

(No Model.)

2 Sheets—Sheet 1.

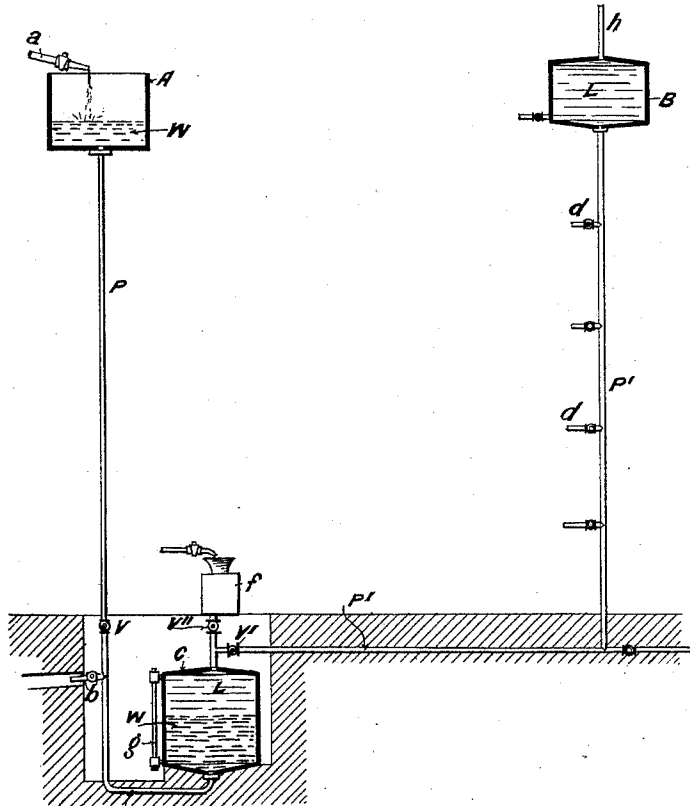
W. BUCKWELL.

APPARATUS FOR THE TRANSFERENCE OF HYDROCARBON OILS.

No. 476,977.

Patented June 14, 1892.

FIG: 1.



Witnesses

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FIG. 2.

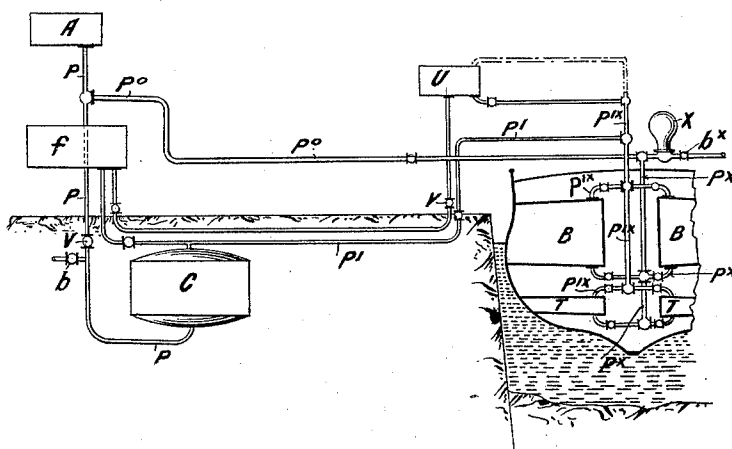
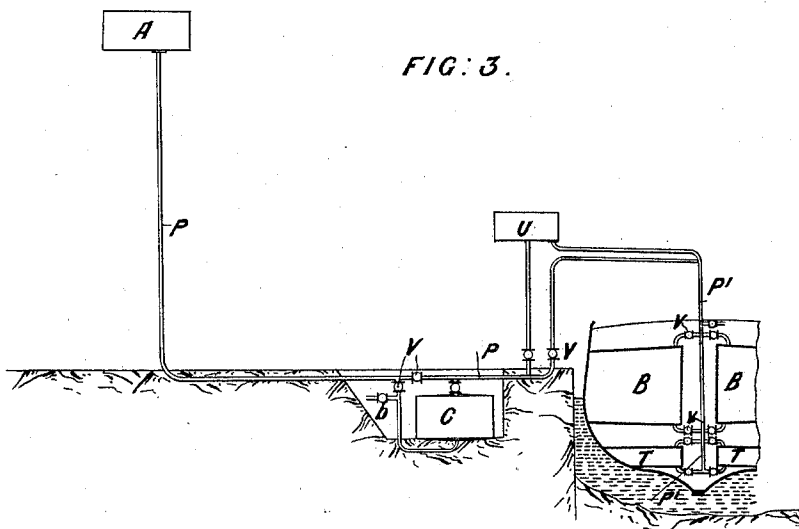


FIG. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM BUCKWELL, OF BRIGHTON, ENGLAND.

