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(54) Track and seat adapter for positioning and locking wheelchairs and transit seats

Spur und Sitzadapter zum Positionieren und Verriegeln von Rollstuhl- und Transitsitzen

Adaptateur de rail et siège pour positionner et bloquer des fauteuils roulants et des sièges de transit

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Description

FIELD OF THE INVENTION

[0001] The present invention relates generally to a secure means for locking cargo and seating in a transportation means. More specifically, the present invention relates to floor-mounted tracks and seat adapters for positioning and locking cargo, wheelchairs, and transit seats within a transportation means such as cars, taxis, buses, vans, and airplanes.

BACKGROUND OF THE INVENTION

[0002] Cars, trucks, vans, airplanes, para-transit vehicles, buses, taxicabs, mobility cars, accessible sport-utility vehicles (SUV), and the like, have been adapted to include track systems that accommodate various types of equipment, cargo, and seating arrangements. Seating arrangements include standard one, two, or three passenger seating, transit seating, and wheelchair accessible seating. Track systems include horizontal A-tracks, vertical A-tracks, horizontal E-tracks, vertical E-tracks, F-tracks, and L-tracks. These tracks can be made of a variety of materials including iron and steel and can be all different lengths and widths. The track types (A, E, F, and L) are differently shaped and/or arranged to accommodate different fittings. A-tracks are traditionally used for cargo. L-tracks are traditionally used for tie downs and accessories such as oxygen tanks. Some seat adapters operate with L-tracks. The desired track system depends on the type of seating or equipment to be secured and the restraining mechanisms to be used with the seating or equipment.

[0003] The differences between the types of tracks can be subtle or blatant. Vertical A-tracks contain elongated rectangular apertures that are evenly distributed along the longitudinal axis of the track; each aperture is parallel to the sides of the track. Horizontal A-tracks contain elongated rectangular apertures that are also evenly dispersed along the longitudinal axis of the track; each aperture is arranged transversely to the sides of the track. E-tracks also contain generally elongated rectangular apertures disposed within the track, but E-tracks differ from A-tracks in cross section. In cross section, A-track apertures are in line with the track, whereas E-track apertures contain protrusions. F-tracks contain circular apertures in the track. The apertures in F-tracks, like the apertures in A-tracks, are in-line with the track. L-tracks contain a channel along the longitudinal axis of the track, a slot formed through the upper surface of the track in communication with the channel, and cylindrical apertures superimposed above the slot in the top surface of the track. In cross section, L-tracks are generally C-shaped. U.S. Patent No. 7,975,979 (Bishop) discloses an L-track of this type. Similarly, U.S. Patent No. 4,771,969 (Dowd) and U.S. Patent No. 5,083,726 (Schurr) describe L-tracks.

[0004] Such track systems can be installed in the floor or along the walls of an array of vehicles to removably attach and secure cargo, standard passenger seats, transit seats, and/or wheelchairs. These track systems enable a vehicle owner and/or operator to set and vary the seating configuration of a vehicle cabin. However, a vehicle owner is limited, by the particular track system they have installed, to those products that correspond with the track system installed. Alternatively, a vehicle owner can remove their current track system and install a completely new and different track system to accommodate other products. Installing, arranging, and rearranging such seating arrangements can be wasteful, time consuming, expensive, bulky and/or cumbersome.

[0005] Transit seats and wheelchairs are adapted to releasably lock with the tracks described above using various secure means. One such attempt is described in U.S. Patent No. 8,074,954 (Wilhelm et al.), which discloses a rail for positioning and locking of elements and a corresponding fitting. The rail disclosed includes a running surface having regularly spaced apart projections and indentations. The projections and indentations include holding surfaces, which can be engaged with a fitting so as to stop movement. The Wilhelm *et al.* reference further discloses a fitting, which includes a notch that can engage recesses in the running surface of the rail. Unfortunately, A-track fittings and L-track fittings would not be compatible with the rail disclosed in the Wilhelm *et al.* reference.

[0006] U.S. Patent No. 6,892,995 (Tame et. al.) is directed to a seat track assembly for adjusting the position of a seat in a vehicle in the forward or backward directions. The track assembly has two lower tracks, which are connected to the floor of a vehicle, and two upper tracks, which are secured to a seat. The upper tracks are configured to slide along the two lower tracks. The Tame *et al.* reference further discloses a latch system which is fixed to the upper track. The latch locks the positional orientation of the upper tracks relative to the lower tracks so that the seat will not slide while the car is in motion. The cam plate of the latch includes wedge teeth arranged on an end opposite a bore. The wedge teeth extend through apertures in the latch assembly and through apertures of the lower track. In order to adjust the seat position while seated, a user lifts the release lever, and the latch system releases. Unfortunately, the seat track assembly cannot accommodate L-track wheelchair restraints or securements.

[0007] U. S. Patent No. 5,391,030 (Lee et al.) discloses a track assembly for positioning and removably securing wheelchairs in accordance with the general term of claim 1 of the present invention. Unfortunately, straps which are fixed to the wheelchair have to be connected with the two tracks of the track assembly so that the seat will still slide a bit while the car is in motion.

[0008] Therefore, there has been a long-felt need for a track system that accommodates more than a single track-type fitting. There is a need for a track system that

can accommodate an A track fitting and a L-track fitting. Additionally, there is a need for an easily positionable seat adapter which can be used with transit seating, wheelchairs, and the track described herein.

BRIEF SUMMARY OF THE INVENTION

[0009] A track assembly for positioning and removably securing wheelchairs and transit seats in a vehicle, having a first rail having a frame, the frame having a top surface, a first side surface, a second side surface, and a longitudinal axis. The track assembly further includes a plurality of apertures having a shape, the apertures evenly distributed within the top surface along the longitudinal axis of the frame, a plurality of channels connecting the first and second side surfaces proximate the top surface, the channels evenly distributed along the longitudinal axis of the frame, and a second rail identical to and arranged in parallel with the first rail to form the track assembly.

[0010] A seat adapter for a floor-mounted track for a transportation vehicle for positioning and removably securing transit seats, having a housing, the housing having a first hook opposite a second hook protruding under a bottom of said housing, respectively, a first aperture opposite a second aperture in the bottom opposite the first and second hooks, respectively, a first slot opposite a second slot arranged along a rear of the housing, respectively, and, a locking means pivotally secured to the housing. The locking means having a first cam arranged within the first aperture of the bottom of the housing, a second cam opposite the first cam and arranged within the second aperture of the bottom, a first lever fixedly secured to the housing and the first cam wherein the first lever arranged within the first slot, a second lever opposite the first lever, the second lever fixedly secured to the housing and the second cam and arranged within the second slot, and a rung fixedly secured to the first and second levers, wherein, to lockingly engage the seat adapter to the track, the hooks are arranged within apertures of the track, the cams are arranged in adjacent apertures of the track, and the rung is depressed, which, in turn, depresses the levers through the slots, and, simultaneously, the cam hook under the adjacent apertures of the track.

[0011] A general object of the invention is to provide a convenient track system for positioning and locking cargo, transit seats, and wheelchairs in vehicles.

[0012] Another object of the invention is to provide a hybrid track system that combines A-track and L-track systems.

[0013] A further object of the invention is to provide a hybrid track system that is a universal platform for different vehicle sizes and different products.

[0014] Yet another object of the invention is to provide a seat adapter that lockingly engages with a hybrid track system in an easy and nearly hands-free manner.

[0015] Still another object of the invention is to provide a seat adapter that disengages with a hybrid track system

in an easy and nearly hands-free manner.

[0016] Another object of the invention is to provide a seat adapter that is sturdy, lightweight and easily positionable.

5 **[0017]** A further object of the invention is to provide a seat adapter that is easily positionable within a hybrid track system.

[0018] A further advantage of the invention is a rail for positioning and removably securing wheelchairs and transit seats in a vehicle. The rail comprises a frame, and said frame has a top surface, a first side surface, a second side surface, and a longitudinal axis. A plurality of apertures having a shape is provided with said rail. Said apertures are evenly distributed within said top surface along said longitudinal axis of said frame. A plurality of channels connect said first and second side surfaces proximate said top surface and said channels are evenly distributed along said longitudinal axis of said frame.

10 **[0019]** The present invention provides a track assembly and seat adapter for positioning and locking wheelchairs and transit seats. A track is defined by the track assembly which comprises:

- a first rail having a frame, said frame comprising a top surface, a first side surface, a second side surface, and a longitudinal axis;
- a plurality of apertures having a shape, said apertures evenly distributed within said top surface along said longitudinal axis of said frame;
- a plurality of channels connecting said first and second side surfaces proximate said top surface, said channels evenly distributed along said longitudinal axis of said frame; and
- a second rail identical to and arranged in parallel with said first rail to form said track assembly.

20 **[0020]** A seat adapter having a housing, said housing comprising:

- a first hook opposite a second hook protruding under a bottom of said housing, respectively;
- a first aperture opposite a second aperture in said bottom opposite said first and second hooks, respectively; and
- a first slot opposite a second slot arranged along a rear of said housing, respectively.

30 **[0021]** A locking means is pivotally secured to said housing, said locking means comprising:

- a first cam arranged within said first aperture of said bottom;

- a second cam opposite said first cam and arranged within said second aperture of said bottom;
- a first lever fixedly secured to said housing and said first cam wherein said first lever arranged within said first slot; 5
- a second lever opposite said first lever, said second lever fixedly secured to said housing and said second cam and arranged within said second slot; and 10
- a rung fixedly secured to said first and second levers.

[0022] Said rung is provided for lockingly engage said seat adapter to said track, said hooks are arranged within apertures of said track, said cams are arranged in adjacent apertures of said track, and said rung is depressed, which, in turn, depresses said levers through said slots, and, simultaneously, said cams hook under the adjacent apertures of said track. 15 20

[0023] These and other objects and advantages of the present invention will be readily appreciable from the following description of preferred embodiments of the invention and from the accompanying drawings and claims. 25

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] The nature and mode of operation of the present invention will now be more fully described in the following detailed description of the invention taken with the accompanying figures, in which: 30

Figure 1 is a perspective view of the track of the invention; 35

Figure 2 is a front view of the track of the invention;

Figure 3 is a rear view of the track of the invention;

Figure 4 is a top view of the track of the invention; 40

Figure 5 is a bottom view of the track of the invention;

Figure 6 is a perspective view of the reinforcement of the invention shown in Figure 5 with the frame cut away; 45

Figure 7A is a left side view of the track of the invention; 50

Figure 7B is a right side view of the track of the invention;

Figure 8 is an alternate embodiment of the track of the invention; 55

Figure 9 is a perspective view of the seat adapter of

the invention;

Figure 10 is a front view of the seat adapter of the invention;

Figure 11 is a rear view of the seat adapter of the invention;

Figure 12 is a top view of the seat adapter of the invention;

Figure 13 is a bottom view of the seat adapter of the invention;

Figure 14 is a left side view of the seat adapter of the invention;

Figure 15 is a right side view of the seat adapter of the invention;

Figure 16 is a view of a user wheeling the seat adapter of the invention along the track of the invention;

Figure 17 is a view of a user positioning the seat adapter of the invention within the track of the invention;

Figure 18A is a view of a user locking the seat adapter of the invention within the track of the invention;

Figure 18B is a cross section view of the locking system of the seat adapter engaged within the track of the invention showing the seat adapter in the unlocked position;

Figure 19A is a view of the locking system of the seat adapter locked by a user and engaged within the track of the invention;

Figure 19B is a cross section view of the locking system of the seat adapter engaged within the track of the invention showing the seat adapter in the locked position;

Figure 20A is a detailed view of part of the locking system of the seat adapter showing the lever sliding downwardly and interacting with the safety lock of the seat adapter;

Figure 20B is a detailed view of part of the locking system of the seat adapter showing the lever and safety lock in the locked position;

Figure 21 is a view of a seat adapter of the invention in storage mode and a seat adapter of the invention in use; and,

Figure 22 is a view of a wheelchair secured to the

track of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0025] At the outset, it should be appreciated that like drawing numbers on different drawing views identify identical, or functionally similar, structural elements of the invention. While the present invention is described with respect to what is presently considered to be the preferred aspects, it is to be understood that the invention as claimed is not limited to the disclosed aspect. The present invention is intended to include various modifications and equivalent arrangements within the spirit and scope of the appended claims.

[0026] Furthermore, it is understood that this invention is not limited to the particular methodology, materials and modifications described and as such may, of course, vary. It is also understood that the terminology used herein is for the purpose of describing particular aspects only, and is not intended to limit the scope of the present invention, which is limited only by the appended claims.

[0027] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood to one of ordinary skill in the art to which this invention belongs.

[0028] Although any methods, devices or materials similar or equivalent to those described herein can be used in the practice or testing of the invention, the preferred methods, devices, and materials are now described.

TRACK STRUCTURE

[0029] Adverting now to the Figures, Figure 1 is a perspective view of track **10** of the invention. Track **10** comprises at least one rail having frame **20** which comprises top surface **21** and sides **22, 23**. Top surface **21** connects sides **22, 23** at their respective top ends. Sides **22, 23** are straight and parallel. The top ends of sides **22, 23** are rounded where they abut top surface **21**. It should be appreciated that the top ends of sides **22, 23** could be angled or arranged at 90 degrees rather than rounded. Additionally, it should be appreciated that sides **22, 23** could have flanges protruding from their respective bottom ends for desired support or various types of floor-mounting. Top surface **21** is perpendicular to sides **22, 23**. Frame **20** further comprises axis **X** which represents a longitudinal axis running along the center of frame **20**. Top surface **21** of frame **20** comprises apertures **25** arranged longitudinally along axis **X**. Apertures **25** are arranged approximately in the center of top surface **21**. Apertures **25** are parallel with sides **22, 23**. Moreover, apertures **25** are spaced apart by a distance **Z** between center points **A**. Preferably, distance **Z** is approximately 5 inches according to industry standards.

[0030] Apertures **25** are identical. It should be appreciated that apertures **25** are identical to standard apertures in a horizontal or vertical A-track. Each aperture **25**

comprises pair of transverse sides **26, 28** and pair of longitudinal sides **27, 29** connecting transverse sides **26, 28**. Transverse sides **26, 28** are parallel and longitudinal sides **27, 29** are parallel. Preferably, apertures **25** have a quadrilateral shape; specifically, an open rectangular prism shape without top or bottom sides.

[0031] Frame **20** further comprises channels **30** which connect sides **22, 23** across top surface **21**. Channels **30** comprise lips **31, 32** and support surfaces **33, 34**. Channels **30** are identical. It should be appreciated that channels **30** represent modified portions of a standard L-track. In the preferred embodiment shown, channels **30** further comprise end portions **E1, E2** which are identical to the ends of apertures **25** where longitudinal sides **27, 29** meet transverse sides **26, 28**. End portions **E1, E2** are part of lips **31, 32** arranged between support surfaces **33, 34**.

[0032] Lips **31, 32** are generally formed by plurality of straight portions **35** and plurality of arcuate portions **36** (described in further detail below). Lips **31, 32** run along top surface **21** between sides **22, 23**. Each straight portion within plurality of straight portions **35** alternates with each arcuate portion of plurality of arcuate portions **36** along lips **31, 32**. Generally, except for reinforcements **40** (described further below), frame **20** is hollow under top surface **21**. Track **10** comprises at least one rail having frame **20** arranged opposite and parallel to a second rail having frame **20A** (described further below). Frames **20, 20A** are identical.

