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3,347,464

WATER DISPERSER

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FIG. 1.

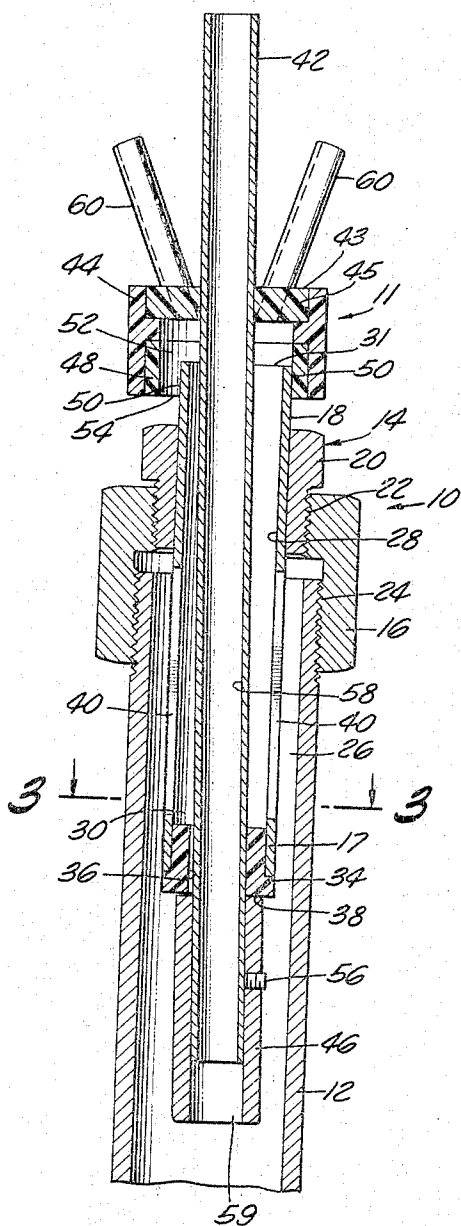
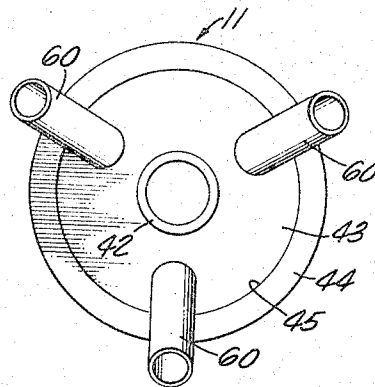


FIG. 2.

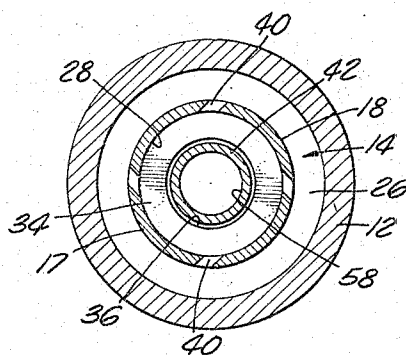


FIG. 3.

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1

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WATER DISPERSER

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ABSTRACT OF THE DISCLOSURE

An irrigation sprinkler having a gyratory water discharge head assembly with a tubular stem loosely mounted within and extending above a stationary supporting tube in such a way that the upper end of the head assembly undergoes gyratory motion about the axis of the tube during operation of the sprinkler, and a plastic bushing supported within a sleeve on the upper end of the head assembly for rolling movement about the outside of the tube to retain the stem out of direct wearing contact with the tube during such gyratory motion.

This invention relates to water discharge devices.

Various forms of sprinklers, as they are often termed, are known in the art. Those most commonly used are for irrigation. More recently such devices have been in use as ornamental fountains. Those designed for home gardens usually send up but a few jets of water. For use in parks, public places and large buildings, fountains typically are more elaborate and provide for spectacular displays consisting of alternately high and low jets. Other designs have jets which move in a rotating or oscillating fashion. The fountain according to this invention is lively, animated and in many respects more pleasing to the viewer than prior art examples. This water fountain will produce individual water droplets, rather than solid streams, and the jets rotate to appear as a variety of sparkles in a predetermined pattern instead of an indiscriminate pattern. The result is an unusual and attractive picture, particularly under lights.

This invention has improved features over water fountains of the type described in U.S. Patent No. 3,081,036. By providing a bushing member on the rotating and gyrating stem which contacts the outer portion of the body, excessive wear of the moving parts is precluded at no sacrifice in operating capability while at the same time providing for a structure that is easy to assemble.

