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DESCRIPTION

TRANSPORTABLE LIQUID PRODUCTS CONTAINER
TECHNICAL FIELD

This invention relates to a container capable of use
5 as a prefabricated, self-contained and self-supporting
liquid products terminal transportable to remote locations
for immediate use for storing and dispensing liquid
products in large quantities ("bulk liquids"). In
addition, the container can be combined with other
10 containers to form a series of containers serving as a
single large terminal facility. The container either can
be active and dispense its liquid product by a pump, or it
can be passive and dispense its liquid products by gravity
or by attachment to an external pump, such as a portable
15 pump or a connection in series to an active container. In
addition, the container may also be used to easily convert
all or part of a dry cargo vessel to a temporary or
permanent liquid products carrier.

This invention also relates to methods of using a
20 container to quickly and easily create a bulk liquid
products storage and dispensing terminal facility for
flammable, explosive, hazardous and non-hazardous liquid
products, as well as certain flowable bulk dry products,
even in remote and primitive locations lacking basic
25 support services such as electricity. Such a facility
would be capable of storing and dispensing such products
immediately upon arrival.

This invention also relates to methods of using a
container to quickly and easily convert all or part of a
30 dry cargo vessel into a carrier for flammable, explosive,
hazardous and non-hazardous liquid products.

This invention also relates to methods of using two
or more containers to establish a loaded terminal facility
at a location previously lacking available terminal
35 facilities for bulk flammable, explosive, hazardous and
non-hazardous liquid products and bulk flowable dry
products.

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BACKGROUND ART

Bulk liquids are traditionally transported in specialized tanker vessels. These ships are relatively few in number compared to dry cargo vessels and require specialized terminal facilities for discharging their cargo ashore for storage and further distribution. These bulk liquid terminals usually need a power source to pump the stored liquid out of the terminal.

Dry cargo vessels are generally configured to transport a plurality of containers of standardized sizes and shapes ("standardized cargo containers") which are described below.

The conversion of dry cargo vessels into liquid product carriers is desirable in order to increase the number of vessels able to carry bulk liquid products. Further, the use of multiple discrete liquid product containers to convert the dry cargo vessels is preferred in order to maximize the increased flexibility conversion offers in determining the portion of a vessel's dry cargo capacity to convert into liquid cargo capacity.

In addition, many commonly transported and stored liquid products require certain safety features on their containers. Petroleum products, for example, require that pressures within a container be maintained within a certain range in order to prevent an explosion or an implosion. Also, an inert gas blanket must fill the ullage of the container in order to prevent an explosive gas mixture from developing. Oxygen-containing gases, such as air, must be excluded from any place in which petroleum fumes might gather in a dangerous quantity, therefore, a proper venting system is required. Fire-fighting or fire-prevention systems also may be needed.

Many locations have the ability to make liquid products from local raw materials, but currently lack a terminal facility or tank farm to store the manufactured liquid products pending the arrival of an appropriate carrier. Therefore, these locations export raw solid

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1 materials instead of manufactured liquid products, to their economic detriment.

Currently, a liquid products terminal facility or tank farm able to receive off-loaded bulk liquid cargo or
5 to store bulk liquid cargo pending the arrival of a liquid products carrier must be constructed using traditional means encompassing much expense, pre-planning and a lengthy period of time.

The inventor is not aware of any container that can
10 be used to convert all or part of a dry products carrier into a liquid products carrier and that can also be used as a transportable, prefabricated bulk liquid products terminal capable of rapidly creating a storage and dispensing facility for bulk liquid products even in remote
15 and primitive areas or to be easily loaded and unloaded aboard a dry cargo vessel.

U.S. Patent 4,746,034 to Ata et al. discloses a portable liquid container which can be stacked up to three units high. When stacked, the containers can be connected
20 in a manner permitting the upper tanks to drain into the lowest tank. Liquid is discharged solely by gravity through a valve located underneath the container which is connected by a pipe to a hole located in the lowest point of a floor which has four sloping triangular portions whose
25 apices converge at the lowest point.

