

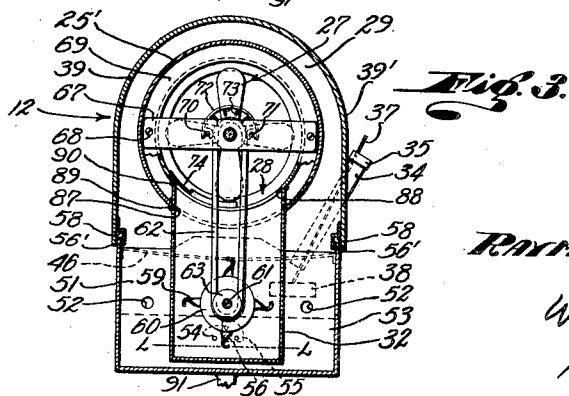
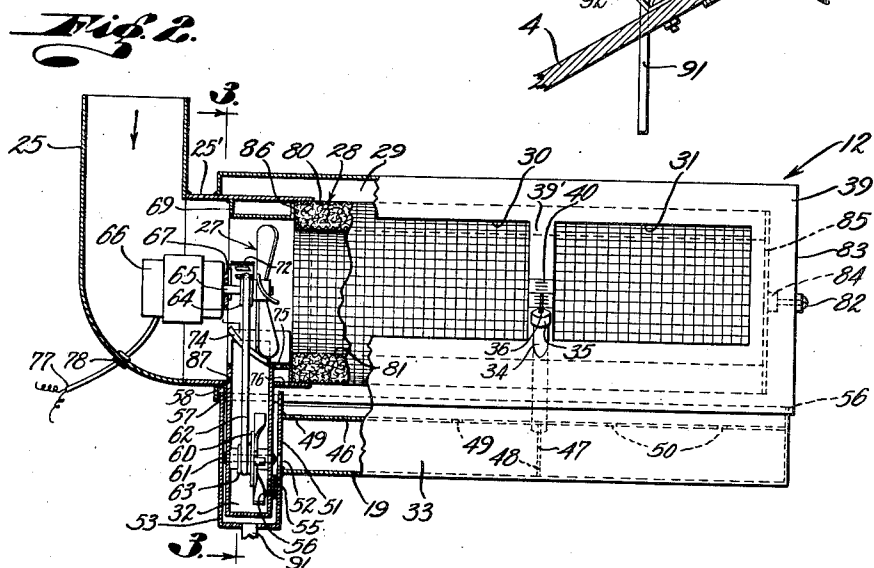
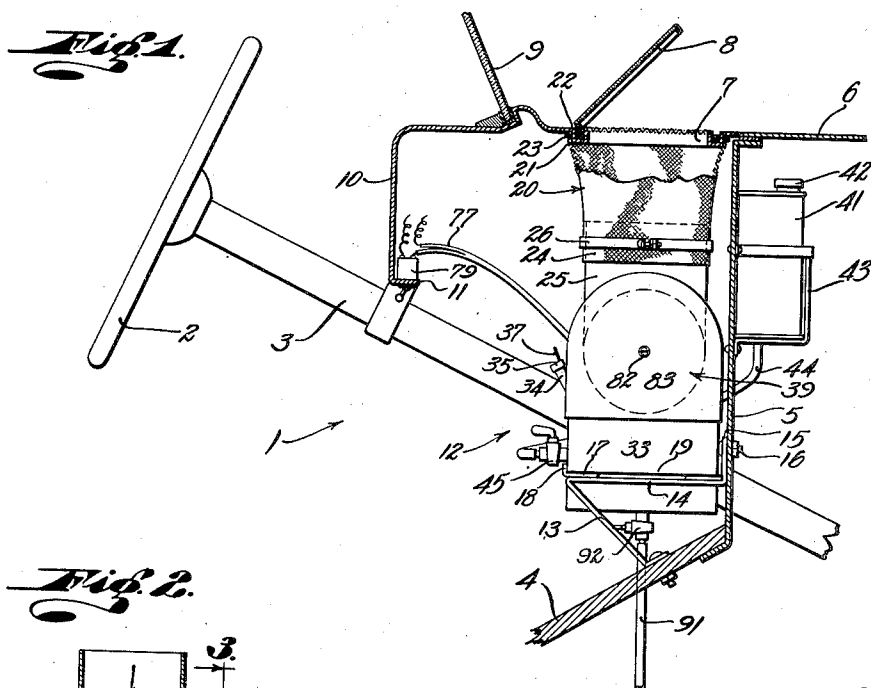
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R. J. STEELE

