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(72) Inventor: **Cartwright, Steven**
Knutsford Cheshire WA16 8NP (GB)

(74) Representative: **Quest, Barry**
Wilson Gunn
5th Floor
Blackfriars House
The Parsonage
Manchester M3 2JA (GB)

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(71) Applicant: **S. Cartwright & Sons (Coachbuilders)**
Ltd
Cheshire WA14 5DH (GB)

(54) **Loading apparatus**

(57) Wheeled apparatus for use in loading and unloading load haulage vehicles has a support structure with linked side members (5, 10, 11, 110, 111, 210, 211) and a vertically movable platform (21, 120, 220, 320) carried on an upright structure (6, 115, 116, 215, 216, 315, 316) mounted on the support structure. The side

members have ground-engaging wheels (8, 114, 214, 314) to enable the apparatus to be moved. One or more feet (14, 118, 218, 318) can be moved down into contact with the ground to hold the apparatus in position. The feet contact the ground together with the wheels so that the wheels contribute to stability. The feet and the platform may be moved by rams in the upright structure.

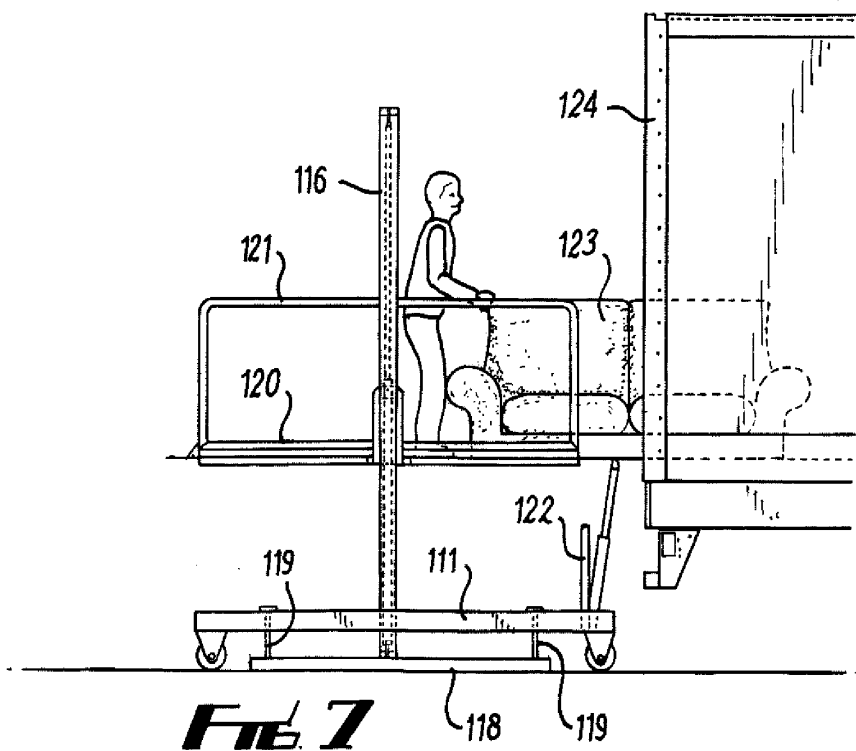


Fig 1

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Description

[0001] This invention relates to loading apparatus having a load-carrying platform which can be lifted and lowered on a support structure, and which has ground-engaging wheels.

[0002] Loading apparatus of this kind, which is described for example in GB 2321050B and EP 1026118A, can be used to transfer loads into and out of load storage areas of load haulage vehicles and is particularly useful where direct loading/unloading between a vehicle floor and a fixed dock surface is not possible, or where loading/unloading between a ground surface and different levels within the vehicle is required.

[0003] The provision of ground-engaging wheels facilitates movement of the apparatus into a convenient loading position on a ground surface but during loading, action has to be taken to ensure that movement of the apparatus is prevented.

[0004] With GB 2321050B the wheels are mounted on the platform so that they are lifted with the platform and the support structure engages the ground surface during loading.

[0005] With EP 1026118A the wheels are movably mounted on the support structure so that they can be moved out of contact with the ground surface during loading.

[0006] An object of the present invention is to provide wheeled loading apparatus which can be held securely against movement during loading without need to move wheels out of contact with the ground surface.

[0007] According to the invention therefore there is provided a wheeled loading apparatus comprising a support structure, a load-carrying platform mounted on the support structure so as to be movable upwardly and downwardly, and ground-engaging wheels on the support structure,

characterised by the provision of at least one support member mounted on the support structure movable between positions at which it is respectively clear of the ground surface and in contact with the ground surface level with a ground-engaging periphery of at least one said ground-engaging wheel.

