

TIRE-TYPE PORTAL CRANE, TIRE-TYPE PORTAL CRANE SYSTEM, AND METHOD FOR MOVING TIRE-TYPE PORTAL CRANE

CROSS-REFERENCE TO RELATED APPLICATIONS

- 5 The present application concerned is to claim the right of priority to the Japanese Patent Application No. 2007-312886 filed on December 3, 2007, with the content cited herewith.

BACKGROUND OF THE INVENTION

10 Field of the Invention

 The present invention relates to a tire-type portal crane, a tire-type portal crane system provided with the tire-type portal crane, and a method for moving the tire-type portal crane.

15 Description of Related Art

 Conventionally, container(s) used in marine transportation are handled by a tire-type portal crane (RTG (rubber tired gantry crane) in a ground container yard.

- In general, a tire-type portal crane loads and unloads containers, while
20 moving in a traveling lane, or a predetermined range along a one-way direction (intra-lane movement), thereby arraying the containers. Usually, a plurality of traveling lanes are laid on a container yard. The tire-type portal crane is provided with a mechanism allowing the crane to move to an adjacent traveling lane (inter-lane movement). Thereby, the tire-type portal crane moves
25 between lanes and is able to handle container cargo in a plurality of traveling

lanes.

Conventional tire-type portal cranes are in most cases equipped on the crane with a generator which generates electricity as a driving source (refer to Japanese Unexamined Patent Application, First Publication No. 20067647).

- 5 Tire-type portal cranes with the above specification are required to keep the generator running at all times, and there are concerns of causing environmental load such as wasteful fuel consumption, noise and exhaust gas.

Thus, there is known a tire-type portal crane, which moves based on electricity supplied partially or entirely from a ground power source to suppress
10 environmental impact.

For example, the tire-type portal crane disclosed in Document 1 (Japanese Unexamined Patent Application, First Publication No. 2007-223805) is not provided with a generator, making not only an intra-lane movement but also an inter-lane movement, with electricity supplied from an outer power
15 source.

Further, the tire-type portal cranes, which are disclosed in Document 2 (Japanese Unexamined Patent Application, First Publication No. H05-319777) and Document 3 (Japanese Unexamined Patent Application, First Publication No. 2003-137493) make an intra-lane movement on supply of electricity from
20 an outer power source installed at each of the traveling lanes and make an inter-lane movement on supply of electricity from a generator mounted on the tire-type portal crane

However, the above-described conventional tire-type portal cranes have the following problems, particular in inter-lane movement.

25 Specifically, the tire-type portal crane disclosed in Document 1 is

supplied with electricity from an outer power source arranged on the ground even during inter-lane movement. Therefore, for example, when the tire-type portal crane makes an inter-lane movement across a plurality of traveling lanes, an outer power source from which electricity is supplied to the tire-type portal crane must be switched sequentially depending on a movement distance, resulting in an increased number of work steps.

Further, a supplementary generator for supplying electricity during inter-lane movement is always mounted on the tire-type portal cranes disclosed in Documents 2 and 3. Thus, these cranes are required to have a structure capable of loading and unloading containers during movement, while the generator is kept mounted.

Still further, where the generator must be halted due to maintenance or failure, the tire-type portal cranes are not allowed to operate until recovery of the generator, although other components of the tire-type portal cranes are in an operable state. As a result, the crane tends to delay work due to stoppage of the power supply.

The present invention has been made to address the above problems. An object of the present invention is to provide a tire-type portal crane capable of suppressing, as much as possible, environmental loads such as wasteful fuel consumption, noise and exhaust gas, simplifying a structure of the main body and preventing a delay in work due to stoppage of the power supply, thereby making an inter-lane movement.

SUMMARY OF THE INVENTION

The present invention is a tire-type portal crane for loading and

unloading containers, while making an intra-lane movement along a predetermined traveling lane laid on a container yard, and also making an inter-lane movement between a plurality of the traveling lanes in which electricity is supplied from an outer power source arranged at each of the traveling lanes during intra-lane movement, and a power supply container having a power supply section for supplying electricity and a housing for accommodating the power supply section is mounted to supply electricity from the power supply container during inter-lane movement.

