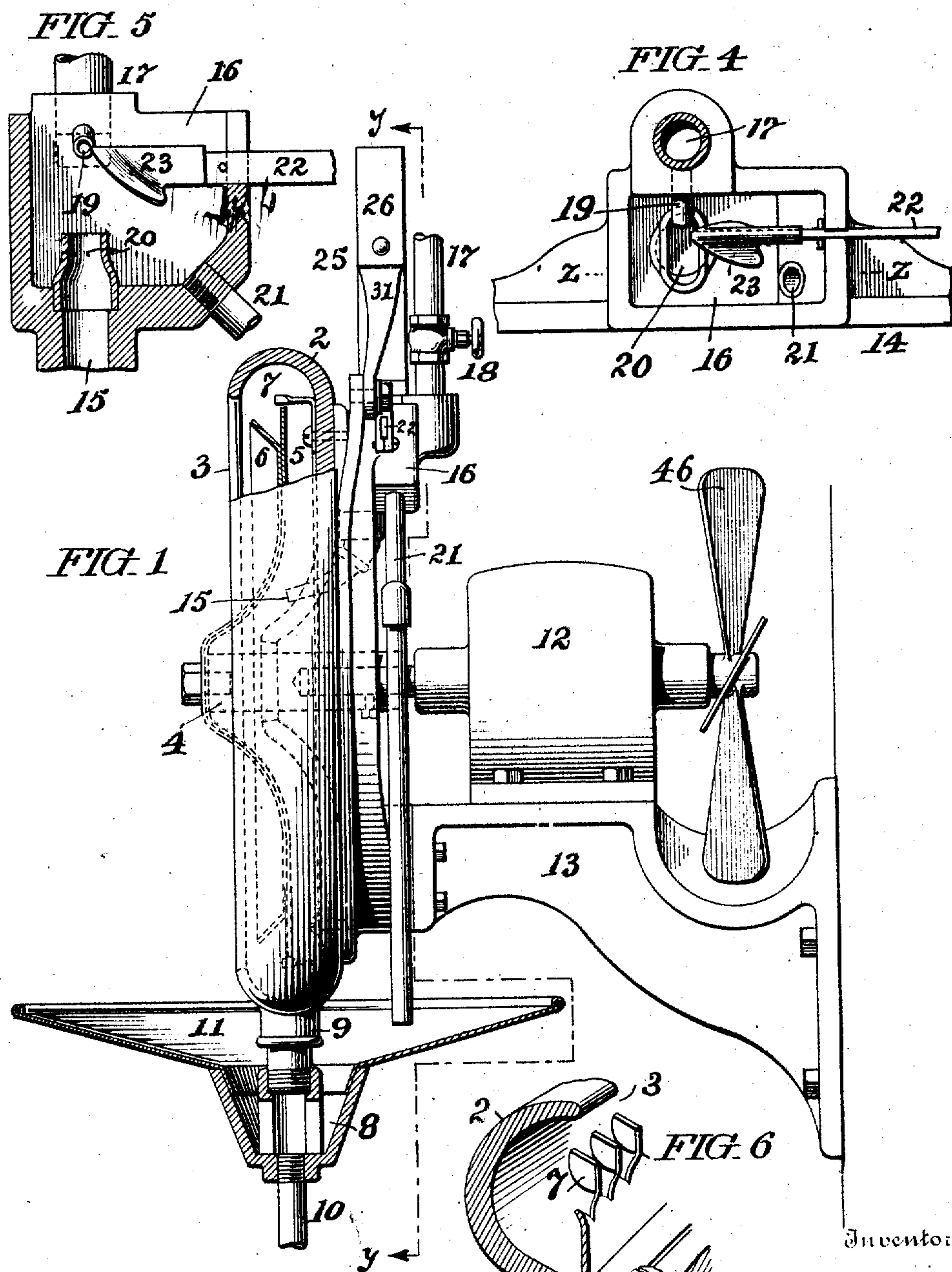


J. W. FRIES.
HUMIDIFIER.
APPLICATION FILED APR. 11, 1910.

969,854.

Patented Sept. 13, 1910.

2 SHEETS—SHEET 1.



Witnesses
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2 SHEETS—SHEET 2.

