Title: METHOD FOR CRANE CONTROL AND STOCK MANAGEMENT

Abstract: The invention relates to a method for crane (1) control and stock (8) management, the method comprising attaching to the goods (2) to be stored an identifier (3) associated with a code, such as number or name, given to the goods in stock accounting or the like; reading the identifier with a reader (5), when the goods are being transferred by a crane; transmitting the identifier information from the reader to the memory (6) of the crane control; transferring the goods with the crane to a selected location in the warehouse; and storing the coordinates of the goods to the memory of the crane control so that they are associated with the identifier; and when the goods are removed from the warehouse, reading with the reader from a work order or the like the identifier information associated with the goods; and transmitting the identifier information from the reader to the memory of the crane control; and activating the crane control with the identifier information, whereby the crane moves to the location of the earlier stored goods.

Fig. 2


Declarations under Rule 4.17:
— of inventorship (Rule 4.17(iv))

Published:
— with international search report (Art. 21(3))
Method for crane control and stock management

Background of the invention

[0001] The invention relates to a method for crane control and stock management, in which method goods arriving for storage at a warehouse are transferred by a crane to a given location in the warehouse and fetched later with the crane from this location for onward transfer.

[0002] In many places, heavy burdens are transferred in a given storage area mainly by crane. On the other hand, stock accounting is used for goods to indicate what the stock or storage area contains and possibly some location information to facilitate the finding of the goods (usually manually entered information). When the goods are to be transferred on (for instance to a processing line or truck), a work order is made, that is, a paper with identifier information of the goods and information on the action to be taken. Often as much time is used in finding or locating the correct goods as in transferring them.

Summary of the invention

[0003] The object of the invention is to solve the problems described above. This object is achieved by a method of the invention that is characterised by attaching to the goods to be stored an identifier associated with a code, such as number or name, given to the goods in stock accounting or the like; reading the identifier with a reader, when the goods are being transferred by a crane; transmitting the identifier information from the reader to the memory of the crane control; transferring the goods with the crane to a selected location in the warehouse; and storing the coordinates of the goods to the memory of the crane control so that they are associated with the identifier; and when the goods are removed from the warehouse, reading with the reader from a work order or the like the identifier information associated with the goods; and transmitting the identifier from the reader to the memory of the crane control; and activating the crane control with the identifier information, whereby the crane moves to the location of the earlier stored goods.

[0004] Thus, the invention is based on an identifier attached to goods to be stored, for instance a bar code sticker, the data of which is stored in the memory of the crane control, and on the location coordinates of the
goods furnished with the identifier, which when the goods are stored are also stored in the memory of the crane control, whereby when fetching the goods from the warehouse, the crane can be controlled automatically to the correct goods by means of this information.

[0005] The memory of the crane is, thus, used to store the goods and their location information, whereby, when the goods are fetched, there is no need to have a separate connection to stock accounting but just the identifier information sent by the reader from the work order to the crane is enough.

[0006] This new method combines earlier separate work phases while improving them at the same time. Earlier, all these - goods handling and finding and stock accounting - were separate work phases. Combining them also reduces the possibility of recording the goods wrong in the stock systems or transferring the wrong goods, for instance.

[0007] When using the present invention, time is no longer wasted in locating the goods; the crane can take the shortest route to the goods; the correct goods are always picked up, so no expensive mistakes are made due to entering wrong goods into the process; synergy gains are obtained between restricted areas and destination areas, whereby accidents and machine malfunctions are avoided; changes and the related costs to current systems are minimal. The above are immediately obtainable benefits.

[0008] Benefits obtained over a longer period of time include reduced dependency on individually trained personnel, more exact goods deliveries, and a better base for additional automation.

List of figures

[0009] The invention will now be described in more detail by means of a preferred embodiment and with reference to the attached drawings, in which

Figure 1 shows the arrival of goods at a warehouse;
Figure 2 shows identifying the goods before transfer to the warehouse;
Figure 3 shows transferring the goods to the warehouse;
Figure 4 shows preparing to fetch the goods from the warehouse; and
Figure 5 shows fetching the goods from the warehouse.
Detailed description of the invention

[0010] Figures 1 to 5 of the drawings depict a method for crane 1 control and stock 8 management, in which method goods 2 arriving at the warehouse 8 for storage are transferred by a crane 1 to a given location in the warehouse 8 and fetched later with the crane 1 from this location for onward transfer. By way of example, a steel sheet roll is used as the goods 2 being stored.

[0011] As shown in Figure 1, the goods 2 arriving for storage are first furnished with an attachable identifier 3 that is associated with a code, such as number or name, given to the goods 2 in stock accounting 4 or the like.

[0012] Then, as shown in Figure 2, the identifier 3 is read by a reader 5, when the goods 2 are transferred by the crane 1, and the identifier information is transmitted from the reader 5 to the memory 6 of the crane 1 control.

