United States Patent

[11] **3,599,810**

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[33] **Germany**
[31] **P 18 15 357.6**

[54] **LOAD-CARRYING VEHICLE**
15 Claims, 11 Drawing Figs.

[52] **U.S. Cl.** ..... **214/77 R,** 214/83.24, 280/34 R
[51] **Int. Cl.** **B60p 1/44**
[50] **Field of Search** ..... 214/77 P, 75 T, 75, 77, 83.24; 280/34 R, 34 A, 35

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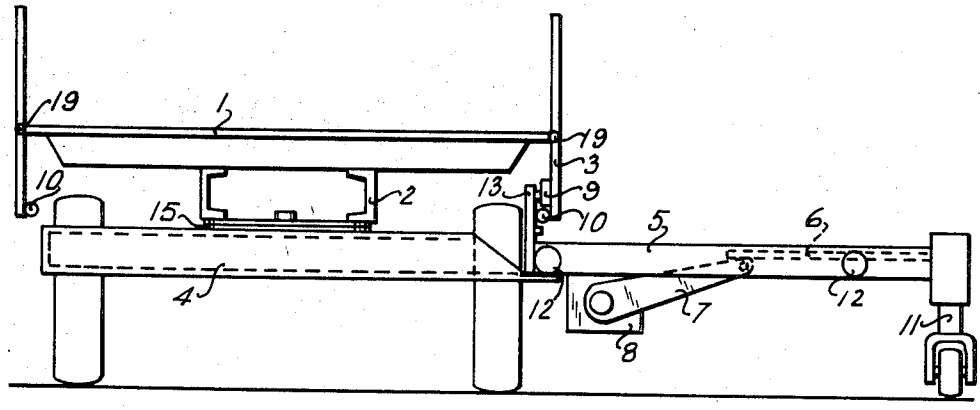
ABSTRACT: A load-carrying vehicle has a load-carrying bed opposite sides of which extend lengthwise of the vehicle. At least one support rail extends along one of the sides at the underside of the bed at least when in use. A supporting frame is mounted on the bed below the same and has an open side. Loading platform means is provided including a slidable frame mounted in the supporting frame for movement relative to the same between an extended and a withdrawn position in the first of which it respectively is withdrawn from the supporting frame through the open side thereof and extends at least in part laterally beyond the one side, and in the second of which it is withdrawn in its entirety inwardly of said one side. Connecting means connects the slidable frame with the support rail for movement lengthwise of the same when the slidable frame is in the extended position. Ground support means supports the part of the slidable frame which extends beyond said one side, on the ground when the slidable frame is in the extended position.



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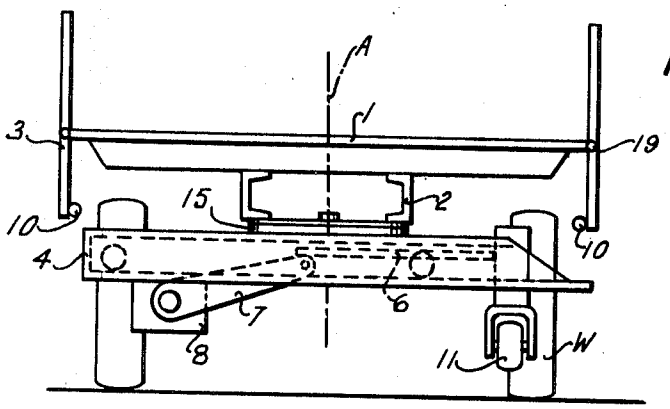

