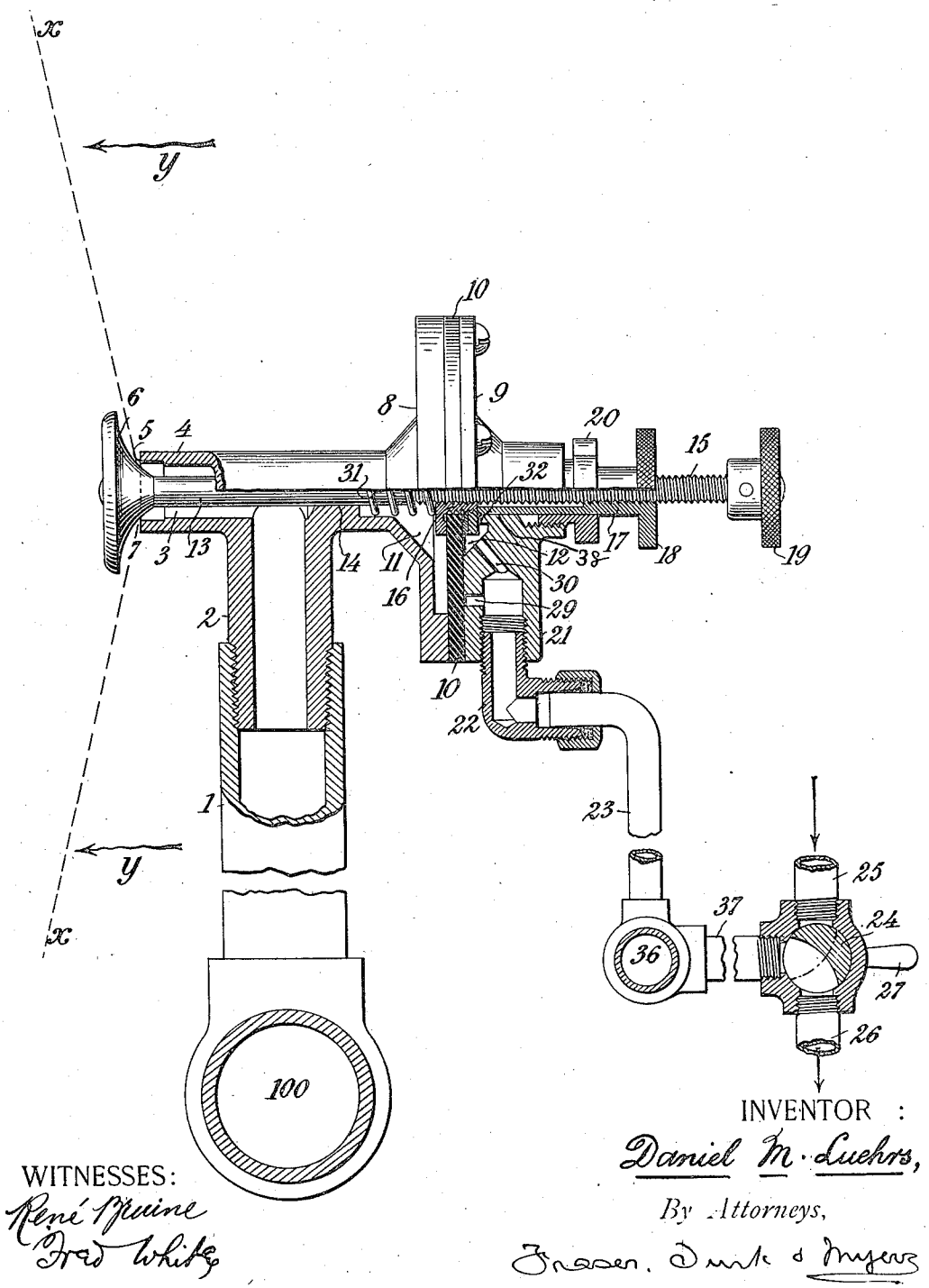
D. M. LUEHRS.

SPRAY NOZZLE.

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1,143,293. Patented June 15, 1915.



WITNESSES:

René Pruine

Fred White

INVENTOR :

Daniel M. Luehrs,

By Attorneys,

Fraser, Dunk & Myers

UNITED STATES PATENT OFFICE.

DANIEL M. LUEHRS, OF DETROIT, MICHIGAN, ASSIGNOR TO AMERICAN BLOWER COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF NEW YORK.

SPRAY-NOZZLE.

1,143,293. Specification of Letters Patent. Patented June 15, 1915.

Application filed August 9, 1913. Serial No. 783,992.

To all whom it may concern:

Be it known that I, DANIEL M. LUEHRS, a citizen of the United States, residing in Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Spray-Nozzles, of which the following is a specification.

