June 20, 1939. W. H. SLOAN 2,163,474

HUMIDIFIER

Filed June 21, 1937 3 Sheets-Sheet 1

Fig. 1.

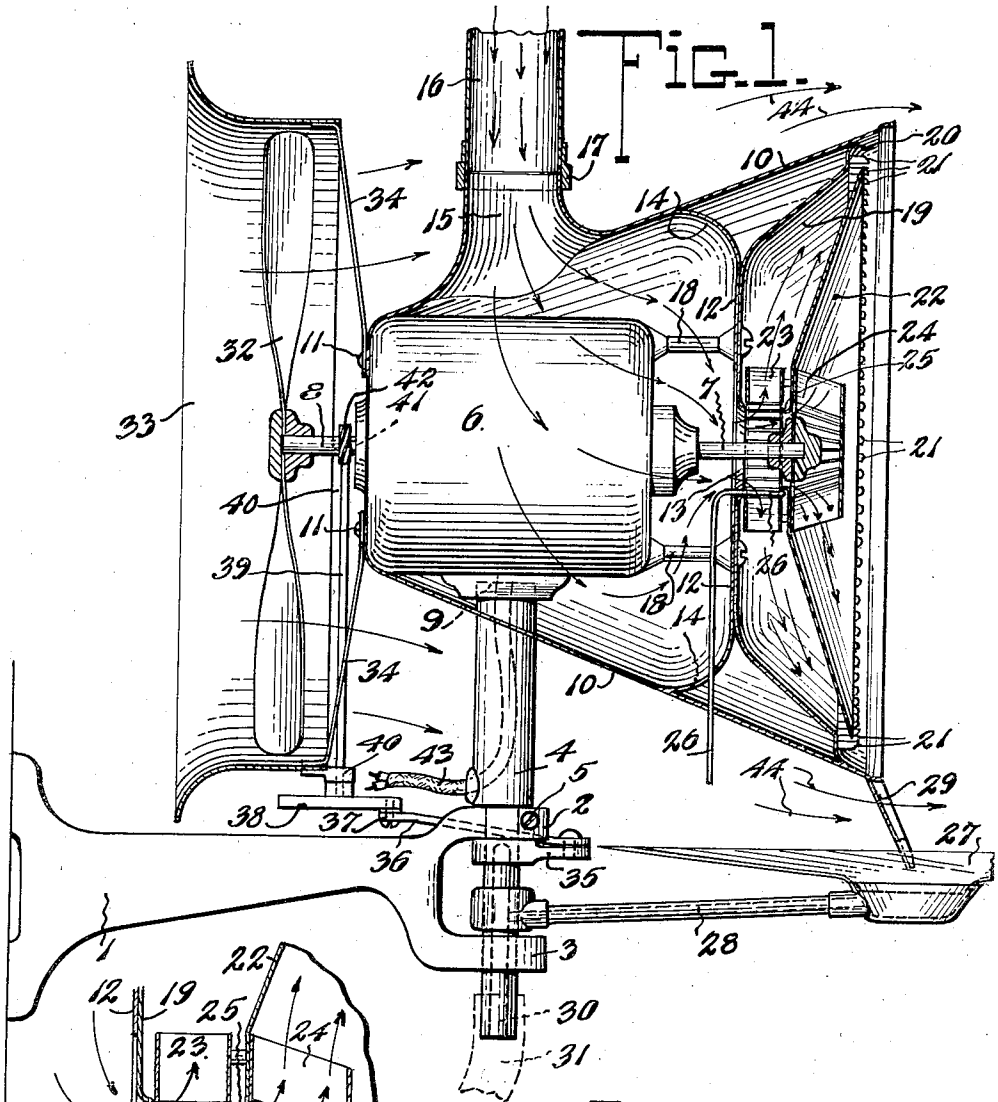

Fig. 2.

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June 20, 1939. W. H. SLOAN 2,163,474

