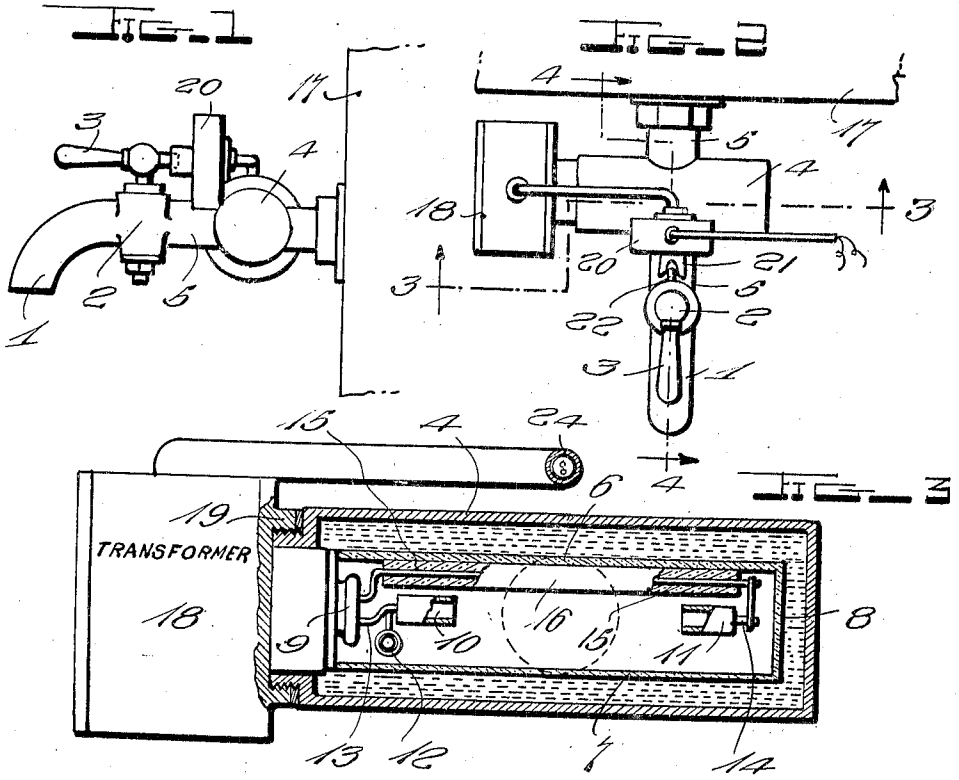
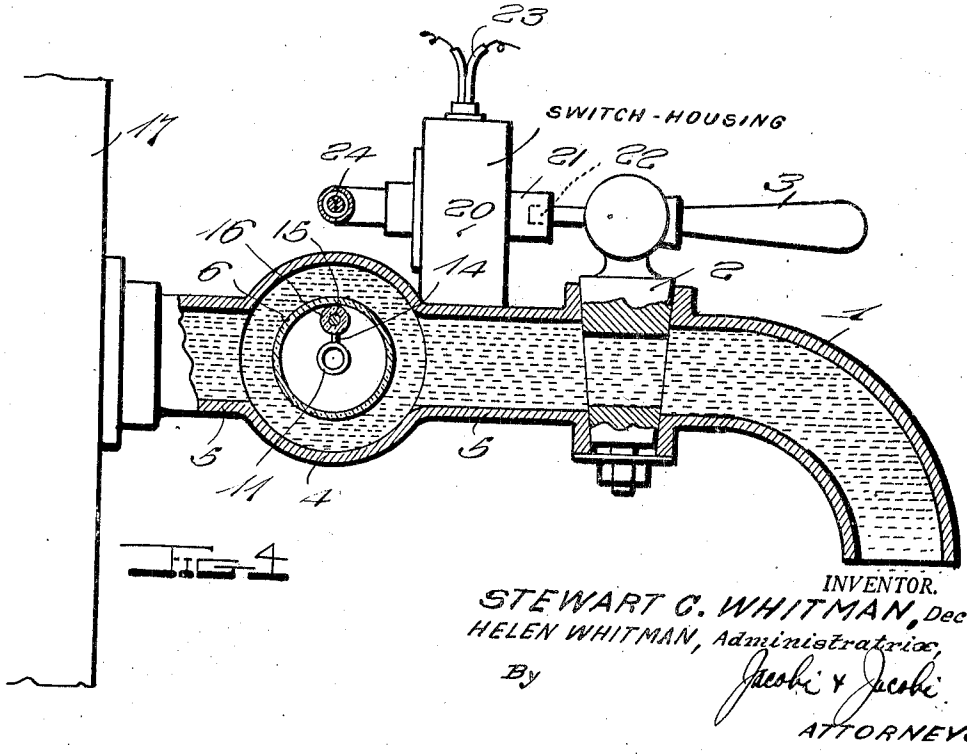
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APPARATUS FOR IRRADIATING LIQUIDS

