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(54)

Seat securing system.

(57)

A system for retaining seats in rows and/or columns comprises a plurality of floor bars 10 and attachment members 14 to which the leg 22 of a seat may be attached by a bolt 18. A tongue formed on the member 14 engages a groove 24 in the bar 10. Various modifications and refinements are described and an alternative supplementary means for connecting seats in rows is also shown.

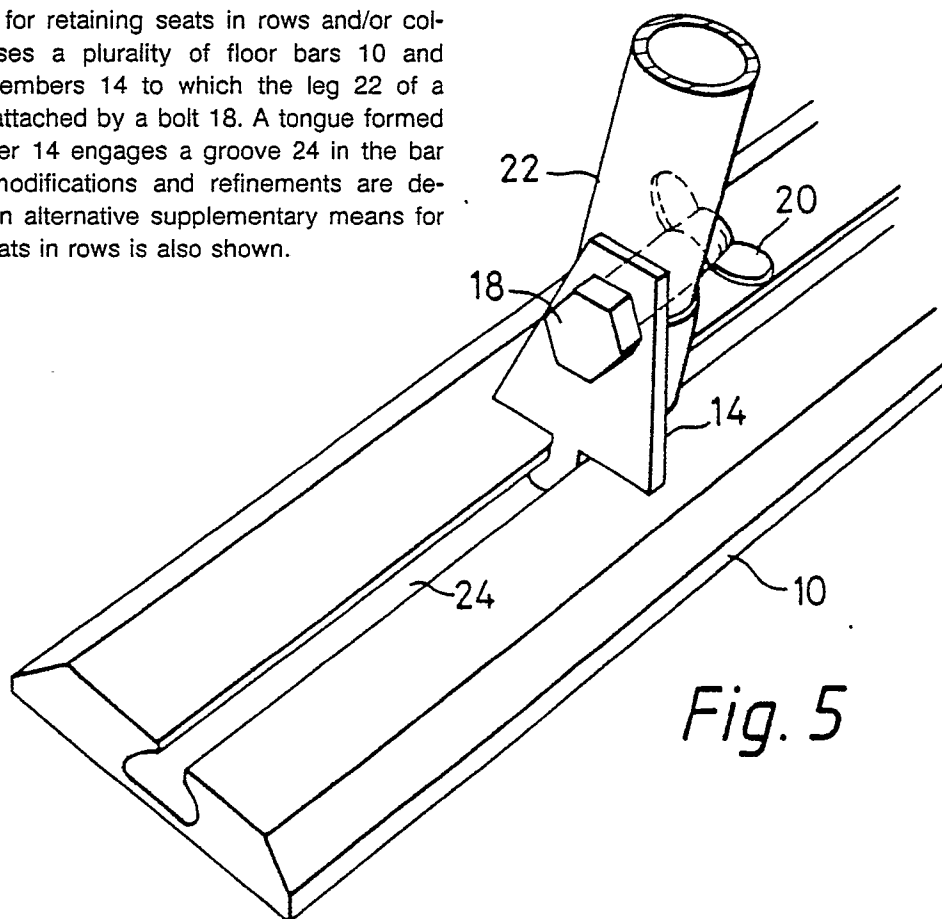


Fig. 5

EP 0 251 540 A2

SEAT SECURING SYSTEM

The present invention relates to the temporary anchoring of removable seats so as to preserve gangways and aisles.

The increasing use of multi-function halls and auditoria for entertainment, conferences, sports and the like has resulted in the increasing use of temporary, removable seating arrangements for events of all types and sizes. In use, such seats are often moved out of place, obstructing gangways and aisles and thereby creating a serious hazard in the event of a fire. Such seats are also liable to be scattered and knocked over following the outbreak of fire.

As a result, the Fire Authorities have required chairs to be interlocked in rows and a number of systems have been developed to accomplish this. Such rows of seats, however, may still be moved or knocked over, and individual seats may become disconnected.

Accordingly, there is a requirement for a system whereby temporary seating arrangements can be retained in positions so as to preserve proper gangways and aisles, both in normal use and in the event of possible panic. One approach to this would be to provide anchoring means for affixing the seats directly to the floor, but this would not be suitable for a floor which is also intended to serve as a surface for playing sports, dancing, etc.

It is an object of the present invention, therefore to provide a seat retention system which obviates or mitigates the aforesaid problems

Accordingly, the present invention provides a seat securing system comprising a plurality of elongate floor bars, a plurality of attachment members adjustably attachable to said floor bars, and means for securing the leg of a seat to each of said attachment members.

Preferably, said floor bars each include a longitudinal groove running along the top surface thereof and having at least one lateral, inwardly extending flange extending along the length thereof, said attachment members being adapted to engage said groove.

Preferably also said members each include a tongue portion adapted to be inserted into said groove and to engage said flange.

A particularly preferred form of attachment member includes a tongue portion as before and a foot portion spaced from said tongue portion and adapted to enter said groove and engage the bottom surface thereof.

Preferably also, said tongue and foot portions are generally planar the plane of said tongue portion being substantially at right angles to the plane of said foot portion such that, in use, the plane of said tongue portion is substantially normal to the long axis of the floor bar and the plane of said foot member is parallel to said axis.

