May 5, 1931. R. B. OTWELL 1,803,436

COMBINED HEATER AND EXHAUST MANIFOLD

Filed Oct. 29, 1929 2 Sheets-Sheet 1

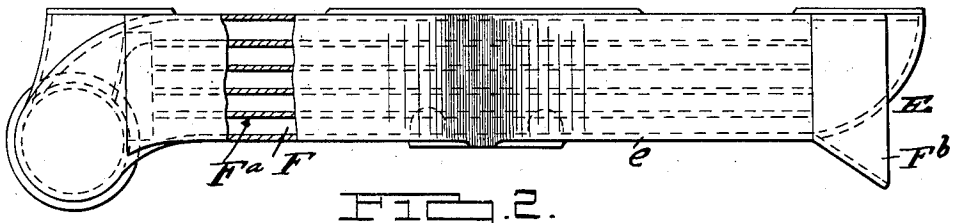


FIG. 2.

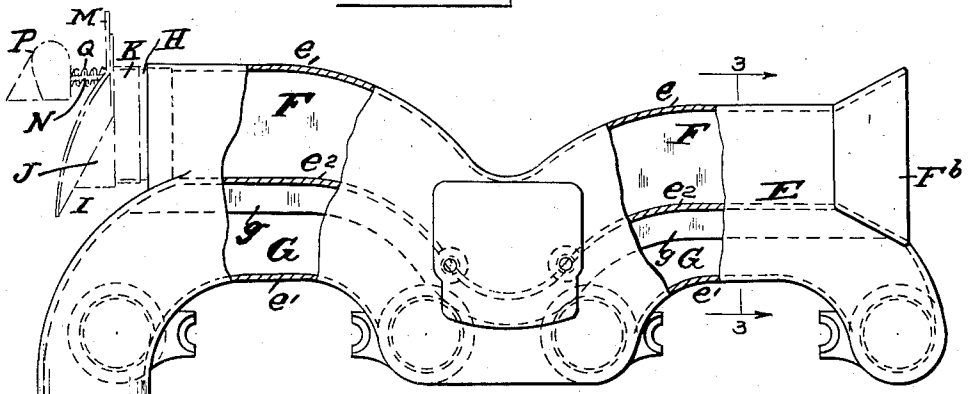


FIG. 1.

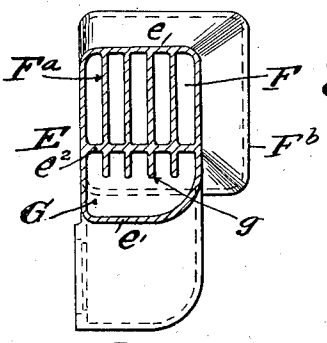


FIG. 3.

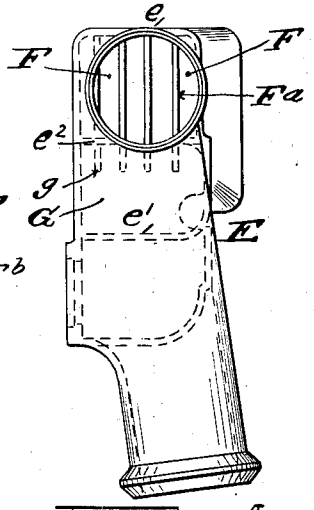


FIG. 4.

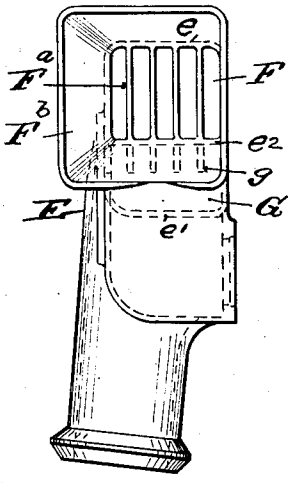


FIG. 5.

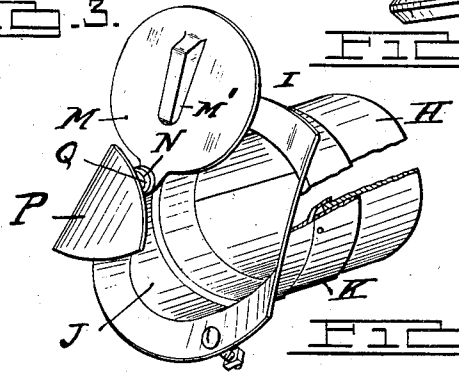


FIG. 6.

