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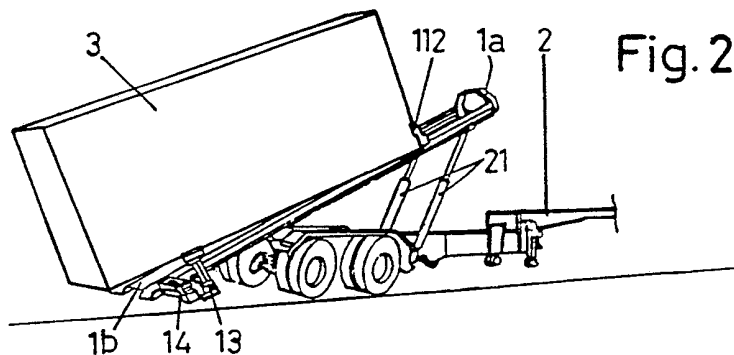
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(54) Self-loading system for containers

(57) Self-loading system for containers, incorporated in a truck, trailer or semi-trailer to be loaded, consists of a tilting upper load chassis (1) with means (112) for attachment of e.g. a capstan and pulley, block hauling arrangement to the front of the container; means for elevating and self-centring (13) the rear of the container and means (14) for anchoring the rear of the container (3); these means being such that, when aforesaid means are actuated in succession, the container (3) can be loaded/unloaded by the driver himself, without the need of any crane or auxiliary equipment. The chassis (1) comprises telescopically-arranged sections (1(a)) and (1(b)), and vertically-movable supports (13) are mounted on a sub-frame which can move along, or be attached to, section (1(b)), and can be locked in position on section (1(a)) when the sections are moved together.