Preferably also, the lowermost edge of said foot portion contacts the bottom surface of said groove at a point about which the attachment member may pivot in response to a force acting parallel to said long axis of the floor bar in such a manner that said tongue portion engages either the longitudinal flange or the bottom surface of the groove, thereby resisting movement of the attachment member along the groove.

The system may further include means for connecting a plurality of seats in a row comprising an elongate member positionable under said seats and means for fastening said elongate member to the structure of each of said seats.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

Fig. 1 is an end elevation of a floor bar forming part of the invention;

Fig. 2 is a perspective view showing a means for linking two floor bars as illustrated in Fig 1;

Fig. 3 is an elevation of an attachment plate for use with the floor bar of Fig 1;

Figs 4a, 4b, 4c show an alternative design of attachment plate;

Fig 5 is a perspective view of the system embodying the invention in use;

Figs 6 (a) and 6 (b) show a particularly preferred form of attachment plate;

Figs 7 (a) and 7 (b) are, respectively, an end elevational view and a perspective view of a preferred form of link member; and

Figs 8, 9 and 10 are, respectively, a schematic front view, a fragmentary perspective view and a bottom perspective view of an alternative means of connecting a plurality of seats in a row.

Referring now to the drawings, the component parts of a seat retention system embodying the invention comprise a plurality of floor bars 10, link members 12 for coupling the floor bars 10, attachment plates 14, 16 or 60 adapted to engage the floor bars 10, and means (such as bolts and wing nuts 18 and 20) for securing chair legs such as 22 to the attachment plates 14, 16 or 60.

The floor bars 10 each comprise an elongate, generally planar member having a longitudinal groove 24 running along the top surface thereof. The groove 24 is provided with first and second inwardly extending lateral flanges 26, 28 running along its length. The sectional shape of the groove 24 may vary and two examples illustrated show downwardly diverging rectilinear walls 30 (in solid lines) and arcuate concave walls 32 (in broken lines).

The bar 10 is preferably formed from a planar base member 34 and a top-most member 36 wherein the groove 24 is formed. The upper corners 40 of the bars 10 are also preferably bevelled as shown. It is desirable that the thickness of the bar 10 should be minimised so far as is practicable. Similarly, the width of the groove 24 should be made as small as possible to reduce the likelihood of high heels or the like catching therein. Preferred materials are ply wood for the base member 34 and a very hard wood for the top-most member 36.

The floor bars 10 may be provided in standard lengths and joined by suitable link members 12 to make up the required total length. The link members 12 may simply be elongate members (preferably of tubular plastics material) having a section adapted to co-operate with the side walls of the groove 24. Thus, a triangular section might be used with walls such as 30 and an elliptical section with walls such as 32. A triangular section is particularly preferred in which case the elongate triangular section link member 76 (as shown in Figs. 7 (a) and 7 (b)) is preferably split along its uppermost vertex such that it may receive a marker card 78 or the like for numbering seat rows etc. In this case additional, similar members may be positioned at appropriate points along the groove of the floor bar 10 corresponding to the positions of individual rows of seats. Such members would not be concerned with linking the bars 10 themselves but would serve simply to receive marker cards. In order to prevent bars 10 so joined from becoming separated, it is preferred that, in use, the front and rear legs of a chair attached to the bars 10 be arranged so as to straddle the join.

The attachment plates 14 and 16 are preferably of aluminium alloy or mild steel and are adapted to detachably engage the floor bars 10. A first type of plate 14 has a generally planar body portion 41, a neck portion 42 and a tongue portion 44. The breadth of the neck 42 is less than the width of the groove 24 and breadth of the tongue 44 is greater, the shape thereof being adapted to pass between the side walls of the groove 24. In this case the tongue 44 is co-planar with the body portion 41. The plate 14 may be attached to the bar 10 at any point by inserting the tongue 44 into the groove 24 and turning the plate through 90° so

that the plane thereof is perpendicular to the long axis of the groove 24. The leg 22 of a seat may then be secured to the plate 14 by any suitable means such as bolt 18 extending through a hole 50 in the plate and co-operating hole in the leg 22, and wing nut 20, or by a suitable clamp, or by other means which may or may not require holes to be drilled in the seat leg. As shown, the leg 46 rests on the top of the bar 10. If desired, the attachment plates 14 may be permanently bonded to the bar 10 after they have been correctly positioned.

With the first type of attachment plates 14, the bolt 18 extends parallel to the long axis of the floor bar 10. A second type of plate 16 also includes a body portion 54 including hole 55, a neck portion 56 and a tongue portion 58. In this case the body 54 is bent so that the plane of the tongue 58 is perpendicular to the plane of that part of the body 54 carrying the hole 55. Accordingly, when in use, a bolt extending through the hole 55 would be at right angles to the long axis of the bar 10. Thus, using the two types of plate 14 and 16 allows either rows or columns of seats to be attached to the bars 10 requiring only one set of holes in the seat legs. Existing stocks of seats are therefore easily adaptable for use with the system.

Obviously, the shape of the plates 14, 16 may be varied widely, and additional holes 60 may be provided in order to allow the system to adapt to different types of chair leg (as shown in Fig. 3 in broken lines). The system described is useable with vertical or angled legs of any cross-section.

Figs. 6(a) and (b) show a particularly preferred embodiment of attachment plate 60 which is adapted to resist movement along the length of the groove 24 of the floor bar 10.

