

TRANSPORT VEHICLE, IN PARTICULAR FOR A PORT

The present invention relates to a transport vehicle, namely a harbor vehicle, including a chassis as well as rolling means.

5 This invention is related to the field of the manufacture of the devices for handling freight containers, in particular that of the manufacture of vehicles designed for transporting such containers in a harbor area.

10 In this respect, it should be noted that, in some parts of the world, the surface of the harbor terminals is limited, even inextensible, so that the harbor authorities, faced with the increase in number of the freight containers to be handled (to be unloaded and/or stored and/or transshipped), favor the increase of storage areas to the detriment of the traffic areas.

15 The increase in number of the containers and the reduction of the traffic areas lead to problems of congestion of the harbor terminals, which some harbor operators have tried to cope with by designing transport vehicles capable of receiving at least two superimposed containers, even two superimposed rows of containers.

Such a transport vehicle has however many drawbacks.

A first drawback consists in that this vehicle is particularly cumbersome, so that it does not permit to manoeuvre with a small turning radius.

20 Another drawback consists in that such a vehicle includes a chassis adopting the form of a platform extending substantially in one plane and including an area for loading freight containers. This being said, these containers, positioned on a loading platform, have a center of gravity, which is located at a substantial distance from the ground. The position of this center of gravity causes problems of stability of the vehicle and its load, in particular in a turn, during acceleration, during deceleration, in particular in case of braking or an emergency stop. In addition, the position of this center of gravity is in contradiction with the good practice of handling, which specifies that the displacement of heavy loads should be carried out with a transport vehicle that permits a positioning of this center of gravity as close as possible to the ground.

30 Another feature of such a transport vehicle consists in that it includes, in the front portion and/or in the rear portion, rolling means formed of a plurality of running gears, in order to permit an adequate taking over of the weight of the transported load.

Thus, transport vehicles are known that include, namely in the rear portion, up to five running gears.

In this respect, it should be noted that, when the transport vehicle takes a turn, the tires of the rolling means tend to skid on the ground, which causes its destruction.

5 According to another drawback, the multiplication of the running gears considerably emphasizes this phenomenon of destruction of the tires.

The present invention is aimed at coping with the drawbacks of the transport vehicles of the state of the art.

To this end, the invention relates to a transport vehicle, namely a harbor vehicle,
10 including, on the one hand, a chassis aimed at receiving at least one freight container, even a superposition of at least two containers, resting on at least a portion of this chassis and, on the other hand, means designed for the vehicle to run on the ground and implanted under at least a portion of this chassis.

This vehicle is characterized in that it includes :

15 - a front module including, on the one hand, a front structure forming partially the chassis of the vehicle and, on the other hand, rolling means implanted under this front structure ;

- a rear module including, on the one hand, a rear structure forming partially the chassis of the vehicle and, on the other hand, rolling means implanted under this rear
20 structure ;

- an intermediate module, interposed between the front module and the rear module, connected to these front and rear modules, and including an intermediate structure, forming partially the chassis of the vehicle, designed for the loading of at least one container, and extending at a lower level than the front and rear structures ;

25 - means designed for ensuring maintaining laterally at least one container loaded on the intermediate loading structure, having between them a separation at least equal to the dimensions of such a container, and at least one portion of which defines a side structure forming partially the chassis of the vehicle.

According to another feature of this vehicle, the front module and/or the rear
30 module include, on the one hand, rolling means formed by at least two running gears, on the other hand, a means for mounting pivotally, according to a vertical axis and under its structure, each running gear of these rolling means and, yet on the other hand,

at least one means for controlling the pivoting of at least such a running gear the rolling means of such a module include.

Thus, the transport vehicle according to the invention includes an intermediate structure aimed at receiving containers and positioned at a lower level than the front and rear structures under which the rolling means are implanted. Such a configuration
5 advantageously permits to substantially lower the center of gravity of the containers, compared to the vehicles of the state of the art.

