Bizard & Labarre,

Oil Tank.

No. 61,148. Patented Jan. 15, 1867.

Plate 2.

Fig. 1.

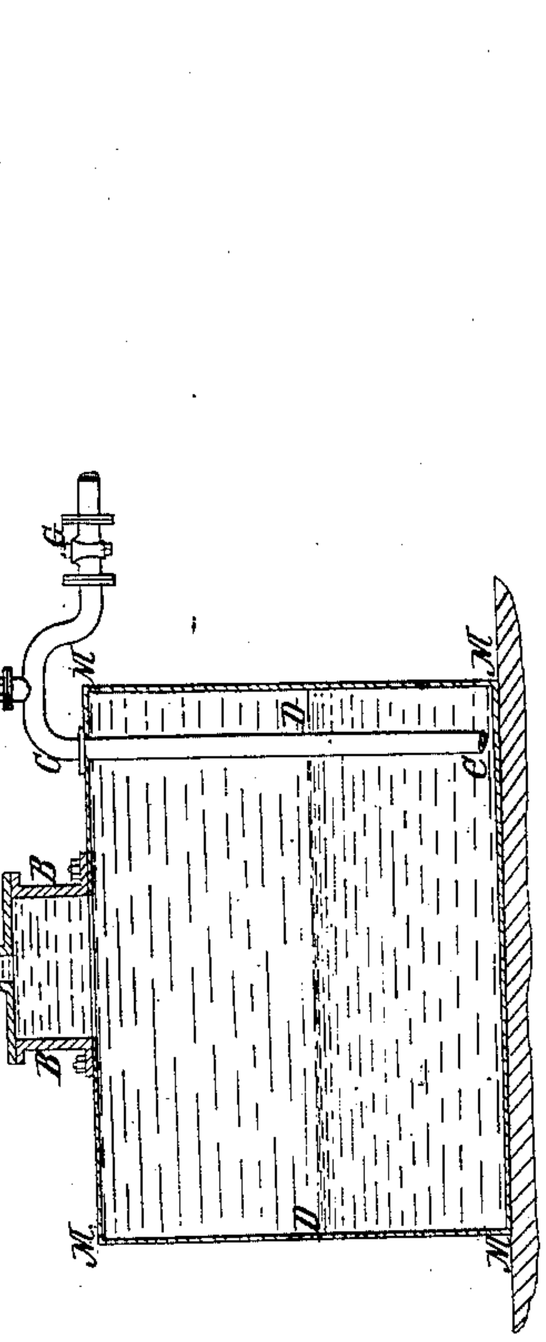

Fig. 2.

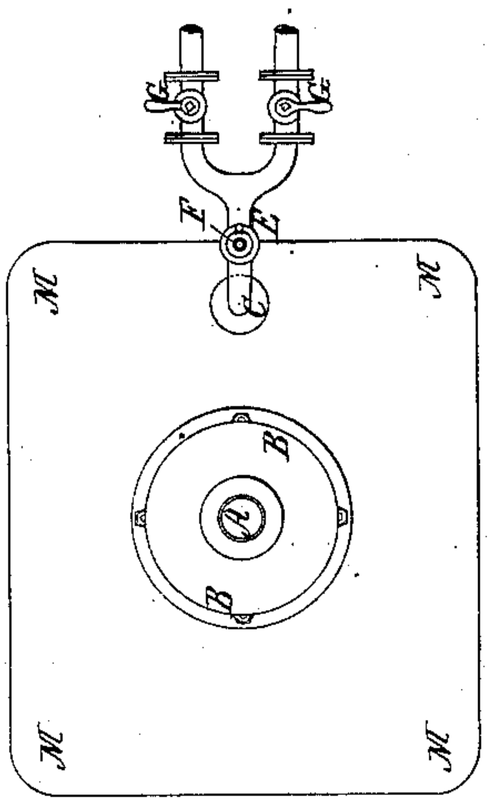

Plate 1.

