

J. P. SIMMONS.
AIR LIFT.
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1,033,278.

Patented July 23, 1912.

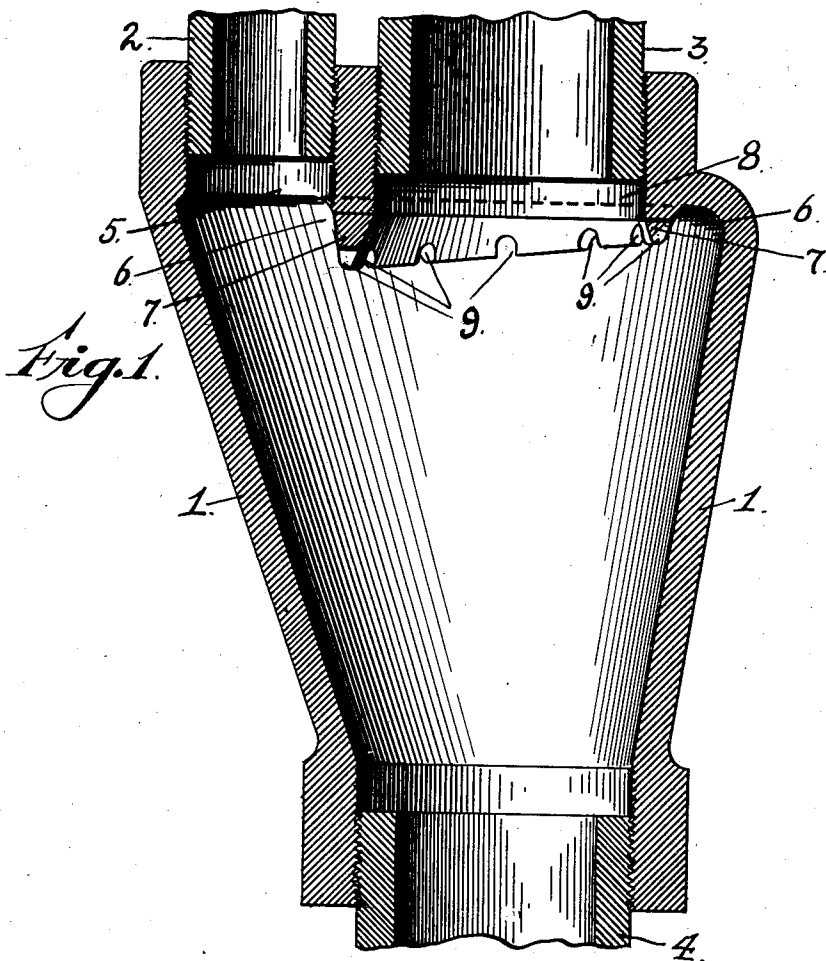
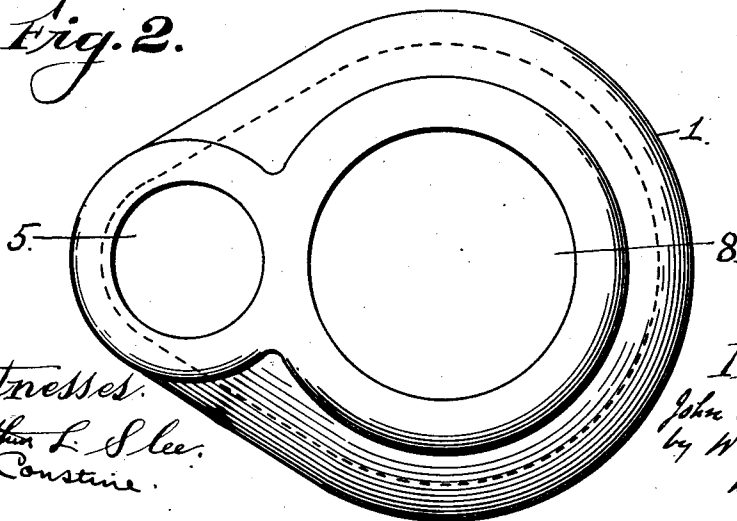


Fig. 2.



Witnesses:
Arthur L. Slee.
S. Constance.

Inventor:
John P. Simmons
by Wm. F. Booth
his Attorney.

UNITED STATES PATENT OFFICE.

JOHN P. SIMMONS, OF SAN FRANCISCO, CALIFORNIA.

AIR-LIFT.

1,033,278.

Specification of Letters Patent.

Patented July 23, 1912.

Application filed June 12, 1911. Serial No. 632,533.

To all whom it may concern:

Be it known that I, JOHN P. SIMMONS, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Air-Lifts, of which the following is a specification.

My invention relates to the class of air-lifts for raising fluids in a pipe.

The object of my invention is to improve the air-lift by increasing its efficiency, and this I attain, principally, by providing for and insuring a distribution of the air entering the liquid column; and, secondarily, by guarding against the obstruction of the lower end of the air pipe by sand or other foreign substances.

As the action of the air in raising a fluid is due wholly to the lightening of the air-impregnated column and not to any ejecting force, it becomes apparent that where, as is usual, no special attention is paid to the distribution of the air at the bottom outlet of the air pipe, there will be no proper or effective spreading of the air bubbles throughout the liquid column. But if this be attended to and the air properly distributed a better effect is had.

