

ADAPTER

The object of the present invention is an adapter for connecting
5 consecutive 20-foot containers to each other on top of the hatch
cover of a cargo ship. By means of the invention the loading of 20-
foot and 40-foot containers one on top of another in the same
stack is enabled.

10 On a cargo ship containers are transported in a hold below hatch
covers and also on deck on top of the hatch covers in a number of
parallel rows and in a number of tiers one on top of the other. On
deck are detachable hatch covers, with which the hold below is
closed. The containers above deck are transported on top of the
15 hatch covers. On the deck of the ship there are typically also fixed
structures, so-called lashing bridges, on which some of the
containers are supported with separate lashing bars.

The lowermost container of each container stack is locked onto the
20 hatch cover with twistlocks and containers that are one on top of
the other are further locked to each other with twistlocks.

A typical container arrangement on top of a hatch cover is that
each individual stack of containers is composed of either 20-foot or
25 of 40-foot containers. 20-foot containers cannot be stacked on top
of a 40-foot container, and on the other hand two consecutive
stacks of 20-foot containers are situated so far apart from each
other that it is possible to work in the space between the container
stacks and to connect lashing bars between a container stack and
30 the hatch cover. In this type of solution it is not possible to stack a
40-foot container on top of two consecutive 20-foot containers.

The stacks of containers are disposed on top of supports that are
rigidly welded to a hatch cover, and that being the case the
35 positioning of the supports determines the locations of the
container stacks. It has not been possible to stack 20-foot and 40-
foot containers in the same stack as the container arrangement has

included a so-called lashing gangway between consecutive 20-foot containers.

Since it has not been possible to stack 20-foot and 40-foot
5 containers in the same stack, the flexibility of the ship from the
viewpoint of loading has been restricted. On the other hand, if it
was desired to change the container arrangement in such a way
that consecutive 20-foot containers were disposed closer to each
10 other than before, at the same time enabling 40-foot containers to
be stacked upon them, the only way has been the welding in a
fixed manner of new supports, and the support structures required
by them, in a new location. Removal of the old supports and
welding of the new ones is a time-consuming job. In addition, the
15 welding and painting of the new support structures to be made
below the top plating of the hatch cover are extremely awkward.

DE 29914837 discloses an adapter for connecting consecutive 20-
foot containers to each other on top of the hatch cover of a cargo
ship. However, it is not possible to connect the containers to each
20 other by using the existing supports.

The purpose of the present invention is to enable the stacking of
40-foot containers onto the same stack as 20-foot containers. This
is implemented with an adapter according to the invention, the
25 adapter being characterized by what is defined in independent
claim 1. Preferred embodiments of the adapter according to the
invention are defined in the dependent claims.

The object of the invention is therefore an adapter, which can be
30 connected to existing supports in the center area of a hatch cover
at a point in which there is space according to the original
container arrangement for connecting the lashing bars of
consecutive 20-foot containers.

35 In the adapter are fastening points, on top of which consecutive
20-foot containers are supported from their corner castings, e.g. by
means of twistlocks.

The fastening points of the adapter are disposed at such a distance from each other that a 40-foot container can be lifted and locked at its corners on top of consecutive 20-foot containers that are on the
5 adapter.

The adapter is self-supporting, i.e. its strength is so great that the loading exerted on the adapter from the 20-foot containers that are on top of the adapter is transmitted into the supports originally on
10 the hatch cover and into the support structures below the top plating.

The adapter can be connected in a detachable manner to the existing supports.
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The adapter can also be connected in a fixed manner to the existing supports and/or to the top plating of a hatch cover.

With the adapter according to the invention it is possible to change
20 the distance between two consecutive 20-foot containers or container stacks to be so small that 40-foot containers can be stacked on top of 20-foot containers or container stacks.

By using the adapter, laborious and expensive modification work
25 for moving the supports of containers is avoided.

In the following, the invention will be described in detail by the aid of some examples of its preferred embodiments with reference to the attached drawings, wherein
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Fig. 1 presents a general view from the deck of a container ship, as viewed from the side, in the case of two stacks of consecutive 20-foot containers.

35 Fig. 2 presents a general view from the deck of a container ship, as viewed from the side, in the case of a stack of consecutive 40-foot containers.

5 Fig. 3 presents a general view from the deck of a container ship, as viewed from the side, in the case of a container stack composed of 20-foot and 40-foot containers.

Fig. 4 presents 20-foot containers in their original locations.

10 Fig. 5 presents a 40-foot container in its original location.

15 Fig. 6 presents the 20-foot containers in their new location by means of the adapter according to the invention.

Fig. 7 presents two 20-foot containers installed into position on top of an adapter according to the invention.

20 Fig. 8 presents the original supports in the center area of the hatch cover.

25 Fig. 9 presents an adapter according to the invention installed into position on top of the original supports.

30 In Figs. 1-3, the hatch cover 1 lies on top of the hatch coaming 2 that is on the deck of a cargo ship. A hatch cover 1 functions as the cover of the cargo hold 3 and at the same time it is possible to transport containers 6, 7 on top of the hatch cover. There are typically a number of hatch covers side by side on top of one cargo hold.

