

1

DESCRIPTION

Distribution Chassis

5

Technical Field

This invention relates to modifications to a trailer chassis to allow direct unloading of products at a store, restaurant or other location that is served by a warehouse (herein referred to as a "retail location") from a shipping container mounted on the chassis. This direct unloading avoids the costs and delays of conventionally unloading the products from the container, warehousing the unloaded products, reloading the products on delivery vehicles, driving the delivery vehicles to the retail location, and unloading the products from the delivery vehicles.

Products being shipped by boat are usually "palletized", that is, placed on pallets so that they can be manipulated by a forklift, pallet jack, or other pallet handling apparatus (herein collectively referred to as "pallet handlers"). The palletized products are then usually loaded in shipping containers of various conventional sizes. The containers are then shipped to their destinations.

Upon arrival at their destinations, the containers are usually offloaded from boats or ships and then mounted on trailers that are especially adapted for transporting the containers. The trailers (with the containers mounted on them) are then driven by trucks to warehouses.

Conventionally, the containers are detachably mounted on top of the chassis of the trailers and the interior floors of the containers are therefore a substantial distance above the ground when so mounted. Accordingly, warehouses and other facilities for receiving products from shipping containers must be provided with elevated loading docks so that the

- 1 palletized products can be unloaded from the containers
using a pallet handler. The pallet handler then can
roll in and out of the container directly from the dock,
which is at the same level as the interior floor of the
5 container (when the container is mounted on the
trailer).

Shipping containers often are not immediately
unloaded when they arrive at a warehouse. They are
often placed aside for several days until they can be
10 scheduled for unloading at the warehouse. Thus, the
products in the container are often stored in the
container for several days. Needless to say, storage
conditions in the container are often not optimal for
the products, especially if the container is left in
15 direct sunlight. If the container has refrigeration
equipment, power and fuel must be provided to the
container until it is unloaded. Further, the delay in
unloading containers at the warehouse makes the loaded
containers unavailable for other use, so that additional
20 containers must be purchased or leased, at substantial
cost, to replace the capacity tied up by the loaded
containers awaiting unloading.

When a container is scheduled to be unloaded at a
warehouse, the rear end of the container is maneuvered
25 until it abuts against an elevated loading dock. The
interior floor of the container and the floor of the
loading dock are then at the same level and abutting
against each other, so as to form a substantially
continuous flat surface between the dock and the
30 container floor. Pallet handlers can then be used to
unload the products from the containers into the
warehouse.

After the palletized goods are unloaded into the
warehouse by personnel who usually perform unloading
35 work, other personnel must assign the goods to
designated areas of the warehouse, called "slots." The
various types of goods must then be transported to the

1 proper assigned slots in the warehouse. This process is
called "slotting." However, the goods cannot be placed
in a slot at random because the goods on the shelves in
any particular slot must be "rotated" to preserve
5 freshness. For example, newly arrived goods may be
placed on the top shelf of a slot, and goods to be
delivered may be "picked" from the bottom shelf of the
slot. After the bottom shelf of the slot is emptied,
the goods in the higher shelves will all be moved to the
10 next lower shelf. This "rotation" is done to assure
that all goods are fresh; otherwise, some goods may not
be picked until the slot has been completely emptied,
which may be very rarely. Of course, the warehouse must
maintain the goods under good storage conditions after
15 they have been slotted and rotated. Obviously, this
rotation of goods, and the supervision to assure that
goods are properly slotted and rotated, are costly.

When goods are to be delivered to retail locations,
they must be "picked," that is, warehouse personnel must
20 select the goods to be delivered for the particular
retail locations, and must retrieve those goods from the
appropriate slots. The picked goods then must be
"routed," that is, the goods for the last destination
must be loaded into the delivery vehicle first, and the
25 goods for the first destination must be loaded into the
delivery vehicle last, for example. If the goods are not
routed properly, the palletized goods for the first
destination will be behind other pallets (and
inaccessible) when the delivery vehicle arrives at the
30 first destination, for example.

There are two types of loading docks in common use,
"open" and "closed." In an open loading dock, only an
elevated dock floor is provided, so that the interior of
the container (and often the interior of the warehouse)
35 are exposed to the environment while the container is
being unloaded. However, it is strongly desired,
especially when dealing with food, that unloading take

1 place at "closed" loading docks, in which the entire
rear end of the container is sealed against the
environment while the container is being unloaded. This
normally requires that the loading dock be structured as
5 an elevated door in a wall, so that the side walls and
the ceiling of the container also abut against the
loading dock when the floor of the container abuts
against the loading dock. Closed loading docks normally
do not have recesses to receive projections extending
10 rearwardly from the rear ends of containers.

