Aug. 27, 1929. B. D. McINTYRE 1,725,878

AUTO HEATER

Filed April 19, 1926

Fig. 1.

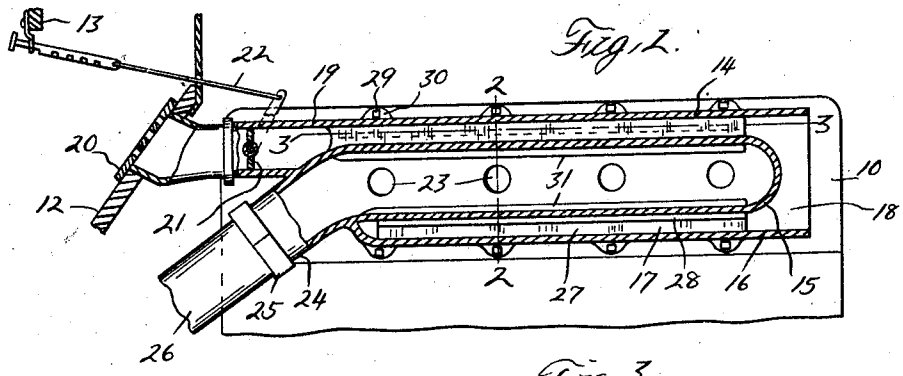


Fig. 3.

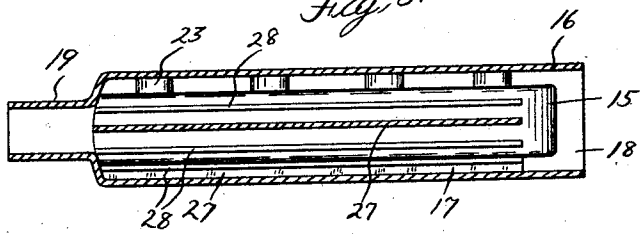


Fig. 4

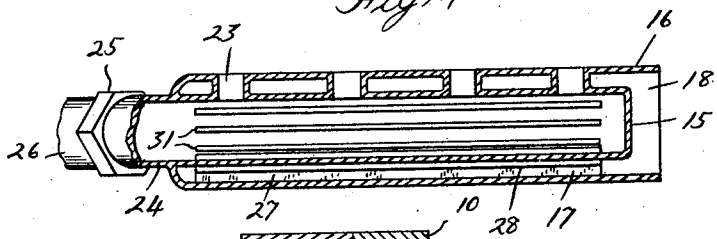
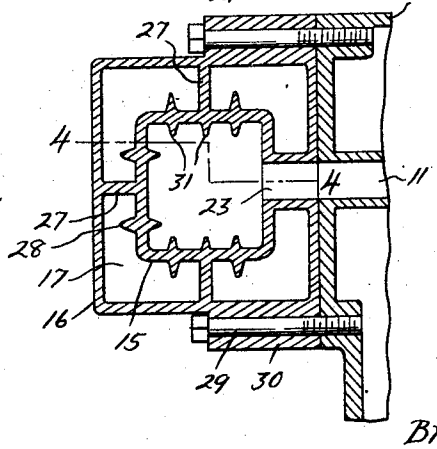


Fig. 2.



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UNITED STATES PATENT OFFICE.

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AUTO HEATER.

Application filed April 19, 1926. Serial No. 103,046.

This invention relates to automobile heaters and more particularly to improvements in that character of heaters in which the exhaust manifold and air casing or housing are of a unitary or integral construction.

It has heretofore been proposed, by myself, and by others, to manufacture an air heater for automobiles in which, in a cast metal construction, a casing is associated in spaced relation with the exhaust manifold. However, in actual practice, considerable difficulty has been experienced because of the unequal expansion and contraction of the manifold and casing, with the result that such devices have, in the main, proven to be commercially unsatisfactory because of the structure becoming cracked or broken due to the strains and stresses imparted thereto because of the aforesaid differences in expansion and contraction of the parts.

It is therefore one of the principal objects of my present invention to provide a heater of an integral or unitary cast metal construction wherein means are provided for effecting an equal or substantially uniform distribution of the heat from the hotter portion of the casting to the cooler portion thereof and further for strengthening or reinforcing that portion of the casting subjected to the more intense heat so as to prevent this portion of the casting from breaking, cracking or otherwise deteriorating.

Another object of the invention is to produce a construction in which the above mentioned advantages are achieved in a simple and consequently economical but satisfactory manner and further to provide a construction which may be conveniently molded or cast.

In practicing the present invention the outer casing is cast in spaced relation with the inner element constituting the exhaust manifold and a plurality of longitudinally disposed spaced webs are provided which support the exhaust manifold in spaced relation to the housing. These webs as designed, extend uninterrupted the entire longitudinal length of the inner element or exhaust manifold and constitute not only radiating fins or elements for the manifold with which the air may contact for heating the same, but conductors for the heat for conducting a portion of the heat of the exhaust manifold to the outer casing. In addition to these functions these webs provide means for strengthening the manifold to prevent distortion or cracking thereof. In addition I propose to employ a plurality of strengthening ribs projecting either radially outwardly or inwardly, or both, from the surface of the wall of the exhaust manifold which also serve to strengthen and reinforce the exhaust manifold which is obviously subjected to the more intense heat to prevent any cracking of the exhaust manifold from the excessive expansion and contraction to which the same is subjected. The ribs also act to increase the heating surfaces with which the air contacts to effect a more efficient heating of the same. Furthermore the inner ribs act as heat collecting fins for gathering heat from the exhaust gases.

