Oct. 22, 1935. A. ROBER 2,018,535

HEATER

Filed March 10, 1934

Fig. 1

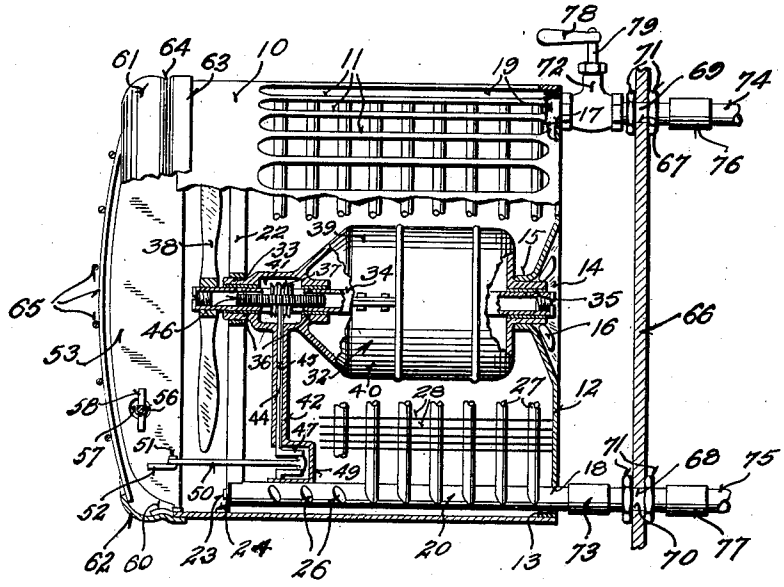


Fig. 2

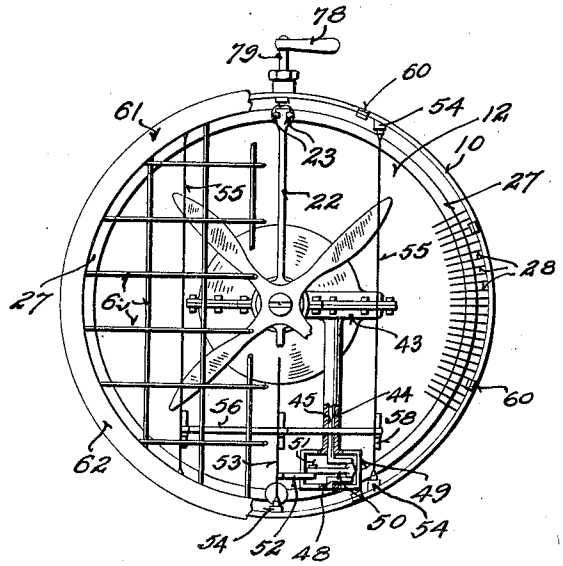


Fig. 4.

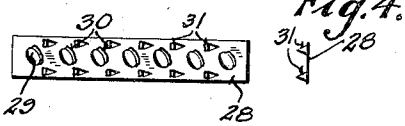


Fig. 3

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HEATER

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11 Claims. (Cl. 257—137)

This invention relates to heating devices and more particularly to an air circulating type for use primarily in heating the interior of motor vehicles.

The primary object of the present invention resides in the provision of a new and improved heater embodying both structural and functional advantages over those in common use today.

Another object lies in the provision of new and improved means for effecting the circulation of heated air.

A further object lies in the provision of new and improved means for exposing an increased area of radiating surface to the action of air to thereby effect a more rapid transfer of heat from the radiator to the flowing air.

A more specific object lies in the provision of new and improved means for effecting the oscillating movement of vanes for effecting an improved circulation of heated air.

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the drawing:—

Fig. 1 is a side elevational view of a heater constructed in accordance with the teachings of the present invention with parts broken away and others shown in section to more clearly illustrate its construction.

Fig. 2 is a front elevational view with parts broken away to show additional details of construction.

Fig. 3 is a plan view of a single fin which forms a part of the heater radiator.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3.