FIG. 1

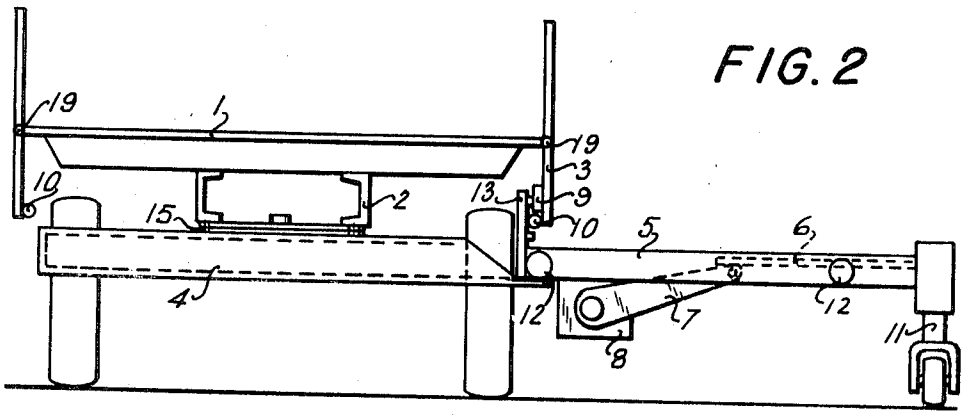

FIG. 2

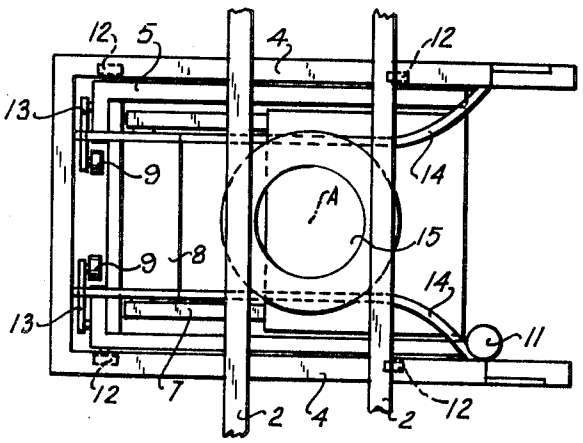

FIG. 3

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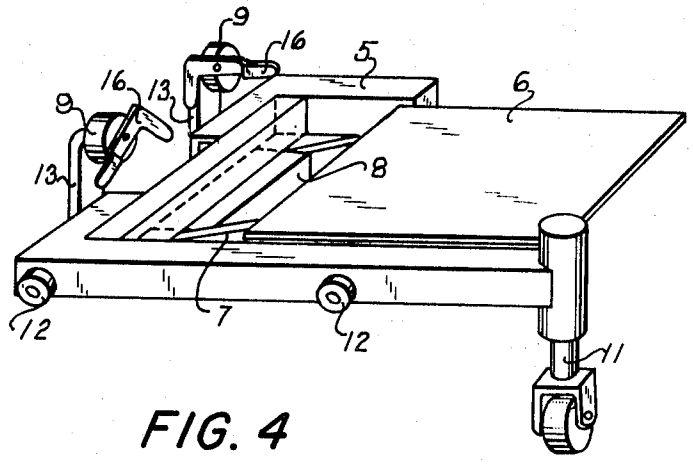
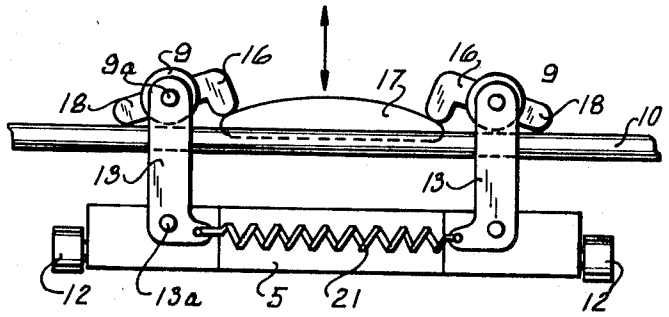


FIG. 4

FIG. 5



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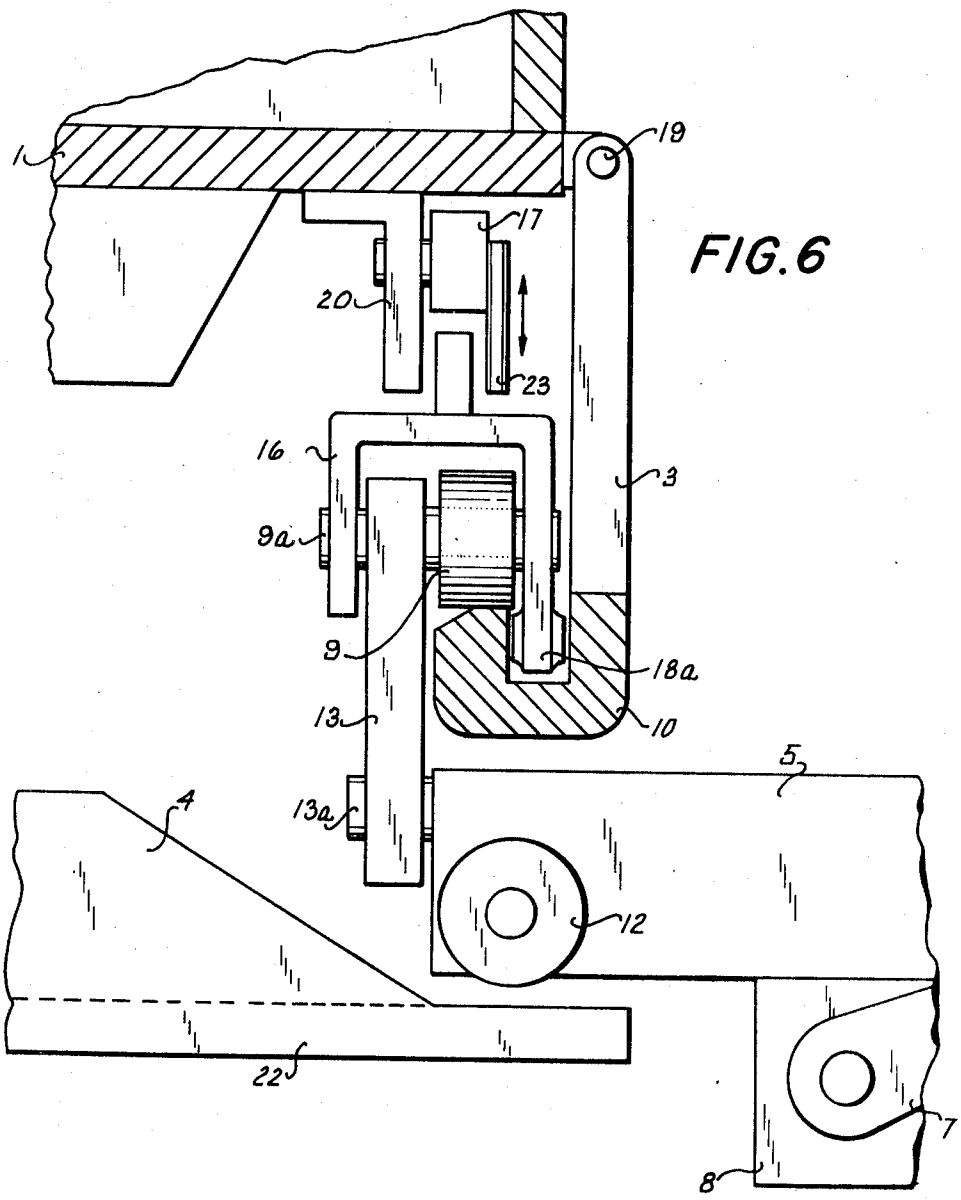