FIG. 2

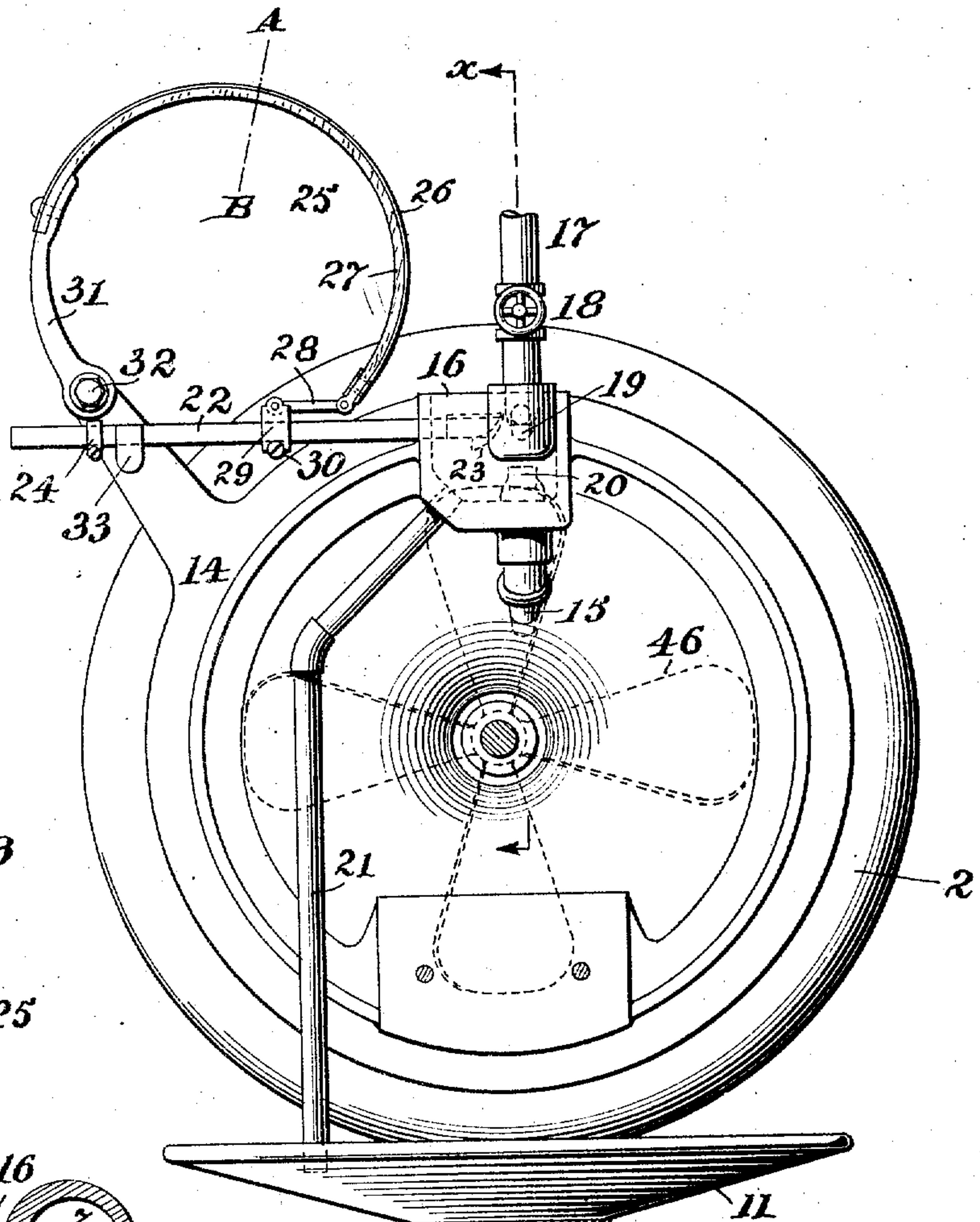
