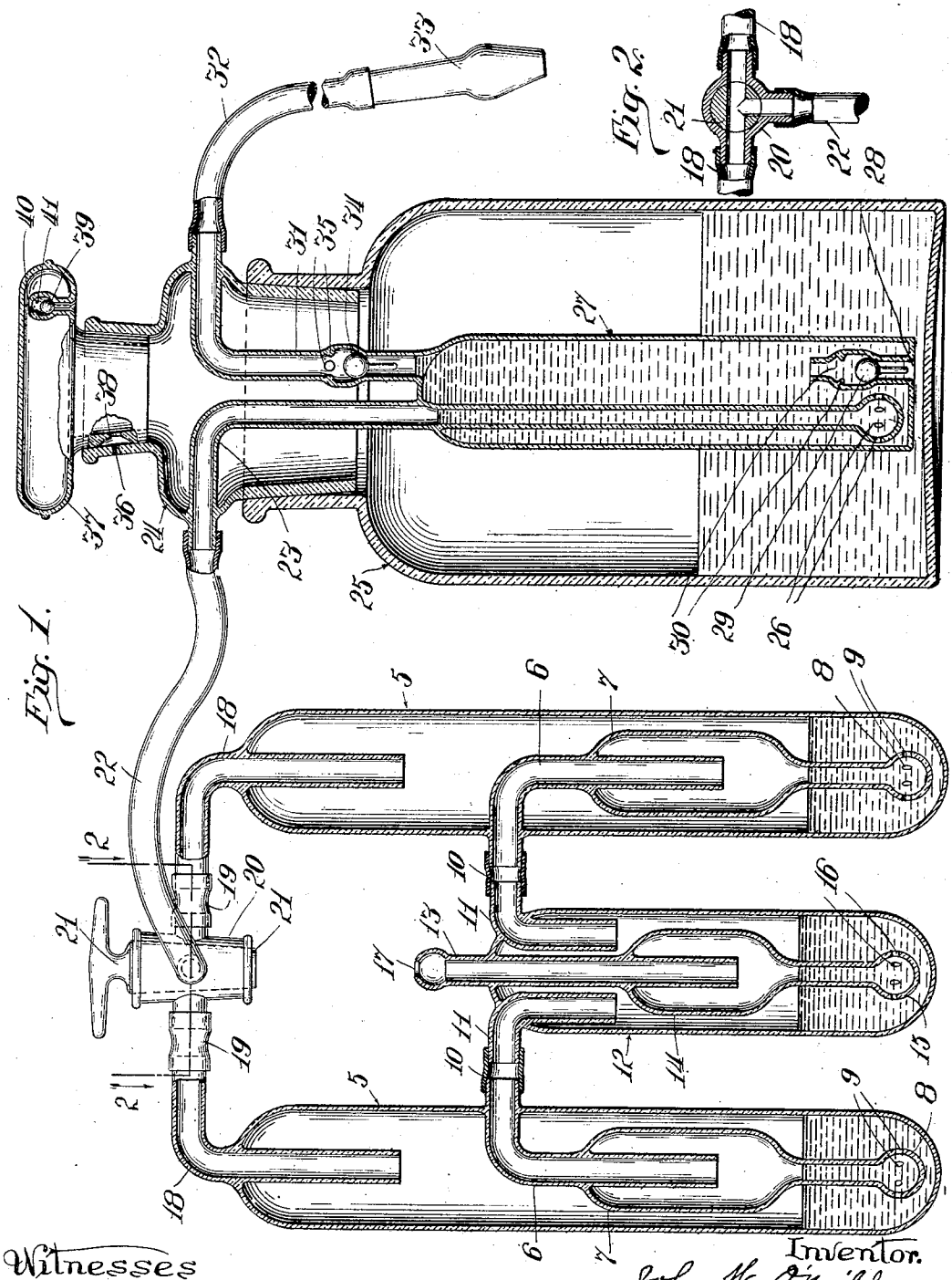
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RADIUM EMANATOR

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RADIUM EMANATOR

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My invention relates to means for administering radium emanations consisting of a fluid media of water impregnated with the radium gas; the invention having for its object the provision of a device which will permit a greater percentage of radium emanations or radium gas to be administered or obtained with each withdrawal of the impregnated fluid than is the case with devices or methods as at present employed; that is to say the device enables more uniform quantities of the radium emanations to be obtained by the user during each withdrawal action.

