30, 31 can be moved and held easily in any positions including said first, second and third position independently by such positioning mechanisms 70A, 70B. When the arm member 50A is turned with the movable half backrest 30(31), as shown in Fig. 14, the flat portion 71 of the positioning mechanisms 70A rotates to counterclockwise around the pivot 180 and the claw 182 engages teeth 72 successively with pushing the guiding portion 73b of the release member 73.

By stopping rotation of the arm member 50A in a desired position, the claw 182 engages one of the teeth 72 and the rotation of the flat portion 71 around the pivot 180 is stopped, so the arm member 50A is fixed at an given angle with respect to the armrest 20(21). Then if the movable half backrest 30(31) is rotated with the arm member 50A fixed and the positioning mechanisms 70B(70A) is operated as above-mentioned operation, the movable half backrest 30(31) can be fixed at a desired angle with respect to the arm member 50A.

Thus, according to the sofa-bed 10D of the fifth embodiment of the present invention, the movable half

backrest 30, 31 can be fixed easily in any position where user desired.

The sixth embodiment of the present invention is shown in Fig. 15.

In the sofa-bed 10E of this embodiment, the coupling portions where the base ends of the arm members 50A are coupled to the armrests 20, 21 and the coupling portions where the top ends of the arm members 50A are coupled to the movable half backrests 30, 31 are different from those of the fifth embodiment as shown in Fig. 13.

In other words, the positioning mechanisms 70A fixed to the base ends of the arm members 50A are located on one end of each armrest 20, 21 or located just the corner of the panel 11. On the other hand, the positioning mechanisms 70B fixed to the top ends of the arm members 50A are located on nearly center of the back sides of the movable half backrests 30, 31. Thus the coupling portion of the arm member 50A is not limited tightly by using such positioning mechanisms 70A, 70B.

The seventh embodiment of the present invention is shown in Fig. 16.

A sofa-bed 10F of the this embodiment is not equipped with the armrests 20, 21 on both ends of the panel 11, but is equipped with a supporting member 65 on each side 11b of the panel 11, and so the movable half backrests 30, 31 are supported on respective supporting members 65 by the arm members 50A. The arm members 50A is the same one of the fourth embodiment. Furthermore, above-mentioned positioning mechanisms 70A, 70B are fixed to both coupling portions where the base end of the arm member 50A is coupled to the supporting member 65 and where the top end of the arm member 50A is coupled to the movable half backrests 30(31).

Using by the positioning mechanisms 70A, 70B, the movable half backrests 30, 31 can be moved and fixed easily in any positions including the first position where they are located along said side 11b of the panel 11 in the bed-mode, a second position where they are directed to be widened toward one side 11b of said panel 11 thereon in the sofa-mode and a third position where they are nearly parallel to said first position and are directed to be widened toward one side of said panel 11 thereon.

Thus in this embodiment, since the armrests are omitted, whole construction of this embodiment is simplified and manufacturing cost is lowered. Although the first position in this embodiment is similar to one of fourth embodiment or the position where the movable half backrests 30, 31 are located along said side 11b of the panel 11, the movable half backrests 30, 31 can be located along said end 11a of the panel 11 or the first position of other embodiments.

The eighth embodiment of the present invention is shown in Fig. 17.

Left half of the sofa-bed 10G of this embodiment is akin to the left half of the sofa-bed 10D of the fifth embodiment shown in Fig. 13, and right half is akin to one of the sofa-bed 10F of the seventh embodiment shown in

Fig. 16. Positions where the movable half backrests 30, 31 are supported may not be symmetrical.

The ninth embodiment of the present invention is shown in Figs. 18 and 19.

Overall construction of the sofa-bed 10H of this embodiment is approximately similar to one of the sofa-bed 10 of the first embodiment. But this embodiment is equipped with a table 90 on the supporting member 60 and is not equipped with mechanisms for supporting the movable half backrests 30, 31 in the third position.

The armrest 20A(21A) fixed to the end of the panel 11 comprises foot boards 26, 26 and an upper board 27 which links said foot boards 26, 26, and they are made of wood. The movable half backrests 30, 31 are supported on the upper boards 27 by said arm members 50 (not shown in Fig. 18) movably between the first positions along the armrest 20A, 21A and the second positions where they are directed to be widened toward one side 11b of said panel 11 thereon.

There are not square pillar 34 and reinforcing member 40(41) on the back side of the movable half backrest 30(31), but coupling pin 38 as a coupling portion of the lock mechanism is provided to the end of the movable half backrest 30(31). When the movable half backrest 30(31) locates in the second position, such coupling pin couples to inside 61A of the corner portion as a caught portion of the lock mechanism on the supporting member 60.

In other words, the movable half backrest 30(31) is held in the second position by coupling the coupling pin 38 of the movable half backrest 30(31) to inside 61A of the corner portion of the supporting member 60. The table 90 fixed to the supporting member 60 is decorated imitate wood, but material is not limited to wood.

The table 90 is fitted to the supporting member 60 so that it may be moved between a using position where the table 90 is supported horizontally in front of said supporting member 60 as shown in Fig. 19 and a receiving position where the table 90 is folded up nearly upright along the supporting member 60 as shown in Fig. 18. Both ends of the base end portion of the table 90 are supported by pivots 91 slightly under both insides 61A of the corner portion of the supporting member 60; on the other hand. Both ends of the top end portion of the table 90 are coupled to both lower end portions of the table 90 by supporting arms 94 which can be flexed at linked points.

The supporting arm 94 comprises the first link 92 and the second link 93. The table 90 is supported in a using position when respective links 92, 93 are aligned in a line and is housed in a housing position when they are flexed at their coupling point and lie one on top of another.

The table 90 may be equipped with a hook 95 as a catching portion, and the supporting member 60 for supporting the table 90 directly may be formed inside portion 61A as a coupling portion of the above-mentioned lock mechanism. Thus they also work as main portions of the

lock mechanism and serve to prevent a quilt on the panel 11 from dropping therefrom.

The tenth embodiment of the present invention is shown in Figs. 20 ~ 19.

Although a sofa-bed 10I of this embodiment is almost similar to the sofa-bed of the second embodiment in operation, but this embodiment has a table 90 mounted on a supporting member 60 and a lock mechanism similar to those of the ninth embodiment.

Although concrete components of the sofa-bed 10I or armrests 20A, 21A, the supporting member 60 and the table 90 are almost similar to those of the ninth embodiment, the movable half backrests 30, 31 can be held by the lock mechanism not only the second position but also the third position where they are parallel to the side 11b of the panel 11 as shown in Fig. 22.

Although configuration and the movement of the movable half backrests 30, 31 is similar to those of the second embodiment, this embodiment is equipped with hooks 95 on the table 95, as shown in Fig. 20, instead of the catching arm 49 with a hook of the second embodiment. The hooks 95 are fixed to nearly respective centers of both sides of the table 90 so as to be coupled to the coupling pins 38 of the movable half backrests 30, 31 placed in the third position when the table 90 is in using position.

The movable half backrests 30, 31 are held in said second positions by coupling the coupling pins 38 of the movable half backrests 30, 31 to the insides portion 61A of the supporting member 60, and they are held in said third positions by coupling the coupling pins 38 to the hooks 95.

In the sofa-bed 10I of this embodiment, a tilt angle of can adjust the movable half backrests 30, 31 can be adjusted when they are held in the third positions. The mounting means 51 fitted to the base end of the arm member 50, as shown in Fig. 21, is mounted on the upper boards 27 of armrest 20A(21A) so as to be adjustable its angle. The mounting means 51 is supported on the upper board 27 rotatably around a pivot 55, and the bolt 56 is screwed into the upper board 27 above the pivot 55 and the shank of the bolt 56 is inserted into a guide slot 57 which is formed on the mounting means 51.

The guide slot 57 is a circular arc centering around the pivot 55. If the bolt 56 is rotated to clockwise, the arm member 50 is fastened. If the bolt 56 is rotated to counterclockwise for unfastening the bolt 56, the angle of the arm member 50 can be adjusted. Therefore, in the third position, the movable half backrest 30(31) can be change from vertically standing state as shown in Fig. 24 to inclined state as shown in Fig. 25, and so user can be sit on the sofa-bed more comfortably.

The compositions of above-mentioned sofa-bed are not limited to the concrete compositions that are shown in figures. Through the second embodiment to the fifth embodiment, each sofa-bed may be equipped with only one movable half backrest. The concrete compositions of the lock mechanism are not limited to the compositions that are shown in figures. Furthermore, through the first

embodiment to the third embodiment, each sofa-bed is equipped with a table movably on the supporting member, and through the fourth embodiment to the eighth embodiment, each sofa-bed is equipped with said supporting member and said table.

The features disclosed in the foregoing description, in the claims and/or in the accompanying drawings may, both separately and in any combination thereof, be material for realising the invention in diverse forms thereof.

Claims

1. A sofa-bed (10) comprising a panel (11) and movable half backrests (30, 31) supported movably at least on one end of both ends of the panel (11) and held in given positions in a bed-mode and a sofa-mode,

said movable half backrests (30, 31) are movable between a first position where they are located along said ends of the panel (11) in the bed-mode and a second position where they are directed to be widened toward one side of said panel (11) thereon in the sofa-mode.

2. A sofa-bed (10) comprising a panel (11) and movable half backrests (30, 31) supported movably at least on one end of both ends of the panel (11) and held in given positions in a bed-mode and a sofa-mode,

said movable half backrests (30, 31) are movable among a first position where they are located along said ends of the panel (11) in the bed-mode, a second position where they are directed to be widened toward one side of said panel (11) thereon in the sofa-mode and a third position where they are nearly parallel to the longitudinal direction of said panel (11) in the sofa-mode.

3. A sofa-bed (10A) as in claim 1, further comprising an arm member (50) for supporting said movable half backrests (30, 31) rotatably at a level on one end of said panel (11) and a lock mechanism for holding said movable half backrests (30, 31) in said second position,

said lock mechanism has a caught portion (61) mounted on one side of said panel (11) behind said movable half backrests (30, 31) in the sofa-mode and a catching portion (48) fixed on one end of said each movable half backrest (30, 31) which can be engaged with said caught portion (61) when said movable half backrests (30, 31) turn to said second position.

4. A sofa-bed (10B) as in claim 2, further comprising an arm member (50) for supporting said movable half backrests (30, 31) rotatably at a level on one end of said panel (11) and a lock mechanism for holding said movable half backrests (30, 31) in said second position and in said third position,

said lock mechanism has a caught portin (61) mounted on one side of said panel (11) behind said movable half backrests (30, 31) in the sofa-mode, a catching portion (48) fixed on one end of said each movable half backrest (30, 31) which can be engaged with said caught portin (61) when said movable half backrests (30, 31) turn to said second position and a catching arm (49) mounted on the back side of said each movable half backrest (30, 31) movably which can be engaged with said caught portin (61) when said movable half backrests (30, 31) turn to said third position.

5. A sofa-bed (10C) comprising a panel (11) and movable half backrests (130, 131) supported movably at least on one side of both sides of the panel (11) and held in given positions in a bed-mode and a sofa-mode,

said movable half backrests (130, 131) are movable between a first position where they are located along said side of the panel (11) in the bed-mode and a second position where they are directed to be widened toward one side of said panel (11) thereon in the sofa-mode.

6. A sofa-bed (10C) comprising a panel (11) and movable half backrests (130, 131) supported movably at least on one side of both sides of the panel (11) and held in given positions in a bed-mode and in a sofa-mode,

said movable half backrests (130, 131) are movable among a first position where they are located along said side of the panel (11) in the bed-mode, a second position where they are directed to be widened toward one side of said panel (11) thereon in the sofa-mode and a third position where they are nearly parallel to said first position and are directed to be widened toward one side of said panel (11) thereon in the sofa-mode.

7. A sofa-bed (10C) as in claim 5, further comprising an arm member (50) for supporting said movable half backrests (130, 131) rotatably at a level on one end of the side of said panel (11) and lock mechanisms for holding said movable half backrests (130, 131) in said second position,

said each lock mechanism has a catching portin (80A) mounted on the end of said panel (11) and a caught portion (84) mounted on one end of said each movable half backrest (130, 131) which can be engaged with said catching portin (80A) when said movable half backrest (130, 131) turns to said second position.

8. A sofa-bed (10C) as in claim 6, further comprising an arm member (50) for supporting said movable half backrests (130, 131) rotatably at a level on one end of the side of said panel (11) and lock mechanisms for holding said movable half backrests (130, 131)

in said second position and in said third position,

said each lock mechanism has two catching portins (80A, 80B) mounted on each end of said panel (11) and a caught portion (84) mounted on one end of said each movable half backrest (130, 131) which can be engaged with one (80A) of said catching portins (80A, 80B) when said movable half backrest (130, 131) turns to said second position and can be engaged with the other (80B) of said catching portins (80A, 80B) when said movable half backrest (130, 131) turns to said third position.

