March 26, 1963 J. V. SEMPLE 3,082,957

FLUID DIFFUSING DEVICE

Filed Oct. 30, 1961

FIG. 1.

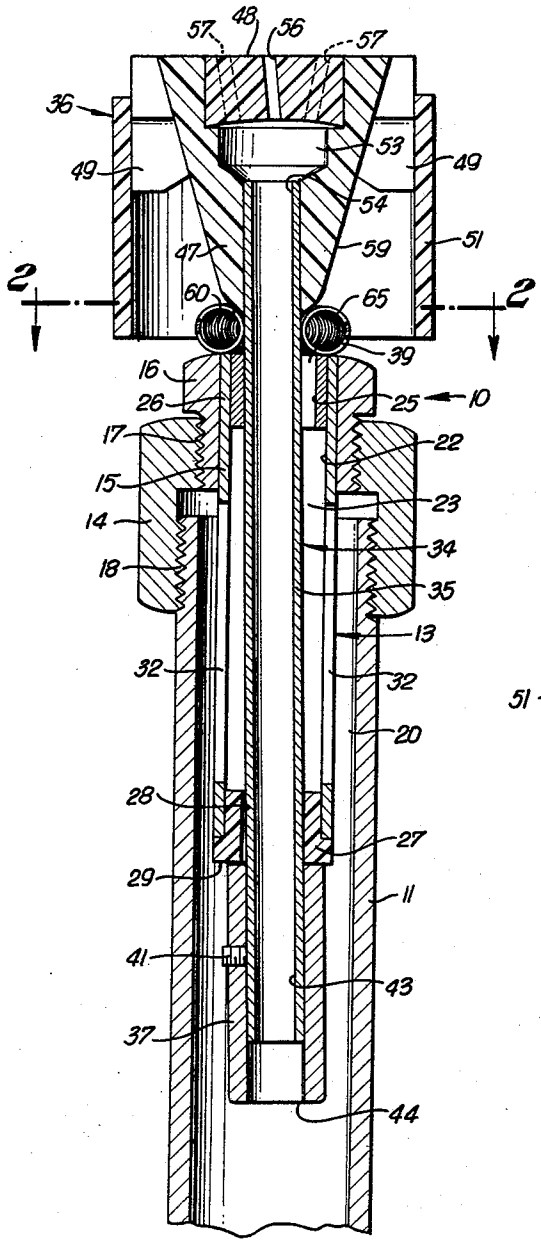
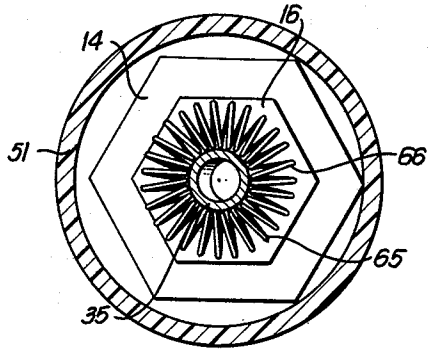


FIG. 2.



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FLUID DIFFUSING DEVICE

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This invention relates generally to fluid diffusing devices and particularly to means for effecting aeration and break-up of water around a distributor of a fluid discharging device.

For purposes of convenience in describing the details of construction and mode of operation of the improvement which constitutes this invention, I have chosen to refer to the ornamental fountain of patent application Serial No. 113,538, filed May 29, 1961, by John O. Hruby, Jr. The fountain device of that patent application comprises a rotary stem having a water distributor head, the undersurface of which is conical to deflect the water outwardly which flows upwardly around the stem. The instant invention provides a water diffuser in the form of a helical spring encircling the stem, and serves to break-up and aerate the water flowing upwardly around the stem.

The improvement of this invention also functions to prevent a conical head of the stem of a fluid-discharging device of the above-mentioned character and which stem is movable vertically in the fluid supply pipe, from seating and sticking within the discharge opening of the supply pipe.

Though the invention is herein described with reference to an ornamental fountain, I desire to have it understood that the invention is usable and advantageous when embodied in other water discharging devices, such as, for example, in a lawn sprinkler of the type illustrated and described in United States Patent No. 2,639,191.

In the accompanying drawing:

FIG. 1 is a central vertical section through an ornamental fountain according to the above-identified patent application Serial No. 113,538, the same being equipped with a coil spring of this invention; and,

FIG. 2 is a cross section taken along line 2—2 of FIG. 1.

