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(54) Locating wheelchairs, primarily in vehicles.

(57) A wheelchair locator is proposed for use mainly in vehicles which are designed for able-bodied passengers but are capable of being adapted to carry a wheelchair passenger who remains in his wheelchair. An inertia reel (9) controls a retractable flexible safety belt (10) which has attachments (12) to secure it releasably to the frame of the wheelchair. The occupant of the wheelchair pulls the belt against the retracting force and attaches it to convenient spaced points on the chair; then when the belt pulls the chair securely against a supporting surface the reel is locked and the chair is held in place. In a taxi the locking and unlocking of the reel may be controlled by the driver.

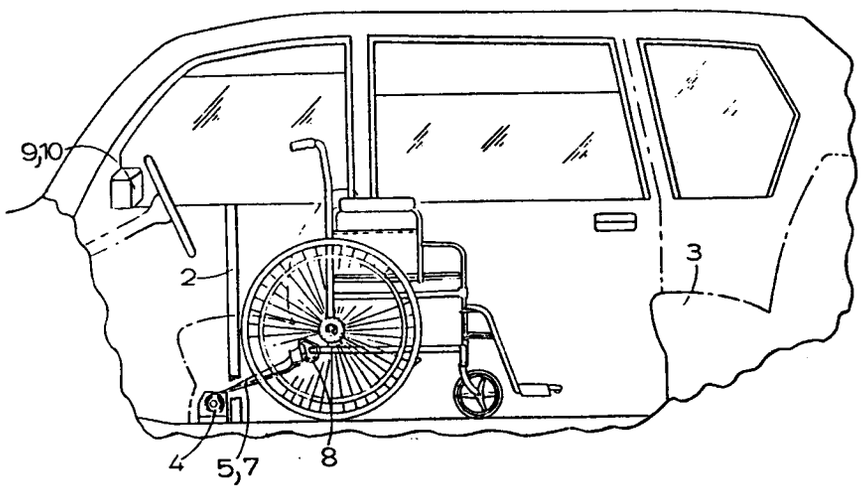

FIG.3.

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LOCATING WHEELCHAIRS, PRIMARILY IN VEHICLES

The invention relates to means for locating a wheelchair, primarily in a moving vehicle, for example a road vehicle, although it might be applicable to other situations.

Many wheelchairs have a brake which can be applied by the occupant, and can be arranged to remain applied without calling for further attention from the occupant. Whilst this prevents most movements of the wheelchair it could tilt or slide with respect to the floor, or the brake could be inadvertently released. It may therefore be desirable to restrain the wheelchair more positively against unexpected movement, especially in a moving vehicle, such as a road vehicle, ship or aircraft.

When a person in a wheelchair is to use a taxi it is usual to transfer that person from the wheelchair to a conventional fixed seat and then fold the chair and stow it separately. This is often inconvenient, indeed very difficult in the case of a severely handicapped person, and there remains the problem of where to stow the empty wheelchair.

It is therefore advantageous, particularly in vehicles, to have a positive locating arrangement which can accommodate wheelchairs of many different specifications, with the occupant remaining in his wheelchair.

All the same there will be occasions when the space in the vehicle is required by an able-bodied passenger and so the locating means should not prevent

normal use of the space that a wheelchair would occupy.

Accordingly it is the aim of the present invention to provide locating means for wheelchairs of differing designs which prevents sudden movement of the chair relative to its supporting surface and which do not obtrude and inconvenience able-bodied people in the vicinity, and which may be used by the occupant of the wheelchair without undue external assistance.

According to the invention a wheelchair locating system comprises restraining means, capable of holding the wheelchair against a restraining surface, in the form of one or more extendible flexible members with attachment devices, by which a wheelchair may be releasably secured to the flexible member or members, and an independently controlled locking device which in one state allows the member or members to be manually extended against the action of resilient retracting means and in its other state locks the member or members against extension; when the system is in the one state the restraining means are free to be secured easily by the user to any convenient portion of the wheelchair, then when the restraining means are retracted and pull the chair against the restraining surface the locking device is engaged and prevents any further extension of the flexible members or members, thereby holding the chair in place.

Preferably tilt-restraining surfaces are provided on each side of the position in which the wheelchair is to be is to be restrained, to prevent the wheelchair sliding sideways.

In a preferred embodiment the restraining means and flexible members comprise a retractable inertia reel belt system modified by the addition of a device for locking the reel at will.

