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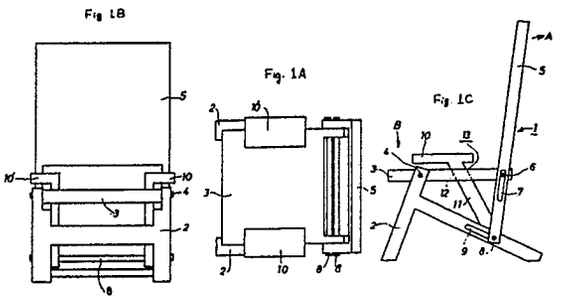
(54) **RECLINING STRUCTURE.**

(57) In a reclining structure (1, 21, 41, 61) according to the present invention, support members (2, 22, 42, 62), a seat member (3, 23, 43, 63) and a back member (5, 25, 45, 55, 75) are connected to one another freely with at least two kinds of members out of these support members, seat member and back member being joined together by a rod (11, 31, 51, 71) of a locking means (13, 33, 53, 73), the rod being disposed so as to cross one of these two kinds of members.. These two kinds of members are locked so as not to be moved with respect to each other with a force imparted only between the rod-crossed member and rod. Accordingly, in order to re-adjust the reclining structure, a user changes his posture on a chair (1, 21, 61) or a bed (41) so as to release the rod-crossed member and rod from the force imparted therebetween and set the support members, seat member and back member, which constitute the reclining structure, freely movable. After the re-adjustment operation is finished, the user sits or lies on the seat member to cause the rod-crossed member and rod to be locked.



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SPECIFICATION

RECLINING APPARATUS

TECHNICAL FIELD

This invention relates to reclining apparatus for locking a chair or a bed in the desirable reclining position.

BACKGROUND ART

General reclining apparatus includes a seat member supporting the lumbar region of a seated person, a support member, a back rest member supporting the back region and a lock device. The seat member is fixed to the support member and is articulatingly connected to the back rest member. The lock device provided between the support member and the seat member locks the seat member in a position and at an angle desired. The lock device generally used is a prop-support type or a serration-support type. The serration-support lock device locks the seat member at a certain set angle using serrations engaged each other and fixed with a screw.

The reclining apparatus or device is generally attached to a bed or a chair as an independent part, thus damaging the appearance of the furniture and making the price high. To attain the firm lock, the lock device is step-adjustable; a user chooses one of the angles set previously at certain intervals. The apparatus is hence incapable of maintaining the furniture in a desirable reclining position. Besides the

apparatus can mainly be mounted only on chairs or beds made of metal.

A back-rest angle adjusting mechanism for a reclining chair is stepless adjustable reclining apparatus generally used for an automobile seat or ratchet type reclining apparatus. The former consists of mechanical parts relatively complicated and thus attains easy and accurate adjustment or regulation; but the disadvantage is high cost. The latter has a simple structure and is thus manufactured at a reasonable cost; but the disadvantage is poor adjustment or regulation. A further disadvantage common to both the mechanisms is that a seated person feels discomfort in the reclining position because the rear portion of the seat member maintains its original position whereas other portions move to change their positions.

An objective of the invention is to provide reclining apparatus favorably attached to furniture like a wooden chair or bed without damaging its appearance.

Another objective of the invention is to provide simply constructed and uncostly manufactured reclining apparatus which steplessly locks the furniture in a desirable reclining position.

DISCLOSURE OF THE INVENTION

Reclining apparatus according to the invention includes a seat member supporting the lumbar region of a seated

person, a back rest member supporting the back region and adjustably connected to the seat member, a support member adjustably connected to both the seat member and the back rest member, and a rod functioning as a lock member mounted on one of the seat member, the back rest member and the support member and fitted across another one of them. When a force is applied only to the seat member, the lock member is locked to maintain the angle between the seat member and the back rest member. On the other hand, when a force is applied to both the seat member and the back rest member, the lock member is unlocked and moves to change the angle between the seat member and the back rest member.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1A is a top view illustrating a reclining chair of a first embodiment according to the invention in the sitting position;

Fig. 1B is a front view of the reclining chair of Fig. 1A;

Fig. 1C is a right side view of the reclining chair of Fig. 1A;

Fig. 2A is a top view of the reclining chair of the first embodiment in the reclining position;

Fig. 2B is a front view of the reclining chair of Fig. 2A;

Fig. 2C is a right side view of the reclining chair of

Fig. 2A;

Fig. 3A is an enlarged right side view illustrating the lock device of the first embodiment;

Fig. 3B is a sectional view taken on line IIIB-IIIB of Fig. 3A;

Fig. 4A is a sectional view taken on line IVA-IVA of Fig. 3B in the lock position of the lock device;

Fig. 4B is a sectional view taken on line IVA-IVA of Fig. 3B in the unlock position of the lock device;

Fig. 5 is a right side view illustrating a reclining chair of a second embodiment according to the invention in the sitting position;

Fig. 6 is a right side view of the reclining chair of the second embodiment in the reclining position;

Fig. 7 is a sectional view taken on line VII-VII of Fig. 6;

Fig. 8A is a top view illustrating a reclinable bed of a third embodiment according to the invention in the lying position;

Fig. 8B is a rear view of the reclinable bed of Fig. 8A;

Fig. 8C is a right side view of the reclinable bed of Fig. 8A;

Fig. 8D is a front view of the reclinable bed of Fig.

8A;

Fig. 9 is a right side view of the reclinable bed of the third embodiment in the reclining position;

Fig. 10A is a top view illustrating a reclining chair of a fourth embodiment according to the invention in the sitting position;

Fig. 10B is a front view of the reclining chair of Fig. 10A;

Fig. 10C is a right side view of the reclining chair of Fig. 10A;

Fig. 11A is a top view of the reclining chair of the fourth embodiment in the reclining position;

Fig. 11B is a front view of the reclining chair of Fig. 11A;

Fig. 11C is a right side view of the reclining chair of Fig. 11A; and

Fig. 12 is a front view illustrating the method for assembling the reclinable chair of the fourth embodiment.

BEST MODE FOR CARRYING OUT THE INVENTION

First through fourth embodiments according to the invention are explained with the accompanying drawings.

Figs. 1A through 1C and Figs. 2A through 2C illustrate a wooden reclining chair 1 of a first embodiment. A seat

member 3 supporting the lumbar region of a seated person is pivotably connected to a T-shaped support member 2 by a shaft 4. A back rest member 5 supporting the back region and the seat member 3 are adjustably connected to each other by a shaft 6 slidably fitted in a long aperture 7 provided on the middle portion of the longitude of the back rest member 5. The bottom of the back rest member 5 and the support member 2 are adjustably connected to each other by a shaft 8 slidably fitted in a long aperture 9. A rod 11 formed as an integral part of an arm rest 10 is secured on one end by the shaft 8 and is inserted across the seat member 3. Figs. 3A and 3B and Figs. 4A and 4B illustrate a lock device 13, wherein the rod 11 is fitted through a rod through hole 12 provided in the seat member 3.

The action of the first embodiment is now described. In the reclining chair 1 thus constructed, the support member 2, the seat member 3 and the back rest member 5 are adjustably interconnected, and the rod 11 of the lock device 13 is connected to the support member 2 and the seat member 3. But the rod 11 may be connected to any two of the support member 2, the seat member 3 and the back rest member 5 or to all of the three.

Fig. 4A shows the lock device in its lock position. Here the positions of the support member 2, the seat member 3 and the back rest member 5 are maintained. When a person is seated on the reclining chair 1 after setting the positions of the support member 2, the seat member 3 and the back rest

member 5 as desired, the weight is applied onto the seat member 3 and a certain force is applied to between the seat member 3 and the rod 11 inserted across the seat member 3. The rod 11 is then firmly engaged in the rod through aperture 12 and the angle between the rod 11 and the seat member 3 is maintained.

When a seated person stretches himself on the reclining chair 1, the force is applied to the positions A and B shown in Fig. 1C to release the lock between the seat member 3 and the rod 11. Fig. 4B shows the lock device in its unlock position. Here the rod 11 is slidably moved in the through hole 12 of the seat member 3, and the positions of the support member 2, the seat member 3 and the back rest member 5 can be re-adjusted. After the re-adjustment, the person is seated on the reclining chair 1 in the reclining position as shown in Figs. 2A through 2C. The weight is again applied onto the seat member 3 and a certain force is applied to between the seat member 3 and the rod 11 inserted across the seat member 3. The rod 11 is then firmly engaged in the rod through aperture 12 and the angle between the rod 11 and the seat member 3 is maintained as shown in Fig. 4A.

