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(54) Loudspeaker mounting apparatus

(57) Apparatus for mounting a plurality of loudspeakers (2) having a plurality of mounting means mounted on a central frame (5), each loudspeaker means receiving and securely retaining a loudspeaker (2) such that, in use, the speakers are mounted on a divergent configuration.

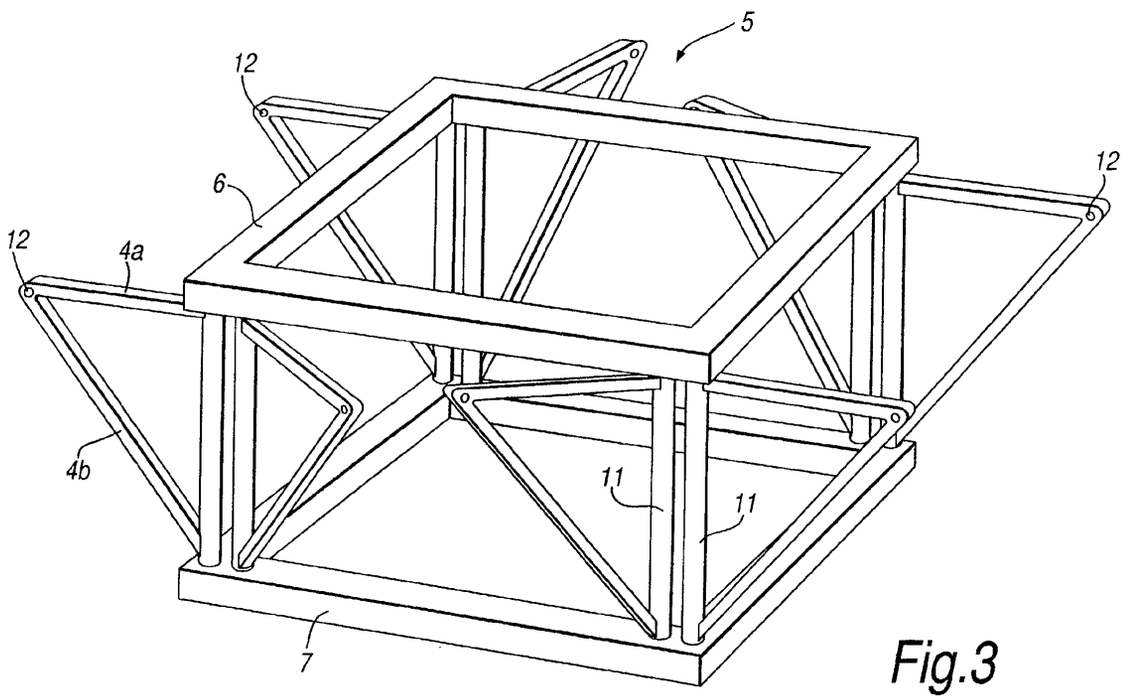

Fig.3

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Description

[0001] The invention relates to apparatus for mounting loudspeakers, and particularly to apparatus for mounting loudspeakers in a divergent configuration.

[0002] Loudspeakers are normally mounted at the periphery of a listening area to direct sound output from the speakers towards a central point; this type of speaker arrangement is referred to hereinafter as a 'convergent' configuration. Although a convergent speaker configuration results in a high quality and balance of sound in the central region of the listening area, the sound quality and balance in the outer regions of the listening area are generally of a lower standard. To provide a more uniform quality and balance of sound it has been suggested that the loudspeaker sounds be directed outwardly from a central point of the listening area, i.e. that a 'divergent' speaker configuration should be adopted. However, to date, sound systems suitable for a divergent speaker configuration have not been widely available, and they generally require the listener to purchase a new specialised sound system rather than adapt his or her existing system.

[0003] The present invention provides apparatus for mounting a plurality of loudspeakers, the apparatus comprising a plurality of housings mounted on a central frame, each housing receiving and securely retaining a loudspeaker, whereby the speakers are mounted in a divergent configuration.

[0004] The invention provides simple and inexpensive apparatus capable of mounting speakers from a existing sound system in a divergent configuration.

