July 31, 1934. J. H. LONSKEY 1,968,214

MANIFOLD AIR HEATER FOR AUTOMOBILES

Filed Oct. 10, 1930 2 Sheets-Sheet 1

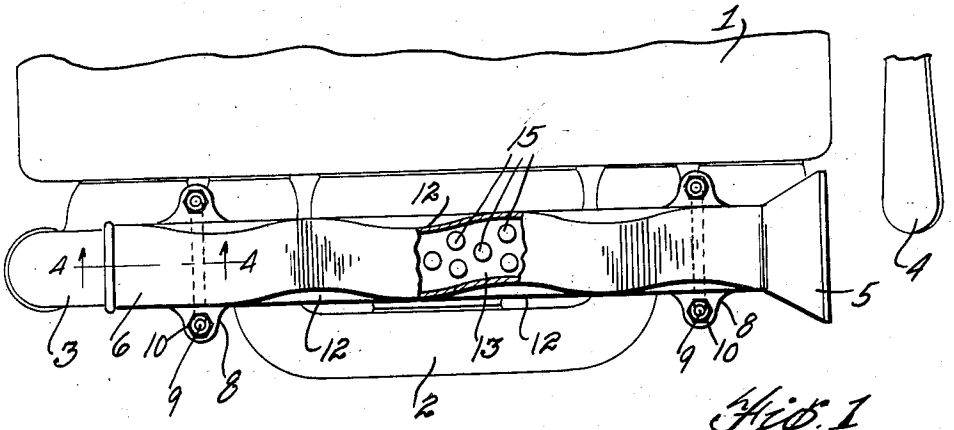


Fig. 1

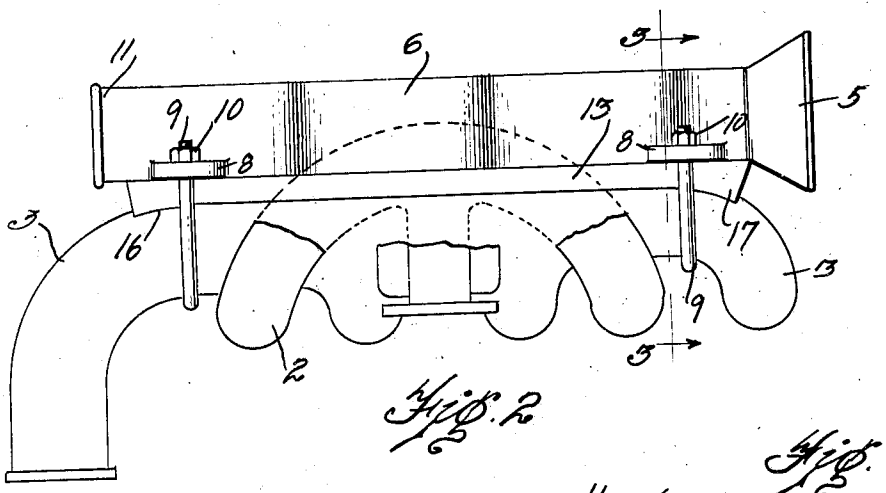


Fig. 2

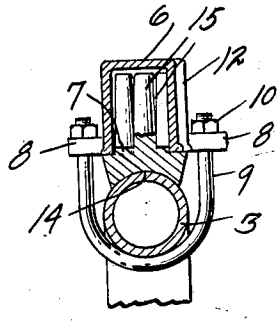


Fig. 3

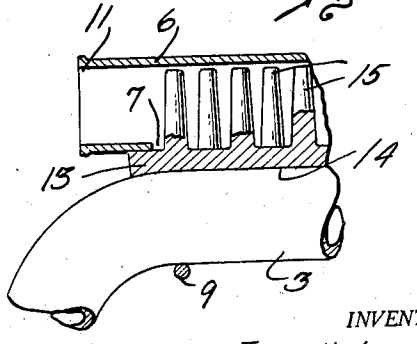


Fig. 4

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MANIFOLD AIR HEATER FOR AUTOMOBILES