The heater chosen for illustrative purposes in the accompanying drawing comprises a shell or body portion 10 preferably cylindrical in shape and formed of sheet metal. A plurality of apertures 11 arranged in any suitable manner such as a series of longitudinally extending slots serve as passages through which air may flow in a manner to be hereinafter more specifically described. A rear cover plate 12 is adapted to be secured to the shell 10 in any approved manner such as by soldering or spot welding an inwardly directed flange 13 within the shell. A central portion 14 of the cover plate 12 is preferably dished inwardly and terminates in a forwardly extending tubular portion 15. A plurality of apertures 16 are formed in the dished portion 14 of the cover plate 12. Holes 17 and 18 preferably diametrically spaced above and below the center of the cover 12 are adapted to receive pipes 19 and 20 which are respectively inlet and exhaust pipes. Plugs serve as closures for the forward ends of pipes 19 and 20 respectively. A spacer element 22 connects the forward ends of the pipes 19 and 20 and serves to retain them in proper spaced relationship. The element 22 is secured to the plugs 21 and in any suitable manner such as by the use of turned ears 23, and it is preferably provided with ends or feet 24 adapted for anchorage to the shell 12 to retain the forward portion of the shell perfectly rigid. The pipes 19 and 20 are provided with a series of spaced holes 25, and 26 respectively. These holes are preferably elliptical to receive thin walled tubes 27 which are similarly shaped. Fins 28 also formed of thin sheet metal strips are provided with oval openings 29 bordered along one side with ears 30 formed of the stock struck from the fin in making the openings 29. A plurality of tangs 31 are also struck from the fins these tangs serve as spacer elements to retain the fins in proper spaced relationship on the several tubes 27. The ends of the tubes 27 are preferably soldered in the holes 25 and 26 to form water tight joints.

An electric motor 32 is supported within the shell 10. The forwardly extending tubular portion 15 formed in the center of the rear cover 12 is adapted to receive the rear bearing housing of the motor. This housing may be anchored in the portion 15 in any suitable manner such as by the use of set screws (not shown). The forward motor bearing housing may be similarly received and retained in an opening 33 formed in the spacer element 22. In this simple and effective manner the motor is securely and rigidly mounted. An armature shaft 34 of the motor 32 is journalled in a rear bearing 35 and a pair of spaced front bearings 36. A worm gear 37 is formed on the shaft 34 intermediate the bearings 35. A fan or propeller 38 is secured to the forward end of the armature shaft in any suitable manner so as to rotate therewith as a unit.

The front end of the motor housing is preferably formed in upper and lower parts 39 and 40 respectively. These parts serve to retain the front bearings 36 in proper alignment. A chamber 41 is formed by recesses in the parts 39 and 40. This chamber serves to retain a lubricant to assure proper operations of the gears. A tubular element 42 is adapted to be secured to the lower wall of a laterally extending portion 43 formed integral with the portion 40 of the motor housing. A shaft 44 passes through a longitudinal bore 45 in the element 42. A worm wheel 46 is keyed to the upper extremity of the shaft 44 and

the same is in mesh with the worm gear 37. An offset portion 47 is formed adjacent the lower extremity of the shaft 44. The extreme lower end 48 of the shaft 44 is journaled in the lower wall of a box-like enlargement 49 on the end of element 42. The offset portion 47 forms a crank arm and is adapted to receive one end of a connector link 50. The other end of the connector link 50 is pivotally mounted on an upstanding portion 51 of an arm 52 which is suitably secured to a central vane 53 which extends from top to bottom of the shell 10 and is journaled for oscillation in inwardly and rearwardly directed tangs 54. Two similarly mounted vanes 55 are spaced laterally on either side of the vane 53. These vanes 53 and 55 are preferably anchored together so as to oscillate in unison. I have chosen to pass a bar 56 through aligned apertures 57 and provide vertically disposed elements 58 which pass through enlarged portions on the bar 56 and are suitably anchored to the vanes 53 and 55.

The forward end portion of the shell 10 is provided with a plurality of spaced resilient fingers 60. These fingers serve to releasably retain a front cover 61. This cover comprises a ring element 62 the rear portion 63 of which overlies the shell 10. A slightly depressed annular groove 64 cooperates with the fingers 60 to retain the cover portion in position on the shell. A grill 65 preferably formed of a plurality of vertically and horizontally disposed wire elements serves to provide a protective screen for the open front of the shell.

