United States Patent

Wertman

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[54] LIQUID SPRINKLING SYSTEM

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[52] **U.S. Cl.**.....**239/1,** 239/229, 239/242, 239/243

[51] **Int. Cl.**.....**B05b 17/00**

[58] **Field of Search**.....239/1, 229, 242, 243, 381, 239/DIG. 1

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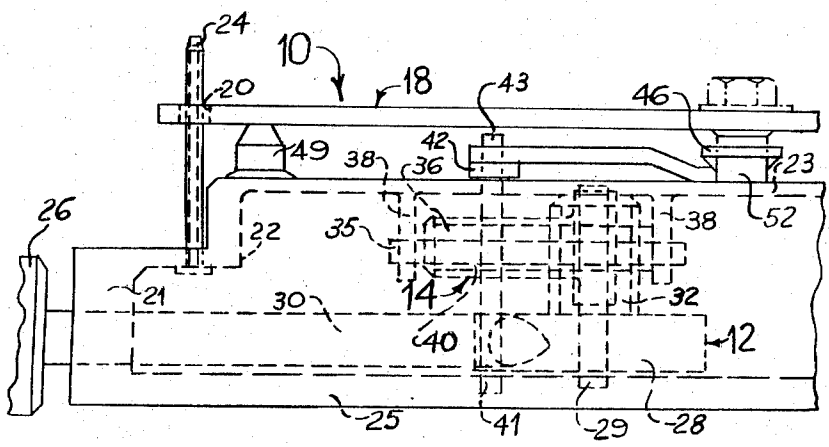
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[57] **ABSTRACT**

Improvements in liquid sprinkling systems are disclosed including means and method comprising passing liquid through a plurality of flexible tubings and for cyclicly moving said tubings in unison while liquid is passing therethrough to produce a predetermined liquid sprinkling pattern formed by continually moving liquid streams which evenly distribute the liquid thereover.