HUMIDIFIER

Filed June 21, 1937 3 Sheets-Sheet 2

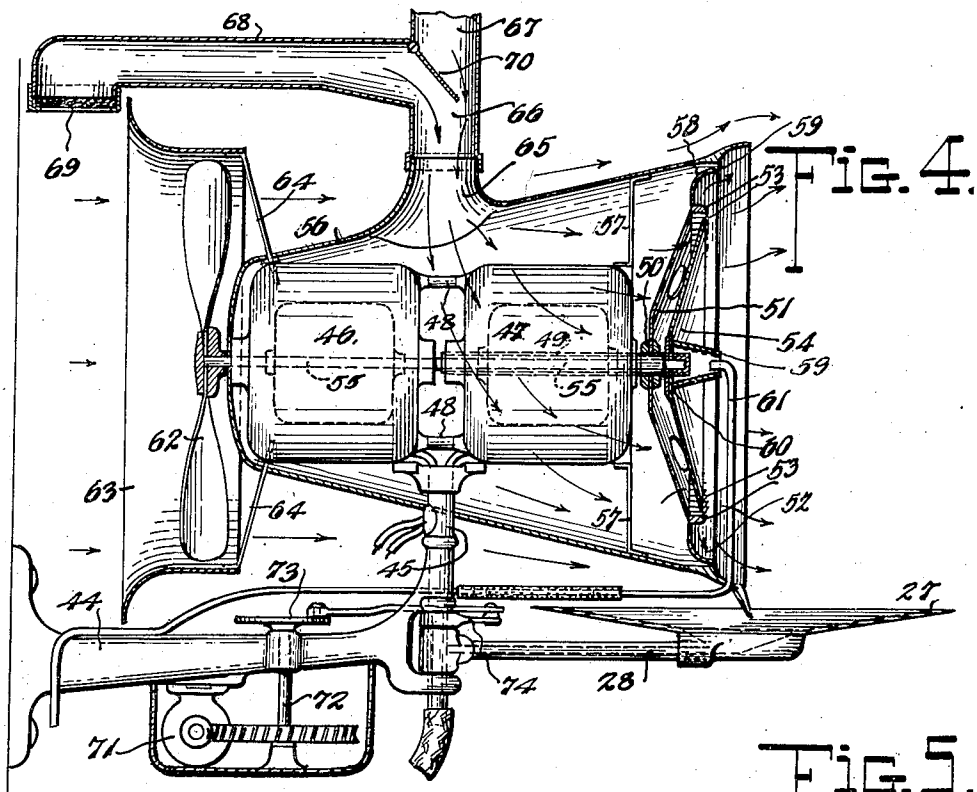

Fig. 4.

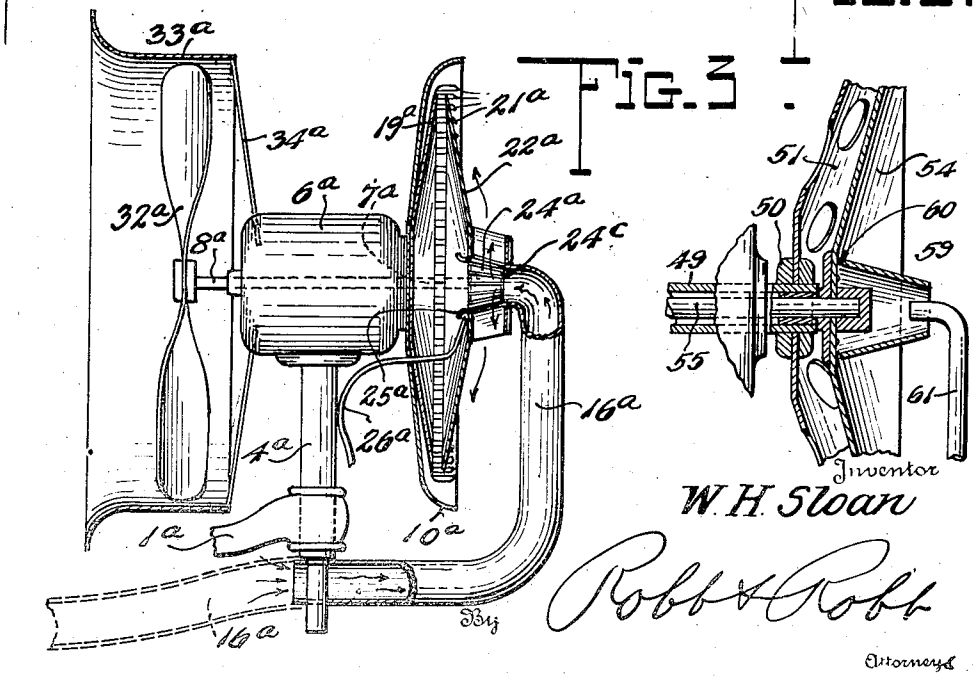

Fig. 5.

Fig. 3.

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June 20, 1939. W. H. SLOAN 2,163,474