The entire heater element is mounted as a unit on a dash board 66 which is provided with a pair of spaced holes 67 and 68, a pair of pipes 69 and 70 respectively pass through these holes and are secured in position on the dash board by means of jam nuts 71, which are threaded on the pipes. A manually operable valve 72 serves as a connector element between the forward end of pipe 69 and the rearward end of pipe 19. A union 73 forms a similar connection between the forward end of pipe 70 and the rearward end of pipe 20. Fluid conducting conduits 74 and 75 which may be either rigid or flexible are respectively connected to the rearward ends of pipes 69 and 70 by means of unions 76 and 77. The forward ends of these conduits may be connected into the cooling system for the radiator or to a jacketed portion of the exhaust manifold to form a complete fluid circulating system through the pipes 19 and 20 and tubes 27.

A suitable manually controlled electric switch (not shown) serves to control the operation of the electric motor and the valve 72 serves to control the flow of heating fluid through the pipes 20 and tubes 27. The operation of the heater may be described briefly in the following manner. A handle 78 on a valve stem 79 of the valve 72 may be turned to its open position to permit the flow of water from the cooling system through the heater. It will be noted that the flow of water through the inlet pipe 19 will divide itself and flow downwardly through the oppositely disposed oval tubes 27 and join together in the outlet pipe 20. When the temperature of the water has been raised to a sufficient degree, the electric motor may be started. The fan 38 which is motor driven, induces a flow of air from the body of the car through the apertures 11 and over the numerous tubes 27. The fins 28 form narrow passages through which the air is drawn. It will also be noted that the thin walled tubes 27 and fins 28 provide a heat radiating surface of an extremely large area and the proximity of the fins requires the intimate contact of the air with the heated surfaces of the tubes and fins to thereby effect an extremely rapid and efficient heat exchange whereby the temperature of the air is raised materially. After the air has been drawn through the radiator of the heater it is dispelled through the grill 65. Rotation of the electric motor results in rotation of the worm gear 37 which in turn effects a relatively slow rotation of the worm wheel 46. The shaft 44 is thereby rotated and the resulting action on the crank arm 47 effects the oscillation and reciprocation of the connector link 50. The forward and rearward movement of the connector link 50 effects oscillation of the central vane 53. The other vanes 55 are simultaneously oscillated through the reciprocating movement of the bar 56. The oscillating of these vanes results in a new and improved circulation of heated air throughout the interior of the vehicle.

The combination of elements, above described, cooperate to form a heating device containing not only numerous structural advantages, but functional advantages which are far in advance of present day methods. The oval formation of the thin walled fluid conducting tube 27 are disposed in such a manner, that the air is in contact with the greatest possible area of the tubes as it is drawn between the fins by the action of the fan 38.

While the heater is designed primarily for the purpose of effecting a rapid heat exchange from the radiator to the vehicle, means is also provided for effecting cooling of the electric motor. The flow of air induced by the fan 38 draws cool air through the openings 16 in the dished portion 14 of the rear cover plate 12. This flow of air passes directly over the entire motor casing and results in maintaining the temperature of the motor within its range of efficient operation.

While the invention has been described for use as a heater, it should be understood that by cutting off the circulation of fluid through the radiator that the device will function equally well to effect a circulation of air for the purpose of cooling the vehicle during the hot summer months.

While the invention has been described in considerable detail in the foregoing specification it is understood that various changes may be made in its embodiment without departing from or sacrificing any of the advantages hereinafter claimed.

I claim:—

1. A device for automobiles comprising a shell, a radiator within said shell, said radiator comprising an inlet pipe, an outlet pipe and a plurality of thin walled tubes connecting said pipes and lying adjacent the inner wall of said shell, a plurality of spaced fins associated with said tubes, means for rigidly retaining in said shell, means for mounting an electric motor within the confines of said radiator, a propeller actuated by the electric motor, a plurality of vanes disposed across an open end of said shell, and means for effecting an oscillating movement of said vanes.

2. A device for automobiles comprising a shell, a radiator within said shell, means for rigidly retaining said radiator within said shell, an electric motor within said shell, motor actuated means for inducing a flow of air through said shell, an oscillating means of circulating the flow of air from said heater through the interior of the automobile and means within said shell actuated by said motor for effecting movement of said oscillating means.

3. A heater for automobiles comprising a shell, a plurality of apertures in said shell, a radiator within said shell lying adjacent the inner wall of said shell, a closure for one end of said shell, means for anchoring said radiator in said shell, an electric motor rigidly mounted within said shell, a fan adjacent the open end of said shell, movable vanes adjacent said fan, and means within said shell actuated by said motor for oscillating said vanes.

