

May 9, 1939.

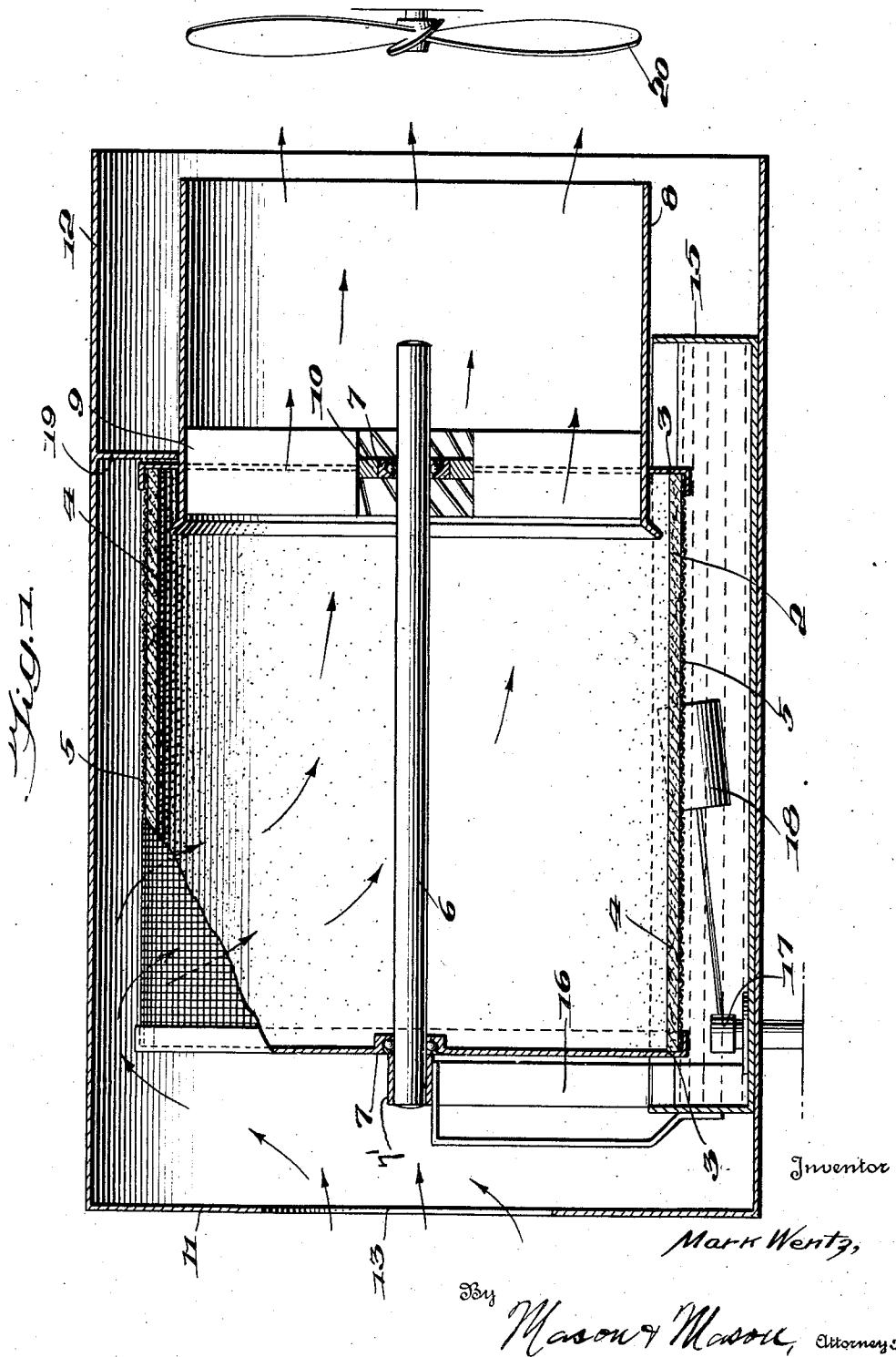
M. WENTZ

2,157,974

AIR COOLER AND HEATER

Filed Aug. 18, 1938

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Fig. 3.

