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J. W. BAILEY

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AIR CONDITIONER FOR AUTOMOBILES

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2 SHEETS—SHEET 1

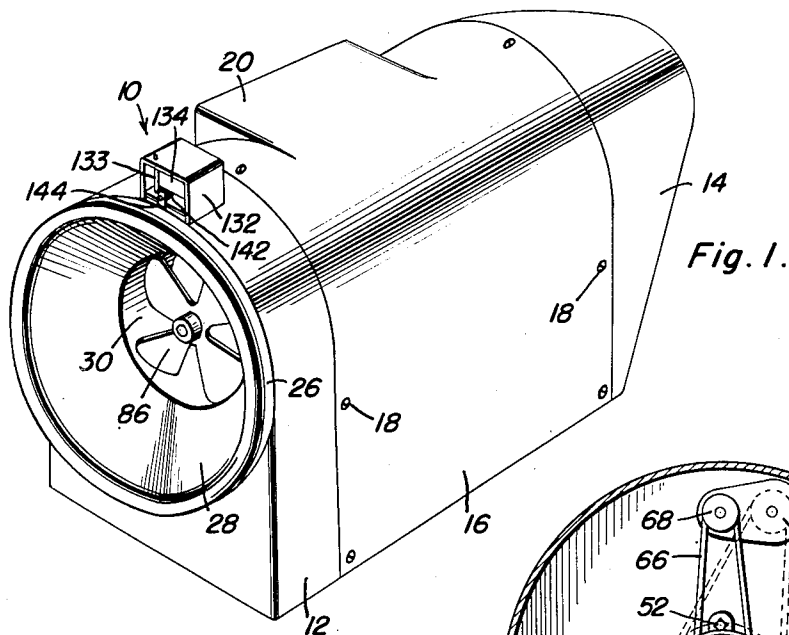


Fig. 1.

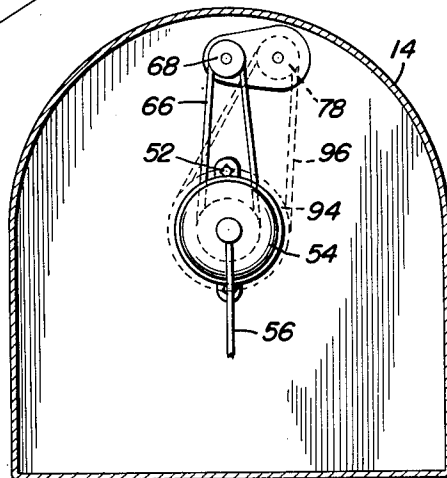


Fig. 4.

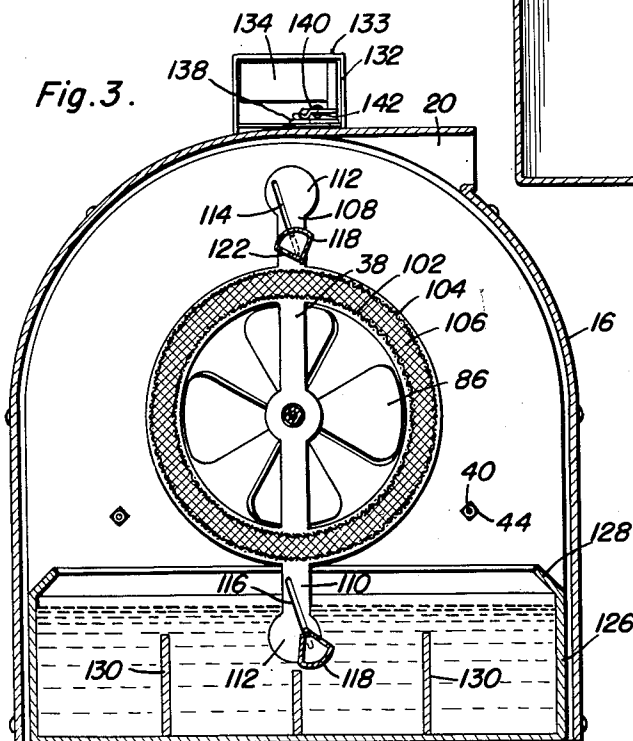


Fig. 3.

James W. Bailey
INVENTOR.