The invention also has for its object the provision of an apparatus wherein the radium element holding portions are non-emptiable; the accidental introduction of water or fluid into the radium element holding portions made impossible. On the other hand, escape of the radium emanations from the fluid holding portion of the apparatus while the latter is being recharged with fluid is made impossible; the recharging of the fluid or water holding portion being permissible without in any way interfering with or disturbing the radium element holding portion and the various connections between the respective parts of the apparatus.

The objects and advantages of my invention will all be more readily comprehended from the following detailed description of the accompanying drawings, wherein:

Figure 1 is a sectional elevation of my improved radium emanator shown assembled and in condition for use; a portion of the withdrawal tube being broken away.

Figure 2 is a detail sectional view of the control cock or valve; the view being taken substantially on the line 2—2 of Figure 1.

My invention relates to an apparatus or device especially intended for the administration of radium emanations in conjunction with a given quantity of pure water or other media; a device wherein the air, before entering the radium element holding receptacle or receptacles, is passed through a suitable washing and purifying solution in advance of the resultant radium emanations passing to and entering the water or other media holding portion of the device, namely the portion from which withdrawal is made by the user.

In the specific exemplification of the invention, the device is shown as preferably constructed of glass and consisting of the desired number of radium element holding members shown at 5, 5. These members are preferably shown as more or less cylindrical in form and identical in construction. It will be understood, however, that any desired number of radium element holding receptacles may be employed. These receptacles are shown arranged in spaced relation and each provided with an air-admitting tube 6 preferably shown extending through the opposing side walls of the two receptacles in air tight or integral relation therewith so as to prevent escape of the emanations or ingress of air other than the air which is intended to be introduced through the tubes 6. The ends of the tubes within the receptacles 5 are each shown provided with an enlarged portion 7, preferably integral with the tubes 6, at a point above the inner end. These enlarged portions 7 are shown preferably terminating in the closed lower ends 8 provided with a suitable number of perforations 9. The ends 8 are in close proximity to the bottoms of the receptacles and are therefore located below the normal level of the radium element in the receptacles 5. With my improved construction shown, it is evident that in the event of upsetting or uptilting the apparatus, the portion of the radium element which may pass through the perforations 9 into the enlargement 7, will be comparatively small and therefore less than the capacity of enlargement 7 above the lower end of tube 6. With the tube 6 extending a considerable distance beneath the top of the enlarged portion 7, it is therefore apparent that accidental discharge of the radium element from the receptacles 5 when the latter become inverted is impossible.

The outer ends of the tubes 6 are suitably connected at 10 to the outer ends of tubes 11, 11 which latter extend through the top of a third receptacle 12; the tubes 11 extending

downward in the receptacle a predetermined extent, preferably to at least a quarter of the length of the receptacle 12. The receptacle 12 is intended to receive an alkali or other suitable solution for purifying and washing the air which is taken into the apparatus by means of the air tube 13 shown disposed through the top of the receptacle 12. The inner end of tube 13 is also provided with an enlargement 14 preferably integral with the tube 13 at a point above the inner lower end; the enlargement 14, like enlargements 7, 7 in the other receptacles preferably having an attenuated portion or lower stem which terminates in the closed bulbular portion 15 provided with a suitable number of perforations or ports 16 in close proximity to the bottom of the receptacle 12. With this construction, like with the receptacles 5, 5; it is apparent that the washing solution in receptacle 12 cannot be entirely accidentally discharged therefrom when the apparatus is titled; the upper end of enlargement 14 trapping that portion of the solution which might enter through ports 16 if the apparatus is titled. The air is admitted through the port 17 in the upper end of tube 13 and made to pass down through the ports 16 and thence through the washing solution in receptacle 12 before it can be withdrawn through tubes 11, 11 and into the radium element holding receptacles 5, 5.

The upper end of each receptacle 5 is shown provided with an outlet tube 18 preferably formed integral with the receptacle and extending down into the tube to a predetermined extent. The outer ends of the two tubes 18 are suitably connected at 19, 19 with the housing 20 of a three-way cock or valve 21; the passages in the cock being more clearly shown in Figure 2, with one of the passages communicating with the tube 22. The other end of tube 22 is connected with the outer end of a tube 23 shown disposed through the stopper member 24 inserted in the neck of the fluid holding receptacle 25. The tube 23 extends down into close proximity with the bottom of the receptacle 25 and has a closed bulbular end provided with suitable perforations or ports as at 26. The portion of tube 23 within receptacle 25 is surrounded by a housing or elongated enclosure 27 preferably formed integral therewith and provided with a closed bottom having a port 28. The port is shown provided with a suitable check valve 29 which is adapted to prevent discharge of fluid from the housing or enclosure 27, while on the other hand permitting inflow of fluid during the withdrawal periods. The upper inner end of the check-valve housing is shown provided with small points or burrs at 30 which will engage the valve 29 and prevent seating in the upper end of the valve-housing during the withdrawal or siphoning periods.

