Jan. 17, 1939. F. W. KLEIN 2,144,426

PORTABLE AIR CONDITIONING AND PURIFYING DEVICE

Filed Aug. 7, 1935 2 Sheets-Sheet 1

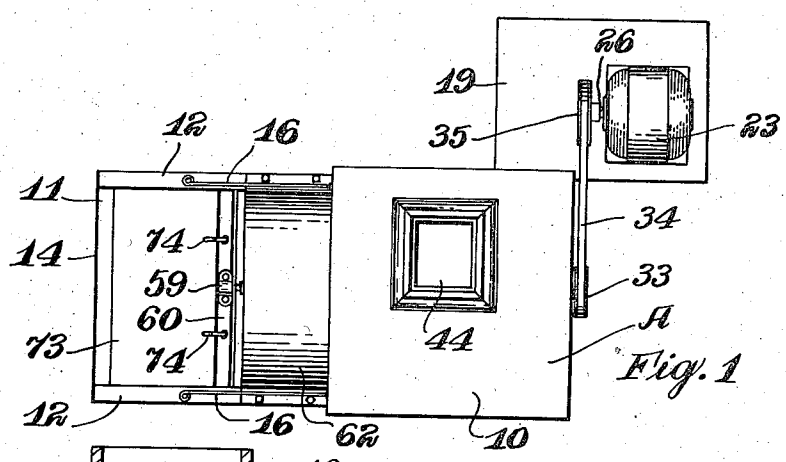


Fig. 1

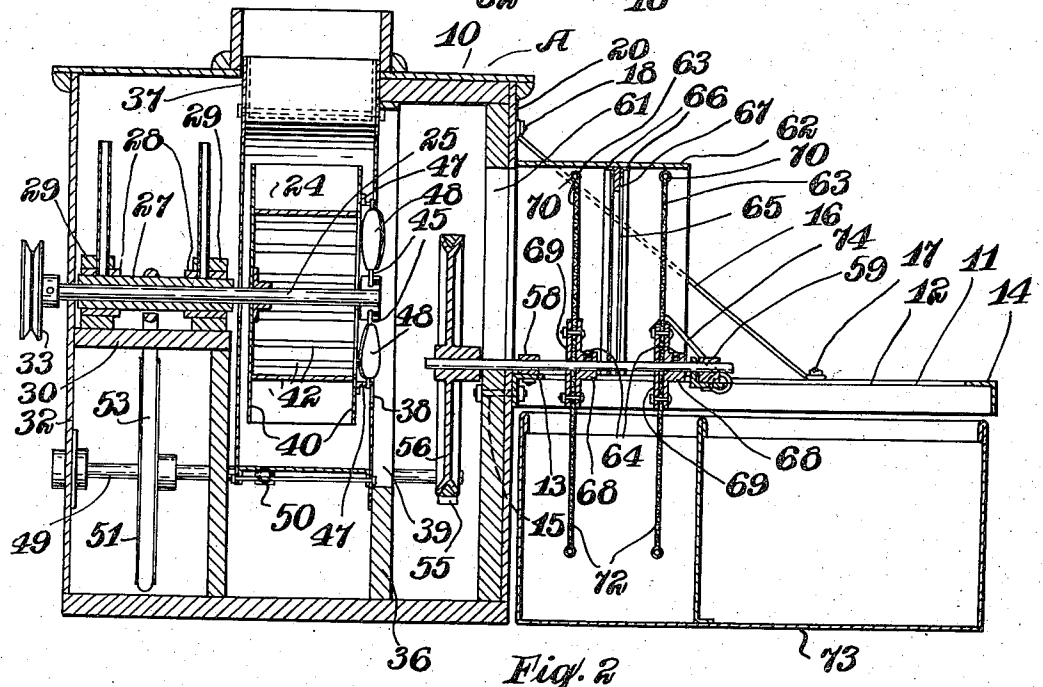


Fig. 2

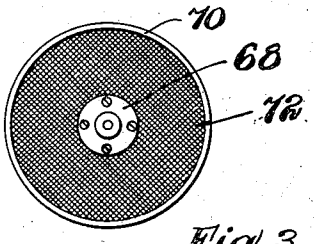


Fig. 3

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PORTABLE AIR CONDITIONING AND PURIFYING DEVICE

Filed Aug. 7, 1935 2 Sheets-Sheet 2

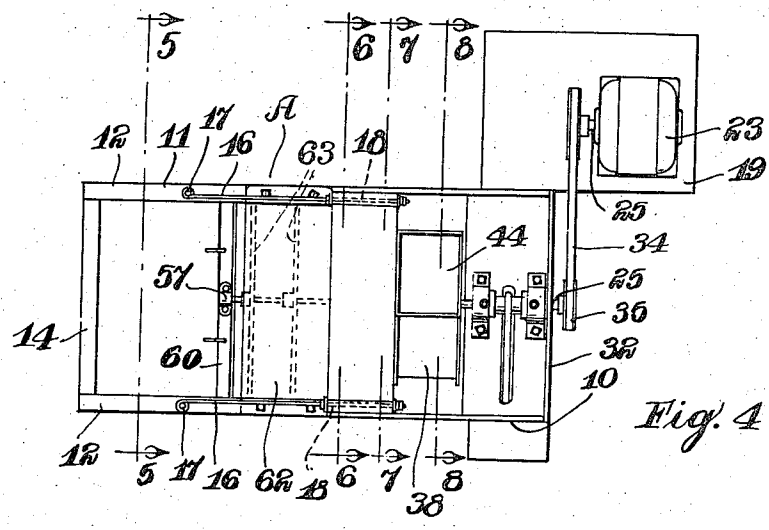


Fig. 4

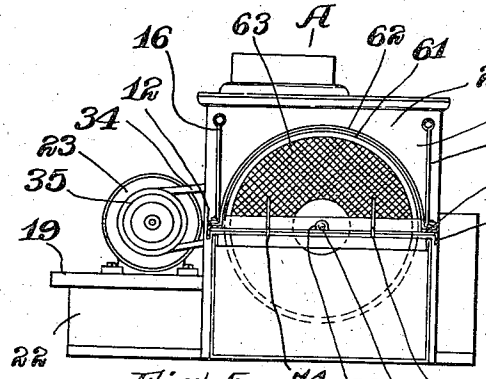


Fig. 5

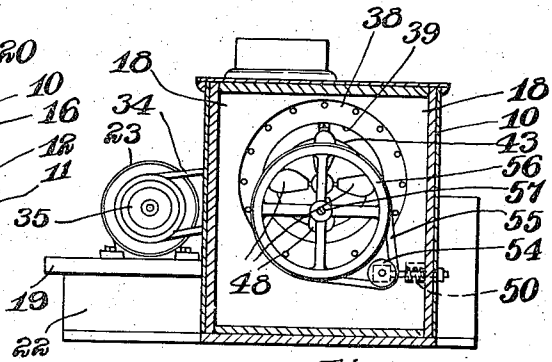


Fig. 6

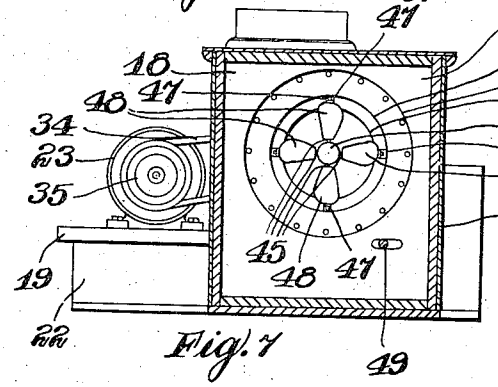


Fig. 7

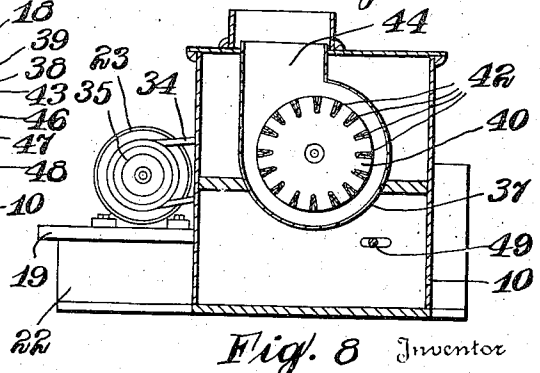


Fig. 8

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UNITED STATES PATENT OFFICE

2,144,426

PORTABLE AIR CONDITIONING AND PURIFYING DEVICE

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Application August 7, 1935, Serial No. 35,156

5 Claims. (Cl. 261—92)

My invention relates to an air conditioning device wherein I provide a means of circulating air by a unit which is self-contained and adapted to be easily operated when placed in any room or within a building where the air therein is adapted to be circulated and conditioned by my device.

A feature of my device resides in a simple, unitary structure which may be readily set up in any convenient place and which is adapted to circulate the air through my device which washes and cleanses the air from dust and other impurities, and conditions the same during the process of circulation to clarify it and when it is desired, to cool or lower the temperature of the air without overloading with moisture.

My device is of a unitary character, being compact, and is portable when it is desired, so that it may be conveniently set up to operate to condition and purify the air.

