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COUPLINGS FOR SPRINKLERS AND NOZZLES

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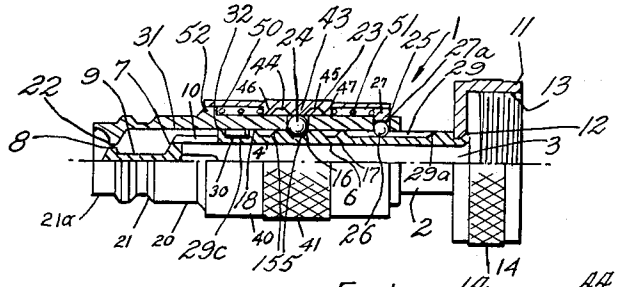


FIG. 1.

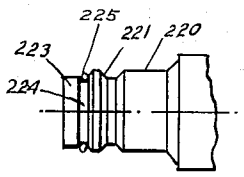


FIG. 2.

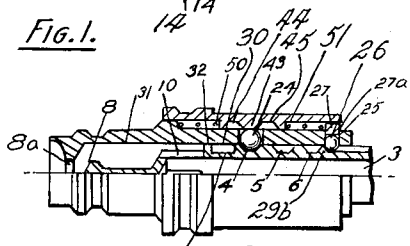


FIG. 3.

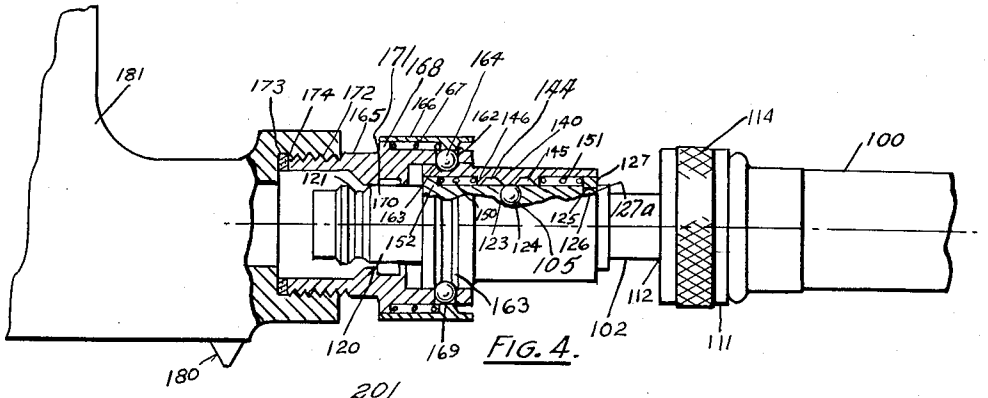


FIG. 4.

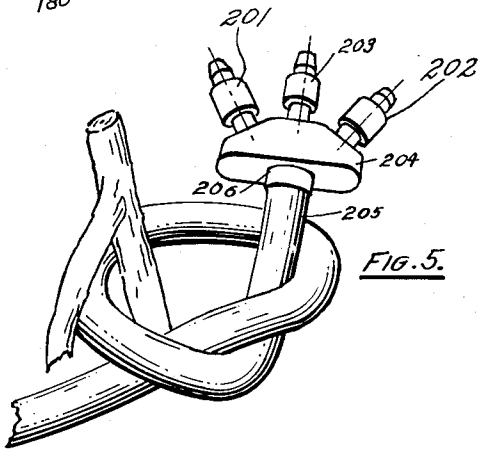


FIG. 5.

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COUPLINGS FOR SPRINKLERS AND NOZZLES

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12 Claims. (Cl. 299—131)

This invention relates to sprinklers and more particularly to shut-off means for stopping the flow of water in hoses preliminary to disconnecting a sprinkler head from the hose. Also, this invention relates to adjustable nozzles for sprinkling.

