

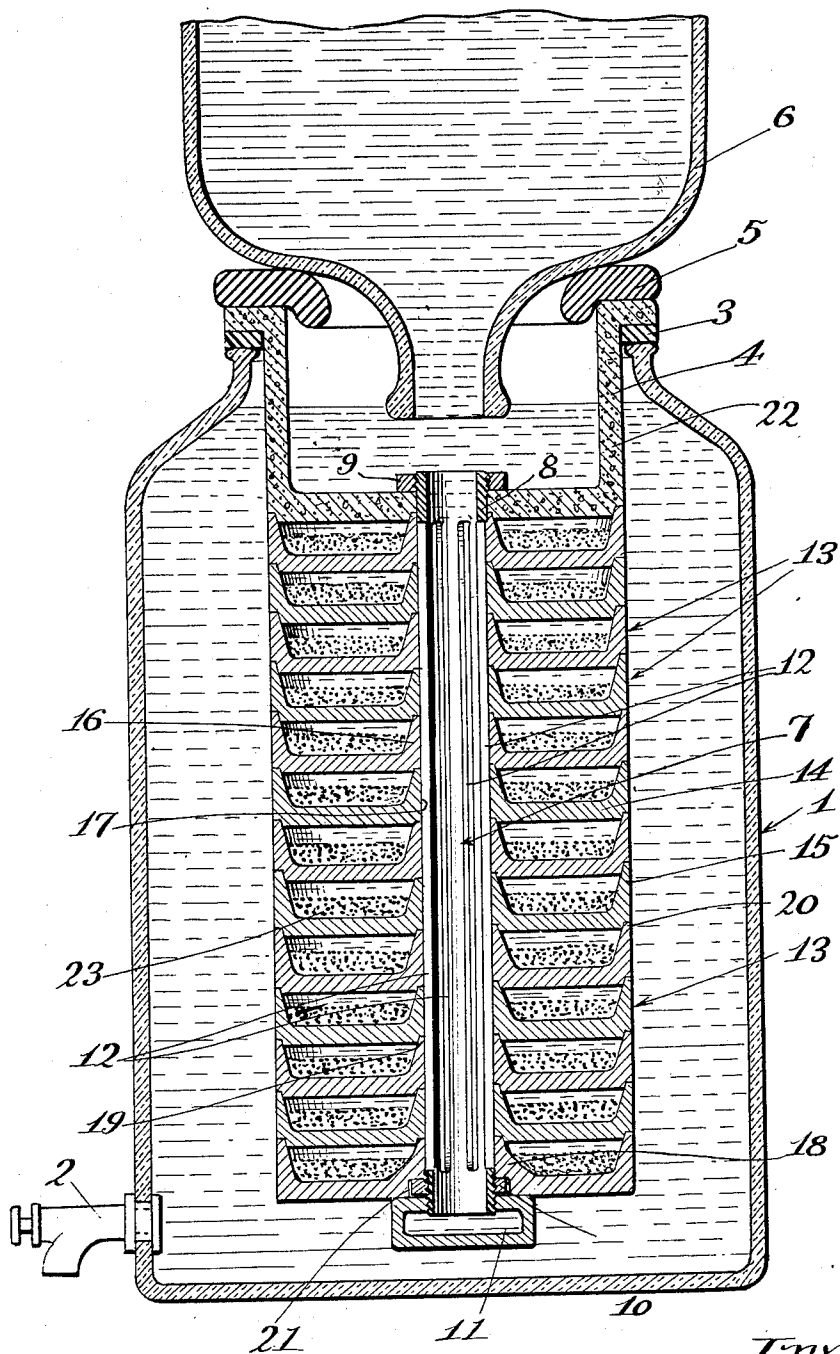
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RADIUM FILTER EMANATOR

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## UNITED STATES PATENT OFFICE

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## RADIUM FILTER EMANATOR

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My invention is a radium filter emanator in which water for drinking purposes or the like is charged with radium emanation.

My present invention is designed to highly charge the water such as may be required for professional purposes, in which the water having a certain specified number of maché units, is to be taken according to a physician's prescription.

The filter emanator may also be utilized as a general device for charging water with radium emanation for household use or the like, in which it may not be necessary to charge the water to as high an extent as for professional use.

When filters are formed using radioactive materials such as crushed or pulverized carnotite, pitch blende or other minerals containing radioactive substances, and the clay or the like is burnt to form a porous filter, the active principles are to a considerable extent lost. Uranium oxide is one of the active principles emitting radium emanation which is found in a number of the various natural ores and when this is heated with clay or the like to make a porous filter, a considerable extent is lost.

Among the various objects of my invention is to impregnate a porous filtering medium with radioactive material without burning same in the filter and to this end I utilize crushed ores containing radioactive material placed in suitable vessels so that the water when passing over and through such vessels will wash the fine powder or pulverized material into the pores of the filtering medium, thus preventing its being lost and be carried off in the water. In this manner the filtering medium may receive and hold a considerable part of the radioactive material without interfering with its filtering properties.

