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(54) Method, device and assembly for cleaning containers

(57) The invention relates to a process for cleaning containers, comprising the following steps:

- arranging an individual layer of containers, such as synthetic crates or the like in an automatic rotation device (4),
- rotating this individual layer substantially through 180° by means of the automatic rotation device (4), whereby waste and rubbish, such as meat and vegetable residue falls out of the containers, and
- subsequently transporting the accordingly rotating individual layer to a cleaning area (105), wherein the containers are treated with washing fluid.

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Description

The present invention relates to a method, device and assembly for cleaning containers.

Many food stuffs such as vegetables, fruit and meat products are transported in synthetic crates, wherein these crates are stacked in layers on pallets. These crates are reusable, but must be cleaned after use.

A known method for cleaning such crates comprises the steps of rotating a complete stack of empty crates which are situated on a pallet, wherein the pallet is also rotated, so that any waste and rubbish falls out of the crates before they enter a washing machine. A problem with this known method is that an unacceptably large amount of waste is still taken into the washing machine along with the crates.

An object of the present invention is to provide an improved method for cleaning containers.

According to the present invention there is provided a method for cleaning containers comprising the following steps:

- arranging an individual layer of containers, such as synthetic crates or the like in an automatic rotation device,
- rotating this individual layer substantially through 180° by means of the automatic rotation device, whereby waste and rubbish, such as meat and vegetable residue falls out of the containers, and
- subsequently transporting the accordingly rotating individual layer to a cleaning area, wherein the containers are treated with washing fluid.

Pursuant to the process according to the present invention only one layer of containers is rotated in time for transportation into the cleaning area, whereby the waste falls of the crates in this one layer, whereby this waste can be easily removed. In the state of the art the waste, contrary to this process falls onto the underside of the layer of crates laying below, whereby an unacceptably large amount of waste and rubbish is taken into the cleaning area. By the process according to the state of the art, blockage of the cleaning area, for example sprayers, pipes and the like, is a large problem.

The individual layer of crates, arranged in a stack of crates on a pallet, is preferably moved into the automatic rotation device. In this way another layer of crates can be moved into the cleaning area during rotation of a layer of crates, so that the cleaning area does not come to a stillstand and a large cleaning capacity is obtained. This is not the case according to the known process.

The stack of container layers on the pallet, are preferably securely gripped above the lowest layer of crates, where subsequently the free lying lowest layer can be moved into the rotation device, whereafter the secured stack of container layers are released in order to permit this stack of container layers to drop, whereby the now lowest lying container layer can be moved into the rotation device, the stack of container layers there above being secured, whereafter these steps can be repeated.

Accordingly the lowest layer of crates is no longer secured, whereby this lowest layer can be moved with respect to the secured stack of container layers, where subsequently this displaced lowest layer of crates is rotated.

On leaving the cleaning area the layers of crates are once again individually rotated per layer by means of a rotating device, whereby subsequently these individual layers can be placed layer by layer on pallets one above the other. In this way, crates are provided which are ready for use. The containers are preferably transported between an entrance and an exit of a circular cleaning area, such as a carousel washing machine, in which cleaning area the containers are washed.

A circular cleaning area takes up little space with respect to line washing machines, wherein individual crates have to be entered instead of individual layers of crates. With such a carousel washing area, it is possible to transport layers of crates in and out.

The invention further relates to a device for rotating an individual layer consisting of one or more containers, such as synthetic crates or the like, for fruit, vegetables and meat, comprising releasable securing means for securing a layer in the device, such that this layer is secured during rotating of the device and rotation means for rotating the device.

The device furthermore preferably comprises releasable securing means for securing a container in a first securable position and releasing of the container layer in a second non securable position.

Accordingly a container layer can be secured during rotation of the device and released during displacement of the container layer into and out of the device.

The securing means preferably comprise a cage like construction wherein most preferably the roof and the floor of the cage construction are mutually displaceable by means of one or more hydraulic cylinders. Accordingly a good securing of the container layer during rotation of the device is provided, whereafter the roof and the floor can be moved apart by means of the cylinders in order to release the container layer.

The rotation means preferably comprise an axle.

The device can furthermore comprise displacing means for displacing the container layer out of the cage construction.

The invention further relates to an assembly for cleaning containers such as synthetic crates or the like for transporting fruit, vegetables and meat, comprising:

- securing means for securing a stack of container layers stacked one above the other on a pallet,
- one or more devices for rotating an individual layer of containers, and
- a circular cleaning area of the carousel type.

The assembly preferably comprises moving means

for moving a container layer stacked on the lower side of a stack of secured container layers. The containers are accordingly moved per container layer into the cleaning area.

The invention will now be described with respect to the figures, wherein:

- figure 1 shows a perspective view of a part of the assembly according to the present invention, comprising a first embodiment of the rotation device according to the present invention,
- figure 2 shows a side view of the rotation device from figure 1,
- figure 3 shows a side view of a second embodiment of the device according to the present invention, and
- figures 4 - 12 show stepwise the process according to the present invention, using a third embodiment of the rotation device according to the present invention.