U.S. Patent No. 4,782,973 to Wiese discloses a storage tank having a double-walled bottom which permits the insulation of the tank bottom, and a flanged discharge valve suitable for the double-walled bottom configuration
30 for gravity discharge of the liquid.

U.S. Patent No. 2,328,080 to Hansen discloses a stationary storage tank located inside a housing designed to reduce condensation and with a hood or cowl located over the tank to facilitate the exit of fumes from the housing
35 and to prevent moisture, dirt and other undesirable elements from entering the housing.

U.S. Patent No. 3,814,290 to Gerhard discloses the



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- 1 use of a trough in the interior of a tank to promote easy
draining and cleaning of a liquid cargo tank that has a
plurality of compartments.

- 5 The above containers are not specifically designed
to serve as a dual purpose transportation container and
terminal for storing and dispensing bulk liquid products,
including flammable or other hazardous liquid products.
None provide access for a person to enter the container,
none has an active means of pumping the stored liquid out
10 of the container, none has an active fire protection or
control means attached, nor does any have a means for
providing and maintaining an inert gas cover when necessary
or required, or for venting the container other than
directly into the atmosphere at the tank top.

- 15 U.S. Patent No. 3,781,139 to Lohse discloses a
detachable power unit comprising an internal combustion
engine and an energy transducer for attachment to freight
containers.

- 20 U.S. Patent No. 3,386,605 to Lafont discloses a
large plastic bag able to permit standard modular size
dismountable cargo containers to carry bulk liquid cargo
instead of packaged cargo.

- 25 U.S. Patent No. 4,143,588 to Exler discloses a
ventilation system comprising walls and channels inside a
"deepfreeze" container to maintain an even temperature and
humidity throughout the interior of the container
transporting standard dry cargo at a controlled
temperature.

- 30 U.S. Patent No. 2,954,003 to Farrell et al.
discloses a liquid products tank capable of transporting
liquified gas at low temperatures in the hold of a ship
using cables, keys and keyways to secure the tank so that
changes in the size of the tank due to temperature extremes
will not affect the ability of the ship to transport the
35 tank. The tank is suspended within a thermal barrier so
that it may carry cryogenic cargo without significant
warming and without harmful contact with the ship's
structure.

1 U.S. Patent No. 3,067,713 to Meesen discloses a
freighter for low-temperature liquified gas comprising
tanks of light alloy metal mounted in a series of
corrugated and beveled guides within the insulated hold of
5 a ship to allow movement of the tank in all directions due
to changes in tank dimensions brought about by temperature
extremes of the liquified gas cargo to be carried in the
tanks.

U.S. Patent No. 3,115,984 to Henry et al. also
10 discloses a tanker for carrying low-temperature liquified
gas comprising at least one multiple compartment tank in an
insulated hold specially constructed for use aboard the
tanker.

U.S. Patent No. 4,107,803 to Sylverest discloses a
15 self-contained and self-powered sea terminal which floats
on the surface of the sea designed to store and discharge
liquids through pumps located onboard the terminal.

None of these references discloses the degree of
transportability and features necessary to allow a
20 container for flammable, explosive, hazardous, or
non-hazardous liquid products both to be carried aboard a
dry cargo vessel (thereby permitting its use as a liquid
products carrier), and to be used as a prefabricated,
transportable liquid products terminal facility for use in
25 areas lacking needed terminal facilities. These features
in a container allow the shipment of liquid products aboard
a greater number of types of vessels and to a greater
number of places.

It is therefore an object of this invention to
30 provide a liquid products container that can be transported
to a desired location lacking a liquid products terminal or
tank farm (even to a remote location lacking an available
electrical supply), and can serve as a prefabricated,
self-contained terminal immediately able to store and
35 dispense flammable, hazardous or explosive liquid cargo, as
well as non-hazardous liquid cargo and some types of dry
bulk cargo, such as cement.