The lock device 13 is not limited to the above construction but may have any other suitable constructions. For example, the rod 11 may be fitted in a groove provided on the seat member 3.

Figs. 5 and 6 are right side views of a reclining chair

21 of a second embodiment. Vertically extending support members 22a and 22c are interconnected by a transversely extending support member 22b. The upper end of the support member 22a is adjustably connected to a seat member 23 by a shaft 24 slidably fitted in a long aperture 29 provided on the seat member 23.

A rod 31 provided to support an arm rest 20 is pivotably connected to the seat member 23 and a back rest member 25 by a shaft 26 and is slidably fitted in the support member 22b. Fig. 7 shows a lock device 33, wherein the support member 22b is fitted in a groove provided on the rod 31.

The back rest member 25 is bent upward at the middle portion thereof and a long aperture is provided above the bent. The support member 22c is adjustably connected to the back rest member 25 by a shaft 28 slidably fitted in the long aperture 27.

The action of the second embodiment is now described. The lock device 33 is locked when the reclining chair 21 is in the sitting position as shown in Fig. 5 and the lock is released in the manner similar to the first embodiment. When the lock device 33 is unlocked, it moves leftward and the rod 31 thus moves leftward. The seat member 23 accordingly slides leftward and the back rest member 25 rotates clockwise to slide left-downward.

Figs. 8A through 8D and Fig. 9 illustrate a reclinable bed 41 of a third embodiment. Each lower end of links 39 and

40 is rotatably connected to a support member 42 by each upper shaft 44, and each upper end of the links 39 and 40 is articulatingly connected to a seat member 43 by each lower shaft 44. The seat member 43 and the support member 42 are thus interconnected by the links 39 and 40. A back rest member 45 is articulatingly connected to the link 39 by the shaft 44 and the rear part of the back rest member 45 is supported by a roller 46 provided on one end of the support member 42. One end of a rod 51 is supported by the support member 42 via a roller 47 of the rod 51 and the other end thereof is inserted across the seat member 43. A lock device 53 is clearly seen in Figs. 8A though 8D, wherein the rod 51 is fitted in a through hole 52 for the rod 51 provided in the seat member 43.

When a person lies on the back rest member 45 and the seat member 43, the weight works to lock the lock device 53 and the reclinable bed 41 is maintained in the lying position as shown in Figs. 8A through 8D. When a handle 54 provided on the lower portion of the rod 51 is pushed leftward of Fig. 8C, the roller 47 slides on the surface of the support member 42 and the seat member 43 rotates anticlockwise to move left-downward. The lock device 53 then moves downward, the links 39 and 40 rotate anticlockwise to move downward and the seat member 43 accordingly forms a V shape with the back rest member 45. The reclinable bed 41 is now in the reclining position as shown in Fig. 9. When the left end of the seat member 43 is pulled upward and the right end thereof is pulled rightward in the reclinable bed 41 of Fig. 9, the

reclinable bed 41 returns to the lying position shown in Figs. 8A through 8D.

Figs. 10A through 10C, Figs. 11A through 11C and Fig. 12 illustrate a reclining chair 61 of a fourth embodiment according to the invention. The main structure of the reclining chair 61 is similar to that of the chair 1 of the first embodiment; only the structure and the function different from those of the chair 1 are thus explained here.

A second back rest member 75 is provided in parallel with a first back rest member 55 both to support the back region of a seated person. The lower portion of the second back rest member 75 is adjustably connected to a T-shaped support member 62 by a shaft 76 slidably fitted in a long aperture 69 provided on the support member 62. The middle portion of the second back rest member 75 is adjustably connected to the rear portion of a seat member 63 by a shaft 66 slidably fitted in a long aperture 67 provided on the first back rest member 55.

The action of the fourth embodiment is now described. When a person is seated on the reclining chair 61 thus constructed, the weight is applied to the front end of the seat member 63 and the second back rest member 75. Here the seat member 63 and a rod 71 inserted across the seat member 63 are locked. The weight applied to the second back rest member 75 gives no effect on the rod 71 and thus both the back rest members 55 and 75 maintain their angles.

When a seated person half lifts the lumbar region from the rear portion of the seat member 63 and stretches himself on the reclining chair 61, a backward force is applied to the first back rest member 55 supporting the shoulders and the head of the seated person. Here the seat member 63 and the rod 71 are unlocked, and the first and second back rest members 55 and 75 accordingly move backward to attain desirable reclining angle and position. After the adjustment, when the person is seated on the reclining chair 61 in the reclining position shown in Figs. 11A through 11C, the weight is again applied to only the seat member 63 and the second back rest member 75, and the seat member 63 and the rod 71 are re-locked.

When a seated person places the hand on an arm rest 60 and half lifts the back and lumbar regions from both the back rest members 55 and 75 and the seat member 63, the lock between the seat member 63 and the rod 71 is released and both the back rest members 55 and 75 return to their sitting positions.

As mentioned above, any complicated controls for reclining such as manual controls are not required to change the sitting position on the reclining chair 61. The reclining chair is in the normalposition when a person is seated. When the seated person stretches himself for reclining, the reclining chair is automatically changed to be in the reclining position. Additionally, the reclining chair 61 is easily constructed and manufactured at a reasonable cost.

When a person is seated on the reclining chair thus constructed, the weight is applied to the seat member and the second back rest member. Here the seat member and a rod are locked. The weight applied to the second back rest member gives no effect on the rod and thus both the back rest members maintain their angles.

When a seated person half lifts the lumbar region from the rear portion of the seat member and stretches himself on the reclining chair, a backward force is applied to the first back rest member supporting the shoulders and the head of the seated person. Here the seat member and the rod are unlocked, and the first and second back rest members and accordingly move backward to attain desirable reclining angle and position. After the adjustment, when the person is seated on the reclining chair in the reclining position, the weight is again applied to only the seat member and the second back rest member, and the seat member and the rod are re-locked.

When a seated person places the hand on an arm rest and half lifts the back and lumbar regions from both the back rest members and the seat member, the lock between the seat member and the rod is released and both the back rest members and return to their sitting positions.

As mentioned above, any complicated controls for reclining such as manual controls are not required to change the sitting position on the reclining chair 61. The reclining

chair is in the normal position when a person is seated. When the seated person stretches himself for reclining, the reclining chair is automatically changed to be in the reclining position. Additionally, the reclining chair 61 is easily constructed and manufactured at a reasonable cost.

INDUSTRIAL APPLICABILITY

In the reclining apparatus of the invention, the support member, the seat member and the back rest member are adjustably interconnected and the rod of the lock device is mounted on one of the support member, the seat member and the back rest member and fitted across another one of them. When a force is applied between the rod and the member through which the rod is fitted, all the positions of the above members are maintained.

When a person changes the posture, e.g., stretches himself, on the reclining chair or the reclinable bed, the lock between the rod and the member through which the rod is fitted is released and the positions of the support member, the seat member and the back rest member are re-adjusted. After the re-adjustment, when the person seats or lies on the chair or the bed, the rod is again firmly engaged with the member.

The reclining apparatus according to the invention is easily locked in a desirable position and also easily unlocked only by using the rod functioning as the lock device together with the support member, the seat member or the back

rest member. The reclining apparatus of the invention is manufactured at a reasonable cost and is also attached to a wooden chair or bed without damaging its appearance. The apparatus maintains the furniture in a desirable reclining position.

CLAIMS

1. Reclining apparatus comprising:

a seat member supporting the lumbar region of a seated person;

a back rest member supporting the back region and adjustably connected to the seat member;

a support member adjustably connected to both the seat member and the back rest member; and

a rod functioning as a lock member mounted on one of the seat member, the back rest member and the support member and fitted across another one of them;

wherein when a force is applied only to the seat member, the lock member is locked to maintain the angle between the seat member and the back rest member, and when a force is applied to both the seat member and the back rest member, the lock member is unlocked and moves to change the angle between the seat member and the back rest member.

2. Reclining apparatus according to claim 1 in which:

the rod fits across the seat member and slides therein;

the rod and the back rest member are connected to each other by a shaft which slides in a long aperture provided on the support member; and

the back rest member and the rear end of the seat member

are connected to each other by a shaft which slides in a long aperture provided on the back rest member.

