No. 786,881. PATENTED APR. 11, 1905.

R. L. DORAN.

FLUID DELIVERY APPARATUS.

APPLICATION FILED MAY 20, 1901.

2 SHEETS—SHEET 1.

Fig. 1.

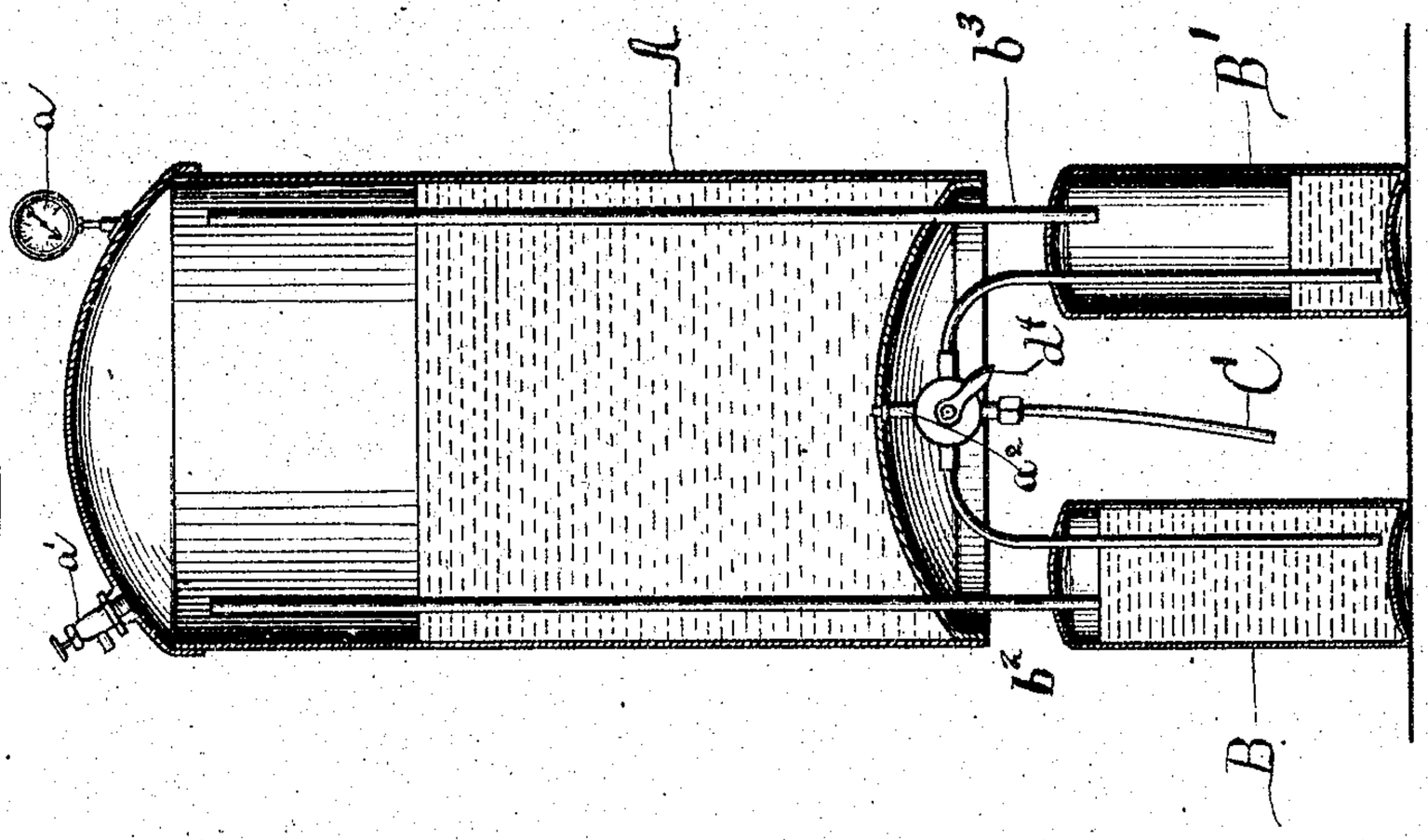
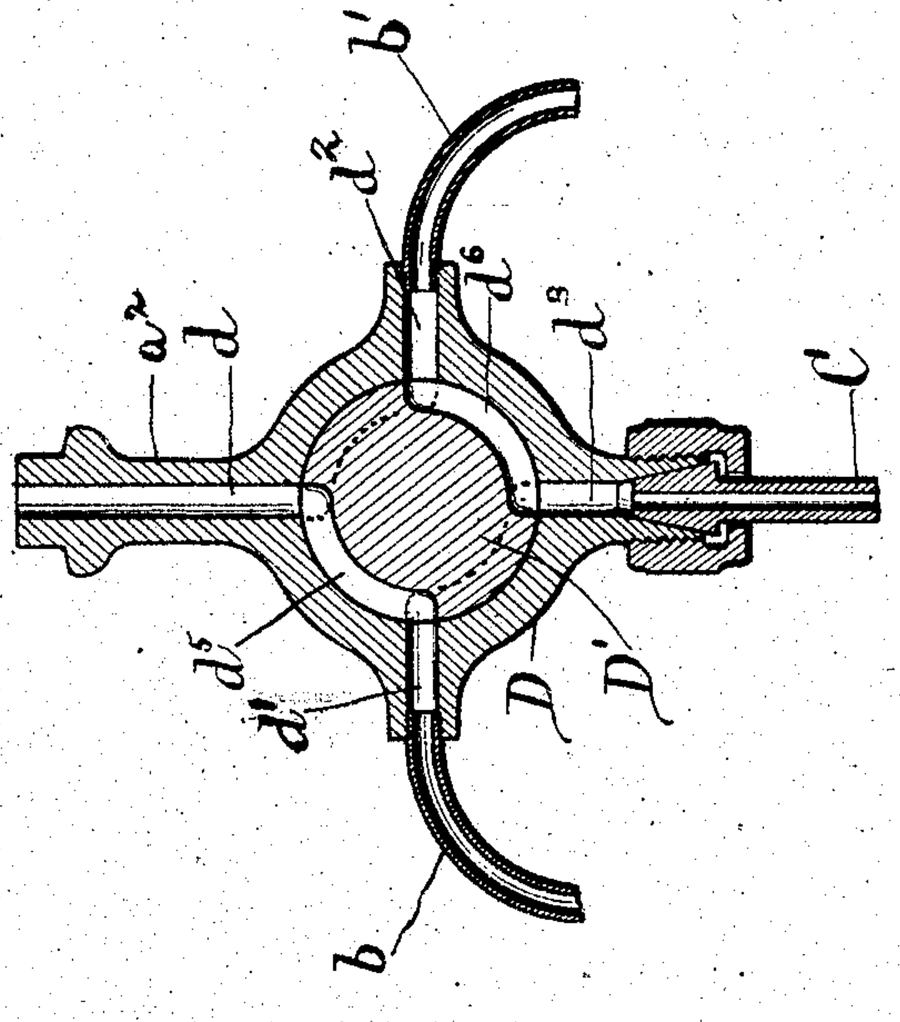


