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WATER SPRAYER

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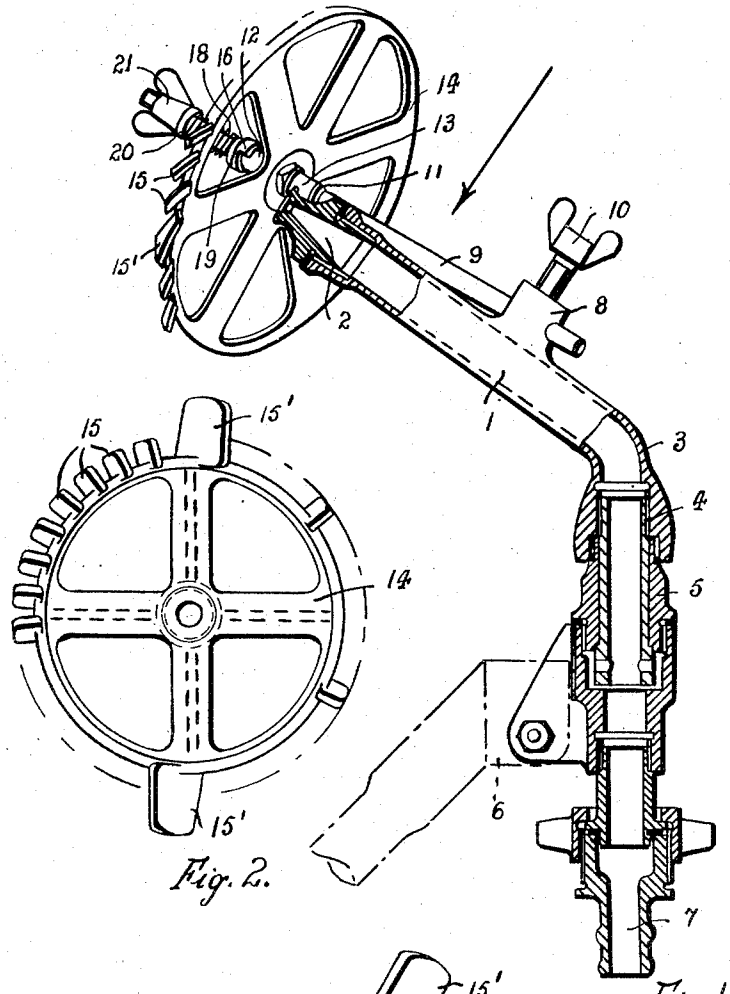

Fig. 1.

Fig. 2.

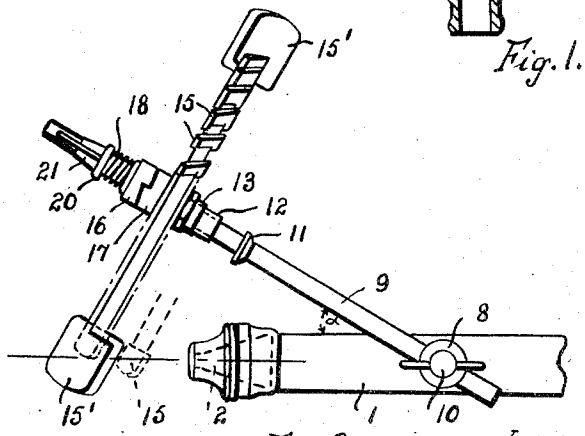

Fig. 3.

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WATER SPRAYER

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2 Claims. (Cl. 299—69)

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This invention relates to improvements in and relating to water sprayers of the kind in which a jet of water is caused to impinge upon and rotate a diffusing or atomising element to produce a spray. Water spraying apparatus of this kind is known in which the diffusing element is in the form of a wheel with radial vanes, mounted for rotation about an axis making an acute lateral angle with the axis of the jet nozzle, itself capable of rotation, so that the vanes project into a water jet emerging from the nozzle and rotation of both the diffusing element on the jet nozzle and of the jet nozzle itself is effected by the reaction of the water jet pressure.

In accordance with the present invention a water sprayer is provided including a rotatably mounted jet nozzle, a rotary diffuser mounted on said jet nozzle for rotation about an axis making a lateral acute angle with the axis of the jet nozzle and for limited movement longitudinally of said axis of rotation, said diffuser having on its periphery a plurality of radial vanes disposed in planes inclined to the plane of rotation of the diffuser and adapted to project into the path of the water jet projected by the nozzle, and to a variable extent in accordance with the position of the diffuser longitudinally of its axis of rotation, so that rotation is imparted both to the diffuser relative to the jet nozzle and to the jet nozzle itself and movement is imparted to the diffuser along its axis of rotation on the jet nozzle, all by reaction pressure of the water jet, and means to retard the rotation of the diffuser on the jet nozzle when said diffuser has made a movement of predetermined extent along its axis of rotation.

