United States Patent

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[73] Assignee Telsco Industries
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[54] **ROTARY SPRINKLER HAVING IMPULSE TYPE TURBINE**
2 Claims, 4 Drawing Figs.

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[51] Int. Cl. B05b 3/02
[50] Field of Search 239/203, 204, 206, 230

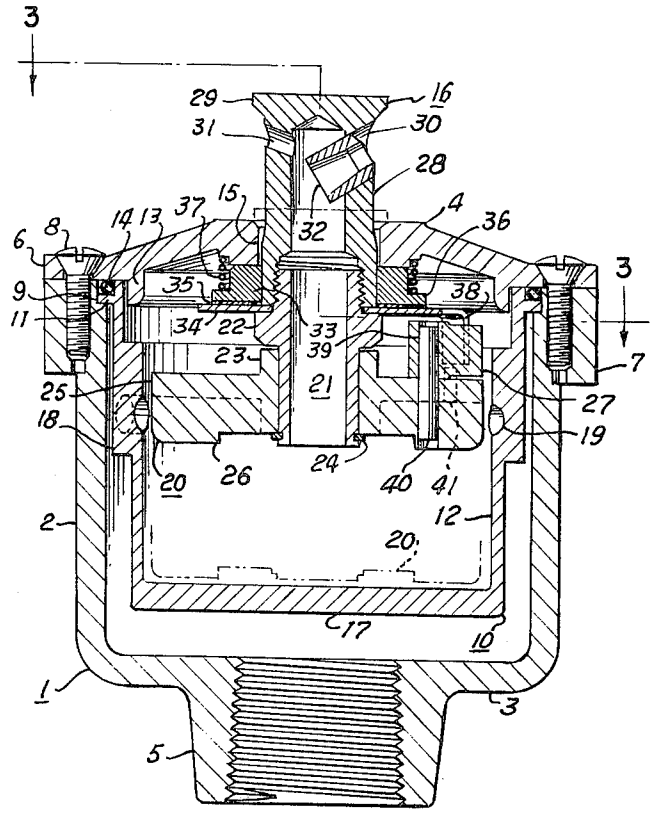
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ABSTRACT: Rotary sprinkler of the underground, popup-type having a water turbine of the impulse type for imparting intermittent or step-by-step rotation to a nozzle.



