

May 20, 1969

I. A. KULLERBACK

3,445,014

VEHICLES WITH CRANE

Filed Jan. 26, 1968

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Fig. 1

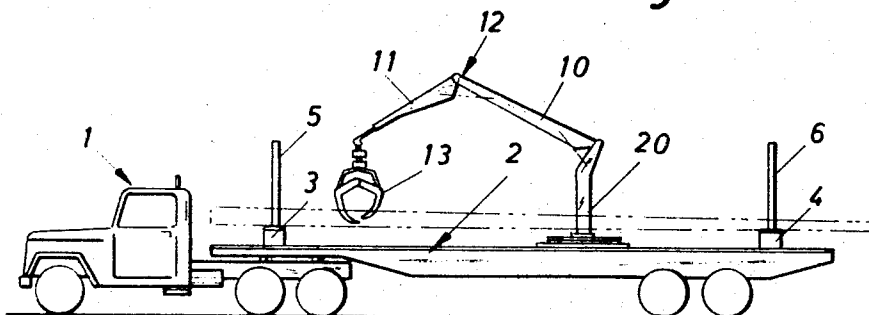


Fig. 2

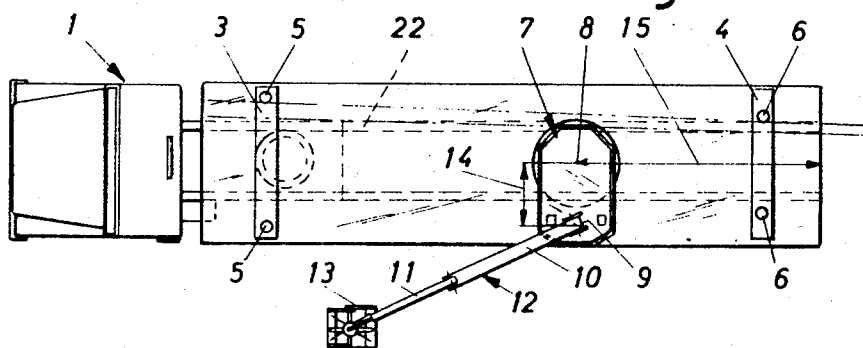
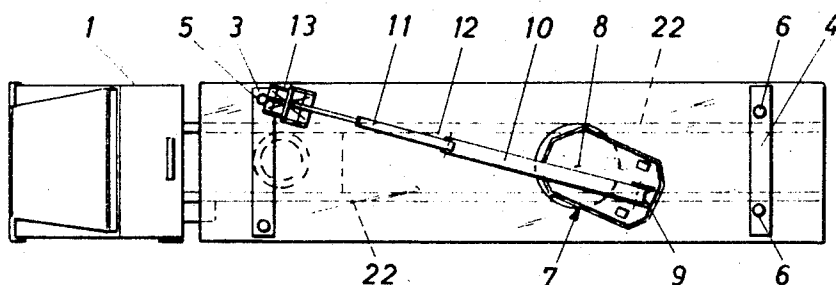