BY *Alvanice A. O'Brien*
and *Harvey B. Jacobson*
Attorneys

March 10, 1953

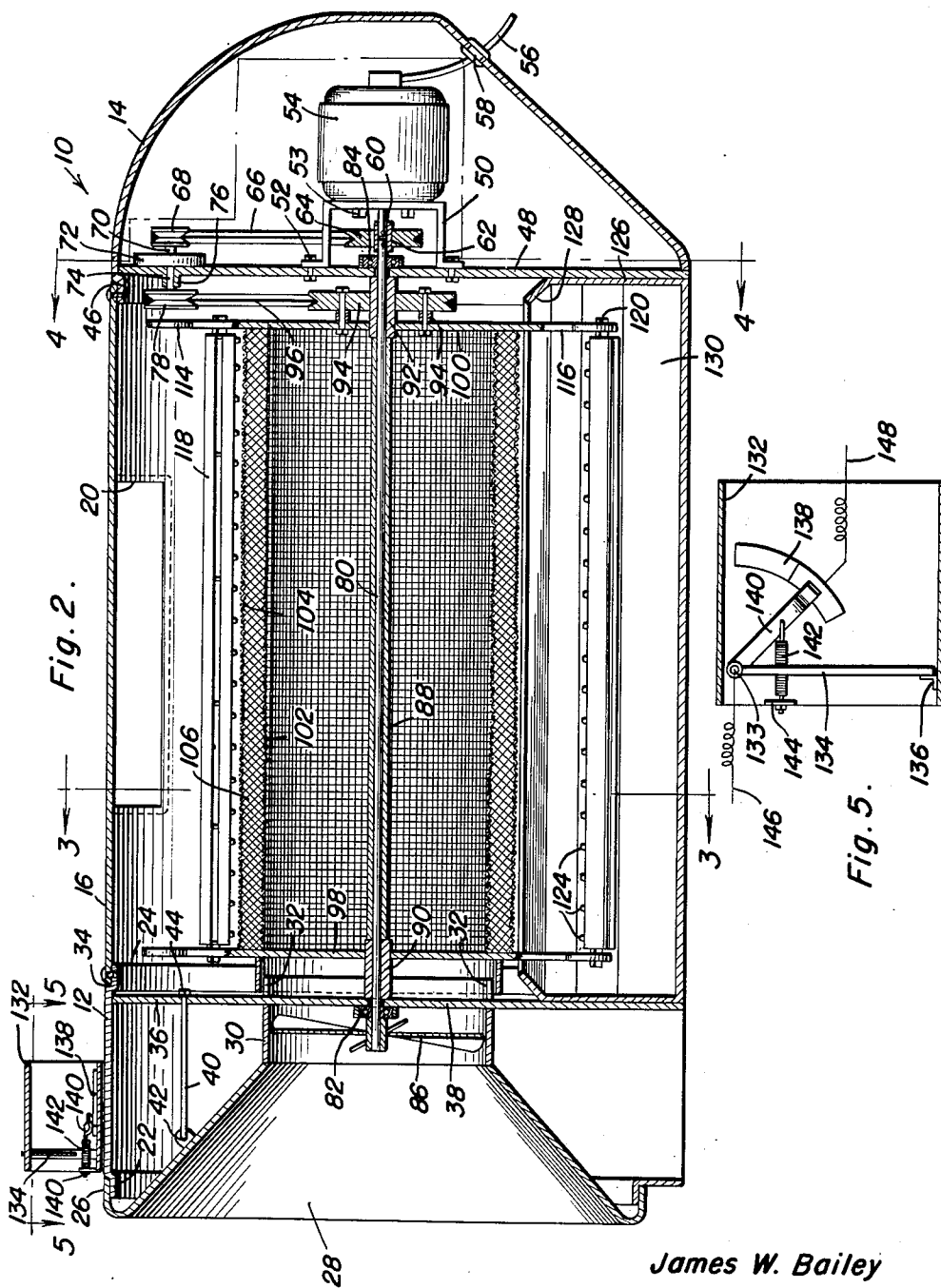
J. W. BAILEY

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AIR CONDITIONER FOR AUTOMOBILES

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2 SHEETS—SHEET 2



James W. Bailey
INVENTOR.

BY *Chance A. O'Brien*
and *Harvey B. Janson*
Attorneys

UNITED STATES PATENT OFFICE

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AIR CONDITIONER FOR AUTOMOBILES

James W. Bailey, Pecos, Tex.

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2 Claims. (Cl. 261—30)

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This invention comprises novel and useful improvements in an air conditioner for automobiles and more specifically pertains to a portable air moistening and air circulating device particularly adapted for use in automotive vehicles.

The principal object of this invention is to provide an improved air conditioning assembly having improved air moistening and humidifying means in conjunction with an improved air circulating means.