HUMIDIFIER

Filed June 21, 1937 3 Sheets-Sheet 3

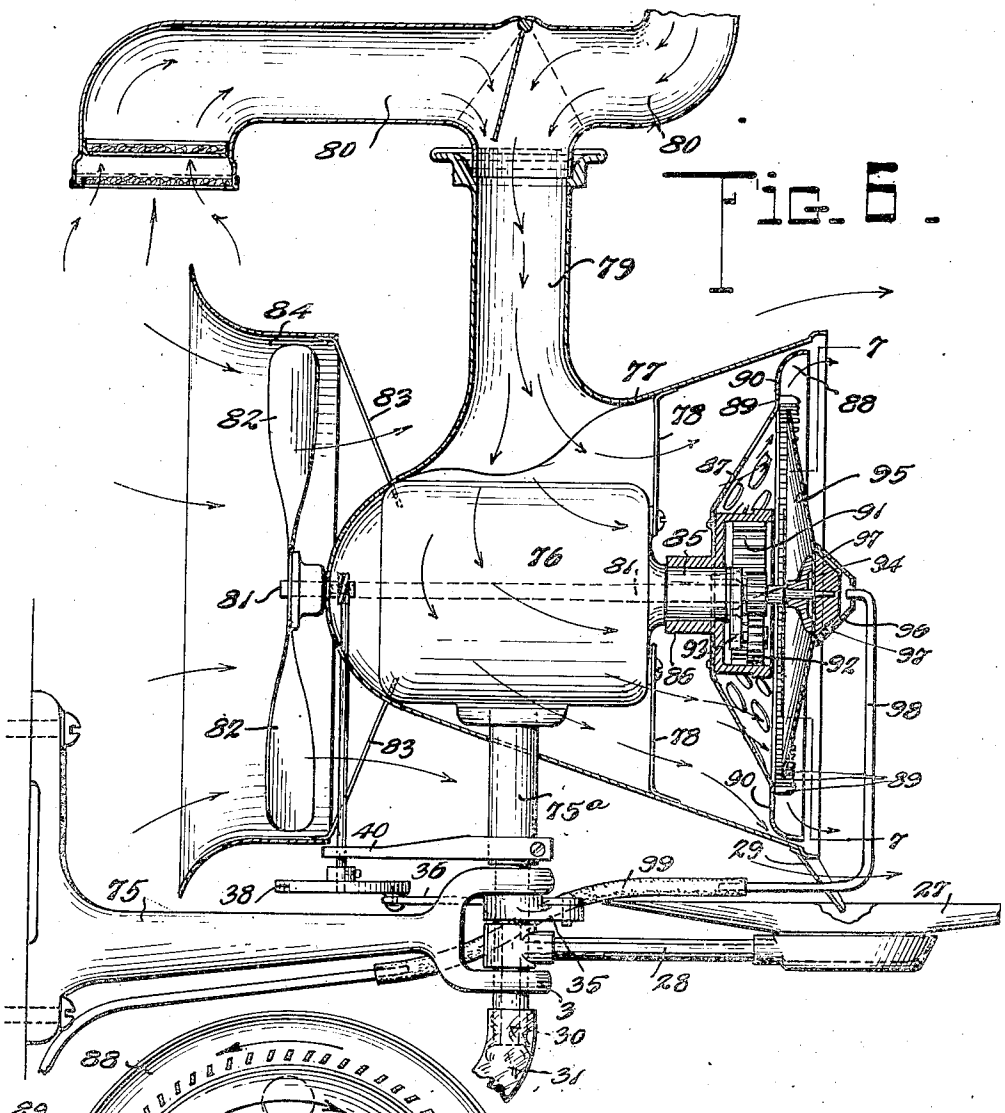

Fig. 6.

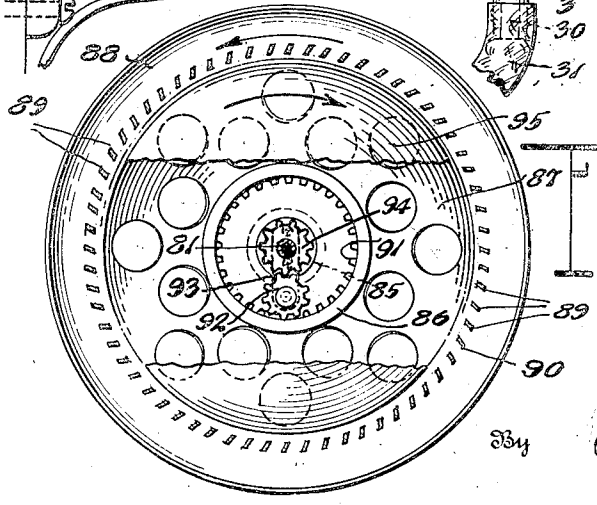

Fig. 7.

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UNITED STATES PATENT OFFICE

2,163,474

HUMIDIFIER

William H. Sloan, Washington, D. C.

Application June 21, 1937, Serial No. 149,456

15 Claims. (Cl. 261—90)

The present invention relates to improvements in huimidifying apparatus designed particularly for use in textile and other large industrial plants for supplying a sufficient quantity of free moisture required to condition the goods being manufactured or to maintain properly humidified atmosphere in the operating space of these manufactories.

This invention relates to and is an improvement upon that type of humidifier disclosed in Patents 1,267,166, dated May 21, 1918, and 1,544,418, dated June 30, 1925.

I have found in the use of these prior humidifiers in cotton mills, for example, that there is a great tendency for lint, floating in the air of the operation room, to collect in the stationary member formed with the impact blades or grids and for large globules or drops of water to form on said blades. This results, in the operation of the apparatus, in continuous dislodgement of lint and watery deposits which drop upon the machinery and goods being manufactured, causing rust spots and serious damage to said goods. So great is this collection of deposits that it is necessary from time to time to clean the grid members of the various humidifiers at material expense, to say nothing of loss due to damage of the manufactured products. By careful study, the foregoing condition has been found to arise from eddying of the currents of air about the edge of the casing in which the grid and rotating disk are disposed and the use of the air of the factory room for dissemination of the moisture under the operation of a fan.