FIG. 6

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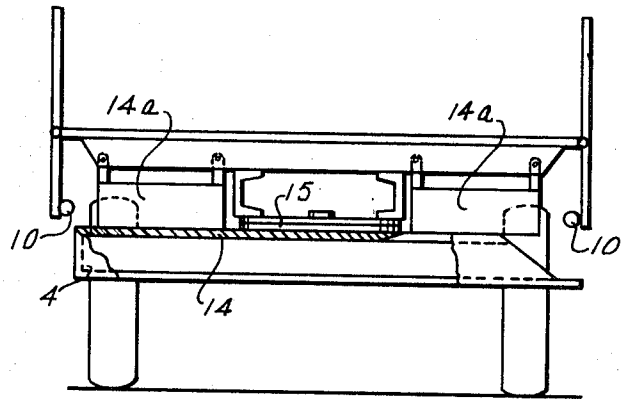


FIG. 7

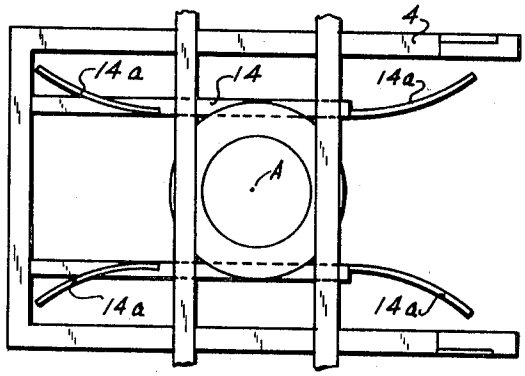


FIG. 8

FIG. 9

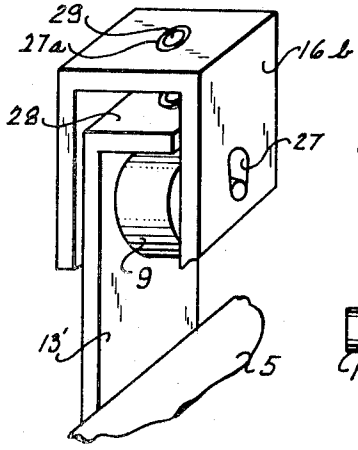
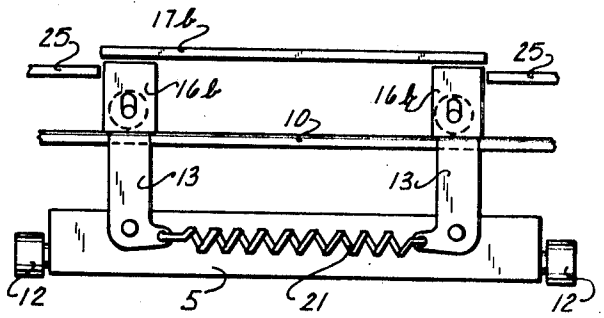


