

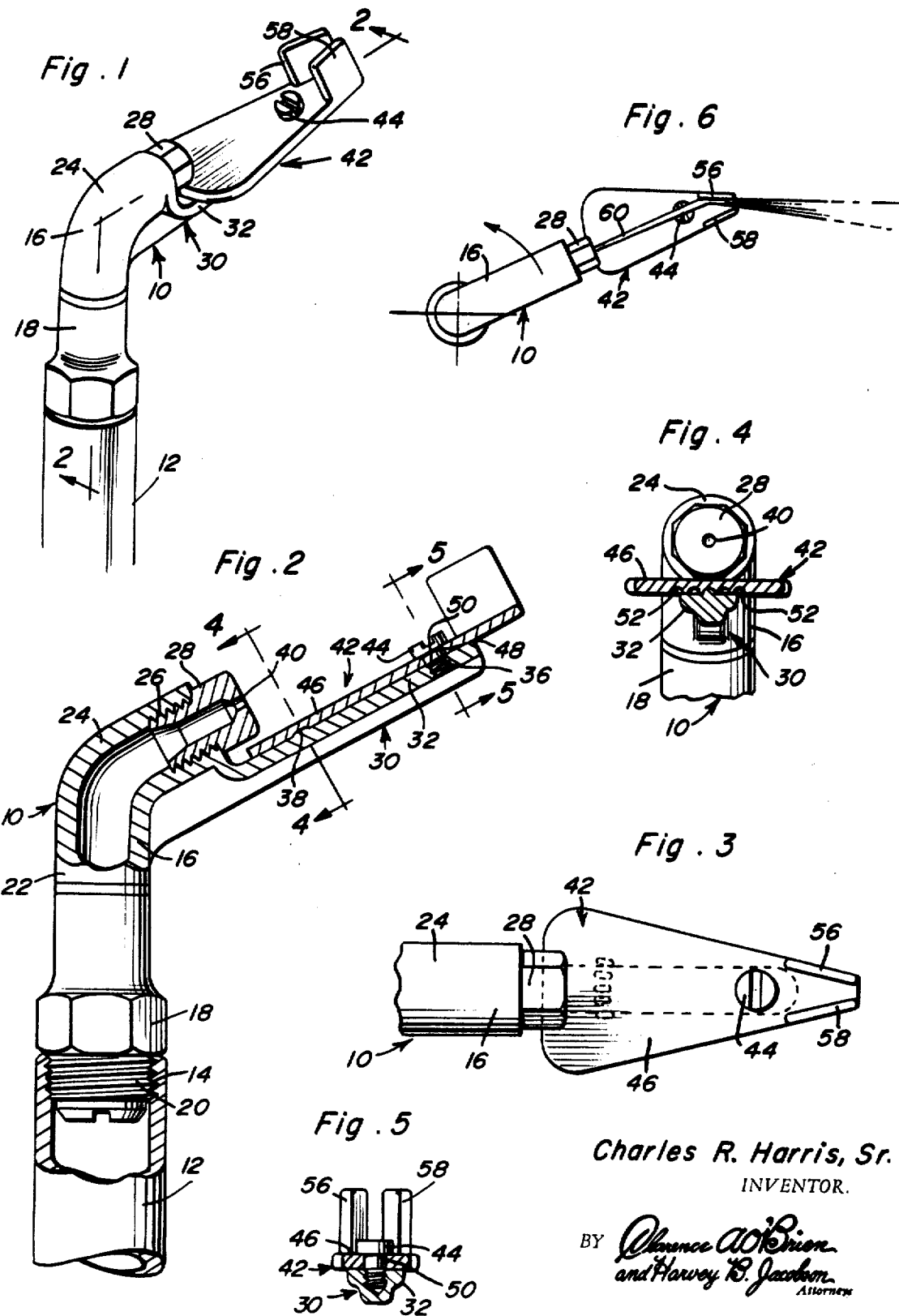
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C. R. HARRIS, SR
SPRINKLER HEAD