It is preferable that a closed loading dock also
provide some kind of sealing engagement apparatus so
that the entire circumference of the rear end of a
container is sealingly engaged with the loading dock
15 when the container abuts against the loading dock.
Ideally, daylight should not be visible between the rear
end of the container and the periphery of the closed
loading dock when the container is being unloaded. The
sealing engagement apparatus could be as simple as a
20 gasket around the periphery of the door of the closed
loading dock, or could also include more elaborate
sealing mechanisms, such as telescoping shrouds or
accordion pleated extensions. Regardless of the
particular structure of the sealing engagement
25 apparatus, it should prevent birds, rodents, insects,
dust, heat, humidity and other environmental
contaminants from entering into the container and the
warehouse (with its stockpiled cargo from other
containers) while a container is being unloaded. Thus,
30 it is important that the rear ends of conventional
shipping containers be substantially free of rearwardly
extending projections so that the entire circumference
of those rear ends can abut against a closed loading
dock.

35 It is not preferred to drive a container into the
interior of a warehouse for unloading because it would
take too much warehouse space, and because workplace

1 rules restrict the amount of carbon monoxide and other
pollutants generated by vehicles that can be introduced
into a closed work environment. Thus, containers are
almost always unloaded at elevated loading docks outside
5 a warehouse, and the palletized goods are then brought
into the warehouse from the dock using pallet handlers.

Conventionally, when a retail location requires a
quantity of a product, a number of pallets of the
desired product are picked and routed in the warehouse
10 and loaded onto a delivery vehicle using a pallet
handler. The delivery vehicle then is driven to the
retail location, where it is unloaded.

The delivery vehicle is usually provided with a
liftgate, which provides a platform that is movable
15 between ground level and the elevated interior floor of
the delivery vehicle's cargo space. Conventionally,
liftgates also are storable in a folded, vertical, or
other compact configuration so that they are out of the
way when not being used, such as when the vehicle is
20 being driven between locations.

Individual pallets are unloaded at the retail
location, usually using a pallet handler that is also
carried by the delivery vehicle. The pallet handler
usually picks up a pallet and then moves onto the
25 liftgate while carrying the pallet. The liftgate then
is lowered to ground level, and the pallet and pallet
handler are moved off the liftgate and into the retail
location. These steps are repeated until the desired
number of pallets have been unloaded at the retail
30 location.

Deliveries to retail locations cannot be made
directly from containers on trailers, because retail
locations normally are not provided with an elevated
loading dock, so that pallets bearing the products
35 cannot normally be unloaded from the container using a
pallet handler. Containers are not usually provided
with platform extensions or liftgates because they must

1 be packed tightly for shipment by boat. Trailer chassis
are not usually provided with platform extensions or
liftgates either.

5 The requirement that pallets of products be unloaded
from containers at elevated loading docks in a
warehouse, slotted, properly maintained, picked, routed
and then reloaded for delivery by delivery vehicles
(with liftgates) to retail locations incurs substantial
costs, especially in time and equipment needed to handle
10 the products (including the delivery vehicles).

Background Art

U.S. Patent No. 4,969,659 to Ehrlich discloses an
extendable container chassis in which first and second
chassis members slide with respect to each other between
15 a retracted position and an extendable position.

U.S. Patent No. 4,580,805 to Bertolini discloses an
extendable truck trailer chassis having a movable rear
extension equipped with a gear rack whose teeth are
adapted to mesh with teeth of an idler pinion mounted on
20 the main frame, which is, in turn, in mesh with a
similar gear rack on a cradle carried on the chassis.

U.S. Patent No. 4,850,786 to Oswald, et al discloses
a container handling apparatus having longitudinally
extending primary frames and a cross frame that
25 interconnects the front ends of the primary frames.

U.S. Patent No. 5,092,623 to Swanner discloses a
trailer having a frame upon which a bed slides relative
to the frame and on which the bed tilts when the
rearmost portion moves the center of gravity away from
30 the wheels.

U.S. Patent No. 5,193,836 to Hastings discloses a
cargo carrying container that can extend cantileverly
rearward over the rearmost attachment station to an
underlying drayable chassis.

35 U.S. Patent No. 5,118,245 to Dunkel discloses a
transversely expandable trailer in which the rear

- 1 support wheels are outside normal highway width limits
when in the expanded position.