9. A sofa-bed (10D or 10E) comprising :

a panel (11),

movable half backrests (30, 31) supported movably at least on one end of both ends of the panel (11) and held in given positions in a bed-mode and in a sofa-mode,

arm members (50A) for supporting said movable half backrests (30, 31) at the end of said panel (11) rotatably at a level; and

angle adjustable positioning mechanisms (70A, 70B) fitted to the coupled portions where a base end of said each arm member (50A) is coupled to the end of said panel (11) and a top end of said arm member (50A) is coupled to said each movable half backrest (30, 31), said movable half backrests (30, 31) are supported and moved by said angle adjustable positioning mechanisms (70A, 70B) among given positions, that is, a first position where they are located along said ends of the panel (11) in the bed-mode, a second position where they are directed to be widened toward one side of said panel (11) thereon in the sofa-mode and a third position where they are nearly parallel to the longitudinal direction of said panel (11) in the sofa-mode.

10. A sofa-bed (10F) comprising:

a panel (11),

movable half backrests (30, 31) supported movably at least on one side of both sides of the panel (11) and held in given positions in a bed-mode and in a sofa-mode,

arm members (50A) for supporting said movable half backrests (30, 31) at the side of said panel (11) rotatably at a level; and

angle adjustable positioning mechanisms (70A, 70B) fitted to the coupled portions where a base end of said each arm member (50A) is coupled to the side of said panel (11) and a top end of said each arm member (50A) is coupled to said each movable half backrest (30, 31), said movable half backrests (30, 31) are movable among given positions, that is, a first position where they are located along said side of the panel (11) in the bed-mode, a second position where they are directed to be widened toward one side of said panel (11) thereon in the sofa-mode and a third position where they are nearly parallel to said first position and are directed

to be widened toward one side of said panel (11) thereon in the sofa-mode.

11. A sofa-bed (10H) as in claims 1 or 2, further comprising:

a supporting member (60) mounted on nearly center of the side of said panel (11) behind said movable half backrests (30, 31) in the sofa-mode; and

a table (90) which is fitted to said supporting member (60) and can be moved between a using position in front of said supporting member (60) where the table (90) is supported at a level and a receiving position where the table (90) is folded up nearly upright along said supporting member (60).

12. A sofa-bed (10H) as in claim 3, in which said caught portion (61A) is mounted on a supporting member (60) which is mounted on nearly center of the side of said panel (11) behind said movable half backrests (30, 31) in the sofa-mode, and further comprises a table (90) which is fitted to said supporting member (60) and can be moved between a using position in front of said supporting member (60) where the table (90) is supported at a level and a receiving position where the table (90) is folded up nearly upright along said supporting member (60).

13. A sofa-bed (10I) as in claim 4, in which said caught portion (61A) of the lock mechanism is mounted on a supporting member (60) which is mounted on nearly center of the side of said panel (11) behind said movable half backrests (30, 31) in the sofa-mode, and further comprises a table (90) which is fitted to said supporting member (60) and can be moved between a using position where the table (90) is supported at a level in front of said supporting member (60) and a receiving position where the table (90) is folded up nearly upright along said supporting member (60), and a catching portin (95) of said table, replaced the catching arm (49) of said lock mechanism, which is mounted on the end of said table (90) and can be engaged with a catching portin (38) of said movable half backrests (30, 31) when they turn to said third position and said table (90) is in the using position.

14. A sofa-bed (10I) as in claim 13, in which said movable half backrests (30, 31) can be changed their tilt angles when they are held in said third position.

