

J. W. FRIES.  
HUMIDIFIER.

APPLICATION FILED AUG. 18, 1909.

Patented Jan. 25, 1910.

2 SHEETS—SHEET 1.

947,301.

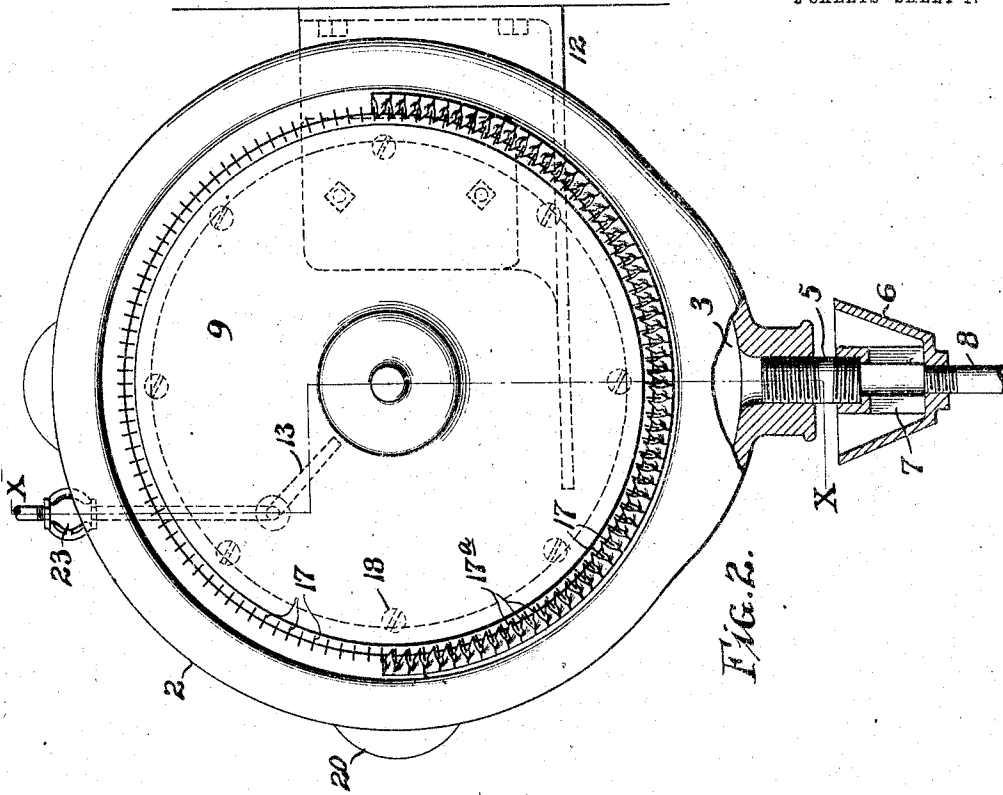


FIG. 2.

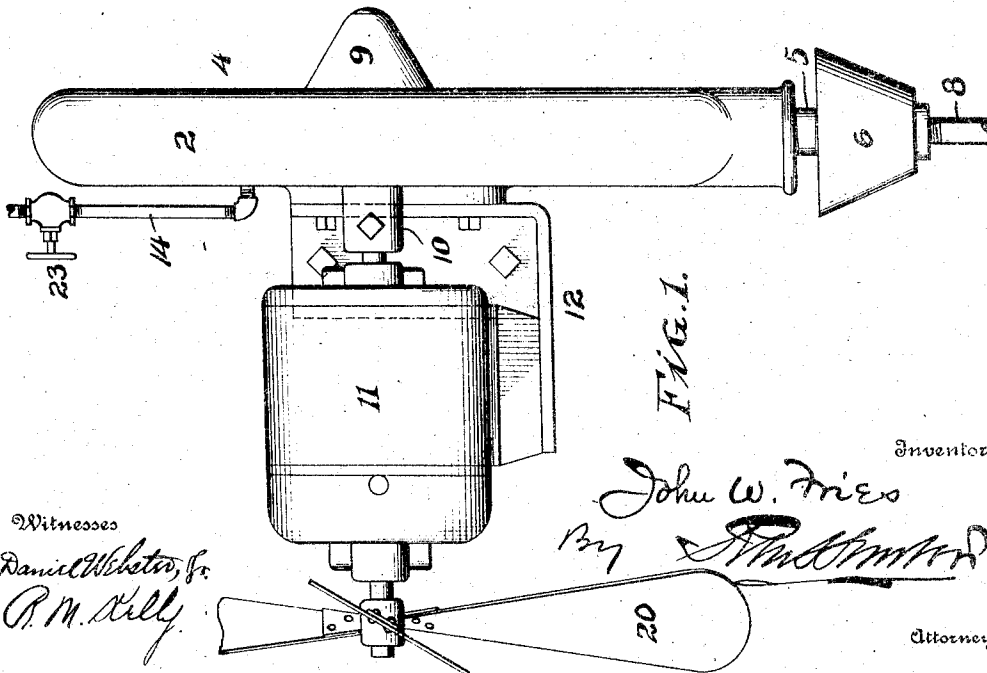


FIG. 1.

