



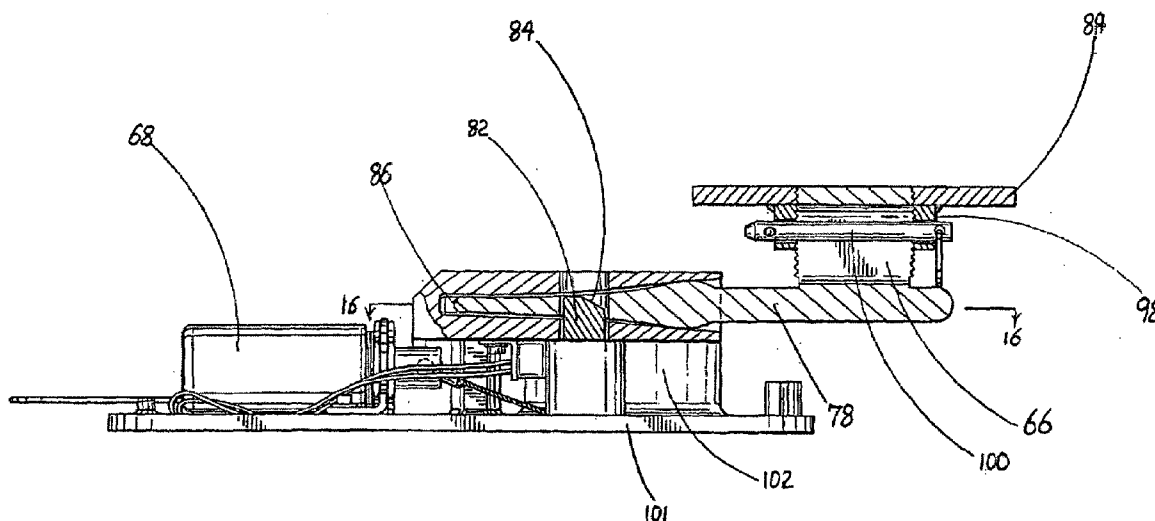
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(19) **United States**(12) **Patent Application Publication**
Girardin et al.(10) **Pub. No.: US 2009/0214314 A1**(43) **Pub. Date: Aug. 27, 2009**(54) **WHEEL CHAIR DOCKING SYSTEM****Publication Classification**(76) Inventors: **Jean-Marc Girardin**, Golden
Beach, FL (US); **John Kazanchy**,
Canton, GA (US)(51) **Int. Cl.**
B60P 3/06 (2006.01)(52) **U.S. Cl.** **410/7**(57) **ABSTRACT**

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A docking system for securing a wheelchair into a vehicle in which docking fixtures are firmly attached to the frame of the wheelchair and the floor of the vehicle, either directly or by attachment to a support which is attached to either the frame of the wheelchair or the floor of the vehicle. A male docking fixture is mounted on a support to the underside of the wheelchair, which is positioned in the vehicle so that the male docking fixture and the female docking fixture are aligned and the male docking fixture can be slideably and releasably locked with the female docking fixture. Preferably, the female docking fixture includes an electrically operated, spring loaded, release mechanism, and may also include a slide mechanism to allow limited forward and rearward movement of the wheelchair while under restraint.

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(2), (4) Date: **Dec. 17, 2008**