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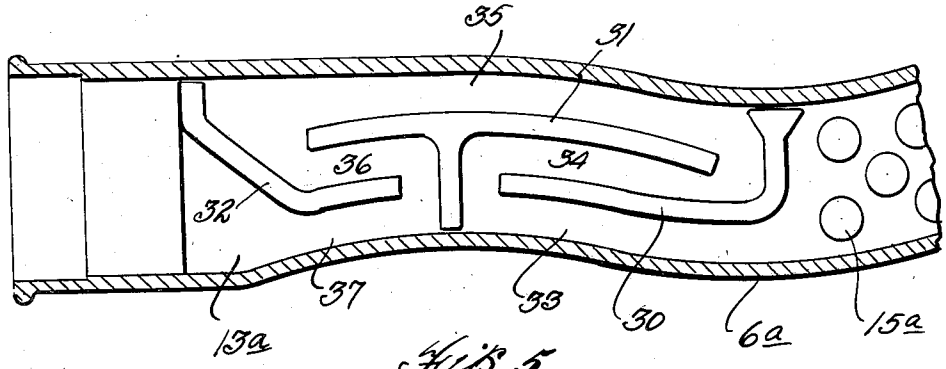


Fig. 5

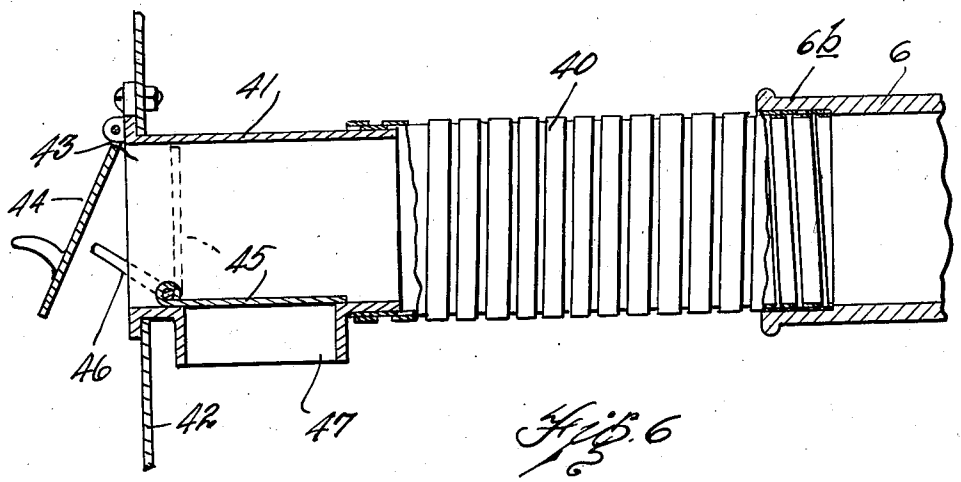


Fig. 6

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MANIFOLD AIR HEATER FOR AUTOMOBILES

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Application October 10, 1930, Serial No. 487,721

12 Claims. (Cl. 257—241)

This invention relates to stoves for the exhaust manifolds of internal combustion engines to be utilized in transferring heated air to the interior of the body of an automobile.

Stoves for this purpose are commonly in use and consist principally of a casing positioned about some portion of the exhaust manifold through which heated air is forced to the interior of the automobile body. Such commonly used structure is more or less inefficient due to the fact that a considerable percentage of air passing through the stove does not contact the manifold. Such arrangement is further found inefficient for the reason that the stove is ordinarily so constructed and arranged that the air is drawn from about the engine causing offensive odors to be discharged into the automobile body. Also in the commonly used structure some of the exhaust gases pass into the stove and the conduit connecting the stove with the automobile body due to imperfections in the casting of the manifold leaving cracks or "blow holes" through which more or less gas may escape or by reason of faulty gaskets.

It is also an object of the invention to provide a block of metal of high heat absorbing capacity such for instance as aluminum or an aluminum alloy and to cement the block to the manifold by an aluminum or metal cement so that in so far as the purpose of heat transferrence is concerned the manifold and aluminum block are as one piece.

A further feature of the invention is to provide an air passageway consisting of a casing mounted on a block of metal which in turn is mounted on the manifold, the air passage being sealed to the block to prevent inflow of air from about the engine and the inlet end of the passageway positioned in close association with the fan used in drawing air through the radiator whereby to the greatest possible extent the air forced into the stove or heater is that which passes from atmosphere through the radiator thereby avoiding discharging odors of oil and gas arising from the engine with which the heater is associated.

A further object and feature of the invention is to provide a stove for exhaust manifolds in which a block of metal of high heat conductivity is provided on its upper surface with a number of heat radiating portions and a casing covering the same providing an air passage, the heat radiating portions being formed to split the air stream into a number of currents deflected in various directions to cause a thorough mixture of the heated and unheated portions of the air and to cause the same to contact with the said heat radiating portions, and further to provide at least a part of the heat radiating portions to form a tortuous passageway in which the direction of travel of air may even be reversed and thus delayed in its discharge to the outlet and thereby further insuring the absorption of heat.