The device shown in the drawing, for purposes of illustrating this invention, is one for producing an ornamental fountain of distinct tiers of water sprays, the device being designated generally by reference numeral **10**, and being mounted atop a water supply riser or pipe **11**.

Fountain device **10** comprises a hollow body **13** extending axially into the upper end of the riser **11**, and a nipple **14** for securing the body upon the riser. The body **13** comprises a rigid tube **15** and a collar or nut **16** around the upper end of the tube, the tube being force-fitted or otherwise suitably secured in the collar. The collar is screw-threaded at **17** for securing the body in the nipple, the nipple being internally screw-threaded at **18** for mounting the fountain device on the riser. The body tube **15** is of smaller outside diameter than the inside diameter of the riser to provide an annular space **20** around the body tube.

Numeral **22** designates the inside cylindrical surface of the body tube **15**, such inside surface defining a body cavity or bore **23**. A water discharge opening **25** in the upper end of the body is defined by a bearing tube **26** which is force-fitted in the upper end portion of the tube **15**. A bearing tube **27** is force-fitted in the lower end of the body tube, the bearing tube **27** having a cylindrical bore **28** extending axially therethrough. The lower end face of the bearing tube **27** defines the lower end face **29** of the body **13**. The bearings **26** and **27** are shown as being formed of laminated phenolic composition.

Formed in the side walls of the body tube **15** is a plurality of apertures **32** for admitting water into the body cavity from the riser pipe. These apertures are formed as narrow slits which extend longitudinally of the body **13**. There are two such slits in the illustrated embodiment, they being diametrically opposed. These slits extend through the wall of the tube **15** at an angle with respect to the radii of the body cavity, **23**, thereby to cause water in the body cavity to spiral around and upwardly in the body cavity and out through the discharge opening **25**.

The rotary and jet producing member of the fountain device is designated generally by reference numeral **34**. It comprises a tubular stem **35**, a head **36** on the upper end of the stem, and a collar **37** on the lower end of the stem. The stem is arranged longitudinally in the body cavity **23** and extends upwardly through the discharge opening **25** and downwardly through the lower end opening **28** of the body. The stem is substantially smaller in outside diameter than the discharge opening **25**. The lower end opening **28** 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 sufficient inclination of the stem with respect to the axis of the body cavity to permit engagement of the stem with the upper end of the inside wall surface **39** which defines the discharge opening **25**.

The rotary member **34** of the illustrated embodiment may be movable axially in the body **13** because of the force of water flowing through the body. The collar **37** limits the extent of upward movement of the rotary member through engagement of the collar against the lower annular end surface **29** of the body **13**. The collar **37** of the illustrated embodiment is secured upon the lower end of the stem by means of a set screw **41**. Numeral **43** designates the axially extending passage or bore of the stem, open at its lower end as an inlet opening **44** for reception of water from the riser **11**. The head **36** has a plurality of orifices, to be described in detail later, some of which serve as outlet passages from the stem for producing certain of the jets of the water fountain.

As thus far described, the fountain device **10** is similar to the lawn sprinklers of U.S. Patent No. 2,639,191. A review of the explanation of the mode of operation of the sprinklers of said patent will make it clear that for the fountain device of the instant invention, the swirl of water around and upwardly in the body cavity **23**, because of the slant of the water inlet apertures **32**, will cause the rotary member **34** to gyrate around in the body with the axis of the stem being inclined with respect to the axis of the body cavity **23**. In being so gyrated, the stem **35** contacts the surfaces which define the discharge opening **25** and the lower end opening **28** of the body whereby the stem rolls along these surfaces and thus rotates on its axis.

It is the structure of the head **36** of the rotary member which makes the device **10** a fountain producing device instead of a lawn sprinkler. The head **36** of the illustrated embodiment is formed of plastics material and comprises a conical portion **47**, a central insert **48**, radially extending dividers **49**, and an outside skirt **51**. The central portion **47** is an axial alignment with the stem and has a cavity **53** which is open to upper end opening **54** of the stem bore **43**. The insert **48** has a plurality of orifices or passages formed therein, these being a centrally disposed orifice **56** and a circumaxially extending series of orifices **57**. The central orifice **56** is inclined slightly with respect to the axis of the stem so that the outlet end opening thereof is eccentric of the axis of the stem and head. The passages **57** are also outwardly inclined. The central orifice **56** spouts a jet which forms a central spire of the

water fountain, and the orifices **57** form an intermediate spray or tier of the water fountain.