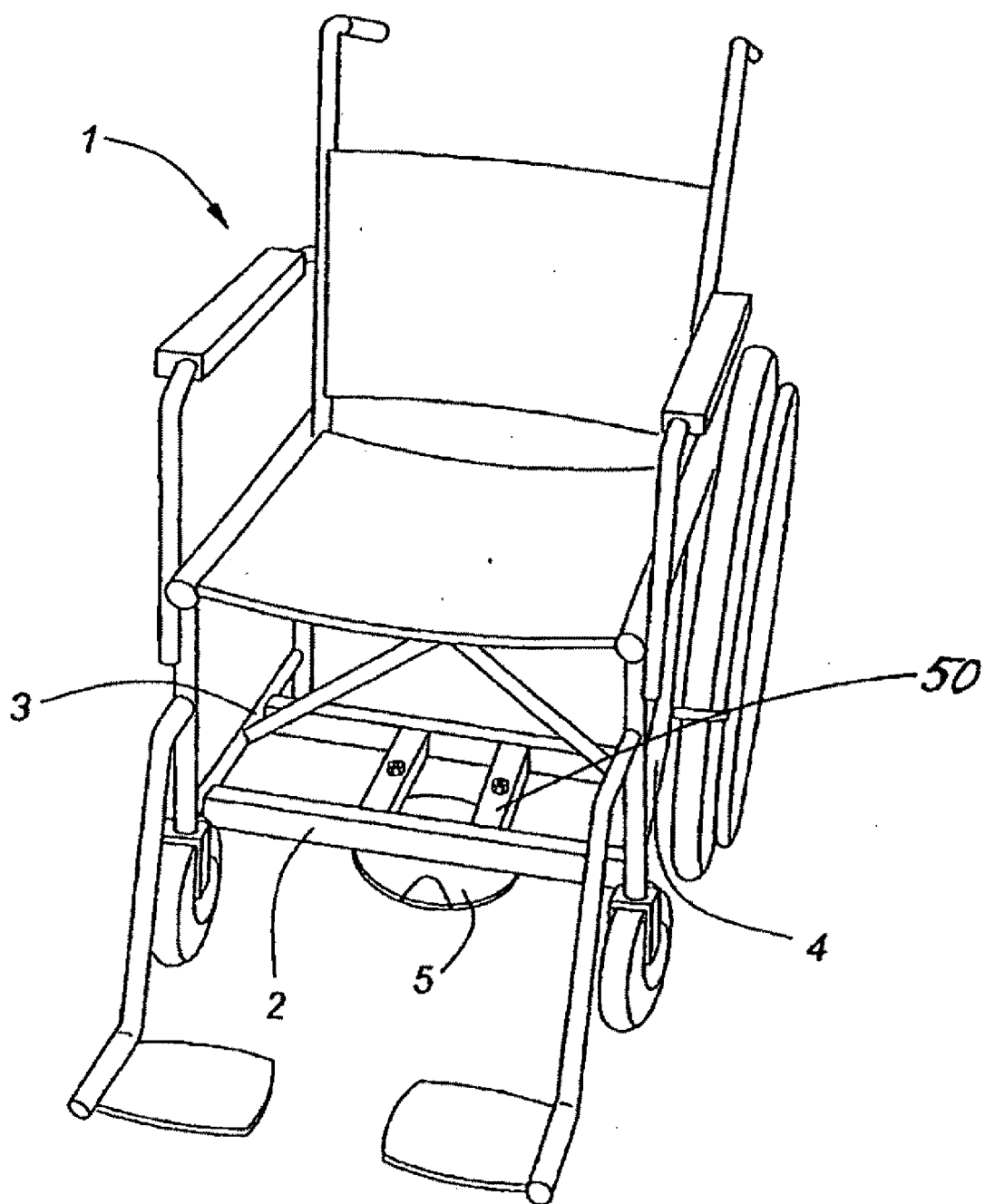


FIG. 1

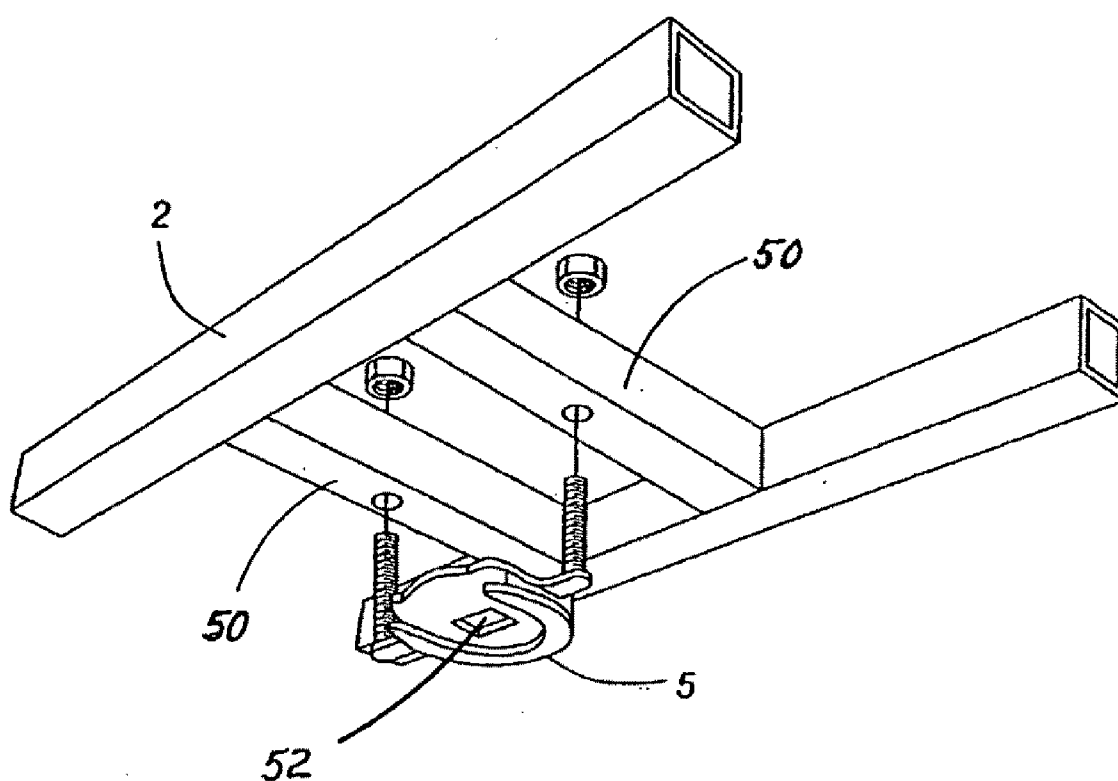


FIG. 2

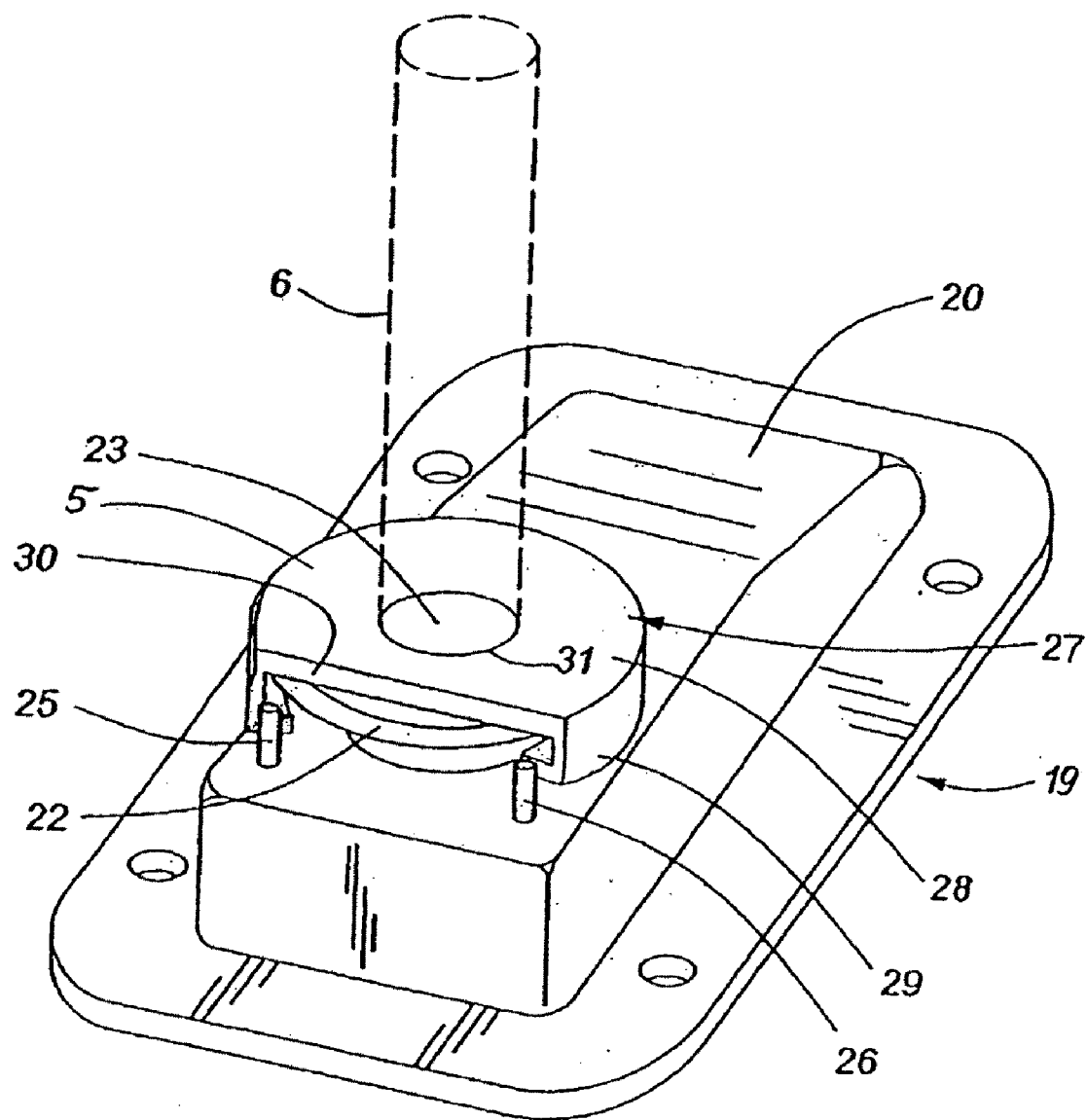


FIG. 3

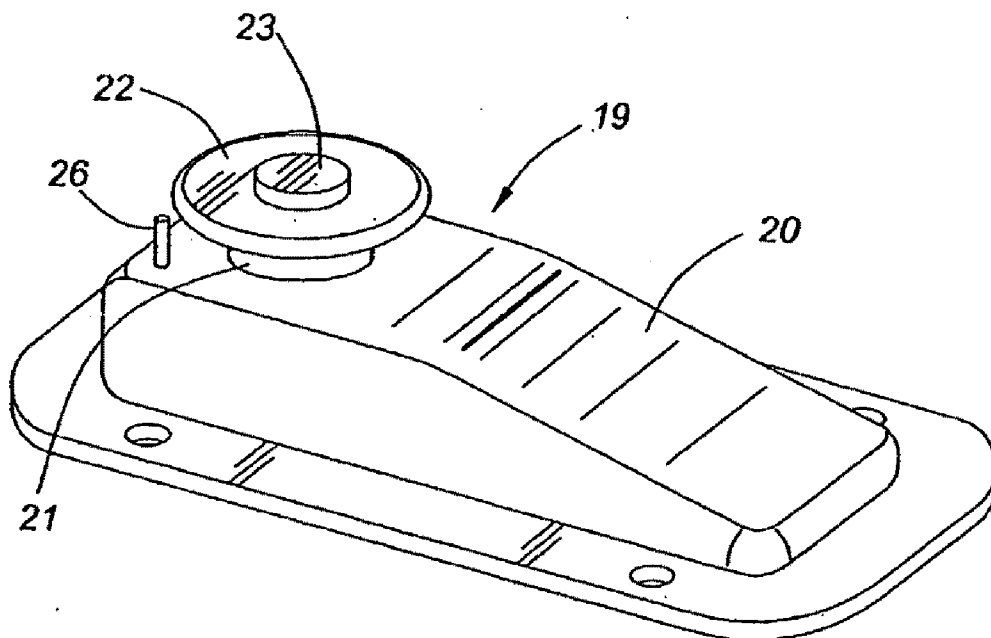


FIG. 4

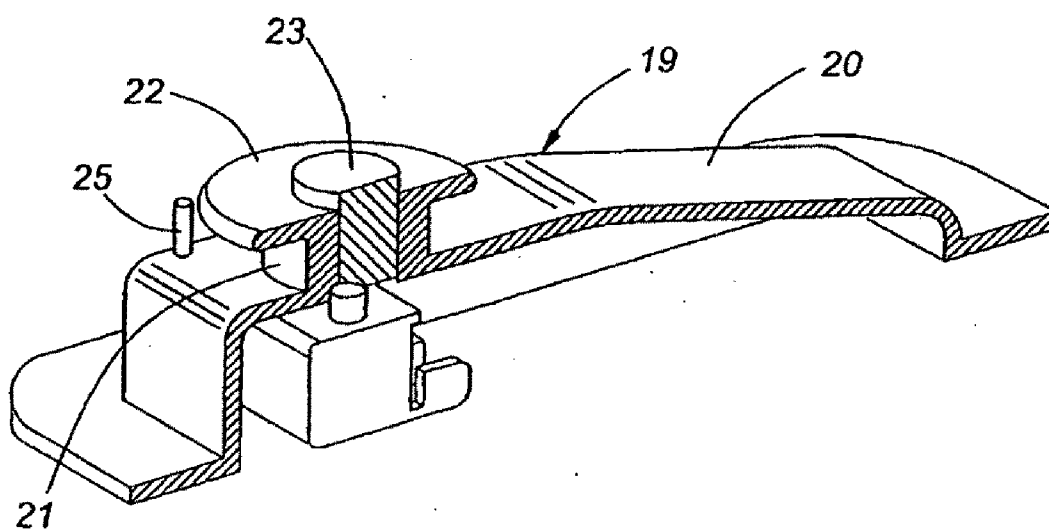