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Fig. 1

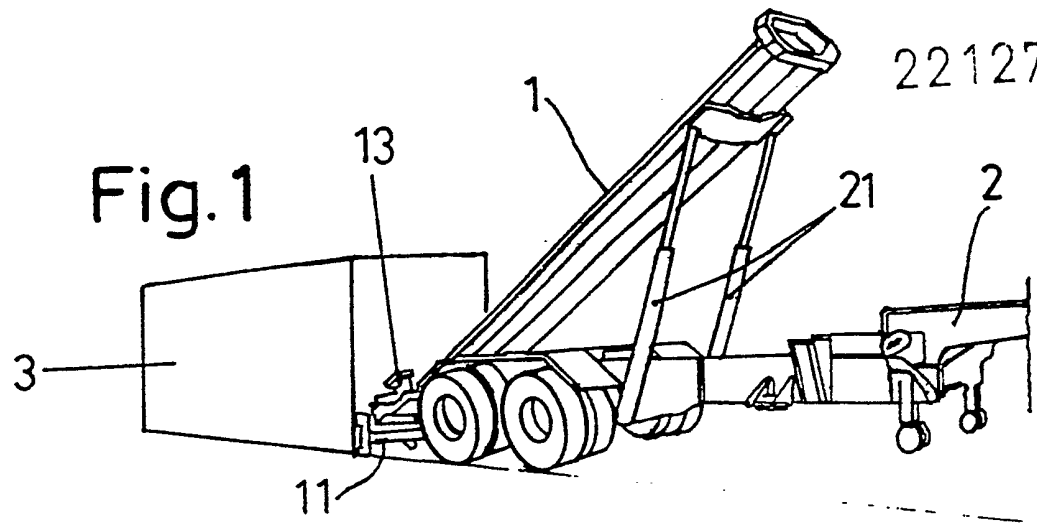


Fig. 2

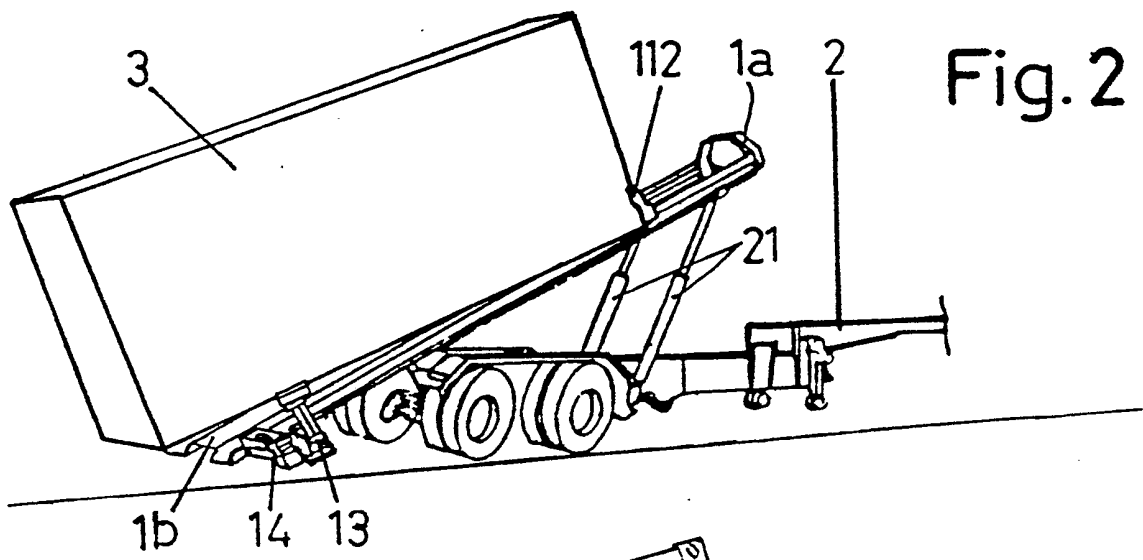


Fig. 3