3,664,586

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2 Sheets-Sheet 1



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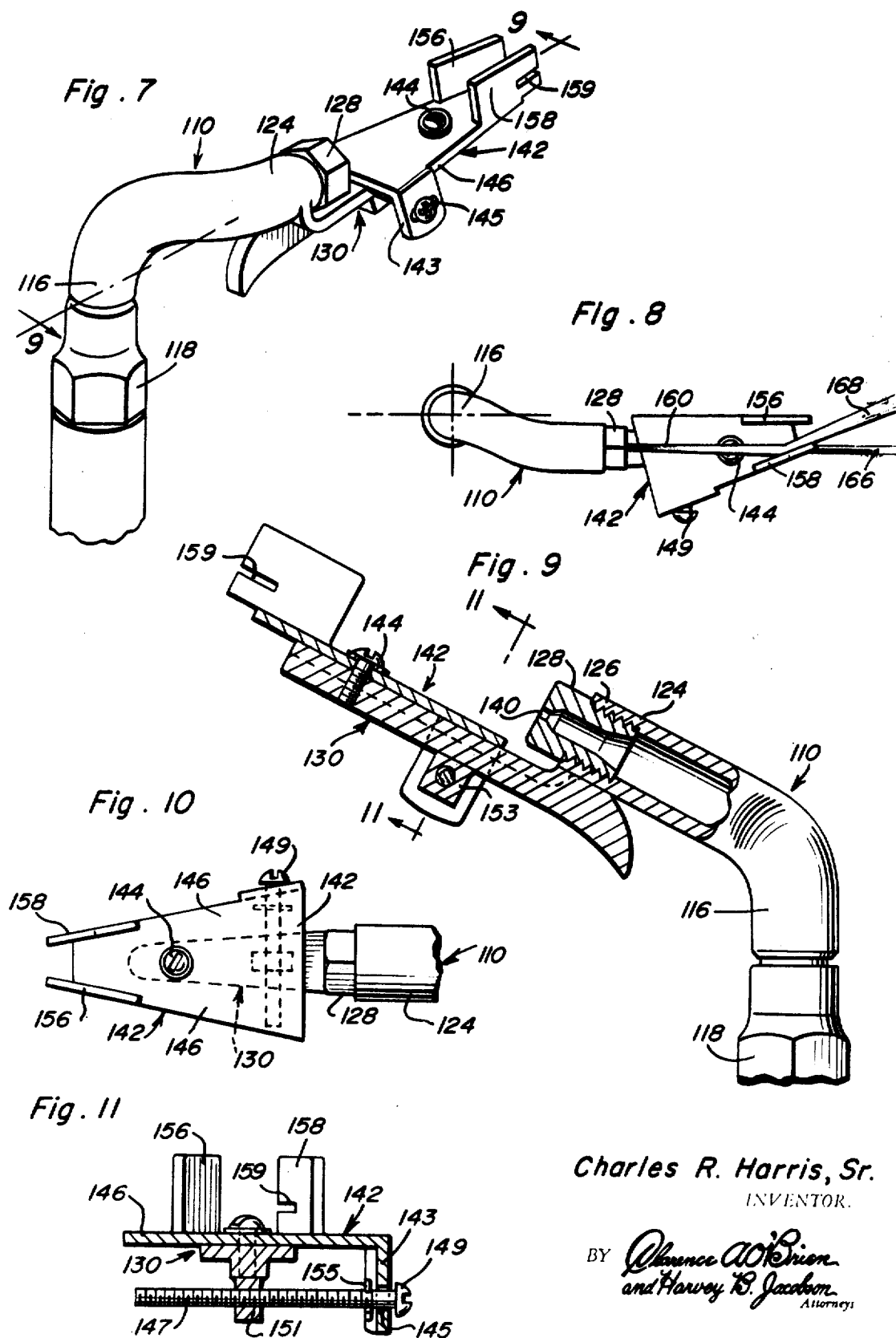
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SPRINKLER HEAD

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ABSTRACT OF THE DISCLOSURE

A tubular body including relatively angulated tubular legs joined at one pair of adjacent ends with their interiors communicated with each other. A rotary coupling member is carried by the free end of one leg for rotary connection with the outlet end of an associated water supply pipe and the free end of the other leg includes means defining a water jet outlet nozzle for endwise outwardly directing a discharge of water therefrom. The free end of the other leg further includes water jet deflecting panel structure supported from the other leg for adjustable registry with and inclination relative to the path of the jet of water from the nozzle.

The sprinkler head of the instant invention, other than its rotary mounting structure, includes only one movable part which is secured in adjusted position during operation of the sprinkler head. Thus, the sprinkler head represents an extremely economical and long lasting sprinkler head which may be used to advantage in many watering or irrigation operations.