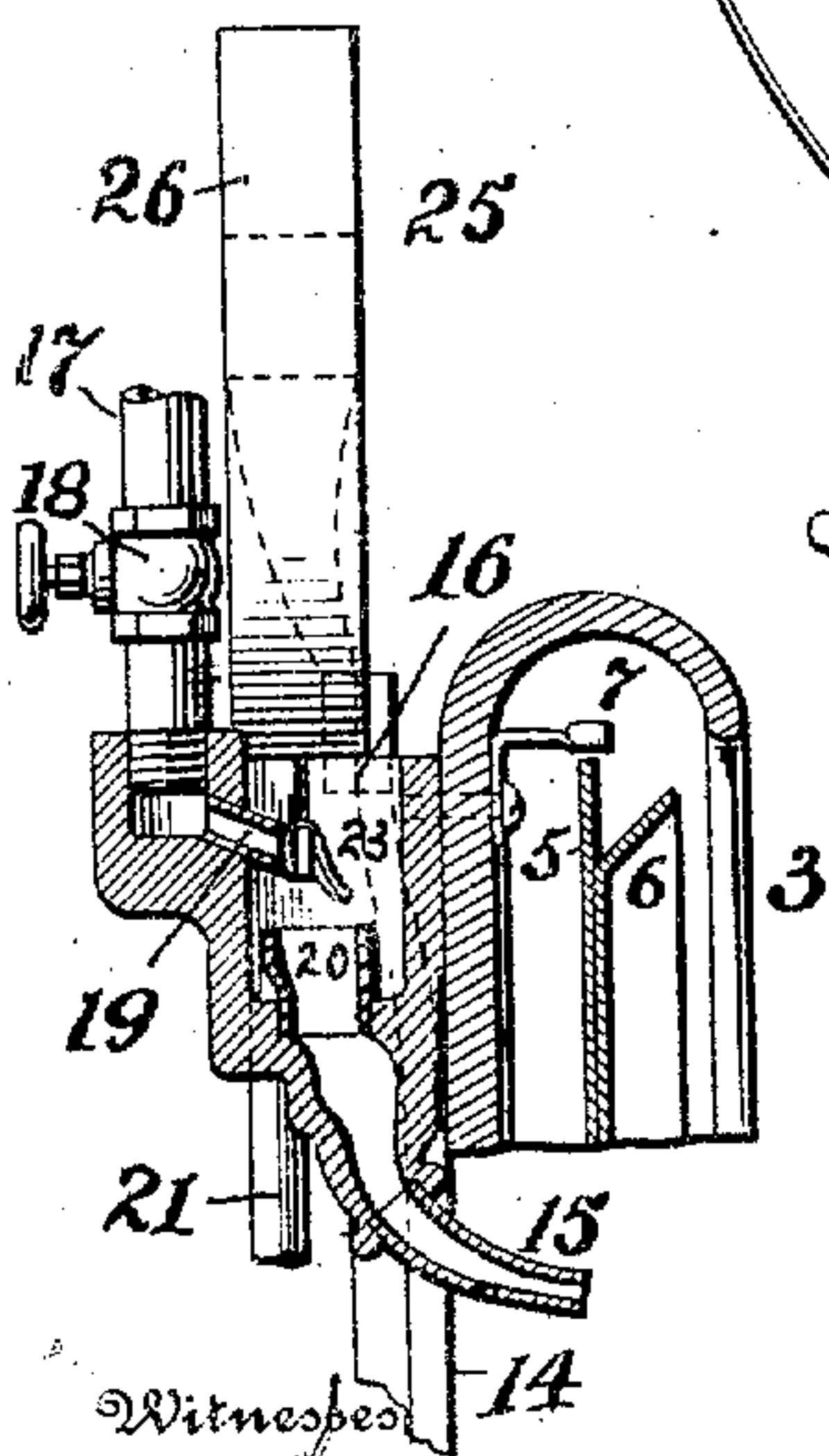