U.S.S.R. Patent 1691822-A1 to Kozl discloses a
transport trailer with removable sides in which the
5 lower tier of the base is positioned on a telescopic
element and the upper tier is composed of two panels
hinged at one end to opposite sides of the frame.

U.S.S.R. Patent No. 1636-290-A2 to Transtekhnika Res
discloses a trailer with extendable L-shaped frames on
10 cross beams.

The inventor is aware of an ice cream company that
has installed a liftgate on the rear of a chassis for a
trailer for a refrigerated shipping container. The
liftgate allows the ice cream to be unloaded directly
15 from the container, but the ice cream must be unloaded
by hand or by hand truck; it cannot be unloaded using a
pallet handler because there is no room to maneuver the
pallet handler, and because it would not be economical
to store the pallet handler inside the container, where
20 it would take up room needed for ice cream.

It is therefore an object of this invention to
provide a device that will allow direct unloading of
palletized products at a retail location from a
container mounted on a trailer in the absence of an
25 elevated loading dock.

It is also an object of this invention to avoid all
the costs and delays incurred by interim warehousing of
palletized goods before delivery to retail locations,
including costs and delays of unloading, slotting,
30 rotating, storing, picking, routing and reloading goods
at a warehouse.

It is a further object of this invention to provide
such a device that is economical, compact and easily
transported.

35 It is a still further object of this invention to
provide such a device that will provide enough room for
a pallet jack or other pallet handling device to

- 1 maneuver adjacent to the rear end of the container in order to unload the container.

It is a still further object of this invention to provide such a device that will avoid the need to
5 purchase or lease additional containers to compensate for containers that are awaiting unloading.

Disclosure of Invention

These and other objects are obtained by a chassis having a rear end, a platform extension fixedly mounted
10 and rearwardly extending from said rear end by a platform depth, and a liftgate having a liftgate depth movable from the level of the rearward end of the platform extension and ground level. Preferably the liftgate is foldable for storage when the container is
15 not being unloaded, and preferably conventional refrigeration apparatus is provided for the container.

This combination of a rearwardly extending platform extension and a moveable liftgate allows palletized cargo to be unloaded directly from a container at a
20 retail location. Preferably, the platform depth is great enough that a pallet handler can maneuver outside the rearward end of the container at the same level as the interior floor of the container. Preferably the platform depth is between 2 and 5 feet (61 to 152
25 centimeters), preferably between three and four feet (91 to 122 centimeters), and optimally approximately three feet (91 centimeters). Preferably the liftgate also is sufficiently large to accommodate both the pallet handler and a pallet being unloaded. Accordingly,
30 preferably the liftgate has a liftgate depth of between approximately four and seven feet (122 centimeters to 213 centimeters) deep, and optimally approximately five feet (152 centimeters) deep.

These and other objects are also obtained by an
35 alternate embodiment comprising a chassis having a rear end (without a platform extension), and a liftgate having a liftgate depth movable from the level of the

1 rearward end of the chassis and ground level.
Preferably the liftgate is foldable for storage when the
container is not being unloaded, but a non-foldable
liftgate can be used if it can be stored vertically
5 without projecting above the ceiling of any container
that may be mounted on the chassis. This movable
liftgate added to the rear end of the chassis allows
palletized cargo to be unloaded directly from a
container at a retail location. Preferably, the
10 liftgate is large enough that a pallet handler with a
standard pallet of 40"x48" can maneuver outside the
rearward end of the container on the liftgate when the
liftgate is horizontally oriented and positioned at the
same level as the interior floor of the container.
15 Preferably, the liftgate depth is great enough to
accommodate the pallet handler, the palletized load, and
the person unloading. Preferably, the liftgate depth is
between approximately 6 and approximately 8 feet (183 to
244 centimeters), and preferably approximately 7 feet
20 (213 centimeters).

The invention does not require major structural
modifications to a trailer chassis and therefore can be
easily retrofitted to existing chassis.

Because the container can be unloaded directly at
25 retail locations using this chassis, the container does
not have to be unloaded at a warehouse. Accordingly,
the container does not have to abut against, or
sealingly engage with, a closed loading dock. Thus,
although the rearwardly extending platform extension
30 (for the embodiment that has a platform extension) would
prevent the container from being unloaded at a closed
loading dock, such unloading is rendered unnecessary by
this chassis.

