June 26, 1951 L. OLSCHEWSKI 2,558,663

IRRIGATING SPRINKLER

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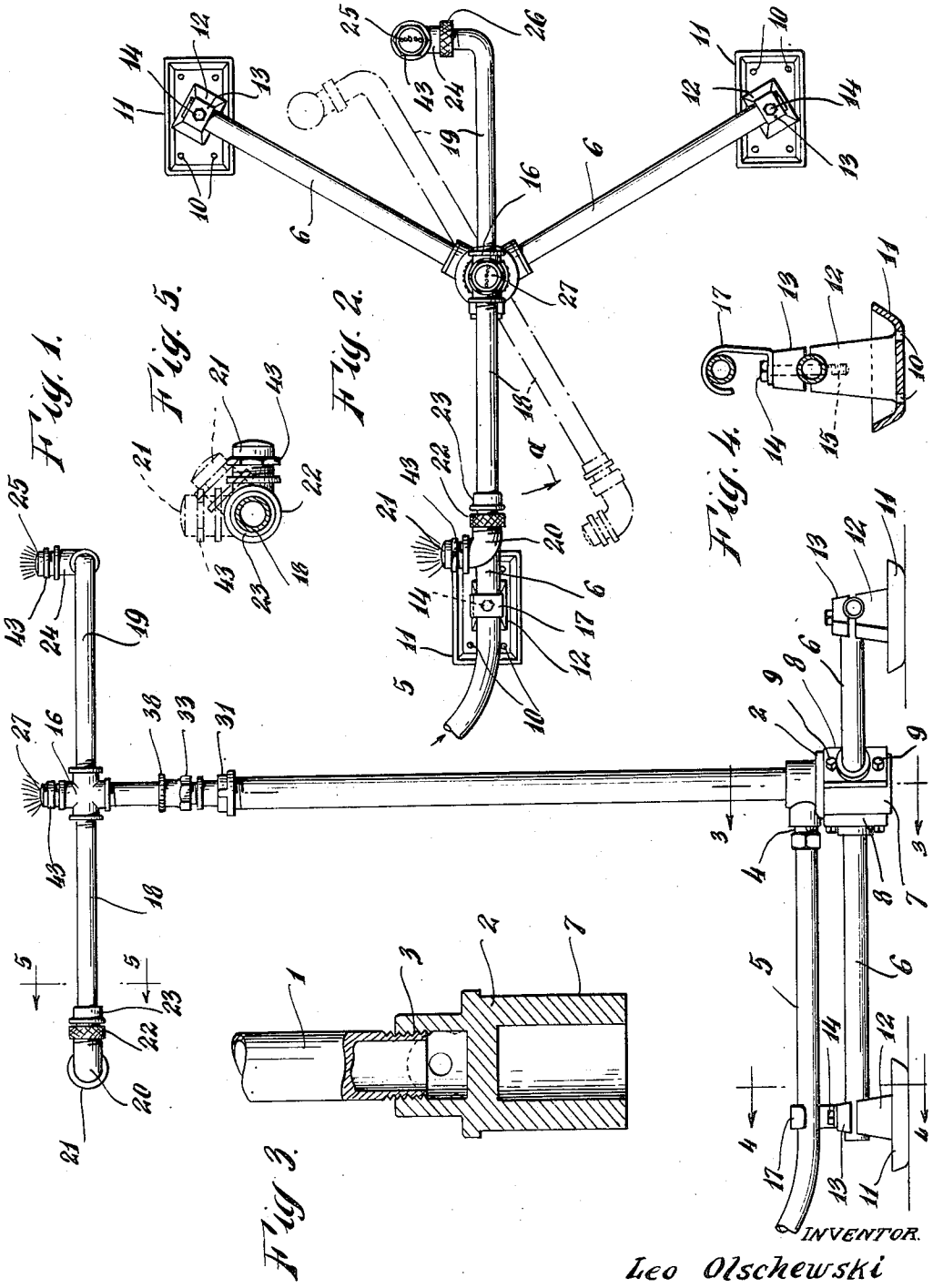


Fig. 1.

Fig. 5.

Fig. 2.

Fig. 4.

Fig. 3.

