May 29, 1962 R. T. WINDSOR 3,036,782

FLOW CONTROL AND SPRINKLER COMBINATION

Filed June 30, 1960

FIG. 1

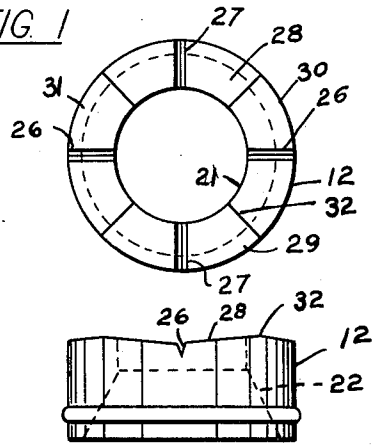
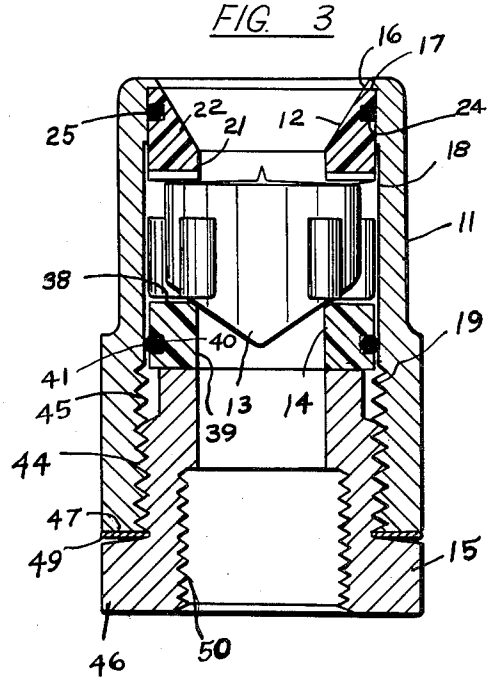


FIG. 2

FIG. 3



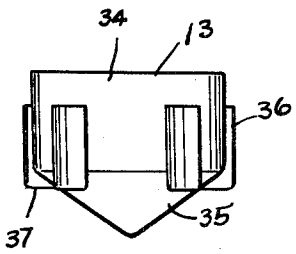


FIG. 4

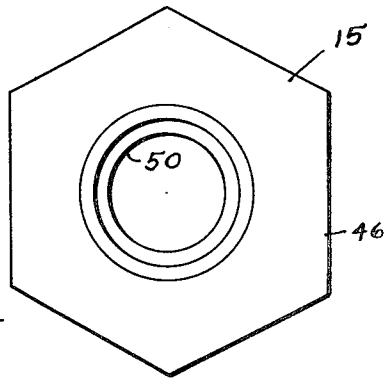


FIG. 5

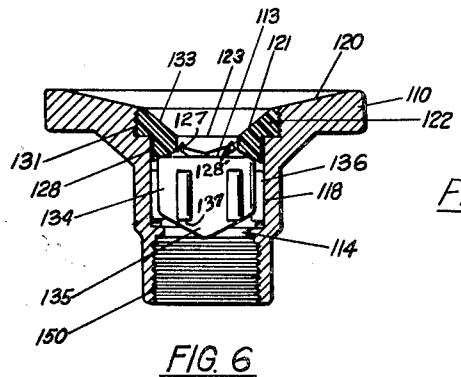


FIG. 6

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FLOW CONTROL AND SPRINKLER COMBINATION

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This invention relates to flow controls and, more particularly, to flow controls in combination with sprinklers.

The invention disclosed herein takes advantage of a characteristic of variable orifice flow controls and, more particularly, those versions of flow controls of the type evolving or utilizing the principle of the flow control disclosed in Patent No. 2,508,793.

At normal water pressures, these flow control devices such as described above produce a high velocity stream or streams of water at the downstream aperture. In normal operation, the velocity of the stream is permitted to decay through turbulence in the fluid itself downstream from the flow control. It has been discovered that if a flow control device is so designed as to discharge these high velocity streams into the atmosphere, water will be sprayed over a considerable area. Thus, the flow control becomes a very effective, centrally controlled sprinkler head.

Numerous devices such as deflectors, shaped apertures, and the like may be used to provide a variety of spray patterns with the device disclosed herein which makes it suitable for a wide variety of lawn sprinkler apparatus and the like.

It is, accordingly, an object of the present invention to provide an improved sprinkler head.

Another object of the invention is to provide an improved sprinkler and flow control combination.

Still another object is to provide a flow control device utilizing a sprinkler head.

A further object of the invention is to provide a sprinkler and flow control combination which is simple in construction, economical to manufacture, and simple and efficient in operation.

With the above and other objects in view, the present invention consists of the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawing and more particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportions, and minor details of construction without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawing:

FIG. 1 is a top view of a part of the device according to the invention;

FIG. 2 is a side view of the part shown in FIG. 1;

FIG. 3 is a longitudinal cross sectional view of the combination flow control and sprinkler head according to the invention;

FIG. 4 is a side view of a part of the flow control device;

FIG. 5 is a bottom view of the device shown in FIG. 3; and

FIG. 6 is a longitudinal crosssectional view of another embodiment of the invention.