In operation, a shipping container full of
35 palletized cargo would be mounted on the chassis and the
platform extension would extend rearwardly approximately
three feet (91 centimeters) from the rear end of the

1 container. Preferably a foldable liftgate with a
liftgate depth of approximately 5 feet (152 centimeter)
would be provided. Optimally, the liftgate would be
foldable and storable extending vertically upwards from
5 the rear end of the platform extension, or underneath
the platform extension. A pallet handler preferably
would be retained on the platform extension during
transportation of the container.

With respect to the alternate embodiment, in
10 operation, a shipping container full of palletized cargo
would be mounted on the chassis and the liftgate would
be deployed so that it abutted against the rear end of
the container, at substantially the same level as the
interior floor of the shipping container, and extended
15 horizontally outwards between approximately 6 feet (183
centimeters) and approximately 8 feet (244 centimeters)
(optimally approximately 7 feet (213 centimeters)).

With respect to the embodiment with a platform
extension, the container full of palletized cargo, with
20 a pallet handler on the platform extension, would be
driven to a retail location. The rear end of the
container then would be opened and the liftgate would be
unfolded to its operational configuration and raised to
a position abutting against the rear end of the platform
25 extension and coplanar with the platform extension. The
pallet handler then would maneuver on the platform
extension (and the liftgate, if necessary) to remove any
desired pallet from the rear end of the container. The
pallet handler carrying the pallet would be maneuvered
30 onto the liftgate. The liftgate then would be lowered
to the ground and the pallet handler could then maneuver
the pallet and deliver it to the appropriate area at the
retail location. After depositing the pallet, the
pallet handler then could be moved onto the liftgate,
35 and the liftgate would then be raised to the level of
the platform extension again. The process can be
repeated as often as necessary to unload the desired

1 quantity of pallets at the retail location. After the
unloading process is completed, the pallet handler would
be secured to the platform extension and the liftgate
would be moved to the stored configuration. The
5 container and chassis then would be driven to the next
retail location at which the unloading operation would
be repeated. In this manner, palletized cargo can be
directly unloaded from a shipping container at various
retail locations. This would avoid the cost and labor
10 involved in unloading the container at an elevated
loading dock at a warehouse, storing the palletized
cargo at the warehouse, loading the palletized cargo
from the warehouse into delivery vehicles, driving the
delivery vehicles to retail locations, and then
15 unloading the palletized cargo from the delivery
vehicles. Because the unloading, warehousing, reloading
and delivery steps can be eliminated, the palletized
cargo spends less time in transit and can be delivered
to customers in less time, for fresher products.
20 Further, especially for fragile or perishable products,
the cargo can remain in a refrigerated or otherwise
suitable environment in the container until the cargo is
delivered directly to a retail location.

With respect to the alternate embodiment without a
25 platform extension, a pallet handler could be packed
inside the container with the palletized cargo, and the
container (on the chassis) could be driven to a retail
location. However, preferably, the pallet handler would
be provided at the first retail location as described
30 below. The rear end of the container then would be
opened and the liftgate would be unfolded to its
operational configuration (if it was foldable) and
raised to a position abutting against the rear end of
the container and substantially coplanar with the
35 interior floor of the container. The pallet handler
then would maneuver on the liftgate to remove any
desired pallet from the rear end of the container. The

1 liftgate then would be lowered to the ground and the
pallet handler could then maneuver the pallet and
deliver it to the appropriate area at the retail
location. After depositing the pallet, the pallet
5 handler then could be moved onto the liftgate, and the
liftgate would then be raised to the level of the
interior floor of the container again. The process can
be repeated as often as necessary to unload the desired
quantity of pallets at the retail location. After the
10 unloading process is completed, the pallet handler would
be secured inside the container and the liftgate would
be folded (if it was foldable) and moved to the stored
configuration. The container and chassis then would be
driven to the next retail operation at which the
15 unloading operation would be repeated.

Preferably, the pallet handler can be left at the
location of the last delivery if that location will be
the first location for unloading the next container. In
this manner, the pallet handler need not be initially
20 packed in the container (taking up precious storage
space), but can be stored at the first location to be
visited so that the pallet handler can be used for
unloading at that first location. The pallet handler
then could be stored inside the container for unloading
25 deliveries at subsequent locations, and can be left at
the last delivery location, as described above.

The original embodiment of this invention was
disclosed in Disclosure Document 343927 filed on
December 3, 1993, under the title "Shortcut Chassis",
30 and in U.S. application 08/703,861, now U.S. Patent
5,827,037, which are hereby incorporated herein by
reference.

