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[54] **SPRINKLER UNIT**
 5 Claims, 11 Drawing Figs.

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 239/383, 239/494, 239/499
[51] Int. Cl..... **B05b 15/02**
[50] Field of Search..... **239/118,**
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ABSTRACT: A sprinkler unit having a body with an out-wardly extending flange and an upstanding ring which acts as a nozzle guard. The nozzle has a freely rotating, angled pin in the center thereof to provide even distribution of water to the area immediately adjacent to the nozzle and angled peripheral orifices to distribute water therethrough to areas more remote from the nozzle.

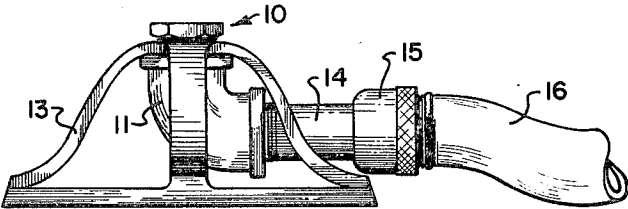


FIG 1

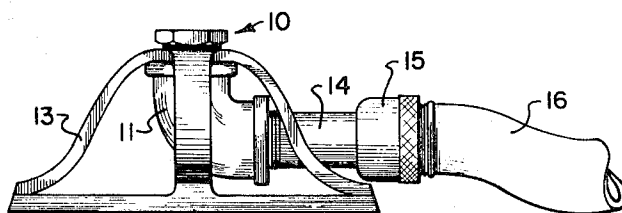


FIG 2

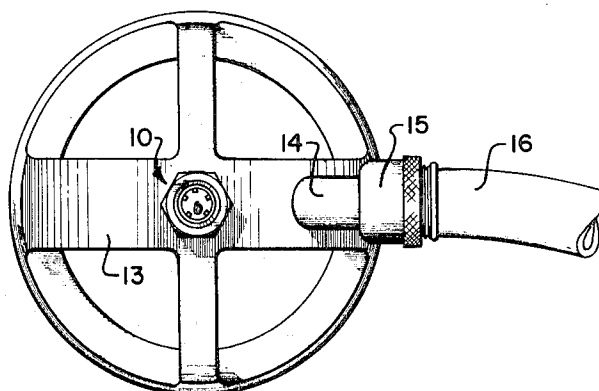


FIG 4

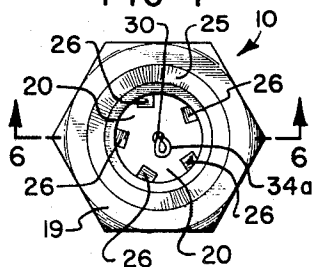


FIG 3

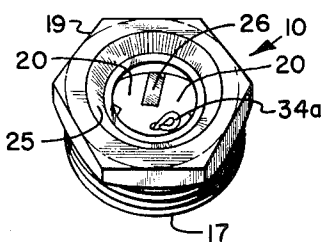


FIG 7

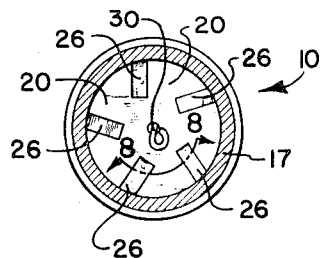


FIG 5

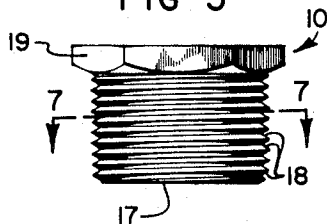


FIG 6

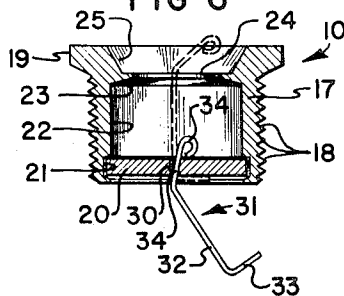
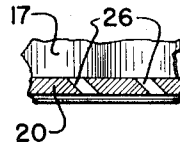


