

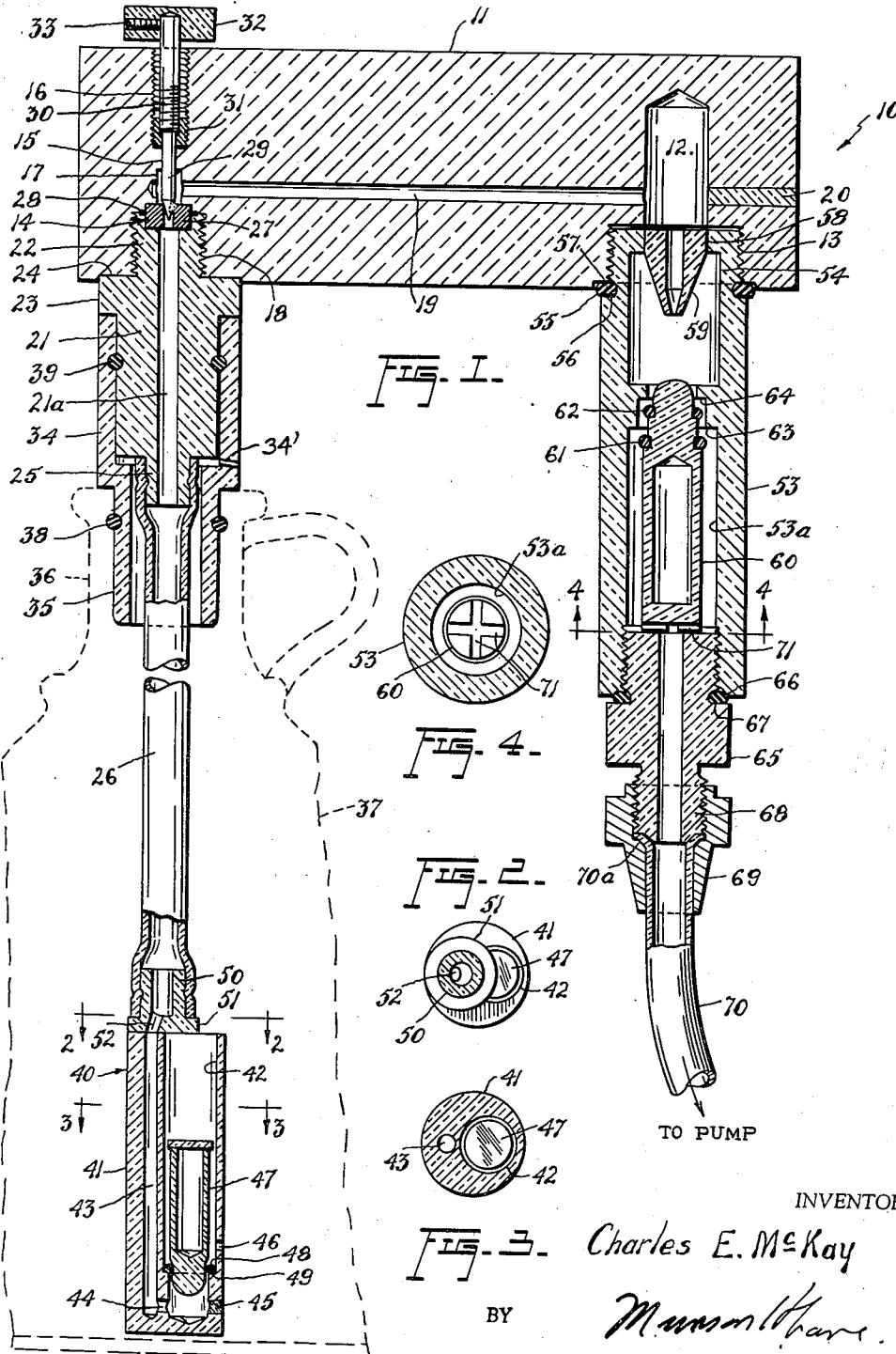
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CHLORINATORS

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## CHLORINATORS

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5 Claims. (Cl. 137—389)

This invention relates to new and useful improvements and structural refinements in chlorinators, and the principal object of the invention is to provide a device of the character herein described which may be conveniently and effectively employed for introducing chlorine into water.

