

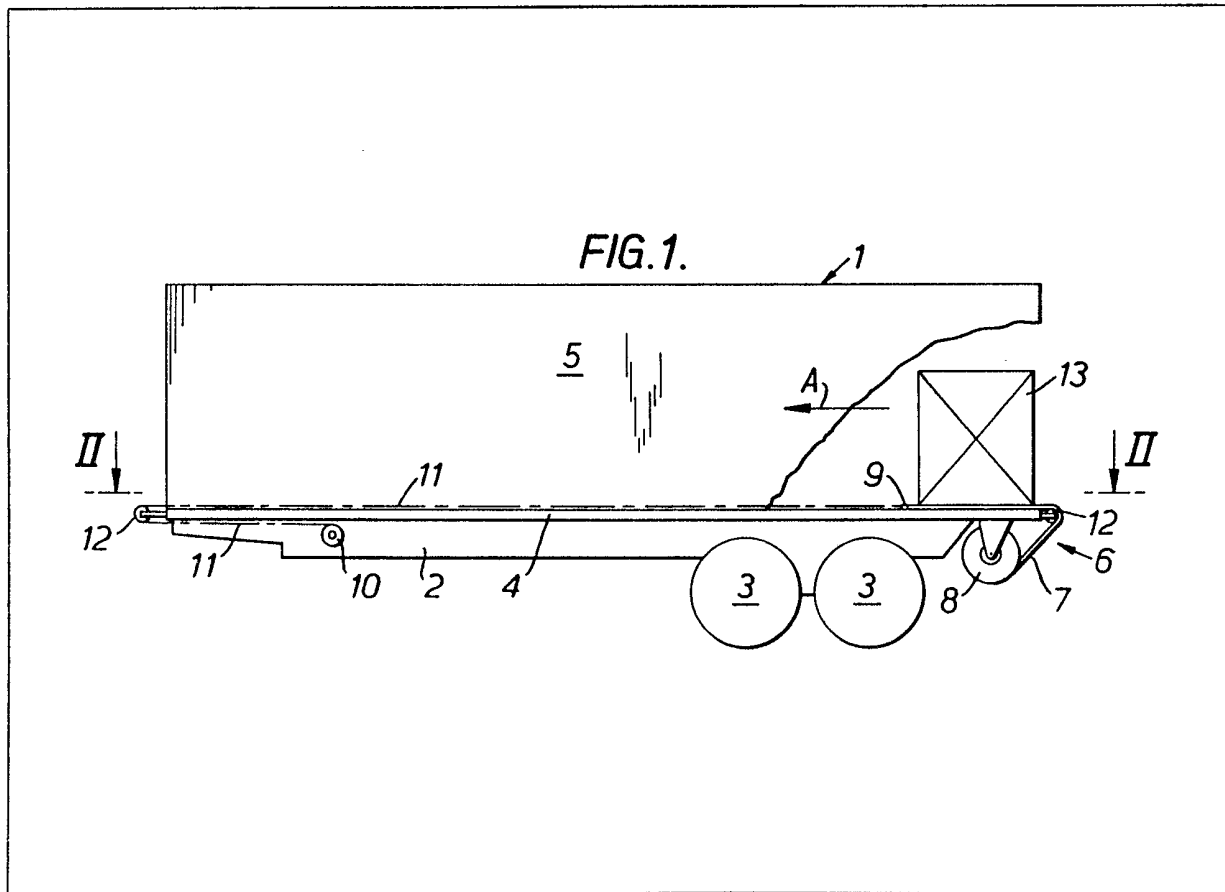
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(54) **An improved freight-carrying road vehicle**

(57) In order to allow a reduction in freight handling facilities, and to allow loading and unloading when such facilities are absent, there is provided a freight-carrying road vehicle (1) with a load-carrying bed (4) incorporating powered conveyor means (6) which extend along the bed (4) for moving loads (13) selectively from one end to the other. The conveyor means (6) may comprise, for example, a roll-up floor (7) of conveyor-type belting which is unrolled over the bed (4) for loading and rolled-up for unloading, by operation of a take-up reel (10) and a storage reel (8) respectively.



