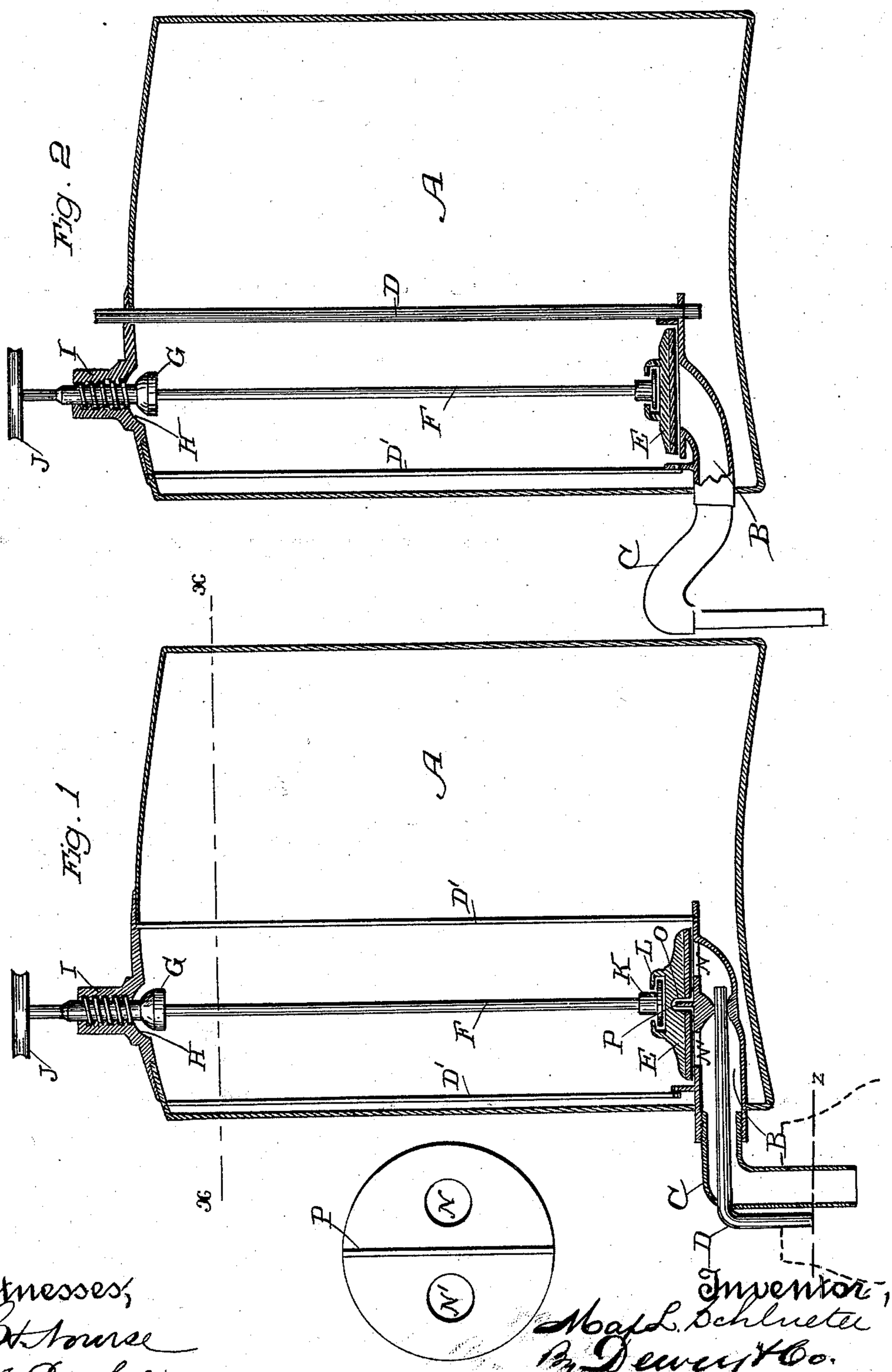
(No Model.)