Other objects, features and advantages of the
present invention will become more fully apparent from
35 the following detailed description of the presently
preferred embodiment for carrying out the invention and

1 the accompanying drawings.

Brief Description of Drawings

Fig. 1 is a side elevational view of a trailer chassis provided with a platform extension and a preferred folding liftgate according to the present invention, showing the liftgate in the unfolded and raised position and, in dotted line, the position of the liftgate when it is lowered.

Fig. 2 is a side elevational view of the embodiment of Fig. 1, in which the preferred folding liftgate has been retracted into the stored position for storage and the pallet jack has been secured to the platform extension for transportation. An alternative vertically storable liftgate is shown in dotted line.

Fig. 3 is a side elevational view of a trailer chassis according to an alternate embodiment of the present invention, showing a foldable liftgate in the stored position.

Fig. 4 is a side elevational view of the trailer chassis of Fig. 3, showing the liftgate in both the stored and partially deployed position, with the fully deployed position indicated in dotted line.

Best Mode for Carrying Out Invention.

The best mode presently contemplated for carrying out the present invention is the preferred embodiment illustrated by way of example in Figs. 1 and 2. An alternate embodiment is illustrated in Figs. 3 and 4.

Referring to Fig. 1, shown is a conventional chassis ("CH") on which a conventional shipping container ("SC") has been mounted. A platform extension 10 has been fixedly attached to the rearward end of the chassis CH so that it extends rearwardly from the rearmost end of the chassis CH, substantially level with the interior floor of the shipping container SC. Preferably, the platform extension 10 extends approximately three feet (91 centimeters) rearwardly from the rear end of the shipping container SC.

1 A foldable liftgate 20 is preferably provided that,
in the unfolded configuration, extends rearwardly from,
and abuts against, the rearmost edge of the platform
extension 10. Preferably the liftgate 20, when in the
5 unfolded configuration, can be moved between the level
of the platform extension 10, or can be lowered to the
level of the ground, as shown in dotted line.
Preferably a conventional lifting apparatus 30 is
provided to lift and lower the liftgate 20 from the
10 lowered position at ground level to the raised position,
at the level of the platform extension 10. Preferably
the lifting apparatus 30 has a lifting capacity of
approximately 2,000 pounds (900 kilograms). Preferably
the liftgate 20 in the unfolded configuration extends
15 rearwardly approximately eight feet (244 centimeters)
from the rear most edge of the platform extension.
Preferably the platform extension 10 is approximately
rectangular in shape, with a platform extension width
approximately equal to the width of the chassis CH and
20 shipping container SC, and a platform extension depth of
approximately three feet (91 centimeters). Preferably
the liftgate 20 in the unfolded configuration also is
rectangular in shape with a liftgate width approximately
equal to the platform extension width and a liftgate
25 depth of approximately eight feet (244 centimeters).
The combination of a platform extension 10 and an
approximately coplanar liftgate 20 (when unfolded and
raised) provides sufficient room for a pallet jack or
other pallet handler PH to maneuver in relation to the
30 rear of the shipping container SC. Indeed the platform
extension 10 and the raised, unfolded liftgate 20
combine to perform the function of an elevated loading
dock so that the pallet handler PH can maneuver in order
to retrieve palletized cargo CA in the shipping
35 container SC. After the pallet handler PH has been
maneuvered to pick up the pallet P and the cargo CA on
the pallet P, the pallet handler PH can be maneuvered so

1 that it and the palletized cargo CA are only on the liftgate 20. The liftgate 20 then can be lowered by the conventional lowering apparatus 30 so that the pallet handler PH and palletized cargo CA are at ground level.

5 The pallet handler PH and palletized cargo CA can then be moved into a retail location. After depositing a pallet P of palletized cargo CA, the pallet handler PH can be maneuvered onto the lowered liftgate 20, which then can be raised until it approximately level with the

10 platform extension 10. The pallet jack PH can then retrieve a second load of palletized cargo CA and repeat the process until any desired amount of palletized cargo CA has been unloaded from the shipping container SC into the retail location.

15 Referring to Fig. 2, shown as the embodiment of Fig. 1, but with the liftgate 20 in the folded configuration, preferably stowed underneath the platform extension 10. As can be seen, the pallet jack PH can be parked on the platform extension 10 so that it can be transported to

20 the next retail location, without using valuable space inside the shipping SC. The platform extension 10, fold away liftgate 20 and pallet jack PH form a very compact configuration on the rear end of the chassis CH and therefore should not significantly impair the driving

25 characteristics of the chassis CH. Further, because the platform extension 10, liftgate 20 and lifting apparatus 30 only need to be attached to end of the chassis CH, they can be retrofitted onto existing chassis CH.

