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(54) **COMBINATION OF A FORKLIFT AND A HAND HELD SCAN DEVICE**

(57) A combination of a forklift and a hand held scan device, which forklift comprises an elongate measurement device arranged to the mast of the forklift in longitudinal direction, which elongate measurement device comprises:

- a main scale extending in longitudinal direction;
- a plurality of unique codes scannable by the hand held scan device, wherein the unique codes are arranged along the scale at a fixed pitch.

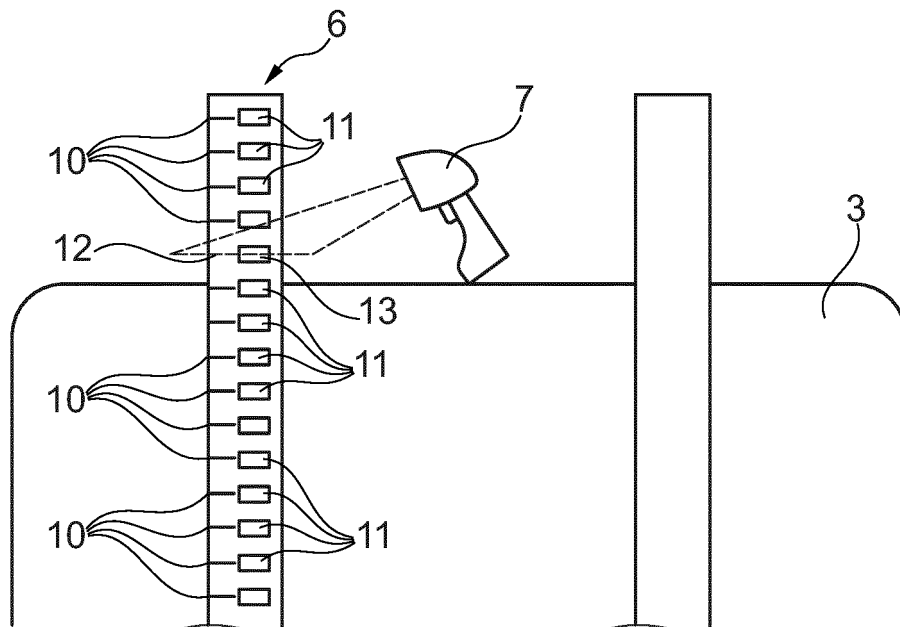


Fig. 2

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Description

[0001] The invention relates to a combination of a fork-lift and a hand held scan device.

[0002] In the field of transporting goods from a supplier to a customer, it is known to use dynamic routing. A truck drives to a first address to collect goods and as soon as the collection is confirmed by the driver of the truck, a next address will be supplied to the driver. At the second address, the goods are collected or goods are delivered and after confirmation, a next address will be supplied. This allows for an optimal use of a fleet of trucks collecting and delivering goods.

[0003] The suppliers wanting their goods to be delivered at a customer have to enter information about the collecting address and the deliver address, as well as information on the size of the goods. This information is taken into account when determining which addresses are supplied to a truck in view of the dynamic routing.

[0004] In particular in the field of goods transported on pallets, the supplier has to enter information on the type of pallet used and the height of the goods on the pallet. This allows for the planner to decide whether a specific truck has sufficient space for the pallet and whether the full height has to be used or that there is space available above one of already collected pallets.

[0005] For stacked transport of pallets, trucks are known in the prior art, which allow for dynamic floors in the truck, by connecting support beams between two walls of the truck, such that a pallet with goods can be supported above another pallet with goods.

[0006] However, suppliers often over estimate the height of their pallet with goods, such that the space of a truck is not optimally used. For example, if a truck has a maximum height of 3 meters and the supplier enters that the height of a pallet is 2 meters, the planning system will only allow for a next pallet to be collected and positioned above said pallet, when the next pallet has a height of maximum 1 meters.

[0007] If, however, the actual height at collection of the pallet proves not to be 2 meters, but only 1,5 meters, pallets up to a height of 1,5 meters would not be taken into account by the planning system for the dynamic routing, but only pallets with a height less than 1 meters.

[0008] It is known in dynamic routing systems, in which the pallets are brought to a central distribution system, to perform a three dimensional scan of the pallets up on arrival at the central distribution system, after which the pallets can be planned more efficiently.