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FIG. 1.

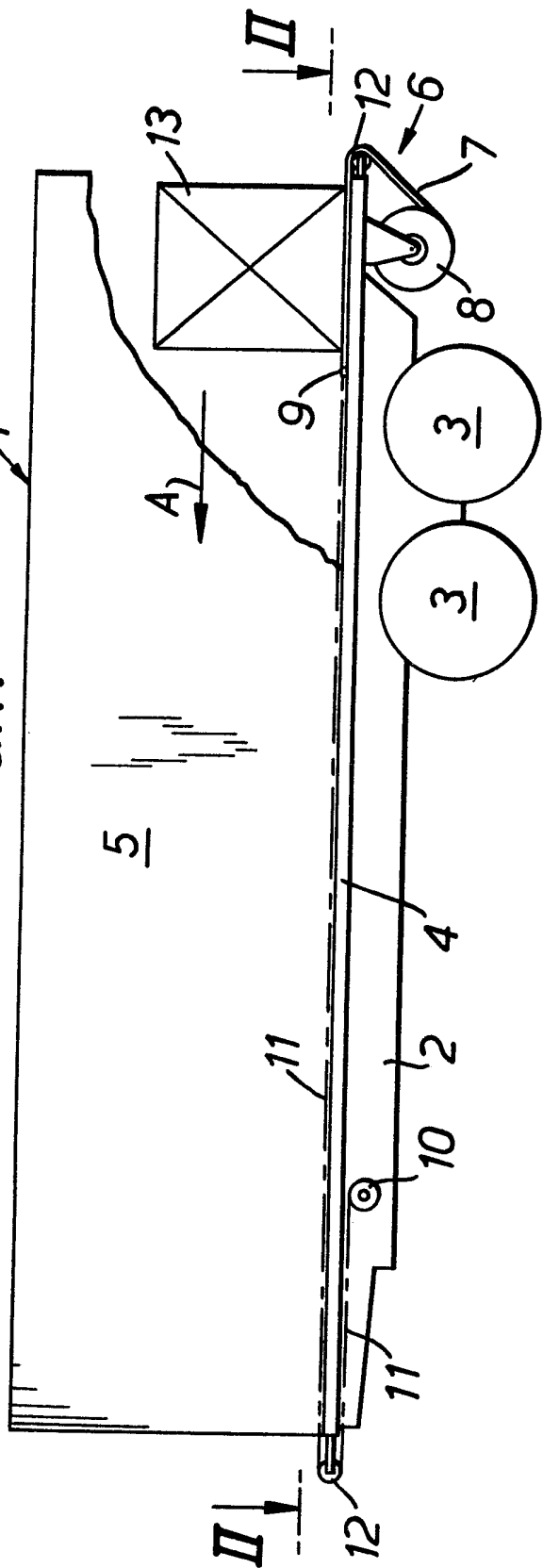
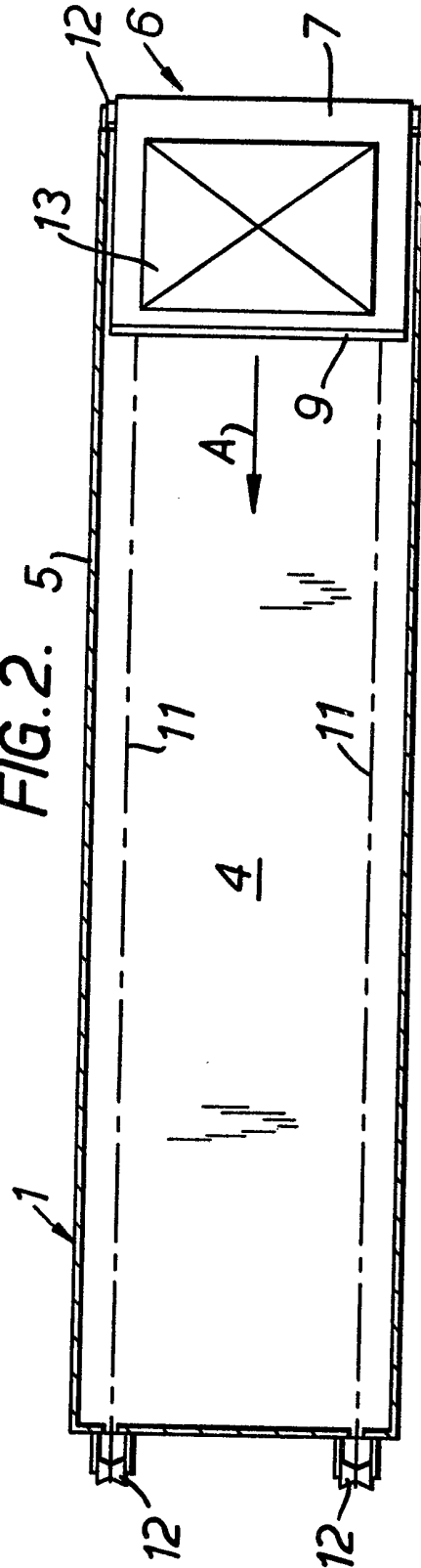


