

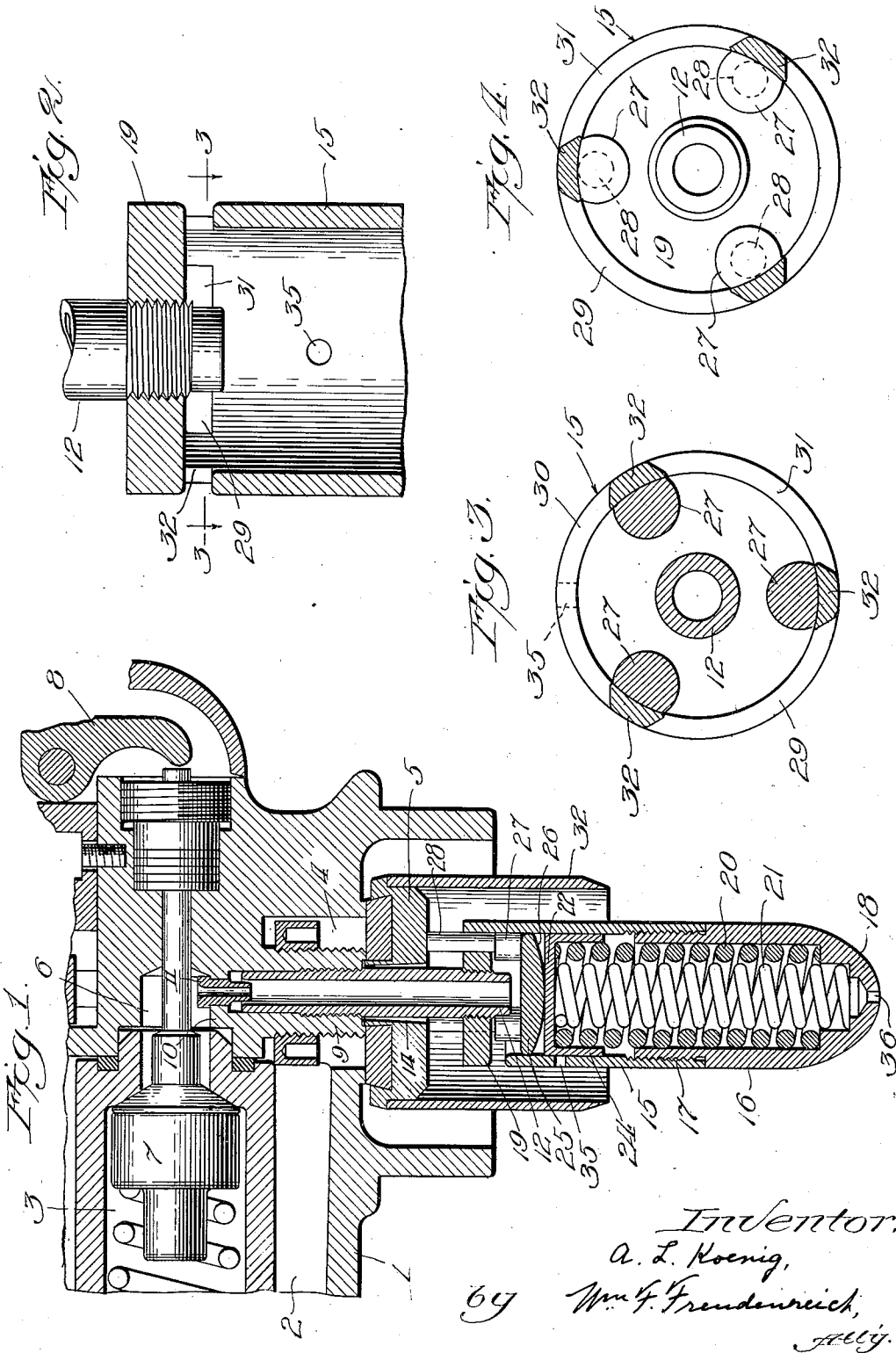
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A. L. KOENIG

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SIRUP VALVE FOR DRAFT ARMS

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Inventor:
A. L. Koenig,
Wm. F. Freudenreich,
Att'y.

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SIRUP VALVE FOR DRAFT ARMS

Alphonso L. Koenig, Chicago, Ill.

