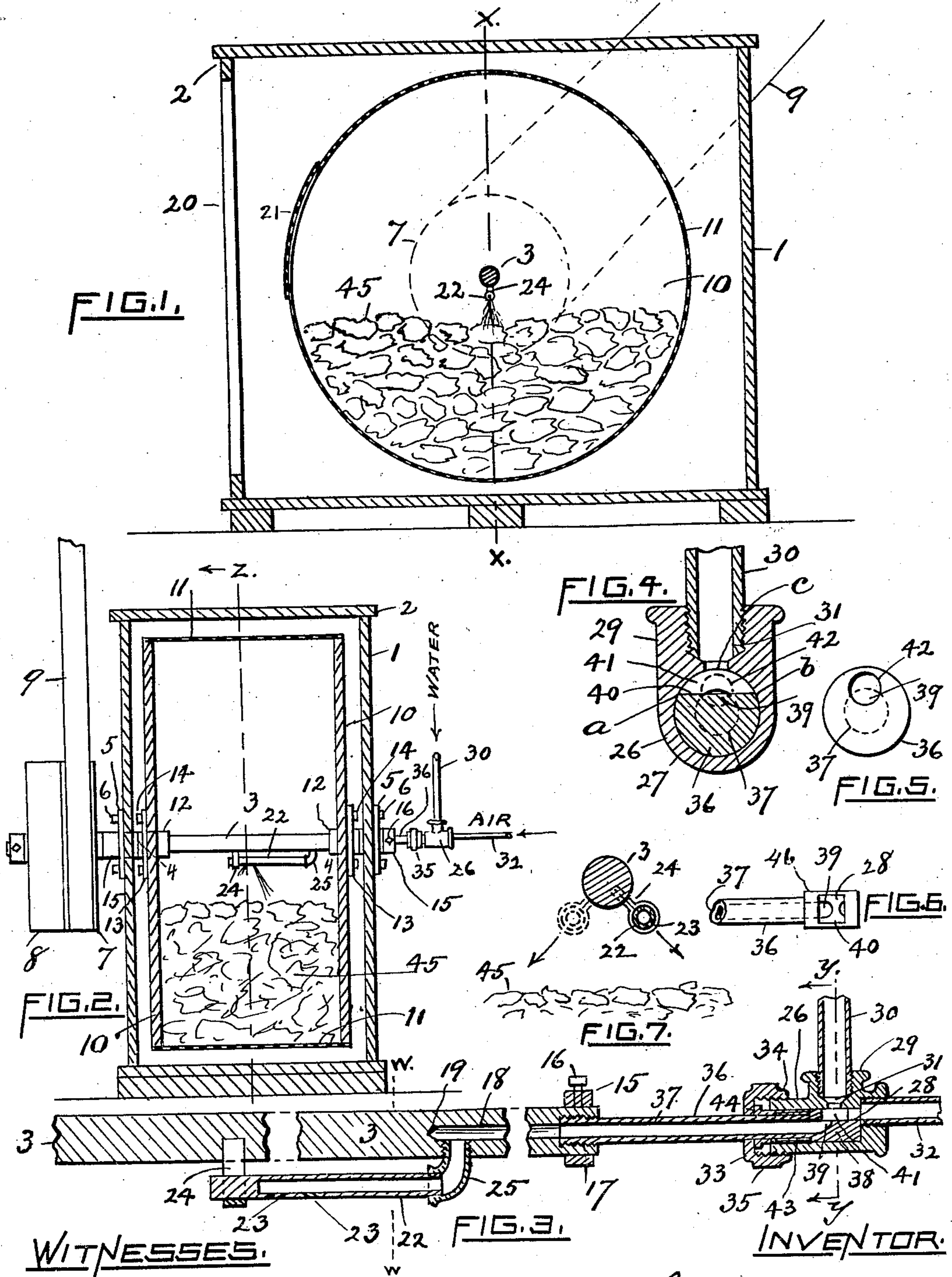


J. KELLY.
HUMIDIFIER.

APPLICATION FILED SEPT. 12, 1908.

929,092.

Patented July 27, 1909.



UNITED STATES PATENT OFFICE.