[0013] After this, as shown in Figure 3, the goods 2 are transferred by the crane 1 to a selected place in the warehouse 8 and the coordinates of the goods 2 are stored into the memory 6 of the crane 1 control so that they are associated with said identifier 3.

[0014] The coordinates of the goods 2 may be stored into the memory 6 of the crane 1 control in the following ways, for example:

[0015] a) storing the coordinates of the goods 2 into the memory 6 of the crane 1 control when the crane 1 determines on the basis of the end of load of its hoisting member that the goods 2 have been left at the selected place (measured load diminishes to zero or nearly to zero);

[0016] b) storing the coordinates of the goods 2 into the memory 6 of the crane 1 control in such a manner that the operator of the crane 1 acknowledges the goods 2 as left in the selected place by separately pressing an appropriate button, for example;

[0017] c) storing the coordinates of the goods 2 into the memory 6 of the crane 1 control, when the hoisting member of the crane 1 detects by means of a mechanical switch (e.g. a switch that measures compression in a gripper-like hoisting member) or sensor (e.g. a sensor that measures negative pressure in a suction pad hoisting member) that the goods 2 have been left in the selected place.
[0018] When later, as shown by Figure 4, said stored goods 2 are fetched from the warehouse 8 for further delivery, the reader 5 reads from a work order 7 or the like the identifier information associated with the goods 2, and the identifier information is transmitted from the reader 5 to the memory 6 of the crane 1 control, and the crane 1 control is activated with said identifier information, whereby the crane 1 moves, as shown in Figure 5, to the location of the earlier stored goods 2, for instance in such a manner that the crane control is kept activated by continuing to press an activation button (not shown in the figures) associated with said function of the crane 1 control.

[0019] The identifier 3 attached to the goods can preferably be a 2D bar code sticker, for instance, in which case a corresponding 2D bar code reader is suitable as the reader 5.

[0020] Even though a steel sheet roll is herein shown as the goods 2 to be stored, when applying the invention, the goods to be stored may be any goods suitable for this type of automated storing.

[0021] The above description of the invention is only intended to illustrate the basic idea of the invention. A person skilled in the art may, however, implement the basic idea of the invention in many ways. The invention and its embodiments are thus not restricted to the example described above, but may vary within the scope of the attached claims.
Claims

1. A method for crane (1) control and stock management, in which method the goods (2) arriving for storage at a warehouse (8) are transferred by a crane (1) to a given location in the warehouse (8) and fetched later with the crane (1) from this location for onward transfer, characterized by attaching to the goods (2) arriving for storage an identifier (3) associated with a code, such as number or name, given to the goods in stock accounting (4) or the like, reading the identifier (3) with a reader (5), when the goods (2) are transferred by the crane, transmitting the identifier information from the reader (5) to the memory (6) of the crane (1) control, transferring the goods (2) with the crane (1) to a selected place in the warehouse (8) and storing the coordinates of the goods (2) into the memory (6) of the crane (1) control so that they are associated with said identifier (3), and

when fetching said stored goods (2), reading with the reader (5) from a work order (7) or the like the identifier information associated with the goods, and

transmitting the identifier information from the reader (5) to the memory (6) of the crane (1) control, and activating the crane (1) control with said identifier information, whereby the crane (1) moves to the location of the earlier stored goods (2).

2. A method as claimed in claim 1, characterized by storing the coordinates of the goods (2) into the memory (6) of the crane (1) control when the crane (1) determines on the basis of the end of load of its hoisting member that the goods (2) have been left at the selected place.

3. A method as claimed in claim 1, characterized by storing the coordinates of the goods (2) into the memory (6) of the crane (1) control in such a manner that the operator of the crane (1) acknowledges the goods (2) as left in the selected place by separately pressing an appropriate button, for example.

4. A method as claimed in claim 1, characterized by storing the coordinates of the goods (2) into the memory (6) of the crane (1) control
when the hoisting member of the crane (1) detects by means of a mechanical switch or sensor that the goods (2) have been left in the selected place.

5. A method as claimed in any one of the preceding claims, characterized in that, when the stored goods (2) are fetched, the crane (1) control is kept activated by continuing to press an activation button associated with said function of the crane (1) control.

6. A method as claimed in any one of the preceding claims, characterized by selecting a bar code sticker as the identifier (3).

7. A method as claimed in any one of the preceding claims, characterized by selecting a 2D bar code reader as the reader (5).
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: B66C, B65G, G06Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

FI, SE, NO, DK

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>US 7344037 B1 (ZAKULA SR DANIEL BRIAN et al.) 18 March 2008 (18.03.2008) whole document, particularly column 9, lines 6-26; fig. 1 and 4</td>
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### Classification of Subject Matter

**Int.Cl.**

- **B66C 13/48** (2006.01)
- **B65G 1/137** (2006.01)
- **G06Q 10/00** (2006.01)