In the use of hoses for sprinkling gardens, disconnecting the nozzle from the end of the hose and replacing the nozzle by a sprinkler head or another type of appliance while the water supply is turned on without drenching the operator has long been a problem. It is the usual practice for the operator to walk back to the sill cock or water supply and close the sill cock to stop the flow of water in the hose before removing the nozzle from the end thereof. This necessitates considerable inconvenience and loss of time and expenditure of energy for the operator to walk from the sprinkler to the sill cock. In nozzles made according to the design now in use, adjustment of the stream is obtained through threaded parts by rotating a part of the nozzle to move one part relative to another to adjust the stream. This is a time consuming operation and considerable effort is required.

It is, accordingly, an object of my invention to provide a novel type of sprinkler nozzle which will automatically shut off the flow of water in a hose so that the nozzle can be disconnected therefrom without shutting off the water supply to the hose.

Another object of my invention is to provide a novel type of coupling.

Another object of my invention is to provide a coupling for connecting a sprinkler to a hose wherein the coupling will shut off the flow of water in the hose until the sprinkler has been connected and, thereafter, a pull on the hose will start the flow of water in the sprinkler head.

Another object of the invention is to provide a nozzle with a novel adjustment means.

Another object of this invention is to provide a novel type coupling and nozzle for adjusting the stream therethrough.

Another object of my invention is to provide a coupling having a novel type of valve and sealing means therein.

Another object of the invention is to provide a novel combination sprinkler.

Another object of this invention is to provide a novel combination sprinkler and coupling.

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 drawings 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 drawings:

Fig. 1 is a side view partly in section showing a novel nozzle and coupling according to the invention;

Fig. 2 is another embodiment of my invention showing a novel type of sealing washer on the end of the male member which is a part of my invention;

Fig. 3 is a view of my invention similar to Fig. 1 showing the valve of my coupling in an open position;

Fig. 4 is another embodiment of my invention showing the coupling connected to a sprinkler head; and

Fig. 5 is a view of my coupling showing the coupling connected to a multi-stage sprinkler head.

Referring now more specifically to the drawings, Figs. 1 and 3 show a coupling member **1**. The coupling is made up of tubular member **2** provided with a hollow portion **3** therethrough and having circumferential ball receiving grooves **4**, **5**, and **6** disposed along the periphery of the tube. The end of the tube is closed by a wall **7** and valve **8** is connected to the end of the wall at **9**. The valve **8** performs the dual function of being a shut-off means to entirely stop the flow of water in the coupling and being a nozzle. The valve **8** is made in the form of a peripheral flange on the end of the wall **9**. Apertures **10** are disposed around the periphery of the tube. A female connecting member **11** is attached to one end of the tube at **12** by peening, welding, or other well known fastening means.

The female connecting member **11** is internally threaded at **13** to receive the male threaded end of a hose or tube and a knurled outer portion **14** is provided for convenience in holding the coupling when attaching it to a hose or other tubular member. An outer tubular shaped member or shell **20** is disposed around the inner tubular member **2**. The outer tubular member is concentrically disposed on the inner member and is provided with a connecting portion **21***a* with a groove **21** at one end thereof to receive a female coupling member of a sprinkler or other appliance for attaching the sprinkler head or other appliance to the coupling, the attachment having a female member similar to member **165** in Fig. 4.

One end of the outer tubular member has an internal wall **22** which cooperates with the valve **8** when the valve is in the position shown in Fig. 1. The valve **8** is slidable to the position shown in Fig. 3 as will be later described. The outer tubular member has holes **23** disposed around the periphery thereof for receiving balls **24**. Holes **25** are provided at spaced intervals around the periphery of the outer tube for receiving balls **26** which are held in engagement with the inner tubular member **2** by means of the split washer **27**. Split washer **27** is held against longitudinal sliding movement in groove **27***a*. Split washer **27** holds balls **26** in holes **25** and in sliding engagement with groove **29**. Washer **27** also serves as an abutment for spring **51**.

