March 6, 1956 C. M. MacCHESNEY 2,737,418

SPRINKLER ATTACHMENT FOR GARDEN HOSE

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FIG. 1

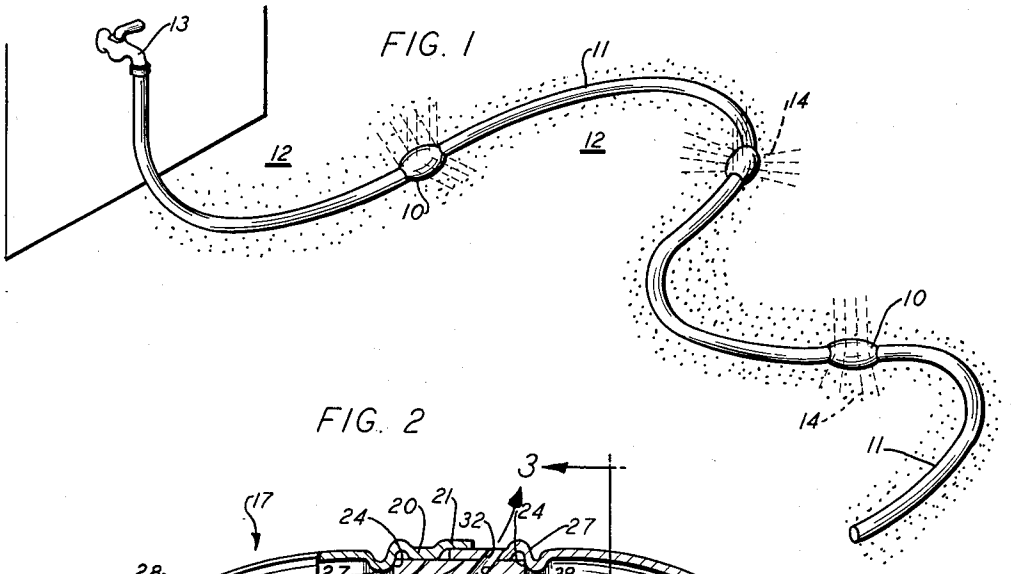


FIG. 2

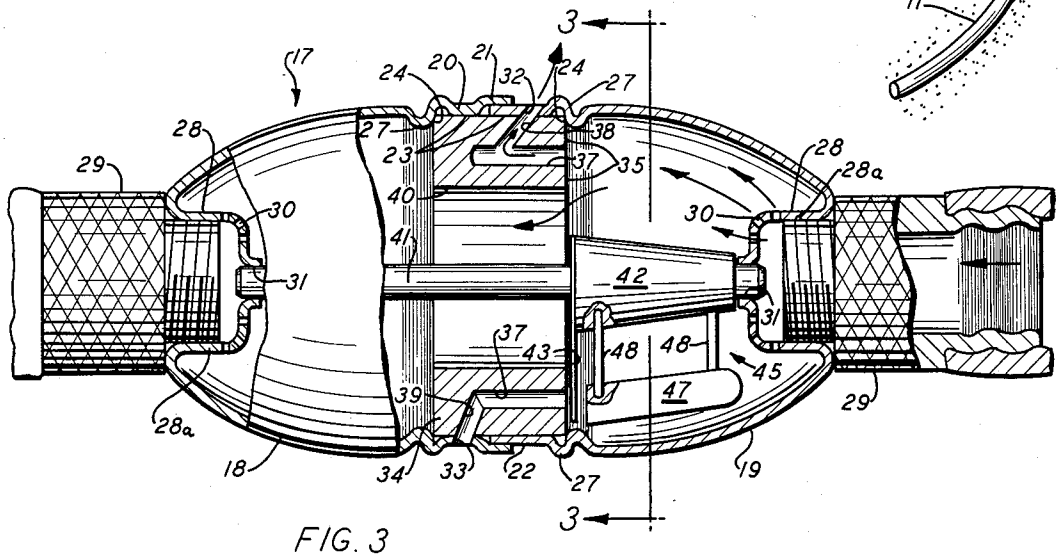
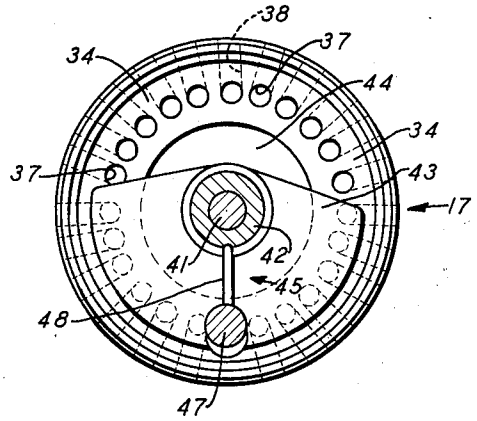