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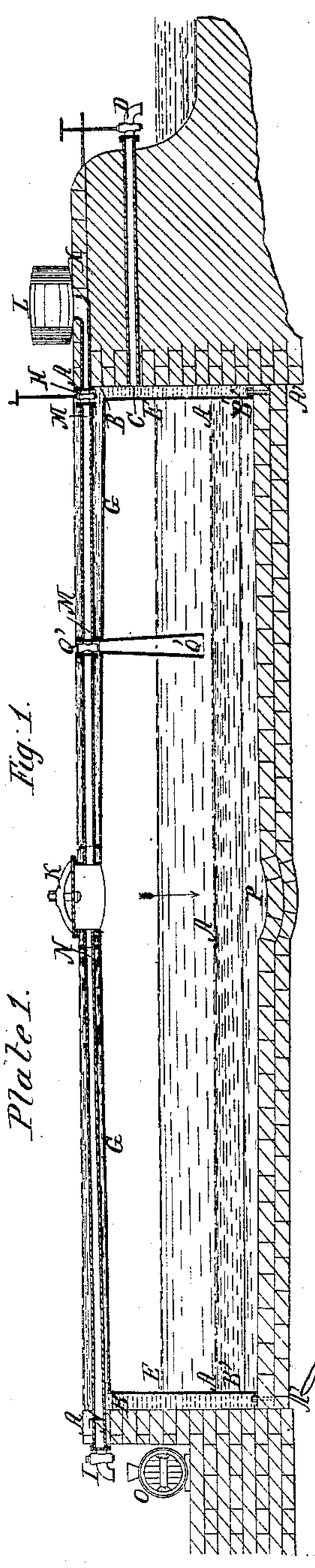

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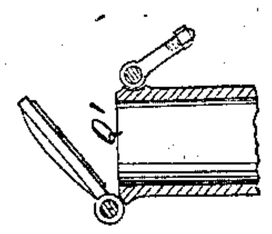

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FELIX BIZARD AND PIERRE LABARRE, OF MARSEILLES, FRANCE.

Letters Patent No. 61,148, *dated January* 15, 1867.

IMPROVED APPARATUS FOR STORING PETROLEUM AND OTHER INFLAMMABLE LIQUIDS.

The Schedule referred to in these Letters Patent and making part of the same.

TO WHOM IT MAY CONCERN:

Be it known that we, FELIX BIZARD and PIERRE LABARRE, of Marseilles, in the empire of France, have invented certain new and improved Apparatus for Storing Hydrocarbon and other Inflammable Liquids; and we hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings.

Our invention is based on the novel application of fixed or movable apparatus, resembling gasometers in construction, to storing liquids of less specific gravity than water, and on the employment of water as a certain means to prevent the escape of the oil, and to avoid all danger from fire or any possibility of the explosion of the reservoir when filled with crude petroleum or other highly inflammable liquid.

The construction and arrangement of the reservoirs may vary to suit the purposes for or connection in which they are used. They may also be either movable or fixed, though the latter arrangement is to be preferred as affording greater security against the danger of fire or explosion, besides possessing the great advantage of being much cheaper. We will therefore confine ourselves more particularly to describing the fixed or stationary reservoir.

In the drawings we have given the reservoir a rectangular form, which in the majority of cases will utilize most of the disposable space, and at the same time will cheapen the cost of construction.

