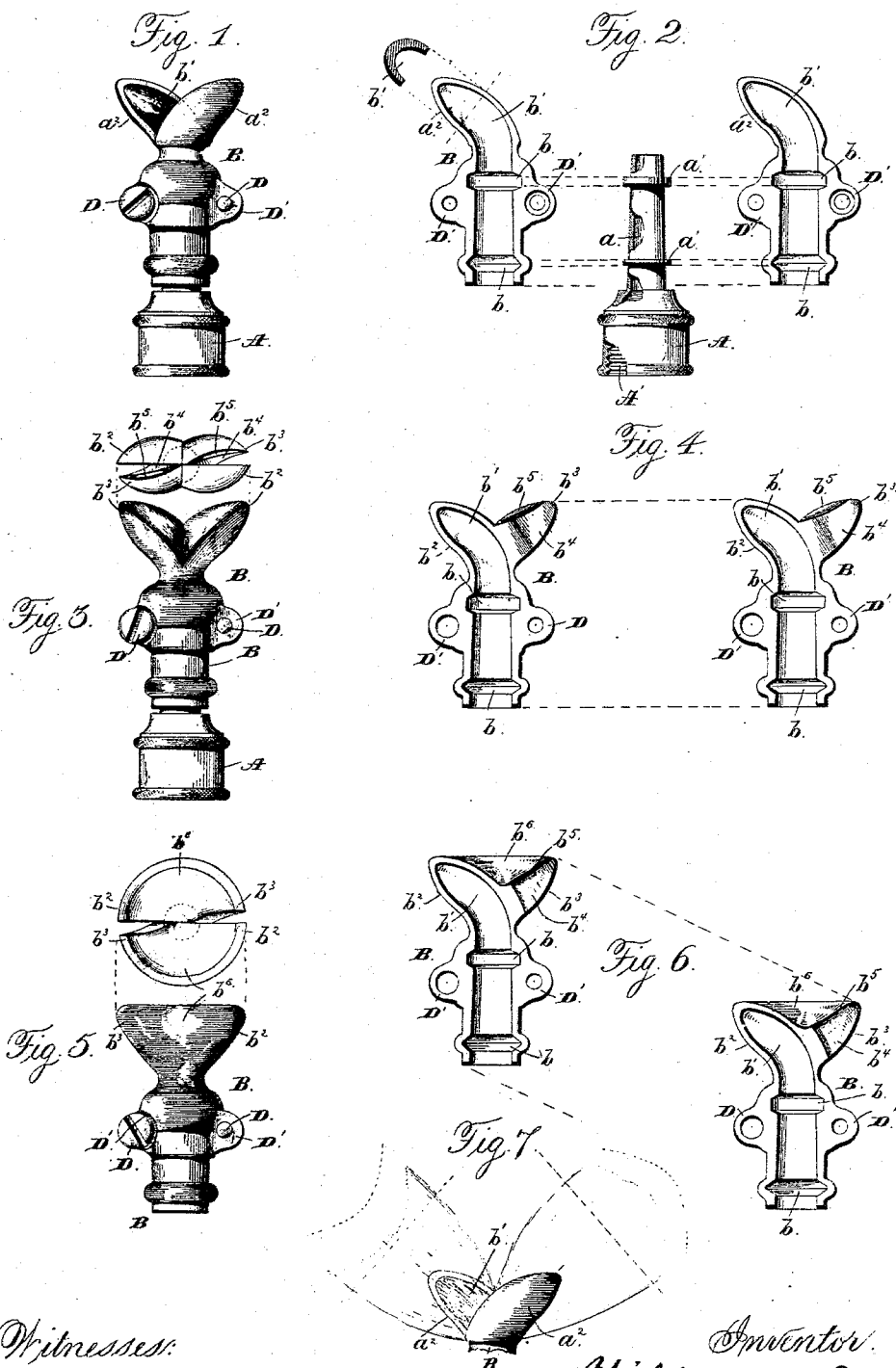


(No Model.)

W. A. DENISON.
SPRINKLER.

No. 414,502.

Patented Nov. 5, 1889.



Witnesses:
Jas. E. Hutchinson.
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UNITED STATES PATENT OFFICE.

WILLIAM A. DENISON, OF NEW HAVEN, CONNECTICUT.

SPRINKLER.

SPECIFICATION forming part of Letters Patent No. 414,502, dated November 5, 1889.

