J. R. WRIGHT.

CENTRIFUGAL SPRAYER.

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1,045,242.

Patented Nov. 26, 1912.

Fig. 1.

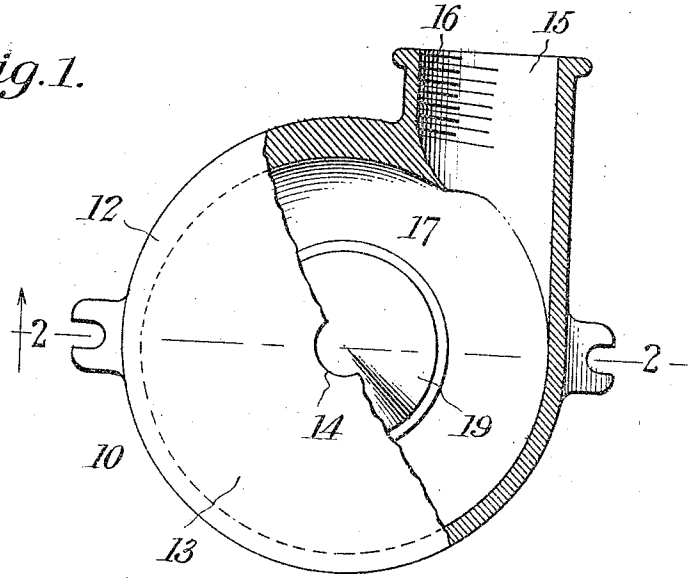


Fig. 2.

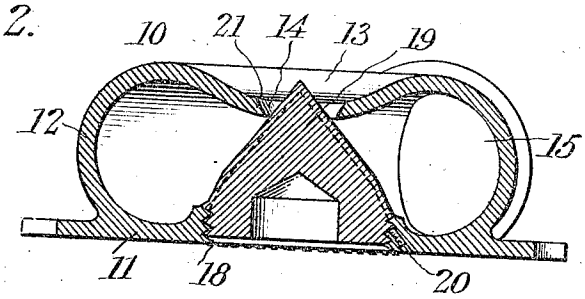
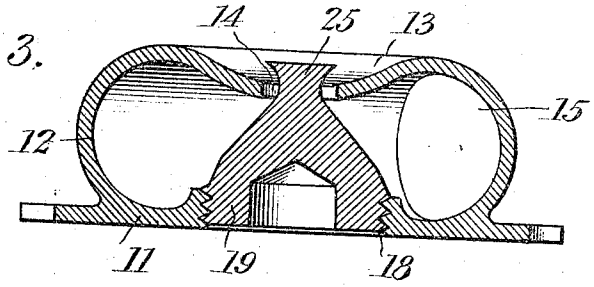


Fig. 3.



WITNESSES

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CENTRIFUGAL SPRAYER.

1,045,242. Specification of Letters Patent. Patented Nov. 26, 1912.

Application filed July 13, 1911. Serial No. 638,299.

To all whom it may concern:

Be it known that I, JAMES R. WRIGHT, a citizen of the United States, residing at Sacramento, in the county of Sacramento and State of California, have invented new and useful Improvements in Centrifugal Sprayers, of which the following is a specification.

This invention relates to water sprinklers of the centrifugal or whirling spray type and has the following objects: To construct such a device in an economical manner—but two separate elements being involved in its construction—and in addition to adapt the device for adjustment to throw either a fine or a coarse spray, the two structural elements mentioned being assembled in such a manner as to be movable for the adjustment. The provision of a sprinkler of the type mentioned which will throw water to a maximum distance with a minimum pressure. In many of the prior devices the spray is elevated to rather too great an extent, and is often caught by the wind and carried away from the point at which it is desired to apply the water. My device is so constructed that the water is thrown in a low arc, or trajectory, so that the full benefit of the momentum imparted is obtained, it being carried to the greatest possible distance for a given initial impulse. At the same time it is liable to a minimum degree to be carried away from the area over which it is desired the sprinkler shall distribute the water. To obviate the puddling of water on the ground immediately adjacent the sprinkler, this being attained by arranging the nozzle in the form of a crater from the center of which the water is lifted and carried away from the sprinkler.