FIG. 5

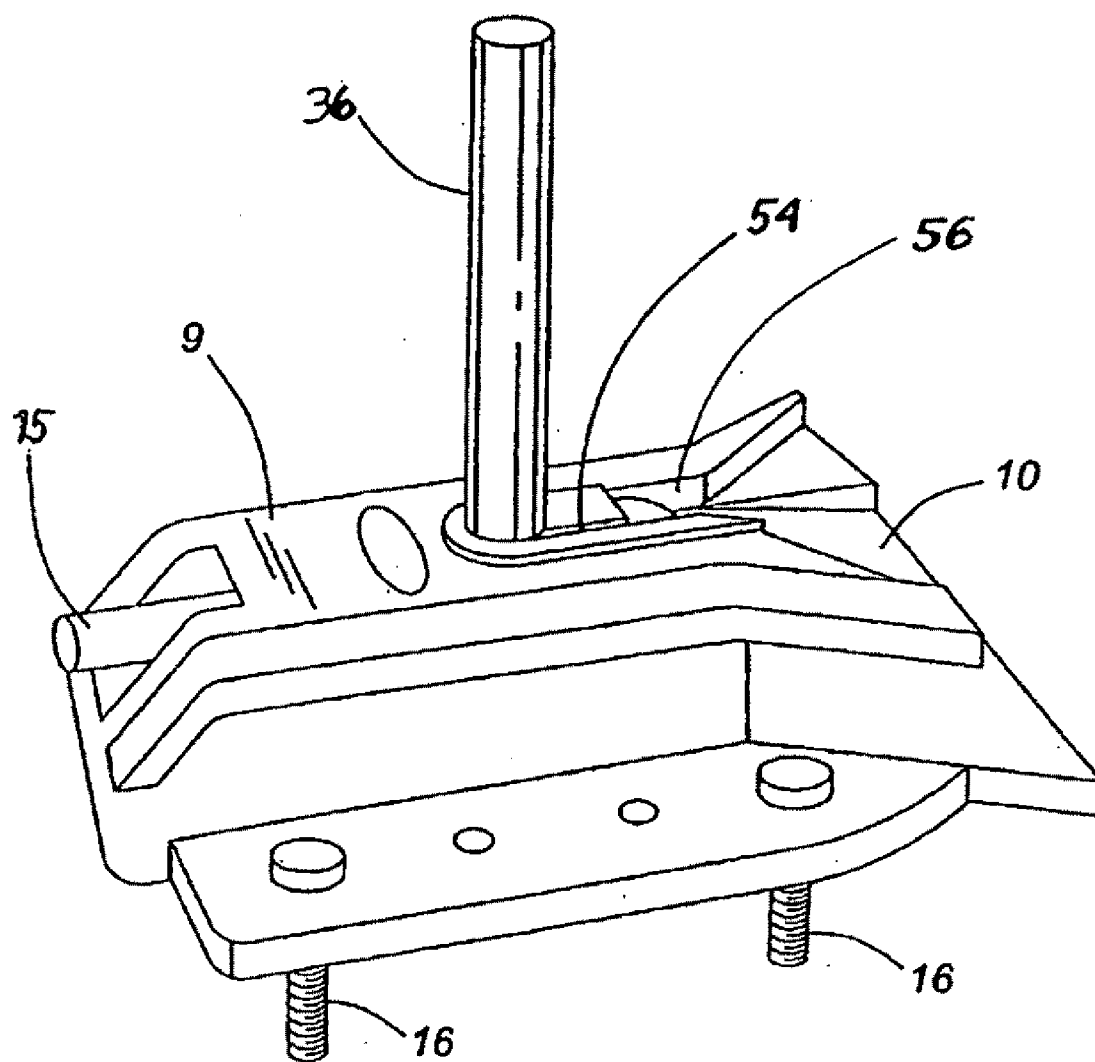


FIG. 6

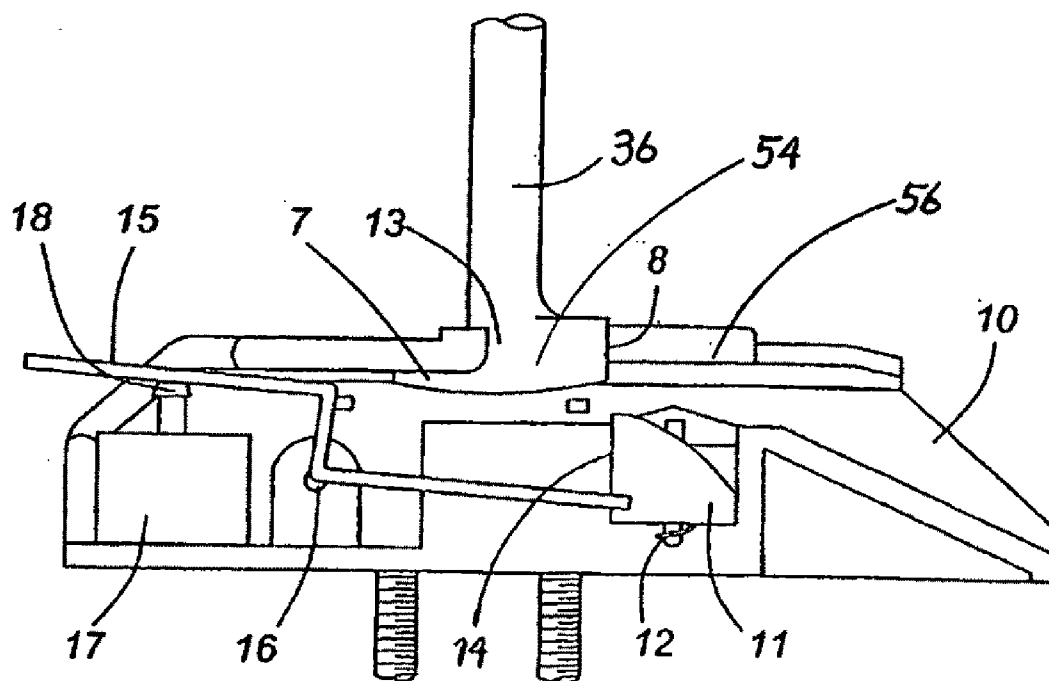


FIG. 7

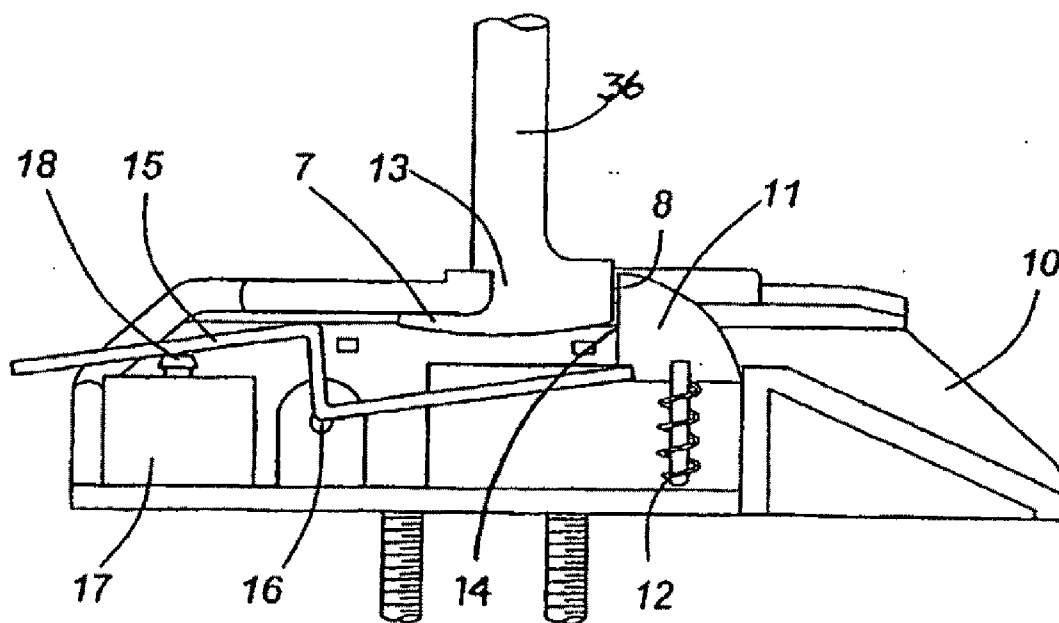
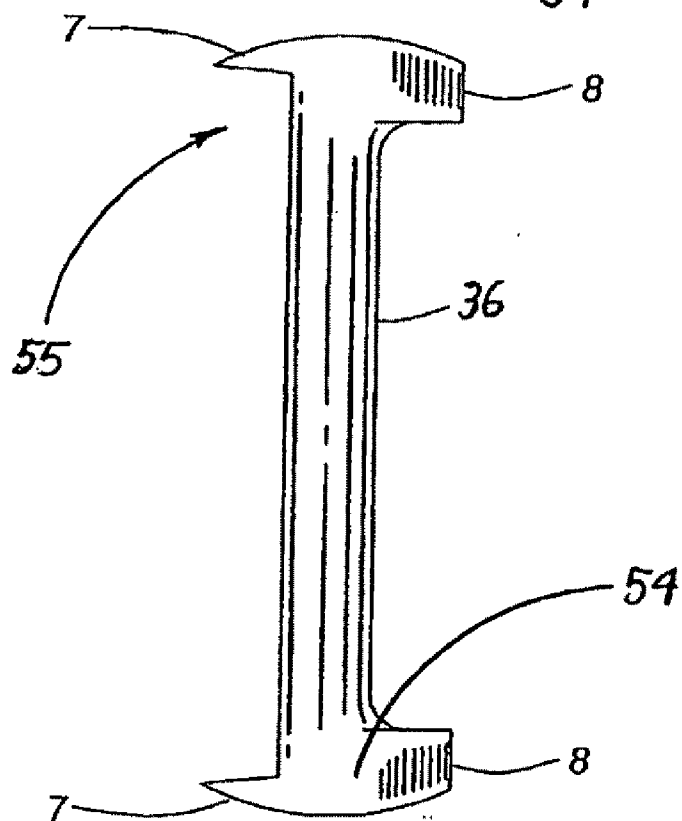
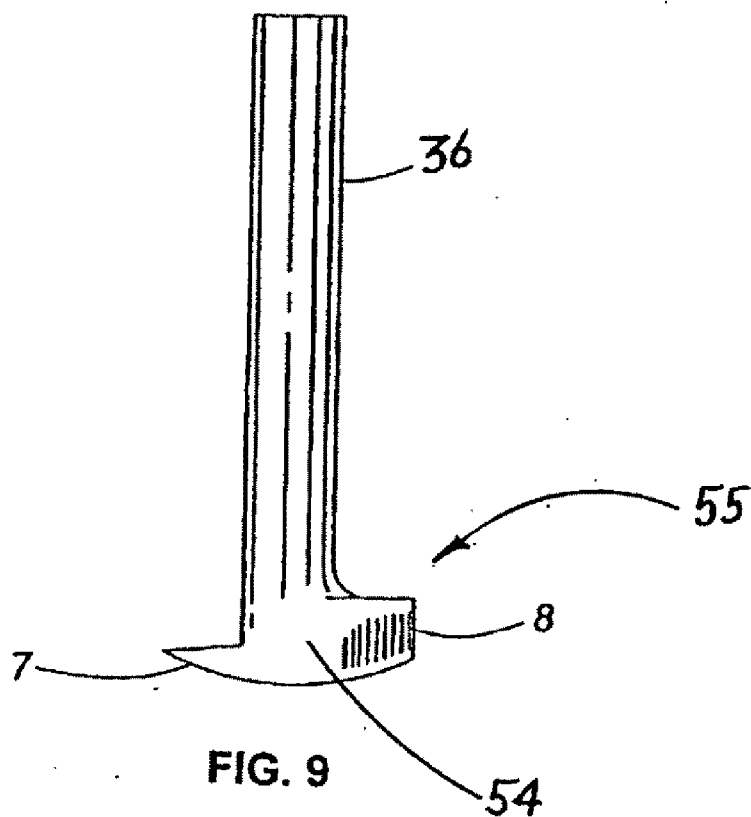