FIG. 3



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FIG. 4

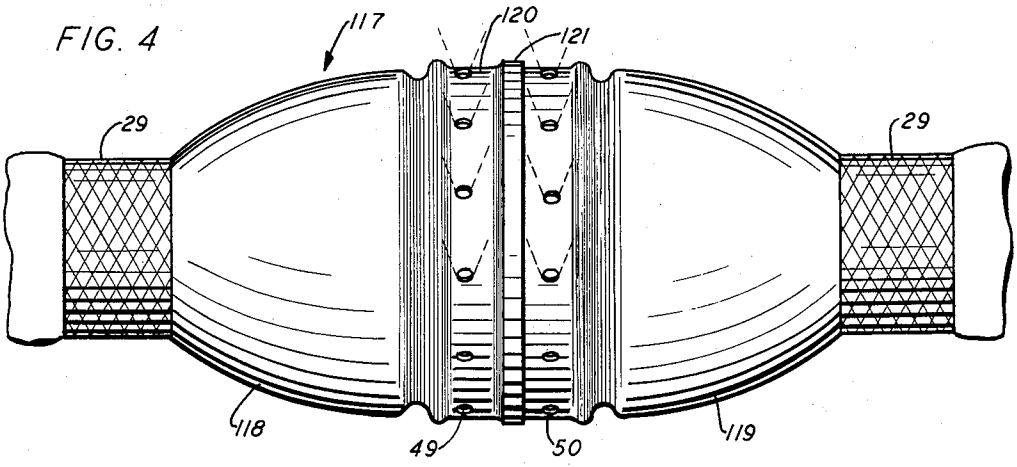


FIG. 5

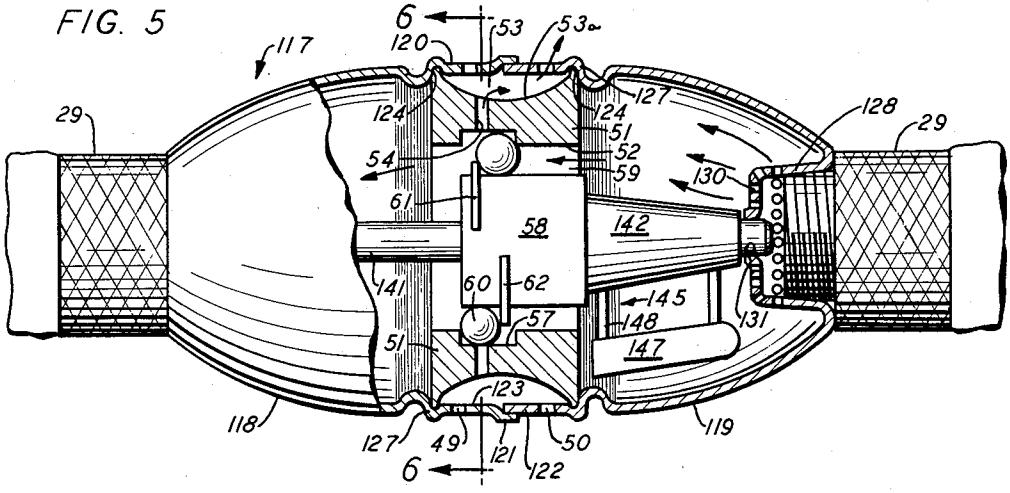
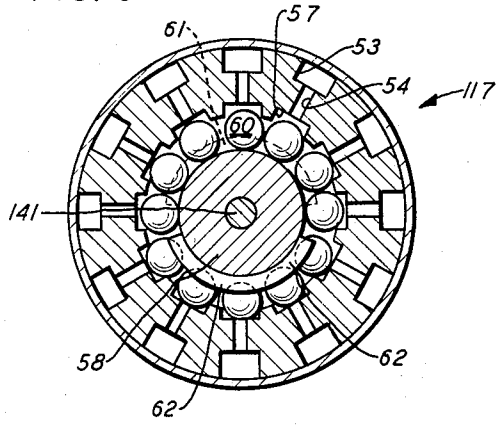