Other objects and advantages will be apparent from the following description, and from the drawings, in which,

Figure 1 is a top view of the device, Fig. 2 is a cross section thereof on the line 2—2 of Fig. 1, Fig. 3 is a sectional view of a modification.

There is illustrated a sprinkler comprising a hollow body casting 10 of circular form, including the flat bottom portion 11, the side walls 12 of slightly volute shape on the interior, horizontally, and the crater portion 13 extending inwardly from the wall and comprising the top of the device, a central water outlet or nozzle opening 14 being formed centrally thereof. A tangentially disposed water inlet 15 is formed on the side of the member 10, threaded as at 16, for the reception of a suitable pipe coupling, and from the inner side of which a wall is extended, curving laterally part way across the inlet passage, tending to coincide in direction, and formed integrally with, the wall 12, at the inner termination of its volute portion, forming a suitable nozzle portion 17 extending inwardly in communication with the interior portion of the body member 10. All of the parts described are cast integrally in one piece. The bottom portion is provided with an enlarged threaded opening 18, concentric with the aperture or nozzle opening 14 through the crater. Projected through this opening 18, there is a cone member 19, having a cylindrically extended threaded base portion screwed in the opening 18, the apex of the cone member being projected slightly through the opening 18, as shown. A slightly convoluted chamber A is thus formed gradually reduced in transverse dimension toward the inner termination of the volute wall. It will be noted that the sides of the cone are inclined more from the horizontal than the adjacent portions of the crater around the outlet portion 14, this having an important effect which will be later described. The base portion of the cone 19 is recessed, the recess being of rectangular form where it opens on the bottom of the cone, in order that a suitable implement may be engaged therein for rotation of the cone to adjust it vertically in the outlet 14, whereby the quality of the spray ejected may be regulated. To hold the cone in adjusted position, a suitable set screw 20 may be engaged diagonally through the bottom, as shown, although it is not believed this will be necessary.

It will be understood that when the device is connected and in operation the cone should be adjusted to allow a considerable flow of water in order to develop the full centrifugal force of the device, although a considerable variation is possible in the adjustment. If made too fine, however, it will be obvious that there will be an insufficient flow of water inwardly of the nozzle 17 to produce the necessary rotation of water in the body member 10 before its exit, for the proper operation of the invention.

It is desirable to form the side wall in a slightly volute shape as shown, whereby it gradually converges toward the center, but only to a sufficient degree to effect displacement of water already therein to accommodate the incoming water from the nozzle 17, with a minimum back pressure, as may be understood. In the operation of the device three forces act upon the water after entering the device, the first of course being the impelling force from the service pipe, the second is a lateral force bearing the water inward toward the outlet, caused by the continual ingress of fresh water at the periphery of the rotated body of water, and the third force is that of the lateral inertia of the water, generally termed centrifugal force. Owing to the rapid entrance and ejectment of water in such devices, where the second force is allowed to act without proper restraint or direction, the effect of the centrifugal force is considerably modified, and often with considerable detriment.

Thus it is, where the cone element in such devices has its walls inclined too near the vertical the lateral force exerted by the force of the incoming water causes too great an elevation of the spray, or where there is no cone used and the water is allowed to escape at the circumference of a circular chamber having vertical walls, the same effect may be produced. In my device, it will be observed that as the water converges to the escape opening 14, the upper portion or crater of the body member 10 bears downwardly upon the water, offsetting the lifting effect of the side of the cone to a certain extent, whereby the water does not tend to fly upwardly as far as it might if the top were horizontal or upwardly inclined toward the center.