Figure 1, plate 1, represents a vertical section of a rectangular reservoir, B B B′ B′, of sheet iron, the sides of which are vertical and the top slightly convex. At the point where the convexity culminates, which is at the centre of the rectangle, is fitted a cast-iron man-hole, K, provided with two pipes intended, the one, M, for filling the reservoir, the other, N, for emptying it. The reservoir, like the gas-holder of a meter, has no bottom. It is, therefore, in effect a rectangular bell or dome, placed in a water-tight basin of masonry, A A A′ A′, and rigidly attached to the bottom of the basin by bars or braces which prevent it from being raised. The conduit C D constitutes the waste pipe of the basin, and is provided with a stop-cock, D. Across the middle of the basin is a trough or sunken channel, P, for receiving the deposits and impurities or foreign matters contained in the oil, and also for enabling men to enter the dome when the basin is empty, in order to clean it. The distance between the sides of the reservoir and the surrounding sides of the basin should be sufficient to allow a man to pass between them. The top of the mason-work of the basin is of such height that the reservoir may be completely submerged, the advantage of which arrangement will be appreciated when the method of filling and emptying the dome is described. The conical tube Q Q′ is intended to mark the level of the fluid within the reservoir, and to indicate when the maximum supply of oil has been received. X is a conduit extending downwards from the surface of the ground and through the masonry connecting with the pipe M; its function is to receive the liquid poured from the barrels L, which should thence flow through the pipe M, (provided with a stop-cock, H,) into the reservoir B B′. I is a cock for regulating the filling of the barrels O. This arrangement, which may be made useful for many purposes in workshops, factories, &c., is particularly adapted for reservoirs used for storing or warehousing liquids.

The following is the method to be pursued in filling the reservoir: The basin being full of water, both outside of and within the sheet-iron dome, the cock I is closed, the man-hole K is shut, the tube Q′, which has a hinged cover, Figure 2, fastened by a bolt and nut also hinged, is opened, and then the waste-cock D is opened. When enough water has escaped through the waste pipe C to bring the level on the outside of the dome to C C, the cock H is opened, and then the oil is emptied from the barrels into the conduit X, and is delivered to the reservoir through the pipe M, falling on the surface of the water contained within the dome. In proportion as the oil enters it displaces an equal weight of water, which escapes from under the dome through the open spaces left between the bottom of the basin and the sides of the dome. The excess of water on the outside of the dome is carried off by the waste pipe C so long as the oil continues to be poured into the reservoir.

Figure 1, plate 1, represents the reservoir as partially full. The level of the water within the dome is at the line E E, whilst on the outside it is at C C, as likewise in the level-indicating tube Q Q′, in which the water remains at C′, *i. e.*, at the same level with the water outside the dome, which may be easily verified by looking in the open tube Q. But as the oil continues to enter the reservoir the water at the level E E will at a given moment reach the level indicated by the letters A A. It will then be seen that the water within the tube Q, being no longer upheld by the water which the oil has displaced, and being surrounded by a medium less dense than itself, will fall by its own gravity, and will be immediately replaced by the oil which attains a level equal to that of the oil contained within the dome, *i. e.*, G G. This may be easily verified by the tube Q, which will indicate the moment when the dome is charged or filled with oil. The cover of the tube Q is then fastened down, and the waste and feed-cocks D and H are closed. This having been done the basin should be completely filled with water, so as to entirely submerge the dome B and pipes M N. The advantages of this arrangement are as follows:

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I. If the sheet-iron dome has any holes or flaws in it, spots of oil will immediately appear on the surface of the water, and thus indicate the existence and locality of the flaws.

II. The superior weight or pressure of the column of water forces the oil to occupy the upper portion of the dome, and thus there is left above the liquid no opening or space in which may be generated explosive and dangerous gases; and besides, as the water surrounds every part of the reservoir, the oil confined within the same is put beyond reach of danger from fire.

III. When the reservoir is to be emptied it will be sufficient to open the cock I, through which the oil will be driven by the superior column of water; but in order to have a constant flow of the oil, which lies in the upper part of the dome, it is necessary to maintain the water in the basin, on the outside of the dome, at its primitive level. This arrangement is attended with the great advantage, first, of obviating the necessity of directly pumping out the oils; second, of allowing all the oil contained in a reservoir, of however great capacity, to be taken out, for as the oil floats on the surface of the water it is thus held in the upper part of the dome, and is forced out through the eduction pipe I; and third, this arrangement admits of the falling or settling of all impurities or foreign matter mixed with the hydrocarbon liquid to the bottom of the basin, and consequently allows the oil to be decanted or taken off naturally and easily. The contrary to this, however, takes place in ordinary reservoirs, whatsoever be their form or dimensions. The bottoms of these reservoirs are covered with mixtures of filth and oil, which increase in quantity in proportion as the capacity of the reservoir enlarges, and cause a considerable loss of the stored liquid. Another advantage which should be mentioned is the ease with which our reserveir may be cleaned; and when once free of water and oil it may be thoroughly ventilated by removing the man-hole frame on the top of the dome.