A lower tier of the water fountain is constituted of jets of water originating from water which passes around the stem **35** and from the discharge opening **25**. The outside surface **59** of the central portion **47** of the head is conical, the lower end part **60** thereof preferably being rounded. The water from the discharge opening **25** flows upwardly along the outside conical surface **59** and is separated by the dividers **49** to produce the jets of water which form the lower tier of the water fountain.

The improvement which constitutes this invention is the provision of a helical spring **65** encircling the stem **35** adjacent the lower end **60** of the conical port **47** of head **36**. The helix or coil **65** is originally cylindrical and is formed to an annulus as by soldering the ends of its spring wire together at **66**. Such annular helical spring is preferably formed to an inside diameter smaller than the outside diameter of the stem **35** so that when placed in encircling position around the stem, the spring will be under tension remaining positioned adjacent the head portion **47**.

It will be noted that the individual coils of helical spring **65** are larger in diameter than the space of discharge opening **25** around the stem **35**, whereby the spring prevents dropping of the rotary member **34** into the body **13** to a position where the conical head portion **47** might otherwise become tightly seated within the upper end of the bearing **26**.

The primary function and advantage of the helical spring **65** is that it breaks up the stream of water flowing upwardly from discharge opening **25** and upwardly along the conical surface **59** of the stem head. When the spring **65** is installed on a device of the illustrated type for producing an ornamental fountain, it will be found that the spray of water from around the conical surface **59** and broken by the dividers **49** will be white or milky in appearance as compared with the clearer jets of droplets from the orifices **57** and of the central spire from orifice **56**, thereby creating an interesting contrast between the distinct sprays of the fountain.

When the coiled spring **65** is fitted around the stem of a lawn sprinkler of the afore-mentioned patent, for example, the spring will serve to aerate and break-up water from the discharge opening of the sprinkler, thereby to increase the even water distribution characteristics of such lawn sprinklers.

While this invention has herein been shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having thus described my invention what is claimed as new in support of Letters Patent is:

1. In a fluid diffusing device of the class wherein a stem projects out through a fluid discharging opening of a fluid supply pipe, the stem having a fluid deflecting head beyond said opening, the head having an annular surface flaring outwardly with respect to the axis of the stem from a smaller end of said annular surface proximate said opening to a larger end of said surface remote said opening, the combination with said stem of a torus of a coil encircling the stem adjacent the smaller end of said head for breaking up and aerating fluid discharged through said opening around the stem.

2. In a fluid diffusing device of the class wherein a stem projects upwardly through a fluid discharging opening of a vertically extending fluid supply pipe, the stem having a fluid deflecting head disposed above said opening, said head having an inverted conical surface the smaller end of which is proximate said opening and the larger end of which is remote said opening, the larger end of the head being larger in diameter than said opening, the combination with said stem of a helical spring, the axis of the coils of said spring being annular and encircling the stem adjacent the smaller end of said head, and the spring being under circumferential tension around the stem.

3. The combination of claim 2 in which said stem is movable vertically in said opening and the diameter of the spring coils is greater than the annular space of said opening around the stem, whereby the stem is prevented by said spring from dropping down through said opening to a position where said head would otherwise seat within said opening.

4. A water diffusing device comprising a vertically extending water supply pipe having a water discharge opening at its upper end, a stem smaller than said opening and extending downwardly therethrough, means responsive to flow of water in said pipe for rotating said stem about a vertical axis, a head on said stem above said opening, the undersurface of said head sloping upwardly and outwardly from said stem to deflect water issuing from said opening, and a torus of a helical spring encircling the stem adjacent said head for break-up and aeration of said issuing water.

5. An ornamental fountain comprising a vertically extending water supply pipe having a water discharge opening at its upper end, a tubular stem smaller than said opening and extending downwardly therethrough, means responsive to flow of water in said pipe for rotating said stem about a vertical axis and for gyrating the stem by rolling around the periphery of said discharge opening, the stem having a water inlet opening at its lower end, a head on said stem above said discharge opening, the head having an outlet orifice for discharge of water from the stem, the undersurface of the head sloping upwardly and outwardly from said stem to deflect water issuing from said discharge opening, and a torus of a helical spring encircling the stem adjacent said head for break-up and aeration of water issuing from said discharge opening.

References Cited in the file of this patent

UNITED STATES PATENTS

1,795,898	Schneider	Mar. 10, 1931
2,161,235	Schlagintivert	June 6, 1939
2,896,864	Jemison et al.	July 28, 1959