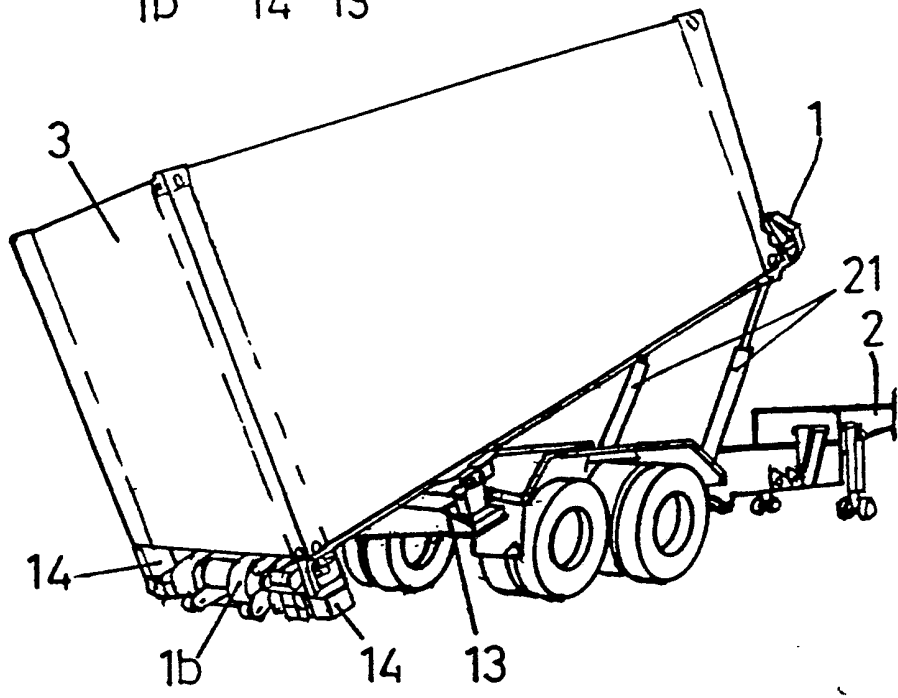


Fig. 4

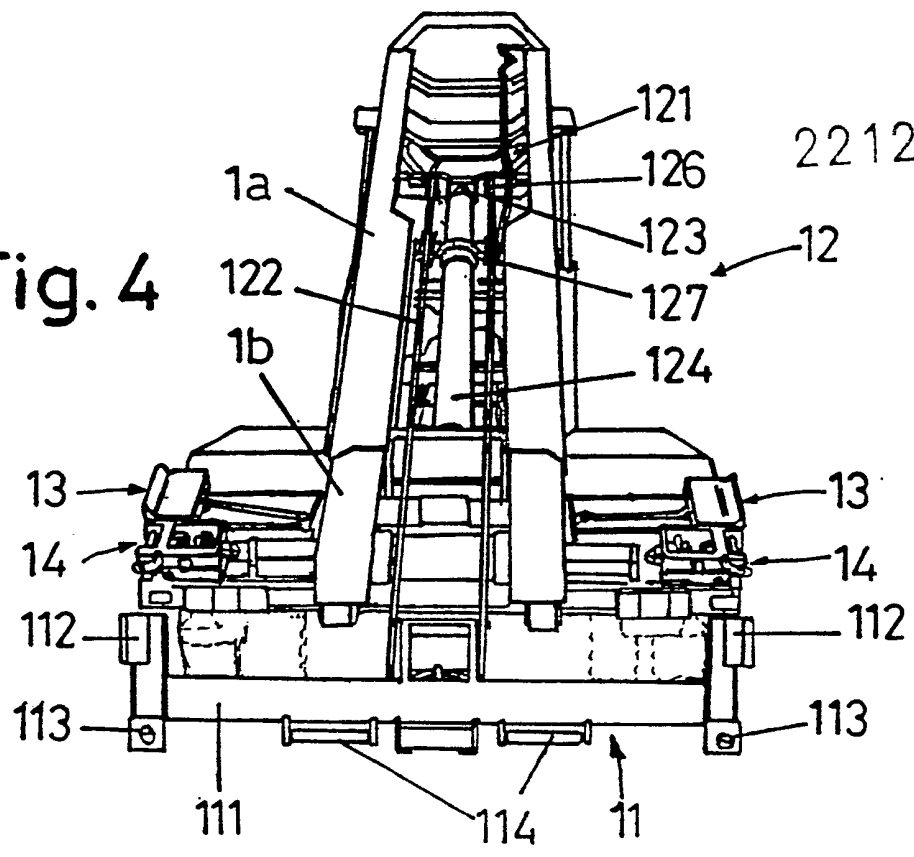


Fig. 5

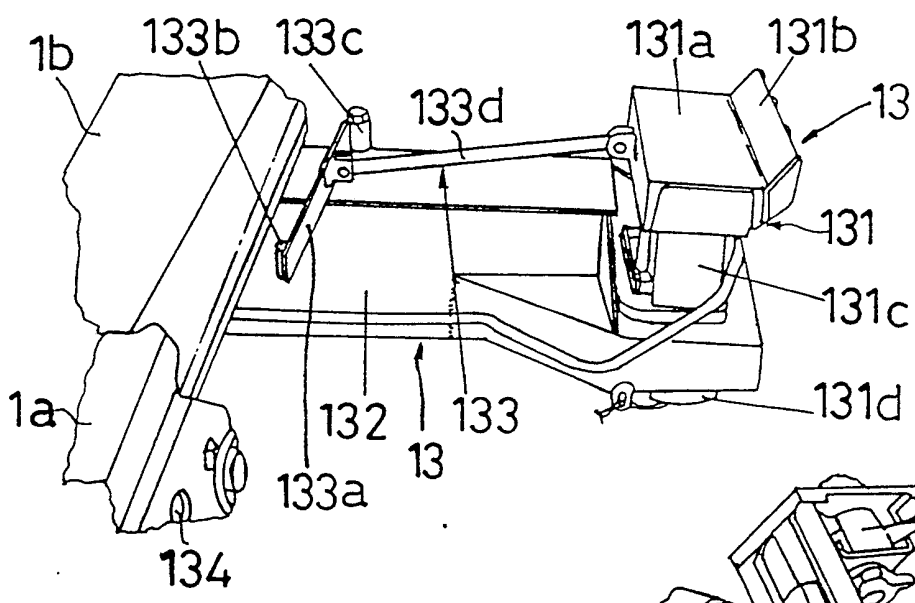
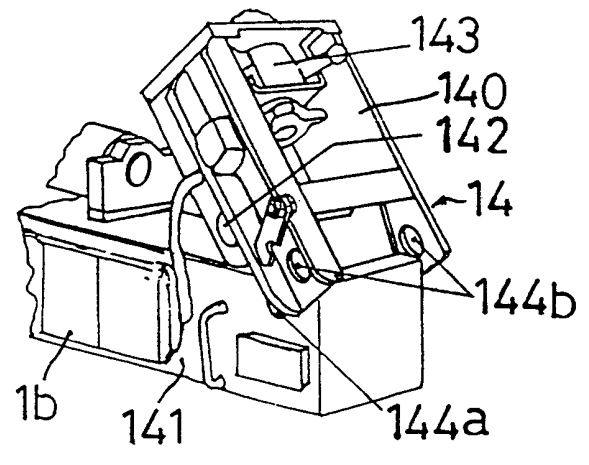