One of the primary objects of these improvements has been to overcome this disadvantage by employing, mainly, air from a separate or outside source that is free from floating particles of lint and filtering out lint from that portion of the air from the immediate space containing the humidifiers which may be employed as an adjunct to the outside air.

To this end my invention embodies air conveying and filtering means in association with the humidifying instrumentalities, said latter being so constructed and arranged as to eliminate the eddying currents occuring in the use of the prior apparatus of this type.

Another disadvantage of the prior art humidifiers resides in the lack of efficiency in the mechanical atomization of the water supplied to the rotating disk and impacted upon the grid elements, barely 20% of the amount being "evaporated" by said devices with resultant waste and expense of the water supply. Any attempt to correct this deficiency by increasing the speed of the disintegrating elements only results in wear, vibration and noise and necessary increase in power with added maintenance costs.

It is, therefore, a further object of these improvements to provide a greater degree of atomization of the water by providing a rotating grid or blade member operating preferably reversely to the rotation of the centrifuging disk, thereby increasing the effectiveness of the impact force and at the same time preventing the undesired collection of the lint and drops of water on the grid member and assisting the flow of air at the point where the eddying currents have heretofore occurred.

Another difficulty experienced with the prior art devices is lack of uniformity of distribution of the moisture-laden air due to the stationary character of the humidifiers which also causes the spray of moisture to be thrown in one direction only, thereby resulting in a "wetting down" and heavy places in the cotton materials being manufactured.

I, therefore, have devised my present invention so as to oscillate the unit, enabling the spray as well as the circulating air to be continuously blown in all directions more or less uniformly, greatly increasing the amount of circulation and evaporation produced by each head or unit in a system, such as illustrated in Patent 1,804,079 dated May 5, 1931.

Among other features of importance in my invention which may be mentioned is the provision of means for impelling fresh or clean air through the grid blades and about the rotating disk, for uniformly feeding water to the disk, and of common actuating means whereby the fan and the disk and/or grid members are rotated and oscillated.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the drawings:

Fig. 1 is a vertical, longitudinal sectional view of an embodiment of my invention, certain parts thereof being broken away and other parts shown in elevation;

Fig. 2 is an enlarged fragmentary detail of the hub portion of the centrifuge disk and its associated impeller air circulating fans and the water feeding means;

Fig. 3 is a sectional view of a simpler form of the invention disclosing somewhat diagrammati-

cally a disk having a single type of impeller air circulating fan member;

Fig. 4 is a vertical sectional view of a further modification of my invention disclosing a rotary mounting for the water disintegrating blades or grids and two motors, one for operating the main air circulating fan and the centrifuge disk, and the other for operating the grid-carrying disk;

Fig. 5 is an enlarged fragmentary sectional view more clearly disclosing the mounting of the disks and the associated water feeding means;

Fig. 6 is a vertical sectional view of another modification of my invention disclosing a common power means for driving the main air circulating fan, the centrifuge disk and the disk carrying the water disintegrating or impingement blades; and

Fig. 7 is a fragmentary sectional view taken approximately on the plane indicated by line 7—7 of Fig. 6.

Like reference characters designate corresponding parts in the several figures of the drawings.

Referring to Figs. 1 and 2, the numeral 1 indicates a fixed supporting bracket or standard suitably located in the space to be humidified. The bracket is bifurcated at one end to provide spaced supporting arms 2 and 3 apertured to receive a vertical hollow supporting sleeve or standard 4 on which my humidifying unit is mounted. The upper arm 2 is split and provided with a clamping bolt 5 for securing the standard 4 therein in any adjusted position.

The humidifier unit comprises a motor 6, preferably of the electric type, having its drive shaft extending forwardly and rearwardly, as indicated at 7 and 8. The bottom of the motor is formed with a bearing 9 for the reception of the upper end of the standard 4.

A truncated cone shaped casing 10 is secured to the motor at 11 and is provided with an intermediate partition member 12 having a central aperture 13. The casing is curved at 14 and faired into the casing 10 to provide a smooth air deflecting surface.

A fresh or filtered air intake duct 15 is formed in the upper portion of the casing 10, constituting the upper journal or pivot for the humidifying unit. A stationary air duct 16 is provided having a ring or sleeve bearing 17 surrounding the upper end of the fresh air duct 15, and constitutes the upper pivot bearing for the humidifier unit.

Supporting posts 18 project forwardly from the motor casing, providing a support for the partition 13 and the air deflector grid-carrying plate or disk 19. This plate 19 is somewhat cone shaped, projecting forwardly to a point adjacent the front edge of the casing 10 and terminating in a bell shaped mouth 20.

Water disintegrating blades or grid members 21 are uniformly spaced around the disk 19 just inside of the bell shaped portion and project forwardly from the vertical portion of the disk.

The shaft 7 of the motor has fixed thereon a cone-shaped centrifuge disk or plate 22, the periphery of which is disposed adjacent to and intermediate the length of the grid members 21, as shown in Fig. 1 of the drawings.