Inventor

John W. Fries

By *[Signature]*

Attorney

Witnesses

Daniel Webster, Jr.

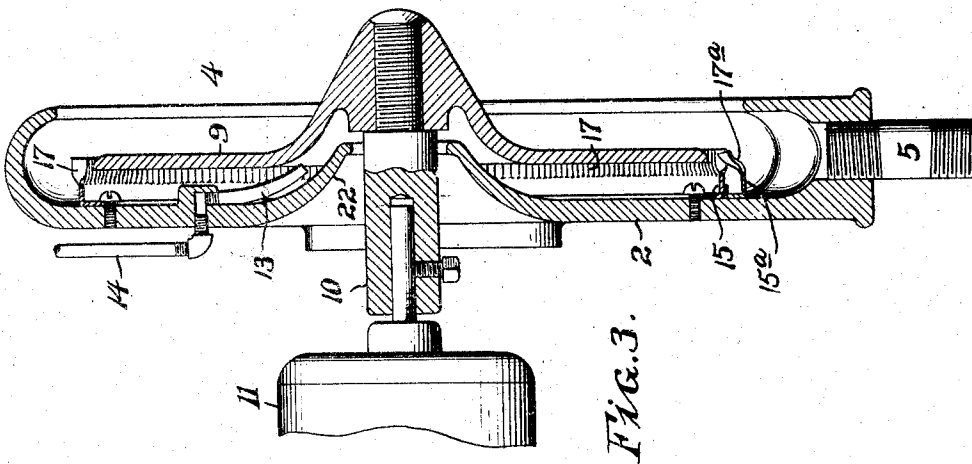
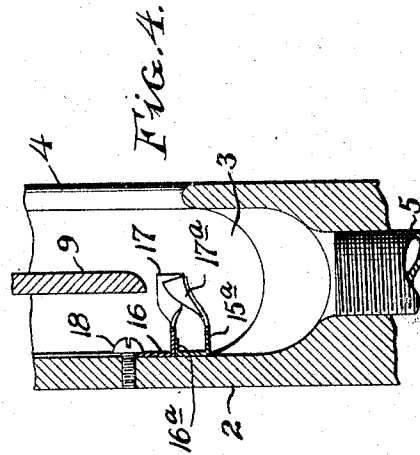
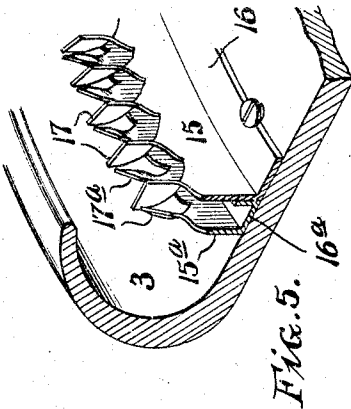
R. M. Kelly

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# UNITED STATES PATENT OFFICE.

JOHN W. FRIES, OF WINSTON SALEM, NORTH CAROLINA.

## HUMIDIFIER.

947,301.

Specification of Letters Patent.

Patented Jan. 25, 1910.

Application filed August 18, 1909. Serial No. 513,392.

To all whom it may concern:

Be it known that I, JOHN W. FRIES, a citizen of the United States, and resident of Winston Salem, county of Forsyth, State of North Carolina, have invented an Improvement in Humidifiers, of which the following is a specification.

My invention relates to a humidifier composed of a rapidly revolving disk upon which the liquid is delivered combined with an annular row of obstructing blades arranged about the circumference of the disk, by which the film of liquid driven outward from the revolving disk by centrifugal force is converted into vapor. A humidifier of this kind is shown and described in my application No. 452,809, filed September 14, 1908. When such a humidifier is arranged in a vertical position there is a tendency, owing to the action of gravity, for a heavier film to form on the lower portion of the disk than on the upper part. When the obstructing blades are uniform throughout the circumference they cannot act to produce a uniform vaporization, since more water will be driven out on the lower blades than on the upper ones. If the humidifier is operated to obtain a maximum efficiency from the upper portion, there will be such excess of water in the lower portion as will prevent complete vaporization, and a substantial portion of water will pass off in drops. If on the other hand, the humidifier is operated to produce a perfectly satisfactory vaporization at the lower portion, the upper part will not be operating to its full capacity and there will be a loss of efficiency.

It is the object of this invention to obviate this difficulty, and this I accomplish by making the obstructing blades which are arranged about the periphery of the rotary disk more dense at the lower portion of the circle than at the upper part to compensate for the difference in the amount of water to be taken. In the preferred form this greater density of the obstructing blades is obtained by means of a set of auxiliary obstructing blades extending between the blades of the annular ring in the lower half or portion, and arranged more or less transversely to the blades of the annular set or ring.

Figure 1 is a side elevation of the humidifier; Fig. 2 is a front elevation of the same with part in vertical section; Fig. 3 is a vertical sectional view on the line  $x-x$  of Fig. 2; Fig. 4 is an enlargement of a portion of

Fig. 3; and Fig. 5 is a perspective sectional view of the fixed case and obstructing blades.