INVENTOR.
Leo Olschewski
BY John O. Seifert
ATTORNEY.

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Fig. 6.

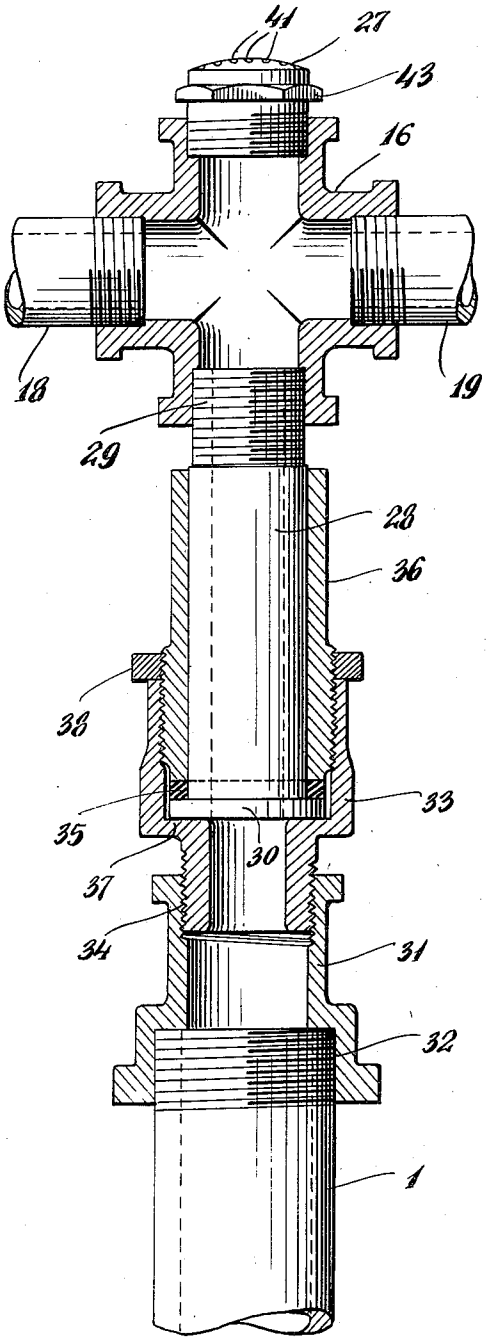


Fig. 9.

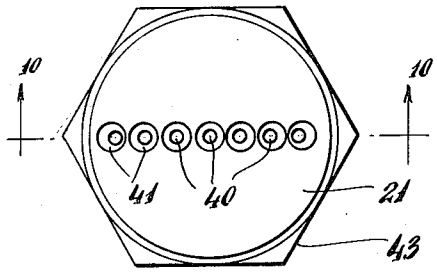


Fig. 10.

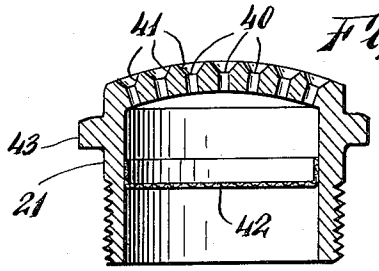


Fig. 8.

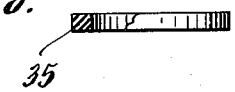
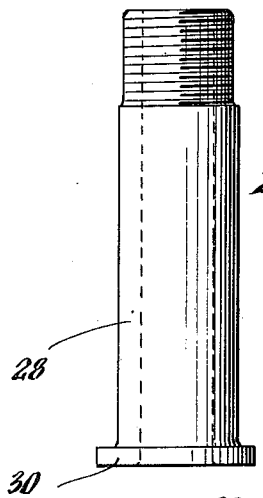


Fig. 7.



INVENTOR.
Leo Olschewski
BY John O. Seifert
ATTORNEY.

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UNITED STATES PATENT OFFICE

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IRRIGATING SPRINKLER

Leo Olschewski, Union, N. J.; Hertha Olschewski, executrix of said Leo Olschewski, deceased, assignor to Emma J. Olschewski

Application April 27, 1946, Serial No. 665,555

4 Claims. (Cl. 299—47)

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This invention relates to irrigating sprinklers and while it is adapted for irrigating land generally it is particularly adapted for irrigating lawns and golf courses.