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APPARATUS FOR IRRADIATING LIQUIDS

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6 Claims. (Cl. 250—45)

This application is a division of an application filed April 4, 1941, Serial No. 386,936, by the said Stewart C. Whitman, deceased.

This invention relates to an apparatus for irradiating liquids, and particularly to an apparatus for irradiating flowing liquids conducted from a source of supply to a suitable point of discharge for storage in receptacles or for immediate use. More particularly the invention relates to an apparatus for dispensing beverages or other liquids and subjecting the same for a suitable period to the sterilizing action of ultraviolet rays as discharged or dispensed.

One object of the invention is to provide a novel construction of apparatus whereby liquids, such as beer, wines or other malt, spirituous or viscous liquids, milk, water or liquids of any kind, may be quickly and economically irradiated.

A further object of the invention is to provide an apparatus for sterilizing beer or other beverages while being dispensed through a discharge faucet in such manner as to enable the operation to be carried out at low cost and without imparting an objectionable taste or odor to the liquid.

A still further object of the invention is to provide means whereby the sterilizer is rendered active when the faucet is opened and rendered inactive when the faucet is closed to secure economy of operation and prevent over exposure of the liquid to the ultraviolet radiation.

With these and other objects in view, which will appear in the course of the subjoined description, the invention consists of the novel features of construction, combination and arrangement of parts as hereinafter described and as illustrated in the accompanying drawing, showing an exemplificative type of apparatus embodying the invention and in which—

Fig. 1 is a view in side elevation of a dispensing and sterilizing apparatus in which water, beer or other liquid is sterilized as discharged through a faucet.

Fig. 2 is a top plan view of the same.

Fig. 3 is a vertical transverse section on line 3—3 of Fig. 2.

Fig. 4 is a vertical longitudinal section on line 4—4 of Fig. 2.

Referring now more particularly to the drawing, 1 designates a faucet provided with the usual valve plug 2 having an operating handle 3. A relatively long irradiating chamber 4 is disposed at the back of the faucet in a supply conductor 5, which preferably forms an integral part of the faucet. This chamber extends longitudinally at right angles to the faucet 1 and conductor 5 and encloses an ultraviolet tube 6 which is positioned substantially horizontally and axially within the chamber. This tube comprises an elongated body portion or envelope 7 integrally closed at one end 8 and sealed at its opposite end by a screw base 9. Electrodes 10 and 11 of crater type are disposed within the tube at the ends thereof, and conveniently attached to one of the electrodes is a suitable small container 12 containing a drop of mercury for furnishing the necessary mercury vapor for operation. Leads 13 and 14 connect electrodes 10 and 11 to the screw base. In the form of tube shown having the respective electrodes at opposite ends of an elongated tube, it is necessary to employ a long conductor 15 forming a continuation of the lead 14 and extending substantially the full length of the tube for attachment to electrode 11. In order to avoid the discharge forming at undesired points on conductor 15, instead of on electrode 11, it is desirable that conductor 15 be enclosed in an insulating glass tube or glass beading 16. The form and arrangement of the electrodes is such that the discharge will be distributed throughout the full area of the enevelope to the interior of the chamber 4.

