

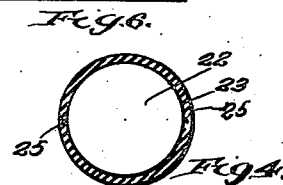
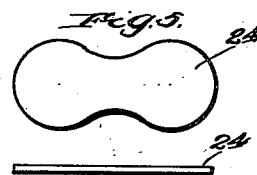
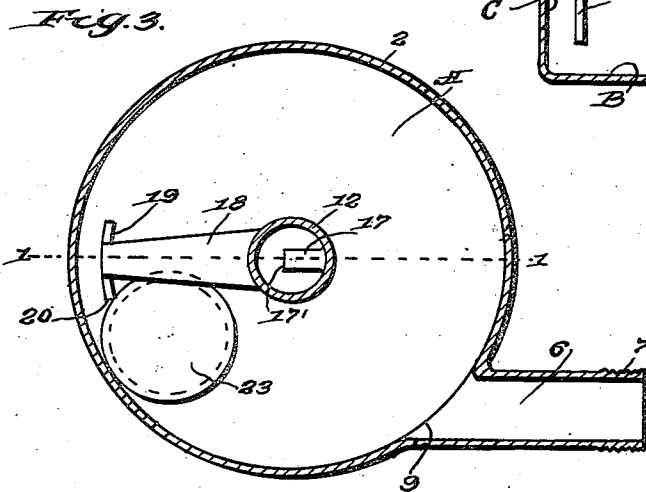
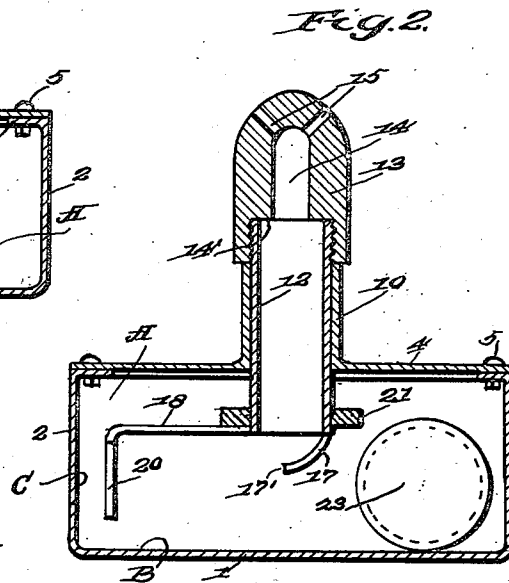
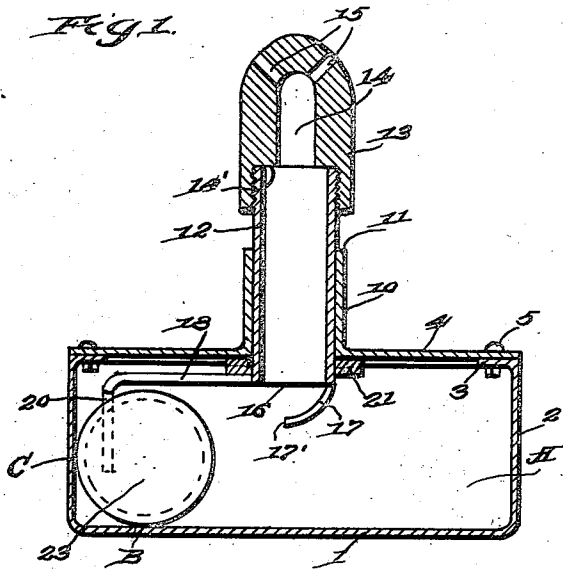
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SPRINKLER

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SPRINKLER

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1 Claim. (Cl. 299—67)

This invention relates to improvements in sprinklers and more especially to lawn sprinklers, and has to do with certain improvements on the structure shown in my Patent No. 1,568,250, issued January 5, 1926.

In this prior patent, a steel ball was disposed in a cylindrical water chamber into which the water supply was tangentially admitted to impart a whirling motion to the water and impel the ball to cause the latter to impact against an actuating arm and intermittently advance or rotate a sprinkler nozzle.

It was found in practice that even the small quantity of sand in the water presented a sufficient abrasive to cause the steel ball to wear grooves along the bottom and radially outer portions of the chamber which the ball traversed, and I found it necessary to case-harden or otherwise provide the chamber walls with suitable surfaces that would resist this wear. I also found it necessary to case-harden that portion of the actuating arm against which the steel ball impacted, all of which very greatly increased the manufacturing cost of the sprinkler.

The above, and many other features of my prior construction are improved and corrected in such a manner that I am now able to make the housing, in which the water chamber is formed, of either cast or stamped material, and entirely avoid the wear and consequent defective operation that resulted from my prior construction.

Therefore it is a feature of this invention to make the interior walls of the water chamber unaltered by case-hardened portions or otherwise changing the character of the material from the general nature of which it is formed.

It is also a feature of the invention to make the actuating arm either integral with the nozzle head or of any desired cast or stamped metal.