FIG. 8



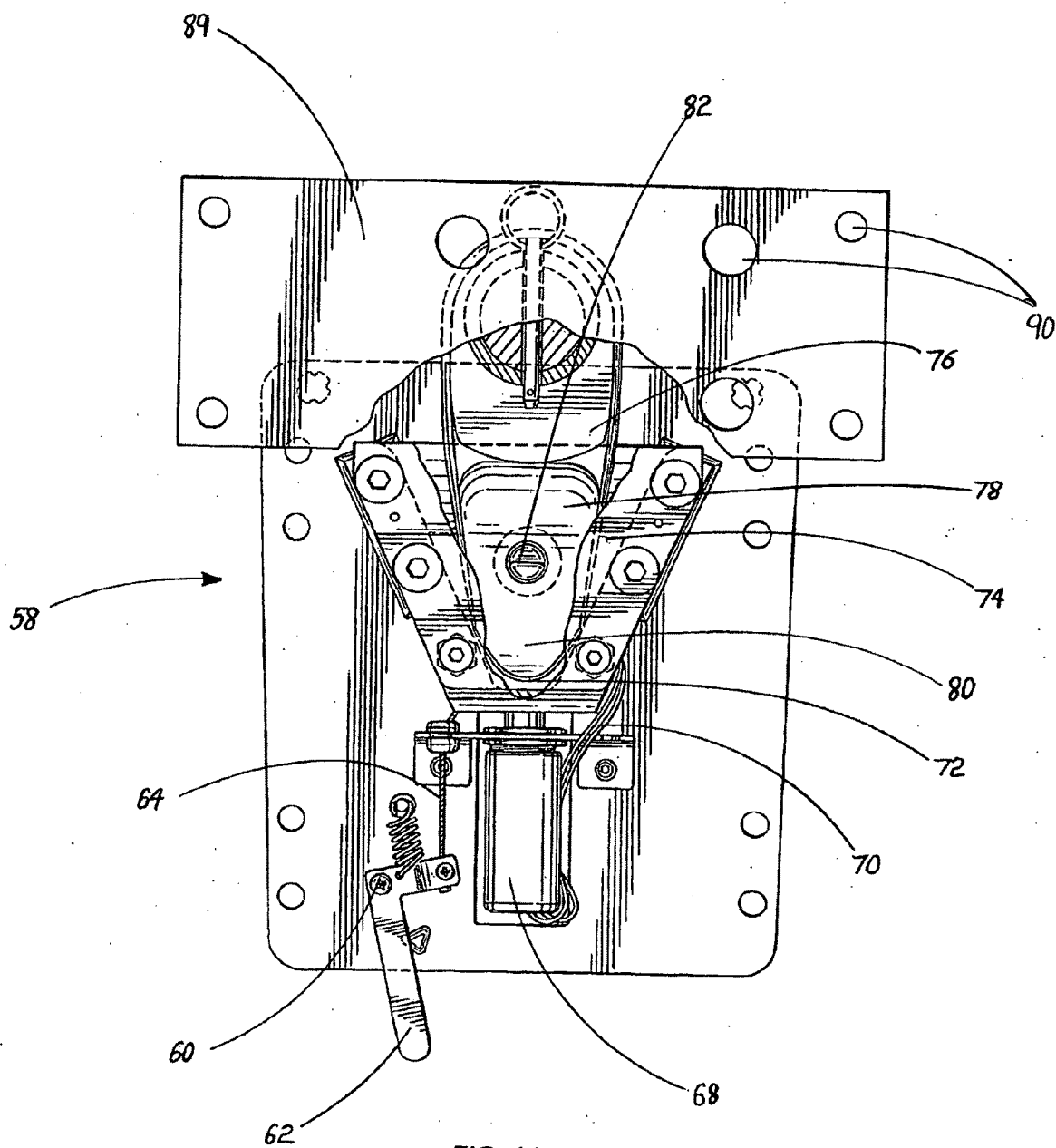
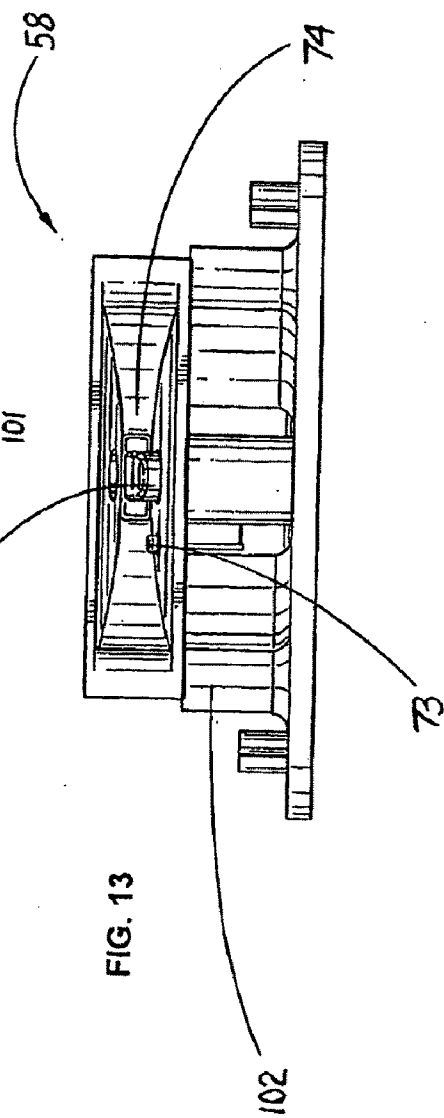
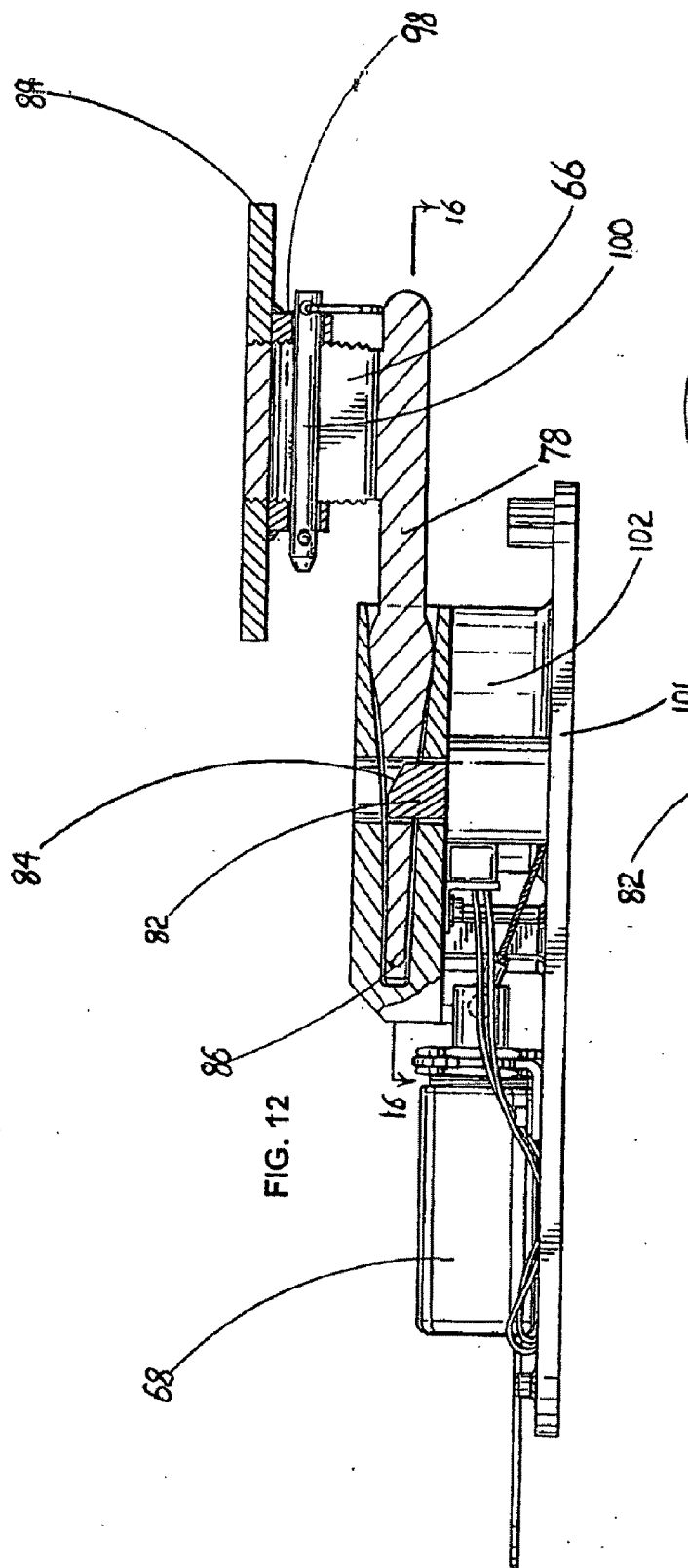
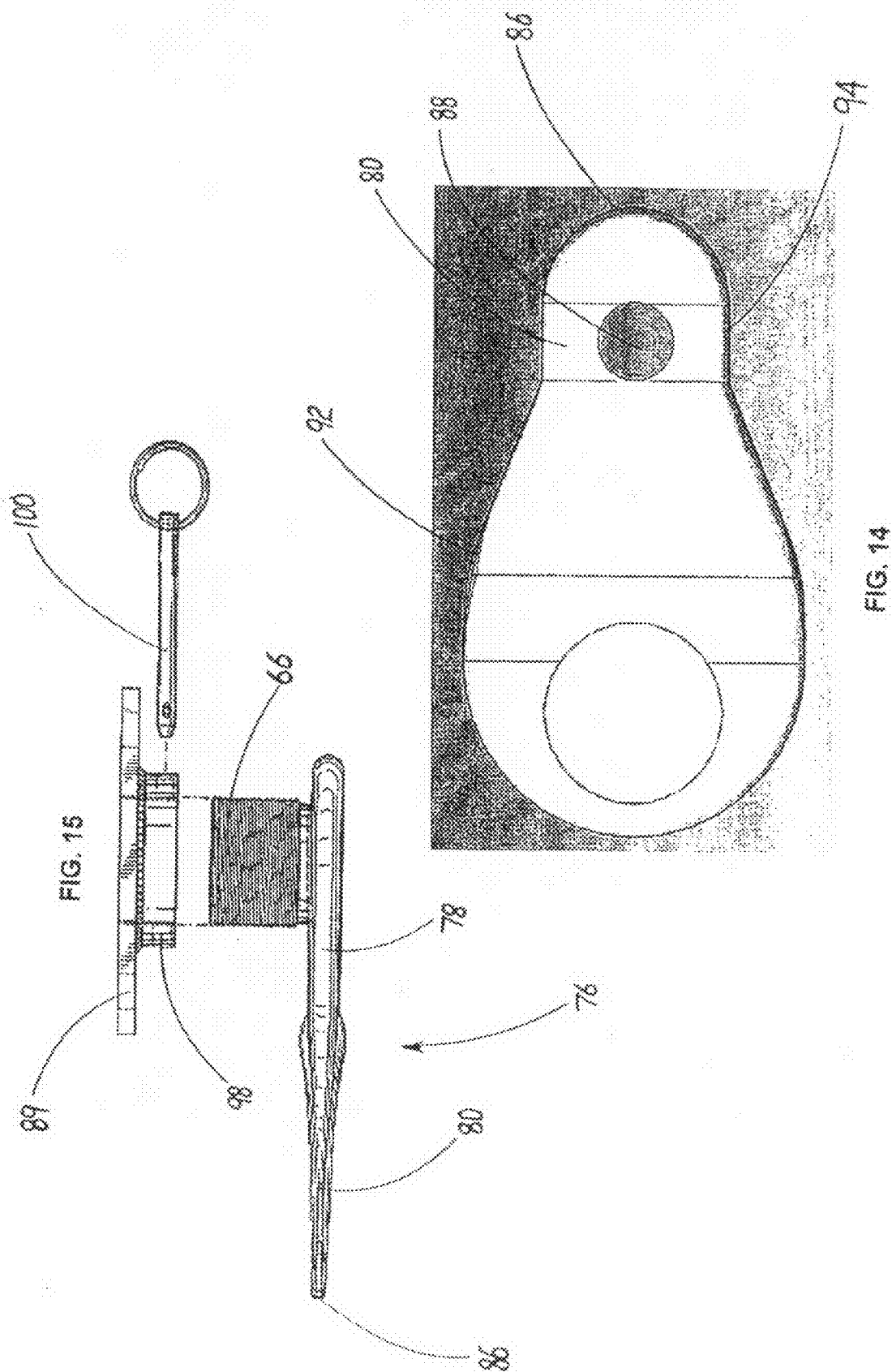