A support device 2, for supporting a stack of container layers on a pallet (not shown) is arranged next to a rotation device (figure 1).

The support device 2 comprises a movable frame 6, mounted on legs 8. Four securing bars 10 are mounted in the frame 6. The four securing bars 10 are provided with securing plates 12. A pneumatic cylinder is joined with each securing bar 10, wherein in figure 1 only one cylinder 14 is shown.

A conveyer belt can run beneath the support device 2, wherein layers of containers stacked up on pallets can extend through the support device 2.

The frame 6 is mounted on the legs 8 by means of chains 16, wherein each chain 16 is connected to an electric motor 18.

The rotation device 4 is provided with a cage construction 24, which is mounted on two V like support elements 26, 27. The support elements 26, 27 are joined to the cage construction 24 by means of a frame element 28. An electric motor 30 is mounted on the support element 27. This motor 30 is connected to a drive belt 32 which is in turn connected to a drive axle 34, wherein the drive axle 34 extends through the top of the support element 27 and is joined to the frame element 28 of the cage construction 24. On the other side of the cage construction 24, the other support element 26 is secured hereto by means of a rotation pin (not shown).

A displaceable floor frame 36 of the cage construction 24 is provided with a rod 38. This rod 38 is joined to a pneumatic cylinder 40. The cylinder 40 is joined to the cage construction 24 by means of two joining elements 42 (see figure 2).

The floor frame 36 is hingeably joined to the cage construction 24 by means of four slats 46, wherein one end of each slat 46 is joined to the floor frame 36, which is arranged independently of the cage construction 24, and on the other side is joined to the cage construction 24 itself. A displacer is mounted to the open roof of the cage construction 24. This displacer consists of an electric motor 50, which is joined by means of an axle 52 with two drive wheel 54. These drive wheels 54 are in turn joined with two other drive wheels 56 by means of two separate chains 58. Two displacing bars 60, 62 extend between the chains 58 and are mounted thereon opposite one another.

In order to clean crates, one single layer of crates is gripped in the support device 2 by means of pushing together the gripping bars 10 by means of the pneumatic cylinder 16. In order to ensure that both sides of all the gripping bars 10 follow a synchronous gripping movement, use is made of a mechanical equivalence adjustment.

This adjustment is realized by the gripping bars 10 and chains which are arranged opposite one another and which are joined by means of a continuing axle (not shown). Oppositely arranged cylinders 16 pull, with the same movement, the gripping bars 10 towards one another. The gripping plates 12 work as force distributors, which ensure that securing force is universily distributed, even when inaccuracies occur in the dimensions of the crate layers.

Gripping the crate layers on the four sides of the layer of crates reduces the problems of buckling and deformation between crates in an individual layer thereof.

When a layer of crates (for example five crates in a layer) are gripped, the frame element 6 is, by means of the chains 16, raised a little in order to separate the lowest layer of crates from the there above arranged stack of crate layers. Subsequently the now free lying layer of crates is moved into the rotation device 4 by means of the not shown displacing means. Thereafter the gripping bars 10 are driven apart by means of the pneumatic cylinders 16, whereby the stack of crate layers drops, whereby subsequently, the lowest layer of crates can be separated (see figures 1 - 4).

When the layer of crates is moved into the rotation device 4, the floor frame 36 and the middle rod 38 are raised by means of the pneumatic cylinder 40. The layer of crates is accordingly pushed against the overhanging lips 48 of the cage construction 24 whereby the layer of crates is secured within the cage construction 24.

The drive belt 32 is then activated by the electric motor 30 whereby the drive axle 34 is also activated. The cage construction 24 is rotated thus. After 180°, rotation of the cage construction 24 is stopped, wherein the layer of crates lies upside down in the cage construction. In this position, waste, rubbish and the like falls out of the crates through the open roof of the cage construction 24.

The layer of crates is subsequently moved out of the cage construction by means of activating the displacing bars 60, 62 along the chains 58.

Without the cage construction 24 being needed to be again rotated through 180°, a new layer of crates can

be moved herein. In this position a layer of crates is gripped by pushing the floor frame 36 downwards, whereafter the cage construction 24 is once again rotated, wherein in which position rubbish, waste and the like can fall through the open bottom of the floor frame 36 of the crates.

In order to correctly position the gripping bars 10, i.e. on the penultimate from the lowest layer of crates, positioning can take place with the aid of an electronic meter, which transmits the height to the control of the frame element 6.

The gripping device and the rotation device, as shown in figure 1, can be placed by both the entry and the exit of a cleaning area in order to effect stacking down and loading layers of crates into a washing area and subsequently for moving and stacking up of the cleaned layers of crates.