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11 Claims. (Cl. 225—26)

In my Patent No. 1,525,650 there is disclosed a form of draft arm containing a valve device for mixing sirup delivered under low pressure and charged water supplied at a high pressure and discharging the mixture for use. An improved valve device of this type is illustrated in my Patent No. 2,162,384 to be granted June 13, 1939. One objection to the valve device of said patent is that, as the mixture of sirup and charged water is dispensed, it flows down over a coiled spring that underlies the sirup valve, proper, and tends constantly to hold it in its closed position. It is difficult to keep the spring and the part which it surrounds clean so that, unless great care is taken, the dispensed liquid is caused to flow over surfaces that are unclean. One of the objects of the present invention is to produce an outlet valve device of the type of my aforesaid patent, in which the mixture of sirup and charged water flows only over smooth surfaces which can be readily cleaned. A further object of the present invention is to produce such a valve device in a form that permits it to be detached without the use of tools and to be separated into parts one of which is simply the valve for the sirup and the cylindrical skirt with which it is customary to provide valves of this kind.

In the old form of valve device a large part of the charged water is driven through the tubular stem of the outlet valve for the sirup, and some or all of it discharged radially against the surrounding coiled spring through small ports in the cylindrical wall of the stem. These ports are usually drilled, so that the charged liquid is driven past sharp corners upon entering the ports. The result of these two conditions is that an excessive amount of the gas with which the liquid is charged becomes free and causes the dispensed liquid to be less sparkling than it would be if more of the gas were retained. A further object of the present invention is to produce a valve device which delivers a mixture of charged liquid and sirup with a substantially higher gas content than is possible in the case of the previous types of valves. This object I attain by eliminating from the path of the charged liquid all sharp edges or obstructions that could serve to break up a solid stream, particularly a small one, into a spray or mist.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in con-

nection with the accompanying drawing, wherein:

Figure 1 is a vertical section through that portion of a draft arm adjacent to and including what may be termed the nozzle, illustrating the present invention; Fig. 2 is a similar section, on a larger scale, showing only a fragment of the tube or hollow stem into which liquid under high pressure is delivered through a nozzle, together with its enlarged downward extension; Fig. 3 is a section on line 3—3 of Fig. 2, looking in the direction of the arrows, the pins for closing the sirup valve being also included; Fig. 4 is a section on line 3—3 of Fig. 2, looking in the opposite direction from that in which the arrows point, the tube or hollow stem and the thrust pins which appear in Figs. 1 and 3 being shown in elevation.

The present invention has to do only with what may be termed the valve for controlling the sirup outlet, and the immediate means for causing the sirup to be mixed with charged water and, therefore, only so much of the remainder of the draft arm, disclosed and claimed in my two aforesaid patents, as is necessary for an understanding of the present improvements, is illustrated.

Briefly described, the draft arm may be said to comprise a casing 1 having a measuring chamber 2 for sirup, and a chamber 3 for receiving from a suitable source of supply charged water under high pressure; these chambers being horizontal and the chamber 3 extending through the sirup chamber. The sirup chamber communicates at the bottom with a vertical cylindrical chamber 4 open on the under side and providing the outlet for the sirup. This outlet is normally closed by the usual valve 5 which may have the form of a thick disk. The high pressure chamber 3 has an extension 6 of smaller diameter which overlies the chamber 4. Communication between the chamber 3 and its extension is controlled by the usual valve 7 adapted to be opened by means of the usual or any suitable operating handle 8. This handle, by means not here shown, also serves to force the valve 5 down and open the sirup outlet at the same time that the valve 7 is opened. Lying within and coaxial with the cylindrical chamber 4 is a nipple 9 the upper end of which is closed by a thin wall 10 that separates the bore in the nipple from the chamber 6. A nozzle 11, having a very small orifice, extends through and is fixed in the wall or partition 10 so that when the valve 7 is opened, fluid under high pressure passes through the nozzle and down into the nipple. All of the parts here-

tofore specifically described are disclosed in one or the other of my aforesaid patents.

In accordance with the present invention, I screw into the nipple 9 a long tube or hollow stem that projects downwardly a considerable distance below the lower end of the nipple. The bore of the member 12 is very much greater than that of the nozzle 11 so that the fluid discharged into the same from the nozzle immediately expands and greatly reduces the pressure thereof. Consequently, the charged liquid that is dispensed from the lower end of the tube or stem 12 is at the desired pressure for filling drinking containers. The member 12 serves not only as a conduit or spout for carrying charged water to a predetermined outlet point, but also as a guide and centering device for the valve 5. It will be seen that the valve 5 has a central hole 14 through which the member 12 extends. I prefer that the opening 14 shall be frusto-conical, the smallest diameter being at the top, whereby the valve is centered against bodily lateral movements but may rock through a limited angle in order to seat itself properly against the valve seat surrounding the open end of the chamber 4, and may slide freely up and down on the member 12.