More specifically, the invention contemplates the provision of a chlorinator having a suction tube adapted to be inserted in a chlorine container and an outlet tube adapted to be connected to the intake of a water pump, whereby chlorine is withdrawn from the container and thoroughly mixed with the water passing through the pump by the action of the pump itself.

An important feature of the invention resides in the provision of a valve means for accurately controlling the rate of flow of chlorine through the device, so that the mixing of the chlorine and water takes place in a proper, predetermined proportion.

Another important feature of the invention resides in the provision of a check valve on the suction tube of the device, so that in the event the supply of chlorine in the container is exhausted, the suction tube does not pull air to deprive the pump of its prime.

Another important feature of the invention resides in the provision of a check valve on the outlet tube of the device, that is, between the device and the pump, so that the device and the chlorine container cannot become flooded with water in the event of a backflow from the pump.

Some of the advantages of the invention reside in its simplicity of construction and operation and in its adaptability to simple and convenient maintenance.

The invention will be more readily understood by reference to the accompanying drawing and the following detailed description which are intended as illustrative of the inventive thought rather than as limiting the invention to specific details set forth therein.

In the drawings:

Figure 1 is a sectional view of the invention, taken in a vertical plane and illustrating a portion of the chlorine container by dotted lines;

Figure 2 is a cross-sectional detail, taken substantially in the plane of the line 2—2 in Figure 1;

Figure 3 is a cross-sectional detail, taken substantially in the plane of the line 3—3 in Figure 1; and

Figure 4 is a cross-sectional detail, taken substantially in the plane of the line 4—4 in Figure 1.

Referring now to the accompanying drawing in detail, the chlorinator is designated generally by the reference numeral 10 and embodies in its construction a block-shaped, horizontally elongated body member 11 which is provided in one end portion thereof with a vertical bore 12, closed at its upper end and formed at its lower end with a screw-threaded counterbore 13.

The other end portion of the member 11 accommodates a flow control valve designated generally by the numeral 14, for which purpose the member 11 is provided with a vertical bore 15 having a relatively deep,

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screw-threaded counterbore 16 at its upper end and a bore portion 17 of an enlarged diameter at its lower end. The bore portion 17, in turn, communicates with a screw-threaded counterbore 18 at the underside of the member 11. A longitudinally extending bore or passage 19 is provided in the member 11 to connect the bore portion 17 with the aforementioned bore 12, the outer end of the passage 19 being suitably plugged, as indicated at 20.

A substantially cylindrical coupling 21 is connected to and depends from the member 11, the coupling 21 having a diametrically reduced, screw-threaded upper end portion 22 fastened in the counterbore 18 and also being provided immediately under the portion 22 with an annular flange or shoulder 23 which abuts a seat 24 formed in the underside of the member 11 concentrically with the counterbore 18. The coupling 21 is equipped at its lower end with a diametrically reduced nipple 25, to which is connected the upper end of a flexible suction tube or hose 26.

The aforementioned flow control valve 14 comprises an annular seat 27 which is pressed in a counterbore in the upper end of the coupling portion 22 and, of course, communicates with the suction tube 26 through the medium of an axial bore 21a in the coupling. A suitable gasket 28 is provided in the counterbore 18 at the upper end of the coupling portion 22 and in surrounding relation with the valve seat 27 and the valve 14 also includes a needle 29 which is engageable with the seat 27, as will be clearly apparent.

The needle 29 is rotatable in the bores 15, 17 and has a screw-threaded portion 30 in operative engagement with an internally and externally threaded bushing 31 disposed in the lower portion of the counterbore 16. The upper end portion of the needle projects above the body member 11 and carries a suitable knob 32 which is secured thereto by a set screw 33.

It will be apparent from the foregoing that by simply manipulating the knob 32 of the needle 29, the flow of fluid from the suction tube 26 to the passage 19 and bore 12 may be accurately controlled.