FIG. 6



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United States Patent Office 2,737,418 Patented Mar. 6, 1956

2,737,418

SPRINKLER ATTACHMENT FOR GARDEN HOSE

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Application January 6, 1955, Serial No. 480,096

18 Claims. (Cl. 299—105)

This invention relates to a new and improved sprinkler attachment for a garden hose and more particularly to such an attachment for use at intervals in a hose for effecting the sprinkling of a lawn over a large area.

The device of this invention is an improvement over the sprinkler attachment disclosed in the copending application entitled "Sprinkler Attachment for Garden Hose," Serial No. 324,486, filed December 6, 1952, now Patent No. 2,709,624, and has as a general object the provision of an improved sprinkler attachment which may be connected in a garden hose and which will operate automatically to discharge water only in a general upward direction regardless of its position on a supporting surface, as a lawn or the like.

Another object of the invention is to provide such a sprinkler attachment with an inexpensive, ellipsoidally shaped casing for preventing the sprinkler attachment from snagging as it is dragged along the ground.

Yet another object of the invention is to provide such a casing with a ring-like insert member provided with a plurality of passages communicating between sprinkler ports in the casing and the casing interior, and a gravity operated diaphragm in the casing adapted to be flexed by inlet water pressure, the construction and arrangement being such that the diaphragm is normally disposed in a position for blocking those passages which are directed generally downward in any rotary position of the casing so that water will be sprayed from the casing only in a general upward direction.

Still another object of the invention is to provide a sprinkler attachment embodying a casing as described above and provided with a ring-like insert having an annular series of radial passages communicating between the casing interior and the casing sprinkler ports, a ball valve associated with each passage, and a gravity operated rotatable cam roller carrying spaced cam blades for shifting certain of the ball valves into blocking association with those passages which are directed generally downward in any rotary position of the casing so that water will be sprayed from the casing only in a general upward direction.

Further features of the invention pertain to the particular arrangement and construction of the elements of the invention whereby the above outlined and additional operating advantages are obtained.

The invention both as to organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification taken in connection with the accompanying drawings in which:

Figure 1 is a perspective view of a garden hose having a plurality of sprinkler attachments of the present invention connected therein;

Fig. 2 is a view partially in vertical section of a first embodiment of the invention;

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 2;

Fig. 4 is a longitudinal side elevation of a second embodiment of the invention;

Fig. 5 is a view partly in vertical section taken through the second embodiment of the invention; and

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 5.

Referring now to Fig. 1 of the drawings, a number of sprinkler attachments **10**, constructed according to the present invention, are there illustrated as being connected at intervals in a hose line **11** which rests upon the lawn **12** and which is connected through the faucet **13** to a source of water supply. The hose **11** and its sprinkler attachments are shown in operation with sprays of water **14** extending upwardly and outwardly from each of the attachments **10**.