A further object of this invention is to provide an air conditioning device of the above character, wherein a single operating means is employed for simultaneously operating the air circulating means and the air moistening means in an improved and interrelated manner.

Yet another object of the invention is to provide an apparatus in conformity with the foregoing objects wherein the electric motor constituting the source of power may be relieved of its function as a driving means when the device is subjected to an air blast or air stream of sufficient strength to operate the fan and thereby drive the humidifying means.

These, together with various ancillary features and objects of the invention which will later become apparent as the following description proceeds, are attained by the present device, a preferred embodiment of which has been illustrated by way of example only in the accompanying drawings, wherein:

Figure 1 is a perspective view showing a preferred embodiment of the invention, the view being taken from the air inlet end of the same;

Figure 2 is a central longitudinal sectional view through the device shown in Figure 1;

Figure 3 is a vertical transverse sectional view taken substantially upon the plane of the section line 3—3 of Figure 2;

Figure 4 is a further vertical transverse sectional detail view taken substantially upon the plane of the section line 4—4 of Figure 2; and

Figure 5 is a vertical longitudinal sectional detail view upon an enlarged scale taken substantially upon the plane of the section 5—5 of Figure 2.

Referring now more specifically to the accompanying drawings, wherein like numerals designate similar parts throughout the several views, it will be seen that the numeral 10 indicates generally the unitary air conditioning apparatus and which includes a front or inlet end casing 12 and a rear casing 14 to each of which is detachably secured a central casing member 16 removably secured thereto as by bolts 18, and pro-

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vided with an air discharge conduit 20 which may be conveniently provided upon its upper surface and may extend laterally therefrom.

As will be readily understood, any suitable damper or other air control means may be provided for controlling the discharge from the outlet conduit 20, but since the construction of the same is well known and forms no part of the present invention, it has not been deemed necessary to illustrate the same.

Referring now to the air inlet casing 12 it will be seen that the same includes flanged extremities 22 and 24 at its front and rear ends, the central casing member being secured to the flange 24, while the flange 22 is embraced by a complementary encircling flange 26 which forms the periphery of a frusto-conical funnel shaped and inwardly extending member 28. This latter member extends centrally of the forward casing 12, and terminates in a cylindrical inwardly extending sleeve 30. The inner end of this sleeve is provided with diametrically opposed longitudinally extending slots 32 extending from its inner end, for a purpose which will later be set forth.

Received in the interior of the front casing member 12, and disposed slightly inwardly of the annular flange 34 joining the flange 24 to the casing 12, is a partition 36 suitably contoured to fit the interior of the casing 12, and having a hollow central portion cut-away to register with the opening in the sleeve 30, this central portion having a diametrically disposed cross-bar 38 adapted to seat in the slots 32 and to be securely and rigidly held therein as by means of bolts 40 which are secured to apertured lugs 42 carried by the interior walls of the frusto-conical member 28, and extending through the partition 36 and secured thereto by fastening nuts 44. It will thus be seen that the front end assembly may be thus assembled as a unit with a central axial inlet opening formed by the sleeve 30 for the inlet of air into the interior of the device through the funnel shaped inlet opening 28.

The rear casing section 14 is preferably closed at its rear end, and in its forward end is likewise provided with a forwardly extending annular flange 46 to which the rear end of the casing member 16 is secured by the above mentioned fastening bolts 18, and a partition 48 is secured to the front end of the casing 14 as shown in Figure 2. A suitable supporting bracket 50 which may consist of a U-shaped member is detachably secured by fastening bolts 52 to the rearward surface of the partition 48, and sup-

ports on its rearward wall as by fastening bolts 53, in a detachable manner, an electric motor 54 which may be supplied with electric current of any suitable source such as the 6 volt storage battery of an automotive vehicle, by means of a suitable electric circuit including the electric conducting cables 56 passing through the casing wall as by means of grommets 58.

Extending inwardly through a suitable aperture in the bracket 50, is the armature shaft 60 of the electric motor 54, to which is attached any suitable connector 62 in the form of a sleeve or the like and which constitutes a hub having a driving pulley 64 thereon. This pulley through a belt drive 66 is connected with a similar pulley 68 carried by a shaft 70 which extends into and is mounted in a reduction gearing casing indicated generally by the numeral 72 and of any conventional construction. This casing is journaled in a boss 76 formed in the wall of the partition 48, the output shaft 74 of the reduction gear casing 72 being provided with a driven pulley 78.