This invention relates to and has for an object to provide a spray nozzle for delivering an unbroken sheet of water and is particularly adapted for use in air purifiers and humidifiers wherein the air under treatment is caused to pass through a curtain of water. To accomplish this end the orifice surfaces must be purged of sediment by flushing from time to time and the various operative parts must be so located relatively to the orifice and to the sheet of water discharged therefrom that the sheet will not be interfered with, and the operator both while actuating the flushing mechanism or adjusting the orifice area must be able to perform his work away from the sheet of water and outside the zone of the spray therefrom. In the present illustrative embodiment of the invention these operative parts are located laterally of the plane of the water sheet.

The drawings accompanying this specification show one practicable embodiment of the invention, the view illustrating a sprinkler head or nozzle in section and partly in elevation.

The sprinkler head is shown unmounted although it will be understood that in use it is so mounted that its spray will intercept the current of air under treatment. The source of water supply is illustrated at 1 to which the connection 2 is attached. A chamber 3 opens from the interior of the connection. The shell 4 of this chamber ends in a seat or face 5, between which and the conical disk 6 or deflector head the discharge orifice 7 is formed. The area of the discharge orifice is adjustable for the purpose of regulating the volume of water discharged and also is movable away from the seat or face 5 for the purpose of purging the orifice surfaces by permitting the temporary passage of a large volume of water for flushing out any foreign bodies which have come to the orifice and cannot pass or any sediment adhering to the surfaces.

The casing for the nozzle is provided with a chamber in which is located a partition movable toward and from the spreader seat 5 which is formed at the front of the casing and as stated before surrounds the discharge. In the illustration the partition is a diaphragm. The casing is shown formed of two shells 8 and 9 fastened together and holding between them a flexible diaphragm 10, a single diaphragm being shown in the present illustration. There is a chamber 11 in the shell 8 in front of the diaphragm and a chamber 12 in the shell 9 behind the same. The supply inlet and the discharge are formed in the casing at the front of the diaphragm. The disk or spreader head 6 is shown carried by a stem 13 which has a close fit with a bearing portion 14 between the chambers 3 and 11. The stem is provided with a screw-thread 15 traversing a nut 16 carried by the diaphragm. An interiorly screw-threaded sleeve 17 is mounted on the stem and affords it a bearing at the rear by being mounted in the bearing 38. The stem is then supported by bearings afforded by the casing at front and rear of the chamber 14 and consequently at the front and rear of the diaphragm. The sleeve is shown abutting the diaphragm. The stem 13 and the sleeve 17 each extend outwardly beyond the rear of the casing and carry an exposed engaging head. In the present illustration the stem is provided with a knurled head 19 and the sleeve 17 is provided with a knurled head 18.

The sleeve 17 is shown mounted in a stuffing box having a gland 20.

The actuation of the disk or head 6 for effecting the flushing is accomplished in the present illustration by a movement of the diaphragm toward the left from its normal position. The shell 9 carries a connection 21, attached by a coupling 22 and pipe 23 to a three-way cock 24. This cock is shown connected to a water supply pipe 25 and a waste vent 26. A handle 27 is shown for controlling the three-way cock. This will be actuated as the exigencies of the installation demand.

In normal operation the water entering from pipe 1 passes through the annular chamber 3 and is discharged from the annular orifice 7 in an unbroken sheet or film of water traveling approximately along line x. The head 6 is drawn back by a strong spring 31, the stress of which is sufficient to

overcome the normal water pressure and prevent the latter from forcing the head 6 farther away from the seat 5. The spring presses the nut 16 back against a shoulder 32 formed within the shell 9 which serves as a positive abutment. The adjustment of the thickness of the film is made by displacing the head 6 which is rigidly attached to the stem 13, 15, this stem being turned by the adjusting head 19. By screwing in the stem the deflector head is forced farther from its seat and the thickness of the spray increased. The sleeve 17 serves as a check-nut which, screwing upon the stem 15, jams against the nut 16. Hence, before adjusting the head 19, the operator should release the sleeve by a backward turn of its head 18, and after the adjustment he should screw this forward to lock the stem.

It is an important advantage of this nozzle that the adjusting head 19 and lock-nut head 18 are in the rear of the spray nozzle so that, in assembling the nozzle, these may be arranged upon the entering side, so that the operator on making the adjustments works in the dry air blowing toward the nozzle.

Arrows *y y* show flow of air.