FIG. 10



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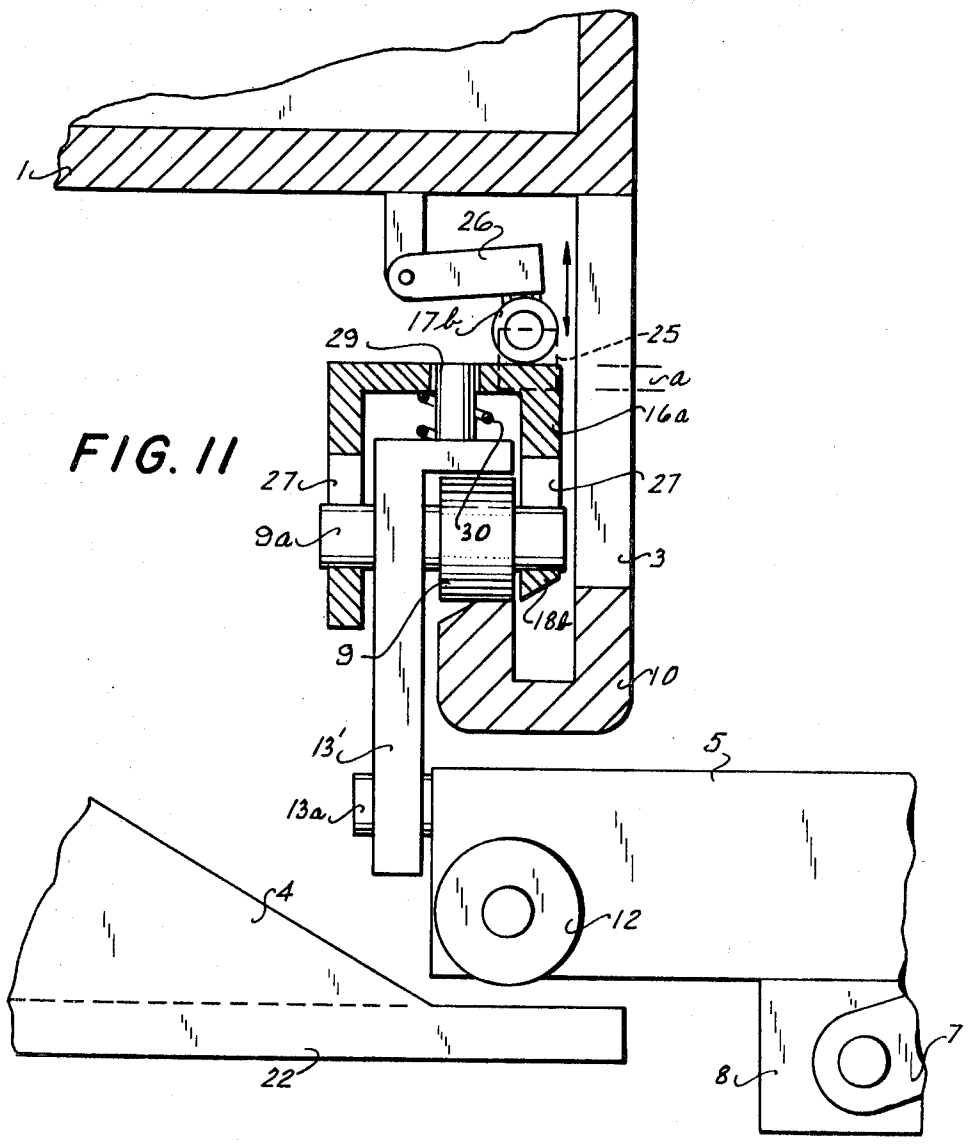

FIG. 11

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LOAD-CARRYING VEHICLE

BACKGROUND OF THE INVENTION

The present invention relates to load-carrying vehicles, and more particularly to a loading platform arrangement for use as a load-carrying vehicle.

It is already known to mount so-called power-lift tailgates on load-carrying vehicles, these "tailgates" need not necessarily be provided at the rear end of the vehicle, but can also be provided at one side. They are power operated and can be lowered to the ground on which the vehicle rests, and raised to the level of the vehicle load-carrying bed. To load heavy items into the vehicle, the "tailgate" is lowered to the ground, the items are placed on it and the tailgate is then raised to the level of the bed whereupon the items are removed from the tailgate and moved onto the bed. Unloading, of course, requires the reverse operations. Such installations are usually operated hydraulically, by manual operation or via the vehicle engine or an electromotor. They may be factory installed in the vehicle or may be subsequently added.

However, these arrangements suffer from the decided disadvantage that they provide only a load-lifting function. To move the heavy articles from the "tailgate" onto the bed of the vehicle, requires shifting labor which must be carried out by the driver and/or a helper and for which the "tailgate" supplies no help whatever. Furthermore, in order to move the articles from the "tailgate" onto the bed, or vice versa, it is necessary to maintain a certain space on the bed free, so that the articles can be moved along this space. Evidently, this necessitates the loss of valuable loading area on the vehicle bed. If the articles being carried are palletized, and if the vehicle not only makes deliveries but also takes back "empties," then it is in addition necessary to load and unload the vehicle in accordance with a predetermined plan in order to make allowance for the fact that not only articles being unloaded, but also empties must be loaded. Therefore, loading and unloading of the vehicle using a simple power tailgate is possible only if a smaller quantity of empties is returned and loaded onto the vehicle than material is unloaded, or if no empties are to be returned.

There are many circumstances where power tailgates cannot be used. This includes, for instance, vehicles where empty bottles must be taken back as deliveries are made, and where usually quantity of empty bottles returned and loaded onto the vehicle corresponds to the quantity of bottles which are being off loaded. This makes it impossible to keep a corridor opened on the vehicle bed through which material can be moved onto and off the tailgate. This, on the other hand, would require than the entire quantity of empties which has previously been taken back and placed onto the bed of the vehicle in front of the materials still be unloaded, be off loaded in order to be able to gain access to the material to be unloaded. Assuming that the vehicle carries ten pallets arranged in a row on the carrying bed, each pallet carrying a number of boxes or crates of beverages, it would thus be necessary to off load nine pallets of empties at the last stop—assuming that the vehicle delivers and takes back one pallet at each stop—in order to reach the tenth and last full pallet.