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1 It is a further object of this invention to provide
a multiple-container liquid products terminal facility at a
remote location without undue expense or unnecessary
duplication of equipment by using a single active container
5 in association with one or more passive containers, or by
using one or more passive containers in association with
some other external pump source or in a location and manner
permitting gravity discharge of the containers' contents.

10 It is a still further object of this invention to
provide a liquid products terminal having a loading arm
("rack") for rapid and easy transfer of liquid from the
terminal to trucks or tank cars.

15 It is a still further object of this invention to
provide a storage container for liquid products capable of
dispensing its liquid product immediately upon its arrival
and filling at a desired location, even in a remote area.

20 It is a still further object of this invention to
provide a liquid products container that can carry many
types of liquid cargo and be easily loaded onto and carried
aboard a dry cargo vessel, thereby converting said vessel
in whole or in part to a liquid products carrier and
increasing the amount and type of transportation available
to carry bulk liquid cargo.

25 It is a still further object of this invention to
provide an economically efficient means for remote
locations to store and dispense various amounts of bulk
liquid cargo under necessary storage conditions pending the
arrival of an appropriate carrier.

30 It is a still further object of this invention to
provide a method for increasing the number of vessels able
to serve as an appropriate carrier for bulk liquid products
or bulk flowable dry products.

DISCLOSURE OF INVENTION

35 These and other objects are obtained by a liquid
products container comprising, in its preferred
configuration, a hollow body for liquid products having a
size and shape able to fit directly, without modification,



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- 1 into the container cells of a containerized cargo vessel or
into the hold of a bulk dry cargo vessel for easy and rapid
transportation to a remote location. The container further
preferably comprises a power source, a deepwell pump, a
5 firefighting system, a venting system, a pressure-control
system and an inert gas system. These features allow
immediate use of the invention as an independent terminal
for bulk petroleum products, other flammable, hazardous or
explosive bulk liquid products, and non-hazardous bulk
10 liquid products or flowable dry bulk products regardless of
available shore facilities.

- In its preferred configuration, this container has
the footprint of a standard shipping container with two
short side walls and two long side walls, but has the
15 overall height of approximately five standard shipping
containers stacked one on top of the other in their normal
shipping mode. The storage tank and supporting structure
are preferably four standard shipping containers high, and
the top frame and associated devices are no more than an
20 additional standard shipping container in height. The
height may be varied in order to fit various dockside crane
capabilities or vessel configurations without changing the
basic function of the unit. The footprint may be varied to
fit any other mode of transportation without changing the
25 basic function of the unit.

- The container preferably has two basic forms:
passive and active. The passive container comprises
standard container lifting attachments on its top and
forklift channels at its bottom. It has devices for
30 controlling the pressure inside the container, for
providing and maintaining an inert gas cover in the ullage,
and for preventing or fighting fires. Preferably, it has
two fittings at its bottom (one each at the bottom center
of each long side wall) for pipes or hoses for connection
35 to one or two other containers, a pipeline, or a gravity
dispensing outlet, or for connection to a dispensing valve.
To reduce clingage and residual liquid product, the bottom

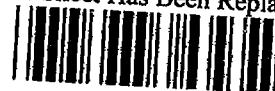
1 floor is preferably slanted from each short side wall
toward a flat section under the center fittings. The
center fittings exit the container through recesses built
into the long walls and do not protrude beyond the long
5 walls.

The active container comprises, in addition to the
above, a pump for pumping its cargo out and through a
dispensing device such as a loading arm (or rack), and,
preferably, a meter with a prover to measure the amount of
10 cargo dispensed, and a power source for the pump, which may
either be connected to a local power supply, such as steam
or electricity, or to an internal combustion engine
connected to the container itself.

