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LIQUID CONTAINER AND VALVE MECHANISM THEREFOR PARTICULARLY APPLICABLE FOR USE IN WATER AND LIKE ELEVATORS.

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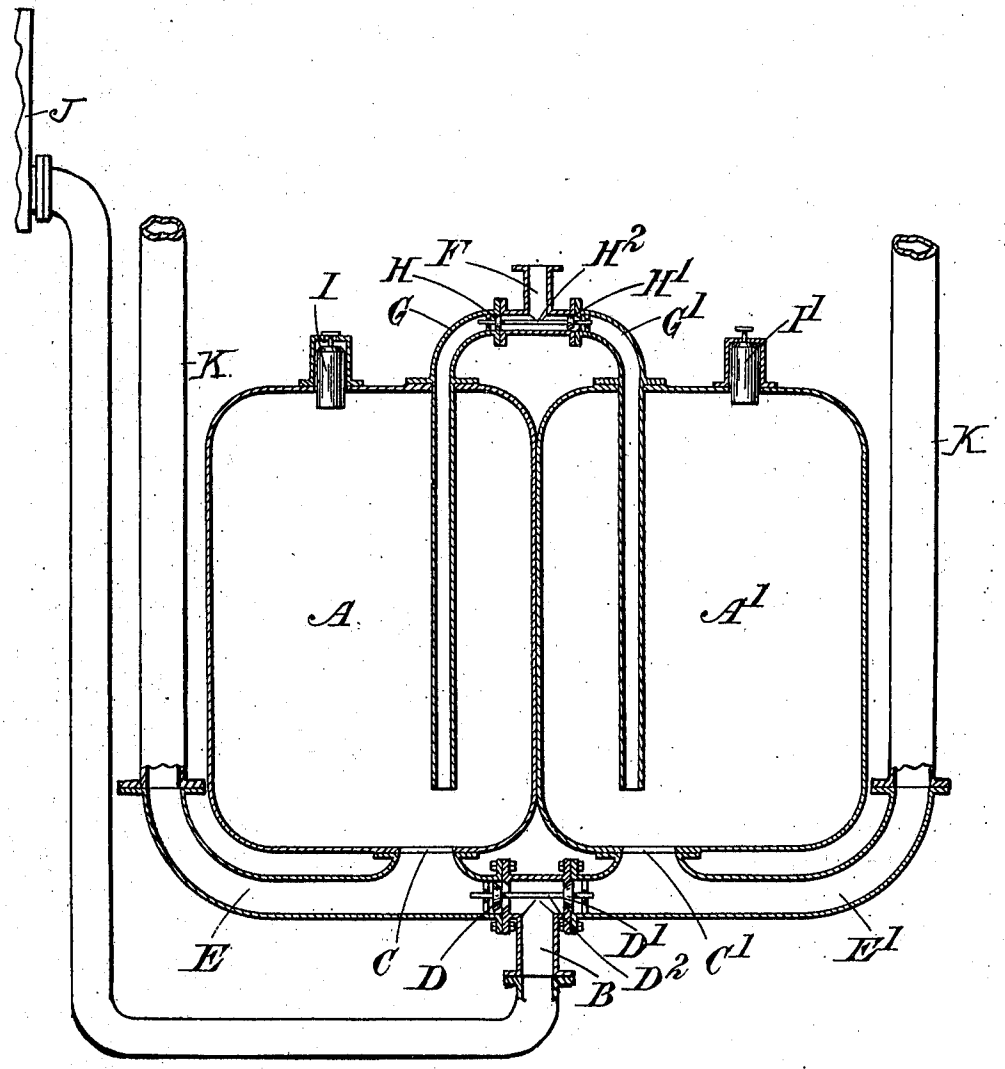
982,364. Patented Jan. 24, 1911.



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LIQUID-CONTAINER AND VALVE MECHANISM THEREFOR PARTICULARLY APPLICABLE FOR USE IN WATER AND LIKE ELEVATORS.

982,364. Specification of Letters Patent. Patented Jan. 24, 1911.

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To all whom it may concern:

Be it known that I, ALBERT EDWARD HODDER, a subject of the King of England, residing at London, in England, have invented certain new and useful Improvements in Liquid-Containers and Valve Mechanism Therefor Particularly Applicable for Use in Water and Like Elevators, of which the following is a specification.

This invention relates to improvements in liquid containers and valve mechanism therefor, and is particularly applicable for use in raising liquids, such as water, sludge, sewage, and the like.

An important feature of this invention is the combination with two or more liquid containers of means for automatically and successively connecting them to a source of fluid-pressure for emptying them and of means for subsequently reducing the pressure so that liquid can be forced into the containers.

Other features of this invention will be evident from the following description taken in connection with the accompanying drawings, which illustrate the preferred constructions of apparatus employed in carrying this invention into effect.