Another feature consists in that the modules include rolling means formed of at least two running gears, a means for mounting pivotally each running gear, and at least
10 one means for controlling the pivoting of at least one such running gear. This advantageously permits to limit, even to suppress, the skidding of the tires of the rolling means and thus to limit the phenomena of destruction of these tires.

This transport vehicle also includes means designed for maintaining laterally at least one container loaded on the intermediate loading structure. Some of these means
15 for maintaining permit to ensure a lateral maintaining of a container positioned directly on this intermediate structure, while some other means for maintaining permit to ensure a lateral maintaining of a second container superimposed on a first container positioned directly on the intermediate structure. These means for maintaining contribute to the stability of the vehicle and its load, in particular in a turn.

Further objectives and advantages of the present invention will become clear during the following description related to embodiments that are given only by way of
20 indicative and non-restrictive examples.

The understanding of this description will be facilitated when referring to the attached drawings, in which:

- 25 - figure 1 is a side view of the transport vehicle according to the invention ;
- figure 2 is a perspective and plunged view of the transport vehicle shown in figure 1.

The present invention is related to the field of the manufacture of vehicles designed for transporting freight containers (C ; C') in a handling and/or storage area, in
30 particular in a harbor area.

In a known way, such a transport vehicle 1 includes a front portion as well as a rear portion, according to the usual direction of displacement of this vehicle 1.

Such a transport vehicle 1 also includes a chassis 2 as well as means (3 ; 4) designed for the rolling of the vehicle 1 on the ground and implanted under at least a portion of this chassis 2.

In this respect, it should be noted that a part 3 of these rolling means (3 ; 4) is
5 implanted in the front portion of the transport vehicle 1, while another part 4 of these rolling means (3 ; 4) is implanted in the rear portion of this vehicle 1.

According to the invention, this transport vehicle 1 includes a plurality of modules (5 ; 6 ; 7) described above.

In particular, this vehicle 1 includes a front module 5 including, on the one
10 hand, a front structure 50 forming partially the chassis 2 of the vehicle 1 and, on the other hand, rolling means 3 implanted under this front structure 50.

This front module 5 also includes, on the one hand (and namely in its upper portion) a driver's cab 51, on the other hand, means 52 for mounting pivotally, according to a vertical axis, this driver's cab 51 with respect to the front structure 50 of
15 this front module 5 and, yet on the other hand, means for orientating this driver's cab 51 tangentially to the path of the vehicle 1.

According to a first embodiment, not shown, the driver's cab 51 can be implanted above a portion of the front structure 50 of the front module 5, while the means for orientating this driver's cab 51 are designed for driving this cab 51 pivotally
20 above the front structure 50, by acting on the means for mounting 52 pivotally the cab 51 or on the cab 51 itself.

Another embodiment shown in figures 1 and 2 consists in that the front module 5 includes a carriage 53.

This carriage 53 includes, on the one hand (and namely in its upper portion) a
25 driver's cab 51 and, on the other hand (and namely in its lower portion), rolling means 3 formed by at least one running gear 30.

This carriage 53 is connected to the front structure 50 the front module 5 includes, this through means for mounting 52 pivotally, according to a vertical axis, this carriage 53 (and hence the driver's cab 51 it includes) with respect to this front
30 structure 50, in particular at the front of this front structure 50.

As regards the means for orientating the driver's cab 51 tangentially to the path of the vehicle 1, they are formed at least partially by means for controlling the pivoting

of the carriage 53 with respect to the front structure 50 of the front module 5.

According to a first embodiment, this driver's cab 51 is mounted fixed on a chassis the carriage 53 includes. In such a case, the means for orientating the driver's cab 51 tangentially to the path of the vehicle 1 are formed only by said means for controlling the pivoting of the carriage 53 with respect to the front structure 50 of the front 5.

However and additionally, this carriage 53 can include means for mounting pivotally, according to a vertical axis, the driver's cab 51 on a chassis this carriage 53 includes. In such a case, the means for orientating the driver's cab 51 can be formed by means for controlling this cab 51 pivotally with respect to the chassis of this carriage 53, this in addition to the control of pivoting of the carriage 53 with respect to the front structure 50 of the front module 5.