FIG. 2.



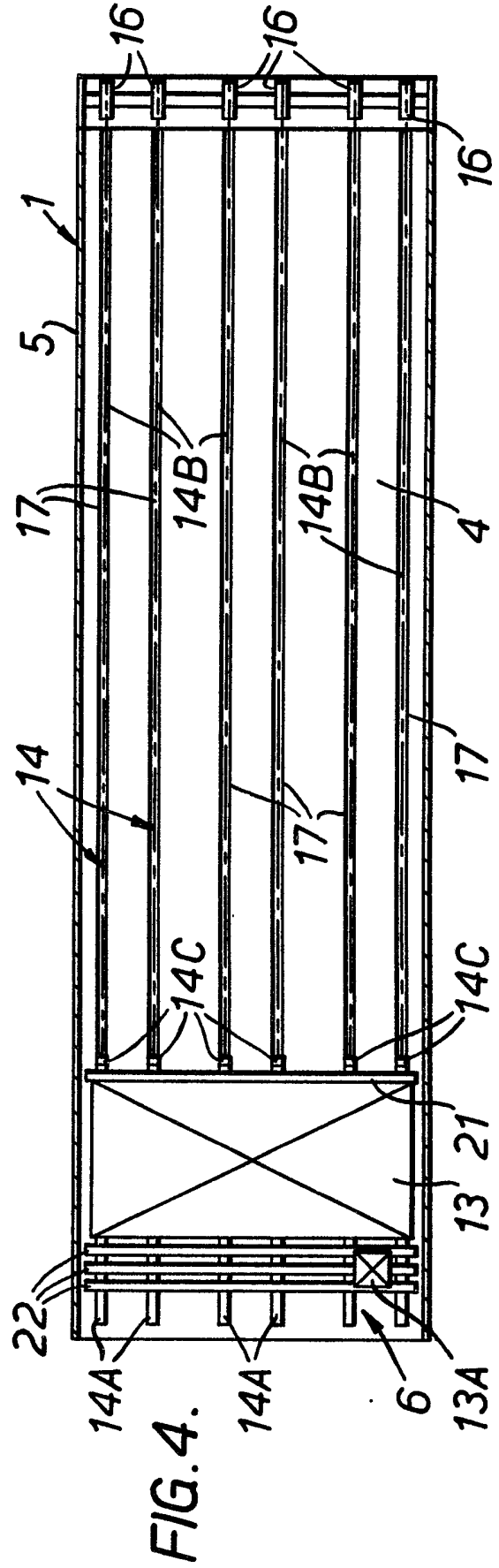
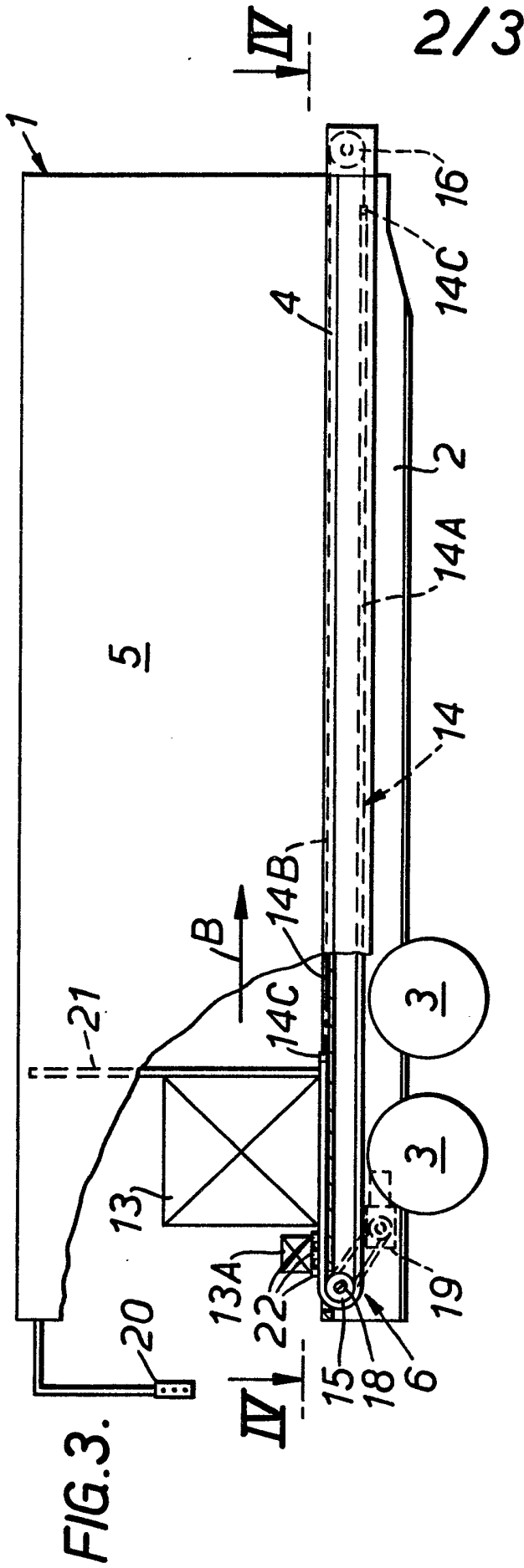


FIG. 5.