The invention relates to that type of sprinkler wherein a stand pipe is mounted in a supporting base and arranged for the connection of a hose and the like to connect the stand pipe with a source of water. Heretofore in sprinklers of this character a series of sprinkler head carriers were connected in communication with and supported by the stand pipe to rotate about the axis thereof. Each of the sprinkler head carriers consists of a T-coupling or fitting with a sprinkler head mounted in one end of an elbow member connected by a union to the T-fitting whereby the sprinkler head may be adjusted from horizontal position to different angular positions relative to the vertical. Pressure induced by the discharge of water from the sprinkler head exerts a force upon the T-coupling or fitting to rotate with the sprinkler head carrying elbow. To provide a plurality of sprinkler heads a series of T-fittings are provided and connected coaxially in superposed relation with the lower T-fitting in communication with the stand pipe and the superposed fittings connected in communication with each other. By this arrangement the area of ground which may be irrigated is restricted.

It is an object of the invention to provide an improved sprinkler of this character whereby a considerably increased area of ground may be irrigated than has heretofore been possible by the provision of an improved construction and arrangement of sprinkler head carrier and improved means for connecting said carrier in communication with and rotatably supporting the same on the stand pipe.

In irrigating sprinklers of this character it is essential that a relatively rigid support is provided for the stand pipe and which support may be readily propelled or moved to different positions without injury to the grass or sod when the sprinkler is used for irrigating lawns or golf courses. It is a further object of the invention to provide an improved support for sprinklers of this character which may be readily propelled to different positions by a pulling force applied to the hose connected in communication with the stand pipe without injury to grass or sod over which it may be propelled.

It is another object of the invention to provide an improved sprinkler head for use in connection with irrigating sprinklers of this character whereby streams discharged from the

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sprinkler head will be discharged a greater distance than has heretofore been possible by irrigating sprinklers, and thus make it possible to irrigate a greater area of ground. The sprinkler head comprises a cap having the outer surface of the end wall of convex form and the inner surface of concave form concentric with the outer convex surface. Said end wall of the cap has perforations or discharge orifices therein disposed in a row diametrically of said wall with the center perforation disposed axially of the cap and the perforations outwardly from each side of said center perforation extending at progressively increasing angles relative to the axis of the cap. The outer portions of said discharge orifices or perforations are counter-sunk or enlarged at the outer end with the wall thereof diverging or inclining outwardly from the perforations to the outer convex surface of the sprinkler cap.

Other objects and advantages of the invention will hereinafter appear.

In the drawings accompanying and forming a part of this application,

Figure 1 is a side elevation of an irrigating sprinkler showing an embodiment of the invention.

Figure 2 is a view looking at the top of Figure 1.

Figure 3 is a sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a sectional view taken on the line 5—5 of Figure 1.

Figure 6 is a fragmentary view of the upper portion of Figure 1 partly in section to show the rotary support for the sprinkler head.

Figure 7 is a side elevation of a tubular member of the means for rotatably connecting the sprinkler head carrier to and in communication with the stand pipe of the sprinkler.

Figure 8 is a side elevation, partly in section, of an anti-friction metal washer of the means for rotatably connecting the sprinkler head carrier to the stand pipe of the sprinkler.

Figure 9 is a plan view of the improved sprinkler head or cap; and

Figure 10 is a sectional view of the sprinkler head or cap taken on the line 10—10 of Figure 9.

In carrying out the embodiment of the invention shown in the drawings a stand pipe 1 is mounted at one end in a base member 2 as by a screw thread connection with a socket in the top of the base member, as at 3. The base member has a fitting 4 mounted in and extending

laterally therefrom in communication through the socket with the stand pipe. The fitting 4 is arranged for connection to a coupling of a hose 5 or the like for connecting the stand pipe with a source of water.