Further, the present invention is a method for moving a tire-type portal crane for loading and unloading containers while making an intra-lane movement along a predetermined traveling lane laid on a container yard, and also making an inter-lane movement between a plurality of the traveling lanes, in which the tire-type portal crane makes an intra-lane movement on supply of electricity from an outer power source arranged at each of the traveling lanes and makes an inter-lane movement by mounting a power supply container having a power supply section for supplying electricity and a housing for accommodating the power supply section to supply electricity from the power supply container.

According to the tire-type portal crane and the method for moving the tire-type portal crane of the present invention, the tire-type portal crane makes an intra-lane movement on supply of electricity from an outer power source arranged at each of the traveling lanes. Thereby, it is possible to suppress as much as possible environmental load such as wasteful fuel consumption, noise and exhaust gas during inter-lane movement.

Further, the tire-type portal crane makes an inter-lane movement by

mounting a power supply container having a power supply section for supplying electricity and a housing for accommodating the power supply section to supply electricity from the power supply container.

In other words, only the power supply container is initially mounted on the tire-type portal crane to eliminate the necessity for subsequent work of power source connection, regardless of a distance during inter-lane movement. Thereby, no generator is required to be mounted at all times, thus making it possible to simplify a structure of the main body and efficiently conduct work necessary for inter-lane movement.

Then, a tire-type portal crane in a container yard usually makes a predominantly intra-lane movement and an inter-lane movement less frequently, thereby it is able to make an inter-lane movement faster than an intra-lane movement. Further, there is no need for actuating a suspending mechanism during inter-lane movement. Thus, a generator may be mounted that has only a capacity for allowing the crane to make an inter-lane movement at a slow speed, thereby making it possible to reduce the number of components mounted on the power supply container to as few as possible and further suppress environmental load.

Further, a power supply container, which is an electricity supplying system independent of the tire-type portal crane, is provided, thus making it possible to actuate the tire-type portal crane by using another power supply container even where a generator must be halted due to maintenance or failure. In other words, there is no need for halting the tire-type portal crane until recovery of the power supply container. Thereby, the tire-type portal crane is prevented from delay in work resulting from the supply of electricity.

Still further, the tire-type portal crane of the present invention is provided with a suspending mechanism for loading and unloading the containers, the power supply container is preferably mounted by using the suspending mechanism during inter-lane movement.

5 In addition, in a method for moving the tire-type portal crane of the present invention, the power supply container is preferably mounted on a suspending mechanism for loading and unloading the containers, when the tire-type portal crane makes an inter-lane movement.

 In the tire-type portal crane and the method for moving the tire-type
10 portal crane of the present invention, a power supply container is suspended on a suspending mechanism for loading and unloading containers when the tire-type portal crane makes an inter-lane movement. In other words, only by suspending the power supply container by the suspending mechanism, can the power supply container be mounted, and becomes a movable state.
15 Thereby, it possible to efficiently perform works necessary for inter-lane movement. Further, the necessity of a structure for mounting the power supply container is eliminated to further simplify the structure of the tire-type portal crane as a whole.

 The present invention is a tire-type portal crane system, which is
20 provided with the tire-type portal crane of the present invention, an outer power source installed at each of the traveling lanes to supply electricity to the tire-type portal crane during intra-lane movement, and a power supply container arranged at the traveling lane at which at least the tire-type portal crane is located and mounted on the tire-type portal crane to supply electricity.

25 In the tire-type portal crane system of the present invention, the outer

power source is installed at each of the traveling lanes. Therefore, the tire-type portal crane is able to travel on supply of electricity from a corresponding outer power source during intra-lane movement. Further, a power supply container is arranged at a traveling lane at which at least a
5 tire-type portal crane is installed. Therefore, the tire-type portal crane is able to move to a next traveling lane with the power supply container being mounted supplied electricity from the container, while making an inter-lane movement.