Fig. 3



IVAR ANSELM KULLERBACK

INVENTOR

BY *Wendroth, Lind & Porek*
Attorneys

May 20, 1969

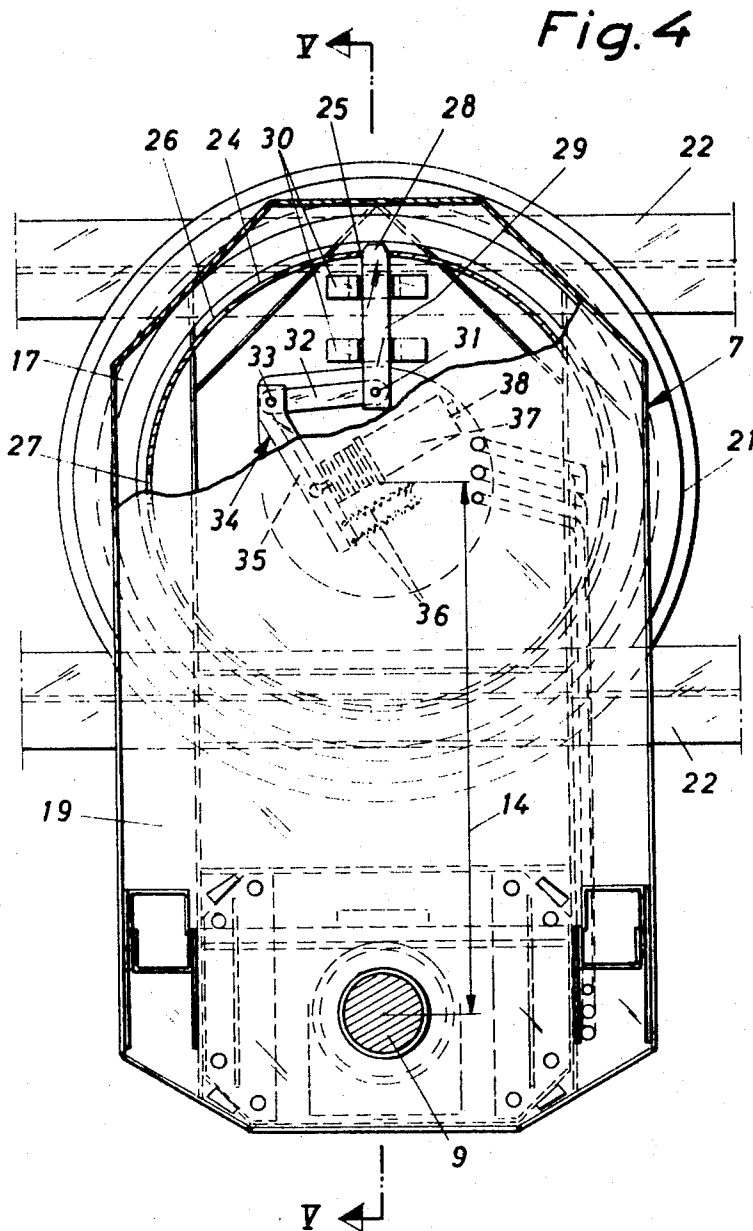
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IVAR ANSELM KULLERBACK

INVENTOR

BY *Donald L. Smith*
Attorney

May 20, 1969

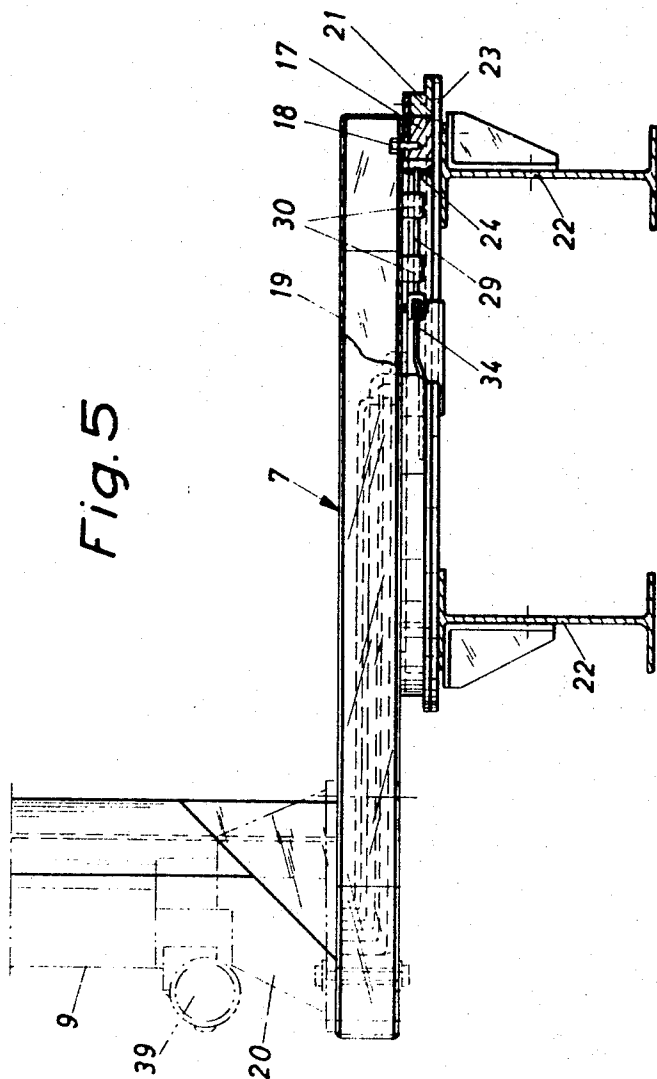
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IVAR ANSELM KULLERBACK

