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⑤④ **Vehicle-mountable access lift.**

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Description

The present invention is a lift of the type used to enable an operator to gain access to an elevated location and is mounted upon a vehicle.

Vehicle-mounted personnel access lifts currently available occupy a substantial proportion of the normal load-carrying area of the vehicle or entail structural features which impede normal use of the load-carrying area. Thus one existing form of such a lift comprises a combination of lifting booms which are disposed along the centre line of a lorry chassis and lie parallel to the length of the vehicle; thus little if any of the lorry remains available for carrying goods or personnel.

The access lift described in FR-A-1440808 appears to be of this type and consists of an assembly of booms articulated together to form a parallelogram deformable in a vertical plane and including a column mounted to pivot on the vehicle about a vertical axis.

An alternative available vehicle-mounted personnel lift is based upon a closed van. Again the lifting booms are disposed lengthwise of the vehicle but usually above the roof of a conventional van body and usually extending to at least a small extent rearward of the body. The boom assembly is mounted upon the top of a vertical column, which in turn is mounted upon the vehicle chassis and extends upwardly through the body interior. Thus use of the van interior in a conventional way is impeded and significantly restricted.

It is an object of the present invention to provide a vehicle-mounted personnel access lift wherein the use of the load-carrying area of the vehicle for stowing and/or supporting the lift is minimised.

The vehicle-mounted personnel access lift according to the present invention comprises an access platform or cage carried upon lift assembly comprising at least two articulated booms and is characterised in that the lowermost boom is pivotally mounted, for pivoting about a generally horizontal axis, upon the upper end of a vertical column, which in turn is mounted above one side of the vehicle in such a way that said two articulated booms are stowable together transverse to the length of the vehicle.

By virtue of the characteristic features of the access lift according to the present invention, the lift assembly may be stowed, when not in use, in a transverse position immediately behind the driving cab of the vehicle or, less desirably, at the rear of the load-carrying surface. Thus the remaining load-carrying area is unimpeded or is impeded to a minimum extent.

As one feature of the present invention, it is desirable for the boom assembly upon which the lift is based to be made as compact as possible and to that end it is desirable that none of the booms be longer than can be accommodated within the width of the vehicle. This does not necessarily mean that each boom must be shorter than the vehicle width, since a longer

boom may be accommodated by inclining it relative to the horizontal in its stowed position. For example, it is preferred that the lowermost boom in the assembly be so pivoted about a horizontal pivot at the point of attachment that said lowermost boom may adopt a downwardly-inclined position, for example extending at an angle of the order of fortyfive degrees downwardly across the width of the vehicle towards the chassis. In this way, a particularly compact orientation of the assembly may be achieved when the latter is stowed.

Advantageously, the vertical column is telescopically extensible. One advantage of such a telescopic vertical column is that the operating height of the lift may be increased by extending the column. However, an important further advantage is that, by extending the column telescopically as the first step in using the access lift, the boom assembly may be raised to a level at which it can be operated freely without any risk of impeding adjacent pedestrians or road traffic. A further advantage of a telescopic column is that, by extending the column, the point of attachment of the boom assembly to the vehicle may be raised to above the height of the vehicle cab, thereby permitting, if desired, rotation of the assembly about a vertical axis to enable the lift to extend in directions other than across the length of the vehicle.

A particularly preferred form of the personnel access lift according to the invention includes a generally vertical boom, displaced across the width of the vehicle from the point of attachment of the assembly to the vehicle and linked to the vehicle by a parallel-motion linkage, whereby said vertical boom will retain its generally vertical orientation throughout operation of the access lift. For example, the lowermost boom may extend downwardly from the upper end of the vertical column to the lower end of the vertical boom, and a link running parallel to the lowermost boom may ensure that the vertical boom remains parallel to the column at all times. Such a vertical boom may if desired also be telescopically extensible.

The boom assembly may be made particularly compact in its collapsed or stowed condition by arranging that at least one of the booms, for example the uppermost boom, is off-set relative to a lower boom or relative to the vertical column along the line of mutual pivoting of said upper and lower booms.

