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(11) Publication number:

0 423 095 A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: **90870147.7**

(51) Int. Cl.⁵: **B66C 19/00**

(22) Date of filing: **14.09.90**

(30) Priority: **18.09.89 BE 8900995**

(43) Date of publication of application:
17.04.91 Bulletin 91/16

(84) Designated Contracting States:
BE DE FR GB IT NL SE

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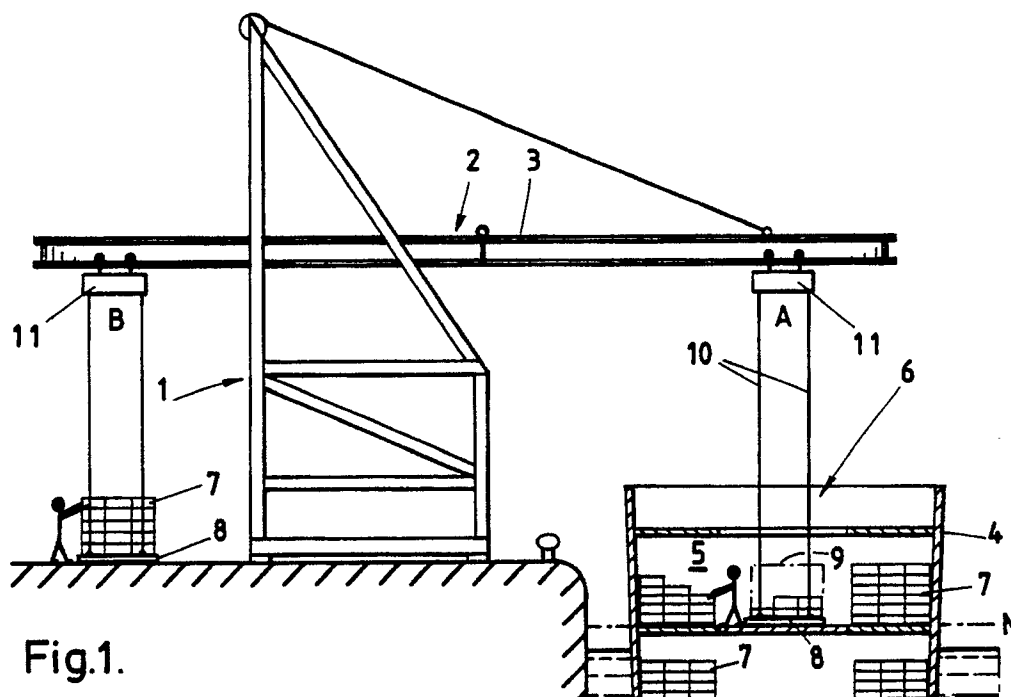
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(54) **Loading and unloading bridge for ships.**

(57) The invention relates to a loading and unloading bridge for manipulating products, such as fruits which can resist only for a very short time temperature fluctuations and which has to be transported from a ship to a shed, equipped with a beam for moving crabs, characterized in that said beam (2) is

provided with a loop-shaped track (12) for said crabs (11) in such a manner that moving a crab (11) to and fro on one and the same section of said track is avoided and that several crabs (11) can be moved along said loop-shaped track (12).



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This invention relates to a loading and unloading bridge for manipulating products, such as fruits which can resist only for a very short time temperature fluctuations, and which has to be transported from a ship to a shed, or vice versa, where an adjusted temperature or humidity degree is provided, which loading or unloading bridge is equipped with a beam for moving crabs, which beam is composed partly as a boom which can be positioned above the hold of the ship to be loaded or unloaded.

A loading and unloading bridge formed by a portal for transporting heavy loads in workshops which is equipped with a track extending around said portal, is known from patent FR 397 759, filed on December 21, 1908.

A similar solution is proposed in patent GB 263 273, filed on November 16, 1925.

Finally, in Dutch patent application 69 01 20 of January 24, 1969, a device for loading and unloading ships is put forward, in which the use of an endless track along which running, wheel sets can be moved, is suggested. Such a device has been invented in order to be mounted movably on board of ships.

It may be assumed that with loading bridges and portals an increase of the loading and unloading capacity was aimed at. Despite the theoretical solution proposed by these documents, the application of the principle which is the basis of these three embodiments has never led to a practical realisation in harbours.

Up to now, no satisfactory solution has been found for an intensive increase of the loading and unloading capacity of a loading or unloading bridge for products, such as fruits which do not resist considerable temperature fluctuations and which are loaded and unloaded on pallets.