While a tube of the type described is preferably used, and as herein shown is an effective type of the tube for the purpose, any other suitable form and type of tube may be used.

The outer wall of the irradiating chamber is substantially cylindrical and coaxial with the ultraviolet tube, thereby forming between them an annular channel through which water or other liquid from a cabinet or tank 17 or other source of supply, with which the pipe 5 is connected, flows in intimate contact with the wall or envelope of the ultraviolet tube to the faucet 1. A transformer 18 is provided for furnishing electric energy at suitable voltage for operating the ultraviolet discharge tube. This transformer may be detachably connected with one of the ends of the chamber 4, as indicated at 19, to form a closure therefor, and this transformer is provided with a suitable form of socket to receive the screw end or plug 9 of the ultraviolet tube, whereby when the tube and transformer are connected the tube may be properly coupled to the transformer to receive electric energy therefrom. Positioned in rear of the faucet and suitably supported by or from the conductor 5, is a switch unit 20 for controlling the supply of electric en-

ergy from the transformer to the tube, and which may most conveniently be placed in the primary circuit of the transformer. The control switch unit 20 is provided with an actuating cam 21 projecting outside of the unit housing and adapted for engagement with a cam engaging pin 22 carried by the plug of the faucet or carried by and projecting rearwardly from the faucet handle 3. The cam and switch unit are so arranged that when the valve plug 2 is positioned for shutting off the flow of liquid to the faucet, the switch is in disconnected position, but when the valve plug 2 is turned by handle 3 to permit the flow of liquid, the switch is closed and energy is supplied to energize the ultraviolet discharge tube. Leads 23 extending from switch unit 20 supply energy from a convenient commercial source to the switch unit, and leads 24 extending between the switch unit and transformer supply current to the latter.

In practice the ultraviolet tube may operate at either high or low voltage, and this tube may conveniently be one in which the tube envelope extends continuously in parallel or concentric relation to the wall of the chamber 4 so as to make the liquid flow passage of uniform width or depth at all points about the tube and between the same and the chamber. By this construction and relative arrangement of the tube and chamber walls an extremely simple construction of irradiating device may be produced and which provides for a flow of a comparatively thin body of water or other liquid in intimate contact with a relatively large area of ultraviolet irradiating surface of the tube before its delivery to the faucet 1 and its discharge through the faucet, and, since the tube consumes energy only during the time that the liquid is flowing, the operating cost is low. This provision for energizing the ultraviolet discharge only when the liquid is flowing through the faucet, eliminates any tendency toward imparting a musty or other undesirable taste to the liquid or of any objectionable odor being imparted to the liquid by being exposed for any extended period to the ultraviolet radiation.

From the foregoing description, taken in connection with the drawing, the construction and mode of operation of the apparatus will be readily understood and it will be seen that the invention provides an apparatus for irradiating and dispensing liquids which is simple of construction, efficient in operation and embodies the other desirable advantages set forth. While the construction disclosed for purpose of exemplification is preferred, it will, of course, be understood that changes in the form, arrangement and proportion of the parts may be made within the scope of the appended claims, without departing from the spirit or sacrificing any of the advantages of the invention.

What is claimed as new and patentable is:

1. In a liquid irradiating device, a liquid supply pipe, a casing disposed horizontally and at right angles to the pipe, said casing being normally open at one end and connected at one side thereof intermediate of its length to the pipe, a discharge faucet connected to the opposite side of the casing at a point intermediate of its length, an ultraviolet discharge tube disposed coaxially within the casing and having electrodes at its opposite ends, conductors connected to the respective electrodes and having terminals disposed at the end of the tube adjacent the normally open end of the casing, a connection plug coupled to said conductors, a transformer coupled to and closing the normally open end of the casing, said transformer having a conducting socket receiving said plug, and means operating automatically on the opening and closing movements of the faucet for respectively connecting the transformer with and disconnecting it from a source of electric current.

