

Description

Background and Summary of the Invention

This invention relates to the loading of motor vehicles, and to apparatus for transporting vehicles. There is described herein apparatus having a movable sleeve with an opening for the passage of at least one vehicle therein using a sled.

Reference is made to GB-A-989859 which apparently shows an apparatus according to the features of the preamble of present claim 1, especially a multiple storey garage and a transport lift for elevating vehicles. The lift has means for horizontally traversing a trolley sideways. A car to be parked is driven onto a trolley and the trolley and vehicle can be pulled onto the lift.

In Application Serial No. 040,469 (US-A-4 768 916) a light-weight sleeve is disclosed which carries a plurality of motor vehicles in vertically separated rows. Once loaded with vehicles this sleeve is inserted into a standard cargo container which may be transported in a conventional fashion. When the container reaches its destination the sleeve is removed from the container and the vehicles are unloaded from the sleeve. This system has two advantages over loading the vehicles directly into the container. First, it is much easier to attach motor vehicles at multiple levels in an open-sided sleeve than in a narrow enclosed container. In addition, all of the attachment mechanism is in the sleeve, thereby leaving the container clean so that it can be used to carry other types of cargo without any modification.

In these devices the vehicles are attached to the sleeve by means of a pair of cradles, one of which supports the front tires of the vehicle and one of which supports the rear tires of the vehicle. For each vehicle which is loaded into the sleeve a pair of cradles is placed in the sleeve at the proper spacing and the vehicle is driven into the sleeve and over the cradles. Gantries having lifting devices in them are used to raise the cradles to the proper height in the sleeve. Finally, the cradles are attached to tension members which are suspended from the sides of the sleeve.

This system is quite slow since the vehicles must be driven into the sleeve onto the cradles positioned and attached to the sleeve one at a time. In addition, driving the vehicle into or out of a sleeve which is only slightly wider than the vehicle is likely to cause damage to the vehicle, particularly when its door is open to enable the driver to get in or out.

In application Serial No. 181,684 an apparatus was disclosed which speeds up the process of loading motor vehicles into sleeves and eliminates the necessity of driving the vehicles into and out of the sleeves. This apparatus supports a sleeve in a raised position which allows a motor vehicle to be driven onto a lifting device which is positioned below the sleeve.

The lifting device then raises the vehicle into the sleeve through its bottom. The cradles, which support the front and rear tires of the vehicle, are positioned between upstanding plates which form the vehicle support surfaces of the lifting device. Thus, the cradles are positioned under the tires of the vehicle when it is driven onto the lifting device and are lifted with the vehicle. Cradle latches, which are attached to the tension members, can be moved to loading positions which permit the cradles to pass by them when the lifting device is raised and to latching positions where they engage the ends of the cradles when the lifting device is lowered. Accordingly, an entire level of vehicles can be lifted into the sleeve at one time and attached nearly automatically when the lifting device is lowered again. Since an entire level of cars is loaded at one time, loading occurs much faster than in the previously disclosed system. In addition, since the vehicles are not driven into the sleeve damage is almost nonexistent. However, devices of this type are extremely expensive and can only be justified where a large volume of cars is being loaded and unloaded on a continual basis.

The subject invention may overcome the foregoing shortcomings and limitations of the prior art by providing a sled which will support at least one motor vehicle and which is dimensioned to fit within the sleeve it will be used to load.

According to the present invention there is provided apparatus for transporting vehicles comprising a sleeve having an opening for the passage of at least one vehicle therein using a sled of the apparatus, adapted to support said at least one vehicle and proportioned for movement through the opening of the sleeve to load said vehicle into the sleeve said apparatus characterised by:

(a) said opening comprising an open end for the passage of a plurality of vehicles into and along the sleeve;

(b) vehicle attachment devices for suspending vehicles from said sleeve in mutually spaced relationship to one another; and

(c) a transport mechanism for moving said sled through the open end of and into said sleeve to position a vehicle on said sled for suspension by said attachment devices.

Further according to the present invention there is provided a method for loading motor vehicles into an open centred sleeve which is used to carry a plurality of motor vehicles by placing at least one motor vehicle on a movable sled which is positioned outside of the sleeve and moving said sled into the sleeve with said at least one motor vehicle located thereon, said method characterised by:

(a) lifting said at least one motor vehicle off said sled and attaching it to said sleeve; and

(b) moving said sled back out of said sleeve to carry another motor vehicle into said sleeve to be

attached thereto.

The sled may be movable on tracks which extend through substantially the entire extent of the sleeve, and at least one sled length in front of it. Thus, the sled can be used to move motor vehicles into and out of a sleeve, which eliminates the necessity of the motor vehicles having to be driven into the sleeve where there is a likelihood that the vehicle will sustain damage. The sled may be movable into and out of the sleeve by means of an endless chain which can be driven in either direction by means of a motor.

In one embodiment, the sled has a pair of spaced-apart wheel ramps which are formed from rows of side-by-side angle beams. Thus, the crades which are used to support the front and rear tires can be placed between adjacent pairs of the angle beams so that the tires of the vehicle will pass over them when the vehicle is driven onto the sled. The ends of the crades are engaged by cradle latches which are slidably raised up a tension member by means of a lifting device located in a gantry which can be moved to any desired position along the sleeve. Pins, which fit through holes in the tension members, attach the cradle latches to the tension members when they have been raised to the proper level.

