Aug. 1, 1950 E. L. WOLF 2,517,154

CARBONATED LIQUID DISCHARGE DEVICE

Filed Oct. 2, 1946

Fig. 1.

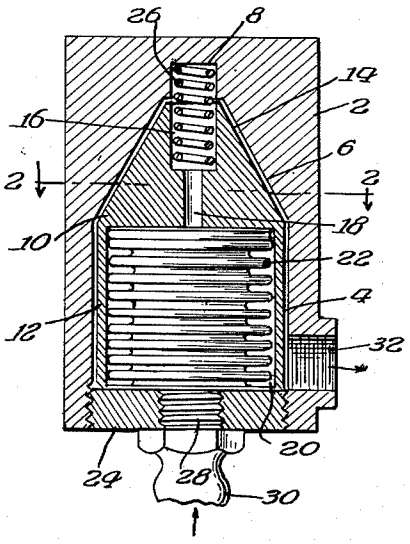


Fig. 3.

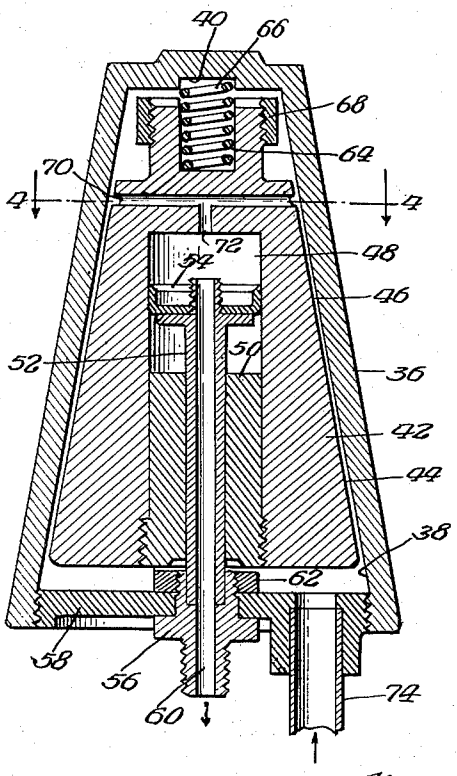


Fig. 2.

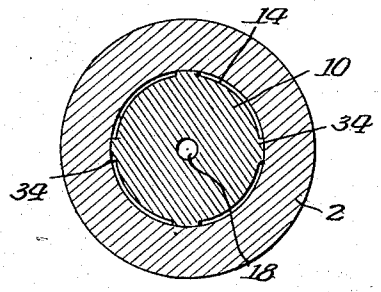
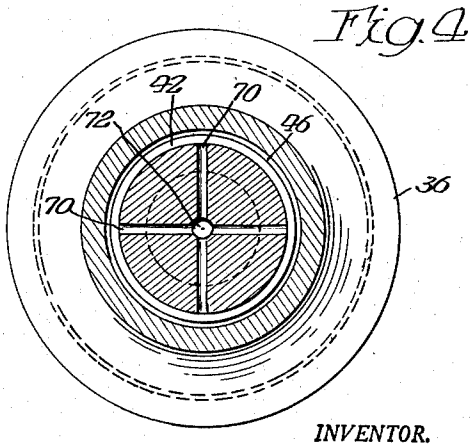


Fig. 4



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CARBONATED LIQUID DISCHARGE DEVICE

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5 Claims. (Cl. 138—43)

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This invention relates in general to flow restrictors or discharge devices which are particularly adapted to restrict the flow of liquids under pressure such as carbonated water.

Devices of this character have been used heretofore for dispensing carbonated liquids in many different places such as soda fountains and vending machines capable of dispensing carbonated beverages. While the discharge device disclosed herein is particularly adapted for use on such a carbonated beverage vending machine, it is by no means limited to such use.