A primary feature resides in drawing the air through a rotating film of water or several films formed by the rotation of the film forming means, with the air passing through and about the same so as to thoroughly cleanse the air, and then discharging the purified air out into the room or building wherein my unitary device is in operation. The simplicity of my device is of primary importance because it permits air to be purified and conditioned in an easy and economical manner.

These features and details, together with other objects and construction of my air reconditioning device, will be more fully and clearly hereinafter set forth.

In the drawings forming part of my specification:

Figure 1 is a plan view of my air conditioning and purifying device.

Figure 2 is a side sectional elevation of the same.

Figure 3 illustrates one of the air screens and moisture film forming discs.

Figure 4 is a plan view of my air conditioning and purifying unit, with the cover portion removed.

Figure 5 is a section on the line 5—5 of Figure 4.

Figure 6 is a section on the line 6—6 of Figure 4.

Figure 7 is a section on the line 7—7 of Figure 4.

Figure 8 is a section on the line 8—8 of Figure 4.

My air conditioning device A comprises a housing 10 from one side of which extends a frame 11. The frame 11 consists in a rectangle formed of angle iron side members 12, and angle iron end members 13 and 14. Bolts 15 secure the end member 13 to the housing 10. The frame 11 is further supported by a pair of braces 16, which are secured by the bolts 17 to the side members 12 of the frame 11, and which are secured by bolts 18 to the housing 10 at a point substantially above the bolts 15, and near the top of the housing.

A platform 19 is secured to the housing 10 adjacent the end opposite the end 20 to which the frame 11 is secured. This platform 19 is reinforced by a base 22 which extends down level with the bottom of the housing 10. The platform 20 is designed to support the motor 23, which is secured on the top thereof.

Within the housing 10 is positioned a fan 24 having a shaft 25 in parallel relationship to the shaft 26 of the motor 23. This shaft 25 is provided with a sleeve 27 which extends through replaceable bearings 28 in bearing supports 29. The bearing supports 29 are secured to a shelf 30 extending transversely across within the housing 10. The shaft 25 extends through the adjacent wall 32 of the housing 10, and is provided with a pulley or sprocket 33. A belt or chain 34 connects the pulley or sprocket 33 with a pulley or sprocket 35 on the shaft 26 of the motor 23.

A vertical partition 36 within the casing 10 forms a support for the casing 37 of the fan 24, and is provided with an aperture 38 coinciding with the inlet aperture 39 of the fan 24, but is larger in size than this inlet aperture 39. The fan 24 may be of any desired shape, but is shown provided with a pair of spaced rotatable plates 40 between which are secured a number of substantially V-shaped blades 42 in spaced relationship about the periphery of the fan plates 40. The plate 40 next adjacent the inlet opening 39 is formed with a central opening 43 acting as an inlet to the rotor. The blades 42 act to force air from the interior of the rotor through the outlet 44, seen in Figure 8 of the drawings.

In the central opening 43 are mounted a series of radially extending shafts 45, journalled in a collar 46 in the shaft 25 and in ears 47 on the rotor plate 40 containing the aperture 43. Adjustable fan blades 48 are mounted on each of these shafts 45. The angle of the blades 48 may be adjusted by adjusting the position of the shafts 45 on the collar 46, or the position of the blades on the shafts 45.

A counter shaft 49, extending parallel to the

shaft 25, is mounted upon a flexible bearing 50, tending to draw the shaft 49 away from the shaft 25. A pulley 51 on the shaft 49 accommodates a belt 53 which extends over the sleeve 27 on the shaft 25. The shaft 49 is thus driven by the belt 53 from the shaft 25. A pulley 54 on the other end of the shaft 49 accommodates a belt 55 which drives a pulley 56 on a shaft 57. It may be seen that the flexible bearing acts to tighten the belts 53 and 55.

The shaft 57 is journalled in a bearing 58 on the end member 13 of the frame 11, and also in a bearing 59 on a cross member 60 on the frame 11. The shaft 57 extends through a substantially semi-circular opening 61 in the end 20 of the housing 10. A substantially semi-circular hood or guard 62 is secured extending between the side members 12 of the frame, closely adjacent the end 20 of the housing 10. Mounted upon the shaft 57, and extending into close relationship to the hood or guard 62 are a pair of film forming wheels 63. The inner of these wheels or the one next adjacent the housing 10, is secured to turn with the shaft 57. The outer wheel 63 is similarly formed, but is selectively engageable with the shaft 57 to rotate therewith by means of a set screw 64.

In order to deflect any air from passing between the wheels 63 and the hood 62 and through the opening 61, I provide a deflector ring 65, which also acts to reinforce the hood 62. This ring is preferably formed of a pair of arcuate angle iron rings 66, between which is positioned a strip of felt 67. Any air entering between the hood 62 and the outermost wheel 63 is deflected inwardly by this deflector ring 65.