In a preferred embodiment of the invention, the apparatus is mounted on a pair of flatbed trailers so that it will be aligned with cargo containers which are carried on similar trailers. A first trailer has frame guides extending across its bed which receive the wheels of the sleeve. Located beside the frame guides are gantry guides which receive the wheels on the gantries. Thus, the sleeve and gantries can be moved across the trailer along parallel paths. The tracks which carry the sled run across the entire extent of the first trailer, between the frame guides and the gantry guides, and extend onto the second trailer far enough that the sled can be positioned completely on the second trailer. A ramp is located on the second trailer at the ends of the sled tracks which allows vehicles to be driven up onto the sled.

Identifying indicia marked on the ramp enable the operator to determine the wheel base of the vehicle which is ready to be loaded, and similar indicia marked on the sled allow the operator to place the crades on the sled at a separation which corresponds to this wheel base. Thus the sled can be prepared for the vehicle before the vehicle is driven onto the sled.

Rams located on the sled move between extended positions where they engage the sides of the sleeve and retracted positions where they do not. Thus the sled can be used to move the sleeve along the sleeve guides into and out of a container.

The foregoing and other objectives, features and advantages of the present invention will be more readily understood upon consideration of the following detailed description of the invention taken in con-

junction with the accompanying drawings.

Brief Description of the Drawings

FIGURE 1 is a side elevation view of a vehicle-loading apparatus embodying the features of the present invention.

FIGURE 2 is a side elevation view, at an enlarged scale, of a portion of the apparatus of FIGURE 1.

FIGURE 3 is an end elevation view, at a more enlarged scale, of the apparatus shown in FIGURE 2.

FIGURE 3 is an end elevation view, at a more enlarged scale, of the apparatus shown in FIGURE 2.

FIGURE 4 is a fragmentary plan view, with parts removed to show hidden detail, of a sled which is an element of the invention.

FIG. 5 is a side elevation view of a cradle latch which is an element of the present invention.

FIG. 6 is an end elevation view of the cradle latch of FIG. 5.

FIG. 7 is a side elevation view of the apparatus of the present invention with a first vehicle positioned on the sled and ready to be loaded into the sleeve.

FIG. 8 is a side elevation view, similar to FIG. 7, with the vehicle placed in the sleeve and ready to be raised.

FIG. 9 is a side elevation view, similar to FIG. 7, with the first vehicle raised and attached to the sleeve and a second vehicle on the sled ready to be moved into the sleeve.

FIG. 10 is a fragmentary side elevation view taken along the line 10-10 in FIG. 4.

FIG. 11 is an enlarged partial end elevation view taken along the line 11-11 of FIG. 4 with a portion of the device being removed to show hidden detail.

Detailed Description of the Invention

Referring to FIG. 1 of the drawings, the apparatus of the present invention is used to load motor vehicles 10 into and out of a lightweight open-centered sleeve 12 which is dimensioned to fit into a standard cargo-carrying container 14. The sleeve is bottomless which permits the vehicles to be moved into it at ground level and then raised and attached to the side walls of the sleeve.

Since the container typically is raised above the ground, the apparatus of the present invention preferably is raised also. In the embodiment illustrated, the apparatus includes two flatbed trailers 18a, 18b which are positioned end to end. In addition to elevating the apparatus to a height where it will be aligned with containers which are carried on similar trailers, placing the apparatus on trailers makes the apparatus portable. Thus, it can be transported to remote sites for use.

Referring now also to FIGS. 2 and 3, one of the trailers 18a has a pair of U-shaped sleeve guides 20

which extend along its entire length. The sleeve guides are separated from one another by the width of the sleeve so that the wheels 22 which are located along each side of the sleeve fit into the sleeve guides. Located outwardly of the sleeve guides 20 are U-shaped gantry guides 24 which receive the wheels 26 of two gantries 28 which are used to lift the vehicles to the height where they are to be attached to the sleeve 12.

Each gantry is composed of a pair of masts 30 which are joined together at their upper extremity by a transverse cross member 32. In the embodiment illustrated, each mast 30 is of two-stage construction having a lower portion 44 and an upper portion 46 which is vertically slidable relative to the lower portion under the control of a double-acting hydraulic cylinder 48. Another double-acting hydraulic cylinder 50, which depends from the upper portion 46 of each mast, has a frame 52 attached to its piston 54. The two gantries are independent of one another but are tied together through double acting hydraulic cylinders 36 so that the distance between the two gantries can be adjusted by selective activation of the cylinders. Since the gantries lift the vehicles through their tires, as will be more fully explained later, this permits the apparatus to be used with vehicles having different wheel bases.

In addition, both pairs of gantries are movable along the trailer 18a by means of cables 38 which extend over pulleys 40 located at each end of the trailer and are attached to the gantries. The cables wrap around sheaths 42 which are driven by a selectively controllable reversible hydraulic motor, not shown.

When the vehicles are lifted they are supported on elongate cradles 56, one which supports the front tires of a vehicle and one which supports its rear tires. Referring to FIGS. 4 and 5, each cradle 56 has two pads 58 which are connected together by a cross tie 59. Each pad comprises front and rear tire-engaging chocks 60 which are supported on each of their ends by a support plate 62. The pads are separated from one another by a sufficient distance that the tires of the narrowest vehicle that is to be lifted by the cradle will fit into them, and are wide enough to allow the cradle to engage the tires of the widest vehicle.