4. A heater comprising a shell, a plurality of apertures in said shell, a closure for one end of said shell, a radiator within said shell, said radiator comprises a plurality of tubes lying adjacent the inner wall of said shell, means for anchoring said radiator in said shell, an electric motor rigidly mounted in said shell, a fan actuated by said motor for inducing a flow of air through said apertures in said casing and in intimate contact with said radiator for effecting a transfer of heat from said radiator to said flowing air, a plurality of movable vanes disposed across the open end of said shell, and means within said shell actuated by said motor for effecting oscillation of said vanes.

5. A heater comprising a casing, a plurality of apertures in said casing, a closure for one end of said casing, a radiator within said casing, said radiator comprising a plurality of thin wall tubes lying adjacent the inner wall of said casing, means for anchoring said radiator within said casing, an electric motor rigidly mounted within said casing, a fan actuated by said motor for inducing a flow of air through said apertures in said casing and in intimate contact with said radiator for effecting a transfer of heat from said radiator to said flowing air, a plurality of movable vanes disposed across the open end of said casing, motor actuated means within said casing for effecting movement of said vanes, and manually operable means for controlling the flow of fluid through said radiator.

6. A heater for automobiles comprising a casing, a plurality of apertures in the wall of said casing, a closure for one end of said casing, a radiator comprising a plurality of thin wall tubes lying adjacent the inner wall of said casing, means for rigidly retaining said radiator within said casing, an electric motor rigidly mounted within said radiator, a propeller actuated by said motor for inducing a flow of air through the apertures in said casing and in intimate contact with said radiator for effecting a transfer of heat from said radiator to the flowing air, a plurality of movable vanes disposed across the open end of said shell, and motor actuated means for effecting movement of said vanes whereby the heated air is circulated from the heater through the interior of the automobile.

7. A heater for automobiles comprising a casing, a plurality of apertures in the wall of said casing, a closure for one end of said casing, a plurality of movable vanes disposed across the open end of said casing, a radiator element comprising a plurality of thin walled tubes lying adjacent the inner wall of said casing, an electric motor within the confines of said radiator, a propeller actuated by said motor, for inducing a flow of air through the apertures in said casing and in intimate contact with said radiator for effecting a transfer of heat from said radiator to the flowing air, and motor actuated means for effecting movement of said vanes whereby the heated air is circulated from the heater through the interior of the automobile.

8. A heater for automobiles comprising a casing, a plurality of apertures in the wall of said casing, a closure for one end of said casing, a radiator comprising a plurality of thin walled tubes lying adjacent the inner wall of said casing, an electric motor within said casing, a propeller actuated by said motor for inducing a flow of air through the apertures in said casing and in intimate contact with said radiator whereby a rapid heat exchange is effected, a plurality of movable vanes disposed across the open end of said casing, motor actuated means for effecting oscillation of said vanes, said propeller serving as an impeller for effecting circulation of air through said vehicle.

9. A device for automobiles comprising a casing, a plurality of apertures in the wall of said casing, a closure for one end of said casing, a radiator lying adjacent the inner wall of said casing, means for rigidly mounting said radiator within said casing, an electric motor within said casing, a propeller actuated by said motor for inducing a flow of air over the surface of said radiator through said apertures in said casing, a plurality of movable vanes disposed across the open end of said casing, motor actuated means for effecting oscillation of said vanes, and means for rigidly mounting said heater to said motor vehicle.

10. A heater for automobiles comprising a casing, a plurality of apertures in the wall of said casing, a radiator within said casing lying adjacent the inner wall thereof, an electric motor housed within said casing, a plurality of movable vanes disposed across the open end of said casing, motor actuated means for effecting oscillation of said vanes, and a propeller actuated by said motor for inducing a flow of air through the apertures in said casing and in intimate contact with said radiator whereby a rapid transfer of heat is effected, said propeller serving as an impeller to circulate the heated air throughout the interior of said automobile.

11. A device for automobiles comprising a casing a plurality of apertures in the wall of said casing, a closure for one end of said casing, a radiator element disposed within said casing and lying adjacent the inner wall thereof, an electric motor within said casing, a propeller actuated by said motor for inducing a flow of air through said apertures in the wall of said casing to effect a transfer of heat to the air and circulating the same within the automobile, means for regulating the flow of fluid through said radiator, and means for anchoring said heater to the dash board of the vehicle.

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