6 Claims, 5 Drawing Figures



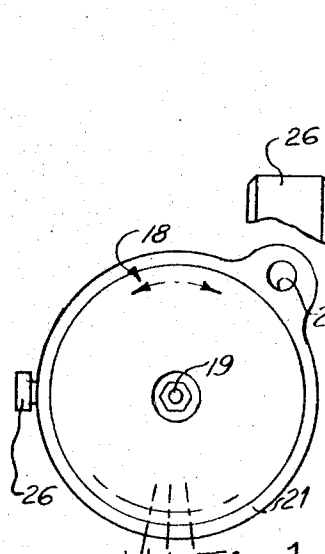


Fig. 1

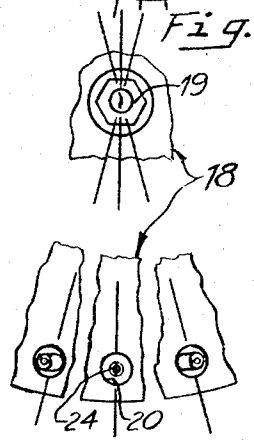


Fig 5

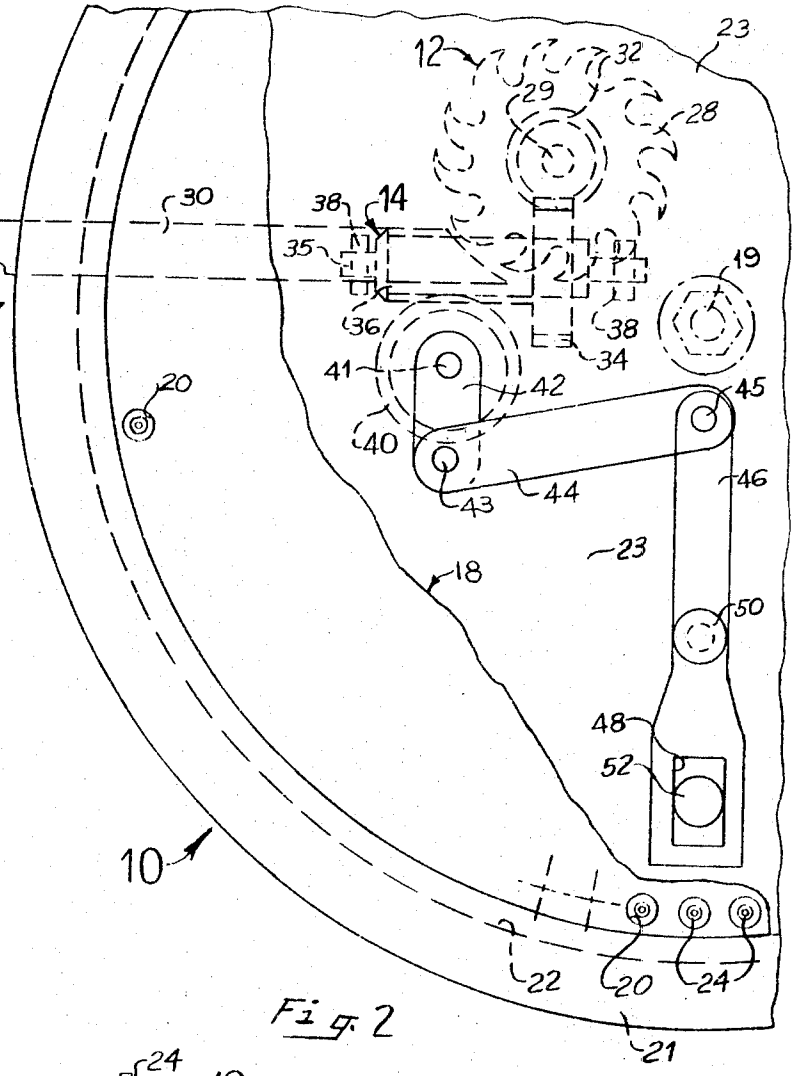


Fig. 2

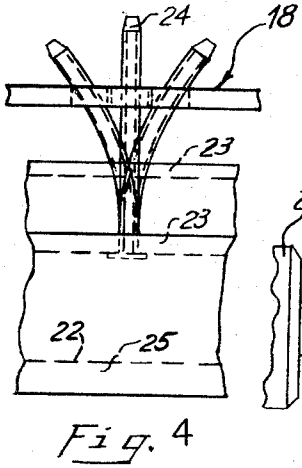


Fig. 4

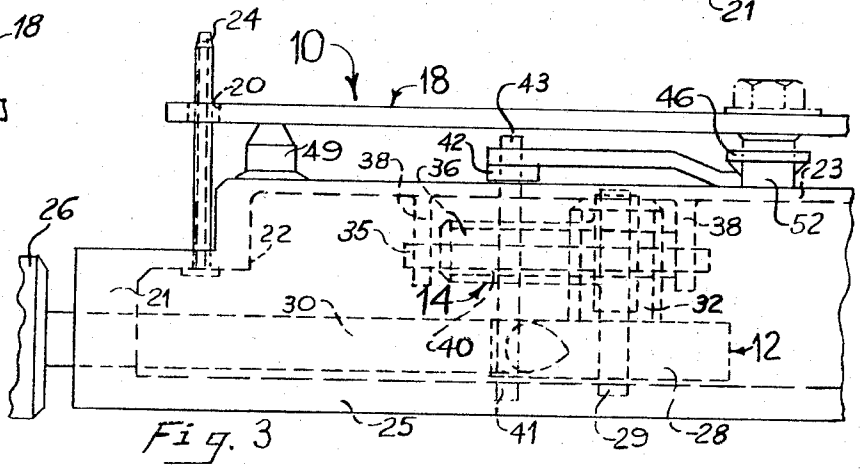


Fig. 3

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LIQUID SPRINKLING SYSTEM

My invention relates to liquid sprinkling systems.

The principal object of my invention is to provide improvements in liquid sprinkling systems including means and method comprising passing liquid through a plurality of flexible tubings and for cyclically moving said tubings in unison while liquid is passing therethrough to produce a predetermined liquid sprinkling pattern formed by continually moving liquid streams which distribute the liquid evenly from perimeter to center.

The foregoing object of my invention and the advantages thereof will become apparent during the course of the following description, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a top plan view of a liquid sprinkling system embodying my invention;

FIG. 2 is a fragmentary top plan view thereof with parts removed;

FIG. 3 is a front elevational view thereof with parts removed; and

FIGS. 4 and 5 are fragmentary top plan and front elevational views, respectively, of said embodiment.