The second embodiment of the rotation device according to the present invention is shown in side view in figure 3. This embodiment 70 has a double cage construction 72. Here, a layer of crates is pushed on one side into the device, and after rotation can be expelled on the other side. The double frame construction 72 has two displaceable bottoms 74 joined to the double cage construction 72 by means of hingeable slat elements 76. The bottoms 74 are displaceable by means pneumatic cylinders 78. The double cage construction 72 is rotated around an axle 60. This double cage can be easily used for different sorts of crates since the bottoms 74 are closed whereby the layers of crates are well secured.

By embodiments of the rotation device according to the present invention not shown, this can be carried out by leaving only the roof or the bottom open, whereby the displacer of the layer of crates can also be mounted on the floor frame of the cage construction.

By the third embodiment 90 of the rotation device according to the present invention as shown in figures 4 to 12, this has in contrast to the embodiment shown in figures 1 and 2, a closed plate 92 as bottom and an open roof 94.

The closed bottom 92 is displaceable by means of a pneumatic cylinder 96, and is mounted on the cage construction 98 by means of slat elements 100. The principle of working of the displaceable bottom 92, cylinder 96, slat elements 100 and cage construction 98, is the same as by the embodiments described above.

On cleaning of layers of crates, the layer of crates is placed in the support device 2 (see figures 4 to 12). Subsequently the penultimate from the lowest layer of crates is gripped by means of the gripping bars 10 and raised (see figure 5). The layer of crates is then moved into the rotation device by means of not shown displacing means (see figures 6 and 7) whereafter the bottom 62 is raised to secure the layer of crates against the roof 64 and the device (see figure 7).

The device is then rotated through 180° (figure 8) whereafter the cylinder rod is pulled back (figure 9) to release the layer of crates. The layer of crates can subsequently by means of the not shown displacing means be displaced into the cleaning area 105.

Since this embodiment of the device has a closed bottom, it must be rerotated through 180° in order to be able to receive a new layer of crates. In order to receive the layer of crates from the cleaning room, (see figures 10 to 12), this process is repeated.

The requested rights are not limited to the above shown and described embodiments of the present invention, but are rather in the first instance determined by the following claims within whose range, many modifications are conceivable.

Claims

1. Process for cleaning containers, comprising the following steps:

   - arranging an individual layer of containers, such as synthetic crates or the like in an automatic rotation device,
   - rotating this individual layer through substantially 180° by means of the automatic rotation device, whereby rubbish, such as meat and vegetable residue falls out of the containers, and
   - subsequently transporting the accordingly rotated individual layer of containers to a cleaning area, wherein the containers are treated with washing fluid.

2. Process according to claim 1, wherein the individual layer is displaced into the automatic rotation device from a plurality of layers, stacked up on a pallet.

3. Process according to claim 2, wherein the stack of container layers from the pallet is gripped above the lowest layer, whereafter the free lying lowest layer is displaced into the rotation device whereafter the gripped stack of container layers are released and dropped, whereby the newly lowest lying container layer can be displaced and the above steps can be repeated.

4. Process according to any of the previous claims, wherein on leaving the washing area, the container layers are once again individually rotated by a rotation device, whereafter these individual layers can be stacked one above the other on pallets.

5. Process according to any of the previous claims, wherein the containers are transported between an entrance and an exit of a circular cleaning area such as a carousel cleaning area, in which cleaning area the containers are washed.

6. Device for rotating an individual layer consisting of one or more containers, such as synthetic crates or the like for vegetables, fruit and meat, comprising releasable securing means for securing a layer in the device such that this layer during rotation of the device is secured, and rotation means for rotating the device.

7. Device according to claim 6, wherein the releasable securing means are displaceable between a first securing position and a second container layer non-securing position.

8. Device according to claim 6 or 7, wherein the securing means are a cage like construction.

9. Device according to claim 8, wherein a roof and a floor of the cage construction are mutually displaceable.

10. Device according to claims 8 or 9, wherein the roof and the floor of the cage construction are mutually joined by means of one or more hydraulic cylinders.

11. Device according to any of the claims 6-10, further comprising locking means for locking the layer of containers in the cage construction.

12. Device according to any of the claims 6-11, wherein the rotation means comprise an axle.

13. Device according to any of the claims 6-12, further comprising displacing means for displacing a layer of containers from the cage construction.

14. Assembly for cleaning containers such as synthetic crates or the like for transporting vegetables, fruit and meat for example, comprising

- securing means for securing a plurality of container layers stacked one above another on a pallet,
- one or more devices for rotating an individual layer of containers according to any of the claims 6-13, and
- a cleaning area.

15. Assembly according to claim 14, further comprising displacing means for displacing a layer of containers situated at the bottom of a stack of secured container layers.

16. Assembly according to claims 14 or 15 for effecting the process according to one of the claims 1-5.

17. Device according to any of the claims 6-13, for rotating an individual layer consisting of one or more containers, such as synthetic crates for transporting vegetables, fruit and meat for example, through substantially 180°.

18. Use of a device according to one of the claims 6-13 for rotating an individual layer of containers through substantially 180°.

