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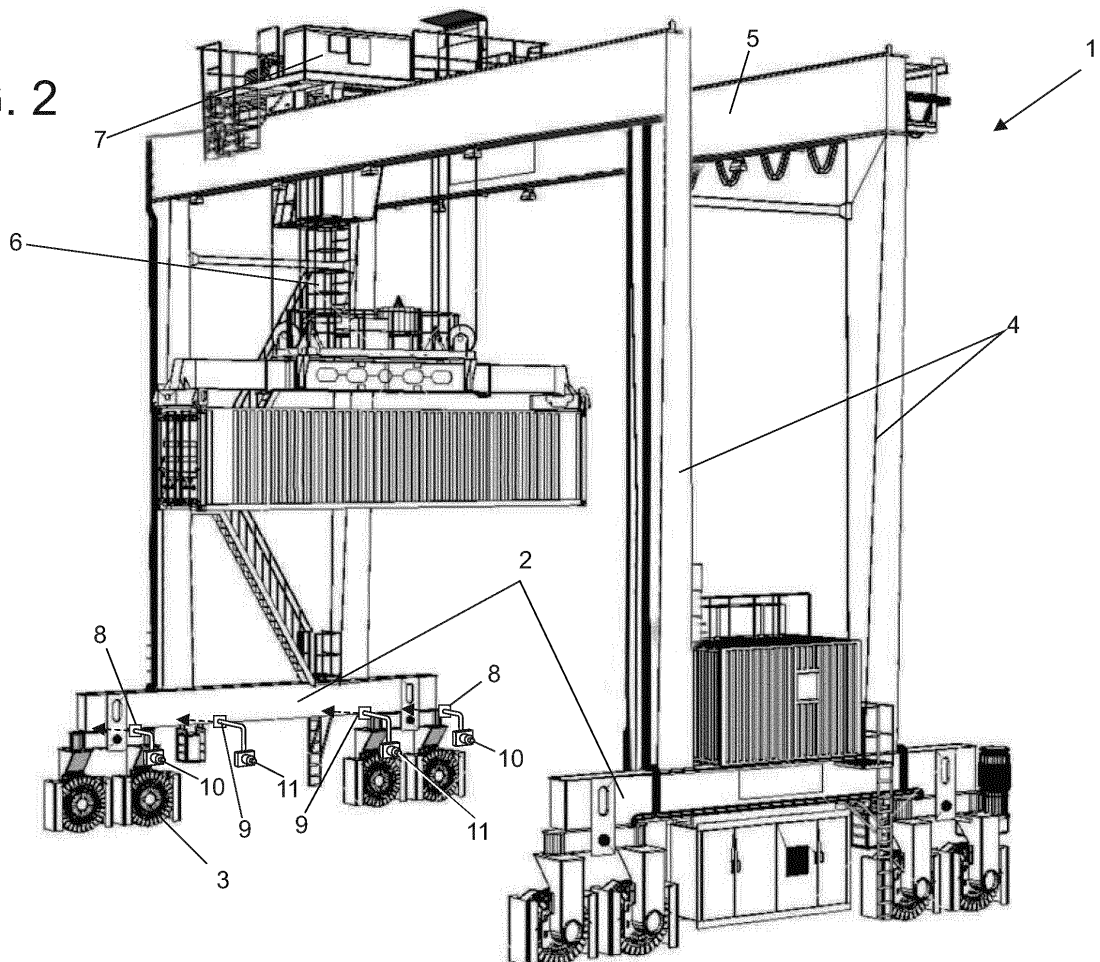
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(54) **SECURITY CAMERAS ARRANGEMENT IN STACKER CRANE (RTG), WITH MONITORING SYSTEM IN CONTAINERS DESCENT STEP FOR COUPLING**

(57) Rubber tired gantry crane (RTG) comprising a lower beam on which four cameras are installed.

FIG. 2



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Description

[0001] The present descriptive report refers to an application for invention patent for an arrangement of additional security cameras installed in respective supports, in gantries of RTG type (for work in port terminals). Through cameras arrangement a perfect background display of the container in descent will be offered to the RTG operator for a safe and quick coupling of the cavities female-to-male to male pins of the body of the transport cart.

STATE OF THE ART

[0002] As it is of prior state of art knowledge, the RTGs are structures in gantry configuration on tires, equipped with a crane system with lifting mechanism (lifting cable) used in port terminals. At the top of RTG a sliding cabin is sustained by side columns, provided on its floor with an armored transparent glass display, on which is positioned the operator at the control panel of the operating system of the lifting mechanism and viewing.

[0003] In short, the traction motor is driven at the predetermined point by its gantry and parked between the tracks signaling the street from the port terminal, next to the containers (previously removed from the ship moored in the port side) and already stacked. The said gate is parked with the help of cameras normally found in their side columns integrated to a monitor installed in the cab. These cameras, together with the visibility provided by the cabin floor display allow the operator to make the necessary maneuvers with the stacking, by the side of which is parked the carrier cart to (which makes distribution to final carriers of the loads contained in the containers).