The cradles are coupled to the gantries by means of cradle latches 64, FIGS. 5 and 6. In the embodiment illustrated, each cradle latch includes a horizontal shelf 66 that is arranged to engage the support plate 62 which is located at the outer extremities of the cradle. The shelf 66 is pivotally connected to a pair of vertical straps 67 which in turn are pivotally connected to a bar 68. Thus, the bar, straps, and shelf form a four-bar parallelogram linkage which allows the shelf to be moved from side to side relative to the bar. The bar 68 is connected to a pair of spaced-apart hooks 70 having eyes 72 projecting from their sides. The spacing between the hooks 70 is such that they

fit loosely on each side of an elongate tension member 74, which is releasably attachable to the sides of the sleeve. A finger 75 located at the top of each tension member slidably fits over the bar which is located at the top of the sleeve and can be affixed to the bar by means of a pin (not shown) which allows a tension member to be attached to the sleeve at any desired position along its longitudinal extent. Each tension member has a series of holes 76 extending through it which releasably receive an elongate pin 78 which is arranged to be engaged by the hooks 70 of the cradle latches. As a result, a cradle latch can be attached to a tension member at different positions along its longitudinal extent. The cradle latches are attached to the frame 52 of the gantries 28 by means of chains 80 which are releasably attachable to the eyes 72. A cradle latch can, therefore, be raised and lowered along a tension member by retraction and extension respectively of the hydraulic cylinders 48 over 50 of the associated gantry.

Extending along the entire linear extent of the first trailer 18a and along a portion of the second trailer 18b is a pair of spaced-apart rails 82 which act as a track for the wheels 84 of a movable sled 86, as can best be seen in FIGS. 4 and 7-9. The rails 82 extend onto the second trailer 18b only far enough so that the sled can be moved completely onto the second trailer. In the embodiment illustrated the sled is divided into two sections which are joined together through a separable pivot joint 88. This allows the sled to be driven partially off of the track into the container 14, as will be more fully explained later, and be separated into two elements for ease of transportation.

The sled is moved along the tracks by means of an endless chain 90, FIG. 10, which runs along the entire length of the first trailer 18a and is selectively movable in either direction by means of a motor (not shown). The chain has a coupling element 92 attached to one of its lengths which can be removably attached to a tie bar 94 by means of a pin 96. The tie bar is attached to a collar 98 which slidably fits over a center beam 100 of the sled. The collar 98 has aligned openings 102 passing through its upper and lower faces, and like openings 104 are located at spaced-apart intervals along the center beam 100 which permits the collar 98 to be attached to the center beam at any desired point by inserting a pin 106 through the openings 102 and 104.

The sled has a length which will accommodate the longest vehicle that will be placed in the sleeve and yet is narrow enough that it will fit into the sleeve. The sled has a pair of spaced-apart wheel ramps 108 which a vehicle can be driven onto that extend along its side margins. In the embodiment illustrated, each wheel ramp is formed from a series of angle beams 110 which are attached to a pair of bars 118. The vertical legs of the angle beams 110 thus form a row of vertical plates which are spaced apart so that the

chocks 60 of a cradle can be placed between them thereby permitting a vehicle which is driven onto the sled to pass over the chocks without contacting them. The wheel ramps are shown in the embodiment illustrated as being removable from the sled which permits the use of other styles of wheel ramps as well as reducing the weight of the sled for transportation.

Located on the second trailer, at the end of the rails 82, is a ramp 112, FIG. 7, which allows a vehicle to be driven onto the sled from the bed of the trailer. Located at the end of the trailer 18b is another ramp 114, FIG. 1, which allows the vehicle to be driven onto the bed of the trailer from the roadway on which the trailer is situated so that a vehicle can be driven from the roadway onto the sled without stopping. However, the ramp 112 is long enough that it will hold one vehicle, which, as will be more fully explained later, allows vehicles to be loaded into the sleeve rapidly.

Since the cradles 56 support a vehicle 70 by its tires, they must be placed on the sled at a separation which is equal to the wheel base of the vehicle being loaded. In order to facilitate the positioning of the cradles on the sled before the vehicle is driven onto it, indexing indicia 111, FIG. 4, which identify each of the angle beams 110, are placed on the sled. In the embodiment illustrated the indicia are numbers, but they could take other forms, such as colors. A similar set of indicia 113, FIG. 7, which is spatially congruent with the indicia 111, is placed on the ramp 112. Thus, by looking at the indicia 111 that the tires of a vehicle are located above, the operator of the device can easily determine where the cradle should be placed on the sled.

Referring now to FIGS. 3 and 11, the sled has hydraulically actuated rams 116 located on both sides of the end which faces the sleeve. The rams are positioned such that when they are extended they protrude from the sides of the sled and extend past the sides of the sleeves for engagement therewith, and when they are retracted they do not protrude from the sides of the sled. As a result, the rams can be used to couple the sled to the sleeve so that by moving the sled along the rails 82 the sleeve will be moved along the sleeve guides 20.