In its preferred method of use, an empty unit is
15 loaded into the hold of a dry cargo vessel. The unit is
then attached to a common vent system that also serves any
other similar units loaded into the same hold. One or more
containers may then be filled with bulk liquid cargo (or
flowable dry cargo), thereby converting the dry cargo
20 carrier at least in part into a liquid products carrier.
If the cargo is to be transported to a port lacking a
liquid products storage and dispensing facility, at least
one unit remains empty. The vessel then sails to a remote
port lacking a liquid products storage and dispensing
25 facility.

If the remote port has a liquid products storage and
dispensing facility, the cargo can be off-loaded directly
into such facility. However, if the port lacks such a
facility, the empty unit is off-loaded first. A first full
30 unit then discharges its cargo into the off-loaded empty
unit. Once transfer of the liquid cargo into the
off-loaded unit is completed, the now-empty first unit is
off-loaded and filled with cargo from a second full unit
still in the vessel's hold. This process continues until
35 all desired units and cargo are off-loaded. This process
results in a new storage and dispensing shore facility able
to immediately dispense liquid (or flowable dry) products.

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1 The same process can be used to move the terminal
and cargo overland to a location remote from the shore by
transporting one or more empty containers by truck, train
or other transportation means from the port to the desired
5 location where they are off-loaded, transferring the cargo
of a filled first container by tank truck, tank cars,
pipeline or other transportation means from the port to the
new location, filling the empty container, transporting the
now-empty first container by truck, train or other
10 transportation means to said location, and filling it with
cargo transported by tank truck, tank car, pipeline or
other transportation means from a second full unit. Again,
this process continues until all desired units and cargo
are transported to the desired remote overland location.

15 Of course, trucks, trains or other transportation
means configured for carrying standard containers can be
used to transport filled and empty containers overland as
well, with the same process as for dry cargo vessels being
used for loading and unloading.

20 BRIEF DESCRIPTION OF DRAWINGS

Figure 1 is a partially cut away elevational view of
the preferred embodiment of the invention.

Figure 2 is a top, partially cut-away plan view of
the preferred embodiment of the invention in its active
25 form.

Figure 3 is a top, partially cut-away plan view of an
alternative embodiment of the invention in its passive form.

Figure 4 is an elevational view of the preferred
embodiment of the invention delivering liquid cargo to a
30 truck parked alongside the invention.

Figure 5 is a top plan view of two passive
alternative embodiments of the invention attached in series
to an active preferred embodiment of the invention in the
middle.

35 BEST MODE FOR CARRYING OUT THE INVENTION

Referring to figure 1, the preferred embodiment of
the invention is shown. The container is comprised

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1 generally of a hollow body 10, supported by a flat
supporting frame 12. A top frame 14 comprising multiple
frame members is attached to the top of hollow body 10.
While hollow body 10 and frame 12 may be of any size and
5 shape, in the preferred embodiment hollow body 10 is a
substantially rectangular parallelepiped except that it has
sloping bottom surfaces as described below.

Currently, the shipping industry relies heavily upon
containerized vessels capable of transporting standard
10 shipping containers with standardized sizes and lifting
sockets capable of transfer to semi-trailer trucks or
railroad flatcars for land transportation. The current
standardized width for most, if not all standard shipping
containers is eight feet. There are four generally used
15 standardized lengths of twenty, twenty-five, thirty-five
and forty feet. The heights of standard shipping
containers vary from generally eight feet to generally ten
feet. Of course, in the future, standardized sizes may
vary from the current sizes and this invention can easily
20 be conformed to the new standardized sizes.

Preferably, hollow body 10 and supporting frame 12
are four standard shipping cargo containers (approximately
forty feet) high. Top frame 14 is preferably approximately
five to seven feet high. The container is thus preferably
25 approximately forty-five to forty-seven feet high.

As seen in figure 2, hollow body 10 has the width of
a standard shipping container along short walls 16 and the
length of a standard shipping container along long walls 20
in the preferred embodiment.