[0009] However, at collection of these pallets the planning system of the dynamic routing still relies on the height entered by the supplier of the pallet with goods. Especially, when the goods are distributed corresponding to a so-called milkrun, in which the truck drives from one address to another, where the truck either retrieves or deliver goods, the exact height of the goods will not be known as the goods will not arrive at a central location with a three dimensional scan system is available. So, in

such distribution systems, the efficiency is low, as the exact height of the goods is not known or only at a very late stage.

[0010] It is an object of the invention to reduce the above mentioned disadvantages.

[0011] This object is achieved according to the invention with a combination of a forklift and a hand held scan device, which forklift comprises an elongate measurement device arranged to the mast of the forklift in longitudinal direction, which elongate measurement device comprises:

- a main scale extending in longitudinal direction;
- a plurality of unique codes scannable by the hand held scan device, wherein the unique codes are arranged along the scale at a fixed pitch.

[0012] A truck used for collecting pallets with goods at different addresses typically brings a forklift along. Furthermore, the driver of such a truck has a hand held scanning device to scan for example a bar-code arranged on the goods to confirm the collection of the goods.

[0013] With the invention, the forklift is provided with a scale on the mast. This allows the driver to measure the actual height of the pallet with the goods by positioning the forklift behind the pallet with goods and reading the scale on the mast. The driver then scans one of the plurality of unique codes corresponding to the determined height of the goods.

[0014] So, just before the pallet with goods is loaded into the truck, the actual height of the pallet is known, which allows the dynamic routing system to take the actual height into account and determine a next address more efficiently. This provides for an improved efficiency as the space of the truck can be used more efficiently. Even when in a milkrun distribution system a pallet with goods is retrieved from a first address and delivered at a next address, the exact height of the goods on the pallet are known and the planning of the dynamic routing system can take this into account.

[0015] In a preferred embodiment of the combination according to the invention the mast of the forklift comprises:

- a stationary mast part arranged to the chassis of the forklift;
- a movable mast part, slidably arranged in the stationary mast part; and
- spoons arranged to the movable mast part;

wherein the measurement device further comprises a secondary scale extending parallel to the main scale; a first marker arranged on the stationary mast part; and a second marker arranged on the movable mast part, wherein the main scale and the secondary scale are arranged to the stationary mast.

[0016] The driver typically would determine the height of the pallet with goods, while sitting on the forklift. How-

ever, if the height of the goods is small, the dashboard and body of the forklift will prevent the driver from correctly reading the scale and determining the actual height of the goods.

[0017] With this embodiment, the forklift can lift the pallet up with the spoons, wherein the movable mast part will slide up along the stationary mast part. The driver of the forklift can then align the first marker with the second marker, such that the spoons at a predefined height relative to for example the ground, on which the forklift is standing.

[0018] Then the driver can read the secondary scale, which takes into account, that the pallet is lifted from the ground at a predetermined height. Then the driver can again scan a unique code corresponding to the read height from the secondary scale. Preferably, the unique codes are also arranged near the secondary scale at a fixed pitch similar to the unique codes arranged along the main scale.

[0019] In yet another embodiment of the combination according to the invention the plurality of unique codes are bar-codes or quick response codes (QR codes).

[0020] Current transport dynamic routing systems use bar-codes or QR codes to identify the collected pallets with goods and the used hand held scan devices are able to scan such codes. By using the same coding standard for the plurality of unique codes arranged along the scale the already used hand held scanning devices can easily be updated to process the actual height and send it to a central database for the dynamic routing system to use.

[0021] In still another embodiment of the combination according to the invention each unique code incorporates the distance between the position of the respective unique code and a base level, for example a support surface on which the forklift is supported.

[0022] The invention also relates to an elongate measurement device for use in a combination according to the invention, which device comprises:

- a scale extending in longitudinal direction;
- a plurality of unique codes scannable by a hand held scan device, wherein the unique codes are arranged along the scale at a fixed pitch.

[0023] The measurement device can easily be arranged on a mast of an already existing forklift, but could also be arranged on the wall of a truck, such that when the pallet with goods is loaded into the truck, the pallet can be positioned next to the measurement device and the driver of the truck can determine and scan the height there.

[0024] A preferred embodiment of the elongate measurement device according to the invention, further comprises an elongate body, such as a slat, wherein the scale and the plurality of unique codes are arranged on a surface of the elongate body.

[0025] The slat allows for easy handling and attachment of the measurement device. The slat also provides

for a low cost solution, wherein the scale and unique codes can be printed onto a surface of the slat or can be provided as a sticker or the like.