Evidently, this is not tolerable and it is therefore customary to use on such vehicles not power tailgates but forklifts which can be carried with the vehicle. These, also, have certain disadvantages. First of all they are expensive particularly because they have their own drive which of course increases the expense of the derived. In addition, the forklift is moved with the front portion of its frame underneath the vehicle to be loaded or unloaded so that the forks extend over the upper surface of the load-carrying bed and engage underneath the pallets to be loaded or off loaded. Because of the projecting front portion of the frame, however, the surface area of the bed which can be reached with the forks, particularly the surface area which is above the vehicle axis, is not accessible so that the material being loaded or unloaded must still be moved about manually.

Furthermore, if the ground is uneven or soft, there is the danger that the forklifts might tilt and become damaged.

SUMMARY OF THE INVENTION

It is, accordingly, an object of the present invention to provide an arrangement in conjunction with a load-carrying vehicle, which arrangement is not possessed of the aforementioned disadvantages.

A more particular object of the present invention is to provide such an arrangement which is relatively simple and comparatively inexpensive in its construction.

A further object of the invention is to provide such an arrangement which is a part of the load-carrying vehicle itself.

Still a further object of the invention is to provide such an arrangement which provides ready access to all parts of the load-carrying bed of the vehicle, irrespective of ambient conditions, such as the condition of the ground on which the vehicle is standing, and the like.

In pursuance of the above objects, and others which will become apparent, one feature of the invention resides in a load-carrying vehicle which comprises, briefly stated, a load-carrying bed having opposite sides which extend lengthwise of the vehicle. At least one support rail extends along one of these sides at the underside of the bed at least when in use. A supporting frame is mounted on the bed below the same and has an open side. Loading platform means is provided including a slidable frame mounted in the supporting frame for movement relative to the same between an extended and a withdrawn position in the first of which it is respectively withdrawn from the supporting frame through the open side thereof and extends at least in part laterally beyond the one side, and in the second of which it is withdrawn in its entirety inwardly of the one side. Connecting means connects the slidable frame with the support rail for movement lengthwise of the same when the slidable frame is in its extended position. Ground support means supports the part of the slidable frame on the ground when the slidable frame is in its extended position.

Thus, the loading platform means is a part of the load-carrying vehicle itself and can be moved to desired locations of the load-carrying bed of the vehicle irrespective of ambient conditions, including the condition of the ground on which the vehicle rests. Access is now possible also to portions of the load-carrying bed which are above the vehicle axes. The arrangement according to the present invention is suitable for all types of load-carrying vehicles having load-carrying beds including semitrailers.

With the arrangement according to the present invention, it is immaterial whether the same quantity of empties must be returned as off loaded. It is no longer necessary to leave a loading and unloading corridor on the bed and instead this space can be used for storing articles.

The loading platform means according to the present invention can be located at a variety of positions underneath the load-carrying bed of the vehicle, entirely in the discretion of the designer. It can be provided as a factory installation or it can be added to an existing vehicle. In the latter case, there is no need to make any significant modifications in the construction of the vehicle itself.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a somewhat diagrammatic end elevational view of the vehicle in accordance with one embodiment of the invention with parts which are made for the sake of clarity;

FIG. 2 is a view similar to FIG. 1 showing the arrangement according to the present invention extending laterally beyond one side of the bed of the vehicle;

FIG. 3 is a top plan view of the arrangement according to the present invention and as employed in FIGS. 1 and 2, with the vehicle itself largely omitted for the sake of clarity;

FIG. 4 is a perspective view of the loading platform arrangement of FIGS. 1—3;

FIG. 5 is a view of FIG. 4 as seen looking towards the right-hand side thereof;

FIG. 6 is a fragmentary sectional elevation on an enlarged scale, showing details of the invention;

FIG. 7 is a view similar to FIG. 1 but illustrating a further embodiment of the invention;

FIG. 8 is a view similar to FIG. 3 but of FIG. 7 with parts of the vehicle again omitted;

FIG. 9 is a fragmentary detailed view, on an enlarged scale, showing a detail according to the embodiment of the invention;

FIG. 10 is a view similar to FIG. 5, but illustrating the embodiment of FIG. 9; and

FIG. 11 is a view similar to FIG. 6, but of the embodiment of FIGS. 9 and 10.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Discussing now the drawing in detail, and firstly the embodiment illustrated in FIGS. 1—5 thereof, it will be seen that a load-carrying vehicle comprises a load-carrying bed 1 mounted below which are two supporting beams 2 which extend lengthwise of the vehicle. Secured to these beams 2 by means of a ring mound 15 of known construction, is a supporting frame 4 which is thus turnable about an axis A illustrated in FIG. 1. Extending along opposite lateral sides of the vehicle bed 1, are mounting supports 3 which project downwardly below the underside of the vehicle bed 1 and which carry respective longitudinally extending support rails 10. The cross-sectional illustration of the support rails 10 in FIGS. 1—5 is diagrammatic only. It will be discussed in more details with reference to the subsequent Figures. Advantageously, but not necessarily, the rails 10 and the mounting supports 3 are pivotable about the hinges 19 so that the rails can be pivoted upwardly above the upper side of the bed 1 when not in use. However, they can also be rigidly connected to the bed 1, as for instance illustrated in the embodiment shown in FIG. 11.