In the drawing the figure is a diagrammatic sectional elevation of two containers with their valve-mechanisms.

Like letters indicate like parts throughout the drawings.

A and A^1 are two containers. The liquid is supplied through an inlet conduit B and passes through to the containers through openings C and C^1. A valve D controls the passage of the liquid to the container A and a valve D^1 to the container A^1. These valves are mounted on a common spindle D^2 and they are so arranged that when one is opened the other is closed. When the liquid is emptied from the containers it passes through either the openings C or C^1 to outlet conduits E or E^1.

Gas under pressure is led through the conduit or pipe F and can pass to either the container A or A^1 through pipes G or G^1 respectively. The passage of the gas through the pipes G and G^1 is controlled by valves H and H^1 mounted on a common spindle H^2. These valves are so arranged that when one is closed the other is opened and preferably the amount of movement of the valves is very limited so that it is practically impossible for both valves to be even partially open at the same time. The pipes G and G^1 are led nearly to the bottom of the containers A and A^1 respectively. The tops of the containers A and A^1 are provided with air-outlet valves I and I^1 respectively, these valves being adapted to close when floated upward by the liquid in the containers.

The operation of the apparatus is as follows:—With the containers empty and the valves in the position shown in the drawings, liquid supplied through the conduit B would pass through the valve D and into the container A. The conduit E it is assumed is connected to a conduit reaching to a height above the containers or is closed in some manner so that the liquid does not pass out of the conduit E. The valve I is open so that the container gradually fills with liquid until reaching the float of the valve I the latter is closed. Compressed gas is then supplied through the conduit F and this escaping through the pipe C^1 to the atmosphere, closes by its rush the valve H^1 and consequently opens the valve H. The compressed gas then passes through the pipe G and bubbles up through the liquid, forcing the liquid out of the container A through the conduit E. The pressure of this liquid closes the valve D and opens the valve D^1 whereupon the liquid is able to pass from the conduit into the container A^1. The valve H having been opened the valve H^1 is closed so that the container A^1 is filled in exactly the same manner as described above in connection with the container A.

When either the container A or the container A^1 is being emptied, the valve I or the valve I^1 respectively is kept closed by the pressure of the gas. The valve I^1 is illustrated in the drawing as being in the closed position, but with the container empty as shown this would not be the case; it is so illustrated merely to indicate the position it occupies when both containers are operative and the container A is in process of being filled and the container A^1 in process of being emptied. Considering, for example, the container A as being empty and about to be filled, the valve H being closed by the major pressure in the conduit F, the water rising in A will entrap a column of air in the pipe G, which by the time the

container A is filled will be under a pressure equal to the head of water above the lower end of the pipe. When the time comes for the valve H to open, the operation is made instantaneous by the column of air in pipe G expanding and thus expediting the action of the rush of air past H^1.

With the two cylinders in operation the valves H and H^1 are operated by the rush of gas which occurs at the moment that either container is completely emptied. The operation of the valves H and H^1 is, as has just been described, aided by the pressure of the gas entrapped in the pipes G and G^1. The compressed gas may be air or any other suitable gas such as steam.

J is a tank from which the liquid is supplied to the containers A A^1. The level of the liquid in the tank J must be above the levels of the tops of the containers. The liquid is emptied from the containers into the conduits K and these reach to a considerable height above the containers as illustrated.

One of the chief advantages of this invention is that there is no moving mechanism within either container.

Obviously various modifications may be made in the method of carrying this invention into effect.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a water elevator the combination of a source of liquid supply J, a conduit B connected thereto, two containers A A^1 each connected at the bottom directly to the conduit B through a valve, a source of fluid pressure, conduits G G^1 connected to each other and to the said source of fluid pressure and said containers, valves H H^1 in said conduits G G^1 arranged one on either side of the junction of the conduits G G^1 with the conduit connected to the source of fluid pressure, a spindle H^2 connecting the said valves H H^1 and a conduit K from the bottom of each container leading up to the level of discharge.

2. In a water elevator the combination of a source of liquid supply J, a conduit B connected thereto, two containers A A^1 having openings C C^1 at the bottom each connected directly to the conduit B, valves D D^1 between the conduit B and the openings C C^1 respectively, a spindle D^2 connecting said valves D D^1, a source of fluid pressure, conduits G G^1 connected to each other and to said source of fluid pressure and said containers, valves H H^1 in said conduits G G^1 arranged one on either side of the junction of the conduits G G^1 with a conduit connected to the source of fluid pressure, a spindle H^2 connecting said valves H H^1 and a conduit leading from the bottom of each container up to the level of discharge.

3. In a water or the like elevator the combination with a container of a fluid-pressure conduit reaching nearly to the bottom of the container and an air-trap formed by the fluid-pressure conduit and the liquid in the container.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT EDWARD HODDER.

Witnesses:

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