In this case, a planar body portion 62 is again provided with one or more apertures 64 for securing the plate 60 to a seat leg 66 by means of a bolt and thumb nut 68 or the like extending through a corresponding aperture in the leg 66, the body portion 62 being parallel to the groove 24 and the aperture in the leg 66 being at right angles with respect thereto.

A tongue portion 70 depends at an angle from the body portion 62 and is twisted to lie in a plane at right angles to the plane thereof. The tongue portion 70 detachably engages the groove 24 as before and the body portion 62 is further provided with a substantially co-planar foot portion 72 which extends into the groove 24, the lowermost edge of the foot portion 72 resting on the bottom surface of the groove 24 at a point 74. Thus, when a force is applied to the seat leg in the direction indicated by

the arrow A, the plate 60 pivots about the point 74 so that the tongue portion 70 engages the flanges 26, 28 of the groove 24, thereby resisting movement of the plate 60 along the groove 24.

Preferably, both the front and back legs of a seat are provided with plates 60 arranged to "face" in opposite directions so that both forward and backward movement of the seat is resisted.

It is particularly envisaged that the system will be used with seats of the type which interlock to form rows. The floor bars 10 would be laid out running in a fore-and-aft direction and spaced apart at regular intervals such that two side legs of, say, every twelfth or fourteenth seat of every row (or otherwise as required by local fire licensing regulations) may be secured thereto. If required, the bars 10 may themselves be secured to the floor or attached to one another by transverse bridging members. Also, as explained above, the system is equally useful for retaining transverse rows of seats and may therefore be used with non-interlocking types.

When attachment plates 60 such as are illustrated in Figs 6 (a) and (b) be used to attach seats to floor bars running fore-and-aft, plates 16 as shown in Figs. 4(a) to 4(c) may be used for attaching non-interlocking seats to transverse floor bars. It should be noted that the transverse bars need not extend the full distance between the fore-and-aft bars, but only as far as the "innermost" legs of the seats attached to the fore-and-aft bars at either end of the row.

An alternative means of connecting seats in transverse rows is illustrated in Figs 8,9 and 10 wherein a plurality of seats 80, typically comprising a moulded plastic seat and back portion 82 and a tubular steel leg structure 84, are connected together by means of elongate members 86 located beneath the front lip of the seat portion 82 and strapped to any convenient part of the leg structure 84. The elongate members 86 may be of extruded plastics material and are preferably of box-section (typically 2½ inches - 6.35 cm - square) to prevent the seats 80 rotating about the long axis thereof. The members 86 may be strapped to the seats 80 by any suitable means such as releasable cable-ties 88 of the type having a toothed strap 90 and releasable locking means 92 affixed to one end thereof. Such ties 88 provide a particularly simple and convenient method of attachment.

Separate elongate members 86 may be connected end to end by means of resilient box-section coupling sleeve 94 adapted to receive the end of the members 86. In order to strengthen such joints it is preferred that a further elongate member (not shown) be secured to the opposite side of the seat legs, straddling the join and extending at least the width of two seats.

As illustrated, annular collars 96 may be fixedly located on the members 86 at positions adjacent a leg of one or more of the seats 80. Laterally projecting tongues 98 and 100 of the collars engage the legs of the seats 80 to resist movement of the seats 80 along the long axis of the members 86.

Alternatively, such movement of the seats may be restricted by means of further cable ties (not shown) passing through apertures (not shown) in the elongate members 86 (preferably in the top and bottom surfaces thereof) and passing around the leg structure 84 between a leg and the point where the seat portion 82 is attached to the leg structure. Typically, the seat at either end of each row would be secured in this manner.

Where possible the location of the members 86 is under the front lip of the seats 80, which location is unobtrusive and does not restrict knee or leg room. The attachment of the members 86 is also not affected by bent or angled seat legs.

The system herein described is extremely versatile and may be used in a variety of configurations to build up blocks of removable seating interconnected in such a way as to greatly reduce the potential hazards of having gangways and aisles distorted or obstructed by loose chairs.

Claims

1. A seat securing system comprising a plurality of elongate floor bars, a plurality of attachment members adjustably attachable to said floor bars, and means for securing the leg of a seat to each of said attachment members.

2. A system as claimed in claim 1 wherein said floor bars each include a longitudinal groove running along the top surface thereof and having at least one lateral inwardly extending flange extending along the length thereof, said attachment members being adapted to engage said groove.

3. A system as claimed in claim 2 wherein said attachment members each include a tongue portion adapted to be inserted into said groove and to engage said flange.

4. A system as claimed in claim 2 wherein said attachment members each further include a foot portion spaced from said tongue portion and adapted to enter said groove and engage the bottom surface thereof.

5. A system as claimed in claim 4 wherein said tongue and foot portions are generally planar, the plane of said tongue portion being substantially at right angles to the plane of said foot portion such that, in use, the plane of said tongue portion is

substantially normal to the long axis of the floor bar and the plane of said foot portion is parallel to said axis.

6. A system as claimed in claim 5 wherein the lowermost edge of said foot portion contacts the bottom surface of said groove at a point about which the attachment member may pivot in response to a force acting parallel to said long axis of the floor bar in such a manner that said tongue portion engages either the longitudinal flange or the bottom surface of the groove, thereby resisting movement of the attachment member along the groove.

