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TRAILER FLOOR

Field of the invention

The invention relates to a trailer floor. In particular to trailer floors for container freight carrying trailers.

Background to the invention

Whilst the following description is in terms of container freight trailers, it will be understood that the invention is not limited to that particular use.

Typically, container freight trailers have a tray or flat section extending from the rear of the trailer to an area near its front end. At this front end area, the level of the tray is stepped to a higher height. This is necessary to permit the location of the wheels and connection of a prime mover. Accordingly, when seeking to utilise all the tray area of such trailers, difficulties arise because of this stepped area as it is necessary to lift container freight to a higher level.

The form of typical container freight trailers fall into three basic constructions.

The first is the most basic and is merely an open tray trailer having the stepped up portion as described above.

The second known arrangement is a fully enclosed version of the open container with a pair of doors being provided at the rear of the trailer. In this embodiment, the full enclosure is by way of rigid panels at the sides, front and roof of the container.

The rigid side form covering of the trailer means that loading of cargo must take place via the pair of doors at the end of the trailer. These trailers are usually backed up to a loading dock which is at a height approximating the height of the trailer floor. It is known to provide the trailer floor with a number of parallel roller conveyors which extend up to the stepped region to facilitate the movement of freight within the trailer. However, the stepped up region can only be utilised for freight if a fork lift or manual labour is used to locate freight on, or remove freight from, that elevated plateau.

The third arrangement is similar to the second except that at least the side panels are comprised of a number of sections of flexible material. In this arrangement, access to

the trailer floor may be gained via the side panels. Typically when in transit, these flexible panels are secured to the trailer floor by way of straps which may be appropriately placed in tension to ensure that the freight is not open to weather elements and cannot fall from the container floor.

The flexible sided trailer permits easier location of freight in the elevated area as a fork lift truck may be used from the side of the container to place cargo at that level.

However, with each of these arrangements the location or removal of freight on the upper plateau is time consuming or involves alternate loading techniques to that used for the rest of the trailer. Typically difficulties will arise where a number of trailers have been located side by side with their end doors at loading docks. If the trailers are closely adjacent to one another it is not possible to manoeuvre a fork lift to fill the upper plateau simultaneously. Delays result.

Likewise it is difficult and time consuming to locate a fork lift up on to a loading dock so that it can enter the trailer to enable freight to be placed on the elevated area. Safety issues also arise when using fork lifts in such restricted conditions.

Object of the invention

It is an object of the present invention to ameliorate some or all of these problems and to provide an alternate means integrated with the trailer floor to permit the storage of freight on the elevated area.

Description of the invention

In accordance with one form of the invention, a trailer having a trailer floor is provided which trailer floor comprises:

- (a) a substantially horizontal first load carrying section;
- (b) a substantially horizontal second load carrying section vertically displaced upwardly from the first load carrying section;
- (c) a substantially horizontal third load carrying section interposed between the first load carrying section and the second load carrying section and being movable between a first position substantially coplanar with the first load carrying

section, to a second position substantially coplanar with the second load carrying section; and

- (d) a lift to move the third load carrying section between the first position and the second position.

In another form of the invention, the first, second and third load carrying sections of the trailer floor are provided with at least one conveyor to permit the freight to be moved between and within each load carrying section. Typically, the conveyor is a set of longitudinally extending rollers.

In accordance with another form of the invention, one or more of these load carrying sections is provided with a guide to assist the location of freight in predetermined locations. Typically, the guide defines the lateral extremities of the width of the section. In a further preferred form, the guide may also be adapted to assist the easy movement of freight there along. An example of such a guide is a plurality of parallel rollers extending along a side of the trailer floor. Preferably such a guide will be provided along both sides of the trailer floor.

In another form of the invention, at least one restraint is provided in one or more of the load carrying sections of the trailer floor to inhibit undesirable movement of the freight on the trailer floor whilst it is being transported. Typically, the restraint may comprise at least one removable upright having an end which can be fixed to the trailer floor in such a way as to constitute a barrier to freight moving longitudinally along the trailer floor. Typically, the end is located in a complementary opening in the trailer floor whilst the other end is fixed to the upper structure of the trailer.