Referring to the drawings in greater detail, **10** generally designates said embodiment which comprises a liquid motor **12**, a gear reduction train **14**, a crank mechanism **16**, an oscillating plate **18** having a plurality of circumferentially spaced apart clearance holes **20**, a liquid manifold compartment **22** and a plurality of flexible tubings **24** extending through said clearance holes **20**. Said liquid manifold compartment **22** which has a hoop-shaped sidewall **21** which is doubly right angularly bent in profile and has top and bottom walls **23** and **25**, respectively, serves as a base for a liquid sprinkler and has a carrying handle **27** in the form of a loop integrally formed with said sidewall **21**. Said liquid motor **12** comprises an inlet port **26** which includes a female garden hose connection, in the instance, an impeller **28**, and an impingement tube **30** disposed eccentrically in relation to said impeller **28**. One end of said impingement tube **30** is in communication with said inlet port **26** and the other end thereof is cut on a radial bias, the radius of which has as its center the center of said impeller **28**. Said impeller **28** which has a worm gear **32** integral therewith is made fast to a shaft **29** supported for rotation about a vertical axis by said top and bottom walls **23** and **25**, respectively. Said gear reduction train **14** includes a spur gear **34** which has a worm gear **36** integral therewith, made fast to a shaft **35** supported by stationary structure **38** suspended from said top wall **23** for rotation about a horizontal axis; and a spur gear **40** made fast to a shaft **41** supported by said top and bottom walls **23** and **25**, respectively, for rotation about a vertical axis. Said spur gear **34** meshes with said worm gear **32** and said spur gear **40** meshes with said worm gear **36**. The upper end of the shaft **41** extends through the top wall **23** and such joint is provided with liquid seal means of well-known construction. A crank **42** external to said liquid manifold compartment **22** has its inner end fast to said upper end of said shaft **41** and its outer end pivotally connected, as at **43**, to the inner end of a link **44**. The outer end of said link **44** is pivotally connected, as at **45**, to the inner end of a pivot lever **46**, the outer end of which is provided with a slot **48**. Said pivot lever **46** is pivotally supported between its ends by a pivot pin **50** upstanding from said top wall **23**. Said oscillating plate **18** is supported for rotation about a vertical axis by a shaft **19** made fast to and upstanding from said top wall **23** centrally thereof. A plurality of stationary posts **49** upstand from said top wall **23** to serve as supports for said plate **18** near the outer periphery thereof. Said plate **18** is provided with an eccentrically located pin **52** which operates in said slot **48**. Each said flexible tubing **24** is provided with a flange at its inner end to form a liquid seal so that liquid cannot escape externally of said tubing and with a flow restriction means at its outer end forming a nozzle. Said plate **18** is operative upon said tubings **24** in unison and between the ends thereof and while they are conveying liquid from the interior of said manifold compartment **22** to the exterior thereof.

In operation of said embodiment **10**, the same is connected to a source of liquid under pressure as, for example, a municipal water supply system supplying a residence equipped with water piping including a garden hose having a male garden hose connection. Said female garden hose connection of said inlet port **26** is threadably engaged with said male garden hose connection to convey liquid through said impingement tube **30** against said impeller **28** and to fill said liquid manifold compartment **22**. The continual impingement of liquid upon said impeller **28** causes the same to rotate in a counterclockwise direction, as viewed in FIG. **2**, which causes said spur gear **40** to rotate in a clockwise direction, as viewed in FIG. **2**. Rotation of said spur gear **40** carries said pivot connection **43** with it in a circular arc, which causes said link **44** to reciprocate, which causes said pivot lever **46** to oscillate about the pivot connection **50** and through the pin **52** and slot **48** connection causes said plate **18** to oscillate in a circular arc about its central vertical pivot axis **19**. Simultaneously with oscillation of said plate **18** and upon filling of said liquid compartment **22** liquid issues in a plurality of circumferentially spaced apart vertical streams through said flexible tubings **24**, the upper ends of which are made to oscillate in a circular arc by said plate **18**. The action of said plate **18** upon the tubings **24** causes each said tubing to bend as much as 60° from its vertical neutral position on either side thereof. The extent of said angular bending of said tubings **24** and the angular speed of said plate **18** and said tubings **24** depends upon the throw of the crank **42** which can be made adjustable by providing an adjustable connection for the pivot connection **43** so that its distance from said shaft **41** can be varied manually by a manual adjustment mechanism disposed above said crank **42** and externally of said plate **18**. The throw distance of the liquid from said tubings **24** and the cycles per minute of said oscillating plate **18** are dependent upon the liquid pressure of the liquid source. For a given liquid pressure and size of said embodiment **10**, the same produces a maximum sprinkling area coverage which is annular and surrounds and is concentric to said plate **18**. The action of said embodiment in producing said spray pattern is fascinating to observe, particularly the sprays of liquid which continually move from one side to the other of the plate means **18** in tangent lines to the flexible tubings **24**. The action of the liquid sprays resembles the opening and closing of a large flower as all of the liquid sprays seem to close when they are upright and then open first in one direction and then in the opposite direction, closing each time between changing the direction of opening. While any given flexible tubing is opening first in one direction and then in the opposite direction the diametrically opposed flexible tubing is opening first in the opposite direction and then in the one direction so that said liquid sprays give an appearance of intersecting as they change the direction of opening. The oscillation in unison of the flexible tubings **24** is also interesting to watch although the movement of said plate means **18** tends to be minimal which creates some mystery as to how the liquid sprays are produced. The sprinkling produced over said spray pattern is substantially uniform.