[0026] The invention furthermore relates to a method for use of the combination according to the invention, which method comprises the steps of:

- positioning the forklift behind a pallet with goods with an identifier;
- selecting a unique code positioned along the scale and corresponding to the height of the goods on the pallet;
- scanning the selected unique code with the hand held scan device;
- scanning the identifier of the pallet with goods with the hand held device; and
- sending the scanned unique code and scanned identifier by the hand held scan device to a central database.

[0027] These and other features of the invention will be elucidated in conjunction with the accompanying drawings.

Figure 1 shows a perspective view of a combination according to the invention.

Figure 2 shows the view of the driver of the forklift according to figure 1.

Figure 3 shows a second embodiment of the combination according to the invention.

[0028] Figure 1 shows a forklift 1 behind a pallet 2 with goods 3. The forklift 1 has a mast 4 with spoons 5. An elongate measurement device 6 is arranged on the mast 4 and will be elucidated in more detail in figure 2.

[0029] The combination of the invention furthermore has a hand held scan device 7 with which a bar-code 8 on the goods 3 can be scanned. Preferably, the bar-code 8 is directed to the forklift 1, such that the driver can easily scan the bar-code 8 with the hand held scan device 7, will remaining behind the wheel of the forklift 1.

[0030] In order to determine the height of the goods 3, the driver 9 looks along the elongate measurement device 6 over the top of the goods 3.

[0031] Figure 2 shows the view of the driver 9 when looking along the elongate measurement device 6 over the top of the goods 3. The measurement device 6 has a scale provided by marks 10 indicating the height of the goods 3 and a plurality of unique codes 11, in this embodiment bar-codes, which incorporate the specific height.

[0032] When the driver 9 has determined the mark 12 corresponding with the height of the goods 3, the hand held scan device 7 is used to scan the corresponding bar-code 13. Together with the scanned bar-code 8 on the goods 3, the information is sent to a central database for use by a planning system of a dynamic routing system.

[0033] Figure 3 shows the view of the driver 9 for a

second embodiment 20. The mast of the forklift has a stationary mast part 4 and a movable mast part 21 to which the spoons 5 are attached. The spoons lift a pallet 22 with goods 23.

[0034] In order to also measure goods with a low height, the movable mast part 21 is lifted to a position in which a first mark 24 on the stationary mast part 4 is aligned with a second mark 25 on the movable mast part 21. The stationary mast part 4 has a main scale 26 with corresponding scannable QR-codes 27 and a secondary scale 28 with scannable QR-codes 29.

[0035] The second scale 28 with the corresponding QR-codes take into account that the first mark 24 is aligned with the second mark 25. This allows for goods with small height to be positioned in sight of the driver 9, who is then able to reliably determine the exact height 30 on the scale and scan the corresponding QR-code 31 with the hand held scan device 7.

[0036] It should be understood that the driver 9 will always select the mark 12, 30 which is of the same height of the first above the height of the goods 3, 23.

Claims

1. Combination of a forklift and a hand held scan device, which forklift comprises an elongate measurement device arranged to the mast of the forklift in longitudinal direction, which elongate measurement device comprises:

- a main scale extending in longitudinal direction;
- a plurality of unique codes scannable by the hand held scan device, wherein the unique codes are arranged along the scale at a fixed pitch.

2. Combination according to claim 1, wherein the mast of the forklift comprises:

- a stationary mast part arranged to the chassis of the forklift;
- a movable mast part, slidably arranged in the stationary mast part; and
- spoons arranged to the movable mast part;

wherein the measurement device further comprises a secondary scale extending parallel to the main scale; a first marker arranged on the stationary mast part; and a second marker arranged on the movable mast part, wherein the main scale and the secondary scale are arranged to the stationary mast.

3. Combination according to claim 1 or 2, wherein the plurality of unique codes are bar-codes or quick response codes (QR codes).

4. Combination according to claim 3, wherein each

unique code incorporates the distance between the position of the respective unique code and a base level, for example a support surface on which the forklift is supported.