A pair of air impellers or fans 23 and 24 are suitably carried by the centrifuge disk to rotate therewith, the impeller 23 being positioned between the air deflector disk 19 carrying the grids and the centrifuge disk 22, while the impeller 24 is disposed on the opposite or exterior side of the centrifuge disk.

The centrifuge disk is provided adjacent its central portion with a curved annular flange 25 designed to receive water from a water supply pipe or conduit 26 and to convey this water uniformly onto the face of the disk as it revolves. The pipe 25 leads to any suitable water supply and is provided with a flexible connection to permit oscillation of the humidifier unit.

A drain pan 27 is carried by a hollow supporting arm 28 pivotally carried on the vertical standard 4, the mouth of the humidifier casing being provided with a drain trough 29 for conveying excess moisture or water into the drain pan 27. This excess moisture is conveyed through the hollow bore of the pipe 28 communicating with the recess 30 in the lower portion of the standard 4. Any suitable means such as a hose 31 may be provided to convey the water away from the humidifier unit.

The motor shaft 8 carries a conventional fan member 32 operating within a fan guard 33 supported by bracket members 34 secured to the casing 10 and motor 6 by the fastenings 11, previously referred to.

Any suitable oscillating mechanism may be provided for swinging the humidifier on its pivots and, for the purpose of illustration, in Fig. 1 of the drawings I have provided a stationary arm 35 which may be either fixed to the wall bracket 1 or secured to the vertical standard 4, the latter arrangement permitting the zone of oscillation to be changed by loosening of the clamping bolt 5 and changing the position of the standard 4.

The arm 35 has a link 36 pivoted thereto at one end, the other end of the link being connected at 37 to a crank disk 38 carried by the lower end of an operating shaft 39 journalled in suitable bearings 40 carried by the fan guard and motor casing. The upper end of the shaft 39 is provided with a worm gear 41 meshing with a worm gear 42 fixed on the motor shaft 8.

Electricity is supplied to the motor 6 through flexible conductor cables 43.

In the operation of the device, the fan 32 creates a draft or current of air exteriorly of the casing 10 toward the mouth, as indicated by the arrows 44, and as the water is conveyed by the pipe 26 onto the curved flange 25 which in turn delivers this water onto the inner rear wall of the rapidly rotating centrifuge disk 22 carried on the front motor shaft 7, the water is uniformly spread over the surface of the disk due to the centrifugal action and moves toward the periphery of the disk where it is thrown off in a very fine film at a high velocity against the disintegrating blades or grids 21 which break the film of water into a fine spray or mist so that it may be readily disseminated.

The rotary air impellers 23 and 24 create a radial balancing draft or blast of air on both sides of the centrifuge disk 22, which air is directed toward the bell shaped mouth 20 of the disk 19 and its grids 21. This air materially assists in the conveying of the atomized moisture out into the space to be humidified and the absorption of the moisture by the air. This arrangement is of importance in that it tends to prevent the usual eddying of the air currents about the mouth of the case in the vicinity of the grid blades, the prevention of oversaturation of the air accompanied by condensation and the elimination of the very objectionable collection of lint

deposits between or on the blades or grids and which ordinarily interfere with the proper breaking up of the water into mist-like particles.

In order to additionally guard against this objectionable lint and dust circulation, the air circulated by the impellers 23 and 24 is supplied by air from a source separate from the air in the space being humidified. This air may be either filtered prior to its introduction into the ducts 16 or it may be fresh outside air drawn from the exterior of the building containing the humidifier.

This air circulated by the impellers 23 and 24 and the air or draft created by the fan 32 join at the mouth of the casing 10 and are caused to move uniformly outwardly without objectionable eddying effects, as above stated.

Referring now to Fig. 3 of the drawings, in which the impeller fan 23 of Fig. 1 is omitted and the water is fed to the concave side of the centrifuge disk rather than the convex side, 1a indicates a supporting bracket in which is journalled the vertical humidifier supporting standard 4a to the upper portion of which is secured the motor 6a. A bell shaped casing 10a is secured to the motor casing constituting an enclosing hood for the water disintegrating grid-carrying disk 19a.

The motor is similar in construction to that shown in Fig. 1 having oppositely extending shafts 7a and 8a, to the latter of which is secured a cone shaped centrifuge disk 22a. Located adjacent the hub portion of this disk is an impeller fan 24a having a central air intake port 24c arranged in communication with a fresh air or filtered air intake duct 16a. The end 7a of the motor shaft is provided with a fan guard 33a carried on the brackets 34a fixed to the motor housing.

The inner portion of the centrifuge disk 22a is provided with a curved arcuate water distributing flange 25a having a suitable water supply conduit 26a for supplying water to the flange 25a for uniform distribution to the disk 22a. If desired, an oscillating mechanism similar to that disclosed in Fig. 1 may be provided to oscillate this humidifier unit on its supporting bracket 1a.