The inner tubular member has blocking portion **15** disposed between grooves **4** and **5** and blocking portion **16** between grooves **5** and **6**. Blocking portion **18** is disposed at the end of groove **4** between groove **29***c* and groove **4** and blocking portion **17** is disposed between longitudinal groove **29** and groove **6**. When a broad spray is desired, valve **8** will be moved to a position outside wall **22**. At the setting, ball **24** will engage groove **6** and ball **26** will engage blocking portion **17**.

Fig. 3 shows the valve of the nozzle set for a narrow stream. Fig. 1 shows the valve of the nozzle set to deliver a very fine mist. The clearance between valve **8** and wall **22** can be controlled in manufacture to provide for any amount of spray from complete cut-off to an appreciable flow of water by providing a large or small clearance between valve **8** and wall **22** when they are in the position shown in Fig. 1.

The inner tubular member is provided with groove

29c which receives the U-shaped packing washer 30. The U-shaped packing washer forms a seal between the surface 31 of the outer tubular member and the outer surface 32 of the inner tubular member. To prevent leakage, a locking sleeve 40 is disposed around the outer periphery of the outer sleeve. The sleeve 40 is provided with a knurled surface 41 for convenience in manually holding the sleeve during operation. The inside of the sleeve is provided with blocking portion 43 which is disposed between grooves 44 and 45. Partitions 46 and 47 are disposed at the extreme edges of grooves 44 and 45, respectively. Springs 50 and 51 are disposed between the outer tubular member and the sleeve. One end of the spring 50 abuts the partition 46 which is attached to the locking sleeve and the other end of the spring 50 abuts against the projection 52 on the outer tubular member. One end of the helical spring 51 abuts against the partition 47 on the sleeve and the other end of the spring 51 abuts against the washer 27. In this manner, the sleeve is biased to a neutral position between springs 50 and 51, thereby holding blocking portion 43 over ball 24 when the sleeve is in the neutral position.

In use, the coupling member shown in Figs. 1 and 3 is connected to a hose or pipe at 12 and when a sprinkler or other appliance is connected to the end 20, water flows through the inner portion of the tubular member at 3, through the aperture 10, through the inner part 31 of the outside tubular member, and through the aperture between the partition 22 and the valve 8. When it is desired to start the flow of water from the end 20 by opening the valve 8, the sleeve 40 is grasped with one hand and a pull is exerted on the hose or on the end 14. This will cause the locking sleeve 40 to slide toward the end 20 and the groove 45 will move overtop the ball 24 so that the ball 24 can move into the groove 45 and allow the ball to move into the groove 45 and out of the groove 4 and continued force by the operator will move the inner tubular member 2 to slide toward split washer 27. After the inner tubular member has moved to the position wherein the valve 8 is spaced from the member 22 in the position shown in Fig. 3, the operator will release the sleeve and the spring 50 will force the sleeve toward the inner tubular member 2, thereby causing the member 43 to force the balls 24 into the groove 4 and lock the valve and inner tubular member in position to allow the flow of water. To close the valve, the operation is reversed.

The coupling shown in Fig. 2 is similar to the coupling in Figs. 1 and 3. The groove 221 corresponds to the groove 21 in Fig. 1. End 223 is provided with a groove 224 which is adapted to receive a washer or O-ring 225. This washer is designed to form sealing engagement with the inner part, such as surface 31 in Fig. 1, to replace a U packing washer of a female coupling member.

The coupling member shown in Fig. 4 is similar in some respects to the member shown in Figs. 1 and 3. The coupling member is made up of an inner tubular member 102. The female connecting member 111 is attached to the tubular member 102 at 112 by peening or other well known fastening means. The female connecting member 111 is threaded to attach to a mating member of a hose 100. An outer tubular member 120 is disposed around the inner tubular member 102 in the relation to each other of members 2 and 20 in Figs. 1 and 3. The outer tubular member is concentrically disposed on the inner member and is provided with a groove 121 at one end thereof to receive a suitable coupling member or sprinkler (not shown).