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CAR COOLER

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Inventor
RAYMOND J. STEELE

W. E. Beatty
Attorney

UNITED STATES PATENT OFFICE

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CAR COOLER

Raymond James Steele, Los Angeles, Calif.

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The invention relates to a car cooler and has for an object to provide a cooling or air-conditioning unit which may be employed to cool the inside of an automobile.

According to a certain prior arrangement it has been proposed to cool the inside of a car by means of a unit having air intake at one of the front windows of the car. This is objectionable as it obstructs the vision of the driver. Another object of the invention is to overcome this defect, and provide a cooling unit which is outside of the range of vision of the driver.

A further object of the invention is to provide an air-conditioning unit which may be readily applied to practically any standard make of automobile. This is accomplished by providing an air intake through the usual cowl opening, and by providing a unit adapted to be supported in a position extending along the front wall separating the engine from the driver's compartment. By extending the unit along that wall, that is crosswise of the car, a suitably long air conditioning path may be obtained with little or no inconvenience, due to the space occupied by the unit, to the occupants of the front seat. Means are provided for discharging the air conditioned atmosphere laterally from the front side of the unit at a point or points removed from the inlet end of the unit. Preferably the inlet end of the unit is provided with an upward extension adapted to be coupled by means of a flexible pipe to the cowl opening, and in this case the air conditioning path is somewhat in the shape of the letter Z wherein one of the outer legs of the Z has been twisted about the middle portion so that it is angularly related to the other leg of the Z, the air entering the cowl and passing downwardly through the inlet opening, then horizontally crosswise of the car parallel to the wall over a path of substantial length, and then laterally from the casing in a general direction towards the rear of the car. This feature has a particular advantage in an automobile where only a limited space is available for the air conditioner behind the instrument panel. I obtain an efficient wetting of the wet surface and obtain some cooling as well by projecting a spray of water in the path of a current of air approaching the evaporative pad. An economy of operation and space are provided by using a splasher wheel in a small tank depending from the main casing, the splasher wheel being mounted low enough to be below the direct flow of air from the inlet to the pad.

The invention relates generally to a type of cooling unit wherein a draft of air is caused to

flow through a porous wet medium whereby the air is cooled due to the evaporation of moisture. While it has heretofore been proposed to keep such a medium wet by means of a small pump which pumps water from a reservoir and discharges it on the wet surface, this has the disadvantage that the pump needs to be repaired frequently to keep it in operation, due to sediment depositing from the water in the pump or to failure of the seal in the pump. Another object of the invention is to overcome this defect, and in so doing, I have provided a cooling feature which is useful for air-conditioning generally, such as a unit which is adapted to be mounted in a window to cool a room.

For further details of the invention reference may be made to the drawing wherein Fig. 1 is a vertical sectional view, with certain parts broken away, through the driver's compartment of an automobile, and in which is mounted a cooler or air-conditioning unit according to the present invention and shown therein as an end view in elevation. Fig. 2 is a side elevation, partly in section, of the air-conditioning unit of Fig. 1. Fig. 3 is a sectional view on line 3—3 of Fig. 2, looking in the direction of the arrows.

Referring in detail to the drawing, I have illustrated the driver's compartment 1 of a conventional passenger automobile, having associated therewith the usual steering wheel 2 and its column 3, floor board 4 from which arises a vertical wall 5, separating the space under the hood 6 from the driver's compartment 1, cowl opening 7, cowl closure 8, windshield 9, and an instrument panel 10 having inturned horizontal edge 11.