[0008] With this arrangement, the (or each) member when in contact with the ground surface can stabilise the apparatus against undesired movement on the ground surface. The member is level with the periphery of at least one wheel which remains in contact with the ground surface. There is therefore no requirement to move this wheel out of contact with the ground surface during loading. The wheel can therefore contribute to support of the apparatus.

[0009] Preferably, the arrangement is such that the (or each) member when in contact with the ground surface is level with all ground-engaging wheels whereby there is no requirement to move any wheel out of contact with the ground surface during loading, and all wheels can contribute to support of the apparatus.

[0010] The (or each) member may be in the form of a foot and in this case may contact the ground surface over a confined surface area, say of square or rectangular or other shape having a largest longitudinal dimension which is small compared with any overall longitudinal dimension of the support structure or platform.

[0011] Alternatively, the (or each) member may be in the form of an elongate beam which contacts the ground surface along its length, along a continuous surface, or at multiple spaced positions along its length. In this case the length of the member may be significant e.g. approaching, equal to or exceeding a longitudinal dimension of the support structure or platform.

[0012] The (or each) member is preferably such as to exert a locking or braking action on the ground surface in so far as it is non-movable relative to the support structure when it contacts the ground surface e.g. it is non-rotatable and held against movement back out of contact with the ground surface, and it is capable of frictionally engaging the ground surface to resist movement thereof along the surface whether as a consequence of the surface area in contact with the ground surface or the construction of the member where it contacts the ground surface.

[0013] Preferably, the support structure has opposite sides thereto with respective said wheels thereat and there is at least one respective said support member at each said side.

[0014] In a particularly preferred embodiment there are at least two support members movable into contact with the ground surface respectively on opposite said sides. Preferably also the members are linked between the said sides by a transverse beam which may also be engageable with the ground surface.

[0015] In one embodiment, the (or each) said support member is mounted at one end region of said support structure adjacent to one (or a respective) said wheel, and at least one further said wheel is mounted on the support structure spaced away from said one end region.

[0016] With this arrangement, especially when the apparatus is loaded with the (or each) support member in contact with the ground surface, the (or each) further said wheel can be forced firmly into contact with the ground surface by the movement or pivotal force acting around the pivot point of the (or each) support member and its respective adjacent wheel. This can help to ensure that the apparatus is located in secure and stable disposition on the ground surface.

[0017] In a further, alternative embodiment, the (or each) support member is disposed centrally or substantially centrally of the respective said side of the support structure.

[0018] The (or each) support member may be movable between the said positions upwardly and downwardly relative to the support structure. This movement may be in a vertical direction. Other arrangements are however also possible. Movement may be at an angle to the

vertical. Also movement may occur with the support structure e.g. by retraction of the wheels relative to the structure to bring the (or each) support member into engagement with the ground surface.

[0019] The support structure may conveniently comprise mutually spaced elongate first members extending in level disposition in a common direction, at least one transverse linking second member between the first members, and at least one upright guiding third member for guiding movement of the platform and the (or each) support member.

[0020] Preferably the first members extend in a common direction along the aforesaid sides.

[0021] There may be a respective said upright third member at each said side, and the third members may be linked at their upper regions by a transverse fourth member.

[0022] Preferably there are two ground-engaging wheels at each side at spaced positions longitudinally of the side. The wheels may be at the end regions of the sides. The wheels may be mounted on the aforesaid first members.

[0023] The arrangement may be such that contact between the (or each) support member and the ground surface provides the entire braking action necessary to hold the apparatus securely in position on the ground surface.

[0024] However, it is also possible to provide additional brakes. For example, at least one wheel may be mounted within a socket structure such that the wheel can be depressed into a locked or braked condition in the socket in which it engages a braking pad or the like.

[0025] Also, at least one wheel may have a manual or power operated brake applied thereto, e.g. to move a braking pad into contact with the wheel periphery.

[0026] Provision may be made for power and/or manual movement of the platform and a remote control may be provided for this on the platform, e.g. where it can be operated by a person standing on the platform, and/or elsewhere.

[0027] The (or each) support member may be movable by power and/or manual operation and a control for this may be provided on the apparatus and/or elsewhere.

[0028] Power means for the platform and the (or each) support member may be associated and, conveniently, a common device, such as a ram, may be used both for movement of the (or each) support member and the platform whereby, for example, initial operation of the power means for the platform first brings the (or each) support member into contact with the ground surface and then subsequent operation effects movement of the platform.

