Heater for Automobiles

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My invention relates to exhaust heaters and particularly to the type of heater in which circulation of air to be heated is procured by the engine fan.

An object of the invention resides in providing a heater of such character which is extremely efficient and which will deliver an appreciable quantity of heated air.

Another object of the invention resides in providing a heater in which the parts may be readily assembled.

A still further object of the invention resides in providing a heater comprising a tubular case and having a tubular heating element concentrically disposed within said case and forming central and annular air passageways.

An object of the invention resides in providing a radiating fin disposed between said heating element and case, said fin serving to hold the heating element spaced from said case.

Another object of the invention resides in constructing said radiating fin substantially in form with portions of said fin engaging both the case and heating element and yieldable to exert a force against both the case and heating element to hold the heating element rigidly attached to the case.

Other objects of the invention reside in the novel combination and arrangement of parts and in the details of construction hereinafter illustrated and/or described.

In the drawings:

Fig. 1 is a side elevational view of a portion of a motor vehicle illustrating an embodiment of my invention applied to the engine thereof.

Fig. 2 is a side elevational sectional view of the manifold and heater shown in Fig. 1 and drawn to a larger scale.

Fig. 3 is an end elevational view of a portion of the structure shown in Fig. 2, drawn to a still larger scale.

For the purpose of illustrating the application of my invention I have shown in the drawing, a portion of a motor vehicle which is indicated in its entirety at A. The vehicle illustrated comprises a frame 10, having the usual body 11 which is constructed with foot boards 12, a dash 13, a hood 14 and the other usual parts. Within the hood 14 is mounted an internal combustion engine 15 which is merely illustrative, since the heater may be mounted on any suitable type of engine. This engine is provided with an exhaust manifold 16 conducting away the exhaust gases from the engine proper, which manifold is connected to an exhaust pipe 17 through a flanged coupling 18 of ordinary construction. The motor vehicle shown includes a radiator 19, a fan 20 and such other usual parts as are ordinarily found in motor vehicles. Such parts, however, not forming any particular feature of the invention have not been illustrated.

My heater proper comprises a tubular case 21 within which is positioned a heating element 22. This heating element is also tubular in form and is constructed with a tubular conduit 23 within the interior thereof and a tubular sleeve 24 encircling said conduit and spaced therefrom to provide a passageway 25 for circulating the exhaust gases from the engine 15 through the heater. The conduit 23 is spread outwardly at its ends as designated at 27 and 28 and is welded to the sleeve 24 at the localities specified at 29 and 30 to form a fluid tight connection between said conduit and sleeve.

For conducting the heating fluid into the passageway 25, a nipple 31 is employed which is welded to the sleeve 24 at one end thereof and which is in communication with the passageway 25. A similar nipple 32 is employed which is welded to the sleeve 24 at its other end and which is also in communication with the passageway 25. The nipples 31 and 32 extend through suitable openings 33 and 34 in the tubular case 21 so that the heating element proper, 22, which is smaller in diameter than the case 21 and may be disposed concentrically within said case to form a central air passageway 35 and an annular air passageway 36 within said case and with the two nipples 31 and 32 extending outwardly through the case where the same may be connected to the engine in a manner to receive the exhaust gases therefrom.

The heating element 22 is held in place within the case 21 through a stellare radiant fin 37. This fin is preferably formed of sheet metal and is bent to provide a number of undulations 38 which provide outer and inner ridges 39 and 40 adapted to be engaged with the case 21 and the sleeve 24 respectively to hold the heating element 22 properly positioned within the heater case 21.

The fin 37 is constructed from a sheet of material of such width that when the fin is applied within the heater, the longitudinal edges of said fin become spaced from one another leaving clearance therebetween slightly greater than the external diameter of the nipple 31.

In the assembly of the heater, the heating element 22 which is constructed as a unit, with the nipples 31 and 32 secured thereto, is inserted into the case 21 and the nipples 31 and 32 caused to project through the openings 33 and 34 in said.
case. In the construction of the heating element, the distance between the outer end of either of these nipples and the opposite side of the heating element is made substantially equal to the internal diameter of the case 21 or hear enough to allow that the said case may be sufficiently sprung to permit of the insertion of the nipples into said openings without difficulty. After the heating element has been inserted into the case, the fin 37 is next bent into circular form and inserted into the space 36 between the case 21 and the heating element 22. In the application of the fin to the heater, the ends 41 and 42 are caused to straddle the nipple 31. With the parts so arranged, the fin is forced endwise into the heater and longitudinally along the space 36 until the same reaches the nipple 32. During insertion of the fin into the case, the nipple 31 passes through the slot 43 in the fin between the ends thereof, which maintains the ends 41 and 42 the proper distance apart and causes the ridges 39 and 40 to firmly engage the surface with which they contact to hold the parts in properly spaced position.