[0004] Through the lifting mechanism, the claws are held in containers and remove them from stacking and deposit them at in carriers carts.

[0005] By way of example, it can be cited patent document PI 0603308-3 named "CRANE TRANSTAINER OF CONTAINER HANDLING" filed on 06/25/2006, which, for its constructivity increases the stacking volume of the container as well as providing faster and safe handling in relation to the lifting mechanism. A front image of this PI 0603308-3 gantry mentioned is attached as Figure 1 for illustrative purposes only.

[0006] However, as is well known by the technicians and operators of this important work of loading and unloading loads that carts carriers have along the surface of their bodies male pins corresponding to the females coupling cavities of containers forming a standardized engagement system, which is adopted in the port terminals around the world.

[0007] Thus, the operator, from their control panel initiates the movement of the lifting cable, lifting by claws containers to remove them from the stack and then aligning them to the body of the cart against which will be done then the descent to the fit between the female cavity and

male pin. This lowering step is delicate since the operator field of view is limited only to the descent container ceiling therefore preventing him/her to see from the platform top height above the male pins of the cart body. To help in this step is then required the work of a second "operator" (which is often the driver of the cart itself) which can guide the direction of alignment between pin-male and female-cavities in the final descent of the container.

[0008] The aid is, however, uncertain and involve risks as this second operator must remain very close to the cart body and the container (which is suspended before the final descent), with records of serious accidents cases. At this stage, usually made through radio communication signals, the second operator sends container positioning information from the ground to RTG operator on the cabin of gantry top platform. This conventional procedure requires considerable delay as well as the ability to synchronize the exact fitting sense that if not in perfect alignment can impact between the container position adjustments and so end up damaging both the female cavity as male pin, causing great damage to the port terminal.

[0009] Another issue is the fact that the RTG operator is in great height on the top platform of the cabin gantry and therefore remain limited only to information sent by "ground operator", when may occur situations of bad faith. Better explaining, there are cases in which cart male are already damaged before the vehicle is parked under the gantry and such condition purposefully cannot be reported to the port area by the driver and cannot be seen by the RTG operator. Under these conditions, when the descent of the container, after unsuccessful attempts to plug the malicious driver can, opportunely, to claim damages because of the possible impacts of the moment, demanding compensation and again impose damages to the port terminal.

OBJECTIVE OF THE PATENT

[0010] It is precisely the elimination of these problems the purpose of the arrangement of cameras in question, which, after installed will capture the front image of the male pins and the bottom of the container before the coupling. This captured image is sent to the monitor of the operator control panel on the RTG platform cabin, which thus has full view of the plugging moment and so can go by adjusting the position of the container down it to a secure locking and fast. Therefore, using the camera arrangement productivity is greater at the terminal port.

[0011] Explained superficially passing the arrangement and the system that involves it to be better detailed through the accompanying drawings.

[0012] Figure 1 shows the state of the art mentioned, whose image is extracted from the PI0603308-3.

[0013] The following figures related, from 2 to 7, refer to the camera arrangement reason for this patent application, and the system that involves:

Figure 2 - is a perspective view of a machine whose

RTG lifting mechanism maintains a suspended container. As noted, the gantry has basically horizontal lower beams with tires, from which extend the lateral support columns of the top platform where is the cabin and the operator control panel. In this figure, it is shown that at specific points of the beam at carts side parking, the security cameras are aligned fixed at their respective holders;

Figure 3 - is a perspective view according to the preceding figure, showing that by brackets cameras were fixed on the bottom beam, without the need for drilling or any interference in the frame of RTG equipment. The camera cables are directed along one of the columns for connection to the logical control panel of said gantry;

Figure 4 - schematic side view of RTG equipment, taken from the lower beam cameras arrangement installation seeing is a carrier cart parked for loading. For a better view of the claimed system, in this view the lower beam is not shown. As noted, the female cavity of the container bottom are aligned with male pin of the carrier cart body;

Figure 5 - view according to the preceding figure shows that during the descent of the container a level of predetermined height by the system is detected by sensors that send signals to the logic control of the RTG in order to the camera arrangement is automatically activated, capturing the images from male pins of the body;

Figure 6 - view according to the preceding figure, showing the detail A, the images captured of alignment between female cavities and male pins are viewed by the operator from the cabin control panel monitor of RTG;

Figure 7 - view according to the preceding figure, showing the detail B, the engagement between male pins and female cavities was done, with this final condition also seen by the operator.

[0014] In accordance with the accompanying drawings, the "SECURITY CAMERAS ARRANGEMENT IN STACKER CRANE (RTG), WITH MONITORING SYSTEM IN CONTAINERS DESCENT STEP FOR COUPLING" object of this present patent of invention, is constituted starting from an outgoing adaptation of RTG equipment (1), generally consisting of lower beams (2) with tires (3) of lateral columns (4) of the platform support (5) higher, where is housed the lifting mechanism (6) and the cabin (7) of the operator.

[0015] As shown by Figures 2 and 3, according to the proposed project two lateral brackets (8) and two central supports (9) are installed at specific points of the lower beam (2) of RTG parking (1) without drilling or mechanical

interference in structure to receive then the respective cameras, side (10) and central (11).