If pallets are stacked on top of each other inside

30 the container, the pallet handler PH can unload a stack of pallets and the entire stack can be delivered to the retail location. If the retail location does not need all the pallets in the stack, the cargo in the pallets on the top of the stack can be removed and the pallets

35 on the bottom can be reloaded into the container SC.

Referring to Fig. 3, shown is a side elevational view of an alternate embodiment of the present

- 1 invention, in which a foldable liftgate 120, preferably
a Maxon model number 80-3 LM, is mounted on the rear
end of a chassis CH. A diesel engine driven generator,
preferably a Carrier Corporation model UG 15, is mounted
5 on the chassis CH to provide power for the liftgate 120.

Referring to Fig. 4, shown is a side elevational
view of the embodiment of Fig. 3, with the liftgate 120
in the partially deployed position, with the fully
deployed position shown in broken line. Preferably,
10 when fully deployed, the liftgate 120 is approximately 7
feet (213 centimeters) in depth, or is the same depth as
the combined platform extension and liftgate of the
embodiment of Figs. 1 and 2. In this alternate
embodiment, the liftgate can serve the combined
15 functions of the platform extension and liftgate of the
embodiment of Figs. 1 and 2.

The present invention offers many advantages over
conventional container unloading, warehousing and
distribution systems. By eliminating the need for an
20 intermediate warehousing step, goods can be delivered
more quickly and cheaply to retail locations for fresher
products and longer shelf life. Also, the cost of goods
can be reduced because of savings from reducing the
amount of warehousing space that is necessary. For
25 goods that require refrigeration or other specialized
storage requirements, the present invention avoids the
need for refrigerated (or other specialized) warehouse
storage. Moreover, because warehousing can be virtually
eliminated, the handling costs for palletized goods can
30 be greatly reduced. There is also a quicker turnaround
of container usage so that shippers do not need to
invest more money for additional containers.

It is preferred that this invention be practiced
with an ISO standard 40-foot (12.19 meters) tandem two
35 axle (where tight backing up space is anticipated) or
three axle (where inordinately heavy container cargo
weight is anticipated wherein weight over each axle

1 would be a consideration) chassis CH. It is also
preferred that the chassis CH also be provided with 6
Schulz twist blocks to accept containers of varying
lengths, such as 50-foot (15.24 meters), 40-foot
5 (12.19), 24-foot (7.32 meters), and 20-foot (6.1 meters)
containers. Optionally, a control panel CP can be
provided adjacent to the platform extension 10 and
operatively connected to the lifting apparatus 30 and
the refrigeration or other environmental control
10 mechanisms for the shipping container.

It is preferred that the lifting apparatus 30 be
electrically powered. The presently preferred lifting
apparatus and liftgate is a Maxon hydraulically operated
foldable liftgate, but any suitable conventional
15 liftgate can be used in the practice of the present
invention.

It is preferred that a generator G be provided on
the chassis CH in order to provide power to operate the
liftgate. Conventionally, a petroleum burning internal
20 combustion engine operatively connected to an electric
generator is available as a single power unit for
attachment to a trailer chassis, usually slung
underneath the middle of the chassis, between the front
and rear axles of the chassis. This unit is commonly
25 used to provide power for refrigeration in containers
that must remain refrigerated while being transported on
a trailer. This power unit also can be used to provide
power for a liftgate. However, no particular
configuration or type of power unit is presently
30 preferred.

The present invention can be used in connection with
any business that requires delivery of goods that have
been shipped in a container. The present invention has
particular utility when applied to chain stores or other
35 customers requiring delivery to multiple locations of
limited types of items, but large volumes of those
particular types, such as fast-food stores. In these

1 types of businesses, a container can hold larger
quantities of fewer types of goods so that the container
can be completely unloaded by visiting fewer customer
locations. Indeed, this may allow such a business to
5 completely avoid warehouse storage.

