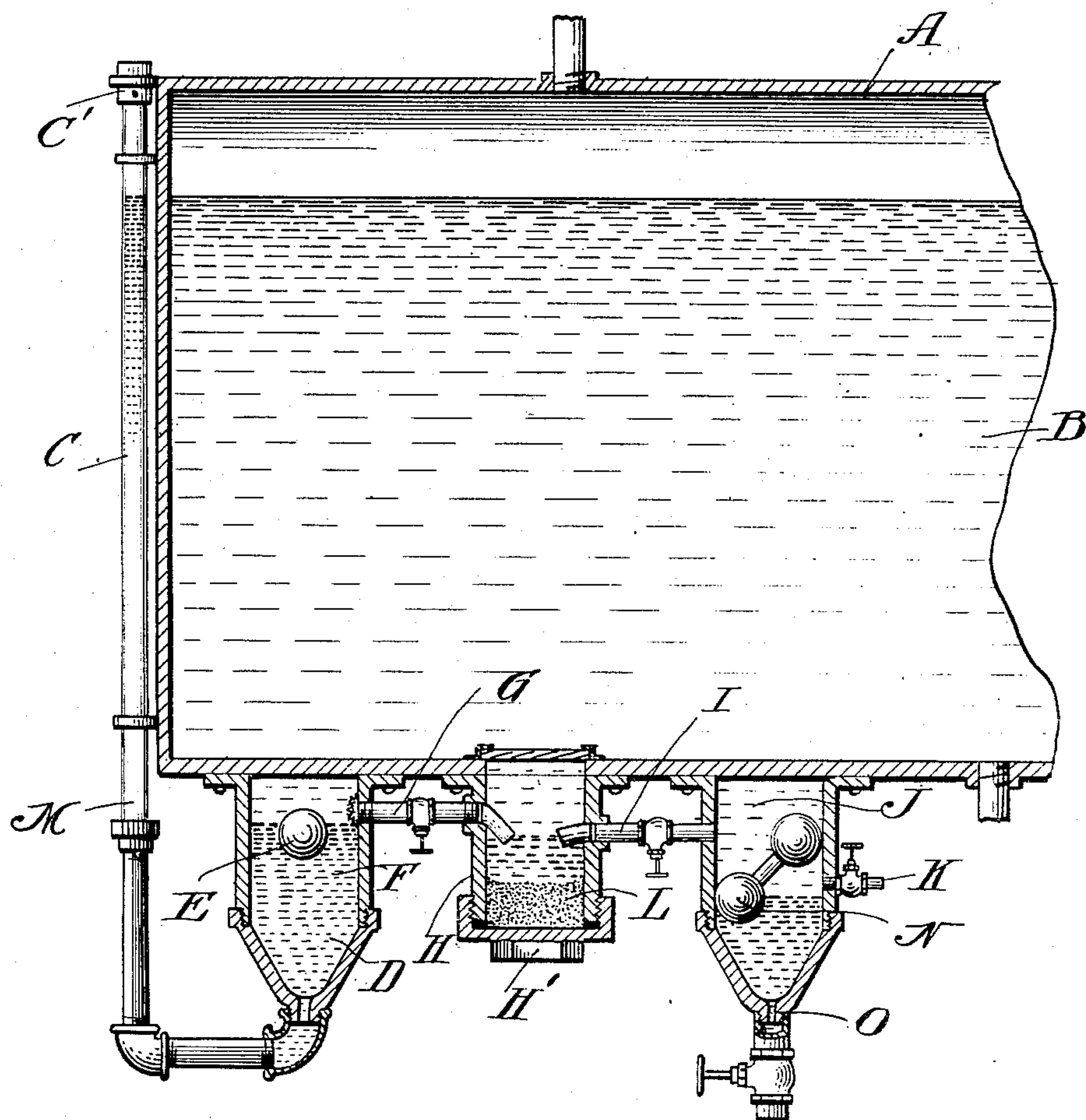


No. 890,756.

PATENTED JUNE 16, 1908.

R. K. BRUNDAGE.  
OIL TANK.

APPLICATION FILED JULY 30, 1906.



Witnesses

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# UNITED STATES PATENT OFFICE.

ROBERT K. BRUNDAGE, OF FARMERSVILLE, CALIFORNIA.

## OIL-TANK.

No. 890,756.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed July 30, 1906. Serial No. 328,370.

*To all whom it may concern:*

Be it known that I, ROBERT K. BRUNDAGE, a citizen of the United States, residing at Farmersville, in the county of Tulare and State of California, have invented new and useful Improvements in Oil-Tanks, of which the following is a specification.

The object of my invention is to provide means for the removal of water contained in crude oil and also the sand and sediment therein and is useful particularly in connection with the oil tank indicator covered by a patent issued to T. J. Brundage and Robert Brundage, which patent is numbered 809,542 issued by the United States Patent Office on the 9th day of January, 1906. In the practical use of the device described in said patent it is found, owing to the large quantity of sand and other substances carried in crude petroleum, that the float valve in the device shown and described therein soon becomes inoperative owing to the lodgment of quantities of sand and sediment on the valve seat and I have provided means which are hereinafter shown and described by which the foreign substances in crude petroleum are removed therefrom and also provides for the removal of water, large quantities of which is often carried in crude petroleum, which should be removed therefrom.

The accompanying drawing is a central vertical section of an oil tank with crude petroleum therein having on the bottom thereof my improvements for accomplishing the purposes above stated, some of the parts of the same being shown in elevation.