There does indeed exist thermally insulated transport boxes which allow to manipulate specific loads such as bananas under good conditions. These known devices are not suitable for loading and unloading boxes stacked on pallets and containing the fruits mentioned in the preamble, at an increased speed. Usually, the dimensions of the boxes determine also the dimensions of the pallets.

Therefore, the invention has for object to load and unload such goods stacked on pallets at exceptional, up to now unknown speeds.

In order to realize this according to the invention, said beam is provided with a loop-shaped track for said crabs in such a manner that moving a crab to and fro on one and the same section of said track is avoided and that several crabs can be moved along said loop-shaped track.

Still according to the invention, an arbitrary series of posts where said crabs can be stopped, are provided along said loop-shaped track, which

are equipped with approaching switches, whilst at least one section of said loop-shaped track is provided as a waiting or standby section located downstream a post where the crab is stopped above the ship's hold. In a particularly advantageous embodiment, the necessary switches and/or crabs can be radio controlled.

Other details and advantages of the invention will appear from the following description of a loading and unloading bridge for ships according to the invention. This description is only given by way of example and does not limit the invention. The reference numerals relate to the figures annexed hereto.

Figure 1 shows schematically a side view of a loading and unloading bridge according to the invention, a schematical crosssection of a ship being also represented.

Figure 2 shows schematically, viewed from above, the route followed by the different crabs on the beam with the boom.

Before starting with the description of the proper characteristics of the loading and unloading bridge according to the invention, it has to be made clear that the shape, the structure and the overall concept of the portal of the loading and unloading bridge is not of any importance. The profile given by way of example is in no way limitative for the invention since only the concept of the components functioning as beam and possibly as hinging boom, is the basis of the patent application.

The loading and unloading bridge according to the invention comprises thus a usual portal 1, the concept and the structure of which are adapted to local requirements. A beam 2, with respect to which a boom 3 is hingedly mounted, is fixed hereon. Of course, the boom has to be able to hing or has to be able to be brought above the ship by means of any other conceivable structure. In Figure 1, the ship's hold has been indicated with general reference 5 and the ship's hatch with reference 6. The level on which there is worked in the phase shown by Figure 1, has been indicated with the letter N. Stacked goods in the form of boxes carry reference 7.

According to the actual technique, the goods (in the embodiment of the example boxes 7) are loaded at said level onto pallets 8. The pallets 8 can also belong to pallet cages 9. Moving each of the pallets or pallet cages, suspended from hoisting cables 10, up and down is realized from a crab 11.

In order to increase the capacity of the loading and unloading bridge according to the invention now considerably according to the invention idea, beam 1 with its boom 2 are equipped with a loop-shaped track 12 (Figure 2) allowing to use simulta-

neously several crabs.

The loop-shaped track 12 can be designed as a monorail from which the crabs 11 are then suspended. The proper monorail can also be replaced by a box girder.

The invention idea consists thus essentially in moving several crabs always in the same direction along the loop-shaped track 12. Each crab with a loaded pallet can then be moved from the place above the hatch to an arbitrary unloading place whilst a following crab can take the available place above the hatch as soon as the previous crab has been removed from above the hatch.

In order to guarantee this extremely increased speed and to increase this still further, several crabs are brought in on the loop-shaped track 12. The number of crabs depends on the structure of the loading and unloading bridge. In the description given here by way of example, four crabs are brought in.

A part of the loop-shaped track 12 is designed as waiting or standby section for one or more crabs.

Along the loop-shaped track 12 are placed adjustable front and end switches. On each crab, approaching switches are provided which can detect a stationary or slowing down crab.

With reference to Figure 2, the working of the loading or unloading bridge according to the invention with a strongly increased efficiency is now clarified.

The places where four crabs can be stopped or move at a certain moment along said loop-shaped track 12, are indicated by letters A, B, C and D. The direction in which the crabs are always moved, is illustrated by two arrows.

Let us suppose now that a crab takes in post A. Post A indicates a place above the ship's hatch in which there can be loaded or unloaded. In the here cited example the ship is supposed to be unloaded. A crab is thus situated in post A from the moment the crab reaches this post to the moment this post is left by the same crab. Between these two moments the unloading or the loading takes places. The here described example is thus about an unloading process of the ship.

The hoisting-cable is risen with its loaden, pallet 8 or pallet cage 9 until the moment the crab 11 may leave post A into the direction of post B.

Post B is an arbitrary or a predetermined place which is determined to be the most appropriate for unloading the goods.

Before a crab 11 has reached post B and thus well before the goods of post B are unloaded, a following crab 11, which was located in the waiting or standby section, which section corresponds with post D, has been able to take in the place of the previous crab, and the loading of a pallet or pallet

cage belonging to this crab can be started.