INVENTOR

BY *Wendert H. Lind & Ponsch.*
Attorneys

May 20, 1969

I. A. KULLERBACK

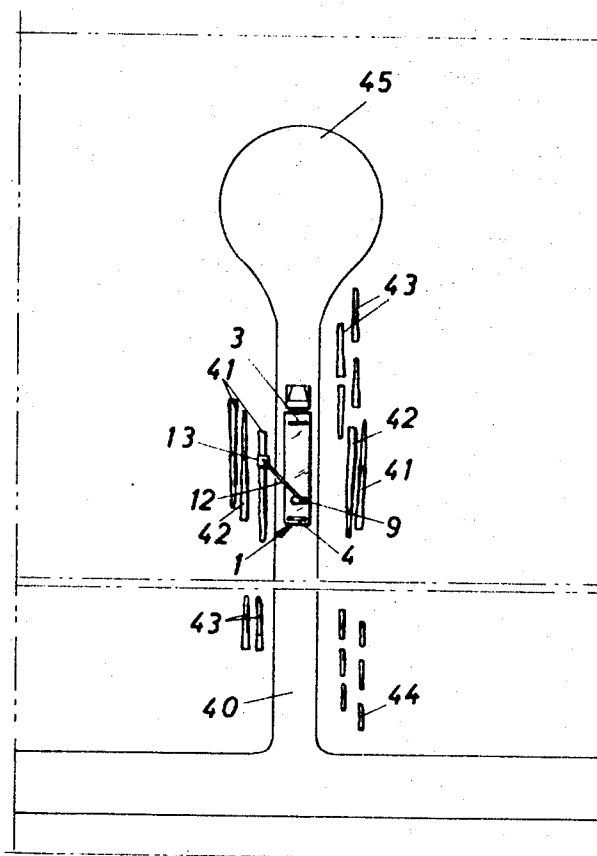
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Fig. 6