Reference character W identifies two of the wheels of the vehicle which of course may be mounted in conventional manner.

Slidable in and with reference to the supporting frame 4 is a slidable frame 5 which is provided in the illustrated embodiment with the rollers 12 which roll along corresponding surfaces of the supporting frame 4. The sliding frame 5 carries a loading platform 6, lifting arms 7 which are connected with the loading platform 6, and a hydraulic drive means 8 which serves to raise and lower the lifting arms 7 and thereby the loading platform 6. The components 6, 7 and 8 constitute together with the slidable frame 5, a unit.

FIG. 2 shows this unit in operative position. In this position, the rollers 9, which as shown in FIGS. 4 and 5, are mounted on the free ends of arms 13 which in turn are pivotable about pins 13*a* with reference to the frame 5 whereas the rollers 9 are pivotable about pins 9*a*, engage and are rollably supported on the respective support rails 10. When this takes place, the slidable frame 5 is slightly lifted so that the rollers 12 no longer have contact with the supporting frame 4. One or more supporting wheels 11—one illustrated—are provided and are adjustable in their height in suitable manner, for instance hydraulically or mechanically, to support the extended front end of the slidable frame on the ground. By varying the height of the wheel 11, that is by raising or lowering it, compensation can be made for unevenesses in the ground, for the presence of pedestrian walks adjacent a road bed on which the vehicle is parked.

As already mentioned, more than one of the wheel 11 may be provided. However, as shown in FIG. 4 in the illustrated embodiment of FIGS. 1—5, there is only a single wheel 11 provided which is located as illustrated, with the frame 5 extending only part way at the side which is not provided with the wheel 11. This has the advantage that load may be placed onto the loading platform 6 from the front as well as from the side, that is, from FIG. 4 from the right-hand or as seen from the top of the drawing.

When the arrangement is in the withdrawn position as shown in FIG. 1, the arms 13 are pivoted about the pins 13' into the general plane of the frame 5. This is caused in the illustrated embodiment by the guide rails 14 which are mounted on the supporting frame 4 and which, as clearly shown in FIG. 3, extend in parallelism with one another for a certain distance and then arcuately divert from one another in the direction of the open side of the supporting frame 4. Each of the guide rails 14 cooperates with one of the arms 13, with the latter being urged to move to upright position as shown in FIGS. 4 and 5, by the presence of the contraction spring 21 (see FIG. 5). Thus, when the slidable frame 5 is moved to its extended position as shown in FIG. 2, from the retracted position shown in FIG. 1, the guide rails 14 initially hold the arms 13 downwardly deflected position by contact with their free ends and while the arms move along the parallel portions of the guide rails 14. When the free ends of the arms 13 reach the arcuately divergent portions of the guide rails 14, the arms 13 can now move upwardly about the respective pins 13*a* under the influence of the spring 21.

Of course, this can also be accomplished in other manner than that illustrated in FIGS. 4 and 5. Such a possibility is for instance shown in FIGS. 7 and 8 with the guide rails 14 are strictly straight and extend in parallelism with one another. However, in the region of the opposite ends of the respective guide rails 14 there are arcuately curved guide tracks 14*a* of sheet metal or the like which are connected in suitable manner to the vehicle bed 1. In this case, the guide rails 14 are secured on the upper side of the supporting frame 4. If the latter is turned about the axis A so that its open side points to its right-hand side of the vehicle (compare FIG. 7) then the arms will remain downwardly deflected into the general plane of the slidable frame 5 until they reach the right-hand ends of the guide rails 14 and will move upwardly only when they reach the right-hand arcuately curved tracks 14*a*. If, on the other hand, the frame 4 is turned about the axis A so that its open side faces towards the left of the vehicle (oppositely illustrated in FIG. 7), then the guide tracks 14*a* located at the left-hand side of the guide rails 14 (compare FIG. 8) will govern when the arms 13 can become erected.

It will be appreciated that once the rollers 9 rest on the support rail 10 so that the inner end of the slidable frame 5 is carried by the support rail 10, provision must be made for preventing accidental movement of the slidable frame 5 from the positions shown in FIG. 2 towards or to the position shown in FIG. 1, before the slidable frame 5 can be moved lengthwise of the vehicle along the respective support rail 10.