FIG 8



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FIG 9

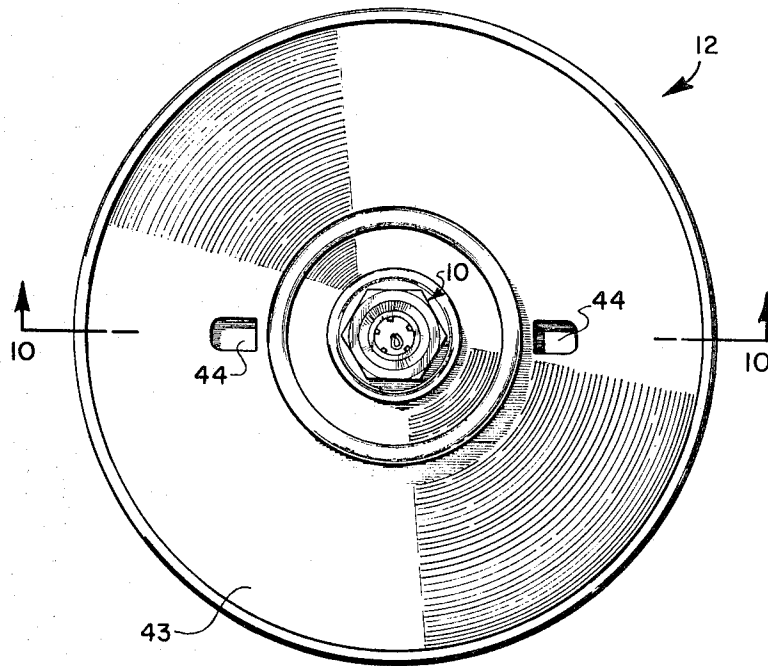


FIG 10

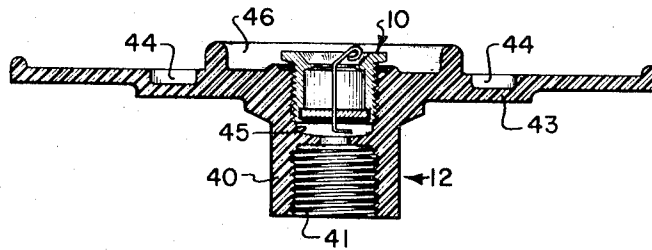
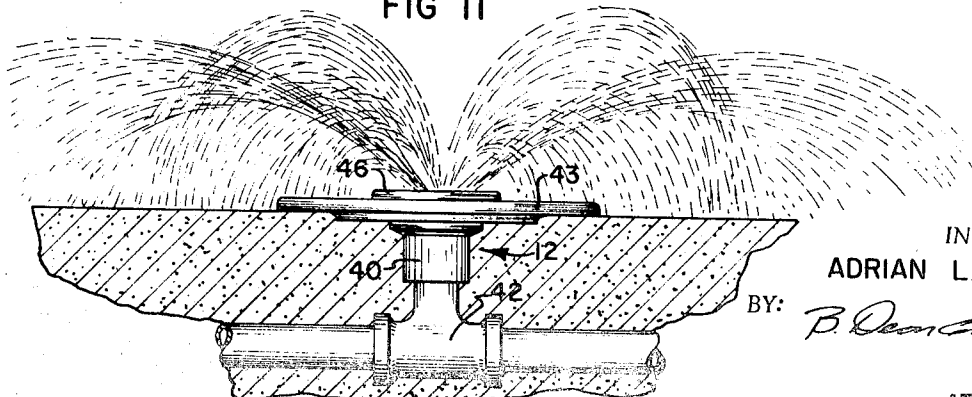


FIG 11



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SPRINKLER UNIT

BRIEF DESCRIPTION

There has long been a need for a low-cost sprinkler unit that will provide an even distribution of water and/or liquid chemicals throughout its entire area of coverage. There has also been a need for a sprinkler unit that will remain free from obstruction due to vegetation growth and that can be permanently installed in a lawn such that children playing on the lawn and falling on the sprinkler unit will not be seriously injured, and such that a warning will be provided before more expensive components are damaged by a lawn mower, or the like.

Principal objects of the present invention are to provide a sprinkler unit that is low in cost, reliable, and that can be safely used in permanently installed sprinkler systems. Another object is to provide a nozzle for such a sprinkler unit that will provide an even liquid distribution throughout the entire coverage area of the sprinkler unit, regardless of the input pressure to the nozzle. It is also an object to provide a nozzle that can be used in virtually any type of permanent or temporary sprinkler system and that can be used to evenly distribute liquified or dissolved chemicals such as fertilizers, herbicides, or insecticides in an even distribution pattern, thereby assuring maximum effectiveness of the chemical application.

Outstanding features of the invention include a nozzle having a bottom baffle with radially positioned angular slots and a chamber into which liquid is swirled from the slots and from which it is centrifugally sprayed radially and in a ring pattern from the nozzle; a central opening through which a stream of liquid is passed; and a pin that extends downwardly through the central opening and angularly into the chamber, to a point adjacent the periphery thereof.

The pin is turned by the swirling liquid and breaks up the stream of water flowing through the central opening, causing it to form a fountain and to disperse evenly around and adjacent to the nozzle, within the ring pattern.