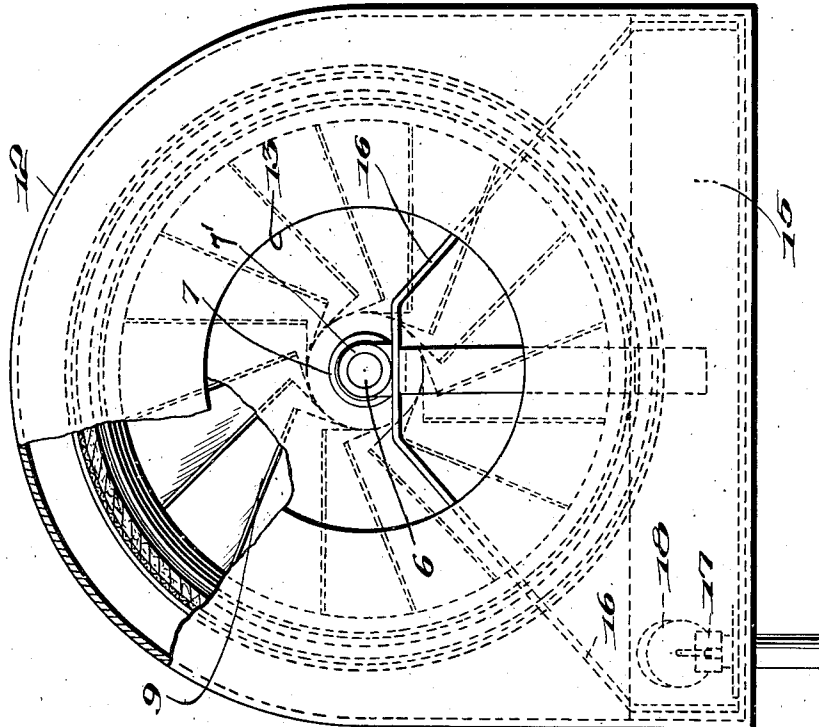
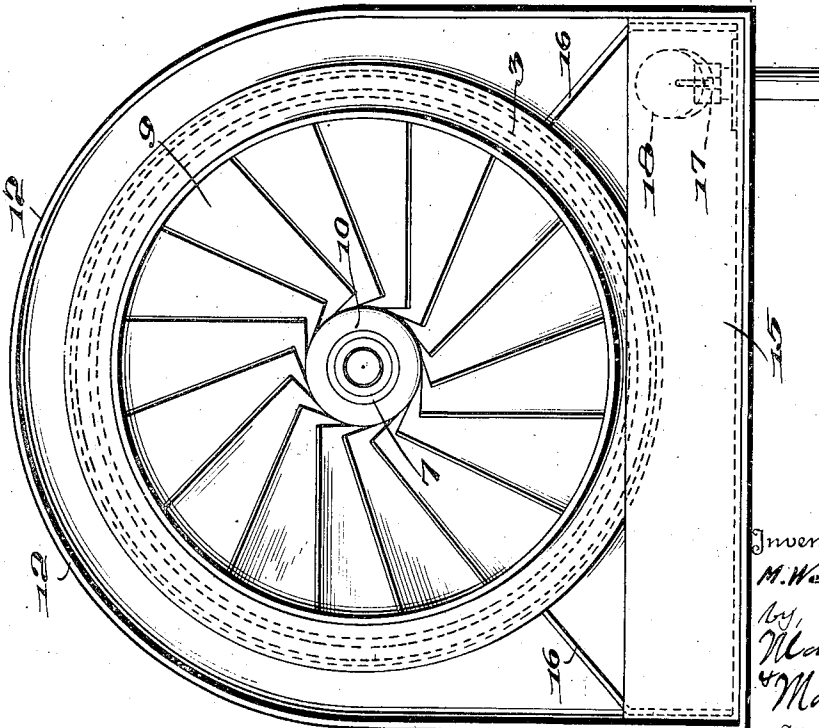


Fig. 2.