Application filed December 29, 1888. Serial No. 294,963. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. DENISON, of New Haven, in the county of New Haven, and in the State of Connecticut, have invented certain new and useful Improvements in Sprinklers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 shows a view of one form of my sprinkler in side elevation; Fig. 2, a similar view with the parts of the sprinkler separated; Fig. 3, a view in elevation of another form of my sprinkler; Fig. 4, a similar view of the two halves of the swivel-piece separated from each other; Fig. 5, a view in elevation showing another form of swivel-piece for the sprinkler; Fig. 6, a similar view of the separated halves of such swivel-piece, and Fig. 7 a detail view showing the action of the two oppositely-extending grooves or passages of the swivel-piece in separating the stream of water from the nozzle and directing it outward in opposite directions.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to provide a lawn-sprinkler of the rotary kind which shall be capable of being cheaply and easily made and simple in construction, and shall distribute the water in all directions evenly and thoroughly without causing in its action any back-pressure on the hose or pipe to which it is attached; and to this end my invention consists in the sprinkler and in the construction, arrangement, and combination of the parts thereof, as hereinafter specified.

In the drawings, A designates the nozzle, which is preferably to be provided with the internally-threaded socket or recess A' to adapt it to be screwed onto a hose-nozzle or pipe. I do not, however, limit myself to such means for attaching it.

Any desired one of the well-known forms of attachment for nozzles or tips for hose and other pipes can be used without departure from my invention.

The nozzle A has through it a straight passage *a* to allow free and unimpeded passage of a stream of water. Swiveled upon the upper or outer portion of the nozzle is the swivel-piece or rotary distributor B. Such swivel-

piece surrounds the nozzle end, and preferably has one or more internal annular grooves *b* to engage corresponding annular ribs *a'* on the outer side of the nozzle. As shown in the drawings, the nozzle has two of such ribs, one near the end or mouth of the nozzle and the other farther down the nozzle toward its attaching portion. The outer one of these ribs is shown as thicker than the other; but I do not limit myself to such construction. The internal grooves *b b* within the swivel-piece B are not made to fit the ribs *a' a'* closely, as such an arrangement would be liable to cause too much friction. A little dirt or grit might then stop or interfere with the rotation of the piece. The sides of the grooves are preferably made inclined in opposite directions, as shown. With the grooves made to engage the ribs loosely the swivel-piece or distributor can have slight play up or down on the nozzle, and whether it is up or down the edges of the ribs on the nozzle will only engage small portions of the inclined sides of the grooves *b b*, so that friction is reduced to its minimum, and there is no chance of such lodgment of grit as will cause stoppage of or interference with the free rotation of the swivel-piece. The water-passage within such piece is directly in front of the end of the nozzle made substantially cylindrical for a short distance. At the end of this short cylindrical portion C the passage is divided in two on a plane running through the axis of the passage. The grooves or channels *b' b'*, forming the two halves of the water-passage, are continued upward and outward to opposite sides of the swivel-piece. The upper and outer portions of these grooves or half-passages after they cross each other are uncovered, with their open sides facing in opposite directions with reference to the axial plane of division of the water-passage hereinbefore referred to. After the grooves or channels thus forming branches of the main water-passage pass each other they are diminished in depth and width, so as to spread the streams of water issuing from them out into concaved sheets directed upward and outward in opposite directions. The incline formed at the outer ends of each of the channels by the diminishing of the channel depth serves to give the stream of water issuing from the

channel end a direction which is at an angle to the axial plane through the swivel-piece and nozzle. The streams of water from the two channels will not only pass upward and outward in opposite directions and from opposite sides of the axis of the swivel-piece, but they will both be directed in opposite directions at an angle to a plane through such axis.

In making my sprinkler I prefer to cast or otherwise form the swivel-piece in two equal and similar parts, the plane of division being an axial one. Each part will then have a semi-cylindrical longitudinal groove to half inclose the nozzle A and extend a short distance beyond the end thereof, and the curved channel or half-passage extending outward from the end of the semi-cylindrical passage. This channel, curved to one side, as shown, is made diminishing in depth and width toward its outward end.

For fastening the halves of the swivel-piece together I prefer to use screws D D, tapped through and engaging suitable lips or flanges D' D' on the opposite halves; but I do not limit myself to such form of fastening. Each half of the swivel-piece can be made, as indicated in the drawings, an exact counterpart of the other. The two halves can be cast or formed in the same mold or die, and can therefore be most cheaply made.

The form of swivel-piece or rotary distributor shown in Figs. 3 and 4 is like that already described, and shown in Figs. 1 and 2, except each half of the piece, instead of having only one upwardly and outwardly extending arm a^2 for containing the water-guiding groove or half-passage, has two similarly-shaped arms branching from the half-piece in opposite directions. One of these arms—the one designated by b^2 —contains the channel or groove b' . The other arm (designated by b^3) is cut away on its inner side at b^4 , so as not to close the channel in the arm b^2 , and at its upper edge is provided with an upwardly-inclined surface b^5 to allow free upward and outward passage of the stream or sheet of water.

In Figs. 5 and 6 a still further modification of the swivel-piece is shown. In this form, instead of having the two branching arms of each half of the swivel-piece made distinct, as shown in Figs. 3 and 4, I connect the two arms b^2 and b^3 by a web b^6 , whose outer surfaces continue the outer surfaces of the arms around on the arc of a circle. This construction and arrangement obviously diminishes the resistance of the air to the rotation of the swivel-piece.