As mentioned above, this carriage 53 includes rolling means 3, which can be mounted pivotally, according to a vertical axis, with respect to the chassis of the carriage 53 (this through means for mounting pivotally according to such axis) or (and preferably) be mounted fixed with respect to this chassis, i.e. non pivotally according to a vertical axis with respect to this chassis.

A preferred embodiment of the invention consists in that these rolling means 3 are formed by a single running gear 30.

An additional feature consists in that the driver's cab 51 can be mounted suspended, as the case may be, on the front structure 50 of the front module 5 or on the chassis of the carriage 53 this front module 5 includes.

Another feature of the invention, the transport vehicle 1 includes a rear module 6 including, on the one hand, a rear structure 60 forming partially the chassis 2 of the vehicle 1 and, on the other hand, rolling means 4 implanted under this rear structure 60.

Another feature of the invention consists in that the front module 5 and/or the rear module 6 include, on the one hand, rolling means (3 ; 4) each formed of at least two running gears (30, 30' ; 40, 40'), on the other hand, a means for mounting pivotally, according to a vertical axis and under its structure (as the case may be, front 50 or rear 60) structure, each running gear (30, 30' ; 40, 40') of these rolling means (3 ; 4) and, yet on the other hand, at least one means for controlling the pivoting of at least one such running gear (30, 30' ; 40, 40') the rolling means (3 ; 4) of such a module (as the case

may be, front 5 or rear 6 module) includes.

Such a module (5 ; 6) then includes a means for mounting pivotally, which, according to a preferred embodiment, can be formed by a ball crown having a fixed portion associated with the structure (50 ; 60) and a movable portion associated with a running gear (30, 30' ; 40, 40') of the rolling means (3 ; 4).

This module (5 ; 6) then also includes a means for controlling the pivoting, which can be of the electric or mechanical type.

However and according to a preferred embodiment of the invention, such a means for controlling the pivoting is preferably of the hydraulic type and includes either at least one jack or a system of pinion and toothed crown, or a system with rack.

As mentioned above, the front module 5 and/or the rear module include at least one means for controlling the pivoting of at least one running gear (30, 30' ; 40, 40') the rolling means (3 ; 4) of such a module (5 ; 6) include.

However and according to a preferred embodiment of the invention, such a front module 5 and/or rear module 6 include, in fact, a means for controlling the pivoting of a single running gear (30 ; 40) the rolling means (3 ; 4) of such a module (5 ; 6) include as well as at least one means for transmitting such a control of pivoting of this running gear (30 ; 40) to at least one other running gear (30 ; 40') the rolling means (3 ; 4) of such a module (5 ; 6) include.

In this respect, it should be noted that such a means for transmitting the control of pivoting to another running gear (30' ; 40') is designed so as to provide this other running gear (30' ; 40') with an angle of pivoting corresponding to a fraction of the angle of pivoting of the running gear (30 ; 40) controlled by the control means.

Such a feature advantageously permits to ensure an adequate synchronization of these running gears (30, 30' ; 40, 40') in turns. This synchronization advantageously permits to avoid the skidding of the tires of these rolling means (3 ; 4).

According to a preferred embodiment of the invention, such a means for transmitting a control of pivoting can be formed of at least one rod or the like.

An additional feature of the invention consists in that the front module 5 and/or the rear module 6 include means (in particular in the form of sensors) for capturing information related to the load transported by the vehicle 1.

These means can be designed for capturing such information with each rolling

means (3 ; 4), even (and preferably) with each running gear (30, 30' ; 40, 40') these rolling means (3 ; 4) include.

Such an embodiment advantageously permits to inform the vehicle 1 and the driver about the transported load, this for each rolling means (3 ; 4) and in a
5 complementary way as well as in combination.

According to an additional feature, the front module 5 and/or the rear module 6 can also include suspension means interposed between the structure (as the case may be, front 50 or rear 60 structure) and the rolling means (3 ; 4) of such a module (5 ; 6).