A drive shaft in the form of a rod 80 is disposed centrally of the sleeve 30 and extends through suitable aligned apertures in the crossbar 38 and partition 48, being journaled in suitable antifriction bearings 82 and 84 disposed on the forward and rearward sides of the crossbar 38 and partition 48 respectively. At its forward end, this driving shaft or rod 80 has fixedly secured thereto a fan 86 of any suitable construction adapted to fit snugly within the confines of the cylindrical member 30 for rotation therein. At its rear end the rod or shaft 80 is received in and connected to the hub or connecting member 62 previously described. It will thus be seen that the shaft 80 and consequently the fan 86 are directly driven by the motor 54 and at the speed of rotation of the motor. The shaft 80 is journaled for rotation in a stationary surrounding tubular shaft 88 which is rigidly connected to a pair of sleeve members 90 and 92 at the forward and rearward ends respectively, these members abutting and being secured to the rearward and forward surfaces respectively of the crossbar 38 and partition 48. Plates 98 and 100 (ends of drum) are rotatably journaled upon the outside of sleeve collars 90 and 92. A pulley 94 is connected to plate 100 by means of two bushings 95 which space the pulley from the plate, both running freely on the sleeve collar 92. The pulley 94 is connected as by a belt 96 with the previously mentioned pulley 78, whereby the drum is rotated by the motor 54 but at a reduced speed with respect thereto.

It may be here noted that any desired speed ratio may be employed, but in the present invention it is preferred to employ a ratio in the neighborhood of 250 to 1, so that the drum will make one revolution for each 250 revolutions of the rod or shaft 80. The forward plate 98 has an opening registering with the opening in the partition 36 and with the passage through the sleeve 30, while the latter plate 100 is imperforate or closed. These plates are rotatably attached to the sleeves 90 and 92, and therefore rotate upon the axis of the sleeve 88.

A pair of cylindrical reticulated or foraminous screen members 102 and 104 are disposed in concentric fashion and rigidly attached to the front and rear plates 98 and 100, and a lining 106 of any suitable pervious material for absorbing and permitting the passage of water therethrough is

interposed between the screens 102 and 104, as indicated at 106.

The plates 98 and 100 are provided with radial extensions or arms 108 and 110, see Figure 3, which are disposed diametrically with respect to each other. Obviously, any desired number of these diametrical pairs of arms or extensions may be provided, two being illustrated for the sake of convenience in Figures 2 and 3.

The outer extremities of these arms conveniently terminate in enlarged portions 112, and these arms are provided with longitudinally extending slots 114 and 116 which are inclined with respect to the center line of the radial arms. These slots are employed to movably support a plurality of dippers for moistening the member 106.

As will be now apparent from Figures 2 and 3, longitudinally extending dippers 118 are provided with axially extending trunnions 120 which are slidably received in the slots 114 and 116 of the plate members 98 and 100. These dippers are preferably pear shaped in cross section, as shown in Figure 3, and consists of hollow tubular members which preferably have closed end walls and have longitudinally extending slot or slots extending throughout substantially the full length of each member, the members and their slots being disposed in parallel relation to the axes of the shafts 80 and 88 and consequently to the axis of rotation of the cylindrical member consisting of the screens 102, 104 and the lining 106.

These slots 122 are disposed at what may be termed the sides of the dippers, as shown in Figure 3 while a series of longitudinally spaced orifices 124 extend radially inwardly from the inner or pointed edge of the dipper, these orifices being formed by perforated outwardly flaring portions of the material of the dipper.

Detachably received in the bottom of the casing 16 and between the crossbar 38 and partition 48, and attached thereto in any suitable manner, is a removable tank 126, see Figure 3, the side walls of this tank having their upper extremities inwardly flaring as at 128, and having suitable antisurge and antisplash baffles 130 therein. This tank is intended to be filled with water, and the same may be removed and replaced from time to time by removing a portion or all of the casing cover 16 as desired.

The tank and water level are so disposed that as shown in Figure 3 the dippers will be immersed during rotation of the cylindrical member, whereby by means of the longitudinal slots 122 the interior of the dippers will be filled with water, this water being retained within the dipper until the same is rotated to its uppermost position, at which time the dipper will be inverted as shown in Figure 3. In this inverted position, the water in the dipper will be permitted to spray or trickle therefrom and will be diffused over the uppermost surface of the rotating cylindrical member, whereby the inner and outer screens and the layer 106 therebetween will be thoroughly moistened.