[0016] The side (10) and central cameras (11) are all integrated into the circuit of cameras and motion sensors already existing in RTG equipment (1) being connected to its control panel through cables extended by one of the side columns (4). Such cameras (10) and (11) are positioned at height and at predetermined points so that they are directed specifically to the corresponding points of positioning of the male pin (12) equidistant from the body (13) of the cart (14) when is parked next to the lower beam (2) of parking, beside the stack of containers (15). The container (15) generally of 20 and 40 feet, in turn, are fitted, on their bottom (16), of female cavities (17).

[0017] Thus made the arrangement in the carrier cart load step (14) in the port terminal, after the lifting and beginning of container descent (15), as shown in Figure 4, in predetermined height the electronic circuit sensors of RTG (1) detect such position and send signal to the control panel which then activates the circuit of cameras (10) and (11) - to be positioned preferably at a height of 1.50m from the ground to the male pin (12), as shown in figure 5. at this point, the male pin (12) can be fully displayed on the monitor (not shown) of the cabin, by the RTG operator so that by his/her control panel may make the maneuvers and direct the female cavities (17) of the bottom (16) of the container (15) prior to coupling, as shown in figure 6 and its detail B.

[0018] Thus, the coupling is given accurately and quickly as shown in Figure 7 and its enlarged detail A, without the aid of a second operator, avoiding accidents and speeding much the work in the port terminal. Furthermore, as an additional preventive factor, if the male pin (12) is bent and being the container (15) already in position before coupling, such a condition can be realized by operator through the images received by the cameras (10) and (11). The operator can then stop the maneuver, hoisting the container (15) for taking measures to avoid any losses.

[0019] In the case of 20-foot containers, the coupling occurs only by male pins (12) central of the cart carrier (14). In this case, the observation for coupling by the operator will only be made by the corresponding cameras, namely the central cameras (11). In the case of 40-foot containers, which coupling occurs only by side male pins (12) of the cart carrier (14), to the operator will interest the observation through the corresponding cameras, i.e. the side cameras (10).

Claims

1. "SECURITY CAMERAS ARRANGEMENT IN STACKER CRANE (RTG)", whereby an RTG equipment (1) consisting of lower beams (2) with tires (3) of lateral columns (4) for top platform support (5), where is the lifting mechanism (6) and the cabin (7) of operator, is **characterized by** receiving, at spe-

cific points of said lower beam (2) of parking, two lateral supports (8) and two central brackets (9) for fixing respective cameras, side (10) and central (11) positioned in height and at predetermined points, directed specifically to the corresponding points of male pins positioning (12) equidistant from the body (13) of cart (14) when this is parked next to the lower beam (2) of parking, to the side of the container stacking (15).

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2. "SECURITY CAMERAS ARRANGEMENT IN STACKER CRANE (RTG)", according to the supports (8) and (9) of claim 1, **characterized by** its independent fixing of RTG equipment structure (1);

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3. "SECURITY CAMERAS ARRANGEMENT IN STACKER CRANE (RTG)", according to the cameras (10) and (11) of claim 1, **characterized by** being integrated into the circuit cameras and logical control panel motion sensors RTG equipment (1) connected by means of extended cables, preferably by one of the lateral columns (4), and preferred height of 1.50 m from the ground to- male pin (12).

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4. MONITORING SYSTEM IN CONTAINERS DESCENT STEP FOR COUPLING" according to claims 1, 2 and 3 on the carrier cart loading step (14) after lifting and beginning of container descent (15), **characterized by**, in predetermined height sensors of the electronic cameras circuit and sensors in the RTG (1) detect such position and send signal to the control panel for the activation of the camera circuit (10) and (11) to display the male pin (12) on the monitor (not shown) of the cabin, by the RTG operator (1), steering and directing the female cavities (17) of the bottom (16) of the container (15) in the male pin (12) of the carrier cart (14).