The shell or outer member has radially disposed holes 123 around the periphery thereof for receiving balls 124 which serve an identical function to holes 23 in Fig. 1. Holes 125 are provided at spaced intervals around the periphery of the outer tube for receiving balls 126 which are held in engagement with the inner tubular member 102 by means of a split washer 127 for the same purpose balls 26 are provided in Fig. 1. The split washer 127 is held against longitudinal sliding movement in groove 127a. The inner tubular member is constructed similar to part 2 having portions 15, 16, and 17 in Fig. 1.

The action of balls 124 is similar to the action of balls 24 in Fig. 1. A locking sleeve 140 is disposed around the outer periphery of the outer sleeve 120. The inside of the sleeve 140 is provided with grooves 144 and 145. Springs 150 and 151 are disposed between the outer tubular member and the sleeve to urge the sleeve to the position shown. One end of the spring 150 abuts against the partition 146 which is attached to the locking sleeve and the other end of the spring 150 abuts against the the partition 152 on the outer tubular member. The locking sleeve 140 is provided with a peripheral groove 163 to accommodate balls 164. Balls 164 are carried in peripheral holes 162 on fitting member 165. Locking sleeve 166 is telescopically disposed on fitting 165 and spring 167 is disposed between partition 168 on fitting 165 and blocking portion 169 on locking sleeve 166. A U-shaped packing washer 170 is provided in a groove 171 in the fitting 165 to sealingly engage the outer surface of the outer tubular member 120. The fitting 165 is adapted to engage sprinkler or other member 181 by means of threads 172 and a rubber washer 173 is provided in groove 174 to form a seal between the sprinkler 181 and the fitting 165 to prevent leakage therebetween.

From the foregoing, it will be apparent that when it is desired to start the flow of water through the sprinkler 181 after the sprinkler has been attached to the coupling member as shown in Fig. 4, it is merely necessary for the operator to grasp the hose 100 at a distance from the sprinkler out of range of the water with the sprinkler resting on the ground with point 180 driven into the ground. A pull on the hose will cause a force between the hose and sprinkler 181 and the locking sleeve 140 due to the sprinkler engaging the ground and the resistance of point 180. The force between the hose and the sprinkler will cause the locking sleeve 140 to slide against the force of the spring 150 to bring the groove 145 in alignment with the ball 124. This will allow the ball 124 to move into the groove 145 and disengage the inner tubular member 102, allowing the tubular member 102 to slide and allowing the valve on the end of the inner tubular member, which is identical to the valve 8 in Fig. 1, to move to an open position to allow water to flow through the sprinkler head 181.

It will readily be seen from the above that after a sprinkler or other appliance is connected to the coupling as shown in Fig. 4, it is only necessary to pull the hose 100 in order to turn on the water since the resistance to sliding of the sprinkler on the ground will exert a pull on the sleeve 140 in the opposite direction.

Fig. 5 shows three sprinkler heads 201, 202, and 203 attached to a common reservoir 204 which is attached to the end of a hose 205 at 206. By using a plurality of sprinkler heads on one hose, it is possible to get a much more even distribution of water over a given area of lawn or other land to be sprinkled.

In the foregoing specification, I have set forth the invention in its preferred practical forms but I am aware 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.

What I claim is:

1. A coupling comprising an inner tubular member and an outer tubular member, means to attach the inner tubular member to a fluid supply, means to attach the outer tubular member to an appliance, shut-off means on the inner tubular member to cooperate with shut-off means on the outer tubular member, said inner shut-off means being slidable to an open and closed position, a

plurality of spaced circumferential grooves in the outer periphery of inner tubular member, holes in the outer tubular member, balls in the holes, and a sleeve telescopically disposed on the outer tubular member, said sleeve having camming surfaces thereon whereby said balls are held in one of said grooves when the shut-off means is in the open position and in another groove when the shut-off means is in the closed position to selectively lock said shut-off means in the open and in the closed position, said shut-off means comprising an inwardly extending wall on said outer tubular member defining a reduced size opening, one end of said inner tubular member adapted to move into said opening when said shut-off means is in the closed position.