3. Reclining apparatus according to claim 1 in which:

the rod fits across the support member and slides therealong;

the rod, the seat member and the back rest member are interconnected by a shaft; and

the seat member and the back rest member are respectively connected to the support member by a first shaft which slides in a long aperture provided on the seat member and by a second shaft which slides in a long aperture provided on the back rest member.

4. Reclining apparatus according to claim 1 further comprising a second back rest member which is provided in parallel with the back rest member, is adjustably connected to the support member by a shaft slidably fitted in a long aperture of the support member and is connected to both the seat member and the back rest member by a shaft.

5. Reclining apparatus according to claim 1 in which the rod has an arm rest on the top edge thereof.

6. Reclining apparatus comprising:

a seat member supporting the lumbar region of a seated person;

a back rest member supporting the back region;

a support member adjustably connected to both the seat member and the back rest member via links; and

a rod functioning as a lock member supported by one of the seat member, the back rest member and the support member and fitted across another one of them;

wherein when a force is applied only to the seat member, the lock member is locked to maintain the angle between the seat member and the back rest member, and when a force is applied to the rod, the lock member is unlocked and moves to change the angle between the seat member and the back rest member.

7. Reclining apparatus according to claim 6 in which:

one end of the rod is fitted across the seat member and the other end thereof is connected to a roller; and

another roller is provided on one end of the support member to support the back rest member.