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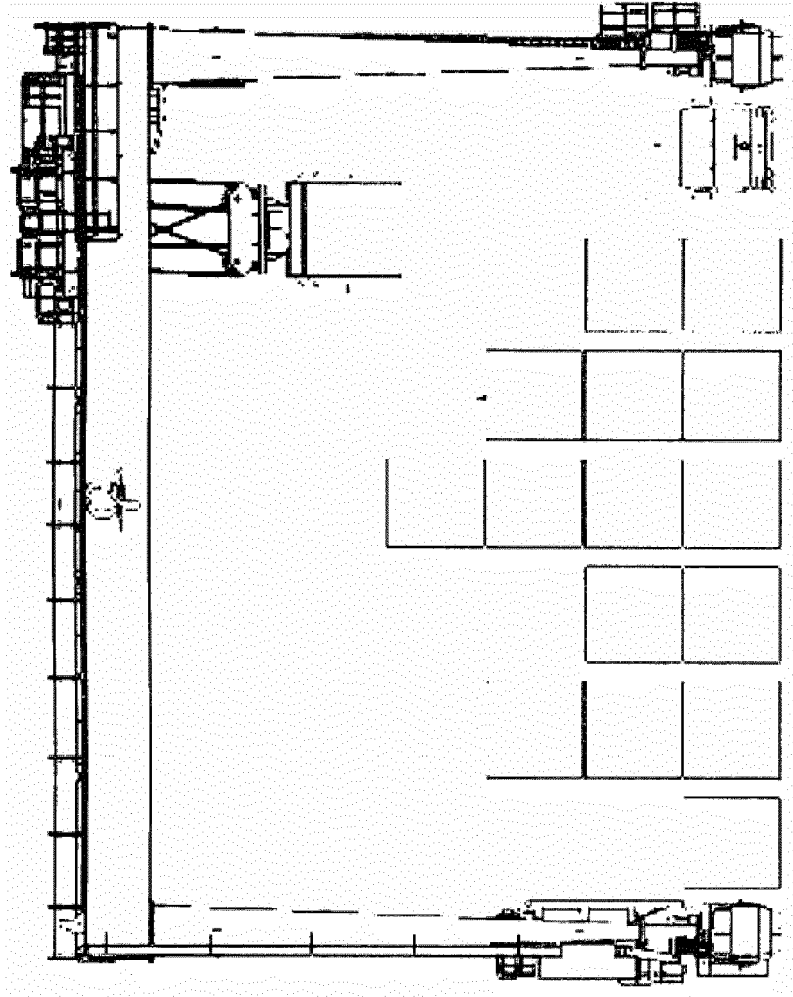
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FIG. 1



