March 5, 1935. K. A. PRÖTT 1,993,299

AIR HUMIDIFIER

Filed April 5, 1933

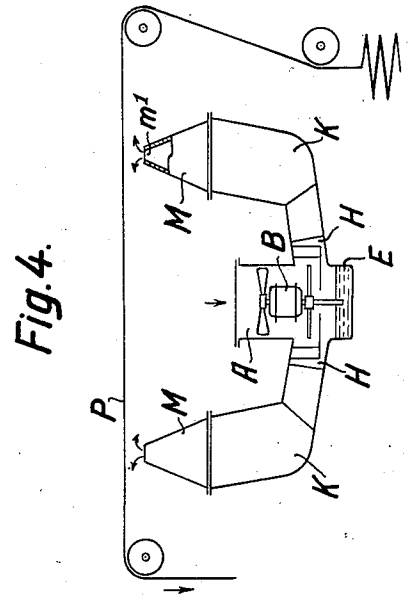


Fig. 4.

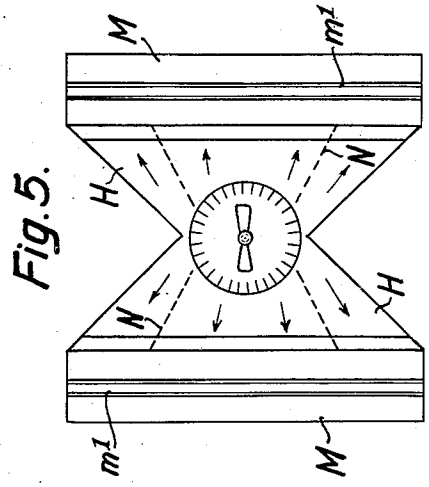


Fig. 5.



Fig. 3.

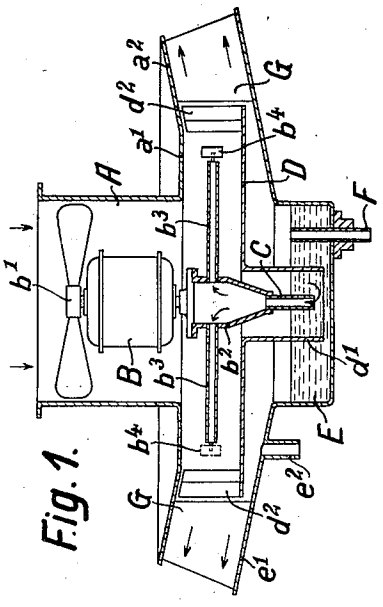


Fig. 1.

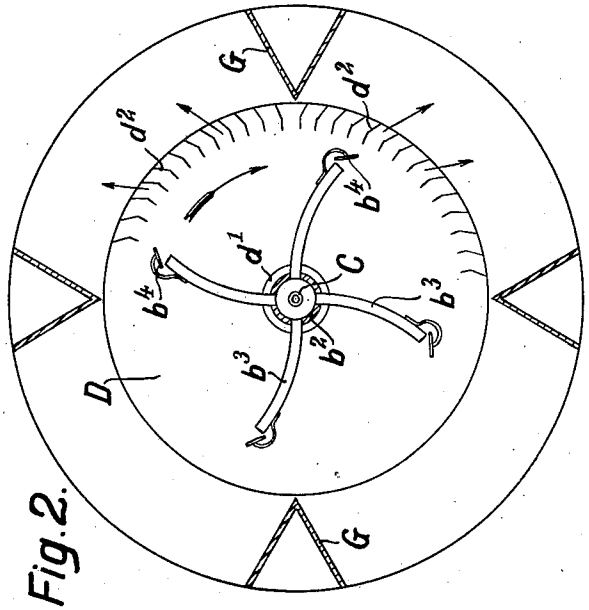


Fig. 2.

Karl August Prött
Inventor

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1,993,299

AIR HUMIDIFIER

Karl August Prött, Rheydt-Bonnenbroich, Germany

Application April 5, 1933, Serial No. 664,563
In Germany April 18, 1932

5 Claims. (Cl. 261—91)

My invention relates to air humidifiers. It is already known to admix to the air to be humidified a regulatable quantity of a finely divided liquid by means of a centrifugal wheel. Serious difficulties arise, however, in regulating this quantity of liquid. My invention has for its object an apparatus of this class in which the desired degree of moisture of the air can be adjusted very easily and reliably and which requires but very little power.

In order that my invention may be clearly understood and readily carried into effect, an embodiment of my improved humidifier is schematically illustrated by way of example in the accompanying drawing, in which

Figure 1 is a vertical section of the humidifier.

Figure 2 is a horizontal section thereof,

Figure 3 is a detail, on enlarged scale,

Figure 4 is a vertical section of the complete humidifying installation, and

Figure 5 is a top view corresponding to Figure 4.

Referring first to Figures 1 to 3, A denotes a cylindrical hollow body or drum having a plane outer bottom flange a^1 with a slightly upward bent outer portion a^2. In the drum A is mounted vertically an electric motor B with the shaft of which is directly coupled a fan b^1 adapted to suck air into drum A from above. The shaft of motor B has rigidly mounted to its lower end a casing b^2 which has a cylindrical or (as shown) tapered lower end into which opens from below a pipe C rigid thereto. The casing b^2 has mounted on it a number of curved centrifugal pipes b^3 situated in a common horizontal plane, the whole thus forming a centrifugal wheel which is driven by the motor B. In front of the outer opening of each pipe b^3 is mounted a baffle plate b^4, see best Figure 2. To the bottom flange a^1 of drum A is fixed at a certain distance apart therefrom a circular sheet metal disc D having a downward tubular extension d^1 into which projects the casing b^2. Between the flange a^1 and the disc D are provided near the outer edge vertical guide blades d^2 which have suitable bent shape, see Figure 2. The flange a^1, a^2 and disc D thus form together a casing in which the centrifugal wheel b^2 b^3 may revolve.