19. Use of an assembly according to any of the claims 14-16 for cleaning containers.

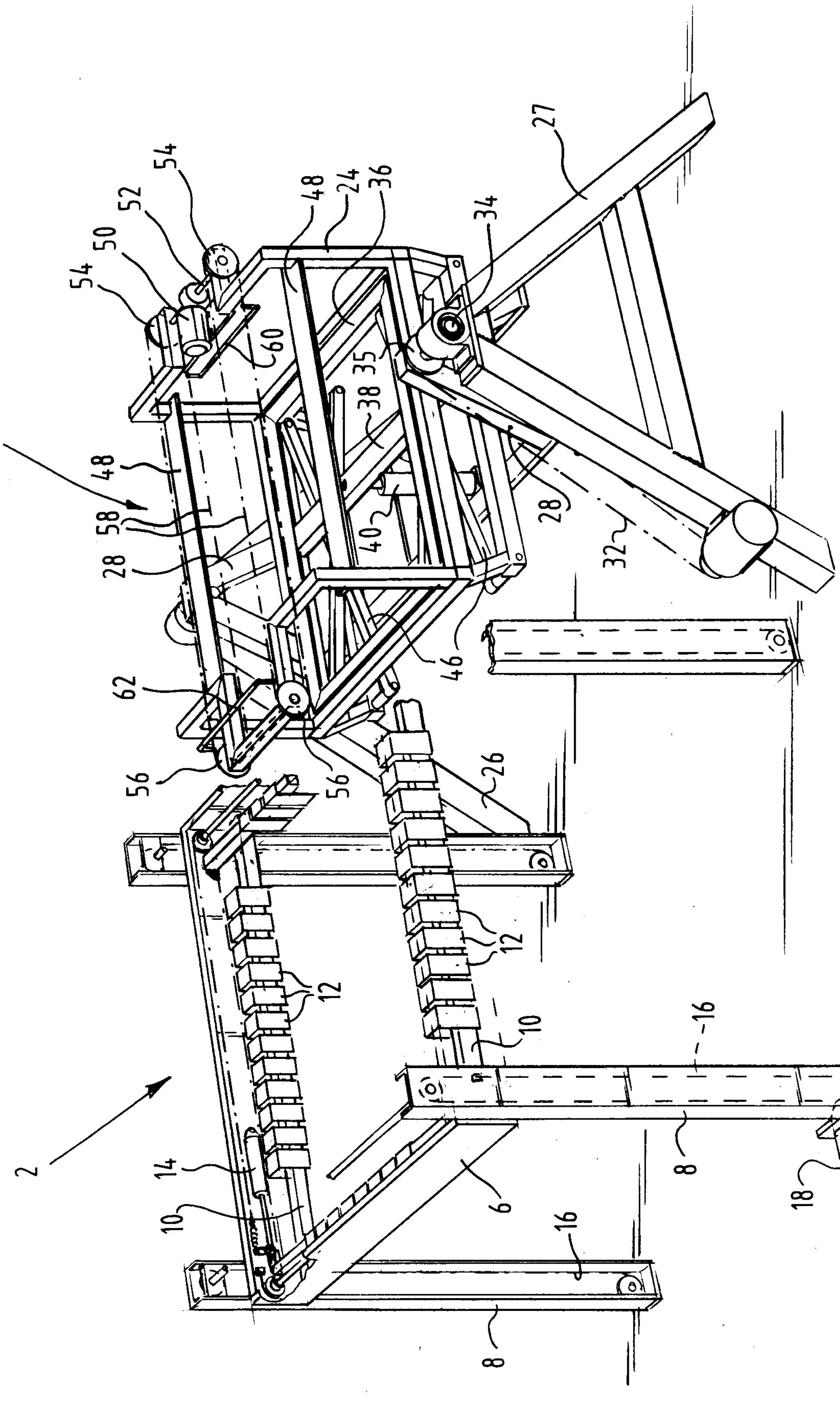
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FIG. 1