Fig. 6



Title: Self-loading system for containers

This invention relates to a self-loading system for containers and to the industrial handling of heavy loads on transport vehicles. In particular, the invention relates to the loading or unloading of containers on and off trailers or semi-trailers to which a tractor unit is coupled for onward transport.

The difficulty and inconvenience of handling containers and similar items when loading them onto road vehicles is well known, since conventionally large accessory cranes are required to lift the load and deposit it on the trailer, with the inconvenience not only of the use of such accessory machines but also of the difficulty of handling and the trouble of correctly positioning the load on the truck.

In an attempt to solve these difficulties, systems were proposed for handling the said loads in which it was no longer necessary to use any type of crane or accessory lifting machinery, since the hoisting of the load would be solved by dragging it by means incorporated partly in the truck onto which it was to be loaded, and partly in the container being loaded.

It is an object of the present invention to provide a

self-loading system for containers in which no equipment, means or apparatus has to be incorporated in the container to be loaded nor is the use of cranes or any other machinery required to load the container.

In accordance with the present invention, there is provided a container loading system for use on trailers or the like, comprising a tilting load bearing chassis including means for connection to the front of a container provided at a rear portion of said chassis; means being provided for moving the container after the connection means has been engaged with the container; and an assembly for connection to the rear of the container, said assembly comprising columns mounted on a rear sub-chassis and being guided on a structure moveably mounted on the load-bearing chassis, means being provided to anchor the structure to the load bearing chassis during movement thereof; each column which is mounted on the sub-chassis comprising a stop plate for lateral self-centring of the container capable of lifting itself and the container through the action of a fluid actuated cylinder for raising the stop plate on its supporting structure; means also being provided for fixing the assembly to the load bearing chassis; the arrangement being such that a container can be loaded or unloaded from the chassis without the use of a crane or similar lifting device.

The present invention will now be described by way of example with reference to the accompanying drawings, in which:-

Figure 1 is a schematic elevation of a self-loading system for containers according to one embodiment of the invention during the first stage of loading, when the upper part of the chassis (1) has been tilted up and the means (11) for connection to the front of the container (3) have been moved to their operating position.

Figure 2 is a schematic elevation of a self-loading system for containers as shown in Figure 1, where the means of elevation (13) have been actuated.

Figure 3 is a schematic elevation of the self-loading system for containers, at a subsequent loading stage, when the means of hoisting/haulage (12) and elevation (13) have brought the container (3) to a subsequent loading position, in which the means of rear connection (14) - already deployed - have been set to hold the container (3).

Figure 4 is a schematic front view of the means of front connection (11) of the container (3) and the means of hoisting/haulage (12), in one working position.

Figure 5 is a partial schematic view of the means of elevation (13) and of their means of attaching to or

releasing from the tilting chassis (1a).