[0005] Preferably, the length and depth of each housing may be adjusted to secure the associated speaker in place. Further, the housings may be mounted on the frame for rotation about a horizontal axis and, furthermore, the housings may be releasably fastened on the frame at a selected angle to the horizontal.

[0006] The frame may be attached to the ceiling of a listening area by any appropriate means, but it is preferred that a pulley system is utilised to allow the height and orientation of the frame to be adjusted.

[0007] The invention also provides a sound system incorporating apparatus as described above.

[0008] A clearer understanding of the invention will be gained from the following detailed description of a preferred embodiment with reference to the accompanying drawings, in which:

Figure 1 is an illustrative view of a preferred embodiment of a loudspeaker mounting apparatus according to the invention;

Figure 2 is an illustrative view of the apparatus shown in Figure 1 with a single housing mounted to a central frame;

Figure 3 is an illustrative view of the central frame shown in Figure 2;

Figure 4 is an illustrative view of the housing shown in Figure 2;

Figures 5a and 5b are plan and side views of the primary components of the frame shown in Figure 3; and

Figures 6 to 9 are plan and side views of components of the housing shown in Figure 4.

[0009] Loudspeaker mounting apparatus, generally designated 1, is secured to the centre of the ceiling of a listening area. Each loudspeaker 2 is securely held in a housing 3 pivotally mounted for rotation about a horizontal axis on support arms 4 of a central frame 5.

[0010] The frame 5 comprises identical upper and lower rectangular members or structures 6,7 with a central cavity. Each structure has one pair of parallel sides slightly longer than the other pair. The confronting faces of the structures 6,7 have two tapped mounting holes 8,9 provided on the longitudinal axis of the longer pair of sides adjacent each comer to receive cylindrical threaded rods or pipes 10. The distance x between the nearest mounting holes on adjacent comers of the structures 6,7 are equal. The rods 10 project at right angles to the plane of the structures 6,7 to define therewith the generally cuboidal frame 5. A cylindrical tube 11 is mounted on each of the rods 10 for pivotal movement about a vertical axis. Supporting arms 4a,4b mounted on the tubes project from each tube to meet at a pivot point 12.

[0011] Each housing 3 has three component parts. Two identical and generally c-shaped tubular first portions 20 have lateral reinforcement struts 21 and inwardly-stepped or tapered free ends 22. The free ends 24 of second and third tubular portions 23a,23b, which are also general c-shaped and have lateral reinforcement struts 21, receive the inwardly-stepped free ends 22 of the first portion in a sliding-fit engagement to form upper and lower support surfaces of the housing. The second portion 23a has uprights or supports 25 projecting at right angles to its main plane for receiving in a sliding fit engagement the free ends of corresponding uprights on the third housing compartment 23b. By adjusting the position of the first and third housing portions relative to the position of the second housing portion, the length and depth of the housing 3 can be adjusted. Clamping screws or other releasable fastening elements are provided to secure the housing portions in the selected position.

[0012] To begin assembly of the various components of the loudspeaker mounting apparatus, a loudspeaker is placed in an expanded housing 3 with its lower rear corner adjacent the outer edge of the second housing component 23a, and the size of the housing is reduced to correspond as closely as possible to the size of the speaker. The clamping screws are tightened to clamp the housing components in position and thus secure the speaker within the housing.

[0013] The frame 5 may be permanently or releasably mounted to the ceiling of the listening area by any ap-

propriate means, but preferably a pulley system is employed to allow the position and orientation of the frame relative to the listening area to be adjusted.

[0014] Threaded lateral projections on the external surfaces of the uprights 25 of the second housing portion 23a are received in openings at the pivot points 12 of the frame support arms 4 with the loudspeaker diaphragm or cone directed away from the housing. The housing, and the enclosed speaker, can be pivoted about the horizontal axis defined between the pivot points and wing nuts or other suitable fastening means are provided to clamp the speaker at the desired angle to the horizontal. The other three loudspeakers are mounted to the frame in a similar fashion.