APPARATUS FOR THE TRANSFERENCE OF HYDROCARBON OILS.

SPECIFICATION forming part of Letters Patent No. 476,977, dated June 14, 1892.

Application filed February 14, 1890. Serial No. 340,411. (No model.) Patented in England July 3, 1889, No. 10,861.

To all whom it may concern:

Be it known that I, WILLIAM BUCKWELL, civil engineer, a subject of the Queen of Great Britain, and a resident of Brighton, in the county of Sussex, England, now residing at Aspra Sabina, in the Kingdom of Italy, have invented certain new and useful Improvements in Apparatus for Hydraulic Transference of Hydrocarbon Oils to or from Ships or Ships' Tanks, (for which a patent has been granted to me in Great Britain, bearing date July 3, 1889, No. 10,861,) of which the following is a specification.

This invention refers to improved apparatus for hydraulic transference of hydrocarbon oils to or from ships or ships' tanks; and in carrying out my invention I employ an oil container or containers constructed with a cylindrical-shaped body having a truncated coned top and a similar-shaped bottom, the bases of the cones being opposite to each other and the apexes in axial line with the cylindrical body. The apexes are provided, respectively, with a water-pressure pipe and an oil-supply pipe, and by reason of the aforesaid construction no air-spaces can be formed, nor are there any projecting parts where the water or oil could possibly be retained therein.

Figure 1 is a sectional diagrammatic view, by reference to which the elementary arrangement of my apparatus will be easily understood, the application of such to the particular purposes of my invention—namely, the transference of the oils to and from ships or ships' tanks—being illustrated by Figs. 2 and 3, hereinafter mentioned.

At Fig. 1 A is a tank or cistern supplied with water W, and is in connection by a pipe P with the lower coned end of the oil reservoir or container C, the shape of which has been particularly described—that is, the oil container or containers should have bottoms draining or inclining to the lower pipes and tops rising at the highest point to the upper pipes. The pipe P being, therefore, always inserted into the bottom of the container C at its lowest point forms an inverted siphon before entering the said containers, or otherwise the pipe P may enter a dip box or pocket below the bottom of the container C. From the top of the container C there is a pipe P', extending to any distance required or to any

height not exceeding one-fourth higher than the head of water at command, as aforesaid, and this pipe P' may have any number of outlets or branches *d d d* upon it or a cistern or tank, as at B, each outlet or branch being fitted with any suitable valve or cock to be opened or closed as the liquid in the pipes may be required for any purpose or use.

In the water-pipe P at or about the level of the top of the container C a branch pipe *b*, with a cock or valve, is placed as a waste-pipe for the water used, as hereinafter explained, and above this branch pipe *b* is fixed a valve V on the pipe P.

On the outlet-pipe P' of the reservoir or container C is fixed a cock or valve V' to shut off the contents of the pipes beyond it when filling the reservoir or container C from the small cistern or funnel *f*, the pipe connecting this funnel with the reservoir C being also provided with a cock or valve V².

The reservoir or container C may or may not have a gage *g*, as shown, or of any other form or construction to indicate the level depth or height of the liquid or liquids there-in contained.

The cistern or tank B, where used, may have an expansion or air pipe *h*, which may be carried up to any convenient point and open to the atmosphere, all other parts of the apparatus being closed air-tight and when in action admitting of no air-spaces or vacuums to serve as receptacles for gases or vapors from the liquid in use, thus avoiding all risks of explosions.