Referring now more particularly to Figs. 2 and 3 of the drawings, the sprinkler attachment there illustrated and embodying the features of the present invention, comprises an ellipsoidally shaped casing **17** which includes similarly constructed cup-shaped casing members **18** and **19**, the open end of the member **18** being provided with an annular flange **20** having an expanded circumferential rim **21** for receiving an annular flange **22** of the open end of member **19**, whereby the two members may be secured together by any suitable means, as by spot welding. Also, the adjacent interior surfaces of flanges **20** and **22** form an annular cylindrical seating surface **23**, centrally located intermediate the ends of the casing **17**, and defined by a pair of parallel, internal annular shoulders **24** formed by annular S-shaped flanges **27**.

Further, the casing **17** comprises a cup-shaped coupling member **28** turned inwardly at each end of the casing and having an internally threaded cylindrical wall **28*a*** for receiving threaded hose connectors **29**. Communication between the coupling members is provided by a plurality of apertures **30** in the inner end walls of the members **28**, these end walls terminating in two centrally disposed, axially aligned bearings **31** for a purpose as subsequently described. Also, the casing **17** is provided with two annular series of sprinkler ports **32** and **33**, the two series being spaced around the periphery of the casing on opposite sides of the rim **21**. Water passages for communicating between these ports and the casing interior are provided in a cylindrical valve insert **34**, as best shown in Fig. 2, which insert snugly fits between the spaced shoulders **24** and has an annular exterior surface in substantially water-tight engagement with the annular casing seating surface **23**. Also, the insert **34** provides an annular radial shoulder **35** facing the inlet flow of the water through the casing **17**.

More particularly, the water passages include an annular series of longitudinal bores **37** opening through the shoulder **35** into communication with the right-hand or inlet side of the casing **17**. Each of the sprinkler ports **32** is connected to a respective bore **37** by a passage **38** which extends from each port at a slight angle toward the discharge end of the casing so that sprays emitting from the sprinkler ports **32** will be inclined slightly toward the inlet end of the casing. Each of the sprinkler ports **33** is connected to a bore **37** by a respective passage **39** which extends from each port at a slight angle toward the inlet end of the casing so that sprays emitting from the sprinkler ports **33** will be inclined slightly toward the discharge end of the casing. Communication between the inlet and discharge ends of the casing is established through a central opening **40** in the insert which opening is coaxial with apertures **31** for a purpose hereinafter described.

Finally, the sprinkler attachment comprises means positioned within the casing for blocking communication between the chamber of the inlet casing member **19** and the lower peripheral one-half portion of the bores **37**

so that the sprinkler automatically functions to emit sprays only in an upward direction no matter what its position may be with respect to the supporting surface of the ground. This blocking means comprises a shaft 41 which extends through the opening 40 and is secured at each end in a bearing 31 so as to be disposed in a substantially coaxial relation with the insert 34. As best shown in Figs. 2 and 3, the shaft carries a truncated cone-shaped hub 42 rotatable on the shaft 41 and positioned with its base closely adjacent to the shoulder 35. The diameter of the hub gradually increases from the inlet side of the casing toward the shoulder 35 to aid in directing inlet water toward the bores 37.

The base end of the hub 42 carries a relatively fixed diaphragm 43 which is normally rotatable with the hub about the shaft 41. This diaphragm is half circular in form and closely overlies a substantial portion of the inlet side of the opening 40 and provides, with the insert 34, a crescent-shaped opening 44 through which inlet water may pass to the discharge end of the casing 17. The diaphragm has a radius such that it overlies certain of the bores 37 and extends through an arc of approximately 180°. When the diaphragm is in the position as shown in Fig. 3, and when it is flexed against the insert shoulder 35 by the inlet water pressure, it is effective to block and seal the lower half portion of the bores 37 or, more particularly, to block all of the bores except those through which water may pass to spray from the ports 32 and 33 in a general upward direction.