Figure 6 is a partial schematic view of the means of rear connection (14) in the semi-deployed position.

A non-limitative example of practical construction of this invention is described below and other methods of construction in which accessory changes are made which do not alter its basis are in no way excluded.

A practical example of the invention illustrated in the drawings comprises:

- an upper load chassis (1) , and on it
- means (11) of front connection of containers (3) to be loaded;
- means (12) of hoisting/haulage of the container (3) once its front part has been engaged;
- means (13) of elevation and self-centring of the rear part of the container (3) in semi-loaded positions;
- means (14) of rear connection of the container (3).

The upper load chassis (1) is mounted on the chassis (2) of the road vehicle (normally a truck, trailer or semi-trailer) and consists of respective sill structures

(1a, 1b) coupled telescopically. Sill structure (1a) can be tilted in relation to the chassis (2) of the vehicle by the action of cylinder (21), and sill structure ((1b) can be moved linearly in relation to the tiltable sill structure (1a) by another cylinder or cylinders (124) which form part of the means of hoisting/haulage (12) described below.

The means (11) for front connection of the container (3) to be loaded, schematically illustrated in Figure 4, comprises a cross-member (111) which has respective guide stops (112) for self-centring the container (3) at its ends; respective connecting bolts (113) for holding the container (3) at the front thereof and respective sliding/supporting rollers (114) which provide support against the ground during the pre-connection operations or against the upper chassis (1) during the hoisting of the container (3) in a central area thereof. The assembly comprising the means (11) is rigidly connected to the haulage cable (122) corresponding to the means of hoisting/haulage (12) described below.

The means of hoisting/haulage (12) include a block (121) movable on the upper chassis (1a), this block (121) being connected to the end of the rod (123) of a cylinder (124) which is fixed at the bottom to the rear part of the said upper chassis (1a). The said movable block (121) incorporates pulleys (126) which form an assembly with



other pulleys (127) fitted to the fixed part of the cylinder (124); this assembly constituting a capstan whose cable (122) has its ends firmly attached to the moveable block (121), passing through the pulleys (127) to turn around the pulleys (126) and emerge underneath the upper chassis (1b) to connect up with the means of front connection (11). According to a particular form of construction, it is arranged for the pulleys (127) and where necessary the pulleys (126) to be provided with a peripheral guard (not illustrated), which while allowing passage of the rope (122) nevertheless prevents its accidental disengagement from the corresponding pulley (126, 127) or the accidental snagging of any loose items which may fall onto the pulley.

The means (13) of elevation and self-centring of the container (3) in semi-loaded positions, schematically represented in Figure 5, consists of respective columns (131) mounted on a rear sub-chassis (132), the assembly being guided on the mobile structure (1b) of the upper chassis (1) and capable of moving with it in relation to the tilting structure (1a) of the upper chassis (1) or of being fixed to it by means of anchorage (133) while the said mobile structure (1b) is moving. Each of the columns (131) has a stop-plate (131a) mounted on a supporting structure (131c), this assembly being capable of raising or lowering when actuated by a fluid actuated

cyclinder (131d). The stop-plate (131a) has a flange (131b) for the lateral self-centring of the container (3).

The relative movement between this rear sub-chassis (132) and the upper chassis (1) is obtained by the sliding or rolling of various sleeves connected to the sub-chassis (132) in guides provided in the mobile upper chassis (1b).

The means of anchorage (133) are, for this practical form of construction and as represented in Figure 5, a pawl (133a) mounted through an articulation (133c) on the sub-chassis (132) and whose bolt (133b) engages with or releases from a sheave-hole (134) on the tilting upper chassis (1a). This anchorage/release is obtained when the corresponding stop-plate (131) is actuated by means of a connecting rod (133d) articulated to the said stop-plate (131) and to the pawl (133a).