The wheelchair locking system may be such that when in position the wheelchair is partially received within a recess. Preferably the recess is within a substantially vertical structure, and the tilt restraining surfaces may define, at least in part, the recess.

It is preferable to incorporate warning means to indicate whether the system is in the free or locked condition.

An advantage of the preferred embodiment is that the wheelchair can be attached to the locking system entirely by the occupant whilst he is in the wheelchair, and the use of flexible members of webbing like seat belts allows the use of the system with virtually any design of wheelchair.

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

Figure 1 shows a schematic perspective view of part of a taxi which incorporates an embodiment of the invention;

Figure 2 is a schematic plan view of part of the interior of the vehicle of Figure 1; and

Figure 3 is a schematic side view of part of the inside of the vehicle of Figure 1, showing a wheelchair in place.

A taxi, basically similar to a conventional London taxi, has the usual partition 1 behind the driver but instead of extending straight across it is joggled so that the portion 2 that is not behind the driver is displaced forwards of the remainder; this reduces to some extent the space available for luggage alongside the driver but it allows sufficient floor space in the rear compartment, at least on one side, to accommodate a wheelchair in its erected condition , complete with occupant, between the partition 1 and the rear seat 3, in the recess thus defined.

The wheelchair will normally be placed with its back to the partition 1 as shown, although it could in theory face either way. To locate it in place during travel we provide a restraining system comprising a reel 4 mounted at the foot of the partition 1, with a belt 5 of flexible webbing projecting through a slot 6 in the partition 1 into the passenger compartment. The belt 5 splits into two portions 7, each terminating in a readily releasable clip 8 capable of being easily clipped by hand onto any convenient part of the structure of a wheelchair. The clips 8 may for example be like the spring shackles used in sailing or the spring Karabiner links used by climbers.

The reel 4 is similar to a conventional inertia reel used for vehicle seat belt restraints, and has the usual recoil spring that is trying to wind the belt up onto the reel, but is modified by the addition of a solenoid-released pawl engaging a ratchet on the reel. When the solenoid is not energised the pawl engages the

ratchet and prevents the belt from being extended. When the occupant of a wheelchair is to enter the taxi the driver energises the solenoid by means of a switch 9 on the dashboard, freeing the belt. The occupant of the wheelchair (or another person) can pull the belt out as far as necessary and then manually engage the clips 8 over two suitable laterally spaced parts of the chair. The recoil spring takes up the slack in the belt and pulls the wheelchair against the partition 1. The driver then de-energises the solenoid again and the belt is locked against further extension, so that the wheelchair is securely located.

There is a warning light 10 on the dashboard to remind the driver when the switch 9 is on, ie. when the belt 5,7 is unlocked.

At least the left-hand door of the taxi is wide enough to accommodate all the normal kinds of wheelchair. The wheelchair may be wheeled up a removable ramp, and the occupant can clip the belt 5,7 onto it while still facing across the taxi if he finds that easier, then he turns it to face the rear and the driver engages the pawl to hold the chair snugly in the recess and against the partition. On reaching the destination the driver closes the switch again to release the belt and allow the occupant to move it away from the partition 1 and disengage the clips.

It will be appreciated that the belt 5 can be left fully retracted in normal use of the taxi, only the ends 7 protruding, so it does not interfere with normal use by able-bodied passengers, and both halves of the partition 1 can carry the usual "jump seats" 11.

There may be sockets or buckles provided at the appropriate points for a separate seat belt (for example of the usual lap-and-diagonal strap type) to be fitted to restrain the occupant of the wheelchair himself. These would, for example, be in the partition 1 and the door pillar, as indicated at 12.

Instead of being in the partition, it will be appreciated that the restraining system could be in another surface, even the floor, and in each case it acts to hold the wheelchair firmly against that surface. In the arrangement described, the partition, by virtue of its shape, defines a recess with vertical sides, into which the wheelchair enters, and these sides help to prevent the chair tilting sideways as the taxi goes round corners.

The retracting force of the reel 4 could be made much greater than that of an orthodox seat belt reel, so as to be capable of exerting a sufficient pull on the wheelchair to pull it positively into place against the partition. In that case there may be provision for disengaging the retracting force while the belt is being pulled out and attached to the chair. In another modification (especially where the invention is used in a private vehicle rather than a taxi) the locking and unlocking of the reel may be arranged to be controlled by the occupant of the wheelchair rather than by the driver.