In plate 2 we have shown a mode of filling and emptying oil reservoirs or covered tanks, so as to avoid danger of explosion, by the application of water in a manner similar in principle to that already described, but yet unlike in some minor features. The apparatus consists of a rectangular sheet-iron reservoir, M, provided with a man-hole, B, on its top. A is a pipe through which the oil is delivered to or drawn off from the reservoir. C is a tube entering the reservoir from the top and extending downward to near the bottom, and it is used to conduct the water into the reservoir. G is a stop-cock which regulates the flow of the water. E is a tube for indicating when the reservoir is filled. F is an air-cock. Our system is applied as follows:

I. In filling, as in emptying the reservoir, it is, above all, necessary to avoid leaving a space above the surface of the stored liquid. In order to attain this end we introduce into the reservoir an incombustible liquid which does not mix with the oil, and which takes the place of the oil as the latter is drawn out from the reservoir, and which flows from the reservoir in proportion as fresh quantities of oil are introduced therein.

If the reservoir M is to be filled with oil, it is necessary, beforehand, to fill it completely, as high as the man-hole B, with water introduced through the pipe C. The cock G is then closed, and the cock G′, fig. 2, is opened, so as to allow the water to escape when the fluid or oil enters the reservoir. It is easy to see that by reason of the difference in height between the points A and G′, which difference may be increased if desired, the oil introduced through the tube A will displace an equal weight of water which will escape from the reservoir through the plunger-tube C, until the reservoir is entirely filled with oil. As soon as the tube E F indicates that the reservoir has received its maximum of oil the cock G should be immediately closed. The reservoir being filled and the opening closed, there remains no open space above the surface of the oil; and at no moment during the operation of filling the tank was there any such space, for when the reservoir was but half filled the lower level of the oil was at D D and the upper level at A, and the other half of the reservoir contained a volume of water occupying a space equal to that which would otherwise have remained unfilled above the surface of the oil.

II. The operation of emptying the reservoir can be performed rapidly, economically, and at the same time without danger. It is only necessary to open the pipe A, through which the liquid will flow into the barrels, and then to open the cock G, through which and the pipe C a column of water is forced into the reservoir, entering the same near its bottom, and driving out the superincumbent hydrocarbon liquid through the tube A. Under this arrangement, especially if the water be under pressure, the oil may be driven to a considerable height without the aid of pumps or other engines; and under all circumstances the reservoir will be emptied of the oil without leaving any open space in which explosive or detonating gases may be generated.

Having described our invention, and the manner in which the same is or may be carried into effect, what we claim, and desire to secure by Letters Patent, is as follows:

1. We claim an oil tank of ordinary or suitable construction, provided at the top thereof with a pipe through which said tank is supplied with, or discharged of, oil, in combination with a pipe also passing through the top into and down to near the bottom of said tank, said pipe being branched and provided with cocks and level-indicator for regulating the flow of water to and from the tank, in the manner and for the purposes set forth.

2. We claim the combination in an oil tank or reservoir of an elevated man-hole, and pipes connected therewith for supplying or drawing off the oil to or from the tank, at a point higher than the top or dome of the said tank, as herein shown and described.

3. In combination with the arrangement claimed in the last preceding clause, we claim the level-indicator when constructed to operate in the manner substantially as described.

4. We claim the channel or depression formed in the bottom of the reservoir for receiving and collecting the sediment, and facilitating the entrance to the dome, substantially as specified.

In testimony whereof we have signed our names to this specification before two subscribing witnesses.

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PIERRE LABARRE.

Witnesses:

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