[0029] The platform may be arranged to move down to the ground surface so that a fork lift truck or other wheeled device can be conveniently driven to the platform on the ground surface.

[0030] The apparatus may be used for loading and unloading of a load haulage vehicle whereby the appa-

ratus can be moved to a rear access opening of the vehicle and the platform may be movable between the ground surface, the floor of the load-carrying compartment of the vehicle, and upper positions of stacked loads or upper decks within the vehicle compartment.

[0031] The invention is not however restricted to this arrangement and the apparatus may be used for transfer of loads between vehicles and elevated loading-bay surfaces and/or for any other suitable purpose.

[0032] Where powered components are used, power may be derived from batteries on the apparatus and/or by connection to an electric or hydraulic or pneumatic power source on a vehicle or elsewhere.

[0033] The platform may comprise a solid deck structure or any other suitable structure.

[0034] The wheels may comprise individual rotatably mounted castors, or rollers or any other suitable structures.

[0035] The invention will now be described further by way of example only and with reference to the accompanying drawings in which:-

Figure 1 is a diagrammatic side elevation of one form of loading apparatus according to the invention;

Figure 2 is a transverse view of the arrangement of Figure 1;

Figure 3 is an exploded perspective view showing part of the apparatus.

Figure 4 is a side elevation of an alternative form of loading apparatus according to the invention in a movable state;

Figure 5 is a plan view of the loading apparatus of Figure 4 with an exemplified load thereon;

Figure 6 shows the apparatus of Figure 4 adjacent the rear of a van, with furniture being loaded onto the platform of the apparatus which is in its lowest position;

Figure 7 is a view similar to Figure 6 showing the platform raised to the level of the van floor;

Figures 8 & 9 are respectively plan and side views of a further form of apparatus according to the invention; and

Figures 10 & 11 are plan and end views of a yet further form of apparatus according to the invention.

[0036] Figure 1 shows loading apparatus used to transfer loads between a ground-surface 1 e.g. in a warehouse or loading bay, and the interior of a load-haulage wheeled road vehicle 2 having a load-supporting floor 3 on which loads can be stacked.

[0037] Loads are moved into and out of the vehicle 2 through a rear access opening 4 provided with doors (not shown).

[0038] The apparatus comprises a support structure having two common-length horizontal beams 5 which are fixed in parallel disposition by connection to two vertical open-sided box-section members 6 linked by two further horizontal box-section beams 7.

[0039] Each of the horizontal beams 5 is fixed at one end to a respective vertical member 6 adjacent a bottom end region thereof, at a common side of the apparatus.

[0040] The two further beams 7 are fixed one above the other at the bottom end regions of the vertical members 6 on the opposite sides thereof to the horizontal beams 5.

[0041] The horizontal beams 5 are fixed to the vertical members 6 slightly above the bottom peripheries of the vertical members 6.

[0042] Two castors 8, 9 are mounted beneath each beam 5, respectively adjacent opposite ends thereof. The castors 8, 9 have ground-engaging peripheries which are normally level with a position spaced below the bottom peripheries of the vertical members 6. The (rear) caster 9 at the free end of each beam 5 away from the vertical member 6 has a swivel mounting; the other (front) caster 8 has a fixed mounting.

[0043] Between the upper end region of each vertical member 6 and the free end of the associated horizontal beam 5 there is fixed a rigid brace rod 10.

[0044] The structure defined by the two vertical members 6, the two horizontal beams 5, the two further horizontal beams 7, and the two brace rods 10 is a rigid self-supporting structure.

[0045] The vertical members 6 are open on those sides facing towards each other.

[0046] Alongside each member 6 there is mounted a hydraulic lift ram 11 which has inner and outer members 12, 13.

[0047] The inner member 12 has at its bottom end a foot 14 which comprises a solid body 15 with a rubber friction pad 16 attached to its lower surface.

[0048] The solid bodies 15 of the two feet 14 are linked by a rigid transverse beam 17 having a lower surface level with the lower surfaces of the bodies 15 and also having a rubber friction pad attached thereto.

[0049] The outer member 13 has at its bottom end a roller carriage 18 which runs inside the box-section member 6 between upper and lower stops 19, 20.

[0050] The foot 14 projects below the respective lower stop 20.

[0051] The two roller carriages 18 support a horizontal platform 21 comprising a frame structure 22 supporting horizontal planks 23. Forward and rearward edges have platform extensions 24, 25 pivotally mounted thereon so as to be movable between stowed upright positions and load-supporting horizontal (or slightly downwardly inclined) positions. These extensions 24, 25 actuate position sensors as they move between their stowed and load-supporting positions.