Such suspension means are preferably associated with each of the running gears
10 (30, 30' ; 40 ; 40') the rolling means (3 ; 4) include.

According to a first embodiment, such suspension means can be of the mechanical type.

However, a preferred embodiment consists in that such suspension means are of the hydraulic type, in particular formed by at least one jack.

As mentioned above, the front module 5 and/or the rear module include means
15 for capturing information related to the load transported by the vehicle 1.

In this respect, it should be noted that such information can be captured in particular at such suspension means.

The means for capturing information are then designed for capturing such
20 information at the suspension means associated with at least one of the running gears (30, 30' ; 40, 40') of each rolling means (3 ; 4), even (and preferably) with each of the running gears (30, 30' ; 40, 40') of these rolling means (3 ; 4).

Such an embodiment advantageously permits to inform the vehicle 1 and the driver of the transported load, this for each rolling means (3 ; 4) and in a
25 complementary way as well as in combination.

In the particular case of a hydraulic suspension, the means for capturing information can be formed of pressure sensors.

An additional feature of the invention consists in that the vehicle includes a means for synchronizing the rolling means (3 ; 4) the front module 5 or the rear module
30 6, respectively, includes with the rolling means (4 ; 3) the rear module 6 or the front means 5, respectively, includes.

According to a first embodiment, such a synchronization means can be of the

electric and/or electronic type, and can then include at least one calculator.

However and according to a preferred embodiment of the invention, such means for synchronizing is formed by a hydraulic system designed for transferring a volume of liquid between the rolling means (3 ; 4) of the front module 5 or rear module 6, respectively, and the rolling means (4 ; 3) of the rear module 6 or front module 5, respectively.

As mentioned above, the transport vehicle 1 includes a front module 5 as well as a rear module 6.

In addition, the vehicle 1 according to the invention also includes an intermediate module 7 interposed between the front module 5 and the rear module 6 and connected to these front 5 and rear 6 modules.

This intermediate module 7 includes an intermediate structure 70, forming partially the chassis 2 of the vehicle 1.

This intermediate structure 70 extends at a lower level than the front 50 and rear 60 structures and is designed for the loading of a load formed of at least one container (C ; C'), of a superposition of at least two containers (for example a superposition of two 40- or 45-feet containers), even of a superposition of two rows of containers (each row including for example two 20-feet containers).

This intermediate structure 70 advantageously permits to lower the center of gravity of such a load and thus to increase the stability of the transport vehicle 1 and its load, namely in turns, during acceleration, during deceleration (in particular in the case of an emergency stop).

As mentioned above, the front module 5 includes a front structure 50, the rear module 6 includes a rear structure 60, and the intermediate module 7 includes an intermediate structure 70.

Yet another feature consists in that the front structure 50 and/or the rear structure 60 and/or the intermediate structure 70 include at least longitudinal beams (500 ; 600 ; 700), even also transversal beams for connecting at least two longitudinal beams (500 ; 600 ; 700) of one and the same structure (50 ; 60 ; 70).

Such a structure (50 ; 60 ; 70) can then be formed of an assembling of these longitudinal beams (500 ; 600 ; 700) and these transversal beams.

Another feature of the present invention consists in that it includes means 8

designed for maintaining laterally at least one container (C ; C') loaded on the intermediate loading structure 70 having between them a separation at least equal to the dimensions (as the case may be, the width or the length) of such a container (C ; C'), and at least part of which defines a side structure 9 forming partially the chassis 2 of the vehicle 1.

These means 8 for maintaining laterally are positioned on both sides of the load to be transported.

In fact, such means 8 for maintaining laterally include longitudinal beams (80), on the one hand, which have between them a separation at least equal to the width of a container (C ; C'), on the other hand, which form at least partially (even in majority) the side structure 9 forming partially the chassis 2 of the vehicle 1 and, yet on the other hand, which connect the front module 5 and the rear module 6, in particular the front structure 50 and the rear structure 60, namely the longitudinal beams (500 ; 600) and/or the transversal beams these structures (50 ; 60) include.