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Fig. 1

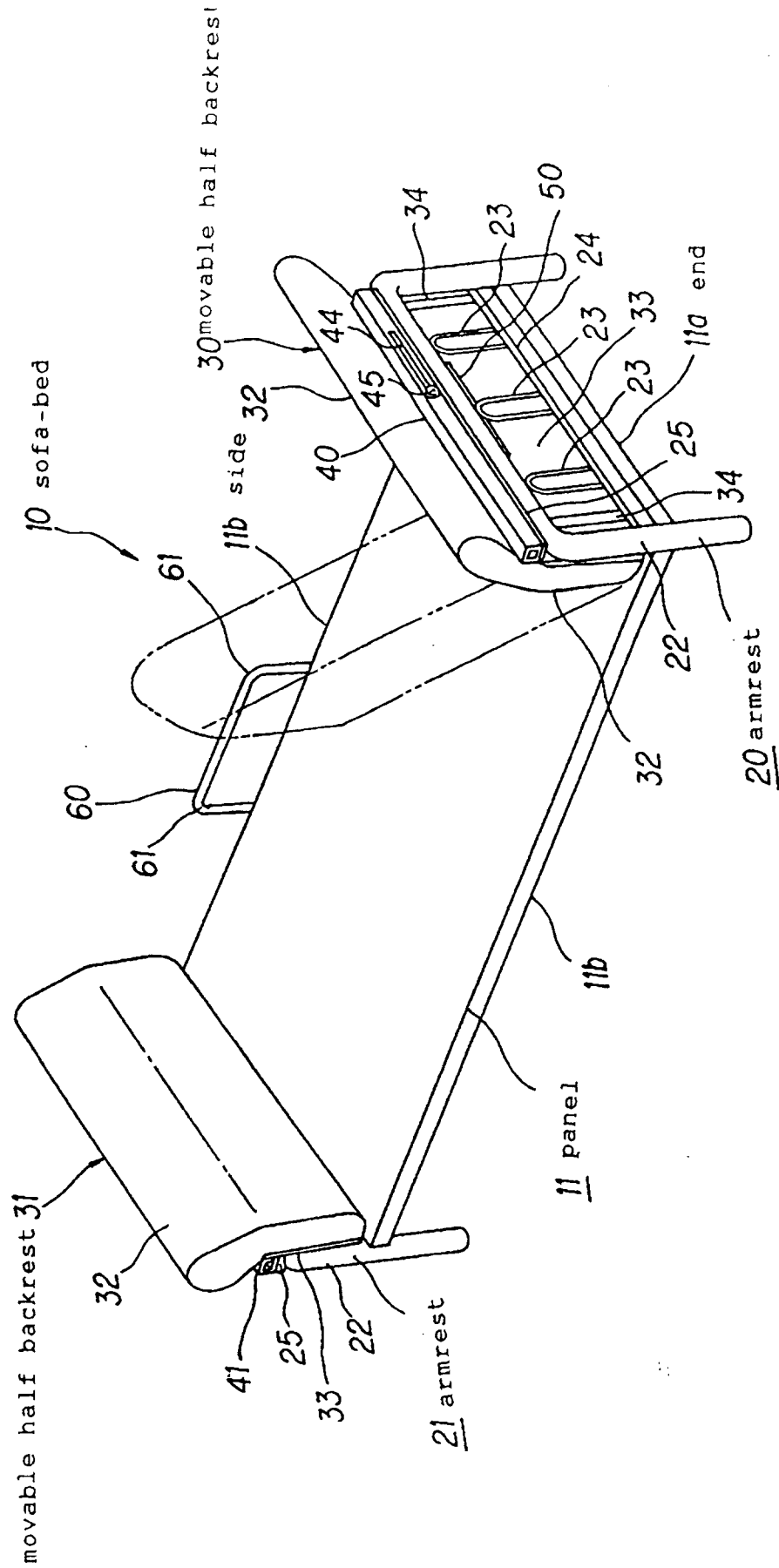


Fig. 2

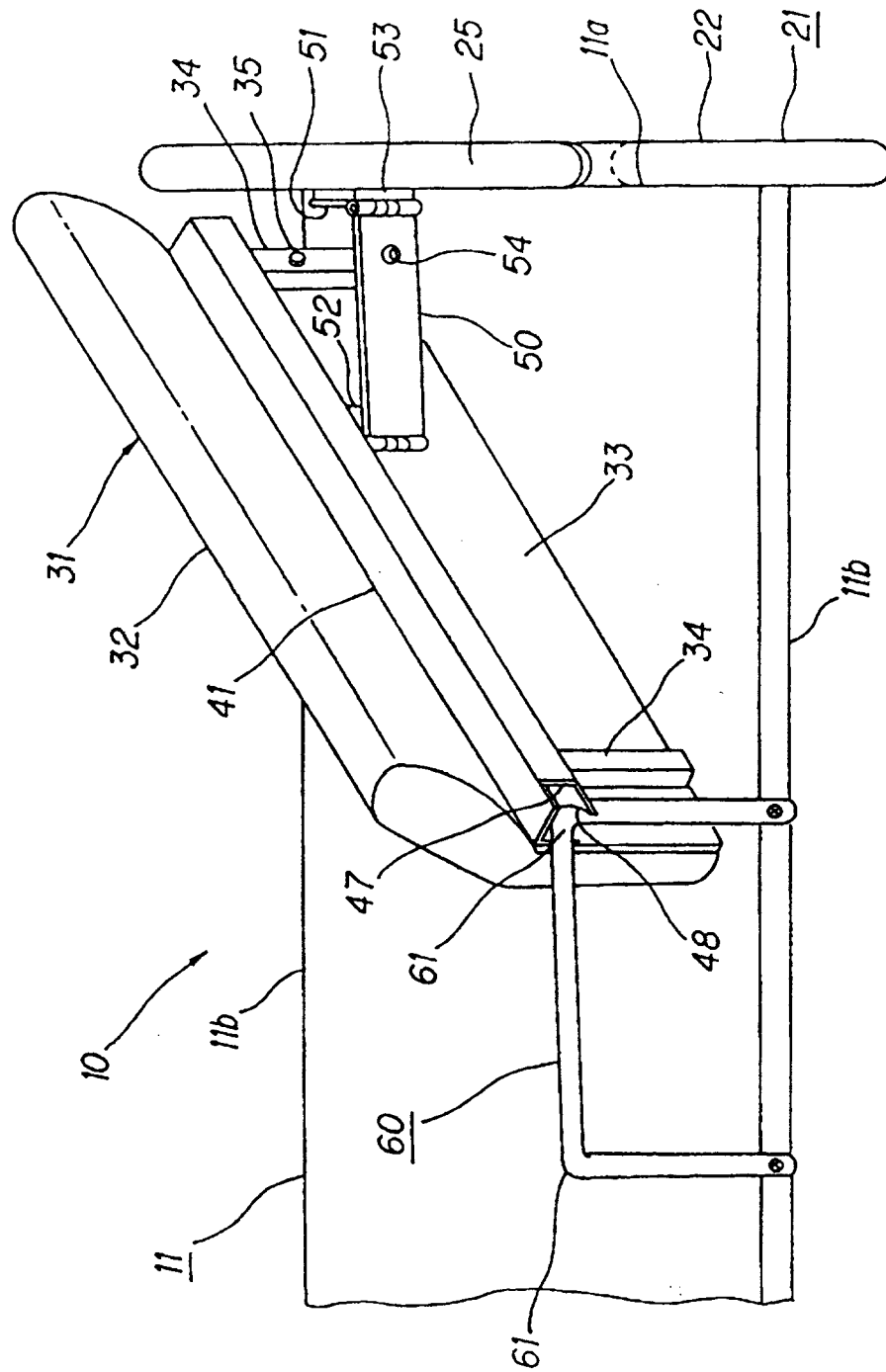


Fig. 3

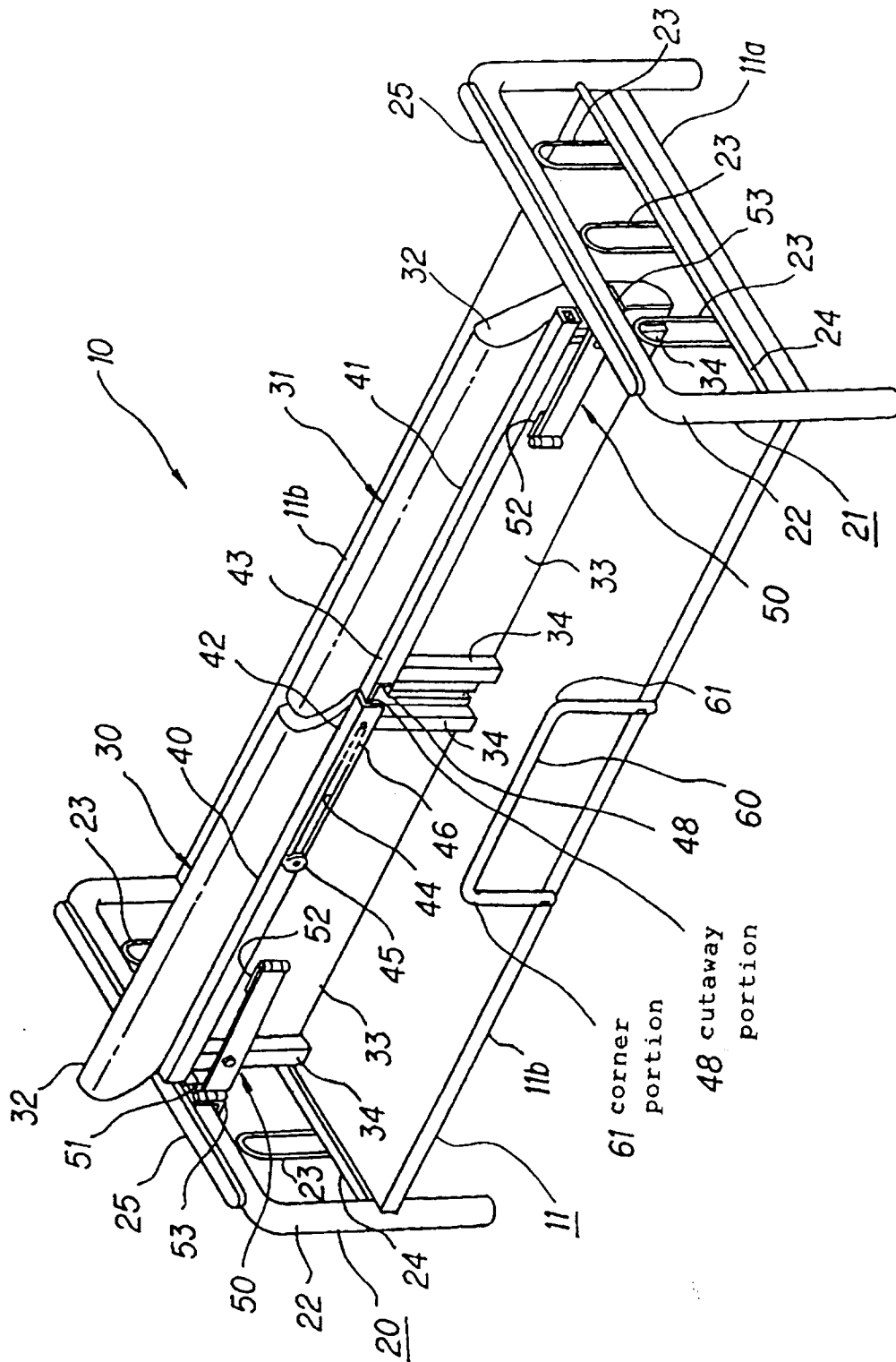


Fig. 4

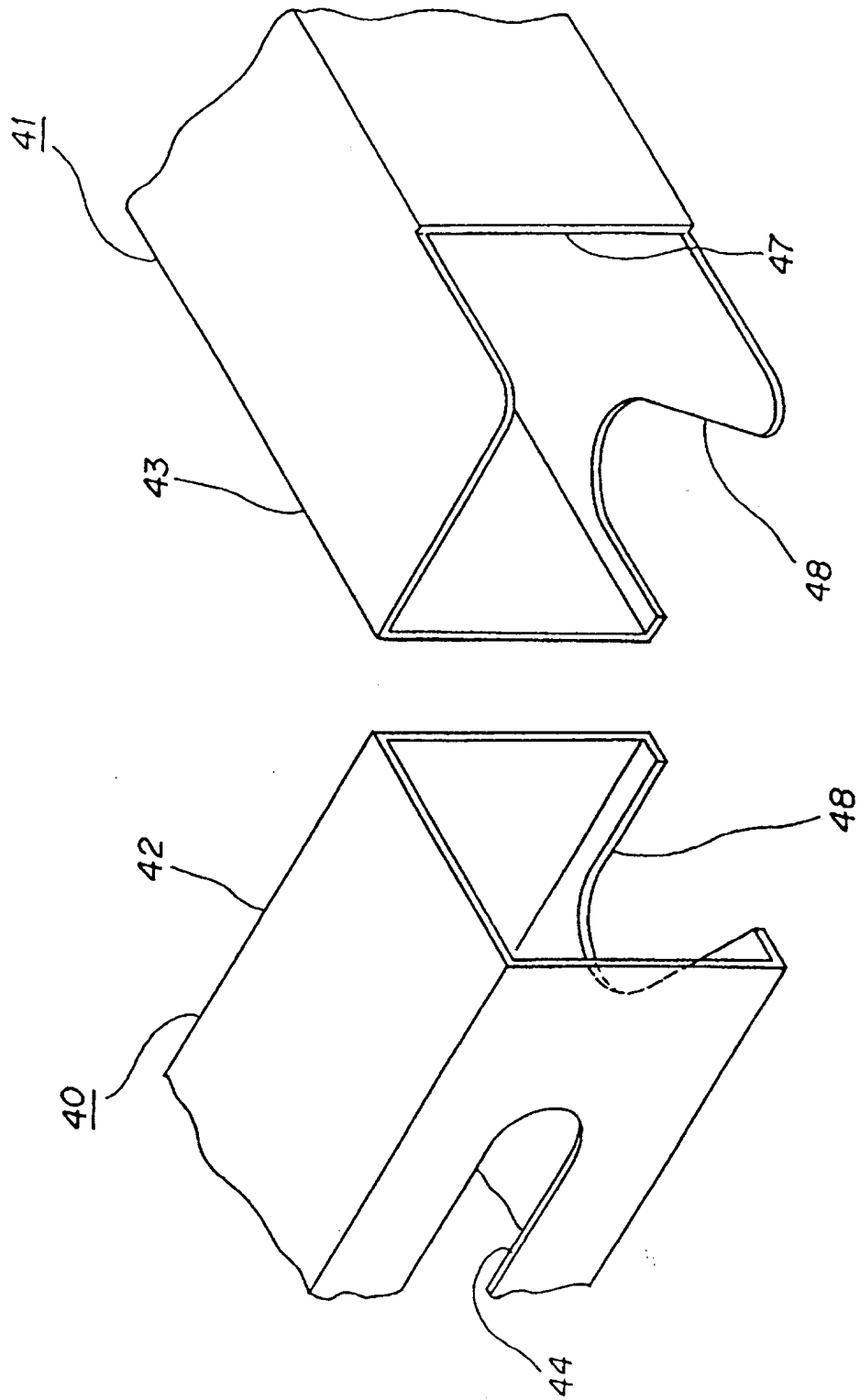


Fig. 5

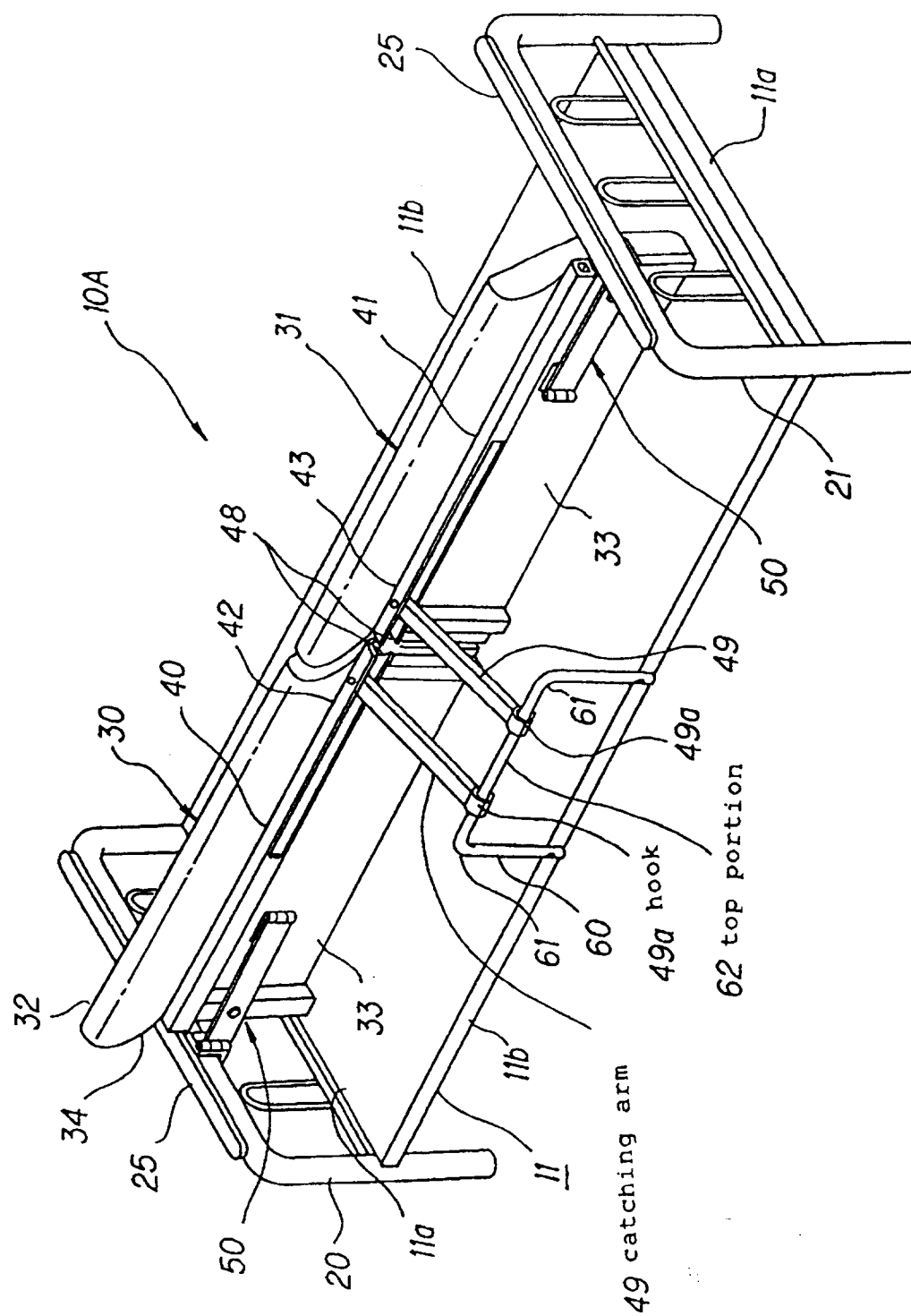


Fig. 6

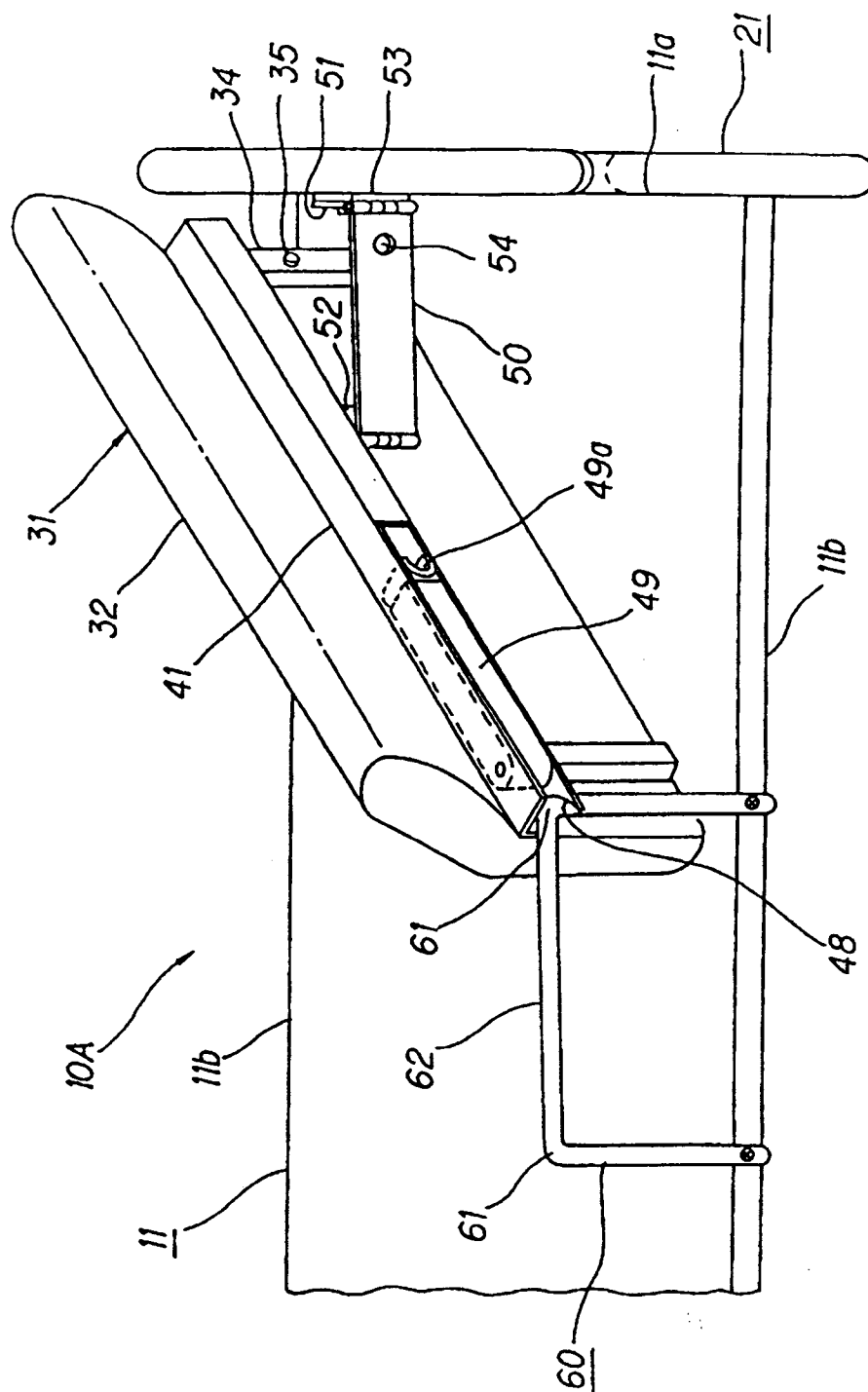