A general object of this invention is to provide for a new and improved water dispersing device which is simple and rugged in construction, reliable in operation and inexpensive to manufacture so that it can be supplied at low cost and be capable of long life.

Another object of the invention is to provide a new and improved water dispersing device which is suitable either as an irrigating disperser or an ornamental fountain wherein moving parts subject to wear are specially constructed so as to operate smoothly over long periods and wherein wear is materially minimized.

Still another object of the invention is to provide a new and improved water dispersing device wherein wearing surfaces are made of dissimilar materials, there being provided one surface of metallic material and a second surface of appropriate low-friction synthetic plastic resin or comparable material which is easy to construct, simple to install, and which lengthens the life of the wearing parts by a considerable amount.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter set forth,

2

pointed out in the appended claims and illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a longitudinal cross-sectional view of a water dispersing device according to this invention.

FIGURE 2 is a top view of the device.

FIGURE 3 is a cross-sectional view of the device taken on the lines 3—3 of FIGURE 1.

Referring to the drawings in detail, reference is made to FIGURE 1 where there is shown a water disperser constructed in accordance with this invention and adapted particularly to create a fountain.

The water disperser, designated generally as 10, receives water from a vertical riser pipe 12 upon which it is mounted. As will be described later, a dispenser head 11 produces a fountain display having low, high and intermediate jets.

Included in the device is a hollow body indicated generally by the reference character 14, extending axially into the upper end of a riser pipe 12. A nipple 16 is provided for securing the body 14 upon the riser pipe by use of threads 24. The body 14 comprises a rigid tube 18 and a collar or nut 20 surrounding the upper end of the tube 18. The tube is force-fitted or otherwise secured in the collar 20. The collar 20 in turn is screw-threaded at 22 into the nipple 16 for mounting the body 14 on the riser. The tube 18 is of smaller outside diameter than the inside diameter of the riser 12 to provide an annular space 26 around the tube.

Designated as 28 is the inside cylindrical surface of the tube 18 which defines a bore or cavity 30. The discharge opening is shown at 31 and is located in the upper end of the body.

Secured in the lower end of the tube 18 by force-fitting is a bearing 34. The bearing has a cylindrical bore 36 which extends axially therethrough. A lower end surface 38 defines the lower end of the bearing. The bearing is shown as a laminated phenolic composition.

Apertures 40 which are shown as four in number in FIGURE 3 are formed in the side wall of the tube 18. The apertures are for the purpose of admitting water into the body cavity from the riser pipe in a somewhat circumferential direction much as originally disclosed in U.S. Patent No. 3,091,398. The apertures which are best shown in FIGURE 3 are narrow slits of considerable length which extend longitudinally through the wall of tube 18. They are at an angle with respect to the radius of body cavity 30, thereby to cause water in the body cavity to spiral around and upwardly and eventually out through the discharge opening 31.

The rotary jet producing member of the disperser designated 10 includes a tubular section or stem 42, a support member 43, and a sleeve 44 on the upper end of the stem. The support member 43 is secured by force-fitting within an appropriate recess 45 in the sleeve 44. The stem is secured by appropriate conventional means in fixed relationship within the support member 43. A bushing member 48, which serves as a gyratory bearing is fitted within the sleeve 44. At the lower end of the stem 42 is a collar 46, secured thereto by use of a set screw 56. The stem 42 is arranged longitudinally in the cavity 30 and extends upwardly through the discharge opening 31 and downwardly through the bore 36 of the bearing 34. The stem is substantially smaller in outside diameter than the discharge opening 31. The bore 36 of the body is only slightly larger in diameter than the stem, enough so that the lower end opening will accommodate rotation of the stem on its longitudinal axis and also to allow sufficient inclination to permit engagement of the bushing member 48 with an outside surface 50 on the upper end of tube 18. A cavity 52 is thus formed along with a downwardly directed discharge opening 54. When

water flows through the body, the stem 42 along with the sleeve 44 and collar 46 moves axially to the position shown in FIGURE 1 due to the force provided by the water. The collar 46 limits upward movement since the lower annular surface 38 of bearing 34 is engaged. Shown at 58 is the axially extending bore of the stem 42 which at its lower end has an inlet opening 59.