In operation the present invention permits fast loading of motor vehicles 10 into sleeves 12 without the requirement that skilled drivers be employed. Each vehicle first is driven up the ramp 114 onto the trailer 118 and then onto the ramp 112 where it temporarily is stopped. An operator then notes the indicia 113 on the ramp 112 which are located below the center lines of the vehicle's tires and places two of the cradles 58 on the sled 86 so that they are centered at the same relative locations as the vehicle's tires based on the indicia 111 located on the sled. The vehicle then is driven onto the sled and stopped with its tires centered above the cradles, FIG. 4. The coupling element 92 is attached to the sled and the chain 90

is moved toward the sleeve 12 until the vehicle is properly positioned within the sleeve. Tension members 74 then are attached to the sleeve in alignment with each of the tires, and cradle latches 64 are placed on the tension members with their shelves 66 positioned under the end plates 62 of the cradles. The gantries 28 then are aligned with the tension members and the cylinders 50 are extended until the chains 80 can be attached to the eyes 72 on the cradle latches. The vehicle now is ready to be raised by the gantries 28 to the proper height in the sleeve as shown in FIG. 8. The raising of the vehicle is accomplished by retracting the cylinders 48, and, if necessary, extending the cylinder 50. When the vehicle is at the proper location in the sleeve the cradle latches 64 are affixed to the tension members 74 by inserting the pins 78 through the cradle latch hooks 70 and the holes 76. The cylinders 48 can then be extended slightly and the chains 80 removed from the cable latches.

While the first vehicle is being lifted by the gantries 28, the chain 90 can be moved in the opposite direction to pull the sled 86 back to its loading position next to the ramp 112. The second vehicle can be driven onto the ramp, the indicia its tires are associated with noted and the next set of cradles positioned on the sled so that the vehicle driven onto them, FIG. 9. The foregoing process then is repeated until the sleeve is completely loaded. Since a succeeding vehicle is loaded onto the sled as the preceding vehicle is being attached to the sleeve, the process allows loading the sleeve quickly without the necessity of actually driving the vehicles onto it.

Once a sleeve is completely loaded the sled is moved to its loading position outside of the sleeve and the rams 116 are extended. The sled then is moved back toward the sleeve until the rams come in contact with it. Further movement of the sled causes the sleeve to be pushed on its wheels 22 along the sleeve guides 20 off of the trailer and into the container 14. When the container reaches its destination, the sled is used to remove the sleeve from the container by moving the sled into the sleeve, extending the rams 116 and then pulling the sled back toward the trailer. When the sled is used to unload a sleeve from a container, the portion of the sled closest to the container can be driven off of the tracks in order to extend into the trailer. The hinge 88, FIGURE 7, between the sled sections allows this to occur without the sled being displaced from this track. Once the loaded sleeve is pulled onto the apparatus, the vehicles can be unloaded from it by reversing the procedure described above.

Claims

1. Apparatus for transporting vehicles (10) compris-



chocks 60 of a cradle can be placed between them thereby permitting a vehicle which is driven onto the sled to pass over the chocks without contacting them. The wheel ramps are shown in the embodiment illustrated as being removable from the sled which permits the use of other styles of wheel ramps as well as reducing the weight of the sled for transportation.

Located on the second trailer, at the end of the rails 82, is a ramp 112, FIG. 7, which allows a vehicle to be driven onto the sled from the bed of the trailer. Located at the end of the trailer 18b is another ramp 114, FIG. 1, which allows the vehicle to be driven onto the bed of the trailer from the roadway on which the trailer is situated so that a vehicle can be driven from the roadway onto the sled without stopping. However, the ramp 112 is long enough that it will hold one vehicle, which, as will be more fully explained later, allows vehicles to be loaded into the sleeve rapidly.

Since the cradles 56 support a vehicle 70 by its tires, they must be placed on the sled at a separation which is equal to the wheel base of the vehicle being loaded. In order to facilitate the positioning of the cradles on the sled before the vehicle is driven onto it, indexing indicia 111, FIG. 4, which identify each of the angle beams 110, are placed on the sled. In the embodiment illustrated the indicia are numbers, but they could take other forms, such as colors. A similar set of indicia 113, FIG. 7, which is spatially congruent with the indicia 111, is placed on the ramp 112. Thus, by looking at the indicia 111 that the tires of a vehicle are located above, the operator of the device can easily determine where the cradle should be placed on the sled.

Referring now to FIGS. 3 and 11, the sled has hydraulically actuated rams 116 located on both sides of the end which faces the sleeve. The rams are positioned such that when they are extended they protrude from the sides of the sled and extend past the sides of the sleeves for engagement therewith, and when they are retracted they do not protrude from the sides of the sled. As a result, the rams can be used to couple the sled to the sleeve so that by moving the sled along the rails 82 the sleeve will be moved along the sleeve guides 20.