For the purpose of conducting the exhaust gases in the heater, a manifold connection is employed which is indicated in its entirety at 44 and which may be of the type illustrated in my co-pending application filed March 7, 1932, Serial No. 597,282. This connection comprises a tubular fitting 45 which is constructed with a conical neck 46 adapted to be wedged into a conical opening 47 in the manifold 16. A yoke 48 encircles the upper end of the neck 46 and is seated against a shoulder 49 formed thereon. A U-bolt 50 passes through this yoke and about the manifold and serves to clamp the fitting into the opening 47 and form a fluid tight connection between said fitting and manifold. Upon the inner end of the fitting 44 and within the manifold 16 is formed a spoon 51 which serves to direct a portion of the exhaust gases entering the manifold into the bore 52 of said fitting. The fitting may be directly screwed upon the nipple 31 as indicated and serves to bring the exhaust manifold into communication with the passageway 25 within the heater proper. For conducting the exhaust gases from the heater, a flexible tube 52 is employed which is provided with a suitable coupling 53 adapted to be screwed on an elbow 54. The elbow 54 is screwed on the nipple 32 and which brings the passageway 25 in communication with the tube 52. This tube may be led to any desirable locality of the automobile to which the exhaust gases are to be discharged or the same may be connected to the exhaust pipe or the muffler of the vehicle as found desirable.

For the purpose of conducting the air to be heated through the heater, the heater is so positioned that a portion of the air delivered by the fan 20 may be directed inwardly into the heater through the open end 56 of the case 21. It was found that by directly mounting the heater on the manifold as with the manifold connection 44, illustrated in the drawing, that the opening 55 of the heater would be in a position to receive an appreciable portion of the air discharged by the fan 20. To assist in directing the air into the 21, a bell 56 is employed which is mounted upon the end of said case. At the other end of the case 21 is provided a reducing coupling 57 which has attached to it, a pipe 58, extending rearwardly through the dash 13 and into the interior of the body of the vehicle. This pipe is secured to the dash through suitable bolts 59 and may be provided with a valve 60 whereby the amount of air entering the vehicle proper may be controlled at will. It will be readily comprehended that air entering the bell 56 passes through both the central air passage 55 and the annular air passageway 36 receiving the heat given off by the heating element 22. Upon leaving the heater, the air passes through the coupling 57, pipe 58 and into the interior of the automobile through the valve 60.

For the purpose of increasing the radiating surface of the heating element and for retarding the flow of gases along such radiating surface, the conduit 23 has been formed with a number of indentations 61, which are arranged progressively along said conduit and which extend both into the air passageway 35 and into the exhaust gas passageway 25. These indentations may be of any suitable shape and are preferably arranged in rows as shown. The air passing through the passageway 35 is somewhat retarded in movement and caused to be heated to a higher temperature than would be the case were said indentations absent. At the same time, the flow of the exhaust gases through the passageway 25 is somewhat retarded and causing more effective transmission of the heat through the walls of the conduit 23 and to the air passing along the passageway 35.

My invention is advantageous in that it provides an extremely simple and efficient heater. The heater may be easily and readily assembled. The stelluradiating fin, when positioned between the heating element and the heater case, serves to hold the parts in proper spaced relation and is itself frictionally held in place. The radiating fin, being constructed of sheet metal has a certain amount of resiliency which holds the parts yieldingly in proper position. Due to the construction of the device, the parts are prevented from becoming loose and raftered. Both the radiating fin and the indentations in the heating element proper add to the radiating surface of the heating element, thereby greatly increasing the efficiency of the heater.

Changes in the specific form of my invention as herein disclosed may be made within the scope of what is claimed, without departing from the spirit of my invention.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. An air heater comprising a tubular case, a tubular heating element disposed concentrically within said case and spaced therefrom to form an annular heated air passageway, said heating element having a nipple extending through said case and communicating with the interior thereof and a radiating fin formed of a sheet of material constructed with undulations and adapted to be bent in the form of a circle to lie in said space and hold the heating element spaced from the radiator case, the ends of said fin straddling said nipple.

2. An air heater comprising a tubular case, a tubular heating element disposed concentrically within said case and spaced therefrom to form an annular heated air passageway, said heating element having a nipple extending through said case and communicating with the interior thereof and a radiating fin insertable longitudinally into said annular passageway and having portions adapted to engage both said case and said heating element for holding the same properly spaced within said passageway, the longitudinal edges of said fin being spaced apart to receive said nipple.
therebetween upon the insertion of the fin into said passageway.
3. An air heater comprising a tubular case, a tubular heating element disposed concentrically within said case and spaced therefrom to form an annular heated air passageway, said heating element having a nipple at one end, extending through said case and another nipple at the other end extending through said case, a radiating fin adapted to be inserted longitudinally into said passageway and having portions adapted to engage both the case and the heating element for holding the heating element in spaced relation within the case, the longitudinal edges of said fin being spaced apart to receive one of said nipples therebetween upon the insertion of the fin into the air passageway, said fin extending up to said second nipple when fully inserted into said passageway.
4. An air heater comprising a tubular case, a tubular heating element disposed within the case and spaced therefrom, said element providing within said case a central passageway and an annular passageway, both for the passage of air therethrough to be heated, said heating element having double walls spaced apart and providing an annular passageway therebetween for a heating fluid, a corrugated tubular fin structure snugly interposed between said heating element and case and cooperating with both thereof to hold the heating element in place within the case, said structure serving further to conduct heat from the heating element and, in turn, heat the air passing through said annular air passageway.
5. An air heater comprising a tubular case, a tubular heating element disposed within the case and spaced therefrom, said element providing within said case a central passageway and an annular passageway, both for the passage of air therethrough to be heated, said heating element having double walls spaced apart and providing an annular passageway therebetween for a heating fluid, a corrugated tubular fin structure snugly interposed between said heating element and case and cooperating with both thereof to hold the heating element in place within the case, said structure serving further to conduct heat from the heating element and, in turn, heat the air passing through said annular air passageway.

ERWIN L. SUTTER.