June 15, 1965 J. R. MOORE 3,189,283

SPRAY HEAD

Filed Jan. 7, 1963

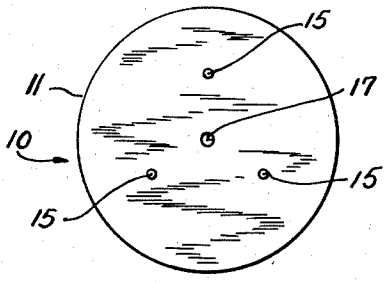


FIG. 1

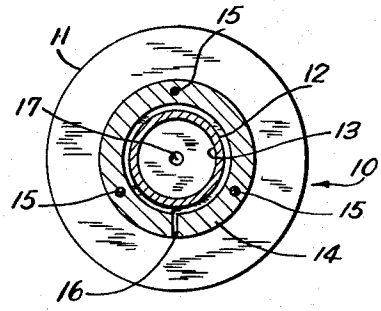


FIG. 2

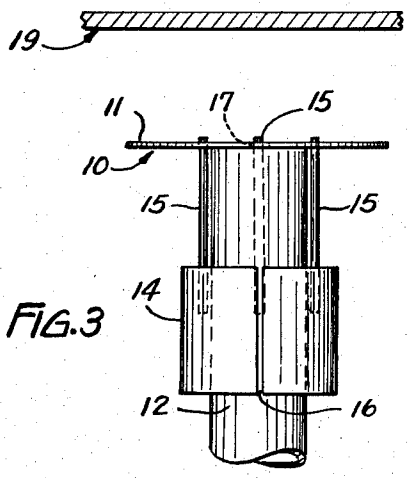


FIG. 3

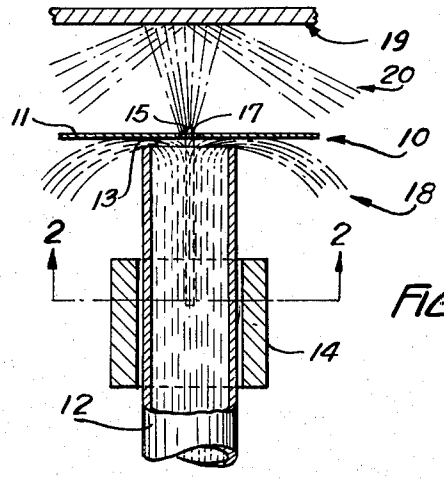


FIG. 4



FIG. 6



FIG. 8

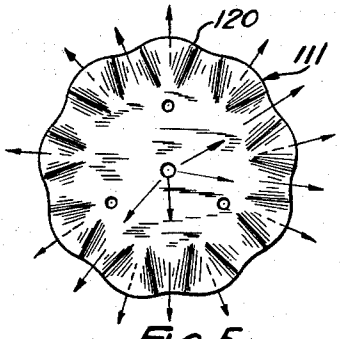


FIG. 5

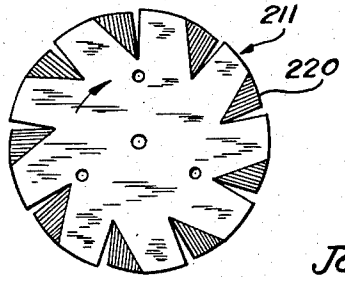


FIG. 7

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SPRAY HEAD

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The present invention relates to spray head devices and more particularly to a spray head device used in association with sewage disposal systems.

The principal object of the present invention is to provide a novel spray head device of an extremely simple and highly practical form for deflecting and distributing liquids, such as over and through sewage filter beds.

Another object of the invention is to provide a spray head device which is self-cleaning.

A further object of the invention is to provide a spray head device asociated with the open end of a flow pipe, comprising, in general, a liquid deflector member adapted for closing the flow pipe open end and being movable to open position in a direction parallel with respect to the pipe open end by flow pressure exerted within the pipe, and means connected to the liquid deflector member for biasing the deflector member to closed position and adapted for fitting over the flow pipe for relative movement thereto.

Other objects inherent in the nature and character of the device disclosed will be apparent to those skilled in the art from the drawings, and from the detailed description which follows.