2. A coupling comprising a hollow inner member and a hollow outer member concentrically disposed thereon, a valve attached to the inner member, said inner member with said valve thereon being slidable on said outer member to control the flow of fluid through said inner member, and means on the outer tubular member to selectively lock the inner member and valve member in open or in closed positions, said means to lock the tubular member comprising balls disposed in radial holes in said outer tubular member, said balls selectively engaging spaced circumferential grooves on said inner member.

3. A coupling comprising an inner tubular member with spaced circumferential grooves thereon, means to attach said inner tubular member to a conduit, a wall at one end of the inner member, openings in the walls of the tubular member adjacent the wall, an outer tubular member telescopically disposed on said inner member, a valve attached to the end of the inner tubular member cooperating with one end of the outer tubular member to control the flow of fluid therethrough, and means on said outer tubular member cooperating with the spaced circumferential grooves on said inner tubular member to longitudinally adjust the outer tubular member on the inner member whereby the flow of fluid through the coupling is controlled, said means on said outer tubular member comprising longitudinally spaced grooves on said inner tubular member, a ball disposed in an opening in said outer tubular member, and cam means to selectively urge said ball into said grooves.

4. The coupling recited in claim 2 wherein the means to lock the tubular member comprises balls disposed in radial holes in said outer tubular member, said balls selectively engaging spaced circumferential grooves on said inner member, and a locking sleeve concentrically disposed on said outer tubular member, said locking sleeve having two spaced internal grooves thereon and an abutment portion therebetween and a spring to bias said locking sleeve to a position with said abutment portion in engagement with said balls whereby said sleeve will release said balls when moved axially in either direction.

5. A coupling comprising an inner tubular member with spaced circumferential grooves thereon, means to attach said inner tubular member to a conduit, a wall at one end of the inner member, openings in the walls of the tubular member adjacent the wall, an outer tubular member telescopically disposed on said inner member, a valve attached to the end of the inner tubular member cooperating with one end of the outer tubular member to control the flow of fluid therethrough, and means cooperating with the spaced grooves to longitudinally adjust the outer tubular member on the inner member whereby the flow of fluid through the coupling is controlled, said means on said outer tubular member comprising a sleeve concentrically disposed thereon and means on said sleeve to connect an appliance thereto.

6. A coupling comprising an inner tubular member with spaced circumferential grooves thereon, means to attach said inner tubular member to a conduit, a wall at one end of the inner member, openings in the walls of the tubular member adjacent the wall, an outer tubular member telescopically disposed on said inner member, a valve attached to the end of the inner tubular member cooperating with one end of the outer tubular member to control the flow of fluid therethrough, means cooperating with the spaced grooves to longitudinally adjust the outer tubular member on the inner member whereby the flow of fluid through the coupling is controlled, said means comprising a locking sleeve on said outer tubular member, said locking sleeve having two spaced internal grooves thereon and an abutment portion therebetween, said locking sleeve having a spring to bias it to a position such that said abutment portion engages balls to hold them in engagement with said spaced grooves in said outer tubular member.

7. A coupling comprising an inner tubular member with spaced circumferential grooves thereon, means to attach said inner tubular member to a conduit, a wall at one end of the inner member, openings in the walls of the tubular member adjacent the wall, an outer tubular member telescopically disposed on said inner member, a valve attached to the end of the inner tubular member cooperating with one end of the outer tubular member to control the flow of fluid therethrough, means cooperating with the spaced grooves to longitudinally adjust the outer tubular member on the inner member whereby the flow of fluid through the coupling is controlled, said means comprising a locking sleeve on said outer tubular member, said locking sleeve having two spaced internal grooves thereon and an abutment portion therebetween, a spring to bias said locking sleeve to a position such that said abutment portion engages balls to hold them in engagement with said spaced grooves in said outer tubular member, and means on said locking sleeve to attach an appliance thereto.