A substantially tubular adapter 34 encloses the coupling 21 and has the upper edge thereof in abutment with the shoulder 23 of the coupling. The adapter 34 is formed integrally at its lower end with a diametrically reduced portion 35 which is receivable in the mouth or neck 36 of a chlorine container 37. A sealing ring 38 is provided in an annular groove on the outside of the adapter portion 35 so as to tightly fit the neck of the container, and a similar sealing ring 39, seated in an annular groove on the outside of the coupling 21 is tightly received in a similar groove on the inside of the adapter body 34, so as to prevent leakage between these two parts. The portion 35 of the adapter freely accommodates therein the aforementioned nipple 25 as well as the upper end portion of the tube 26, and it will be noted that by simply withdrawing the adapter portion 35 from the mouth of the container 37, the container may be refilled with chlorine or replaced by a full container, whenever necessary. The adapter 34 is provided at one side thereof with an aperture 34' whereby the interior of the container is vented to the atmosphere through the hollow portion 35.

The suction tube 26 is provided at its lower end with an inlet check valve designated generally by the numeral 40, the same comprising an upright cylindrical housing 41 provided with a relatively large valve chamber 42 and with a relatively small duct 43 disposed at one side of and parallel with the chamber 42. The lower end portion of the housing 41 is provided with a transverse drilling 44 which connects the lower end of the duct 43 with the lower end of the chamber 42, the outer end of

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the drilling 44 being suitably plugged as indicated at 45. The chamber 42 communicates with the interior of the chlorine container 37 through its open upper end and also through a lateral opening 46 provided in the housing 41 intermediate the ends of the chamber, whereby chlorine may enter the chamber even when it is at a low level in the container.

A substantially cylindrical valve element 47 is movable vertically in the chamber 42, the element 47 preferably being hollow as shown so that it is buoyant and floats upon the liquid in the chamber. The lower end portion of the element 47 is equipped with an annular sealing ring 48 which is engageable with an annular seat 49 formed in the lower portion of the chamber 42, below the inlet opening 46.

The lower end of the tube 26 is connected to a nipple 50 having a flanged base portion 51 adhesively or otherwise suitably secured to the upper end of the housing 41, the base portion 51 being formed with an oblique passageway 52 which establishes communication between the duct 43 and the tube 26, as will be clearly understood. The diameter of the base portion 51 is such that it partially covers the upper end of the chamber 42 and prevents the valve element 47 from sliding out of the chamber in the event that at any time the device should become inverted.

When the device is in operation and chlorine is being drawn from the container 37 through the tube 26 and valve 40, the valve element 47 will normally float on the level of liquid in the chamber 42 in a raised position from the seat 49 to maintain the valve open. However, if the supply of chlorine in the container 37 should become exhausted, the falling level thereof will permit the element 47 to move downwardly in the chamber 42 until the ring 48 of the element 47 contacts the seat 49 and closes the valve. In this manner, sucking of air into the tube 26 will be prevented, such as would otherwise cause the pump (hereinafter mentioned) to lose its prime.

Referring now to the right hand portion of Figure 1, it will be seen that a cylindrical outlet valve body 53 depends from the body member 11 and is provided at its upper end with a screw-threaded portion 54, secured in the counterbore 13. An annular sealing ring 55 is positioned on the portion 54 between a seat 56 formed on the body 53 and a similar seat 57 provided at the underside of the member 11 concentrically with the counterbore 13. The body 53 has a closed upper end provided with an aperture 58 in which is pressed a cone-shaped spout 59, whereby chlorine passing through the bores 19 and 12 is discharged into the valve body 53.

The valve body 53 accommodates therein a vertically movable valve element 60 which, like the element 47, is substantially cylindrical and hollow so as to be buoyant on the liquid in the valve chamber 53a of the body 53. The upper end portion of the element 60 is formed with stepped shoulders having two sealing rings 61, 62 mounted thereon, these rings being vertically spaced and of different diameters, adapted to engage vertically spaced valve seats 63, 64, respectively, provided in the valve chamber 53a.

The lower end portion of the valve body 53 is internally threaded to receive a connector 65, a sealing ring 66 being interposed between the lower end of the body and a shoulder 67 on the connector, to prevent leakage. The connector 65 is equipped at the bottom thereof with a threaded nipple 68 to receive a conventional coupling nut 69 whereby a flexible outlet hose or tube 70, provided with a flared end 70a is connected to the nipple 68.