The sprinkler head includes the usual rotary coupling member from which it is supported from the outlet end of an associated water supply pipe for rotation about an axis generally coinciding with the outlet end of the water supply pipe. The sprinkler head further includes an angulated outlet nozzle portion operative to direct a jet discharge of water outwardly of the axis of rotation of the sprinkler head and a water jet deflecting panel structure is supported from the sprinkling head outwardly of the path of water discharged from the nozzle and includes inclined flange portions which may be selectively shifted into inclined registry with the jet of water being discharged from the sprinkler head whereby a reactive force will be imparted to the sprinkler head upon the impinging of water on the flange portion and cause the head to rotate about its axis of rotation as a jet of water is being discharged therefrom.

The main object of this invention is to provide a sprinkler head including a minimum number of individual components and components which are placed in motion during operation of the sprinkler head.

Another object of this invention, in accordance with the immediately preceding object, is to provide a sprinkler head which will be operative to completely and evenly cover the area surrounding the sprinkler head and within its range.

Another object of this invention is to provide a sprinkler head whose effective range may be varied inversely relative to the amount of water to be discharged over a predetermined area within its range in a given period of time.

Still another object of this invention is to provide a sprinkler head that may be readily substituted for and utilized in lieu of conventional sprinkler heads presently in use.

A still further object of this invention is to provide a sprinkler head which is well suited for both domestic and agricultural use.

A final object of this invention to be specifically enumerated herein is to provide a sprinkler head in accord-

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ance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a perspective view illustrating the sprinkler head mounted on the discharge end of an upright water supply pipe;

FIG. 2 is an enlarged section view taken substantially upon the plane indicated by the section line 2—2 of FIG. 1;

FIG. 3 is a fragmentary top plan view of the head;

FIG. 4 is a sectional view taken substantially upon the plane indicated by the section line 4—4 of FIG. 2;

FIG. 5 is a transverse sectional view taken substantially upon the plane indicated by the section line 5—5 of FIG. 2;

FIG. 6 is a top plan view of the sprinkler head illustrating the manner a jet discharge of water therefrom imparts a reactionary force upon the sprinkler head;

FIG. 7 is a view similar to FIG. 1, but of a modified form of the invention;

FIG. 8 is a top plan view of the modified form;

FIG. 9 is an enlarged sectional view of the modified form taken substantially upon the plane indicated by the section line 9—9 of FIG. 7;

FIG. 10 is an enlarged fragmentary top plan view of the modified form; and

FIG. 11 is a transverse sectional view taken substantially upon the plane indicated by the section line 11—11 of FIG. 9.

Referring now more specifically to the drawings the numeral 10 generally designates a first form of sprinkler head illustrated in FIGS. 1 and 2 of the drawings as being secured to the upper discharge end of an upstanding water delivery pipe 12.

As may best be seen from FIG. 2 of the drawings the outlet end of the water pipe 12 is internally threaded as at 14 and the sprinkler head 10 includes a body 16 from which a rotary coupling 18 is journaled. The rotary coupling 18 includes an externally threaded portion 20 which is threadedly engaged in the outlet end of the water supply pipe 12 and accordingly, the body 16 is rotatably supported from the pipe 12 as is conventional.

The body 12 is tubular and includes relatively angulated inlet and outlet ends 22 and 24. The tubular rotary coupling 18 is rotatably journaled on the inlet end 22 and the outlet end 24 is internally threaded as at 26 and has a tubular water jet nozzle 28 removably threadedly engaged therein.

The body 16 includes a mounting structure referred to in general by the reference numeral 30 disposed outwardly of the water jet nozzle 28 and the structure 30 defines an upwardly facing mounting plate 32 having a threaded bore 36 formed therethrough. In addition, the mounting plate 32 includes a raised detent 38 for a purpose to be hereinafter more fully set forth.

The mounting plate 32 generally parallels the longitudinal centerline of the outlet opening 40 of the water jet nozzle 28 and a water jet deflecting panel structure referred to in general by the reference numeral 42 is oscillatably supported from the mounting plate 32 by means of a pivot fastener 44.

The structure 42 includes a base plate 46 which closely overlies the upper surface of the mounting plate 32 and

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the base plate 46 has a bore 48 formed therethrough in which the smooth cylindrical sank portion 50 of the fastener 44 is received for oscillation of the base plate 46 relative to the mounting plate 32.

The undersurface of the base plate 46 includes a plurality of elongated transversely spaced grooves 52 which lie on radii of the bore 48 and in which the detent 38 is selectively receivable. Accordingly, after the fastener 44 has been tightened, but not over-tightened, the base plate 46 may be oscillated by applying lateral pressure on the opposite side edges of the base plate 46 adjacent nozzle 28. Sufficient lateral pressure will cause upward deflection of the end portion of the base plate 46 underlying the nozzle 28 and allow the projection 38 to slip from one notch 52 to the next so as to releasably retain the base plate 46 in adjusted oscillated position.