In general, the first may usefully be hydraulically operated. For example, at least one of the pairs of articulated booms and/or the lowermost boom and the vertical column may be caused to pivot relative to each other by means of a hydraulic ram extending between them. Advantageously, the hydraulic driving power for operating the lift may be provided by some form of power take-off mechanism from the vehicle engine. However in one form of the invention described in greater detail below with reference to the accompanying drawings, at least one such hydraulic

ram is dispensed with by providing a mechanical linkage between, for example, the uppermost pair of booms such that upward pivoting of one of the booms automatically pivots the other boom upwardly about their mutual pivot.

The uppermost boom will carry at its upper end a platform or cage to carry the operator. It is highly desirable that a self-levelling mechanism be provided to maintain the platform level at all positions of the boom assembly. Such self-levelling mechanisms, for example tie-rods linking the platform to another part of the lift structure, are already known *per se*.

Operation of the lift is preferably effected from controls located on the platform or cage, so that an operator may enter the cage and elevate the latter and adjust its spatial position from within the cage. As a less preferred alternative which requires a second operator, the movement of the booms and cage may be controlled from the level of the vehicle surface.

The access lift according to the present invention may be custom-made for a particular make of lorry or van or may even be built with the vehicle itself. However it is envisaged as being particularly suitable for designing as a conversion or modification unit or kit for addition to a standard vehicle chassis after manufacture of the latter. For example, the whole lift structure, including if desired an aforesaid vertical column, may be built upon one or more cross-members designed to be mounted across an existing vehicle chassis. Preferably such a cross-member or members is provided with a lift-jack at each end, which may be extended downwards into contact with the adjacent ground surface to provide extra stability to the personnel lift when it is to be used. Such a self-contained unit for attachment to a vehicle chassis may be sold or shipped as such, for example overseas, to a factory where vehicles are produced or to a workshop in which vehicle modifications are carried out.

The invention will now be further described with reference to the accompanying drawings, wherein:-

Fig. 1 is a view in elevation, from the rear of a vehicle, of one embodiment of the personnel lift according to the invention in a stowed condition; Fig. 2 is a view corresponding to Fig. 1, showing the lift in an extended condition;

Fig. 3 is a view of the personnel lift of Fig. 1 from the side; and

Figs. 4 to 6 show in outline plan view three ways in which the lift of Figs. 1 to 3 may be located on a van relative to the van body.

Referring firstly to Figs. 1 to 3, the base frame of the personnel access lift comprises two cross-members 7, together carrying a lifting jack 8 at each end and secured across the chassis 9 of a vehicle, immediately behind the driving cab 10. Projecting vertically from the cross-members 7, at the nearside of the vehicle, is a column 11, which is telescopically extensible under hydraulic pressure. The upper end

12 of the column 11 lies, when contracted, somewhat above the height of the top of the cab 10; that upper end 12 carries the boom assembly.

The lowermost boom 13 is pivoted at one end at pivot point 14 on the column end 12 and carries at its other end a vertical boom 15. Parallel to the boom 13 and also linking the column upper end 12 and the boom 15 is a link 16, which holds the boom 15 vertical whatever the position of the boom 13. In the stowed position of the boom assembly, as shown in Fig. 1, the vertical boom 15 is located above the cross-members 7 at the opposite side of the vehicle to the vertical column 11 and the boom 13 lies across the vehicle at an angle of the order of 45° to the horizontal.

Pivoted upon the upper end of the vertical boom 15 is a boom 17, to the upper end of which the uppermost boom 18 is pivoted at 19. A cranked extension 18a of the boom 18 is linked to the vertical boom 15 by a link 20. The effect of the link 20 is that, when the boom 17 pivots clockwise relative to the vertical boom 15, the uppermost boom 18 pivots in the same direction relative to the boom 17. At the upper end of the boom 18 is located a personnel cage 21. A self-levelling mechanism (not shown) is provided to ensure that the cage 21 remains level in all positions of the boom assembly.

Relative pivoting of the lowermost boom 13 and the vertical column 11 is effected by a hydraulic ram 22 and pivoting of the boom 17 relative to the vertical boom 15 is effected by a hydraulic ram 23 (not visible in Fig. 2). Pivoting of the uppermost boom 18 is effected by the link 20.