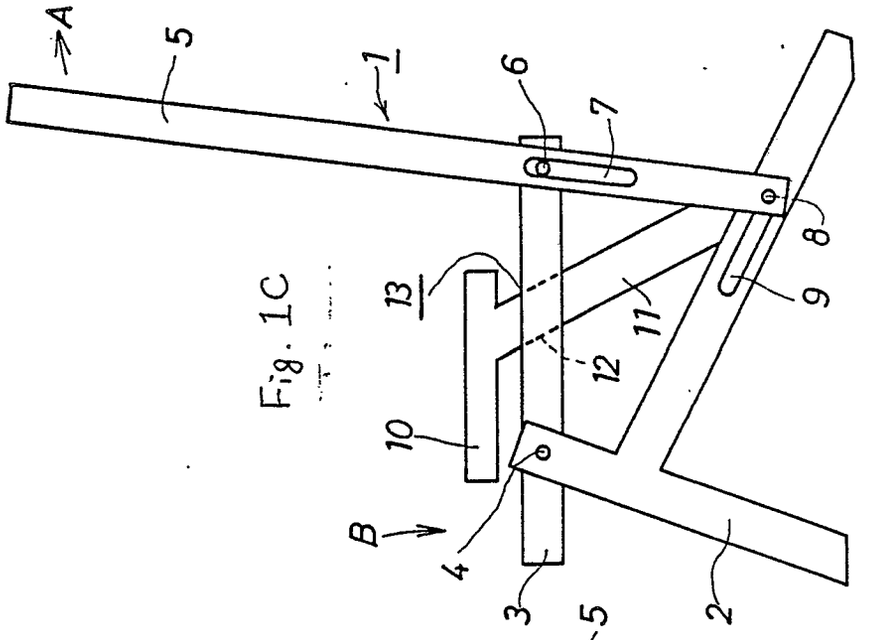


Fig. 1C

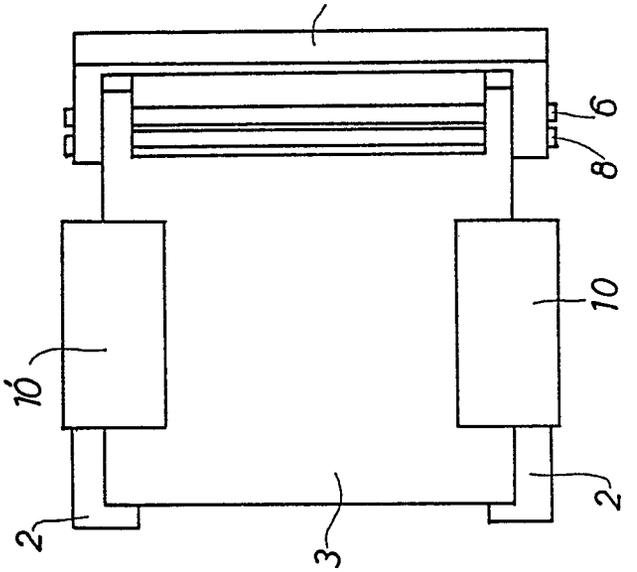


Fig. 1A

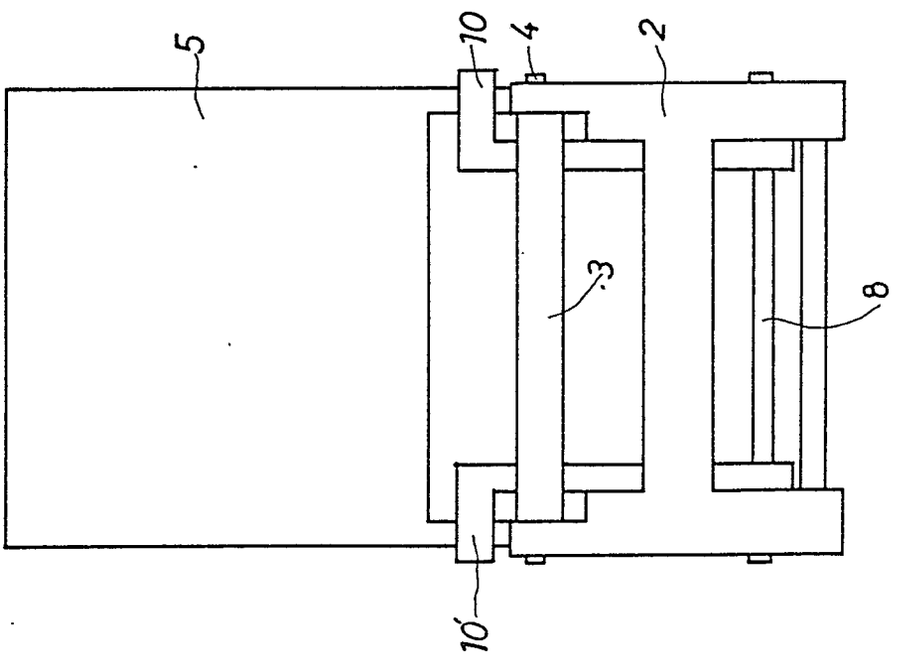


Fig. 1B

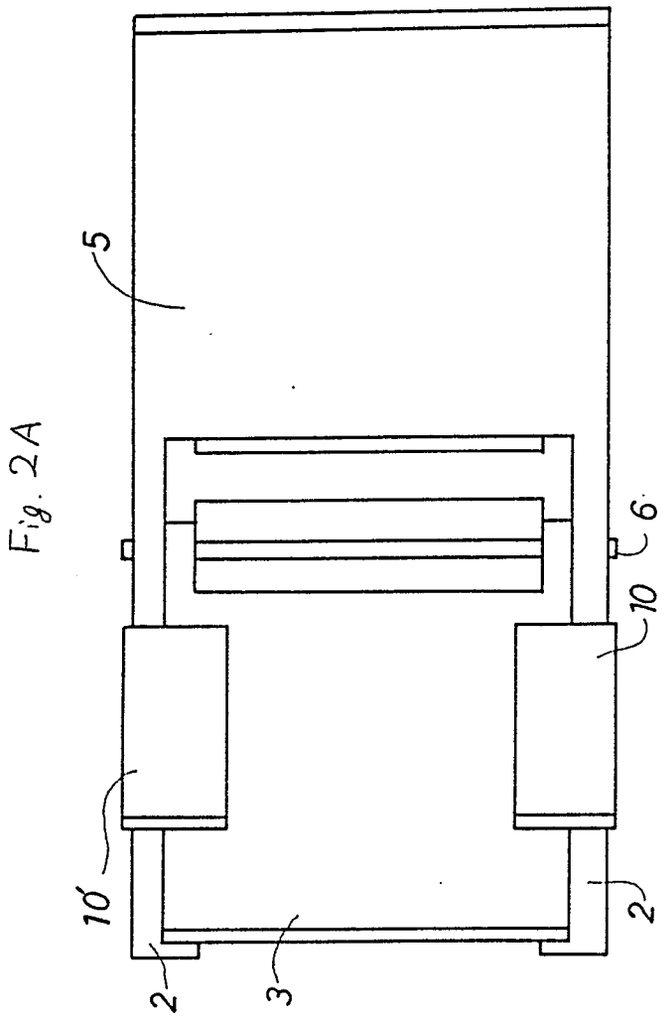


Fig. 2A

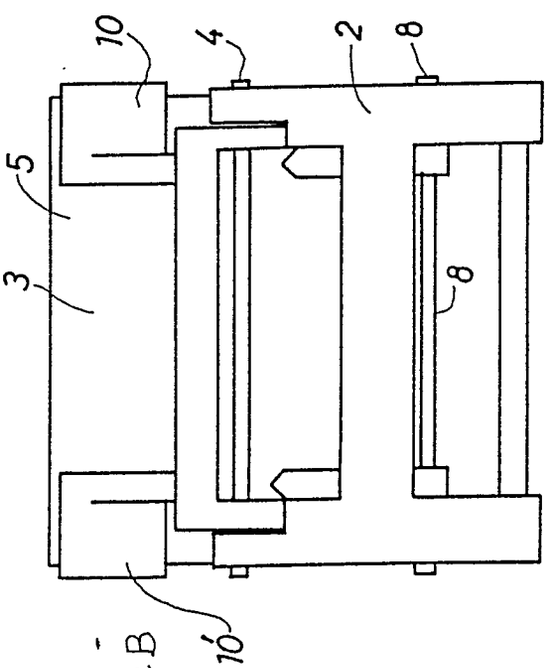