It is the present practice in machines of this character to maintain a volume of saturated or substantially saturated aqueous solution of carbon dioxide to be discharged into a receptacle. This carbonated liquid is maintained at a high pressure and usually a low temperature. One of the problems which is presented in dispensing a carbonated liquid is the necessity of discharging the solution from its high pressure to atmospheric pressure fast enough for practical purposes and yet slow enough to prevent excessive agitation and turbulence which results in a loss of gas from the liquid. Furthermore, fine particles of foreign matter may become deposited in ordinary discharge devices tending to clog the passages and thereby reduce the efficiency thereof.

It is common practice to employ some means for disrupting the impact of the issuing solution. Such means usually includes a stationary member to receive the impact of the solution under pressure which distributes the liquid in a spray. This has been found to be unsatisfactory in actual practice not only because of the high rate of gas loss, but also because the small passage which distributes the solution in a spray has a tendency to become clogged due to the inevitable presence of fine particles of foreign matter. Such clogging necessitates removal of the device for cleaning.

In my present invention I have been able to overcome the various disadvantages mentioned above by providing a structure which will not only retain a high gas content in the issuing solution but which also will be self-cleaning, thereby avoiding any necessity for complete removal of the device due to clogging.

One of the principal objects of the present invention is to provide a discharge device for restricting the flow of a fluid under pressure, such as carbonated water, which will minimize gas loss and which has self-cleaning characteristics.

Another object is to provide a flow restrictor

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for discharging fluids such as carbonated water wherein the impact member against which the fluid flows is movable.

A further object is to provide a flow restrictor for discharging fluids such as carbonated water wherein the impact member against which the fluid flows is movable under the pressure of the fluid to form a restricted opening which is self-cleaning and which effectively reduces the velocity of flow without an undue agitation or turbulence thereof.

Still another object is to provide the flow restrictor for discharging fluids such as carbonated water wherein the impact member against which the fluid flows is movable under the pressure of the fluid to form a restricted opening, whereby the initial discharge of fluid will have a cleaning effect thereon before the opening becomes fully restricted.

Other objects and advantages of the invention will become apparent upon reading the following description taken in connection with the accompanying drawing in which:

Fig. 1 is a longitudinal sectional view through one form of the discharge device;

Fig. 2 is a transverse section taken substantially along the plane of line 2—2 of Fig. 1;

Fig. 3 is a longitudinal section through a modified form of discharge device; and

Fig. 4 is a transverse section taken substantially along the plane of line 4—4 of Fig. 3.

The construction and operation of the present invention may be briefly described as providing a body within which a passage is located to receive a fluid under pressure and transfer the fluid from an inlet to an outlet in the body. The passage is formed by a space between the inner surface of the body and a movable impact member located therein. Normally, the impact member is spaced a comparatively great distance from the inner surface of the body thus providing an unrestricted passage. The impact member is designed to move in such a way as to close or restrict the passage under the pressure of the incoming fluid. Yieldable means are provided to resist the restricting movement of the impact member whereby the initial onrush of the incoming fluid will flow through the passage unrestricted and thus wash or clean the passage of any foreign matter which may have become deposited therein. After the pressure of the incoming fluid has been built up sufficiently to overcome the resistance of the yielding means, it will move the impact member to a position where the passage is restricted, thus restricting the flow of the fluid therethrough so

that it will leave the outlet slow enough to prevent excessive agitation and turbulence, but fast enough for all practical purposes. The restricting pressure will be built up immediately after the initial onrush of the incoming fluid so that the cleaning of the passage takes but a moment before the passage becomes restricted and the velocity of flow of the fluid is decreased.

Referring now more particularly to the drawing and especially to Figs. 1 and 2, it will be seen that in this form of the invention a hollow body 2 is provided which has at one end thereof a substantially cylindrical opening 4 terminating in a tapered or conical portion 6. The inner end of this conical portion then terminates in a recess 8.

An impact member 10 is adapted to be received within the hollow body, which impact member is shaped substantially like the opening in the body, having a cylindrical portion 12 and a conical portion 14. A recess 16 is located in one end of the impact member and is adapted to be in alignment with the recess 8 in the body. The recess 16 is connected by means of a passage 18 with the cylindrical recess 20 at the other end of the impact member.