M. L. SCHLUETER.

LIQUID CONTAINING CAN.

No. 550,696. Patented Dec. 3, 1895.



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UNITED STATES PATENT OFFICE.

MAX L. SCHLUETER, OF OAKLAND, CALIFORNIA.

LIQUID-CONTAINING CAN.

SPECIFICATION forming part of Letters Patent No. 550,696, dated December 3, 1895.

Application filed June 14, 1894. Serial No. 514,606. (No model.)

To all whom it may concern:

Be it known that I, MAX L. SCHLUETER, a citizen of the United States, residing in Oakland, Alameda county, State of California, have invented an Improvement in Liquid-Containing Cans; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a liquid-containing can and attachments therefor to be used in connection with the drawing of the liquid from the can.

It consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical section of the can, showing one form of my attachment. Fig. 2 shows a modification of the same.

The object of my invention is to provide such an attachment for liquid-containing cans as will allow the liquid to be drawn from the can, while a certain amount of vacuum is produced in the upper part of the can by reason of the pressure of the liquid to resist the admission of air to take its place as the liquid is being drawn, so that this vacuum, in connection with the nozzle through which the liquid is drawn, serves to check the flow of the liquid when the level of the liquid in the vessel to be drawn reaches the level of the air-admission pipe. It also provides for a free movement of the air in the upper part of the can when the discharge-opening has been closed, so that any pressure from expansion of air within the can caused by heat will be equalized and the surplus allowed to escape.

A is a can of any usual or suitable description, having a discharge-pipe B fixed in the lower part, and it is shown in the present case at one side of the can, so that it is permanent, lying mostly within the can and having the outer end flush with or slightly projecting from the side of the can. The interior of this projecting end is ground or otherwise fitted to receive a removable discharge-nozzle C, which is bent so that its lower end is below the level of the bottom of the can, as shown. In Fig. 2 this supplemental nozzle is first bent upwardly and then downwardly, so that the upper curvature is above the level of the air-admission pipe D. In this case the pipe D extends up through the top of the can and the lower end is situated close to the bottom of the can.

In Fig. 1 the discharge-pipe extends out horizontally and is bent down at right angles. The air-pipe D is of similar shape, extending from the rear inner end of the discharge-pipe through the front side, and it is bent down exterior to the pipe and is shorter.

The inner end of the pipe or passage B has a horizontal seat formed upon it, and this is adapted to be closed by a valve E, which fits upon the seat. The valve-seat may have two openings, as shown in Fig. 1, or a single one, as in Fig. 2.

The valve E has a stem or shank F, extending upward and connecting at the upper end with a conical valve G, which closes upwardly against a seat H, fixed in the upper part of the can, as shown. Above this seat is formed a screw-threaded nut, and a corresponding threaded shank I passes through this nut and has upon the upper end a disk J, by which it may be turned.

The lower end of the stem F has upon it a head K, which turns loosely within an annular flange L, formed upon the top of the valve E, so that when the disk J is turned this head may turn loosely and allow the valve to seat or be raised without turning around.

The distance between the valves E and G is such that when the valve E is closed the valve G is opened and when the valve E is opened the valve G is closed.

As the top and bottom of the can, being of thin metal, are elastic and would not maintain the proper distances, I have shown brace-rods upon each side of the stem F, connecting at the top with the rigid portion H, in which the valve-seat is formed, and at the bottom with a plate which forms an extension upon each side of the seat on which the valve E closes.

In Fig. 2 the air-pipe D forms one of these brace-rods, and the other one is shown at D′. In Fig. 1, the air-pipe D being differently located, I have shown two independent brace-rods D′.

In Fig 1, as previously stated, the air-pipe D extends horizontally through the side of the discharge-pipe C and is turned downward

parallel with the downwardly-projecting portion and outside thereof and somewhat shorter, so that its lower end will dip into the vessel which is to be filled, and when the vessel has been filled up to the level of the bottom of this air-pipe further ingress of air will be prevented and the flow of liquid from the can will be cut off, thus enabling the user to fill the containing-vessel up to any desired point without any danger of overflow.