2. An apparatus for irradiating liquids by means of ultraviolet rays comprising a chamber through which the liquid flows, the chamber being normally open at one end, an inlet pipe leading to the chamber, an outlet pipe leading from the chamber, an ultraviolet tube in the chamber having electrodes provided with terminals, a transformer at the open end of the chamber having means associated therewith for closing the open end of the chamber and connecting the transformer with the terminals of the electrodes, a switch for connecting the transformer with or disconnecting it from a source of current supply, a rotary valve in the outlet pipe movable in opposite directions to open and closed positions, an operating handle connected to the valve, and a direct motion transmitting connection between the valve and the switch including a member carried by and movable with the valve for closing the switch when the handle is turned to open the valve and for opening the switch when the handle is turned to close the valve.

3. An apparatus for irradiating liquids by means of ultraviolet rays comprising a chamber through which the liquid flows, an inlet pipe leading to the chamber, an outlet pipe leading from the chamber, at the opposite side thereof from the inlet pipe an ultraviolet tube in the chamber extending across spaced between the pipes in transverse relation to the pipes and having electrodes spaced from each other a distance disposing them at opposite sides of the pipes and provided with terminals, a switch for connecting the electrode terminals with or disconnecting them from a source of current supply said switch being mounted upon the outlet pipe in front of said chamber, a rotary valve in the outlet pipe having a handle movable in opposite directions to open and close the valve, and operating projection extending from the handle of said switch and an operating projection on the valve and engaging the operative projection of the switch for closing the switch when the handle is turned to open the valve and for opening the switch when the handle is turned to close the valve.

4. An apparatus for irradiating liquids by means of ultraviolet rays comprising a chamber through which the liquid flows, an inlet pipe leading to the chamber at one side thereof, an outlet pipe leading from the chamber at the opposite side of the chamber, an ultraviolet tube in the chamber having electrodes spaced from each other a distance disposing them at opposite sides of the inlet and the outlet and provided with terminals, a switch for connecting the electrode terminals with or disconnecting them from a source of current supply disposed externally of the casing, a rotary valve in the outlet pipe movable in opposite directions to open and closed positions, said valve being positioned between the casing and said valve, an operating handle connected to the valve, and a direct motion transmitting connection between the switch and valve comprising a cam projecting from the switch towards the valve and a pin projecting from the valve towards the switch and engaging the cam to operate the switch, said pin moving with the valve for closing the switch when the

handle is turned to open the valve and for opening the switch when the handle is turned to close the valve.

5. In a liquid irradiating device, a liquid supply pipe, a casing disposed at right angles to the pipe, said casing being normally open at one end and connected at one side thereof intermediate of its length to the pipe, a discharge faucet connected to the opposite side of the casing at a point intermediate of its length, an ultraviolet discharge tube disposed coaxially within the casing and having electrodes therein, conductors connected to the respective electrodes and having terminals disposed at the end of the tube adjacent the normally open end of the casing, a detachable closure for the normally open end of the casing, a transformer carried by the closure, means operative on the attachment of the closure to and its detachment from the casing for respectively connecting the transformer with and disconnecting it from the electrode terminals, and means operated automatically by and on the opening and closing movements of the faucet for respectively connecting the transformer with and disconnecting it from a source of electric current.

6. In a liquid irradiating device, a liquid supply pipe, a casing disposed at right angles to the pipe, said casing being normally open at one end and connected at one side thereof intermediate of its length to the pipe, a discharge faucet connected to the opposite side of the casing at a point intermediate of its length, an ultraviolet discharge tube disposed coaxially within the casing and having electrodes at its opposite ends, conductors connected to the respective electrodes and having terminals disposed at the end of the tube adjacent the normally open end of the casing, a detachable closure for the normally open end of the casing, a transformer carried by the closure, means operative on the attachment of the closure to and its detachment from the casing for respectively connecting the transformer with and disconnecting it from the terminals of the conductors, and means operating automatically by and on the opening and closing movements of the faucet for respectively connecting the transformer with and disconnecting it from a source of electric current.

HELEN WHITMAN,
Administratrix of the Estate of Stewart C. Whitman, Deceased.