Fig. 7

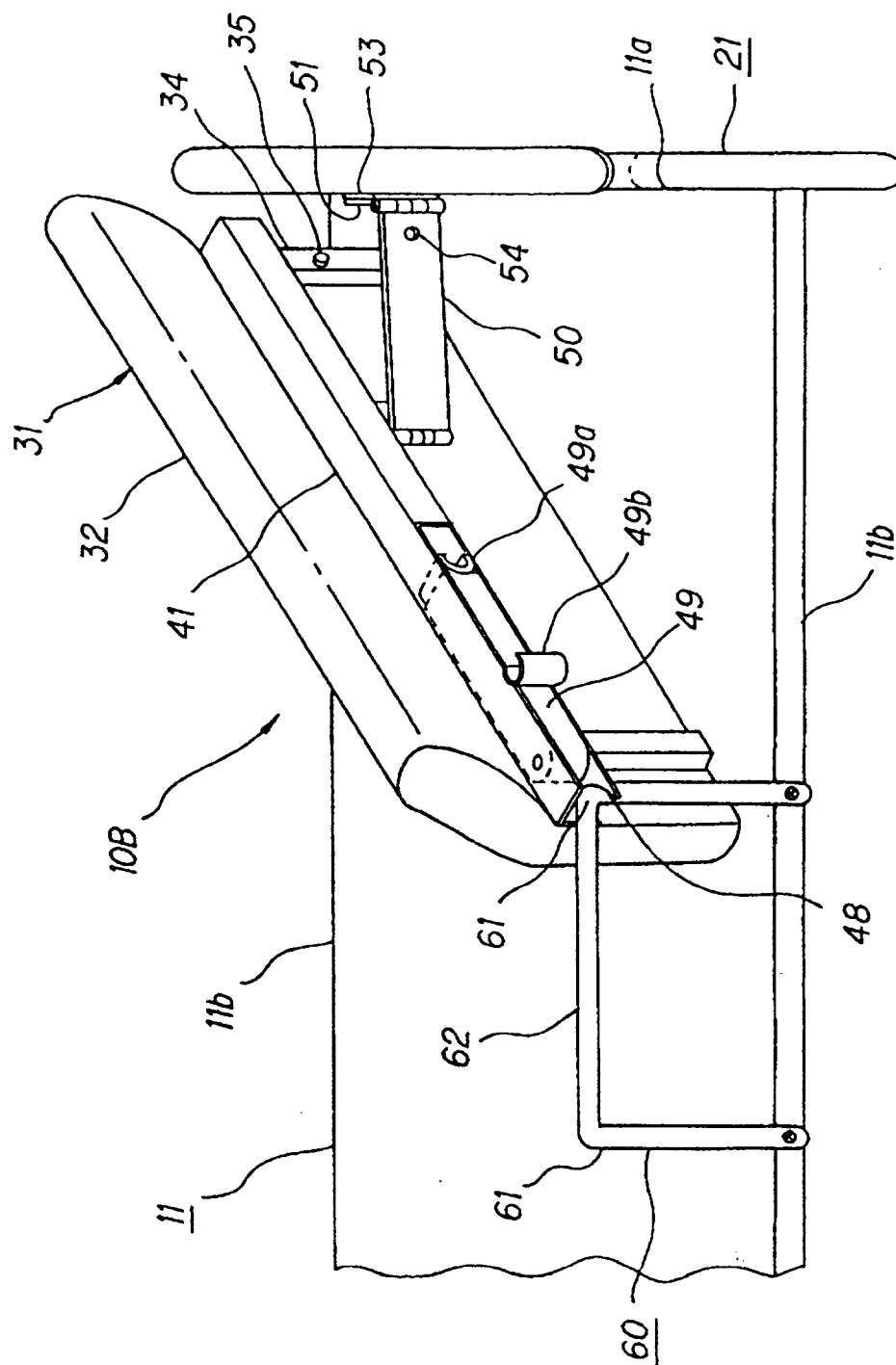


Fig. 8

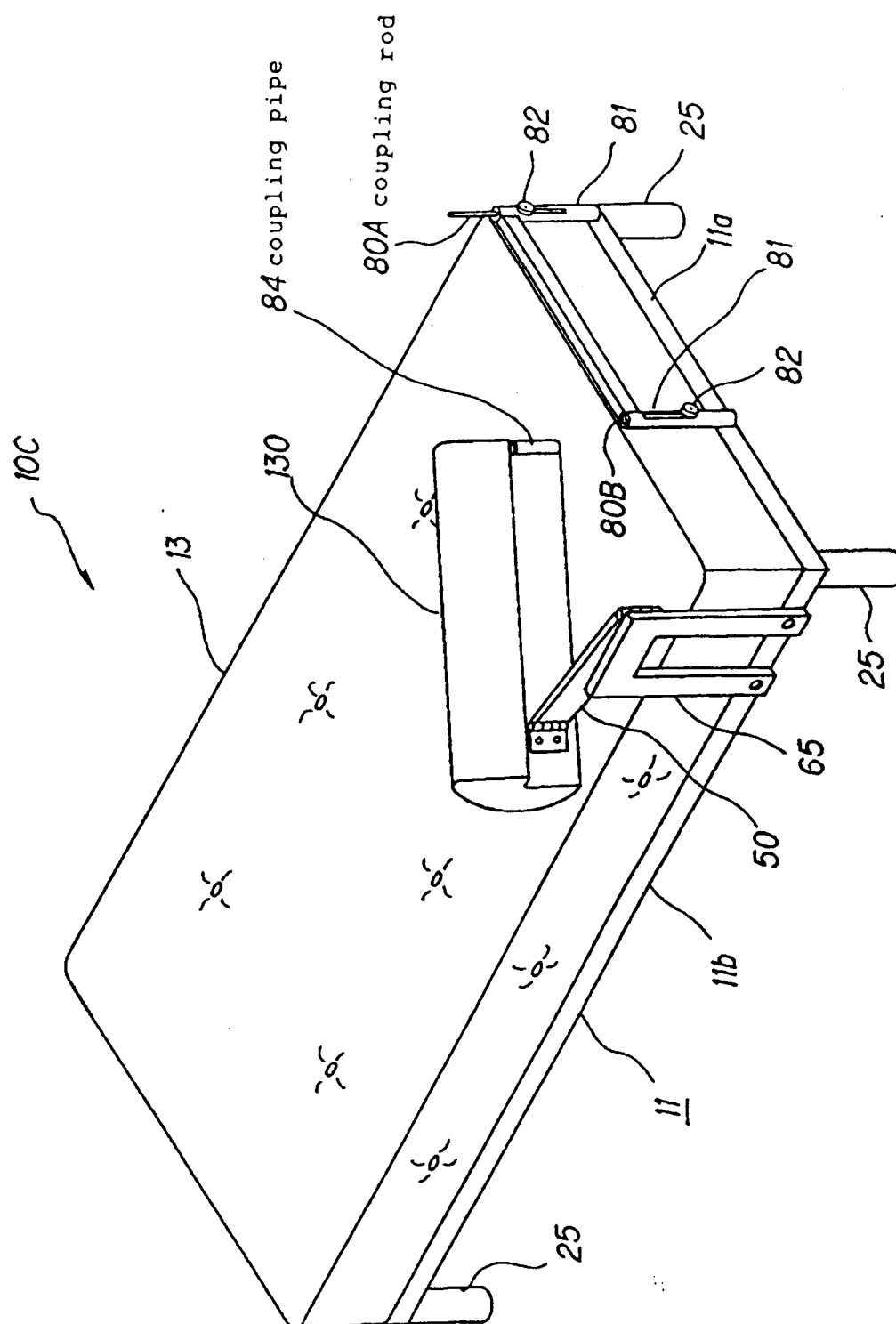


Fig. 9

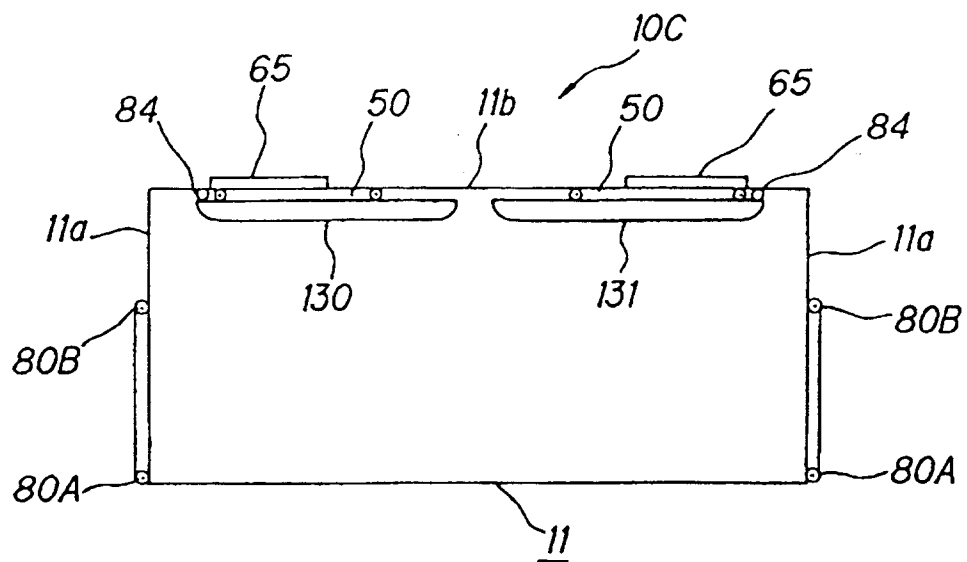


Fig. 10

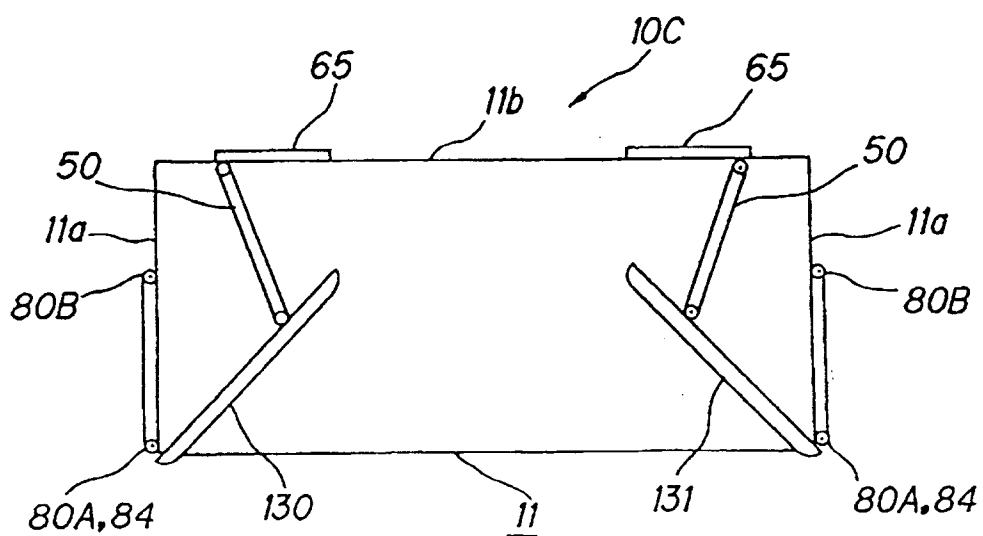


Fig. 11

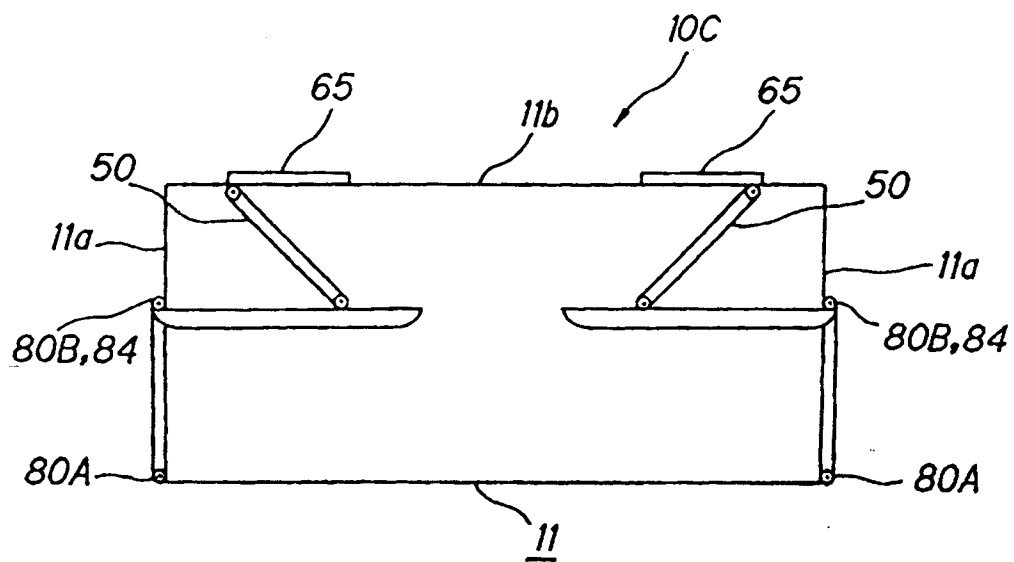


Fig. 12

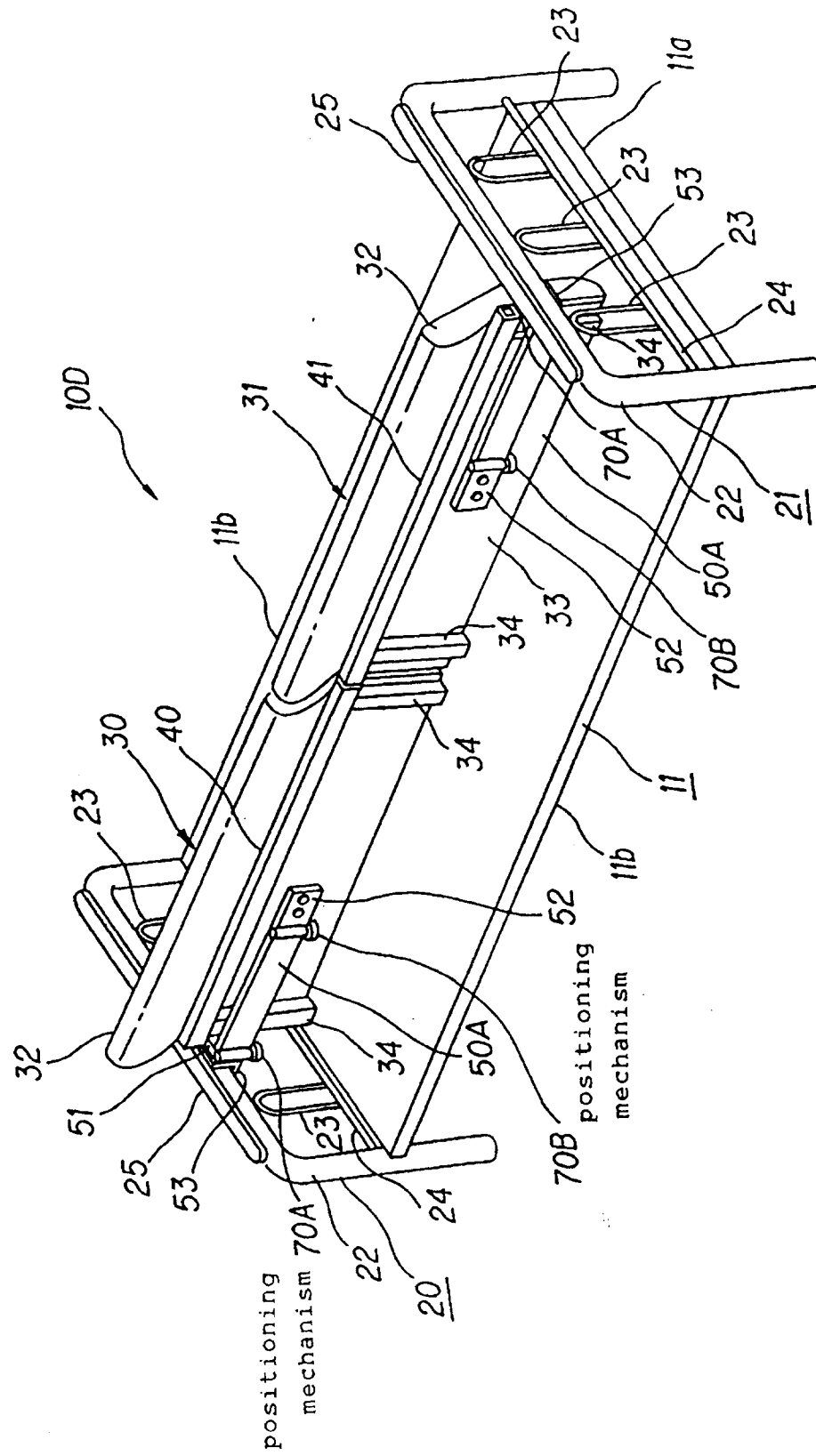


Fig. 13