In the operation of this form of the invention, when the motor is started and the water turned on, a small jet or fine stream will be projected onto the curved wall 25a of the centrifuge disk causing the same to be spread out uniformly and projected tangentially from the periphery of the disk against the grid members 21a, effectively breaking up the water film into a fine spray or mist as in the previously described form.

The form 32a creates an external balancing draft of air around the outside of the bell shaped casing, while the fresh or filtered air from the duct 16a is dispersed by the impeller 24a radially outwardly adjacent the surface of the disk 22a meeting the air from the fan 32a adjacent the mouth of the bell housing 10a, thus eliminating any tendency of eddying currents of air being created in the vicinity of the mouth of the casing or in the zone of the grids 21a. The flow of clean air toward the grids 21a also prevents lint and excess moisture from collecting at these points.

In the modified form disclosed in Figs. 4 and 5, the grid-carrying disk is rotated as well as the centrifuge disk and the fan for supplying the external air. The impellers of the previous forms are dispensed with, as the grid-carrying disk constitutes the air impeller in this form.

A wall bracket 44 is provided carrying a vertical supporting standard 45 on which the humidifier unit is mounted. The unit in this form comprises a pair of motors 46—47 joined together by the members 48, the motor 47 being provided with a hollow shaft or sleeve 49 projecting forwardly and carrying a hub 50 to which is secured a combined rotary apertured impeller and grid-carrying disk 51, the shape of which is somewhat similar to t he disk 19 in Fig. 1. This disk is also bell shaped at its periphery, as indicated at 52, and is provided with an equally spaced ring of water impingement blades or grids 53 for breaking up the water film leaving the centrifuge disk 54 which is fixed to the end of the drive shaft 55 of the motor 46 and extends through the hollow motor shaft 49 to a point beyond the same.

The motors 46 and 47 are surrounded by the conical casing 56 as in the other form, this casing being supported at its smaller end from the casing of the motor 46. Intermediate the length of the casing are radial supporting bracket arms 57 extending between the casing of the motor 47 and the interior surface of the casing 56.

At the mouth of the casing, as indicated at 58, the rim of the grid-carrying disk is disposed in spaced relation to the inner surface of the casing to provide a narrow air outlet slot adjacent to the bell-shaped portion of the mouth.

The centrifuge disk is provided at its center with a cone-shaped water feeding sleeve 59 designed to uniformly feed water to the concave face of the disk through small openings 60 adjacent the surface of the disk. Water for humidification purposes is fed into the center of the cone member 59 through the supply tube 61, as seen in Fig. 5.

The shaft 55 extends through the closed end of the casing 56 and has secured thereon a fan member 62 providing an external air current or draft, as described in connection with the other figures of the drawings. A suitable guard 63 supported by brackets 64 is fixed to the casing 56 and surrounds the fan 62.

As disclosed in the other forms, the casing 56 is provided with an upwardly extending air intake sleeve 65 constituting the upper pivot for the humidifier unit. The end of this sleeve or duct is disposed in communication with a fresh air intake conduit 66, but this conduit, as disclosed in Fig. 4, is provided with a conduit 67 leading to a source of fresh air, and a second communicating passage 68 is provided communicating with the space being humidified.

In order to prevent foreign matter such as lint from entering the passage 68, a dry filter 69 is removably positioned on the end of this passage. A damper 70 is disposed at the juncture of the two passages 67 and 68 to variably control the flow of air passing through the passages.

The oscillating mechanism disclosed in this form is also similar to that disclosed in Fig. 1 except that a separate motor 71 is mounted on the bracket 44 and drives the vertical shaft 72 journalled in the bracket, the shaft carrying a crank wheel 73 connected to arm 74 secured on the standard 45 which is journalled in the bracket 44.

In the operation of this form of the device, the fan 62 provides a draft along the exterior of the casing 56 and around the mouth of said casing. The rotation of the centrifuge disk 54 and the grid carrying impeller disk 51 creates a radial current of air along the surfaces of the disks toward the grids 53 and the slot 57. The air being deflected outwardly at the point by the bell-shaped portion of the disk 51 and cas-

ing is gradually directed in the same direction as the air from the fan 62 joining the air at the mouth of the humidifier, thus eliminating eddying of the air currents at this point.

Water from the pipe 61 is fed into the cone 59 and due to the rotating of the cone it is fed outwardly through the openings 60 onto the surface of the disk 54 and is then projected from the rim of the disk against the grids as before described.

The above results may be accomplished by rotating both of the disks 51 and 54 in the same direction to thereby obtain an extremely high relative speed between the two disks and thereby creating a much greater or effective impinging action between the grids and water film leaving the disk 54.

In the form of my invention disclosed in Figs. 6 and 7, I provide a supporting bracket 75 in which is journalled the supporting standard 75a carrying my humidifier unit. This unit comprises a motor 76 surrounded by a conical casing 77 suitably connected to the motor by bracket arms 78. The casing is formed with a fresh air inlet duct 79 connecting with a damper-controlled dual air supply passage 80 similar to the showing in Fig. 4. The motor shaft 81 projects through the closed end of the casing 77 and has fixed thereon a fan 82 for supplying the external current or draft of air past the mouth of the casing 77. Bracket rods 83 projecting from the motor casing carry a guard 84 for the fan 82. The forward end of the motor casing or frame is provided with a trunnion 85 on which is journalled the hub 86 of my apertured combined air impeller and grid-carrying conical plate 87.