By the provision of a block of metal of a high heat conductivity in a complete surface contact with the exhaust manifold of an engine the heat is rapidly drawn from the manifold or in other words, the manifold is maintained cooler than would be the case if such block and air passageway were not utilized. Thus, by my arrangement, a secondary desirable result is secured in lowering the temperature of the exhaust manifold and parts in close association therewith resulting in less liability of burning of exhaust valves and thus the heater device (although made detachable as hereinafter shown) is desirable to be retained in place both summer and winter, provision being made for summer use by discharge of the heated air to atmosphere rather than to the interior of the vehicle body.

Further, due to the high heat conductivity, a smaller portion of the exhaust manifold needs to be utilized by the stove. Thus, the space to be occupied by this heater is less than is usual permitting its installation in many places without interfering with the installation of various other instrumentalities.

These objects and the several novel features of the invention are hereinafter more fully described and claimed, and the preferred form of construction of an exhaust manifold heater embodying my invention is shown in the accompanying drawings in which—

Fig. 1 is a plan view of my improved device attached to the exhaust manifold of an engine.

Fig. 2 is a side elevation thereof.

Fig. 3 is a section taken on line 3—3 of Fig. 2.

Fig. 4 is a section taken on line 4—4 of Fig. 1.

Fig. 5 is a sectional view of an alternative form of construction of a heater embodying my invention.

Fig. 6 is a detail in section of a valved outlet for heated air.

Referring now to the drawings, it will be seen that the engine block 1 has connected thereto the usual intake manifold 2 and exhaust manifold 3. The usual fan 4 is positioned in front of the engine block 1 and when the same is rotated a volume of air will be directed into the funnel shaped end 5 of the casing 6 which is positioned in close association with the fan.

The casing 6 is hollow throughout its length and the lower wall of the same is cut out as indicated at 7 for a purpose to be hereinafter described. Suitable lugs 8 are formed integral with the casing 6 near the lower edge thereof and the U bolts 9 extend under the exhaust manifold 3 and through the lugs 8. By tightening the nuts 10 the casing 6 will be clamped securely to the exhaust manifold. A suitable conduit 40 may be inserted in the end 11 of the casing 6 for directing the heated air that has passed through the casing 6 to any desired point either to the interior of the car or to atmosphere as will be understood from Fig. 6. It will be seen by reference to Fig. 1 that the sides of the casing 6 are formed with the undulations 12 providing a sinuous passageway for air.

A metal block 13 preferably of relatively high heat conductivity, as aluminum, is positioned between the manifold 3 and the casing 6, the lower face of the same being concave as indicated at 14 to closely fit the rounded exhaust manifold 3. An appropriate metal cement is used between the block 13 and the manifold to insure a practically perfect metal to metal contact and thus secure efficient heat transference. The upper face of the block 13 is provided with the heat radiating portions, preferably the pins 15 extending into the casing 6 through the cut out portion 7.

It will be seen by reference to Figs. 1 and 4, that the pins are preferably integral with the block and are arranged in staggered relationship to thereby split the air streams into several currents continuously changed in direction of flow and deflected one to another as it passes through the member 6. It will be seen by reference to Fig. 2, that the ends 16 and 17 of the bar 13 are downwardly curved to fit the downwardly curved portions of the exhaust manifold 3 whereby, when the bar 13 is clamped between the member 6 and the exhaust manifold 3, it will be impossible for the said bar to be displaced longitudinally of the exhaust manifold. It will be further understood that the lower edges of the casing 6 about the opening 7 may be cemented to the block 13 to seal the interstices between the casing and the block 13 and, inasmuch as the opening 5 is just in rear of the fan 4, no engine odors can enter the casing 6.

As previously stated, the stove or heater may have projections of various forms extending into the air passageway. An alternative arrangement is shown in Fig. 5 in which the casing 6^a has the pins 15^a in staggered relation as in the form shown in Fig. 1 and at the discharge end of the casing there are provided vertical ribs extending from the face of the block 13^a to the top of the casing as indicated at 30, 31 and 32. These ribs are formed to provide a passageway 33, a reverse passageway 34, a third passageway 35 and another reverse passageway 36 to a passageway 37 opening to the discharge end of the casing.