Further, a power supply container arranged at another traveling lane is
10 transported by a trailer, thus making it possible to use in common the other traveling lane and the power supply container.

Thereby, it is possible to provide a tire-type portal crane system capable of suppressing as much as possible environmental load such as noise and exhaust gas, simplifying a structure of the main body and preventing delay
15 in work resulting from the supply of electricity to make an efficient inter-lane movement.

Still further, in the tire-type portal crane system of the present invention, it is preferable to use the container as a housing.

In addition, in the method for moving the tire-type portal crane of the
20 present invention, it is preferable to use the container as the housing of the power supply container.

In the tire-type portal crane system and the method for moving the tire-type portal crane of the present invention, a container for container yard is used as a housing of the power supply container. This eliminates the
25 necessity of exchanging the suspension tool and enabling the mount of the

power supply container just by suspending it in a way similar to the loading of a normal container. Therefore, the tire-type portal crane can be simplified in structure, and the work necessary for inter-lane movement can be conducted more efficiently.

5 According to the tire-type portal crane of the present invention, the tire-type portal crane system provided with the tire-type portal crane and the method for moving the tire-type portal crane, it is possible to suppress, as much as possible, environmental loads such as wasteful fuel consumption, noise and exhaust gas, simplify a structure of the main body, prevent a delay
10 in work resulting from the supply of electricity, and make an efficient inter-lane movement.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a general view of a tire-type portal crane system of the
15 present invention.

FIG. 2 is a front elevational view of a tire-type portal crane in the tire-type portal crane system shown in FIG. 1.

FIG. 3 is a front elevational view showing a state that the tire-type portal crane suspends a container in the tire-type portal crane system shown
20 in FIG. 2.

FIG. 4 is a view showing a power supply container of the present invention.

FIG. 5 is a front elevational view showing a state that the power supply container shown in FIG. 4 is mounted on the tire-type portal crane of the
25 present invention.

FIG. 6 is a block diagram for explaining a method for moving the tire-type portal crane system of the present invention and a view showing a whole structure of the tire-type portal crane system.

FIG. 7 is a block diagram for explaining a method for moving the tire-type portal crane system of the present invention and a front elevational view of the tire-type portal crane.

FIG. 8 is a block diagram for explaining a method for moving the tire-type portal crane system of the present invention and a view showing a whole structure of the tire-type portal crane system.

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DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, a description is given for one embodiment of the tire-type portal crane of the present invention with reference to FIG. 1 to FIG. 8. FIG. 1 is a general view of a tire-type portal crane system 100 including the tire-type portal crane 1 of the present invention.

First, a description is given for a construction of the tire-type portal crane 1 of the present embodiment with reference to 1 to FIG. 5.

As shown in FIG. 1, the tire-type portal crane 1 of the present embodiment loads and unloads containers C1 delivered in and out by a trailer T or others, while making an intra-lane movement along a predetermined traveling lane L inside a container yard Y. Then, a plurality of container lines C are formed inside the container yard Y in a state that a plurality of container lines are arranged along each traveling lane L. In addition, the container lines C shown in FIG. 1 are illustrated in such a manner that adjacent containers C1 are in contact with each other for the convenience of explanation. However,

as shown in FIG. 2, a certain clearance is provided between them since they are gripped by a suspending mechanism 5 of the tire-type portal crane 1.

Further, the number of traveling lanes L and the number of containers C1 arranged on the container line C are not limited to the number of containers

5 shown in FIG. 1 or FIG. 2.

As shown in FIG. 2, the tire-type portal crane 1 is provided with tire-type traveling unit 2, a pair of leg portions 3 installed upright approximately parallel and capable of traveling by the traveling unit 2, a beam portion 4 constructed at an upper part between the leg portions 3, and a suspending
10 mechanism 5 suspended so as to be installed on the beam portion 4. Then, a power supply section E is connected to the traveling unit 2 and the suspending mechanism 5 so as to supply electricity as a driving source. In addition, the power supply section E is not necessarily arranged as that shown in FIG. 2.