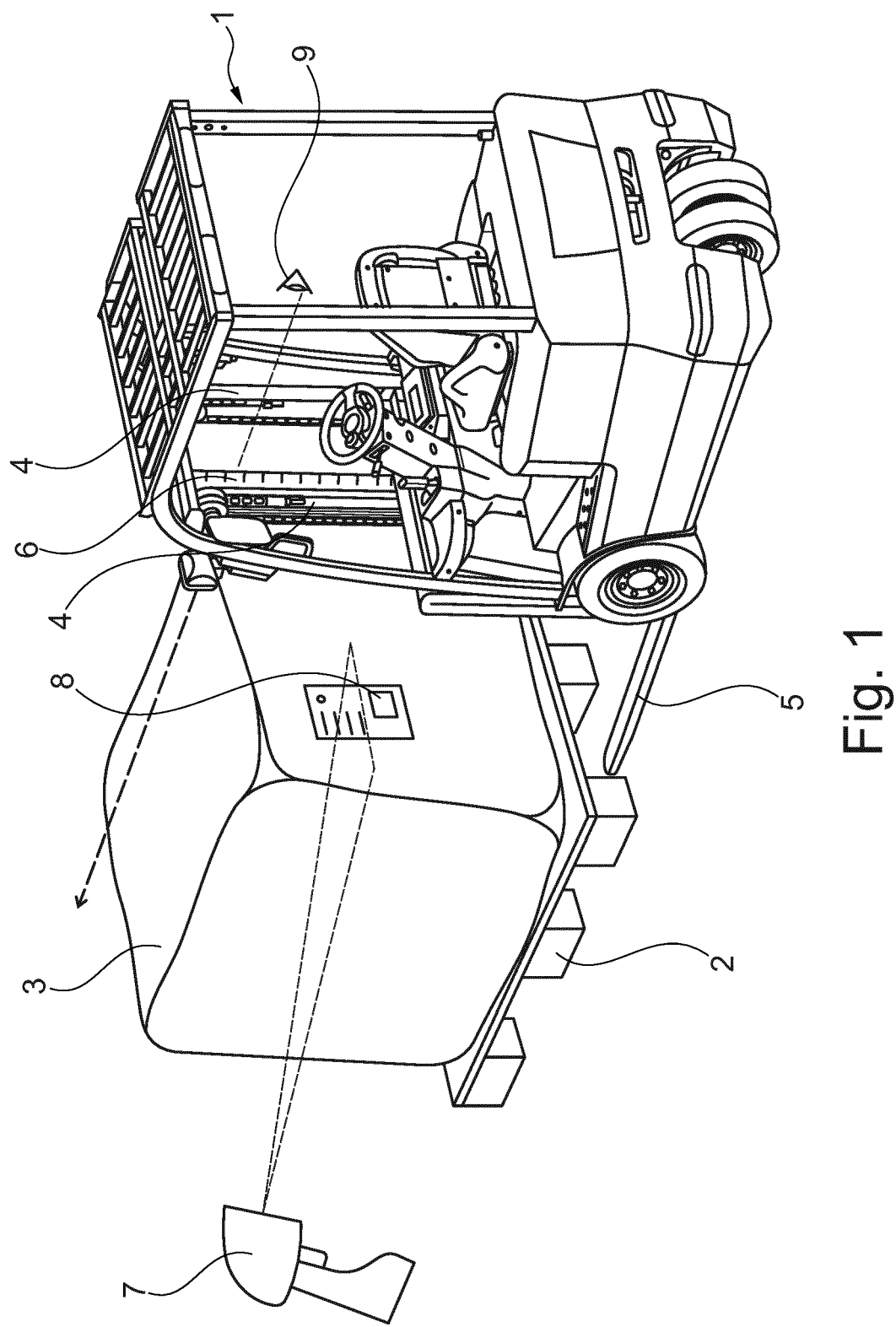
5. Elongate measurement device for use in a combination according to any of the preceding claims, which device comprises:

- a scale extending in longitudinal direction;
- a plurality of unique codes scannable by a hand held scan device, wherein the unique codes are arranged along the scale at a fixed pitch.

6. Elongate measurement device according to claim 5, further comprising an elongate body, such as a slat, wherein the scale and the plurality of unique codes are arranged on a surface of the elongate body.

7. Method for use of the combination according to one of the claims 1 - 4, which method comprises the steps of:

- positioning the forklift behind a pallet with goods with an identifier;
- selecting a unique code positioned along the scale and corresponding to the height of the goods on the pallet;
- scanning the selected unique code with the hand held scan device;
- scanning the identifier of the pallet with goods with the hand held device; and
- sending the scanned unique code and scanned identifier by the hand held scan device to a central database.