The ribs have parts thereof, as shown, fitting the side wall of the casing and also engage the top of the casing sufficiently closely to cause the greater volume of air to pass through the enumerated passageways. By this arrangement, the discharge of the air from the heater is delayed permitting opportunity for the absorption of heat.

Preferably, the discharge end of the casing 6, whether made in the form shown in Fig. 1 or Fig. 5, is connected by means of flexible tubing 40 with a tubular casting 41 having an end portion extending through the dash 42 and opening to the compartment of the vehicle. The tube 40 has its inlet end positioned within a recessed part 6^b and at the discharge end of the casing 6 and at its opposite end slips over the exterior of the end of the hollow casting 41. All the parts providing the air passageway at the outlet end of the casing telescope in the direction of travel of the air preventing any possible odors passing into the passageway at these points.

The specific form of construction of the casting 41 providing a valved outlet for the heated air is not a material part of the invention. It may be of any desired form. Preferably, however, this member 41 is of tubular character having the outlet end 43 to which is hinged a valve 44 on the vehicle compartment side of the dash 42, the arrangement being provided to retain the valve in any open position.

I further preferably provide a swing valve 45 which may be turned, by an appropriate lever 46, to the position shown by dotted lines in Fig. 6 or to the position shown by full lines in which latter position, and with the valve 44 open, a free flow of heated air into the body of the vehicle is provided. With the valve 45 raised to the dotted position the auxiliary outlet 47 is open while the flow of air into the body of the vehicle is practically stopped. This permits a continuous flow of air through the heater to full capacity with a consequent cooling of the exhaust manifold which, as heretofore stated, is desirable in preventing overheating of the exhaust valves. Oftentimes, in the fall or spring when it is not quite cool enough to require a heater, if the valve 44 be closed, the heat is discharged to atmosphere and to any point it may be desired by connecting a conduit with the part 47. Thus, at all times the effectiveness in respect to cooling the exhaust manifold is attained and yet the interior of the car may be kept at approximately the desired temperature by increasing or decreasing the amount of opening of the valve 44 or if no heated air is desired by raising the valve 45 to the dotted line position.

I have made this heater readily removable through use of the U bolts heretofore described so that it may be dispensed with in summertime if desired but, by the arrangement of the dual outlet structure 41, the device may be maintained in service through the summer period to secure the effect of maintaining the manifold cool by simply closing the valve 44 and raising the valve 45 to the dotted line position.

The valve 44, of course, may be dispensed with but I have so shown the extra valve 44 to permit a tight closing of the outlet into the vehicle body as the swing valve like the valve 45 is of necessity slightly spaced from the wall of the tubular member 41 to permit movement of the valve from one position to the other. This would allow escape of some heated air into the body of the vehicle. This, however, may be immaterial and for that reason the valve 44 might be dispensed with, the principal feature of the construction being a means enabling the device to be maintained in service throughout the entire year.

From the foregoing description it is evident that the heater construction is simple in character; is effective in operation in that the air stream produced by operation of the fan is split into a number of streams which are continually deflected one into the other. The air body is thus broken up and all parts thereof forced to contact with heat radiating surfaces; that, by the interposition of solid metal block on the exhaust manifold there can be no liability of imperfec-

tions in the manifold permitting an escape of carbon monoxide gas into the air passageways; that, by the positioning of the inlet end of the casing 6 as close to the radiator cooling fan as is possible the possibility of air contaminated by oil odors from the engine being discharged into the heater is obviated, and further that the various objects of the invention are attained by the construction described.

Having thus fully described my invention, what I claim and desire to secure by Letters Patent of the United States is—

1. A manifold air heater for automobiles, comprising a block of metal of higher heat conductivity than cast iron secured in metallic contact with the manifold whereby the block of metal is heated, and a casing through which air is passed to be heated, said casing being in metallic contact with and enclosing a portion of the block in air tight relationship therewith and providing a construction whereby the air stream in passing through the casing flows in surface contact with the heated block.

2. A manifold air heater for automobiles, comprising a block of commercial aluminum secured in metallic contact with the manifold whereby the block is heated, and a casing mounted thereon in air tight relation therewith providing an air passageway and enclosing a portion of the block in airtight relationship therewith whereby the air stream is heated through direct contact therewith.

