US 20030141166A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2003/0141166 A1**

Hoveling (43) **Pub. Date: Jul. 31, 2003**

(54) **DEVICE FOR MOVING PRODUCTS**

(76) Inventor: **Rene Michael Hoveling**, Woerden (NL)

Correspondence Address:
YOUNG & THOMPSON
745 SOUTH 23RD STREET 2ND FLOOR
ARLINGTON, VA 22202

(21) Appl. No.: **10/057,980**

(22) Filed: **Jan. 29, 2002**

Publication Classification

(51) **Int. Cl.**[7] **B65G 65/00**

(52) **U.S. Cl.** **198/618**

(57) **ABSTRACT**

Device for moving products from a loading station to an unloading station. Carriers on which containers for the products are arranged move along a guide in the direction of transport. The drive is implemented with the aid of a toothed belt and each carrier is provided with a locking pawl that is hingeably fixed thereto and that can come into engagement with the toothed belt. The locking pawl is furthermore provided with a tab on which an operating element, such as a cylinder, firmly fixed to the transport device is able to engage. A second set of teeth constructed as a toothed belt is present and this is arranged in a stationary position. The carrier is provided with a wheel running in this toothed belt. This wheel is provided with a non-return clutch.

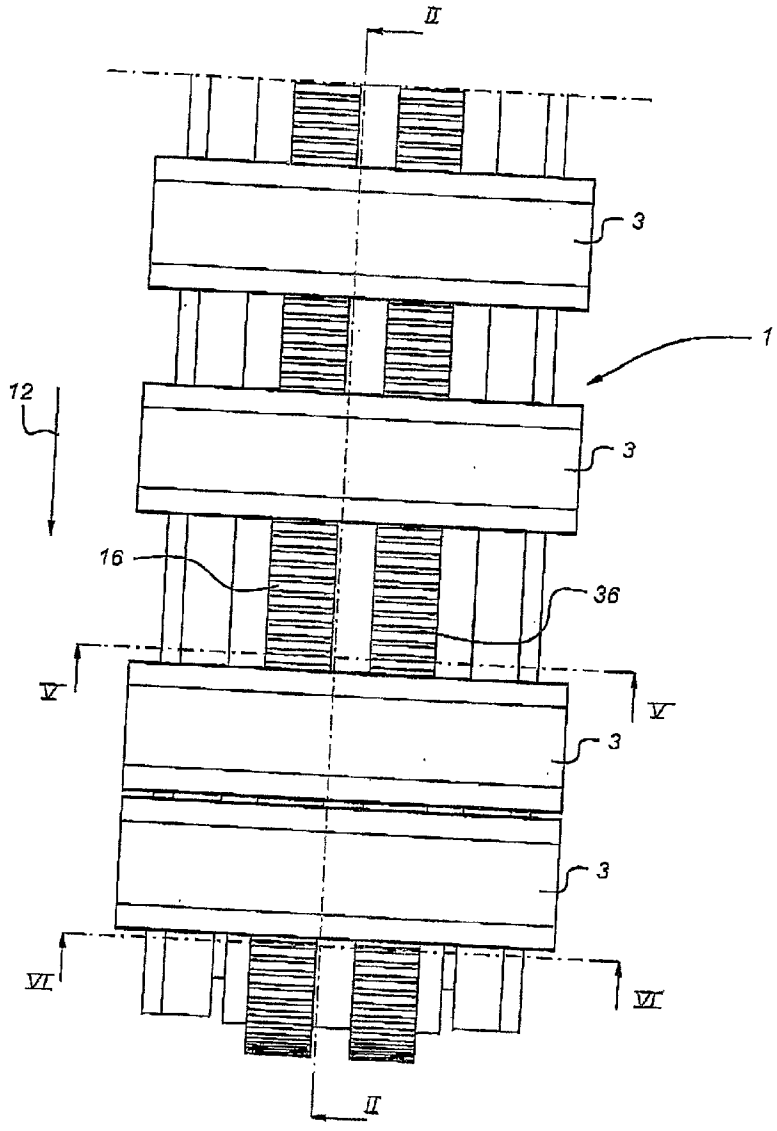


Fig 1

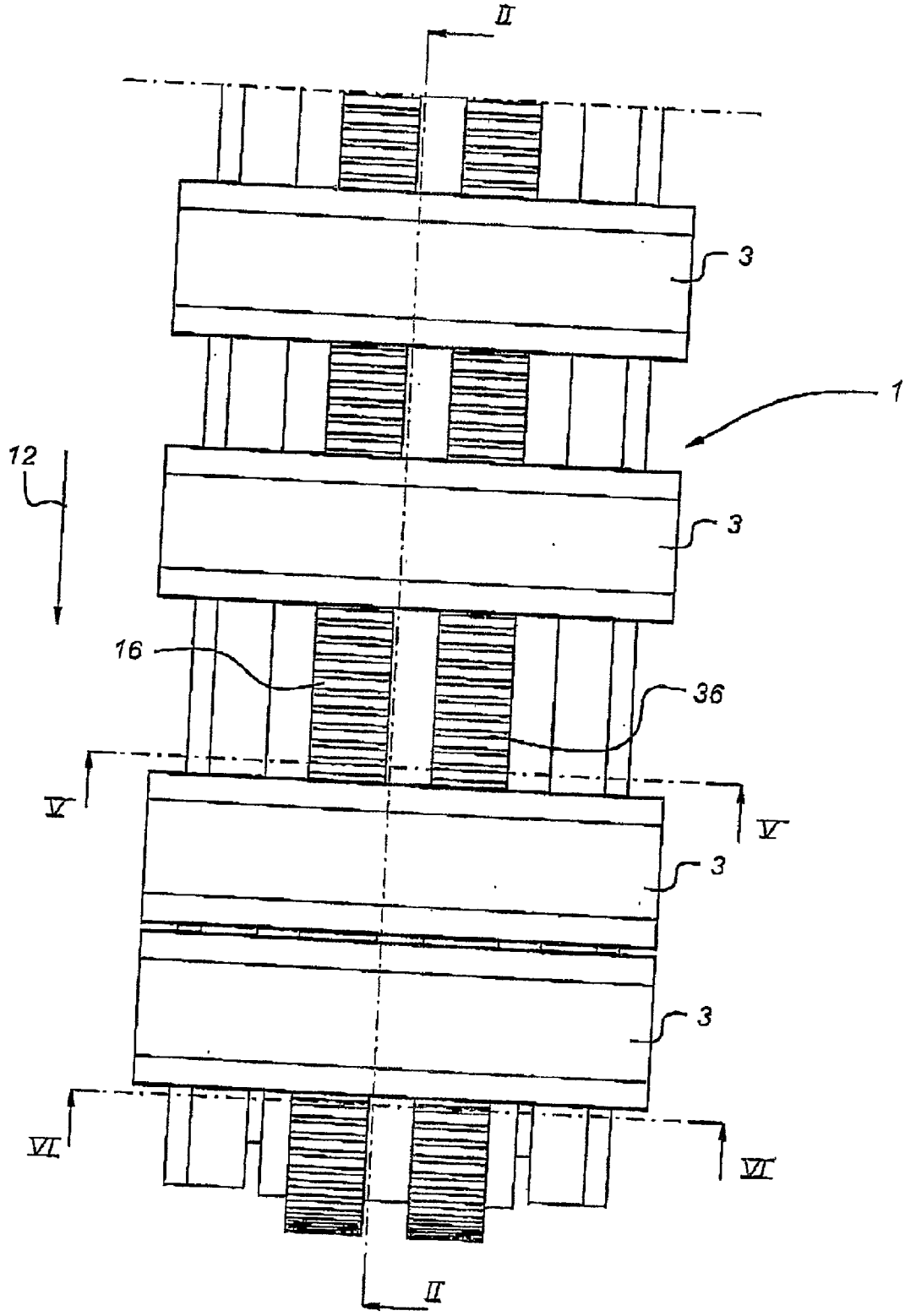


Fig 2

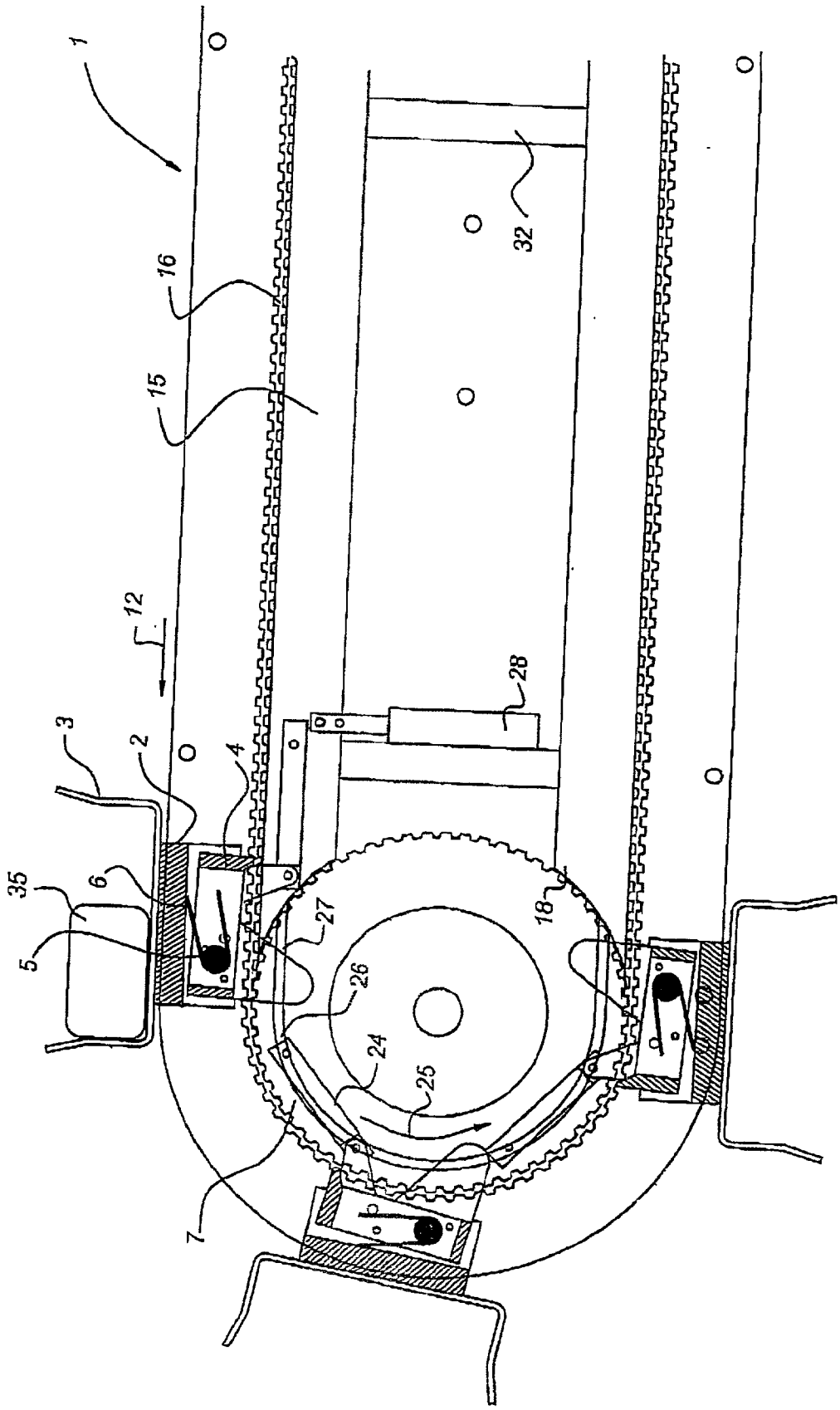