CLAIMS

1. A wheelchair locating system capable of holding a wheelchair against a restraining surface (2), comprising restraining means in the form of one or more extendible flexible members (5,7) provided with attachment devices (8) by which a wheelchair may be releasably secured to the flexible member or members, and an independently controlled restraining device (4) from which the flexible members (5,7) are extendible, the restraining device in one state allowing the member or members (5,7) to be manually extended and in another state preventing them from extension and thereby holding the wheelchair against the restraining surface (2).

2. A wheelchair locating system according to claim 1 which further comprises resilient retracting means and which when the restraining device is in the one state allows the extendible member or members to be manually extended against the action of the resilient retracting means.

3. A wheelchair locating system according to claim 2 in which the resilient retraction means is a retractable inertia reel arranged so that when the restraining device is in the second state the reel is locked by a pawl co-operating with the reel, and in the first state the pawl is released and the flexible member or members (5,7) tensioned.

4. A wheelchair locating system according to any one of claims 1 to 3 including warning means (10) to

indicate whether the system is in the one or the other state.

5. A wheelchair locating system according to any one of claims 1 to 4 in which tilt restraining surfaces are provided on each side of the position in which the wheelchair is to be restrained.

6. A motor vehicle provided with a wheelchair locating system according to any preceding claim.

7. A motor vehicle according to claim 6 in which a driver's compartment is located forward of a passenger compartment and is separated from it by a transverse partition (1) which is stepped forwards in the region away from the driver to define a recess between the step in the partition and the side wall of the vehicle so that the recess provides a larger space in the passenger compartment in the region away from the driver than is present behind the driver, and in which the wheelchair locating system is arranged so as to locate a wheelchair in the recess.