[0052] The platform framework 22 has mounted thereon a battery pack 26 and electrical controls 27 by

means of which the two rams 11 are operated. The rams 11 are linked for equalisation.

[0053] A manual spring loaded brake handle 28 is provided alongside each fixed castor 8. The handle 28 is used to move a friction brake pad into and out of contact with the respective castor 8 and for safety is spring loaded to the braked position.

[0054] Each swivel castor 9 is mounted within a socket (not shown) into which the castor can be removably inserted to cause the castor 9 to be slightly retracted into a position in which it engages friction pads associated with the socket.

[0055] The apparatus so far described can be used for transferring loads between the vehicle load compartment and the ground surface 1 behind the vehicle.

[0056] With all castors 8, 9 un-braked and freely rotatable (i.e. with the hand brakes 28 released and the rear swivel castors 9 not forced into their sockets), the loading apparatus can be pushed on the ground surface 1 until the front side of the apparatus having the upright members 6 is close to the rear access opening 4 of the vehicle.

[0057] The feet 14 and the linking beam 17 are raised above the ground surface 1 with the carriages 18 on the stops 20 so that the peripheries of the castors 8, 9 contact and are free to rotate on the ground surface 1.

[0058] With the apparatus in the desired position, the apparatus is then locked against further movement on the ground surface 1 by actuating the rams 11 to cause the inner members 12 to move downwardly.

[0059] Movement downwardly of the inner members 12 continues until the rubber-covered lower surfaces of the feet 14 and the linking beam 17 firmly engage the ground surface 1. The linking beam 17 spreads the load on the ground surface 1 and contributes to constructional strength and stability.

[0060] The apparatus is supported on the ground surface 1, in a secure and stable manner, by the castors 8, 9, the feet 14 and the linking beam 17.

[0061] The weight of the apparatus, and of any load on the platform 21, acts to pivot the apparatus about the feet 14, the linking beam 17 and the front castors 8, to ensure that the rear castors 9 are firmly forced on to the ground surface 1.

[0062] The handles 28 may additionally be operated to brake the front castors 8, and also the rear castors 9 may be retracted into their sockets, as described above, using manual controls (not shown).

[0063] In this position the platform is at its lowermost position slightly above the ground surface 1 with the carriages 18 engaging the stop 20, and the rear extension 25 can now be pivoted out into contact with the ground surface 1. This facilitates movement of a fork lift truck on or off the platform 21. When the platform 21 is loaded the rear extension 25 can be moved up to its protective stowed position and this actuates the sensor to allow further operation of the rams 11. The platform 21 can now be moved upwardly so that it is level with the vehicle

floor 3 or at a higher position level with an upper part of a load stack and/or an upper internal vehicle loading deck. The carriages 18 engage the upper stop 19 to limit upward travel of the platform 21.

[0064] The forward extension 24 can now be pivoted out to facilitate movement of loads on or off the platform 21 into the vehicle. With the extensions 24 in this position its sensor is actuated to prevent further operation of the rams 11.

[0065] When desired, after moving the extension 24 back up to its stowed position the rams 11 can be operated to move the platform 21 down to a lowermost position at which the carriages 18 engage the lower stop 20 and the inner members can be retracted to move the feet 14 and the linking beam 17 off the ground surface 1. The castors 8, 9 can then be freed by operation of the handles 28 and by operation of controls to move the rear castors 9 out of their sockets.

[0066] With this arrangement the castors 8, 9 of the loading apparatus facilitate easy manoeuvrability on the ground surface, and, when desired, movement can be arrested and the apparatus can be held in a secure and stable manner using the castors 8, 9 to contribute to support of the apparatus. The castors 8, 9 may be large wheels to facilitate movement and stability.

[0067] The loading apparatus of Figures 4-7 comprises a rectangular frame having three side members 110-112. Frame members 110, 111 are opposed to each other across the width of the frame, whilst the third member 112 forms an end member. The fourth side of the rectangle 113 is open. Each corner of the frame is supported by a respective, preferably castor mounted, wheel 114.

[0068] Each of the side frame members 110, 111 support a respective upright lift post or jack member 115, 116 which are connected at their upper ends by a bridge member 117.

[0069] Also provided below each side frame member 110, 111 is a respective stabiliser foot 118 in the form of an elongate plank member, which can be raised clear of the ground as in Figure 4, or pressed firmly against the ground as in Figure 7 by means of jacks 119 (Figure 7), and/or by the jacks 115, 116 in which case components 119 may also be jacks or alternatively may be guides.