35 A lashing bridge 4 for fastening the lashing bars 5 of containers can also be installed on the coaming 2.

On top of a hatch cover 20-foot containers 6 and 40-foot containers 7 are generally transported in such a way that in one stack there are only containers of the same length. The locations of the containers are determined according to the positioning of the supports 8, 9, 10 (Figs. 4-9) welded onto the hatch cover. There are different supports for 40-foot containers than for 20-foot containers. The supports for 40-foot containers are marked with the reference numbers 8 and 8', the outer supports for a 20-foot container with the reference numbers 9 and 9', and the inner supports for a 20-foot container with the reference numbers 10 and 10'.

Between consecutive stacks of 20-foot containers is a so-called lashing gangway 11 (Fig. 1), i.e. a working space for securing the lashing bars 5 of the containers. In this arrangement it is not possible to fit 40-foot containers on top of consecutive 20-foot containers.

In order for it to be possible to connect a 40-foot container on top of 20-foot containers, the outer ends of two consecutive 20-foot containers must be situated on the same line as the ends of the 40-foot container. In this position only a small gap remains between the 20-foot containers. The corners of the outer ends of these 20-foot containers rest on the same supports 8, 8' as the corners of a 40-foot container. So that the inner ends of the 20-foot containers could be supported, an adapter 12 according to the invention is installed to rest on the existing supports 10, 10'.

So that the adapter can be quickly installed into its position, it may be necessary to remove the locking elements 13, 13', which are generally welded on, in the lashing gangway for fastening the lashing bars of the containers. When using an adapter, there is no space for lashing bars between two consecutive 20-foot containers.

Locking devices 14, with which the adapter can be quickly and easily connected into its position, are made according to the location of the original supports in the adapter 12. The locking

device 14 can be a device integrated into the adapter, which is used manually when fastening and detaching the adapter. Alternatively, the adapter can be implemented in such a way that a separate device, such as a twistlock, is used as the locking device, which can be manual, semi-automatic or fully automatic in its operation.

The adapter 12 is self-supporting, i.e. its strength is so great that the loading exerted on the adapter from the 20-foot containers that are on top of the adapter is transmitted into the supports 10, 10' originally on the hatch cover 1 and into the support structures below the top plating. In this case there is no need to weld separate support structures to the hatch cover.

Fastening points 15, 15' are made in the center area of the adapter at the point of the corner castings of the 20-foot containers. Typically separate twistlocks 16, 16' are installed into these fastening points, into which twistlocks the containers are locked from their corner castings. The fastening points 15, 15' of the adapter 12 are situated at such a distance from each other that a 40-foot container 7 can be lifted and locked at its corners onto consecutive 20-foot containers 6 placed on top of the adapter.

It is practical to make adapters for two or four corner castings of a container. Generally on the edge of a hatch cover is an adapter for two corner castings of a container (= two 20-foot containers end-to-end on the edge), and on the other hand in the center area of the hatch cover adapters for four corner castings are used (= two 20-foot containers end-to-end and side-by-side) In the center area of the hatch cover it is also possible to use side by side two adapters intended for two corner castings.

When using the adapter, generally 1-3 tiers of 20-foot containers 6 are stacked on top of it and on top of these a number of tiers of 40-foot containers 7. Depending on the weight of the containers, also other types of combinations are possible.

An adapter 12 can be connected to existing supports also by welding or with other mechanical devices than what is presented herein.

- 5 An adapter 12 can be steel or composite or some other sufficiently strong material.

It is obvious to the person skilled in the art that the invention is not limited to the embodiments described above, but that it can be
10 varied within the scope of the claims presented below.

The characteristic features possibly presented in the description in conjunction with other characteristic features can also, if necessary, be used separately to each other.
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CLAIMS

1. Adapter (12) for connecting consecutive 20-foot containers (6) to each other on top of the hatch cover (1) of a cargo ship, **characterized** in that the adapter (12) is installed to rest on existing supports (10, 10') in the center area of a hatch cover (1) that were originally intended for fastening 20-foot containers (6).
2. Adapter according to claim 1, **characterized** in that fastening points (15, 15') are formed in the adapter (12), on top of which fastening points consecutive 20-foot containers (6) are supported from their corner castings.
3. Adapter according to claim 1 or 2, **characterized** in that the fastening points (15, 15') of the adapter (12) are situated at such a distance from each other that a 40-foot container (7) can be lifted and locked at its corners onto consecutive 20-foot containers (6) placed on top of the adapter.
4. Adapter according to any of claims 1-3, **characterized** in that the adapter (12) is self-supporting, i.e. the loading exerted on the adapter from the 20-foot containers (6) that are on top of the adapter is transmitted into the supports (10, 10') originally on the hatch cover (1) and into the support structures below the top plating.
5. Adapter according to any of claims 1-4, **characterized** in that the adapter (12) is connected in a detachable manner to existing supports (10, 10').

6. Adapter according to any of claims 1-4, **characterized** in that the adapter (12) is installed in a fixed manner.
7. Adapter according to any of claims 1-6, **characterized** in that the adapter (12) is made of steel or composite.