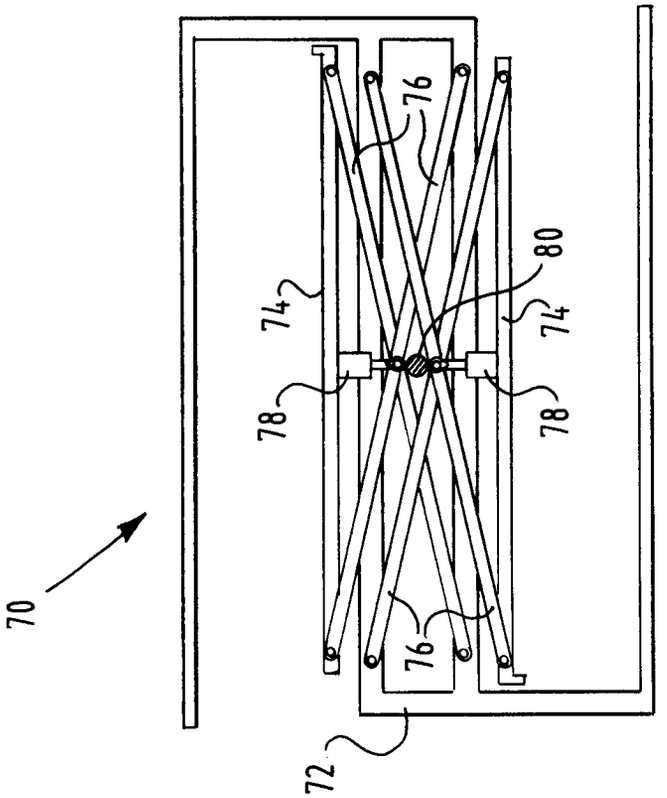

FIG. 3

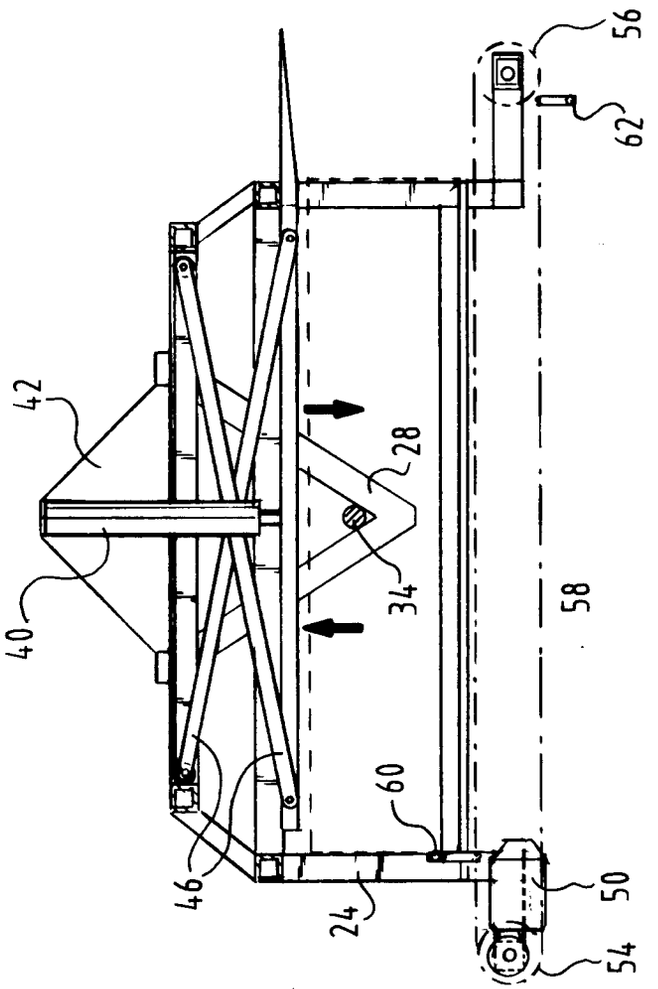

FIG. 2

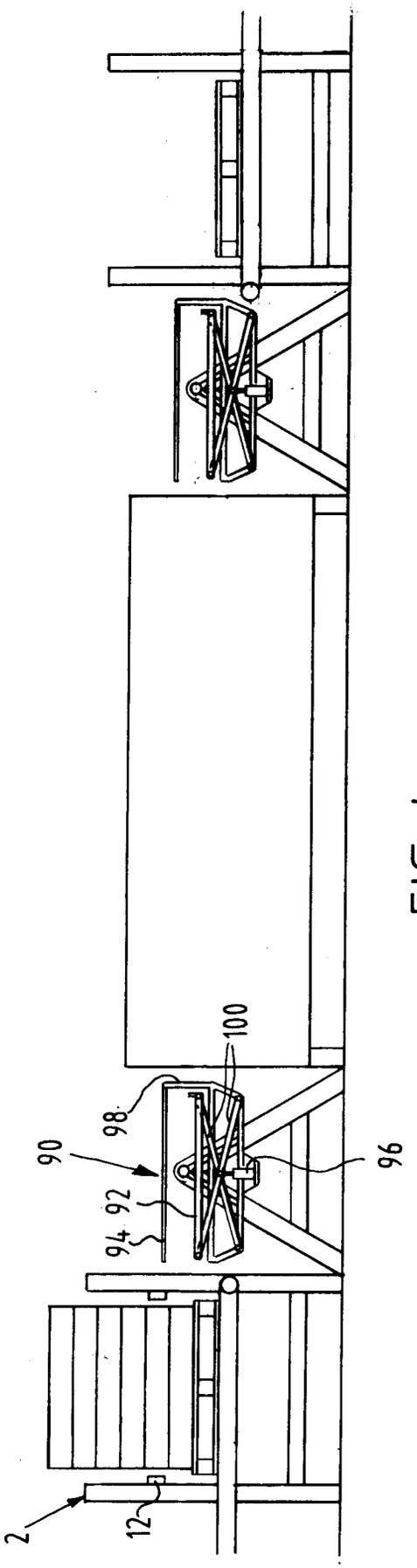

FIG. 4

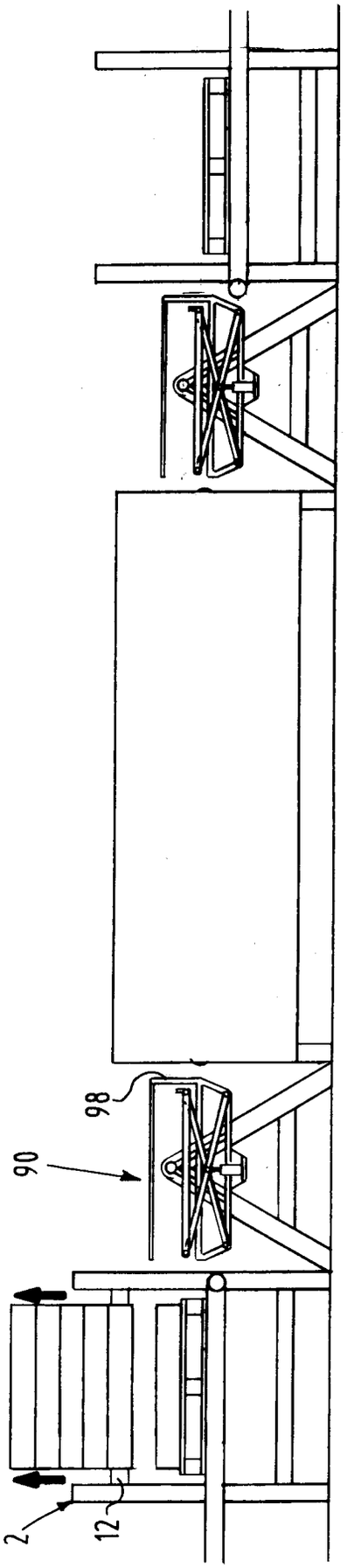

FIG. 5

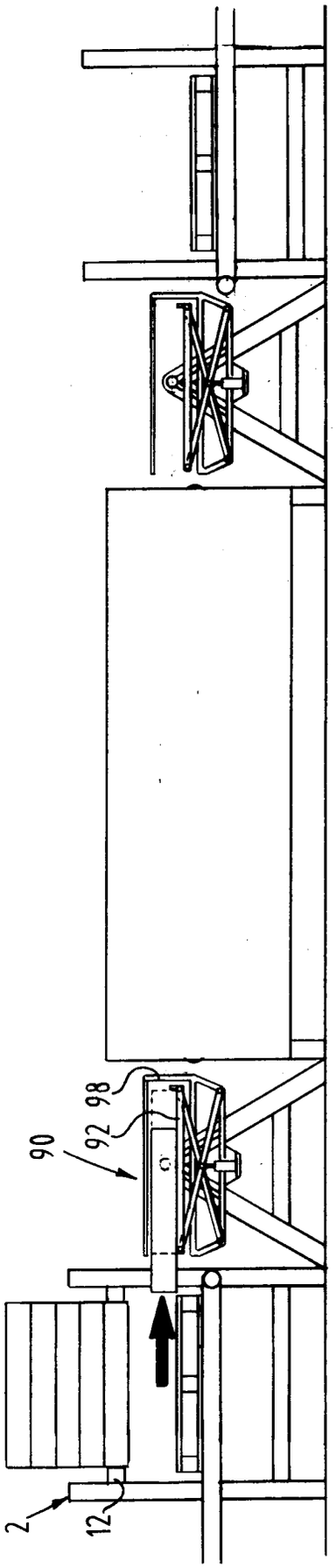

FIG. 6

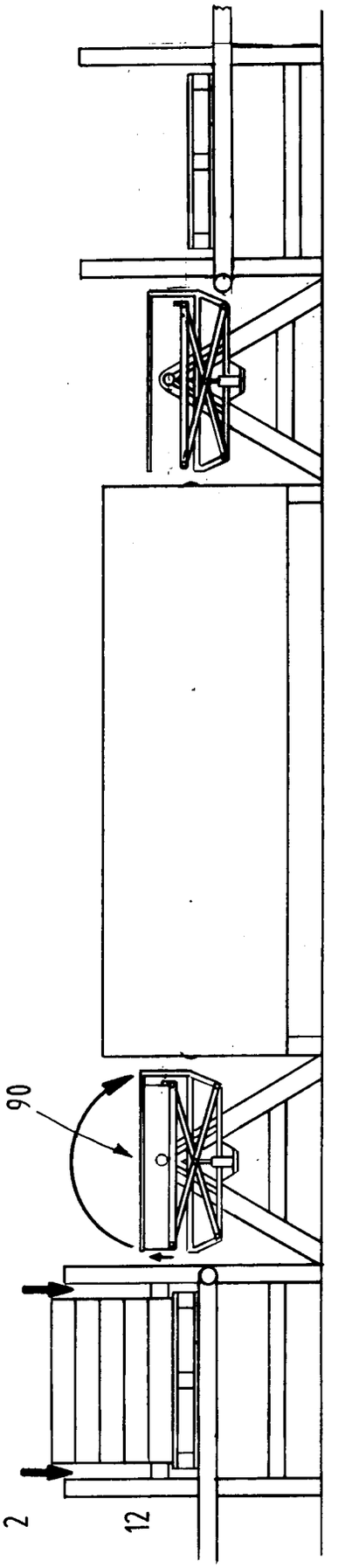

FIG. 7

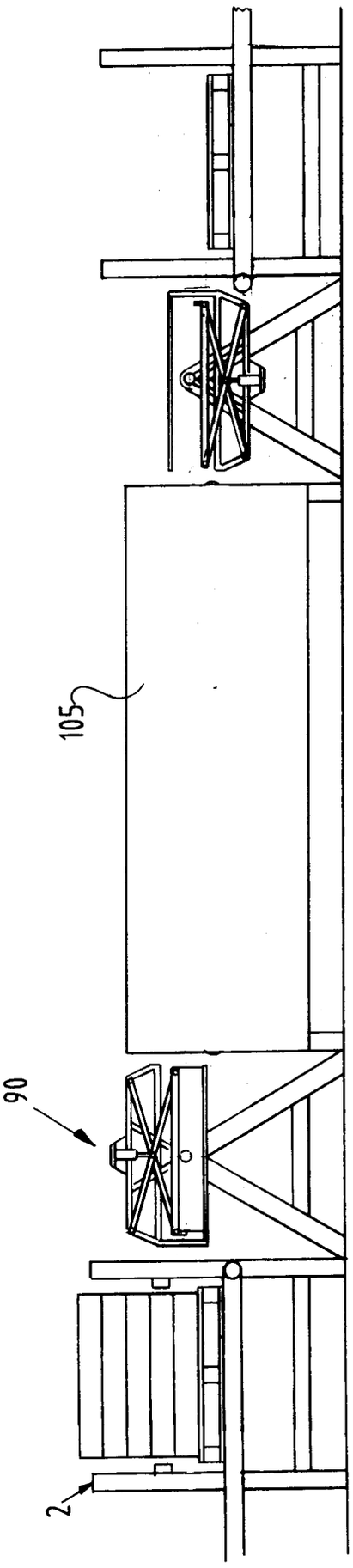