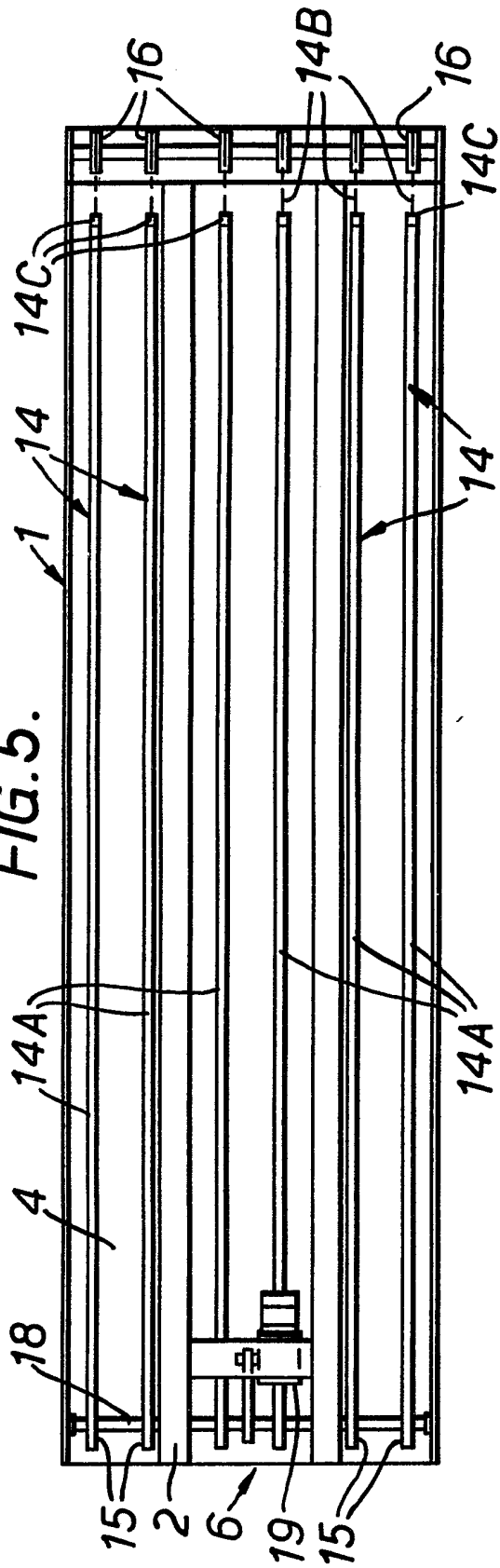
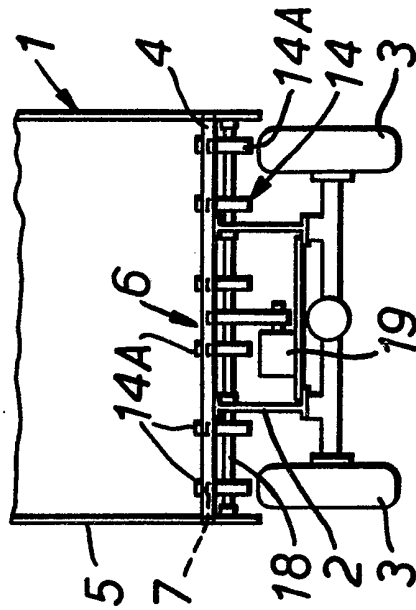


FIG. 6.



## SPECIFICATION

**An improved freight-carrying road vehicle**

The present invention relates to freight-carrying road vehicles, such as lorries, vans and trailers,  
 5 having a load-carrying bed which is usually loaded at one end, and to a method of loading and unloading such vehicles.

Although it is common practice to provide heavier vehicles of this type, such as low-loader  
 10 transporters, with a heavy-duty winch for hauling loads into position on the bed of the vehicle, this is not practical in lighter vehicles, such as box vans, trailers or lorries, where the weight of such a winch could have a prohibitive effect on the  
 15 payload of the vehicle. Where facilities allow, these vehicles are loaded by crane or fork-lift truck. For example, the loading of palletised loads into large box vans or box trailers often requires two fork-lift trucks: one to bring the loads to the  
 20 loading end and another to arrange the loads on the bed. In some instances, loads have to be manhandled into position on the bed of the vehicle.

The object of the present invention is to provide  
 25 an improved freight-carrying road vehicle of the aforesaid type in which loading and unloading is facilitated.

According to one aspect, the present invention provides a freight-carrying road vehicle having a  
 30 load-carrying bed incorporating powered conveyor means which extend along the bed for moving loads selectively from one end of the bed to the other.

The conveyor means may comprise a plurality  
 35 of driven lockable rollers, two or more transversely-spaced chains and/or cables driven around respective wheels or pulleys at each end of the load-carrying bed, or a belt conveyor driven around rollers at each end of the bed. The  
 40 conveyor means, for example, a belt conveyor, may be arranged centrally of the bed with a fixed support surface at each side thereof, or there may be two or more conveyors arranged symmetrically with respect to the median longitudinal axis of the  
 45 bed with fixed support surfaces between them. In the case of chain, cable or belt conveyors, the chains, cables or belts may be anchored to the wheels, pulleys or rollers at the ends of the bed, or they may be endless.