7. A system as claimed in any of claims 2 to 6 further including link members for connecting said floor bars end to end, said link members comprising elongate members having a section adapted to co-operate with said groove.

8. A system as claimed in claim 7 wherein said link members are of hollow extruded plastics material and are triangular in section, being split along one vertex thereof.

9. A system as claimed in any preceding claim wherein said attachment members each include a plate portion having at least one aperture formed therein whereby the member may be secured to the leg of a seat by bolt or clamping means or the like extending through said aperture and through a corresponding aperture formed in the seat leg.

10. A system as claimed in claim 9 wherein, in use, said plate portion is parallel to the long axis of said groove.

11. A system as claimed in claim 9 wherein, in use, said plate portion is normal to the long axis of said groove.

12. A system as claimed in any preceding claim further including means for connecting a plurality of seats in a row, comprising an elongate member positionable under said seats and means for fastening said elongate member to the structure of each of said seats.

13. A system as claimed in claim 12 wherein said elongate member is a hollow box-section member.

14. A system as claimed in claim 12 or claim 13 wherein said fastening means comprise releasable straps adapted to be looped around said elongate member and around the structure of the seat.

15. A system as claimed in claim 12, 13 or 14 further including means for securing two of said elongate members end to end.

16. A system as claimed in claim 15 including a further elongate member attachable to the opposite side of the seat legs so as to straddle a joint between two of said first mentioned elongate members.

17. A system as claimed in any of claims 12 to 16 further including a collar locatable on said elongate member and having at least one laterally extending tongue adapted, in use, to abut against a portion of the seat structure so as to inhibit movement of the seat relative to the elongate member.

18. A system as claimed in any of claims 14 to 16 wherein said elongate members are provided with apertures through which said straps may pass prior to being looped around the structure of the seat.