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UNITED STATES PATENT OFFICE

2,157,974

AIR COOLER AND HEATER

Mark Wentz, Big Spring, Tex., assignor, by direct and mesne assignments, of twenty-four and one-half per cent to himself and twenty-four and one-half per cent to S. B. Stone and twenty-five and one-half per cent to J. H. Greene and twenty-five and one-half per cent to R. F. Schermerhorn

Application August 18, 1938, Serial No. 225,627

1 Claim. (Cl. 261—92)

This invention relates to apparatus for cooling air which also may be used for heating air.

The invention involves the principle of the evaporation of water which is continuously picked up by a revolving drum or cylinder having its surface covered with an absorbent material, the water evaporating in the cylinder and thus causing a lowering of the temperature of the air, where the device is used as a cooler. The cooled air is forced through the cylinder by a fan, or fans, either upon the principle of pressure where the fan is located at the inlet end of the cylinder, or by suction, where the fan is located at the discharge end of the cylinder, or both of these means of forcing air through the evaporated water in the cylinder may be employed. Under a preferred form of the invention, the cylinder is rotated by air pressure acting upon the blades of a fan fixed at the discharge end of the cylinder, the desirable result being that the cylinder shall be rotated in order to pick up the water from a tank, or other source, where the water has been absorbed by the material of which the cylinder is covered, and as such cylinder rotates the water is forced through the absorbent material by the air, and vaporized, producing a lowering of the temperature within the cylinder, so that when the air current flows through the latter it will have become sufficiently cool to lower the temperature of a room, apartment, automobile or other place where such cooled air is caused to enter by the pressure of the air which projects the air through the cylinder.

The principles involved in my invention may be utilized and applied by a number of constructions, some of which will be herein illustrated, and described in the following specification. It is to be understood, however, that other forms or embodiments of the invention may be produced which will carry into effect the principles thereof, without departing from the generic idea involved.

In the accompanying drawings which illustrate some of the forms of my invention:

Fig. 1 illustrates an air cooling apparatus in vertical section;

Fig. 2 is a front end elevation of the form shown in Fig. 1;

Fig. 3 is an elevation of the inlet end of the apparatus illustrated in Fig. 1 with certain parts broken away;

Referring first to Figs. 1, 2 and 3 of the drawings, under this form of the invention a drum 2 comprising heads 3, 3 has its peripheral portion composed of a layer of textile, absorbent material, such as cotton 4, which is surrounded by wire

netting 5, the netting being mainly for the purpose of forming a final covering for the absorbent material 4, and for holding it in its proper position on the drum.

The drum 2 is mounted for rotation upon a shaft 6 sustained in suitable ball bearings 7, by supports such as the brackets 16 at the closed, inlet end of the drum. At the outlet end of the drum a cylinder 8 extends outwardly and frontwardly from the head 3 of the drum to which it may be secured. Within this cylindrical member are a plurality of fixed blades 9, herein shown as secured to a ring 10, and constituting a fan, centrally of which ring is the bearing 7 surrounding the free end of shaft 6. The blades 9 are placed at the proper angle, and preferably so constructed as to be capable of adjustment, to various angles, so as to properly control the speed of rotation of the drum through the instrumentality of said blades, as will be described. Inasmuch as the blades 9 are fixed to the cylindrical extension 8, which in turn is fixed to the drum, said drum, the extension and the blades 9 will be caused to rotate as a single unit about the free end of the shaft 6 by a current of air acting on the blades 9. The entire drum structure is enclosed within an outer housing 12, having an open front end as shown, and a rear end 11 which is provided with a central open portion 13, the latter being for the entrance of air which passes through the porous covering of the drum to its interior, thence axially through the drum and out its front end. Near the discharge end of the housing a plate 19 projects into the space between the housing and cylinder 8 completely around the latter except for the space occupied by tank 15, for compelling the air to pass through the porous drum wall, and preventing its escape at the open end of the housing, without passing through the drum.

