June 27, 1933. J. F. DAWSON 1,915,718

CARBONATING MIXING VALVE

Filed Sept. 22, 1931

Fig. 1

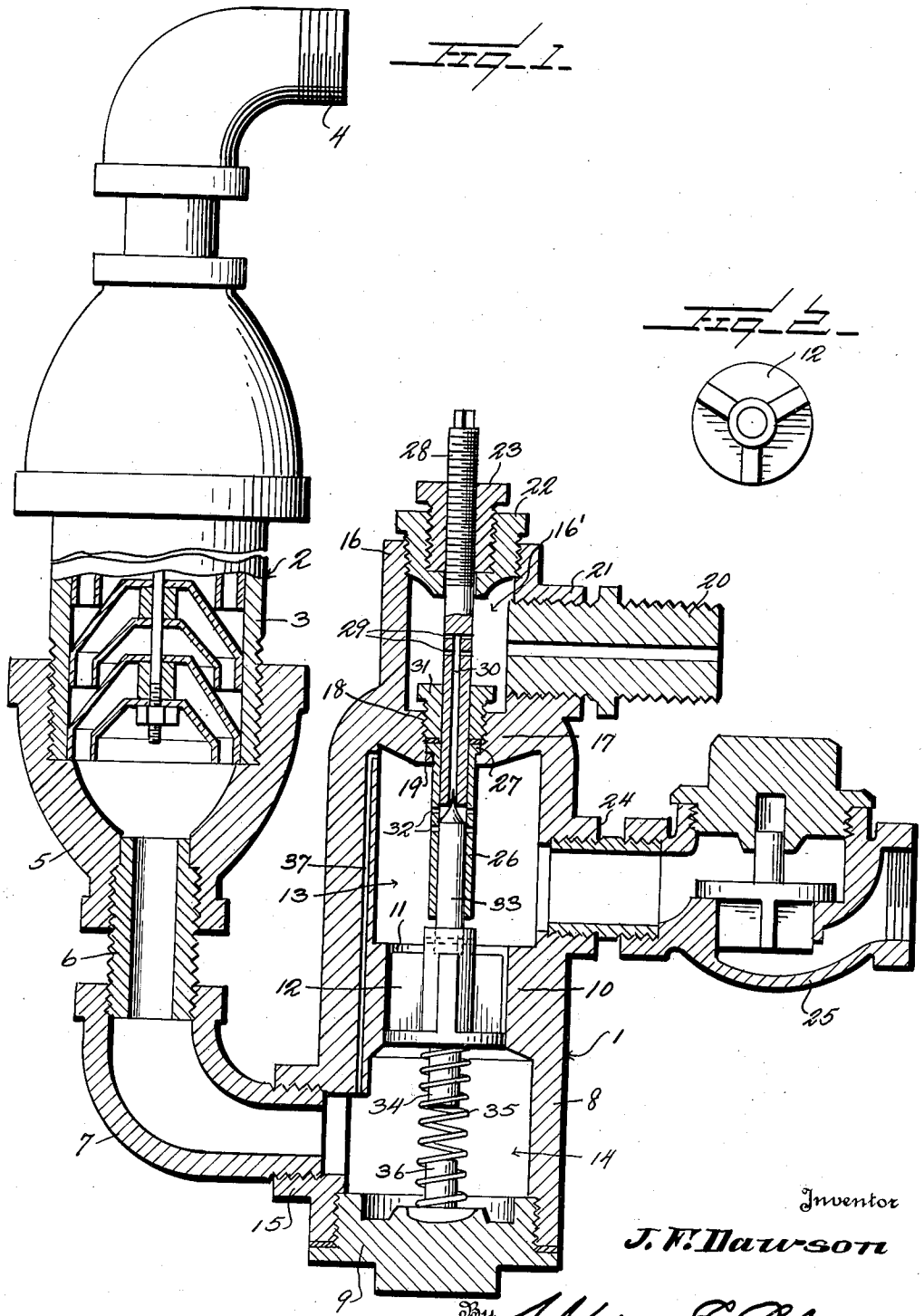


Fig. 2

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CARBONATING MIXING VALVE

Application filed September 22, 1931. Serial No. 564,397.