The traveling unit 2 is provided with a traveling wheel 2a, a direction
15 adjusting mechanism (not illustrated) for changing the direction of the traveling wheel 2a, a wheel driving motor (not illustrated) for driving the traveling wheel 2a, and a traveling unit controller (not illustrated) for controlling the direction adjusting mechanism and the wheel driving motor upon receiving electricity from the power supply section E. The traveling unit controller, which receives
20 electricity from the power supply section E, uses the direction adjusting mechanism to switch the direction of the traveling wheel 2a and uses the wheel driving motor to drive the traveling wheel 2a, by which the traveling unit 2 is able to travel only a predetermined distance along both a direction of intra-lane movement and a direction of inter-lane movement at a right angle
25 with the intra-lane movement.

In other words, electricity is supplied to the traveling unit 2 via the power supply section, thereby the tire-type portal crane 1 is able to move freely inside a container yard Y.

The pair of leg portions 3 support the beam portion 4 and the
5 suspending mechanism 5. Then, an electricity receiving cable 6 for receiving electricity from an outer power source 10 to be described later and a cable reel 6a for accommodating the electricity receiving cable 6 are installed on an outer side face of one of the leg portion 3. Further, an electricity receiving connector 7 for a power supply container used to receive electricity from a
10 power supply container 20 (to be described later) is installed on an inner side face of the other leg portion 3. In addition, the cable reel 6a and the electricity receiving connector 7 are not necessarily arranged as those shown in FIG. 2.

The electricity receiving cable 6 is provided at its leading end with an
15 electricity receiving connector 6b for outer power source. The electricity receiving connector 6b can receive electricity from an outer power source 10 when the connector 6b connects with the power source 10. Further, the base end of the electricity receiving cable 6 is electrically connected to the power supply section E.

20 Still further, the cable reel 6a is provided with an axial center portion, accommodating the electricity receiving cable 6 by reeling it into the axial center portion. The cable reel 6a is controlled by a cable reel controller (not illustrated), reeling up or reeling out the electricity receiving cable 6 on the basis of tensile force and moving direction of the thus reeled electricity
25 receiving cable 6.

The electricity receiving connector 7 is electrically connected to the power supply section E and also connectable to an electricity supplying cable 24 of a power supply container 20 to be described later via an electricity supplying connector 24a.

5 The beam portion 4 supports the suspending mechanism 5 so as to suspend it. Then, the beam portion 4 is provided with a guide rail 4a in such a manner that the suspending mechanism 5 can move laterally along a longitudinal direction of the beam portion 4.

 The suspending mechanism 5 acts so as to load and unload a
10 container C1 on receiving of electricity from the power supply section E. More specifically, the suspending mechanism 5 is provided with a trolley 5a capable of moving laterally along the guide rail 4a of the beam portion 4, a spreader 5b for gripping the container C1, a suspending cable 5c for suspending the spreader 5b from the trolley 5a, a hoist 5d for reeling up and
15 reeling out the suspending cable 5c, and a suspending mechanism controller (not illustrated) for controlling the actions of the trolley 5a, the spreader 5b and the hoist 5d.

 The suspending mechanism controller is electrically connected to the power supply section E and also puts control in such a manner that the trolley
20 5a, the spreader 5b and the hoist 5d act respectively as described above on actuation by electricity supplied from the power supply section E. In other words, the suspending mechanism controller actuates the trolley 5a and the hoist 5d by electricity supplied from the power supply section E, thereby positioning the spreader 5b, and allowing the spreader 5b to grip a container
25 C1 as shown in FIG. 3. It is also possible to position the spreader 5b and

release the thus gripped container C1 after the container is loaded or unloaded. In other words, the suspending mechanism 5 is able to load and unload the container C1 arranged inside a range where the suspending mechanism 5 can move (space surrounded by the leg portion 3 and the beam portion 4) upon
 5 supply of electricity.