Such position is clearly identified with FIGS. 3—6 from which it will be seen that there are mounted on for pivotable movement about the pivot pins 9*a* of the rollers 9, the arresting members 16 arm portions of which engage behind the respective support rail 10 and in this manner prevent movement of the slidable frame 5 from the position of FIG. 2 to the position of FIG. 1. To provide for such engagement behind the rail 10, one end of each of the arresting members 16 is laterally offset with reference to the remainder of the respective member 16. It is this offset one end which then engages behind the supporting rail 10.

As shown in FIG. 5, an actuating member 17 is located at the open side of the frame 4 and movable upwardly and downwardly in direction of the double-headed arrow in FIG. 5. The principle of operation, and how the member 17 moves the arresting member 16 to arresting position with respect to the support rail 10, when itself is moved in upward direction in FIG. 5, is clearly evident.

The detail is illustrated in FIG. 6 with like reference numerals identified with like elements as in the preceding Figures. Here, the arresting members are identified with reference numeral **16** and are substantially of U-shaped cross-sectional configuration with the outermost arm **18** extending into a groove provided in the support rail **10** to thus prevent all but lengthwise movement—lengthwise to the rail **10**—of the frame **5** when the arms **18** are in this position. In the embodiment of FIG. **6**, the actuating member **17** is mounted in a support **20** which in turn is connected to the underside of the bed **1**, and is again movable upwardly and downwardly as indicated by the double-headed arrow. To permit movement of the rollers **9** into rolling contact with the rail **10** and the frame **5** is moved from the position of FIG. **1** to that of FIG. **2**, the member **17** of FIG. **6** is in its down position (oppositely the one shown in FIG. **6**) and the arresting member **16** include an obtuse angle with one another. In this position, the portion **23** mounted on the member **17**, is located ahead of the respective rollers **9** and prevents longitudinal movement of the frame **5**, that is the movement lengthwise of the respective support rail **10**. The rollers **12** of the slidable frame **5** are slightly spaced upwardly above the extension **22** of the supporting frame **4**, and thus the slidable frame **5** may compensate for slight unevenness of the ground.

Once the frame **5** has been moved to the position of FIG. **2** which is also that shown in FIG. **6**, the member **17** is moved upwardly in the direction of the double-headed arrow and thereby displaces the members **16** to arresting position as illustrated in FIG. **6**, where the arms **18** engage in the groove of the rail **10**. This makes it impossible for the frame **5** to be moved transversely of the direction of elongation of the rail **10**, but, because at the same time the member **23** moved upwardly away from the rollers **9**, the frame **5** can now be moved lengthwise of the rail **10**.

Coming, finally, to the embodiment illustrated in FIGS. **9**, **10** and **11** it will be seen that here again the arresting members—identified with reference numeral **16***b*—are of substantially U-shaped cross section. They are mounted as before on arms which are identified with reference numeral **13'** and correspond to the arms **13** of the preceding Figures. However, each of the arms **13'** in FIGS. **9—11** has an angled portion **28** at its free end from which there projects a pin **9** which extends through an opening **27***a* in the bight of the respective arresting member **16***a*. A similar but elongated opening **27** is provided in one arm of the arresting member **16***b* and a portion of the pin **9***a* on which the rollers **9** are mounted extends through this opening **27** or at least into it. An expansion spring **30** (see FIG. **11**) is confined between the portion **28** and the bight of the respective member **16***b* and tends to move the latter upwardly away from the portion **28** to the position illustrated in FIG. **9** and in FIG. **11**.

As shown in FIG. **11** there is further provided in this embodiment upwardly above the respective rail **10** an auxiliary rail **25** extending lengthwise of the vehicle but interrupted for a distance corresponding to the width of the open side of the frame **4**, with this interruption being so located as to normally register with the open side of the frame **4** when the same is in its inoperative position in which it is merely transported beneath the vehicle with the loading arrangement not being in use. The purpose is to permit the frame **5** to pass not only through the open side of the frame **4** but also through the interruption in the respective auxiliary rail **25**.

When the slidable frame **5** is moved to its extended position, corresponding to that shown in FIG. **2**, the arms **13'** with the arresting member **16***b* are located in this interruption of the respective auxiliary rail **25** and this prevents lengthwise movement of the frame **5** in the direction of elongation of the respective rail **10**. Only after the deflecting member **17***b*—which is illustrated as an elongated rod or tubular member secured as by welding or in any other suitable manner to pivotable support arms **26** (one shown in FIG. **11**) the arresting members **16***b* are downwardly displaced against the force of the springs **30** so that the outermost arm **18***b* (compare FIG. **11**) extends into the groove of the respective rail **10**. In so doing the members **16***b* are downwardly displaced at least by the distance *a* in FIG. **11**, so that they are now no longer located with any portion in the interruption between adjacent sections of the respective rail **25** and thus permit lengthwise movement of the frame **5** in longitudinal direction of the respective rail **10**. At the same time the presence of the arms **18***b* in the groove of the rail **10** prevents transverse movement of the frame **5**.