The diaphragm 43 is automatically positioned in such a blocking position by a pendulum 45 including a weight 47 which is fixed to and hung in a spaced parallel relation to the hub 42 by a pair of arms 48. The longitudinal axis of the pendulum weight 47 passes through the bisecting radius of the diaphragm, so that the diaphragm will normally overlie approximately the lower one-half of bores 37, regardless of the position of the casing 17 in relation to the ground (Fig. 3).

The diaphragm may be formed of any suitable material having that degree of flexibility which will enable inlet water pressure to flex and lock it against the shoulder 35 of the valve insert 34 while retaining a degree of resiliency so that it is normally disposed closely adjacent to but free of the insert when unflexed by water pressure (Fig. 2).

Considering now the operation of the above described sprinkler attachment, it will be understood that, when the valve 13 is opened, inlet water will enter from the hose 11, pass through the inlet apertures 30 and into the right-hand portion of the sprinkler casing. Since the pendulum 45 automatically assumes its lowest possible position, the diaphragm will automatically be disposed in an overlapping relation with respect to approximately the lower one-half of the bores 37, regardless of the relative position of the casing to the supporting ground surface. The reduced opening 44 above the diaphragm aids in building up inlet pressure in the casing 19 which flexes the diaphragm 43 against the shoulder 35 and locks it in blocking position as shown in Fig. 3. This causes inlet water to enter the upper unblocked bores 37 and to be discharged as sprays in a general upward direction from the casing 17, while the remainder of the inlet water flowing through the opening 44 passes out the discharge end of the casing to the next sprinkler attachment in the hose line.

Referring now to Figs. 4 to 6, inclusive, there is shown another form of the sprinkler attachment embodying the present invention. As best shown in Fig. 5, a casing 117 is provided which, except for the sprinkler ports, is substantially identical to the casing 17 and includes the parts 118 to 128 which are the same as parts 18 to 28, respectively, and 130 and 131, which are the same as parts 30 and 31, respectively. As best shown in Fig. 4, the casing 117 is provided with two spaced parallel series of sprinkler ports 49 and 50, the two series being located on opposite

sides of the expanded rim 121 and being arranged in pairs around the periphery of the casing. The sprinkler attachment includes a shaft 141, a hub 142 and a pendulum 145 embodying the parts 147 and 148, constructed substantially as previously described.

The sprinkler attachment includes an annular valve ring 51, positioned in the casing between the spaced shoulders 124, and provided with a central opening 52 through which extends the shaft 141. The outer periphery of the valve ring 51 comprises a series of equally spaced cavities 53 having laterally spaced vertical walls and a longitudinally extending concave bottom surface 53*a*. Each of these cavities provides a communication between a pair of the sprinkler ports 49 and 50 and a respective radial passage 54 which opens at its inner end into the left-hand portion of one of a series of rectangular cavities 57 which are formed in the inner peripheral surface of the ring 51 and spaced equally apart. Each of the cavities 57 has an axial length somewhat greater than the width of the cavity for a purpose hereinafter described.

The pendulum 145 and shaft 141 are connected with means for blocking approximately the lower one-half of the passages 54 so that the sprinkler attachment automatically operates to discharge sprays of water only in a general upward direction regardless of its position on the ground. As shown in Fig. 5, a cylindrical cam roller 58 is disposed coaxially of the central opening 52 and is fixedly secured at its right-hand end to the base of the hub 142 for rotation therewith on the shaft 141. The cylindrical outer surface, extending longitudinally of the cam roller 58, extends from the right-hand side of the valve ring 51 to substantially the left-hand extremities of the cavities 57, and forms with the valve ring an annular passage 59 for establishing communication between the inlet and discharge ends of the casing 117.