This invention relates to improvements in carbonating devices and pertains particularly to an improved gas and water mixing valve.

The primary object of the present invention is to provide an improved valve structure for automatically admitting gas and water to the carbonating device when the draft arm with which the same is coupled, is open for the extraction of carbonated water therefrom.

Another object of the invention is to provide a mixing valve for the purpose set forth which is actuated by the pressure of the water in the pipe line connected thereto and which has a water actuated valve plug directly connected with a gas inlet control valve so that the sticking of any of the parts cannot occur.

A still further object of the invention is to provide a water pressure controlled mixing valve having a novel gas inlet controlling valve element and a novel means for regulating the quantity of gas admitted therethrough.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:—

Figure 1 is a view partly in vertical section and partly in side elevation of the improved structure embodying the present invention;

Figure 2 is a bottom plan view of one of the water actuated plugs in the valve structure.

Referring now more particularly to the drawing wherein like numerals of reference indicate corresponding parts throughout the several views, the numeral 1 indicates generally the present improved mixing valve while the numeral 2 indicates as a whole the carbonating element with which the valve is connected and in which the gas and water are thoroughly mixed before passing to the control or draw-off faucet which is connected in the usual manner thereto.

The structure 2 is shown and described in detail in the co-pending application, Serial No. 530,706 filed April 16th, 1931, therefore, a detailed description of the same in the present case will not be made, except to point out that the device includes a casing 3 to the upper end of which is connected a lead-off coupling 4 with which a pipe is connected to carry the carbonated water to a control valve or draft arm and the lower end has a coupling 5 connected therewith which is joined with the mixing valve 1 through the medium of the nipple 6 and elbow coupling 7.

The mixing valve 1 comprises an elongated chambered body 8 in the lower end of which is threadably secured the removable plug 9. Within the body 8 there is formed the reduced central portion 10 in the passage 11 of which is normally positioned the water actuated valve plug 12 the construction of which will hereinafter be more specifically described. By the formation of the reduced central portion 10 which is normally closed by the valve plug 12 there are thus formed the two chambers 13 and 14. The chamber 13 will hereinafter be referred to as the water chamber and the chamber 14 will be referred to as the discharge or outlet chamber.

The body of the member 8 is provided with a laterally threaded outlet nipple 15 with which the coupling 7 is connected and which communicates with the outlet chamber 14 in the manner illustrated.

The upper end of the body 8 has a reduced extension 16 formed integral therewith which is separated from the water chamber 13 by the dividing wall 17 through which is formed a passage which at its upper end is threaded as indicated at 18, while its lower end is of reduced diameter thus forming a shoulder 19. The extension 16 is hollow as shown and forms a gas receiving chamber 16′ into which gas is discharged through the coupling 20 which has one end detachably secured in the laterally opening nipple 21. The top of the extension 16 which forms the gas chamber or cylinder is closed by the threaded plug 22

through which a passage is formed which receives a plug 23 in its upper end.

Leading laterally through the wall of the body 8 into the water chamber 13 is a nipple 24 with which is coupled a one-way or check valve unit 25 which permits water to flow only into the chamber 13, this valve being designed to have a water supply line coupled therewith.

Disposed in and extending longitudinally through the water chamber 13 is a tube 26, the upper end of which is enlarged as indicated at 27 so as to rest upon the shoulder 19 and thus support the tube in position in the manner shown. Extending downwardly through the plug 23 is a stem 28 which has its upper end threadably connected with the plug 23 while at a point substantially midway between its ends there are formed therethrough the transverse passages 29 which lead into the axial passage or bore 30 which extends downwardly and through the lower end of the stem.

The transverse or inlet passages 29 are located within the gas receiving chamber 16' and the lower end of the stem extends downwardly through a packing nut 31 which is located in the threaded upper portion of the wall 17, into the upper end of the tube 26, terminating therein just above the outlet apertures 32 which are formed through the wall of this tube.

