Church & Knight,

Oil Tank.

No. 57,866. Patented Sep. 11, 1866.

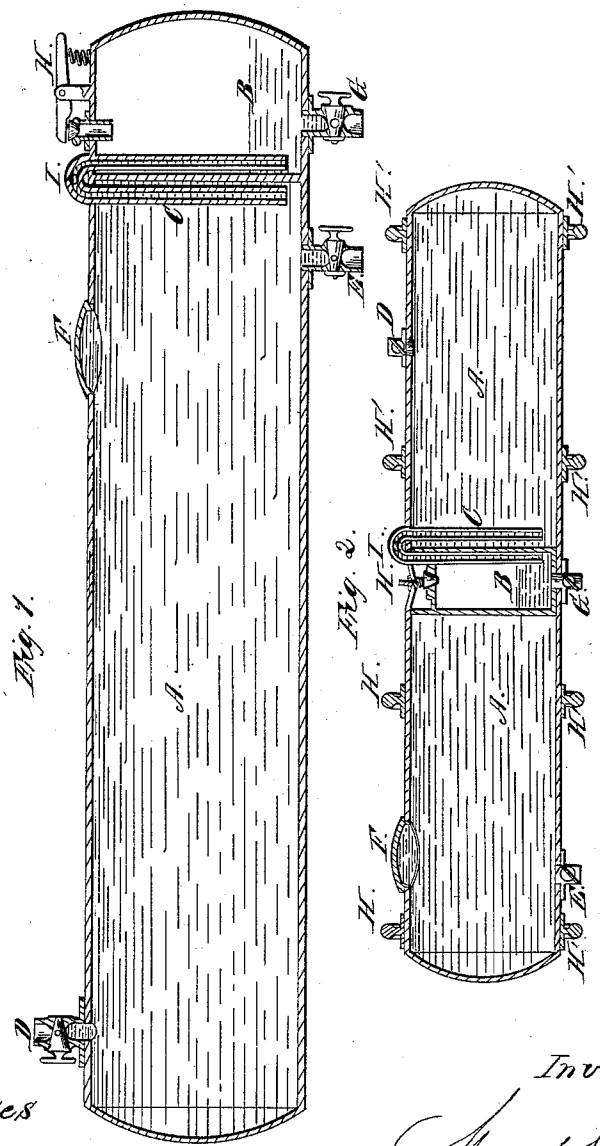


Fig. 1.

Fig. 2.

Witnesses

Solon C. Kemon
James L. Ewin

Inventor

Marcus A. Church
Edward Knight

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

M. C. C. CHURCH, OF PARKERSBURG, WEST VIRGINIA, AND EDWARD H. KNIGHT, OF WASHINGTON, D. C.

IMPROVED TANK FOR PETROLEUM, &c.

Specification forming part of Letters Patent No. **57,866**, dated September 11, 1866.

To all whom it may concern:

Be it known that we, MARIUS C. C. CHURCH, of Parkersburg, in the county of Wood and State of West Virginia, and EDWARD H. KNIGHT, of Washington, in the county of Washington and District of Columbia, have invented a new and Improved Tank for the Transportation or Storage of Petroleum and other Liquids; and we do hereby declare the following to be a full, clear, and exact description of the same, sufficient to enable one skilled in the art to which the invention appertains to make use of it, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a longitudinal central section through the tank. Fig. 2 is a similar section of a modified arrangement of the air-chamber.

Our improvement consists of a tank provided with a chamber to receive the overflow due to the expansion of the oil on increase of its temperature, the oil thus overflowed being returned to the chamber as the volume therein contracts.

On the expansion of the oil with which the main chamber is filled it overflows into the air-chamber, the connection between the two being by a pipe whose open ends are beneath the surface of the oil in the respective chambers, so that a portion of the oil, being driven by expansion from the main chamber into the air-chamber, is returned by contraction into the main chamber without admitting air thereinto.

The object of the invention is to keep the main chamber constantly full of the liquid, and to give the latter a place wherein to expand or contract.

In the drawings we have represented the tank as of a cylindrical shape, the ends being bulged outwardly. A is the main or oil chamber of the tank, and B an air-chamber, divided from A by a diaphragm or partition. The connection between the two is by means of a pipe, C, whose open ends are near the bottoms of the respective chambers, so that when the tank A is filled and a portion of liquid in the chamber B both ends of the pipe C shall be submerged in liquid.