Another object of my invention is forming part of the filter by a burnt porous vessel or medium such as burnt clay, this being constructed with radioactive material incorporated therein and with radium salts in accordance with a formula I have found satisfactory.

My invention comprises both the structure of the filter and the method of impregnating

the material with the radioactive materials and in the method of charging the water with the radium emanation.

The structure of the filter comprises preferably a jar which may be mounted in a water receiving receptacle and depending from the jar I have a tube preferably made of hard rubber with longitudinal openings. This tube has a series of cups or the like placed thereon formed of porous filtering material in which the crushed ores having radioactive principles are placed. The lower end of the tube is preferably closed by a detachable container which receives the sediment or the like from the water being filtered. This water is preferably utilized from a bottle or the like inverted over the jar and the charged water receptacle.

My invention will be more readily understood with reference to the accompanying drawing; in which the numeral 1 indicates a receptacle for charged water. This may be made of glass or other suitable material and has a faucet 2 for drawing off the water. A gasket 3 formed of rubber or the equivalent is placed on the top of the receptacle 1 and a jar 4 is supported on the gasket. A second, preferably soft rubber ring 5 rests on the rim of the jar and forms a direct support for the bottle 6 containing water to be filtered and charged. As is seen from the illustration, the neck of the bottle dips to a considerable extent into the jar 4.

This jar may be made of a filtering medium such as a filter clay or of a non-filtering material such as porcelain or burnt clay and would preferably have radioactive materials incorporated therein as hereunder set forth.

The further structural details of my filter comprise a tube 7 preferably formed of hard rubber which is fitted in an opening 8 in the base of the jar 4 and the upper end secured by a nut 9 or the like also preferably formed of hard rubber. The lower end of the tube has a nut 10 preferably screw threaded thereon and a container 11 is also screwed or otherwise secured on the bottom of the tube. These parts if not made of hard rubber, will preferably be made of some material which

will not affect the water. The tube has a series of longitudinal slots or openings 12.

A series of cups 13 are stacked on the tube. Each of these cups has a base 14, an outer rim 15 and an inner rim 16, there being a central opening 17 through each of the cups through which the tube 7 extends. The lowermost cup is preferably made with a thickened inner rim as indicated by the numeral 18 to make it stronger. The outer and the inner rims have an inter-fitting engagement with the cup immediately above the base as indicated by the numerals 19 and 20. The lowermost cup has a socket 21 resting on the nut 10, the base also preferably resting on the receptacle 11 and thereby supporting the whole stack of cups.

The jar 4 is preferably made of a filtering material and of a composition having substantially the following ingredients represented by bulk:

	Per cent
Carnotite ore crushed to about 20 mesh-----	20 to 25
25 Sawdust-----	2
Pumice-stone crushed to about 20 mesh-----	3 to 5
Insoluble radium salts-----	0.1 to 0.3
Together with sodium silicate----	.01
30 Soda ash-----	.05

these latter ingredients acting as a flux and a binder. A suitable clay is utilized to make up the balance, such clay being of a character that it will burn properly in making a jar. The radium salts used should be the insoluble salts of which I may use all the salts which are of a reasonable price or any one or more of same.

The jar of filtering medium may be molded in any suitable manner known to pottery makers and burnt or fired in the ordinary manner. The pumice stone acts as a filtering material as well as having the slight radioactive materials. The sawdust chars and gives a more or less porous structure.

It is to be understood that I may use other minerals or ores having radioactive principles either in their natural state or concentrated and crushed, being incorporated in the filter.

In the drawing the various dots indicated by the numeral 22 in the jar 4 are intended to indicate the crushed ore and the insoluble radium salts. Each of the cups has a layer of crushed ore having radioactive principles such as carnotite, pitch blende or any other ore which may be sufficiently high grade. These may be utilized as crushed from the natural mineral or concentrated. Such layers are indicated by the numeral 23 and may if desired completely fill the cups or preferably be spaced below the bottom of the cup immediately above.

It is most desirable in building up the stack of cups that there be a water-tight joint

between the various cups and also between the uppermost cup and the jar 4, in order that the water, instead of seeping through the joints, will be forced through the porous parts of the cups.

The manner of using my radium filter emanator and its manner of functioning is substantially as follows:

Presuming the receptacle 1, the jar 4 and the cups are empty of water and a bottle is inserted as illustrated, the water will pour out of the bottle into the jar and flow down through the slots or openings in the tube and filter through the cups. The air will bubble up through the water. As the water rises to the neck of the bottle no more water will flow out of same. When water is drawn off a certain amount of air will leak in adjacent the ring 5 or the gasket 3, or it may bubble in through the faucet 2. It is desirable, however, not to have too free a communication with the outside air as the niton gas would escape to too great an extent. Air will be interchanged between the receptacle 1 and the jar 4 by filtering or passing through the body of the jar or it may pass through the cups into the tube and hence into the jar. Thus as water is removed from the jar the air bubbles will enter same.