The upper end of the housing or enclosure 27 is provided with a withdrawal tube 31, shown formed integral therewith; and this tube 31 extends upwardly and thence laterally and out through the side of the stopper member 24, with which the tube 31 is also preferably formed integral. The housing or enclosure 27 is therefore supported and maintained in proper position by the tubes 23 and 31. The outer end of tube 31 is shown provided with a suitable flexible tube 32 having a suitable mouthpiece 33, which enables the user, by suction, to withdraw a prescribed quantity of fluid and radium emanation from container 25, by way of the enclosure or housing 27.

The tube 31, in its vertically disposed portion within container or receptacle 25, is provided with an enlargement to receive a check-valve 34, which is normally seated at the lower end of the enlargement and prevents improper escape of the emanations while at the same time permitting withdrawal, because seating of the valve 34 at the upper end of the enlargement is prevented by the small protrusions 35.

In order to prevent a vacuum being formed in the receptacle 25, I show the stopper member 24 provided with a small port 36, in the upper neck portion which receives the second stopper or closure member 37, which, like the member 24 is also preferably glass and made hollow and provided with an enlarged rim portion as shown. The stopper or closure 37 in the depending or body portion is provided with an opening 38, adapted to be brought into register with port 36 when stopper 37 is rotated to proper position. With this construction it is apparent that a minute quantity of air may be admitted into container or receptacle 25 if occasion requires. The stopper 37 (which is preferably hollow as stated) has its rim portion also provided with a small check-valve 39 normally seated against ingress of air. The valve-housing is shown with a small opening 40 in its top and the upper end of the housing at a point removed from the opening 40 is shown provided with the small inwardly projecting points or burrs 41, which will prevent the upward seating of valve 39 in the event the pressure within the receptacle 25 is too greatly reduced. It is apparent that one air admitting opening in stopper 37 is sufficient; check-valve 39, however, will automatically function in the event that the user should fail to properly rotate stopper 37 to bring the ports 36 and 38 into register or through some inadvertence the ports have become clogged.

The receptacle 25 is preferably provided with the two stoppers or closure members

so as to permit easy filling of receptacle 25 by removing stopper 37 without removing or disturbing the connections between stopper 24 and the other parts of the apparatus.

In practice, it has been found that approximately one-fifth of the radium emanations are absorbed by the water or other fluid media in receptacle 25, while the other four-fifths would pass upward though the water or media and gather in the air space above. As the emanations are brought from tubes or members 5, 5 by means of the tube 22, controlled by cock 21, it is apparent that the emanations are all discharged by means of tube 23 in the lower closed end of the enclosure or housing 27 which is normally maintained full of water or other media as shown; the enclosure 27 filling up with water as shown during the charging period of receptacle 25 when the receptacle likewise is filled with water or other fluid media; because check-valve 29 will permit the inflow of the water and prevent outflow from enclosure 27. The radium emanations or radium gas will only flow into housing 27 when valve 21 has been opened and the user places tube 32 in his mouth and causes a suction action in housing 27 sufficient to induce the gas to flow from either receptacle 5 through tubes 22, 23 and be drawn into housing 27. During each withdrawal or siphoning period, a quantity of water or fluid media impregnated with radium gas equal to the quantity withdrawn by the user from housing 27, will flow from the receptacle through valve port 28 and into the housing 27, with the result that the latter will be kept substantially filled until the final withdrawal. It is therefore apparent that the radium emanations will be housed within enclosure 27 and escape prevented. As a result none of the emanations are lost and the user may obtain the prescribed quantity with each withdrawal or inhalation.

With the check-valve 34 located in the withdrawal tube 31, it is apparent that improper use of the apparatus is made impossible; that is to say, blowing through tube 31 if possible, would cause the water or other fluid media to pass through the radium emanation admitting tube and into the radium element holding receptacles. With the check-valve 34 in the tube, blowing through tube 31 as above stated is made impossible.