FIG. 8

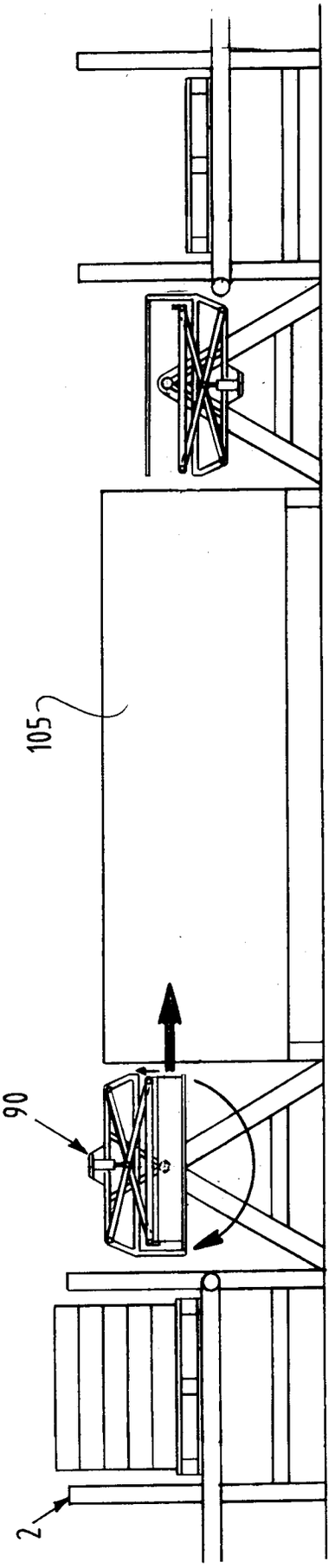

FIG. 9

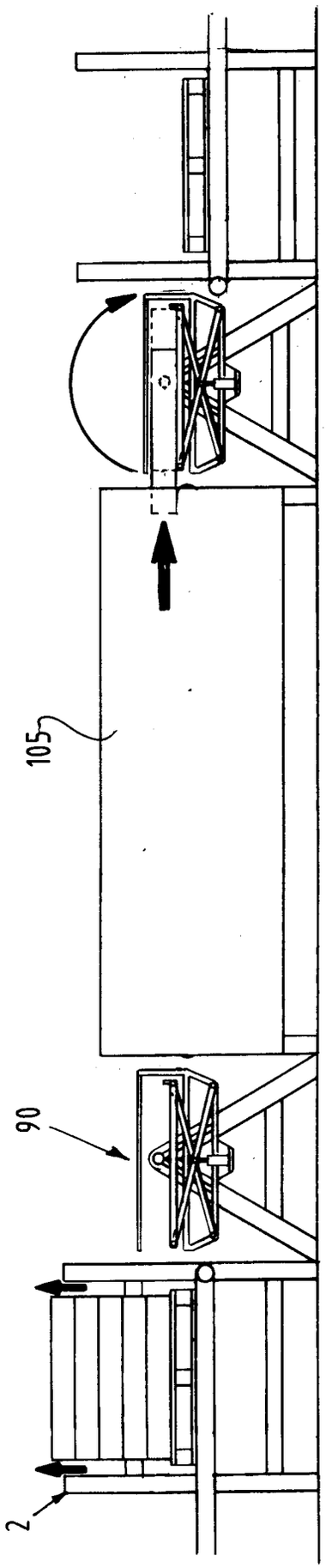

FIG. 10

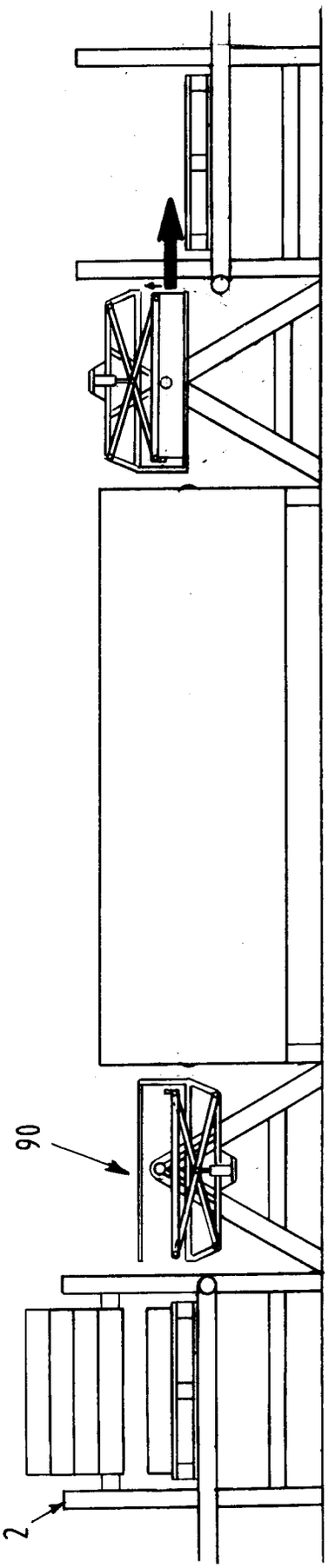

FIG. 11

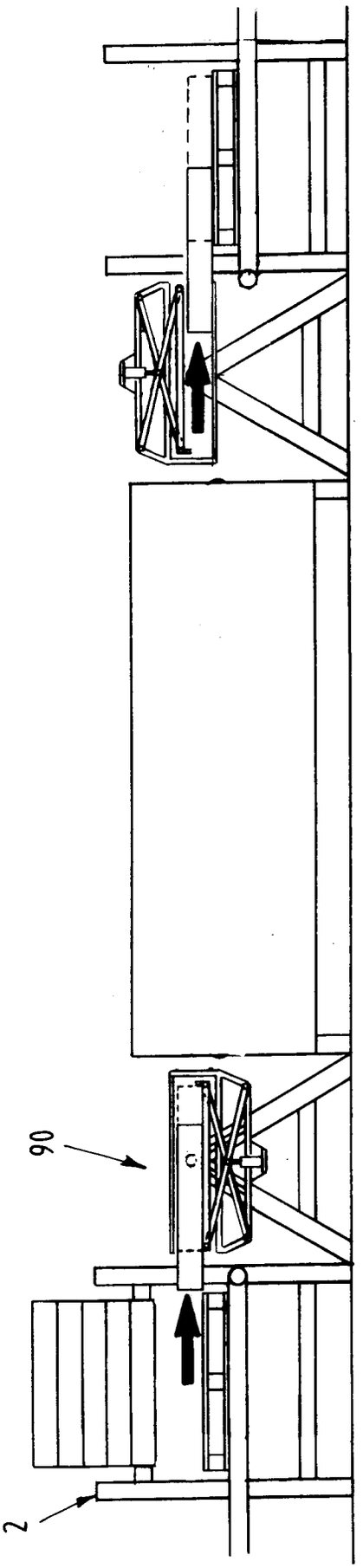

FIG. 12

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 20 1994

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)
X	EP 0 603 975 A (PIEPERS) 29 June 1994 * column 1, line 1 - line 24 * * column 2, line 37 - column 3, line 33 * * column 4, line 15 - line 33; figures 1-7,13,14 *	1-7, 11-19	B08B9/20
Y		8,9	

Y	DE 34 36 865 A (KLOTZKI) 12 June 1986 * page 7, line 13 - page 10, line 17; figures *	8,9	
A		1,4,6, 11,12, 14,16-19	

			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B08B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 September 1997	Van der Zee, W

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
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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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