2 is a fixed circular case open at its front as at 4 and having an inwardly directed gutter 3 at its periphery. The bottom of the gutter 3 terminates in a drainage tube 5 connecting with a waste pipe 8 through a funnel shaped casting 6 which is formed with vent openings 7 surrounded by an upwardly extending circular flange. The waste water passes from the gutter through the pipes 5 and 8 and any air that may be present escapes through the vents 7. The funnel 6 prevents the escape of unvaporized water.

12 is a bracket to which the case 2 is bolted and by which the humidifier may be suspended.

11 is a motor carried by the bracket 12 with its shaft extending centrally with a conical flange 22 projecting forwardly from the center of the case 2.

9 is a disk within the case 2 having a rearwardly extending hub 10 fitting upon the motor shaft and secured thereto by a set screw or other suitable means. This disk has a thin edge and the rear face is flat, as shown in Fig. 4. Surrounding the disk and close to it is a ring 15 secured to the inner face of the case by a flange 16 and screws 18 and having its outer edge provided with a series of blades 17 arranged close to one another about the periphery of the disk 9. In practice the ring 15 is preferably formed of copper spun into shape with the edge slitted and the slit portions twisted radially to form the blades as shown. These blades receive the liquid thrown off of the disk 9 and vaporize it, and they are directed toward the opening 4 of the case, so that the vapor may pass freely away.

14 is the pipe for supplying the liquid (usually water) and is provided with a nozzle 13 on the inside of the case 2 through which the liquid is discharged on the disk 9 near its center.

20 is a fan or blower on the outer end of the motor shaft to produce a current of air over the case and carry the discharged vapor into the room.

The water supplied to the disk 9 quickly spreads out over its surface by centrifugal action and as it travels outward its speed increases and its thickness diminishes, so that it is in the form of an attenuated film around the edge of the disk. This film is thrown off and converted into vapor by im-

pact with the fixed blades 17. Owing to the action of gravity there is a tendency for the film to have a greater thickness on the lower portion of the disk than on the upper portion, and consequently the water is thrown off in greater volume at such portions and will not be vaporized as readily by impact with the fixed blades 17 as will the water of the upper portion of the film.

10 To overcome this I provide a set of auxiliary fixed blades 17<sup>a</sup> between the blades 17, preferably through the lower half of the set 17. These are preferably formed by twisting the slit edges of a semi-annular strip 15<sup>a</sup>, provided with a flange 16<sup>a</sup> soldered to the ring 15 of the blades 17. As shown the blades 17<sup>a</sup> are twisted so as to lie in an angular position transversely between the blades 17. This particular angular position is not, however, essential. The water film thrown from the edge of the disk 9 impacts partly on the blades 17 and partly on the blades 17<sup>a</sup>, and owing to the transverse position of the auxiliary blade 17<sup>a</sup> the free passage of unvaporized drops between the blades 17 is prevented. By thus increasing the vaporizing action of the stationary blades about the lower portion of the rotary disk 9 to compensate for the greater volume of the water in the discharged film at such portion, I am able to obtain a practically uniform vaporization through the circumference. The degree of humidity produced depends upon the speed of the disk 9 and the amount of water supplied to it, and with a given speed the degree of humidity may be regulated by adjusting the valve 23 in the supply pipe 14.

What I claim is as follows:

40 1. In a humidifier, the combination of a rotatable disk arranged in a vertical plane, means for delivering liquid to the disk, and an annular row of obstructions arranged in a vertical plane about the circumference of the disk and close to it against which the film of liquid driven outward from the disk by centrifugal force is projected and vaporized, said obstructions being more dense in

the lower than in the upper portion of said annular row. 50

2. In a humidifier, the combination of a rotatable disk arranged in a vertical plane, means for delivering liquid to the disk, an annular row of spaced obstructions arranged in a vertical plane about the circumference of the disk and close to it against which the film of liquid driven outward from the disk by centrifugal force is projected and vaporized, and a set of auxiliary obstructions between the obstructions of said annular row in the lower portion of said row. 55

3. In a humidifier, the combination of a rotatable disk arranged in a vertical plane, means for delivering liquid to the disk, an annular row of spaced obstructions arranged in a vertical plane about the circumference of the disk and close to it against which the film of liquid driven outward from the disk by centrifugal force is projected and vaporized, and a set of auxiliary obstructions between the obstructions of said annular row in the lower portion of said row and extending in a more or less transverse direction between said obstructions of the annular row. 75

4. The combination with the case 2 having the annular gutter 3, the rotatable disk 9, and the ring of transverse blades 17 about the periphery of the disk, of the set of auxiliary blades 17<sup>a</sup> between the blades 17 in the lower portion of the ring. 80

5. The combination with the case 2 having the annular gutter 3, the rotatable disk 9, the ring 15 secured to the case and having the annular set of blades 17 extending transversely to the edge of the disk 9, of the semi-annular strip 15<sup>a</sup> secured adjacent to the lower half of the ring 15 and having the auxiliary set of blades 17<sup>a</sup> extending between the adjacent blades 17 of the ring 15. 85

In testimony of which invention, I have hereunto set my hand.

JOHN W. FRIES.

Witnesses:

CHAS. KREECH,  
FLORA P. COHEN.