As can be seen in the attached figures, such a longitudinal beam 80 extends substantially in the plane of the front structure 50 and the rear structure 60, in particular in the plane of the longitudinal beams (500 ; 600) these structures (50 ; 60) include, which it is preferably made integral with, namely through welding.

It should be noted that such a longitudinal beam 80 is, in particular, designed so as to ensure a lateral maintaining of a container C positioned directly on the intermediate structure 70.

In addition, the means 8 for maintaining laterally can also include vertical boards 81.

These vertical boards 81 have between them a separation at least equal to the width of a container (C ; C').

In addition, these boards 81 are made integral (namely by means of bolts) with at least one module (in particular the intermediate module 7, even also the aggregate of the front module 5, rear module 6 and intermediate module 7 the vehicle 1 includes) and/or with a longitudinal beam 80 the means 8 for maintaining laterally include.

A particular embodiment consists in that these boards 81 are made integral with the longitudinal beams 80 of the means 8 for maintaining laterally as well as with the intermediate structure 70 (in particular with the longitudinal beams 700 of this

intermediate structure 70). Such an embodiment advantageously permits to transfer onto these longitudinal beams 80 part of the weight of the load supported by this intermediate structure 70. In such a case, such vertical boards 81 then form partially the side structure 9 forming partially the chassis 2 of the vehicle 1.

5 Another feature consists in that these vertical boards 81 have a height determined for these vertical boards 81 to extend laterally with respect to a second container C' superimposed on a first container C loaded on the intermediate structure 70 of the intermediate module 7.

10 As can be seen in the attached figures, the means 8 for maintaining laterally can also include posts 82 and/or cross-beams 83 that have between them a separation at least equal to the length of a container (C ; C').

Such posts 82 and/or cross-beams 83 are then implanted upstream and/or downstream of the load to be transported.

15 In this respect, it should be noted that in particular either the intermediate module 7 and/or the front module 5 or the intermediate module 7 and/or the rear module 6 then include at least one such post 82 and/or at least one such cross-beam 83.

Here too, such posts 82 and/or such cross-beams 83 can form partially the side structure 9 forming partially the chassis 2 of the vehicle 1.

20 As regards the posts 82, they can advantageously be used to make integral the intermediate structure 70 with the front 50 and rear 60 structures, in particular through welding of these posts 82, on the one hand, to this intermediate structure 70 and, on the other hand, to these front 50 and rear 60 structures.

An additional feature as regards the transport vehicle 1 includes means for guiding at least one container (C ; C') during its loading onto this transport vehicle 1.

25 In this respect, it should be noted that the means for guiding a container C aimed at being positioned directly on the intermediate structure 70 are formed by at least part of the means 8 for maintaining laterally, in particular by the above-mentioned longitudinal beams 80, vertical boards 81, stiles 82 and cross-beams 83.

30 As regards the means for guiding a second container C' aimed at being superposed onto a first container C positioned directly on the intermediate structure 70, they are formed by part of the means 8 for maintaining laterally, in particular by the above-mentioned vertical boards 81, posts 82 and cross-beams 83.

According to an additional feature, at least part of the longitudinal beams (500 ; 600 ; 700 ; 80) at least the intermediate structure 70 (even also the front structure 50 and/or the rear structure 60) and/or the means 8 for maintaining laterally are formed of tubes or (closed or closable) boxes having an inner volume for receiving at least the means for synchronizing the rolling means (3 ; 4) of the front 5 and rear 6 modules.

Yet another feature consists in that the front 50, rear 60 and intermediate 70 structures (even also the structure 9 when it is defined by the longitudinal beams 80 of the means for maintaining laterally 8) each extend substantially in a horizontal plane, while the plane in which the intermediate structure 70 extends is located at a lower level than the plane in which the front structure 50 extends and the plane in which the rear structure 60 extend (even also than the plane in which the longitudinal beams 80 of the means for maintaining laterally 8 extend).