Immediately after the goods have been unloaded at post B, the respective crab can go further along the loop-shaped track 12 until it reaches post C.

Post C can be the beginning of the waiting or standby section which extends upto post D. Post C may also indicate the place from which the speed at which a crab moves, is lowered and/or this crab is slowed down.

It will be clear that generating the different signals for stopping, slowing down or getting the different crabs back into motion when approaching and reaching the different posts A, B, C and D can be remote controlled, but can also be controlled fully automatically.

The necessary detection means are also provided for detecting the bends of the loop-shaped track 12 whereby the crabs take these bends at a lowered speed.

When a crab is stopped in post A, i.e. thus above the ship's hatch 6, then an operator situated in the hold or on the deck can lower the hoisting cables 10 with an infrared control at high speed and then at lowered speed and finally stop them at the desired level. These different steps can also be automatized when the course of the hoisting cable from the crab upto the level at which there is worked in the ship, is known.

By a radio control of the switches, an optimal utilization of the device can be obtained.

It will be clear that, although this does not belong to the invention idea, the loop-shaped track can be covered partly or completely. The crabs have such a structure that a faulty crab can be replaced quickly and easily by another one.

When the dimensions of the ship's hatch allow this, two roller bridges, belonging either or not to two portals positioned next to each other, can be used. The sections of the loop-shaped track on which post A is situated, are then positioned in such a manner with respect to one another that in the ship's hold the loading and unloading steps can take place in the limited space available therefor. Such a positioning allows a considerably increased work speed.

From the hereabove given description of the loading and unloading bridge according to the invention, it appears immediately to which extend the work speed, and thus the loading and unloading capacity of such a device for bringing boxes with fruit stacked on pallets on board of a ship, can be increased to a considerable degree, when this is compared with the capacity of usual, analogous loading and unloading bridges where only one crab has to be moved to and fro along one single track.

It will be clear that the invention is not limited to the hereabove described embodiment and that

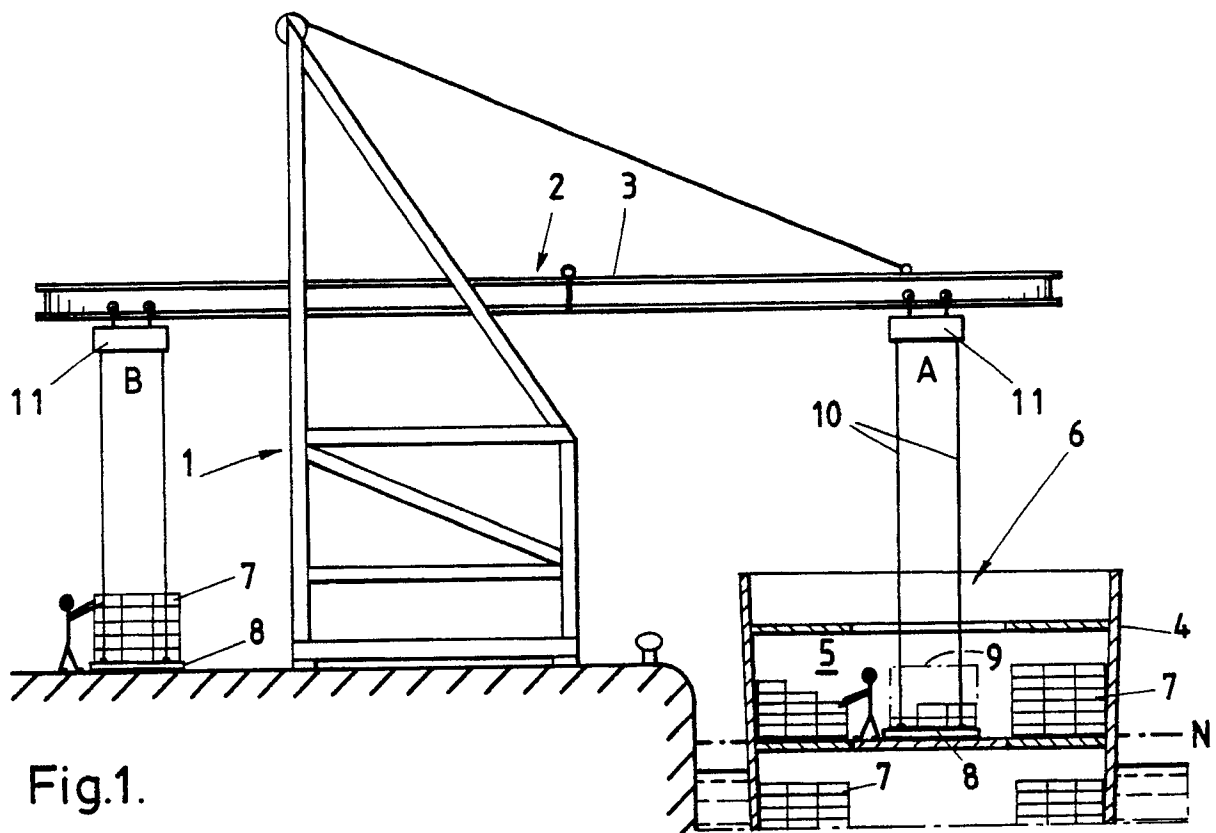
many modifications can be brought hereon without leaving the scope of the patent application.