The movement of the diffuser in the direction of its axis changes the path of rotation of the vanes and therefore the extent of their projection into the water jet. The extent of such permitted movement is controlled by the means retarding rotation of the diffuser which may be an adjustable friction brake provided on the axis spindle of the diffuser, the adjustment of which enables the speed of rotation and the position of the diffuser relative to the jet to be related to the strength of the water jet to vary the nature and distribution of the spray produced.

In the preferred arrangement the diffuser is provided with one or several vanes of greater

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radial length than others, the vanes of greater length where more than one are used, being symmetrically disposed e. g. at diametrically opposite points on the periphery of the diffuser, the arrangement being such that when the diffuser takes a position with the vanes of shorter radial length wholly or for the major part withdrawn from the path of the water projected from the jet nozzle, the longer vanes remain in a position to be fully impinged upon by the water to maintain rotation.

The invention is illustrated by way of example in the accompanying drawings in which:

Fig. 1 is a view in elevation partly in section of a complete water sprayer,

Fig. 2 is a front view of the diffuser, and

Fig. 3 is a view from above the atomiser and the end of the jet nozzle, taken in the direction of the arrow in Fig. 1.

Referring to the drawings, the jet nozzle may take the form of a tube 1 having a suitably reduced outlet 2 and mounted so as to project at an angle above the horizontal, the lower end 3 being bent and formed for engagement with a bearing 4 at the upper end of a supporting body 5 having a water passage therethrough, so that the nozzle 1 is capable of rotation about the axis of the body 5.

The body 5 is carried by a tripod or like support 6 and is intended to be disposed with the axis substantially vertical and is provided at its lower end with a suitable union 7 for connection with a water supply pipe (not shown).

On the upper side of the tube 1 is formed a boss 8 pierced to receive a rod 9 directed so as to make a transverse acute angle α with the axis of the jet nozzle 1 as shown in Fig. 3, and also directed slightly downwards relative to said axis as shown in Fig. 1. The rod 9 is adjustable longitudinally of itself in the boss 8 being retained as set by means of a locking screw 10 provided in the boss. The rod is provided with a shoulder 11 and on the outer end of the rod beyond the shoulder is mounted a rotatable first sleeve 12 also capable of sliding movement on the rod 9. On this sleeve 12 in turn is rotatably and slidably mounted a further or second sleeve 13 forming a hub for the diffuser.

The diffuser is formed by a spoked wheel 14 fixed on sleeve 13 and having a plurality of vanes

15 formed on its periphery and uniformly inclined to the plane of the wheel. In the example shown the vanes are of uniform radial length with the exception of two vanes 15' disposed at diametrically opposite points on the periphery, these two vanes being of approximately twice the radial length and also twice the angular width of the others. Adjacent vanes 15 are slightly spaced from one another by an angular distance which is a small fraction e. g. one-fifth of the angular width of the small vanes, the spacing between a large vane 15' and adjacent small vanes 15 however being somewhat greater.

When mounted on sleeve 12 on rod 9 the vane wheel or diffuser is in a plane inclined laterally, and also vertically, to the axis of the jet nozzle 1 and the vanes 15 extend across or into the jet axis, the downward tilt of the rod 9 being such that the axis of the jet meets the periphery of the diffuser approximately at the point of contact therewith of a tangent in a plane which is vertical and parallel to the rod 9.

The ends of the first and second sleeves 12 and 13 are provided with flanges 16 and 17 formed with co-operating dogs to form a clutch enabling the two sleeves to be clutched together.

The outer end of the rod 9 is surrounded by a compression spring 18 mounted between a pair of cup washers 19, 20, one of which 19 engages the end surface of the flange 16 on the first sleeve 12 and the other of which 20 is engaged by a wing nut 21 screwed on the end of the rod 9, whereby the compression of the spring 18 and thereby the frictional resistance between the cup washer 19 and the flange 16 on the first sleeve 12 may be varied and a required degree of retardation thereby imposed upon the second sleeve 13 and the diffuser 14 fixed thereon, whenever the cooperating dogs on the flanges 16 and 17 of the two sleeves 12 and 13 become engaged.