[0033] Figure 2 shows a front view of frame **20**. Top surface **21** is planar and apertures **25** are planar. Apertures **25** are not visible behind the rounded top end of side **22**. Channels **30** are visible through the rounded top end of side **22**. Supportive surfaces **33** are shoulder-like portions within side **22**. Supportive surfaces **33** are parallel with top surface **21**. Plurality of straight portions **35** and plurality of arcuate portions **36** are visible along lips **32** which connect side **22** to side **23** protruding behind side **22**. L-track fittings are arranged to slidably engage channels **30**. Supportive surfaces **33** provide support for such fittings. Figure 3 shows a rear view of frame **20** which is substantially similar to frame **20** shown in Figure 2. Frame **20** shown in Figure 3 differs in that channels **30** intersect with side **23** rather than side **22**. Moreover, support surfaces **34** are shown distributed along side **23**. Support surfaces **34**, like support surfaces **33**, are shoulder-like portions within side **23** and are parallel with top surface **21**. Lips **31** are visible protruding behind side **23** connecting side **23** to side **22** along top surface **21**. Plurality of straight and arcuate portions **35, 36** are visible along lips **31**. It should be appreciated that Figures 2 and 3 are not identical because channels **30** are diagonally arranged between sides **22, 23**.

[0034] Figure 4 is a top view of frame **20**. Support surfaces **33, 34** of channels **30** are positioned below the rounded top ends of sides **22, 23**, respectively. Plurality of straight and arcuate portions **35, 36** of lips **31, 32** of channels **30** are shown alternating. From the top, right-

most portion of channels **30**, lip **32** proceeds, starting from side **23**, with arcuate portion **35**, straight portion **36**, arcuate portion **35**, end **E2**, straight portion **36**, arcuate portion **35**, and straight portion **36**. Straight portions **36** have varying lengths due to the diagonal nature of lip **32**. End **E2** includes three straight sides of an open rectangular prism. The longitudinal side of end **E2** proximate side **23** is longer than the longitudinal side of end **E2** proximate side **22** due to the diagonal nature of channels **30**. The transverse side of the partial rectangular prism shape of end **E2** connects the longitudinal sides of end **E2**. Lip **31** is opposite lip **32** within channels **30**. For clarity, lip **32** is annotated in channel **30** positioned between two apertures **25**. Lip **31** is annotated in channel **30** positioned on the left. It should be appreciated that lips **31**, **32** are identical in both channels **30** illustrated in Figure 4. From the top, left-most portion of channels **30**, lip **31** proceeds, starting from side **23**, with straight portion **36**, arcuate portion **35**, straight portion **36**, end **E1**, arcuate portion **35**, straight portion **36**, and arcuate portion **35**. Again, straight portions **36** have varying lengths due to the diagonal nature of lip **31**. End **E1** includes three straight sides of an open rectangular prism. The longitudinal side of end **E1** proximate side **23** is shorter than the longitudinal side of end **E1** proximate side **22** due to the diagonal nature of channels **30**. Both ends **E1**, **E2** are open on the top and bottom ends to receive fittings.

[0035] Similarly, apertures **25** are nearly rectangular prisms except apertures **25** have open top and bottom faces to receive fittings. Figure 5 is a bottom view of frame **20** showing reinforcements **40**. Reinforcements **40** are welded and connect sides **22**, **23** proximate bottom ends of sides **22**, **23**, respectively. Reinforcements **40** are correspondingly shaped to reinforce channels **30**. At the center of reinforcements **40**, bolts **41** are arranged to be secured to a floor surface. It should be appreciated that any suitable secure means could be used to secure reinforcements **40** to a floor surface for example, screws, nails, pins, soldering, brazing, welding, or cementing. Additionally, each reinforcement **40** can have more than a single bolt **41** if desired.

[0036] Figure 6 is a perspective view of frame **20** and reinforcement **40** of the invention. Reinforcement **40** comprises base **40A** and flanges **40B**. As shown in Figure 5, base **40A** is correspondingly shaped with channels **30** and is arranged opposite top surface **21** of frame **20**. Flanges **40B** are extensions connecting base **40A** to top surface **21** and sides **22**, **23** of frame **20**. Flanges **40B** are welded to sides **22**, **23** and top surface **21**. In the preferred embodiment, flanges **40B** are arranged on the corners of base **40A** proximate sides **22**, **23**. It should be appreciated that flanges **40B** could be arranged in any suitable manner to support channels **30**. For example, flanges **40B** could be a continuous side wall protruding upward from base **40A** between sides **22**, **23**. However, in the preferred embodiment, flanges **40B** are not continuous between sides **22**, **23**. Instead, openings **40C** are arranged between flanges **40B** proximate bolts **41** so that

a user can access bolts **41**. Openings **40C** additionally decrease the overall mass of frame **20** making frame **20** lightweight and easy to maneuver.

[0037] Figure 7A is a left side view, or a left end view, of frame **20** and reinforcement **40**. Flange **40B** arranged proximate side **22** is welded along side **22** and top surface **21**. Only exterior surface **41** of flange **40B** is visible because reinforcement **40** is arranged diagonally between sides **22**, **23**, respectively. Side surface **42** is not visible. Base **40A** is behind flange **40B** proximate side **22**. In contrast, exterior surface **41** and side surface **42** are visible of flange **40B** proximate side **23**. Side surface **42** is visible proximate side **23** because reinforcement **40** is welded to side **23** at an angle corresponding to the angle of channels **30**. Side surface **42** connects to base **40A** proximate the bottom of flange **40B** seamlessly. Figure 7B is a right side view, or a right end view, of frame **20** and reinforcement **40**. Figure 7B is identical to Figure 7A. Flange **40B** proximate side **23** is welded along side **23** and top surface **21**. Only exterior surface of flange **40B** is visible. Side surface **42** is not visible. In contrast, exterior surface **41** and side surface **42** are visible with respect to flange **40B** welded proximate side **22**.

[0038] Figure 8 is a top view of an alternate embodiment of frame **20** showing channels **30** without ends **E1**, **E2**. Channels **30**, in this embodiment, comprise lips **31**, **32** and lips **31**, **32** comprise plurality of arcuate and straight portions **35**, **36** but, exclude ends **E1**, **E2** as included in the preferred embodiment. Lips **32** comprise, from the portion proximate side **23**, arcuate portion **35**, straight portion **36**, arcuate portion **35**, and straight portion **36**. Lips **31** comprise, from the portion proximate side **23**, straight portion **36**, arcuate portion **35**, straight portion **36**, arcuate portion **35**, straight portion **36**, and arcuate portion **35**. Bolts **41** are arranged in reinforcements **40** approximately in the center of frame **20** below lips **31**, **32** of channels **30**. In a further embodiment, frame **20** could comprise any arrangement of apertures **25** and channels **30**. Instead of alternating apertures **25** and channels **30**, frame **20** could include a plurality of apertures **25** arranged adjacent one another followed by a plurality of channels **30** arranged adjacent one another. Alternatively, frame **20** could include two apertures **25** arranged adjacent one another followed by two channels **30** arranged adjacent one another. Additionally, it should be appreciated that apertures **25** could be arranged transversely to longitudinal axis **X** to mimic standard horizontal A-track. Apertures **25** could be modified to emulate standard horizontal and vertical E-tracks. Apertures **25** can even be substituted with circular apertures of the typical F-track. Frame **20** of the instant invention can be arranged in any suitable manner to accommodate any number of track fittings and should not be construed to be limited to A and L tracks. Frame **20** could include a horizontal aperture **25**, a vertical aperture **25**, a circular aperture of the typical F-track, and channels **30** of the preferred and alternate embodiments in any pattern, *i.e.*,

sequential or alternating.

[0039] It should be appreciated that channels **30** are substantially similar to the standard L-track. Channels **30** alone without ends **E1**, **E2** comprise three equidistant circular apertures separated by straight portions **36** of lips **31**, **32**. Straight portions **36** of lips **31**, **32** are closer together than the diameters of the circular apertures. The distance between the center points of adjacent circular apertures is approximately 1 inch according to industry standards. The diameter of each circular aperture is approximately 20 millimeters according to industry standards.

[0040] Channels **30** are arranged to receive wheelchair tie downs and other L-track fittings. Track **10** can include a plurality of frames **20** mounted within the floor of a vehicle to accommodate any number of seating arrangements. Consistent with the Americans with Disabilities Act, in order to accommodate a wheelchair, a minimum amount of floor space is required (30 inches by 48 inches). Accordingly, track **10** can be arranged with a floor space of a transportation means at least 30 inches by 48 inches. Apertures **25** are arranged to receive A-track fittings. Each aperture is approximately 6.2 centimeters long (or 2.4 inches) by 1.3 centimeters wide (or approximately 0.5 inches).

SEAT ADAPTER STRUCTURE

[0041] Figure 9 shows a perspective view of seat adapter **100**. Broadly, seat adapter **100** comprises housing **100A** and locking system **100B**. Housing **100A** comprises bottom **101**, left side **102**, right side **103**, top of left side **104**, top of right side **105**, front of left side **106**, rear of left side **107**, front of right side **108**, and rear of right side **109**. Left and right sides **102**, **103** are substantially upright and parallel. Bottom **101** connects left and right sides **102**, **103** at their respective bottom ends. Tops of left and right sides **104**, **105** are arranged to receive a transit seat. Tops of left and right sides **104**, **105** do not connect. However, it should be appreciated that tops of left and right sides **104**, **105** could connect to provide greater support for a transit seat fixedly secured above. Similarly, front of left side **106** does not connect to front of right side **108** and rear of left side **107** does not connect to rear of right side **109**. Left and right sides **102**, **103** are connected by bottom **101** and locking system **100B**. It should be appreciated that housing **100A** is preferably made of aluminum or titanium based metals. However, housing **100A** could be constructed of any suitable alternative such as iron, steel, or even a sturdy plastic.

[0042] Housing **100A** further comprises extension members **130**, **131** extending from rear of left side **107** and rear of right side **109**, respectively, proximate bottom **101**. Wheels **W** are fixedly secured to L-shaped extension members **130A**, **131A** which, in turn, are secured to extension members **130**, **131**. Wheel **W** is fixedly secured to L-shaped extension member **130A** and another wheel **W** is fixedly secured to L-shaped extension mem-

ber **131A**. Wheels **W** are identical. Wheels **W** enable a user to transport seat adapter **100** and a seat fixedly secured thereto. Wheels **W** also enable a user to guide seat adapter **100** alongside the inward facing walls of parallel frames **20**, **20A** of track system **50**: Hooks **110**, **111** are fixedly secured to and protrude downwardly and rearwardly from under bottom **101** proximate wheels **W**, respectively. Wheels **W** can be any suitable wheel and/or caster. For example, wheels **W** could be pneumatic, phenolic, made of rubber, made of polyurethane and threaded, pressed steel, or nylon. Wheels **W** can be custom made at J.W. Winco located at 2815 South Calhoun Road, New Berlin, WI 53151. Alternatively, a typical wheel and fixed caster can be used.

[0043] Housing **100A** also comprises slots **118**, **119** arranged along rear of left side **107** and rear of right side **109**, respectively. Locks **120**, **121** are also arranged on rear of left side **107** and rear of right side **109**, respectively, proximate slots **118**, **119**, respectively. Slots **118**, **119** are arranged to receive levers **114**, **115** of locking system **100B**. Levers **114**, **115** can be moved vertically within slots **118**, **119** (described in further detail below).

[0044] Locking system **100B** comprises cams **112**, **113**, levers **114**, **115**, and rung **116**. Cams **112**, **113** protrude through and under bottom **101** opposite hooks **110**, **111** and wheels **W**. Cams **112**, **113** are fixedly secured to levers **114**, **115** secured within housing **100A**. Rung **116** connects levers **114**, **115** proximate rear of left and right sides **107**, **109**, respectively.

[0045] Figures 9 through 15 show seat adapter **100** in the locked position. Levers **114**, **115** are substantially parallel with bottom **101**. and tops of right and left sides **104**, **105**. Locks **120**, **121** engage the tops of lever ends **114A**, **115A** of levers **114**, **115**, respectively. Wheels **W** are suspended above the floor surface and cams **112**, **113** are in locked position arranged under bottom **101** and forward of fronts of left and right sides **106**, **108** opposite hook **110**, **111**. In this arrangement, cams **112**, **113** protrude beyond the front side of bottom **101**. As described below, when seat adapter **100** and locking system **100B** are in the unlocked position, levers **114**, **115** are arranged at angles β in relation to bottom **101** (as shown in Figure 18B). When cams **112**, **113** are in the unlocked position, cams **112**, **113** are completely under bottom **101** and do not protrude beyond the front side of bottom **101**.

[0046] Seat adapter **100** is shown from the front in Figure 10. Fronts of left and right sides **106**, **108** are spaced apart and connected only by bottom **101** and rung **116** of locking system **100B**. In the locked position shown, rung **116** is opposite tops of left and right sides **104**, **105**. Additionally, rung **116** is substantially parallel and proximate bottom **101**. Wheels **W** are visible behind rung **116** suspended above the floor surface. Figure 11 shows the rear of seat adapter **100**. Rears of left and right sides **107**, **109** are spaced apart and connected by bottom **101** and rung **116** of locking system **100B**. Slots **118**, **119** of respective rear sides **107**, **109** are arranged vertically to

slidingly receive levers **114, 115**, respectively. Locks **120, 121** are secured to rear sides **107, 109**, respectively, proximate slots **118, 119**, respectively, by means of lock bolts **124, 125**. Locks **120, 121** are arranged to rotate freely around lock bolts **124, 125**. When seat adapter **100** is in the locked position, gravity dictates the vertical alignment of locks **120, 121** and levers **114, 115** present locks **120, 121** from swinging.

[0047] Locks **120, 121** comprise respective angled sides **122, 123**, respective shoulders **126, 127**, and respective appendages **132, 133**. Angled sides **122, 123** and shoulders **126, 127** are substantially parallel with rear left and right sides **107, 109**, respectively. Appendages **132, 133** are substantially perpendicular to angled sides **122, 123** and shoulders **126, 127** of locks **120, 121**. Angled sides **122, 123** are angled downwardly so that when levers **114, 115** engage them from above lock bolts **124, 125**, levers **114, 115** push locks **120, 121** inward and upward around lock bolts **124, 125** so that levers **114, 115** can continue to pass through slots **118, 119**. Locks **120, 121** are mirror images such that each angled side **122, 123** is directed away from the other. Wheels **W** are arranged behind rear left and right sides **107, 109** proximate left and right sides **102, 103** such that a user can easily position his/her foot between wheels **W**.

[0048] Figure 12 shows tops of left and right sides **104, 105** of housing **100A** of seat adapter **100**. From this view, cams **112, 113** are visible above bottom **101**. Levers **114, 115** are resting along the respective bottoms of slots **118, 119**. Lever ends **114A, 115A** are visible through slots **118, 119**, respectively. Locks **120, 121** are resting atop lever ends **114A, 115A** of levers **114, 115**. Hooks **110, 111** are visible below bottom **101** opposite cams **112, 113**. Figure 13 shows bottom **101** of housing **100A** of seat adapter **100**. Hook **110** is shown protruding from bottom **101** proximate left side **102** and opposite cam **112**. Hook **111** is shown protruding from bottom **101** proximate right side **103** and opposite cam **113**. Cam **112** is in the locked position and protruding outwardly from bottom **101** proximate left side **102**. Cam **113** is in the locked position protruding outwardly from bottom **101** proximate right side **103**. Bottom **101** has a semi-circular aperture connecting front left and right sides **106, 108**. Similarly, bottom **101** has a semi-circular aperture connecting rear left and right sides **107, 109**. These semi-circular apertures allow a user to stand on either the front or rear side of a seat and seat adapter **100** and move the seat and seat adapter **100** without having bottom **101** of seat adapter **100** interfere with the gait of the user.

