Nov. 12, 1935.

D. J. LAMBERT

2,021,116

CHLORINATING APPARATUS

Filed Jan. 16, 1934

Fig. 1

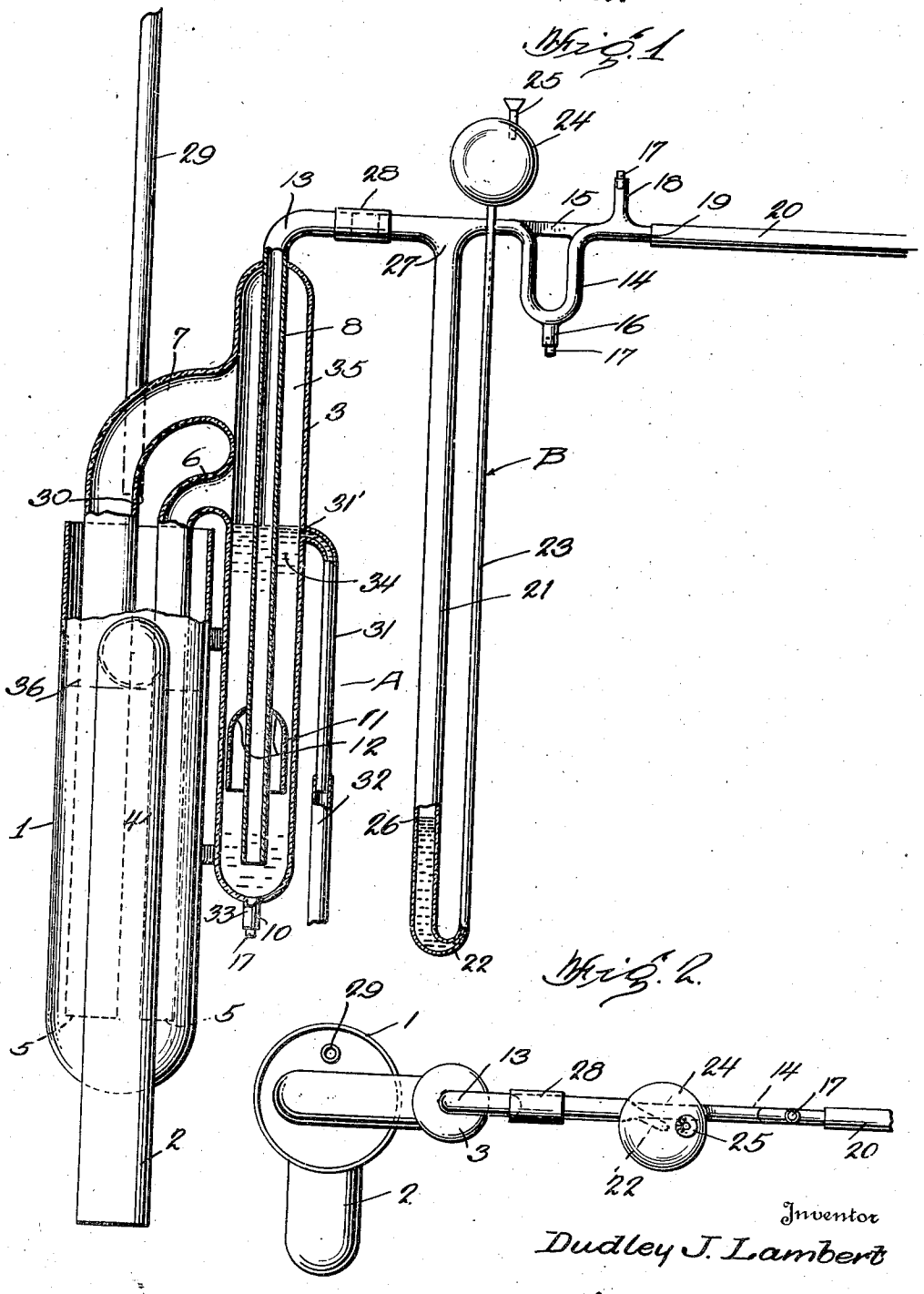


Fig. 2.

Inventor

Dudley J. Lambert

By Drury, Crowe & Gordon

Attorneys

Patented Nov. 12, 1935

2,021,116

UNITED STATES PATENT OFFICE

2,021,116

CHLORINATING APPARATUS

Dudley J. Lambert, Fairburn, Ga., assignor of one-half to Guy Hearn, Fairburn, Ga.