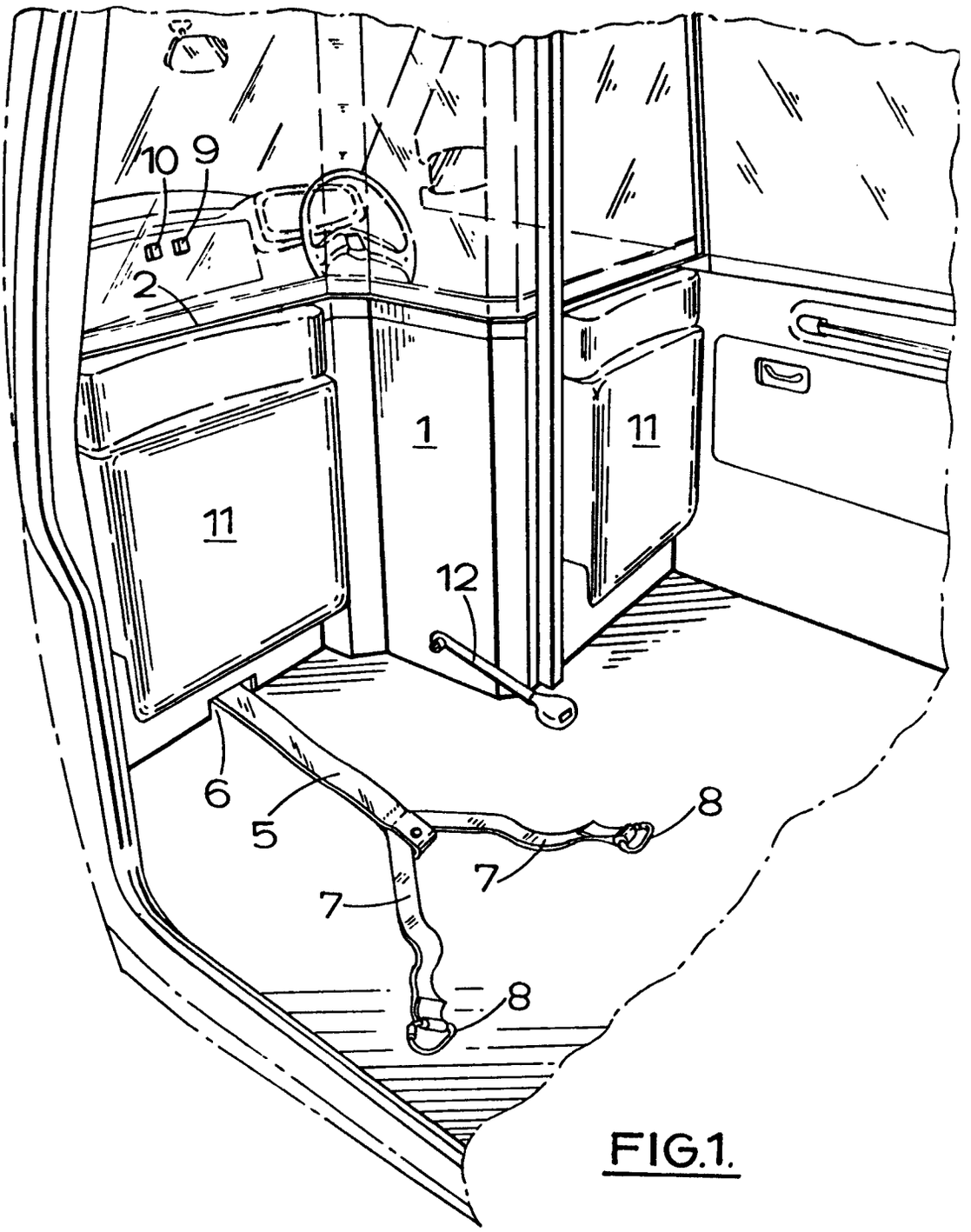

FIG.1.

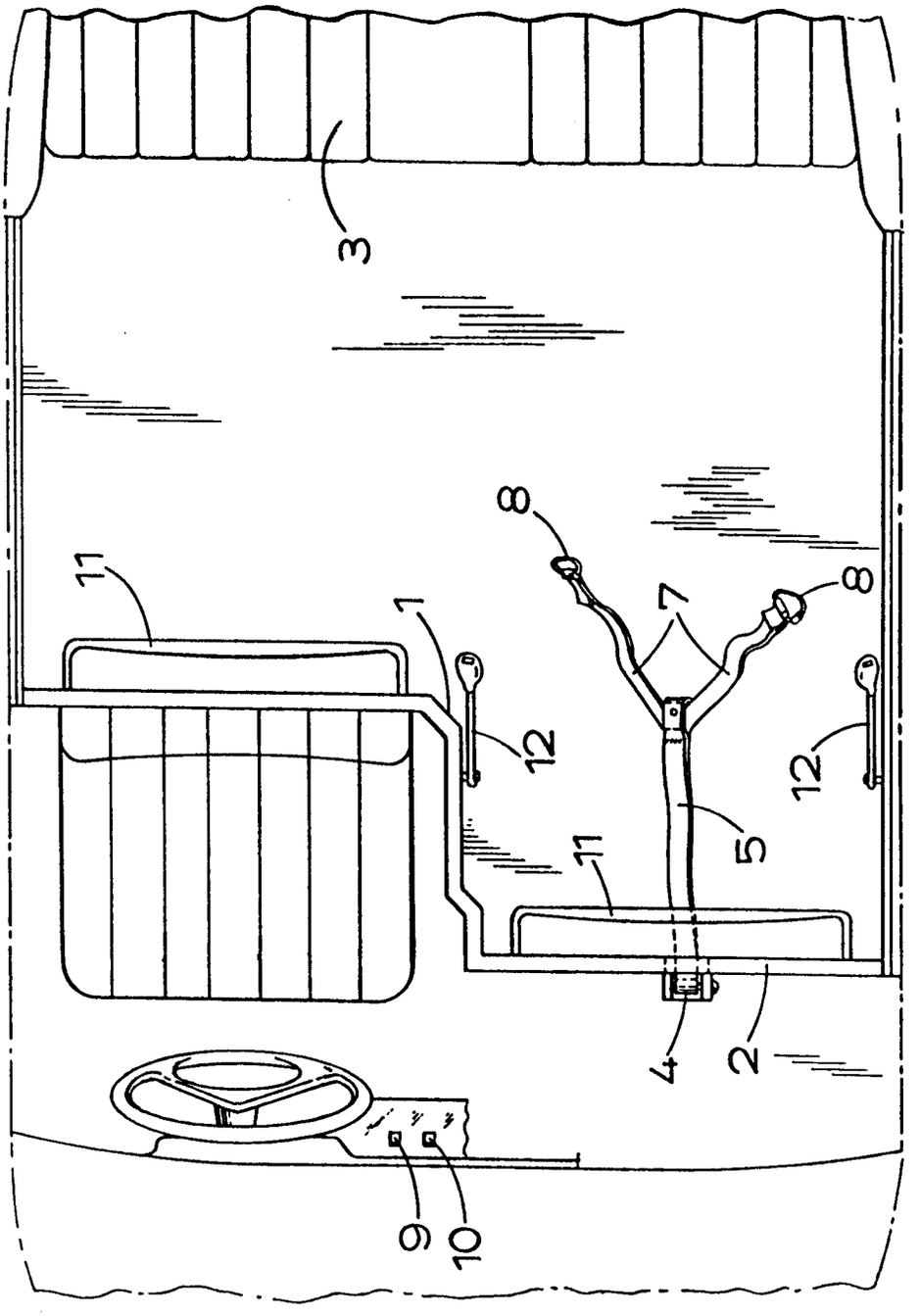

FIG.2.