Of special consequence in the device here disclosed is the location and composition of the bushing member 48 which constitutes an important feature of this invention. The bushing member 48 is constructed preferably of an appropriate synthetic plastic resin material which can be either molded or otherwise shaped to an accurate inside dimension. The inside surface of the bushing member 48 is made preferably smoothly cylindrical and appreciably larger in diameter than the outside diameter of the body tube 18, namely, the outside surface 50. Since the sleeve 44 and consequently the bushing member 48 gyrates with the stem 14, the inside surface of the bushing member 48 rolls about the surface 50. Moreover, since the surface 50 is metallic, there is a difference in the materials and the attendant advantage of low-friction engagement. Constructed and assembled as shown, the stem 18 in the head 44 can be easily subassembled prior to being mounted in the standing portion of the device.

Mounted on the support member 43 are discharge tubes 60. These tubes may be oriented in various directions either outwardly and upwardly or merely outwardly, depending on the use to which the device may be put. As here shown the tubes 60 incline at an angle and may vary in number. Three such tubes are shown in the present embodiment. Also passing through the support member 43 is the stem 42 whereby to create a central stream within the streams created by the tubes 60.

The bushing member 48 is shown as a non-metallic material. Another suitable material in addition to that previously made reference to is a laminated phenolic composition. The bushing member, constituting as it does an important aspect of this invention, when force-fitted on the sleeve 44 provides the surface which, as noted above, contacts the surface 50 of the tube 18.

In operation, the head 11 and the accompanying stem 42 will rise to the position shown in FIGURE 1 due to the force of water flowing upwardly therethrough. Since the openings or slits 40 are inclined as shown in FIGURE 3, the stem 42 will simultaneously gyrate and rotate. However, by the positioning of the bushing member 48, as shown in FIGURE 1, the surface 50 of tube 18 will be contacted to provide support for the stem. A high jet will be produced through stem 42 while intermediate side jets are formed by tubes 60. At the same time, some water will exit at the discharge opening 31, collect momentarily in cavity 52 and pass out through the discharge opening 54.

The construction provides for several advantages not found in the prior art. By placing the bushing member 48 in the position shown, rather than within tube 18, ease of assembly is facilitated. At the same time, wearing on the upper portion of the stem is obviated as the stem is not in contact with a moving part. In addition, the water which passes through the discharge opening 31 will be forced downwardly through the discharge opening 54 formed between bushing 48 and surface 50. This precludes any unsightly intermittent upward splashing. Also, since there is no bearing to provide a restriction in discharge opening 31, passage of both water and such dirt as may be present in the stream is made easier.

While the instant invention has been shown and described herein in what is conceived to be the best mode, it is recognized that modifications may be made within the scope of this invention. Accordingly, it is considered that

this invention is to be measured by the scope of the claims appended hereto.

Having described the invention, what is claimed as new in support of Letters Patent is:

1. A water disperser comprising:
 - a tube having normally open upper and lower ends, coupling means for securing said tube to the open upper end of a riser, said upper tube end being exposed above said coupling means, and
 - a gyratory disperser head assembly rotatably and gyratably mounted in said tube including a tubular stem of smaller external diameter than the internal diameter of said tube and extending through said tube, the upper end of said stem being exposed above the upper end of said tube, bearing means supporting the lower end of said stem in the lower end of said tube for gyratory movement of said upper stem end about the axis of said tube, a sleeve of appreciably larger internal diameter than the external diameter of said tube coaxially surrounding and secured to the upper end of said stem with the lower end of said sleeve overlapping the upper end of said tube, a cylindrical bushing coaxially mounted in the lower end of said sleeve having an inside bearing surface larger in diameter than the external diameter of said tube, said bushing engaging and being adapted to roll about the upper end of said tube during gyratory motion of said head assembly, said bearing means and bushing being so dimensioned that said stem remains out of direct wearing contact with said tube during gyratory motion of said head assembly and resultant rolling motion of said bushing about said tube, outlet means on the upper end of said head assembly through which water is adapted to issue from said assembly, and passage means communicating with said outlet means and opening through the inner end of said head assembly through which water is adapted to flow from said riser to said outlet means in such a way as to impart gyratory motion to said head assembly.
2. A water disperser according to claim 1 wherein: said bushing is composed of a synthetic plastic resin material and said tube is composed of a metallic material, whereby said bushing has a relatively low coefficient of friction against said tube.
3. A water disperser according to claim 1 wherein: said sleeve has an upper end wall joined to said stem and closing the upper end of said sleeve, said passage means comprise a water passage defined between said stem and tube and opening through the upper end of said tube to the interior of said sleeve, and said bushing and tube define therebetween a discharge opening through which water issues during operation of said disperser and which progresses circumferentially around said tube during rolling motion of said bushing around said tube occasioned by gyratory motion of said head assembly.

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