30 Referring again to figure 1, the floor of hollow
body 10 is composed of three sections which may be
integrally formed. Center section 22 is flat and centered
between the two short walls 16, and extends from one long
wall 20 to the other long wall 20. Each of the two sloping
35 sections 24 is attached to a different short side wall 16,
extends from one long wall 20 to the other long wall 20,
and slopes downward to be connected to center section 22.



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1 Ceiling 26 is connected to short walls 16 and long
walls 20 at their tops and has circular hatchway 27
centered between the two long walls at one end and circular
opening 29 centered between all four walls in the middle of
5 ceiling 26.

Expansion dome 30 is attached to ceiling 26
surrounding opening 29. Hatch 32 is hingedly connected to
the top of expansion dome 30 and can be opened or sealed by
a locking mechanism attached to and engaged by wheel 34.
10 Referring to figure 2, attached to hatch 32 is adaptor 36
which permits the attachment of gauging equipment to take
soundings without breaching the inert gas cover that needs
to cover certain types of potentially explosive cargos.

Referring again to figure 1, venting manifold 40 is
15 also attached to hatch 32 and comprises venting standpipe
port 42 to which is attached a venting standpipe when the
container is in use on land, or in use aboard vessels under
conditions requiring a standpipe extension. Venting
manifold 40 also comprises common venting port 44 which is
20 connected to a common venting system for atmospheric
venting outside the hold when the container is in use
aboard a vessel. Selector valve 46 is attached to venting
manifold 40 between venting standpipe port 42 and common
venting port 44 such that one port is open and the other is
25 closed at any given time.

Pressure and vacuum venting valve 50 of any
conventional design is attached to venting manifold 40
between its attachment to hatch 32 and selector valve 46.
Valve 50 can be set to release gas or liquid at a given
30 pressure, and to permit the introduction of atmospheric gas
at a partial vacuum in order to prevent explosion or
implosion, respectively.

Deep well shaft 52 is attached to ceiling 26
underneath expansion dome 30 around the perimeter of
35 opening 29 and descends to be connected to center
section 22. Deep well shaft 52 is provided with openings
53 at its top and bottom to permit the inflow of the liquid



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1 and gases contained inside hollow body 10 into deep well shaft 52.

5 In the preferred embodiment, two pipes 54 are connected to either side of deep well shaft 52 at or near its connection with center section 22 perpendicular to each long wall 20. A flange 56 is connected to the end of each pipe 54 for connections to pipes or hoses which connect to other containers, storage tanks or discharge outlets, including gravity discharge outlets, or for connections to
10 a discharge valve. As shown in figures 2 and 3, the total length of each pipe 54 and flange 56 is determined to be such that flange 56 does not extend beyond the exterior edge of long wall 20.

15 As shown in figures 1 and 3, an inset box comprising two side walls 60, back wall 62, bottom wall 64, and top wall 66 is built into each long wall 20 at or near the bottom of deep well shaft 52. Pipe 54 passes through a hole in back wall 62 in a sealed manner. Valve 70 is located between flange 56 and back wall 62 inside pipe 54,
20 and is connected to and can be opened or closed by wheel 72. When not connected to a pipe or hose, pipe 54 may also be sealed with a plate releasably attached to flange 56.

Referring only to figure 1, built into supporting frame 12 are at least two channels 74 for receiving the
25 prongs of a forklift.

Ladder 76 is attached to the exterior of a short wall 16 or long wall 20.

30 Hatchway 27 is covered by hatch 80 hingedly connected to ceiling 26 over hatchway 27. Hatch 80 can be opened or sealed by a locking mechanism attached to and engaged by wheel 82.

Ladder 84 is attached to the interior of the short wall 16 near hatchway 27 and extends from ceiling 26 to slanting section 24.

35 Ladder 86 is attached to top frame 14 if top frame 14 is taller than approximately six to seven feet.

A firefighting means, preferably foam generator 90



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1 of any conventional design, is connected to the top of
ceiling 26 at its end opposing hatchway 27 and comprises
foam concentrate tank 92, water reservoir 94, and manual
and/or automatic foam system activator 96. The foam is
5 dispensed through piping system 100 which has dispensing
nozzles 101 placed throughout top frame 14. The system is
powered either by inert gas pressure or by a hookup to a
water main.