The passages and the inclined surfaces on the inner opposing sides of the two halves of the swivel-piece are arranged and shaped just as in the form of swivel device or piece shown in Figs. 3 and 4.

The operation of my sprinkler is briefly as follows: The water issues unimpeded from the mouth of nozzle A and enters the short straight passage within the swivel-piece,

larger in diameter than the mouth of the passage within the nozzle. At the end of this short passage in the swivel-piece the stream of water is divided into two equal portions, the division being on an axial plane through the stream. The two halves of the stream then flow upward and outward, being guided by the diverging channels or grooves. As the streams of water reach the outer ends of the channels they are, by the shape of such ends and by the inclines formed by a diminishing of the channel's depth, spread out into thin sheets having a slightly concave form in cross-section, and are turned or thrown backward with reference to the direction of rotation of the swivel-piece. The unbalanced pressure against the closed bottom of the channels b' and b' in the two arms b^2 and b^3 and the action of the streams as delivered from the ends of such channels upon the air will cause a very rapid rotation of the swivel-piece. Such rotation of the piece causes the streams of water to be divided up into minute drops shortly after they leave the channel ends. The result is a very even and thorough wetting of all the space within the reach of the water. As the channels b' b' are made open, as described and shown, throughout most of their length, the water flows freely and unimpeded out of the short straight passage in the swivel-piece and no back-pressure is caused upon the hose or other pipe to which the nozzle is attached. With the water issuing unimpeded the spread of the sprinkler or the distance to which the streams of water are thrown is very great. With the swivel-piece and the nozzle connected as described hereinbefore, with a little play between the ribs on the nozzle and the sides of the annular grooves within the swivel-piece, if the sprinkler is held upright, the water passing from the nozzle into the swivel-piece will tend to lift the latter, so that its weight will cause little or no friction of the ribs upon the engaging grooves. The swivel-piece is therefore free to be turned most easily and rapidly by the water.

I do not intend to limit myself to any particular manner or means of fastening together the duplicate parts of the nozzle. They can be attached or fastened together in any desired way without departure from my invention.

Having thus described my invention, what I claim is—

1. In a sprinkler, the rotary swivel-piece divided axially into two equal parts, with each part having an upwardly and outwardly extending channel on its inner side, in combination with means for fastening the two parts together, substantially as and for the purpose shown.

2. In a sprinkler, in combination with the rotary swivel-piece divided axially into two equal and similar parts, each part having on its inner face a groove or half-passage extending upwardly and outwardly, with the upper and

outer end diminished in depth, means for fastening the two parts of the sprinkler together, substantially as and for the purpose set forth.

5 3. In a sprinkler, in combination with the rotary swivel-piece divided axially into two equal and similar parts, with each part having on its inner face a groove adapted at its inner and lower end to partially embrace the
10 end of a nozzle and from the nozzle-embracing portion extending upward and then outward, means for fastening the two halves of the swivel-piece together, substantially as and for the purpose described.

15 4. In a sprinkler, in combination with the rotary swivel-piece divided axially into two similar parts, each having in its inner face the straight groove or channel to partially embrace the nozzle to which the piece is to be
20 attached, and the groove leading upward and outward from such straight groove and having its outer end made diminishing in depth, means for fastening the two halves of the swivel-piece together, substantially as and
25 for the purpose specified.

5. In a sprinkler, in combination with the nozzle, the rotary piece swiveled thereon, having its interior water-passage divided into two oppositely-extending half passages or grooves
30 running upward and outward and having their upper and outer open portions facing in opposite directions, substantially as and for the purpose shown.

6. In a sprinkler, in combination with the
35 nozzle, the rotary piece swiveled thereon, having its interior water-passage forming a continuation of the passage through the nozzle

and divided into two half passages or grooves running upward and outward in opposite directions and having their upper and outer
40 ends diminished in depth to form inclines, substantially as and for the purpose set forth.

7. In a sprinkler, in combination with the nozzle having one or more annular ribs, the rotary piece on such nozzle, having one or
45 more annular grooves to engage the ribs on the nozzle, a passage to receive the water from the nozzle divided at its upper end into two half passages or grooves extending upwardly and outwardly in opposite directions
50 past each other, so that their upper and outer portions are uncovered, and having at their upper and outer ends inclined surfaces, substantially as and for the purpose described.

8. In combination with the nozzle having
55 one or more annular ribs, the swivel-piece having one or more ribs engaging annular grooves with oppositely-inclined sides, the water-passage to receive the water from the nozzle, the two half passages or channels
60 forming divisions of the water-passage extending past each other upwardly and outwardly in opposite directions and having their upper and outer portions open or uncovered and diminishing in width and depth
65 toward their ends, substantially as and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 26th day of November, 1888.

WILLIAM A. DENISON.

Witnesses:

JULIUS TWISS,
EARTLESS P. ARIME.