[0070] The frame encloses a platform 120, which is carried by the jacks 115, 116 so as to be raisable and lowerable thereby, between a ground-contacting position (between the feet 118) as in Figure 6, and a raised position as in Figure 7.

[0071] The platform 120 may be provided with safety rails 121 along each side parallel to frame member 110, 111. Controls such as 122 are also provided on the frame for operation of the jacks.

[0072] The loading apparatus can be used as illustrated in Figures 6 and 7, for example furniture items 123 are loaded onto the platform 120 when the latter is at ground level, the platform raised to the floor or deck level

of a van 124, and the furniture items then transferred into the van, without any substantial lifting.

[0073] The jacks may be pneumatically or hydraulically operated, or may be screw jacks operated by a lever.

[0074] If required, a third foot 118 may be provided in association with the end frame member 112, for additional stability.

[0075] Figures 8 and 9 show a yet further embodiment. This is similar to the embodiment of Figures 4-7 and similar reference numerals are used for similar parts prefixed 200 instead of 100.

[0076] Thus the apparatus of Figures 8 and 9 has a support structure with an open rectangular frame having opposite side members 210, 211 linked by an end member 212.

[0077] At each side there is a centrally disposed upright further member 215, 216 enclosing a vertically acting double end ram. These members 215, 216 are mounted on the side members 210, 211 and are linked at their top ends by a further transverse member 217.

[0078] A platform 220 with side rails or side walls 221 and a pivotal front end ramp 225 is mounted on the upright members 215, 216 so as to be movable upwardly and downwardly relative thereto by means of the rams.

[0079] The side members 210, 211 have castors 214 mounted at their ends and a respective support member 218 is located centrally beneath each side member 210, 211.

[0080] These support members 218 are connected to the rams of the upright members 215, 216 and the arrangement is such that, with the platform 220 in a lowermost position, actuation of the rams first causes the support members 218 to be moved downwardly into contact with the ground surface. Further operation of the rams then causes the platform 220 to be lifted. This procedure is reversed with reverse operation of the rams.

[0081] The support members 218 are generally half the length of the side members 210, 211 and are shaped to provide a flat lower surface parallel to the ground surface and upwardly inclined upper surfaces. The flat lower surfaces may have spaced pads for secure engagement with the ground surface.

[0082] Figures 10 and 11 show a yet further embodiment.

[0083] The apparatus of Figures 10 and 11 has a support structure with two horizontal parallel side members 310, 311 linked by two cross members 312. As shown the side members 310, 311 can be extended telescopically.

[0084] The side members 310, 311 have castors 314 at their ends.

[0085] An upright member 315 is fixed to one of the cross members 312. This has a vertically acting double ended jack and movably supports a walled platform 320.

[0086] At its bottom end, a support member 318 is connected to the jack beneath the cross member 312.

[0087] The support member 318 is an elongate mem-

ber essentially the same length as the cross member 312 with a flat lower surface parallel to the ground surface and an inclined upper surface.

[0088] As with other embodiments, initial operation of the jack moves the support member 318 downwardly into engagement with the ground surface. Further movement causes the platform 320 to be moved upwardly. The platform 320 can be moved down, and then the support member 318 is lifted by reverse operation of the jack.

[0089] It is of course to be understood that the invention is not intended to be restricted to the details of the above embodiments which are described by way of example only.