This plate is formed with a bell shaped mouth 88 located adjacent the inner surface of the mouth of the casing 77 in slightly spaced relation to provide a narrow air outlet slot. A ring or circle of water-disintegrating blades or grids 89 is disposed in the flat portion 90 of the disk just inside of the bell shaped portion 88.

The hub 86 is formed with an enlarged internal ring gear 91 meshing with an idler gear 92 journalled on an arm 93 fixedly secured to the end of the trunnion 85 of the motor frame. The gear 92 meshes with a second gear 94 fixed to the motor shaft 81 projecting from the forward end of the motor casing. The end of the motor shaft 81 has also fixed thereon a cone shaped centrifuge disk 95, the periphery of which travels adjacent to the grids 89 and intermediate the length thereof.

Located on the reduced extension of the front end of the shaft 81 is a conical shaped water-distributing member 96 having radially inclined passages 97 leading to the exterior surface of the centrifuge disk 95. Water is discharged at any desired rate and quantity through a central water supply pipe or tube 98 extending from a suitable water source. To provide for the oscillation of the motor, I preferably interpose a flexible hose member 99 in the length of the pipe 98 in order to provide for the bending movement of the pipe during the oscillation of the unit.

Oscillation of the humidifier is accomplished as in Fig. 1, this mechanism being given the same reference characters; also a drain pan similar in construction to that disclosed in the figure of the drawing just referred to is provided.

In the operation of this form, the motor 76 constitutes the sole power source for the operation of the conditioner. As before, the fan 82 creates a balancing draft or current of air around the casing 77 meeting the spray or moisture-laden mist at the mouth of the casing to prevent eddying. The grid-carrying impeller disk 87 and the centrifuge 95 are driven in reverse directions by the gear mechanism 91 to 94 causing an air circulation or balancing current to be created outwardly through the grid members and through the space between the periphery of the impeller disk 89 and the interior of the casing at its mouth.

Water is uniformly fed onto the face of the centrifuge disk 95 by the conical hub 96 and is projected against the ring of grid members 89 and is broken up into a fine mist where it intermingles with the air currents above referred to. This moisture-laden air meets the air from the fan 82 at the mouth of the casing 77 effectively preventing eddying currents of air at the said mouth.

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

1. In a humidifier of the class described for textile factories and the like, the combination of water supply means, means for atomizing the water comprising a centrifuge disk and a water disintegrating member surrounding the periphery of the disk to break up the water projected therefrom, means for circulating clean air only free from lint to said atomizing device to disseminate the atomized water, and separate air supply means for intermingling the air in the space being humidified with the aforementioned lint-free air supply and atomized water.

2. In a humidifier of the class described, for textile factories and the like, the combination of an open mouth casing, water supply means, means within the casing for atomizing the water from said supply, an air duct for supplying lint free air to the interior of said casing, said water atomizing device constituting means for circulating said lint-free air to disseminate the water vapor, and means for supplying air exteriorly of the casing for mixing with the lint-free air and water vapor adjacent the mouth of the casing to assist in the dissemination of the water vapor.

3. In an air humidifying device of the class described, a casing, a rotary centrifuge disk, water impingement means disposed adjacent the periphery of said disk, means for supplying water to the surface of the disk, and means for creating an exterior current of air at the mouth of said casing, separate means for creating a balancing interior current of filtered air at said mouth to prevent eddying of air currents at said mouth and to disseminate the moisture produced by the film of water thrown by the disk against the impingement means.

4. In a device of the class described, a casing having a discharge mouth, water atomizing means within said casing, water supply means therefor, means for creating an exterior current of air surrounding said discharge mouth, means for creating a balancing interior current of air for disseminating said atomized water, and means for supplying all the said second air from a separate source.

5. In a humidifier of the class described, a support, a casing having a discharge mouth and a fresh air inlet port, a source of water supply and means within the casing for atomizing the water from said supply, means for creating a draft of air along said casing past said mouth, separate air impeller means for creating a balancing current of fresh air through said discharge mouth to disseminate said atomized water and prevent eddying air currents in the vicinity of said discharge

mouth, and common operating means for said atomizing, draft and impeller means.

6. In a humidifier of the class described, a support, a casing having a fresh air inlet port and a discharge mouth, a motor, water supply means, a rotary centrifuge disk disposed in said casing to receive water from said supply means and operable by said motor, water atomizing blades arranged adjacent the periphery of said disk for disintegrating the water projected from said disk into a fine water mist, air impeller means on said disk for circulating air through said inlet, casing and said mouth to disseminate the water mist into the space being humidified, and air impeller means exterior of the casing for creating an auxiliary balancing draft of air toward said mouth to prevent eddying of the moisture-laden air.