[0015] As the free ends of the first and third housing compartments 20,23b are received within the free ends of the second housing compartment 23a, the distance between the lateral projections and the periphery of the second housing compartment 23a remains constant. Thus, provided the speaker is correctly orientated within the housing and the loudspeaker diaphragm projects away from the frame, the housing will be free to rotate around an axis defined by the pivot point 12 without interference from the frame 5.

[0016] The various components of the apparatus may be manufactured from metal, e.g. aluminium, a plastics material or any other suitable material.

[0017] Of course, modifications to the described embodiment are possible without departing from the spirit of the invention. For instance the frame could be adapted to receive any number of housings containing loudspeakers, e.g. the frame could be hectangonal to support six speakers.

Claims

1. Apparatus for mounting a plurality of loudspeakers, the apparatus comprising a plurality of loudspeaker mounting means mounted on a central frame, each loudspeaker mounting means receiving and securely retaining a loudspeaker, wherein, in use, the speakers are mounted on a divergent configuration.

2. Apparatus according to claim 1, wherein the loudspeaker mounting means are demountably secured to the frame.

3. Apparatus according to claim 1 or 2, wherein the loudspeaker mounting means are pivotally mounted on the frame.

4. Apparatus according to claim 3, wherein the loudspeaker mounting means-are pivotally mounted for rotation about a horizontal axis.

5. Apparatus according to any one of claims 1 or 4, wherein each loudspeaker mounting means is releasably securable at a selected angle to the horizontal.

6. Apparatus according to any one of claims 1 to 5, wherein means are provided for suspending the frame from a ceiling at a selected height.

7. Apparatus according to any one of claims 1 to 6, wherein the loudspeaker mounting means comprise a plurality of interengaging components defining a housing.

8. Apparatus according to claim 7, wherein the relative positions of the housing components of each loudspeaker mounting means are adjustable such that loudspeakers of different dimensions can be received and securely retained in the housing.

9. Apparatus for mounting a plurality of loudspeakers substantially as herein described with reference to the accompanying drawings.

10. An assembly comprising apparatus for mounting a plurality of loudspeakers as defined in any one of the preceding claims, and a loudspeaker mounted in each of the loudspeaker receiving means.