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 4.

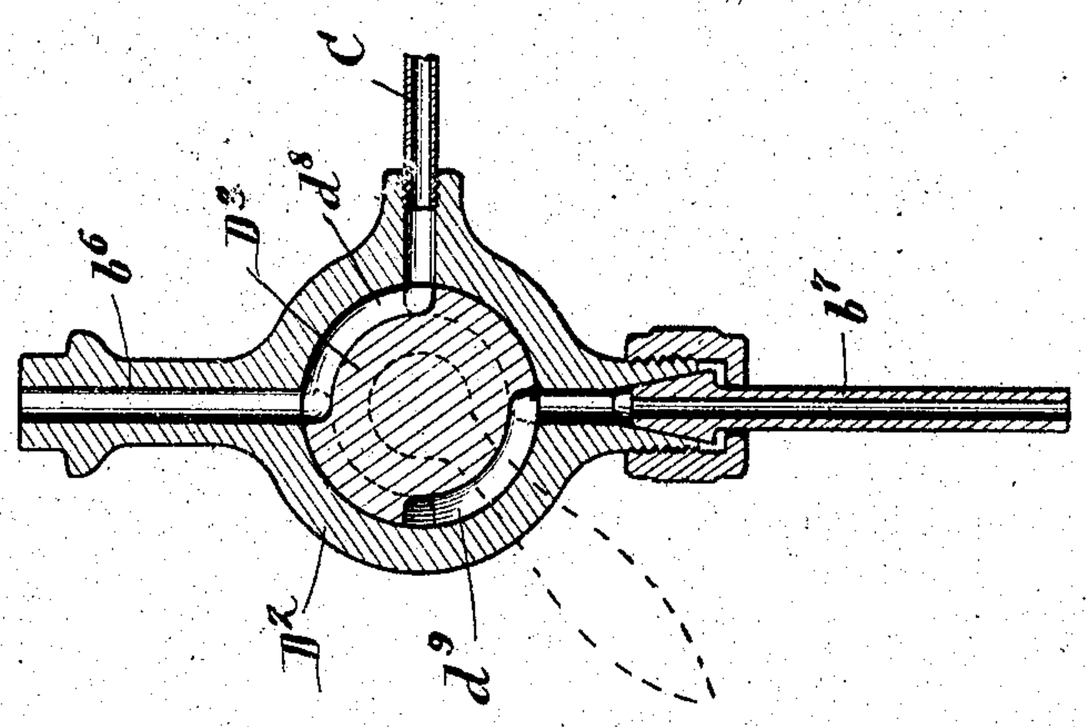
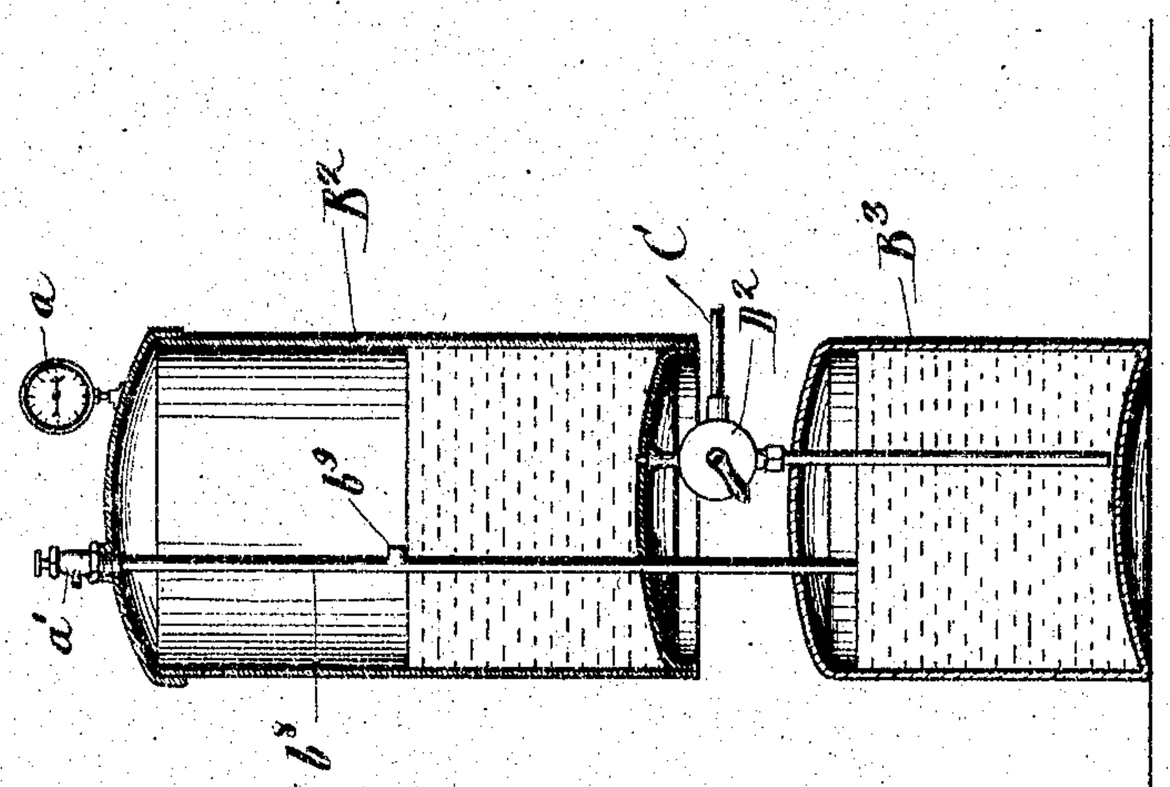