While the invention has been disclosed with respect
to the particular preferred embodiments described
herein, it will be apparent to a person skilled in the
art that there are other embodiments that fall within
10 the spirit and scope of the invention. For example, and
not by way of limitation, the liftgate could be non-
foldable, but storable in a vertical position (as shown
in dotted line in Fig. 2), which offers the added
advantage that the stored liftgate helps to retain the
15 pallet handler PH on the platform extension 10. For
another example, the liftgate for the alternate
embodiment (without the platform extension) need not be
foldable if it can be stored in a vertical position
abutting against the rear end of the container.
20 However, this non-foldable liftgate cannot extend above
the top of the container when stored in order to avoid
problems of vertical clearance while transporting the
container. Further, this non-foldable liftgate would
need to be at least partially deployed when a container
25 is loaded on the chassis so that it would be not
obstruct loading of the container on the chassis.

Accordingly, no limitations to the present invention
are to be implied or inferred, except as explicitly and
specifically set forth in the attached claims.

30 Industrial Applicability

This invention is applicable wherever palletized
goods in shipping containers must be provided to
multiple locations because this invention allows the
delivery of such goods without a warehouse. Thus, this
35 invention is particularly valuable where warehouse space
is expensive or not available.

CLAIMS



What is claimed is:

1. A device, comprising:

5 a chassis having a rear end, said chassis being adapted for receiving a detachable shipping container with an interior floor and also having walls and a ceiling, whereby the interior floor of a container mounted on said chassis is elevated to a container floor height;

10 a platform extension extending rearwardly from said rear end by a platform depth and defining a platform height, wherein said platform height is approximately equal to said container floor height;

15 a moveable liftgate having a liftgate depth movable from a raised position abutting against and coplanar with said platform extension and a lowered position at ground level; and

20 a lifting apparatus operatively connected to said liftgate whereby said liftgate can be lowered to said lowered position and raised to said raised position;

25 wherein said platform depth is between approximately 2 feet (61 centimeters) and approximately 5 feet (152 centimeters), whereby said platform depth is great enough that a pallet handler can maneuver outside said container on said platform extension and said liftgate; and

30 wherein said liftgate depth is between approximately 3 feet (91 centimeters) and approximately 7 feet (213 centimeters), whereby said liftgate depth is great enough for said liftgate to accommodate a pallet handler carrying a pallet.

35 2. A device according to claim 1, wherein said liftgate is pivotably mounted so as to be storable extending vertically upwards from said platform extension when folded.



1 3. A device according to claim 1, wherein said liftgate is foldable and storable underneath said platform extension.

2 4. A device according to claim 1, wherein said
5 liftgate is capable of lifting approximately 2000 pounds (900 kilograms).

6 5. A device according to claim 1, further comprising:

7 a generator mounted on said chassis adapted to
10 provide power to said liftgate.

8 6. A device according to claim 1, further comprising:

9 a control panel adjacent to said platform extension operatively connected to said liftgate.

15 7. A device according to claim 1, wherein said liftgate is mounted on said platform extension.

16 8. A device according to claim 1, further comprising:

17 a generator mounted on said chassis adapted to be
20 operably connected to said container to provide power for environmental control mechanisms for said container.

18 9. A device, comprising:

19 a platform extension attachable to a rear portion of
21 a chassis, said chassis being adapted for receiving a
25 detachable shipping container having an interior floor and also having walls and a ceiling, whereby the interior floor of said container is maintained at a container floor height when said container is mounted on said chassis, wherein said platform extension extends
30 rearwardly from said rear portion by a platform depth and defines a platform height, wherein said platform height is approximately equal to said container floor height;

31 a moveable liftgate having a liftgate depth mounted
35 on said chassis and movable from a raised position abutting against and coplanar with said platform extension and a lowered position at ground level; and



1 a lifting apparatus operatively connected to said liftgate whereby said liftgate can be lowered to said lowered position and raised to said raised position;

5 wherein said platform depth is between approximately 2 feet (61 centimeters) and approximately 5 feet (152 centimeters), whereby said platform depth is great enough that a pallet handler can maneuver on said platform and said liftgate outside said container; and

10 wherein said liftgate depth is between approximately 4 feet (122 centimeters) and approximately 7 feet (213 centimeters), whereby said liftgate depth is great enough for said liftgate to accommodate said pallet handler carrying a pallet.

15 10. A device according to claim 9, wherein said liftgate is pivotably mounted so as to be storable extending vertically upwards from said rearward edge of said platform extension.

20 11. A device according to claim 9, wherein said liftgate is foldable and pivotably mounted so as to be storable underneath said platform extension when folded.

12. A device according to claim 9, wherein said platform depth is between approximately 2 feet (61 centimeters) and approximately 5 feet (152 centimeters).