FIG. 3



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FIG. 7



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UNITED STATES PATENT OFFICE.

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

HUMIDIFIER.

969,854.

Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed April 11, 1910. Serial No. 554,590.

To all whom it may concern:

Be it known that I, JOHN W. FRIES, a citizen of the United States, and a 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 has reference to humidifiers and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

My invention more particularly relates to means for automatically controlling the supply of water to the humidifying apparatus under the control of the condition of the atmosphere of the room or compartment in which the apparatus is located, whereby the humidity imparted to the atmosphere of the room may be maintained in a substantially constant condition.

My improvements are also designed to permit a greater or less humidity to be provided under automatic regulation, as may be required to suit the conditions prevailing within the room or compartment in which the apparatus is located.

My invention, while being adapted to humidifiers of various constructions, is more particularly designed for use in connection with humidifiers of the character disclosed in Letters Patent No. 947,300 and granted to me on Jan. 25, 1910, and in which a regulated stream of water is projected upon a rapidly revolving disk, from the perimeter of which it is thrown as a film and caused to be impacted by a circular row of abutments by means of which it is sub-divided into a vapor, the density of which is dependent upon the amount of water delivered to the revolving disk in a given time.

My invention consists, in its application to the aforesaid humidifying apparatus, of a nozzle for supplying water to the revolving disk, means for delivering a stream of water to the nozzle, and means controlled by the humidity of the atmosphere to divert the stream of water from the nozzle whenever the humidity of the atmosphere exceeds a predetermined degree.

More specifically, my invention consists of certain details of construction which are illustrated in the drawings and more fully described hereinafter.

My invention, generally, comprehends the above described features in addition with

those hereinafter described and all of which are more particularly defined in the claims.

Referring to the drawings, Figure 1 is a side elevation of my improved humidifying apparatus with part in section; Fig. 2 is a rear elevation of the same with the motor and bracket removed; Fig. 3 is a cross sectional view on line *x—x* of Fig. 2; Fig. 4 is a plan view looking down upon the immediate means for controlling the stream of water; Fig. 5 is a sectional elevation of the same taken on line *z—z* of Fig. 4; Fig. 6 is a perspective view illustrating the construction of the abutments by which the film of water is sprayed; and Fig. 7 is a cross section of the diverting means.

While my invention is applicable to various humidifying means, to enable its operation to be clearly understood I will describe the same in connection with my preferred form of humidifying apparatus.

2 is a case closed at the back and open at the front 3. This case is provided with an annular gutter which discharges into a drain pipe 9 at the bottom, said drain pipe supporting a drainage hopper 8 from which the waste pipe 10 extends. Resting in the open top of the hopper 8 is a flaring spun copper basin 11 which is adapted to receive waste water and convey it into the waste pipe 10 through the hopper 8, as will readily be understood by reference to Fig. 1.

Within the case 2 is arranged a central shaft 4, which is rotated by an electric motor 12; and to this shaft is secured a disk 5 which is rapidly rotated within a circular row of abutments 7, by means of the electric motor. The disk 5 may be provided with an oblique flange 6 near its periphery by which drafts due to the rotating disk may be directed outward so as not to interfere with the escape of the vapor produced by the action of the abutment 7 upon the rapidly rotating film of water produced by the disk 5.

Secured to the back of the case 2 is a circular frame 14 which is bolted to a bracket 13, to which the motor is also secured and by which bracket the entire apparatus may be secured to a post or wall of the building. The opposite end of the motor shaft may be provided with a fan 46 for producing a current of air over the perimeter of the case 2 from the rear, said draft being for the purpose of carrying the vapor produced out into the room.

The upper part of the frame 14 is provided with a small well 16 having an inclined nozzle 19 which communicates with a water pipe 17 having a control valve 18.

5 The lower part of the well, immediately below the outlet of nozzle 19 is provided with an elongated tubular part 20 adapted to receive the water from the nozzle when not otherwise prevented. The water received in

10 the tubular part 20 flows downward into the nozzle 15 which delivers the water upon the back of the revolving disk 5. This water, delivered to the disk, is caused to spread out over the same under centrifugal action and

15 extends beyond the perimeter in a thin film which is brought into contact with the abutments 7 and thereby sub-divided into the form of vapor. The tubular part 20, in the bottom of the well 16 is of less width than

20 the well so as to form a space beyond the tubular part which may receive the stream of water from the nozzle 19 should the valve 18 be turned open too much, so as to prevent the excess of water passing down to the

25 disk. Any water passing from the nozzle 19 which does not find its way into the tubular part 20, is received in the well and drains off by the pipe 21, from which it is discharged into the basin 11 and thence

30 through the head 8 into the waste pipe 10. 22 is a reciprocating bar which is provided on its end with a water diverting head 23 formed with a groove 23^a and adapted to be moved to contact with the stream of wa-

35 ter issuing from the nozzle 19 whenever it is desired to divert the said water from falling into the tubular part 20, to reduce the amount of water supplied to the rotating disk. This diverting head and bar is re-