In one preferred embodiment, the conveyor  
 50 means comprise a roll-up floor which is anchored at one of its ends to a storage reel mounted at said one end of the load-carrying bed and connected at its other end to a take-up reel at or  
 55 adjacent to the other end of the bed, the floor being unrolled over the bed for loading and rolled-up for unloading by selective driving of the take-up reel and storage reel, respectively. The floor may comprise conveyor-type belting or rigid,  
 60 flexibly-interconnected transverse slats.

In another preferred embodiment, the conveyor means comprise a number of transversely-spaced endless loops, each formed by a portion of chain and a portion of cable which are joined end-to-end

65 and are driven around a respective sprocket at said one end of the bed and a respective return wheel at the other end, the loops running in respective guide channels in the bed so that the chain portions, or load-engaging elements carried  
 70 thereby, project above the surface of the bed to engage and move the loads in use. Although both the sprockets and the return wheels may be driven, it is preferable that the sprockets are arranged to be driven selectively in opposite  
 75 directions by a drive unit, while the return wheels are freely-rotatable.

The use of loops made from a combination of chain and cable, usually wire cable, is preferred to the use of chains only, in view of the cost of the  
 80 latter. Since the chain portion of each loop moves the load in use, it must be long enough to pass around its respective drive sprocket and extend along the entire length of the bed. Rigid transverse slats and upstanding transverse anti-spill barriers  
 85 may be releasably engageable with the chain portions to support small loads and unstable loads respectively. The chains themselves may include rollers to reduce friction in the guide channels, and upstanding dogs or like elements for engaging the  
 90 loads.

According to a second aspect, the present invention provides a method of loading and unloading a freight-carrying road vehicle having a load-carrying bed with powered conveyor means  
 95 which extend along the bed, wherein a load placed on the conveyor means is moved selectively from one end of the bed to the other.

When the load comprises a single item, the conveyor means are operated continuously until  
 100 the load is positioned correctly along the bed of the vehicle. When the load comprises a number of discrete items, such as pallets, it is preferable that the conveyor means be operated intermittently so that, during each period of operation, the conveyor  
 105 means advance or retreat along the bed by a distance corresponding to the length of one item, to permit loading or unloading respectively.

A vehicle according to the present invention facilitates loading and unloading when fork-lift  
 110 trucks or the like are unavailable, and therefore offers economical advantages as regards labour costs or enables bigger loads to be handled. Even when fork-lift trucks or similar facilities are available, the present goods vehicle can be loaded  
 115 and unloaded more rapidly than goods vehicles in use until now, allowing the same facilities to handle more vehicles or the same number of vehicles to be handled by reduced facilities.

The present invention will now be more  
 120 particularly described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a partly cut-away side elevational view of a freight-carrying road vehicle according to one embodiment of the present invention;

Figure 2 is a plan view of the vehicle of Figure 1 at the plane II—II;

Figure 3 is a partly cut-away side elevational view of a freight-carrying road-vehicle according

to a second embodiment of the present invention;

Figure 4 is a plan view from above of the vehicle of Figure 3 at the plane IV—IV;

Figure 5 is a plan view of the vehicle of Figure 3 from below, the wheels being omitted for clarity, and

Figure 6 is a rear view of the vehicle of Figure 3.

Referring now to the drawings, there is shown a freight-carrying road vehicle which, in this example, is a box trailer 1. The trailer 1 has a rigid chassis 2 which mounts two pairs of road wheels 3 at its rear and supports a load-carrying bed 4 extending the length of the chassis 2. The bed 4 is in the floor of a load-stowage compartment which is defined by an upstanding box structure 5 supported by the chassis 2. The box structure 5 has an opening at the rear for loading and unloading of goods from the trailer 1. To facilitate the loading and unloading, the trailer 1 is provided with conveyor means, generally indicated 6.