IVAR ANSELM KULLERBACK

INVENTOR

BY *Wendroth L. de Ponce*
Attorney

May 20, 1969

I. A. KULLERBACK

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Fig. 10

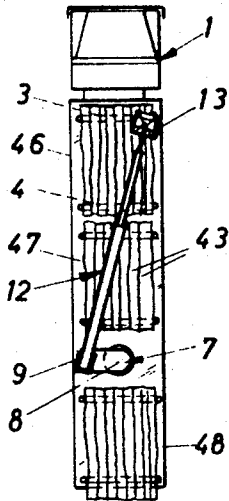


Fig. 9

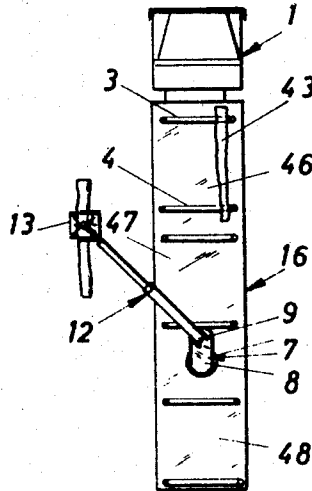


Fig. 8

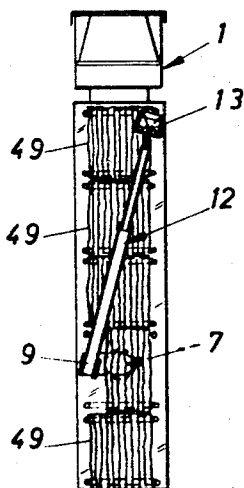
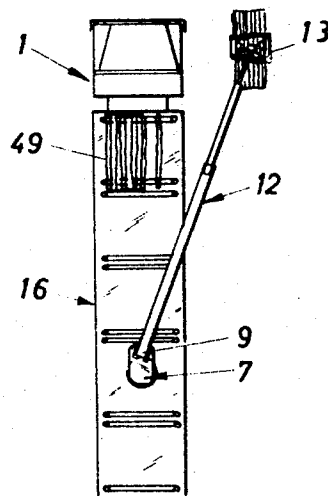


Fig. 7



IVAR ANSELM KULLERBACK

INVENTOR

BY *Wenduth, Lind & Ansel*
Attys

May 20, 1969

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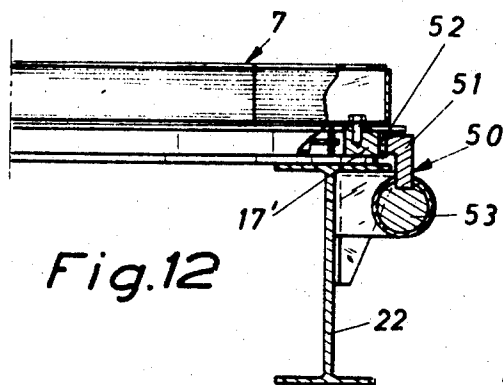


Fig. 12

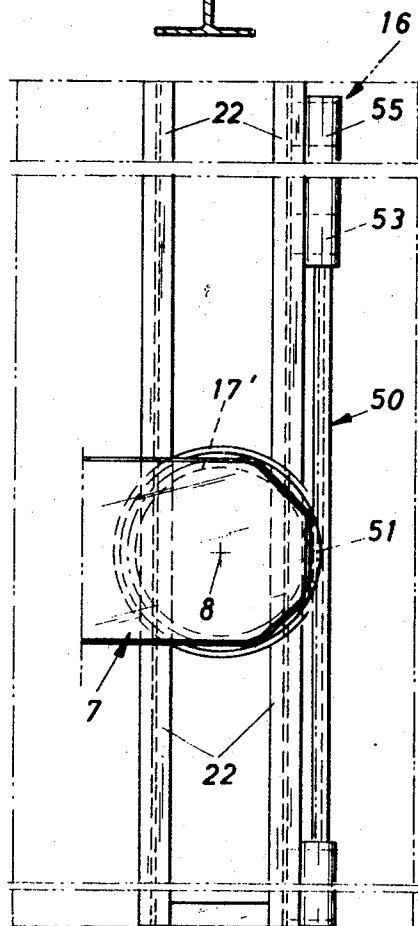


Fig. 11

IVAR ANSELM KULLERBACK
INVENTOR

BY *Wendell L. Lind & Ponsel*
attorneys

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3,445,014

VEHICLES WITH CRANE

Ivar Anselm Kullerback, Rattvik, Sweden, assignor to
Hiab-Foco Aktiebolag, Hudiksvall, Sweden, a corporation of Sweden

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1,738/67

Int. Cl. B60p 1/48; B66c 23/54

U.S. Cl. 214—77

5 Claims

ABSTRACT OF THE DISCLOSURE

This invention relates to a load-carrying vehicle having on its chassis a turnable ring carrying a crane provided with a foldable lifting arm. The purpose of the invention is to increase the adjustability of the crane and this has been achieved by journalling the crane about a vertical axis on the turning ring and arranging it eccentrically on the same. The distance between the turning axis of the ring and the turning axis of the crane is essentially equal to half the width of the load carrying surface of the vehicle.