25 13. A device according to claim 12, wherein said platform depth is between approximately 3 feet (91 centimeters) and approximately 4 feet (122 centimeters).

30 14. A device according to claim 9, wherein said liftgate has a liftgate depth of between approximately 4 feet (122 centimeters) and approximately 7 feet (213 centimeters).

15. A device according to claim 14, wherein said liftgate has a liftgate depth of approximately 5 feet (152 centimeters).

35 16. A device according to claim 9, wherein said liftgate is capable of lifting approximately 2000 pounds (900 kilograms).



1 17. A device according to claim 9, wherein said liftgate is attached to said platform extension.

 18. A process for distributing palletized cargo from a loaded shipping container having an interior
5 floor, comprising:

 mounting said shipping container on a distribution chassis, whereby said interior floor of said container is maintained at a container floor height, said distribution chassis having a rear end, a platform
10 extension extending rearwardly from said rear end by a platform depth to a rearward edge, said platform extension defining a platform height, wherein said platform height is approximately equal to said container floor height, a moveable liftgate having a liftgate
15 depth movable from a raised position abutting against said rearward edge of said platform extension and substantially coplanar with said platform extension and a lowered position at ground level, wherein said platform depth is great enough that a pallet handler can
20 maneuver on said platform extension and said liftgate outside said container, and wherein said liftgate depth is great enough for said liftgate to accommodate a pallet handler carrying a pallet;

 providing a pallet handler on said platform
25 extension;

 transporting said distribution chassis, said shipping container and said pallet handler to a retail location;

 raising said liftgate to a position abutting against
30 said rearward edge of said platform extension and approximately coplanar with said platform extension;

 maneuvering said pallet handler on said platform extension and said liftgate to remove palletized goods from said shipping container;

35 moving said pallet handler carrying said palletized goods onto said liftgate;



1 lowering said liftgate, said pallet handler and
said palletized goods to ground level; and
 delivering said palletized goods to said retail
location using said pallet handler.

5 19. A device, comprising:

 a chassis having a rear end, said chassis being
adapted for receiving a detachable shipping container
with an interior floor and also having walls and a
ceiling, whereby the interior floor of a container
10 mounted on said chassis is elevated to a container floor
height;

 a moveable liftgate having a liftgate depth movable
from a raised position abutting against said interior
floor and coplanar with said container floor height and
15 a lowered position at ground level; and

 a lifting apparatus operatively connected to said
liftgate whereby said liftgate can be lowered to said
lowered position and raised to said raised position;

 wherein said liftgate depth is between 5 feet (152
20 centimeters) and approximately 10 feet (305
centimeters), whereby said liftgate depth is great
enough that a pallet handler carrying a pallet can
maneuver outside said container on said liftgate.

 20. A device according to claim 19, wherein said
25 liftgate is pivotably mounted so as to be storable
extending vertically upwards from said rear end of said
chassis when stored.

 21. A device according to claim 20, wherein said
liftgate is foldable.

30 22. A device according to claim 20, wherein said
liftgate is not foldable and does not extend above said
ceiling of said container when stored.

 23. A device according to claim 19, wherein said
liftgate is capable of lifting approximately 2000 pounds
35 (900 kilograms).

 24. A device according to claim 19, further
comprising:



1 a generator mounted on said chassis adapted to be
operably connected to said container to provide power
for environmental control mechanisms for said container.

25. A process for distributing palletized cargo
5 from a loaded shipping container having an interior
floor, comprising:

mounting said shipping container on a distribution
chassis, whereby said interior floor of said container
is maintained at a container floor height, said
10 distribution chassis having a rear end, a moveable
liftgate having a liftgate depth movable from a raised
position abutting against said rear end of said chassis
and substantially coplanar with said container floor
height and a lowered position at ground level, wherein
15 said liftgate depth is great enough that a pallet
handler can maneuver on said liftgate outside said
container and wherein said liftgate depth is great
enough for said liftgate to accommodate a pallet handler
carrying a pallet;

20 providing a pallet handler at a first retail
location;

transporting said distribution chassis and said
shipping container to said first retail location;

raising said liftgate to a position abutting against
25 said rear end of said chassis and approximately coplanar
with said container floor height;

maneuvering said pallet handler on said liftgate to
remove palletized goods from said shipping container;

moving said pallet handler carrying said palletized
30 goods onto said liftgate;

lowering said liftgate, said pallet handler and
said palletized goods to ground level; and

delivering said palletized goods to said first
retail location using said pallet handler.