40 stricted in its movement by an adjustable stop 24, which comes into contact with the bearing 33 on the frame 14, by which the bar is supported and guided. This adjustment is made so that the diverting head 23

45 may move in front of the stream of water just sufficient to divert it. The bar 22 is moved by means of a motor device operated by variations in the hygrometric conditions of the atmosphere. In the particular form

50 of motor device shown, a support 31 is adjustably clamped to the frame 14 by a screw 32 and this support carries a curved arm 25, the free end of which is connected by a link 28 with a block 29 adjustably clamped

55 upon the bar 22 by a clamping screw 30. The curved arm 25 is of compound construction; that is to say, it is formed of an outer band 26 of brass or other metal and an inner curved part 27 of wood, said parts

60 being secured together at each end. In the preferred construction, I saw the wooden portion out of a board with the grain running substantially in the line A-B (Fig. 2) as this makes the device more sensitive to

65 hygrometric changes.

When the proper hygrometric condition of the atmosphere is had, the parts will be in the condition indicated in Fig. 2; and under these conditions, all of the water which is intended to be used is permitted to

70 pass from the nozzle 19 into the tubular part 20 and thence by the nozzle 15 to the revolving disk 5. By the adjustment of the hand valve 18 slightly more water may pass from the nozzle 19 than is actually re-

75 quired for maintaining the degree of humidity required. If the humidity should increase above the predetermined amount, the wooden portion 27 of the arm 25 expands to a greater degree than the metal part 26, with

80 the result that the bar 22 is shifted so that the diverting head 23 is brought into contact with the small stream of water from the nozzle 19 and causes it to be diverted to one side

85 of the tubular part 20 whereby the supply of water to the disk is temporarily cut off and this condition maintained until the degree of humidity is reduced to the predetermined amount and slightly below the same. When this condition is reached, the curved

90 arm 25 will tend to increase its curvature and will move the bar 22 in the opposite direction, so that the diverting head 23 thereof is moved out of contact with the stream of water issuing from the nozzle 19

95 and said water will again flow into the tubular part 20 and thence down through the nozzle 15 to the revolving disk 5.

It will be understood that the device will operate automatically to control the amount

100 of moisture which is to be transformed into vapor without, as a matter of fact, either changing the speed of the machine or of the amount of water which is passing through

105 the nozzle 19. The adjustment of the stream of water from the nozzle 19 does not have to be very accurately made because the automatic devices control the amount of water dissipated into vapor to maintain the hygrometric conditions just what is desired.

110 It is evident, however, that it is not desirable that too large a stream of water shall pass through the nozzle 15, as that would produce a vapor tending to form a spray which would be objectionable; and conse-

115 quently, the valve 18 should be of a form which will allow of easy adjustment for slight differences in quantity of water permitted to pass, so that approximately the right amount of water may be supplied to

120 the machine. As before stated, any careless handling of the valve 18 will cause the jet of water from the nozzle 19 to pass beyond the tubular part 20 and escape by the waste

125 pipe 21 without passing to the revolving disk. This free flow of water may be resorted to occasionally when it is desired to clear the valve 18 should it become clogged from any cause.

I have shown a motor device of a simple

130

form, which I have found excellently adapted for the purpose of my invention and have arranged it at the back of the machine so that it is affected by the air which is drawn from the rear and consequently, is made to respond to the conditions of the air in the room drawn from a distance from where the vapor is produced. By this means the device is more accurate in its action than would be the case if the motor device for regulating the humidity were arranged in front of the machine and affected by the freshly formed vapor.