The rate of rotation of the water in the device is greatly magnified, as will be understood, by the convergence of the crater and the cone surfaces on the interior of the device and the speed of the water or rate of rotation at the center will be increased beyond that at the periphery in a degree almost corresponding to the difference between the diameter of the opening 14 and the circumference of the chamber in the body member. This is due to the fact that there is nothing but friction with the chamber surfaces tending to lessen the speed of the water, and the friction of the incoming water from the nozzle 17 will tend to maintain this at the same speed until it reaches the escape opening 14. That is to say, supposing the circumference of the chamber A to measure six inches, and the circumference of the opening 14 one inch and a half; the water moves at the same speed in rotating around the narrower space as it does in moving around the larger boundary, it would of necessity make the circuit of the orifice in one-quarter time required to circulate around the outer wall of the device. It is believed, however, that the rate of rotation is increased slightly more than in the ratio mentioned, for the reason that, in addition to rotating in a smaller arc, the water is gradually confined in smaller space between the converging faces of the cone and the crater, the effect being somewhat the same as that of a tapered nozzle of spiral form.

By sharpening the edge of the opening 14, as shown at 21 in Fig. 2, the efficiency of the radial movement of the water is increased. Any water tending to trickle over the surface of the device from the opening 14 will drain down the sides of the crater to the outgoing water, by which it will be caught up and carried outwardly from the device itself, whereby the formation of a puddle therearound may be avoided.

In Fig. 3 there is illustrated a modification of the device in which the member is provided with a recessed rim or cap portion 25, forming a continuation of its outer surfaces, and so positioned, that when the cone is lowered in the body member to give the maximum flow of water the curvature of the cap side 25 will be concentric with the adjacent edge portion of the opening 14 and the radial movement of water escaping therefrom facilitated. This cap is of such size that it may be readily projected through the opening 14 in the assemblage of the device.

It should be noted that by the spiral form of the outer wall, as shown in Fig. 1, some of the back pressure which would be involved by the displacement of rotating water by the newly entering fluid is obviated, for it will be readily appreciated that the water circulating in the device striking the incoming stream at an angle would tend to cut it off to some extent, and by the gradual convolution of the side wall together with the deflecting effect of the nozzle 17, the direction of movement of the two bodies of water is made as nearly co-incident as possible. By making the cone member so readily removable, the interior of the device may be easily cleaned, and should it become choked by matter in the service water no difficulty would be met with in cleaning out the obstruction. The device would of course preferably be made of such metal as will not corrode easily, whereby the adjustment of the cone in the body member will be easy at all times, and the nozzle will not tend to become fouled by scale and the like.

It should be explained that by adjusting the cone element to a low position in the form of device in Fig. 3, the outwardly flared portion will give the whole spray a more definite direction with respect to the horizontal, while with the cone adjusted with its conical surface in proximity with the opening a more diffused spray is produced,

and at the same time a considerable range of fineness is obtained in either the diffused or definitely directed spray.

What is claimed is:

1. In a device of the class described, the combination of a hollow body having a crater-like top provided with a central outlet opening, the inner surface of the top inclining downwardly toward the opening on all sides, the body having also a tangential inlet passage; and a cone element carried by the bottom of the body projected through the opening and shaped for projection of water through the opening at an angle to the adjacent upper surface of the top, whereby fluid engaged with the outer surface of the device by capillary attraction will be drained inwardly, and water lifted and projected upwardly by the device will engage and lift said drained water from and outwardly of the device.

2. A device of the class described comprising a hollow body member having a tangential inlet passage and including a flat bottom, having an enlarged threaded opening therethrough, and a top portion having a concentric escape opening, the outer surface of the top sloping upward from the escape opening, a removable cone element having its apex projecting upwardly through the escape opening and having a cylindrical lower portion threaded and engaged in the enlarged opening, and adapted for vertical adjustment by rotation, said apex being enlarged and connected to the lower portion of the cone element by a reduced portion having a curved and upwardly flared surface, the upper flared surface being adapted to deflect water laterally from the device at a certain angle with respect to the horizontal, the edge of said outlet opening being adjustable relatively—by adjustment of the cone element—toward the conical surface for production of a diffused spray, and toward the flared portion for production of a spray of more definite direction with respect to the horizontal.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES R. WRIGHT.

Witnesses:
ROY L. BROOKE,
CHARLES H. AUG.