In Figures 1 and 2, the conveyor means 6 comprise a roll-up floor 7 which, in this example, is made from heavy-duty conveyor-belt and extends across the whole width of the bed 4. One end of the roll-up floor 7 is anchored to a driven storage reel 8 which is mounted under the rear end of the chassis 2 in a position where it can act as an energy-absorbing crash barrier in the event of a collision from the rear. The other end of the roll-up floor 7 has a transverse reinforcing lath 9 which is connected to a respective driven take-up reel 10 mounted on each side of the chassis 2 beneath the forward end of the bed 4, by a respective steel cable or chain 11 passing along each side of the bed 4. The front and rear edges of the load-carrying bed 4 carry respective guide rollers 12 over which the cables or chains 11 and the roll-up floor 7 pass, in use.

When the trailer 1 is to be loaded, the take-up reels 10 are operated so that the floor 7 slowly unrolls over the bed 4 of the trailer 1 in the direction of arrow A as a load 13 is placed on the floor 7 at the rear end. When the trailer 1 is being unloaded, the storage reel 8 is operated to roll up the floor 7 in the opposite direction as each load 13 is removed. The load-carrying bed 4 can be used conventionally by uncoupling the floor 7 and the chains 11, which are then wound onto their respective reels 8, 10 for storage.

When the load comprises a single large item, such as a section of pipe, one end of the load is placed on the floor 7 and the latter is unrolled along the bed 4 in a continuous operation until the load is positioned correctly. On the other hand, when the load comprises a number of separate items 13 (on pallets, for example) as shown, the take-up reels 10 are operated intermittently so that, in each period of operation, the floor 7 advances by a distance corresponding to the length of each item 13 and is stopped while the item is placed thereon. The procedure is reversed when the items 13 are being unloaded.

The storage reel 8 and take-up reels 10 may be powered electrically, by a power take-off from the

engine of a tractor vehicle (not shown) or hydraulically, and may be selectively operable in both directions. In this example, however, the reels 8, 10 are driven hydraulically but arranged so that, when the floor 7 is being unrolled, the take-up reels 10 are driven while the storage reel 8 rotates freely and, when the floor 7 is being rolled-up, the storage reel 8 is driven while the take-up reels 10 rotate freely. The operation of the reels 8, 10 is controlled from the rear of the trailer 1.

As an alternative to the above embodiment, the roll-up floor 7 may be formed by a plurality of rigid transverse slats which have flexible interconnections and run in guide elements at the sides of the trailer bed. In this case, the cables or chains would be housed in the guide elements so as to leave the bed clear when the floor is rolled-up.

In the trailer 1 shown in Figures 3, 4, 5 and 6, the conveyor means 6 comprise six transversely-spaced endless loops 14, each of which is formed from a portion 14A of chain and a portion 14B of wire cable which are joined end-to-end. The loops 14 are driven around respective drive sprockets 15 at the rear end of the load-carrying bed 4 and respective return pulleys 16 at the forward end of the bed 4. The loops 14 are arranged symmetrically with respect to the median longitudinal axis of the bed 4, and run in respective guide channels 17 in the bed 4 so that the chain portions 14A project slightly above its surface, as shown in Figure 6. The chain portion 14A of each loop 14 moves the load 13 in use and must therefore be of sufficient length to pass around its respective drive sprocket 15 while extending along the entire length of the bed 4. The chains themselves may have rollers to facilitate running in the guide channels, and upstanding dogs, fingers or like elements which project above the bed to engage the load 13. The chain and cable portions 14A, 14B are connected by releasable couplings 14C.

The drive sprockets 15 are mounted on a common drive shaft 18 which is selectively rotatable in both directions by means of a drive unit 19 mounted on the chassis 2 beneath the rear end of the bed 4. In this example, the drive unit 19 is powered electrically and is operable from a hand-held remote control box 20 (Figure 3). The return pulleys 16 are freely-rotatable.