The structure 42 further includes a pair of upstanding flanges 56 and 58 which generally parallel the path 60 of a jet of water discharged from the nozzle 28. However, the flanges 56 and 58 are slightly convergent at their ends remote from the nozzle 28 and their convergent ends are spaced apart sufficiently to receive at least a major portion of a jet discharge of water from the nozzle 28 therebetween when the base plate 46 is in its centered position illustrated in FIGS. 2-4 of the drawings. Therefore, when the plate 46 is centered, a major portion of a jet discharge of water along the path 60 from the nozzle 28 will pass between the adjacent ends of the flanges 58 and maximum range of the sprinkler head 10 will be achieved. However, no rotational force is imparted to the body 16 when the panel 46 is centrally positioned. Accordingly, when it is desired to impart rotational thrust to the body 16, the plate 46 is shifted to either side from its centered position whereby either the flange 56 or the flange 58 will be brought into greater registry with the path 60 along which water is discharged from the nozzle 28. Of course, when the flange 56 is disposed in full registry with the path 60 in the manner illustrated in FIG. 6 of the drawings, maximum reaction force is applied to the body 16 so as to rotate the latter in a counterclockwise direction as viewed in FIG. 6 of the drawings. However, the base plate 46 may be adjusted so as to bring either the flange 56 or the flange 58 into only partial registry with the path 60 and to thereby obtain the necessary reactionary force to rotate the body 16 without greatly adversely affecting the maximum range of the sprinkler head 10.

Of course, the body, rotary coupling and water jet deflecting panel structure 42 may be constructed of any suitable material. In addition, several water jet deflecting panel structures of different configurations may be provided for use in conjunction with the body 16 so as to obtain substantially any desired sprinkling or irrigation characteristics desired.

With attention now invited more specifically to FIG. 7 of the drawings there may be seen a modified form of sprinkler head referred to in general by the reference numeral 110. The head 110 is similar in many respects to the head 10 and the various components of the sprinkler 110 corresponding to related components of the sprinkler 10 have been given corresponding reference numerals in the 100 series.

The head 110 differs from the head 10 in that the water jet deflecting panel structure 142 includes a depending flange 143 on one marginal edge of its base plate 146. The flange 143 includes an elongated slot 145 through which the head end of an adjusting shank 147 is received. The head end of the shank 147 is provided with a head 149 disposed on the outer side of the flange 143 and the opposite end of the shank 147, which is externally threaded, is threaded through a threaded bore 151 formed in a depending mounting lug portion 153 of the mounting structure 130. In addition, the shank 147 includes a diametric bore through which a diametric stop pin 155 is secured.

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The flange 143 is closely spaced between the head 149 and the pin 155 whereby rotation of the shank 147 by a screwdriver or the like will cause the plate 146 to rotate relative to the structure 130 about the pivot fastener 144. Of course, by rotating the base plate 146 in opposite directions, the flanges 156 and 158 may be selectively moved into registry with the path 160, see FIG. 8.

It will be noted from FIGS. 7, 9 and 11 of the drawings that the flange 158 is provided with a slot 159 whereby a portion of the water jet discharge from the water jet nozzle 128 may be allowed to pass through the flange 158 as indicated at 166 in FIG. 8 of the drawings although the major portion 168 of the water jet discharge will be deflected by the flange 158 and a reactive force will be imparted to the head 10 so as to swing the latter in a clockwise direction as viewed in FIG. 8. Of course, when the flange 156 is swung into registry with the path 160, the reactive force imparted to the head 110 will cause the latter to swing in a counterclockwise direction as viewed in FIG. 8.