The above and many other objects, advantages and novel details of construction of the invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawing wherein

Figure 1 is a fragmentary sectional side elevation of a motor vehicle equipped with a heater constructed in accordance with this invention.

Figure 2 is an enlarged transverse sectional view taken substantially on the plane indicated by line 2—2 of Figure 1.

Figure 3 is a longitudinal sectional view taken substantially on the plane indicated by line 3—3 of Figure 1, and

Figure 4 is a longitudinal sectional view taken substantially on the plane indicated by the line 4—4 of Figure 2.

Referring now particularly to the drawings wherein like reference characters indicate like parts, it will be noted that there is fragmentarily illustrated an internal combustion engine 10 provided with a plurality of exhaust ports 11 and I have also illustrated a portion of the floor 12 and dash board 13 of the body of the motor vehicle.

The invention contemplates specifically the use of a unitary or integral structure 14 formed preferably, although not necessarily, of cast metal, and including an inner element 15 constituting the exhaust manifold and an outer housing or casing 16 arranged in spaced relation thereto and constituting therewith an air chamber or passageway 17.

The casing 16 is provided with an open forward end 18 and the rear end terminates in a sleeved portion 19 by which connection may be made in any suitable manner with a register 20 adapted to be positioned in the floor 12 of the motor vehicle. A valve 21 controlled by means indicated generally by the

reference character 22 is provided for regulating the passage of the heated air from the chamber 17 through the register 20 to the interior of the vehicle. The exhaust ports 11 of the engine 10 communicate with registering ports or passages 23 in the casting 14 whereby the products of combustion from the engine pass directly into the manifold 15. The sleeved rear end 24 of the manifold 15 is connected as for instance, by means of a collar 25 to the exhaust pipe 26.

In producing the casting 14 the exhaust manifold 15 and the casing 16 are connected by a plurality of longitudinally extending webs 27 which extend substantially the entire longitudinal length of the manifold 15 and are cast integrally therewith as well as with the wall of the casing 16. While any desired number of these supporting or spacing webs 27 may be employed, I have found that the desired degree of efficiency may be attained by using three of such webs arranged adjacent the top and bottom and one side of the manifold 16 as clearly illustrated in Figure 2 of the drawing. Also cast integral with the wall of the manifold 15 and projecting outwardly therefrom are a plurality of strengthening ribs 28. Obviously any number of these strengthening ribs may be employed but I have also found that the number and arrangement of these ribs, illustrated in Figure 2 of the drawing, proves to be entirely satisfactory. From this figure it will be noted that two of such strengthening ribs are associated with each of the webs 27 and are arranged on opposite sides of these webs, it being understood that these ribs extend longitudinally of the manifold 15 and terminate adjacent, if not coincident, with the ends of the webs 27. In some types of installations it is desirable, if not necessary, to provide a plurality of inwardly directed ribs or fins 31, which in addition to strengthening the manifold, function to gather heat from the gases and conduct the same to the manifold.

Any preferred means for attaching the casting 14 to the engine block, with the ports 23 thereof in registration with the exhaust ports 11, may be employed but in the illustrative embodiment shown herein, bolts 29 are shown passing through enlargements or ears 30 on the casting and threadedly engaging the engine block.

In operation, air enters the open end 18 of the casing 16 and passes longitudinally thereof around the exhaust manifold 15 and around and between the ribs 28 and webs 27 and thence out through the sleeved portion 19 and the register 20 to the interior of the vehicle. It is assumed, of course, that under these conditions the valve 21 will be open. The air during its passage through the air passage 17, comes into intimate contact not only with the wall of the manifold 15, but with the surfaces of the webs 27 as well as with the ribs 28 so that it becomes quickly and thoroughly heated. Obviously the exhaust gases discharged through the exhaust ports 11 pass, through the ports 23, to the interior of the manifold 15 and thence longitudinally thereof and out through the sleeved portion 24 to the exhaust pipe 26.

As mentioned hereinbefore, the webs 27 not only function to support the manifold 15 and casing 16 in a fixed spaced relation but also operate to conduct heat from the manifold 15 to the wall of the casing 16. This has the advantage, not only of causing a more uniform expansion and contraction of these parts but also maintains the wall of the casing 16 in a hotter condition so as to effect a more efficient and through heating of the air contacting therewith. Obviously the webs 27 by extending uninterrupted practically the entire length of both the manifold and casing, reinforces and strengthens these parts. By forming these webs the entire longitudinal length of the manifold, liability of the same becoming cracked or broken because of the unequal expansion and contraction of the parts is minimized if not eliminated.

The reinforcing ribs 28 in addition to strengthening the manifold 15, and causing a more equal distribution of the expansion and contraction strains and stresses imparted thereto, function as radiating ribs thus providing a greater heating surface with which the air passing through the passageway 17 may contact. Furthermore the ribs or fins 31 function to reinforce the manifold and to gather and conduct heat thereto.

Obvious changes, modification and rearrangement of parts will immediately suggest themselves to those skilled in this particular art and in consequence thereof reservation is made to make such changes as may come within the purview of the accompanying claim.

What I claim as my invention is:

In a heater for motor vehicles, an integral structure comprising an exhaust manifold, a spaced casing substantially enclosing said manifold and forming therewith a passageway, a plurality of longitudinally extending webs connecting the walls of said manifold and casing, and ribs on said manifold projecting inwardly and outwardly therefrom on opposite sides of said webs.

In testimony whereof I affix my signature.

BROUWER D. McINTYRE.