The base member 2 is provided with means for firmly supporting the same upon the ground, and as shown comprise a series of three tubular arms or legs 6 equidistantly spaced about and extending radially from a hollow portion 7 extending downwardly from the stand pipe engaging socket of the base member. One of the arms extends parallel to and below the fitting 4. The arms 6, which may consist of piping, are fixed at one end in openings in plates 8 secured to flats of the outer surface of the portion 7 of the base member 2 by screws 9. Ground engaging shoes 11 are secured to and support the outer ends of the arms 6. The shoes 11 are of rectangular dished form, preferably of greater length than width, and have a flat ground engaging surface with the forward and rearward ends of said surface merging in rounded portions with the side of the shoes. The shoes are provided in the bottom surface with perforations 10 whereby water collecting in the shoes will seep through said perforations and irrigate the portion of the ground below the shoes. The shoes 11 have a central pillar 12 having a transverse recess in the top conforming to the outer contour of the arms. The recess engaged by the arm 6 extending parallel to the fitting 4, as shown in Figure 4, is extended in a direction longitudinally of the shoe 11 whereby the shoe 11 will extend parallel to said arm 6. The arms 6 are secured to the shoe pillars 12 by caps 13 having a recess in the under face opposed to the end of the pillar 12 corresponding in shape to the recess in the pillar 12 and secured thereto by a screw 14 extended through an opening in the cap 13 and the arm 6 and threaded into the pillar 12, as shown at 15 in Figure 4. The shoes 11 are connected to the other arms 6 to extend parallel to each other and the shoe 11 connected to the arm 6 extending parallel to fitting 4. For this purpose the pillars 12 of the other shoes 11 are disposed diagonally of the shoes, as shown in Figure 2, and the recess in the tops of said pillars is arranged so that they extend along the surfaces of the arms to which they are connected. Said arms 6 are connected to the pillars 12 by caps 13 and screws 14 as described and shown in Figure 4. A hook member 17 is secured to the top of the pillar 12 connected to the arm extending parallel to the fitting 4, as shown in Figures 1 and 2, by the screw 14 connecting the cap 13 to the pillar 2. The hose 5 connected to the fitting 4 is adapted to be engaged with the hook member 17 and whereby the sprinkler is adapted to be propelled to different positions by a pulling force applied to the hose. By the arrangement of the flat bottom face of the shoes 11 and the shoes 11 extending in the same direction, there is no possibility of the shoes injuring the grass or sod of a lawn or golf course as the shoes move over the same.

A tubular sprinkler head carrier is connected in communication with and rotatably supported by the stand pipe 1. As shown this sprinkler head carrier comprises a fitting in the form of a four way coupling 16. A pair of tubes or pipes 18, 19 are screw threaded in opposed branches of said coupling 16, as shown in Figures 1 and 2. An elbow 20 having a sprinkler head or cap 21 mounted in one end thereof is connected to the outer end of pipe 18 by a union 22. One member

of union 22 is threaded into an enlargement 23 at the end of pipe 18 and the other member of the union 22 threaded onto the elbow 20, as shown in Figures 1 and 2.

The outer end of the tube 19 is bent at a right angle, and an elbow 24 having a sprinkler head or cap 25 mounted in one end thereof is connected at the opposite end to tube 19 by a union 26. One member of union 26 is connected to the elbow 24 and the other member of union 26 is connected to the tube 19. By this arrangement of connecting the elbows 20 and 24 to the tubes 18 and 19 the sprinkler heads or caps 21 and 25 may be adjusted to different angular positions. A sprinkler head or cap 27 is fixedly mounted in an opening in the fitting or coupling 16 intermediate the tubes 18, 19 to extend at a right angle to said tubes.