In operation the present invention permits fast loading of motor vehicles 10 into sleeves 12 without the requirement that skilled drivers be employed. Each vehicle first is driven up the ramp 114 onto the trailer 118 and then onto the ramp 112 where it temporarily is stopped. An operator then notes the indicia 113 on the ramp 112 which are located below the center lines of the vehicle's tires and places two of the cradles 58 on the sled 86 so that they are centered at the same relative locations as the vehicle's tires based on the indicia 111 located on the sled. The vehicle then is driven onto the sled and stopped with its tires centered above the cradles, FIG. 4. The coupling element 92 is attached to the sled and the chain 90

is moved toward the sleeve 12 until the vehicle is properly positioned within the sleeve. Tension members 74 then are attached to the sleeve in alignment with each of the tires, and cradle latches 64 are placed on the tension members with their shelves 66 positioned under the end plates 62 of the cradles. The gantries 28 then are aligned with the tension members and the cylinders 50 are extended until the chains 80 can be attached to the eyes 72 on the cradle latches. The vehicle now is ready to be raised by the gantries 28 to the proper height in the sleeve as shown in FIG. 8. The raising of the vehicle is accomplished by retracting the cylinders 48, and, if necessary, extending the cylinder 50. When the vehicle is at the proper location in the sleeve the cradle latches 64 are affixed to the tension members 74 by inserting the pins 78 through the cradle latch hooks 70 and the holes 76. The cylinders 48 can then be extended slightly and the chains 80 removed from the cable latches.

While the first vehicle is being lifted by the gantries 28, the chain 90 can be moved in the opposite direction to pull the sled 86 back to its loading position next to the ramp 112. The second vehicle can be driven onto the ramp, the indicia its tires are associated with noted and the next set of cradles positioned on the sled so that the vehicle driven onto them, FIG. 9. The foregoing process then is repeated until the sleeve is completely loaded. Since a succeeding vehicle is loaded onto the sled as the preceding vehicle is being attached to the sleeve, the process allows loading the sleeve quickly without the necessity of actually driving the vehicles onto it.

Once a sleeve is completely loaded the sled is moved to its loading position outside of the sleeve and the rams 116 are extended. The sled then is moved back toward the sleeve until the rams come in contact with it. Further movement of the sled causes the sleeve to be pushed on its wheels 22 along the sleeve guides 20 off of the trailer and into the container 14. When the container reaches its destination, the sled is used to remove the sleeve from the container by moving the sled into the sleeve, extending the rams 116 and then pulling the sled back toward the trailer. When the sled is used to unload a sleeve from a container, the portion of the sled closest to the container can be driven off of the tracks in order to extend into the trailer. The hinge 88, FIGURE 7, between the sled sections allows this to occur without the sled being displaced from this track. Once the loaded sleeve is pulled onto the apparatus, the vehicles can be unloaded from it by reversing the procedure described above.

Claims

1. Apparatus for transporting vehicles (10) compris-



ing a sleeve (12) having an opening for the passage of at least one vehicle (10) therein using a sled (86) of the apparatus, adapted to support said at least one vehicle (10) and proportioned for movement through the opening of the sleeve (12) to load said vehicle (10) into the sleeve (12), said apparatus characterised by:

(a) said opening comprising an open end for the passage of a plurality of vehicles (10) into and along the sleeve (12);

(b) vehicle attachment devices (56, 64, 74) for suspending vehicles (10) from said sleeve (12) in mutually spaced relationship to one another; and

(c) a transport mechanism (90, 18a, 18b, 82, 112, 92, 94) for moving said sled (86) through the open end of and into said sleeve (12) to position a vehicle (10) on said sled (86) for suspension by said attachment devices.

2. Apparatus as claimed in Claim 1 wherein said transport mechanism (90, 18a, 18b, 82, 112, 92, 94) has

(a) a pad (18a, 18b) which supports said sleeve (12);

(b) tracks (82) located on said pad (18a, 18b);

(c) a drive system (90, 92, 94) for moving said sled (86) in either direction along said tracks (82);

(d) said tracks (82) being arranged such that said sled (86) can travel across substantially the entire length of said sleeve (12) and can be located completely outside of said sleeve (12); and

(e) a ramp (112) arranged for driving said motor vehicles (10) onto said sled (86) when said sled (86) is located outside of said sleeve (12).

3. Apparatus as claimed in Claim 2 wherein said sled (86) includes a body and a pair of parallel wheel ramps (108) which are removably attached to said body.

4. Apparatus as claimed in Claim 3 wherein said wheel ramps (108) comprise rows of spaced-apart vertical plates (110).

5. Apparatus as claimed in Claim 4 wherein the motor vehicles (10) are attached to said sleeves (12) by means of cradles (56) having chocks (60) which engage the tires of said motor vehicles (10), wherein said plates (110) are arranged to receive said chocks (60) therebetween so that a motor vehicle (10) can be driven onto said wheel ramps (108) without contacting said chocks (60).

6. Apparatus as claimed in Claim 2 wherein said drive system comprises:

(a) an endless chain (90) which extends along said pad (18a, 18b) parallel with said tracks (82);

(b) a coupling element (92) which is carried by said chain (90); and

(c) a tie bar (94) attached to said sled (86) for coupling said sled to said coupling element (92).

7. Apparatus as claimed in Claim 2 wherein said sled (86) includes movable rams (116) that engage said sleeve (12) so that said sleeve (12) will move across said pad (18a, 18b) as said sled (86) is moved along said tracks (82).