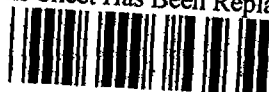
Referring to figure 3, compressed inert gas
10 cylinders 102 are releasably attached to inert gas
manifold 104 which is connected to the top of ceiling 26.
Inert gas manifold 104 has a discharge port 109 into the
interior of hollow body 10, preferably at expansion dome 30
for the creation of an inert gas blanket in the ullage of
15 the tank. The inert gas's release is regulated to occur at
a given pressure inside the ullage by gas pressure
regulator 105 located between cylinders 102 and discharge
port 109.

There is also a discharge port 111 into the interior
20 of water reservoir 94 for the creation of foam in case of
need regulated by high-capacity regulator 107 located
between cylinders 102 and discharge port 111.

Referring to figure 1, also in the preferred
embodiment of the active container and attached to the top
25 of ceiling 26 are an internal combustion engine 110,
preferably diesel, whose exhaust is routed into heat
exchanger and exhaust scrubber 106. Engine 110 powers a
generator 112, which powers an electric motor 114. Also
attached is a fuel tank 116 for engine 110 which has
30 fittings 120 for connection to the vessel's venting system
when the container is aboard a vessel.

Electric motor 114 also preferably is powerable by
an external ship or shore electrical supply through
connections and conduit of any conventional means and
35 design.

On containers having internal combustion engine 110,
the exhaust of engine 110 is routed into a heat exchanger



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1 and exhaust scrubber 106 which cools and scrubs the exhaust before discharging it into a port in inert gas manifold 104, in order to conserve the inert gas in cylinders 102 when the engine is in use.

5 Deep well cargo pump 122, of any conventional design, is located at the bottom of internal pipe 126 which is itself located inside deep well shaft 52. Pump 122 is powered by electric motor 114 through a right angle drive 124 of conventional design which extends from
10 electric motor 114 into expansion dome 30 in a sealed manner. Drive 124 powers pump shaft 125 which descends into internal pipe 126 in a sealed manner and descends inside internal pipe 126 until it reaches and powers pump 122. Pump 122 pushes the liquid cargo up through
15 internal pipe 126.

Internal pipe 126 makes a right angle bend in expansion dome 30 and passes through the side of expansion dome 30 in a sealed manner toward hatch 80 and terminates shortly after a valve 130 in a standardized flange 134.
20 Valve 130 can be opened and closed by wheel 132.

In alternate embodiments, the pump may be powered by external steam, or by a hydraulic system of any conventional design powered by engine 110 or by an external source.

25 Swivel 136 is attached to the top of ceiling 26 at a point between flange 134 and hatch 80. Loading arm 140, shown in its shipping position in figure 1, is movably attached to the top of swivel 136, and comprises a flange 142 connected to pipe 144 which, in turn, is connected to
30 valve 146 which can be opened and closed by wheel 150. Meter 152 is attached to the opposite side of valve 146. Detachable loading pipe 154 is attached to the opposite side of meter 152.

As shown in figure 4, for the discharge of liquid
35 detachable loading pipe 154 is removed and arm 140 is rotated on swivel 136 so that flange 142 faces flange 134 and pipe section 155 is connected to each flange. Standard



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1 cargo hose or jointed downspout 158 is then attached to the
end of detachable loading pipe 154 for discharge of liquid
into trucks or tank cars.

As shown in figure 2, prover 156, of conventional
5 design, is also attached to the top of ceiling 26, and
drains into the interior of hollow body 10 at port 157, and
is connected by its U-shaped pipe 159 to loading arm 140 at
meter 152 when detachable loading pipe 154 has been
removed, loading arm 140 has been swiveled into its
10 discharge position from its shipping position and pipe 155
has been connected to flange 144 and to flange 134. The
accuracy of meter 152 is then verified. U-shaped
section 159 is then detached from meter 154 and detachable
loading pipe 154 is reattached, now extending out over
15 short wall 16 in a position to load any vehicle parked
beside said container through standard cargo hose or
jointed downspout 158 as shown in figure 4.