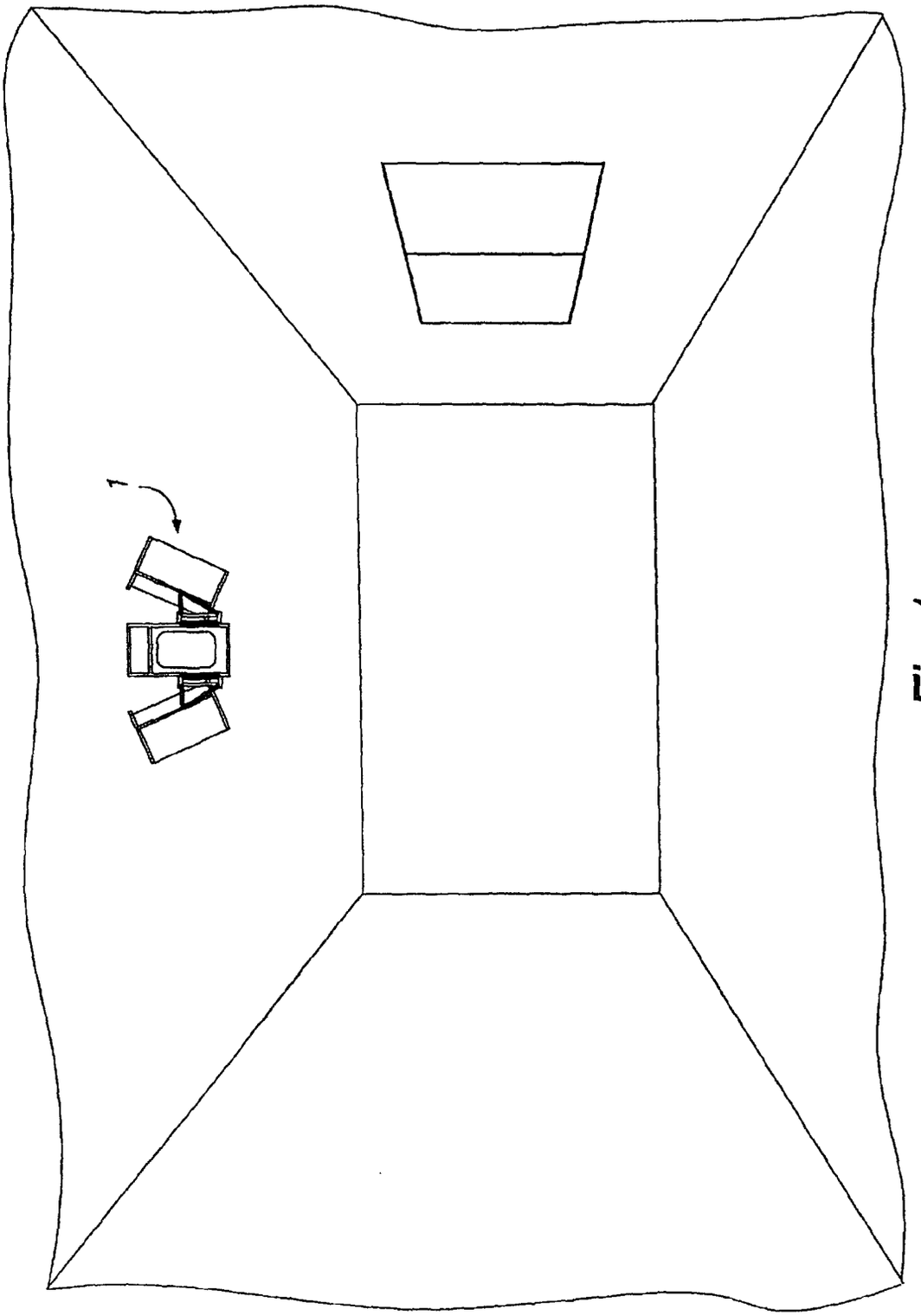

Fig.1

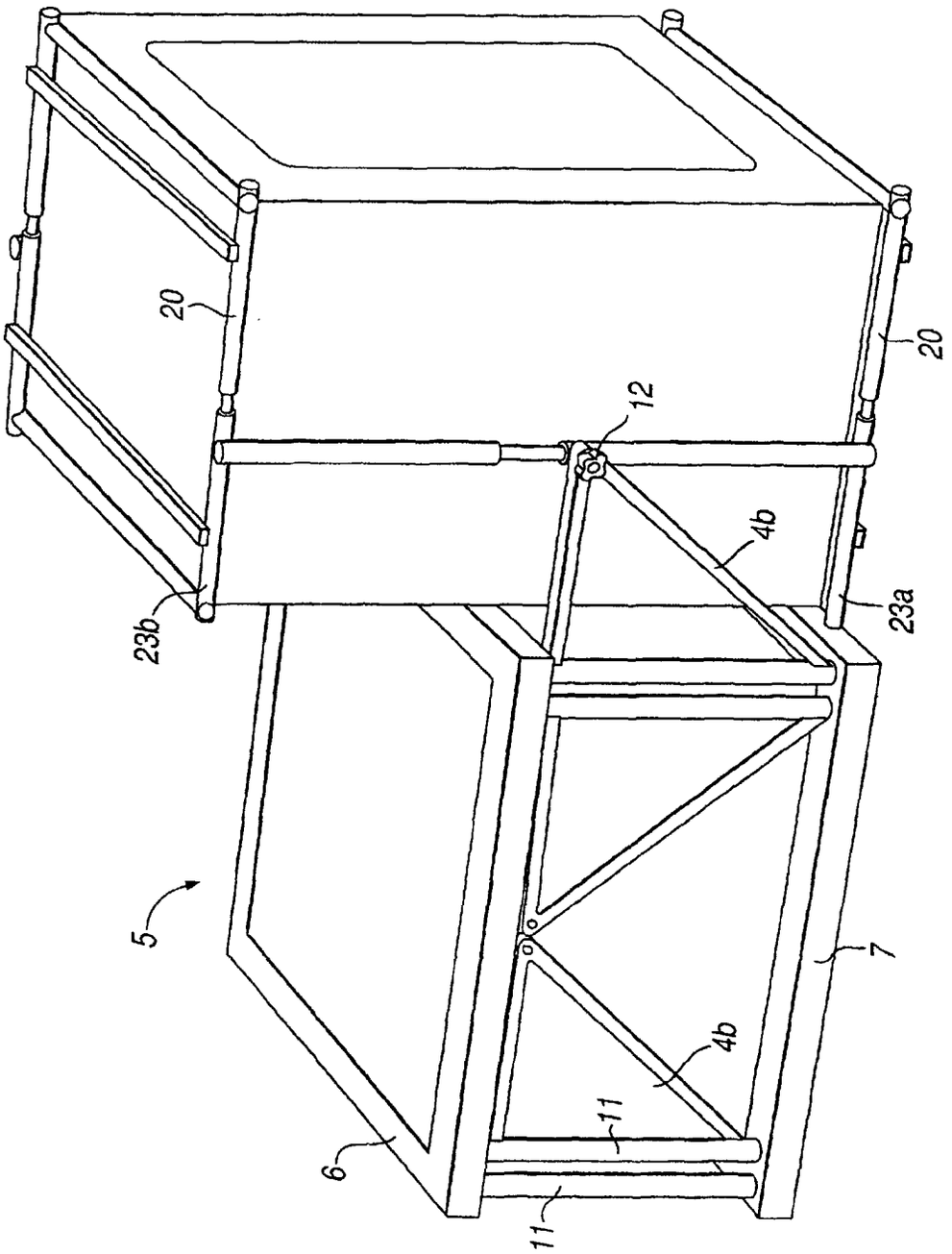

Fig.2

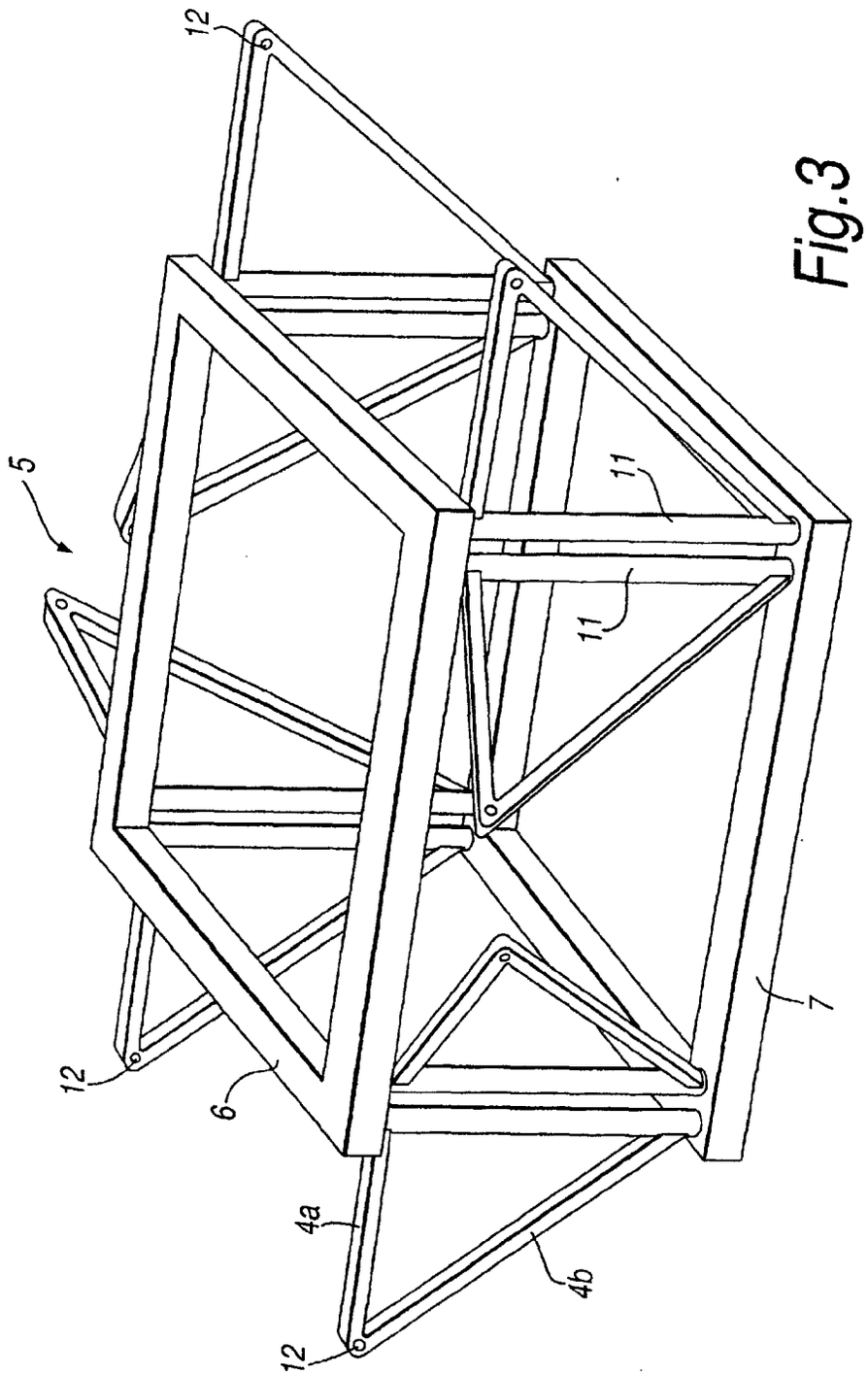

Fig.3

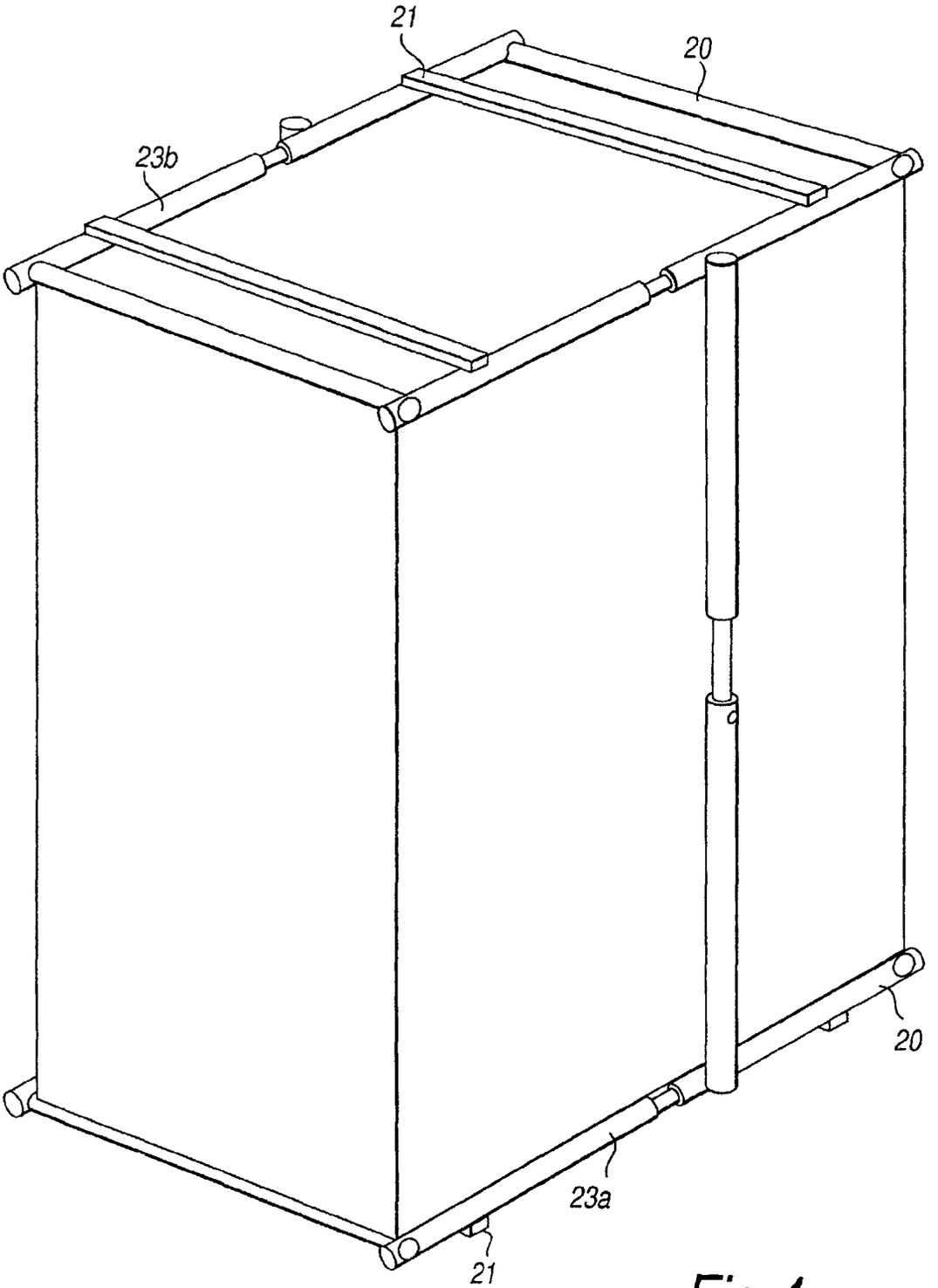

Fig.4

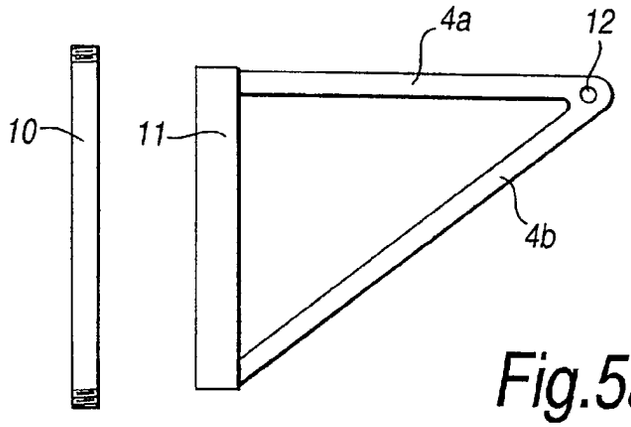