The water actuated valve plug 12 which is slidably mounted in the passage 11 which is formed through the reduced portion 10 of the body, normally closes this passage and has secured thereto and extending upwardly therefrom the valve needle 33, the pointed upper end of which extends into and closes the lower end of the bore 30 in the stem 28. The lower part of the valve plug 12 is of a diameter to snugly fit in the passage 11 and it will thus be seen that when this plug is forced downwardly this snugly fitting portion will pass beyond the lower end of the passage 11 and thus permit water to escape from the chamber 13 into the chamber 14. The underside of the plug 12 is provided with a stem 34 about which engages the upper end of a coiled spring 35 which has its lower end rested upon the plug 9 and surrounding or receiving a stem 36 which is carried by and extends upwardly from this plug. This spring, as will be readily apparent, maintains the valve plug 12 in its proper position in the passage between the chambers 13 and 14.

Leading from the top of the water receiving chamber 13 into and through the wall of the body 8, is a by-pass passage 37 which leads to the opposite side of the reduced portion 10 and opens into the outlet chamber 14.

In the operation of the present valve communication is made between the gas container and the nipple 21 through the medium of the coupling 20 while a water supply pipe is connected with the inlet side of the check valve 25. When the pressure within the body 2 is reduced below the pressure behind the water entering the valve 25, the water will flow through this valve into the chamber 13 and force the valve plug 12 downwardly against the tension of the spring 25. The downward movement of the plug 12 will remove the point of the valve needle 13 from the outlet end of the bore 30 in the stem 28, thus allowing gas to pass from the chamber 16' through the stem and through the apertures 32 in the sleeve 26, into the water chamber 13. The water and gas will thus pass by the plug 12 into the lower or outlet chamber 14 from which they will pass into the device 2 where a thorough agitation will be given the water as it passes, to effectively dissolve the gas therein. As will be readily apparent as soon as the pressure within the structure 2 equalizes the water and gas pressure the spring 35 will restore the plug 12 to its former position in the passage 11 thereby reinserting the point of the valve needle 33 in the bore 30 and thus closing off the discharge of any more gas into the water chamber. By providing the by-pass 37 the trapping of gas in the upper part of the chamber is prevented and the valve plug thus permitted to return to its normal position.

By the adjustment of the stem 28 the distance which the valve plug and nipple 33 are required to move in order to open the passage 11, may be readily regulated, thereby regulating the quantity of gas allowed to enter the water chamber 13.

From the foregoing description it will be readily apparent that the gas controlling valve must always move with the water actuated valve plug and therefore the possibility of the gas controlling the valve becoming stuck and remaining open is avoided and the efficiency of the mixing valve as a whole is accordingly increased.

Having thus described the invention, what is claimed is:—

1. A mixing valve of the character described comprising a body having a pair of chambers therein each having an inlet, a centrally bored stem leading from one of said chambers into and terminating in the other and having each end opening into a chamber, a valve needle reciprocably mounted in one of said chambers for movement longitudinally of said stem and normally having its pointed end positioned in the said terminal end of the stem, an outlet for said last mentioned chamber, a valve plug normally closing said outlet and connected with and adapted to move in the same path as said needle, and spring means normally maintaining said valve plug and needle in predetermined positions.

2. A mixing valve of the character described comprising a body having a pair of

chambers therein each having an inlet, a centrally bored stem leading from one of said chambers into and terminating in the other and having each end opening into a chamber, a valve needle reciprocably mounted in one of said chambers for movement longitudinally of said stem and normally having its pointed end positioned in the said terminal end of the stem, an outlet for said last mentioned chamber, a valve plug normally closing said outlet and connected with and adapted to move in the same path as said needle, spring means normally maintaining said valve plug and needle in predetermined positions, and means for adjusting said stem longitudinally for controlling the distance which the valve plug must move to open position.