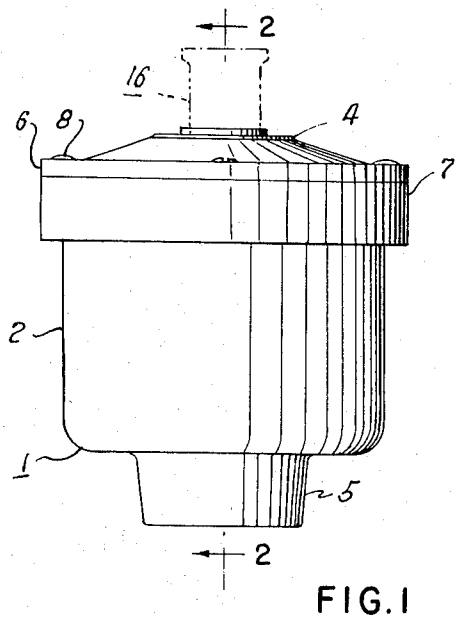


FIG. 1

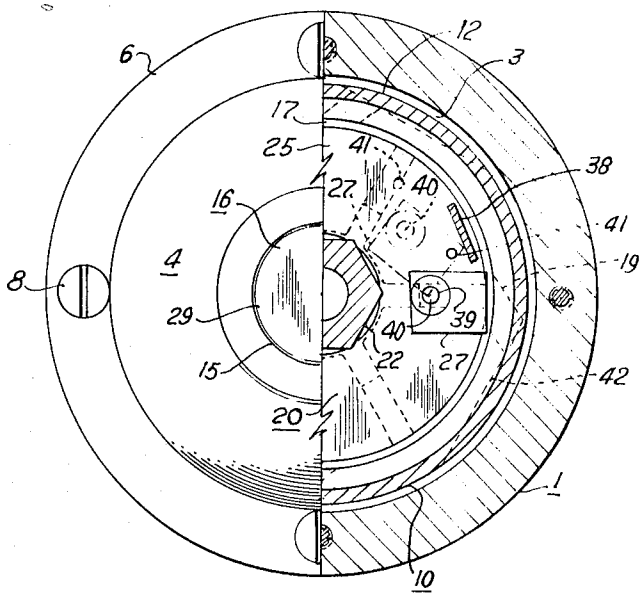


FIG. 3

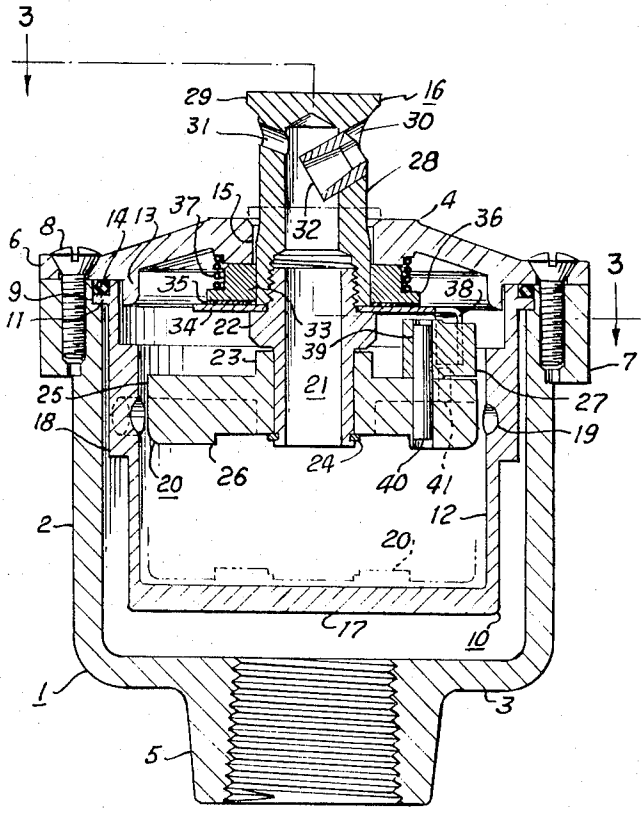


FIG. 2

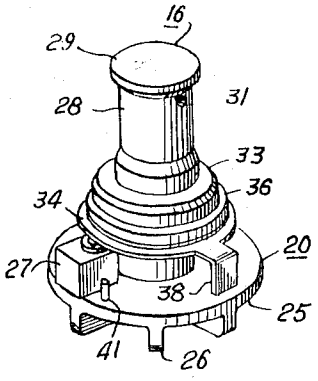


FIG. 4

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ROTARY SPRINKLER HAVING IMPULSE TYPE TURBINE

SUMMARY OF THE INVENTION

A novel sprinkler head having a turbine chamber, with an impeller or turbine rotatable therein coaxially about a rotatable nozzle tube, and an inlet for admitting water under pressure into the turbine chamber to drive the impeller for imparting intermittent or step-by-step rotation to the nozzle tube. A circular disc, rotatable with the nozzle tube, overlies the impeller and has an angular arm projecting and depending therefrom within the circumference of said impeller so as to be revolvable in an annular path concentric to the rotational axis thereof. The impeller carries an upstanding pin which pivotally supports a striker for relative swinging movement into the path of the angular arm so as to impart rotational movement intermittently to the nozzle tube through the disc. For confining the striker against separation from the pin, the upper end of said pin is in spaced contiguity to the disc. The striker is in the form of an oblong, rectangular block having a mounting opening in its inner end portion offset transversely toward the direction of rotation of the impeller, and a stop upstands from said impeller for limiting swinging of the striker block in said direction of impeller rotation.

A construction designed to carry out the invention will be described hereinafter, together with other features of the invention.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevational view of an irrigation sprinkler head of the underground, popup-type with its rotary nozzle protracted in broken lines.

FIG. 2 is an enlarged, transverse, vertical sectional view, taken on the line 2–2 of FIG. 1, showing a water turbine of the impulse type constructed in accordance with the invention for imparting intermittent rotation to the nozzle which is shown protracted, the lower position of the turbine being shown in broken lines,

FIG. 3 is a horizontal, cross-sectional view taken on the line 3–3 of FIG. 2, and

FIG. 4 is a perspective view of the water turbine and nozzle.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawing, the numeral 1 designates the hollow body or casing of an irrigation sprinkler head having an upright, cylindrical sidewall 2, a circular bottom wall 3 (FIG. 2) and a removable, circular cover plate or top wall 4. An internally screw-threaded inlet nipple 5 depends axially from the bottom wall 3, and an external, radial enlargement or flange 6 is provided at the upper end of the sidewall 2 for supporting the cover plate 4 by its flat, peripheral rim 7 which is fastened to the flange by screws 8. The sidewall flange 6 is internally recessed at 9 to suspend a cylindrical, cuplike, diffuser of turbine housing 10, by the external, peripheral lip 11 of its sidewall 12, within the body 1 in spaced relation to its side and bottom walls. An annular flange or rib 13 may depend from the inner margin of the flat cover rim 7 for confining the housing flange 11 in coaction with said rim and the recess 9, and an O-ring 14 or other packing is recessed in said housing flange to seal off therearound. The cover plate has an axial, circular opening 15, which is inwardly bossed of flanged, extending therethrough for rotatably and slidably receiving a rotary nozzle 16 to be described hereinafter.