A special feature of the invention resides in an unrestrained body or ball for actuating the nozzle arm, which ball is spherically cushioned in a manner to absorb the wear of extraneous abrasive substances, and also the wear incident to constantly traversing portions of the water chamber and periodic engagement with the actuating arm.

It is also a feature of the invention to provide a ball that will effectively function even after the spherical covering has worn off.

The invention has many other features and objects which will be more fully described in connection with the accompanying drawing, and

which will be more particularly pointed out in and by the appended claim.

In the drawing:

Fig. 1 is a vertical sectional view on line 1—1 of Fig. 3, showing the nozzle in an extended or operative position such as it would occupy when the sprinkler is in operation.

Fig. 2 is a similar view showing the nozzle in the collapsed position which it would assume when the sprinkler is not operating.

Fig. 3 is a horizontal sectional view taken through the sprinkler.

Fig. 4 is a sectional view of the spherical covering disposed about a ball core.

Fig. 5 is a plan view of a blank of raw rubber cut to be wrapped about the ball core.

Fig. 6 is an edge view thereof.

Like characters of reference designate similar parts throughout the different figures of the drawing.

As shown, I have provided a housing of thin stamped or drawn material to more graphically emphasize the non-wearing features resulting from my improved construction. This housing has a bottom wall 1, an upright cylindrical wall 2 and may have an intumed flange 3, to which a cover 4 may be secured by means such as bolts 5. The interior of this housing forms what I will term a water chamber, which is generally indicated at A. Any suitable base or support may be provided on which the sprinkler may rest, but this is not a feature of the invention.

A water ingress is provided which may be in the form of a tube 6, connected with the housing or formed integral therewith, and opening there- to substantially tangentially of the cylindrical chamber A, preferably midway of the height thereof. The outer end 7 is suitably threaded for connection with a lawn hose. The bore of the tube 6 is substantially uniform and it is not necessary to reduce it to increase velocity because of the fact that the improved ball I will later describe is enlarged in diameter and therefore its total mass becomes intensively responsive to the flow of water, as will later appear.

Reference will next be made to the nozzle head and the manner in which it is rotatively mounted in the sprinkler structure.

The cover 4 is provided with a journalling sleeve 10 having an abutment end 11. Rotatively and longitudinally movable in said sleeve 10 is a nozzle pipe 12 which forms the water egress for the chamber A. Threaded or otherwise fixed to said pipe 12 is a nozzle head 13 having a bore 14, communicating with said pipe, and provided with

sprinkling outlets 15, of any desired form. The intake end 16 of said pipe 12 is provided with an obstructing member or lug 17, which is disposed in the path of the water entering pipe 12, and the function of which is to prevent the ball, to be later described, from being sucked up by the flow through pipe 12, and hence having its circular travel about the chamber A interrupted. It will be seen from Fig. 3 that the obstructing member or lug 17 is not wide enough appreciably to restrict the volume of flow into pipe 12.

It will be observed that this lug 17 projects toward the radially inner face of impact member 19, so that it always extends toward the ball when the latter is deflected radially inwardly after having impacted against edge 20. Hence the terminal end 17' is always in a position to interrupt movement of the ball away from its normal course of travel. This, in practice, is very important because a rubber covered ball is more responsive to suction than a metal ball.

A nozzle actuating arm 18 is suitably formed on or secured to pipe 12 and extends radially outwardly therefrom and is provided with a downwardly extending impact end 19, having an impact edge 20 for engagement by the ball. A spacing washer 21 fits snugly over pipe 12, above arm 18, and limits upward movement of the entire nozzle structure under the thrust of egressing water, to a position dependent upon the thickness of the washer, as will be clear from Figs. 1 and 2. Washers of different thickness may be employed, and it is also important to note that this washer absorbs the friction against the bottom of cover 4. If conditions such as varying water pressure requires an increased or decreased frictional resistance, then washers of correspondingly greater or less diameter are employed. Hence, the spacing means or washer 21 functions in two capacities, and in the matter of height it serves to locate the impact portion 19 at the proper elevation with respect to the ball.

In the absence of water pressure, the nozzle head descends until the bottom 13' engages the abutment end 11 of sleeve 10, as shown in Fig. 2. When pressure has been turned on the water not only engages the surface 14' but by reason of the fact that egress provided by openings 15 is of very much less capacity than the ingress afforded at 9, the constantly resulting pressure will force the nozzle into the Fig. 1 position, and keep it there. Hence, it will be clear that the major friction resulting from turning movement of the pipe 12, will be localized on washer 21, or rather between the upper face of the latter and the bottom of cover 4, if the washer does not turn or is fitted too tightly or anchored so as not to turn. However, I prefer not to fit the washer 21 so tightly on pipe 12 as to prevent the washer from turning, and hence, rotatively speaking, it may, and actually does constitute a full floating washer in which the friction would be divided between the upper face and cover 4, and between the lower face and arm 18.