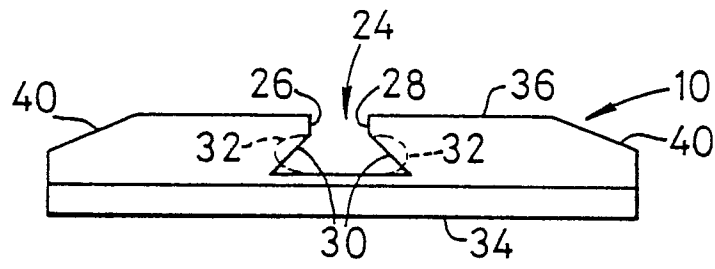


Fig. 1

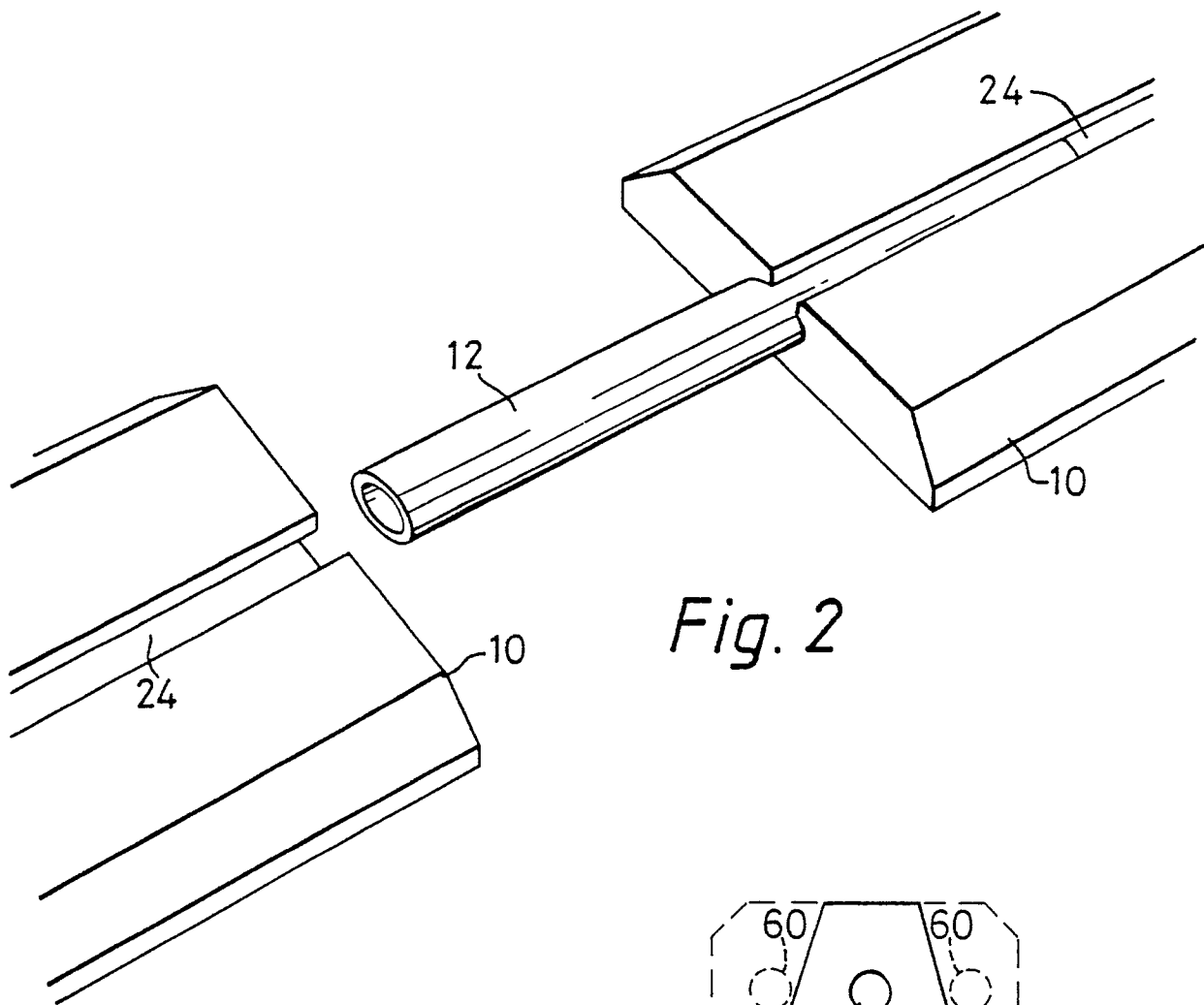


Fig. 2

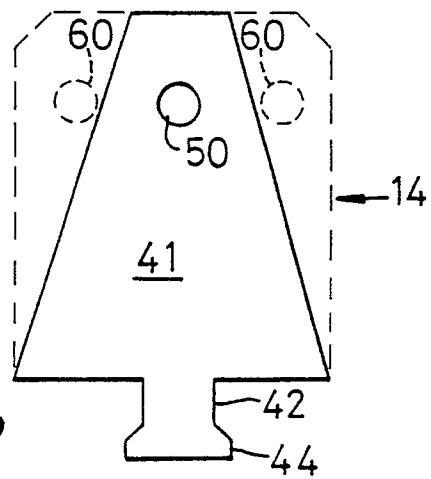
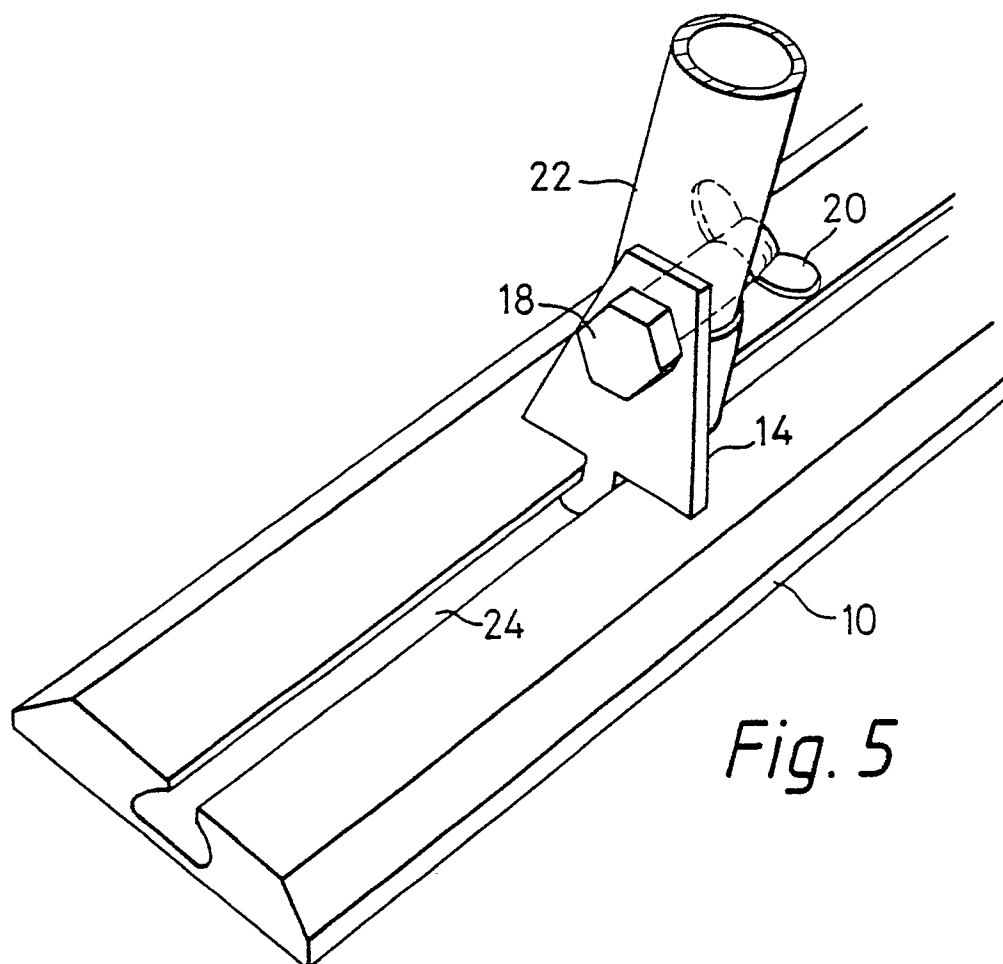