JAMES KELLY, OF PROVIDENCE, RHODE ISLAND.

HUMIDIFIER.

No. 929,092.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed September 12, 1908. Serial No. 452,737.

To all whom it may concern:

Be it known that I, JAMES KELLY, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Humidifiers, of which the following is a specification, reference being had therein to the accompanying drawings.

Like reference characters indicate like parts.

Figure 1 is a view of the case and cage, constituting parts of my improved humidifier, as seen on section line *z z* of Fig. 2, and including the pipe discharging a water spray under pressure. Fig. 2 is a view of my said improvement and apparatus embodying the same, as seen on section line *x x* of Fig. 1. Fig. 3 is a longitudinal sectional view of my said humidifier. Fig. 4 is a sectional view (on an enlarged scale) of my improved valve, constituting the principal feature of said invention. Fig. 5 is an end elevation of the humidifier valve. Fig. 6 is a top plan view of the movable portion of said valve. Fig. 7 is a detail view, illustrating the two extreme positions of the spray-discharging pipe, the section being shown as on line *w w* of Fig. 3.

My invention relates to the class of humidifiers for moistening the atmosphere of factories and for other mechanical uses, and it consists of the novel construction and combination of the several parts hereinafter described and set forth in the claims.

In the drawings 1 represents a box, or chamber, having a cover 2 and a door 20 allowing access to the interior thereof. A shaft 3 is rotatably mounted in tubular (or other) bearings 4 in opposite sides of said box or case. The bearings 4 may have flanges 5, extending in contact with the box or case, and fastened to the latter by bolts 6, or otherwise. At one end of the shaft 3 the fast pulley 7 and loose pulley 8 are secured. The driving belt is shown at 9.

A cage or drum 10 has two opposite circular ends or disks, around which a coarse-meshed wire-netting 11 is fastened, extending from one end of said cage or drum to the other. An opening 21 is made through said netting and is provided with a cover or door, as may be preferred, allowing access into the cage or drum. This cage or drum is mounted fast on the shaft 3 so as to rotate with it. The shaft 3 extends through tubular bear-

ings 12, which are made with flanges 13, the latter being fastened in position upon the cage or drum by the bolts 14. A collar 15 surrounds the shaft 3 on each opposite side of the box 1 and is secured to said shaft by the set screw 16. The shaft 3 at one end has a longitudinal bore tapped therein, with a left-hand screw thread, shown at 17, and from the bore 17 there extends a short, concentric, longitudinal, axial bore 18, having a closed end, as represented at 19. The shaft 3 is tapped with a radially directed hole opening into the bore 18.

A sprinkling or discharging pipe 22 has two discharges or orifices 23, 23, extending diagonally through the outer side of said pipe in opposite directions. The pipe 22 preferably extends parallel to the shaft 3, within the cage or drum 10, to a point about half-way the length of the shaft 3, as shown in Fig. 2. A metallic band 24 surrounds the inner end of the pipe 22 and forms a circular clip, best seen in Fig. 7, and terminating in two straight parallel ends, which are inserted in the pipe 22, as illustrated in Figs. 3 and 7. The pipe 22 is screw-threaded at one end and is there supported by an elbow 25 at one end thereof, the opposite end of which elbow enters said hole tapped in the shaft 3 and enters the bore 18 of the shaft 3.

The humidifier valve comprises a T-piece or body 26 and a movable valve, separately shown in Figs. 5 and 6. The body portion or case of said T-piece (shown as horizontal in Figs. 2, 3 and 4) has a concentric bore, indicated as 27, closed at its inner end, except where an eccentrically-located screw-threaded bore 28 opens into it. The branch 29 of the T-piece is integral with the valve body 26 and has a tubular hole tapped in it, within which the threaded end of a pipe 30 is engaged. The bore in said branch pipe 29 is concentrically reduced, as shown at 31 in Fig. 3, so that it has a comparatively small diameter as represented at *c* in Fig. 4, where it enters into the bore 27 of the body portion or valve case 26 of the T-pieces. Into the eccentrically located bore 28, a pipe 32 enters, and is engaged in position by a screw thread. On the end of the T-piece, opposite to the pipe 32, it has an exterior screw-thread shown in Fig. 3. A tubular stuffing box 33, having a smooth central aperture and an interior screw-thread in its peripheral flange 34, is engageable with said exterior threads of said T-piece.