A series of spherical valve members 60 engage the outer surface of the cam roller 58 and the outer portion of each of these valve members engages one of the cavities 57, the outer surface of each cavity 57 being spaced from the outer surface of the cam roller 58 such a distance that the spherical valve members 60 permit the cam roller 58 to rotate with ease. The diameter of each valve member 60 is such that it is shiftable longitudinally of its respective cavity 57 but is maintained in substantially a constant lateral position with respect thereto.

The cam roller 58 comprises a pair of arcuate, radially disposed, spaced cam blades 61 and 62 which are fixed on opposite sides of the cam roller in such positions that the longitudinal axis of the pendulum weight 147 passes through the bisecting radius of both of the arcuate cam blades, so that the cam blades are normally held by the pendulum in the positions shown in Figs. 5 and 6 in any rotary position of the casing 117. As illustrated, the cam blade 62 operates to shift into a left-hand passage closing position those ball valves 60 which are associated with the passages 54 having a general downward direction so that the ball valves automatically close the mouths of those passages which are directed downwardly in any position of the casing. The cam blade 61 is operative for shifting into a right-hand passage opening position those ball valves 60 associated with the passages 54 which have a general upward direction, so that those passages are unblocked and sprays of water are thus discharged from the casing only in a general upward direction. Furthermore, the arrangement is such that the initial contact between a cam blade and a spherical valve member is always off center so that the valve member is moved in the direction of the larger segmental spherical portion thereof, and the spherical valve members are moved in the proper direction without jamming.

Considering now the operation of the above described sprinkler attachment, it will be understood that a hose will be equipped with a plurality of sprinklers as shown in Fig. 1. When the valve 13 is opened water will enter

from the hose 11, pass through inlet apertures 130 and into the right-hand portion 119 of the sprinkler casing. Since the pendulum 145 automatically assumes the lowest position possible, the cam blades 61 and 62 will be in the positions shown in Figs. 5 and 6. The spherical valve members 60, in the lower half of the series, will be shifted to their left-hand positions by the cam 62 and will drop into a seating position across their respective passages 54, thus blocking off the flow of water through all of the passages 54 which are directed generally downward in any rotary position of the casing. The spherical valve members in the upper one-half of the series will be shifted to the right-hand nonblocking position by the cam blade 61. The reduced annular passage 59 and the associated ball valves aid in building up inlet water pressure which causes an amount of the water to pass into the passage 59, between the ball valves 60 and into upper cavities 57, through the respective passages 54, and out the respective sprinkler ports 49 and 50 to discharge from the casing as sprays directed only in a general upward direction. The remainder of the inlet water flows through the passage 59, between the ball valves 60, and out the discharge end 118 of the casing to the next sprinkler attachment in the hose line.

From the foregoing, it is apparent that there has been provided an improved sprinkler attachment which may be connected in a garden hose and which will operate automatically to discharge water only in a general upward direction regardless of its position on a supporting surface, such as a lawn or the like. Moreover, the sprinkler attachment is of sturdy, simple and light weight construction, and is so formed that each sprinkler is free to move with a hose on a supporting surface, as a lawn or the like. Thus, to secure effective sprinkling of a lawn over a large area, the hose need only be pulled out in appropriate fashion and connected to a source of water supply.

While two embodiments of the invention have been shown and described, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

I claim:

1. A sprinkler attachment comprising, a hollow casing having a longitudinal axis and an annular series of sprinkler ports, means for connecting said casing with a hose line, and means in said casing pivotable independently of the casing around the longitudinal axis thereof for automatically closing those sprinkler ports which are directed generally downward in any rotary position of the casing.

2. A sprinkler attachment comprising, a hollow casing having an annular series of sprinkler ports and inlet means in one end of said casing for connection with a hose line, a gravity operated member in the casing pivotable with respect to said casing around the longitudinal axis thereof, and means operatively associated with said member for automatically closing those sprinkler ports which are directed generally downward in any rotary position of said casing.