My improved nozzle actuator is in the form of an unrestrained rolling body capable of being motivated by the whirling water to engage the impact member at 20, on each revolution, and thereby intermittently rotate the nozzle structure a fraction of a revolution. In the most improved form of the invention, this actuator is spherical and comprises a weight core 22, of metal, and a cushioned periphery of yielding material such for instance as rubber, indicated at 23. The member 19 is located in such proximity

to the wall 2, with respect to the diameter of the ball 23, that the center of the latter will be disposed radially inwardly from said member; hence, after the first impact the whirling water will shift the ball radially inwardly of said member 19 and the ball will thence negotiate a cycle of movement around the chamber and again impactively engage member 19. This causes intermittent rotation of the nozzle with intervening periods of rest, and it is a feature to make this intermittent movement of the nozzle as nearly uniform as possible throughout one complete cycle, so that the lawn surface will be uniformly sprinkled.

In the most improved construction I cut two or more layers of raw rubber into the form of blank shown at 24, and dispose the same over the core 22 in a manner to uniformly enclose the same. Then the rubber cover is vulcanized. To prevent the core from sinking in the cover while the latter is soft and in the mold, I provide the core with suitable anchoring projections 25 of any desired form or size. In practice, the cover will become free from the core but will snugly fit the same, and I have found that the cover will wear spherically because of the fact that the wear is so uniformly sustained.

When I used a steel ball I found that the nozzle was turned to a greater extent at each impact, through one segment of a circle than through another segment, thus causing an uneven sprinkling of the lawn. With my improved rubber covered ball I find there is no variation, and I obtain an even and substantially uniform sprinkling of an area. When operating with a steel ball, I found that the impact was solid and very sharp, especially when the ball travelled just past the intake 9, and was less sudden after or as the ball receded from said intake 9. This sudden and sharp impact with member 19 advanced the nozzle further than was the case after the ball had travelled approximately half or three-quarters of a circle.

Because of the abrasive action of the sand, which is present in practically all city water, I found that the steel ball wore a groove along the lower peripheral area or travel path portion B of contact with bottom wall 1, and also or travel path portion as indicated at C where the ball engaged the upright wall 2. That is the reason why case-hardened portions of the housing were necessary. This is entirely avoided with my improved ball because the yielding action of the latter permits the sand to indent it and hence the wear is hardly appreciable.

While I find that a rubber covered ball of the same diameter as a steel ball would not function as well, it is merely necessary to enlarge the height of the chamber A, and provide a metal core practically as large as the previously used steel ball, in order to afford the rubber covered ball the requisite weight to make it effective.

However, it is a feature of this invention to provide a metal core of a character which will avoid the necessity of greatly enlarging the diameter of the ball, and this feature comprises a core made of one-tenth antimony and nine-tenths lead, or of equivalent metals functioning in a like capacity. However, this particular composition forms a material, and hence if the rubber cover should wear off, the core could function, and as this core would be softer than the metal parts with which it coats, it would absorb wear and not require renewal of the housing or actuating arm.

Thus, in any and all events, this improved ball not only permits the use of a cast housing and actuating arm, and avoids the expense of case-hardened parts, but its nature corrects certain operative deficiencies of the steel ball, as I shall next explain.

In the first place I desire to point out that any metal to metal contact requires that the metal of one part be softer or faster wearing than that of another part, irrespective of the abrasive action of the sand, and by means of this improved ball, either when peripherally cushioned or after the cushion has worn off, it is so much softer in the first instance, and sufficiently softer in the second instance, that I am enabled to make the housing and impacting parts of fast wearing material, such as casting or stamped metal.

In the matter of operation, the relatively heavier core of the cushioned ball, I obtain a sharp impact with the actuating arm, but it is a cushioned impact that does not cause the jar and jolt of the steel ball. Further, all other conditions being equal, the cushioned ball travels with slightly greater resistance than the steel ball, and the resulting impact is less severe, whereby a shorter advance movement of the nozzle is effected, which is a real advantage in actual practice, but the advancing movement is uniform throughout a cycle of travel, which is not true of the steel ball.

However, I have provided a feature whereby I can obtain just as much of an advance movement of the nozzle with a rubber covered ball as with a steel ball, and this feature is embodied in the spacing washer 21. Thus, I can use a washer of relatively reduced diameter when I desire to

increase the intermittent advance of the nozzle because the resulting friction against the cover 4 is correspondingly reduced. Then if I desire a relatively reduced advance movement of the nozzle, I use a washer 21 of corresponding larger diameter.

I also desire to point out that when the pressure of water is extremely high, and would therefore cause a too rapid rotation of the nozzle, I can correct this by inserting a washer 21 of greater diameter, and in the case of a relatively reduced pressure, or where just a slight increase of nozzle rotation is desired, I can employ a relatively smaller diameter washer. Hence, it will be seen that by this simple expedient I can control the rate of rotation of the nozzle and thus make the sprinkler self-compensating.

It is believed that my invention will be fully understood from the foregoing description, and I do not wish to be limited to the construction shown except for such limitations as the claim may impart.

I claim:—

A lawn sprinkler including a housing provided with ball travel path portions of relatively hard material and having an ingress discharging water into said chamber to form a whirling mass, a movable sprinkler head for said sprinkler having an actuating arm in said chamber formed of relatively hard material, and a ball in said housing having a soft cushioning covering and a thrust increasing and weight imposing core of fast wearing material relative to said path portions and arm, whereby said core may function after the soft covering has worn off from said core.

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