Application January 16, 1934, Serial No. 706,900

8 Claims. (Cl. 210—28)

Generically this invention relates to mixing devices, but it more especially is directed to the type adapted to effect the mixing of a purifying substance such as chlorine with a fluid such as water to effect purification of the latter.

One of the principal objects of this invention is the provision of a device or apparatus of this character formed from transparent and noncorrosive material so that the mixing operation can be observed at all times, and having no movable parts to become damaged by corrosion thereby affecting the efficient operation of the device and requiring frequent replacement.

A further important object of this invention is the provision of a structure of this character formed of glass or other transparent material corrosive-resistant to the chemical action of chlorine whereby deterioration of the device is substantially eliminated and long life and efficient operation assured.

A still further object of this invention is the provision of a transparent noncorrosive chlorinating apparatus embodying simple and unique means for starting the siphoning action of the device when initially starting its operation, having moisture and sediment collecting traps adapted to be expeditiously cleaned without requiring dismantling of the device proper, and fluid control means for automatically maintaining the operation of the device substantially uniform irrespective of fluctuations in the flow of chlorine to the device, yet simple in construction, and adapted to efficiently function, irrespective of variation in operating requirements.

With these and other objects in view, which will become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts, and illustrated in the accompanying drawing, in which like characters of reference indicate like parts throughout the several figures, of which:

Fig. 1 is a diagrammatic view partly in section and partly in elevation illustrating my improved mixing or chlorinating apparatus.

Fig. 2 is a top plan view of Fig. 1.

The devices of this general character with which I am familiar have proven deficient in being non-transparent, thereby preventing a view of the mixing operation and condition of the interior of the device at all times, or being in whole or in part subject to the corrosive action of chlorine, or of a complex and costly construction, and susceptible to a sudden change or fluctuation in the flow of chlorine thereto affecting its efficient operation, and it was to overcome such deficiencies and to provide a simple, transparent device and connecting parts effecting a unitary structure all substantially impervious to corrosion from the chemical action of chlorine, formed with a mixing chamber, a water container having siphon connection with the chamber, means for delivering the chlorine within and adjacent the bottom of said mixing chamber, means within the chamber for breaking up the chlorine and effecting mixing thereof with the water during the simultaneous passage of the water and chlorine therethrough, and water and air controlled chlorine trap means compensating for the fluctuations in flow of chlorine to the mixing chamber, whereby back pressure and retardation of the continuous water flow to the mixing chamber is substantially eliminated, trap means for collecting moisture and extraneous matter, and means for expeditiously cleaning said trap means without interfering with other parts of the device, that I designed the purefactor or chlorinating apparatus forming the subject matter of this invention.

In the illustrated embodiment characterizing this invention there is shown a transparent chlorinating or mixing apparatus A for effecting purification of water, sewage, bleaching materials, and the like, formed of glass or other transparent material impervious to the chemical action of chlorine or like substances, comprising a tubular water container 1 open at its upper end and formed adjacent thereto with an overflow pipe 2 extending below the bottom of the container. Mounted adjacent and in spaced relation with respect to said container is a tubular mixing chamber 3 closed at its ends and extending substantially half of its height above the upper end of said container 1, formed with a water intake tube 4 extending outwardly and downwardly in parallel spaced relation with respect thereto and within the water container 1 to a point adjacent the bottom thereof as at 5. Said mixing chamber 3 is also formed intermediate its upper end and the discharge end 6 of tube 4 with a similarly shaped overflow pipe 7 of greater diameter than said tube 4 extending outwardly and downwardly in parallelism with said tube 4 and within the water container 1 terminating as at 5.

A chlorine gas inlet pipe or conduit 8 extends through the top 9 of mixing chamber 3 terminating adjacent the bottom thereof as at 10, and formed integral with or suitably mounted thereon at a point spaced above the bottom 10 is a bell or dome like baffle or gas deflector screen 11 open at its lower end and with

its sides spaced from the sides of the chamber and formed in its upper end with a plurality of perforations 12 adapted to break up the gas and effect a thorough mixing with the water within the chamber as will hereinafter more fully appear. The upper end of conduit 8 exterior of said chamber is bent at right angles as at 13 and extends outwardly therefrom and at a point spaced from the chamber 3 is formed with a U-shaped trap 14 and with a solid glass bridging reinforcing section 15. The trap 14 is adapted to collect moisture and extraneous matter to prevent the same reaching the cut-off valve and is formed with an outlet nipple 16 closed by a stopper 17 of rubber or other suitable material of a noncorrosive nature.