To connect the coupling 16 in communication with and rotatably support the same upon the stand pipe, a tube 28 is provided with external screw threads at one end for threaded connection with the opening in the coupling 16 in line with and opposed to the sprinkler head 27, as at 29. The opposite end of said tube 28 has an outwardly extending annular flange 30. A coupling 31 has an enlarged portion at one end engaged upon the end of the stand pipe 1 and has screw threaded connection therewith, as at 32. A second coupling 33 has a reduced portion at one end which is engaged in and has screw threaded connection with the reduced end of the coupling 31, as at 34. The bore in said reduced portion of said coupling 33 is of less diameter than the bores in the coupling 31 and stand pipe 1 and is substantially the same diameter as the bore in the tube 28. A washer 35 of anti-friction metal, such as lead, is engaged upon the tube 28 and the flange 30. A member in the form of a sleeve 36 is loosely mounted on the tube 28 at the side of the washer 35 opposite the tube flange 30 and the end of the sleeve 36 adjacent the washer 35 being externally screw threaded. The tube 28 with the washer 35 thereon is engaged in the portion of larger diameter of the coupling 33 with the flange end 30 of the tube 28 opposed to a shoulder 37 in the coupling 33. The tube 28 is secured in this position by the threaded engagement of the external screw thread on the sleeve 36 with an internal screw thread on the coupling 33, as shown in Figure 6. The sleeve 36 confines the flanged end 30 of the tube 28 and the washer 35 between the shoulder 37 and the end of the sleeve 36. The sleeve 36 is locked in position in the coupling 33 by a lock nut 38 threaded onto the sleeve 36 abutting the end of the coupling 33. By this construction and arrangement of sprinkler head carrier 16, 18 and 19 with the tube 28 connected centrally thereto, and the connecting and the supporting of the same from the stand pipe 1 by means of the coupling 33 and sleeve 36, there is only one moving part and any force which may tend to cant the sprinkler head carrier 16, 18 and 19 and set up a binding force that might interfere with the rotation of the sprinkler head carrier 16, 18 and 19 is taken up by the sleeve 36. Furthermore, the pressure of the water passing through the stand pipe 1 into the tube 28 is increased due to the reduction in the diameter of the bore in the tube 28 relative to the bore in the stand pipe 1 and the pressure of the water is further increased by the resistance of the sprinkler heads 21, 25, 27 to the discharge of the water therethrough. Said pressure is sufficient to exert a lifting force on the sprinkler

head carrier 16, 18 and 19 and relieve the weight thereof on the shoulder 37. The only friction to retard the rotation of the sprinkler head carrier 16, 18 and 19 is that between the tube flange 30 and the washer 35 of anti-friction metal and between the tube 28 and sleeve 36 and thereby reducing the frictional resistance to the rotation of the sprinkler head carrier 16, 18 and 19 to a minimum.

The sprinkler heads or caps 21, 25 and 27 are of similar structure, each comprising a cap member externally screw threaded for threaded connection with the coupling 16 and the elbows 20, 24 (Figures 1 and 2). The end closure wall of the caps is substantially of uniform thickness having an outer convex surface and an inner concentric concave surface with a row of perforations or discharge orifices 40 extending diametrically of said wall. As shown, there are seven of said perforations 40, the center perforation being disposed axially of the cap and the perforations at the opposite sides of said center perforation inclining at progressively increasing angles relative to the center perforation. The outer portion of the perforations 40 are countersunk to the same extent with the wall of the countersunk portions diverging outwardly from the perforations 40 toward the convex surface of the caps 21, 25, 27, as shown at 41 in Figures 9 and 10. A strainer 42 of cup form is arranged in the caps 21, 25, 27 in spaced relation to the end wall and retained therein by impinging the skirt of the strainer against the side wall of the caps. To facilitate mounting and removing the sprinkler heads or caps 21, 25, 27 they are arranged for the application of a wrench, as at 43. The sprinkler head or cap 27 is mounted in the coupling 16 so that the row of perforations 40 therein extend in line with the pipes or tubes 18, 19. The sprinkler head 21 is mounted in the elbow 20 so that the row of perforations 40 therein extend in a plane substantially parallel to the pipe or tube 18, and the sprinkler head or cap 25 is mounted in the elbow 24 so that the perforations 40 extend at a right angle to the tube or pipe 19, as shown in Figure 2.

The sprinkler head carrier 16, 18 and 19 is rotated by the force of a pressure exerted thereon and induced by the discharge of the water from one of the sprinkler heads 21, 25, in the present instance the sprinkler head 21. To cause the sprinkler head carrier 16, 18 and 19 to rotate in the direction indicated by the arrow *a*, Figure 2, the sprinkler head carrying elbow 20 is adjusted so that the sprinkler head 21 will be disposed in angular relation to the tube 18, and may be adjusted to extend horizontally at a right angle to the tube 18, as shown, or may be adjusted to different angular positions between the horizontal and vertical. The greatest force will be applied to the sprinkler head carrier 16, 18 and 19 to rotate said carrier at a relatively high speed when the sprinkler head is adjusted to horizontal position. The speed of rotation of the sprinkler head carrier 16, 18 and 19 is reduced by adjustment of the sprinkler head 21 out of the horizontal position and to the vertical.