Then, a description is given for a power source connected to the tire-type portal crane 1 with reference to 1, FIG. 4 and FIG. 5. The power source connected to the tire-type portal crane 1 includes an outer power source 10 and a power supply container 20.

10 As shown in FIG. 1, the outer power source 10 is installed in the vicinity of one end of each traveling lane L at which the container line C is formed. As described above, the outer power source 10 is electrically connectable to the electricity receiving cable 6 of the tire-type portal crane 1. Therefore, the electricity receiving cable 6 of the tire-type portal crane 1 is connected to the
 15 outer power source 10, thus making it possible to supply electricity to the power supply section E of the tire-type portal crane 1.

As shown in FIG. 4, the power supply container 20 is provided with a generator (power supply section) 21 for supplying electricity, an electricity supplying cable 24 electrically connected to the generator 21 via a
 20 regeneration resistor 22 and a terminal box 23, an electricity supplying cable reel 25 for accommodating the electricity supplying cable 24 by being reeled at the axial center portion and a housing 26 for accommodating the generator 21, the regeneration resistor 22, the terminal box 23, the electricity supplying cable 24 and the electricity supplying cable reel 25.

25 An engine for generator is used as the generator 21 so that electricity

can be generated inside the housing 26 of the power supply container 20.

Further, in order to discharge exhaust gas resulting from electricity generation by the generator 21, an exhaust opening 26a communicatively connecting the generator 21 directly with the outside and a ventilation fan 26b

5 communicatively connecting the inside of the housing 26 with the outside are respectively installed in the housing 26.

The electricity supplying cable 24 is provided at the leading end with an electricity supplying connector 24a, and, as shown in FIG. 5, connectable to the electricity receiving connector 7 in the tire-type portal crane 1. In other
10 words, the electricity receiving connector 7 in the tire-type portal crane 1 is connected to the electricity supplying cable 24, thereby making it possible to supply electricity to the power supply section E of the tire-type portal crane 1.

Further, the housing 26 is a container similar in specification to a container used as a container C1. Therefore, after the electricity supplying
15 cable 24 of the power supply container 20 is connected to the electricity receiving connector 7 in the tire-type portal crane 1, the suspending mechanism 5 is only allowed to act in the same way as the container C1 is loaded or unloaded, thus making it possible to suspend the power supply container 20, as shown in FIG. 5. Then, a space similar in size to the
20 container C1 will be sufficient as that necessary for loading or unloading the power supply container 20.

Further, the power supply container 20 arranged at the other traveling lane L is transported by a trailer T, thus making it possible to use the power supply container 20 at the other traveling lane L.

25 Therefore, for example, as shown in FIG. 1, on the assumption that a

space corresponding to one container is given as a power source yard L1 at a corner on one end of the container line C formed at each of the traveling lanes L, it is possible to place the power supply container 20 as one of the containers C1 at the power source yard L1. Thereby, the power supply container 20 can be used to supply electricity to the tire-type portal crane 1 located at a traveling lane L at which the power supply container 20 is arranged.

Next, a description is given for a method of moving the tire-type portal crane 1 of the present embodiment with reference to 1, and FIG. 5 to FIG. 8.

The tire-type portal crane 1 of the present embodiment makes an intra-lane movement on supply of electricity from the outer power source 10 arranged at each of the traveling lanes L10 and makes an inter-lane movement by mounting a power supply container 20 to supply electricity from the power supply container 20.