Fig. 2B

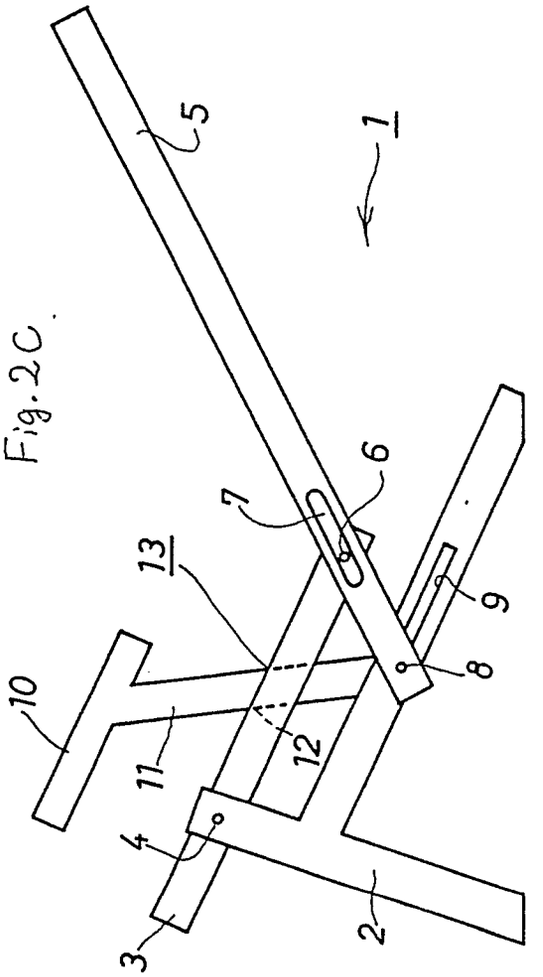


Fig. 2C

Fig. 3B

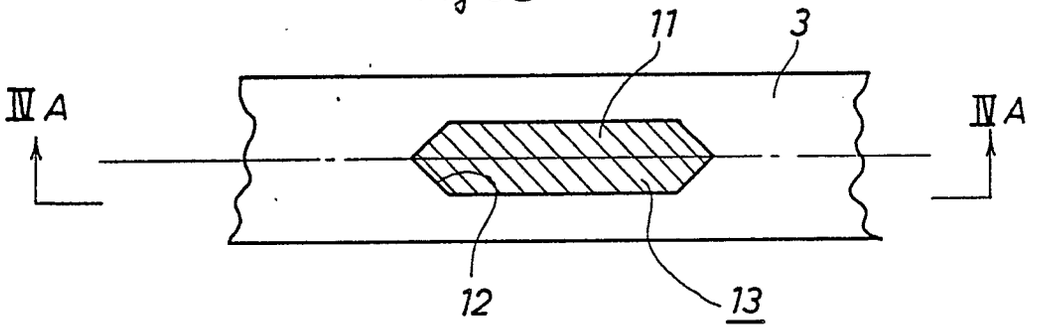


Fig. 3A

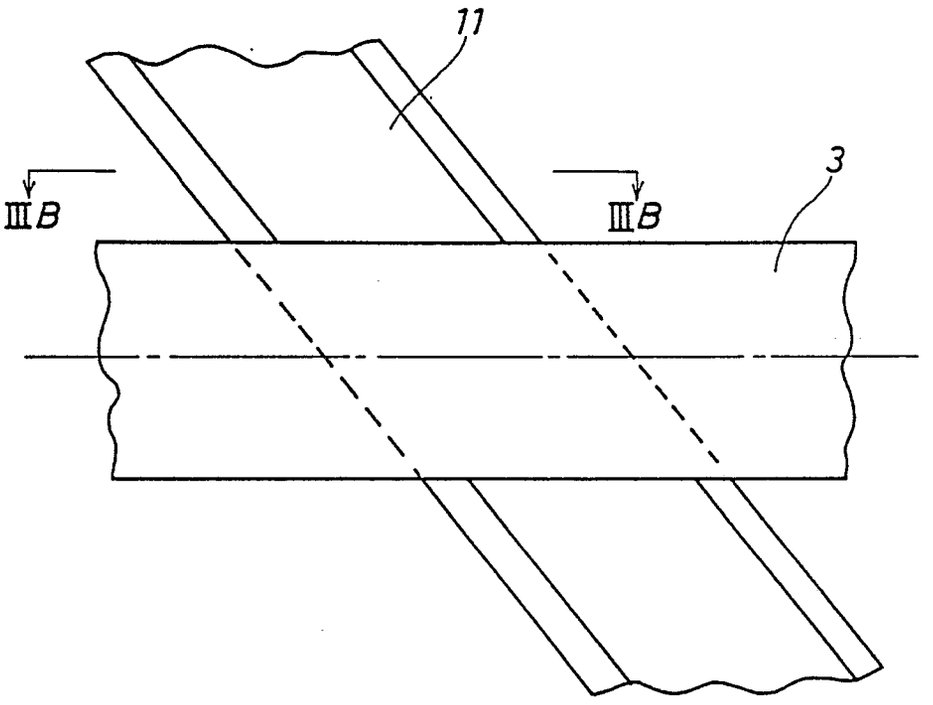


Fig. 4A

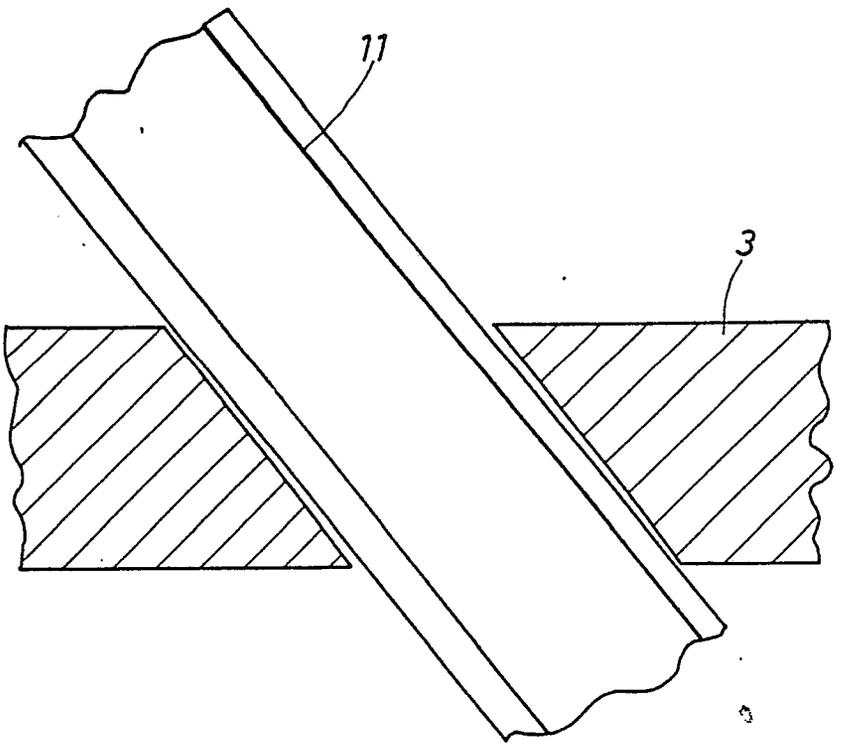
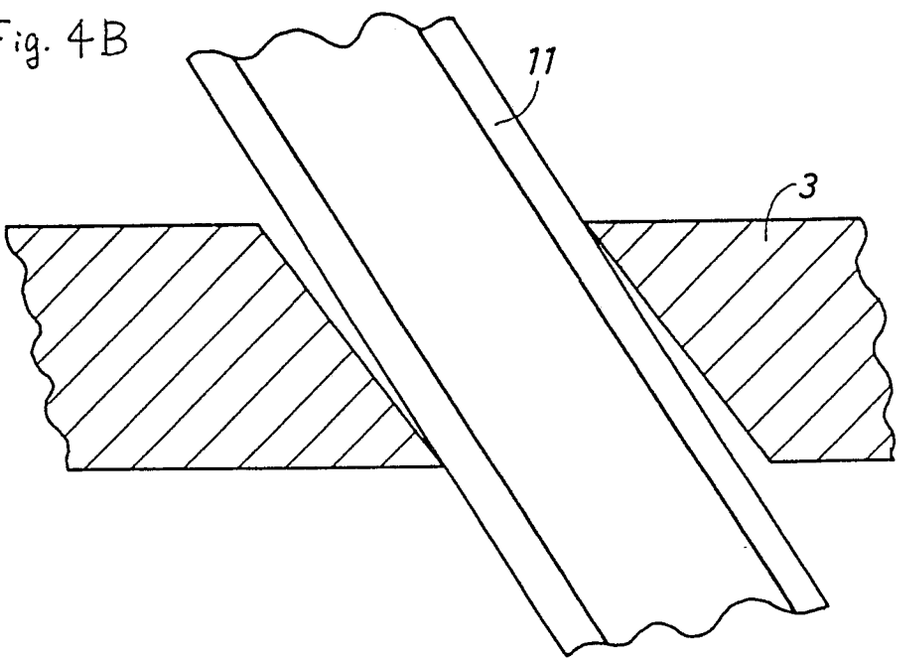