FIG. 11





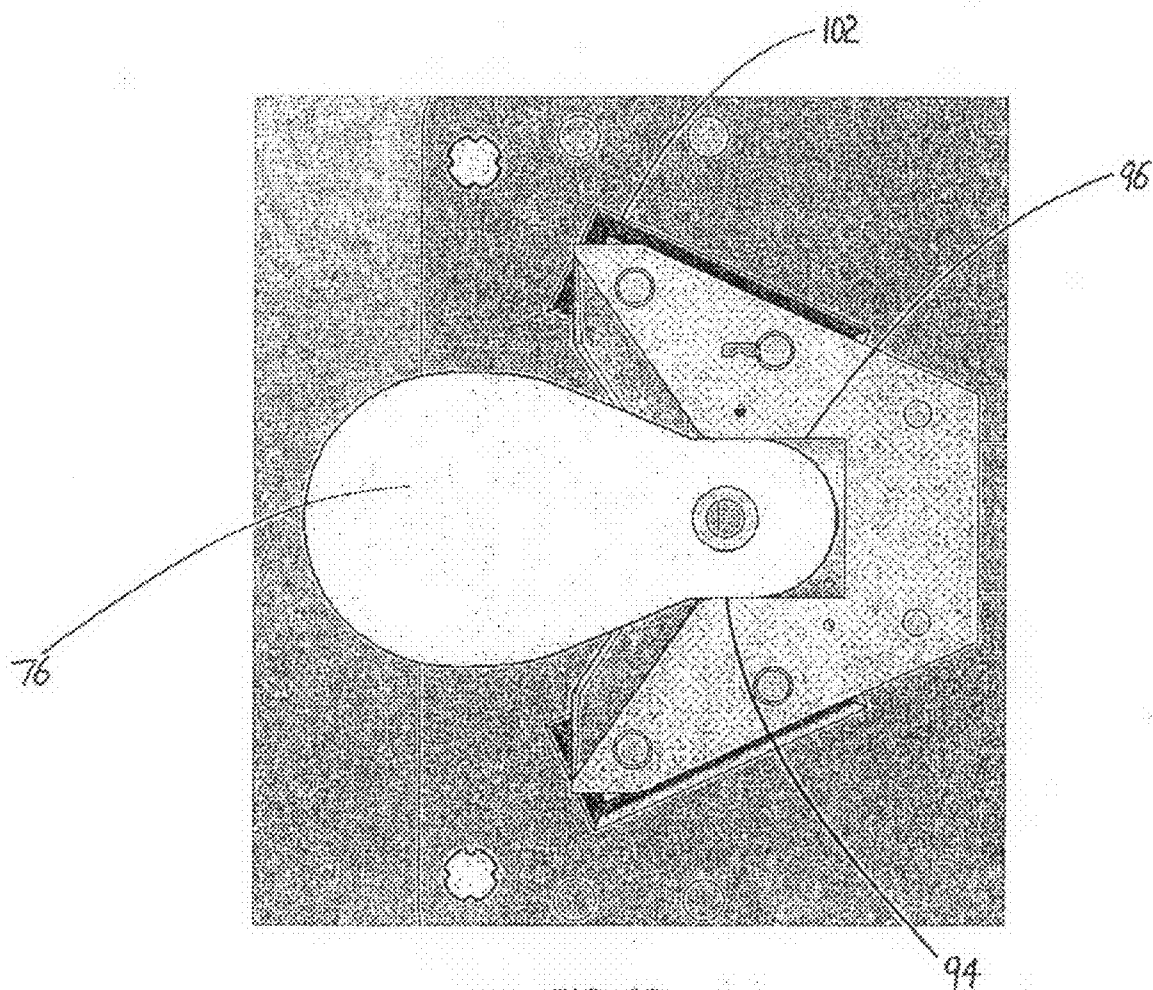


FIG. 16

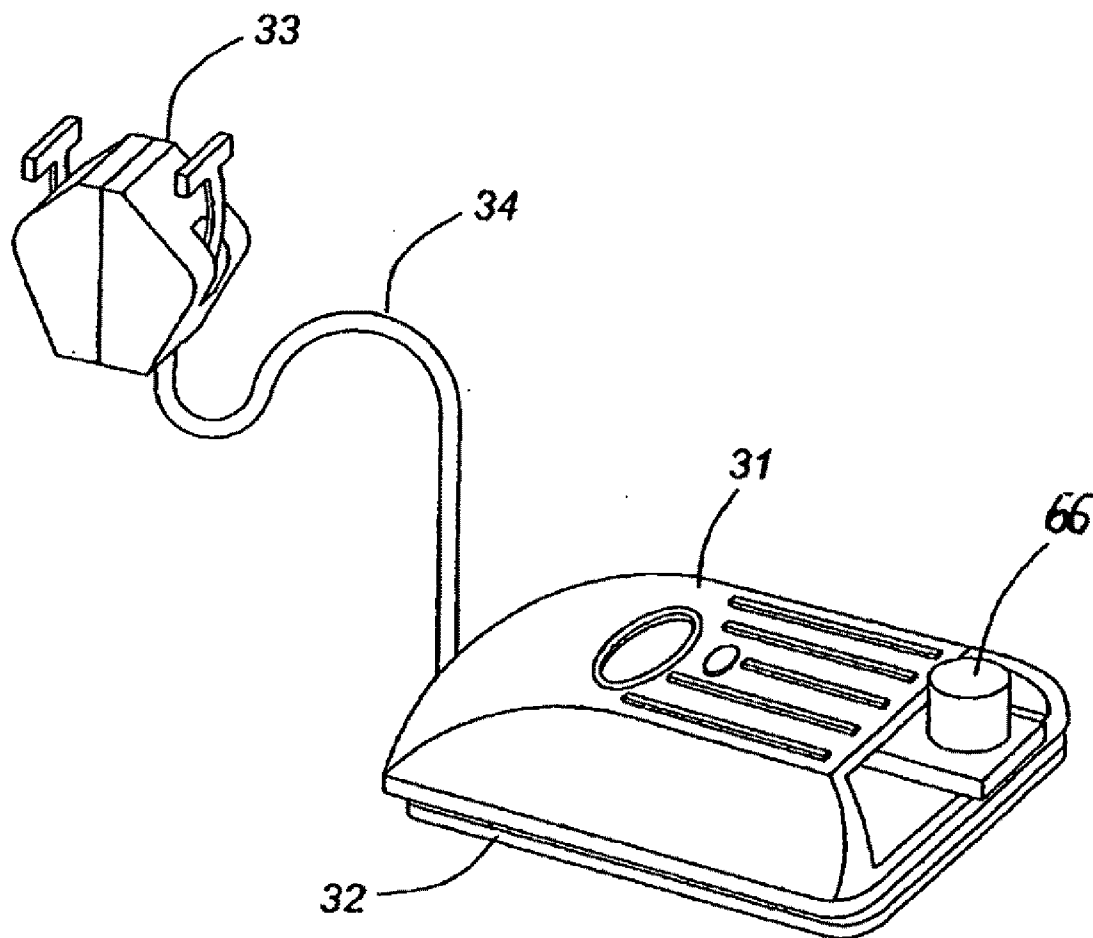


FIG. 17

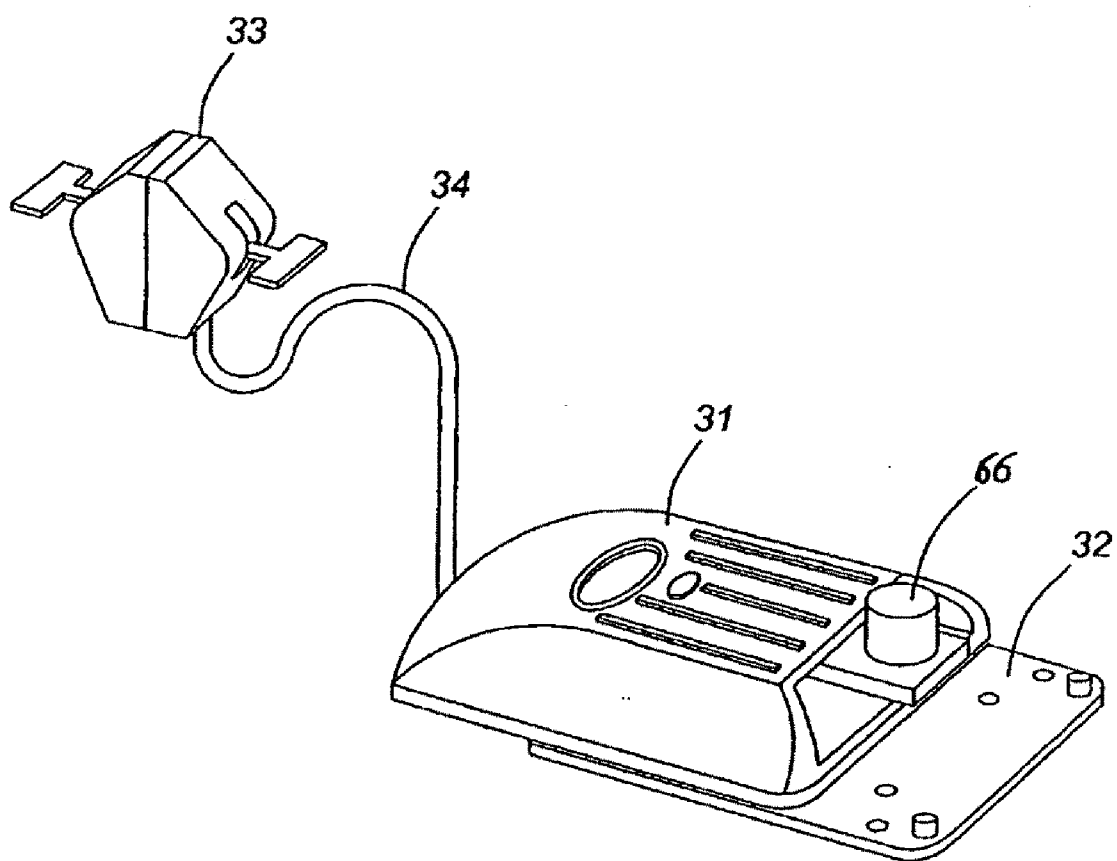


FIG. 18

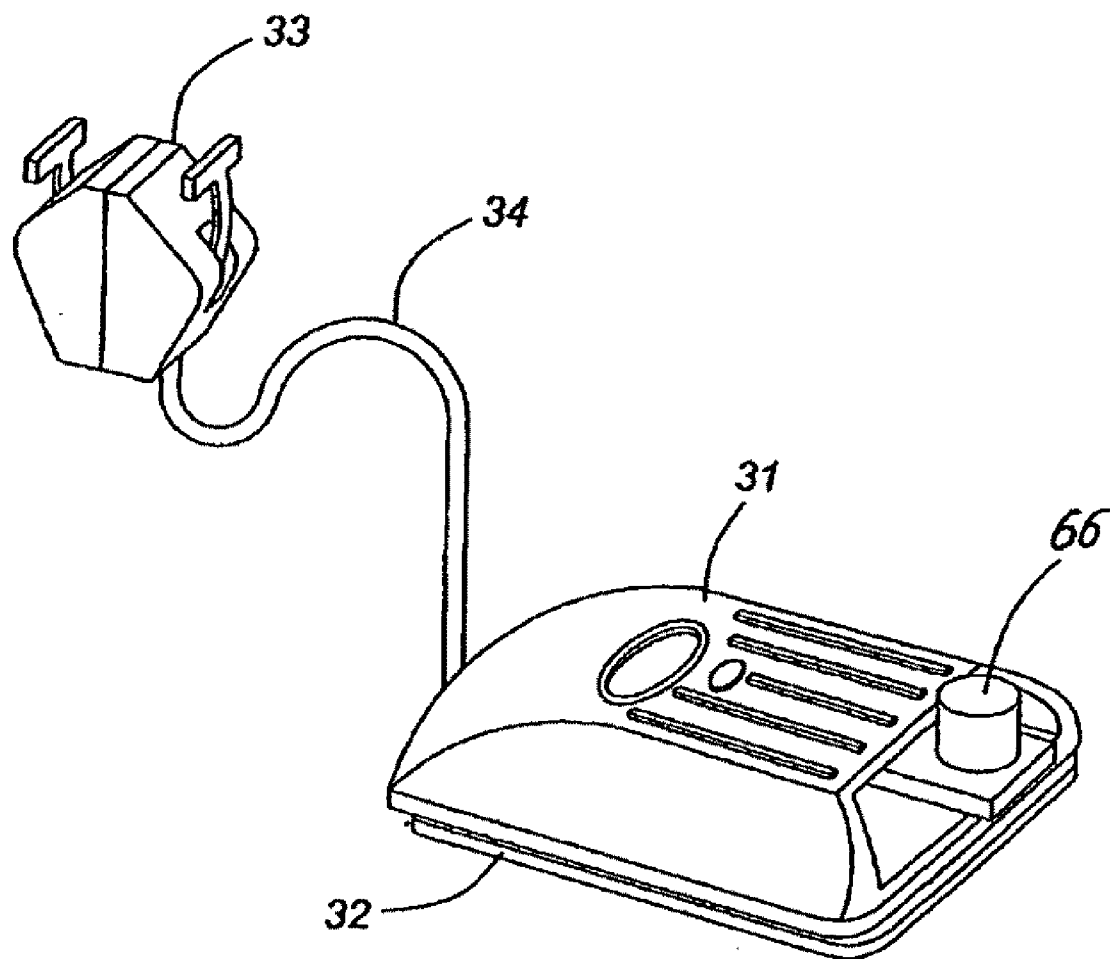


FIG. 17

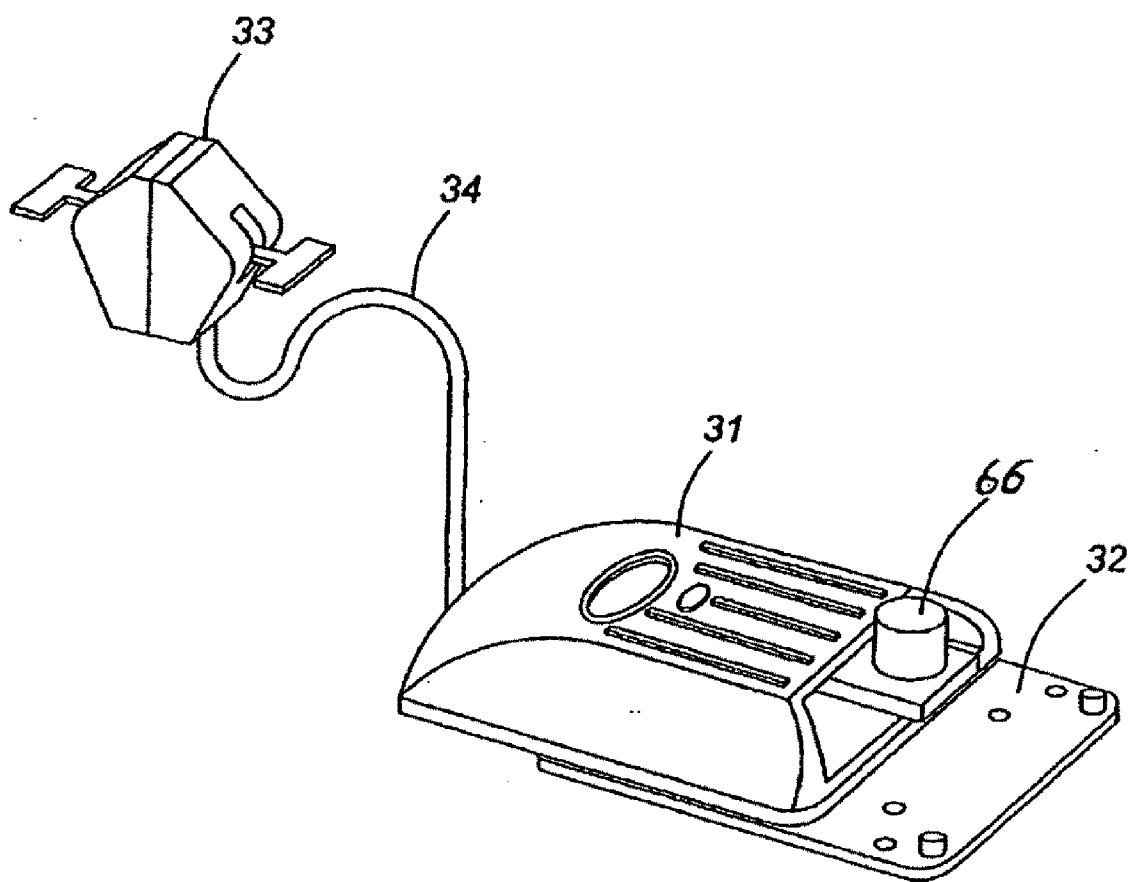


FIG. 18

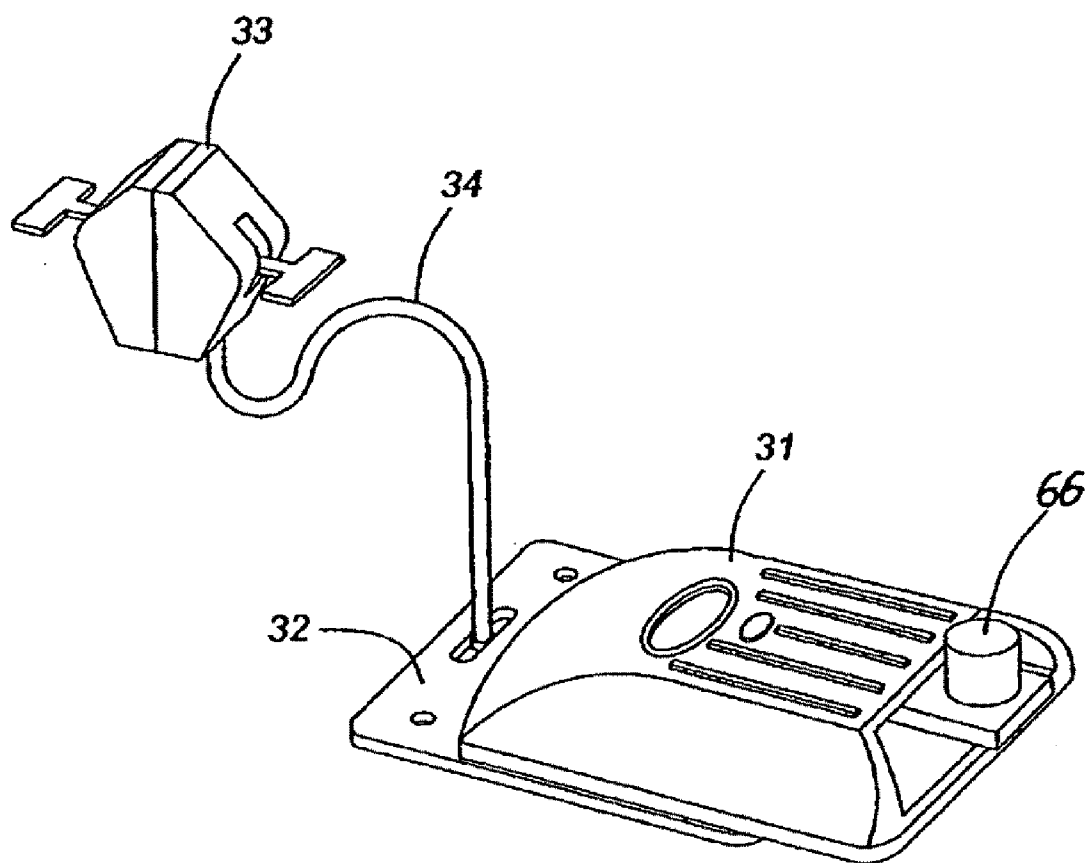


FIG. 19

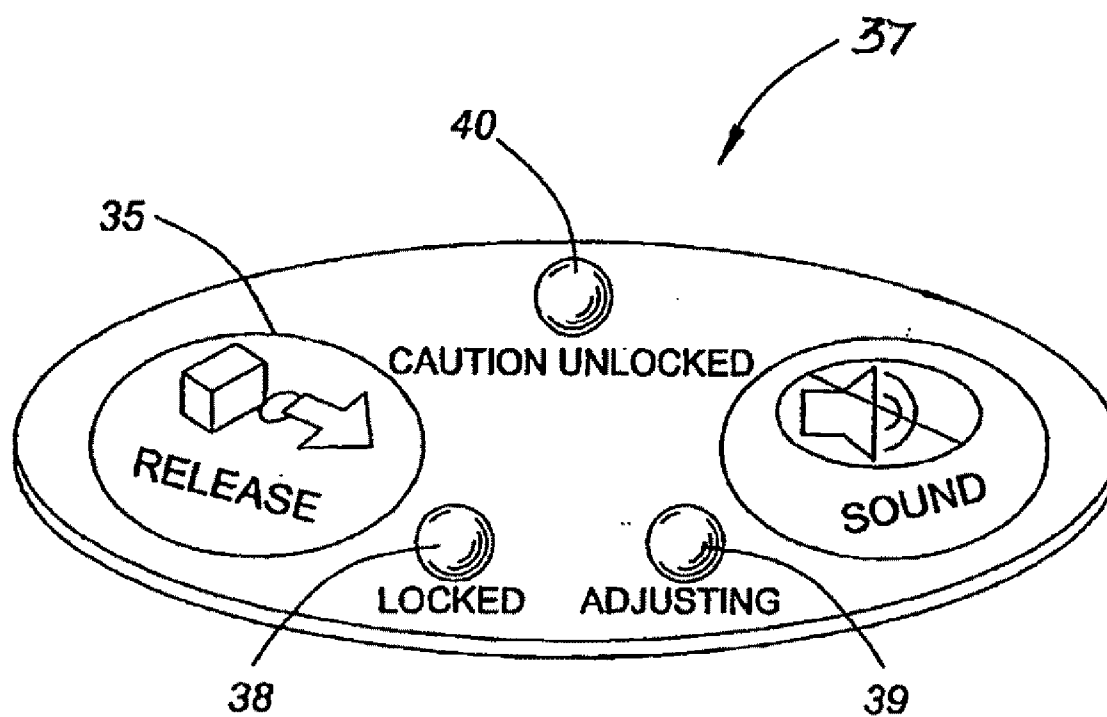


FIG. 20

WHEEL CHAIR DOCKING SYSTEM

BACKGROUND AND SUMMARY

[0001] The welfare and safety of persons being transported in wheelchairs, three wheeled scooters, power bases and the like is of ever increasing concern and many jurisdictions have enacted stringent safety requirements for devices to secure the wheelchair into the transport vehicle and the occupant into the wheelchair. Numerous structures, most of which are reasonably effective, have been suggested in the prior art, but they frequently require the attachment of a plurality of straps or the like to one or more anchor points in the vehicle. After attachment the straps have to be tightened either by the wheelchair occupant or by an attendant. Frequently, the wheelchair occupant has neither the physical strength nor the manual dexterity to manipulate the necessary straps and the like. This means that the attendant, or vehicle driver must spend several minutes securing each wheelchair in his/her charge into the vehicle. There have been some attempts to provide self attachment devices in the past and attention is directed to U.S. Pat. Nos. 4,690,364 and 6,474,916 in which a locking mechanism is secured either beneath or to the rear of a wheelchair and releasably locked to a post similarly mounted, either under or behind the wheelchair, on the floor of the vehicle. While reasonably effective in certain circumstances, problems of automatic unlocking and twisting or rotation of the wheelchair about the vertical post still remain. Thus, there remains a need for an automatic wheelchair docking system that can, if desired, be operated automatically by the occupant or an attendant from a central or other convenient location, or that can be operated manually by either the attendant or the wheelchair occupant. It will also be appreciated that some wheelchair occupants may be the driver of the vehicle, usually provided that the vehicle is equipped with hand controls.

Object of Docking System

[0002] The docking system described herein can be operated manually, or automatically, from a central or other convenient location. A male docking fixture is releasably but securely attached to a support beneath the seat of the wheelchair so that the free end of the male docking fixture can engage securely with a female docking fixture attached to the floor. Alternatively, the male docking fixture may be permanently or releasably mounted on the floor of the vehicle and engageable with a female docking fixture mounted securely on the underside of the wheelchair. The female docking fixture, whether it is on the floor or mounted beneath the wheelchair seat may be provided with a power operated latch mechanism so as to secure and release the male docking fixture. The male docking fixture may include a power transmission cable to transmit power to a female docking fixture secured beneath the seat of the wheelchair via complementary sliding contacts on the male docking fixture and the female docking fixture.