To manipulate the apparatus, the whole being supposed empty or containing air only, close all the valves or cocks except V on pipe P and V² below the funnel *f*, which are to be left open. Water is then to be run from cistern A to descend by pipe P and fill the container C, the air escaping by the funnel *f*. When the water rises into *f*, the valve V on water-pipe P is closed, leaving the low reservoir or container C full of water. Any supply of the oil or light liquid then available, whether from barrels or reservoir near or at a distance or from any supply-pipe of any other similar apparatus to this herein described, may be discharged or supplied to the funnel *f* without pressure or under pressure. The valve on the branch or waste pipe *b* be-

ing opened, the water in the container C will then run out thereby, and oil will occupy its place and completely fill the container C, which may be a reservoir of comparatively large capacity, thus providing a large store of the oil or light liquid required for any uses. All valves being closed and the container C full of oil, as aforesaid, the valve V on pipe P and the valve V' on pipe P' are opened. The oil will rise and fill the pipe P' and the tank or cistern B or ship or ship's tank, which B may represent, the oil being forced without agitation by the gravity of the water from the cistern A entering the reservoir or container C by the inverted siphon at the bottom and lowest point thereof. Thus, all parts of the apparatus being filled with liquid without air-spaces, no gas or vapors can accumulate and no explosion can by any possibility occur.

Figs. 3 and 4 show such an apparatus applied for effecting the main object of my invention—namely, the loading and discharge of petroleum tank steamers or for the supply of liquid fuel to any war-vessel or steamer using such liquid fuel wholly or in part in lieu of solid fuel.

Referring to Fig. 2, B is one of several tanks or cargo-bulk containers, and T one of the ballast or liquid-fuel tanks on one side of a vessel, similar tanks being on the other side and each separate tank connected to a main pipe at its lowest point and the branch connection closed with a valve, as also the top of each tank at its highest point is connected to another main pipe and having a valve upon each branch. The pipes connected to the bottoms of tanks are used for water and the pipes from the tops of tanks are used for petroleum, and it is to be observed that the principle of construction of the bottoms and tops of the tank should be as described with reference to Fig. 1—that is, sloped toward the point of junction of the pipes with the tanks. The container C being supposed full of petroleum derived from the source of production or distant reservoir *f*, the water-reservoir A being at any distance or elevation above the vessel to be loaded, the pipes P and P' having valves V and V', as shown, the tanks B T in the steamer or other vessel lying alongside the quay being full of water, to load the vessel with petroleum the valves on the inlet and outlet pipe of any one tank B or T being opened and a waste-pipe *b*^x from the water-pipe P^x opened at deck-level the petroleum will flow into the tanks B or T, as the case may be, and its contained water flow out to waste until the tank is full of petroleum without air-space remaining, when the inlet-valve on the top of the tank can be closed and other tanks filled in the same manner till the vessel is fully laden. After all tanks are full of petroleum the main water-pipe P^x up to the level of the deck of vessel and all the branch pipes to the bottoms of tanks, their valves being left open, will remain full of water only, while to provide for

the expansion and contraction of the oil in the tanks the main water-pipe at or above the level of the deck shall have an enlargement or reservoir X, of globular form, partly filled with water and of sufficient capacity to admit of any expansion or contraction of the oil in the tanks. In a case where the reservoir C of petroleum is somewhat above the level of the vessel to be loaded, as a reservoir U, (previously filled, say, from the container C or from a discharging tank-steamer, as herein-after described,) it is only necessary to connect the reservoir U direct with the main pipe leading to the tops of the tanks B and T, the main water-pipes in the vessel being opened, as previously described, when the tanks B and T will be filled with petroleum, as the extra head or pressure given by the lighter liquid from the tank U will force out all the water in the tanks B T, leaving only water in the main water-pipes up to or above deck-level.

To discharge a tank-steamer carrying petroleum with the apparatus and appliances shown in Fig. 2, the head of the water at A must be connected by the pipe P^o to the main water-pipe P^x, leading to the bottom of tanks B and T. The valves on the branch pipes being open, the main oil-pipe P^{ix} (from the tops of the tanks B and T) connected to the reservoir U either at the bottom or by a pipe over the top, as in dotted lines, and the valves on the branch pipes at tops of tanks B and T being opened, as aforesaid, the oil will flow steadily up the pipe P^{ix} to the reservoir U, and from thence may be transferred by gravity to a main or distant reservoir, such as that marked *f*. The vessel may, however, be discharged directly into a main reservoir or into the container C, in the latter case opening the waste-water branch *b* to discharge simultaneously the water previously contained in C, closing the valve on the branch *b* as soon as the container is full of oil.