8. A method for loading motor vehicles (10) into an open centred sleeve (12) which is used to carry a plurality of motor vehicles (10) by placing at least one motor vehicle (10) on a movable sled (86) which is positioned outside of the sleeve (12) and moving said sled into the sleeve (12) with said at least one motor vehicle (10) located thereon, said method characterised by:

(a) lifting said at least one motor vehicle (10) off said sled (86) and attaching it to said sleeve (12); and

(b) moving said sled (86) back out of said sleeve (12) to carry another motor vehicle (10) into said sleeve (12) to be attached thereto.

9. A method as claimed in Claim 8 further comprising

(c) moving said sled (86) back into said sleeve (12) below one of said motor vehicles (10);

(d) detaching said motor vehicle from said sleeve (86) and lowering it onto said sled (86); and

(e) moving said sled (86) out of said sleeve (12) with said motor vehicle (10) located thereon.

10. A method as claimed in Claim 9 further comprising the step of thereafter driving said motor vehicle (10) off said sled.

Patentansprüche

1. Ausrüstung für den Transport von Fahrzeugen (10), enthaltend eine Tragevorrichtung (12), die eine Öffnung für den Durchlaß mindestens eines Fahrzeuges (10) aufweist, wobei ein Schlitten (86) der Ausrüstung benutzt wird, der in der Lage ist, zumindest dieses eine Fahrzeug zu tragen, und der so proportioniert ist, daß er durch die Öffnung der Tragevorrichtung bewegt werden kann, um dieses Fahrzeug (10) in die Tragevorrichtung

ing a sleeve (12) having an opening for the passage of at least one vehicle (10) therein using a sled (86) of the apparatus, adapted to support said at least one vehicle (10) and proportioned for movement through the opening of the sleeve (12) to load said vehicle (10) into the sleeve (12), said apparatus characterised by:

(a) said opening comprising an open end for the passage of a plurality of vehicles (10) into and along the sleeve (12);

(b) vehicle attachment devices (56, 64, 74) for suspending vehicles (10) from said sleeve (12) in mutually spaced relationship to one another; and

(c) a transport mechanism (90, 18a, 18b, 82, 112, 92, 94) for moving said sled (86) through the open end of and into said sleeve (12) to position a vehicle (10) on said sled (86) for suspension by said attachment devices.

2. Apparatus as claimed in Claim 1 wherein said transport mechanism (90, 18a, 18b, 82, 112, 92, 94) has

(a) a pad (18a, 18b) which supports said sleeve (12);

(b) tracks (82) located on said pad (18a, 18b);
(c) a drive system (90, 92, 94) for moving said sled (86) in either direction along said tracks (82);

(d) said tracks (82) being arranged such that said sled (86) can travel across substantially the entire length of said sleeve (12) and can be located completely outside of said sleeve (12); and

(e) a ramp (112) arranged for driving said motor vehicles (10) onto said sled (86) when said sled (86) is located outside of said sleeve (12).

3. Apparatus as claimed in Claim 2 wherein said sled (86) includes a body and a pair of parallel wheel ramps (108) which are removably attached to said body.

4. Apparatus as claimed in Claim 3 wherein said wheel ramps (108) comprise rows of spaced-apart vertical plates (110).

5. Apparatus as claimed in Claim 4 wherein the motor vehicles (10) are attached to said sleeves (12) by means of cradles (56) having chocks (60) which engage the tires of said motor vehicles (10), wherein said plates (110) are arranged to receive said chocks (60) therebetween so that a motor vehicle (10) can be driven onto said wheel ramps (108) without contacting said chocks (60).

6. Apparatus as claimed in Claim 2 wherein said drive system comprises:

(a) an endless chain (90) which extends along said pad (18a, 18b) parallel with said tracks (82);

(b) a coupling element (92) which is carried by said chain (90); and

(c) a tie bar (94) attached to said sled (86) for coupling said sled to said coupling element (92).

7. Apparatus as claimed in Claim 2 wherein said sled (86) includes movable rams (116) that engage said sleeve (12) so that said sleeve (12) will move across said pad (18a, 18b) as said sled (86) is moved along said tracks (82).

8. A method for loading motor vehicles (10) into an open centred sleeve (12) which is used to carry a plurality of motor vehicles (10) by placing at least one motor vehicle (10) on a movable sled (86) which is positioned outside of the sleeve (12) and moving said sled into the sleeve (12) with said at least one motor vehicle (10) located thereon, said method characterised by:

(a) lifting said at least one motor vehicle (10) off said sled (86) and attaching it to said sleeve (12); and

(b) moving said sled (86) back out of said sleeve (12) to carry another motor vehicle (10) into said sleeve (12) to be attached thereto.

9. A method as claimed in Claim 8 further comprising

(c) moving said sled (86) back into said sleeve (12) below one of said motor vehicles (10);

(d) detaching said motor vehicle from said sleeve (86) and lowering it onto said sled (86); and

(e) moving said sled (86) out of said sleeve (12) with said motor vehicle (10) located thereon.

10. A method as claimed in Claim 9 further comprising the step of thereafter driving said motor vehicle (10) off said sled.