More specifically, as shown in FIG. 1, the electricity receiving cable 6 of the tire-type portal crane 1 is connected to an outer power source 10 during intra-lane movement. Thereby, it is possible to supply electricity from the outer power source 10 to the traveling unit 2 and the suspending mechanism 5 via the electricity receiving cable 6 and the power supply section E. Further, the electricity receiving cable 6 is reeled up or reeled out by the cable reel controller on the basis of the tensile force and moving direction, thereby the length can be appropriately adjusted depending on a distance between the tire-type portal crane 1 and the outer power source 10. Thus, the tire-type portal crane 1 is supplied electricity from the outer power source 10 and able to load and unload a container C1 by using the suspending mechanism 5,

while moving along the traveling lane L by the traveling unit 2.

On the other hand, during inter-lane movement, as shown in FIG. 6, first, the tire-type portal crane 1 is moved to one end of the container line C, which is given as a power source yard L1 where the power supply container 20 is placed. Then, as shown in FIG. 7, the electricity receiving cable 6 of the tire-type portal crane 1 is removed from the outer power source 10, and the electricity receiving connector 7 in the tire-type portal crane 1 is connected to the electricity supplying cable 24 of the power supply container 20. Thereby, a source of supplying electricity to the power supply section E of the tire-type portal crane 1 can be switched from the outer power source 10 to the power supply container 20.

Next, the suspending mechanism 5 of the tire-type portal crane 1 is actuated to suspend the power supply container 20, as shown in FIG. 5. Thereby, the tire-type portal crane 1 is able to move freely inside a container yard Y on supply of electricity from the power supply container 20, irrespective of a positional relationship with the outer power source 10.

In addition, the source of supplying electricity to the power supply section E of the tire-type portal crane 1 may be switched from the outer power source 10 to the power supply container 20 at a timing after the power supply container 20 is suspended.

Next, the traveling unit 2 of the tire-type portal crane 1 is actuated, by which, as shown in FIG. 8, the tire-type portal crane 1 can be moved to a position at which the crane is able to make an inter-lane movement inside a container yard Y. Then, the wheel driving motor is driven after a direction adjusting mechanism of the traveling unit 2 is adjusted from a direction of

intra-lane movement to a direction of inter-lane movement at a right angle with the intra-lane movement in a state that the power supply container 20 is suspended, thereby the crane makes an inter-lane movement.

After movement to a target traveling lane L, the suspended power supply container 20 is then placed at a power source yard L1 of the thus moved traveling lane L. Then, the electricity receiving connector 7 in the tire-type portal crane 1 is removed from the electricity supplying cable 24 of the power supply container 20, and the electricity receiving cable 6 of the tire-type portal crane 1 is connected to the outer power source 10. Thereby allowing the tire-type portal crane 1 to make an intra-lane movement, load and unload containers C1 on the traveling lane L after inter-lane movement. Further, where it makes again an inter-lane movement, usable is the power supply container 20, which is placed on the power source yard L1 of the traveling lane L.

In addition, the source of supplying electricity to the power supply section E of the tire-type portal crane 1 may be switched from the power supply container 20 to the outer power source 10 at a timing before the power supply container 20 is loaded or unloaded.

As described above, the tire-type portal crane 1 of the present embodiment makes an intra-lane movement upon supply of electricity from the outer power source 10 arranged at each of traveling lanes L. Thereby, as compared with a tire-type portal crane kept running at all times by electricity generated by a generator, the tire-type portal crane is able to suppress, as much as possible, environmental load such as wasteful fuel consumption, production of noise and exhaust gas during inter-lane movement.

Further, the tire-type portal crane 1 makes an inter-lane movement upon supply of electricity from the power supply container 20. In other words, irrespective of a distance during inter-lane movement, the necessity for a subsequent work for connecting to a power source is eliminated simply by mounting the power supply container 20 on the tire-type portal crane 1. Thereby, as compared with a tire-type portal crane kept running at all times by electricity generated by a generator, there is eliminated the necessity for installing the generator at all times, thus making it possible to simplify a structure of the main body. Further, as compared with a tire-type portal crane on supply of electricity exclusively from the outer power source 10, it is possible to efficiently conduct work necessary for inter-lane movement.