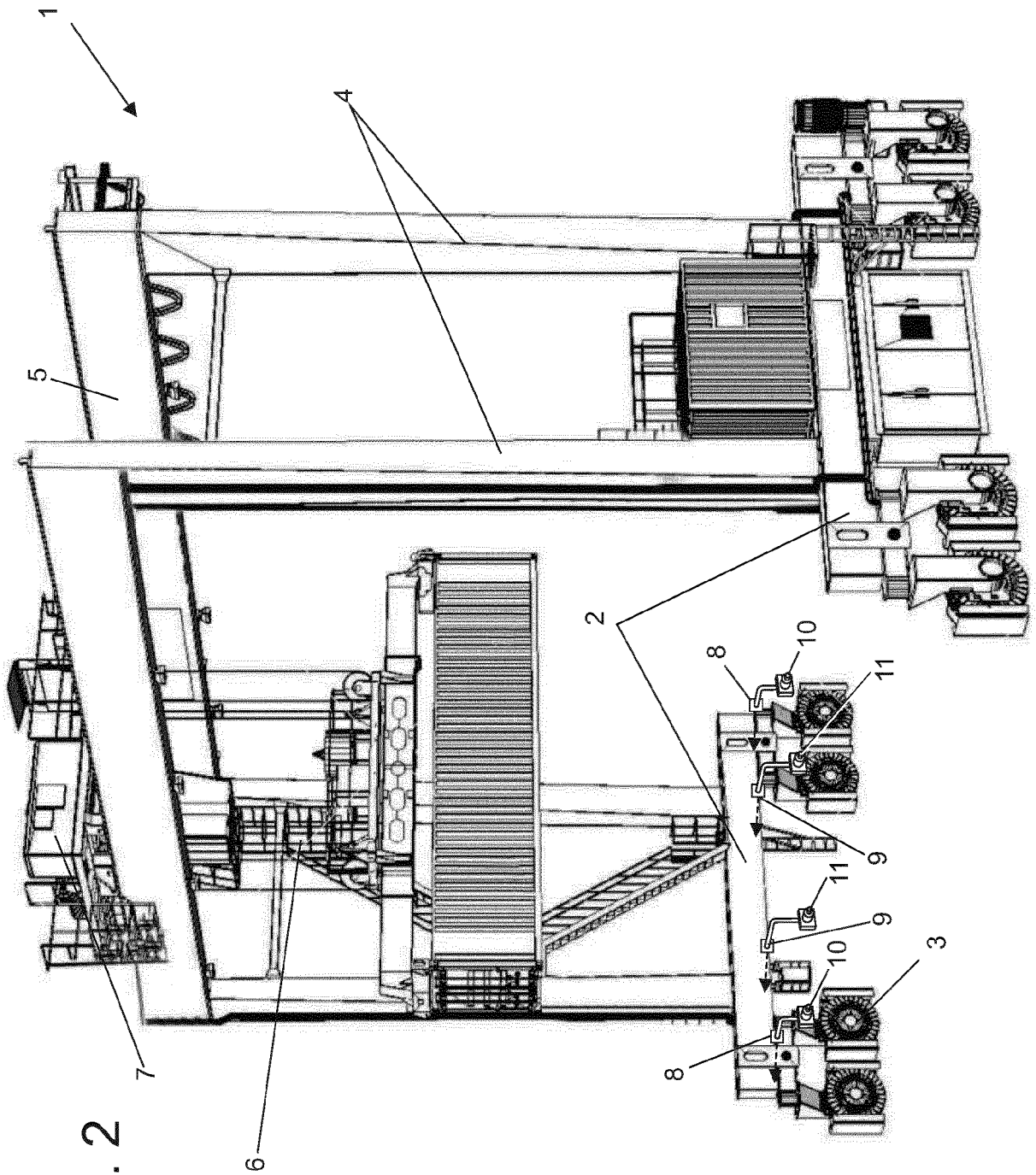


FIG. 2

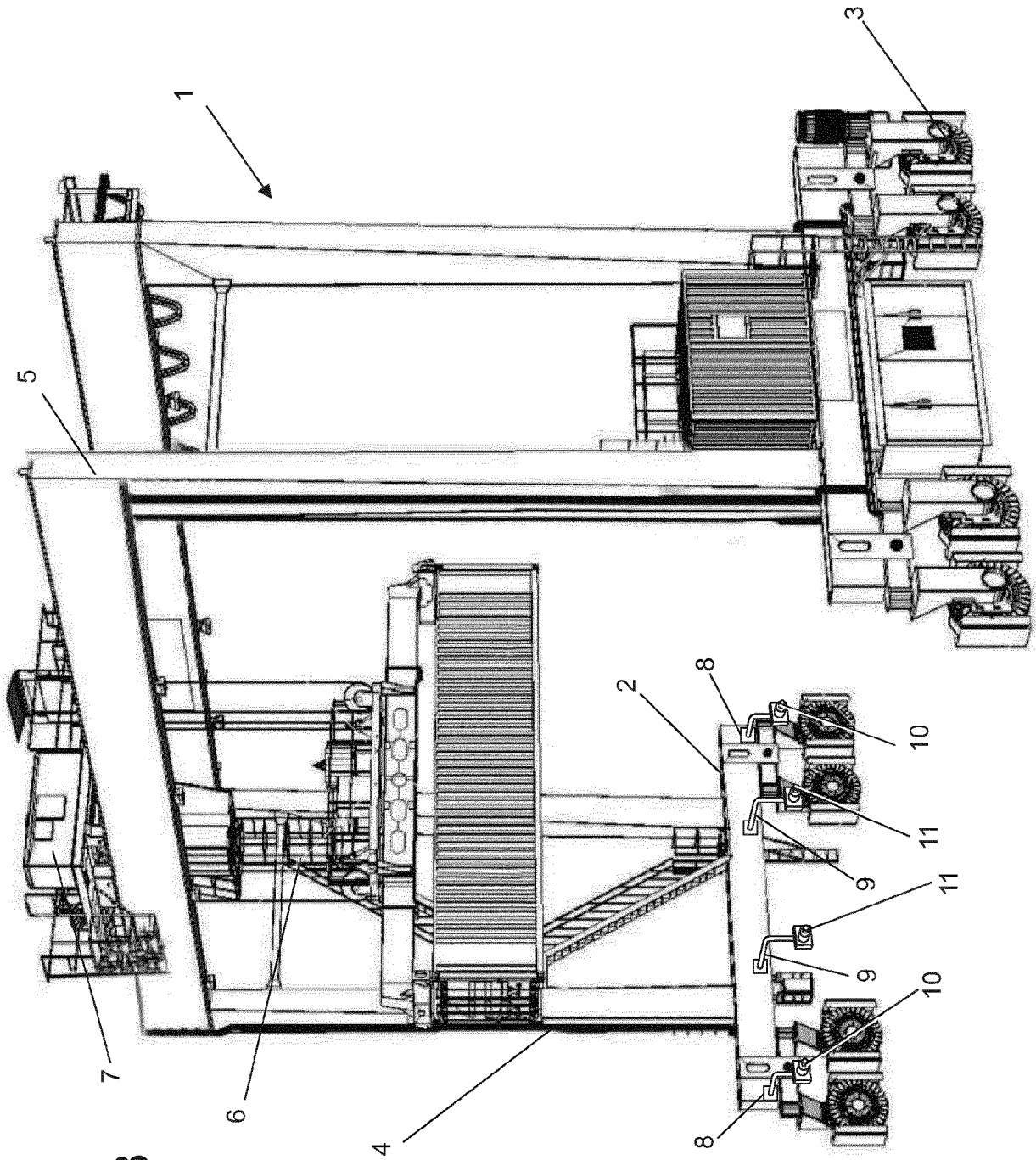
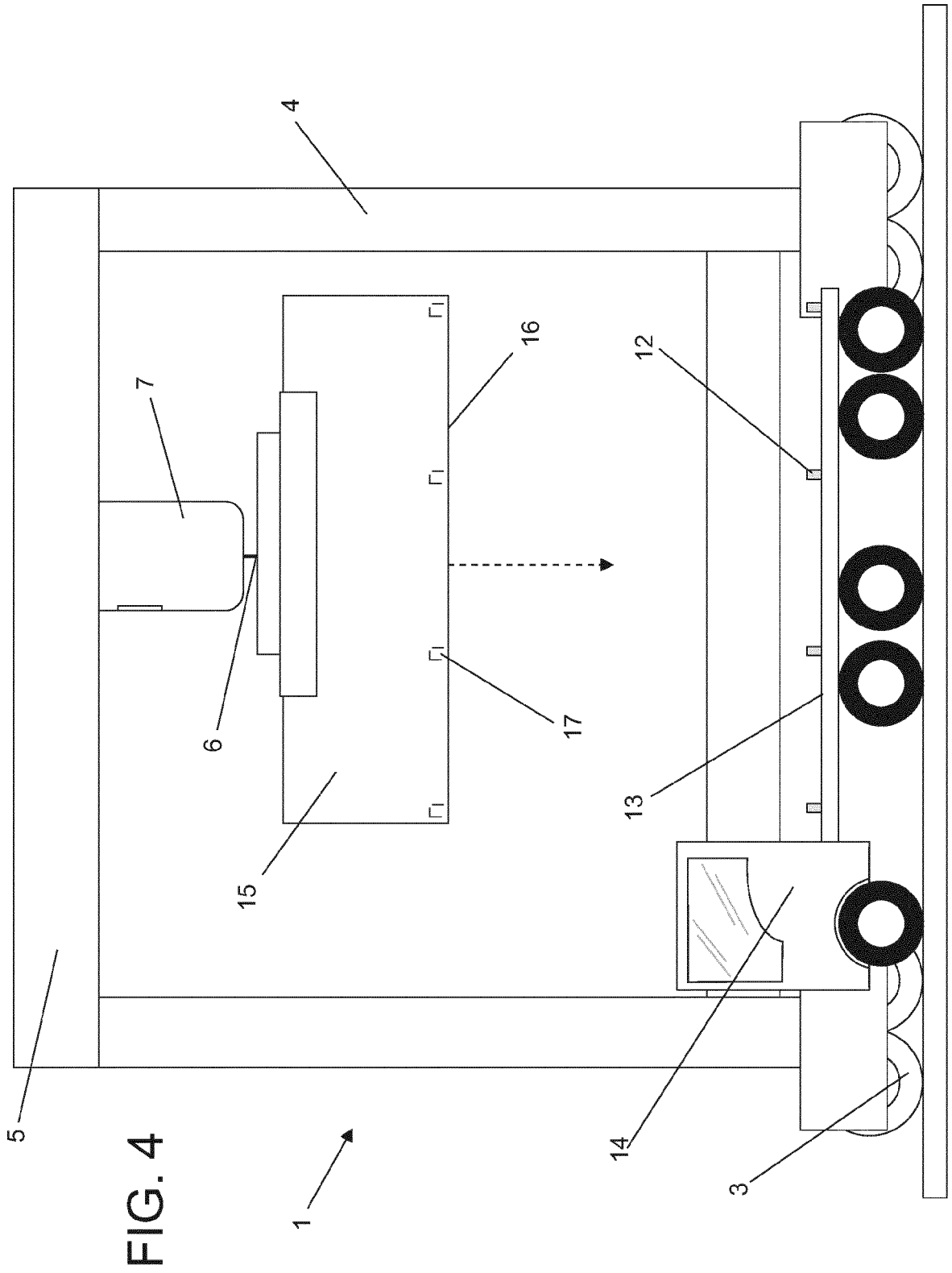
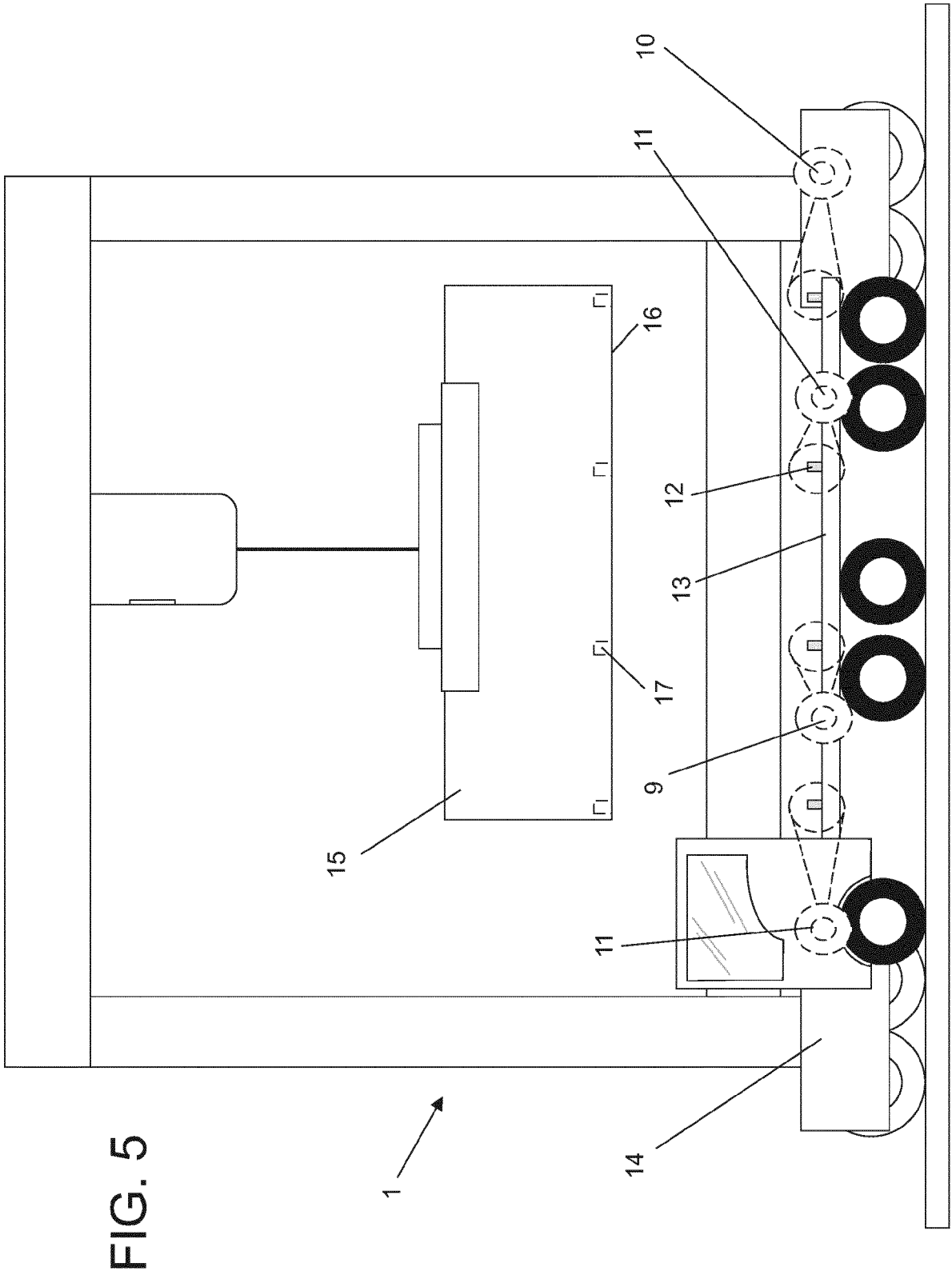
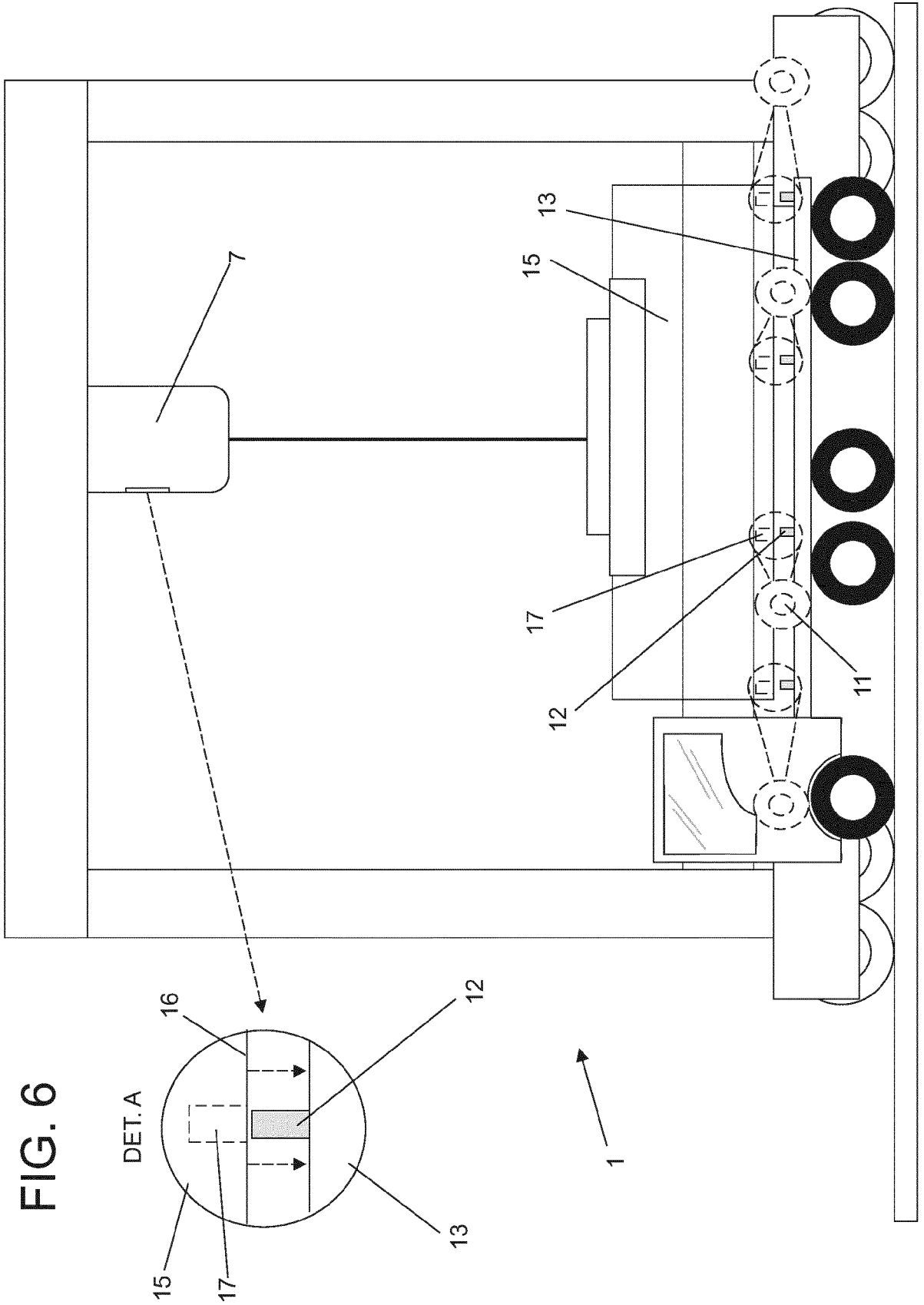
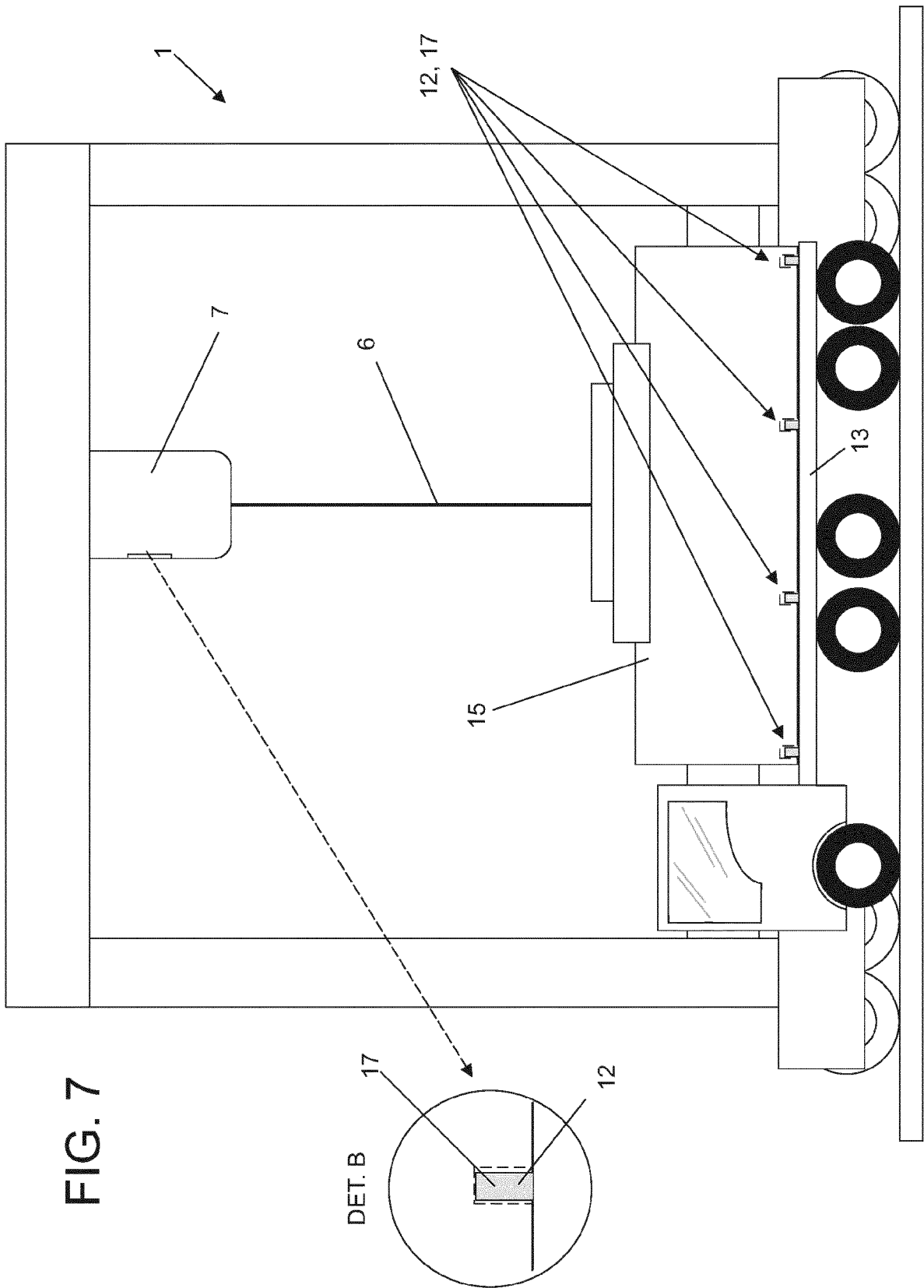


FIG. 3











EUROPEAN SEARCH REPORT

Application Number
EP 16 38 2208

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A	Netarus LLC: "About Hoistcam", Webarchive 3 May 2015 (2015-05-03), XP002763891, Retrieved from the Internet: URL:https://web.archive.org/web/20150503034926/http://hoistcam.com/about [retrieved on 2016-11-07] * the whole document *	2	
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A	* page 9, lines 16-18 *	3	
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		7 November 2016	Serôdio, Renato
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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07-11-2016

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