Patentansprüche

1. Ausrüstung für den Transport von Fahrzeugen (10), enthaltend eine Tragevorrichtung (12), die eine Öffnung für den Durchlaß mindestens eines Fahrzeuges (10) aufweist, wobei ein Schlitten (86) der Ausrüstung benutzt wird, der in der Lage ist, zumindest dieses eine Fahrzeug zu tragen, und der so proportioniert ist, daß er durch die Öffnung der Tragevorrichtung bewegt werden kann, um dieses Fahrzeug (10) in die Tragevorrichtung

einzuladen, gekennzeichnet durch:

- a) ein offenes Ende im Bereich dieser Öffnung für den Durchlaß mehrerer Fahrzeuge (10) in und entlang der Tragevorrichtung (12);
 - b) Fahrzeugbefestigungseinrichtungen (56, 64, 74), um Fahrzeuge (10) in der Tragevorrichtung (12) in relativ zueinanderliegenden Abständen aufzuhängen; und
 - c) einen Transportmechanismus (19, 18a, 18b, 82, 112, 92, 94), um diesen Schlitten (86) durch das offene Ende der und in diese Tragevorrichtung (12) hineinzubewegen, um ein Fahrzeug (10) auf diesem Schlitten (86) für das Aufhängen durch diese Befestigungseinrichtung zu positionieren.
2. Ausrüstung nach Anspruch 1, bei der dieser Transportmechanismus (90, 18a, 18b, 82, 112, 92, 94) aufweist
- a) eine Plattform (18a, 18b), die diese Tragevorrichtung (12) trägt;
 - b) auf dieser Plattform (18a, 18b) angeordnete Schienen (82);
 - c) ein Antriebssystem; (90, 92, 94), um diesen Schlitten (86) in beiden Richtungen entlang dieser Schienen (82) zu bewegen;
 - d) wobei diese Schienen (82) in einer solchen Weise angeordnet sind, daß dieser Schlitten (82) über im wesentlichen die gesamte Länge dieser Tragevorrichtung (12) verfahren und anschließend vollständig außerhalb dieser Tragevorrichtung (12) angeordnet werden kann; und
 - e) eine Rampe (112), die dazu dient, um diese Motorfahrzeuge (10) auf diesen Schlitten (86) zu fahren, wenn dieser Schlitten (86) sich außerhalb dieser Tragevorrichtung (12) befindet.
3. Ausrüstung nach Anspruch 2, bei der dieser Schlitten (86) ein Basisgestell und zwei parallele Radrampen (108) aufweist, die abnehmbar an diesen Basisgestell befestigt sind.
4. Ausrüstung nach Anspruch 3, bei der diese Radrampen (108) Reihen von im Abstand liegender vertikaler Platten (110) umfaßt.
5. Ausrüstung nach Anspruch 4, bei der die Motorfahrzeuge (10) an diesen Tragevorrichtungen (12) mittels Stützgestellen (56) befestigbar sind, die Blöcke (60) aufweisen, welche gegen die Reifen dieser Motorfahrzeuge (10) zur Anlage kommen, wobei diese Platten (110) so angeordnet sind, um diese Blöcke (60) zwischen sich aufzunehmen, so daß ein Motorfahrzeug (10) auf diese Radrampen (108) aufgefahren werden kann, ohne mit diesen Blöcken (60) in Kontakt zu kom-

men.

6. Ausrüstung nach Anspruch 2, bei der dieses Antriebssystem umfaßt:
 - a) eine Endloskette (90), die sich entlang dieser Plattform (18a, 18b) parallel mit den Schienen (82) erstreckt;
 - b) ein Kupplungselement (92), das von dieser Kette (90) getragen ist; und
 - c) eine Verbindungsstange (94), die an diesem Schlitten (86) befestigt ist, um diesen Schlitten mit diesem Kupplungselement (92) zu verkuppeln.
7. Ausrüstung nach Anspruch 2, bei der dieser Schlitten (86) bewegliche Plunger (116) enthält, die mit dieser Tragevorrichtung (12) in Eingriff kommen, so daß diese Tragevorrichtung (12) sich entlang dieser Plattform (18a, 18b) bewegen wird, wenn dieser Schlitten (86) entlang dieser Schienen (82) bewegt wird.
8. Ein Verfahren zum Einladen von Motorfahrzeugen (10) in eine offen zentrierte Tragevorrichtung (12), die dazu verwendet wird, eine Vielzahl von Motorfahrzeugen (10) zu befördern, indem mindestens ein Motorfahrzeug (10) auf einen beweglichen Schlitten (86) platziert wird, der außerhalb der Tragevorrichtung (12) positioniert ist, und bewegen dieses Schlitten in die Tragevorrichtung (12) mit mindestens diesem einen darauf platzierten Motorfahrzeug (10), wobei dieses Verfahren dadurch gekennzeichnet ist, daß:
 - a) mindestens dieses eine Motorfahrzeug von diesem Schlitten (86) abgehoben und an dieser Tragevorrichtung (12) befestigt wird; und
 - b) dieser Schlitten (86) zurück aus dieser Tragevorrichtung (12) bewegt wird, um ein weiteres Motorfahrzeug (10) in diese Tragevorrichtung (12) zu befördern, welches daran befestigt werden soll.
9. Ein Verfahren nach Anspruch 8, welches weiterhin umfaßt:
 - c) Bewegen dieses Schlittens (86) zurück in diese Tragevorrichtung (12) unterhalb eines dieser Motorfahrzeuge (10);
 - d) Lösen dieses Motorfahrzeuges von dieser Tragevorrichtung (12) und Absenken desselben auf diesen Schlitten (86); und
 - e) Bewegen dieses Schlittens (86) aus dieser Tragevorrichtung (12) zusammen mit dem darauf befindlichen Motorfahrzeug (10).
10. Ein Verfahren nach Anspruch 9, welches weiterhin den Schritt umfaßt, das anschließend dieses Motorfahrzeug (10) von diesem Schlitten weggefahren wird.