When the trailer 1 is to be loaded, the drive unit 19 is operated so that the loops 14 move in the direction of arrow B (Figure 3) until the chain portions 14A extend far enough along the guide channels 17 to support the load 13. The load 13 is then placed on the chain portions 14A, the drive unit 19 is operated until the load 13 is positioned correctly. When the load 13 comprises a number of separate items on pallets, the drive unit 19 is operated intermittently, as described previously. The drive unit 19 is operated in the reverse direction during unloading.

One or more transverse anti-spill barriers or cradles 21 may be provided, which are releasably engageable with the chain portions 14A so as to

be upstanding, as shown in Figure 3. The cradle 21 prevents toppling of an unstable load during the intermittent movement of loading and during transit. When a number of small, loose articles

- 5 13A are to be loaded, a number of rigid transverse supporting slats 22 may be fixed to the chain portions 14A (Figures 3 and 4). Typically, these slats 22 are made from polypropylene. Similarly, a number of pallets or skips with rollers or wheels
- 10 may be engageable with the chain portions to carry awkward loads, such as bags of cement, fertiliser and the like.

- It will be appreciated that the principle of the present invention may be applied to other freight-carrying vehicles, such as railway wagons and small cargo aircraft.
- 15

#### CLAIMS

1. A freight-carrying road vehicle load-carrying bed incorporating powered conveyor means which
- 20 extend along the bed for moving loads selectively from one end of the bed to the other.

2. A vehicle according to Claim 1, in which the conveyor means comprise a roll-up floor which is anchored at one of its ends to a storage reel
- 25 mounted at said one end of the load-carrying bed and connected at its other end to a take-up reel at or adjacent the other end of the bed, the floor being unrolled over the bed for loading and rolled-up for unloading by selective driving of the take-
- 30 up reel and the storage reel, respectively.

3. A vehicle according to Claim 2, in which the roll-up floor comprises conveyor-type belting.

4. A vehicle according to Claim 2, in which the roll-up floor comprises a plurality of rigid, flexibly-
- 35 interconnected transverse slats.

5. A vehicle according to Claim 1, in which the conveyor means comprise a number of transversely-spaced endless loops, each formed by a portion of chain and a portion of cable which
- 40 are joined end-to-end and are driven around a

respective socket at said one end of the bed and a respective return wheel at the other end, the loops running in respective guide channels in the bed so that the chain portions, or load-engaging elements

45 carried thereby, project above the surface of the bed to engage and move the loads in use.

6. A vehicle according to Claim 5, in which the sprockets are arranged to be driven selectively in opposite directions for loading and unloading by a
- 50 drive unit, and the return wheels are freely-rotatable.

7. A vehicle according to Claim 5 or Claim 6, in which the chain portion of each loop is of sufficient length for it to pass around its
- 55 respective drive sprocket while extending along the entire length of the load-carrying bed.

8. A vehicle according to Claim 5, Claim 6 or Claim 7, in which a plurality of rigid transverse slats are releasably engageable with the chain
- 60 portions to support loads in use.

9. A vehicle according to Claim 5, Claim 6, Claim 7 or Claim 8, in which a transverse anti-spill barrier is releasably engageable with the chain
- 65 portions so as to be upstanding for the support of unstable loads.

10. A method of loading and unloading a freight-carrying road vehicle having a load-carrying bed with powered conveyor means which
- 70 extend along the bed, in which a load placed on the conveyor means is moved selectively from one end of the bed to the other.

11. A method according to Claim 10, in which, for loads comprising a number of discrete items, the conveyor means are operated intermittently so
- 75 that, during each period of operation, the conveyor means advance or retreat along the bed by a distance corresponding to the length of one item, to permit loading or unloading respectively.

12. A goods vehicle substantially as herein described with reference to, and as shown in, the
- 80 accompanying drawings.