The cylindrical recess 20 is adapted to receive an expansible member such as a bellows 22. This bellows is sealed securely to the closure member 24 which threadedly engages the open end of the body 2 for closing the body whereupon the bellows will be located within the recess 20.

A coiled compression spring 26 is located within the recesses 8 and 16 and normally maintains the impact member 10 against the closure member 24, but will permit a reciprocating movement thereof in such a way as to close the space between the conical portions of the impact member and the inner surfaces of the body.

A threaded opening 28 centrally located in the closure member 24 is adapted to receive one end of a conduit 30 thus providing an inlet for the fluid under pressure. The outlet 32 may be located at any suitable place in the body 2 and is shown herein as being radially disposed near one end thereof.

The space between the inner surface of the hollow body 2 and the impact member 10 provides a passage through which the carbonated liquid may pass from the inlet to the outlet. As the fluid enters the body from the inlet 30 it will first be received within the bellows 22. Some of the fluid will start to expand the bellows and some of the fluid will pass outwardly through the passage 18, into the recess 16 and through the passage around the conical portion of the impact member 10. From this passage the fluid is then delivered to the outlet 32. As the pressure of the incoming fluid is increased, the bellows will be expanded a sufficient amount to move the impact member 10 against the compression of the spring 26 tending to close the space or passage between the impact member and the body. In order to limit the movement of the impact member 10, I prefer to provide a plurality of ribs 34 within the space between the body and the impact member. These ribs may be integral with either the body or the impact member, and will preferably be of such thickness that when the impact member reaches its closed or uppermost position, the passage will be sufficiently restricted as to permit the carbonated fluid to be dispensed through the outlet sufficiently slow to prevent any excessive agitation, but fast enough for practical purposes.

It will be evident that in the normal position of the impact member 10, the passage or space around the conical portion thereof will be comparatively large. This passage will become restricted as the impact member tends to close the space as it moves under pressure of the incoming fluid. As soon as the fluid has stopped flowing, the pressure will be relieved and the spring 26 will return the impact member to its normal position. In the event that any small particles of foreign matter have become deposited on the surfaces of the passage, they will be immediately washed out during the next flow of fluid therethrough. In other words, the spring 26 will prevent an immediate closing of the impact member so that the initial onrush of incoming fluid will immediately pass through the passage while it is still unrestricted. Immediately thereafter, however, the pressure of the fluid will be such as to move the impact member to its restricting position during the remainder of the time that the fluid is being dispensed.

Figs. 3 and 4 illustrate a similar device embodying the same broad principles but disclosing a specifically different form of construction. In this case the outer body 36 is hollow and has a substantially conical inner surface 38 extending throughout the length thereof. At the narrow end of the body it is provided with a recess 40. The impact member 42 also has a conical surface 44 and is mounted within the body and spaced therefrom to provide a passage 46 to receive the fluid under pressure as it passes from the inlet to the outlet.

The impact member 42 is provided with a longitudinal central opening 48 within which a bearing member 50 is located and which receives an elongated tubular member 52 adapted to support a cup 54 at one end thereof. The other end of the tubular member 52 is received within a bearing 56 located centrally of the closure member 58 which closes the opening at the large end of the body 36. The tubular member 52 and the bearing 56 provide an elongated passage 60 which constitutes the outlet of the body. The inner end of the bearing 56 is adapted to threadedly receive a nut 62 whereby the assembly may be held rigidly in place.

A recess 64 is provided at the small end of the impact member 42 and extends axially thereof to receive the coiled compression spring 66. The other end of the spring is adapted to be received within the recess 40 and to bear thereagainst whereby the impact member is normally maintain in a position wherein the passage 46 is unrestricted.

The impact member is adapted to be moved longitudinally of the body under pressure of the incoming fluid similar to the device shown in Figs. 1 and 2, but in this case the impact member is limited in the restricting movement by means of an adjusting nut 68 threadedly secured to the small end thereof. As the impact member moves to its restricting position, the adjusting nut 68 will come against the inner small end of the body, thus limiting the movement thereof.

A plurality of radially extending passages 70 within the impact member 42 join with a central axially extending passage 72 which in turn connects with the opening 48 and directs the fluid into the passage 60.