In the accompanying drawings and forming a part of this specification:

FIG. 1 is a plan view of the deflector member of the novel spray head device;

FIG. 2 is a view in cross section taken along line 2—2 of FIG. 4;

FIG. 3 is an elevational view of the spray head device;

FIG. 4 is a cross sectional view of FIG. 3;

FIG. 5 is a plan view of a modified deflector member for the spray head device;

FIG. 6 is an elevational view of FIG. 5;

FIG. 7 is a plan view of another modified deflector member for the spray head device; and

FIG. 8 is an elevational view of FIG. 7.

The novel and improved spray head device which is the subject of present invention is designed primarily for use in a sewage disposal system, and is further designed with the intention of using it for distributing raw liquid sewage, such as over or through a filter bed. The filter bed may be a mass of discrete material such as gravel or wood slats, over which a gelatinous aerobic bacteria collects and which is generally known in the sewage disposal art as zoogloea. The zoogloea or aerobic bacteria require for sustenance oxygen and moisture, therefore it is conventional to place the filter in the system where it will be exposed in some suitable manner to the atmosphere or oxygen, and to distribute liquids, especially raw sewage liquids over or through filter beds, by spraying, so as to expose the liquids to the atmosphere for partial breakdown through oxygenation. The zoogloea or aerobic bacteria feed on the septical matter within the raw sewage and pass a relatively pure liquid therefrom into other stages where the liquid is subsequently treated, as by chemical means.

Unless the zoogloea or aerobic bacteria is directly contacted by the force of the spray distribution, there is a tendency for the filter bed to develop an excessively heavy growth in those areas not being hit by the spray. As a consequence, the continued growth fills up the spaces between the discrete material to such an extent as to cause "ponding" or flooding, thereby making it difficult if not impossible for the liquid to pass through the filter.

It is a purpose of the spray head device 10 to achieve an effective liquid contact over or through the filter bed. The spray head device includes a deflector plate or member 11 which is adapted to close the open end of a flow pipe 12 with which the device is associated. The flow pipe in turn is connected to a remote source of liquid (not shown) for conducting the liquid such as raw liquid sewage from a settlement tank, by predetermined pumping pressure.

The liquid deflector member 11 is maintained normally in closed position over the open end 13 of the flow pipe by a biasing means such as by the weighted collar 14 shown in FIGS. 2, 3 and 4. It should be understood that the scope of the invention is not necesarily limited to a weighted collar but may also encompass any other suitable structure which would serve to retain the deflector member in closed position over the open end of the flow pipe and which would permit the deflector member to move away from the flow pipe open end so that the member will at all times be evenly parallel with respect to the pipe open end 13 in order to maintain even distribution.

The weighted collar 14 is preferably connected to the deflector member 11 by a series of rods 15. The rods are fixed at one end within the collar and at the other end to the deflector member 11. The weighted collar is split, as shown at 16, so that it may be readily adjusted in the field during installation over and about the outside diameter of the flow pipe 12 and so that it will also be capable of free axial sliding movement relative to the flow pipe.

The deflector member 11 may be further provided with a centrally disposed aperture 17 for a purpose to be described.

In the operation of the novel spray head device 10, when pressure is being exerted within the flow pipe by the liquid sewage being pumped upwardly therethrough, the liquid pressure against the deflector member will cause the deflector member, and accordingly its biasing means or weighted collar 14, which is disposed about and over the flow pipe 12, to be moved or raised relative to the open end 13 of the flow pipe. The extent to which the deflector member is moved is determined by the amount of pressure employed and the weight of the collar; and the extent of the range of the spray distribution will be determined by the extent of the opening between the deflector member and the flow pipe open end. The resulting spray from the deflector member, as shown at 18 in FIG. 4, will be fan-like in character around the entire circumference of the member as it contacts the undersurface of the member and is deflected radially outwardly between the member and the flow pipe open end.

The spray head device may be employed in a type of sewage disposal system wherein the top of the filter bed compartment, as partially shown at 19, is closely spaced from the top of the deflector member; thus an additional stream of liquid may pass through a centrally disposed aperture 17 provided in the member. The stream will be deflected by the top 19 of the filter compartment, as shown at 20 in FIG. 4, for further breakdown of the liquid and distribution over the filter bed. Thus the novel spray head device is capable of a primary and secondary liquid distribution.