The other end of the tube 70 is connected to the intake of a suitable water pump (not shown), so that chlorine drawn through the device from the container 37 and regulated as to rate of flow by the valve 14, is properly mixed with the water passing through the pump by the action of the pump itself.

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In normal operation, the lower end of the outlet valve element 60 rests upon the top surface of the connector 65, since no appreciable amount of chlorine is present in the valve chamber 53a to raise the buoyant element 60. In other words, the chlorine passes through the chamber 53a as fast as it is permitted to flow through the control valve 14, and it will be observed that the lower end of the element 60 is provided with a plurality of transverse grooves 71 to facilitate flow of chlorine, even though the element 60 rests upon the top surface of the connector 65. However, in the event of any back flow of water occurring at the pump and passing to the device through the hose 70, the filling of the chamber 53a with water will automatically raise the buoyant valve element 60 so that the sealing rings 61, 62 thereof are brought in contact with the valve seats 63, 64. Thus, the valve will be closed and flooding of the device as well as back flow of water into the chlorine container will be prevented.

The entire apparatus is preferably made from material such as Plexiglas, or the like, which is highly resistant to the chemical action of chlorine. The various sealing rings or gaskets 28, 38, 39, 62, etc. are preferably made from soft rubber or neoprene, while the needle 29 and seat 27 are either of pure silver or silver plated.

Although the invention is primarily intended for use as a chlorinator, it may obviously also be used in other environments, wherever mixing of two different fluids is to be performed.

While in the foregoing there has been shown and described the preferred embodiment of the invention, various modifications may become apparent to those skilled in the art to which the invention relates. Accordingly, it is not desired to limit the invention to this disclosure and various modifications may be resorted to, such as may lie within the spirit and scope of the appended claims.

What is claimed as new is:

1. A chlorinator adapted to be connected to the intake of a water pump for introducing chlorine in water passing through the pump, said chlorinator comprising a suction tube adapted to be inserted in a chlorine container, a normally open inlet check valve provided at the lower end of said suction tube, a flow control valve connected to the upper end of the suction tube, a normally open outlet check valve communicating with said flow control valve, and an outlet tube communicating with the outlet check valve and adapted to be connected to the intake of a pump, said inlet valve being adapted to be closed by falling level of chlorine in the stated container and said outlet valve being adapted to be closed by backflow from the stated pump.

2. A chlorinator adapted to be connected to the intake of a water pump for introducing chlorine in water passing through the pump, said chlorinator comprising a horizontally elongated member formed with a longitudinally extending passage, a flow control valve provided in said member at one end of said passage, an outlet valve body depending from said member in communication with the other end of the passage, a normally open check valve provided in said outlet valve body, an outlet tube communicating with the outlet valve body and adapted to be connected to the intake of a pump, a coupling depending from said member in communication with said flow control valve, a suction tube connected to said coupling and adapted to be inserted in a chlorine container, and a normally open inlet check valve provided at the lower end of said suction tube, said first mentioned check valve being adapted to be closed by backflow from the stated pump and said inlet check valve being adapted to be closed by falling level of chlorine in the stated container.

3. The device as defined in claim 2 together with an adapter provided on said coupling and receivable in the mouth of a chlorine container, said adapter including a main body portion receiving said coupling therein, and a

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depending container engaging portion having said suction tube extending freely therethrough.

4. The device as defined in claim 2 wherein said inlet check valve comprises a vertically elongated housing provided with a longitudinally extending valve chamber and with a duct parallel to and at one side of said valve chamber, the upper end of said duct communicating with said suction tube and the lower end of the duct communicating with the bottom of the valve chamber, a fluid inlet opening provided at one side of said housing in communication with said valve chamber, a valve seat provided in the valve chamber below said opening, and a buoyant valve member movable vertically in said chamber and engageable with said seat at the lower end of its movement, when chlorine in the stated container falls to the level of said opening.

5. The device as defined in claim 2 wherein the outlet valve body is provided intermediate the ends thereof with a

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seat, said outlet tube being connected to the lower end of said valve body, and said outlet valve member being buoyant and movable vertically in said valve body below the seat and engageable with said seat at the upper end of its movement, in the presence of backflow from the stated pump.

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