[0049] Left side **102** of seat adapter **100** is shown in Figure 14. Lever end **114A** is protruding outwardly from slot **118** and lever end **114A** is substantially parallel to the floor surface. Wheel **W** is suspended above the floor surface. Hook **110** is protruding outwardly from bottom **101** and cam **112** is protruding outwardly from bottom **101** in the opposite direction. When seat adapter **100** is lockingly engaged with frame **20** of track **10**, hook **110** engages under top surface **21** through aperture **25** and

cam **112** engages under top surface **21** through an adjacent aperture **25**.

[0050] Similarly, right side **103** of seat adapter **100** is shown in Figure 15. Lever end **115A** is protruding outwardly from slot **119** and lever end **115A** is substantially parallel to the floor surface. Wheel **W** is suspended above the floor surface. Hook **111** is protruding outwardly from bottom **101** and cam **113** is protruding outwardly from bottom **101** in the opposite direction. When seat adapter **100** is lockingly engaged with track **10**, hook **110** engages under top surface **21** through aperture **25** and hook **111** engages under top surface **21** through aperture **25** of a parallel frame. Likewise, cam **112** engages under top surface **21** through aperture **25** and cam **113** engages under top surface **21** through aperture **25** of a parallel frame.

FUNCTION

[0051] Once track system **50** is installed, a user can secure a number of desired transit seats each fixed atop seat adapter **100** inside the cabin of a vehicle. For example, a flip style transit seat made by Freedman Seating Company located at 4545 West Augusta Boulevard, Chicago, IL 60651 can be mounted with bolts to top of left side **104** and top of right side **105** of seat adapter **100**. Other flip style transit seats and fixed seats are also compatible with seat adapter **100**. Track system **50** comprises frame **20** spaced apart from and parallel with frame **20A**. Track system **50** can include additional frames depending on the desired seating arrangement.

[0052] To secure desired transit seat **250** fixed atop seat adapter **100**, user **200**, as shown in Figure 16, tilts seat **250** and seat adapter **100** onto wheels **W** and rolls seat **250** and seat adapter **100** forward together. User **200** arranges wheels **W** between frames **20, 20A** such that one wheel **W** is guided by frame **20** and another wheel **W** is guided by frame **20A**. When seat **250** and seat adapter **100** are positioned for storage (to be described below) or for use, a user aligns hooks **110, 111** with opposing apertures **25** arranged in frames **20, 20A**.

[0053] Then, as shown in Figure 17, user **200** tilts seat **250** and seat adapter **100** forward such that hooks **110, 111** protrude into opposing apertures **25** and respectively hook under top surfaces **21** of frames **20, 20A** behind the protruded apertures **25**. As seat **250** and seat adapter **100** are tilted forward further and hooks **110, 111** are hooked in place, bottom **101** of seat adapter **100** comes into contact with top surfaces **21** of frames **20, 20A**. As seat adapter **100** comes into full contact with frames **20, 20A**, cams **112, 113** protrude into adjacent and opposing apertures **25** in frames **20, 20A**. Hooks **110, 111** engage with parallel apertures **25** of frames **20, 20A**, respectively, and cams **112, 113** engage with separate adjacent parallel apertures **25** of frames **20, 20A**.

[0054] Figure 18A shows how user **200** secures seat **250** and seat adapter **100** in track system **50**. Once seat **250** and seat adapter **100** are positioned in apertures **25**, user **200**, using a single foot, steps downward on top of

rung 116. As rung 116 is pressed downward, levers 114, 115 slide downward. As discussed above, lever ends 114A, 115A of levers 114, 115, protrude rearwardly through slots 118, 119, respectively. As rung 116 is pressed downward, lever ends 114A, 115A slide downwardly through slots 118, 119 and lever ends 114A, 115A come in contact with locks 120, 121 along their respective angled sides 122, 123; locks 120, 121 are rotated partially around lock bolts 124, 125. It should be appreciated that while locks 120, 121 are swing, levers 114, 115 can continue to slide downwardly through slots 118, 119 passing lock bolts 124, 125. When levers 114, 115 about the respective bottoms of slots 118, 119, locks 120, 121 swing back such that shoulders 126, 127 engage atop lever ends 114A, 115A again as shown in Figure 19A. Figure 18A illustrates only the portion of housing 100A that interacts with frame 20A but it should be appreciated that the other portion of housing 100A that interacts with frame 20 functions the same.

[0055] The unlocked position of locking system 100B is shown in cross-section in Figure 18B taken generally along line 18B-18B shown in Figure 17. Seat adapter 100 is positioned such that bottom 101 is resting atop frame 20A. Hook 111 is positioned in aperture 25 such that it is hooked under top surface 21 of frame 20A. Cam 113 is arranged within a separate adjacent aperture 25 of frame 20A. Lever 115 is arranged lifted upward at angle β . Since locking system 100B is in the unlocked position, cam 113 is not hooked under top surface 21 of frame 20A. Lever 115 and cam 113 rotate about pivot 140. Lock 121 is in its default position partially covering slot 119. Appendage 133 of lock 121 is shown projecting outwardly such that it should be appreciated that user 200 could swing lock 121 out of the way using a single foot. Figure 19A shows rung 116 fully pressed downward and locking system 100B is in locked position. Lever end 115A is resting atop the bottom of slot 119. Lock 121 has swung back and lock 121 is again partially covering slot 119. Shoulder 127 of lock 121 is resting atop lever end 115A. Rung 116 is again proximate bottom 101. Wheels W are still suspended off the floor surface. As shown in Figure 19B, in the locked position, cam 113 pivots forward about pivot 140 to hook under top surface 21 of frame 20A. In this arrangement, lever 115 is proximate to and parallel with bottom 101. Figure 19B is a cross section of locking system 100B taken generally along line 19B-19B shown in Figure 11.

[0056] Figure 20A shows a detail view of the interaction between lever 115 and lock 121 when rung 116 is pressed downward. As discussed above, when rung 116 is pressed downward, lever 115 secured to rung 116 is also pressed downward. Lever 115 is guided downward through slot 119. When lever end 115A contacts angled side 123 of lock 121, lock 121 swings around lock bolt 125 in the leftward direction shown. As lock 121 swings leftwardly, lever 115 is allowed to continue downward through slot 119. Figure 20B shows a detail of lever 115 and lock 121 after rung 116 has been fully pressed down-

ward. Shoulder 127 of lock 121 is resting atop lever end 115A.

[0057] To disengage seat adapter 100 from track system 50, user 200 first rotates locks 120, 121 around lock bolts 124, 125. To rotate locks 120, 121 around lock bolts 124, 125, user 200 moves appendages 132, 133 inwardly, up and around lock bolts 124, 125 with his/her foot. Once appendages 132, 133 are rotated around lock bolts 124, 125, the straight sides of locks 120, 121 rest on the outward facing sides of lever ends 114A, 115A. With the straight sides of locks 120, 121 resting on the outward facing sides of lever ends 114A, 115A, user 200 places a single foot under rung 116 and lifts rung 116 upward. Levers 114, 115 slide upwardly through slots 118, 119 and pass lock bolts 124, 125 unimpeded by shoulders 126, 127 of locks 120, 121. As rung 116 is lifted upward and levers 114, 115 pass lock bolts 124, 125, locks 120, 121 slide back into their original positions by force of gravity. Simultaneously, as rung 116 is lifted upward, cams 112, 113 retract from under top surfaces 21 of frames 20, 20A and slide under bottom 101 of housing 100A.

[0058] When rung 116 is fully lifted and cams 112, 113 are retracted under housing 100A, user 200 removes his/her foot and rung 116 and levers 114, 115 remain lifted. Rung 116 and levers 114, 115 remain lifted due to friction about pivot 140. The friction adds to the resistance load present in the levering system such that the total resistance load has a torque sufficient to overcome the torque created by the levering system alone and gravity. This friction plus cams 112, 113 positioned opposite levers 114, 115 about pivot 140 enable user 200 to raise and lower rung 116 in a controlled manner. With rung 116 raised and cams 112, 113 retracted, user 200 simply tilts seat 250 and seat adapter 100 backward onto wheels W. Cams 112, 113 are lifted out of apertures 25 and hooks 110, 111 are extricated from adjacent apertures 25. With hooks 110, 111 disengaged from track system 50, user 200 is free to roll seat adapter 100 to another position along track system 50 or remove seat 250 and seat adapter 100 altogether.

[0059] As shown in Figure 21, seat adapter 100 can be arranged in a storage mode such that a number of seats 250 and seat adapters 100 can be arranged closely together along track system 50. When a number of seat adapters 100 are arranged in this manner, seats 250 are not operational because there is insufficient space to flip down the seat portion of seat 250. However, it is beneficial to be able to store seats 250 and seat adapters 100 so that when seats 250 are needed at a later time, seats 250 are easily accessible and easily positionable as described herein. Figure 21 also shows seat adapter 100 arranged for use. As long as nothing causing an obstruction in front of seat adapter 100, such as another seat adapter, seat adapter 100 is operational provided it is safely secured in track system 50.

[0060] Wheelchairs can be secured to track system 50 using typical industry tie-downs as follows. At least six frames as described herein are arranged in parallel along

a floor. Two front belts are secured to tracks of track system **50** which are situated wider than the front of the wheelchair. These belts stabilize the wheelchair side-to-side. Additionally, two rear belts are secured to tracks of track system **50**; the rear belts should align with the frame of the wheelchair. A lap and shoulder belt is then typically connected to the rear tie downs, the wall, and the user.

[0061] Thus, it is seen that the objects of the present invention are efficiently obtained, although modifications and changes to the invention should be readily apparent to those having ordinary skill in the art, which modifications are intended to be within the spirit and scope of the invention as claimed. It also is understood that the foregoing description is illustrative of the present invention and should not be considered as limiting. Therefore, other embodiments of the present invention are possible without departing from the spirit and scope of the present invention.

REFERENCE NUMERALS

[0062]

10	track
20	frame
20A	frame
21	top
22	side
23	side
X	longitudinal axis
25	aperture
Z	distance
A	center point
26	pair of transverse sides
27	pair of longitudinal sides
28	pair of transverse sides
29	pair of longitudinal sides
30	channel
31	lip
32	lip
33	support surface
34	support surface
35	plurality of straight portions
36	plurality of arcuate portions
a	angle
40	reinforcement
40A	base
40B	flange
40C	opening
41	exterior surface
42	side surface
50	X-track system
100	seat adapter
100A	housing
100B	locking system
101	bottom
102	left side
103	right side

104	top of left side
105	top of right side
106	front of left side
107	rear of left side
108	front of right side
109	rear of right side
W	wheel
W	wheel
110	hook
111	hook
112	cam
112A	aperture
113	cam
113A	aperture
114	lever
114A	lever end
115	lever
115A	lever end
116	rung
118	slot
119	slot
120	lock
121	lock
122	angled side
123	angled side
124	lock bolt
125	lock bolt
126	shoulder
127	shoulder
130	extension member
130A	L-shaped member
131	extension member
131A	L-shaped member
132	appendage
133	appendage
140	pivot
200	user
250	seat

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Claims

1. A track (10) assembly for positioning and removably securing wheelchairs and transit seats (250) in a vehicle, comprising:

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a first rail having a frame (20), said frame (20) comprising a top surface (21), a first side surface (22), a second side surface (23), and a longitudinal axis (X);

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a plurality of apertures (25) having a shape, said apertures (25) evenly distributed within said top surface (21) along said longitudinal axis (X) of said frame (20); and

55

a second rail (20A) identical to and arranged in parallel with said first rail (20) to form said track (10) assembly;

characterised in that

- a plurality of channels (30) connecting said first and second side surfaces (22, 23) proximate said top surface (21), wherein said channels (30) are evenly distributed along said longitudinal axis (X) of said frame (20).
2. The track (10) assembly for positioning and removably securing wheelchairs and transit seats (250) in a vehicle recited in Claim 1 wherein said first shape is an elongated quadrilateral.
 3. The track (10) assembly for positioning and removably securing wheelchairs and transit seats (250) in a vehicle recited in Claim 2 wherein said first shape is a rectangle.
 4. The track (10) assembly for positioning and removably securing wheelchairs and transit seats (250) in a vehicle recited in the preceding Claims, wherein said channels (30) further comprise a first lip (31) having alternating straight and arcuate portions (35, 36) and a second lip (32) opposite from said first lip (31) wherein said second lip (32) comprises respective alternating straight and arcuate portions (35, 36) which are aligned with the alternating straight and arcuate portions (35, 36) of said first lip (31).
 5. The track (10) assembly for positioning and removably securing wheelchairs and transit seats (250) in a vehicle recited in the preceding Claims wherein said channels (30) are arranged at an angle in relation to said apertures (25).
 6. The track (10) assembly for positioning and removably securing wheelchairs and transit seats (250) in a vehicle recited in Claim 5 wherein said angle is approximately 45 degrees.
 7. The track (10) assembly for positioning and removably securing wheelchairs and transit seats (250) in a vehicle recited in the preceding Claims wherein said plurality of apertures (25) and said plurality of channels (30) are alternately arranged.
 8. The track (10) assembly for positioning and removably securing wheelchairs and transit seats (250) in a vehicle recited in the preceding Claims wherein at least one aperture (25) of said plurality of apertures (25) overlaps at least one channel (30) of said plurality of channels (30).
 9. The track (10) assembly for positioning and removably securing wheelchairs and transit seats (250) in a vehicle recited in the preceding Claims wherein said frame (20) further comprises a reinforcement means (40).
 10. The track (10) assembly according to anyone of
- Claims 1 to 9, comprising a seat adapter (100) for a transportation vehicle for positioning and removably securing transit seats (250) in the transportation vehicle, wherein the seat adapter (100) comprises a housing (100A) having a locking means (100B) pivotally secured to said housing (100A), said locking means (100B) comprising:
- at least one cam (112, 113);
 - at least one lever (114, 115) fixedly secured to said housing (100A) and said at least one cam (112, 113);
 - a rung (116) fixedly secured to said at least one lever (114, 115);
- wherein to lockingly engage said seat adapter (100) to the track (10) assembly mounted to a floor, said at least one cam (112, 113) is aligned with an aperture (25) of said track (10) assembly and said rung (116) is depressed, which, in turn, depresses said at least one lever (114, 115), and, said at least one cam (112, 113) hooks under said aperture (25) of said track (10) assembly.
11. The track (10) assembly recited in Claim 10, the seat adapter (100) further comprising a first extension member (130) opposite a second (131) extension member secured to a first and second rear side (107, 109) of said housing (100A), respectively, proximate said bottom (101) of said housing (100A).
 12. The track (10) assembly recited in Claim 11, the seat adapter (100) further comprising a first wheel (W) secured to said first extension member (130) and a second wheel (W) secured to said second extension member (131).
 13. The track (10) assembly recited in the Claims 10 to 12, the seat adapter (100) further comprising a first lock (120) and a second lock (121) arranged to maintain said levers (114, 115) in a locked position.
 14. Use of a track (10) assembly according to the claims 10 to 13 for positioning and locking wheelchairs and transit seats (250).