In the lower portion of the housing 12 I have herein shown a water tank 15 which may be supplied with water from a suitable source through a valve 17 controlled by a float 18 which maintains the water in the tank 15 at a constant level. That level is ordinarily so controlled as to submerge in part the absorbent textile material 4 so that when the drum rotates sufficient of the peripheral absorbent material of the drum will be submerged in the water of the tank in order that the water will be lifted by the drum and caused to be forced in the form of a fine mist into the interior of the drum, the air which is forced into said interior picking up the cooled atmosphere resulting from the evaporation of

the water, and carrying such cooled atmosphere to the point of delivery, where desired.

The air which is projected through the drum in this form of the invention may be drawn through the drum by a fan 20, which is illustrated, merely conventionally, as being placed a suitable distance from the outlet end of the drum and housing. This fan may be an ordinary electric fan such as used in the rooms of houses, or any fan in fact, which will draw the air centrally through the drum, while cooling it, due to its contact with the vaporized water within the interior of the drum.

Referring to Fig. 3, radial strut members 16 extend from the drum head 3 at the inlet end of the drum to a sleeve member 7', supporting that end of the shaft and the drum. At the outlet end of the drum the latter is supported upon the shaft 6 by the blades 9 of the fan, which extend from the cylindrical member 8, secured in the drum head at that end, radially to the ring 10 which in turn surrounds and is connected with the ball bearing race member at that end of the drum.

Where the apparatus is to be used for heating instead of cooling air, it will be obvious that the water in the tank 15 will be heated to a suitable degree in order that the water picked up by the absorbent covering of the rotating drum when evaporated will heat the air which is blown through the interior of the drum so that in such use of the apparatus it is merely necessary to apply warm water, instead of cool water, to the supply tank 15, from which the drum picks up the water.

From the foregoing it will be seen that the form of the invention herein shown, air is forced by pressure, or drawn by suction means applied at one end of the drum and such air is caused to pass as a current between the outer housing and the inner porous drum wall, and from the outer surface thereof to the interior of the drum. The porous drum wall being saturated with water picked up from the tank, or other source, as the drum rotates, the air passing through such

absorbent material, becomes cooled, and is discharged axially from the interior of the drum, through the discharge end thereof. Evaporation of the water causes the cooling of the air, which is delivered to the apartment, room, or other place desired.

It is contemplated that only the outer part of a single layer of textile material less than the entire absorbent covering will pass through the water in the tank. The inner portion of the absorbent covering will thus be dry, and as a result will help to dry out the air as it is passing to the interior of the drum, so that dry, cool air will be discharged from the apparatus.

The invention has many applications and uses, where a supply of cool, dry air is desired, and besides being useful to cool rooms and apartments may be employed for cooling the air in automobiles.

Other forms embodying the invention, may be constructed without departing from the principles thereof.

I claim:

In an air cooling apparatus, the combination of a housing having inlet and outlet openings at its ends and a tank to contain water in its lower portion, a shaft fixedly supported at one end in said housing, the opposite end of said shaft being free or unsupported, a drum having an absorbent covering rotatively supported by said shaft near said shaft-end and arranged to dip into the water in said tank, a cylindrical extension member secured within the opposite end of the drum and extending beyond the drum toward the open discharge end of the housing, fan blades fixed within said member and connected at their inner ends to a bearing for supporting the drum on the free end portion of the shaft permitting rotation of said drum, extension member and fan blades about said shaft, and suction-creating means for causing a current of air to flow inwardly through the porous wall of said drum and axially through the fan blades to effect rotation of said drum, extension member, and fan blades as a unit.

MARK WENTZ.