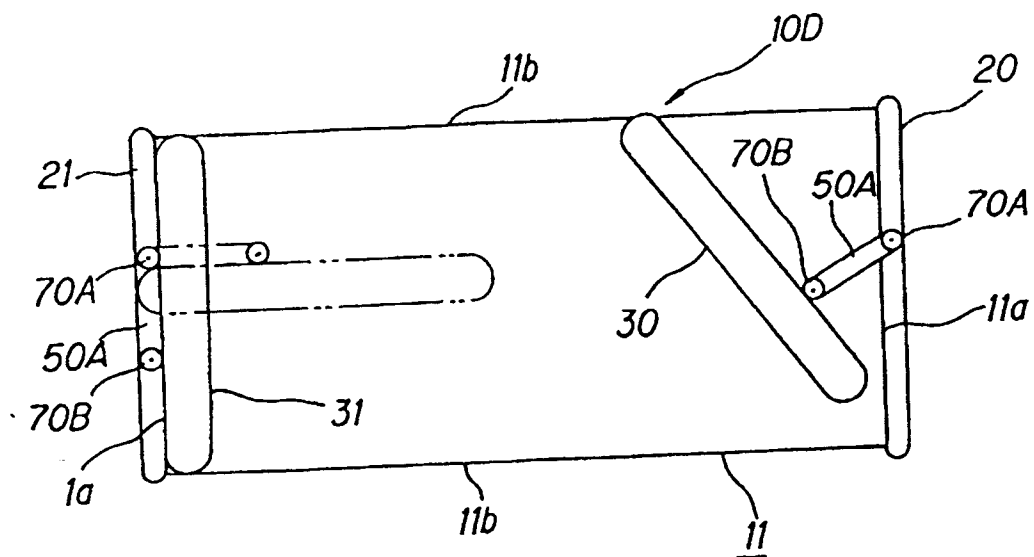


Fig. 14

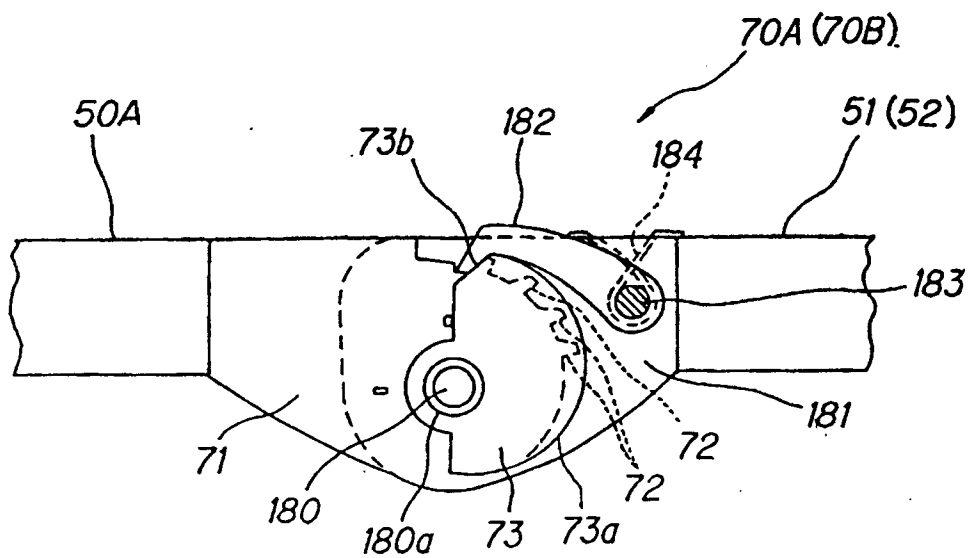


Fig. 15

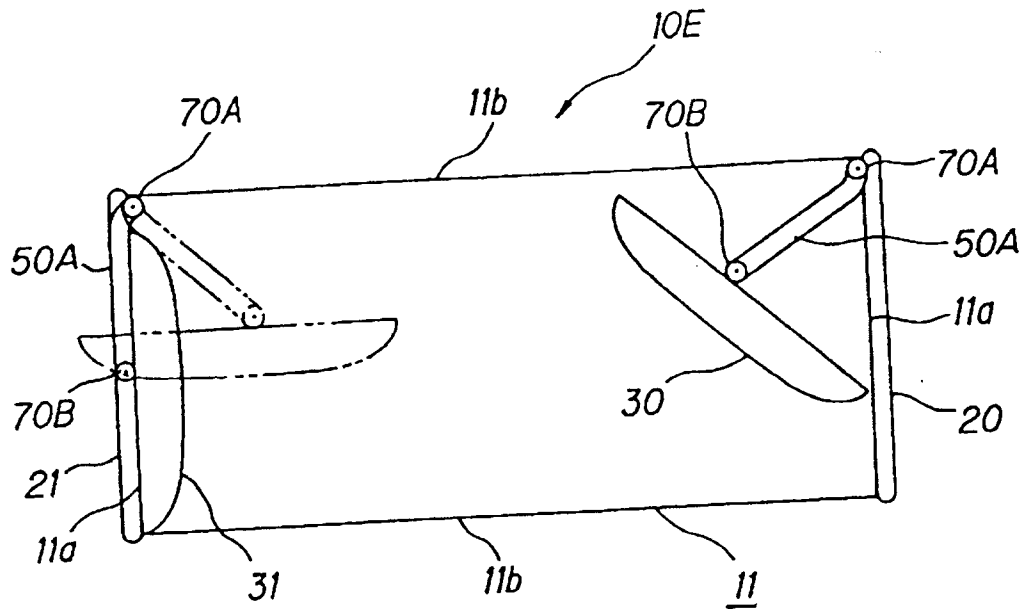


Fig. 16

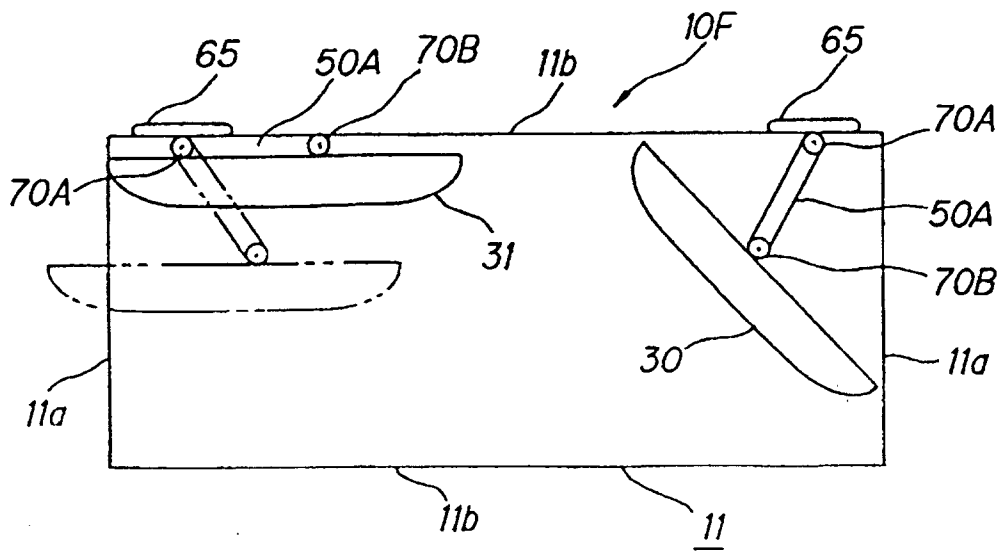


Fig. 17

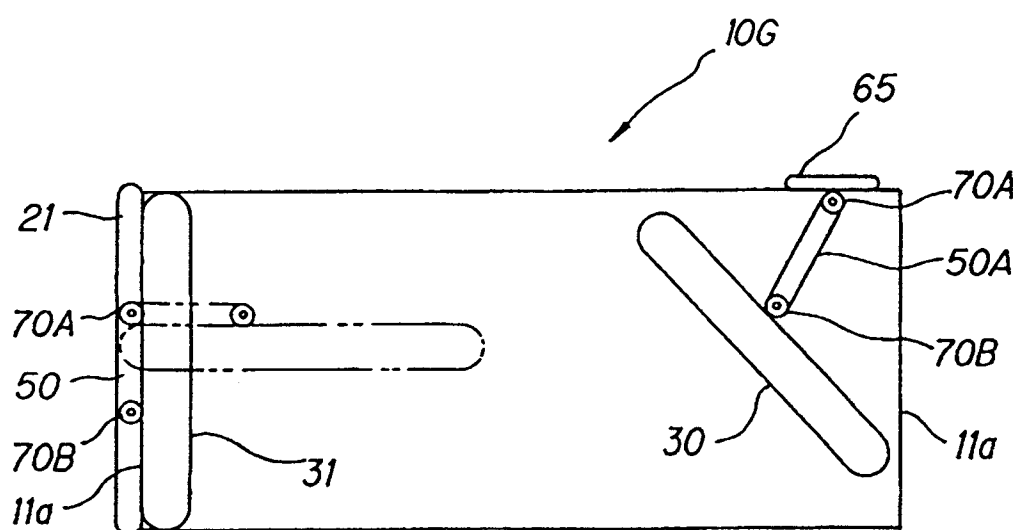


Fig. 18

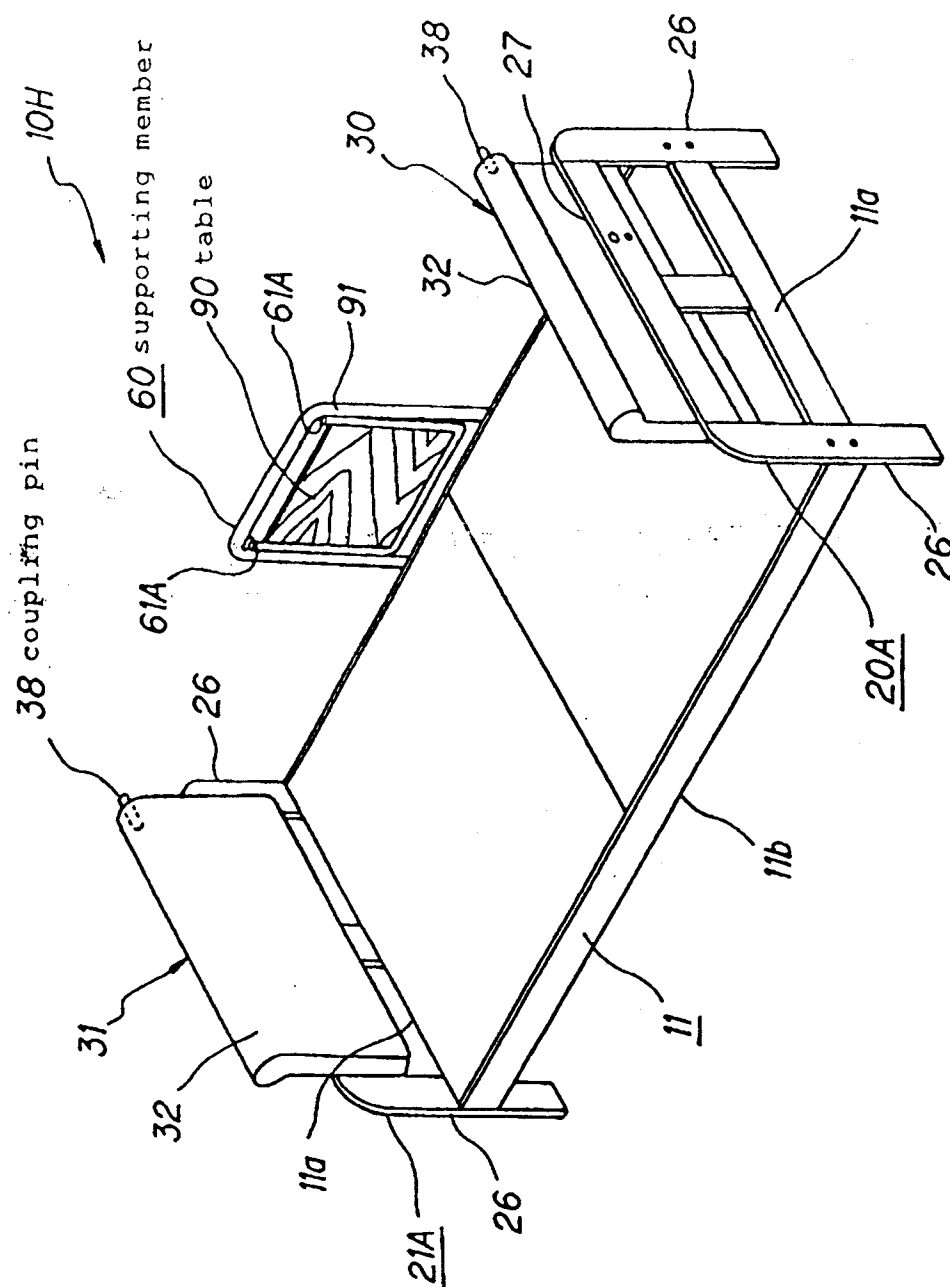


Fig. 19

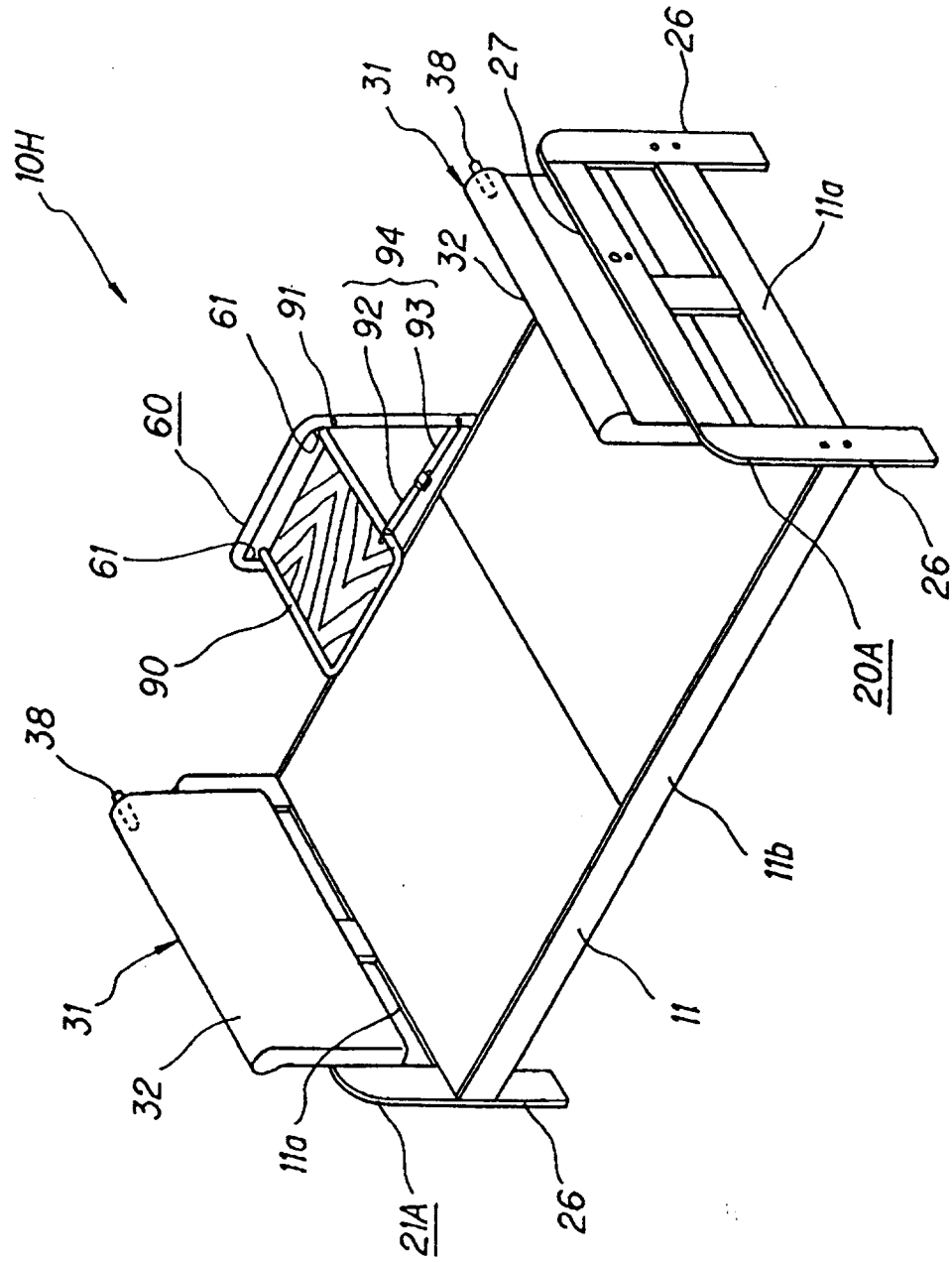