Fig 3

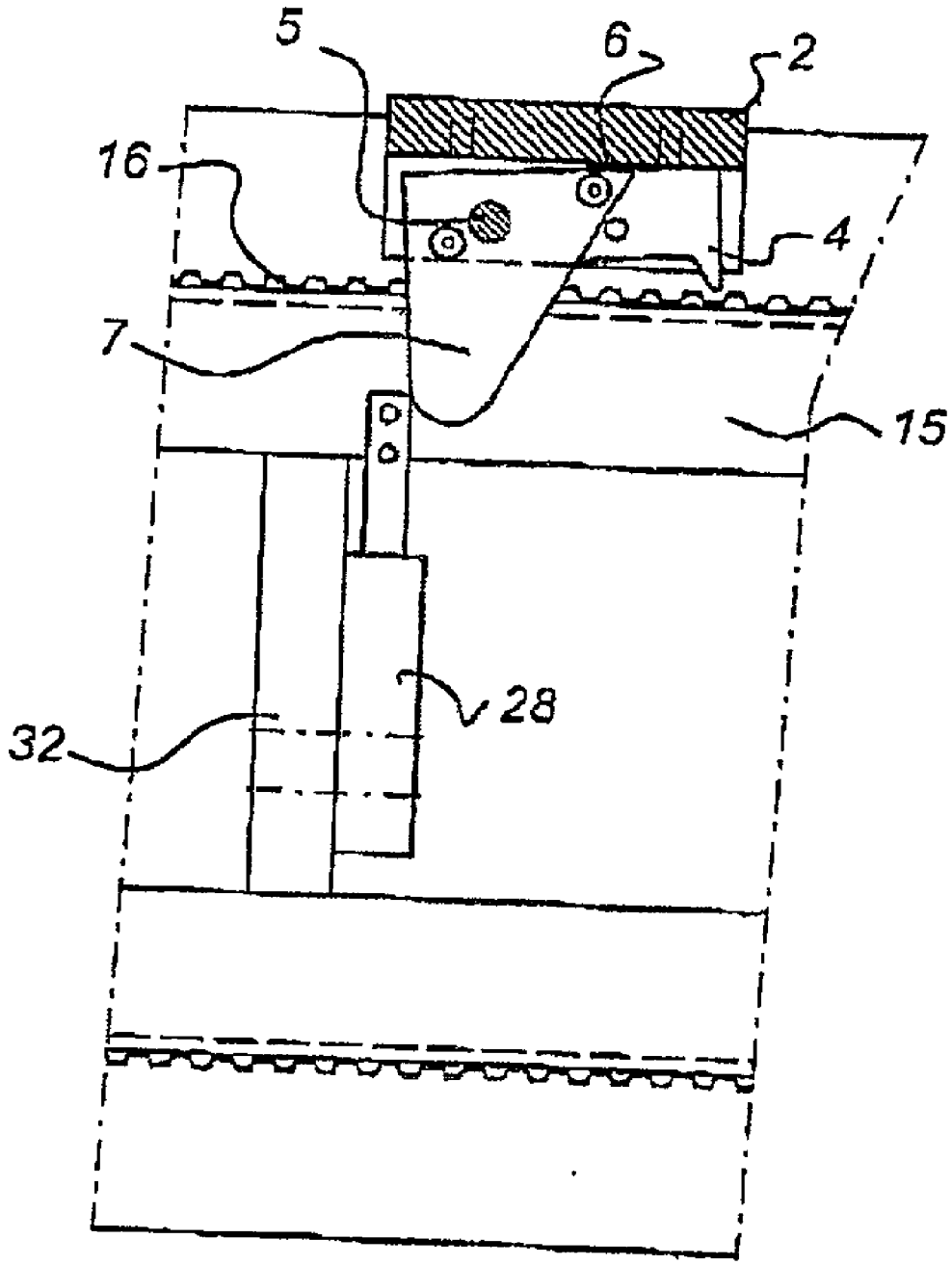


Fig 4

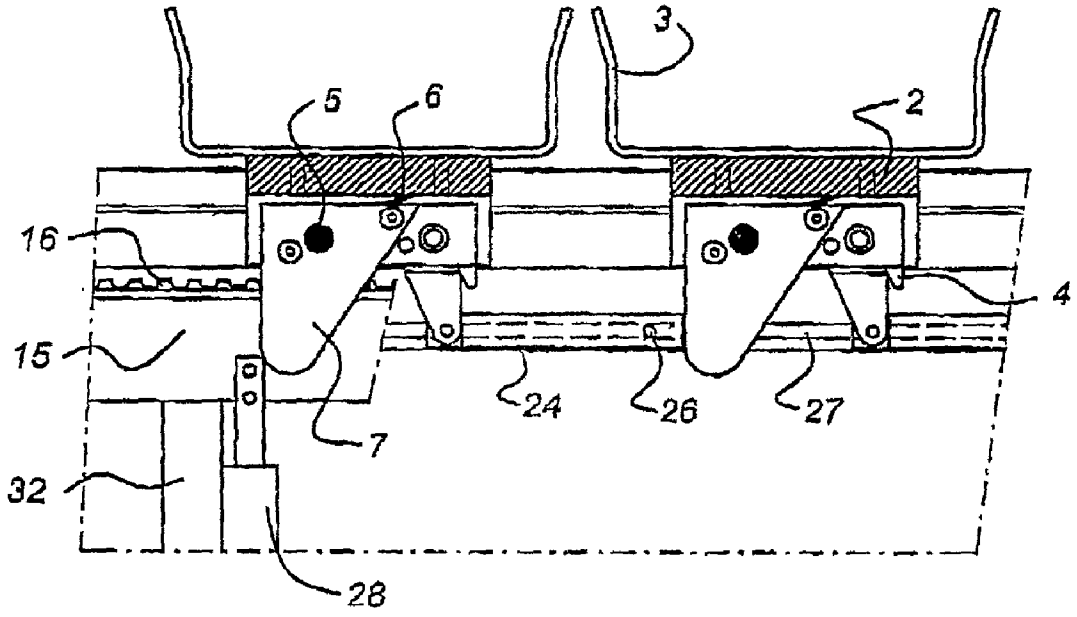


Fig 5

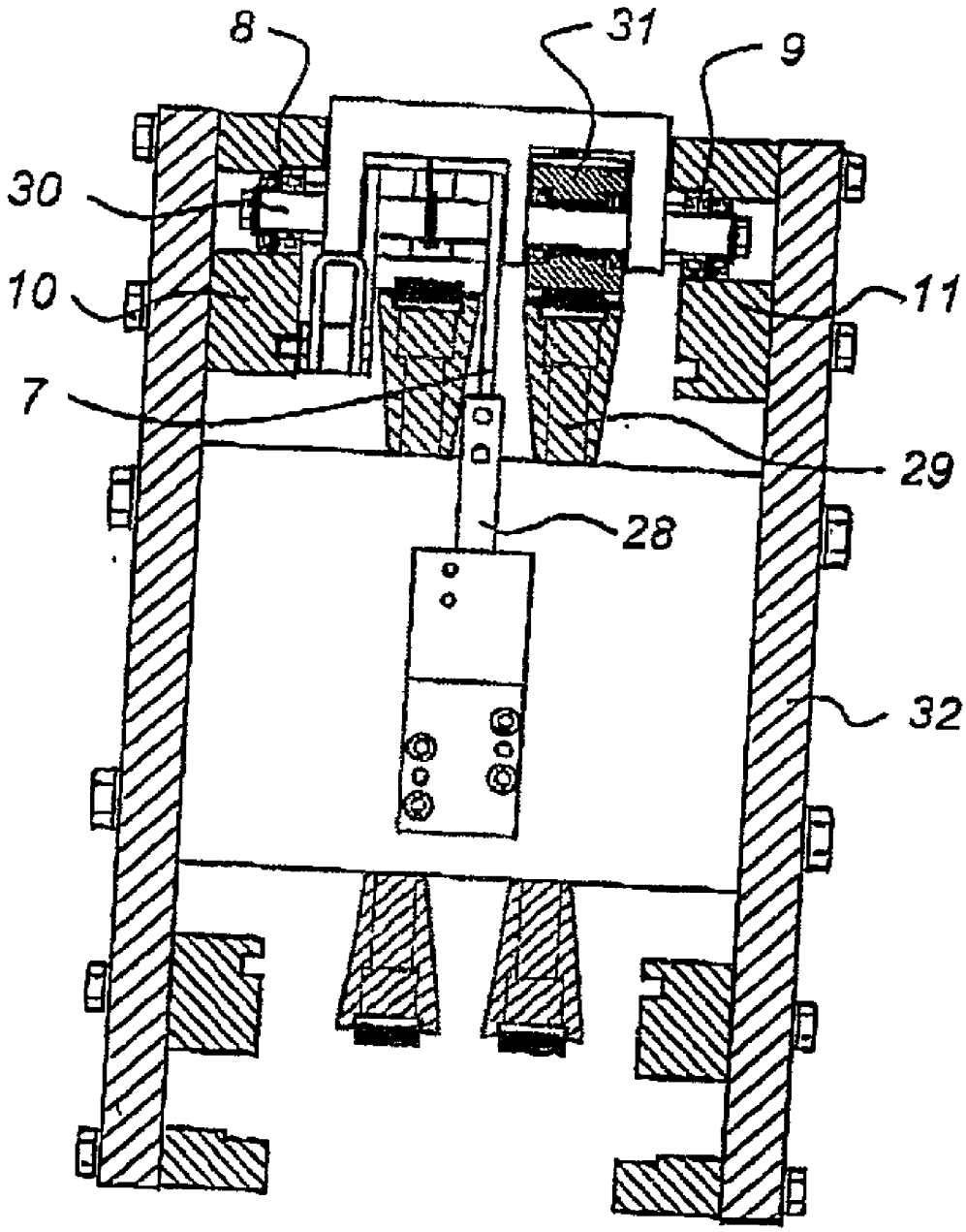


Fig 6a

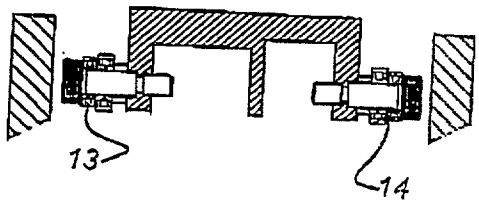
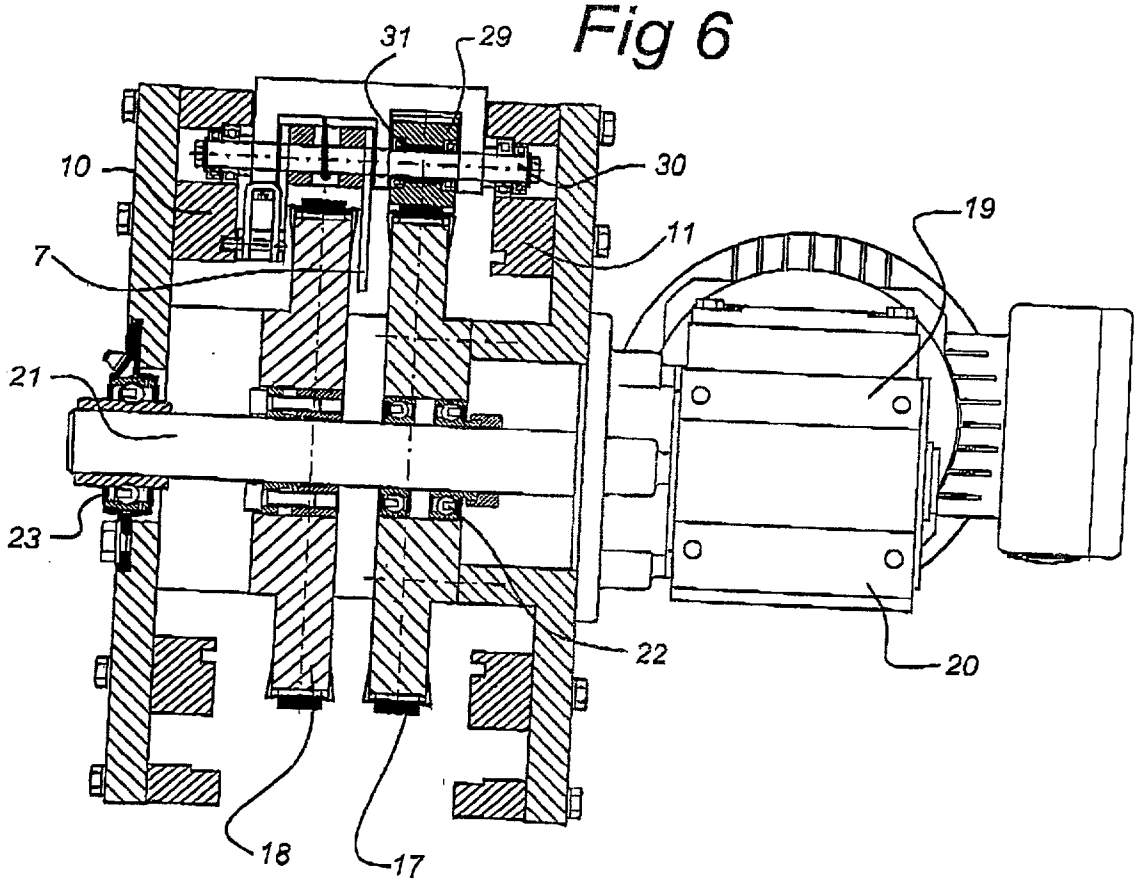


Fig 6



DEVICE FOR MOVING PRODUCTS

FIELD OF THE INVENTION

[0001] The invention relates to a device for moving products from a loading station to an unloading station.

BACKGROUND TO THE INVENTION

[0002] Devices for moving products from a loading station to an unloading station in a container having a multiplicity of carriers for said containers for said products, as well as a transport device for moving said containers between said loading station and