Fig.5a

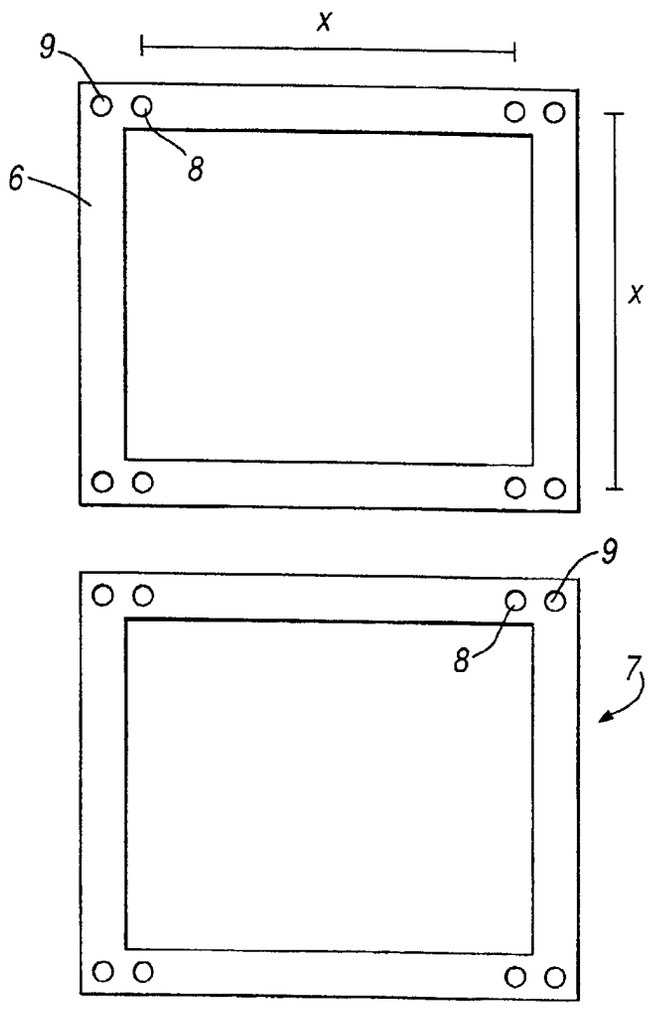

Fig.5b

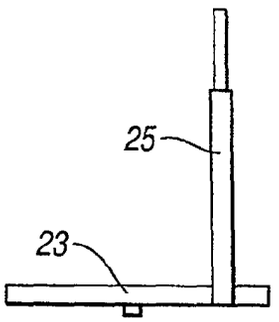

Fig.6

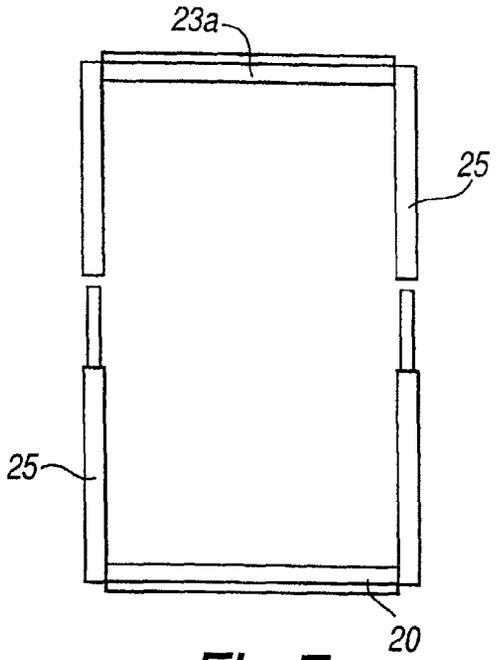

Fig.7

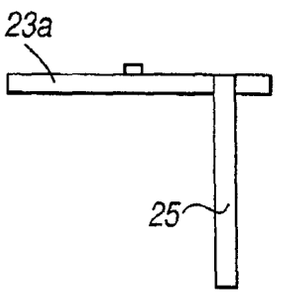

