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(54) Lifting device, especially for containers

(57) The lifting device particularly for airline trolleys with a basic element (1) resting on the ground and a lifting unit (3) is provided with driving means (10 - 14) comprising a chain drive between basic element (1) and lifting unit (3) having the driving motor (9) placed in a top compartment (8) of the lifting unit (3) itself.

Fig. 1

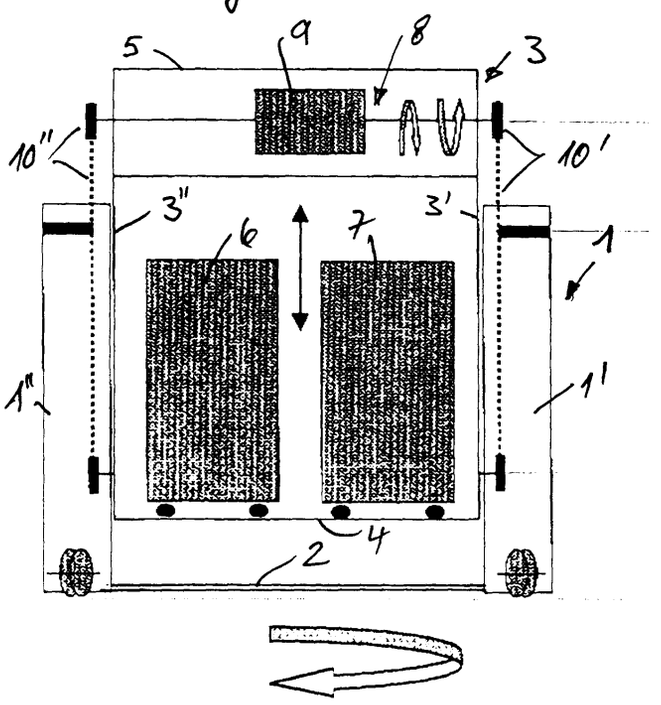

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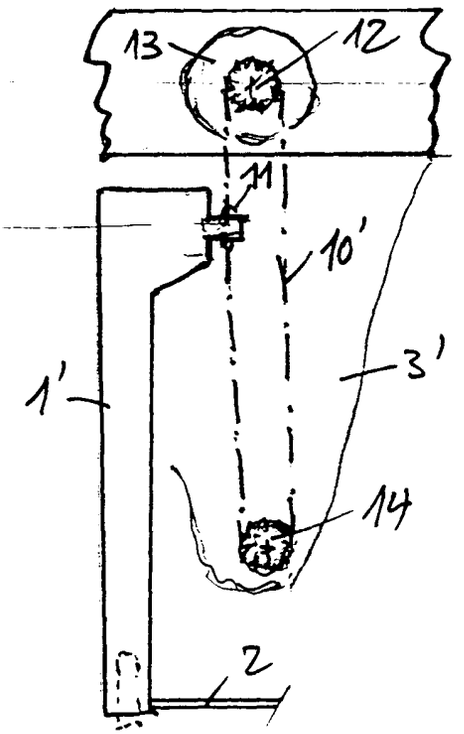
Fig. 2



Description

[0001] The present invention relates to a lifting device for racks for goods, said racks being equipped with superimposed containers, such as trays or drawers for said goods, particularly airline trolleys, comprising a basic element provided for resting on a floor and having two opposite side walls interconnected by a bottom structure and a lifting unit with a bottom platform arranged between said side walls of the basic element and guided for vertical movement on said side walls, and driving means for said lifting unit.

[0002] The racks for goods which are of particular interest in connection with the present invention are so-called airline trolleys. The airline trolley as standing on its own wheels is a simple and very flexible system for moving and storing food and items inside and outside the aeroplanes. For the operation in the flight kitchen, to fill and empty it with trays and drawers, the ergonomic situation is not ideal and so trolley lifters are used to bring trolleys in the right position to load and unload them. Trolley lifters are used in tray stripping operation, tray setting operation and in drawer packing systems.

[0003] Most of such known trolley lifters, due to their general construction, need relatively large floor space.

[0004] Since floor space is at a premium, it was an object of the present invention to find out a new useful design of a lifting device being of simple design, needing a minimum of floor space and enabling loading and unloading the racks from the two opposite sides.

[0005] In order to solve this problem the present invention proposes in a lifting device of the kind defined hereinabove a design as defined in the characterising clause of claim 1.

[0006] Special embodiments of the invention are defined in the dependent claims.