In another preferred form of the invention, the lift to move the third load carrying section comprises hydraulics, electronics and/or mechanisms. Particularly preferred are hydraulics actuated by an electric motor. In such an arrangement, hydraulic cylinders are positioned beneath the third load carrying section and adjacent to each corner. The operation of these hydraulic cylinders may be coordinated by the use of appropriate hydraulic fluid lines communicating between the hydraulic cylinders to permit the uniform lifting and lowering movement of the third load carrying section between the first and second positions.

The control of these arrangements may be via an electric motor (as mentioned above) which may be actuated by an operator either from a location adjacent to the hydraulic cylinders at the side of the trailer, or from a position on top of the trailer floor, or from a position remote of the trailer.

In another preferred form of the invention, the trailer further comprises a pair of doors to close an end of the trailer. Typically, each of the pair of doors is attached to the trailer by at least one set of double pivot hinges. These double pivot hinges allow each of the pair of doors to be rotated about two spaced axes to permit the door to be rotated so that it does not obstruct the defined loading width of the trailer.

Description of the drawings

The invention will be further illustrated with reference to the accompanying drawings in which:

Figure 1 is a vertical cross section of a container freight trailer with a freight container in a first position;

Figure 2 is a vertical cross section of the container freight trailer of Figure 1 with the freight container in a second position;

Figure 3 is a vertical cross section of the container freight trailer of Figure 1 with the freight container in a third position;

Figure 4 is a vertical cross section of the container freight trailer of Figure 1 with the freight container in a fourth position;

Figure 5 is a vertical cross section of the container freight trailer of Figure 1 fully loaded with containers;

Figure 6 is a view along A-A of the container freight trailer of Figure 1;

Figure 7 is a view along B-B of the container freight trailer of Figure 4; and

Figure 8 is a magnified view in area C in Figure 6 depicting the sequential movement I-IV of the double hinged rear trailer doors.

In the drawings, like components are provided with the same number designation.

As shown in the drawings, a container freight trailer 4 has a floor which is composed of a substantially horizontal first load carrying section 1, a substantially horizontal second load carrying section 2 vertically displaced upward from the first load carrying section 1 and a substantially horizontal third load carrying section 3 interposed longitudinally between the first load carrying section 1 and second load carrying section 2. The third load carrying section 3 is movable between the first position where it is coplanar with the first load carrying section 1 as shown in Figures 1 and 2, and a second position where it is coplanar with load carrying section 2 as shown in Figure 3 to 5.

As shown in Figure 6, each of sections 1, 2 and 3 are provided with a pair of parallel roller strips 7. Strips 7 are aligned with each other. Each strip 7 is made up of rollers which are individually orientated in the transverse direction and protrude partially above the floor. In use the container 6 sits on these roller strips 7 and may be easily moved horizontally along the strip by hand, by reason of the rotation of these rollers.

The movement of the third load carrying section 3 between the first position and the second position may be achieved by hydraulics which are electrically actuated. As shown in Figures 3 and 7, hydraulic cylinders 8 are positioned beneath the third load carrying section 3 and adjacent to each of its corners. These hydraulic cylinders 8 are connected together by conventional hydraulic fluid lines (not shown) and the movement of the third section up and down is activated by a conventional electric motor (not shown).

In order to load container freight into the trailer 4, the truck rig 5 positions the trailer 4 adjacent a suitable loading dock (not shown). As will be apparent from Figure 1, the container 6 is initially loaded into rear of the trailer 4 through open double hinged doors 9 into the first position.

The container 6 is then moved in the direction of the arrow along roller strips 7 until it reaches the second position at which it is fully supported by the third load carrying section 3 as shown in Figure 2.

To locate the container 6 on the second load carrying section 3, the hydraulic cylinders 8 are actuated to allow the uniform vertical movement of third load carrying section 3 from the second position as shown in Figure 2 to the third position as shown in Figure 3.

Thereafter the container 6 is moved in the direction of the arrow as shown in Figure 4 from the third load carrying section 3 into the fourth position at which the container is fully supported by the second load carrying section 2. Once again, such horizontal movements are facilitated by the roller action of the roller strips 7.