The three-way cock or valve 31, for convenience, may be provided with some suitable marking whereby the user may readily determine the position of the valve.

I have shown what I believe is a simple embodiment of my invention, which has been described in terms employed merely as terms of description and not as terms of limitation, as structural modifications may be made without departing from the spirit of my invention.

What I claim is:

1. In a radium emanator, the combination of a sealed radium element holding receptacle having an outlet tube, a fluid holding receptacle provided with an inlet tube connected with the outlet tube of the radium element holding receptacle, said inlet tube extending toward the bottom within the fluid holding receptacle, a closed housing, sealed about the inner end of said inlet tube, terminating adjacent to the bottom of said fluid holding receptacle and extending substantially throughout the height of said receptacle, a valved inlet in the bottom of said housing closable against outflow from the housing, and a withdrawal tube sealed to and leading from the upper end of said housing to the fluid holding receptacle exterior.

2. In apparatus of the character described, a closed fluid holding receptacle, an inlet tube extending downwardly within the receptacle toward the bottom thereof, an enclosure about the inner end of the inlet tube in sealed relation therewith and terminating adjacent to the bottom of the receptacle in a closed bottom, a valved inlet at the lower end of said enclosure adapted to admit fluid from the receptacle while preventing outflow from the enclosure into the receptacle, and a closable outlet tube leading from the upper end of said enclosure and to the fluid holding receptacle exterior.

3. In apparatus of the character described, a closed fluid holding receptacle, an inlet tube extending longitudinally within the receptacle toward the bottom thereof, an enclosure about the inner end of said tube disposed substantially throughout the length of said receptacle in sealed relation with said tube and provided with a closed bottom located adjacent to the bottom of the receptacle, a valved inlet adapted to permit flow from the receptacle into said enclosure while preventing reverse flow, an outlet tube leading from the upper end of said enclosure to the receptacle exterior, and self-closing means for admitting air into the upper end of said receptacle.

4. In apparatus of the character described, a fluid holding receptacle provided at top with removable closure means, an inlet tube extending downwardly into the receptacle from the upper end thereof and terminating in proximity to the bottom thereof, an elongated enclosure sealed to said inlet tube and disposed substantially throughout the length of the receptacle and terminating in a closed end adjacent to the bottom of the receptacle, a valved inlet in said enclosure for permitting flow of fluid from the receptacle while preventing reverse flow from the enclosure, an outlet tube leading from the

upper end of the enclosure to the receptacle exterior, a valve in said outlet tube for preventing ingress therethrough, and self-closing means for admitting air into the upper end of said receptacle.

5. A radium emanator, comprising a closed radium element holding receptacle provided at top with an outlet tube, an air washing receptacle having an air admitting tube formed to prevent outflow of the washing medium therethrough, a purified air tube leading from said last mentioned receptacle into the radium element holding receptacle, the end of said last mentioned tube within the radium element holding receptacle being formed to prevent outflow of the radium element therethrough, a fluid-holding receptacle provided with an inlet tube arranged in communication with the outlet tube of said radium element holding receptacle, the last mentioned tube extending lengthwise within the fluid holding receptacle toward the bottom thereof, an enclosure about the inner end of said last mentioned tube in sealed relation therewith and provided with a closed bottom adjacent to the bottom of the fluid holding receptacle bottom, a valved inlet in the bottom of said enclosures for permitting flow of the fluid into the enclosure while preventing reverse flow, an outlet tube leading from the upper end of said enclosure to the exterior of the fluid holding receptacle, closure means for the upper end of said fluid holding receptacle, and means in said closure means for controlling the pressure within said fluid holding receptacle.

6. In apparatus of the character described, closed radium element holding receptacles each provided at top with an outlet tube, an air washing receptacle having an air admitting tube and a purified air outlet tube communicating with the radium element holding receptacles, a fluid holding receptacle having an inlet tube extending toward the bottom thereof, controllable means for selectively establishing communication between the radium element holding receptacles and said fluid holding receptacle, an enclosure about the inner end of the lastmentioned inlet tube, an inlet in said enclosure provided with a valve operable by the pressure of the fluid in said fluid-holding receptacle whereby inflow of the fluid into said enclosure is permitted, said valve being seatable against flow from the enclosure in said receptacle, means whereby air may be admitted into the top of said fluid holding receptacle, and a withdrawal tube connected with the top of said enclosure, said tube being formed to prevent ingress therethrough.

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