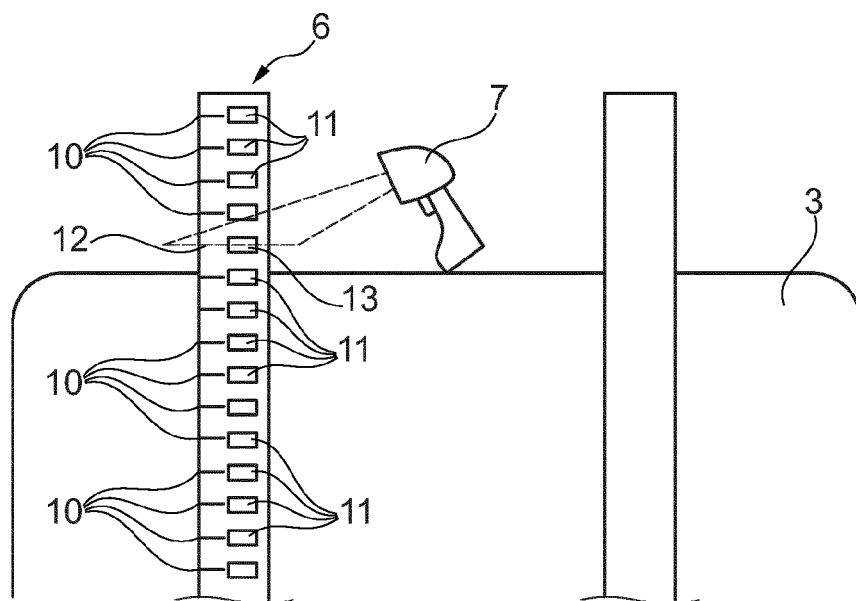


Fig. 2

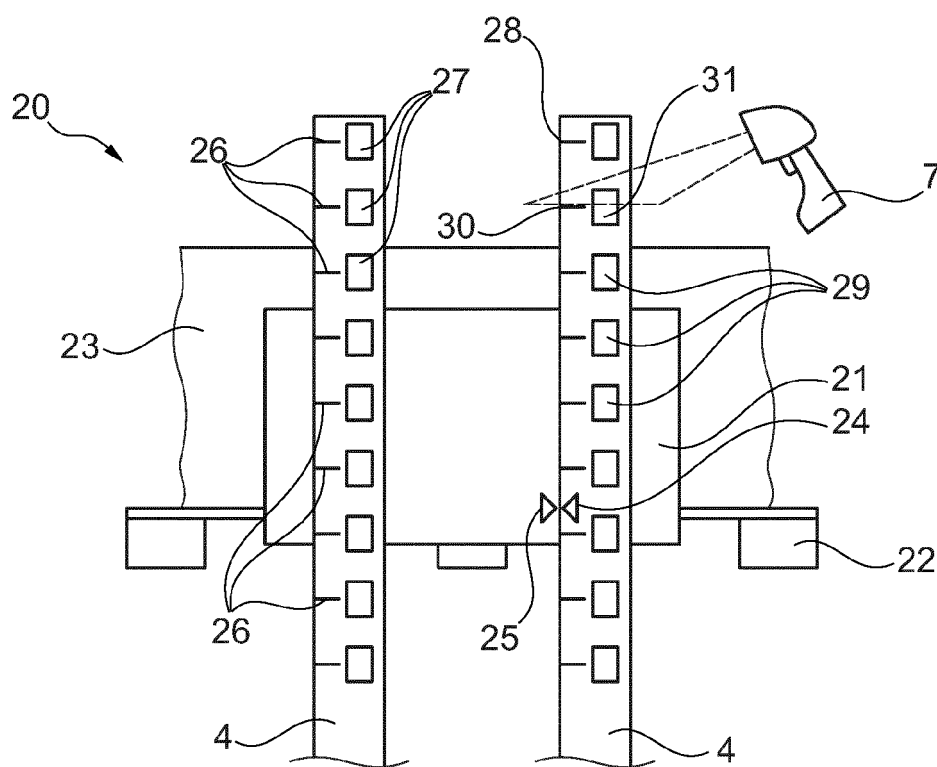


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 16 16 8986

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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 (IPC)
X	US 2009/101447 A1 (DURHAM TERRY [US] ET AL) 23 April 2009 (2009-04-23)	1-6	INV. B66F9/075
A	* paragraphs [0012], [0013], [0015], [0016], [0022] *	7	
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			TECHNICAL FIELDS SEARCHED (IPC)
			B66F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		16 November 2016	Serôdio, Renato
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82