Of course, it is clear that simply by turning the frame **4** on the respective ring mount **15** about the axis A, and thereby displacing it through 180°so that the open side of the frame **4** faces the other longitudinal side of the vehicle (for instance the left as seen in FIG. **1**) loading and unloading may be accomplished from the other side of the vehicle. Suitable arresting means for preventing undesired turning movement about the axis A will be provided and is of course too well known to require detailed description.

After loading and/or unloading is completed, the frame **5** is moved lengthwise of the respective rail **10** until it registers with the inside of the frame **4**. Thereupon the arresting members are disengaged from the frame **10** and the frame **5** is moved in the frame **4** until it reaches the position illustrated for instance in FIG. **1**. Again, suitable arresting means may be provided for preventing frame **5** from moving with reference to the frame **4** when the device is not in use, for instance when the vehicle travels. If the rails **10** are mounted pivotably in the manner illustrated for instance in the embodiment of FIGS. **1—5** or in that of FIG. **6**, they can be pivoted upwardly above the hinges **19** and secured in suitable manner to the sides of the vehicle. With the frame **5** located within the confines of the frame **4**, as for instance shown in FIG. **1**, the arms **13** or **13'** with their respective rollers and arresting members are located in recesses provided for this purpose on the frame **5**.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of applications differing from the types described above.

While the invention has been illustrated and described as embodied in a load-carrying vehicle, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.

I claim:

1. In a load-carrying vehicle, in combination, a load-carrying bed having opposite sides which extend lengthwise of the vehicle; at least one support rail extending along one of said sides at the underside of said bed at least when in use; a supporting frame mounted on said bed below the same and having an open side; loading platform means, including a slidable frame mounted in said supporting frame for movement relative to the same between an extended and a withdrawn position in the first of which it is withdrawn from said supporting frame through said open side thereof and extends at least in part laterally beyond said one side, and in the second of which it is withdrawn in its entirety inwardly of said one side; connecting means for connecting said slidable frame with said support rail for movement lengthwise of the same when said slidable frame is in said extended position; and ground support means for supporting said part of said slidable frame on the ground when the slidable frame is in said extended position thereof.

2. In a vehicle as defined in claim **1**, wherein said ground support means comprises a wheel.

3. In a vehicle as defined in claim 2, wherein said wheel is adjustable in height so as to compensate for unevenness of the ground.

4. In a vehicle as defined in claim 1, wherein said supporting frame is turnable through at least 180°about an upright axis with reference to said load-carrying bed.

5. In a vehicle as defined in claim 4, further comprising an additional support rail extending along the other of said sides at the underside of said bed, so that said connecting means may connect said slidable frame with said additional support rail in response to turning of said support frame through 180°and movement of said slidable frame to extended position in which it extends laterally beyond said other of said sides.

6. In a vehicle as defined in claim 1, said connecting means comprising roller means provided on said slidable frame and arranged to engage and roll on said support rail when said slidable frame is in said extended position.

7. In a vehicle as defined in claim 6, wherein said connecting means further comprises at least one arm mounted on said slidable frame and pivotable between two positions in one of which a free end portion of said arm is located in the general plane of said slidable frame and in the other of which it projects upwardly above the same; biasing means biasing said arm to said other position; control means acting counter to said biasing means and moving said arm to said one position in response to movement of said slidable frame to said withdrawn position thereof; said roller means comprising at least one roller mounted freely turnably on said free end portion and arranged to engage and roll on said support rail when said arm is in said other position.

8. In a vehicle as defined in claim 7, said connecting means further comprising arresting means provided on said free end portion of said arm and movable between an arresting position engaging said rail when said slidable frame is in said extended position for preventing undesired movement of said slidable frame to said withdrawn position, and a release position.

9. In a vehicle as defined in claim 8, said rail having a groove facing upwardly towards said bed, and said arresting means comprising at least one arresting member tiltable about the axis of rotation of said roller and having a portion extendable into said groove when said slidable frame is in said extended position and said arm is in said other position.

10. In a vehicle as defined in claim 8, said control means comprising guide track means on said supporting frame and arranged to receive said free end portion of said arm, and to move the latter to said one position, in response to movement of said slidable frame to said withdrawn position thereof.

11. In a vehicle as defined in claim 10, further comprising an additional arm similar to said one arm and spaced from the latter transverse to the direction of movement of said slidable frame, and additional roller and additional arresting means on said additional arm; and wherein said guide track means comprises two guide tracks spaced from one another transversely of the direction of movement of said slidable frame and each cooperating with one of said arms.

12. In a vehicle as defined in claim 11, wherein said guide tracks arcuately recede from one another in direction of movement of said slidable frame to said extended position thereof.

13. In a vehicle as defined in claim 8, further comprising locking means at said open side of said supporting frame and being movable upwardly and downwardly with reference to said bed for thereby moving said arresting means to said arresting position and said release position, respectively.

14. In a vehicle as defined in claim 1, further comprising mounting means mounting said support rail for movement between a lower position in which it extends along said one side at the underside of said bed, and an upper position in which it is located upwardly of said underside.

15. In a vehicle as defined in claim 14, said mounting means comprising hinge means mounting said rail for hinged movement between said upper and lower positions.