It should be understood that the plate means **18** can also be made to move in other ways than that shown and described. For example, the plate **18** can be made to move so that its center moves in a circle about a central vertical axis so as to cause the free end of each flexible tubing to move in a circle. Said plate means **18** can be made to reciprocate in a straight linear path so as to oscillate the free end of each flexible tubing in a straight linear path which is perpendicular to the direction of reciprocation of said plate means **18**.

It will thus be seen that there has been provided by my invention improvements in liquid sprinkling systems in which the object hereinabove set forth together with many thoroughly practical advantages has been successfully achieved. While a preferred embodiment of my invention has been shown and described it is to be understood that variations and changes may be resorted to without departing from the spirit of my invention as defined by the appended claims.

What I claim is:

1. In a liquid sprinkling system, liquid sprinkling means comprising liquid manifold compartment means constructed to connect to a source of liquid under pressure and having inlet port means for liquid to enter therein, a plurality of spaced apart flexible tubings in communication with the interior of said liquid compartment means so that liquid exiting from the latter passes through said flexible tubings and out the free ends thereof, plate means having clearance aperture means therein corresponding to said flexible tubings, said flexible tubings extending through said aperture means so that the free ends of said tubings project beyond a face of said plate means, and means including a liquid motor driven by liquid from said liquid source for moving said plate means and said flexible tubings relative to each other, said flexible tubings being angularly bent between the ends thereof by the action of said plate means upon them, whereby the free ends of said flexible tubings are moved in unison while liquid is passing therethrough to produce a predetermined liquid sprinkling pattern formed by continually moving liquid streams which evenly distribute the liquid thereover.

2. In a liquid sprinkling system, liquid sprinkling means as claimed in claim 1, said liquid manifold compartment means being stationary and serving as a base for a liquid sprinkler, said flexible tubings having their lower ends made fast in respect to said liquid manifold compartment means, and said plate means being cyclically moveable relative to said flexible tubings.

3. In a liquid sprinkling system, the means as claimed in claim 2, both said flexible tubings and said clearance aperture means being circumferentially spaced apart, said plate means constructed in relation to said liquid motor so that it is made to oscillate in a circular arc and so that the free ends of said flexible tubings are caused to oscillate in a circular arc.

4. In a liquid sprinkling system, liquid sprinkling method comprising passing liquid through a liquid manifold compartment so that liquid exiting from the latter passes through a plurality of flexible tubings and out the free ends thereof, providing plate means with clearance aperture means therein through which said flexible tubings extend so that upon movement of said plate means said flexible tubings are angularly bent between the ends thereof, moving said plate and said tubings relative to each other so that the free ends of said flexible tubings are moved in unison so as to spray liquid in a predetermined liquid sprinkling pattern formed by continually moving liquid streams which evenly distribute the liquid thereover.

5. In a liquid sprinkling system, liquid sprinkling method as claimed in claim 4, holding said liquid compartment means stationary so that it serves as a base, holding the lower ends of said flexible tubings stationary and cyclically moving said plate means relative to said flexible tubings.

6. In a liquid sprinkling system, the method as claimed in claim 5, oscillating said plate means in a circular arc so that the free ends of said flexible tubings are made to oscillate in a circular arc.

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