[0003] Once the wheelchair is attached to the floor, the system may provide limited forward and rearward position adjustment to facilitate a comfortable driving position for the wheelchair occupant.

[0004] The wheelchair docking system is designed with male and a female docking fixtures, one connected to the wheelchair and the other connected to the floor, which when engaged with each other, connect the wheelchair to the floor and restrict the ability of the wheelchair to rotate.

[0005] The wheelchair docking system is designed such that the male docking fixture is height-adjustable and comprised of an engagement part with lateral surfaces disposed at an acute angle and wherein the female docking fixture contains a docking port adapted to receive the male docking fixture.

[0006] The wheelchair docking system is also designed such that the male docking fixture is comprised of an engagement part with its lateral surfaces disposed at an acute angle and wherein the female docking fixture contains a docking port with a tapered entry containing a spring-loaded latching bolt adapted to receive and lock in place the male docking fixture.

BRIEF DESCRIPTION OF DRAWINGS

[0007] FIG. 1 is a front isometric view of one embodiment of the wheelchair docking system;

[0008] FIG. 2 is a close up view of the attachment frame mounted on the wheelchair of FIG. 1 coupled with a female docking fixture;

[0009] FIG. 3 is perspective view of one embodiment of the male docking fixture;

[0010] FIG. 4 is a perspective view of one embodiment of the male docking fixture of FIG. 3;

[0011] FIG. 5 is a sectional perspective view of the male docking fixture of FIG. 3;

[0012] FIG. 6 is an isometric view of coupled male and female docking fixtures according to another embodiment of a wheelchair docking system;

[0013] FIG. 7 is a side elevational view of the system of FIG. 6 in the loading or unlatched position;

[0014] FIG. 8 is a side elevational view of the system of FIG. 6 in the locked position;

[0015] FIG. 9 is a side view of the male docking fixture useable in the system shown in FIGS. 6-8;

[0016] FIG. 10 is a side view of a double male docking fixture useable in the system shown in FIGS. 6-8;

[0017] FIG. 11 is a plan view in partial section of another embodiment of coupled male and female docking fixtures;

[0018] FIG. 12 is a side view in partial section of the docking fixtures shown in FIG. 11;

[0019] FIG. 13 is an end view of the female docking fixture shown in FIGS. 11 and 12;

[0020] FIG. 14 is a top plan view of an alternative male docking fixture;

[0021] FIG. 15 is an exploded side elevational view of the male docking fixture shown in FIGS. 11 and 12;

[0022] FIG. 16 is a horizontal sectional view (corresponding to 16-16 of FIG. 12) of the male docking fixture and the corresponding female docking fixture engaged with one another, except that the shape of the docking fixtures in FIG. 16 are slightly different than the docking fixtures of FIG. 12;

[0023] FIG. 17 is a perspective view of a docking system with remote control;

[0024] FIG. 18 is a perspective view of the docking system of FIG. 17 in a forward position;

[0025] FIG. 19 is a perspective view of the docking system of FIG. 17 in a rearward position; and

[0026] FIG. 20 is a front view of a dash control console for use with the wheelchair docking system.