The inner end of the horizontal part of the pipe D extends into the chamber beneath the seat of the valve E, and the air will flow through the pipe, thence upwardly through the passage N in the valve-seat into the can, while the liquid will flow out through a second passage N′ in the opposite side of the seat.

In order to insure the flow of the air through one passage and the flow of the liquid through the other, I have shown the lower part of the valve having a transverse slot made in it, as shown at O, and upon the central part of the valve-seat is an upwardly-projecting rib P, which fits into this slot, extending upward far enough to practically cut off communication between the two sides.

The operation of my invention, as disclosed in the construction shown in Fig. 1, will then be as follows: When the disk J is turned so as to open the valve E, the valve G will immediately close against the seat H, and liquid, flowing out by gravitation, will at first fill both the passages C and D; but the greater length of the column in the pipe C overcomes the pressure in D and draws the liquid back into the can, so as to allow the air to pass in through the pipe D. It will be manifest that there will be a resistance to the inflow of air through this pipe dependent upon the length of its vertical arm; but the extension of the discharge-nozzle C below the bottom of the air-pipe contains an amount of liquid which is so calculated that it will be sufficient to overcome this back-pressure, and will thus cause a steady flow of liquid from the discharge-nozzle and an inflow of air through the pipe D, which will arise in bubbles through the liquid into the upper part of the can. There will always be a slight tension caused by this action during the flow of the liquid, which will cause a partial vacuum in the upper part of the can, and the result will be that, a vessel to be filled being held so that the discharge-nozzle C dips into it and the upper edge of the vessel to be filled is above the bottom of the pipe D, as soon as the liquid in the vessel has risen to a point to cover and close the bottom of the pipe D it will cease to flow from the nozzle C on account of the closing of the air-passage. The valve E is now closed by turning the disk J so as to screw the thread I down in its nut until the valve E is seated. The valve G is simultaneously opened. Any inequality of pressure of the exterior air and that in the upper part of the can is instantly overcome when the valve G is opened, because a free flow of air is allowed through the valve-seat H, either around the screw-threads I, which may be loose enough for the purpose, or by a separate opening, if preferred. Thus the small vacuum which had been produced in the upper part of the can, as previously described, will be overcome and the pressure of air will be equalized within the can. If the can is standing in a warm place and the air within the can becomes expanded by heat, it will also flow out through this passage around the valve G, and will thus at all times be equalized while liquid is not being drawn. Whenever liquid is to be drawn again the conditions first described are produced, the valve G being closed, so that no further direct communication is made between the upper part of the can and the open air, and the valve E opened, so that liquid may be drawn by overcoming the pressure of the liquid until air can flow through the pipe D and escape into the can, the liquid flowing out through the discharge-pipe C, as before described.

The construction shown in Fig. 2 operates in all essential particulars the same as that shown in Fig. 1 When the valve E is opened, the liquid begins to flow, and the vacuum created in the can serves to draw the liquid out of pipe D, so that air may enter said pipe and rise in the form of bubbles through the liquid in the can to overcome the vacuum and substantially equalize the pressure within the can.

From the foregoing description it will be readily understood that the operation is substantially the same in both of the forms shown in the drawings.

In Fig. 1 the valve E is closed and the pipes C and D empty, because when the valve is closed and the receiving-vessel removed the weight of the liquid in the lower part of pipe C will cause it to run by gravitation, and it will then draw air in through the pipe D to take its place, and by reason of its greater length will overcome the tendency of the liquid to flow out through the pipe D at the same time. In this instance when the valve E is opened the liquid in the can will fill the pipes C and D, because its weight is sufficient to cause the body of air above the line $x\,x$ to expand enough to allow the liquid to descend into these pipes. The greater length of the column in the pipe C overcomes the weight of the column in pipe D and draws it back into the inner end of pipe B, followed by the air, which fills the vacuum thus produced, and the air continues to be drawn in by the superior weight in the pipe C and escapes up through the opening beneath the valve E into the can to take the place of the escaping liquid as long as it flows. As soon as the liquid in the receiving-vessel reaches the lower end of the pipe D it prevents any further entrance of air, and the vacuum thus produced in the upper part of the can holds the liquid suspended, as it were, in the pipe C until the valve E is closed and the receiving-vessel is lowered enough to allow air to enter pipe D,

when the liquid remaining in the pipe C below the valve E will escape, leaving the pipes empty, as at first described.