Patentansprüche

1. Eine Spurvorrichtung (10) zur Positionierung und lösbaren Befestigung von Rollstühlen und Transitsitzen (250) in einem Fahrzeug, umfassend:
 - eine erste Schiene mit einem Rahmen (20), wobei der Rahmen (20) eine obere Oberfläche (21), eine erste Seitenoberfläche (22), eine zweite Seitenoberfläche (23) und eine Längsachse (X) umfasst,

- eine Vielzahl geformter Öffnungen (25), wobei die Öffnungen (25) innerhalb der oberen Oberfläche (21) entlang der Längsachse (X) des Rahmens (20) gleichmäßig verteilt sind, und eine zweite Schiene (20A), die identisch und parallel angeordnet zur ersten Schiene (20) ist, um die Spurvorrichtung (10) zu bilden, **dadurch gekennzeichnet, dass** eine Vielzahl von Rinnen (30), die die erste und zweite Seitenoberfläche (22, 23) entlang der oberen Oberfläche (21) miteinander verbindet, wobei die Rinnen (30) gleichmäßig entlang der Längsachse (X) des Rahmens (20) verteilt sind.
2. Die Spurvorrichtung (10) zur Positionierung und lös-
baren Befestigung von Rollstühlen und Transitsitzen
(250) in einem Fahrzeug nach Anspruch 1, wobei es
sich bei der ersten Form um ein verlängertes Viereck
handelt.
 3. Die Spurvorrichtung (10) zur Positionierung und lös-
baren Befestigung von Rollstühlen und Transitsitzen
(250) in einem Fahrzeug nach Anspruch 2, wobei es
sich bei der ersten Form um ein Rechteck handelt.
 4. Die Spurvorrichtung (10) zur Positionierung und lös-
baren Befestigung von Rollstühlen und Transitsitzen
(250) in einem Fahrzeug nach einem der vorange-
henden Ansprüche, wobei die Rinnen (30) zudem
eine erste Lippe (31) umfassen, die abwechselnd
gerade und bogenförmige Abschnitte (35, 36) auf-
weist, sowie eine zweite Lippe (32) gegenüber der
ersten Lippe (31), wobei die zweite Lippe (32) ent-
sprechend abwechselnd gerade und bogenförmige
Abschnitte (35, 36) aufweist, die an den abwech-
selnd geraden und bogenförmigen Abschnitten (35,
36) der ersten Lippe (31) ausgerichtet sind.
 5. Die Spurvorrichtung (10) zur Positionierung und lös-
baren Befestigung von Rollstühlen und Transitsitzen
(250) in einem Fahrzeug nach einem der vorange-
henden Ansprüche, wobei die Rinnen (30) in einem
Winkel in Bezug zu den Öffnungen (25) angeordnet
sind.
 6. Die Spurvorrichtung (10) zur Positionierung und lös-
baren Befestigung von Rollstühlen und Transitsitzen
(250) in einem Fahrzeug nach Anspruch 5, wobei
der Winkel ungefähr 45 Grad beträgt.
 7. Die Spurvorrichtung (10) zur Positionierung und lös-
baren Befestigung von Rollstühlen und Transitsitzen
(250) in einem Fahrzeug nach einem der vorange-
henden Ansprüche, wobei die Vielzahl der Öffnun-
gen (25) und die Vielzahl der Rinnen (30) abwech-
selnd angeordnet sind.
 8. Die Spurvorrichtung (10) zur Positionierung und lös-
baren Befestigung von Rollstühlen und Transitsitzen
(250) in einem Fahrzeug nach einem der vorange-
henden Ansprüche, wobei mindestens eine Öffnung
(25) der Vielzahl der Öffnungen (25) mit mindestens
einer Rinne (30) der Vielzahl der Rinnen (30) über-
lappt.
 9. Die Spurvorrichtung (10) zur Positionierung und lös-
baren Befestigung von Rollstühlen und Transitsitzen
(250) in einem Fahrzeug nach einem der vorange-
henden Ansprüche, wobei der Rahmen (20) zudem
ein Verstärkungsmittel (40) aufweist.
 10. Die Spurvorrichtung (10) nach einem der Ansprüche
1 bis 9, umfassend einen Sitzadapter (100) für ein
Transportfahrzeug zur Positionierung und lös-
baren Befestigung von Transitsitzen (250) in dem Trans-
portfahrzeug, wobei der Sitzadapter (100) umfasst:
ein Gehäuse (100A) mit einer Sperrvorrichtung
(100B), das am Gehäuse (100A) drehbar befestigt
ist, wobei die Sperrvorrichtung (100B) umfasst:
mindestens eine Nocke (112, 113),
mindestens einen Hebel (114, 115), der fest
am Gehäuse (100A) und an mindestens einer
Nocke (112, 113) befestigt ist,
eine Sprosse (116), die an dem mindestens
einen Hebel (114, 115) befestigt ist,
wobei zwecks des verriegelbaren Einras-
tens des Sitzadapters (100) in die an einen
Boden montierte Spurvorrichtung (10) die
mindestens eine Nocke (112, 113) bezüg-
lich einer Öffnung (25) der Spurvorrichtung
(10) ausgerichtet und die Sprosse (116) nie-
dergedrückt ist, was wiederum den mindes-
tens einen Hebel (114, 115) niederdrückt
und sich die mindestens eine Nocke (112,
113) unter die Öffnung (25) die Spurvorrich-
tung (10) einhakt.
 11. Die Spurvorrichtung (10) nach Anspruch 10, wobei
der Sitzadapter (100) zudem ein erstes Erweite-
rungselement (130) gegenüber einem zweiten Er-
weiterungselement (131) umfasst, wobei das erste
Erweiterungselement (130) und zweite Erweite-
rungselement (131) jeweils an einer ersten bzw.
zweiten Rückseite (107, 109) des Gehäuses (100A)
neben der Unterseite (101) des Gehäuses (100A)
befestigt sind.
 12. Die Spurvorrichtung (10) nach Anspruch 11, der Sitz-
adapter (100) zudem umfassend ein erstes Rad (W),
das am ersten Erweiterungselement (130) befestigt
ist, und ein zweites Rad (W), das am zweiten Erweite-
rungselement (131) befestigt ist.

13. Die Spurvorrichtung (10) nach einem der Ansprüche 10 bis 12, der Sitzadapter (100) zudem umfassend eine erste Sperrvorrichtung (120) und eine zweite Sperrvorrichtung (121), die angeordnet sind, um die Hebel (114, 115) in einer verriegelten Stellung zu halten.
14. Verwendung einer Spurvorrichtung (10) nach einem der Ansprüche 10 bis 13 zur Positionierung und Verriegelung von Rollstühlen und Transitsitzen (250).

Revendications

1. Un assemblage de traces (10) pour positionner et bloquer de manière amovible des fauteuils roulants et des sièges de transit (250) dans un véhicule, comprenant:

un premier rail avec un cadre (20), le cadre (20) comprenant une surface supérieure (21), une première surface latérale (22), une seconde surface latérale (23) et un axe longitudinal (X);
une pluralité d'ouvertures (25) ayant une forme, les ouvertures (25) étant distribuées régulièrement sur la surface supérieure (21) le long de l'axe longitudinal (X) du cadre (20) et;

un second rail (20A), identique à et disposé en parallèle du premier rail (20) pour former l'assemblage de traces (10);

caractérisé en cela que

une pluralité de canaux (30) connectant la première et la seconde surface latérale (22, 23) proches de la surface supérieure (21) dans laquelle les canaux (30) sont distribués régulièrement le long de l'axe longitudinal (X) du cadre (20).

2. L'assemblage de traces (10) pour positionner et bloquer de manière amovible les fauteuils roulants et les sièges de transit (250) dans un véhicule selon la revendication 1 dans lequel la première forme est un quadrilatéral allongé.
3. L'assemblage de traces (10) pour positionner et bloquer de manière amovible les fauteuils roulants et les sièges de transit (250) dans un véhicule selon la revendication 2 dans lequel la première forme est un rectangle.
4. L'assemblage de traces (10) pour positionner et bloquer de manière amovible les fauteuils roulants et les sièges de transit (250) dans un véhicule selon l'une des revendications précédentes dans lequel les canaux (30) comprennent également une première lèvre (31) ayant des portions alternativement droites et arquées (35, 36) et une seconde lèvre (32) à l'opposé de la première lèvre (31) dans lequel la seconde lèvre (32) comprend des portions alterna-

tivement droites et arquées (35, 36) qui sont alignées avec les portions alternativement droites et arquées (35, 36) de la première lèvre (31).

5. L'assemblage de traces (10) pour positionner et bloquer de manière amovible les fauteuils roulants et les sièges de transit (250) dans un véhicule selon l'une des revendications précédentes dans lequel les canaux (30) sont organisés sur un angle en relation avec les ouvertures (25).

6. L'assemblage de traces (10) pour positionner et bloquer de manière amovible les fauteuils roulants et les sièges de transit (250) dans un véhicule selon la revendication 5 dans lequel l'angle est d'environ 45 degrés.

7. L'assemblage de traces (10) pour positionner et bloquer de manière amovible les fauteuils roulants et les sièges de transit (250) dans un véhicule selon l'une des revendications précédentes dans lequel la pluralité d'ouvertures (25) et la pluralité de canaux (30) s'alternent.

8. L'assemblage de traces (10) pour positionner et bloquer de manière amovible les fauteuils roulants et les sièges de transit (250) dans un véhicule selon l'une des revendications précédentes dans au moins une ouverture (25) de la pluralité d'ouvertures (25) chevauche au moins un canal (30) de la pluralité de canaux (30).

9. L'assemblage de traces (10) pour positionner et bloquer de manière amovible les fauteuils roulants et les sièges de transit (250) dans un véhicule selon l'une des revendications précédentes dans lequel le cadre (20) comprend également un moyen de renfort (40).

10. L'assemblage de traces (10) selon l'une des revendications 1 à 9 comprenant un adaptateur de siège (100) pour un véhicule de transport pour positionner et bloquer de manière amovible des sièges de transit (250) dans un véhicule de transport dans lequel l'adaptateur de siège (100) comprend un boîtier (100A) ayant un moyen de verrouillage (100B) attaché de manière pivotante sur le boîtier (100A), le moyen de verrouillage (100B) comprenant:

au moins un galet (112, 113),
au moins un levier (114, 115) fixé de manière sécurisée sur le boîtier (100A) et sur l'au moins un galet (112, 113),
un échelon (116) fixé de manière sécurisée sur l'au moins un levier (114, 115),
dans lequel, pour verrouiller l'adaptateur de siège (100) à l'assemblage de traces (10) monté

sur un sol, l'au moins un galet (112, 113) est aligné sur une ouverture (25) du assemblage de traces (10) et l'échelon (116) est enfoncé, et à son tour, l'au moins un levier (114, 115) et l'au moins un galet (112, 113) s'accroche sous l'ouverture (25) de l'assemblage de traces (10).

- 5
11. L'assemblage de traces (10) selon la revendication 10, l'adaptateur de siège (100) comprenant un premier membre extension (130) opposé un second membre extension (131) bloqué par un premier côté arrière et un second côté arrière (107, 109) du boîtier (100A), respectivement, à proximité du sol (101) du boîtier (100A).
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12. L'assemblage de traces (10) selon la revendication 11, l'adaptateur de siège (100) comprenant également une première roue (W) bloquée sur le premier membre à extension (130) et une seconde roue (W) bloquée sur le second membre à extension (131).
- 20
13. L'assemblage de traces (10) selon l'une des revendications précédentes 10 à 12, l'adaptateur de siège (100) comprenant également un premier verrou (120) et un second verrou (121) organisés pour maintenir les leviers (114, 115) dans une position verrouillée.
- 25
14. Utilisation d'un assemblage de traces (10) selon l'une des revendications 10 à 13 pour positionner et bloquer des fauteuils roulants et des sièges de transition (250).
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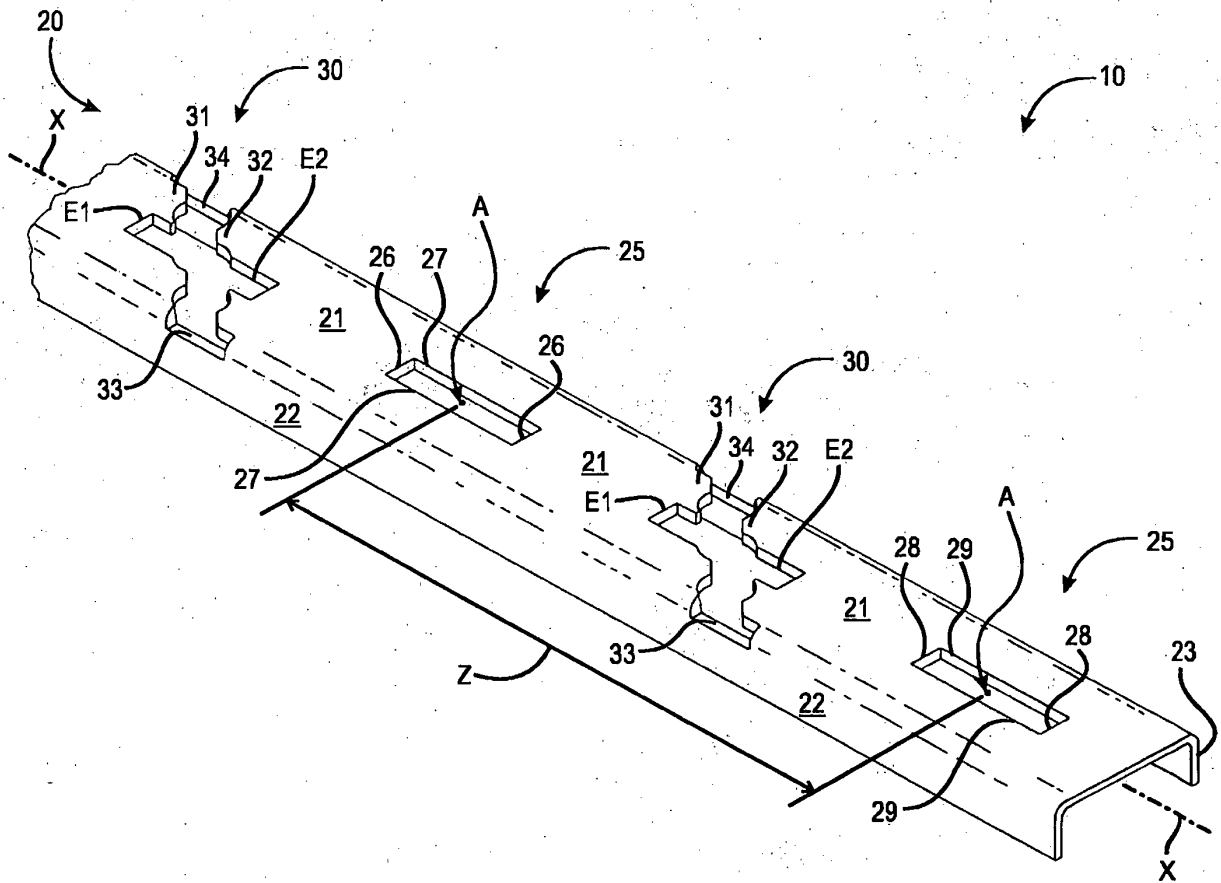