Claims

1. A wheeled loading apparatus comprising a support structure, a load-carrying platform mounted on the support structure so as to be movable upwardly and downwardly, and ground-engaging wheels on the support structure, **characterised by** the provision of at least one support member mounted on the support structure movable between positions at which it is respectively clear of the ground surface and in contact with the ground surface level with a ground-engaging periphery of at least one said ground-engaging wheel.
2. Apparatus according to claim 1 **characterised in that** the (or each) member is in contact with the ground surface level with ground-engaging peripheries of all ground-engaging wheels.
3. Apparatus according to claim 1 or 2 **characterised in that** the (or each) member is in the form of a foot.
4. Apparatus according to claim 1 or 2 **characterised in that** the (or each) member is in the form of a beam contactable with the ground surface along its length.
5. Apparatus according to any one of claims 1 to 4 **characterised in that** the support structure has opposite sides thereto with respective said wheels thereat and there is at least one respective said support member at each said side.
6. Apparatus according to claim 5 **characterised in that** at least one support member on one side is linked by a transverse beam with at least one said support member on the opposite side.
7. Apparatus according to claim 5 **characterised in that** each side has a respective said support member disposed centrally thereof.
8. Apparatus according to any one of claims 1 to 7 **characterised in that** the (or each) support member is movable upwardly and downwardly relative to the support structure between said positions.
9. Apparatus according to any one of claims 1 to 8 **characterised in that** the support structure comprises mutually spaced elongate first members extending in level disposition in a common direction, at least one transverse linking second member between the first members, and at least one upright guiding third member for guiding movement of the platform and the (or each) support member.
10. Apparatus according to claim 9 when dependent on claim 5 **characterised in that** the first members extend along the said sides.
11. Apparatus according to claim 10 **characterised in that** there is a respective said upright third member at each said side.
12. Apparatus according to claim 11 **characterised in that** the third members are linked at their upper regions by a transverse fourth member.
13. Apparatus according to claim 5 or any claim dependent thereon **characterised in that** there are two ground-engaging wheels at each side at spaced positions longitudinally of the side.
14. Apparatus according to claim 13 **characterised in that** the wheels are at the end regions of the sides.
15. Apparatus according to any one of claims 1 to 14 **characterised in that** at least one ground-engaging wheel is provided with a brake.
16. Apparatus according to any one of claims 1 to 15 **characterised by** the provision of power means mounted on the apparatus for powering movement of the platform, a remote control being provided for the power means at a position accessible by a person standing on the platform.
17. Apparatus according to any one of claims 1 to 16 **characterised by** the provision of power means mounted on the apparatus for powering movement of the (or each) support member.
18. Apparatus according to claim 17 **characterised in that** the power means for the (or each) support member comprises a ram.
19. Apparatus according to claim 16 and claim 17 or claim 18 **characterised in that** the power means for the platform and the power means for the (or each) support members are associated so that ini-

tial operation of the power means for the platform causes the (or each) support member first to move to contact the ground surface.

20. Apparatus according to any one of claims 1 to 19 ⁵
characterised in that the platform is movable down into contact with the ground surface.