The diffuser housing 10, which forms a turbine chamber, has a flat, circular bottom wall 17 and an open top; while the upper portion 18 of its sidewall 12 is of increased thickness below its lip 11. Tangential openings or ports 19 are formed in the thickened upper portion 18 of the housing side wall for directing water from the interior of the hollow body 1 tangentially into said housing to impart constant rotation to an impeller or turbine 20. As shown by the broken lines 42 in FIG. 3, the housing side wall 12 may be horizontally recessed or grooved tangentially adjacent each port 19 and primarily clockwise thereof. A tubular spindle 21, having an external, radial flange or shoulder 22 which may be polygonal (FIG. 3), is screw-threaded into the lower end of the nozzle 16 so as to depend axially therefrom for rotatably supporting the impeller 20 by its annular hub 23; and a retaining ring 24, carried by the lower end of the spindle, underlies the hub. The impeller includes a flat, circular disc 25 having a plurality of radial vanes 26 on its underside for impingement by the jets of water passing through the ports 19 after said impeller is lifted to its upper position by the flow of water around and beneath said impeller to the bore of the spindle 21. As will be explained, a striker 27 is pivotally mounted on the impeller 20 so as to intermittently transmit its momentum to the nozzle 16.

The latter includes a cylindrical tube 28 having a closed and enlarged or flanged upper end 29. A pair of diametrically-opposed, upwardly-divergent outlet orifices or ports 30 and 31 are provided in the upper end portion of the nozzle tube 28, with the orifice 30 being larger and having a range nipple 32 disposed therein and extending inwardly thereof. Below the inwardly-bossed opening 15 of the cover plate 4, the nozzle tube has an annular, flanged collar 33 confined thereon by an annular plate 34 which overlies the radial flange or shoulder 22 of the tubular spindle 21. A bearing 35 is interposed between the collar 33 and plate 34 and is formed of plastic or other antifriction material to seal off around the nozzle tube. The collar has an external, radial flange or shoulder 36 at its lower end for coacting with the cover plate to confine a helical spring 37 therebetween. Manifestly, the nozzle 16 as well as the impeller 20 is constantly urged downwardly by the force of the spring 37 against the pressure of the water.

An angular arm or member 38 projects radially from the annular plate 34, which is of appreciably less external diameter than the disc 25 of the impeller 20, and has an upright depending portion for engagement by the striker 27 upon each revolution of said impeller. It is readily apparent that the depending portion of the arm 38 revolves in an annular path within the circumference of the impeller and that intermittent or step-by-step rotation is imparted thereto by each engagement with the striker. The striker 27 is in the form of a rectangular block (FIGS. 3 and 4) of greater length than its width and depth, which may be approximately equal, and has an upright, eccentric opening 39 extending through its inner end portion. An upright pivot pin 40 upstands from the impeller disc for rotatably supporting the striker by its opening 39 which is offset counterclockwise from the longitudinal axis of said striker. Since the outer peripheral portion of the annular plate overlies the latter opening in spaced contiguity, separation or upward displacement of the striker 27 from its pivot pin is prevented. Obviously, the striker is swung counterclockwise outwardly by centrifugal force and that its eccentric pivotal mounting permits inward clockwise pivoting of said striker for revolving past the arm as shown in broken lines in FIG. 3. In order to prevent excessive counterclockwise movement of the striker 27 and accidental binding with the arm 38, a stop pin 41 upstands from the impeller disc adjacent and outwardly counterclockwise of the pivot pin 40.

I claim:

1. In a sprinkler head having an impeller and a nozzle tube rotatable about an upright common axis;

improvements in imparting intermittent rotation to the nozzle tube including,

a circular disc mounted on and rotatable with the nozzle tube in overlying rotation to the impeller,

an angular member projecting from the disc and having a depending outer end portion disposed within the circumference of said impeller and revolvable within an annular path concentric to the rotational axis thereof,

a striker pivotally mounted on the impeller for relative swinging movement about an upright axis into the path of the outer end portion of the angular member so as to impart rotational movement intermittently to said nozzle tube through said disc,

a pin upstanding from said impeller for pivotally supporting the striker and having its upper end in spaced contiguity to said disc for confining said striker against upward displacement,

said striker being in the form of a block having an opening in its inner end portion for mounting on the pin, and

upstanding stop means carried by said impeller for limiting pivotal movement of said striker block in the direction of rotation of said impeller.

2. The combination defined in claim 1 wherein the opening of the striker block is offset transversely toward the direction of rotation of the impeller.