I do not restrict myself to any particular construction of motor device to control the humidity, nor do I restrict myself to any particular means for controlling the water supply to the revolving disk, as these parts may be greatly modified without departing from the spirit of the invention. Furthermore, while I have shown the humidity regulator employed in connection with a specific form of vapor producing apparatus, I do not restrict myself to this particular form of machine in the combination recited, as my invention is applicable to various types of humidifiers.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The combination of a humidifying apparatus having a spraying disk and a waste pipe, means for supplying a constant stream of water to the humidifying apparatus, and means controlled by the hygrometric condition of the air to vary the amount of the constant stream of water which passes to the spraying disk and the amount which passes to the waste pipe.
2. The combination of a humidifying apparatus, means for supplying a stream of water to the humidifying apparatus, and means controlled by the hygrometric condition of the air to regulate the supply of water to the humidifying apparatus having devices for diverting the stream of water away from the humidifying apparatus whenever the humidity of the air exceeds a predetermined degree.
3. The combination of a humidifying apparatus, means for supplying a stream of water to the humidifying apparatus, means controlled by the hygrometric condition of the air to regulate the supply of water to the humidifying apparatus having devices for diverting the stream of water away from the humidifying apparatus whenever the humidity of the air exceeds a predetermined degree, and a waste pipe for carrying away the water which is diverted from the humidifying apparatus.
4. The combination of a humidifying apparatus having vaporizing devices, means for supplying a variable stream of water to the vaporizing devices of the humidifying

apparatus, a static hand valve for adjusting the size of the stream of water delivered to the humidifying apparatus whereby a constant stream of water of any determined size may be assured, and means controlled by the hygrometric condition of the air to regulate the total amount of the constant stream of water which reaches the vaporizing devices said means having automatic devices acting upon the stream of water independently of the static valve for varying the amount thereof which is delivered to the vaporizing devices.

5. A humidifying apparatus comprising a rapidly rotating disk and a circular row of abutments for disrupting and vaporizing a film of water, and a nozzle for supplying water to the revolving disk, combined with means for supplying a constant and uniform stream of water to the nozzle, means arranged to control the volume of the said stream of water actually delivered to the nozzle and divert the remainder away from the nozzle and devices controlled by the humidity of the air to automatically operate the means for controlling the actual amount of water delivered to the nozzle to change the amount of vapor produced by the humidifying apparatus without affecting the total amount of water flowing to the apparatus.

6. A humidifying apparatus comprising a rapidly rotating disk and a circular row of abutments for disrupting and vaporizing a film of water, and a nozzle for supplying water to the revolving disk, combined with means for supplying a regulated stream of water to the nozzle, means arranged to control the stream of water before being delivered to the nozzle, devices controlled by the humidity of the air to automatically operate the means for controlling the stream of water delivered to the nozzle to change the amount of vapor produced by the humidifying apparatus, and a fan to draw the air from a distance and force it over the devices controlled by the humidity of the air.

7. A humidifying apparatus, comprising a revolving disk, a circular row of abutments about the disk for vaporizing a film of water, and a nozzle to supply water to the disk, in combination with means to supply a continuous stream of water of practically constant volume to the humidifying apparatus, diverting means to divert the stream of water at intervals from the humidifying apparatus, and means operating under the variations of the humidity of the atmosphere for controlling the diverting means whereby less water will be supplied to the revolving disk when the humidity is in excess of the requirements than when it is below the requirements.

8. A humidifying apparatus, comprising a revolving disk, a circular row of abutments about the disk for vaporizing a film

of water, and a nozzle to supply water to the disk, in combination with means to supply a stream of water to the humidifying apparatus, diverting means to divert the stream of water from the humidifying apparatus, and means operating under the variations of the humidity of the atmosphere for controlling the diverting means whereby less water will be supplied to the revolving disk when the humidity is in excess of the requirements than when it is below the requirements said means consisting of a reciprocable guiding device for the diverting means and a curved expansible body composed of layers of metal and wood or other hygroscopic substance secured together at one end and operatively connected at the other end with the guiding means.

9. A humidifying apparatus, comprising a revolving disk, a circular row of abutments about the disk for vaporizing a film of water, and a nozzle to supply water to the disk, in combination with means to supply a stream of water to the humidifying apparatus, diverting means to divert the stream of water from the humidifying apparatus, means operating under the variations of the humidity of the atmosphere for controlling the diverting means whereby less water will be supplied to the revolving disk when the humidity is in excess of the requirements than when it is below the requirements said means consisting of a reciprocable guiding device for the diverting means and a curved expansible body composed of layers of metal and wood or other hygroscopic substance secured together at one end and operatively connected at the other end with the guiding means, and means for conveying away the waste water from the humidifying apparatus and also the diverted water which is automatically prevented from being delivered to the humidifying apparatus.