Fig. 20

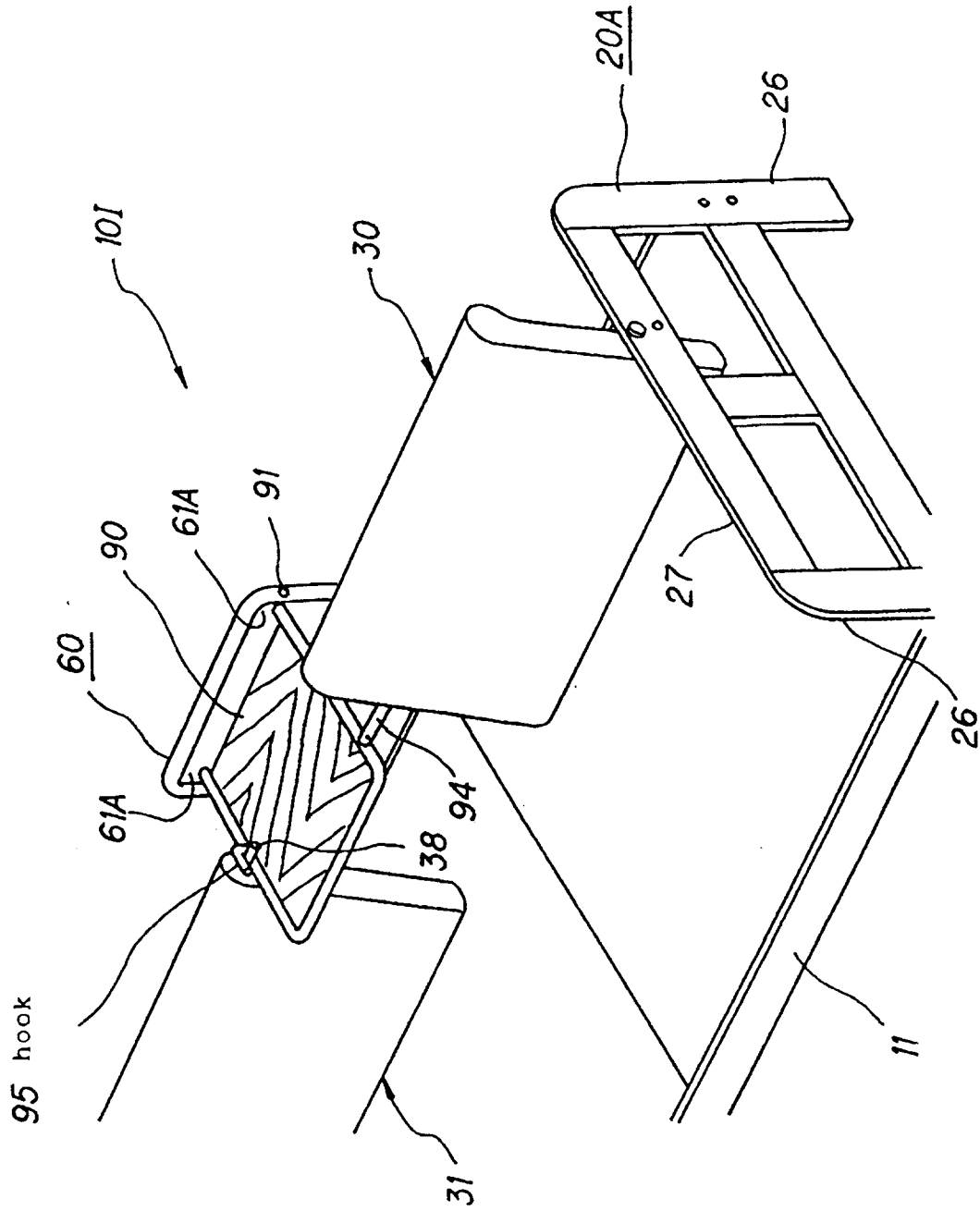


Fig. 21

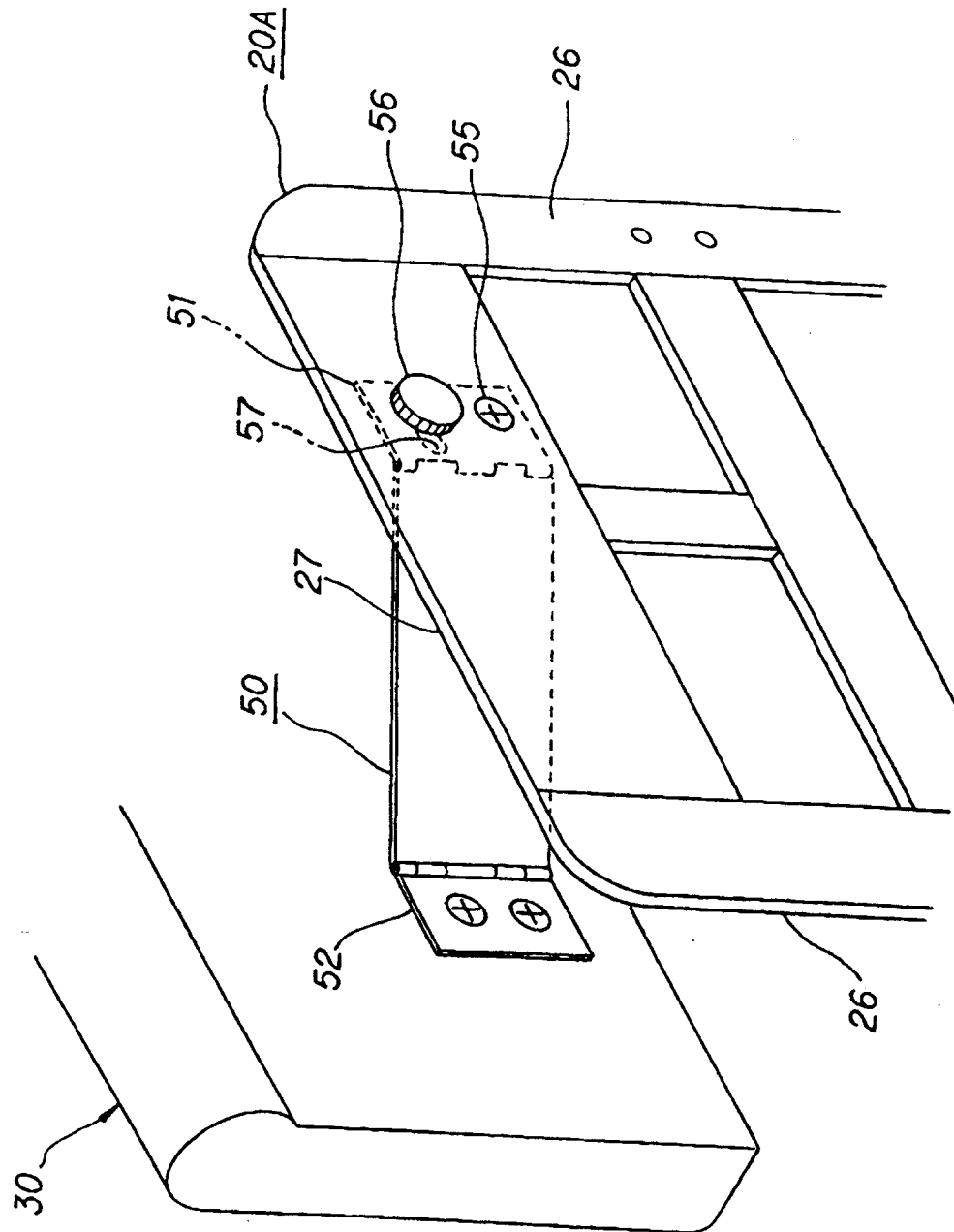


Fig. 22

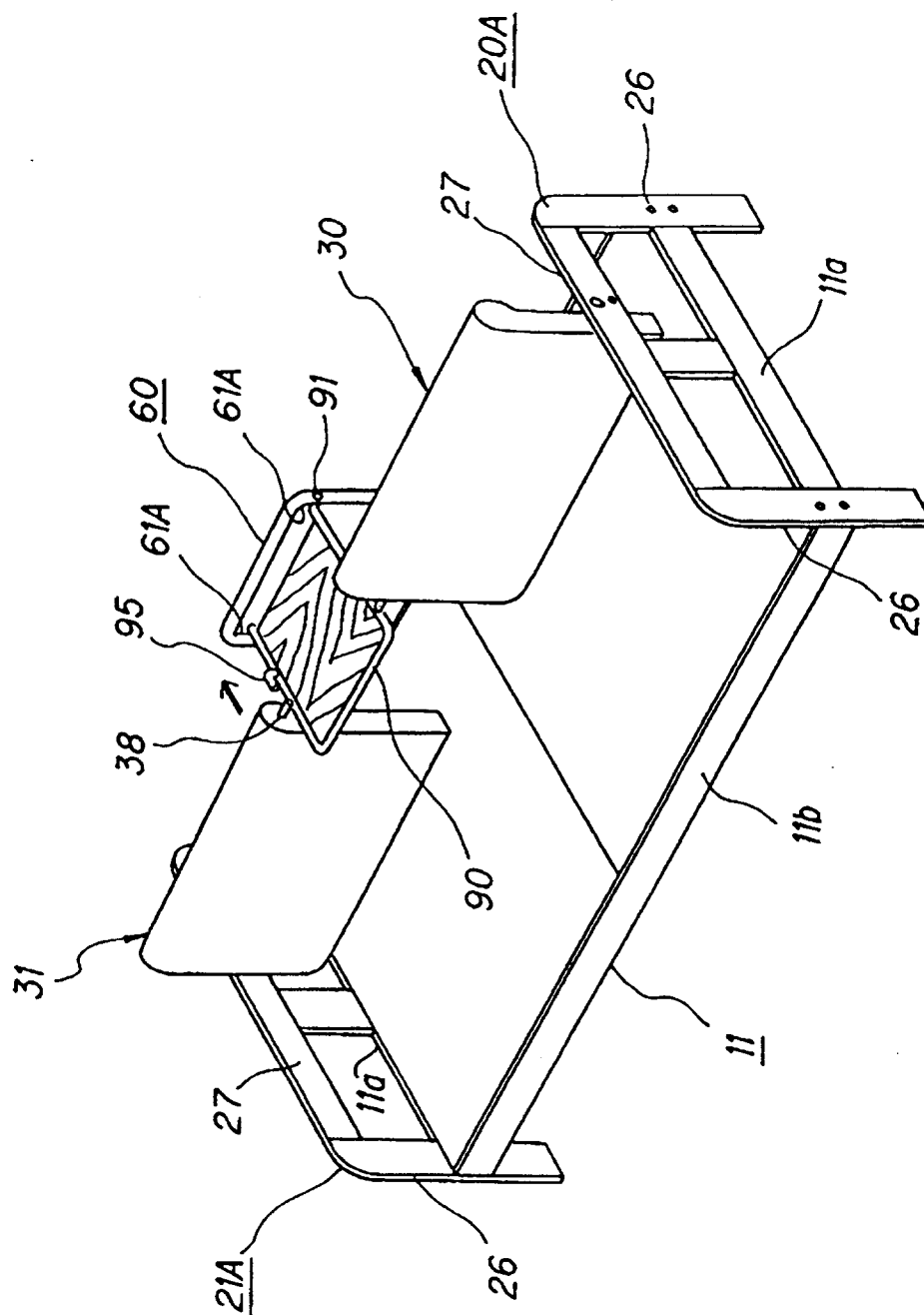


Fig. 23

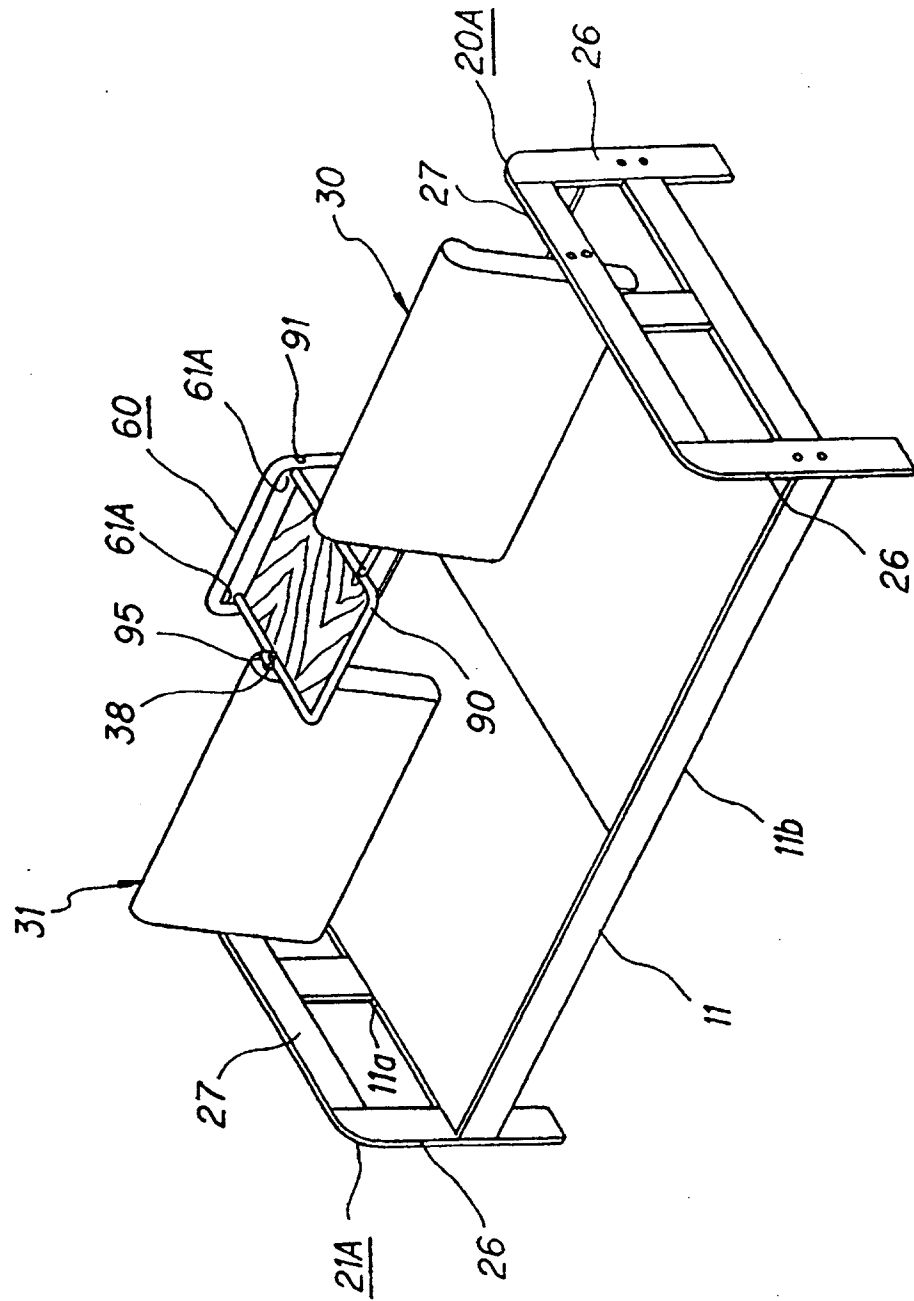


Fig. 24

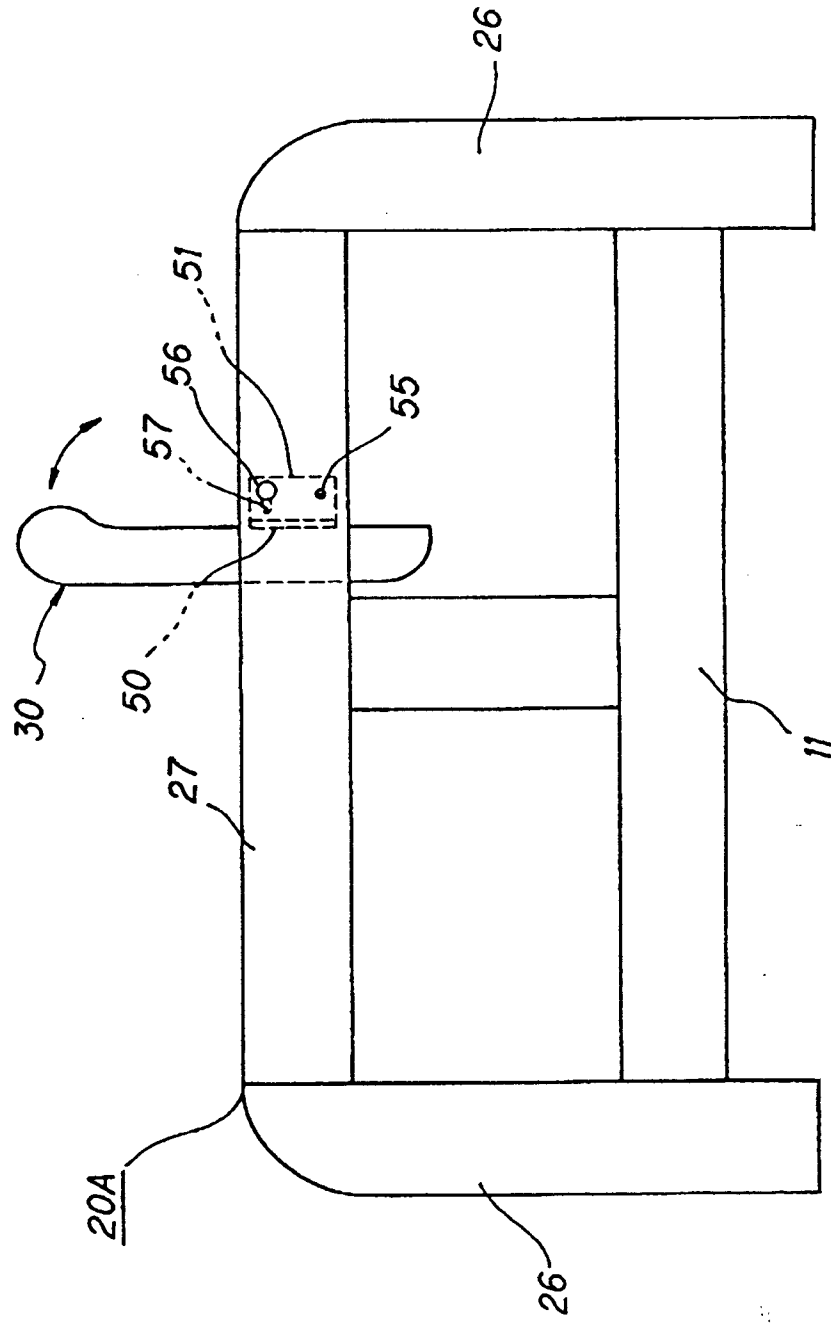


Fig. 25

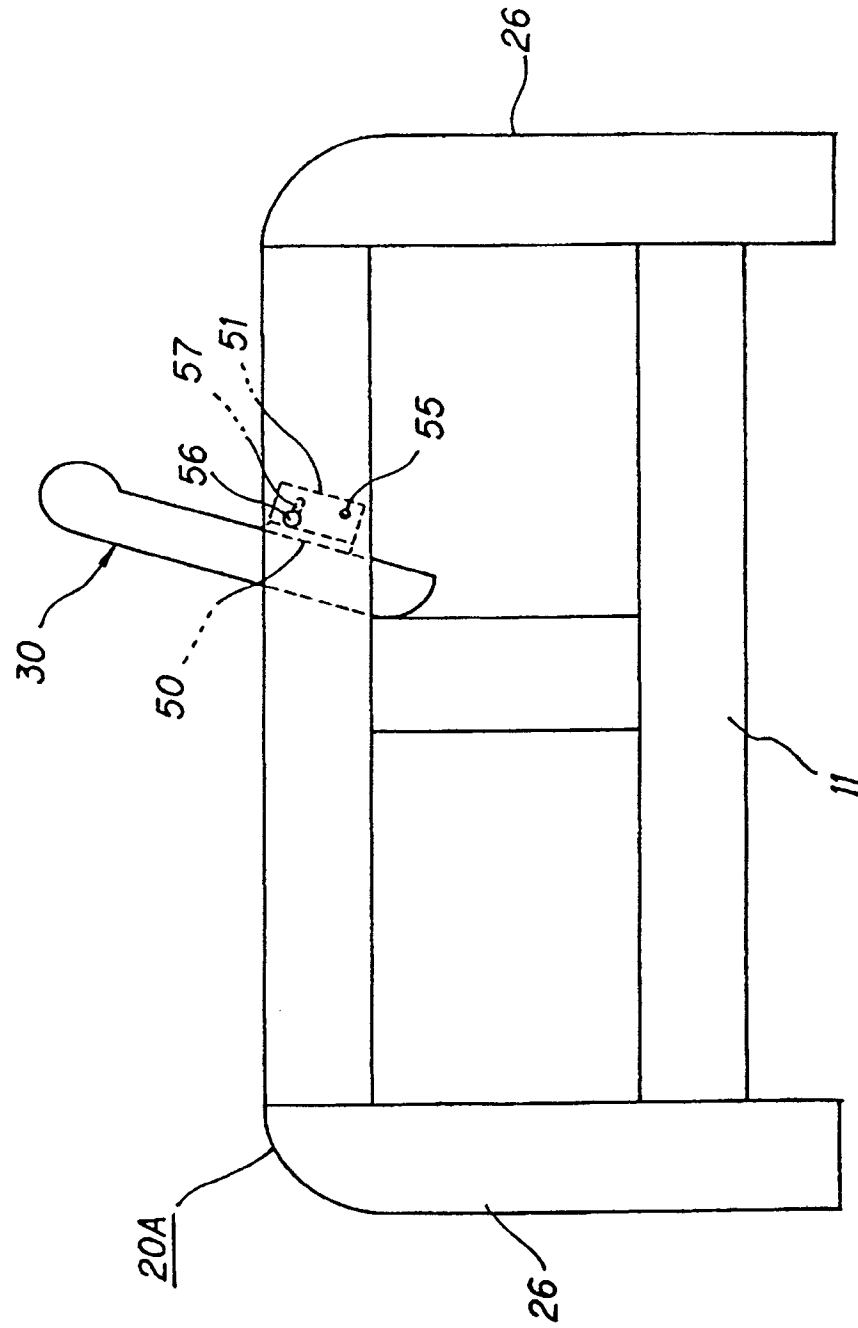


Fig. 26