Fig. 3.



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UNITED STATES PATENT OFFICE.

ROBERT L. DORAN, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO ACORN BRASS MANUFACTURING COMPANY, A CORPORATION OF ILLINOIS.

FLUID-DELIVERY APPARATUS.

SPECIFICATION forming part of Letters Patent No. 786,881, dated April 11, 1905.

Application filed May 20, 1901. Serial No. 61,032.

To all whom it may concern:

Be it known that I, ROBERT LAWRENCE DORAN, a citizen of the United States, residing at Chicago, county of Cook, in the State of Illinois, have invented certain new and useful Improvements in Fluid-Delivery Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of the specification.

The invention has for its object more particularly to provide an improved apparatus for supplying gasolene or like volatile inflammable liquids to explosive-engines or to illuminating-burners, although, manifestly, the invention will be susceptible of use in other situations. One serious objection to the use of gasolene is that the rules of the insurance companies with respect thereto are such that but a very small quantity may be in open connection with the main of an engine or lighting system at any one time. Thus, for example, in many places these rules forbid the open connection with the main for delivering gasolene of a tank of a larger capacity than one gallon.

The object of this invention is, primarily, to combine with the main for delivering gasolene to an engine, to illuminating-burners, or the like of plural tanks or chambers connected with the main in such manner that when one of said tanks is delivering gasolene to the main communication for the passage of gasolene from the other of said tanks to the main will be cut off.

Another object of the invention is to provide the tanks with means for supplying the gasolene to the main under superatmospheric pressure.

These objects of invention are accomplished by the features hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the claims at the end of the specification.

While I have described what I regard as the preferred embodiment of the invention, it is manifest that its details may be varied by the skill of the mechanic, and to such details, therefore, I do not wish the invention to be understood as restricted.

Figure 1 is a view in vertical elevation through the fluid-delivery apparatus embodying my invention. Fig. 2 is an enlarged detail view, in vertical section, through the four-way-valve mechanism which is preferably employed in carrying out this invention. Fig. 3 is a view in side elevation showing a modified structure embodying features of this invention. Fig. 4 is a view in vertical section of a three-way cock used with this modified construction.

In Fig. 1, A designates a supply-tank in which the main supply of gasolene or like fluid may be maintained, preferably, under a suitable superatmospheric pressure sufficient to cause the flow of the gasolene through the main into which it is to be ultimately delivered. For this reason the tank A is shown as equipped with a pressure-gage *a*, and it will be provided also with a suitable delivery-opening *a'*. Beneath the supply-tank A are placed plural delivery-tanks B and B', that will be connected with the supply-tank and with a delivery-main C in such manner that when communication for passage of gasolene is established between the main C and one of the delivery-tanks B, for example, the other delivery-tank B' will be closed against passage of gasolene therefrom into the main.