unloading station and vice versa are known in the prior art. Reference is made in particular to U.S. Pat. Nos. 5,046,598 and 5,280,830. In these devices there are a large number of carriers and a continuously circulating belt or chain. The carriers engage on the belt, chain or the like by means of friction. If these have to stop in a certain position, means such as a cylinder are present which are moved into the path of the carriers. As a result a carrier is restrained and slip takes place between carrier and belt or chain. That is to say, the carrier concerned is pushed against the movable block with relatively high force. It is possible to reduce this force by reducing the grip between belt or chain and carrier, but this results in a less reliable transport when the operating means, that is to say the block, is not active. This disadvantage is greater if the front carrier of a series of carriers is restrained and the following carriers are blocked by this. Whenever a new carrier is blocked, a further frictional force is transferred to the front carrier and the force on the block increases.

SUMMARY OF THE INVENTION

[0003] The aim of the present invention is to provide a device for moving products which has a continuously operating drive and by means of which carriers are able to move with the drive or are able to remain stationary with respect to the drive, in a simple and guaranteed manner. A further aim of the present invention is to limit the forces exerted on the carriers when the latter are stationary.

[0004] A further aim of the present invention is to limit the forces exerted on the front carrier of a series of carriers when stationary.

[0005] A further aim of the present invention is to provide a construction by means of which it is possible to ensure that no movement in the direction opposed to the direction of transport can take place when the carrier is stationary.

[0006] A further aim of the present invention is to provide a construction by means of which accurate movement of the carrier together with the drive can be ensured without slip occurring.