3. The structure as recited in claim 2 wherein the gravity operated member comprises a hub and a pendulum fixedly secured thereto.

4. A sprinkler attachment comprising, a hollow casing having an annular series of sprinkler ports and inlet means in one end of the casing for connection with a hose line, means in said casing providing a shoulder facing inlet flow, said means having a plurality of passages each communicating with a sprinkler port and opening into the casing interior through said shoulder, and a gravity operated member pivotally mounted in the casing to swing in a plane substantially parallel to and closely adjacent said shoulder and operable for selectively closing those of said passages communicating with sprinkler ports which are directed generally downward in any rotary position of the casing.

5. A sprinkler attachment comprising, a hollow casing having an annular series of sprinkler ports and inlet means in one end of the casing for connection with a hose line, means in said casing providing a shoulder facing inlet flow, said means having a plurality of passages each communicating with a sprinkler port and opening into the casing interior through said shoulder, a gravity operated member in said casing having pivotal movement about the longitudinal axis thereof, and resilient means operatively associated with said member and responsive to inlet water pressure for selectively closing those of said passages communicating with sprinkler ports which are directed generally downward in any rotary position of the casing.

6. The structure recited in claim 5, and wherein said resilient means comprises a half circular diaphragm normally disposed closely adjacent to said shoulder and overlying a portion of said passages and adapted to be flexed by inlet water pressure against said shoulder for selectively closing a plurality of said passages.

7. A sprinkler attachment for a garden hose comprising, an ellipsoidally shaped hollow casing having an annular series of sprinkler ports intermediate the ends thereof, inlet means in one end of said casing and discharge means in the other end of said casing for connection in a hose line, said casing being free to rotate on the ground with a hose line, said inlet and discharge means including a pair of axially aligned bearings, a shaft having its ends fixed in said bearings, means coaxial with said shaft providing an annular shoulder in said casing facing the inlet flow, said means having a plurality of passages each communicating with a sprinkler port and opening into said casing interior through said shoulder, and gravity operated means mounted for rotation on said shaft and movable in an arc adjacent said shoulder for selectively closing those of said passages communicating with sprinkler ports which are directed generally downward in any rotary position of said casing.

8. A sprinkler attachment for a garden hose comprising, an ellipsoidally shaped hollow casing having an annular series of sprinkler ports intermediate the ends thereof, inlet means in one end of said casing and discharge means in the other end of said casing for connection in a hose line, said casing being free to rotate on the ground with a hose line, a portion of said casing forming a pair of inwardly disposed spaced annular flanges including said sprinkler ports therebetween, an annular insert positioned between said flanges and providing an annular shoulder in said casing facing inlet flow, said insert having a plurality of passages each communicating with a sprinkler port and opening into said casing interior through said shoulder, a gravity operated pendulum mounted in the casing for rotation about the longitudinal axis of said insert, and a resilient diaphragm mounted on said pendulum and rotatable in an arc substantially parallel to the plane of said shoulder, said diaphragm being normally disposed in a spaced relation from said shoulder and adapted to be flexed by inlet water pressure against said shoulder for selectively closing those of said passages communicating with sprinkler ports which are directed generally downward in any rotary position of said casing.

9. Control means adapted for association with a sprinkler casing having inlet means in one end and discharge means in the other end for connection in a hose line and a plurality of sprinkler ports therebetween, comprising a shaft adapted to be fixed in said casing longitudinally thereof, a ring-like insert adapted for positioning in said casing coaxially of said shaft for providing an annular shoulder in said casing facing fluid flow therethrough, said insert having a plurality of passages each communicating with one of said sprinkler ports and opening into the interior of said casing through said shoulder,

a gravity operated pendulum rotatably mounted on said shaft and adapted to have one end thereof adjacent said shoulder, and a half circular resilient diaphragm fixed to said end of said pendulum and adapted to swing in an arc adjacent said shoulder, said diaphragm being adapted to flex against said shoulder in response to inlet fluid pressure in said casing for selectively closing those of said passages communicating with said sprinkler ports which are directed generally downward in any rotary position of the casing.