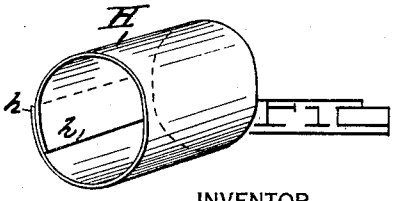


FIG. 7.

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COMBINED HEATER AND EXHAUST MANIFOLD

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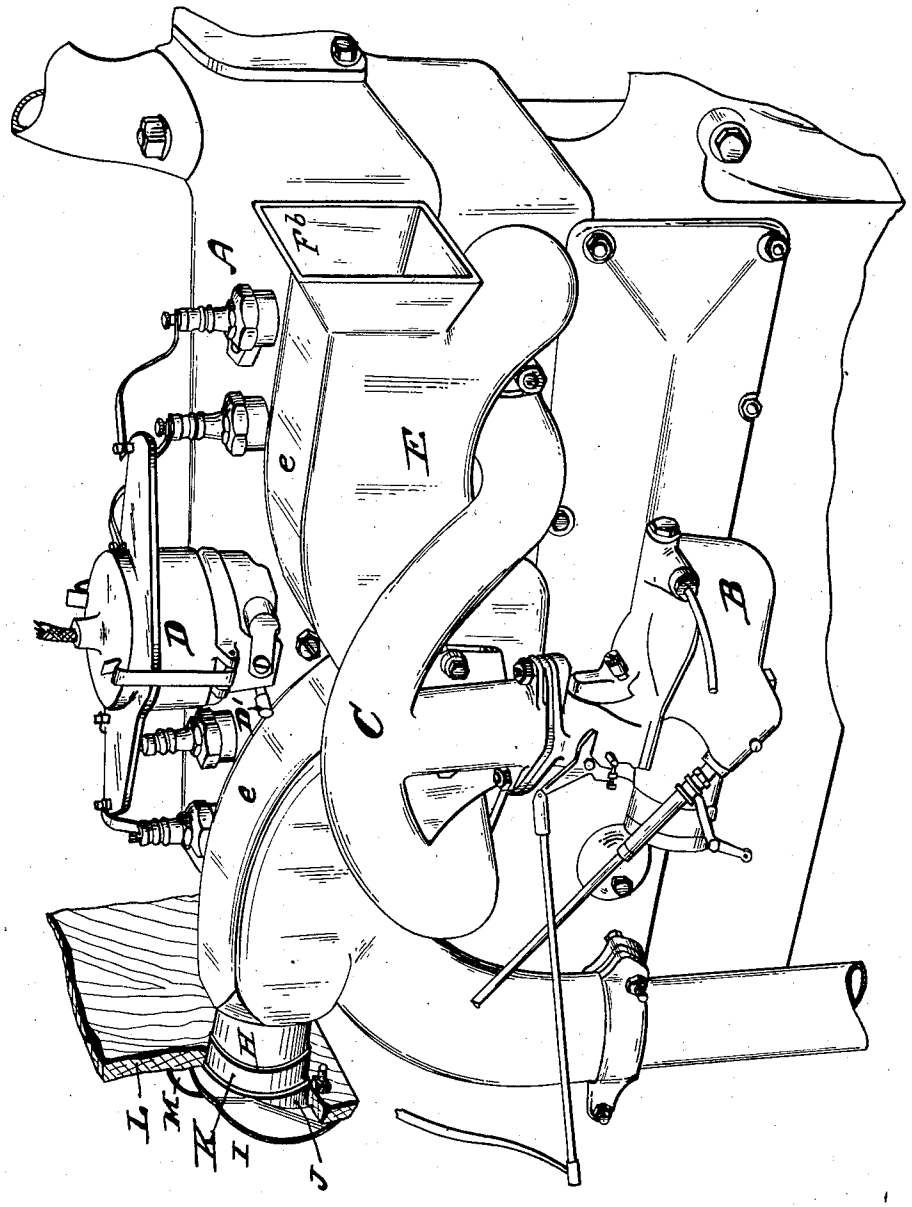


Fig. 2.