The said means (14) of rear connection of the container (3) - schematically represented in Figure 6 comprise a cross member (141) rigidly connected to (or more particularly forming a single piece with) the mobile upper chassis (1b) and bearing a support (140) at each end on which the connection bolt (143) is mounted, which will fit into the corresponding sheave-hole of the container (3) to secure the latter. The support (140) can tilt in relation to the cross-member (141) by means of a through-bolt (142);

and by providing respective orifices (144a, 144b) facing each other in other areas of the support (140) and cross-member (141), in such a way that in the deployed position the orifices (144a, 144b) are opposite each other so that the assembly can be fixed by inserting a through-bolt into them.

Possible changes which in no way alter the essence of the invention are, for example, configuring the cross-members of the sub-chassis (132) and the rear (141) and/or front (111) connection members to adapt them to the self-loading of containers (3) of different widths; modifying the arrangement and/or components of the means of hoisting/haulage (12); varying the forms and/or actuating mechanisms of the components described, or similar alterations.

In any case, for the self-loading of a container (3) according to the system of this invention, the following operations are carried out in the succession:

1. Connection of the container (3) - Pre-loading stage

The vehicle (2) is moved up to the container (3) and the means (12) of lowering the means of front connection (11), which rest on the ground on their rollers (114) actuated. The bolts (113) are inserted into the container (3) and the guide stops (112) are automatically positioned,

self-centring the container (3).

2. Elevation of the container (3) - semi-loaded stage

The means of hoisting/haulage (12) are actuated, picking up the means of front connection (11) and raising the front part of the container (3) until it is placed on the rear part of the upper chassis (1a). The means of hoisting/haulage (12) continue to be actuated until the means of elevation (13) and of rear connection (14) are positioned approximately underneath the middle of the container (3).

3. Rear anchoring of the container (3) - final loading stage

The sub-chassis (1b) is moved, and with it the means of elevation (13) and rear connection (14) to their extreme opposite position. The means (13) which lift the container (3) are actuated, leaving the sub-chassis (1b) and means of connection (14) free. The means of hoisting/haulage (12) are actuated, causing the container (3) to move forward on the sub-chassis (1a) and moving forward with it the means of elevation (13) - which are supporting it - until their self-locking on the sub-chassis (1a). The means of rear anchoring (14) are deployed and fixed to the container (3) and the sub-chassis (1b) is moved to its original extreme position. The assembly is tilted downwards until the container (3) is horizontal,

which corresponds to its transport position. For  
unloading the container (3), the operations described are  
carried out in the reverse order.

Claims:

1. A container loading system for use on trailers or the like, comprising a tilting load bearing chassis including means for connection to the front of a container provided at a rear portion of said chassis; means being provided for moving the container after the connection means has been engaged with the container; and an assembly for connection to the rear of the container, said assembly comprising columns mounted on a rear sub-chassis and being guided on a structure moveably mounted on the load-bearing chassis, means being provided to anchor the structure to the load bearing chassis during movement thereof; each column which is mounted on the sub-chassis comprising a stop plate for lateral self-centring of the container capable of lifting itself and the container through the action of a fluid actuated cylinder for raising the stop plate on its supporting structure; means also being provided for fixing the assembly to the load bearing chassis; the arrangement being such that a container can be loaded or unloaded from the chassis without the use of a crane or similar lifting device.

2. A system as claimed in claim 1, wherein the means for fixing the assembly to the load bearing chassis comprises, for each column, a unidirectional pawl mounted on the sub-chassis and linked to the column by a connecting rod,

the pawl being engaged or released from a sheave hole provided opposite thereto.

3. A system as claimed in claim 1 or 2, wherein the sub-chassis includes telescopic coupling member structures, a tilting upper chassis and a further moveable structure which is telescopically moveable on the former between two end positions by means of fluid actuated cylinders; the said structures containing the means for moving the container which are reciprocable by the action of a cylinder fixed at the rear end thereof; said means incorporating a set of pulleys, one end of which is attached to the means for connection to the front of the container which can move beyond the rear of the load bearing chassis when the cylinder is retracted.

4. A container loading system which is substantially as herein described in relation to the accompanying drawings.