Fig. 1

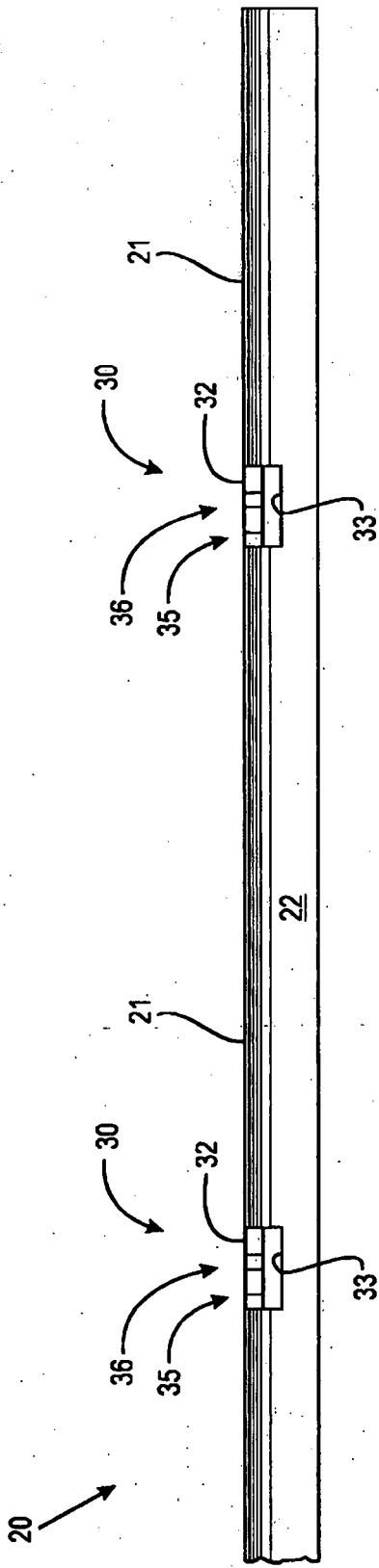


Fig. 2

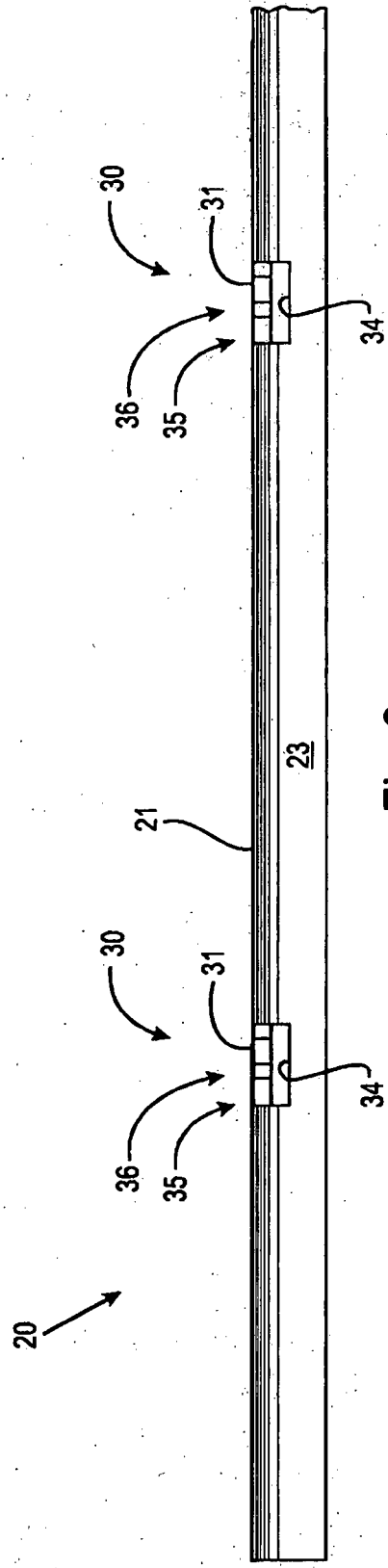


Fig. 3

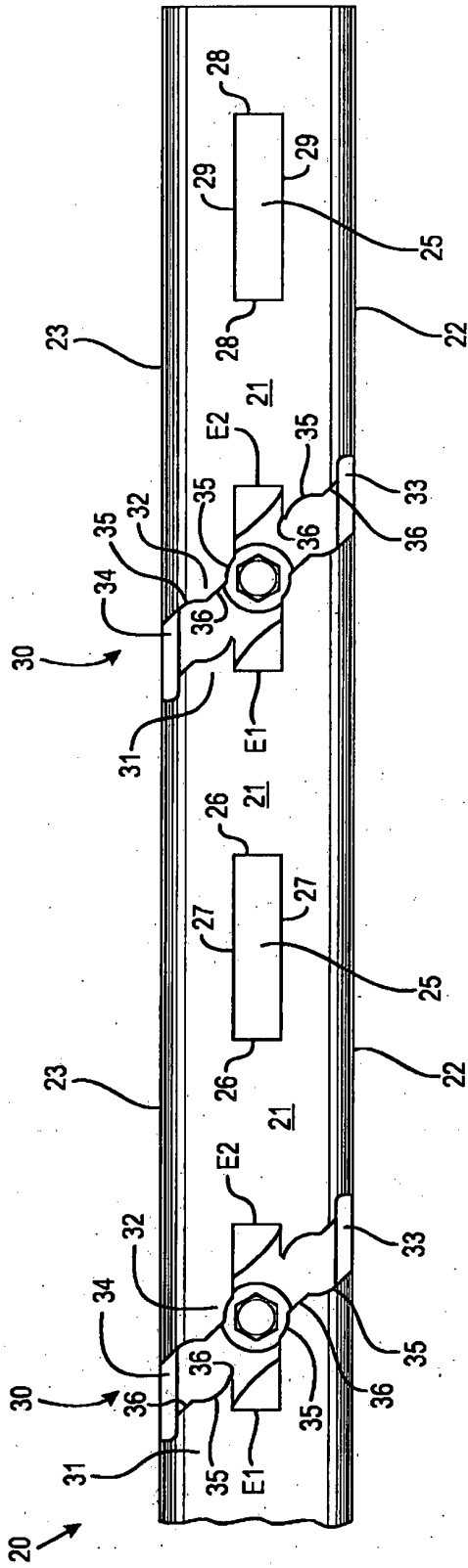


Fig. 4

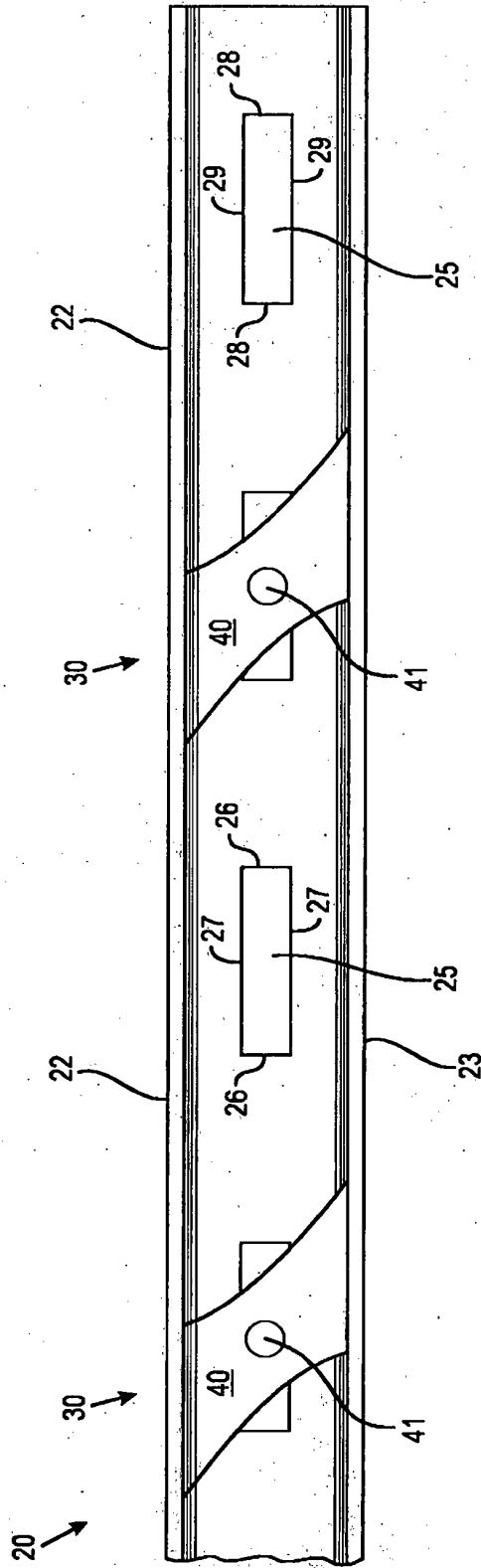
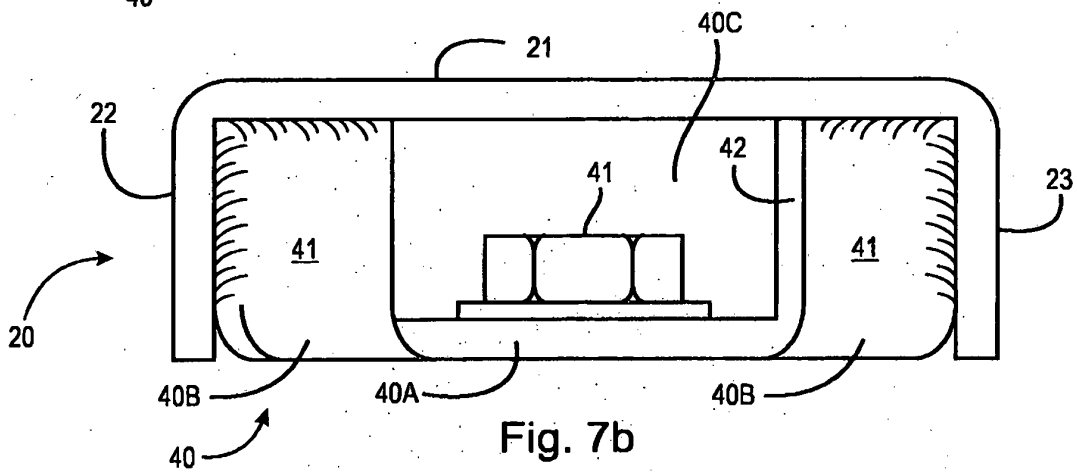
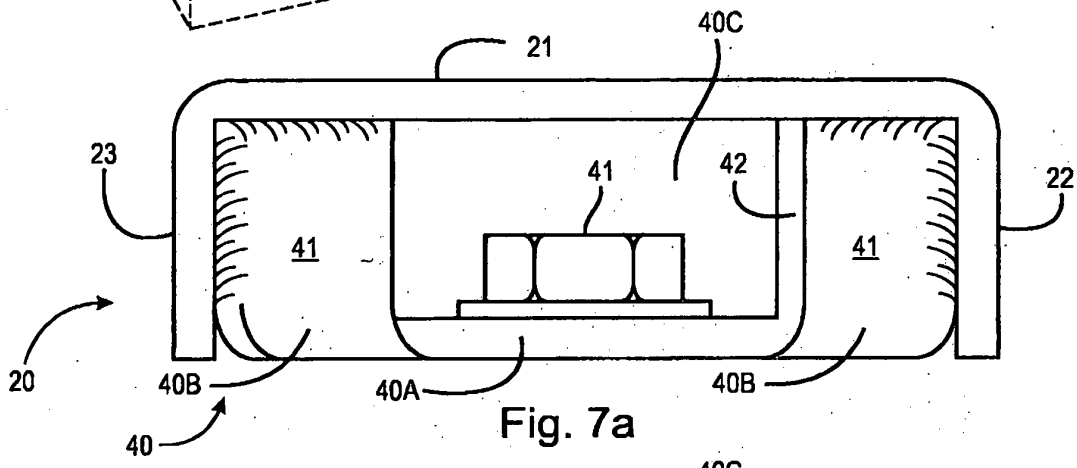
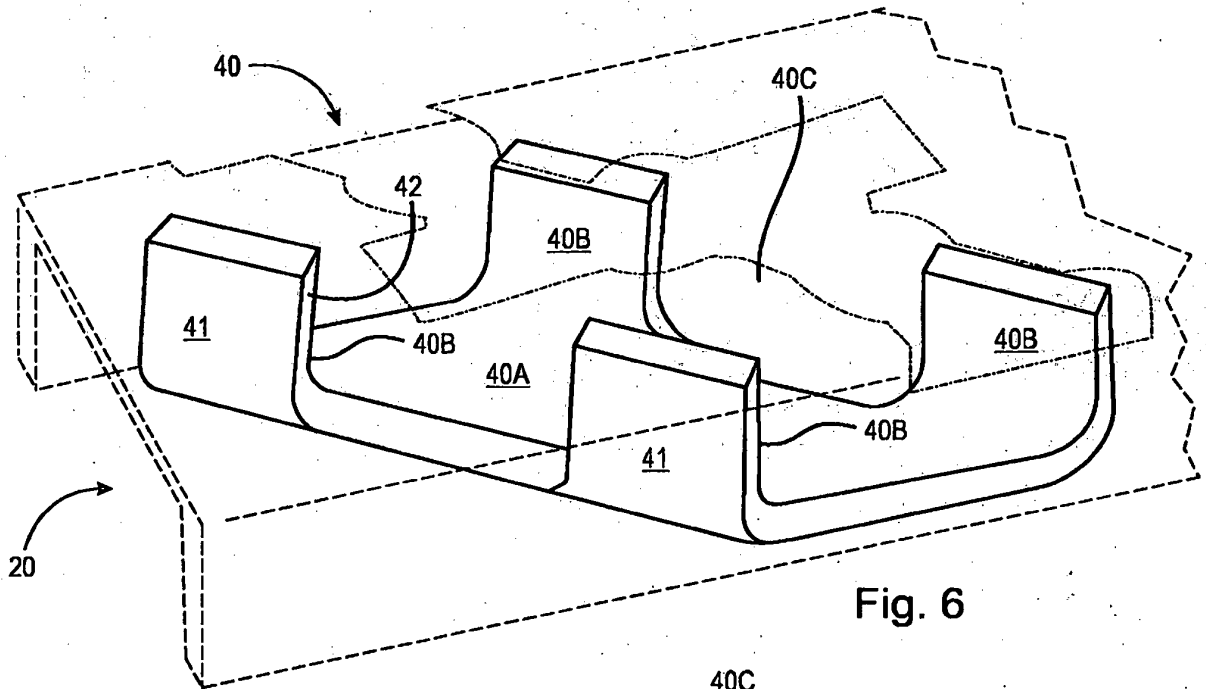