The manner of impregnating the filter cups with the radioactive material is substantially as follows:

As above mentioned the radium ores and radium salts are crushed and some of the crushed material will naturally be very fine and of a pulverized nature. Should there be insufficient of the finely pulverized material, some of it may be specially ground or pulverized to pass a fine mesh. This material is to a certain extent carried by the water into the porous cups or filtering medium, in the action of the water passing through and the continued action and use of the jar tends to incorporate a considerable amount of the radioactive minerals or salts in the body of the filtering cups or other filtering mediums.

It will be apparent that the water passing downwardly from an upper cup to a lower cup when water is drawn out of the receptacle 1, will cause the radioactive materials to be incorporated in the base of the cups and the horizontal flow of the water will cause this material to be incorporated in the outer rim or the vertical wall of the cup.

It is obvious by the construction of my radium filter emanator that in the jar 4 a large surface is exposed to the water, giving out radio emanations. However, in the filter cups there is a much larger surface of the radioactive material exposed, both in bulk and by being incorporated in the porous filter material to the water, thus giving a high charge as represented in maché units in the water, in a comparatively short time.

For professional use of physicians or in

hospitals it may be desirable to utilize highly concentrated radioactive ores or insoluble radium salts in fairly large proportions so that the water will become rapidly charged with the radium emanation no matter if a considerable amount is being drawn off more or less continuously.

In order to clean my filter emanator it is only necessary to remove the jar 4 with the stacks of cups from the receptacle 1 to detach the container 11 which may have the sediment washed out and to clean the inside of the tube 7 by any suitable utensil. This tube it will be noted is of a material to which the slimes and sediment in the water do not tend to cling so that these will naturally descend into the receptacle 11, thereby preventing clogging of the filter with slimes and sediment in the natural water. A subsidiary object of my invention is to filter the water as thoroughly as possible as well as to charge same with radium emanation.

While I have described the radioactive material as being burnt into a filter jar or the like 4, it is to be understood that I may make any type of filtering medium in the same manner, or I may incorporate these materials into a non-filtering jar or surface, by glazing or suitably burning the material carrying the radioactive principles.

Moreover, although I have described the radioactive material as being placed loose in cups in order to impregnate the porous material with the pulverized radioactive material, it is to be understood that I may incorporate these fine powders in other filtering mediums in substantially the same way, by washing same into the filtering medium. This may be done before the device is constructed, or may take place in actual use.

It will be obvious that the various features of my invention may be considerably modified to make different types of filters and emanation units and for various different purposes. Such changes however, would be within the spirit of my invention as set forth in the description, drawing, and claims.

Having described my invention, what I claim is:

1. In a radium filter emanator, an annular cup-like porous vessel having a substantially horizontal base, a substantially vertical outer rim and vertical inner rim with a central opening therethrough at the inner rim, crushed radioactive material held in said vessel, and means to pass water through the inner rim into contact with the material and through the vessel.

2. In a radium filter emanator, a plurality of superposed cup-like vessels of porous filter material with the open side up, crushed radioactive material held in said vessels, and means to pass water in contact with the material and through the porous walls of said vessels.

3. In a radium filter emanator, a vertical tube having openings in the side, a plurality of cup-like porous vessels stacked on said tube, the tube passing through a central opening in each of the vessels, crushed radioactive material held in said vessels, means to pass water into the tube into contact with the radioactive material and through the porous vessels.

4. In a radium filter emanator, a substantially vertical tube having openings in its wall, a container for sediment at the lower end of the tube, a plurality of cup-like vessels of porous material forming a stack on said tube, crushed radioactive material in said vessels and means to pass water into the tube, into contact with the radioactive material and through the vessels.

5. In a radium filter emanator, a jar having an opening in the bottom, a tube extending downwardly therefrom having openings in its wall, a plurality of cup-like vessels forming a stack on said tube, crushed radioactive material in said vessels, and means to pass water into the jar and into the tube in contact with the radioactive material and through the vessels.

6. In a radium filter emanator as claimed in claim 5, a container secured to the lower end of the tube to receive sediment.

7. In a radium filter emanator as claimed in claim 5, the jar being porous and with radioactive material contained in the walls of said jar.

8. A radium filter emanator comprising in combination a receptacle for charged water, an outlet therefrom, a jar supported in said receptacle having an opening in its base, a tube having openings in its wall depending from the jar, a stack of cup-like vessels having central openings surrounding the tube, crushed radioactive material in said vessels, and means to flow water into said jar, into the tube in contact with the radioactive material and through the vessels into the receptacle.

9. A radium filter emanator as claimed in claim 8, having means on the lower end of the tube to support the stack of vessels, and a container to receive sediment or the like.

10. In a radium filter emanator an annular cup like porous vessel having inner and outer walls and a base, crushed radioactive material supported on the base and extending partly upwardly on the walls, and means to flow water through one of the walls of the vessel over and through the radioactive material and through the other wall.

11. In a radium filter emanator a plurality of annular cup like porous vessels, stacked one on top of the other with the open side up, each vessel having inner and outer walls and a base, radioactive material supported on the base of each vessel and extending partly upwardly on the sides of same, means

for flowing water through one of the sides of each vessel over and through the material on the base of each vessel, and outwardly through the other wall of each vessel.

<sup>5</sup> In testimony whereof I have signed my name to this specification.

JOHN C. WICHMANN.

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