10. The combination of a humidifying apparatus, means for supplying a stream of water to the humidifying apparatus, means controlled by the hygrometric condition of the air to regulate the supply of water to the humidifying apparatus arranged adjacent to the humidifying apparatus, and a fan for drawing air from a distance from the humidifying apparatus and blowing it over the means controlled by the hygrometric condition of the air for regulating the supply of water to the humidifying apparatus.

11. A humidifying apparatus comprising a revolving disk, and a circular row of abutments around the disk and by which the film of water produced by the disk is transformed into vapor, combined with a receptacle for water terminating in a nozzle leading to the disk and having within the receptacle a raised wall the space on one side

of which leads to the nozzle and on the other side opening into the body of the vessel, a waste pipe from the vessel to receive surplus water which may not find its way into the nozzle leading to the disk, a laterally extending water nozzle opening within the water receptacle and adapted to deliver a stream of water on either side of the raised wall according to the amount of pressure under which it flows, and a hand valve to control the supply of water from the said water supplying nozzle to normally control the pressure under which it is delivered so that should the water be permitted to flow with great pressure as when flushing out the control valve the surplus water will pass over the wall and into the waste pipe but otherwise under different adjustment will flow into the nozzle leading to the revolving disk.

12. A humidifying apparatus comprising a revolving disk, and a circular row of abutments around the disk and by which the film of water produced by the disk is transformed into vapor, combined with a receptacle for water terminating in a nozzle leading to the disk and having within the receptacle a raised wall the space on one side of which leads to the nozzle and on the other side opening into the body of the vessel, a waste pipe from the vessel to receive surplus water which may not find its way into the nozzle leading to the disk, a laterally extending water nozzle opening within the water receptacle and adapted to deliver a stream of water on either side of the raised wall according to the amount of pressure under which it flows, a hand valve to control the supply of water from the said water supply nozzle to normally control the pressure under which it is delivered so that should the water be permitted to flow with great pressure as when flushing out the control valve the surplus water will pass over the wall and into the waste pipe but otherwise under different adjustment will flow into the nozzle leading to the revolving disk, adjustable means for diverting the stream of water away from the nozzle leading to the disk, and automatic means controlled by the hygrometric condition of the air to operate the diverting means to control the amount of water delivered to the revolving disk.

13. A humidifying apparatus comprising a revolving disk, and a circular row of abutments around the disk and by which the film of water produced by the disk is transformed into vapor, combined with a receptacle for water terminating in a nozzle leading to the disk and having within the receptacle a raised wall the space on one side of which leads to the nozzle and on the other side opening into the body of the vessel, a waste pipe from the vessel to receive surplus

water which may not find its way into the nozzle leading to the disk, a laterally extending water nozzle opening within the water receptacle and adapted to deliver a stream of water on either side of the raised wall according to the amount of pressure under which it flows, a hand valve to control the supply of water from the said water supplying nozzle to normally control the pressure under which it is delivered so that should the water be permitted to flow with great pressure as when flushing out the control valve the surplus water will pass over the wall and into the waste pipe but otherwise under different adjustment will flow into the nozzle leading to the revolving disk, adjustable means for diverting the stream of water away from the nozzle leading to the disk, automatic means controlled by the hygrometric condition of the air to operate the diverting means to control the amount of water delivered to the revolving disk and means for blowing air over both the humidifying apparatus and the means controlled by the hygrometric condition of the air.

14. In a humidifying apparatus, a combination of a revolving disk, a circular row of abutments about the disk, a vertical case

open in front of the disk and having an annular gutter terminating at the bottom in a waste pipe, a head open to the atmosphere at the top and communicating with the interior of the waste pipe, a horizontally arranged basin below the case and supported by and having a discharge opening into the head of large diameter, and means for supplying water to the rotating disk.

15. In a humidifying apparatus, a combination of a revolving disk, a circular row of abutments about the disk, a vertical case open in front of the disk and having an annular gutter terminating at the bottom in a waste pipe, a horizontally arranged basin below the case and having a discharge opening into the waste pipe, means for supplying water to the rotating disk, and automatic means for diverting the water from the disk and delivering it to the basin whenever the degree of humidity of the atmosphere is in excess of the requirements.

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

JOHN W. FRIES.

Witnesses:

FRED. F. BAHUSON,
H. C. MILLER.