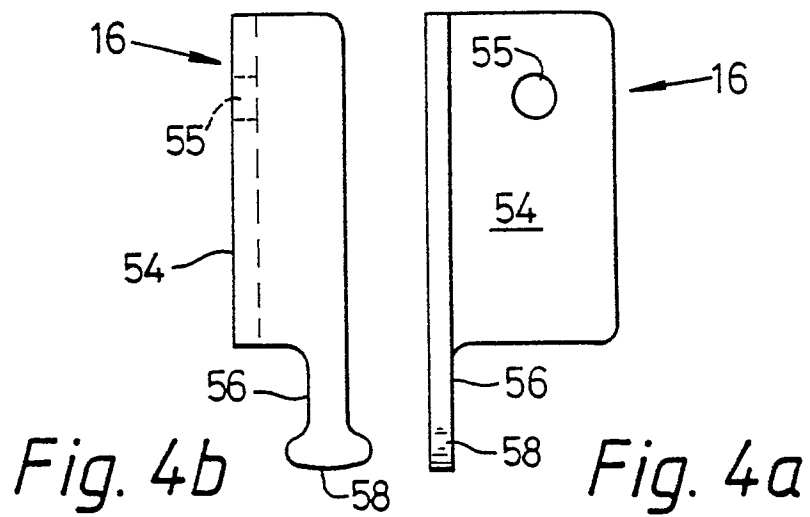
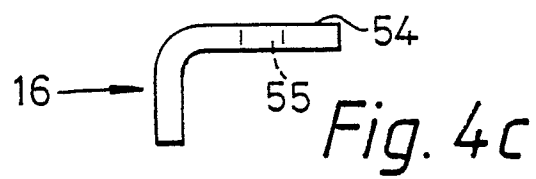
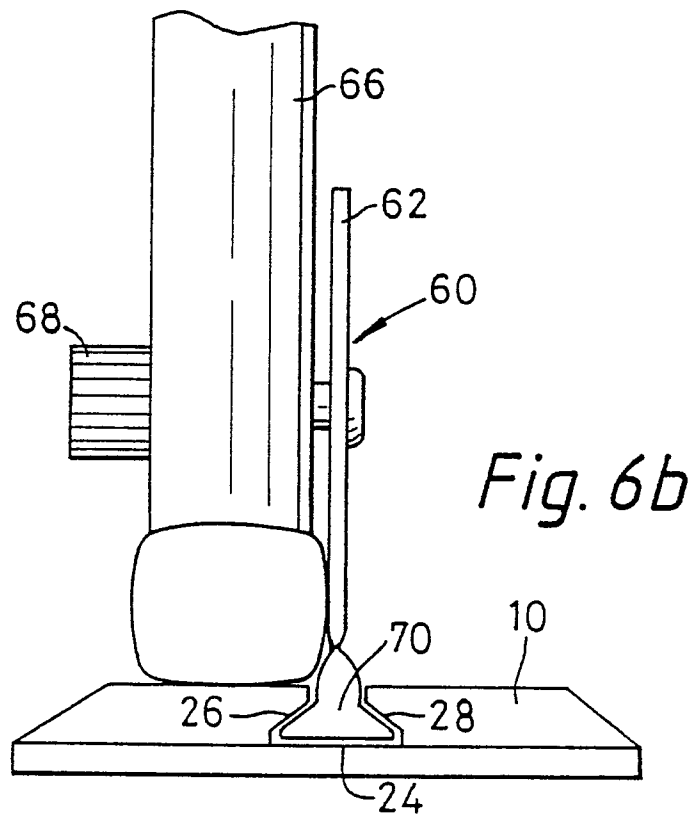
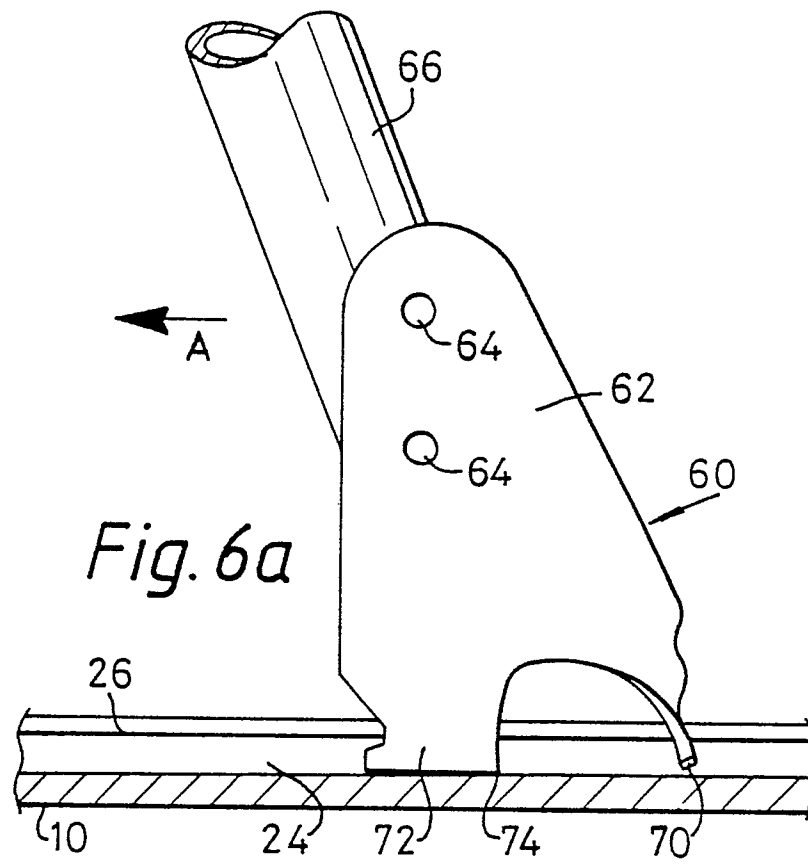