Fig. 4B



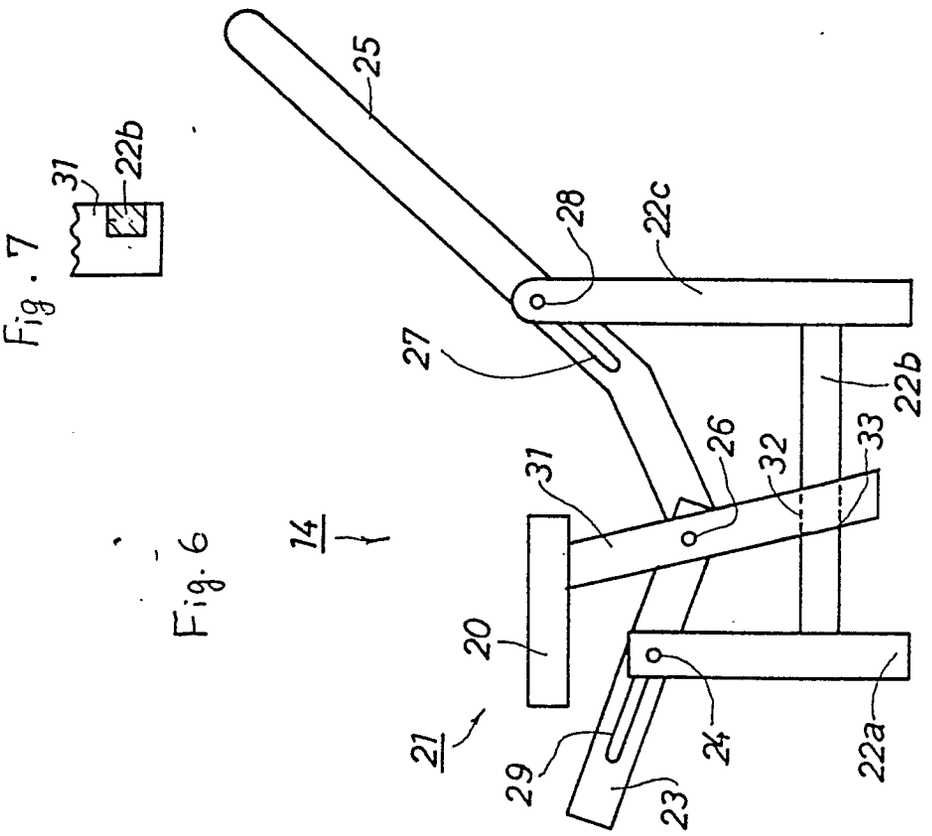


Fig. 6

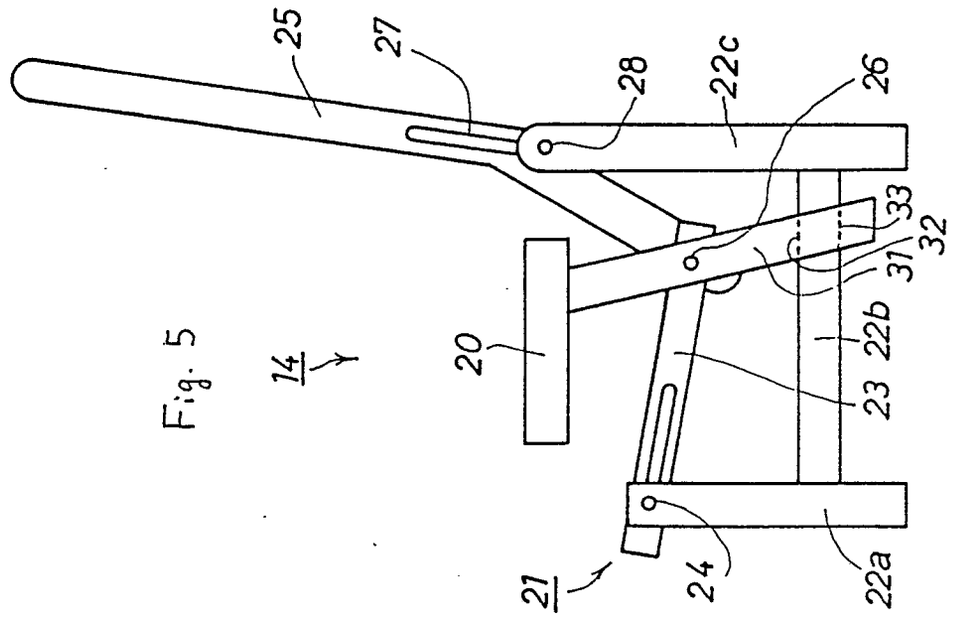


Fig. 5

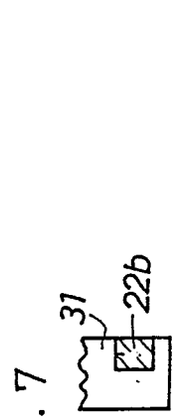


Fig. 7

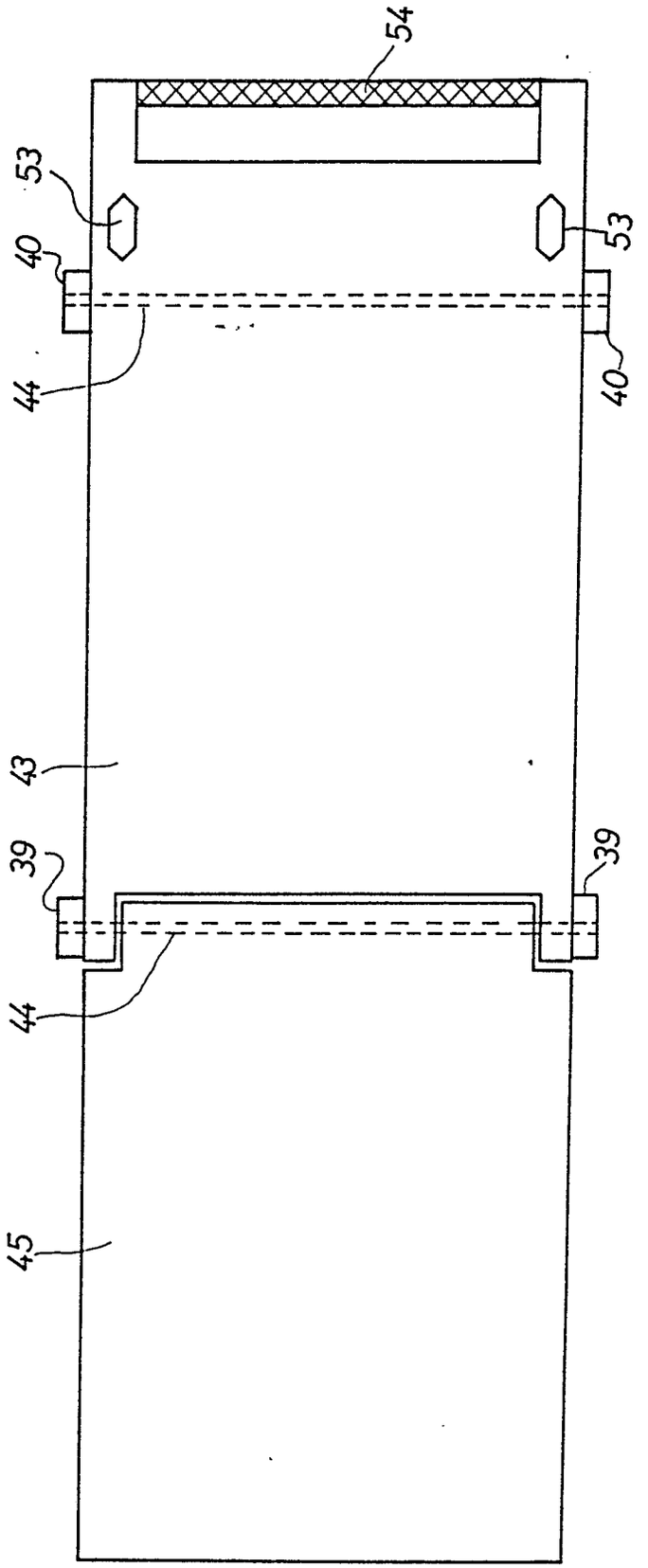


Fig. 8A

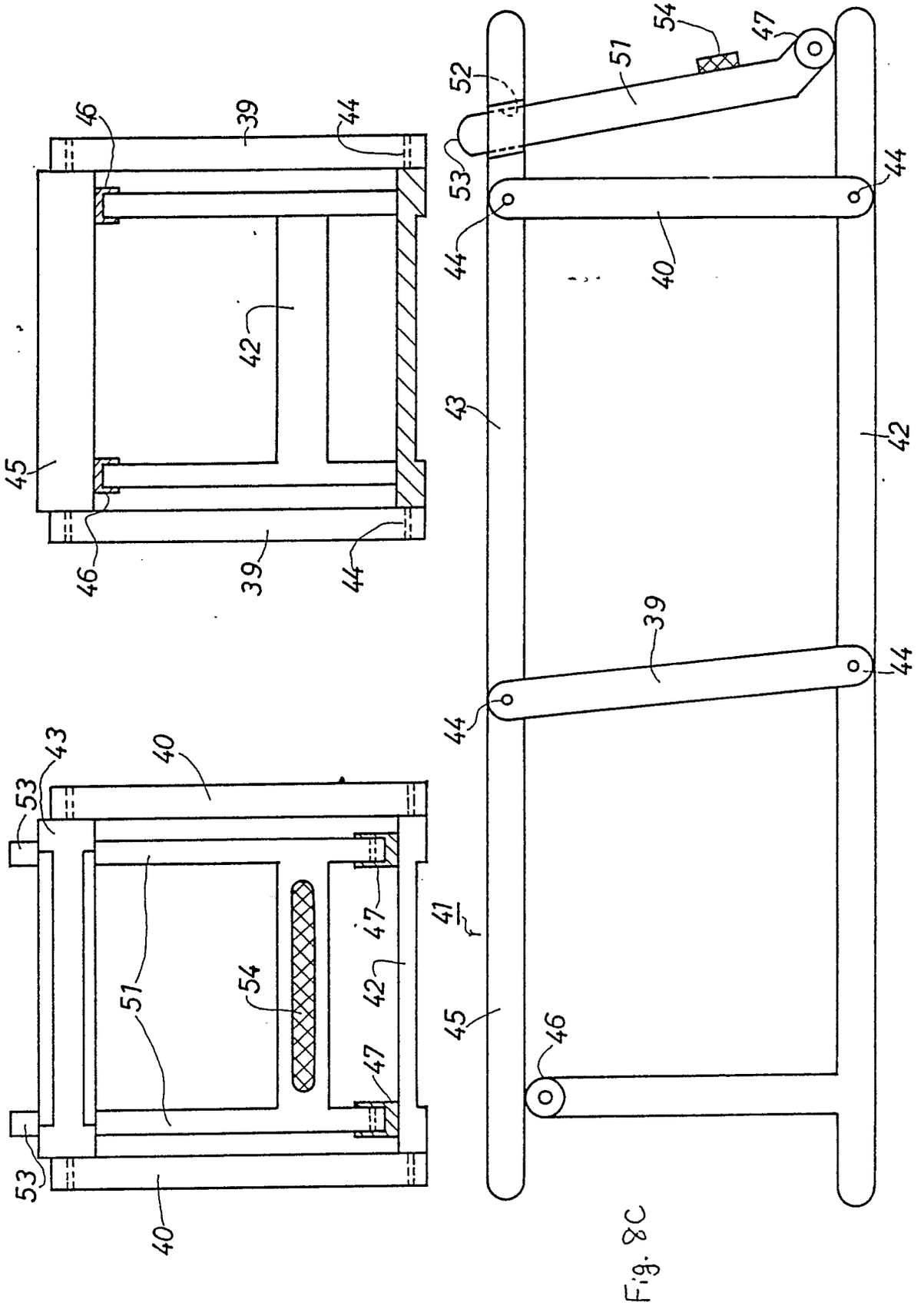

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Fig. 8D
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Fig. 8B
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Fig. 8C