8. A coupling comprising an inner tubular member with spaced circumferential grooves thereon, means to attach said inner tubular member to a conduit, a wall at one end of the inner member, openings in the walls of the tubular member adjacent the wall, an outer tubular member telescopically disposed on said inner member, a valve attached to the end of the inner tubular member cooperating with one end of the outer tubular member to control the flow of fluid therethrough, means cooperating with the spaced grooves to longitudinally adjust the outer tubular member on the inner member whereby the flow of fluid through the coupling is controlled, said means comprising a locking sleeve on said outer tubular member, said locking sleeve having two spaced internal grooves thereon and an abutment portion therebetween, a spring to bias said locking sleeve to a position such that said abutment portion engages balls to hold them in engagement with said spaced grooves in said outer tubular member, and means on said locking sleeve to attach an appliance thereto, said means comprising a tubular member and balls carried in spaced apertures therein.

9. A coupling comprising an inner tubular member with spaced circumferential grooves thereon, means to attach said inner tubular member to a conduit, a wall at one end of the inner member, openings in the walls of the tubular member adjacent the wall, an outer tubular member telescopically disposed on said inner member, a valve attached to the end of the inner tubular member cooperating with one end of the outer tubular member to control the flow of fluid therethrough, means cooperating with the spaced grooves to longitudinally adjust the outer tubular member on the inner member whereby the flow of fluid through the coupling is controlled, said means comprising a locking sleeve on said outer tubular member, said locking sleeve having two spaced internal grooves thereon and an abutment portion therebetween, a spring to bias said locking sleeve to a position such that said abutment portion engages balls to hold them in engagement with said spaced grooves

in said outer tubular member, means on said locking sleeve to attach an appliance thereto, a peripheral groove on said outer tubular member, and a washer carried therein to cooperate with the inside surface of said appliance to form a sealing surface therebetween.

10. A coupling comprising an inner tubular member with spaced circumferential grooves thereon, means to attach said inner tubular member to a conduit, a wall at one end of the inner member, openings in the walls of the tubular member adjacent the wall, an outer tubular member telescopically disposed on said inner member, a valve attached to the end of the inner tubular member cooperating with one end of the outer tubular member to control the flow of fluid therethrough, and means cooperating with the spaced grooves to longitudinally adjust the outer tubular member on the inner member whereby the flow of fluid through the coupling is controlled from a broad spray to a narrow stream.

11. A nozzle comprising an outer tubular member and an inner tubular member telescopically disposed in said outer member, a locking sleeve telescopically disposed on said outer tubular member, balls supported on said outer tubular member adapted to be urged into peripheral grooves in said inner tubular member, said inner tubular member having a wall at one end thereof, apertures therein adjacent said wall, and a valve attached to said wall, said valve adapted to cooperate with said outer tubular member to control a stream of fluid through said nozzle in accordance with the relative position of said outer and said inner tubular members.

12. A nozzle comprising an outer tubular member and an inner tubular member telescopically disposed in said outer member, a locking sleeve telescopically disposed on said outer tubular member, said inner tubular member having a wall at one end thereof, apertures therein adjacent said wall, a valve attached to said wall, said valve adapted to cooperate with said outer tubular member to control a stream of fluid through said nozzle in accordance with the relative position of said outer and said inner tubular members, means to hold said outer and said inner tubular members in adjusted position, said means comprising longitudinally spaced grooves on said inner member, balls held in radial apertures in said outer tubular member and engaging one of said grooves, and longitudinally spaced grooves with a blocking portion therebetween on said locking sleeve, said sleeve being biased to a position with said blocking portion engaging said balls and movable in one direction to allow said balls to enter one locking sleeve groove and movable in the other direction to allow the balls to enter the other groove.

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