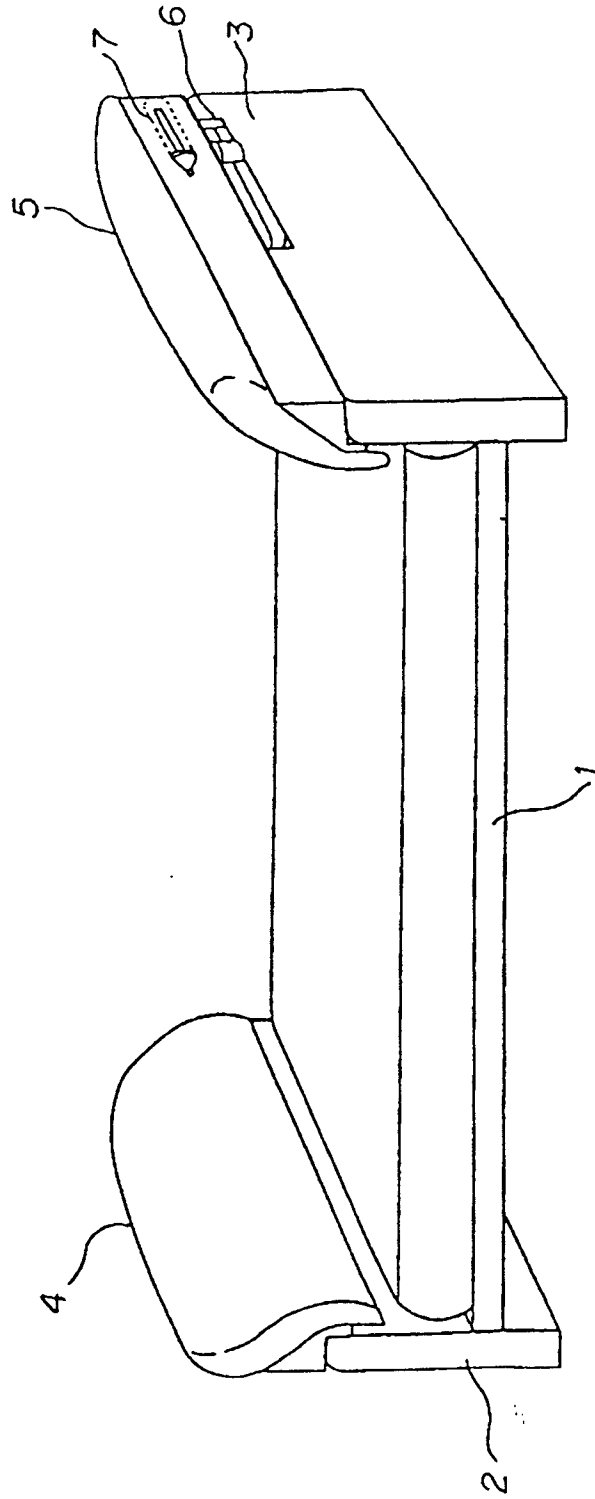
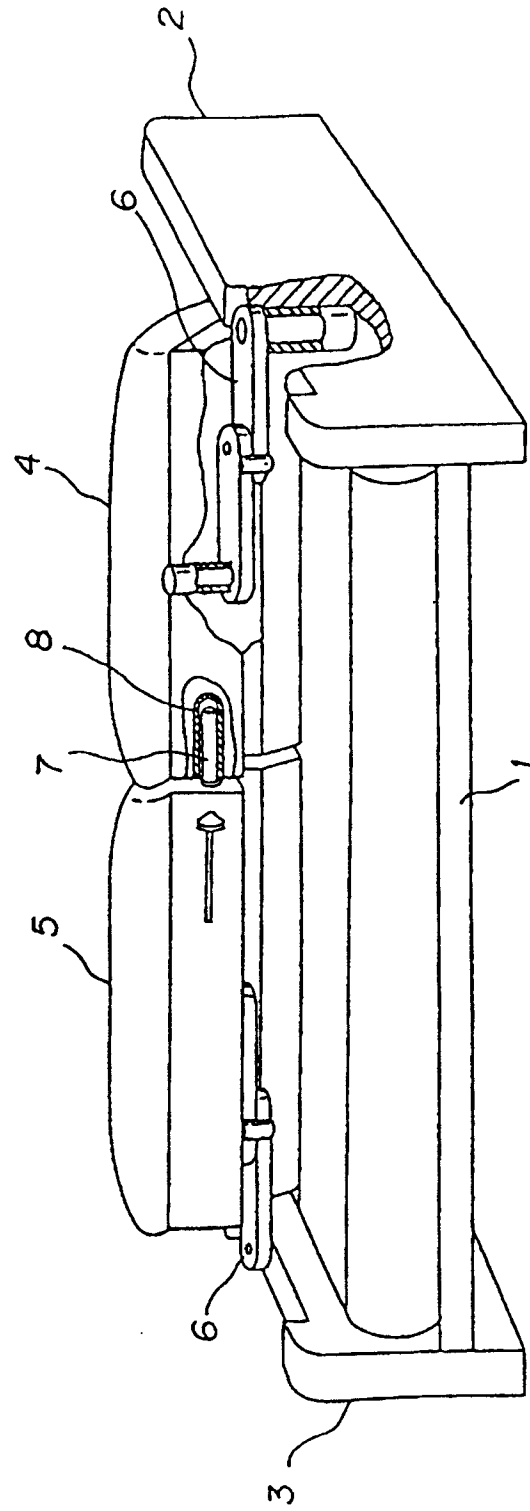


Fig. 27





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 11 4405

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.6)
D,A	EP-A-0 573 671 (KASHIMA) * column 13, line 45 - column 15, line 56; figures 1-6,24,25,45 * ---	1,2,5,6, 9,10	A47C17/04 A47C7/40
A	DE-U-89 00 717 (POR SEDA WOHNMÖBEL) * figure 4 * -----	1,2,5,6, 9,10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A47C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15 December 1995	Examiner Mysliwetz, W
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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