A sprinkler body is provided for the nozzle and includes an outwardly extending flange that holds vegetation away from the sprinkler nozzle and an upstanding ring around the nozzle that guards the nozzle against damage and that absorbs impact of persons falling on the sprinkler unit.

Additional objects and features will become apparent from the following detailed description and drawings, disclosing what is presently contemplated as being the best mode of the invention.

THE DRAWINGS

FIG. 1 is a side elevation view of a conventional stand and hose fitting, equipped with the nozzle of the sprinkler unit of the invention;

FIG. 2, a top plan view;

FIG. 3, an enlarged perspective view of the nozzle, per se;

FIG. 4, a top plan view of the nozzle;

FIG. 5, a side elevation view;

FIG. 6, a vertical section, taken on the line 6-6 of FIG. 4, with the pin shown in full lines in its lowermost position and in broken lines in its fully raised position;

FIG. 7, a horizontal section, taken on the line 7-7 of FIG. 5;

FIG. 8, a fragmentary section, taken on the line 8-8 of FIG. 7;

FIG. 9, a top plan view of the sprinkler, complete with nozzle;

FIG. 10, a vertical section, taken on the line 10-10 of FIG. 9; and

FIG. 11, a somewhat schematic view showing a typical distribution pattern of liquid passed through a nozzle of the invention.

DETAILED DESCRIPTION

Referring now to the drawings:

In the illustrated preferred embodiment, a nozzle, shown generally at 10 is made to fit into either a conventional coupling 11, or a sprinkler body 12, such as is shown in FIGS. 9-11 to form a sprinkler unit.

The conventional coupling 11 is shown supported by a conventional type stand 13 that is adapted to rest on the ground. A nipple 14 is connected to the coupling (which may be of elbow configuration, as shown) and a conventional hose connector 15 interconnects the nipple 14 and a conventional garden hose 16.

Nozzle 10 includes a boss 17, having a central passage and exterior threads 18, and a hexagon shaped head 19 to facilitate threading of the nozzle into a coupling or sprinkler body.

A baffle plate 20 is mounted in a groove 21 provided therefor inside body 17 and at the lowermost end of a cylindrical chamber 22, forming a portion of the interior passage.

At its upper end, chamber 22 has a shoulder 23 that is angled upwardly and inwardly with respect to the wall of chamber 22 to form a restricted opening 24. An upper chamber is formed above shoulder 23 and its wall 25 is flared upwardly and outwardly with respect to the opening 24.

A plurality of slots 26 are provided through the periphery of baffle plate 20 and are angled such that liquid coming through them from beneath the nozzle enters the chamber 22 tangentially and is swirled around. When the liquid hits the angled underside of shoulder 23 it is directed through opening 24 and centrifugally out of the nozzle. Wall 25 assists in guiding the discharging water which is then distributed around the nozzle, with the greatest portion of the liquid that passes through slots 26 then being deposited in a ring pattern around the nozzle, as shown in FIG. 11.

The swirling, centrifugal discharge effectively results in an even distribution of the liquid in all directions, but does not insure an even distribution at all distances from the nozzle and, as has been noted, the predominant liquid application is of ring shape.

The use of nozzles having chambers and a slotted plate such as has been herein described has long been common, and such nozzles are readily commercially available.

However, my nozzle further includes a central opening 30 through the plate 20 and a pin 31 inserted through the central opening 30.

Pin 31 is considerably smaller in diameter than is the central opening 30 and is freely slidable therein. The pin includes an elongate portion 32 that is adapted to extend through opening 30 when the pin is in its raised position (as shown by broken lines in FIG. 6 and in full lines in FIG. 10) and a bent portion 33 at its lower end that engages the bottom of plate 20 when the pin is in its uppermost position, to hold the pin in the nozzle.

At the other end of portion 32, the pin is angularly bent to form an arm as at 34, and the arm 34 then terminates at a bent back head portion 34a. The arm 34 is angled with respect to portion 32 such that when the pin is in its uppermost position and portion 32 is extending straight through central opening 30, and portion 33 is engaging the bottom of plate 20, the head 34a is closely adjacent to the wall 25.

Pin 31 is in its uppermost or fully raised position whenever liquid is acting from beneath the nozzle and is being forced through the slots 26 and the central opening 30 and will drop to its lowermost position wherein head 34a holds it in the central opening whenever the liquid flow is cut off.

In operation, as has been described, flow through slots 26 causes the liquid to swirl up and over wall 25, to be centrifugally distributed around the nozzle, but primarily in a ring, some distance from the nozzle. At the same time flow is through the central opening 30. This raises pin 31 and positions head 34a closely adjacent to wall 25. The swirling liquid moving over wall 25 then engages the head 34a and rapidly moves it around the wall. As the head turns, the angled portion swings through the liquid stream projecting from the central opening. This breaks up the upwardly projecting stream and causes it to form a fountain that provides an even distribu-

tion of liquid throughout the center area not covered by the swirling liquid passed through slots 26.