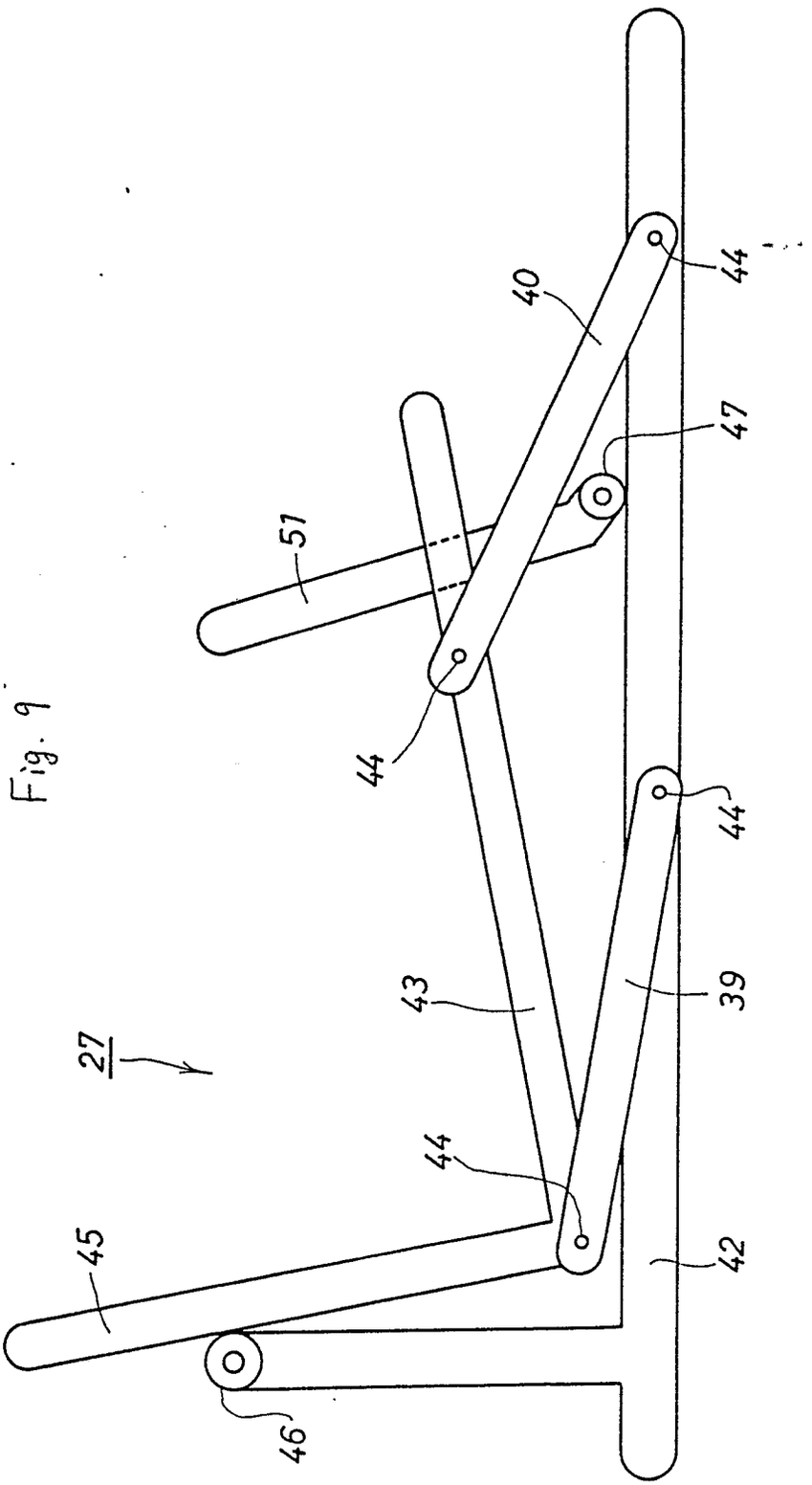


Fig. 9

Fig. 10A

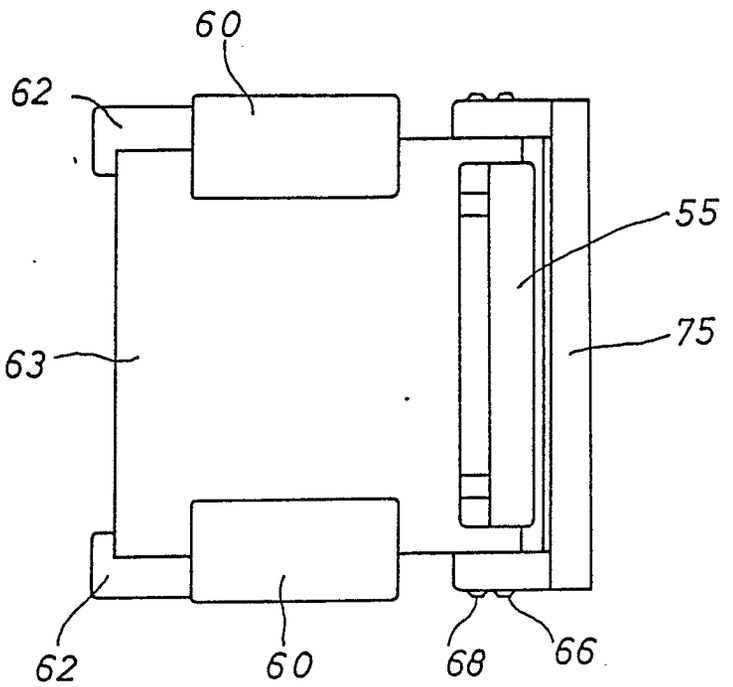


Fig. 10B

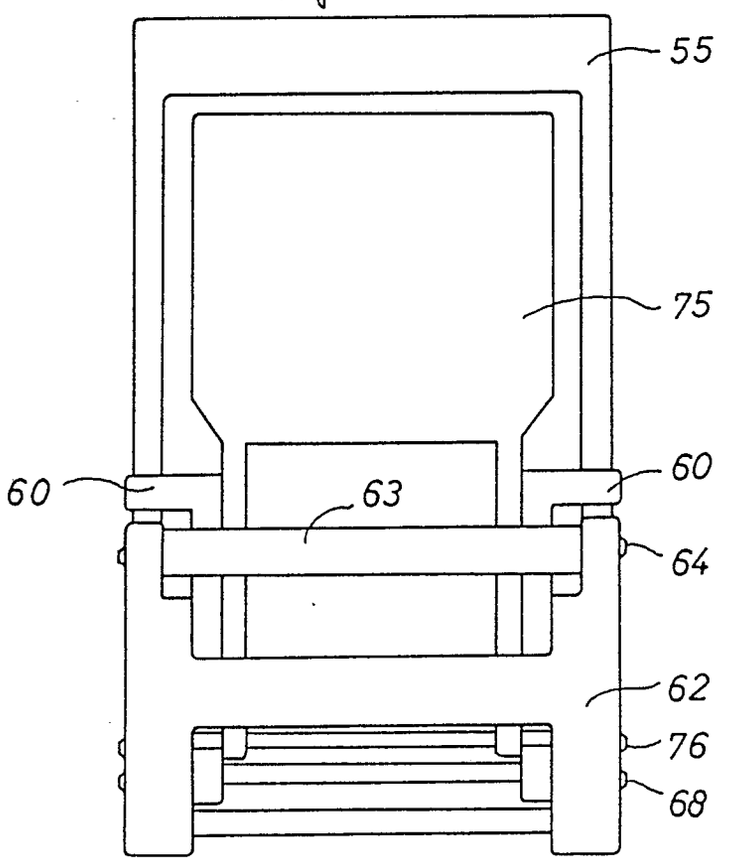
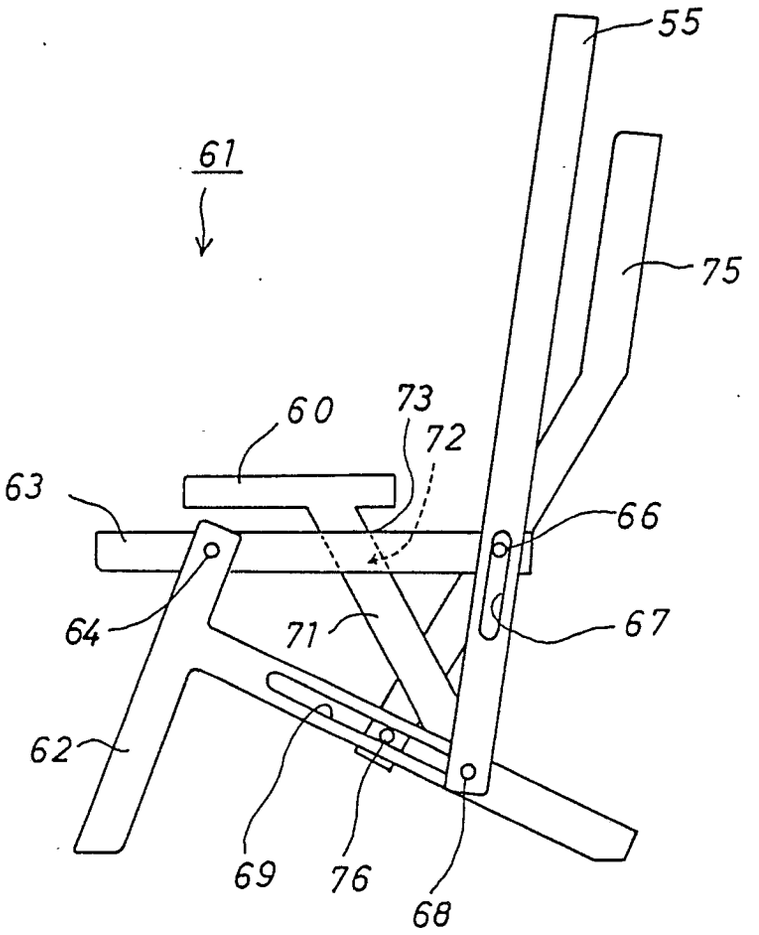