The outer peripheral surface of the stuffing box 33 is formed with hexagonally-disposed faces, as at 35 (or with any other suitable angular faces), so that the stuffing box may be seized and operated by a wrench.

The valve proper consists of a cylindrical stem 36, which has a concentric tubular bore 37, nearly all its length. The bore 37 is partially closed at its inner end by an abutment, as shown at 38 in Fig. 3, except that a small aperture 39 extends therefrom upwardly, as seen in Figs. 3, 4, 5 and 6. The upper surface of the valve stem 36 is, for a portion thereof, reduced to extend in a plane, as represented at 40, and so affords a space or chamber 41, shown in Figs. 3 and 4. Through the closed end of the valve stem 36 is an eccentrically located bore 42 which, as the valve stem 36 rotates continuously, registers periodically with the bore 28 of the valve body or valve case 26. The valve stem 36 has a head 46 against which a tubular packing 43 is mounted. A gland or collar 44 has a tubular body and is mounted slidably on the valve stem 36, and it also has an annular flange, which is adapted to abut on one side the interior surface of the end of the stuffing box 33, and on the opposite side is adapted to abut the edge of the packing 43.

The device hereinbefore described is especially adapted for use in hat manufacture, for moistening the pelts of rabbits as a preliminary operation before removing the fur from the skin. These pelts when delivered at the factory are very dry, hard and brittle, and require to be softened before they can be laid straight and smooth enough for the action of the cutting or shaving tool. This moistening work has heretofore been done by manual labor, the workman wetting the skins and manipulating them by hand. Unless this work is done gently and gradually, the skins are liable to crack, and for that reason there is a considerable loss of the fur, because the shaving tool cannot work close enough to the skins, if the latter are cracked, or not sufficiently flattened and spread.

In the use of my improved device, a quantity of rabbit pelts, designated in the drawings as 45, are thrown into the cage or drum 10, and lie loosely in bulk by gravity, resting upon the screen or wire netting 11 in the lowest part of the drum or cage, as represented in Figs. 1 and 2. For the purpose of thus placing the pelts in the drum or cage, the doors or covers are provided in the case and in the drum as already described, said doors or covers being closed while the drum or cage is rotating. Power applied by the belt 9 to the fast pulley 7 turns the shaft 3 and the drum 10, 11, which is secured thereon. During such rotation, the mass of pelts 45 tumble over each other to keep their position by gravity in the bottom of the drum

or cage. The valve stem 36, being fastened to the end of the shaft 3, as seen in Figs. 2 and 3, turns with the shaft 3, but rotates in the bore 27 of the valve case 26, the latter being permanently secured in a fixed position upon any suitable support. Air, under pressure, passes through the pipe 32, as indicated by the horizontal arrow in Fig. 2, and water, under pressure, passes through the pipe 30, as indicated by the vertical arrow in said figure. These air currents and water currents mingle in the space or chamber 41 within the valve case 26, and so mingled pass through the aperture 39 and along the bore 37 of the valve stem 36, and thence through the bore 18 of the shaft 3 and through the elbow 25 into the sprinkler pipe 22, from which pipe the water, so aerated, is discharged as a fine spray, through the discharging apertures 25, and falls upon the tumbling mass of pelts, thus gradually, evenly and constantly moistening them to the desired degree of saturation. The result is that the skins are uniformly wet throughout the entire mass and assume a pliable, soft condition, in which they may be properly laid and exposed to the shearing operation. Rotatable cages have heretofore been used in the preparation of such rabbit skins for the purpose of dislodging therefrom by their said tumbling movement any dirt or foreign substances, which may have been entangled therewith, as also to shake out any loose hairs which may be in the mass. If however, the screen or wire netting is wet, such dislodged substances and hairs are liable to stick to the screen or netting on the interior surface thereof, and so to clog the same, or drum. To prevent this, I have devised the apparatus hereinbefore described, and by means of it provide for an intermittent discharge of the spray instead of having a continued discharge, and also direct this discharge to the lowermost part of the cage or drum to a limited extent and not all around the same. When the rotating valve stem 36 is in the position shown in Figs. 4 and 5, the air, discharged from the pipe 32 under pressure, meets the water, discharged from the pipe 30, under pressure, in the chamber or space 41, and breaks up or dissipates the water into a fine spray, which passing through the orifice 39 (Fig. 3) is discharged in the bore 37 of the valve stem 36 and is finally discharged by the sprinkler pipe 22, as already explained. But when, by the rotation of the valve stem 36, the bore 42 of said valve no longer registers with the bore 28 of the valve case 26, the air is shut off, so that it cannot be discharged from the pipe 32; and at the same time the peripheral surface of the valve 36 from *a* to *b* is passing over the open end of the bore *c* (Fig. 4) and thereby shuts off the water currents passing down through