Screwed upon the lower end of the member 12 is a capsule-shaped shell comprising an upper section 15 and a lower section 16 screwed together, as indicated at 17. The lower end of this shell or extension is preferably brought to a blunt or rounded point, as indicated at 18, while the top consists of a fairly thick, flat wall 19; the connection between the extension and the member 12 being produced by screwing the member 12 into and through the wall 19.

Within the hollow extension is a suitable compression spring device which may conveniently consist of two long compression springs 20 and 21, one of which surrounds the other. Resting on top of the springs is a piston 22 in the form of an inverted cup comprising a flat bottom which meets the cylindrical skirt or wall 24 in a sharp corner; the piston being a good sliding fit that will make it difficult for fluids to pass between the same and the surrounding shell. On top of the piston is set a disk 25 the under side of which is convex, so that the disk may rock from side to side in any direction. The top face of the disk is polished so as to be very smooth, and the periphery is rounded, as indicated at 26, so as to leave no sharp edges or corners. Resting upon the disk 25 are the heads 27 of a plurality of pins 28 which extend up through and have a sliding fit in the wall 19 forming the top of the capsule or extension. I prefer to use three of these pins, as shown. The heads of the pins serve as limiting stops to prevent the pins from being pushed too far in the upward direction by the underlying springs. The upper ends of the pins engage with the under side of the valve 5 and, when free to do so, the pins hold the valve seated. In other words, the parts are so proportioned that when the valve 5 is closed, as shown in Fig. 1, the springs are under compression and thus cause the pins to exert a yielding upward pressure on the valve.

The disk 25 serves as a spreading device for charged water delivered against the same from the lower end of the tube or hollow stem 12, the water passing radially, in all directions, and leaving the interior of the shell or extension through a number of slots distributed around the shell or extension with their upper bounding edges lying in the plane of the under face of the wall 19; the combined length of the slots being

only a little less than the circumference of the shell or extension, so that each slot is separated at its ends from the adjacent slots by narrow, uncut strips of metal. In the arrangement shown, there are three of these slots 29, 30 and 31, separated from each other at their ends by narrow wall sections 32. The pins 28 are so disposed that each lies just within or behind one of the wall sections; the head of each pin being cut away on one side, as shown, so as to fit against one of the sections 32. The pins and their heads are round so that the charged water striking them after being deflected laterally by the spreading disk 25 meets no sharp corners or edges. Care is also taken to round the corners at all of the wall edges bounding the three outlet slots. Consequently, the charged water, after leaving the lower end of the tubular stem 12, does not encounter any sharp corners or edges which invariably act to liberate excessive quantities of the gas with which the water is charged, and the water therefore contains a desirably high gas content when it is delivered into the drinking glass or container along with the sirup.

The charged water escaping from the shell or extension travels laterally in the plane of the under side of the wall 19 until it is arrested by the usual cylindrical skirt 34 that surrounds and depends from the valve 5. The sirup flows down over the exterior surface of this skirt and is met at the lower edge of the skirt by the charged water which is traveling downward along the interior surface. Some of the charged water and, subsequently, some of the mixture of water and sirup, may flow down along the extension on the hollow stem; but, by making the extension circular in cross section and providing it with a polished exterior, the water and sirup encounter no obstacle, while flowing down, that would cause undesired liberation of the charging gas in the water.

The piston 22 may be a good enough fit within the surrounding shell to prevent any substantial leakage of water downwardly past the same, particularly since the top and sides of the piston meet in a sharp corner or edge. However, in order to relieve the pressure directly above the piston after it has been forced down by the opening of the valve 5, I place a small hole 35 in the wall of the shell or extension at a point which lies between the lower edge and the top of the piston when the valve 5 is closed, and at or above the top of the piston when this valve is open. Since the spreader plate 25 must be permitted to rock, it cannot be as close a fit in the surrounding shell as is the piston and, therefore, some charged water will drive down past the spreader disk and against the piston. This water can escape through the hole or orifice 35. I also place at the lowest point in the bottom of the capsule-like extension a drain orifice 36 which will permit water to drain out of the interior of the extension after the valve 5 has been closed, should any water succeed in getting down past the piston.