It should be here noted that during this movement as soon as the dipper passes its mid portion on its way downward, the weight of the same will cause the dipper to travel to the radially outward portion of the groove 116 as shown in Figure 3, so that the dipper will be at its lowermost position, and may attain a considerable lower position than would be possible if the dipper were fixed with respect to the supporting arms 108 and 110.

However, its uppermost position, the dipper will move by the influence of gravity to the inward position in its slot, as shown in the top of Figure 3, and this abrupt downward movement of the dipper, arrested by the lower end of the slot, will cause a shaking action which will assist in discharging the contents of the dipper upon the upper surface of the rotating cylinder.

As so far described, it will be seen that the fan 86 is rotated in synchronized relation with respect to the rotation of the cylindrical member, by means of a common power source 54, the fan rotates 250 times as fast as the cylindrical moistening device. The air thus drawn inwardly from the funnel 28, through the sleeve 30 and into the interior of the cylindrical member 102, and find its escape only radially outwardly through the cylindrical walls 102, 104 and 106 of the rotating cylindrical member. This air passing through the porous layer 106 will pick up moisture therefrom, and be thoroughly moistened and conditioned, and will then find its escape under the pressure of the fan through the air discharge conduit 20. This air may be conducted to any suitable place for air conditioning the interior of automotive vehicles.

In addition to the foregoing however, a further mode of operation is contemplated which at times may dispense with the operation of the motor 54.

For this purpose, the front casing 12 is provided with a housing 132 consisting of side walls and a top, the front and rear of this housing being open as indicated in Figure 5. By means of a vertically extending pivot pin 133, disposed adjacent one of the side walls of the housing, a transversely extending vane 134 is pivoted for movement about a vertical axis, under the influence of the air stream which may be passing through the housing 132.

The opposite wall of the housing may conveniently be provided with a bracket 136 forming a stop member for limiting the forward pivoting movement of the vane 134. Mounted in any convenient manner in the housing, is a stationary rheostat switch contact 138 of any suitable and conventional design, and a resilient movable contact 140 is rigidly attached to the end of the vane 134 for oscillating movement over the contact 138. By means of a spring 142, secured to the contact 140 into a stationary lug 144 carried by the casing 132, the vane is urged to its closed position which corresponds to the full current position of the electric motor 54. Under the influence of the air stream, the vane 134 is opened to varying positions against the opposition of spring 142, and this opening movement causes a traversal of the fixed contact 138 by the flexible switch element 140, thereby varying the resistance in the circuit of the electric motor 54, to which the device is connected as by conductors 146 and 148. It will thus be seen that in some conditions of operation, when the air stream is sufficiently great, the vane 134 will completely cut off flow of current through the electric motor, and the rotating fan 86, will through the associated gearing 94, 96, 78, 68, 66, 64 operate the tubular shaft 88 and consequently the rotating cylindrical air conditioner. The electrical current in the vehicle battery is thus saved during these conditions of operation.

Of course, in the latter use of the invention, it is contemplated that the air conditioning unit

will be mounted in such a manner, as for example upon the exterior of a vehicle, or in line with air ducts built into the front of the automobile for conducting air into the inside, whereby the same will be subjected to the air flow created by the progress of the vehicle.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily appear to those skilled in the art after a consideration of the foregoing specification and accompanying drawings, it is not desired to limit the invention to the exact construction shown and described. Accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. An air conditioner comprising a water tank and a cylindrical drum mounted for rotation upon its central axis above said tank, said drum having a hollow interior and a permeable wall, means for blowing air into said interior and educting the same through said wall, dippers carried by said drum for immersion in said tank and for discharging water upon the top of said drum during rotation and means for rotating said drum, said dippers comprising elongated hollow members on opposite sides of said drum, means for supporting said dippers radially outwardly of said drum, said last means comprising radially extending plates on said drum, said plates having outwardly extending slots, said members being mounted for sliding movement in said slots.

2. An air conditioner comprising a water tank and a cylindrical drum mounted for rotation upon its central axis above said tank, said drum having a hollow interior and a permeable wall, means for blowing air into said interior and educting the same through said wall, dippers carried by said drum for immersion in said tank and for discharging water upon the top of said drum during rotation and means for rotating said drum, said dippers comprising elongated hollow members on opposite sides of said drum, means for supporting said dippers radially outwardly of said drum, said last means comprising radially extending plates on said drum, said plates having outwardly extending slots, said members being mounted for sliding movement in said slots, said dippers having water dispensing orifices adjacent said drum and water inlet means in said dippers.

JAMES W. BAILEY.

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