Preferably the connections between the supply-tank A, the delivery-tanks B and B', and the delivery-main C, by which the gasolene or like fluid will be conducted to the point of consumption, will be of substantially the character illustrated in the drawings, and preferably, also, the valve mechanism for controlling the passage of gasolene and the like will be such as is shown in the drawings, although it is manifest that these features may be varied by the skill of the mechanic without departure from the invention. As shown in Figs. 1 and 2, the bottom of the tank A is connected, by a pipe a^2, to a four-way-valve casing D, this casing being shown as formed

with the ports d, d', d^2, and d^3. With the port d' is connected a pipe b, that leads to the delivery-tank B, and with the port d^2 is connected a pipe b', that leads to the delivery-tank B', while the port d^3 is connected, by a suitable coupling, with the delivery-main C, whereby the fluid will be delivered to the engine or burners at which it is to be consumed. Within the valve-casing D is mounted a revoluble valve D', the stem of which extends outside the casing and is furnished with a handle d^4, whereby the valve D' may be conveniently manipulated. The valve D' is formed with the channels d^5 and d^6, that are preferably arranged as shown in Fig. 2 of the drawings—that is to say, the arrangement of the channels d^5 and d^6 is such that the channel d^5 serves to establish communication between the ports d and d' in order that gasolene may pass from the tank A to the delivery-tank B and serves also to establish communication when the valve D' is turned a quarter-revolution between the ports d' and d^3, when communication will be established between the tank B and the delivery-main C. In like manner the channel d^6 will establish communication between the ports d and d^3 when the tank B is to be filled and will establish communication between the ports d and d^3 when the tank B' is to discharge into the delivery-main C. As shown, the delivery-tanks B and B' are connected, by equalizing-pipes b^2 and b^3, with the upper portion of the supply-tank A, so that the same pressure will exist in the several tanks A, B, and B'. It will be understood, of course, that by turning the controlling-valve D' an eighth-revolution all the ports d, d', and d^3 will be closed, so that there will be no communication between the supply-tank A and the individual tanks D and D' or between these individual tanks and the main C.

From the foregoing description the operation of the form of my invention above set forth will be seen to be as follows, it being assumed that the supply-tank A has a charge of gasolene therein under superatmospheric pressure—say sixty pounds to the square inch. If now the valve be in the position shown in the drawings, there will be a free passage for gasolene between the supply-tank A and the delivery-tank B through the port d, channel d^5, port d', and pipe b; but at such time communication between the main C and the delivery-tank B will be cut off by the valve D'. At such time, however, the tank B' will be in communication with the delivery-main C by the pipe b', port d', channel d^6, and port d^3; but the valve D' will not permit the passage of gasolene from the supply-tank A to the delivery-tank B'. Inasmuch, however, as the equalizing-pipes b^2 and b^3 connect the upper parts of the tanks B and B' with the upper part of the tank A, the superatmospheric pressure within the tank A will be communicated to the surface of the gasolene in the tank B, thereby causing the gasolene to flow freely thence into the main C. When the volume of gasolene has been withdrawn or approximately withdrawn from the delivery-tank B', the valve D' will be shifted, so that its channel d^6 will establish communication between the ports d and d^2 of the valve-casing, thereby permitting the gasolene to pass from the tank A into the tank B', the valve D' closing communication between the ports d^2 and d^3 at such time. This movement of the valve D' will close the communication between the ports d and d' of the valve-casing, thereby shutting off the flow of gasolene from the tank A to the tank B, but at the same time open communication, by the channel d^5, between the port d' and the port d^3, thereby permitting the gasolene from the tank B to now discharge into the delivery-main C.

While the construction above described embodies what I regard as the most effective form of the invention, it is manifest that the details may be modified and features may be omitted without departing from the scope of the invention. Thus, for example, referring to the construction shown in Figs. 1 and 2, it is obvious that one of the delivery-tanks—B', for example—might be omitted or temporarily put out of action, and in such case the valve D' would first be turned, so as to cause the gasolene to flow from the tank A, through pipe b, into tank B until said tank B was filled. Then the valve D' would be shifted, so as to cause the channel d^5 to connect the ports d' and d^3, thus placing the tank B in open communication with the main C. This modified construction would still accomplish the object of the invention so far as connecting the main with plural tanks or chambers in such manner that when one of the tanks—B, for example—is delivering to the main communication for the passage of gasolene from the tank A to the main would be cut off and will accomplish also the object of providing means whereby the gasolene will be supplied to the main under superatmospheric pressure.