Now with more particular reference to the drawing, the flow control and sprinkler combination is made of a hollow body 11, an orifice plate 12, a diaphragm member 13, a backing ring 14, and a backing member 15.

The body member 11 is hollow and has an outlet bore 16 which terminates just below a shoulder 17 formed by a counterbore in the body 11. The body 11 has a shallow second counterbore 18 above the counterbore

defining the shoulder 17. The counterbore 18 extends to a threaded portion 19 of the body 11.

The orifice plate 12 is an annular member having a bore 21 therethrough. The bore 21 joins a tapered outlet 22 which has an outwardly diverging flared surface communicating with the bore 21 and forming a smooth continuation of the bore 16. The orifice plate 12 has an annular outer peripheral groove 24 therein which receives an O-shaped sealing washer 25. The washer 25 forms a seal between the orifice plate 12 and the inner periphery of the counterbore in the shoulder 17.

The upstream surface of the orifice plate 12 has slots 26 and 27 which are continuous slots cut radially in the upstream side of the orifice plate 12. The slots 26 are cut at right angles to the slots 27. The slots 27 are deepest at the centers and have flatter outer portions 28 and 29. The slots 26 have outwardly flared flatter portions 30 and 31, respectively. Ridges 32 are formed where the material defining the slots terminates.

The diaphragm 13 may be made of a resilient body and has a cylindrical portion 34 terminating in a converging conical section 35 integrally connected to the cylindrical portion 34. Spaced ribs 36 are integrally attached to the outer periphery of the cylindrical portion 34 and extend downwardly therefrom. Outer flat ends 37 of the ribs 36 rest on an inner flat surface 38 of the backing ring 14.

The backing ring 14 has an opening 39 therethrough and an outer peripheral groove 40 which receives a packing washer 41. The packing washer 41 may effect a seal between the outer periphery of the backing ring 14 and the inside of the body 11.

The backing ring 14 has a threaded portion 44 which engages internal threads 45 of the body 11. A hexagonal shoulder 46 overlies ends 47 of the body 11 and sealingly clamps a copper washer 49 therebetween to form a seal. An inlet 50 of the backing member 15 is threaded to receive suitable pipe for connecting the sprinkler to a suitable water line.

When the device is assembled as shown in FIG. 3, water pressure at the threaded inlet 50 will be imposed on the diaphragm 13 and water will flow through the slots 26 and 27 and impinge on the diverging surface of the outlet 22 and the water will be distributed over the surrounding area as it rebounds from the outlet 22. As pressure at the inlet 50 increases, the diaphragm 13 will be compressed into the slots 26 and 27 and the portions 29, 30, and 31 thereof. The flow of water therethrough will be held constant as the pressure of water at the inlet 50 increases. It will be seen, therefore, that an efficient, economical combination flow control and sprinkler head is provided.

In the embodiment of the invention shown in FIG. 6, a body 110 is shown which may be made of metal, plastic, or other suitable material. The body 110 has a threaded inlet counterbore 150 suitable to be attached to a garden hose, water supply pipe, or the like, the threaded counterbore 150 terminating in a bore 114. A counterbore 118 receives a diaphragm member 134 which may be constructed like the diaphragm shown in FIG. 4.

Ends 137 of ribs 136 rest on the shoulder which defines a bottom of the counterbore 118 and the sides of the ribs 136 engage the inside of the counterbore 118 to locate the diaphragm member 134 and loosely receive it therein. The diaphragm member 134 has a conical upstream portion 135 and a flat downstream side 113 which rests on the grooved upstream end of an orifice plate 122. The orifice plate 122 has an externally threadable flange 133 received in a threaded second counterbore 131. A reduced diameter cylindrical portion 128 is integrally connected to the flange 133. The upstream end of the cylindrical portion 128 has grooves 127 and

128' similar to the slots 26 and 27 of the embodiment shown in FIGS. 1 to 5.

The downstream end of the body 110 has an inclined surface 120 thereon which forms a continuation of an inclined cylindrical surface 121 of the orifice plate 122. This inclined surface generally conforms to the frustum of a cone and is inclined at an angle of somewhat less than thirty degrees to a radius of a bore 123 through the orifice plate 122.

The foregoing specification sets forth the invention in its preferred practical forms but it is understood that the structure shown is capable of modification within a range of equivalents without departing from the invention which is to be understood is broadly novel as is commensurate with the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows.

I claim:

1. A flow control and sprinkler combination comprising a hollow body member, an orifice plate supported in said hollow body member, said orifice plate having an opening therethrough, said opening diverging outwardly toward the downstream end thereof, said orifice plate having an end surface on the upstream end thereof having

slots formed therein and extending radially thereof, a resilient cylindrical diaphragm member having one end thereof resting on the grooved end of said orifice plate, the upstream end of said diaphragm member terminating in a conical member, an annular backing member supported in said body member on said diaphragm member, spaced peripherally disposed ribs on the outer periphery of said diaphragm member, said ribs each having one end thereof supported on said backing member, and a threaded member in said body member having an inlet therein, said threaded member having an end disposed against said backing member.

2. The flow control and sprinkler combination recited in claim 1 wherein said backing member has an outer peripheral groove therein and an O-shaped sealing washer disposed in said groove.

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