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Patented May 5, 1931

1,803,436

UNITED STATES PATENT OFFICE

RALPH B. OTWELL, OF DETROIT, MICHIGAN

COMBINED HEATER AND EXHAUST MANIFOLD

Application filed October 29, 1929. Serial No. 403,203.

My invention relates to a combined heater and exhaust manifold for motor driven vehicles.

This invention is designed particularly for use in connection with a well-known and extensively used motor vehicle, the construction being such that it may be readily installed in the power plant of said vehicle and when employed eliminates all necessity for removing the heater and exhaust manifold to service certain adjacent and other parts of the power unit, when removing said parts, or making repairs.

A further object of the invention is to increase the heating surface of the device while maintaining the present prescribed length of manifold, through the use of a plurality of vertical-wave-like partition walls spaced apart within the heating chamber and integral with the upper and lower walls of said chamber, also by a plurality of fins, integral with and depending from the wall dividing the heating chamber from the exhaust chamber, said walls, partitions and fins having an undulating or wave-like contour, thereby materially increasing the heating surface over which the air passes on its way to the body of the vehicle.

A further object of the present invention is to so form the exhaust manifold that it may project downwardly between and adjacent to the branches of the intake manifold leading from the carburetor to the respective cylinders of the engine that the incoming gas may be heated before entering the several cylinders.

A further object of the invention is to so construct the device that it provides ready access to the oiler of the distributor and other adjacent parts of the power unit thereby avoiding any unnecessary expenditure of time and effort to reach these and other parts.

A further object of the invention is the removable expansible tube connection employed between the heater and the register, also the register assembly, including its shut-off cover and adjustable deflector.

With the foregoing and other objects in view which will appear as the description proceeds, the invention further resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes may be made in the precise embodiment of the invention herein disclosed without departing from the spirit of the same.

In the drawings accompanying this specification:

Figure 1 is a side elvation of the combined heater and exhaust manifold, with parts broken away and in section, showing the undulating outer and dividing wall and the partition walls and fins, of the heating chamber and exhaust manifold; also in dotted lines, the register assembly and the removable expansion tube connection between the heater and register.

Figure 2 is a plan view of the device with a portion of the upper wall broken away disclosing in cross-section a plurality of spaced partition walls.

Figure 3 is a cross-sectional view taken on or about line 3—3 of Figure 1.

Figure 4 is a rear end elevation of the combined manifold and heater.

Figure 5 is a front end elevation of the same.

Figure 6 is a perspective view of the register assembly.

Figure 7 is a perspective view of a detail of the expansible tube, connecting the heater with the register assembly.

Figure 8 is a perspective view of the engine, the intake manifold, the distributor and the combined exhaust manifold and heater, showing the relation of the latter to the inlet manifold also the distributor and adjacent parts.

Referring now to the letters of reference placed upon the drawings in which the same characters indicate like parts in the several views:

A denotes the engine of a motor vehicle. B the carburetor, C the intake manifold. D indicates the timer or distributor of the power plant and D^1 an oiler for same. E indicates a combined heater and exhaust manifold consisting of an integral cast-metal unit, its upper wall e, lower wall e^1 and the intermediate wall e^2 dividing the heating and ex-

haust chambers having an undulating or wave-like form whereby the heating surface is enlarged and that the device may straddle and extend downwardly between the connections leading from the inlet manifold to the engine. Bridging the upper heating chamber F, are a plurality of integral vertical partition walls F^a, which conform to the wave-like form of the inclosing walls, spaced apart to provide air ducts through which fresh air heated in its passage through the chamber is forced into the body of the vehicle by a fan (not shown) forming part of the usual power plant installation.

Projecting downwardly from the horizontal dividing wall e^2 into the exhaust manifold G, are a plurality of fins *g* integral with the horizontal dividing wall and conforming to its undulating or wave-like outline that it may also increase the heating surface of the device.

While the primary object of the undulating wave-like construction is to materially increase the heating surface of the device within a certain prescribed length, the extent of which is controlled by proximity of the device to other parts of the power plant, it also has for its object a construction in which greater accessibility may be had for inspection, removal and repairs of adjacent parts of the power plant, thereby avoiding the necessity for the removal of the exhaust-heater manifold for this purpose and thus effecting a saving of both time and money.

Upon reference to Figure 8 it will be noted that the wave-like contour of the heater-manifold, provides in a marked degree ready accessibility to the timer-distributor for oiling, adjustment or repairs.