As the fluid enters the inlet 74, it will bear against the large end of the impact member 42 and some of it will flow along the surface thereof through the space or passage 46. From this pas-

sage, the fluid will enter the passages 70 and 72 and will then be dispensed through the passage 60. Here again the passage or space 46 between the impact member and the body is normally unrestricted so that the initial onrush of fluid will move through the passage and clean any small particles of foreign matter which may have become lodged therein from a previous dispensing operation. Immediately after this initial onrush of fluid, however, sufficient pressure will have been exerted against the end of the conical impact member 42 to move it toward the inner conical surface of the body to a position where it will restrict the flow of the fluid, enabling it to pass through the outlet and be dispensed sufficiently slow to prevent excessive agitation but fast enough for practical purposes. The feature of the adjustable nut 68 is advantageous in adjusting the restricting action of the impact member to different conditions depending upon the temperature and pressure of the stored carbonated fluid as well as the atmospheric pressure.

From the foregoing description it will be evident that I have provided a novel flow restrictor or discharge device particularly useful in the dispensing of carbonated fluids from a vending machine or other dispensing apparatus, which device is self-cleaning, thus avoiding the necessity for frequent disassembly of the device by a service man.

It will be evident that changes may be made in the form, construction and arrangement of parts from those disclosed herein without departing in any way from the spirit of the invention or sacrificing any of the attendant advantages thereof provided, however, that such changes fall within the scope of the claims appended hereto.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A carbonated liquid discharge device comprising a hollow body having an inlet and an outlet therein for the passage of liquid under pressure, at least a portion of the inner surface of said body being tapered, a movable impact member mounted within said body having at least a portion of its surface tapered and substantially parallel to the tapered portion of said body and spaced therefrom to provide a passage for the liquid, said impact member being movable under pressure of the incoming liquid toward the tapered portion of said body thereby restricting said passage and the flow of liquid therethrough, and means to limit the restricting movement of said impact member.

2. A carbonated liquid discharge device comprising a hollow body having an inlet and an outlet therein for the passage of liquid under pressure, at least a portion of the inner surface of said body being conical, a frustro-conical movable impact member mounted within said body in spaced relation to the conical surface thereof to provide a passage for the liquid, said impact member being movable under pressure of the incoming liquid toward the conical inner surface of said body thereby restricting said passage and the flow of liquid therethrough, and means to limit the restricting movement of said impact member.

3. A carbonated liquid discharge device comprising a hollow body having an inlet and an outlet therein for the passage of liquid under pressure, a movable impact member having a tapered portion thereon mounted within said body and spaced from a similarly tapered portion within said body to provide a passage for the liquid, a bellows located within said impact member and adapted to receive liquid under pressure from said inlet and expand the bellows, whereby said impact member is moved to restrict said passage, a second passage from said bellows to said first passage to carry the liquid thereto, and means to limit the restricting movement of said impact member.

4. A carbonated liquid discharge device comprising a hollow body having an inlet and an outlet therein for the passage of liquid under pressure, a movable impact member having a tapered portion thereon spaced from a similarly tapered portion within said body thereby forming a normally open passage to receive the liquid, said impact member being movable under pressure of the incoming liquid to restrict said passage and the flow of liquid therethrough, and yieldable means to resist the restricting movement of said impact member, whereby an initial amount of liquid will pass through said passage unrestricted to thereby clean said passage immediately prior to actuation of said impact member to restrict said passage.

5. A carbonated liquid discharge device having self-cleaning characteristics, comprising a hollow body having an inlet and an outlet therein for the passage of liquid under pressure, the inner surface of said body having a conical shape, a frustro-conical impact member within said body and spaced therefrom, the space between said body and said member being a passage to receive liquid under pressure and said member being movable under pressure of the incoming liquid from a normal open position where the passage is unrestricted to a closed position where the passage is restricted, and yieldable means to resist the restricting movement of said member, whereby the initial onrush of liquid from the inlet will pass through the passage unrestricted for cleaning purposes until the pressure of the liquid is sufficient to move said member to restricting position.

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