the pipe *c*; so that there cannot be any discharge of spray from the pipe 22. Thus the discharge of spray from the pipe 22 is intermittent and continues only for a limited time or proportionate part of the rotation of the shaft 3, beginning, as illustrated in Fig. 7, when the pipes 20, 23 are in the position shown in solid lines, and ending when the said pipes are in the position shown in said figure in dotted lines. At no other time during the rotation of the shaft 3 is the spray discharged upon the mass of pelts 45.

The pipe 22 lies comparatively close to the shaft 3 so that there is no possibility of the skins lapping around it as the cage or drum rotates.

It is obvious that, instead of discharging air through the pipe 32 and water through the pipe 30, the same result would be accomplished if the air were discharged through the pipe 32 and the water through the pipe 30.

Although I have shown and described my invention as applied to hat manufacture as aforesaid, it is equally adapted for use, either when an intermittent discharge of spray is desired for any purpose, or when the spray is to be discharged only within a certain limited area.

I claim as a novel and useful invention and desire to secure by Letters Patent:—

1. In a humidifier, the combination therewith of a chamber therein; means of supplying water thereto in said chamber under pressure; means of supplying air thereto in said chamber under pressure, to convert said water into spray; means for discharging such spray; and means for interrupting such discharge to make the same intermittent.

2. In a humidifier, the combination therewith of means for supplying water thereto; means for supplying air thereto; means for mingling said water and air therein to form a spray, and rotatably mounted means adapted to discharge said spray intermittently.

3. In a humidifier, the combination therewith of a discharging pipe; a valve case having a chamber; a pipe adapted to conduct air to said chamber under pressure; a pipe adapted to conduct water to said chamber under pressure; and a valve movable in said case and capable of conducting said mingled air and water from said chamber to said discharging pipe intermittently.

4. In a humidifier, the combination therewith of a shaft rotatably mounted in suitable bearings; a discharging pipe upon said shaft; a driving pulley upon said shaft; a valve case having a chamber; a pipe adapted to conduct air under pressure to said chamber; a pipe adapted to conduct water under pressure to said chamber; and a valve rotatably mounted in said case and capable of conducting the mingled air and

water from said chamber to the discharging pipe.

5. In a humidifier, the combination therewith of a shaft mounted rotatably on suitable supports and having an axial bore whose inner end is closed; a pipe having a series of discharging apertures; an elbow connecting one end of said pipe with said bore of the shaft; means for rigidly supporting said pipe at its opposite end upon said shaft; means for rotating said shaft; and means for conducting water under pressure into the bore of said shaft; and means for conducting air under pressure into said bore.

6. In a humidifier, the combination therewith of a shaft mounted rotatably on suitable supports and having an axial bore whose inner end is closed; means for rotating the shaft; a pipe having a series of discharging apertures; an elbow connecting one end of said pipe with the bore of said shaft; means for rigidly supporting the pipe at its opposite end upon the shaft; means for conducting mingled air and water under pressure into the bore of the shaft; and means for making the discharge thereof from said pipe intermittent.