D is the inlet-aperture of the chamber A, and E the discharge, both or either being provided with faucets. F is a man-hole to afford an entrance, as occasion may require, for cleaning out the tank. G is the discharge-aperture of chamber B, and H a safety-valve on the latter to allow the air or gas to escape if the internal pressure becomes extreme.

In Fig. 1 the air-chamber is situated at the end of the tank, and in Fig. 2 it is in the center, consisting in the latter of an upright cylinder, whose upper head being depressed below the upper surface of the tank permits the safety-valve to be protected within the recess thus formed.

Projecting rings or re-enforce-bands H′ H′ encircling the tank may be added to permit the tank to be rolled without striking the parts D E F G H or the bend of the pipe C in cases where it projects beyond the outside of the cylinder.

The bend of the pipe C may have a faucet, I, so as to close the connection between the chambers A B while the tank is being rolled over and over. This tank may be of any shape or size, and is only shown cylindrical, as that is necessarily a favorite shape from the facility of its construction, the economy of material, and strength of the completed tank.

This improved tank is designed for the transportation of oil or other liquids by land or water or for storage of the same, the provision of the chamber B permitting the tank to be placed under varying circumstances as to temperature without injury.

To avoid the danger of collapse of the vessel under possible condition of the contraction of the bulk of its contents, a valve may be so arranged as to open inwardly under a certain amount of external pressure, and permit the entrance of air into the chamber B.

In charging the tank with oil or other fluid it is introduced at the inlet-opening D until the chamber A is full. It may then be overflowed into the chamber B through pipe C until the outlet of the said pipe in chamber B is sufficiently submerged to make sure that under all circumstances of expansion or contraction of the fluid or motion of the car or vessel the opening of the pipe into the chamber B shall not be exposed to the air in said chamber.

The flow of the liquid through the pipe C may be gaged or observed, or a sufficient quantity may be separately introduced into chamber B; but we prefer to overflow into chamber B from chamber A, as by that means the pipe C becomes filled with liquid, and no air will reach chamber A. The tank being thus sufficiently charged with oil, if it is to be moved in such a manner as to upset it, the faucet I is closed until the tank is disposed in an upright position in the required place, when the faucet is opened.

On shipboard, where the verticality of the tank may be seriously disturbed, a vessel may be placed inside of the chamber B around the open mouth of the tube C, so as to prevent the liquid from being withdrawn therefrom by the careening, rolling, or pitching of the ship.

The expansion of the fluid in A, as has been said, will drive a portion through pipe C into chamber B, and a subsequent contraction will return it to A, the air, by the said expansion, being condensed in B, and expanding again as the liquid, by contraction, resumes its place in chamber A.

The tank may be made of such a size as to form a sufficient load for a railroad-car, or it may be made smaller, so as to be readily handled, as is usual with barrels, &c. The conditions we have endeavored to secure are not limited by questions of size or adaptation for transportation or storage, but consist in enabling the main chamber of the tank to be kept full, relieving itself into the other chamber under expansion of the fluid, and supplying itself with fluid, from said auxiliary chamber under circumstances of contraction or leakage in the main chamber.

Among the reasons for desiring the main chamber to be kept full are to avoid the swashing about of the contents, and also to form a gage of quantity both for commercial and internal-revenue purposes.

The legs of the pipe C, which extend into the chambers B A, if the means of communication be left open, will act as a siphon to discharge the greater part of the liquid contents of B when A is emptied by the usual means—to wit, the opening E.

The tank is sometimes charged with fluid at a higher temperature than the surrounding atmosphere, and by placing a sufficient amount in the smaller chamber provision is made for the contraction of the fluid in the larger compartment, which receives fluid from the smaller as its contents contract. Thus the smaller chamber receives the surplus on the expansion of the oil and renders a supply on its contraction, keeping the larger chamber full.

Having described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

A tank for the transportation or storage of petroleum or other liquids, provided with an auxiliary chamber and connecting-pipe, operating substantially as described.

To the above specification of our improvements in petroleum-tanks we have signed our hands this 21st of August, 1866.

MARIUS C. C. CHURCH.
EDWARD H. KNIGHT.

Witnesses:
SOLON C. KEMON,
OCTAVIUS KNIGHT.