Fig. 3





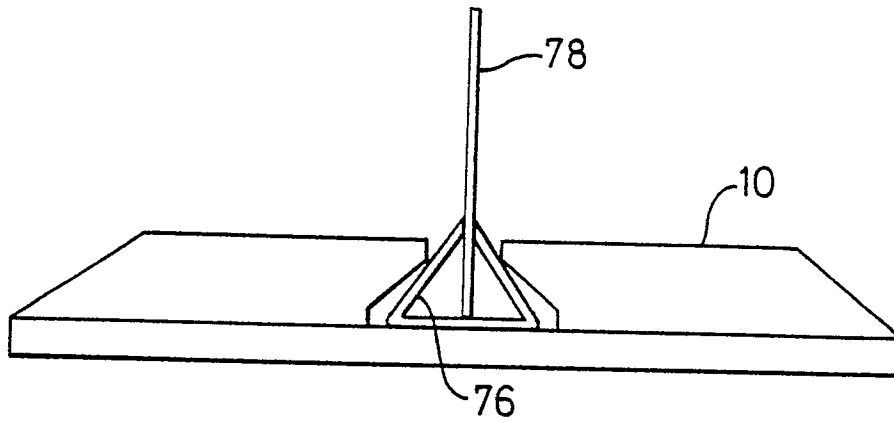


Fig. 7a

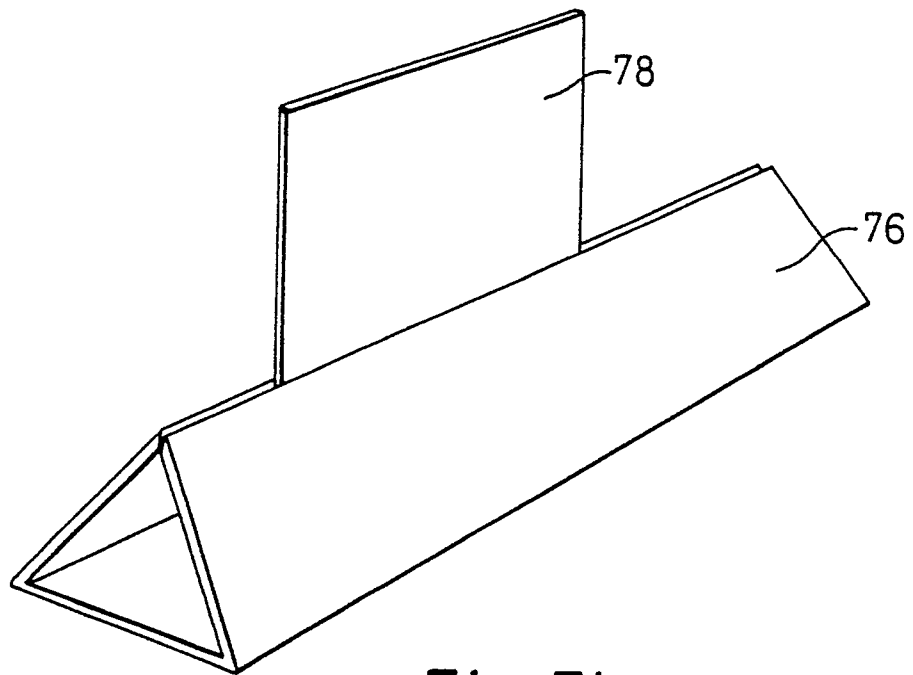


Fig. 7b