At the commencement of operation the diffuser and its related parts are in the positions shown in Fig. 1 and the smaller vanes 15 lie in the path of a water jet delivered from nozzle 1 so that it may impinge upon them fully. The inertia of the atomiser wheel will easily be overcome and the impact of the water upon the vanes will cause the wheel and sleeve 13 on which it is fixed to rotate freely about the first sleeve 12. At the same time the jet nozzle 1 is rotated relatively slowly on its bearing 4 by the reaction of the water pressure on the vanes 15.

As the wheel gathers momentum, it will also slide along the first sleeve until the dog clutch is engaged. By this means rotation of the wheel is retarded due to the frictional resistance imposed by the spring 18. In this, which is the normal running position, the wheel will have moved laterally outwards from the axis of the jet, so that the water no longer impinges fully on the small vanes 15, but rather upon or in the region of their peripheral outer edges. The jet will however continue to impinge fully upon the two large vanes 15' (see Fig. 3) and the intermittent pressure exerted upon the two large vanes 15' is sufficient to maintain smooth rotation of the wheel and of the jet nozzle, while the water will be diffused into spray by contact with the outer edge of the small vanes. Pressure on the small vanes 15 will still contribute to the rotational movements but only to a small extent.

The normal running position and also the speed may be varied and controlled within limits to suit the available water jet pressure, to take account of external conditions such as the strength of the wind and to control the degree of atomisation or breaking up of the water jet as desired, by adjustment of the compression of the spring 18 by means of the wing nut 21. By increasing the compression of spring 18 frictional engagement between washer 19 and the flange 16 on sleeve 12 is increased and the wheel caused to rotate more slowly.

As a result of this braking of the wheel the large vanes 15' are engaged by the jet at longer time intervals and the jet nozzle 1 caused to rotate more slowly on bearing 4.

The arrangement also offers the advantage that it operates automatically to offset the effects of varying wind pressure. For example, wind pressure in the direction tending to resist rotation of the atomiser also urges it inwards on its spindle 9 with reduction of the frictional engagement between washer 19 and flange 16 and some movement of the vanes into the path of the jet and in the case of a very strong gust of wind in this direction the clutch may be temporarily disengaged and all the vanes heavily engaged by the water jet. Wind pressure in the reverse direction tends to remove the vanes from the jet and increase the frictional resistance between parts 16 and 19.

The friction spring coupling and clutch means are particularly efficacious under heavy wind conditions in preventing cessation of rotation of diffuser and jet nozzle and other than temporary changes in speed as the diffuser moves into and out of the wind.

I claim:

1. A water sprayer comprising a support element, a jet nozzle mounted for rotation on said support element and adapted to project a water jet at an upward inclination when in use, a spindle carried on said jet nozzle and making a lateral acute angle with the axis of said jet nozzle, a sleeve mounted for rotation on said spindle, a rotary diffuser mounted on said spindle for rotation on, and movement along said spindle, said diffuser including a plurality of radial vanes disposed in places inclined to the axis of rotation of said diffuser and adapted to project into the path of a water jet projected by said jet nozzle so that said diffuser is rotated on said spindle by said water jet and is moved longitudinally in one direction along said spindle by said water jet and said vanes progressively withdrawn from the path of said water jet, braking means adapted to resist rotation of said sleeve on said spindle, and a sliding dog clutch between said sleeve and said diffuser adapted to effect clutching engagement between said sleeve and said diffuser when said diffuser has been moved on said spindle to a predetermined extent by said water jet.

2. A water sprayer comprising a support element, a jet nozzle mounted for rotation on said support element and adapted to project a water jet at an upward inclination when in use, a spindle carried on said jet nozzle and making a lateral acute angle with the axis of said jet nozzle, a sleeve mounted for rotation on said spindle, a rotary diffuser mounted on said spindle for rotation on, and movement along said spindle, said diffuser including a number of vanes of short radial length and at least one vane of greater radial length disposed in planes inclined to the axis of rotation of said diffuser and adapted to project into the path of said water jet projected by said jet nozzle so that said diffuser is rotated on said spindle by said water jet and is moved longitudinally in one direction along said spindle

by said water jet and said vanes of shorter radial length progressively withdrawn from the path of said water jet, braking means adapted to resist rotation of said sleeve on said spindle, and a clutch between said sleeve and said diffuser adapted to effect clutching engagement between said sleeve and said diffuser when said diffuser has been moved on said spindle to a predetermined extent by said water jet.

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