The present invention relates to load-carrying vehicles of the kind provided with a ring journalled on their chassis, said ring carrying a crane with a foldable lifting arm. The main feature of the invention is to be seen therein that the crane, in a manner known per se, is journalled on the turning ring and is eccentrically arranged on the latter, the distance between the rotation axis of the ring and the rotation axis of the crane mainly corresponding to or being somewhat smaller than half the width of the load-carrying surface of the vehicle. This arrangement makes it possible to adjust the turn-ring in different turning positions in such a way that the crane will be situated either at one side of the vehicle or at the other side of the same or in the vertical longitudinal centre plane of the vehicle either in front of or behind the rotation axis of the ring. It is also rendered possible to adjust the turning ring to any intermediate position in case such a position should be desirable or necessary. In particular at the loading of timber on the load-carrying vehicle, such a device gives important advantages irrespective of whether the timber comprises undivided trunks or whether the latter are divided in timber logs with a length of 4-5 meters and the tops are divided in pulp timber with a length of 2-3 meters.

This will be obvious from the following description with reference to the drawings. In the drawings:

FIG. 1 is a side elevation of a semitrailer provided with a crane according to the invention,

FIG. 2 is a plan view of the same loading vehicle,

FIG. 3 is a view similar to the one shown in FIG. 2 and illustrating a method for the swinging of the turning ring of the vehicle,

FIG. 4 shows on an enlarged scale a plane view of the turning ring according to FIG. 2,

FIG. 5 shows a vertical cross section on the line V—V in FIG. 4 through the vehicle chassis with the turning ring,

FIG. 6 is a plan view of a forest area with a small road and timber placed at the sides of this road,

FIG. 7 is a plan view of the vehicle at the loading operation of pulp timber,

FIG. 8 shows a vehicle loaded with pulp timber,

FIG. 9 is a plan view of the vehicle at timber loading,

FIG. 10 is a plan view of the vehicle loaded with timber,

FIG. 11 is a plan view of a section of the turning ring according to a second embodiment provided with a hydraulic device for turning the ring, and

FIG. 12 shows a vertical section on the line XII—XII in FIG. 11 through this device.

The semitrailer 1 shown in the drawings is supposed to have a loading surface with a length of about 12 meters and a width of about 2.5 meters. There is on the chassis 2 of the vehicle arranged a number of beams 3, 4 for carrying the load and having, at their ends, vertically extending posts 5, 6.

The chassis 2 carries a turning ring 7, the turning axis 8 of which is situated in the longitudinal center plane of the vehicle 1 and there is on the ring 7 arranged a crane 9 provided with a lifting arm 12 comprising two by means of a pivot interconnected parts 10, 11 and provided with a catching tool 13. The crane 9 is arranged eccentrically in relation to the turning axis 8 of the turning ring 7. The distance 14 (FIG. 2) between the turning axis 8 of the turning ring 7 and the rotation axis of the crane 9 is in the example illustrated to be about 1 meter. The turning axis 8 of the ring 7 is situated on the chassis 2 at a distance 15 from the rear end of the vehicle 1 which comprises preferably about $\frac{2}{5}$ of the whole length of the loading surface 16.