that said switches and/or said crabs are radio controlled.

Claims

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1. A loading and unloading bridge for manipulating products, such as fruits which can resist only for a very short time temperature fluctuations, and which has to be transported from a ship to a shed, or vice versa, where an adjusted temperature or humidity degree is provided, which loading or unloading bridge is equipped with a beam for moving crabs, which beam is composed partly as a boom which can be positioned above the hold of the ship to be loaded or unloaded, characterized in that said beam (2) is provided with a loop-shaped track (12) for said crabs (11) in such a manner that moving a crab (11) to and fro on one and the same section of said track is avoided and that several crabs (11) can be moved along said loop-shaped track (12). 10 15 20
2. A loading and unloading bridge according to claim 1, characterized in that an arbitrary series of posts A, B, C and D are provided, which are equipped with approaching switches, where said crabs (11) can be stopped. 25
3. A loading and unloading bridge according to claim 2, characterized in that at least one section of said loop-shaped track (12) is provided as a waiting or standby section located downstream a post where the crab is stopped above the ship's hold. 30
4. A loading and unloading bridge according to any one of the claims 1 to 3, characterized in that said loop-shaped track is designed as a monorail so that said crabs (11) are suspended from this monorail. 35
5. A loading and unloading bridge according to any one of the claims 1 to 3, characterized in that said loop-shaped track (12) is designed as a hollow girder. 40
6. A loading and unloading bridge according to any one of the claims 1 to 5, characterized in that the movements of said crabs over said loop-shaped track (12) are remote controlled.
7. A method for manipulating products, such as fruits which can resist only limited temperature fluctuations during loading and unloading out or in a ship, characterized in that use is made of a loading and unloading bridge equipped with a beam with a loop-shaped track for crabs, in such a manner that moving said crabs to and fro on one and the same section of said track is avoided and several crabs can be moved along said loop-shaped track, whilst a series of arbitrary posts A, B, C and D are provided along said loop-shaped track (12), which are equipped with approaching switches and where said crabs can be stopped. 45 50 55
8. A method according to claim 7, characterized in





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EUROPEAN SEARCH REPORT

Application Number

EP 90 87 0147

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
D,X	FR-A-3 977 59 (LE COMPTOIR GENERAL D'ELECTRICITE ET D'APPLICATIONS INDUSTRIELLES) * Complete document * -- --	1,2,3,4,6,7	B 66 C 19/00
D,X	NL-A-6 901 204 (PONSEN) * Page 4, claim 1; figures 1,2 * -- --	1,4	
Y		5	
A		7	
Y	FR-A-1 173 666 (FERRAND) * Page 2, line 96 * -- --	5	
X	NL-A-7 701 923 (MITSUI ENGINEERING & SHIPBUILDING CO.) * Page 3, lines 34-36; page 4, lines 1-4,22-25; page 7, lines 14-20; page 8, lines 7-15,28-31 * -- --	1,4,6	
A		7,8	
X	NL-A-5 166 4 (STASTRA) * Complete document * -- --	1	
A		7	
D,X	GB-A-2 632 73 (MacKENZIE) * Page 1, lines 1-90; figures 1-11 * -- --	1	TECHNICAL FIELDS SEARCHED (Int. Cl.5) B 66 C
A		7	
A	GB-A-2 106 756 (J.H. CARRUTHERS AND CO.) * Page 1, lines 5-7 * -- --	8	
A	FR-A-2 196 288 (CONRAD STORK) -- --		
A	FR-A-6 956 85 (BORDES) -- --		
		--/--	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of search 04 December 90	Examiner VAN DEN BERGHE E.J.J
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention		E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons &: member of the same patent family, corresponding document	



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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	FR-A-2 529 186 (SIMOND) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of search 04 December 90	Examiner VAN DEN BERGHE E.J.J
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention		E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons ----- &: member of the same patent family, corresponding document	