7. In a humidifier of the class described, a casing having a discharge mouth and an air inlet port, water supply means, water atomizing means in said casing for receiving water from said supply means and breaking the same into a fine water mist, an air inlet conduit communicating with said inlet port having branch pipes, one of said pipes leading to an air supply exterior of the place being humidified and the other of said pipes leading to the place being humidified, filter means for the last mentioned pipe, air impeller means in said casing for disseminating the water mist into the place being humidified, and separate air impeller means exterior of the casing for creating an external current of air toward the mouth of the casing to assist in the dissemination of the water mist and to prevent eddying of the moisture-laden air in the vicinity of the mouth of the casing.

8. In a humidifier, a support, a motor mounted on said support having oppositely projecting shafts, a casing surrounding said motor and supported thereby, said casing comprising a tapering shell closed at its smaller end and having a discharge mouth at its larger end, an air inlet for introducing air into the shell intermediate the ends thereof, a partition intermediate the mouth and the inlet having a central opening, a centrifuge disk carried by said motor shaft having air impeller means thereon for receiving air from said central opening in the partition and impelling the same outwardly of the casing between the periphery of the disk and the inner surface of the casing, water disintegrating grid members located in the casing in the path of water projected from the rim of the disk to carry the water mist outwardly through the mouth of the casing, and air impelling means adjacent the small end of the casing for creating a current of air along the exterior of the casing.

9. In a humidifier of the class described, a conical shaped casing having an air inlet passage and a discharge mouth, a motor therein, a centrifuge disk arranged in the mouth of said casing to be driven by said motor, said disk having an opening therethrough adjacent its center, means for supplying water to the surface of said disk, water disintegrating means adjacent the periphery of the disk for breaking up the water projected from the disk into a fine mist, air impeller means on both sides of the disk in communication with the interior of the casing for receiving air from the interior thereof and feeding said air along both sides of the disk toward said water disintegrating means to convey the moisture through the mouth of said casing to the place being conditioned, and air impeller means exterior of the casing for creating a balancing current of air around the mouth of the casing to prevent eddying of the moisture-laden air in the vicinity of said mouth.

10. In a humidifier of the class described, a support, a centrifuge disk carried thereby, means for supplying water to the surface of said disk, rotary water disintegrating means arranged to move in a path around the periphery of said centrifuge disk for breaking the water projected from the periphery of the disk into water vapor, and means for rotating said disk and disintegrating means.

11. In a humidifier of the class described, a support, a centrifuge disk carried thereby, means for supplying water to the surface of said disk, rotary water disintegrating means arranged to move in a path around the periphery of said centrifuge disk for breaking the water projected from the periphery of the disk into water vapor, and means for rotating said disk and disintegrating means in opposite directions.

12. In a humidifier of the class described, a support, a centrifuge disk carried thereby, means for supplying water to the surface of said disk, rotary water disintegrating means arranged to move in a path around the periphery of said centrifuge disk for breaking the water projected from the periphery of the disk into water vapor, means for rotating said disk and disintegrating means, and a casing surrounding said disk and disintegrating means having a discharge mouth and an air inlet port, one of said rotary disk and rotary water disintegrating means constituting air impeller means for impelling air from the casing through said discharge mouth to disseminate the water vapor.

13. In a humidifier of the class described, a support, a centrifuge disk carried thereby, means for supplying water to the surface of said disk, rotary water disintegrating means arranged to move in a path around the periphery of said centrifuge disk for breaking the water projected from the periphery of the disk into water vapor, means for rotating said disk and disintegrating means, a casing surrounding said disk and disintegrating means having a discharge mouth and an air inlet port, one of said rotary disk and rotary water disintegrating means constituting air impeller means for impelling air from the casing through said discharge mouth to disseminate the water vapor, and air circulating means exterior of the casing for directing a balancing current of air from the space being conditioned to prevent eddying of the moisture-laden air.

14. In a humidifier of the class described, a support, a centrifuge disk carried thereby, means for supplying water to the surface of said disk, rotary water disintegrating means arranged to move in a path around the periphery of the disk for breaking the water projected from the periphery of the disk into water vapor, means for rotating said disk and disintegrating means in opposite directions comprising a common motor for driving one of said rotary members in one direction and reverse gearing between the motor and the other rotary member for driving the same in a reverse direction.

15. In a humidifier of the class described, a support, a centrifuge disk carried thereby, means for supplying water to the surface of said disk, rotary water disintegrating means arranged

to move in a path around the periphery of said centrifuge disk for breaking the water projected from the periphery of the disk into water vapor, means for rotating said disk and disintegrating means, a casing surrounding said disk and disintegrating means having a discharge mouth and an air inlet port, one of said rotary disk and rotary water disintegrating means constituting air impeller means for impelling air from the casing through said discharge mouth disseminate the water vapor, and air circulating means exterior of the casing for directing a balancing current of air from the space being conditioned to prevent eddying of the moisture-laden air, said disk rotating means for the rotary disk means and water disintegrating means comprising a single motor constituting driving means for the external air circulating means.

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