Fig. 5



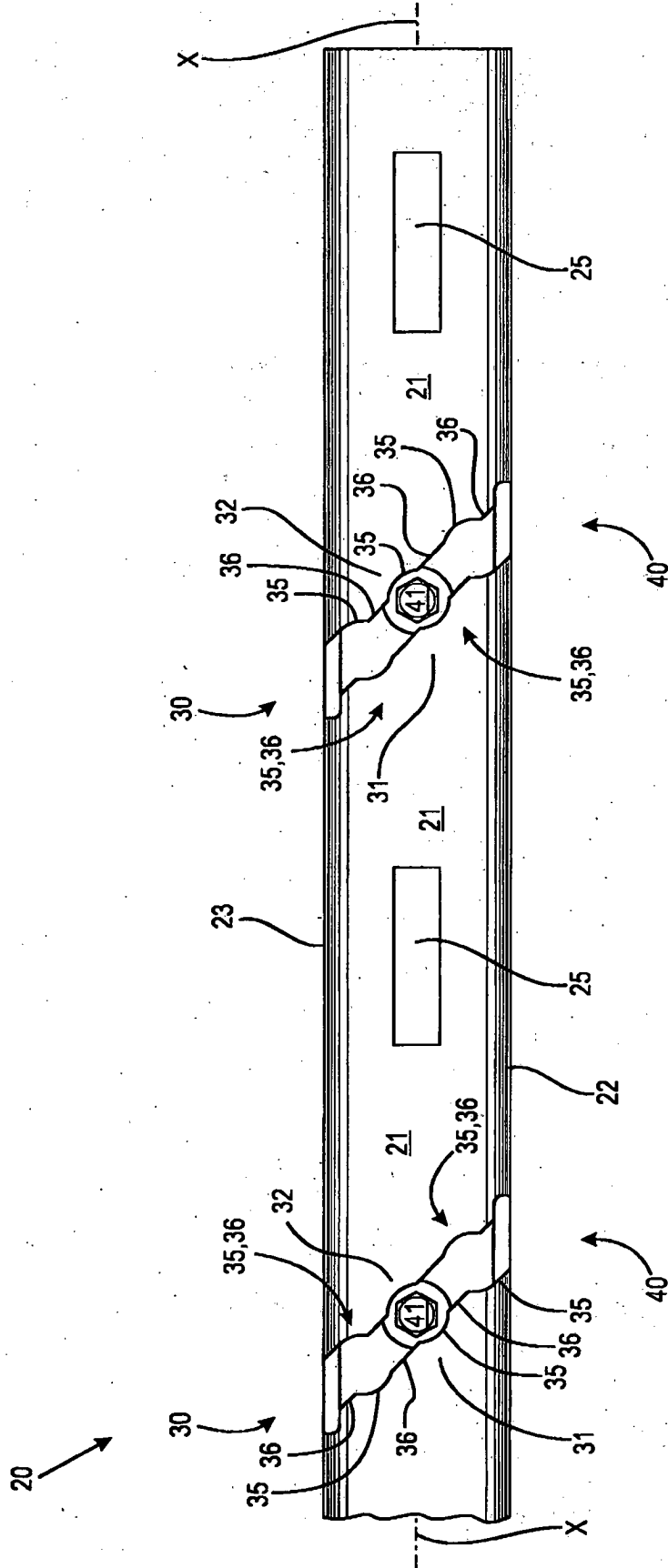


Fig. 8

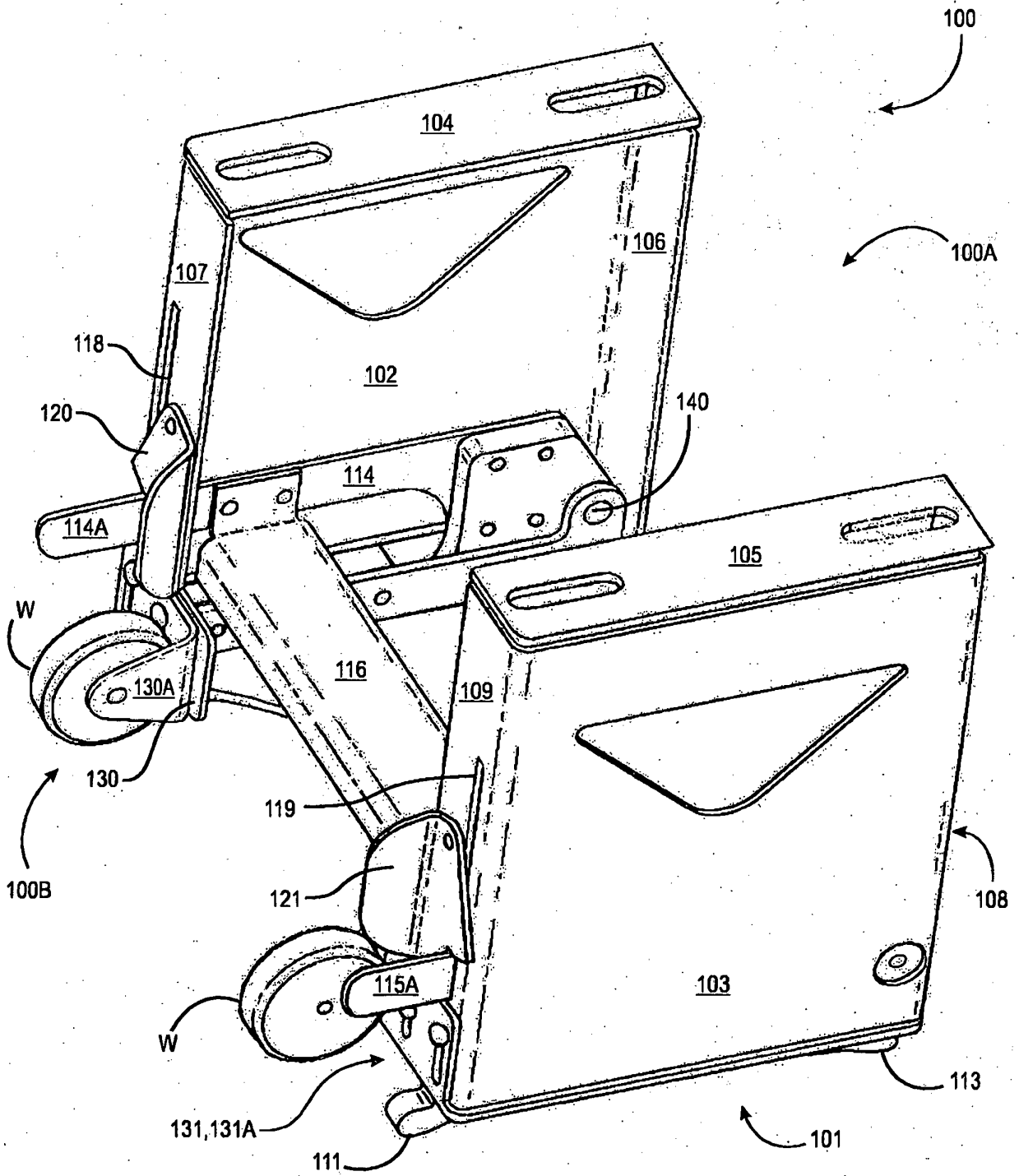


Fig. 9

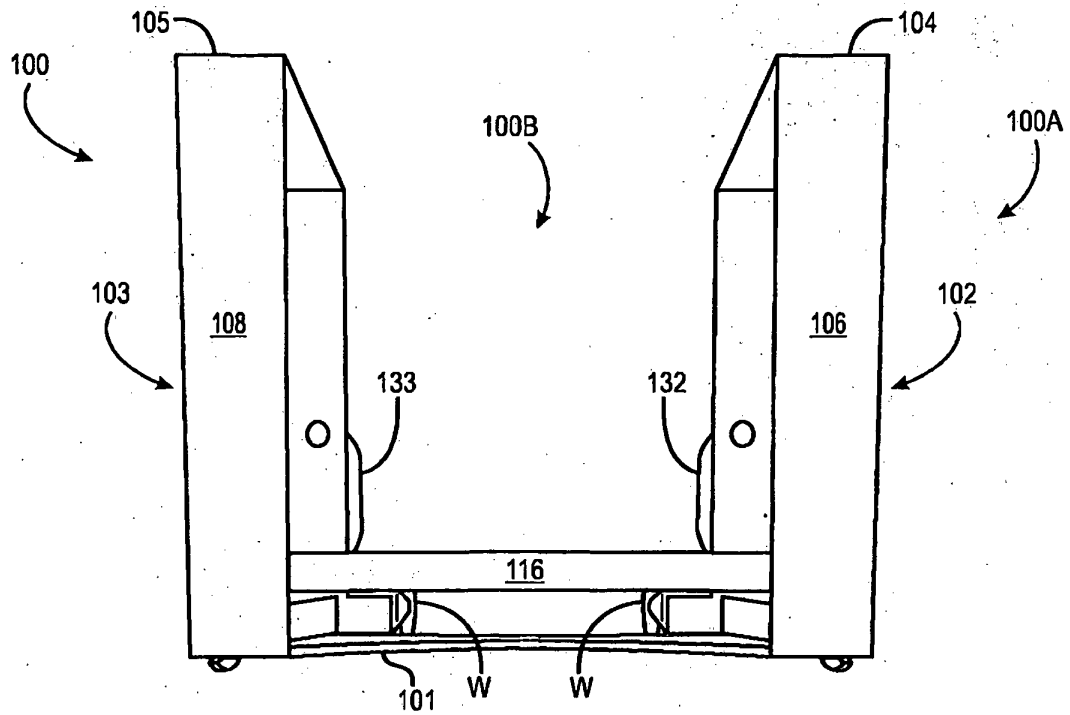


Fig. 10

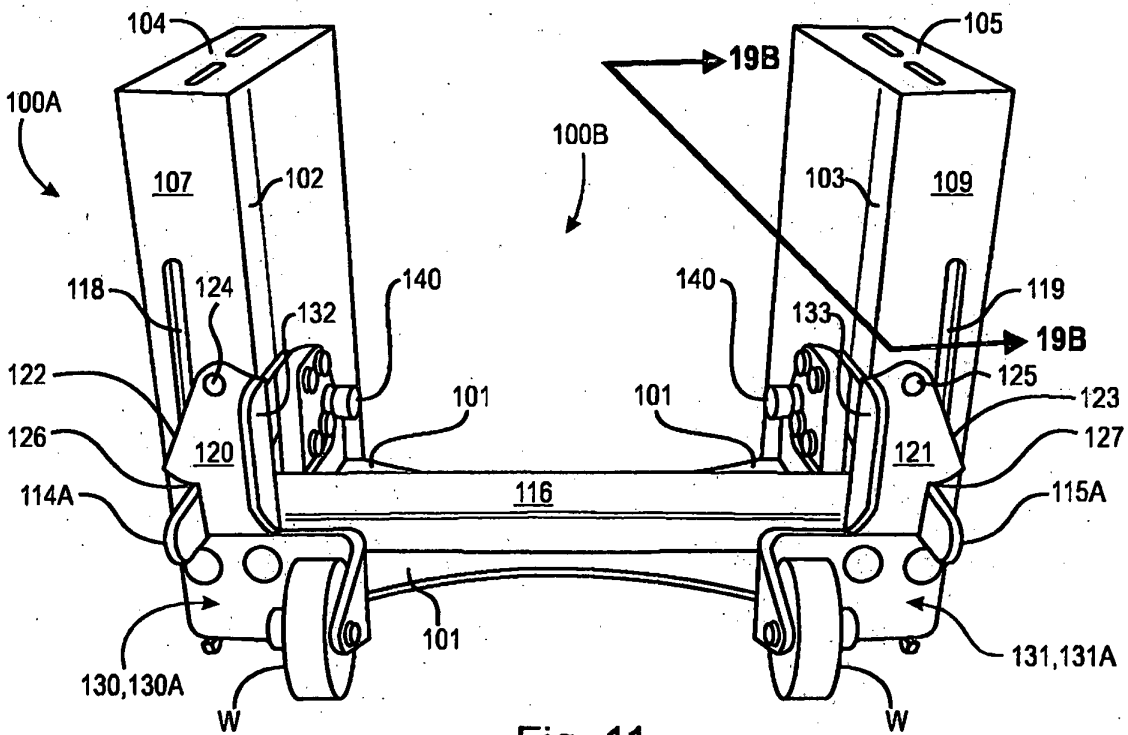
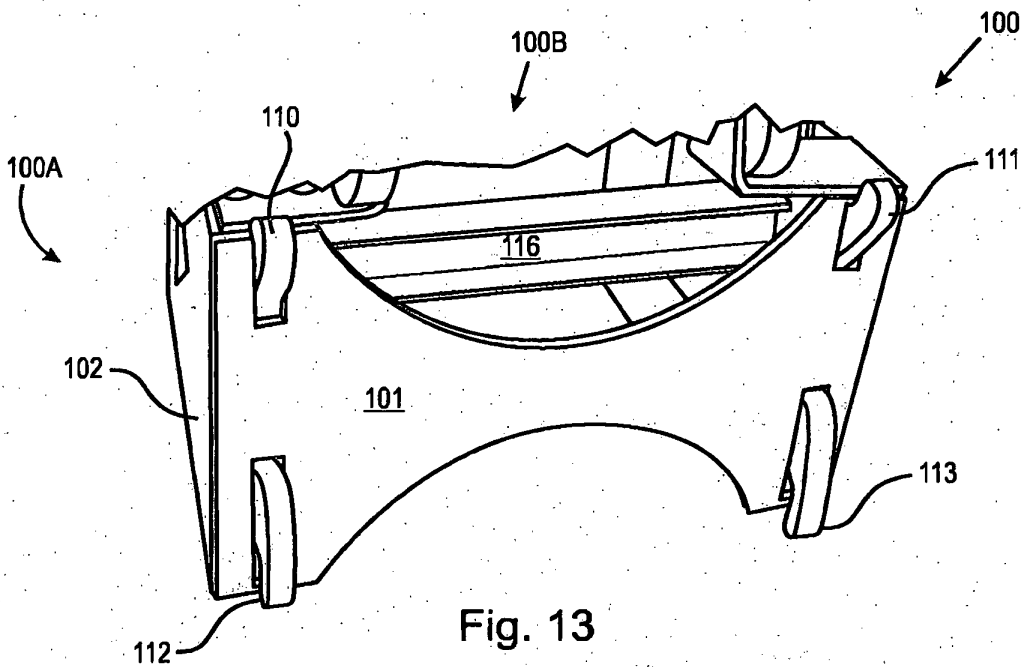
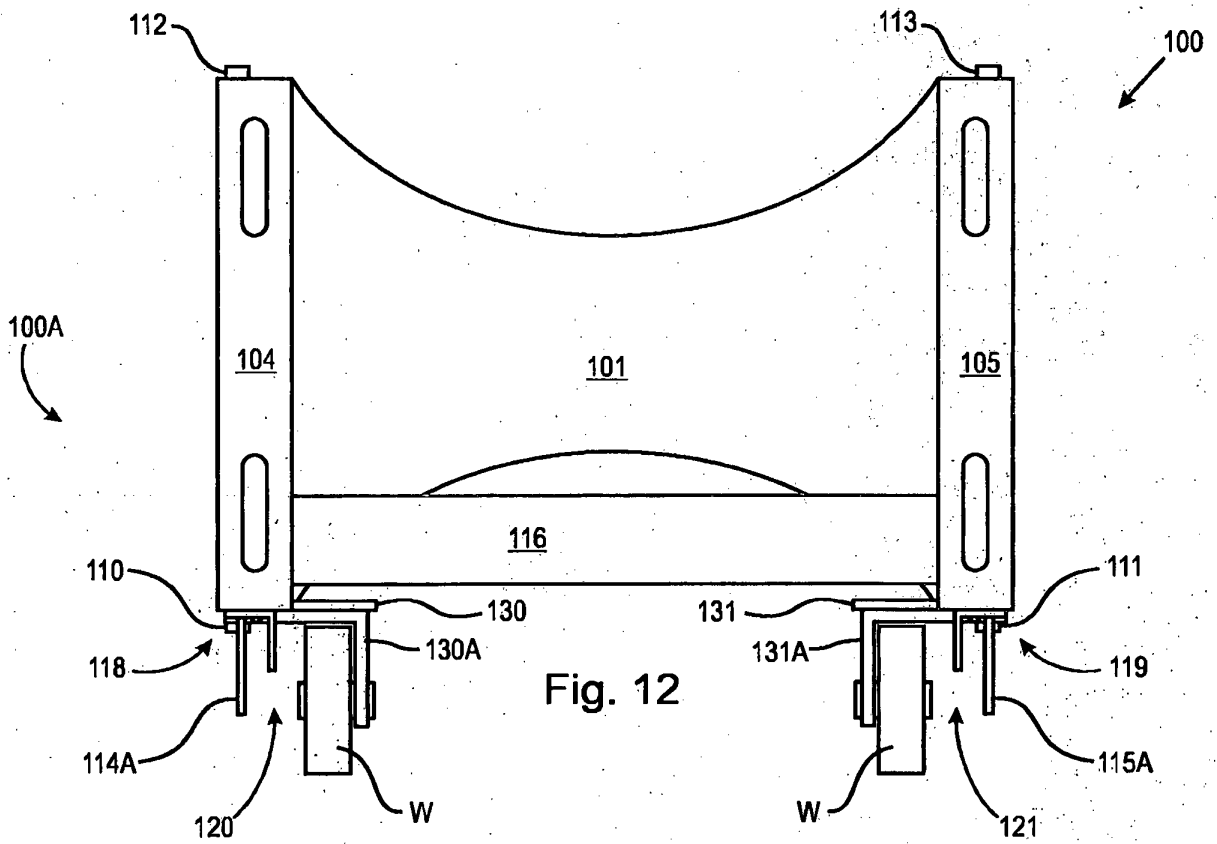