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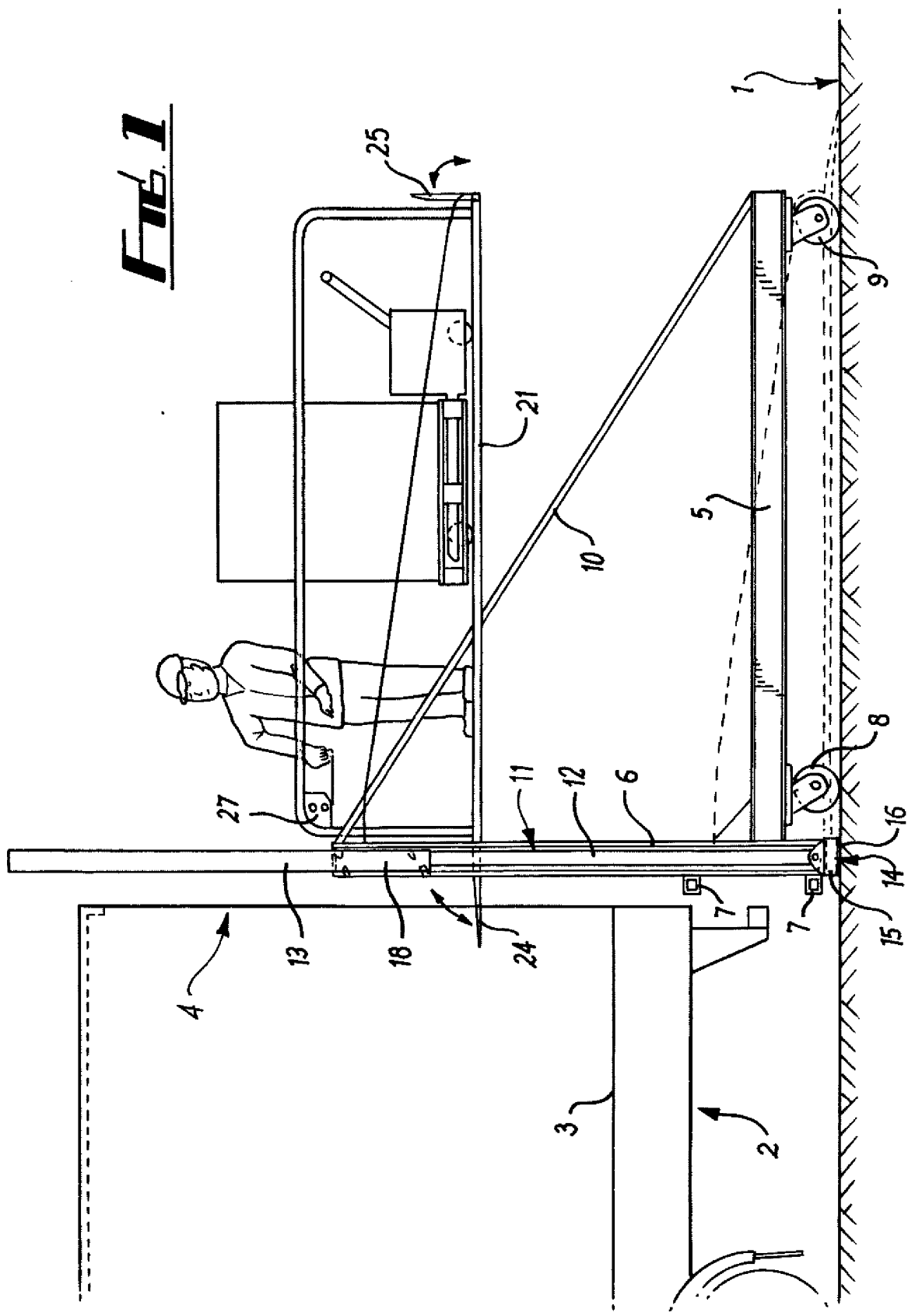
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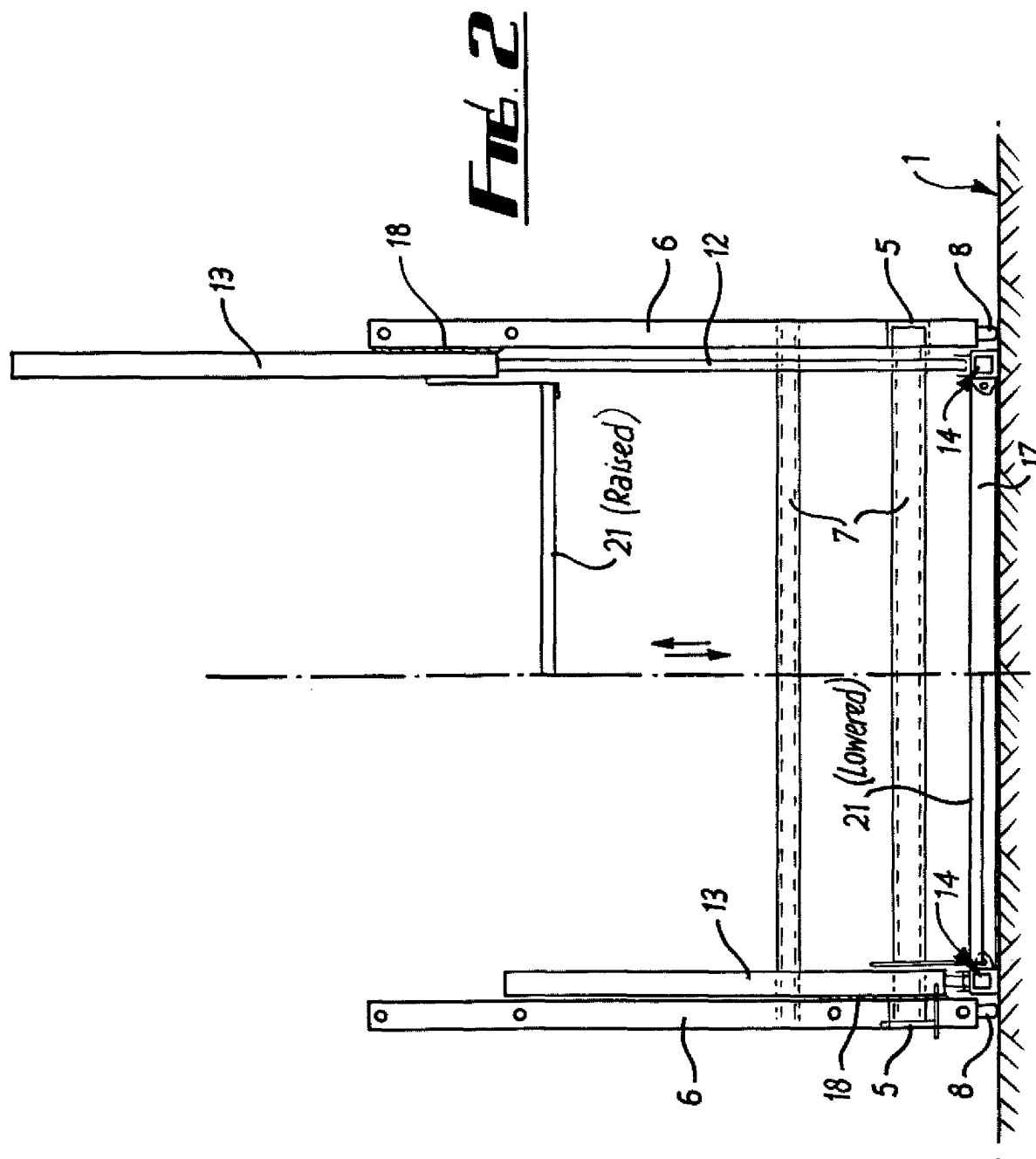