While the nozzle 10 can be advantageously used with many sprinkler units, it is particularly useful with the sprinkler unit shown in FIGS. 9—11. As shown, the sprinkler unit consists of the body 12 and the nozzle 10.

Body 12 has a depending boss 40 that is interiorly threaded at 41 to be connected to a tee 42 or other suitable fitting of a liquid supply system.

A flange 43 extends outwardly with respect to boss 40 and serves to hold down vegetation growth in the area immediately surrounding nozzle 10. This keeps vegetation from plugging up nozzle 10 and obstructing free movement of pin 31.

A pair of recesses 44 are provided to be diametrically opposite one another in the flange 43 and provide means whereby a spanner wrench, not shown, can be used to thread the body onto the fitting of the liquid supply system to which it is to be attached.

Nozzle 10 is threaded into a threaded well 45 in the boss 42, above the threads 41 and an upstanding ring 46 surrounds the well and the nozzle and extends upwardly to a point above the top edge of the nozzle when it is fully threaded into the well 45.

The entire sprinkler body is preferably made of a durable, shock absorbing plastic, and ring 46 will serve as a guard against damage to the nozzle while at the same time absorbing the impact of children or others who may fall onto the sprinkler.

The sprinkler herein described is especially adapted for permanent lawn irrigation systems, the flange 43 will rest on the ground surface and will prevent encroachment of grass into the nozzle. The boss will extend to meet a subterranean irrigation system and will anchor the sprinkler in place, and the nozzle construction insures complete coverage within the range of the nozzle, regardless of the pressure applied thereto.

The overall profile of the sprinkler is low to allow for ready clearance by lawn mowers and the like and, should a lawn mower strike any portion of the sprinkler, it would most likely be ring 46, and the impact would warn the operator before the nozzle was damaged.

The sprinkler is inexpensive to construct, and especially the body 11, which may be ejection molded, and can be easily installed even by an inexperienced person.

Although a preferred form of my invention has been disclosed, it is to be understood that variations are possible.

I claim:

1. A sprinkler unit comprising:

a plastic body having:

a downwardly projecting, threaded boss adapted to connect to a liquid supply system,

a flange extending outwardly from the boss,

a passageway through the boss, and

an upstanding ring on the flange and surrounding the upper end of the passageway;

a nozzle threaded into the upper end of the passageway such

that the top of surface of the nozzle is below the top of the said upstanding ring, and the flange will keep vegetation from obstructing flow through the nozzle, said nozzle including:

a central passage therethrough, a baffle plate in the bottom of said central passage, said baffle plate having angular slots therethrough whereby liquid passed through the slots is swirled within the central passage and is discharged from the upper end thereof and a central opening therethrough,

an outwardly and upwardly flared wall at the upper end of the central passage, and a pin extending freely through the central opening in the baffle plate, said pin having a straight intermediate portion adapted to extend through the central opening,

a bent portion at the lower end thereof to prevent passage of the pin upwardly through the central opening, and an angulated arm portion at the other end of the straight intermediate portion, said angulated arm portion extending to a location adjacent the outwardly and upwardly flared wall when the pin is in its uppermost position, whereby the bent portion engages the underside of the baffle, and terminating in a bent back portion that restrains the pin against movement downwardly out of the central opening and that is contacted by swirling liquid being discharged to pivot the pin.

2. A sprinkler nozzle comprising:

an exteriorly threaded boss projecting from a head;

a central passage through the boss and head;

a baffle plate in one end of the central passage, said baffle plate having angular slots therethrough at the periphery thereof, whereby liquid passed through the slots and into the central passage is swirled before being centrifugally discharged from the other end of the central passage, and a central opening; and

a pin extending freely through the central opening in the baffle plate, said pin having a straight intermediate portion adapted to extend through the central opening, means on the lower end of the straight intermediate portion preventing upward movement of the pin out of the central opening while allowing liquid passage therethrough and an angulated arm at the other end of the intermediate portion, extending to a location adjacent to the upper end of the central passage when the pin is in its uppermost position.

3. A sprinkler nozzle as in claim 2, wherein the upper end of the central passage is flared outwardly and upwardly.

4. A sprinkler nozzle as in claim 3, wherein:

the end of the angulated arm opposite the intermediate, straight section is reversely bent; and

the means on the lower end of the intermediate straight section comprises a bent portion of the pin.

5. A sprinkler nozzle as in claim 4, including a shoulder having an inwardly and upwardly inclined bottom surface, between the baffle plate and the flared wall.