Fig. 10C



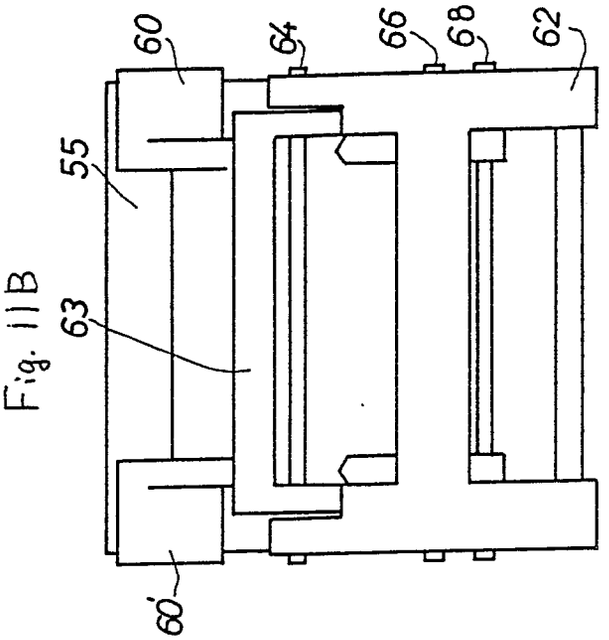


Fig. 11B

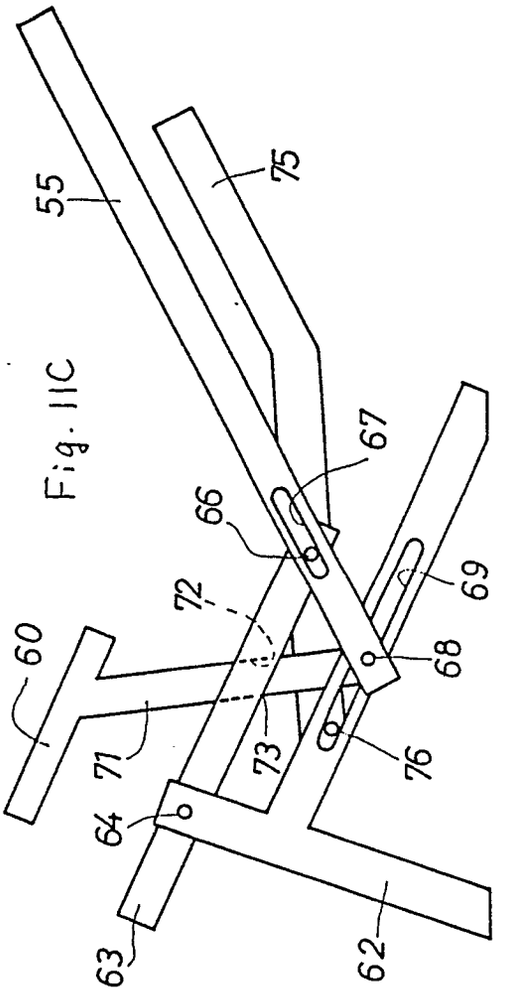


Fig. 11C

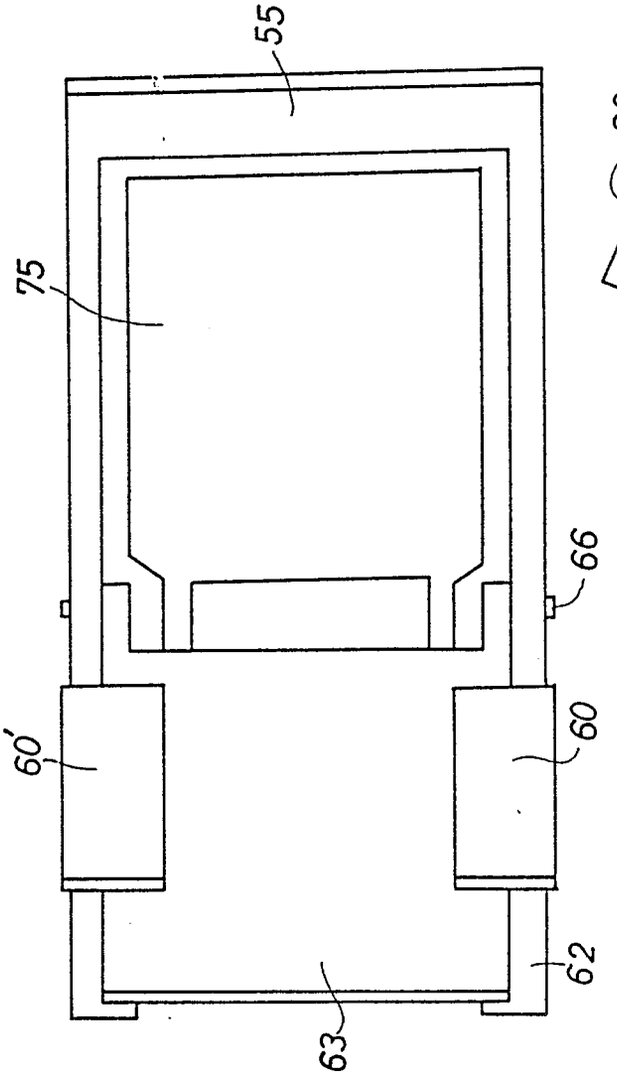


Fig. 11A

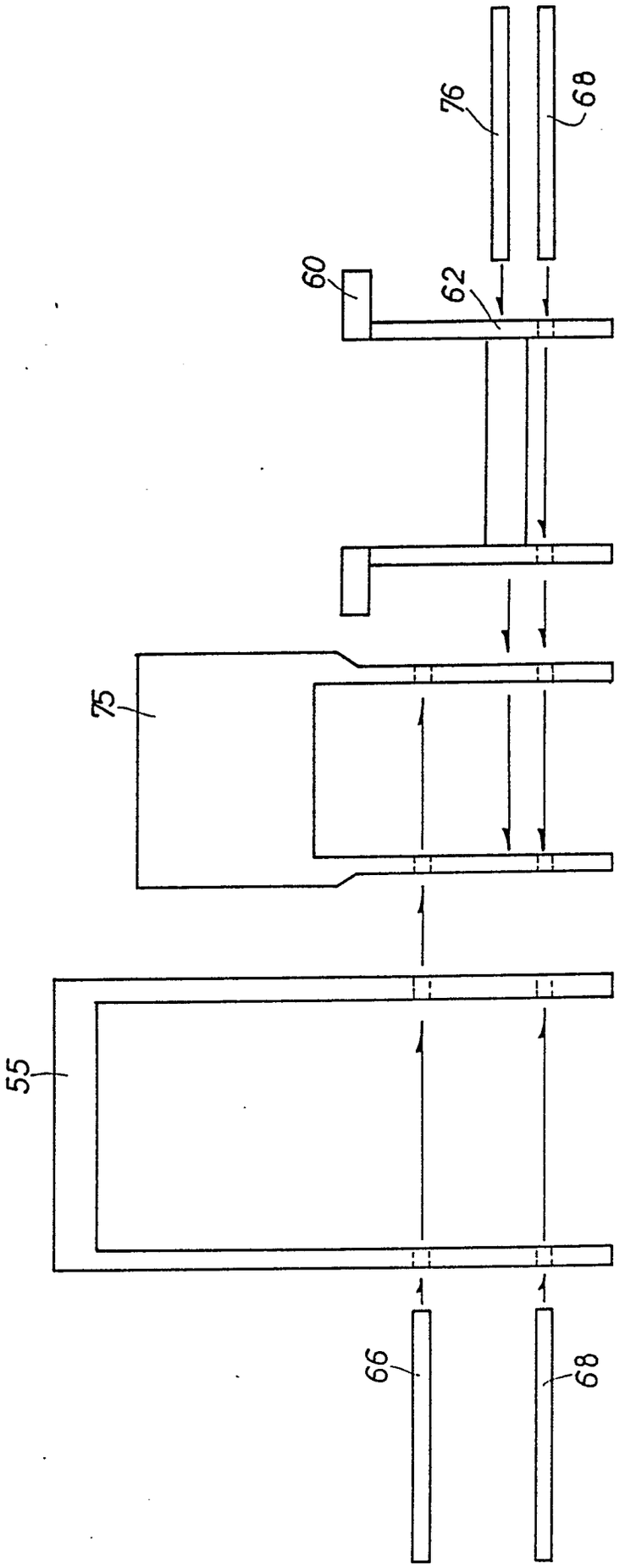


Fig. 12

INTERNATIONAL SEARCH REPORT

International Application No PCT/JP89/00716

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl[4] A47C1/032, 17/175

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System [8]	Classification Symbols
IPC	A47C1/032, 4/04, 13/00, 17/175

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [9]

Jitsuyo Shinan Koho	1926 - 1989
Kokai Jitsuyo Shinan Koho	1971 - 1989

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	GB, A, 1403648 (F. LUSCH) 20 August 1975 (20. 08. 75)	1
A	JP, Y1, 47-28009 (Nishiki Co., Ltd.) 25 August 1972 (25. 08. 72) (Family : none)	2 - 5
A	JP, B1, 45-41423 (Otto Gulainar) 25 December 1970 (25. 12. 70) (Family : none)	6 - 7

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
September 22, 1989 (22. 09. 89)	October 9, 1989 (09. 10. 89)
International Searching Authority	**Signature of Authorized Officer**
Japanese Patent Office	