Referring again to figure 1, a plurality of lights
160 can also be attached to top frame 14 and powered either
20 by generator 112 or by an available external electrical
source.

A plurality of lifting attachments 162 for hooks or
other cargo lifting devices are also attached to top frame
14 for off-loading the container from ships or other trans-
25 portation or for other manipulation. Preferably, these
lifting attachments are standard container lifting sockets
and are attached one per corner at the top of frame 14.

A spill containment edging 164 is connected to the
top of ceiling 26 and runs around its perimeter in order to
30 contain any liquid spilled onto the top ceiling 26.
Preferably, the edging is approximately six inches high.

Stiffening frames can be added to provide support to
the ceiling, the four side walls and the floor of hollow
body 10. Such frames may be either internal or external
35 depending upon the type of liquid to be contained in the
hollow body 10. External frames will decrease the volume
of hollow body 10 marginally, but will decrease clingage



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1 and increase ease of cleaning. The rungs of ladder 76 are not to extend beyond the external frames if external frames are used, or are to be recessed into short wall 16 or long wall 20 if internal frames are used.

5 As shown by figure 3, it is also apparent that the passive container will contain the same features as the active container except for pump 122 and its power source, engine 110, scrubber 106, fuel tank 116, vent connection 120, generator 112, motor 114, right angle drive 124, pump
10 shaft 125, pipe 126, valve 130, wheel 132, flange 134, swivel 136, loading arm 140 and prover 156.

As shown by figure 5, one or more passive containers carrying the same cargo can be connected in series to an active container through pipes or hoses 170 attached to
15 pipes 54 and the active container can then pump the cargo of the passive containers out through its loading arm 140.

This invention has been disclosed with respect to the certain particular preferred embodiments. It will be obvious to those skilled in the art that changes and
20 modifications can be made in the disclosed embodiments without departing from the spirit and scope of the invention. For example, the height of the container can be varied in order to fit various dockside crane capabilities or vessel configurations without changing the basic
25 function of the unit. Similarly, the footprint of the container may be varied to fit any other mode of transportation without changing the basic function of the unit. Also, although the general form of the preferred embodiment is a rectangular parallelepiped (except with
30 sloping bottom surfaces), it is well known in the art that the container's edges can and should be rounded off in order to prevent "pocketing." Also, for example, opening 29 or hatchway 27 may have shapes other than circular without loss of function. In addition, when one or more
35 passive containers are connected in series to one or more active containers, the method of circuiting the connections between the active and passive containers may be varied in



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- 1 order to provide isolation between a plurality of
compatible cargoes or products. Accordingly, no
limitations are to be implied or inferred except as
specifically and explicitly set forth in the attached
5 claims.

INDUSTRIAL APPLICABILITY

- This invention provides bulk liquid containers that
can be rapidly transported to a remote location lacking
storage and dispensing facilities for bulk liquid products.
10 The containers can be quickly deposited, and prepared to
receive and dispense a wide variety of bulk liquid cargoes
including flammable, explosive, hazardous and non-hazardous
liquid cargoes as well as bulk flowable dry cargoes, thereby
serving as a prefabricated terminal. A loading rack allows
15 for rapid and convenient filling of tank trucks or tank
cars from the terminal. A container may be connected in
series to other containers (with or without pumping means)
to create a facility capable of storing and dispensing
large amounts of bulk liquid products.
20 The containers can be loaded into dry cargo vessels
thereby converting them in whole or in part into bulk
liquid products carriers. Although some dry cargo vessels
may not have sufficient capacity to be fully loaded with
full liquid product containers, all should be able to be
25 loaded with a plurality of full containers and at least one
empty container.