The gas inlet conduit 8 adjacent one edge of trap 14 is formed with a moisture cleanout nipple 18 projecting in an opposite direction with respect to trap 14 and closed by a removable stopper or plug 17 suitably connected to the extremity of conduit 8 as at 19, a rubber hose or other suitable connection 20 forming a continuation of conduit 8 connected to a suitable control valve and source of chlorine, not shown. Intermediate the trap 14 and mixing chamber 3 conduit 8 is integrally formed with or has suitably connected thereto an elongated gas trap B comprising gas trap line 21 extending downwardly to a point below the lower end of mixing chamber 3 formed at its lower end with a U-shaped bend 22 and reduced return tube section 23 extending upwardly in spaced parallelism with respect to line 21 to a point above conduit 8 and terminating at its upper end, in the present instance, in a spherical water trap or container 24. A funnel like water and air intake 25 is mounted in the upper edge of container 24 with its lower end projecting within said container and in offset relation with respect to section 23, as and for a purpose hereinafter more fully appearing. The quantity of water adapted to fill said container is introduced therein which normally fills section 23 and gas trap line 21 to its normal water level as at 26. Therefore after the device has been initially started and the trap B filled with gas and water the gas normally flows across inlet opening 27 discharging into mixing chamber 3 as at 10. However any sudden increase in gas pressure is compensated for by forcing the water in said trap B out of section 21 and into container 24, and as the flow or pressure diminishes the water returns to its normal level as at 26. The position of inlet 25 prevents the water when forced into container 24 from being discharged therefrom directly through said air inlet, as will be clear without further description.

While the trap B and mixing chamber 3 may be integrally connected if desired, in order to effect a more compact form for the purposes of shipment, etc., conduit 8 may be severed and connected by a detachable connection 28 of rubber hose or other suitable noncorrosive material.

For the purposes of continuously or otherwise directing a stream of water through the device, a water inlet 29 is provided, connected to a suitable control valve and source of water supply, not shown, and terminating at a point adjacent the upper end of the water container 1 as at 30, and in order to effect a discharge of the chlorinated or suitably treated water or other fluid from the device, said mixing chamber is formed with a discharge conduit or vacuum line 31 communicating with the mixing chamber at a point opposite the upper end of the water container 1 as at 31' and suitably connected to an extension conduit 32, similar to connection 20, with its discharge end connected to a pump or emptying into a suitable container or reservoir, not shown.

In order that extraneous matter accumulating in mixing chamber 3 may be trapped, extension trap 33 is formed at the lower end of said chamber and closed by a removable stopper or plug 17, as heretofore described. It will also be noted that 34 designates the normal water level of mixing chamber 3, and the portion of chamber 3 above 34 constitutes a vacuum or overflow head 35.

It is to be understood that the chlorine container from which the supply to the device is obtained is preferably buried in the ground so as to render the gas substantially unaffected by temperature fluctuations thereby maintaining a substantially uniform gas pressure and flow to the device.

Although the operation would seem to be clear from the above description, it might be well to further state that when the gas and water control valves are open, to initially start the device to operating it is but necessary to close the lower end of overflow pipe 2, with the thumb for instance, whereupon the water flowing from inlet 29 will fill container 1 causing the same to flow through pipe 8 into the mixing chamber 3 and initially start the siphoning action. The thumb may then be removed, permitting the water in container 1 to overflow through pipe 2 and assume its normal level as at 36, whereupon the device will continue to operate as long as desired. Simultaneous with the flow of water into mixing container 3, gas flows into said mixing chamber discharging at the lower end of conduit 8 as at 10, mingling with the water and bubbling upward around and through baffle 11, and is further broken up and mixed with the water by screen openings 12, the chlorinated mixture being discharged from said mixing chamber through outlet opening 31' and outlet pipe or conduit 31 to a suitable receiving reservoir or pump, not shown. The fluctuations in gas pressure are controlled by the safety or stabilizing trap B as heretofore explained. It will also be observed that if by reason of undue gas pressure or water supply, chamber 3 becomes filled above the outlet 31', such excess contents will be discharged into container 1 through overflow outlet 7, it being apparent that the device is automatically self adjusting or controlled to maintain the operation substantially constant irrespective of fluctuations in either gas or water flow through the device, as will be clear without further discussion.

It will be noted that owing to its light weight and compact form, the device may be expeditiously mounted in connection with and supported by the gas intake and chlorinated water outlet conduits, or it may be additionally supported as desired.