[0007] So instead of using a known system with a central column, the invention proposes a system with usually two trolleys arranged side by side (smallest volume) and in the circle surrounding the corners the lifting mechanism is installed. For turning the whole system a 4-wheel system is arranged in the same circle. This design provides a most simple solution needing a minimum of floor space, a minimum ramping and enabling loading and unloading of the racks or trolleys from both sides (opposite sides).

[0008] For lifting a simple arrangement is made, in that an electric motor sits in the top of the lifting unit and by a preferred arrangement of a gearbox and cross-shaft and two chains guided by sprockets which push the baseframe down and by this motion lift itself and the trolleys up. This can be regarded as a unit lifting itself off the ground.

[0009] An embodiment of the present invention is represented in the accompanying drawings in which:

Fig. 1 shows schematically a side view of a lifting device of the invention;

Fig. 2 is a purely schematic representation of the driving means, and

Fig. 3 is a schematical top view showing some more details of the lifting device.

[0010] Figures 1 and 2 represent purely schematically a lifting device in accordance with the present invention for lifting simultaneously two airline trolleys at a desired height for loading or unloading the trolleys with drawers or trays.

[0011] The device comprises a basic element 1 with two opposite side walls 1', 1" and a bottom structure 2 interconnecting the side walls. Inside the basic element is a lifting unit 3 guided for vertical movement between the side walls 1', 1" of the basic element.

[0012] The lifting unit 3 also has two side walls 3', 3" overlying the side walls 1', 1" of the basic element and interconnected by a bottom platform 4 and by a top casing 5. The space between the top casing 5 and the bottom platform 4 is provided for taking up two trolleys 6, 7 side by side for being lifted to any desired height above the floor (ground).

[0013] Driving means 8 are provided in the top casing 5 and in the side walls 1', 3' and 1", 3" and comprise an electric motor 9 usually with a reduction gear (not represented), a chain drive 10', 10" on each side of the lifting unit, leading, as shown in Fig. 2, from an attachment point 11 at the upper part of each side wall 1', 1" of the basic element 1 over a sprocket wheel 12 on a drive shaft of electric motor 13 to an idling guide sprocket wheel 14 at the lower part of the side wall 3' resp. 3" of the lifting unit 3 back to an attachment point on the side wall 1' resp. 1" of the basic element 1, thus forming a closed loop.

[0014] The electric motor 13 is able to lift by the chain 10' resp. 10" the lifting unit 3 at any desired level for easy loading or unloading the trolleys 6, 7.

[0015] The basic element 1 is provided with wheels having each its axe on a radius passing through the centre of the base, thus enabling easy rotation of the lifting device.

[0016] The basic element 1 is preferably resting on a circular bottom plate (not shown), which may be provided with an upstanding centre pin for centring the basic element. Such bottom plate can easily be displaced to any location, enabling installation of the lifting unit at any desired place.

[0017] The chain drive 10 - 14 needs little space and allows arrangement of the driving motor on the top of the lifting unit 3 itself. This solution is the one asking for a minimum of space.

[0018] Fig. 3 shows a top view of a lifting device in some more detail. The side walls 1', 1" of the basic element 1 are each double walled, forming a space for taking up parts of the driving means. The whole forms a kind of cylindrical body. The bottom platform 4 of the lifting unit has its corners on a circle corresponding sub-

stantially with the circle defined by the outer side walls 1', 1". The four wheels 15 of the basic unit have their axes passing through the centre C of the device, allowing rotation of the device, but normally no other displacement.

[0019] In order to lift off the basic element (its bottom structure) of the ground it is possible to introduce an auxiliary device into the space between bottom platform 4 and bottom structure 2. When lowering the platform 4 it abuts such device and by continuing the movement lifts the basic element 1 (e.g. for cleaning purposes under the bottom structure 2).

Claims

1. A lifting device for racks for goods, said racks being equipped with superimposed containers, such as trays or drawers for said goods, particularly airline trolleys, comprising a basic element provided for resting on a floor and having two opposite side walls interconnected by a bottom structure and a lifting unit with a bottom platform arranged between said side walls of the basic element and guided for vertical movement on said side walls, and driving means for said lifting unit, characterised in that said lifting unit is also provided with side walls substantially overlying the side walls of said basic element, interconnected by said bottom platform and at their top end for defining a space for taking up said racks and wherein said driving means are mounted at the top end of the lifting unit and comprise an electric motor and, optionally, a reduction gear and at least one chain drive, this chain drive leading from an attachment point at the upper part on the adjacent side wall of the basic element over a sprocket wheel on a drive shaft, an idling guide sprocket wheel at the lower part on the adjacent side wall of the lifting unit back to said attachment point for forming a closed loop.