In front of the driver's seat, not shown, and at the right-hand side of the middle of the car looking forward, I provide the cooler 12 of this invention which is supported from the floor board 4 by an angular bracket 13 having a horizontal portion 14 continuing to a vertical extending portion 15 which is secured to the wall 5 by bolts 16. On the horizontal portion 14 I secure by welding or otherwise an L shaped piece 17 having upturned portion 18 which extends across the front of the cooler 12 to keep it from sliding off the bracket. The base 19 of the cooler 12 is rectangular in shape, shown in Figs. 1, 2, and 3, and the bracket 13, 14, etc., provides a support for this rectangular bottom 19, one or more additional angular brackets 13 being spaced along the length of the cooler 12 to support it from the floor board 4 and wall 5. The cooler 12 is supplied with air taken in through the cowl opening 7. The incoming air passes through cowl opening 7, and then

through a flexible coupling tube 20 of fabric, the upper end 21 of which is secured around the rim 22 of the cowl opening 7, by means of a band 23 of wire or the like. The lower end 24 of the coupling tube 20 is secured to the inlet 25 of the cooler 12 by means of a suitable clamping band 26.

As shown in Fig. 2, the air passes downwardly through the inlet 25, around a fan 27, into the interior of a porous cylindrical pad 28, through the pad into the annular space 29 around it, then radially or laterally outward, more or less at right angles to the longitudinal axis of the cylinder 28, and through the rectangular openings 30 and 31 (in casing 39) which face the driver's seat not shown.

The pad 28 is kept moist by water from an auxiliary tank 32 which is supplied with water from a main tank 33. Tank 33 has a filler tube 34 having cap 35 which may be removed to fill the tank 33. If desired, the cap 35 may be provided with an aperture 36 through which projects a wire 37 which extends through tube 34 and is fastened to a float 38 to serve as a water gauge. On the front wall 39' of the inverted U shaped casing 39, between the outlets 30 and 31 I provide a scale 40 which cooperates with the end of the wire 37 to show the height of the water in tank 33.

An auxiliary supply of water may be provided by a tank 41 having filler cap 42 as shown in Fig. 1. Tank 41 is secured by means of a bracket 43 to the front of the wall 5, under the hood, and it is connected to the tank 33 by a pipe 44 having a valve 45.

The top of tank 33 is provided with a slightly concave top piece 46 and extending across the tank 33 is a baffle 47 having at its bottom an aperture 48. The baffle 47 prevents the water from surging when the car goes around a corner and the aperture 48 permits the water to flow from one half of the tank 33 to the other.

The top 46 at each side of the baffle 47 has an aperture 49 and 50, to provide an air vent for tank 33, and to permit any moisture which drops on the top 46 to flow into the tank 33. The end wall 51 of the tank 33 is provided with an aperture 52 so that water can drain from tank 33 into an outer casing 53 in which the tank 32 is arranged. Water flows from the casing 53 into the tank 32 through one or more apertures 54 (Figs. 2 and 3), a suitable number of which may be opened or closed by means of the slide valve 55 pivoted at 56.

Valve 55 is a sheet of metal or the like in the shape of a quarter of a circle as shown in dotted lines in Figure 3, and it is swung on pivot 56 to uncover a desired number of the apertures 54.

The casing 53, which serves as a tank, and tank 32 extend below the bottom of casing 33, so that the auxiliary tanks provided by 32 and 53 will have water in them even though the car were tilted sideways so that all of the water in tank 33 would flow away from the wall 51.

The valve 55 provides a simple means for regulating the amount of moisture to be delivered to the pad 28. The valve 55 is manually adjusted to allow a desired amount of water to flow into tank 32, depending upon atmospheric conditions. The valve 55 is accessible when the cooler 12 is taken apart, the tank 32 being removable from the extension 33. The sides of the tank 33 project upwardly above the top 46 as shown at 56 and the extension 53 has a similar rim 57 which forms an extension of the rim 56. The top part of the cooler 12 has a groove 58, with a suitable

packing therein not shown, and the groove 58 fits over the rim 56—57.

The liquid level in tank 32 is normally at the height represented at the line L—L, Fig. 3. Dipping slightly below this level are the dipper arms 59 of a splasher wheel 60 which serves to lift and splash the water from tank 32, into the path of the current of air from the inlet 25 in front of the fan 27, to add moisture to the air entering the pad 28. A splasher wheel 60 is housed in splasher tank 32 below the pad 28, the splasher wheel 60 is outside the direct path from inlet 25 through the pad 28.