According to the embodiment shown in FIGS. 4 and 5, the turning ring 7 comprises a guiding ring 17 which by means of bolts 18 is attached to the stand 19 of the turning ring. The post 20 of the crane 9 is by means of one end attached to the stand 19. The guiding ring 17 is journalled in a rim 21 on the longitudinal beams 22 of the chassis. Concentrically to the guiding ring 17 on one of the beams 22 there is attached a plate 23 with a vertically extending ring flange 24 with lock openings 25, 26, and 27 arranged in different angular positions. The bevelled outer end 28 of a bolt 29 is insertable in one of the openings 25, 26, and 27 when the bolt is in a position in front of the opening in question. The bolt 29 slides in guides 30 on the under side of the crane stand 19 and it is at its inner end, by means of a pin 31, linked to one arm 32 of a two-armed lever 34 pivoted on a vertical shaft 33 on the crane stand 19 and the other arm 35 of the lever 34 is swung, according to FIG. 4, in counterclockwise direction by the action of pull springs 36. A pneumatic piston and cylinder unit 37 cooperates with the arm 35 and when air pressure is applied on the rear end 38 of said unit 37, the latter swings the two-armed lever 34 against the action of the springs 36 in clockwise direction against the action of the springs 36 for releasing the bolt 29 from the lock opening in question, i.e., one of the openings 25, 26, 27.

Reference letter 39 denotes a hydraulic device for turning the crane 9 about its vertical axis.

In FIG. 6 there is shown how trunks 41 and 42 with a length of, e.g., 13-15 meters have been pulled out of the forest and been placed on both sides of the forest road 40. There are also placed piles of timber trunks 43 with a length of about 4-5 meters and pulp timber 44 with a length of 2-3 meters. When the vehicle 1 is driven up the road 40, the turning ring 7 is swung in such a way that the crane 9 will be situated on the right hand side of the vehicle. When the vehicle has arrived to the first pile of timber on the left hand side (see the position in FIG. 6), the lifting arm 12 is used for loading the trunks 41 with the root ends in the longitudinal direction of the vehicle, on the load carrying beams 3, 4. When the vehicle 1 has been turned at the turning space 45 and then drives on the road 40 in opposite direction, the three trunks 41 on the opposite side of the road are loaded, thus, also in this case the tree trunks having the root ends in the driving direction. The next vehicle loads first the tree trunks 42 which are situated on the right hand side of the road and have their root ends situated in the driving direction of the road. In this case the turning ring 7 has been swung half a revolution such that the crane is situ-

ated on the left hand side of the vehicle. When the vehicle has been turned at the turning space 45 and reached the first pile of trunks on the opposite side of the road, also the tree trunks 42 having their root ends turned in the driving direction of the vehicle are placed on the load-carrying beams 3, 4.

The timber trunks 43 are loaded in a similar way. So as to ensure, at the loading of the timber trunks 43 on the two foremost load-carrying beams 3, 4 on the loading vehicle according to FIG. 9, that the lifting arm 12 does not get too long a reach, the turning ring 7 is swung in such a way that the crane 9 will be situated in front of the turning axis 8 in the vertical longitudinal centre plane of the vehicle. When the space 46 above the loading surface 16 at the foremost position has been filled with timber trunks 43, the turning ring 7 is swung, e.g., a quarter of a revolution to the left or to the right as desired so as to facilitate the loading and then the next space 47 or 48 is filled with timber trunks 43.

When the vehicle 1, as shown in FIGS. 7 and 8, is used for the loading or pulp timber, it is possible to place, on the loading surface 15, five piles 49 of pulp timber. It is advisable, also in this case, at the loading of the timber pile 49 situated closest to the driver's cabin of the vehicle first to swing the turning ring 7 in such a way that the crane 9 will be situated as close to the front end of the vehicle as possible. The lifting arm 12 may then be made rather short and a rather large quantity may be lifted each time.

Thus, it is obvious that the shown and described device makes it possible to fill the load-carrying surface of the vehicle with timber quickly and easily.