In the drawings A is an oil tank with crude oil or petroleum B therein. Mounted on the side thereof is the oil indicator tube C having on the bottom thereof a ball valve, the casing surrounding which forms a chamber D which I have termed for convenience the brine chamber. In this chamber is a float valve E adapted to float on the brine F and below the petroleum B therein. This construction is exactly identical with that shown in the patent above referred to except that the top of the chamber D herein does not open into and communicate directly with the oil in the oil tank as is the case in the device described in said patent, otherwise it is exactly similar and works in the same way. Water slightly impregnated with salt and slightly colored is turned into the indicator tube C upon the removal therefrom of the cap C' on the top of the indi-

cator tube until the brine in the valve rises to a point on a level with the bottom of the connecting pipe G which will be plainly indicated through the glass tube as at M. The tank is now ready to be filled with petroleum or crude oil. The crude oil will enter the top of the sand receptacle or chamber H from the oil tank, then into the brine chamber D and fill it up. A wire screen projects over the entrance to the pipe G and prevents the ball E from closing the opening into the pipe G while liquid is passing therethrough, it will also fill the valve chamber J which I have termed the water chamber. Whatever sand may be held in suspension in the oil tank will naturally gravitate to the bottom and pass into the sand chamber H and lodge on the bottom thereof as shown in the drawing, the sand therein being indicated by the letter L. This sand chamber or receptacle is provided on the bottom thereof with a screw cap H' upon the removal of which the contents of the chamber will pass out. It is unnecessary usually to remove this sand or debris except when the oil tank is empty, but in a construction where it should become necessary to remove the sand while there is oil in the oil tank a closure for the connection leading out of the tank into the sand chamber can be provided to close the opening from the oil tank into the sand receptacle when the cap H' is to be removed. To prevent the sand which gravitates down and settles on the bottom of the sand receptacle from passing into the connecting chamber as it passes down I have provided that the inwardly projecting ends of the connecting pipes G and I drop downwardly.

It will be seen in the drawing that the connecting pipe I is below the level of the connecting pipe G, the purpose of which is to permit the water which will accumulate in the sand receptacle (this water always remains at the bottom of the petroleum) to pass into the water chamber J and not into the brine chamber D.

To provide means for the removal of the water which is contained in crude petroleum and which naturally gravitates to the bottom thereof I have provided the water chamber J into which whatever water which passes into the sand receptacle and which rises above the level of the connecting pipe I will pass. This chamber is provided with a duplex ball valve N, the lower ball of which



has a greater specific gravity than oil and less than water and when there is no water in the valve chamber the lower ball valve will be seated in the bottom of the chamber and prevent the passage downwardly therefrom of oil because as stated it has a greater specific gravity than oil. It will remain resting on the bottom of the valve chamber and close the discharge port O leading therefrom and prevent the passage therethrough of oil, but when this chamber receives enough water to unseat the valve (which will take place when any considerable quantity of water accumulates therein owing to the fact that the valve has less specific gravity than water) the valve will become unseated and the water will pass out. It thereby provides means to automatically let whatever water accumulated in the bottom of the chamber pass out, closing immediately when the water passes therefrom. I have provided this ball valve with a ball at each end, the purpose of which is to reliably unseat the valve N in case the same should have a tendency to adhere to its seat in the bottom of the chamber and thereby always provide an opening for the passage of water out of the chamber and always prevent the passage of oil therefrom. This duplex valve is so constructed or made of such material that the lower ball has a greater specific gravity than oil and less than that of water while the upper ball and the connection between these two balls is approximately of the same specific gravity as oil. It will be seen that the upper ball and the connection therewith being of the same specific gravity as oil will not tend to unseat the lower ball when they are immersed in oil but in case the water should rise in the valve chamber above the lower ball the buoyancy of the connection and the upper ball together with the buoyancy of the lower ball will be such that it will always unseat the lower ball and permit the water to run out.

In order to ascertain whether the water chamber J is filled with oil or water I have placed in the side thereof a discharge cock K by means of which I can ascertain whether

oil or water is in the valve chamber. This is to practically test the operation of the valve N, although little trouble is occasioned in this regard owing to the duplex character of the valve, being provided with extra lifting power to always unseat itself when an unusual quantity of water is contained in the chamber.

Having described my invention what I claim is:—

1. The herein described means to separate the sand, sediment and water from crude oil, comprising a tank having on the bottom thereof a sand receptacle, the said sand receptacle being in open communication with the oil tank; a water chamber below the oil tank and connected with the sand chamber, the said water chamber being provided with a ball valve having less specific gravity than water and a greater specific gravity than oil.

2. In an apparatus of the character herein described, a water chamber communicating with the oil chamber and being provided with a duplex ball valve, one ball of which has a less specific gravity than water and more than oil, the other ball valve having the same specific gravity as oil.

3. In an apparatus of the kind described, an oil tank, a sand chamber in open communication with the tank, a water chamber communicating with the sand chamber, and a valve in said water chamber operative by the flow of water into the chamber to empty it.

4. In an apparatus of the kind described, an oil chamber, a sand receptacle opening into the oil chamber, a water-chamber communicating with the sand receptacle by means of a pipe, said pipe extending into the sand receptacle and being downwardly bent therein, and a gravity valve in the water chamber substantially for the purpose set forth.

In witness that I claim the foregoing I have hereunto subscribed my name this 23rd day of July, 1906.

ROBERT K. BRUNDAGE.

Witnesses:

HENRY T. HAZARD,  
E. E. HARPAM.