Wheel 60 is rotatably mounted on a stud 61 which is secured in the opposite walls of the tank 32. Wheel 60 is driven by a belt 62 which passes over a pulley 63 secured to the wheel 60, and over a pulley 64 on the shaft 65 of the fan 27. The fan is driven by an electric motor 66 mounted on a bar 67 which is secured by bolts 68 to the face of a cylinder 69 in which the fan 27 rotates. Motor 66 is secured to bar 67 by means of bolts 70, 71, and these bolts also secure an arched baffle 72 having spaced depending fins 73. The hood 72 extends vertically above the pulley 64 and above the top of belt 62 in order to catch the moisture thrown off from this pulley and belt, and deflected it into the path of fan 27. At the bottom of cylinder 69, and just outside the path of fan 27, I provide a concave run-off pan 74 which slopes downwardly and leads the drip from the casing 69, due to water splashed thereon from wheel 60 to an aperture 75 which communicates with an aperture 76, which discharges the drip onto the top 46 of the tank 43, so that it will be returned through apertures 49 and 50 to this tank. Fan 27 rotates counterclockwise as seen in Fig. 3. Pan 74 covers the rear right-hand corner of the top of tank 32 as seen in Fig. 2 and is lapped inside the wall of casing 69. The top of pan 74 extends the full width of casing 69 as shown on Fig. 2.

Motor 66 may be operated from the storage battery of the car, and its circuit 77 may pass through the wall of inlet 25 as shown at 78 and may be provided with a switch 79 mounted on the ledge 11 of the instrument panel 10 as shown in Fig. 1.

The pad 28 comprises spaced cylinders 80 and 81 of coarse wire mesh with a packing therebetween of porous material such as aspen excelsior.

When the car is in motion, the air is forced through the cowl opening 7 by the cover 8, and the amount of air passing through the cooler 12 may be regulated by suitably adjusting the extent to which the cover 8 is open. During this time, the motor 66 may run continually or only occasionally to wet pad 28, and to assist the draft. When the car is standing still, motor 66 may be operated to force a draft of air through the cooler 12, and to wet pad 28.

It will be apparent that the extent to which the incoming air is cooled may be regulated by varying the amount of moisture delivered to the pad 28, and this in turn may be adjusted by suitably adjusting the position of valve 55 in order to control the rate at which water flows into tank 32 from the main tank 33.

It will be apparent I have provided a car cooler which is simple in operation wherein the draft of air as well as the cooling thereof may be readily regulated, as well as a cooler which may be readily installed in all standard makes of cars

and without interfering with the vision of the driver.

If the atmosphere is laden with dust, the cooler 12 is particularly useful as the pad 28 serves as an air filter. By closing all the windows of the car and by admitting air to the interior of the car only through the cowl opening 7, and by filtering this air through the pad 28, it will be apparent that substantially dust-free air will be delivered to the interior of the car. If it is desired to remove the pad 28 to clean or repair it, this may be done by means of the bolt 82 mounted in the end 83 of casing 39, this bolt serving as a stud to support and center a boss 84 having depression not shown, to receive the end of bolt 82. The boss 84 is mounted on an end piece 85 suitably covering and fastened to the ends of the cylinders 80 and 81. By lifting the top part of the cooler 12 off of the tank portion, that is by removing the rim 56—57 from the groove 58, and by removing the bolt 82, the pad 28 may be removed from the casing 39. At its open end, the pad 28 rests against the intumed face 86 of the cylinder 69 and it is held in this position by the bolt 82.

There is enough frictional engagement between the rim 56—57 and the groove 58 to retain the casing 39 in position on the tank 33 although other fastening means may be employed if desired.

The inlet 25 is in the shape of an elbow, the horizontal portion 25' of which, at its lower side has an aperture 87. A corresponding aperture 88 is immediately above aperture 87, in the cylinder or circular casing 69. If the apertures 87 and 88 were projected on a horizontal plane they would be rectangular in shape and the same size as the top of the tank 32 which passes through aperture 88, where the outside of tank 32 is welded to the meeting edge of the casing 25' as shown at 89, the top of tank 32 continuing upwardly and being suitably secured to the edge of aperture 88 in the casing 69 as shown at 90.