7. In a humidifier, the combination therewith of a shaft mounted rotatably in suitable bearings and having an axial bore whose inner end is closed; means for rotating the shaft; a pipe having a series of discharging apertures; an elbow connecting one end of the pipe with the bore of the shaft; means for rigidly supporting the pipe at its opposite end upon the shaft; a valve case having a chamber; an air pipe opening into said chamber; a water pipe opening into said chamber; a valve having a tubular stem and one closed end and provided with apertures adapted to register periodically with said chamber to conduct the mingled air and water therefrom, which tubular valve stem is mounted in the valve case and is rotatable therein by means of said shaft; and a coupling connecting said valve stem and shaft so that their bores are continuous with each other.

8. In a humidifier, the combination of a rotatably mounted shaft; a discharging pipe thereon provided with sprinkling apertures; and means for intermittently supplying mingled air and water under pressure to said pipe.

9. In a humidifier, the combination of a tubular valve case, having a tubular integral branch extending therefrom; a closed end for said tubular valve case provided with an eccentrically located opening parallel with the axis thereof; a water pipe threaded into engagement with the bore of said branch; an air pipe threaded into engagement with said eccentrically located opening; a cylindrical valve mounted rota-

ably in the bore of said valve case and having a longitudinal bore and one closed end and provided with a transverse groove which communicates with said longitudinal bore; an eccentrically located port capable of registering with the eccentrically located opening of the valve case and communicating with said groove of the valve, and coupling means for connecting said valve rotatably in said valve case.

10. In a humidifier, the combination of a valve case 26 having a tubular longitudinal bore 27 and one closed end, the latter being provided with an eccentrically located opening 28; a tubular branch 29 extending from the valve case 26 at a right angle and having a bore provided with a screw thread, but concentrically reduced to form a conical seat 31 and a discharging orifice *c*; a valve 36 having a longitudinal axial bore 37 which is partially closed at its inner end by an abutment 38, which valve is rotatably mounted in the bore 27 of the valve case 26; a water pipe 30 in threaded engagement with said branch 29; an air pipe 32 in threaded engagement with said opening 28 of the valve case 26; an annular packing 43 mounted upon the valve 36; a gland or collar 44 slidable on the valve 36 and adapted to compress the packing 43 on the edge thereof; and a stuffing box 33 having an interiorly threaded tubular body 34 which is engageable with an exterior screw-thread of the valve case 26 and having a central aperture which enables the stuffing box to slide on the valve 36 and thereby to press the gland 44 into forcible contact with said packing, said valve 36 having a transverse groove whose bottom surface 40 is open to communicate periodically at 39 with the valve bore 37 and also with the valve bore 28 with the intermediate abutment 38 between said two places of such communication.

11. The improved humidifying apparatus

herein described, consisting of the combination of the box 1 having the door 20; the shaft 3 rotatably mounted in bearings 4 of said box and having the short axial bore 18 with the closed end 19; the pulleys 7 and 8 on said shaft; the sprinkler pipe 22 supported at one end by the clip 24 from the shaft 3 and at the opposite end by the elbow 25 into the shaft bore 18; the revoluble drum 10 having the cylindrical screen or wire netting 11 and mounted concentrically and fast upon the shaft 3 by bearings 12; the valve case 26 having the bore 27 and one closed end, the latter being provided with an eccentrically located opening 28; a tubular branch 29 extending from the valve case 26 at a right angle and having a screw-threaded bore with a discharging reduced orifice *c*; a valve 36 having a bore 37 which is partially closed at its inner end by an abutment 38, said valve being rotatably mounted in the bore 27 of the valve case 26; a water pipe 30 in threaded engagement with said branch 29; an air pipe 32 in threaded engagement with said opening 28 of the valve case; an annular packing 43 mounted upon the valve 36; a gland or collar 44 slidable on the valve 36 and adapted to compress the packing 43 on the edge thereof; a stuffing box 33 in threaded engagement with the valve case 26 and having a central aperture for the passage of the valve 36 through it, said valve 36 having a transverse groove whose bottom surface is open to communicate periodically with the bores 37 and 28 as the valve 26 rotates, said tubular valve 36 being connected with the shaft 3 in alinement therewith.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES KELLY.

Witnesses:

WARREN R. PERCE,
HOWARD A. LAMPREY.