**Revendications**

1. Appareil destiné à transporter des véhicules (10) comportant un bâti (12) ayant une ouverture pour le passage d'au moins un véhicule en utilisant un traîneau (86) de l'appareil, prévu pour supporter ledit véhicule (10) et proportionné pour un déplacement à travers l'ouverture du bâti (12) afin de charger ledit véhicule (10) dans le bâti (12), ledit appareil étant caractérisé par :
 - (a) ladite ouverture comportant une extrémité ouverte pour le passage de plusieurs véhicules (10) dans et le long du bâti (12);
 - (b) des dispositifs de fixation de véhicule (56, 64, 74) destinés à suspendre des véhicules (10) dans ledit bâti (12) en relation mutuellement espacé l'un par rapport à l'autre; et
 - (c) un mécanisme de transport (90, 18a, 18b, 82, 112, 92, 94) destiné à déplacer ledit traîneau (86) à travers l'extrémité ouverte et dans ledit bâti (12) de façon à positionner un véhicule (10) sur ledit traîneau (86) pour suspension par lesdits dispositifs de fixation.
2. Appareil selon la revendication 1, dans lequel ledit mécanisme de transport (90, 18a, 18b, 82, 112, 92, 94) possède :
 - (a) un bloc (18a, 18b) qui supporte ledit bâti (12);
 - (b) des rails (82) disposés sur ledit bloc (18a, 18b);
 - (c) un système d'entraînement (90, 92, 94) destiné à déplacer ledit traîneau (86) dans chaque direction le long desdits rails (82);
 - (d) lesdits rails (82) étant disposés de telle sorte que ledit traîneau (86) peut se déplacer sur sensiblement toute la longueur dudit bâti (12) et peut se trouver totalement à l'extérieur dudit bâti (12); et
 - (e) une rampe (112) prévue pour entraîner lesdits véhicules à moteur (10) sur ledit traîneau (86) lorsque ledit traîneau (86) se trouve à l'extérieur dudit bâti (12).
3. Appareil selon la revendication 2, dans lequel ledit traîneau (86) comprend un corps et une paire de rampes de roue parallèles (108) qui est fixée de façon amovible sur ledit corps.
4. Appareil selon la revendication 3, dans lequel lesdites rampes de roue (108) comportent des plaques verticales espacées (110).
5. Appareil selon la revendication 4, dans lequel les véhicules à moteur (10) sont fixés sur lesdits bâtis (12) au moyen de berceaux (56) ayant des cales (60) qui engagent les pneumatiques desdits véhicules à moteur (10), lesdites plaques (110) étant prévues pour recevoir lesdites cales (60) entre elles de telle sorte qu'un véhicule à moteur (10) peut être amené sur lesdites rampes de roue (108) sans venir en contact avec lesdites cales (60).
6. Appareil selon la revendication 2, dans lequel ledit système d'entraînement comporte :
 - (a) une chaîne sans fin (90) qui s'étend le long dudit bloc (18a, 18b) parallèlement aux dits rails (82);
 - (b) un élément d'accouplement (92) qui est porté par ladite chaîne (90); et
 - (c) un tirant (94) fixé sur ledit traîneau (86) afin de relier ledit traîneau audit élément d'accouplement (92).
7. Appareil selon la revendication 2, dans lequel ledit traîneau (86) comprend des vérins mobiles (116) qui engagent ledit bâti (12) de telle sorte que ledit bâti (12) se déplace sur ledit bloc (18a, 18b) lorsque ledit traîneau (86) est déplacé le long desdits rails (82).
8. Procédé de chargement de véhicules à moteur (10) dans un bâti à ouverture centrée (12) qui est utilisé pour porter plusieurs véhicules à moteur (10) en mettant au moins un véhicule à moteur (10) sur un traîneau mobile (8) qui est positionné à l'extérieur du bâti (12) et en déplaçant ledit traîneau dans le bâti (12) avec ledit véhicule à moteur (10) qui se trouve dessus, ledit procédé étant caractérisé par :
 - (a) le levage dudit véhicule à moteur (10) à l'écart dudit traîneau (86) et la fixation de celui-ci sur ledit bâti (12); et
 - (b) le déplacement dudit traîneau (86) en arrière hors dudit bâti (12) afin de transporter un autre véhicule à moteur (10) dans ledit bâti (12) pour qu'il y soit fixé.
9. Procédé selon la revendication 8, comportant en outre le fait de :
 - (c) déplacer ledit traîneau (86) en arrière dans ledit bâti (12) sous l'un desdits véhicules à moteur (10);
 - (d) détacher ledit véhicule à moteur dudit tunnel (12) et l'abaisser sur ledit traîneau (86); et
 - (e) déplacer ledit traîneau (86) hors dudit bâti (12) avec ledit véhicule à moteur (10) qui se trouve dessus.
10. Procédé selon la revendication 9, comportant en outre l'étape consistant à conduire ensuite ledit véhicule à moteur (10) à l'écart dudit traîneau.