In extending the assembly from the stowed position of Fig. 1 to the extended position of Fig. 2, the operator enters the personnel cage 21 at vehicle level and then first extends the column 11 to a desired upward extent until the column head 12 is at least well clear of the cab 10. The head 12 is able to rotate relative to the inner shaft 24 of the column if desired. Next the vertical boom 15 is raised to or towards its intended working height, an operation which entails very little lateral movement of the booms beyond the width of the vehicle. Finally, by means of booms 17 and 18, the cage 21 is moved into its desired working position, slewing the assembly around the column 11 as axis if desired.

Figs. 4 to 6 show an assembly such as described above mounted upon a van. In Figs. 4 and 5, the assembly is located between the cab 10 and van bodies 25 and 26 respectively, body 26 being partially extended forward at 27 to increase its capacity as compared with body 25. In the version shown in Fig. 6, the assembly is located at the rear of the van, behind the body 28.

As is readily apparent, the illustrated embodiment of the invention is a very compact personnel lift, which can be mounted on a vehicle with minimum adaptation of the vehicle and with very little demand on

load-carrying capacity, but which can extend to a substantial height relative to the height of the vehicle.

Claims

1. A personnel access lift mounted upon a vehicle, which access lift comprises an access platform or cage (21) carried upon a lift assembly comprising at least two articulated booms (13, 15, 17, 18), characterised in that the lowermost boom (13) is pivotally mounted, for pivoting about a generally horizontal axis, upon the upper end of a vertical column (11), which in turn is mounted above one side of the vehicle (9, 10) in such a way that said two articulated booms are stowable together transverse to the length of the vehicle.

2. A personnel access lift according to claim 1, characterised in that said vertical column (11) is mounted immediately behind the driving cab (10) of the vehicle.

3. A personnel access lift according to claim 1 or 2, characterised in that said vertical column (11) is telescopically extensible.

4. A personnel access lift according to claim 3, characterised in that said lift assembly is mounted for pivoting also about a generally vertical axis.

5. A personnel access lift according to any of claims 1 to 4, characterised in that the lowermost boom (13) is stowable in a downwardly-inclined position.

6. A personnel access lift according to any of the preceding claims, characterised in that it includes a generally vertical boom (15), displaced across the width of the vehicle from the point of attachment of the lift assembly to the vertical column (11) and linked to the column by a parallel-motion linkage (13, 16) to retain said generally vertical orientation.

7. A personnel access lift according to claim 6, characterised in that said generally vertical boom (15) is telescopically extensible.

8. A personnel access lift according to any of the preceding claims, characterised in that at least one boom (13, 15, 17, 18) is off-set relative to a lower boom (13, 15, 17) or to said vertical column (11) along their line of mutual pivoting (14, 19).

Patentansprüche

1. Auf einem Fahrzeug montierbare Arbeitshebebühne, bestehen aus einer begehbaren Plattform oder einem Korb (21), der von einer aus mindestens zwei gelenkig miteinander verbundenen Balken (13, 15, 17, 18) bestehenden Hebeanordnung getragen wird, **dadurch gekennzeichnet**, daß der unterste Balken (13) schwenkbar um eine im allgemeinen horizontale Achse auf dem oberen Ende einer senkrech-

ten Säule (11) angeordnet ist, die wiederum auf einer Seite des Fahrzeuges (9, 10) derart angeordnet ist, daß die genannten zwei miteinander verbundenen Balken zusammen quer zur Längserstreckung des Fahrzeuges verstaubar sind.

2. Auf einem Fahrzeug montierbare Arbeitshebebühne nach Anspruch 1, **dadurch gekennzeichnet**, daß die genannte senkrechte Säule (11) unmittelbar hinter dem Fahrerhaus (10) des Fahrzeuges angeordnet ist.

3. Auf einem Fahrzeug montierbare Arbeitshebebühne nach Anspruch 1 oder 2, **dadurch gekennzeichnet**, daß die genannte senkrechte Säule (11) teleskopisch ausziehbar ist.

4. Auf einem Fahrzeug montierbare Arbeitshebebühne nach Anspruch 3, **dadurch gekennzeichnet**, daß die genannte Hebeanordnung zur Drehung um eine im allgemeinen senkrechte Achse angeordnet ist.