2. The lifting device as claimed in claim 1, characterised in that the chain drive of said driving means is arranged in a box-like space on the inner side of the side wall of the basic element.

3. The lifting device as claimed in claim 1 or 2, characterised by a chain drive on both side walls of the lifting unit, said two chain drives being synchronously driven by said driving shaft.

4. The lifting device of any of claims 1 to 3, characterised in that the periphery of said outer side walls of said basic element is on a circle, said bottom platform of the lifting unit being of rectangular shape with the four corners lying substantially on said circle.

5. The lifting device of claim 4, for accommodating two identical racks to be placed side by side, characterised in that the length of said bottom platform corresponds with the length of one rack and the width of the platform is the double of the width of one rack.

6. The lifting device of any of claims 1 to 5, characterised in that the basic element is equipped with wheels or rollers enabling easy displacement of the whole lifting device to any desired location, and optionally by means for blocking the action of the wheels or rollers.

7. The lifting device of any of claims 1 to 5, characterised in that the basic element is equipped with wheels or rollers having fixed axes lying on a radius passing through the centre of the bottom to enable rotation of the lifting device about said centre of the bottom.

8. The lifting device of any of claims 1 to 5 or 7, characterised by a separate circular bottom plate upon which the wheels or rollers of the device rest.

9. The lifting device of claim 8, characterised in that the bottom plate has a central upwardly extending pin for centring the device.

10. The lifting device of any of claims 1 to 9, characterised by an auxiliary device to be inserted between the bottom and the bottom platform of the lifting device when the latter is in a lifted position, enabling lifting of the whole basic element by lowering the lifting device.