By opening or closing the proper valves, as has been previously described, oil or petroleum contained in the reservoir or container C can be transferred to the tank B, if so required, or to the main and distant reservoir, such as *f*, or petroleum from a distant reservoir at a low level can be transferred or transported to a high-level tank or reservoir by operating with the container C, as herein previously described, and the container C may be filled with oil and emptied again, as required.

Fig. 3 shows a simple arrangement of the apparatus and appliances which can be equally used for loading or discharging tank-steamers or other vessels where the tank or reservoir U may be used alternately for oil and for water, as required, the vessel discharging her oil cargo from the cargo-bulk containers or tanks B and the liquid-fuel container or ballast-tanks T into the tank or reservoir U or, if the tank U contains water, into the container C, while, conversely, any

vessel may receive cargo of oil or supply of liquid fuel directly from the tank or reservoir U or container C, as the case may be, and in the manner already previously described.

5 Oils contained in tank U can be transferred to container C by gravity and opening the waste-water branch *b*, as also oils contained in C can be transferred to the tank or reservoir at U by the pressure of the head of water in tank A. In all cases the transfer of
10 the oils from vessel to vessel or from tank to tank will be effected without commotion in the liquid and without leaving any air-spaces whatever to accumulate gases or vapor, thus
15 avoiding all risks of fires or explosions in the tanks, reservoirs, containers, or vessels.

In tank-steamers having cargo-bulk containers arranged for the carrying of any general cargo alternately with oils or to serve
20 both purposes, their tank being fitted with air-tight and oil-tight manholes or hatches, the discharge of the oil cargo from the tanks in the manner herein described by use of water at the same time sweeps them clean
25 and free from oil, gas, and vapor, so that when the water is discharged by opening a valve to the water in which the vessel floats and one of the hatches raised the tanks or cargo-bulk containers are at once ready for any general
30 or dry cargo.

In war-vessels or other steamers requiring to use liquid fuel the reservoirs for the oils may be the ballast-tanks, or in lieu of them the oils may be conveyed to the burners of
35 the furnaces under any pressure desired, while the consumption of the fuel, being replaced by an equal bulk of water, does not alter the trim of the vessel or materially affect its flotation as where solid fuel is used.

40 I am aware that it is not new to employ water-pressure to raise oil which is of less specific gravity than the water, and I am aware that various expedients have been proposed to obviate the danger of accumulated gas
45 which may be evolved from the said oil. I

therefore do not broadly lay claim to such apparatus, but I define my invention to be an improved means or apparatus whereby oil may be transferred to or from marine vessels with a certainty of there being no possibility
50 of the formation or creation of voids or spaces wherein vapor can lodge.

I claim as my invention as follows:

1. In apparatus for hydraulic transference of hydrocarbon oils to or from ships or ships' tanks, the combination, with the said tanks,
55 of the water-pressure tank A, pipe P, and cylindrical conical-ended container C, with oil-supply cistern *f*, pipe P', and valves *b* and V V, whereby oil may be transferred to or from the
60 said marine vessels or their tanks and the lodgment of liquid or the formation of air-spaces effectually prevented, as set forth.

2. In apparatus for hydraulic transference of hydrocarbon oils to or from ships or ships' tanks, the combination in such apparatus,
65 essentially composed of water-pressure tank A, water-pipe P, oil-pipe P', and ships' tanks B T, of the container C, constructed with a cylindrical-shaped body having a truncated-cone-shaped top and a truncated-cone-shaped
70 bottom, the bases of the cones being opposite to each other and the apexes in axial line with the cylindrical body and having the said oil and water pipes proceeding from the said
75 apexes, respectively, whereby the interior of the container C presents a smooth even surface preventing the lodgment of liquid and the formation of air-spaces, as set forth.

3. In apparatus for hydraulic transference of hydrocarbon oils to or from ships or ships' tanks, the combination, with the tank A, pipe P, container C, the source of oil-supply, and the pipes and valves, of the high-level secondary reservoir U, as set forth.

Dated the 27th day of January, 1890.

W. BUCKWELL.

In presence of—

A. P. TOMASSINI,
L. MENJOIRE.