[0007] These and further aims are achieved by means of a device for moving products from a loading station to an unloading station, comprising a multiplicity of carriers for said containers for said products, as well as a transport device for moving said containers between said loading station and said unloading station and vice versa, which transport device comprises a frame, a drive, circulating therein, for said carriers, guide means for said carriers and engagement means for bringing said carriers into engagement with said drive, wherein said drive is provided with recesses and said carrier is provided with an engagement member that extends into said recesses, operating means being present in order to move said engagement member out of the recesses.

[0008] According to a further aspect the present invention relates to a device for moving products from a loading station to an unloading station, comprising a multiplicity of carriers for said containers for said products, as well as a transport device for moving said containers between said loading station and said unloading station and vice versa, which transport device comprises a frame, a drive, circulating therein, for said carriers, guide means for said carriers and engagement means for bringing said carriers into engagement with said drive, wherein said carrier is provided with a toothed wheel that can rotate in the direction of transport and locks in a direction opposed thereto, which toothed wheel meshes with a set of teeth provided on the frame.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The present invention will be explained in more detail below with reference to an illustrative embodiment shown in the drawing. In the drawing:

[0010] **FIG. 1** shows a plan view of the device according to the invention;

[0011] **FIG. 2** shows a cross-section along the line **11-11** in **FIG. 1**;

[0012] **FIG. 3** shows detail A from **FIG. 2**;

[0013] **FIG. 4** shows the detail according to **FIG. 3** with two carriers;

[0014] **FIG. 5** shows the device according to the present invention in cross-section; and

[0015] **FIG. 6** shows the device according to the present invention in cross-section.

DETAILED DESCRIPTION OF THE INVENTION

[0016] The device according to the present invention is shown by **1** in the figures. This device consists of a large number of carriers **2** on which containers **3** are fitted for containing products. The direction of transport of device **1** is indicated by arrow **12**. Transport takes place from a loading station to an unloading station. With this arrangement it is possible for a number of carriers to accumulate at the loading station and/or unloading station and for a number of products to be placed in the containers, or removed therefrom, at the same time.

[0017] According to the present invention a continuously circulating toothed belt **16** is present. This belt rests on a support **15** fixed to frame **32** of the device **1**. There are wheels **18** (only one is shown in **FIG. 2**) located some distance apart, around which toothed belt **16** is wrapped. One of the wheels **18** serves for the drive. This is shown in detail in **FIG. 6**. Shaft **21** is driven via motor **19** and reduction gear **20**. Shaft **21** is firmly fixed to wheel **18**.

[0018] Each of the carriers **2** is provided with two shafts located some distance apart. A first shaft **30** is shown in **FIGS. 5 and 6** and is provided close to the ends with bearings **8**, **9** which run in guides **10**, **11** of frame **32**. This shaft **30** also serves as hinge pin for a locking pawl **4**, whilst

freewheel **29** is also fixed thereto. Shaft **30** is fitted on carrier **2** such that it cannot turn. Freewheel **29** is provided with a freewheel clutch **31**.

[**0019**] The second shaft of carrier **2** consists of two stubs **13**, **14** (**FIG. 6***a*), both provided with bearings. Like shaft **30**, these run in guides **10** and **11**. In this way it is ensured that the carrier **2** describes a predetermined path some distance away from the toothed belt **16**.

[**0020**] As has already been indicated, a locking pawl **4** is hingeably connected to carrier **2**. The free end thereof is pushed into the cavities in toothed belt **16** by means of a spring **6**. Consequently, when the toothed belt **16** is moved in the direction of arrow **12** the carriers **2** will move in the same direction. Locking pawl **4** is also provided with a tab **7**. The free end of carrier **2** can be moved out of the toothing of toothed belt **16** by operating this tab **7**. This is shown in **FIG. 3**. Tab **7** can be lifted under the influence of cylinder **28**, which is firmly connected to the frame **32**, as a result of which locking pawl **4** is freed from the toothed belt **16**. As a result the toothed belt **16** can continue to move whilst it is ensured that the carrier **2** is stationary. In contrast to the prior art, with this arrangement there is no mutual slip between any part of the carrier **2** and the toothed belt **16**.

[**0021**] In addition to a tab, an auxiliary arm **24** is also hingeably connected at **25** to locking pawl **4**. The free end of auxiliary arm **24** is provided with a pin **26** that runs in a groove **27** in the frame **32**.

[**0022**] If the front carrier of a series of carriers **2** becomes stationary, for example with the aid of cylinder **28**, the auxiliary arm **24** connected thereto will also become stationary (**FIG. 4**). The tab **7** of the following carrier moved forward by the toothed belt **16** will come into contact with the free end of auxiliary arm **24** and in this way provide for decoupling of the locking pawl **4** concerned. That is to say, the carriers following the first of a series of carriers no longer have to be restrained by the front or first of said series of carriers by slip acting thereon but are restrained by active decoupling from the toothed belt **16**. As soon as the first carrier **2** moves on, coupling of the following carrier **2** with the toothed belt also takes place. In view of the length of the arm **24** there is sufficient time after cylinder **28** has moved backwards briefly for said cylinder to move rapidly back into the path of the tabs **7**, so that in principle the following carrier can again be restrained.