5. Auf einem Fahrzeug montierbare Arbeitshebebühne nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet**, daß der unterste Balken (13) in nach unten geneigter Stellung verstaubar ist.

6. Auf einem Fahrzeug montierbare Arbeitshebebühne nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß sie einen im allgemeinen senkrechten Balken (15) aufweist, der quer zur Breite des Fahrzeuges versetzt vom Verbindungspunkt der Hebeanordnung zur vertikalen Säule angeordnet ist und mit der Säule durch eine Parallelogramm-Verbindung zur Beibehaltung einer im allgemeinen senkrechten Ausrichtung verbunden ist.

7. Auf einem Fahrzeug montierbare Arbeitshebebühne nach Anspruch 6, **dadurch gekennzeichnet**, daß der genannte senkrechte Balken (15) teleskopisch ausziehbar ist.

8. Auf einem Fahrzeug montierbare Arbeitshebebühne nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß mindestens ein Balken (13, 15, 17, 18) relativ zu einem unteren Balken (13, 15, 17) oder zur genannten senkrechten Säule (11) längs ihrer Schwenkachse (14, 19) versetzt ist.

Revendications

1. Dispositif d'ascension de personnel monté sur un véhicule, comprenant une plate-forme d'accès ou nacelle (21), portée par un ensemble élévateur qui comporte au moins deux mâts articulés (13, 15, 17, 18), caractérisé en ce que le mât le plus bas (13) est monté pivotant au dessus de l'extrémité supérieure d'une colonne verticale (11) afin de pouvoir tourner en rotation autour d'un axe généralement horizontal, colonne qui à son tour est montée au dessus de l'un des côtés du véhicule (9, 10), de sorte que les deux mâts articulés puissent être disposés ensemble transversalement par rapport à la longueur du véhi-

cule.

2. Dispositif d'ascension de personnel suivant la revendication 1, caractérisé en ce que ladite colonne verticale (11) est montée juste derrière la cabine (10) du véhicule. 5

3. Dispositif d'ascension de personnel suivant l'une quelconque des revendications 1 ou 2, caractérisé en ce que la colonne verticale (11) est télescopique.

4. Dispositif d'ascension de personnel suivant la revendication 3, caractérisé en ce que l'ensemble élévateur est aussi monté pivotant autour d'un axe généralement vertical. 10

5. Dispositif d'ascension de personnel suivant l'une quelconque des revendications 1 à 4, caractérisé en ce que le mât inférieur (13) peut être placé en une position inclinée vers le bas. 15

6. Dispositif d'ascension de personnel suivant l'une quelconque des revendications précédentes, caractérisé en ce qu'il comporte un mât généralement vertical (15) qui est déplacé dans le sens de la largeur du véhicule, du point d'attache de l'ensemble élévateur à la colonne verticale (11), et reliée à celle-ci par une tringlerie à déplacement parallèle (13, 16) pour maintenir ladite orientation généralement verticale. 20 25

7. Dispositif d'ascension de personnel suivant la revendication 6, caractérisé en ce que le mât généralement vertical (15) est télescopique.

8. Dispositif d'ascension de personnel suivant l'une quelconque des revendications précédentes, caractérisé en ce qu'au moins un mât (13, 15, 17, 18) est décalé par rapport à un mât inférieur (13, 15, 17) ou à ladite colonne verticale (11) suivant leur ligne commune de pivotement (14, 19). 30 35

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FIG. 3.

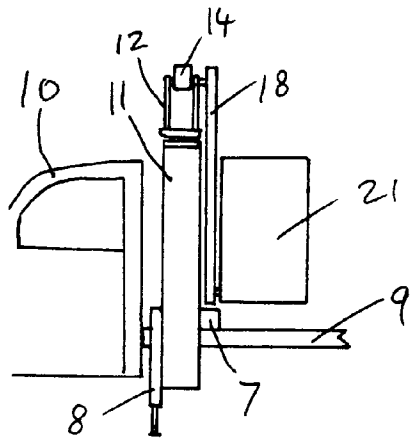


FIG. 1.