In the use of such nozzles it is found that particles of sand, grit or dirt find their way in and are arrested between the head and seat, so that they clog the annular discharge space. When this occurs the continuity of the sheet of water is interrupted and the humidifier becomes ineffective because the air which passes through the interrupted portion of the sheet of water is not properly wetted and is liable to carry through its dust or other impurities which the humidifier should remove. To remedy this difficulty provision is made for flushing out the nozzle by moving the head farther from its seat against the resistance of the spring 31, so that the clogging matters are permitted to escape, being washed out by the augmented flow of water. Instead of accomplishing this by a hand displacement of the stem, as has been common, the present nozzle is provided with hydraulic clearing means. By turning the three-way cock 24 to the position shown in dotted lines, water pressure is admitted from the pipe 25 to the chamber 12 and acts upon the diaphragm 10 to force the stem 13 and head 6 outwardly against the pressure of the spring 31. Upon turning the three-way cock back to the position shown in full lines, the water thus admitted is discharged through the waste 26, and the nozzle, having been purged by the augmented flow, assumes its normal position.

In the use of such spray nozzles it is customary to apply a series of nozzles all fed from one main pipe. In the drawing this main is indicated at 100, the pipe 1 being one of a series of branch pipes leading to the respective nozzles. In such case the three-way cock 24 is best placed entirely outside the humidifier or air washer, so that it shall control the entire series of spray nozzles.

For this purpose a pipe 36 is interposed serving as a main from which branch a series of pipes 23 leading to the respective nozzles, the pipe 36 being connected to the three-way cock by a pipe 37. It will be understood that the three-way cock may be operated manually whenever the need arises; or it will be a simple and obvious matter to operate it automatically at stated intervals, if preferred.

The present invention provides a spray nozzle or head which is adapted for the same purpose as that set forth in my Patent No. 962,512, dated June 28, 1910. The present invention, however, constitutes an important improvement over the construction set forth in the said patent, as will be apparent from the foregoing description.

Although but one embodiment of the invention is shown and described, it will be apparent that this is illustrative of the invention, and that changes may be made within the scope of the claims without departing from the spirit of the invention.

What I claim is:—

1. In a spray nozzle, the combination with a casing having within it a chamber, a partition therein, the casing having an inlet and a discharge at the front of said partition and an annular seat surrounding the discharge and a water connection behind the partition, a spreader head for said seat, a stem carrying the spreader head and having screw-threaded connection with the partition and extending outwardly beyond the rear of the casing and carrying an exposed engaging head, the casing carrying an abutment for positively limiting the rearward position of the partition, a compression spring for holding the partition against its said abutment, a lock nut screw-threaded on the stem engaging the diaphragm and extending beyond the rear of the casing and carrying an exposed engaging head.

2. In a spray nozzle the combination with a casing having within it a chamber, a flexible diaphragm secured therein, the casing having an inlet and a discharge at the front of the diaphragm and an annular seat surrounding the discharge and a water connection behind the diaphragm, a spreader head for said seat, a stem carrying the spreader head and having screw-threaded connection with the diaphragm and extending outwardly beyond the rear of the casing and carrying an exposed engaging head, a sleeve surrounding said stem at the rear of the diaphragm and having screw-threaded connection therewith and adapted to abut the diaphragm and serve as a lock nut for the

stem, said sleeve extending outwardly beyond the rear of the casing and carrying an exposed engaging head.

3. In a spray nozzle the combination with a casing provided with a chamber, a diaphragm disposed therein, said casing having a discharge and being formed with a spreader head seat, a spreader head for seating thereon, a stem carrying said spreader head and having screw-threaded connection with the diaphragm, said stem extending outwardly beyond the rear of the casing and carrying an exposed engaging head, the casing being provided with an abutment for limiting the backward movement of the diaphragm and a compression spring at the front of the diaphragm.

4. In a spray nozzle, the combination with a casing having within it a chamber, a partition therein, the casing having an inlet and a discharge at the front of said partition and an annular seat surrounding the discharge and a water connection behind the partition, a spreader head for said seat, a stem carrying the spreader head and having screw-threaded connection with the partition and extending outwardly beyond the rear of the casing and carrying an exposed engaging head, a lock nut screw-threaded on the stem engaging the partition and extending beyond the rear of the casing and carrying an exposed engaging head.

5. In a spray nozzle, the combination with a casing having within it a chamber and a bearing at the front and rear of the chamber, a single flexible diaphragm mounted in such chamber and carrying a nut, the casing having an inlet and a discharge at the front of the diaphragm and an annular seat surrounding the discharge and a water connection behind the diaphragm, a spreader head for said seat, a stem carrying the spreader head and disposed in the said bearing at the front of the chamber and having screw-threaded connection with the said nut and extending outwardly beyond the rear of the casing and carrying an exposed engaging head, a sleeve surrounding said stem at the rear of the diaphragm and having screw-threaded connection therewith and adapted to abut the said nut and serve as a lock nut for the stem, said sleeve being disposed in the said bearing at the rear of the chamber and extending outwardly beyond the rear of the casing and carrying an exposed engaging head.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

DANIEL M. LUEHRS.

Witnesses:
FREDERICK R. STILL,
PAUL C. WILKINSON.