The forward end of the heating chamber F is constructed with a funnel-shaped opening F^b to receive the fresh, cool, outer air, put in circulation by the forward movement of the car or driven by the usual fan (not shown) used in connection with the cooling system of the power plant.

Fitted in the opposite open end of the heating chamber is a collapsible tube H, consisting of a strip of sheet metal coiled so that its edges *h*—*h* overlap to form an expansible tube—see Figures 6 and 7—providing a connection between the heater and hot air register assembly I, mounted in a suitable hole cut in the dash of the motor vehicle.

By providing an expansible tube for connecting the heater with the register at least three desirable results are obtained:—first, the expanding action of the tube insures against the parts rattling in transit, second, when it is desired to disconnect the heater from the register—as for example during the summer months—the tube may be readily compressed and withdrawn, and third, its inherent flexibility compensates for any misalignment between the heater and register.

The register assembly I, consists of a flanged casing J, secured to a collar K extending through an opening in the vehicle dash L, to receive the expansible and collapsible tube H, connected with the open end of the air heating chamber.

M is a swinging cover governing the delivery of heated air into the car, fitted with a lug M^1 for manually operating same. The cover is pivoted upon a bolt N projecting through the wall of the dash to secure the cover in position. Also pivoted upon the bolt N, is an arcuate deflector P which may be turned on its pivot that the heated air may be delivered in any desired direction.

Q indicates a spring sleeved on the bolt N, and bearing against the cover M and deflector P to insure against the rattling of these parts in transit.

Having now indicated the several parts by reference letters the construction and operation of the device will be readily understood.

When it is desired to heat the vehicle, the cover M, closing the opening through the register, is opened that the air warmed as it passes through the heating chamber of the device may pass to the body of the car. If the occupant of the car desires to direct the heated air in a particular direction he has only to adjust the deflector P accordingly, to obtain the desired result.

Having thus described my invention, what I claim is:

1. In a combined heater and exhaust manifold of the character described, a casing comprising undulating wave-like top, bottom, and a longitudinally extending dividing wall, cast integral with a pair of flat side walls, forming respectively an air heating chamber and an exhaust manifold and whereby the heating surface is relatively increased within a given length by said wave-like walls, said air chamber being divided longitudinally by a plurality of partition walls cast integral with the undulating wave-like top and dividing walls.

2. In a combined heater and exhaust manifold of the character described, a casing comprising undulating wave-like top, bottom, and a longitudinally extending dividing wall, cast integral with a pair of flat side walls, forming respectively an air heating chamber and an exhaust manifold and whereby the air heating surface is increased within a given length by said wave-like walls; a plurality of partition walls integral with and conforming to the undulating wave-like top and dividing walls of the air chamber; and a plurality of vertical, longitudinally extending fins projecting into the exhaust chamber, cast integral with the said undulating wave-like dividing wall.

3. In a combined heater and exhaust manifold of the character described, a casing comprising undulating wave-like top, bottom,

and longitudinally extending dividing walls cast integral with a pair of flat side walls, forming respectively an air heating chamber and an exhaust manifold and whereby the heating surface is increased within a given length by said wave-like walls, a plurality of verticai longitudinally extending partition walls cast integral with the undulating wave-like top and dividing walls of the air chamber; a plurality of vertical, longitudinally extending fins, cast integral with said dividing wall and projecting into the exhaust chamber; and means for controlling the delivery of the heated air to the body of the vehicle.

4. In a combined heater and exhaust manifold; an air heating chamber extending longitudinally adjacent the exhaust manifold; a register unit, adapted to be supported in the wall of a vehicle dash, and a collapsible tube formed of sheet metal with overlapping edges, adapted to connect the air heating chamber with the register unit.

5. In a combined heater and exhaust manifold, an air heating chamber extending longitudinally adjacent the exhaust manifold; a register unit connected with the air chamber, adapted to be supported in the dash of a vehicle, said register unit comprising a flanged casing forming an air duct; a cover plate pivoted to a bolt extending through the flange of the casing, adapted to close the air duct through said casing; an arcuate deflector also pivoted to said bolt; and a spring coiled on the bolt and bearing against the cover plate and deflector, whereby said parts pivoted upon the bolt are held against rattling.

In testimony whereof, I sign this specification.

RALPH B. OTWELL.