10. A sprinkler attachment for a garden hose comprising, a hollow casing having a sprinkler port intermediate the ends thereof, means defining a water inlet opening in one end of said casing for connection to a garden hose, means in said casing defining a radial passage communicating between said port and the casing interior, valve means shiftable laterally of said passage between a first position for blocking said passage and a second position allowing flow therethrough, and gravity operated means in said casing rotatable about the longitudinal axis thereof for shifting said valve means into said first position when said sprinkler port is directed generally downward.

11. A sprinkler attachment comprising, a hollow casing having an annular series of sprinkler ports intermediate the ends thereof and inlet means in one end of the casing for connection with a hose line, a valve member mounted in said casing and having a plurality of radial passages each communicating between a sprinkler port and the casing interior, means for blocking certain of said passages including a ball valve associated with each passage and shiftable laterally thereof between a first position for blocking the passage and a second position allowing flow therethrough, and gravity operated means in said casing mounted for rotation about the longitudinal axis thereof for shifting into said first position the ball valves associated with those of said passages communicating with sprinkler ports which are directed generally downward in any rotary position of the casing.

12. The structure as recited in claim 11 wherein said gravity operated means include means for shifting into said second position the ball valves associated with those of said passages communicating with sprinkler ports which are directed generally upward in any rotary position of the casing.

13. A sprinkler attachment comprising, a hollow casing having an annular series of sprinkler ports intermediate the ends thereof and inlet means in one end thereof for connection with a hose line, a ring-like valve member mounted in the casing intermediate the ends thereof and having a central cylindrical opening in communication with the casing inlet, said valve member having a plurality of radial passages each forming a communication between a sprinkler port and said central opening, gravity operated cam means concentrically mounted for rotation within said opening, and a plurality of ball valves operatively associated with said cam means and said valve member, each of said ball valves being associated with the mouth of one of said passages and being shiftable laterally thereof between a first position for blocking the respective associated passage and a second position allowing flow therethrough, said cam means being operative automatically for shifting into the first position the ball valves associated with those of said passages communicating with sprinkler ports which are directed generally downward in any rotary position of the casing.

14. The sprinkler attachment as recited in claim 13 wherein the outer periphery of the ring-like valve member comprises an annular series of equally spaced cavities having laterally spaced radial walls and longitudinally extending concave outer walls, each of said cavities forming a communication between a sprinkler port and one of said radial passages.

15. The sprinkler attachment as recited in claim 13 wherein the inner periphery of the ring-like valve member comprises a series of equally spaced apart substantially rectangular cavities opening toward the longitudinal axis of said casing, each of said cavities having a length axially of said casing which is substantially greater than the width thereof.

16. The structure as recited in claim 13 wherein the gravity operated cam means comprises, a shaft extending concentrically through said central cylindrical opening, a cylindrical roller mounted for rotation on said shaft in said opening and having its outer annular surface spaced from the inner periphery of the ring-like valve member, an arcuate radially extending cam blade carried by said roller, and a pendulum mounted for rotation on said shaft and fixed to said roller for automatically maintaining the cam blade in position for shifting into the first position the ball valves associated with those of said passages communicating with sprinkler ports which are directed generally downward in any rotary position of the casing.

17. The structure as recited in claim 16 wherein the gravity operated cam means includes a second arcuate radially disposed cam blade carried by said roller and operative for automatically shifting into the second position the ball valves associated with those of said passages communicating with sprinkler ports which are directed generally upward in any rotary position of the casing.

18. The structure as recited in claim 17 wherein each ball valve is positioned between the cam roller and the inner periphery of the central opening and is confined for longitudinal movement within the limits of an associated rectangular cavity formed in said ring-like member.

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