3. A manifold air heater for automobiles, comprising a block of metal of higher heat conductivity than cast iron secured in metallic contact with the manifold, a casing mounted on the block providing an air passageway, said block in air tight relationship therewith and having a plurality of projecting portions positioned in the air passageway for direct contact with the air stream and providing a means of transferring the heat from the exhaust manifold to the air stream.

4. A manifold air heater for automobiles comprising a block of metal formed to seat on the manifold, a metallic cement between the block and the manifold to insure a practically perfect metallic contact therebetween, a casing through which air is passed to be heated, said casing having an opening therein, the periphery of which is cemented to the block, said block having a portion thereof projecting into the air passageway through the said opening whereby the heat of the manifold is transferred to the air in the passageway.

5. A manifold air heater for automobiles consisting of a hollow casing for the passage of air and having an opening in its side, a solid block of non-porous metal interposed between the casing and the manifold and to which block the open side of the casing is secured in air-tight relationship, the said interposed block of metal providing a means for transferring the heat of the manifold to the interior of the casing and preventing leakage of gases thereinto due to imperfection in the manifold casting.

6. A manifold air heater for automobiles consisting of a hollow casing through which air is passed to be heated, said casing having an opening in its side, a block of a commercial form of aluminum interposed between the casing and the manifold to which block the open side of the casing is secured in air-tight relationship, said block of aluminum having a number of heat radiating portions extending into the air passageway providing a means for breaking up the air stream.

7. A manifold air heater for automobiles consisting of a hollow casing sinuous in form through which air is passed to be heated, said casing having an opening in its side, a solid block of metal having a higher heat conductivity than cast iron interposed between the casing and the manifold to which block the open side of the casing is secured in air-tight relationship, a series of pins having a higher heat conductivity than cast iron in metallic contact with the said block of metal and extending into the air passageway and arranged in staggered relation whereby the air stream is deflected and caused to be broken up in its passage therethrough.

8. A manifold air heater for automobiles consisting of a hollow metal casing having a funnel shaped inlet end extending forwardly of the engine block in close association with the cooling fan therefor and an opening at its opposite end for discharge of air, said casing having an opening in its side extending longitudinally thereof, a block of metal secured in metallic contact with the exhaust manifold and having a base greater in width than the width of said opening and a portion extending through the side opening of the casing to the interior thereof against which the wall of the casing defining the said opening engages, said last named portion providing heat dissipating means and being of a form to provide a tortuous passageway to restrict the rapidity of movement of the air therethrough.

9. A manifold air heater for automobiles comprising a hollow metal casing having an inlet at one end and an outlet at the other and an opening in its side, a cast block of metal shaped on its bottom side to conform to the shape of the exhaust manifold and extending at each end over curved portions of the manifold substantially as described, the upper face of the block having integral portions projecting through the side opening of the casing into the interior thereof, lugs on the casing, and U bolts extending about the manifold to the lugs of the casing for securing the casing and block to the manifold.

10. A manifold air heater for automobiles having a cooling fan providing a means for lowering the temperature of the manifold and for heating the interior of the body of an automobile comprising a block of metal of high heat conductivity mounted on the manifold in metallic contact therewith to extract heat from the manifold, a hollow casing providing an air passageway having an inlet at the forward end of the engine block and at the rear of the cooling fan of the automobile, and a conduit connected with the opposite end thereof for the discharge of heated air, said end having a valved outlet portion permitting the air to be discharged at will to the interior of the automobile or to atmosphere exteriorly of the automobile body, said casing having an opening in its side and mounted in air-tight relation with the block, said block having a heat radiating portion in the air passageway.

11. A manifold air heater for automobiles comprising a block of a commercial form of aluminum secured in metallic contact with the manifold, a casing having an inlet and a discharge aperture at the respective opposite ends and a side opening, said block having a series of integral pins in staggered relation projecting into the casing through the side opening providing heat radiating and air deflecting portions by which the heat extracted from the exhaust manifold is transferred to the air stream.

12. A manifold air heater for automobiles com-

prising a conduit through which the air may be passed from end to end, the walls of which are formed of metal impervious to the passage of gases therethrough and at least one wall of which is of metal of a greater heat conductivity than cast iron maintained in metallic contact with the exhaust manifold whereby the heat of the exhaust manifold is conducted to the interior of the conduit, said conduit having a forward open end and a discharge end opening to the automobile body in alignment with the general longitudinal axis of the manifold whereby a comparatively free movement of the air therethrough is secured and is heated through direct contact with the said wall of higher heat conductivity.

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