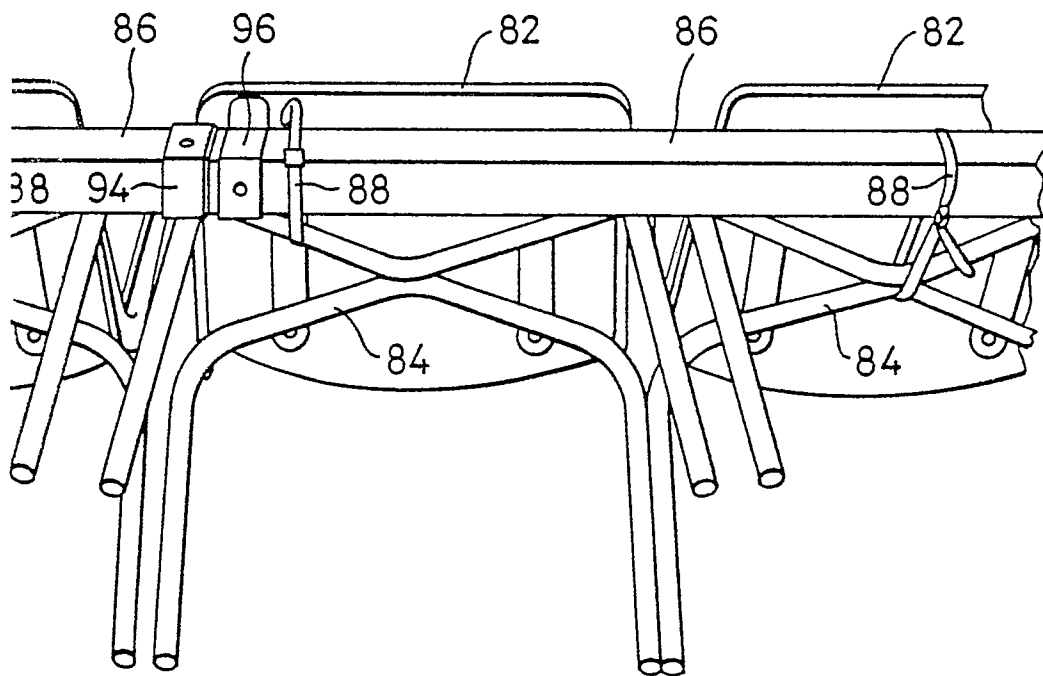


Fig. 10

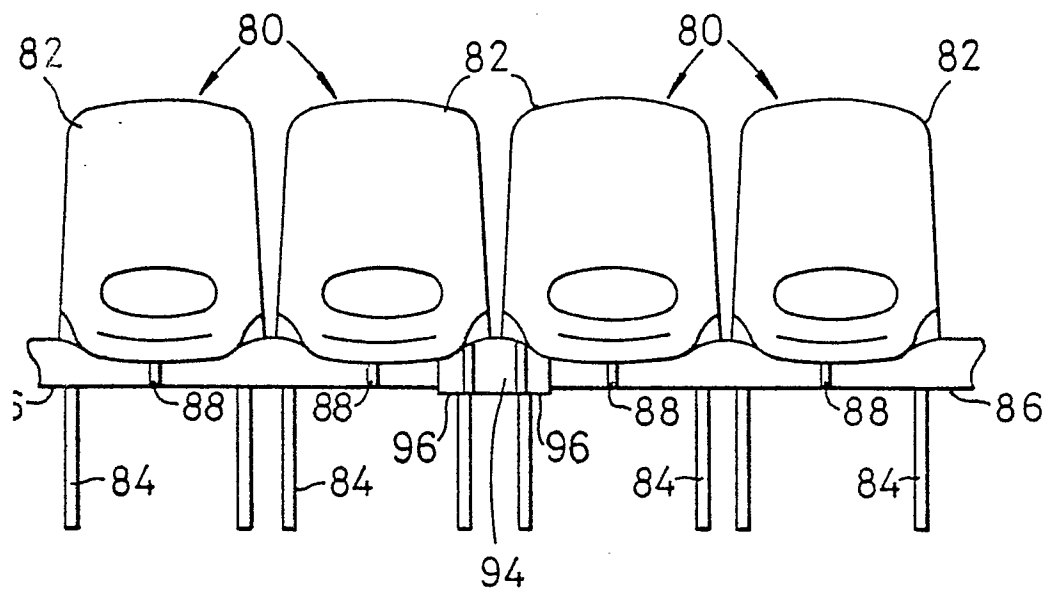


Fig. 8

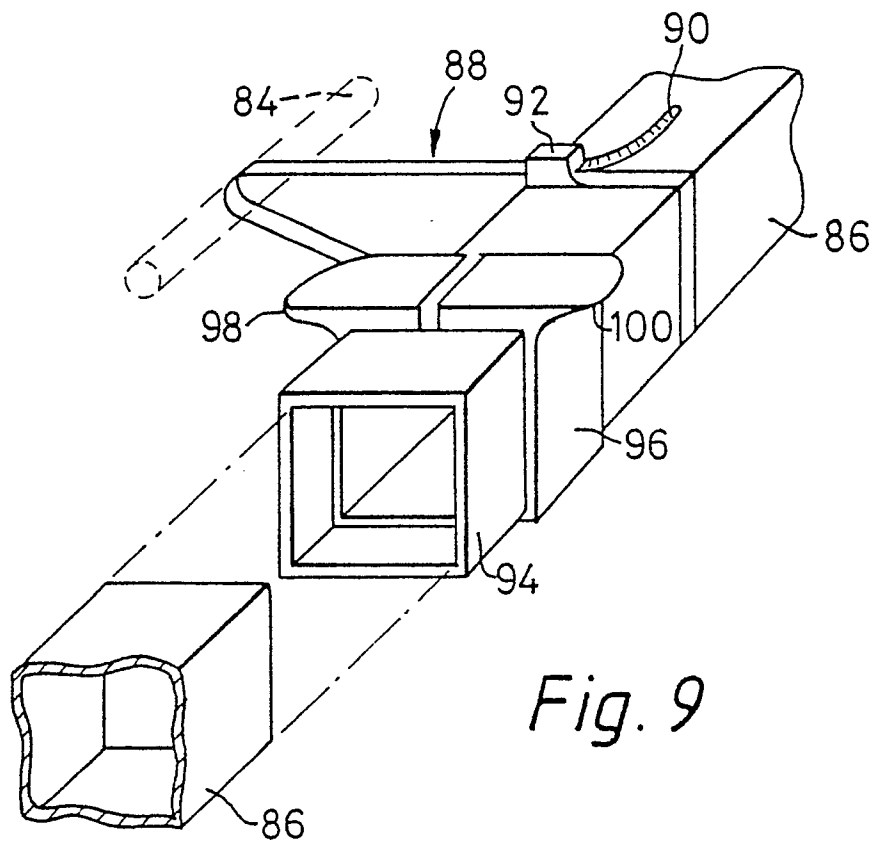


Fig. 9