Fig.8

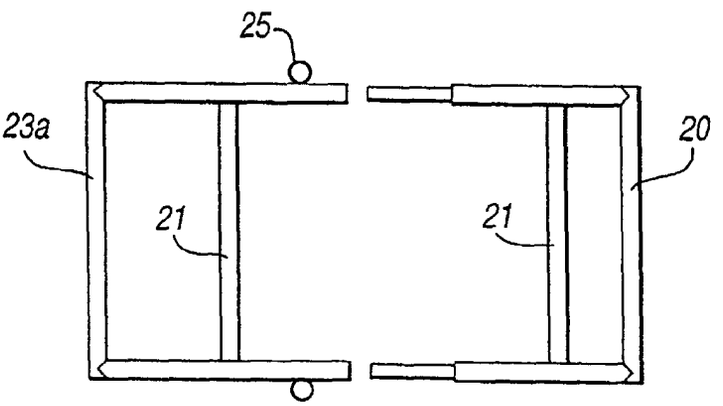

Fig.9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 30 4986

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.7)
A	US 5 758 852 A (MARTIN) 2 June 1998 (1998-06-02) * abstract; claim 1; figures 19-27 * * column 7, line 7 - column 9, line 15 * ---	1-10	H04R1/02 H04R1/40
A	US 5 266 751 A (TAGUCHI) 30 November 1993 (1993-11-30) * abstract; figures 1,7,12,14,16,19 * -----	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

H04R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	11 January 2001	Danielidis, S

CATEGORY OF CITED DOCUMENTS

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