DETAILED DESCRIPTION

[0027] In FIG. 1 there is shown a wheelchair 1 having a quadrilateral frame 2 securely mounted to the side frame members 3, 4 of the wheelchair 1. Frame 2 includes cross members 50 for added strength, and supports a centrally mounted female docking fixture 5 (as seen more clearly in FIG. 2). A female docking fixture 5 is bolted to the cross members 50 of the quadrilateral frame 2 and is designed to engage the circular flange 22 of a male docking fixture 19 securely mounted directly to the floor of a vehicular conveyance in any conventional manner such as with screws or bolts. Alternatively, the male docking fixture 19 may be indirectly attached to the floor by first affixing the base of the fixture 19 to a plate that is then attached to the floor. Once the flange of the male docking fixture 22 is engaged with the female docking fixture 5, an opening in the female docking fixture 52 aligns with an axial, spring loaded locking pin 23 that extends through the opening and locks the fixtures in place. Alternatively, the female docking fixture may be affixed to the end of a connecting shaft 6 (as seen in FIG. 3) which is securely mounted to the wheelchair or the floor in any conventional manner such as screwing. In this arrangement, the female docking fixture 5 then similarly engages a male docking fixture 19. Sloped entry ramp 20 on the top of the male docking fixture 19 acts as a guide for the female docking fixture as the wheelchair approaches the docked position. A circular neck 21, having a circular flange 22, is mounted vertically on fixture 19 and is provided with an axial, spring loaded, locking pin 23, which may be electrically actuated from a central location by the driver or by the wheelchair occupant, by a solenoid switch 24. Vertical locator pins 25, 26 may also be mounted on fixture 19 and positioned so as to permit limited rotation of shaft 6 or to restrict rotation of shaft 6, as described in more detail below. In order to engage with fixture 19, the end of connecting shaft 6 has a flange housing 27 having a top 28 secured to the connecting shaft 6 and a lower inwardly directed flange 29 (see FIG. 2), the top surface of which is adapted to slideably engage the lower surface of flange 22 (as seen in FIG. 3). When fully engaged, spring loaded pin 23 extends through the axial bore so as to releasably lock flange housing 27 to the docking fixture 19. It will be appreciated that the position of pins 25, 26 is a matter of choice so as to either permit limited rotation of connecting shaft 6 and hence of the wheelchair, or to substantially preclude angular rotation when pins 25, 26 abut flat face 30 of flange housing 27. In order to release the wheelchair, the pin 23 is retracted by actuation of solenoid switch 24, either by the wheelchair occupant or by the attendant. In order to facilitate smooth mating of flange housing 27 with flange 22, the edge 30 of flange housing 27 and the circumferential rim of flange 22 are preferably beveled.

[0028] In FIG. 6 is shown another embodiment of the wheelchair docking system. A threaded connecting shaft 36 is securely mounted the wheelchair or to a support in any conventional manner such as screwing. The opposite end of shaft 36 is provided with an integrally formed hammer headed like foot 55 having a sloping leading edge 7, flat lateral sides 54 and a squared trailing face 8 (see FIGS. 9 and 10). The shaft 36 and the foot 55 combine to form a male docking fixture that is able to couple with the female docking fixture 9. The shaft 36 is of sufficient length that, when attached to the bottom of

a wheelchair 1, provides normal ground clearance but can engage a floor mounted female docking fixture 9 which is securely bolted, at any selected position on the floor of a vehicular conveyance (not shown), by means of bolts 16. Fixture 9 is provided with a flared and sloped entry 10 at one end with flat internal lateral walls 56 for sliding engagement with the leading edge 7 and flat lateral sides 54 of connecting shaft 36 when the wheelchair is positioned thereabove. Edge 7 then rides over a spring loaded latching bolt with a beveled front end 11 thereby compressing spring 12 (FIG. 7) and allowing the arm to fully enter the fixture 9 until the front 13 thereof abuts the face of the docking fixture 9, as seen in FIG. 6, and flat lateral sides 54 of shaft 36 glide along flat internal lateral walls 56 of the female docking fixture. Once fully engaged with the female docking fixture, the shaft 36 clears bolt 11 and allows spring 12 to extend and drive bolt 11 upwardly so that the vertical face 14 thereof abuts the rear face 8 of shaft 36, thereby locking the shaft and fixture together. In the locked position, the internal lateral walls 56 of the female docking fixture 9 abut the lateral sides 54 of shaft 36 and securely fasten the wheelchair in the vehicle without any possibility of the wheelchair swiveling or twisting about the central axis thereof and without any need to tighten or adjust restraining straps and the like by either the wheelchair occupant or the attendant. The elongated slope 7 of the foot 55 further serves to limit the extent to which a wheelchair may rotate when the foot is engaged in the female docking fixture 9.

[0029] In order to release the wheelchair from the locked position in this arrangement it is merely necessary to raise the free end of the lever 15, pivotally mounted about a fulcrum 16 and engaging with bolt 11, from the locked position shown in FIG. 8 to the unlocked position shown in FIG. 7. This may be accomplished manually if necessary but it will be appreciated that this is impossible for a wheelchair occupant and somewhat awkward and inconvenient for the attendant. It is preferred, therefore, that the release be effected by the attendant from a central or other convenient location such as the driver's seat. To facilitate release, a conventional solenoid switch 17 is mounted beneath the end of lever 15 with the end of plunger 18 thereof in contact with lever 15. Upon activation of solenoid 17, plunger 18 extends from the retracted position shown in FIG. 8 to the extended position shown in FIG. 7, thereby forcing bolt 11 down to the unlocked position shown in FIG. 7 and releasing arm 6. Power for solenoid 17 may be provided in any conventional manner such as wires from the control position and the vehicle battery, or from an internal power source which may be actuated by any conventional remote control system such as a radio signal.

[0030] It will be appreciated that the female docking fixture 9 may also be mounted to a quadrilateral frame 2 on a wheelchair 1 and the connecting shaft 36 may be mounted on the floor of the vehicle. This arrangement has the advantage that the shaft 36 is in the vehicle at a fixed position which facilitates the accurate location of a plurality of wheelchairs in the vehicle. It also allows for somewhat greater ground clearance for the wheelchair when it is not in the vehicle. Power to actuate solenoid 17, now located on wheelchair 1, may be provided from the wheelchair power supply if so equipped, an internal power supply or by leads passing internally through shaft 36 and contact shoes (not shown) on female docking fixture 9.

[0031] FIGS. 11-12 and 15-16 show a third embodiment wherein the wheelchair docking system is comprised of male

docking fixture 76 with an elongated foot 78 that has been adapted for slideable locking engagement with a docking port 74 located in the female docking fixture 58. The female docking fixture 58 is comprised of a steel base 101 from which riser columns 102 extend upwardly to support a docking port having a rectangular entry way. The entry way 74 is flared (seen most clearly in FIG. 13) and converges toward a terminal rectangular portion 96 (as shown in FIG. 16) within which the engagement part 80 of the elongated foot 78 docks. The female docking fixture contains a centrally located latching bolt 82 disposed transverse to its entry way. Preferably, the latching bolt 82 is spring loaded and comprises a beveled end 84 adapted to allow the front edge 86 of elongated foot 78 of the male docking fixture (FIG. 15) to slide into the docking port. As the front edge 86 of foot 78 rides over the bolt 82, the spring is compressed (not shown), forcing the bolt downward and allowing the engagement part to fully enter the docking port (as seen in FIG. 12) until the front edge 86 thereof abuts the walls of the docking port (as seen in FIG. 11), whereupon a central opening 88 in the engagement part 80 aligns with bolt 82 and allows the spring (not shown) to extend and drive the bolt upwardly, thereby locking the fixtures together (as shown in FIGS. 11 and 12). When the engagement part 80 of the foot 78 is engaged with the female fixture, its parallel lateral sides 94 abut the lateral inner walls 96 of the terminal rectangular portion of the docking port 74. The entry way of the female docking port 74 is flared both laterally and vertically (as seen in FIG. 13) and is adapted to facilitate engagement with the male docking fixture 76 when the wheelchair occupant approaches the stationary position from a generally frontal trajectory. The port has sufficient vertical space to allow engagement with a male docking fixture that is only generally vertically aligned with the docking port in order to account for changes in weight of the wheelchair occupant, variances in the relative vertical positioning of the docking fixtures, differences in wheelchair tire size, and the like. Additionally, the female docking fixture contains a microswitch 73 (see FIG. 13) in the docking port which verifies when the foot of the male fixture is fully engaged in the docking port, and a second microswitch adjacent to the latching bolt (not shown), which verifies when the bolt is in the extended and locked position. When both switches have been actuated, a signal is sent to the console 37 (see FIG. 20) indicating that the wheelchair is securely engaged in the vehicle.

[0032] The male docking fixture 76 comprises an elongated foot 78 with an engagement part 80 narrower at its free end than the width at the end by which it is attached to a support plate 89. The lateral surfaces of the elongated foot 92 are disposed at an acute angle, preferably but not necessarily being approximately 45 degrees, and merging to form front edge 86 which is adapted to engage the docking port 74 from a wide variety of angles. Alternatively, the lateral surfaces of the elongated foot merge into a rectangular engagement part with a curved front edge having its parallel sides 94 narrower than the portion of the foot attached to the support plate. In addition the engagement part of the foot 80 is thinner than the portion of the foot containing the threaded shaft 66. Once fully engaged, the front edge of the engagement part 86 will abut the walls of the docking port 74, and the parallel lateral surfaces 94 of the engagement part will abut the inner lateral walls 96 of the docking port (as seen in FIG. 16), thus establishing a secure connection and aligning the central opening 88 in the engagement part 80 with the spring loaded bolt 82

housed within the female docking fixture. This connection allows the docking fixtures to have an approximately 1-3 degree angular displacement relative to one another so as to generally restrict the rotation of the wheelchair relative to the vehicular conveyance.

[0033] In FIG. 15 it can be seen that the male docking fixture further comprises a shaft 66 which is attached to a support plate 89 comprising an apparatus designed for adjustable and locking engagement with the shaft at any desired vertical and axial position, the support plate 89 being further attached to either the wheelchair or the ground. Preferably, but not essentially, the shaft 66 is threaded (as shown in FIG. 15) for secure and adjustable rotational attachment with an internally threaded collar 98 in the support plate 89. Rotating the shaft 66 of the male docking fixture 76 relative to the collar 98 would then provide for varying height adjustment of the fixture depending upon the length of the shaft and distance between the threads thereon. To secure the male fixture 76 in a desired vertical and axial position in the collar 98, openings (not shown) in the collar 98 and the shaft 66 would align at varying points of rotation, thus allowing a fastening device, preferably, but not essentially, a pin 100 with a spring loaded locking ball at one end, or the like, to be inserted through the openings once in the desired alignment. The support plate 89 has bolt holes 90 which allow bolts to secure the plate to the underside of a manually operated or electrical wheelchair, a three-wheeled scooter, or any other apparatus with which the docking system is used. Alternatively, the support could be designed so as to be integral to the male docking fixture, thus allowing for direct attachment of the male docking fixture to the floor or wheelchair (not shown).