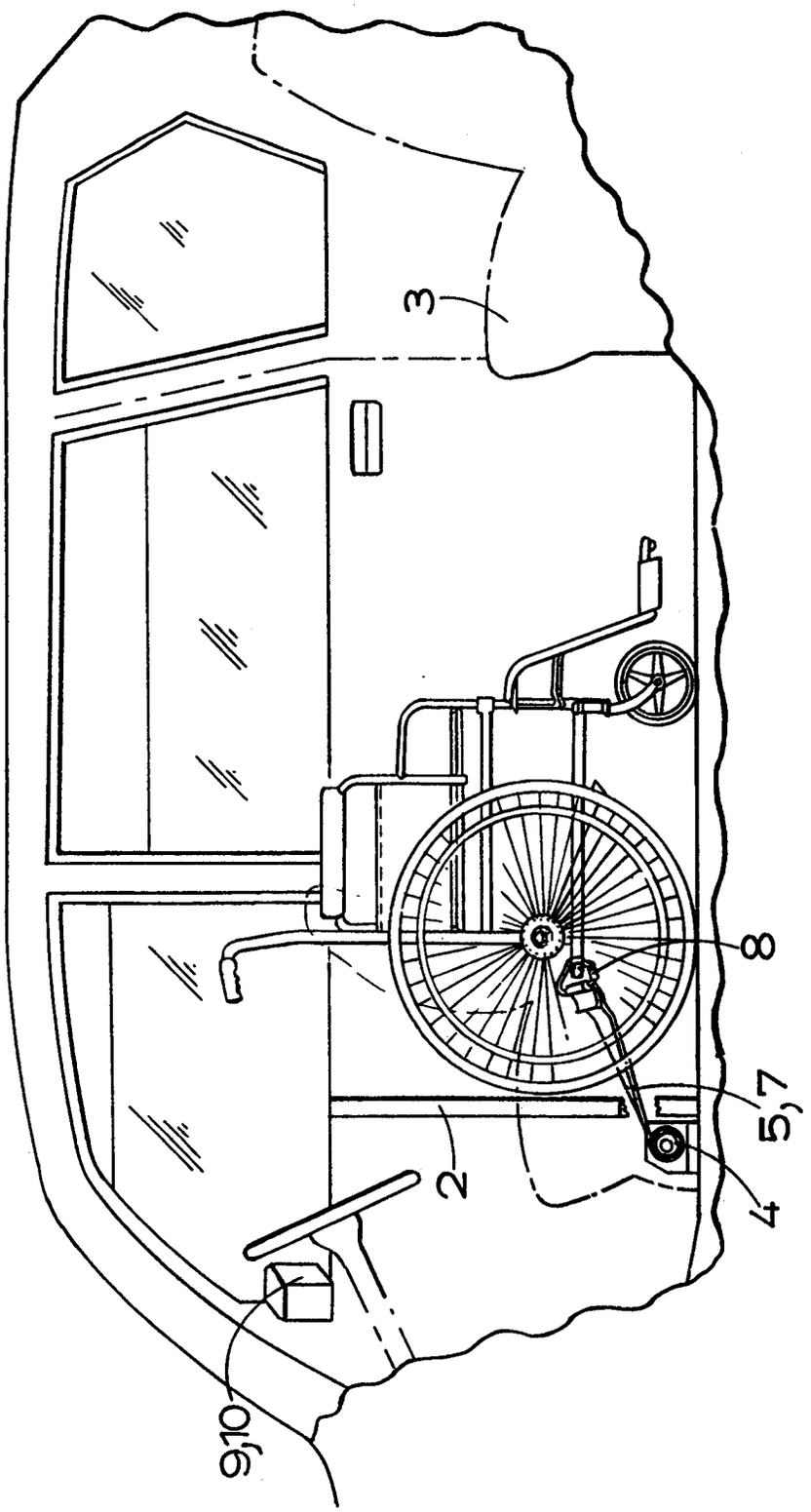

FIG.3.