It should be noted that the longitudinal beams (500 ; 600 ; 700), even the transversal beams such a structure (50 ; 60 ; 70) includes, extend substantially in a horizontal plane (namely specific for each structure), this in order to define a platform.

A particular embodiment consists in that the longitudinal beams (500 ; 600 ; 80) of the front 50, rear 60 and side 9 structures extend in one and the same horizontal plane.

An additional feature consists in that the transport vehicle 1 includes means 10 for propelling this vehicle 1.

Such propelling means 10 are preferably of an electric or hydraulic type, but they can also be of the hydrostatic or hybrid type.

According to another feature, such means 10 can be of a dismountable, interchangeable, even autonomous type.

A particular embodiment consists in that these propelling means 10 can be positioned on the front structure 50 or (and preferably) on the rear structure 60 of the vehicle 1.

Finally, the chassis 2 of the transport vehicle 1 according to the invention is in particular formed by said front structure 50, said intermediate structure 70, said rear structure 60 as well as by said side structure 9.

CLAIMS

1. Transport vehicle (1), namely a harbor vehicle, including :

- a chassis (2) aimed at receiving at least one freight container (C ; C'), even a
5 superposition of at least two containers (C ; C'), resting on at least a portion of this chassis (2) ;
- means (3 ; 4) designed for the vehicle (1) to run on the ground and implanted under at least a portion of this chassis (2) ;
- a front module (5) including, on the one hand, a front structure (50) forming
10 partially the chassis (2) of the vehicle (1) and, on the other hand, rolling means (3) implanted under this front structure (50) ;
- a rear module (6) including, on the one hand, a rear structure (60) forming partially the chassis (2) of the vehicle (1) and, on the other hand, rolling means (4) implanted under this rear structure (60) ;
- 15 - an intermediate module (7), interposed between the front module (5) and the rear module (6), connected to these front (5) and rear (6) modules, and including an intermediate structure (70), forming partially the chassis (2) of the vehicle (1), designed for the loading of at least one container (C ; C'), and extending at a lower level than the front (50) and rear (60) structures ;
- 20 - means (8) designed for ensuring maintaining laterally at least one container (C ; C') loaded on the intermediate loading structure (70), having between them a separation at least equal to the dimensions of such a container (C ; C'), and at least one portion of which defines a side structure (9) forming partially the chassis (2) of the vehicle (1),
- 25 characterized in that the means (8) for maintaining laterally include longitudinal beams (80), on the one hand, which have between them a separation at least equal to the width of a container (C ; C'), on the other hand, which form at least partially the side structure (9) forming partially the chassis (2) of the vehicle (1) and, yet on the other hand, which connect the front module (5) and the rear module (6), in particular
- 30 the front structure (50) and the rear structure (60).

2. Transport vehicle (1) according to claim 1, characterized in that the front module (5) includes, on the one hand, a driver's cab (51), on the other hand, means (52)

for mounting pivotally, according to a vertical axis, this driver's cab (51) with respect to the front structure (50) of this front module (5) and, yet on the other hand, means for orientating this driver's cab (51) tangentially to the path of the vehicle (1).

5 3. Transport vehicle (1) according to claim 2, characterized in that the driver's cab (51) is implanted above a portion of the front structure (50) of the front module (5), while the means for orientating this driver's cab (51) are designed for driving this cab (51) pivotally with respect to the front structure (50), by acting on the means (52) for mounting pivotally or on the cab (51).

10 4. Transport vehicle (1) according to claim 2, characterized in that the front module (5) includes a carriage (53), on the one hand, including the driver's cab (51) as well as rolling means (3) and, on the other hand, connected to the front structure (50) the front module (5) includes, this through means (52) for mounting pivotally, according to a vertical axis, this carriage (53) with respect to this front structure (50).

15 5. Transport vehicle (1) according to claim 4, characterized in that the carriage (53) includes means for mounting pivotally, according to a vertical axis, the driver's cab (51) and/or rolling means (3), this on a chassis this carriage (53) includes.