Then, a tire-type portal crane 1 on a container yard Y usually makes a predominantly intra-lane movement and an inter-lane movement less frequently, thereby it is able to make an inter-lane movement faster than an intra-lane movement. Further, there is no need for actuating a suspending mechanism during inter-lane movement. Thus, a generator may be mounted that has only a capacity for allowing the crane to make an inter-lane movement at a slow speed, thereby making it possible to suppress, as much as possible, the capacity of components mounted on the power supply container and further suppress the environmental load.

Further, the power supply container 20 is mounted by suspending the power supply container 20 on the suspending mechanism 5 for loading and unloading containers. In other words, the suspending mechanism 5 is used only to suspend the power supply container 20. Thereby, it is possible to more efficiently conduct the work necessary for inter-lane movement.

Provision of a structure to mount the power supply container 20 is not required, and the tire-type portal crane 1 can be simplified in structure as a whole.

Still further, the housing 26 of the power supply container 20 is a container similar in specification to a container used as a container C1.

5 Thereby, the suspending mechanism 5 is not required for exchange, and work similar to that for unloading the container C1 is simply conducted to suspend the power supply container 20, thus making it possible to mount the power supply container 20. It is therefore possible to further simplify the structure of the tire-type portal crane 1 and also efficiently conduct work necessary for
10 inter-lane movement.

In addition, independently of the tire-type portal crane 1, the power supply container 20 is installed as a power supply system, by which the other power supply container 20 is used to actuate the tire-type portal crane 1 even where a generator must be halted due to maintenance or failure. In other
15 words, it is not necessary to halt the tire-type portal crane 1 until the recovery of the power supply container 20. Thereby, the tire-type portal crane 1 is free of any delay in work resulting from the supply of electricity.

A description has been made in detail for the embodiment of the present invention with reference to the drawings. It shall be understood that a
20 specific constitution of the present invention is not limited to the above embodiment but includes any change in design as long as it does not depart from the spirit of the present invention.

In the above embodiment, the power source yard L1 is installed inside the container line C along the traveling lane L. However, the present
25 invention shall not be limited thereto.

The housing 26 of the power supply container 20 is a container similar in specification to that used as a container C1. Therefore, for example, the power supply container 20 may be placed so as to stack on the container C1 or to be stacked thereon. As a result, it is possible to place the power supply
5 container 20 at any position inside the container line C without providing a power source yard L1.

In the above embodiment, the generator 21 is used as a power supply section of the power supply container 20. However, the present invention shall not be limited thereto. The power supply section of the power supply
10 container 20 may be constituted, for example, in such a manner that a chargeable battery is used as the power supply section to charge when no electricity is supplied from the power supply container 20 to the tire-type portal crane 1. Further, the power supply container 20 is not limited to the constitution as long as it is at least provided with a power supply section and a
15 housing 26.

In the above embodiment, one power supply container 20 is installed on one unit of the tire-type portal crane 1. However, the present invention shall not be limited thereto and two or more of power supply containers 20 may be installed.

20 In the above embodiment, only one unit of the tire-type portal crane 1 is arranged at a plurality of traveling lanes L. However, the present invention shall not be limited thereto and a plurality of tire-type portal cranes may be arranged. Further, the power supply container 20 is loaded into a trailer T and can be transported freely between container yards Y. Therefore, where a
25 plurality of tire-type portal cranes 1 are arranged inside a container yard Y, it is

acceptable that the number of power supply containers 20 is smaller than that of tire-type portal cranes 1.

A method for supplying electricity from the outer power source 10 to the tire-type portal crane 1 and a method for supplying electricity from the power supply container 20 to the tire-type portal crane 1 are not limited to those described in the above embodiment, as long as they are able to supply electricity to the power supply section E of the tire-type portal crane 1.

Electricity may be supplied, for example, by using a trolley line constructed on a stage arranged along the traveling lane L as the outer power source 10 and by using a pantograph installed separately on the tire-type portal crane 1 as means for receiving electricity from the outer power source 10. Further, electricity may be supplied from the power supply container 20 by installing an electricity receiving cable for power supply container on the suspending mechanism 5 of the tire-type portal crane 1.