It will thus be seen that I have produced a construction in which none of the sirup, after mingling with the charged water at the lower edge of the skirt 34 comes in contact with anything except the smooth outer surface of the lower end of the capsule-like extension or shell. Consequently, this surface is kept clean by the action of the charged water, while the draft arm is in use. Should the draft arm be left idle for a time long enough to cause any growths to develop on surfaces to which some of the sirup

adheres, all such surfaces can be cleaned easily and effectively. Since no sirup comes in contact with the springs housed in the polished shell, they do not require to be cleaned as do springs over which the mixture of charged water and sirup flows and, furthermore, they are so effectively housed that neither the water nor the sirup can be contaminated through contact therewith. It will also be seen that the entire valve and mixing unit can be quickly and easily removed and the main sirup valve with its skirt be separated from the remainder of the unit so that each may be cleaned independently of the other, while the two sections of the capsule-like device may be unscrewed from each other to permit the removal of the springs and other movable elements within the interior thereof. It is unnecessary to remove the tubular element or hollow spring that supports the capsule-like device so that, by screwing the capsule-like device on to the stem until it meets a limiting shoulder, accurate adjustment of the parts is assured upon reassembling them in the draft arm following their removal for the purpose of cleaning them. What will not be so evident from the mere inspection of the structure as the ease for keeping the structure clean, is the important advantage of conserving the gas with which the water is charged. Actual experience shows that by avoiding the driving of the charged water against sharp edges or corners, the drink as it is dispensed to the user contains twenty-five percent more gas than that dispensed by one of my prior draft arms, and therefore possesses greater life and is more sparkling and refreshing.

While I have illustrated and described with particularity only a single preferred form of my invention, I do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the definitions of my invention constituting the appended claims.

I claim:

1. In a draft arm apparatus of the general character described having an outlet for sirup, a valve for said outlet, a nozzle for liquid under high pressure above and in axial alignment with the valve, and a tubular member aligned with the nozzle and extending through the center of the valve: said tubular member being stationary and the valve being slidable thereon, an enlarged capsule-like extension on the lower end of said tubular member having side outlets near the upper end, a piston in said extension below said outlets, thrust means resting on said piston and including pins slidable through the top of the extension and engaged with the under side of the valve, and a compression spring in said extension below and exerting an upward pressure on the piston.

2. In a draft arm apparatus of the general character described having an outlet for sirup, a valve for said outlet, a nozzle for liquid under high pressure above and in axial alignment with the valve, and a tubular member aligned with the nozzle and extending through the center of the valve: said tubular member being stationary, the valve having a central frusto-conical opening through which said tubular member passes, the smaller end of said opening having approximately the same diameter as the external diameter of the tubular member so that the valve may rock on the latter as well as slide lengthwise thereof, an enlarged capsule-like ex-

tension on the lower end of said tubular member having side outlets near the upper end, a piston in said extension below said outlets, thrust means resting on said piston and including pins slidable through the top of the extension and engaged with the under side of the valve, and a compression spring in said extension below and exerting an upward pressure on the piston.

3. In a draft arm apparatus of the general character described having an outlet for sirup, a valve for said outlet, a nozzle for liquid under high pressure above and in axial alignment with the valve, and a tubular member aligned with the nozzle and extending through the center of the valve: said tubular member being stationary and the valve being slidable thereon, an enlarged capsule-like extension on the lower end of said tubular member having side outlets near the upper end, a piston in said extension below said outlets, a disk having a convex under side resting on said piston, pins resting on said disk and extending slidably through the top of said extension into engagement with the under side of said valve, and a compression spring in said extension below and exerting an upward pressure on said piston.

4. In a draft arm apparatus of the general character described having an outlet for sirup, a valve for said outlet, a nozzle for liquid under high pressure above and in axial alignment with the valve, and a tubular member aligned with the nozzle and extending through the center of the valve: said tubular member being stationary and the valve being slidable thereon, an enlarged capsule-like extension on the lower end of said tubular member having near the upper end side outlets in the form of a plurality of slots arranged in a manner completely to encircle the said extension except for short interruptions between adjacent slot ends, a piston in said extension below said outlets, thrust means resting on said piston and including pins slidable through the top of the extension and engaged with the under side of the valve, and a compression spring in said extension below and exerting an upward pressure on the piston.

5. In a draft arm apparatus of the general character described having an outlet for sirup, a valve for said outlet, a nozzle for liquid under high pressure above and in axial alignment with the valve, and a tubular member aligned with the nozzle and extending through the center of the valve: said tubular member being stationary and the valve being slidable thereon, an enlarged capsule-like extension on the lower end of said tubular member having near the upper end a group of slots arranged in a manner completely to encircle the said extension except for short interruptions between adjacent slot ends, a piston in said extension below said outlets, thrust means resting on said piston and including pins each located just inwardly from an unutilized portion of said extension between two adjacent slot ends and slidable through the top of the extension and engaged with the under side of the valve, and a compression spring in said extension below and exerting an upward pressure on the piston.