As shown in figure 5 subsequent containers 6 are moved along the first and third sections until the trailer 4 is full.

To restrict unwanted longitudinal movement of the containers 6, posts 10 and 11 are installed at the perimeter of the second load carrying section 2 and third load carrying section 3, as shown in Figure 5.

During loading, it is important to inhibit the containers 6 from skewing and becoming damaged. To achieve this, a pair of roller strips 12 are provided along the lower area of each of the walls adjacent to the first section 1. The distance between the pair of strips 12 is designed to be only marginally greater than the width of the containers. This maintains the containers substantially in straight alignment.

To further assist quick loading of the trailer 4, it is desirable for the doors 9 to be positioned so they do not encroach upon the width of the trailer 4. As shown in Figure 8, the doors 9 have a double hinge 13.

In position I, the door 9 is closed. In position II, the door 9 has been partially opened by rotation of door 9 about first hinge 14. As the door is opened to position III, the door 9 also rotates about second hinge 15. With such double hinged arrangement, the door 9 may be opened in to a position where it is complete clear of the walls adjacent the first load carrying section so the full width of the rear of trailer 4 can be utilised to load the containers 6. Obviously, it is also possible with this arrangement to have the door 9 further rotated to position IV where it is substantially parallel to the sides of the trailer 4.

The word 'comprising' as used in this description and in the claims does not limit the invention claimed to exclude any variants or additions which are obvious to the person skilled in the art and which do not have a material effect upon the invention.

Modifications and improvements to the invention will be readily apparent to those skilled in the art. Such modifications and improvements are intended to be within the scope of this invention.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A trailer having a trailer floor comprising:
- (a) a substantially horizontal first load carrying section;
 - (b) a substantially horizontal second load carrying section vertically displaced upwardly from the first load carrying section;
 - (c) a substantially horizontal third load carrying section interposed between the first load carrying section and the second load carrying section and being movable between a first position substantially coplanar with the first load carrying section, to a second position substantially coplanar with the second load carrying section; and
 - (d) a lift to move the third load carrying section between the first position and the second position.
2. The trailer of claim 1 wherein the first, second and third load carrying sections of the trailer floor have at least one conveyor to permit freight to be moved between and within each load carrying section.
3. The trailer of claim 2 wherein the conveyor is a set of longitudinally extending rollers.
4. The trailer of claim 1, wherein one or more of the load carrying sections is provided with a guide to assist the location of freight in predetermined locations.
5. The trailer of claim 4, wherein the guide defines the lateral extremities of the width of the first load carrying section.
6. The trailer of either claims 4 or 5, wherein the guide includes a plurality of parallel rollers extending along at least a part of a side of the trailer floor adjacent the first load carrying section.
7. The trailer of either claims 4 or 5 wherein the guide includes a plurality of parallel rollers extending along at least a part of both sides of the trailer floor adjacent the first load carrying section.

8. The trailer of claim 1 further comprising at least one restraint in one or more of the load carrying sections to inhibit undesirable movement of freight located thereon.
9. The trailer of claim 8 wherein the restraint comprises at least one removable upright having an end which can be fixed to the trailer floor to constitute a barrier to freight moving longitudinally along the trailer floor.
10. The trailer of claim 9 wherein the end is locatable in a complementary opening in the trailer floor whilst the upright has another end fixable to an upper structure of the trailer.
11. The trailer of claim 1 wherein the lift to move the third load carrying section comprises hydraulics, electronics and/or mechanisms.
12. The trailer of claim 11 wherein the hydraulics are actuated by an electric motor.
13. The trailer of claim 11 wherein the hydraulics include hydraulic cylinders positioned beneath the third load carrying section adjacent to each corner thereof.
14. The trailer of claim 13 wherein the operation of the hydraulic cylinders is coordinated to permit substantially uniform lifting and lowering of the third load carrying section between the first and second positions.
15. The trailer of claim 1 further comprising a pair of doors to close an end of the trailer.
16. The trailer of claim 15 wherein each of the pair of doors is attached to the trailer by at least one set of double pivot hinges to permit each of the pair of doors to be rotated about two spaced axes.