[0034] In order to release the wheelchair from the locked position it is merely necessary to move the free end of the lever 62, pivotally mounted about an axis 60 and engaging a cable 64 which actuates the spring loaded bolt 82. This may be accomplished manually if necessary but it will be appreciated that this may be impossible for a wheelchair occupant and somewhat awkward and inconvenient for the attendant. It is preferred, therefore, that the latching bolt be moveable by both a manual actuating lever 62 and a solenoid switch 68. This would allow the release to be effected by the attendant from a central or other convenient location, such as the driver's seat. To facilitate release, a conventional solenoid switch 68 is mounted adjacent to lever 58 with its plunger (not shown) connected to a cable 64 which retracts the bolt from the extended and engaged position. Upon activation of solenoid 68, the plunger retracts from the extended position (not shown) to the retracted position (not shown), thereby pulling bolt 82 down to the unlocked position (not shown) and releasing engagement part 80. Power for solenoid 68 may be provided in any conventional manner such as wires 70 from the control position and the vehicle battery, or from an internal power source which may be actuated by any conventional remote control system such as a radio signal. A wheelchair docking system as described with both a manual actuating lever and a solenoid switch ensures a greater degree of safety in that an occupant can disengage from the vehicular conveyance regardless of whether the solenoid switch fails to retract the bolt from the engaged position due to power failure or otherwise.

[0035] In certain circumstances a wheelchair occupant may be the driver of the vehicle in which the docking system is installed adjacent and immediately behind the steering wheel. Usually, in such circumstance the vehicle is provided with

hand controls and the regular driver's seat is removed. A docking fixture **58** is mounted on the vehicle floor in a suitable position rearwardly of the vehicle steering wheel (not shown), as seen in FIG. 17. As seen more clearly in FIGS. 18 and 19, female docking fixture **58** is slideably mounted on a base plate **32** for movement between a forward position as seen in FIG. 18 and a rearward position as seen in FIG. 19, when a lock (not shown) located between fixture **31** and base plate **32** is actuated by adjustment lever **33**, generally but not essentially, located on the dashboard or sidewall of the vehicle and accessible to the wheelchair occupant. Lever **33** is generally operatively connected to the lock by actuating cable **34**.

[0036] In operation, the wheelchair occupant docks the wheelchair into the female docking fixture and the microswitch housed within the wall of the docking port and the microswitch located adjacent to latching bolt are actuated, together signaling a green light **38** on dash console **37** (as seen in FIG. 20). When the green light is on, the occupant may either prepare to drive or may adjust his position relative to the steering wheel. In order to adjust position, the adjust lever **33** is depressed to temporarily disengage female docking fixture **31** from base **32**. This deactivates green light **38** and activates flashing amber light **39**, to indicate that the wheelchair is not disengaged from the docking fixture, but is not fully locked in position either. The wheelchair occupant can then either slide the docking fixture forwards or backwards by about 2"-4" from a neutral central position so as to attain a desired and comfortable driving position. When the desired position is located, the adjust lever **33** is raised and the docking fixture **31** and base **32** are locked together. The amber light **39** will cease to flash and the green light **38** will relight. In order to disengage the wheelchair and occupant from the docking fixture completely, the occupant may press the release button **35** on console **36** so as to release the male docking fixture **6** from the female docking fixture **31**. Upon pressing button **35**, red light **40** will flash and upon release of arm **6**, will remain on constantly to indicate that the wheelchair is not secured.

[0037] It will be appreciated that either a male docking fixture or female docking fixture may be securely mounted to a support on the underside of the wheelchair, with the other of a male or female docking fixture securely attached to the floor, or alternatively to a support thereon. Additionally, in each embodiment, female docking fixtures **5**, **9**, **58** may be provided on both the floor of the vehicle and on the wheelchair so as to provide for maximum ground clearance for the wheelchair and an uncluttered floor in the vehicle. In this arrangement it is, of course, necessary to modify the male docking fixture or connecting shaft to engage the female docking fixtures at each end thereof so that the male docking fixture or connecting shaft can be detached from female docking fixtures which are secured to both the wheelchair and the floor.

[0038] Furthermore, some wheelchairs have very little ground clearance and frequently catch on obstructions on the floor. For this reason, it is preferred that the female docking fixture **58** is provided with a sloping top cover with as low a vertical profile as possible so as to facilitate the wheelchair riding smoothly thereover. The female docking fixture may also be equipped with lights near the docking port which aid the occupant in docking the wheelchair at night or in dark environments.

[0039] While the embodiments described thus far have referenced placement of the wheelchair adjacent the driving

position, it will be appreciated that the docking system described herein is not limited thereto. A docking fixture may equally well be placed at any one or more of the seating positions in the vehicle, both front and rear. Additionally, the adjustable features of the docking system described herein have been described with reference to forward and rearward motion when the wheelchair is in the operative position and height adjustment of the male docking fixture relative to the support. However, there may be situations when limited lateral movement or additional vertical movement of the female docking fixture is desired. Lateral movement can be easily achieved by loosening the securing bolts of the slide mechanism in elongated boltholes so as to effect the required adjustment and retightening by the installation technician. Similarly, additional vertical movement can be achieved by careful placement of shims or by adjustment of lifting bolts.

[0040] Although the inventions described and claimed herein have been depicted and described in considerable detail with reference to certain preferred embodiments, one skilled in the art will appreciate that the inventions claimed herein can be practiced with other embodiments, including improvement, variations and modifications of the embodiments shown herein. The embodiments shown herein have been presented for purposes of illustration and not of limitation. Therefore, the spirit and scope of the appended claims should not be limited to the description of the preferred embodiments contained herein.

1. A wheelchair docking system for releasably securing a wheelchair to the floor of a vehicular conveyance, comprising:

- a male and a female docking fixture, which when coupled connect the wheelchair to the floor;
- the male docking fixture adapted for secure attachment to one of either the wheelchair or the floor, and further adapted for releasable locking engagement with a female docking fixture;
- a female docking fixture adapted for secure attachment to the other of either the support or the floor;
- the female docking fixture further adapted for locking engagement with the male docking fixture, whereby the female docking fixture and male docking fixture are the only structures securing the wheelchair to the floor of the vehicular conveyance,
- the female and male docking fixtures generally restricting the rotational movement of the wheelchair.

2. A wheelchair docking system as claimed in claim 1 wherein the male docking fixture is carried by a support attached to the underside of a wheelchair, and the female docking fixture is affixed to the floor of a vehicle.

3. A wheelchair docking system as claimed in claim 2, wherein the male docking fixture comprises an elongated foot with an engagement part comprising lateral surfaces merging to form a front edge of the male docking fixture, the male docking fixture having an opening extending through the engagement part, the opening adapted for releasable locking engagement with a releasable latching bolt carried by the female docking fixture.

4. A wheelchair docking system as claimed in claim 2, wherein the female docking fixture includes a docking port with an entry way adapted to slideably receive the male docking fixture and wherein a position indicator light is adjacent to the docking port;

5. A wheelchair docking system as claimed in claim 4 comprising a mechanical actuator adapted to move the releasable latching bolt comprising an actuating lever and cable.

6. A wheelchair docking system as claimed in claim 2, wherein the system comprises a support with an internally threaded collar, the male docking fixture being adapted for secure and adjustable rotational attachment to the collar.

7. A wheelchair docking system as claimed in claim 6, wherein the male docking fixture comprises a threaded shaft adapted for secure and adjustable rotational attachment with the collar.

8. A wheelchair docking system as claimed in claim 7, including a removable pin adapted to lock the male docking fixture with the collar in a desired axial position.

9. A wheelchair docking system as claimed in claim 5 wherein the latching bolt is spring loaded and comprises a beveled end adapted for releasable locking engagement with the opening extending through the engagement part of the male docking fixture.

10. A wheelchair docking system as claimed in claim 9 including a pivotally mounted lever operatively connected to the spring loaded latching bolt and adapted to move the latching bolt from a locked position to an unlocked position so as to allow disengagement of the male docking fixture from the female docking fixture.

11. A wheelchair docking system as claimed in claim 10 wherein the latching bolt is alternatively moveable by a manually operable lever and an electrically operated solenoid switch.

12. A wheelchair docking system as claimed in claim 2 in which the male and female docking fixtures are adapted to engage in a generally horizontal relative sliding motion.

13. A wheelchair docking system for releasably securing a wheelchair to the floor of a vehicular conveyance, comprising:

a male docking fixture adapted for secure attachment to one of the wheelchair or the floor, and further, adapted for releasable locking engagement with a female docking fixture;

a male and a female docking fixture, which when coupled connect the wheelchair to the floor and the floor;

a male docking fixture being height-adjustable and comprised of an elongated foot with an engagement part having lateral surfaces disposed at an acute angle and merging to form a front edge and further adapted for releasable locking engagement with a female docking fixture in a generally lateral relative sliding motion;

a female docking fixture, adapted for secure attachment to the other of either the support or the floor, and comprising a docking port with an entry way adapted for releasable locking engagement with the male docking fixture, whereby the female docking fixture and male docking fixture are the only structures securing the wheelchair to the floor of the vehicular conveyance;

the engagement of the male and female docking fixtures forming a connection that generally restricts the rotational movement of the wheelchair.

14. A wheelchair docking system as claimed in claim 13, wherein the system comprises a support with an internally threaded collar, the male docking fixture being adapted for secure and adjustable rotational attachment to the collar.

15. A wheelchair docking system as claimed in claim 13, wherein the male docking fixture includes a threaded shaft adapted for secure and adjustable rotational attachment with the collar.

17. A wheelchair docking system as claimed in claim 13 including a removable pin adapted to lock the male docking fixture with the collar in a desired axial position.

18. A wheelchair docking system as claimed in claim 13, wherein the female docking fixture is securely attached to the floor of the vehicular conveyance and wherein a position indicator light is adjacent to the docking port;

19. A wheelchair docking system as claimed in claim 13 where in the releasable latching bolt is moveable into and out of engagement with the male docking fixture, the latching bolt being moveable by both a manual actuating lever and a solenoid operated cable.

20. A wheelchair docking system for releasably securing a wheelchair to the floor of a vehicular conveyance, comprising:

a male docking fixture extending from a support, the male docking fixture comprising a threaded shaft adapted for height adjustment relative to the support and a collar carried by the support, the male docking fixture comprising an elongated foot with an engagement part and having a central opening and lateral surfaces disposed at an acute angle which merging to form a front edge, the support and male docking fixture being adapted for secure attachment to the underside of a wheelchair;

a female docking fixture adapted for secure attachment to the floor of the vehicular conveyance, comprising a docking port with a tapered entry way and a spring loaded latching bolt disposed transverse to the entry way and adapted for releasable locking engagement with the opening in the male docking fixture;

the male docking fixture adapted for releasable locking engagement with a female docking fixture in a generally lateral relative sliding motion;

whereby the female docking fixture and male docking fixture are the only structures securing the wheelchair to the floor of the vehicular conveyance, and sides of the tapered entry way form an acute angle that generally matches with the acute angle of the sides of the male docking fixture to achieve a connection that generally restricts the rotational movement of the wheelchair.

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