The housing 26 of the power supply container 20 is preferably a container similar in specification to that used as a container C1. However, the present invention shall not be limited thereto.

A method for mounting the power supply container 20 on the tire-type portal crane 1 is preferably a method by using the suspending mechanism 5 of the tire-type portal crane 1. However, the present invention shall not be limited thereto.

A description has been so far made for a preferred embodiment of the present invention, however, the present invention shall not be limited thereto.

The present invention may be subjected to addition, omission, replacement and other modifications within a scope not departing from the spirit of the

present invention. The present invention shall not be limited to the above description but will be limited only by the scope of the attached claims.

What is claimed is:

1. A tire-type portal crane for loading and unloading containers while making an intra-lane movement along a predetermined traveling lane laid on a container yard, and also making an inter-lane movement between a plurality of the traveling lanes, wherein

electricity is supplied from an outer power source arranged at each of the traveling lanes during the intra-lane movement, and

a power supply container having a power supply section for supplying electricity and a housing for accommodating the power supply section is mounted only during the inter-lane movement to supply electricity from the power supply container.

2. The tire-type portal crane according to claim 1, further comprising a suspending mechanism for loading and unloading the containers, wherein

the suspending mechanism is used to suspend the power supply container during inter-lane movement.

3. A tire-type portal crane system, comprising:

the tire-type portal crane described in claim 1;

the outer power source installed at each of the traveling lanes to supply electricity to the tire-type portal crane during the intra-lane movement; and

a power supply container arranged at the traveling lane at which the tire-type portal crane is positioned, which is mounted on the tire-type portal crane only during the inter-lane movement to supply electricity to the tire-type portal crane.

4. The tire-type portal crane system according to claim 3, further comprising the power supply container having the container as the housing.

5. A tire-type portal crane system, comprising:
the tire-type portal crane described in claim 2;
the outer power source installed at each of the traveling lanes to supply electricity to the tire-type portal crane during the intra-lane movement; and
a power supply container arranged at the traveling lane at which the tire-type portal crane is positioned, which is mounted on the tire-type portal crane only during the inter-lane movement to supply electricity to the tire-type portal crane.

6. The tire-type portal crane system according to claim 5, further comprising the power supply container having the container as the housing.

7. A method for moving a tire-type portal crane for loading and unloading containers while making an intra-lane movement along a predetermined traveling lane laid on a container yard, and also making an inter-lane movement between

a plurality of the traveling lanes, wherein

electricity is supplied from an outer power source arranged at each of the traveling lanes during the intra-lane movement, and

a power supply container having a power supply section for supplying electricity and a housing for accommodating the power supply section is mounted only during the inter-lane movement to supply electricity from the power supply container.

8. The method for moving the tire-type portal crane according to claim 7, wherein

a suspending mechanism for loading and unloading the containers is used to suspend and mount the power supply container during inter-lane movement.

9. The method for moving the tire-type portal crane according to claim 8, wherein

the container is used as the housing of the power supply container.

10. A tire-type portal crane for loading and unloading containers, while making an intra-lane movement along a predetermined traveling lane laid on a container yard, and also making an inter-lane movement between a plurality of the traveling lanes, the tire-type portal crane, comprising:

an electricity receiving portion for outer power source for receiving electricity, during the intra-lane movement, from an outer power source installed

at each of the traveling lanes; and

an electricity receiving portion for power supply container for receiving electricity, only during the inter-lane movement, from a power supply container mounted thereon; wherein

the power supply container is provided with a power supply section for supplying electricity and a housing for accommodating the power supply section.

11. A method for moving the tire-type portal crane according to claim 10, the method comprising the steps of:

placing the tire-type portal crane at which the power supply container is arranged; and

disconnecting the outer power source from said electricity receiving portion for outer power source, and connecting the power supply container to said electricity receiving portion for power supply container.