The elongated slot 145 is provided to enable the base plate 146 to be angularly displaced relative to the mounting structure 130 while the threaded shank 147 is being turned. In addition, the surplus axial spacing between the head 149 and the pin 155 is provided to enable the flange 143 to be angularly displaced relative to the threaded shank 147. Also, it will be noted that the center line of the path 160 is slightly laterally offset to the right of the axis of rotation of the body 116, thereby enabling registration of the flange 156 with the discharge of water to cause faster rotation of the body 116 than that caused by registration of the flange 158 with the water jet discharge.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A sprinkler head for attachment to the discharge end portion of a water delivery pipe, said sprinkler head including an inlet provided with rotary coupling structure for mounting said head on said discharge end portion for rotation about an upstanding axis, said head including a laterally outwardly opening water jet outlet nozzle for directing a jet discharge of water from said nozzle along a path extending outwardly from said axis, said head including mounting structure disposed outwardly of said nozzle along but to one side of said path and water jet deflecting panel structure adjustably supported from said mounting structure for adjustable stationary positioning in registration with an inclination relative to said path to selectively laterally deflect said jet discharge to either side of said path, whereby the reactive force on said panel structure will function as torque input to said head for rotating the latter about said axis, said mounting structure comprising an upwardly facing mounting plate portion generally paralleling and underlying said path outwardly of said nozzle, said water jet deflecting panel structure including a base plate pivotally supported from said mounting plate for adjustable oscillation about an axis disposed generally normal to said path and said base plate, said base plate including an upstanding water jet deflecting flange generally paralleling but slightly inclined relative to said path and spaced along the latter from said axis of oscillation for adjustable lateral swinging with said base plate into said path to deflect the latter.

2. The combination of claim 1 wherein said base plate includes a pair of said upstanding flanges slightly convergent away from said nozzle and spaced apart at their

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adjacent ends a distance greater than the width of said path.

3. The combination of claim 2 wherein said flanges, when the spacing between said adjacent ends is centered relative to said path, are generally equally and oppositely inclined relative to and disposed on opposite sides of said path.

4. The combination of claim 3 wherein said base plate and mounting plate portion include coacting means operable to releasably retain said base plate in adjusted oscillated position.

5. The combination of claim 3 wherein said upstanding flange portions are spaced along said path outwardly from said axis of oscillation.

6. A sprinkler head including a rotary inlet neck and a laterally outwardly opening water jet outlet nozzle for directing a jet discharge of water from said nozzle along a path extending outwardly from said inlet neck, a mounting plate portion underlying said path outwardly of said nozzle, a base plate supported from said mounting plate portion for oscillation about an axis disposed generally normal to said path and said mounting plate, said base plate including a pair of upstanding flange portions generally paralleling each other and said path and disposed on opposite sides of the latter outwardly from said nozzle and spaced along said path from said axis, said flange portions being slightly convergent toward their ends remote from said nozzle and spaced apart at their convergent ends whereby at least a major portion of said water jet may pass therebetween.

7. The combination of claim 6 wherein said flanges, when the spacing between said adjacent ends is centered relative to said path, are generally equally and oppositely inclined relative to and disposed on opposite sides of said path.

8. The combination of claim 7 wherein said base plate and mounting plate portion include coacting means operable to releasably retain said base plate in adjusted oscillated position.

9. The combination of claim 1 wherein said path extends along a line which intersects with said axis.

10. The combination of claim 1 wherein said path extends along a line which passes adjacent but is spaced from said axis.

11. The combination of claim 6 wherein one of said flange portions includes a narrow slot formed therein on the end thereof remote from said nozzle and with which the central portion of said path is registered when said one flange is registered with said path.

12. The combination of claim 7 wherein said base plate and mounting plate portion include coacting means oper-

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able to releasably retain said base plate in adjusted oscillated position, said coacting means comprising a threaded bore formed in a portion of said mounting plate portion, a threaded shank member threaded in said bore, and a slotted flange portion carried by said base plate disposed transverse to said shank member and through which the latter extends, said shank member including axially spaced abutment portions disposed on opposite sides of and closely adjacent said flange, said abutment portions being engageable by said opposite sides to limit angular displacement of said flange relative to said mounting plate portion.

13. A sprinkler head for attachment to the discharge end portion of a water delivery pipe, said sprinkler head including an inlet provided with rotary coupling structure journaled from said head for mounting said head on said discharge end portion for rotary movement relative thereto, said head including laterally discharging water jet discharge means for discharging a jet stream of water along a lateral path extending outwardly from said axis, said head including a mounting plate portion underlying said path, and water jet deflecting panel structure supported from said mounting plate portion for limited oscillation relative thereto, said water jet deflecting panel structure including a pair of laterally outstanding deflection surface portions positioned, when said panel structure is in a generally centered position relative to its limit positions of oscillation, on opposite sides of and with said surface portions oppositely inclined relative to a plane containing said path and generally paralleling the axis of rotary movement of said coupling structure, the shifting of said panel structure between said limit positions of oscillation thereof serving to alternately position said deflection surface portions in registry with said path.

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