[**0023**] In addition to the circulating toothed belt **16** there is a further toothed belt **36** that is fitted such that it is stationary and extends parallel to toothed belt **16**. As can be seen from **FIG. 6**, wheel **17** is also fitted such that it is stationary. This is achieved by the presence of bearings mounted on the rotary shaft **21**. Freewheel **29** turns around shaft **30**. The freewheel clutch **31** is constructed such that backward movement cannot take place. That is to say, if carrier **2** becomes stationary, for example as a result of operation of cylinder **28**, there is no risk that this carrier will move backwards. After all, freewheel **29** in engagement with stationary belt **36** prevents such mutual rotation.

[**0024**] In the manner described above it is possible in a simple manner to bring a number of containers into a waiting position, then to bring them simultaneously or one by one into a transport position and then to bring them into a free position again, either as a group or individually. By means of the construction described above, accurate positioning of the containers with respect to the surroundings is possible, which is important when loading/unloading.

[**0025**] It will be understood that operation of the locking pawl **4** can take place in any way that can be envisaged in the prior art. Operation can take place by means of a part that is stationary with respect to the frame, but it is also possible to fit operating means on the carrier. After all, as a result of the present invention it is no longer necessary actively to restrain carrier **2** after decoupling of locking pawl **4**, as was the case in the state of the art with the construction using slip.

[**0026**] This also means that the motor power employed can be lower since the effects of friction, such as the production of heat and particles, are no longer present.

[**0027**] Detection of the various carriers can be carried out by any method known in the state of the art, such as by means of light. It will be understood that instead of a toothed belt it is also possible to use a chain or the like. These and further modifications fall within the scope of those skilled in the art after reading the above description and within the scope of the appended claims.

1. Device (**1**) for moving products (**35**) from a loading station to an unloading station, comprising a multiplicity of carriers (**2**) for said containers for said products, as well as a transport device for moving said containers between said loading station and said unloading station and vice versa, which transport device comprises a frame, a drive (**16**), circulating therein, for said carriers, guide means (**9**, **10**) for said carriers and engagement means (**4**) for bringing said carriers into engagement with said drive, wherein said drive is provided with recesses and said carrier is provided with an engagement member that extends into said recesses, operating means (**28**) being present in order to move said engagement member out of the recesses.

2. Device according to claim 1, wherein said operating means are connected to the frame.

3. Device according to claim 1, wherein said engagement member is hingeably fixed to said carrier.

4. Device according to claim 1, wherein said drive comprises a toothed belt above which (in the transport position) said carrier is fitted.

5. Device according to claim 1, wherein said carrier is provided with further operating means (**24**) for operating the engagement member of a following carrier in the direction of transport.

6. Device according to claim 1, wherein said carrier is provided with a toothed wheel that can rotate in the direction of transport and locks in a direction opposed thereto, which toothed wheel (**29**) meshes with a set of teeth provided on the frame.

7. Device according to claim 6, wherein said set of teeth comprises a stationary toothed belt (**36**).

8. Device according to claims **4** and **7**, wherein the two toothed belts are arranged alongside one another.

9. Device for moving products from a loading station to an unloading station, comprising a multiplicity of carriers for said containers for said products, as well as a transport device for moving said containers between said loading station and said unloading station and vice versa, which transport device comprises a frame, a drive, circulating therein, for said carriers, guide means for said carriers and

engagement means for bringing said carriers into engagement with said drive, wherein said carrier is provided with a toothed wheel that can rotate in the direction of transport and locks in a direction opposed thereto, which toothed wheel meshes with a set of teeth provided on the frame.

10. Device according to claim 9, wherein said operating means are connected to the frame.

11. Device according to claim 9, wherein said engagement member is hingeably fixed to said carrier.

12. Device according to claim 9, wherein said drive comprises a toothed belt above which (in the transport position) said carrier is fitted.

13. Device according to claim 9, wherein said carrier is provided with further operating means for operating the engagement member of a following carrier in the direction of transport.

14. Device according to claim 9, wherein said drive is provided with recesses and said carrier is provided with an engagement member that extends into said recesses, operating means being present in order to move said engagement member out of the recesses.

15. Device according to claim 9, wherein said set of teeth comprises a stationary toothed belt.

* * * * *