Fig. 11



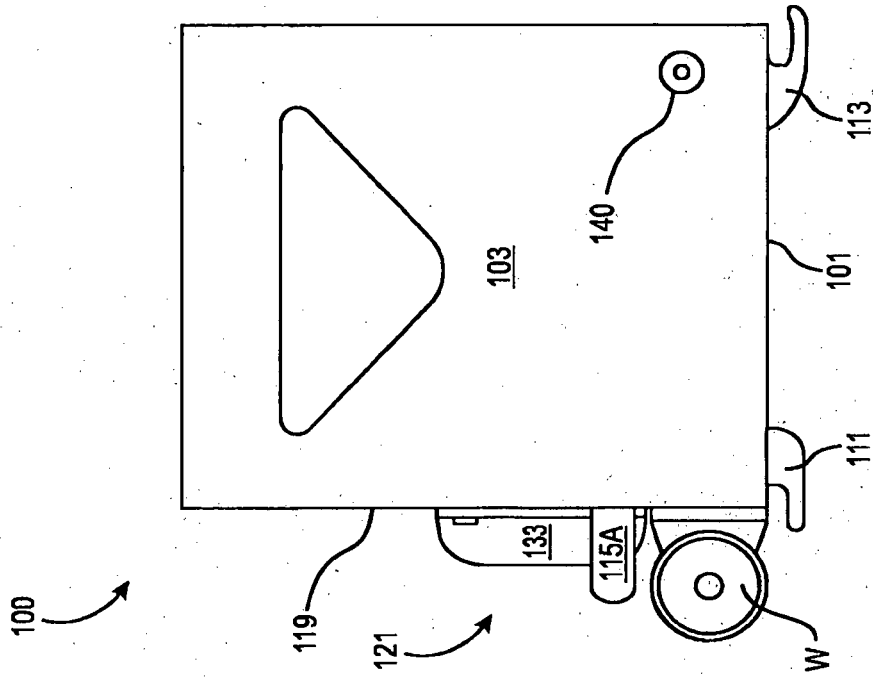


Fig. 14

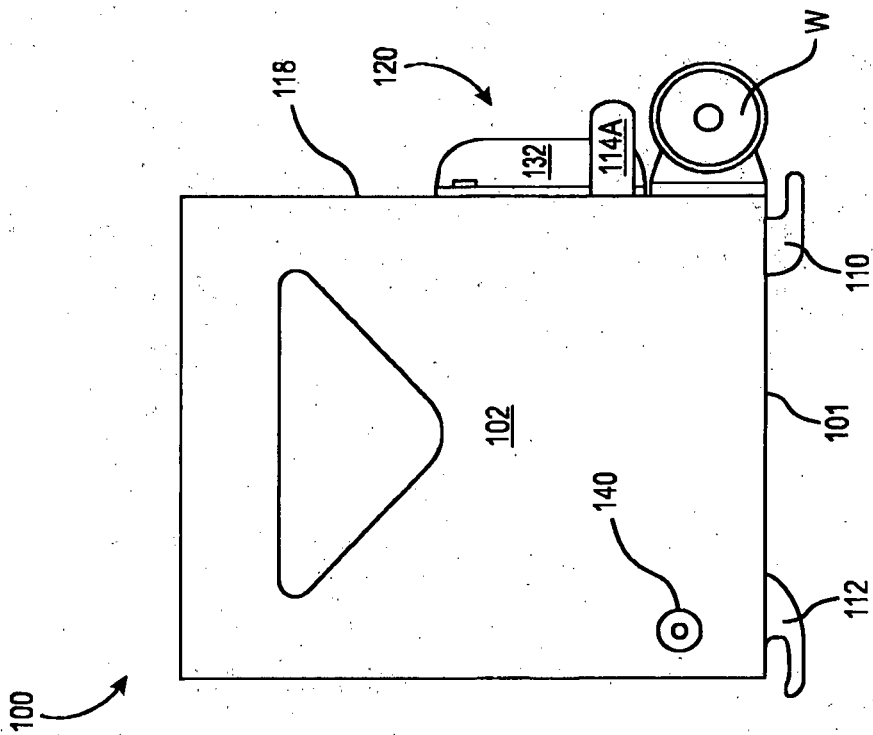


Fig. 15

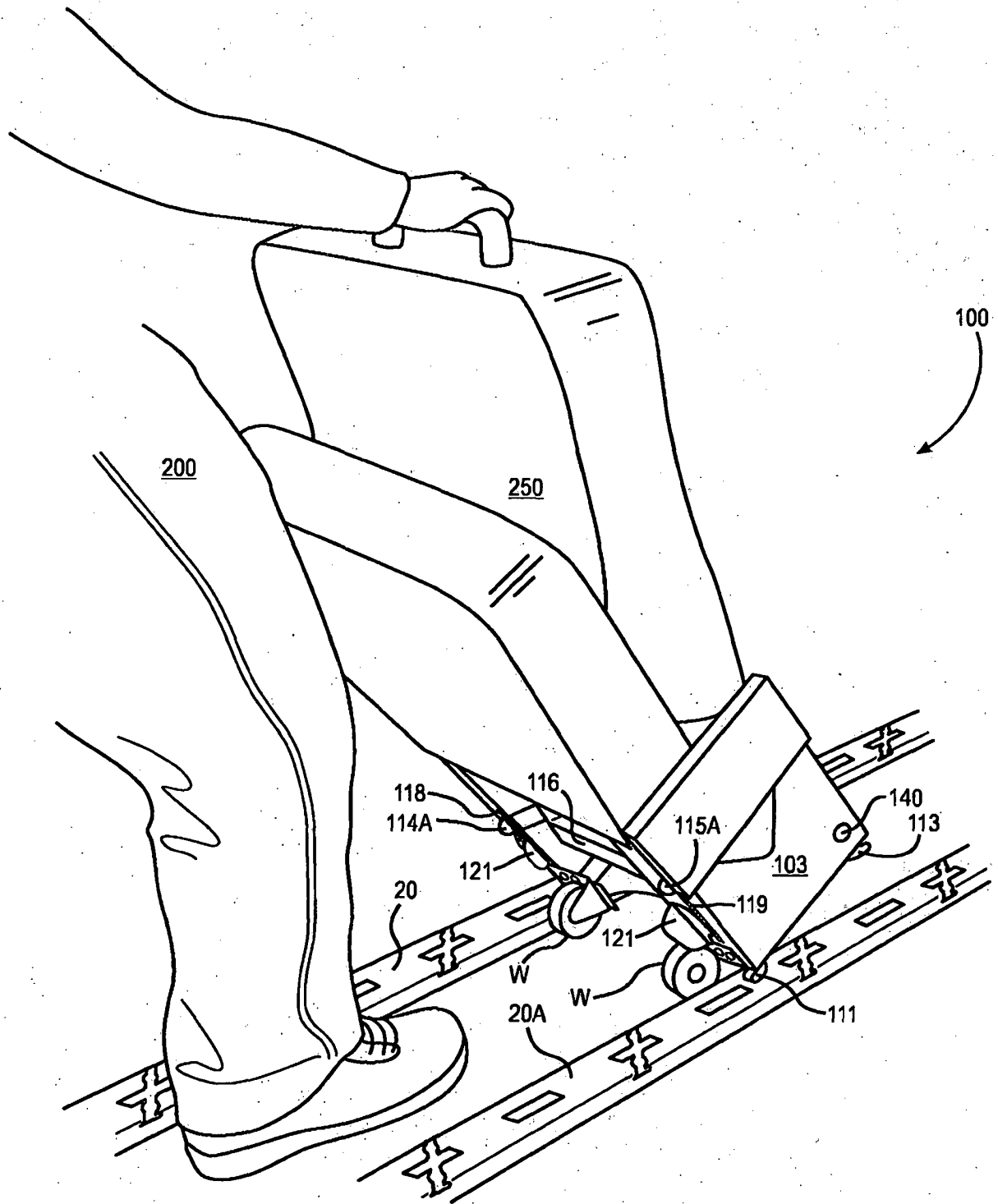


Fig. 16

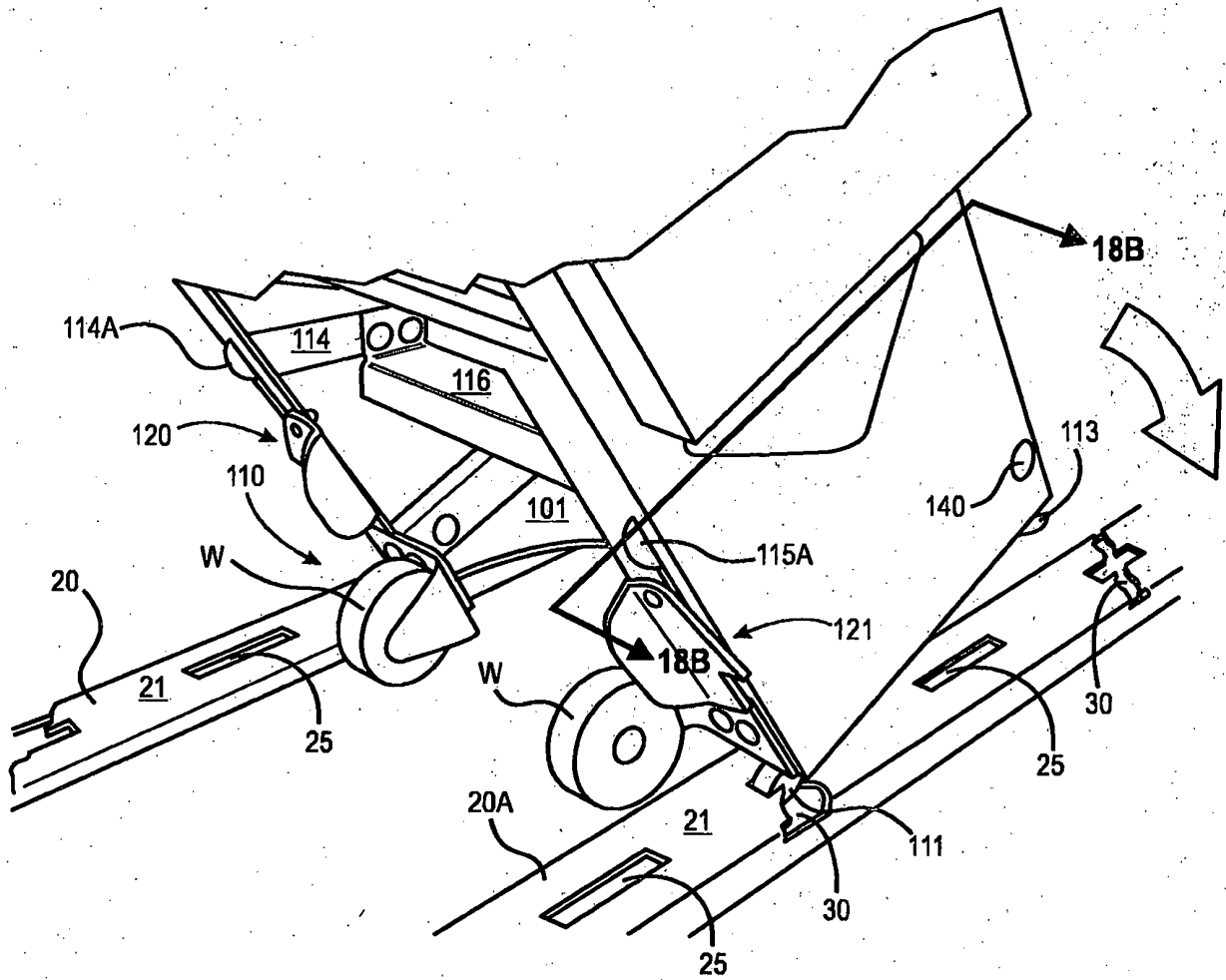


Fig. 17

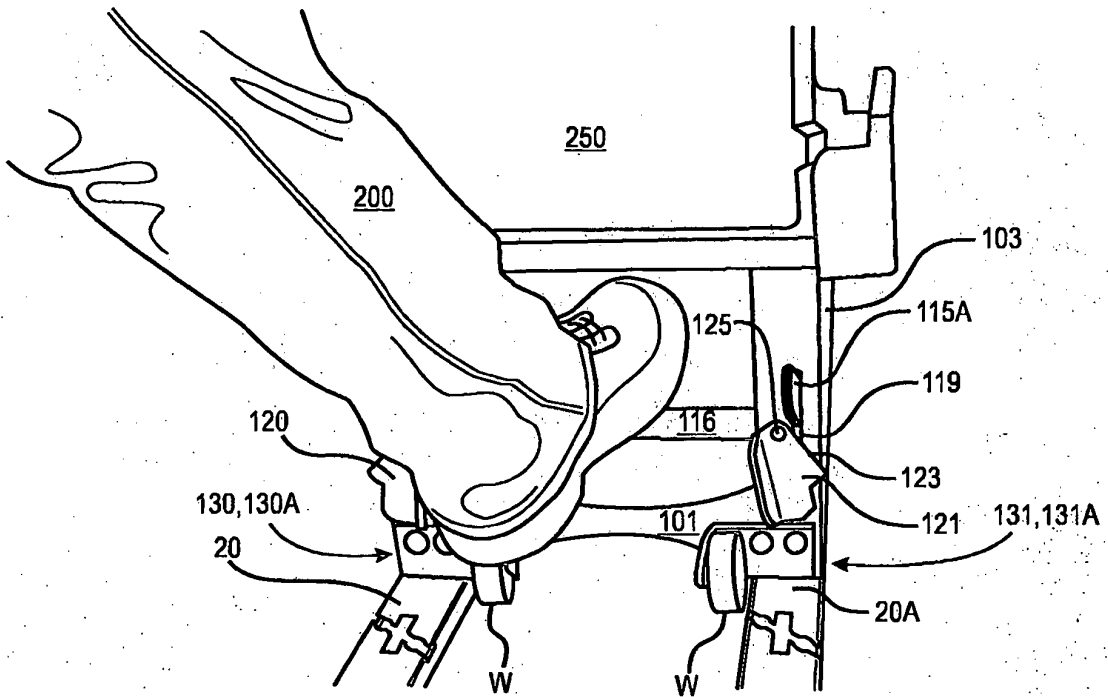


Fig. 18A

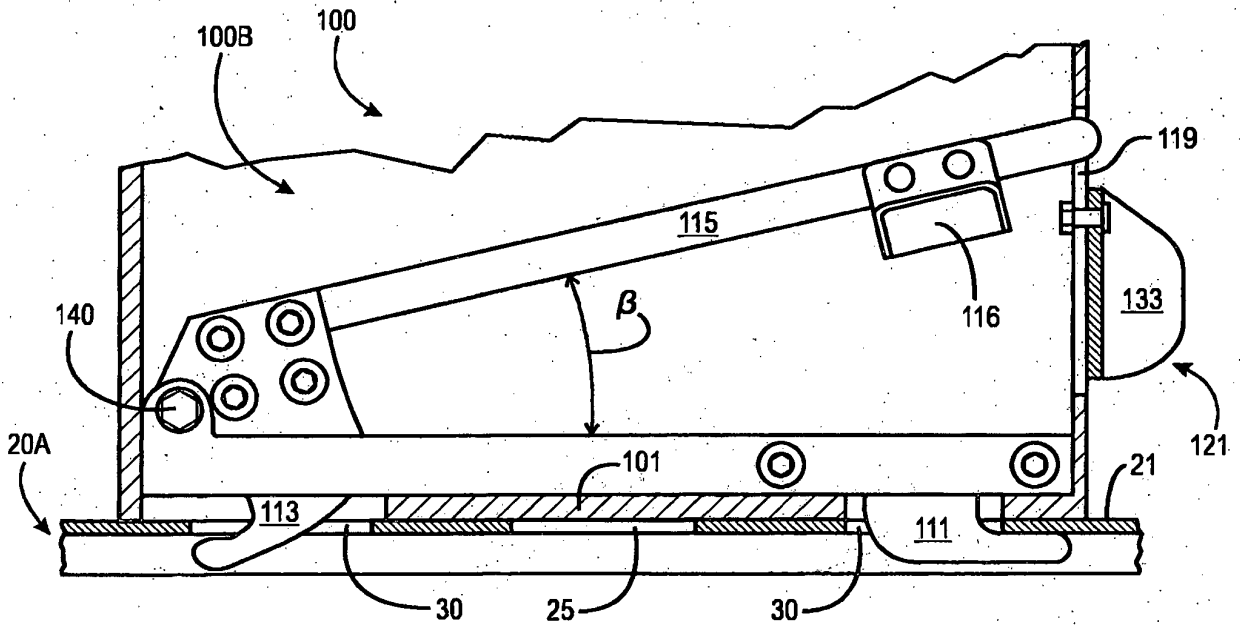


Fig. 18B

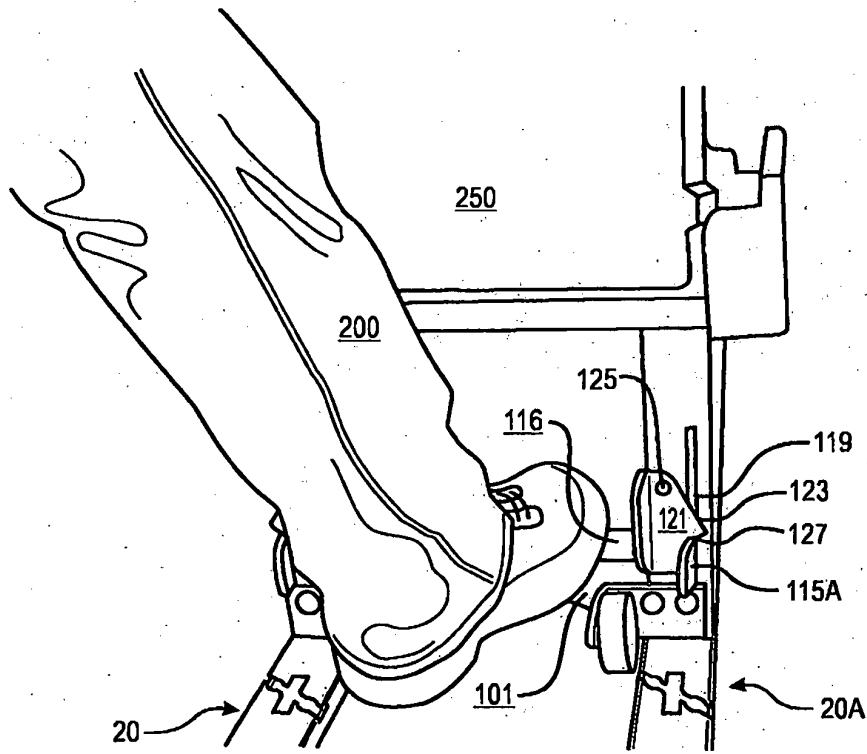