In FIG. 5 a modified version of the deflector member 111 is illustrated wherein that portion of the deflector member which contacts the open end of the flow pipe is flat in order to attain a substantial closing effect and the peripheral edges of the deflector member are scalloped. The scalloped peripheral edges 120 cause a spray pattern to be made different from that disclosed in FIGS. 1–4, the result being somewhat like a staggered or tiered spray planewise with respect to the top of a filter bed, not shown.

FIG. 7 discloses still another modification wherein the central portion of the deflector member 211 is also flat so as to attain a substantial closing effect with the open end of the flow pipe when in closed position. The peripheral edges of the deflector member are alternatively cut and bent downwardly as shown at 220, for still another and different spray pattern and are capable of causing the deflector member and its biasing structure to rotate gradually relative to the flow pipe over a period of time of operation. As a consequence, if there were any tendency for a filter bed to develop an excessively active bacteria growth in any areas not directly contacted by a direct blast of the spray, it would be substantially eliminated.

It is a further advantage of the invention that in the manner of construction of the novel spray device the deflector member is axially and parallelly movable with respect to the open end of the pipe that in the event any obstructive masses in the liquid sewage should occur within the flow pipe the pressure in the pipe being the same will cause the deflector member to rise higher than normally and thereby allow the obstructive mass to pass outwardly from the flow pipe.

Thus it may now be observed that the improved and novel spray head device of the present invention is self-cleaning; serves also as a closure structure for the end of a flow pipe; is adapted to provide for different types of spray distributions; and is also adapted to provide for lesser or greater distributions depending on the pressure being exerted through the flow pipe and the force of the biasing means.

Having described my invention, I claim:

1. In a spray head device associated with the open end of a liquid flow pipe,

a liquid deflector member adapted to fit flatly in closed position against and parallel to the open end of the flow pipe and adaptable to be axially movable away from the flow pipe open end to open positions,

and a weighted collar means annularly disposed about the flow pipe and including means connecting said collar means to said liquid deflector member, said collar means continuously biasing said liquid deflector member toward said closed position and being adapted to be axially slidable relative to said flow pipe so that said deflector member is movable by liquid flowing from the pipe in an axially parallel direction away from said open end to open positions determined by the force of the flow and counter biasing effect of the collar means to obtain an even distribution of liquid outwardly from between the flow pipe open end and the distributor member toward the periphery of the distributor member,

said periphery of the deflector member including additional means for deflecting the liquid in a tiered pattern beyond said periphery.

2. In a spray head device associated with the open end of a liquid flow pipe,

a liquid deflector member adapted to fit flatly in closed position against and parallel to the open end of the flow pipe and adaptable to be axially movable away from the flow pipe open end to open positions,

and a weighted collar means annularly disposed about the flow pipe and including means connecting said collar means to said liquid deflector member, said collar means further having a split along its length for adjustment of said collar means about said flow pipe and continuously biasing said liquid deflector member toward said closed position and being adapted to be axially slidable relative to said flow pipe so that said deflector member is movable by liquid flow from the pipe in an axially parallel direction away from said open end to open positions determined by the force of the flow and the combination of the counter biasing effect of and the adjustment of said collar means about the flow pipe to obtain an even distribution of liquid outwardly from between the flow pipe open end and the distributor member toward the periphery of the distributor member.

3. In a spray head associated with the open end of a liquid flow pipe,

a liquid deflector member adapted to fit flatly in closed position against and parallel to the open end of the flow pipe and adaptable to be axially movable away from the flow pipe open end to open positions,

and a weighted collar means annularly disposed about the flow pipe and including means connecting said collar means to said liquid deflector member, said collar means continuously biasing said liquid deflector member toward said closed position and being adapted to be axially slidable relative to said flow pipe so that said deflector member is movable by liquid flowing from the pipe in an axially parallel direction away from said open end to open positions determined by the force of the flow and counter biasing effect of the collar means to obtain an even distribution of liquid outwardly from between the flow pipe open end and the distributor member toward the periphery of the distributor member;

said periphery of the deflector member having additional means for deflecting the liquid in a tiered pattern beyond said periphery and including means for reacting against the liquid flow to provide rotation of said deflector member relative to the flow pipe open end.

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