6. In a draft arm apparatus of the general character described having an outlet for sirup, a valve for said outlet, a nozzle for liquid under high pressure above and in axial alignment with the valve, and a tubular member aligned with the nozzle and extending through the center of the valve: said tubular member being stationary and the valve being slidable thereon, an enlarged

capsule-like extension on the lower end of said tubular member, a piston in the upper part of said extension, a spreader disk having a convex under-side resting on said piston, pins resting on said disk and extending slidably through the top of said extension into engagement with the under side of said valve, said pins having shoulders to limit the upward movements thereof, a compression spring in said extension below and exerting an upward pressure on said piston, and the side wall of said extension having long outlet slots arranged end to end to encircle the extension just below the top wall of the latter.

7. In a draft arm apparatus of the general character described having an outlet for sirup, a valve for said outlet, a nozzle for liquid under high pressure above and in axial alignment with the valve, and a tubular member aligned with the nozzle and extending through the center of the valve: said tubular member being stationary and the valve being slidable thereon, an enlarged capsule-like extension on the lower end of said tubular member having near the upper end side outlets in the form of a plurality of slots arranged in a manner completely to encircle the said extension except for short interruptions between adjacent slot ends, a piston in said extension below said outlets, the side wall of the extension having an orifice therein a little below the top of the piston, thrust means resting on said piston and including pins slidable through the top of the extension and engaged with the under side of the valve, and a compression spring in said extension below and exerting an upward pressure on the piston.

8. In a draft arm apparatus of the general character described having an outlet for sirup, a valve for said outlet, a nozzle for liquid under high pressure above and in axial alignment with the valve, and a tubular member aligned with the nozzle and extending through the center of the valve: said tubular member being stationary and the valve being slidable thereon, an enlarged capsule-like extension on the lower end of said tubular member, a piston in the upper part of said extension, a spreader disk having a flat polished top and a convex under side resting on said piston, pins resting on said disk and extending slidably through the top of said extension into engagement with the under side of said valve, said pins having shoulders to limit the upward movements thereof, a compression spring in said extension below and exerting an upward pressure on said piston, there being long outlet slots through the side wall of said extension at about the level of the top of the extension and arranged end to end to encircle the extension, and all of the edges of the slots having rounded corners.

9. In a draft arm apparatus of the general character described having an outlet for sirup, a

valve for said outlet, a nozzle for liquid under high pressure above and in axial alignment with the valve, and a tubular member aligned with the nozzle and extending through the center of the valve: said tubular member being stationary and the valve being slidable thereon, an enlarged capsule-like extension on the lower end of said tubular member having side outlets near the upper end, a piston in the upper part of said extension, means resting on said piston and including pins extending slidably through the top of said extension into engagement with the under side of said valve, a compression spring in said extension below and exerting an upward pressure on said piston, and there being long slots through the side wall of said extension encircling the latter near the top thereof, said extension having a smooth periphery and terminating in a rounded point.

10. In a draft arm apparatus of the general character described having an outlet for sirup, a valve for said outlet, a nozzle for liquid under high pressure above and in axial alignment with the valve, and a tubular member aligned with the nozzle and extending through the center of the valve: said tubular member being stationary and the valve being slidable thereon, an enlarged capsule-like extension on the lower end of said tubular member having side outlets near the upper end, a piston in the upper part of said extension, means resting on said piston and including pins extending slidably through the top of said extension into engagement with the under side of said valve, a compression spring in said extension below and exerting an upward pressure on said piston, and there being long slots through the side wall of said extension encircling the latter near the top thereof, said extension having a smooth periphery and terminating in a rounded point and having a drain orifice in the lower end and a pressure relief port at a point a little below the top of the piston when the latter is up.

11. A valve device for a draft arm comprising a tubular member, a disk-like valve slidable thereon, an enlarged capsule-like extension on the lower end of said tubular member, said extension being formed in two sections united by screw threads, a piston in the upper part of said extension, a spreader disk having a convex under-side resting on said piston, pins resting on said disk and extending slidably through the top of said extension into engagement with the under side of said valve, said pins having shoulders to limit the upward movements thereof, a compression spring in said extension below and exerting an upward pressure on said piston, and the side wall of said extension having long outlet slots arranged end to end to encircle the extension just below the top wall of the latter.

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