3. A mixing valve of the character described comprisihg a body having three aligned chambers therein, one terminal chamber constituting an outlet chamber, a longitudinal shiftable stem extending through the other terminal chamber and into the intermediate chamber, said stem having a bore opening at the inner end of the stem into the intermediate chamber and opening intermediate the ends of the stem into the said other terminal chamber, a passage communicating between the outlet chamber and the intermediate chamber, a plug valve reciprocably mounted in said passage, a valve needle coupled with said plug valve and having its pointed end closing the inner end of said stem, spring means normally controlling said valve plug and needle, and inlet means for said intermediate and second mentioned terminal chambers.

4. A mixing valve of the character described comprising a body having three aligned chambers therein, one terminal chamber constituting an outlet chamber, a longitudinally shiftable stem extending through the other terminal chamber and into the intermediate chamber, said stem having a bore opening at the inner end of the stem into the intermediate chamber and opening intermediate the ends of the stem into the said other terminal chamber, a passage communicating between the outlet chamber and the intermediate chamber, a plug valve reciprocably mounted in said passage, a valve needle coupled with said plug valve and having its pointed end closing the inner end of said stem, spring means normally controlling said valve plug and needle, inlet means for said intermediate and second mentioned terminal chambers, and a by-pass communicating between the outlet chamber and said intermediate chamber.

5. A mixing valve of the character described comprising a body having a central chamber and oppositely positioned terminal chambers one thereof constituting an outlet chamber, inlet means for the other terminal chamber and the intermediate chamber, a tube secured at one end in a passage between the intermediate chamber and the said other terminal chamber and terminating at its other end in the intermediate chamber and further having apertures through the wall thereof leading to the intermediate chamber, a longitudinally adjustable stem extending through the said other terminal chamber into said tube and having a central bore opening at one end in the tube and having its other end in communication with the interior of the said other terminal chamber, a valve needle slidably mounted in said tube and having its pointed end normally closing said bore, a valve plug reciprocably mounted in a passage communicating between the outlet chamber and the intermediate chamber and having connection with said valve needle, spring means normally retaining said valve plug in one position, and a by-pass passage communicating at one end with said intermediate chamber and at its other end with said outlet chamber, said sleeve inlet apertures being uncovered by the pointed end of the valve needle.

6. A carbonating device, comprising an elongated body having three aligned chambers therein constituting gas, water and discharge chambers, there being communicating passages between the outer gas and discharge chambers and the central water chamber, inlet means for said water chamber and gas chamber and an outlet for the discharge chamber, a stem adjustably secured at one end in the gas chamber and extending through the adjacent communicating passage into the water chamber, said stem having a bore formed therein from the water chamber end and opening laterally into the gas chamber, a sleeve secured at one end in the body between the gas and water chambers and having said stem extended thereinto, said sleeve having lateral apertures in the wall opening into the water chamber, a reciprocable plug valve mounted in the passage between the water and discharge chambers, a needle valve carried by the plug and extending into said sleeve and closing the open end of said stem passage, spring means in the discharge chamber urging said plug valve and said needle valve to closed position, and a check valve controlling the inlet to the water chamber.

7. In a mixing valve, a body having a gas chamber and a liquid chamber each having an inlet, a valve controlling a communicating passage between said chambers including a seat and a seat engaging member, an outlet for the liquid chamber, valve means operating to open said outlet upon the reduction of the pressure upon the outer side thereof below the pressure in the liquid chamber, said valve seat engaging member being moved from its seat by and with said means

when the latter is opened, and means for shifting said seat relative to the member whereby the distance moved therefrom by the said member may be regulated.

8. A carbonating device, comprising a body having a gas and a water chamber, inlets to said chambers, a tubular stem extending from one chamber into the other and terminating at one end in the water chamber, there being a communicating passage between the interior of the stem and the gas chamber, a needle valve reciprocably positioned in the water chamber and having its point entering the adjacent end of the tubular stem to normally close the latter, an outlet for the water chamber, a plug valve normally closing said outlet and having said stem connected therewith, resilient means normally urging the plug valve in a direction to retain the needle valve seated in the tubular stem, said tubular stem extending through a wall of the gas chamber and adjustably connected therewith for movement relative to the needle valve.

In testimony whereof I hereunto affix my signature.

JAMES F. DAWSON.