Fig. 19A

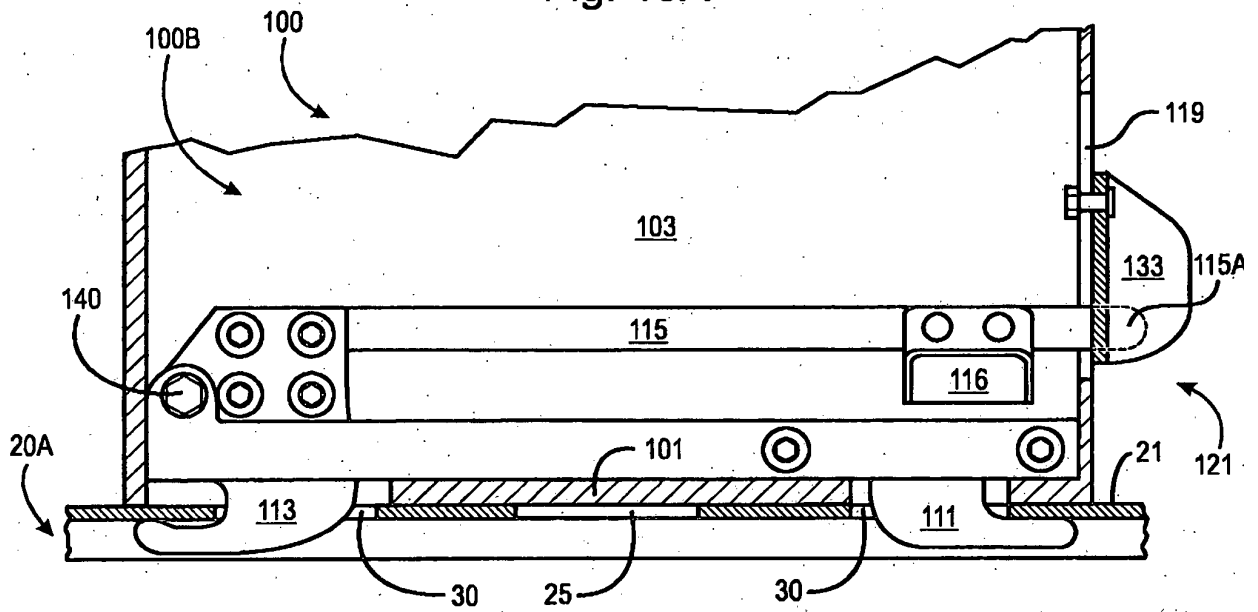
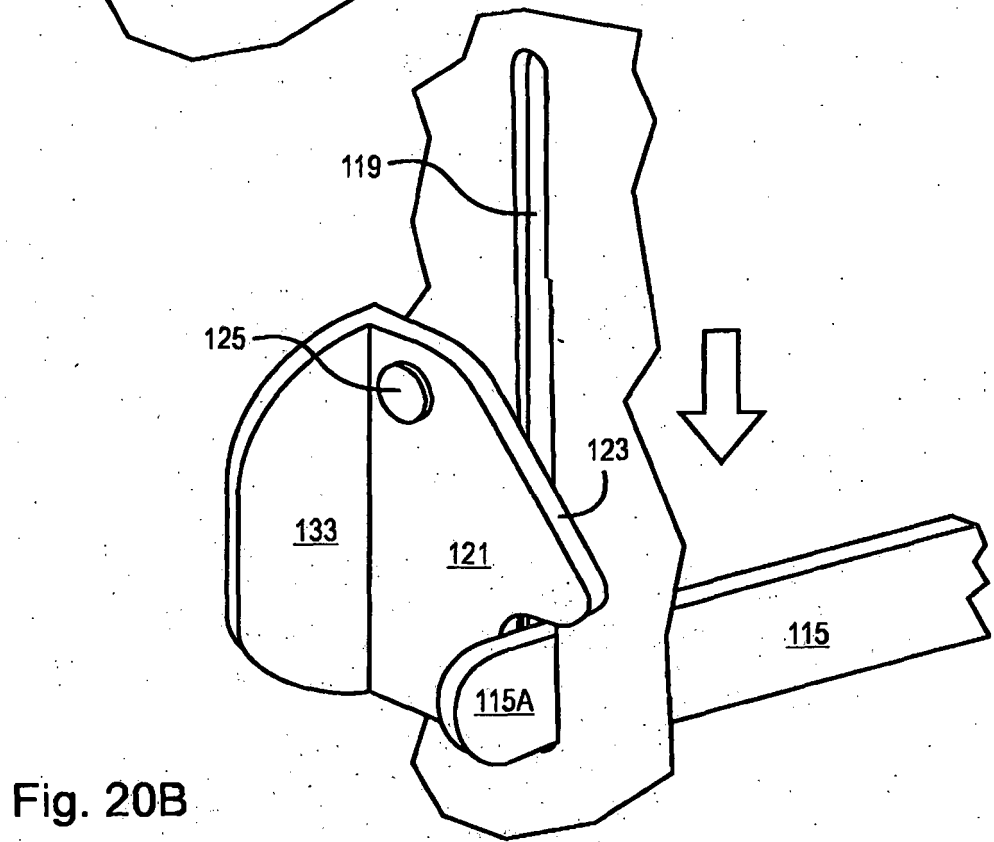
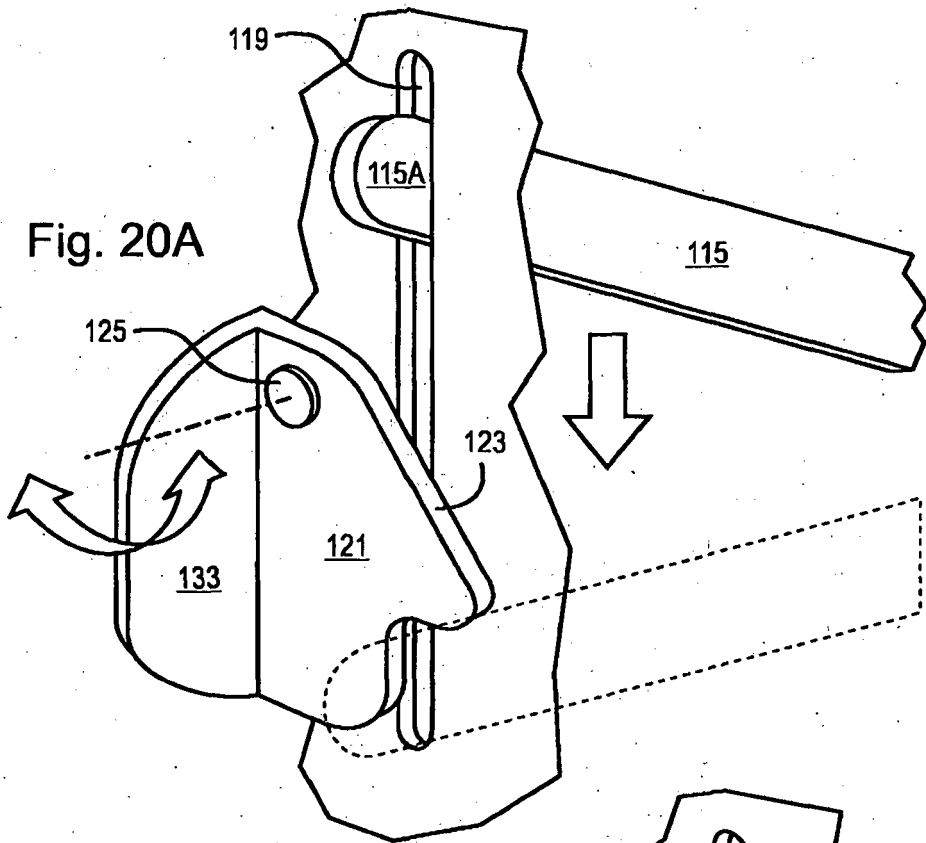


Fig. 19B



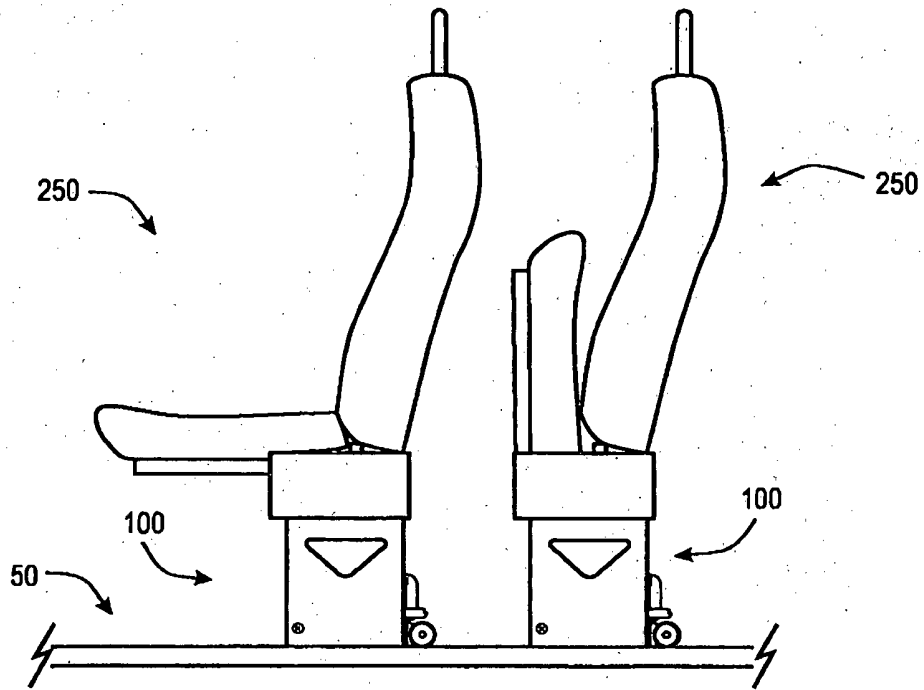


Fig. 21

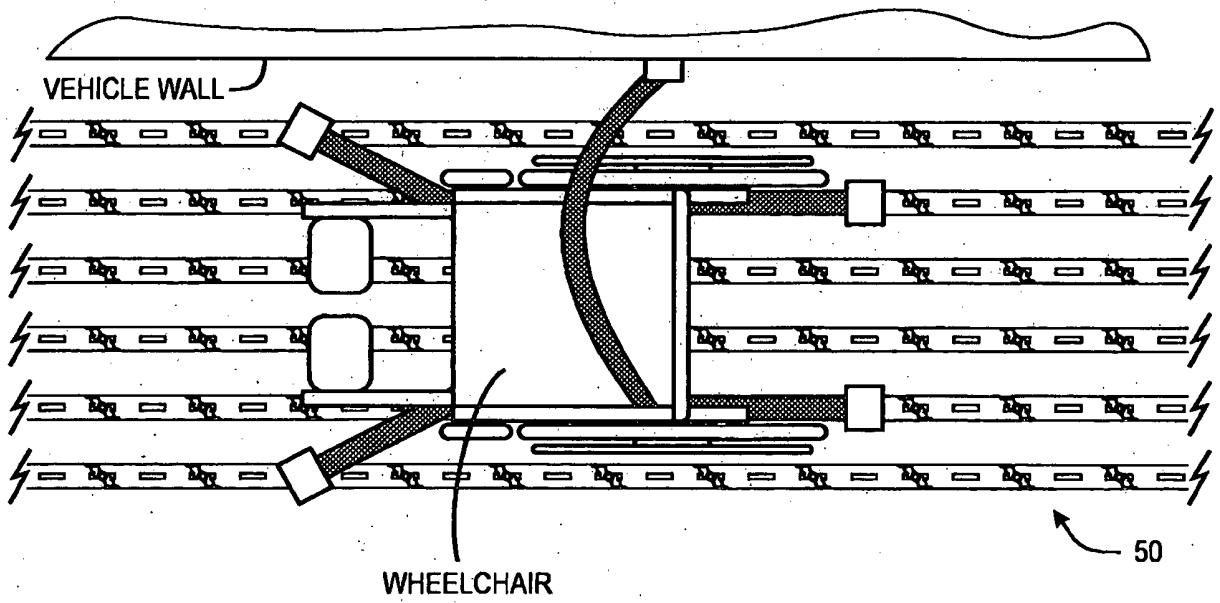


Fig. 22

REFERENCES CITED IN THE DESCRIPTION

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