It is therefore apparent that I have designed a unique, transparent, self adjusting chlorinating device, without movable parts to become damaged through usage, simple in design, compact in form, substantially indestructible, yet manufacturable at a minimum of cost and efficient for the purposes intended.

Although in practice I have found that the form of my invention illustrated in the accompanying drawing and referred to in the above description as the preferred embodiment, is the most efficient and practical, yet realizing the conditions concurrent with the adoption of my invention will necessarily vary, I desire to empha-

size that various minor changes in details of construction, proportion and arrangement of parts may be resorted to within the scope of the appended claims without departing from or sacrificing any of the principles of this invention.

It is to be understood that while I have referred to the connection 28 and stoppers 17 as being formed of rubber, they may be formed of glass or other suitable non-corrosive material, and the container 1 may be integrally connected with the mixing chamber or not according to the exigencies of the particular requirements. Also the device may be cast as an integral unitary structure if desired.

Having thus described my invention, what I desire protected by Letters Patent is as set forth in the following claims:

1. A transparent non-corrosive chlorinating device comprising a fluid container, a mixing chamber having a siphon connection with the container for delivering fluid to the chamber, overflow means communicating with the chamber and container for returning the fluid to the container when it reaches a predetermined level in said chamber, conduit means for delivering chlorine gas to said chamber adjacent the bottom thereof, baffle means in said chamber, and means for normally maintaining a predetermined fluid level in said container.

2. A transparent non-corrosive device for treating a fluid with a purifying substance comprising a fluid container, a mixing chamber structure having an inlet siphon and outlet overflow connections with said container, means for directing the purifying substance within said mixing chamber, means for directing the fluid mixture from said chamber, and means associated with the container for initially starting the siphoning action, whereby fluid is delivered into said mixing chamber and operation of the device effected.

3. A transparent non-corrosive device for treating a fluid with a purifying agent comprising a fluid container, a mixing chamber structure adjacent said container having siphon inlet and overflow connections with said container, means for directing the purifying agent within and adjacent the bottom of said chamber, baffle means mounted within said chamber, and means connected to said container for establishing the normal fluid level therein, and additionally operable to start the siphoning action, whereby the fluid is caused to flow into said mixing chamber and operation of the device effected.

4. A non-corrosive device or apparatus for treating a fluid with a purifying agent comprising a fluid container, a mixing chamber structure having a siphon connection with the container for delivering fluid to the chamber, conduit means for directing the purifying agent to said mixing chamber, and compensating means communicating with said conduit means, said compensating means being responsive to pressure fluctuations in the flow of the purifying agent to the mixing chamber, whereby substantial uniform operation of the device is effected.

5. A transparent non-corrosive apparatus for treating a fluid with a purifying substance comprising a fluid container, a mixing chamber structure having a siphon connection with the container for delivering fluid to the chamber, conduit means for the purifying substance connected to the chamber, and fluid controlled trap means connected to said conduit, said means being responsive to pressure fluctuations in the flow of said substance to the mixing chamber, whereby substantial uniform operation of the device is effected.

6. A transparent non-corrosive device for treating a fluid with a purifying agent such as chlorine comprising a fluid container, a mixing chamber having a siphon connection with the container, chlorine conduit means connected to the mixing chamber, means mounted in the chamber for breaking up the chlorine, and compensating means connected with said chlorine conduit for maintaining the mixing operation substantially constant irrespective of fluctuations in the chlorine flow to the mixing chamber, and overflow means connected to the fluid container and operable to start the siphoning action of said siphon.

7. A transparent non-corrosive mixing device for treating water with chlorine comprising a water container, a mixing chamber, the lower portion of said chamber adapted to normally contain water and constituting the mixing section and the upper portion normally constituting a vacuum section, siphon means communicating with the vacuum section and extending within the water container, conduit means connected to said chamber for delivering chlorine to said mixing section, and means in connection with the water container for initially starting the siphoning action of said siphon.

8. A transparent non-corrosive device for treating a fluid with a purifying agent comprising a fluid container, a mixing chamber having a siphon connection with the container for delivering fluid to the chamber, conduit means for said agent connected to the chamber, moisture collecting traps connected to said chamber and said conduit, clean out means for said traps, and fluid controlled trap means connected to said conduit, said means being responsive to pressure fluctuations in the flow of said agent to the mixing chamber, whereby substantial uniform operation of the device is effected.

DUDLEY J. LAMBERT.