The extension d^1 and the pipe C project into a liquid container E spacedly fixed to the underside of disc D and having a slightly inwardly inclined large edge e^1, an annular gap being left between disc D and edge e^1. Finally, a liquid feed pipe e^2, Figure 1, opens into the edge e^1 and an overflow pipe F is adjustably arranged on the liquid container E, the position of which pipe determines the level of the liquid in the container E.

Partitions G, Figure 2, of angular cross section are mounted between the flanges a^2 and e^1 by which the annular gap existing between these two parts is subdivided so as to form four separate outlets.

When motor B is revolving, the fan b^1 sucks air from above and presses it through the annular gap between the flanges a^2, e^1 directly into the room where the humidifier is being mounted, as it will be the case in textile shops, for instance rooms in which selfactors are working, or into a special further appliance an embodiment of which is described hereinafter. Furthermore a vacuum is produced at the same time within the casing b^2 by the likewise rotating centrifugal wheel b^2 b^3, whereby liquid is sucked from the container E to the casing b^2 through the pipe C. By centrifugal action and adhesion this liquid is raised up into the pipe arms b^3 and spread radially outward by them against the baffle plates b^4. On these plates the liquid is atomized and mixed with the air supplied from above by the fan b^1, the mixture then striking the guide blades d^2 by which it is further atomized and humidifies the air around the apparatus. The coarser drops of liquid which owing to the mixture being spread vertically fan-like, strike the surfaces of the flanges a^1 and e^2, are retained by these surfaces, while the drops that escape horizontally are retained by the bent guide blades d^2. The liquid thus collecting on these surfaces a^1, e^2 and d^2 can flow back to the liquid container E through the gap existing between disc D and flange e^1, without being hindered in any way by the air current.

When passing through the pipe arms b^3, the liquid owing to its inertia flows only along one side of the pipe, as shown in Figure 3, so that the suction effect of the centrifugal wheel is not detracted.

The suction height, Figure 1, of the apparatus is adjusted by setting the overflow pipe F to which end any suitable means, for example screw thread, may be provided. With uniform rate of revolutions of the fan b^1 the delivered liquid quantity then depends only still upon the suction height.

Figures 4 and 5 show the apparatus described hereinbefore in connection with an appliance intended to moisten aprons of textile material, paper, felt or the like.

The humidifier B A E has attached to it two gradually enlarging channels H, H which open

each into an equalizing vessel K of rectangular cross section. Each of these vessels carries a cap M which at top has a gap m^1 corresponding in length to that of the respective vessel K. Guide plates N may further be provided in the channels H, see Figure 5.

The moistened air delivered by the apparatus to the vessels K has throughout equal pressure and, consequently, escapes at all places of the gaps m^1 at uniform velocity. I attain in this manner with certainty a uniform humidification of the apron P which is moved over the gaps m^1 at uniform regulatable speed by suitable guiding means known in the art.

What I claim and desire to secure by Letters Patent is:—

1. A humidifier comprising a fan, a closed channel adapted to receive the air delivered by said fan, guide blades in said channel, a centrifugal wheel adapted to cast a liquid and arranged within said channel, said centrifugal wheel having a hollow shaft and tubes extending radially from said shaft, a baffle plate arranged in front of each of said tubes, and a liquid container arranged below said wheel, the hollow shaft of the latter dipping in said container.

2. A humidifier comprising a fan, a closed channel adapted to receive the air delivered by said fan, guide blades in said channel, a centrifugal wheel adapted to cast a liquid and arranged within said channel, said centrifugal wheel having a hollow shaft and tubes extending radially from said shaft, a baffle plate arranged in front of each of said tubes, and a liquid container arranged below said wheel, the hollow shaft of the latter dipping in said container, and a regulatable overflow pipe provided in connection with said liquid container.

3. A humidifier comprising a fan, a closed channel adapted to receive the air delivered by said fan, guide blades in said channel, a centrifugal wheel adapted to cast a liquid and arranged within said channel, said centrifugal wheel having a hollow shaft and tubes extending radially from said shaft, a baffle plate arranged in front of each of said tubes, and a liquid container arranged below said wheel, the hollow shaft of the latter dipping in said container, and a motor adapted to drive both said fan and said centrifugal wheel.

4. A humidifier comprising a fan, a closed channel adapted to receive the air delivered by said fan, guide blades in said channel, a centrifugal wheel adapted to cast a liquid and arranged within said channel, said centrifugal wheel having a hollow shaft and tubes extending radially from said shaft, a baffle plate arranged in front of each of said tubes, and a liquid container arranged below said wheel, the hollow shaft of the latter dipping in said container, a regulatable overflow pipe provided in connection with said liquid container, and at least one collecting vessel for the humidified air delivered, said vessel having a gap-shaped outlet opening.

5. A humidifier comprising a fan, a closed channel adapted to receive the air delivered by said fan, guide blades in said channel, a centrifugal wheel adapted to cast a liquid and arranged within said channel, said centrifugal wheel having a hollow shaft and tubes extending radially from said shaft, a baffle plate arranged in front of each of said tubes, and a liquid container arranged below said wheel, the hollow shaft of the latter dipping in said container, a regulatable overflow pipe provided in connection with said liquid container, and at least one collecting vessel for the humidified air delivered, said vessel having a gap-shaped outlet opening, and guiding partitions provided in said vessel.

KARL AUGUST PRÖTT.