20 6. Transport vehicle (1) according to any of the preceding claims, characterized in that the front module (5) and/or the rear module (6) include, on the one hand, rolling means (3 ; 4) each formed by at least two running gears (30, 30' ; 40, 40'), on the other hand, a means for mounting pivotally, according to a vertical axis and under its structure (50 ; 60), each running gear (30, 30' ; 40, 40') of these rolling means (3 ; 4) and yet on the other hand, at least one means for controlling the pivoting of at least one such running gear (30, 30' ; 40, 40') the rolling means (3 ; 4) of such a module (5 ; 6) include.

25 7. Transport vehicle (1) according to claim 6, characterized in that the front module (5) and/or the rear module (6) include a means for controlling the pivoting of a running gear (30; 40) the rolling means (3 ; 4) of such a module (5 ; 6) include as well as at least one means for transmitting such a control of pivoting of this running gear (30; 40) to at least one other running gear (30' ; 40') the rolling means (3 ; 4) of such a module (5 ; 6) include.

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8. Transport vehicle (1) according to claim 7, characterized in that the means for transmitting the control of pivoting to another running gear (30' ; 40') is designed so as

to provide this other running gear (30' ; 40') with an angle of pivoting corresponding to a fraction of the angle of pivoting of the running gear (30 ; 40) controlled by the control means.

5 9. Transport vehicle (1) according to any of the preceding claims, characterized in that the front module (5) and/or the rear module (6) include means for capturing information related to the load transported by the vehicle (1), even also suspension means interposed between the structure (50 ; 60) and the rolling means (3 ; 4) of such a module (5 ; 6) and at which this information is captured.

10 10. Transport vehicle (1) according to any of the preceding claims, characterized in that the vehicle (1) includes a means for synchronizing the rolling means (3 ; 4) the front module (5) or the rear module (6), respectively, includes with the rolling means (4 ; 3) the rear module (6) or the front means (5), respectively, includes.

15 11. Transport vehicle (1) according to claim 10, characterized in that the means for synchronizing is formed by a hydraulic system designed for transferring a volume of liquid between the rolling means (3 ; 4) of the front module (5) or the rear module (6), respectively, and the rolling means (4 ; 3) of the rear module (6) or the front module (5), respectively.

20 12. Transport vehicle (1) according to any of the preceding claims, characterized in that the means (8) for maintaining laterally include vertical boards (81), which have between them a separation at least equal to the width of a container (C; C'), and which are made integral with at least one module (5 ; 6 ; 7) and/or one longitudinal beam (80) the means (8) for maintaining laterally include.

25 13. Transport vehicle (1) according to claim 12, characterized in that the vertical boards (81) have a height determined for these vertical boards (81) to extend laterally with respect to a second container (C') superimposed on a first container (C) loaded on the intermediate structure (70) of the intermediate module (7).

30 14. Transport vehicle (1) according to any of the preceding claims, characterized in that the means (8) for maintaining laterally include posts (82) and/or cross-beams (83) the intermediate module (7) and/or, as the case may be, the front module (5) or the rear module (6) include, and that have between them a separation at least equal to the length of a container (C ; C').

15. Transport vehicle (1) according to any of the preceding claims, characterized in that it includes means for guiding at least one container (C ; C') during its loading onto this transport vehicle (1).

5 16. Transport vehicle (1) according to any of the preceding claims, characterized in that the front structure (50) and/or the rear structure (60) and/or the intermediate structure (70) and/or the side la structure (9) include at least longitudinal beams (500 ; 600 ; 700 ; 80), even also transversal beams for connecting at least two longitudinal beams (500 ; 600 ; 700 ; 80).

10 17. Transport vehicle (1) according to claims 10 and 16, characterized in that at least part of the longitudinal beams (500 ; 600 ; 700 ; 80) the structures (50 ; 60 ; 70 ; 9) and/or the means (8) for maintaining laterally include are formed of tubes or boxes having an inner volume for receiving at least the means for synchronizing the rolling means (3 ; 4) of the front (5) and rear (6) modules.