In Fig. 2 the pipe D extends upward through the top of the can instead of downward below the bottom, as in Fig. 1. In both cases, however, a vacuum is necessary to be formed in the upper part of the can before air can enter through either pipe D to replace the escaping liquid. The amount of vacuum and the length of the column of liquid in the pipe C necessary to produce this vacuum depends upon the length of the column of liquid to be first displaced from the air-pipe, whether this pipe extends downward, as in Fig. 1, or upward, as in Fig. 2. For instance, suppose the pipe C extended down ten feet and the pipe D nine feet, both being filled with liquid and practically connected at the upper end, as they are in Fig. 1. The superior weight of the liquid in pipe C would draw the liquid up in pipe D by producing a vacuum from the upper end until air would take its place. (This presupposes that the tube is so small that capillary attraction will prevent the air and water passing each other in the same tube, and they will not do this in any ordinary-sized faucet-nozzle.) Precisely the same thing occurs in Fig. 2, except that the air is drawn down against the upward pressure of the liquid within the can, which would, if free to act, fill the tube D to a level with the main body. The length of the column in the pipe C must in each case be sufficient to produce a vacuum which will draw the liquid out of pipe D and allow air to enter and take its place. If in either case the air-pipe D were over thirty-three feet long, the weight of the column (if of water) would not be sufficient to empty the air-tube, so as to let air enter. The principle is the same with the shorter pipes practically used. The length of the liquid column in pipe C must be sufficient to more than balance the column in pipe D. Of course when the valve E is opened liquid would flow from the can until the vacuum would balance the column of liquid if there were no air-openings. Then it would cease. In this device the liquid column is just long enough to continually overcome the vacuum and cause air to flow into the can as long as the relative proportion is preserved. When the liquid in the receiver rises to line *z z*, the column is so shortened that it will cease to overcome the vacuum and the flow will cease.

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

1. A can or vessel adapted to contain liquids having a discharge passage and pipe extension exterior to the vessel projecting below the bottom thereof, a valve or cock adapted to close the inner end of said pipe or passage having a stem extending up through the top of the can, a valve seat fixed in the top of the can and a valve closing against said seat when the liquid discharge valve is opened and opening when the liquid discharge valve is closed, and a frame-work consisting of brace rods extending between the two valve seats whereby their position relative to each other is maintained independent of the walls of the can.

2. A can or vessel adapted to contain liquids, with top and bottom valves opening and closing in opposition to each other, a discharge passage in the lower part of the vessel with a valve seat having two openings through it, one of which communicates with the discharge passage and the other with an air inlet passage, an upwardly projecting flange across the valve seat between these openings, and a corresponding channel in the valve face.

3. A can or vessel adapted to contain liquids having a discharge passage, and an extension or continuation therefrom exterior to the can, projecting below the bottom of the can, a valve closing the inner end of the discharge passage, having a stem extending upwardly therefrom through the top with means for raising or depressing it to open or close the valve, a second valve fixed to the upper end of the stem to close upwardly against a seat in the top of the can, when the discharge valve is open, and to open when the discharge valve is closed, and an air pipe, one end of which opens in the can beneath the level of the discharge valve, and the other exterior to the can, said pipe containing a column of liquid which is continually overbalanced to allow air to enter when the discharge column fills the full length of its pipe, and which counterbalances the latter and prevents flow when the flowing column is less than the depth of its discharge pipe.

In witness whereof I have hereunto set my hand.

MAX L. SCHLUETER.

Witnesses:
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H. M. SLOPER.