The wheels 63 are formed with a central flange 68 adapted to fit the shaft 57, and a clamping plate 69 securable to the flange 68 to clamp the material forming the wheel. An outer hoop 70 is provided, which is secured to the central flange by means of a mesh material 72. This mesh material may be any suitable material which is provided with perforations which may be bridged by water as the wheel is rotated through a bath of water. A wire mesh screen can be used; a perforated plate could be made suitable, or one of a series of fabrics or other materials could be used if desired. The wheel 63 is best illustrated in Figures 2 and 3 of the drawings.

A liquid container 73 is provided closely adjacent the frame 11, and positioned beneath the frame 11. The container 73 provides a reservoir of water through which the wheels 63 pass in the rotation thereto. Almost half of the wheels 63 are submerged at all times. As the wheels 63 pass through the water, the water bridges the openings or perforations in the mesh material, and provide virtually a solid film wall of water through which the air must pass before entering the opening 61 in the housing 10. When both of the wheels 63 are in rotation, the air must pass through two films of water before entering the housing.

In order to prevent rotation of the wheel 63 when it is not secured to the shaft 57, one or more hooks 74, pivotally secured to the end member 13 of the frame 11, is engaged into the mesh of the outer wheel 63, holding this wheel against rotation when it is only desired to rotate the inner wheel 63.

In operation, when the motor 23 is started, the fan 24 starts to rotate, drawing air through the inlet aperture 43 of the fan rotor, and through the opening 61 in the end 20 of the housing 10. In order to pass through the opening 61, air must pass through the wheels 63, one or both of which provide a wall of water which acts to cleanse and purify, as well as cool the air before it is exhausted through the discharge opening or outlet 44.

It has been found that for ordinary purposes, it is only necessary to provide one film of water through which the air must pass. If greater cooling is desired, or if the air is exceptionally dirty or dusty, both of the wheels 63 are rotated by the motor 23, thus providing a double wall or film of water through which the air must pass.

I have described a particular drive for the motor. It is understood that if it is desired, the motor can be connected directly to the shaft 25 by means of a universal joint or the like, and the pulleys or sprockets 33 and 35, and the belt or chain 34 can be eliminated. Other drives and belts can be changed as desired, without changing the invention. For example, gears can be used to connect the various driven elements.

In accordance with the patent statutes, I have described the principles of operation of my air conditioning device, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that this is only illustrative of a means of carrying out my invention, and that obvious changes can be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. An air conditioning device including a fan, a passage to said fan, a pair of wheels having openings therethrough in said passage, a shaft upon which said wheels are mounted, means for rotating said shaft, means for sifting air and for applying a film of liquid over the openings in said wheels, and means for holding one of said wheels stationary when desired to function merely as a sifting means.

2. An air conditioning device comprising a fan, an outlet from said fan, an inlet to said fan, a pair of rotatable net-like surfaces in said inlet through which said air must pass to sift and moisten the air, means for applying a constant film of water over said net-like surface of one of said surfaces in said inlet, and means for selectively rotating the other surface for applying a constant film of moisture over the other of said surfaces in said inlet passage, said last named means acting to sift air passing therethrough at all times.

3. A portable air conditioning unit comprising a housing, a water tank within said housing, an air fan having V-shaped air blades, side plates for supporting said air blades therebetween to position the same radially extending from the axis with the openings of the V-shaped portions at the periphery of the fan wheel, rotatable screen-like water film forming means adapted to rotate virtually semi-immersed within said water tank, means for rotating said air fan and water film forming means in unison, and air guides adapted to direct the air drawn into said unit over and through said water film means, and air baffle means between said water film means and said fan to retard excess moisture being picked up by the air passing through said unit.

4. A portable air conditioning unit comprising an air suction and blower fan, a housing for inclosing said fan, air inlet passageways to the center of said fan, rotatable and adjustable blades in said air inlet, an air outlet passage for said fan, a water tank, a water film forming means rotatable within said tank, passageways for guid-

ing air over and through said water film means, and baffle means for retarding excess moisture from entering said fan and being forced out of said unit.

5. An air conditioner including a casing, a fan in said casing, an air inlet in said casing, a wheel adapted to carry a film of moisture rotatably mounted in the path of air entering said inlet, a second wheel in the path of air entering said inlet, means on said second wheel for sifting air and for carrying a film of moisture, means for moistening said wheels, means for imparting rotation to both of said wheels, and means for selectively holding one of said wheels stationary to function merely as a sifting means.

FRANK W. KLEIN.