When it is desired to adjust the turning ring 7 in accordance to the embodiment shown in FIGS. 1-5, the catching tool 13 is brought to enclose any of the posts 5. Then, a hydraulic pressure is applied on the turning device 39 of the crane 9 (FIG. 5). However, as the lifting arm 12 of the crane cannot turn as it is held by the post 5, this results instead in a turning of the turning ring 7 about its axis 8. During the turning also a pneumatic pressure is applied on the cylinder 37 such that the two-armed lever 34 is swung in in clockwise direction and the bolt 29 thus is kept in retracted position, i.e., with the end 28 out of contact with the ring flange 24. When the turning ring 7 approaches the intended angular position, the stream of compressed air to the cylinder 37 is interrupted, and the springs 36 swing the two-armed lever 34 in counterclockwise direction. The bolt 29 with its outer end 28 will project into the opening situated in front of it (the opening 25 according to FIG. 4) and locks the turning ring. The flow of pressure medium is at the same time interrupted to the hydraulic turning device 39.

According to the embodiment shown in FIGS. 11 and 12, the turning ring 7 has been provided with a special turning device 50. This device comprises a ratchet 51 extending parallel to the longitudinal beams 22 of the vehicle chassis 2 and the teeth of the ratchet 51 can mesh with an external cog ring 42 on the guiding ring 17'. The ratchet 51 is at its both ends connected to pistons 53, 54, each of these pistons being axially displaceable in its hydraulic cylinder 55 and 56, respectively.

For the rotation of the ring 7 in one direction or in the other pressure medium must be fed into the cylinder 55 and out of the cylinder 56 or vice versa, and the ratchet 51 is then displaced in its longitudinal direction causing the desired turning of the guiding ring 17' and thus also of the turning ring 7.

The invention has been described in the foregoing for purposes of illustration only and is not intended to be limited by this description or otherwise. Thus, the crane 9

as well as the turning ring 7 and also the vehicle may be constructively modified in many ways within the scope of the invention. Locking means of other kind than the locking bolt 29 may of course be used. The turning ring may be constructed as a turning disk. The hydraulic piston and cylinder units for the swinging of the two parts 10, 11 of the lifting arm in relation to each other and in relation to the crane stand and the valve control device have not been illustrated as they are well known to anyone skilled in the art and these details do not fall within the scope of the invention. The crane device may of course be used also for loading other goods than timber.

What I claim is:

1. A load-carrying vehicle having on its chassis a turnable ring (7) which carries a crane (9) provided with a foldable lifting arm (12), wherein the improvement comprises journalling the crane for rotation about a vertical axis on the turning ring (7) and arranging it eccentrically on the same, the distance (14) between the turning axis (8) of the ring (7) and the turning axis of the crane substantially corresponding to half the width of the load-carrying surface (16) of the vehicle whereby the load may be deposited on or removed from the load-carrying surface by the crane.

2. A load-carrying vehicle as claimed in claim 1, wherein the improvement comprises arranging the central shaft (8) of the turning ring (7) in the longitudinal central plane at a distance from the rear border of the vehicle, this distance being about $\frac{2}{3}$ of the length of the load-carrying surface.

3. A load-carrying vehicle as claimed in claim 1, wherein the improvement comprises shaping the turning ring (7) lockable to a ring flange (24) which is concentric to the turning axis of the ring (7) and connected to the vehicle chassis (2) by means of a bolt (29) arranged, by the action of spring means (36), to be brought to locking position with the outer end (28) of the bolt engaging one of several locking openings (25, 26, 27) situated at different angle positions in the ring flange and adapted to be brought to releasing position mechanically, e.g., by means of a pull cable, or pneumatically or hydraulically.

4. A load-carrying vehicle as claimed in claim 1, wherein the improvement comprises a hydraulic motor for turning the turning ring (7).

5. A load-carrying vehicle as claimed in claim 1, wherein the improvement comprises providing the turning ring (7) with a cog ring (52) which is concentric to the turning axis of the turning ring (7) and which co-operates with a ratchet (51) displaceable by means of hydraulic piston and cylinder units (55, 56).

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GERALD M. FORLENZA, *Primary Examiner*.

R. J. SPAR, *Assistant Examiner*.

U.S. Cl. X.R.