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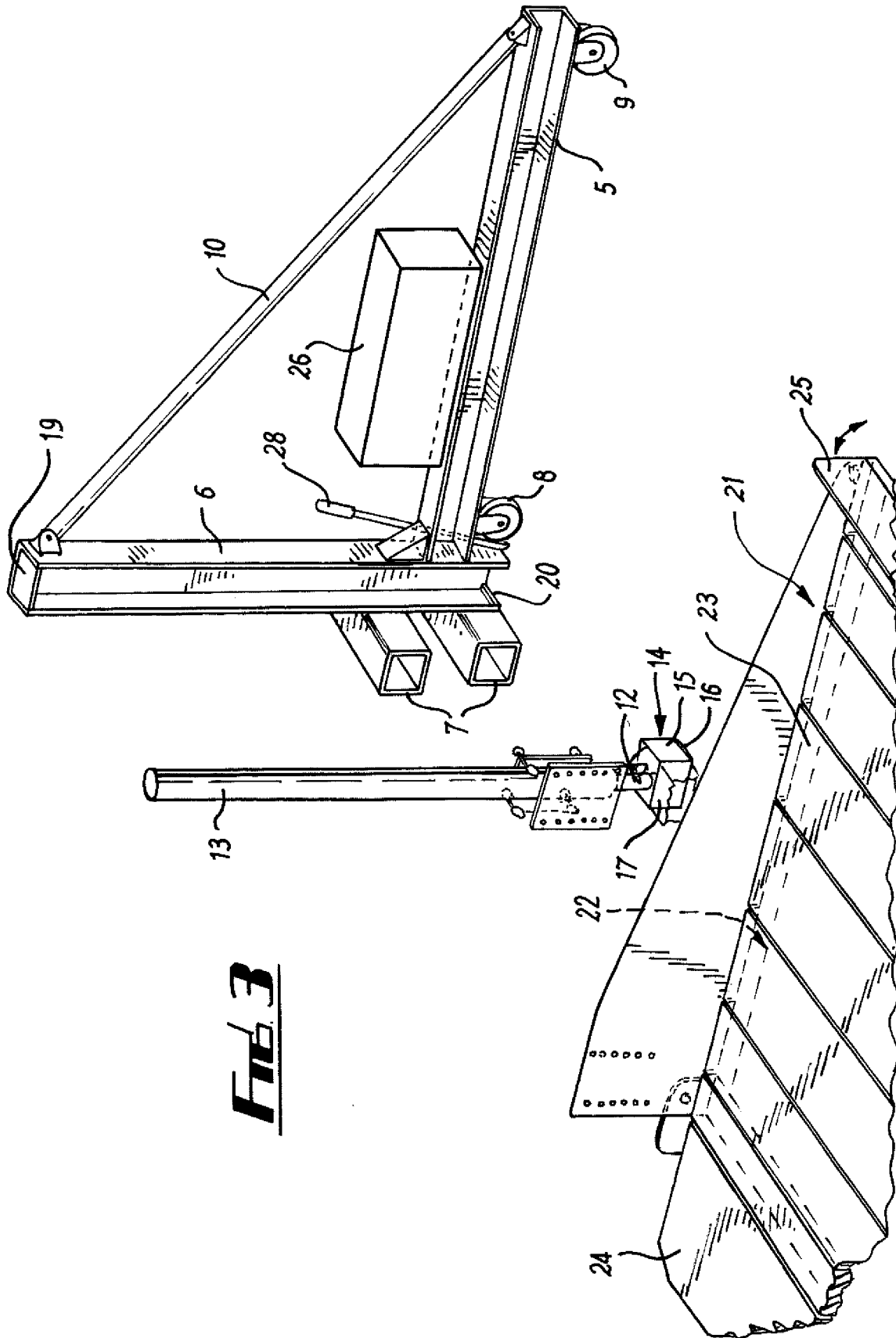
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Fig. 1







File 3