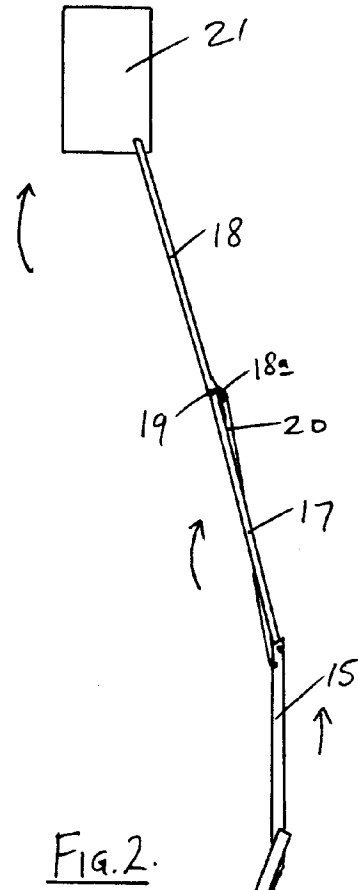
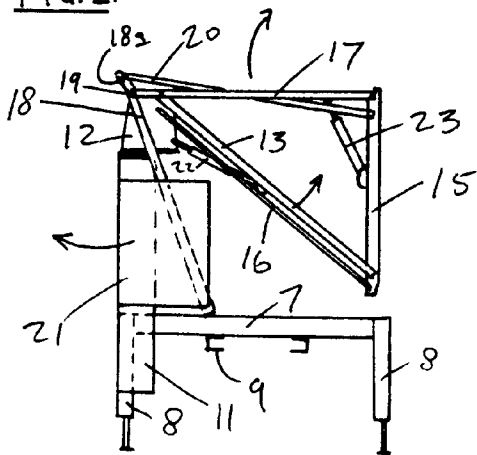


FIG. 2.

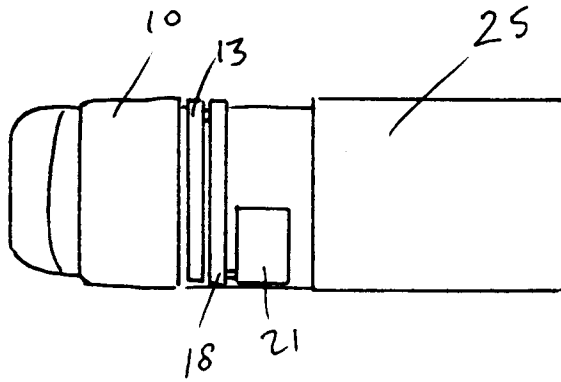


FIG. 4.

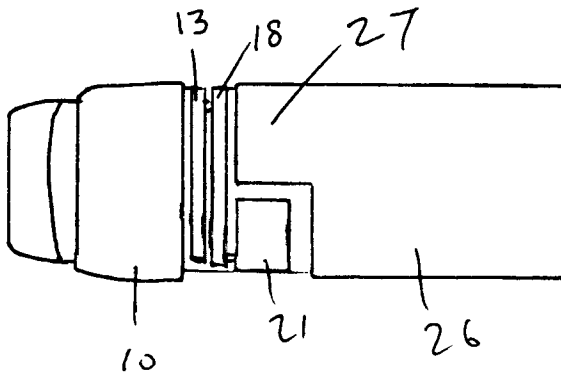


FIG. 5.

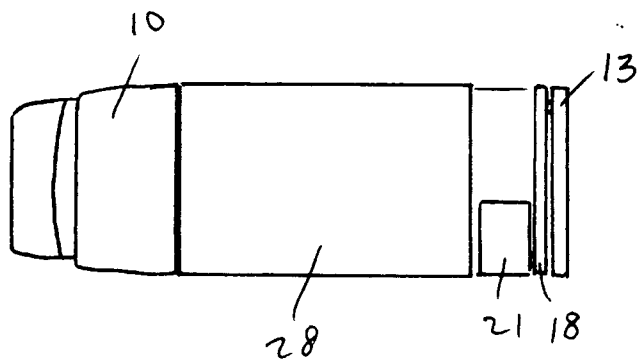


FIG. 6.