The sprinkler head 25 may be mounted so that the row of perforations 40 extend in a plane parallel to the tube 19, as shown in Figure 1, but is preferably mounted so that the row of perforations 40 extend in a plane transversely of the tube 19, as shown in Figure 2. By this latter arrangement the sprinkler head 25 may be adjusted to discharge water vertically upward, or

adjusted to position to discharge the water outwardly or inwardly substantially in a horizontal plane, or upwardly and outwardly and inwardly by adjustment of the sprinkler head 25 to different angular positions between the horizontal and vertical. By countersinking the outer ends of the discharge orifices or perforations 40 as described the stream is discharged to a greater extent and will irrigate a greater area of ground than if the discharge orifices are of uniform diameter for the entire length thereof. Since countersinking the outer end portion of the discharge orifices 40 there is discharged from the orifices 40 a column of water for a distance of three feet or more before the columns of water begin to break into a spray. The adjustment of the sprinkler head carrying elbows 20, 24 may be readily effected since all that is required is to loosen the members 22, 26 of the unions connecting the elbows 20, 24 to the tubes 18, 19 for which purpose said union members 22, 26 are knurled to facilitate the manipulation of the same. After the sprinkler heads 21, 25 have been adjusted said unions 22, 26 may be as readily manipulated to secure the sprinkler head carrying elbows 20, 24 in adjusted position.

Having described my invention, I claim:

1. In a sprinkler including a stand pipe and a tubular sprinkler head carrier connected in communication with and rotatably supported by the stand pipe, means to movably support the stand pipe with the sprinkler head carrier, comprising a base member in which the stand pipe is mounted and having a laterally extending fitting in communication with the stand pipe and adapted for connection of a hose coupling, arms equidistantly spaced about and extending outwardly from the base member in angular relation to the stand pipe, and rectangular shoes having a flat ground engaging face and connected to the arms and the shoes extending in parallel relation to each other with one shoe extending parallel to its connected arm and the other shoes disposed transverse to their respective arms.

2. A sprinkler as claimed in claim 1, wherein the fitting adapted for connection of a hose coupling is disposed above and extends parallel to the arm having the shoe extending parallel to said arm, a hook member fixed to and extending upwardly from said arm and adapted for engagement of a hose connected to the base fitting to facilitate moving the sprinkler by a pulling force applied to the hose.

3. In a sprinkler including a stand pipe and a tubular sprinkler head carrier connected in communication with and rotatably supported by the stand pipe, means to movably support the stand pipe with the sprinkler head carrier, comprising a base member in which the stand pipe is mounted and having a laterally extending fitting in communication with the stand pipe and adapted for connection to a hose coupling, arms equidistantly spaced about and extending outwardly from the base member in angular relation to the stand pipe, and rectangular shoes of dish form having a flat ground engaging face and arranged with a central pillar adapted for engagement and connection of the arms thereto with the shoes extending in parallel relation to each other.

4. In a sprinkler including a stand pipe and a tubular sprinkler head carrier connected in communication with and rotatably supported by the stand pipe, means to movably support the stand

pipe with the sprinkler head carrier, comprising a base member in which the stand pipe is mounted and having a laterally extending fitting in communication with the stand pipe and adapted for connection of a hose coupling, arms equidistantly spaced about and extending outwardly from the base member in angular relation to the stand pipe, rectangular shoes each having a flat ground engaging face and arranged with a central pillar having a recess in the upper end conforming to the contour of and for engagement of the arms, a cap having a recess in the bottom face thereof conforming to and for engagement of an arm in opposed relation to the pillar, and a screw extended through said cap and the arm and threaded into the pillar for securing the shoes to the arms with the shoes extending in parallel relation to each other.

LEO OLSCHEWSKI.

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