Fig. 1

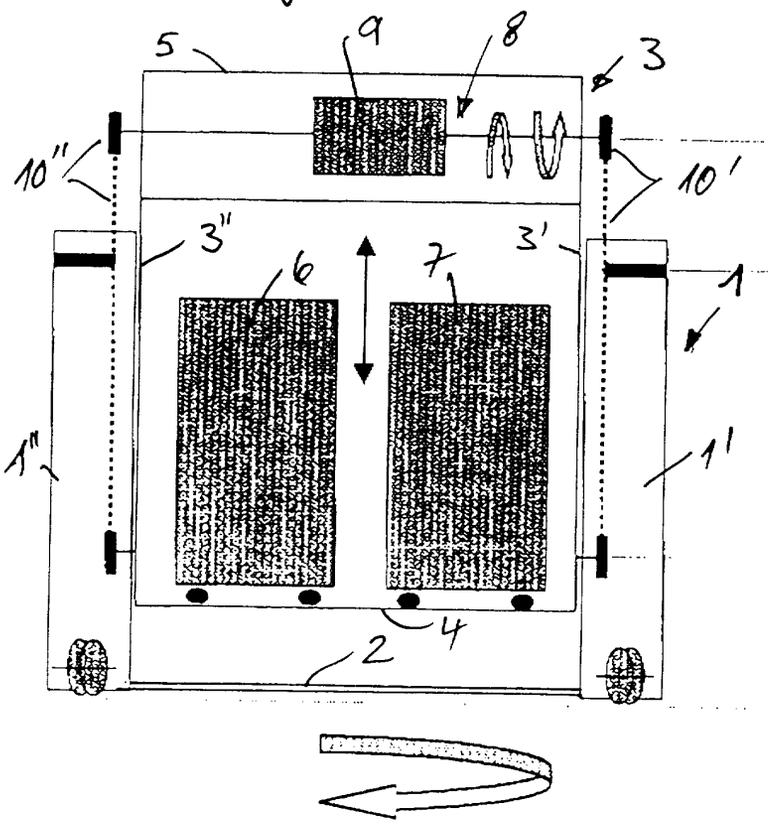


Fig. 2

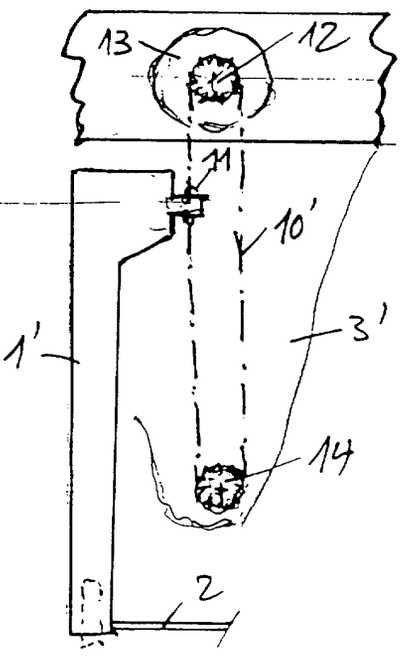
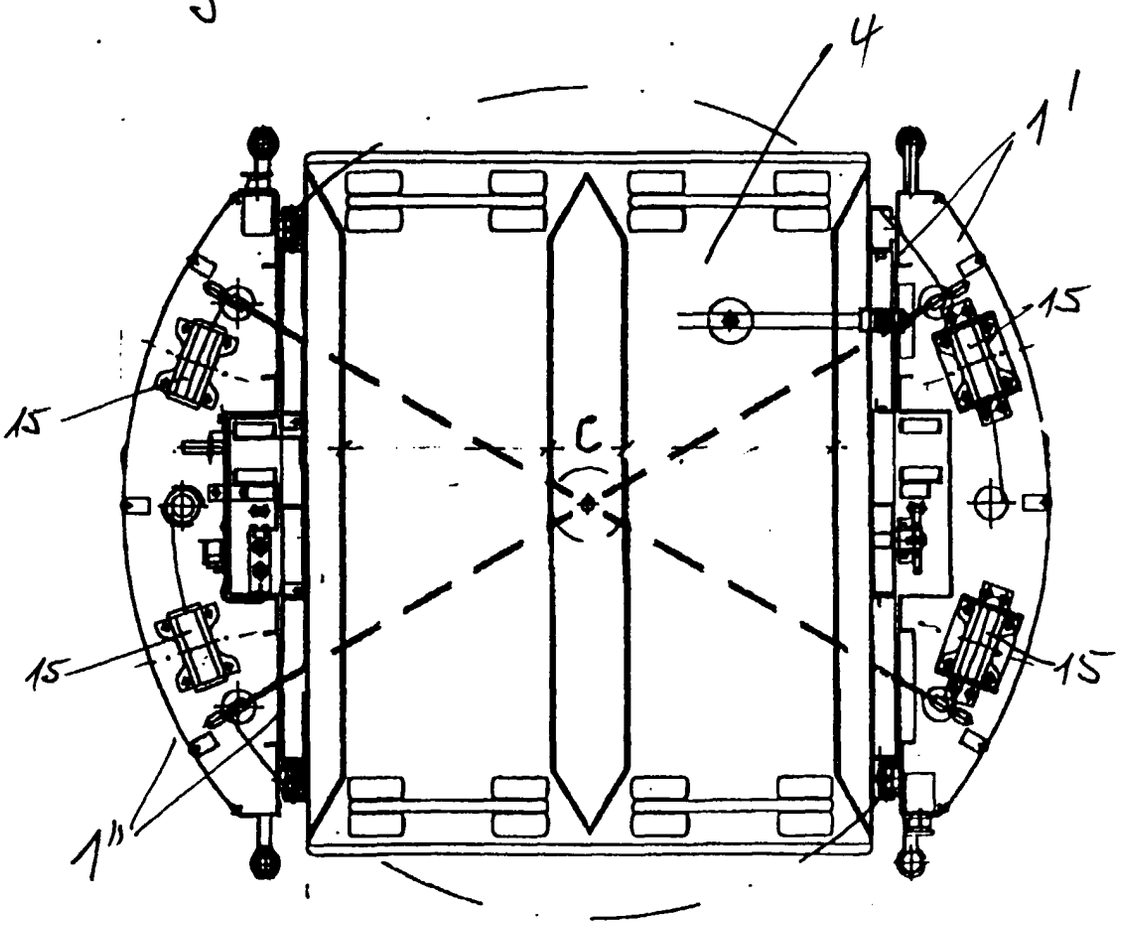


Fig. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 99 10 2359

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.6)
Y	US 5 401 134 A (HABICHT HELMUT ET AL) 28 March 1995 * abstract * * column 3, line 64 - column 4, line 50 * * figures 1,2 *	1,3,6	B66F9/08
A	---	3,7	
Y	DE 196 30 162 A (BOSCH GMBH ROBERT) 29 January 1998 * abstract * * claims 1-3,5,8,9 * * figures 1-3 *	1,3,6	
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A	---	1-3,6,7	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
	WO 90 06279 A (TIGWELL BRUCE ROLAND) 14 June 1990 * abstract * * figure 7 *		A47F B66F A47B
A	---	1-3,5	B64D
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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	11 May 1999	Lupo, A

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Application Number
EP 99 10 2359

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.6)
A	US 4 345 802 A (SORENSEN EGON) 24 August 1982 * column 1, line 31 - line 44 * * figures 1,2 * -----	1	
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