- When one or more loaded containers are carried in a
vessel together with one or more empty or nearly empty
containers, it is possible to transport the containers to a
30 desired location and create a bulk liquid products terminal
facility loaded with bulk liquid products ready for
immediate dispensing by off-loading an empty container
first, filling it with liquid cargo from a loaded container
and then off-loading that container when it is empty and
35 filling it, in turn, with liquid products from another full
container, continuing in this manner until all desired
containers and cargo are off-loaded, thereby immediately

- 1 creating a loaded terminal facility.

Finally, of course, these containers may be transported to a desired location in an empty or nearly empty state and then deposited to immediately create a

- 5 pre-constructed, self-supporting liquid products terminal facility or a tank farm to be filled from any source such as a tanker, a train, trucks, a pipeline, or an associated processing or producing facility.

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CLAIMS:

1. A liquid products container, comprising:
 - a hollow body adapted for containing a bulk liquid cargo having an upper portion and a lower portion and an opening in said upper portion, said hollow body being configured to be transportable by dry cargo vessels;
 - pressure control means connected to said hollow body for controlling pressure within said hollow body;
 - lifting means attached to said hollow body for receiving lifting devices;
 - unloading means connected to said hollow body for unloading liquid products from said hollow body; and
 - a metering device having a specified liquid measure accuracy attached to said hollow body for determining an amount of liquid flowing through said metering device for said hollow body.
2. A container according to claim 1, further comprising:
 - an expansion dome having a hatch opening connected to said upper portion of said hollow body over said opening in said upper portion; and
 - a lockable hatch releasably covering said hatch opening.
3. A container according to claim 1,^{or 2} wherein said unloading means comprises:
 - at least one fitting, connected to said lower portion of said hollow body, for receiving pipes, hoses or discharge valves for liquid transfer therethrough.
4. A container according to claim 1,^{2 or 3} wherein said unloading means further comprises:
 - a pump connected to said hollow body to transfer liquid by pump operation.





5. A method for establishing a liquid products terminal facility at any desired location, comprising the steps of:

5 transporting to said desired location at least one container comprising:

10 a hollow body member adapted for containing a bulk liquid cargo having an upper portion and a lower portion, said hollow body having the shape of a substantially rectangular parallelepiped with sloping bottom surfaces, having a footprint of a standardized cargo container, and having a width and a height, said height being equal to approximately four times said width, whereby said hollow body is configured to be transportable by dry cargo vessels without stacking;

15 pressure control means connected to said hollow body for controlling pressure within said hollow body;

lifting means attached to said hollow body for receiving lifting devices; and

20 unloading means, including a pump, for unloading liquid products from said hollow body; and

depositing said hollow body at said desired location.

25 6. A method according to claim 5, wherein said liquid products containers are configured to be transportable aboard a containerized cargo vessel.

7. A method for using a container capable of containing a liquid product comprising the steps of:

30 transporting a first substantially empty container to a desired location;

transporting a second at least partially filled container containing said liquid product to said desired location;



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depositing said first substantially empty container at said desired location; and

off-loading said liquid product from said second at least partially filled container into said first substantially empty container, so that said second at least partially filled container becomes a second off-loaded substantially empty container.

8. A method according to claim 7, further comprising:

depositing said second off-loaded substantially empty container at said desired location.

9. A method for converting a dry cargo vessel to a vessel capable of transporting bulk liquid products, comprising the steps of:

loading a liquid products container onto said vessel, wherein said container comprises:

a hollow body adapted for containing a bulk liquid cargo, an upper portion and a lower portion, said hollow body being configured to be transportable by dry cargo vessels;

pressure control means connected to said hollow body for controlling pressure within said hollow body;

lifting means attached to said hollow body for receiving lifting devices; and

unloading means connected to said hollow body for unloading liquid products from said hollow body; and
loading liquid cargo into said hollow body.

10. A method according to claim 9, wherein said containers are configured to be transportable by a containerized cargo vessel.