My invention consists in the novel construction and relative arrangement of the air and liquid pipes at their junction as I shall now fully describe by reference to the accompanying drawings in which—

Figure 1 is a vertical section of my air-lift. Fig. 2 is a plan of the connecting member 1, the pipes being omitted.

Though my improvement is applicable to various arrangements of the air and liquid pipes with respect to their connection, in practical construction it takes the form of a single hollow member in which the improved constructions are contained, which said member is adapted to receive in its top both the air pipe and the flow pipe, and to receive in its bottom the suction pipe. 1 is this member or casting. In its top it has screwed into it the air pipe 2, and the flow pipe 3. In its bottom is screwed the suction pipe 4.

The air pipe opening, designated by 5, leads down into the cavity of the casting with a gradual widening laterally as shown by the dotted line in Fig. 2, and a gradual contracting slope longitudinally as shown in Fig. 1.

The cavity of the casting is formed in its

upper portion with an enlarged circular chamber 6 connecting with the smaller part of the air-pipe opening 5 and encompassing a downwardly projecting flange 7 of the flow-pipe-opening 8. This flange, on its lower edge, is sloped upwardly away from the side of the air-pipe opening, that is to say, the side of the flange farthest from the air inlet is the shortest. In the lower edge of the flange are made all around it the air inlet grooves 9, which open from said edge upward.

The air entering the casting 1 from the pipe 2, will, under the pressure of the liquid in the closed cavity of the casting, find the highest level of the chamber 6 throughout its circular extent and will form an air pocket therein. The supply of air continuing will cause the pocket to overflow, which overflow will first take place at the shallowest rim of the chamber through the groove 9 at that portion and pass into the liquid column in pipe 3 at that side. This groove not having capacity sufficient to pass all the air, the latter will next reach and pass through adjacent grooves 9 in the direction of the deeper portion of the chamber rim, and so on until it reaches and passes through the groove 9 in the deepest portion, which groove is nearest the air inlet. The chamber 6 is contracted, as shown by the dotted line in Fig. 2, toward the side farthest from the air inlet, which construction also assists in passing some of the air through the grooves nearest the air inlet. It will thus be seen that the air instead of passing into the liquid column in the flow pipe 3 by a single gulp, as it were, in the immediate vicinity of its entrance to the casting 1, is caused first to encircle the flow pipe and then to enter it in numerous little streams all around and well distributed, and to mix with the column of liquid in divided form. As the cavity of the casting 1 slopes toward the bottom and the air grooves 9 also open downward, no sand or sediment will collect to prevent a steady flow of air.

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

1. In an air-lift, a flow-pipe having formed about its lower end an encircling chamber, said lower end projecting into said chamber and having its lower edge sloped upwardly from one side to the other whereby the chamber is deeper at one side,

and said end being provided with an annular series of openings; and an air-pipe, the inlet of which communicates with said encircling chamber at its deeper side.

5 2. In an air-lift, a flow pipe having formed about its lower end an encircling chamber, said lower end projecting into said chamber with its lower edge sloped upwardly from one side to the other whereby
10 the chamber is deeper at one side, and said end being provided with an annular series of grooves cut upwardly from its lower edge; and an air pipe, the inlet of which communicates with said encircling chamber
15 at its deeper side.

3. In an air-lift, and in combination with its flow-pipe, air-pipe and suction-pipe, a hollow member fashioned to receive the flow-pipe and the air-pipe in its upper end,
20 and the suction-pipe in its lower end, the cavity of said member being formed at its upper portion with an enlargement constituting a circular chamber encircling the flow pipe connection and with a flange projecting downward into and forming the inner
25 wall of said chamber, said flange being provided with a series of openings, and said flange having its lower edge sloped upwardly from the air-pipe inlet to the opposite side.
30

4. In an air lift, and in combination with its flow-pipe, air-pipe and suction-pipe, a hollow member fashioned to receive the flow-pipe and the air-pipe in its upper end,
35 and the suction-pipe in its lower end, the

cavity of said member being formed at its upper portion with an enlargement constituting a circular chamber encircling the flow-pipe connection and with a flange projecting downward into and forming the inner
40 wall of said chamber, said flange being provided with a series of grooves cut upwardly in its lower edge, and said flange having its lower edge sloped upwardly from the air-pipe inlet to the opposite side.
45

5. In an air-lift, a connecting member for the flow-pipe, air-pipe and suction-pipe, consisting of a hollow piece, receiving in its top the flow-pipe and the air-pipe, and in its bottom the suction-pipe, said piece having
50 its cavity narrowing downwardly, with its air-pipe connection side widening laterally downward, and said piece having its cavity formed at its upper portion with an enlargement constituting a circular chamber
55 encircling the flow-pipe connection and with a flange projecting downward into and forming the inner wall of said chamber, said flange being provided with a series of grooves cut upwardly in its lower edge, and
60 said flange having its lower edge sloped upwardly from the air-pipe inlet to the opposite side.

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

JOHN P. SIMMONS.

Witnesses:

WM. F. BOOTH,
D. B. RICHARDS.