The casing 53 may be provided with a drain pipe 91 having a suitable stop-cock 92.

After the car cooler 12 has remained idle for some time, the water in the main tank 33 and in the auxiliary tank 32 will reach the same level, namely a level higher than the level L—L shown in Fig. 3. Hence, there is a surplus of water in the auxiliary tank 32 when the car cooler 12 is put into operation, with the result that a surplus or excessive amount of water is initially thrown by the splasher arms 59 into the path of the fan 27, this water being thrown largely on the inside of casing 69. In this situation, the drip pan 74 is particularly useful as it returns this excessive drip from the casing 69 through the apertures 75 and 76 and through the apertures 49 and 50 in the tank closure 46, into the main tank 33, with the result that the water in the auxiliary tank 32 very quickly reaches its proper level L—L.

While I have shown a splasher wheel 60 operating with an auxiliary tank 32 to which a regulated amount of liquid is delivered from the main tank 33, it will be apparent that various other means may be employed for delivering a regulated amount of water into the path of the incoming air. It will also be apparent that various other modifications may be made in the invention without departing from the spirit of the following claims. Also, the flexible pipe or coupling 20, which may be of canvas, or the like, may be extensible in case it is desired to employ 75

the car cooler here shown, in connection with that type of automobile having a cowl opening with a depending portion which moves up and down as the cowl is opened or closed. In this case, the flexible coupling 20 would have a length sufficient to permit the cowl to open, and the flexible coupling 20 would simply fold on itself when the cowl is closed. It will be understood that when the car cooler 12 is in operation, one or more of the windows of the auto, preferably in the rear, are left slightly open in order to permit the air-conditioned air from the cooler 12, to circulate through the car and pass out through the rear window or windows.

I claim:

1. An air conditioner comprising an air filter, a fan in front of said filter, a casing around said fan, a splasher wheel below said fan, means for rotating said wheel, an auxiliary tank for said wheel, a main tank, a connection between said tanks, and a drip pan at the top of said auxiliary tank for returning drip from said casing to said main tank.

2. An air conditioner comprising a cylindrical air filter, a closure for one end thereof, a tank, a concave closure for the top of said tank, an inverted U shaped casing fitting on said tank, means for supporting said filter with the outer surface thereof in spaced relation from said casing and said tank closure, apertures in said tank closure below said filter, an air outlet in the side of said casing, an L shaped inlet at one end of said casing, a fan, a motor for said fan, means for supporting said motor and said fan in said inlet, means operated by said motor for delivering liquid from said tank to wet said filter, means for coupling said inlet to the cowl opening of an automobile, and means for supporting said tank and said casing in the driver's compartment of said automobile.

3. An air-conditioner comprising a casing having an inlet passage, an elongated hollow pad having one end thereof open and connected with the discharge end of said passage, means closing the other end of said pad, said casing having a wall spaced from the outside of said pad, said casing having an outlet communicating with the exterior of said pad, means for connecting said inlet passage to the cowl opening of an auto, said casing having a bottom wall at a certain level to catch the drip from said pad, a motor-driven fan at the open end of said pad, a tank below said fan, a fluid passage from said bottom wall to said tank, said tank having a bottom wall below the level of the bottom wall of said casing, a splasher wheel in said tank, and a belt connecting said wheel and said fan.

4. An air-conditioner comprising a casing having an inlet passage, an elongated hollow pad having one end thereof open and connected with the discharge end of said passage, means closing the other end of said pad, said casing having a wall spaced from the outside of said pad, said casing having an outlet communicating with the exterior of said pad, said casing having a bottom wall at a certain level to catch the drip from said pad, a motor-driven fan at the open end of said pad, a tank below said fan, a fluid passage from said bottom wall to said tank, said tank having a bottom wall below the level of the bottom wall of said casing, a splasher wheel in said tank in splashing relation to said fan, and means for driving said wheel.

RAYMOND JAMES STEELE.