In the form of the invention illustrated in Fig. 3 of the drawings plural tanks B^2 and B^3 are used, and these tanks are connected with the delivery-main C by suitable valve mechanism, whereby when one of the tanks or compartments—B^2, for example—is in open communication with the main C the other tank or compartment B^3 will be cut off therefrom. Preferably the valve mechanism comprises a three-way-valve casing D^2, containing a revoluble valve D^3, this valve being formed with channels d^8 and d^9. The tank B^2 is connected with the valve-casing D^2 by a pipe b^6, while the tank B^3 is connected with the valve-casing by a pipe B^7. By referring to Fig. 4 it will be seen that when the valve D^3 is turned to the position there shown gasolene may pass from the tank B^2, by pipe b^6, through the valve-casing D^2, by channel d^8, to the main C, and at

such time the tank B^3 will be cut off from communication with the main C. If, however, the valve D^3 be turned, so as to cause the channel d^9 to come opposite the pipe b^7 and main C, then gasolene may pass from the tank B^3, through pipe b^7, through channel d^9 of the valve-casing to the main C, the tank B^2 being at such time cut off from the main C. The tanks B^2 and B^3 are connected together by an equalizing-pipe b^8, having a port b^9 formed therein at a suitable distance above the bottom of the tank B^2. The tank B^2 is also provided with a pressure-regulator a and a delivery-pipe a', the pipe a' being shown as communicating with the top of the equalizing-pipe b^8. The capacity of the tank B^2 is shown considerably larger than that of the tank B^3, as the tank B^2 is designed not merely to hold a supply of gasolene, (say one gallon,) but also to hold a charge of air above atmospheric pressure. In filling the tanks gasolene will be delivered by pipe a' and will first pass through pipe b^8 into tank B^3 until said tank is approximately full. The gasolene will then pass through the opening b^9 in the pipe b^8 into the lower part of the tank B^2 and until it reaches the level of the top of the opening b^9. Air under pressure will then be delivered to the tank B^2, after which the delivery-pipe a' will be closed. If now the valve D^3 be turned to the position shown in Fig. 4 of the drawings, gasolene will pass from the tank B^2 to the main C, as above described, and when the supply of tank B^2 is exhausted the valve D^3 will be shifted so as to close communication between the tank B^3 and the main C. When the tank B^3 is thus placed in communication with the main C, the pressure of air passing through the equalizing-pipe b^8 to the top of the tank B^3 will force the gasolene from such tank into the main C. It is obvious that by properly turning the valve D^3 the supply of gasolene may be entirely cut off from the main C.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A fluid-pressure apparatus of the character described, comprising upper and lower tanks, a pipe extending from each of said tanks, a delivery-main, a multiway valve connecting said pipes and said main, and an equalizing-pipe connecting the upper portion of the uppermost tank to the upper portion of the lower tank.

2. A fluid-pressure apparatus of the character described, comprising upper and lower tanks, the uppermost tank being of greater capacity than the lower tank and serving as a holder for both liquid and air, a pipe extending from each of said tanks, a delivery-main and a multiway valve connecting said pipes and said main, the upper part of said uppermost tank being connected to the tank beneath it.

3. In fluid-delivery apparatus, the combination with a supply-tank, of plural delivery-tanks, suitable pipes for passage of gasolene or like liquid connecting said delivery-tanks to said supply-tank and with a discharge-main, equalizing-pipes extending between said supply-tank and said delivery-tanks, and suitable valve mechanism whereby when the supply of gasolene or like liquid is admitted from the supply-tank to one of said delivery-tanks connection between said supply-tank and the other of said delivery-tanks is cut off and said delivery-tank thus cut off from the supply-tank is placed in communication with the delivery-main.

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