W. L. MORELAND.

MANIFOLD.

APPLICATION FILED MAR. 20, 1916.

1,289,868. Patented Dec. 31, 1918.

Fig. 1.

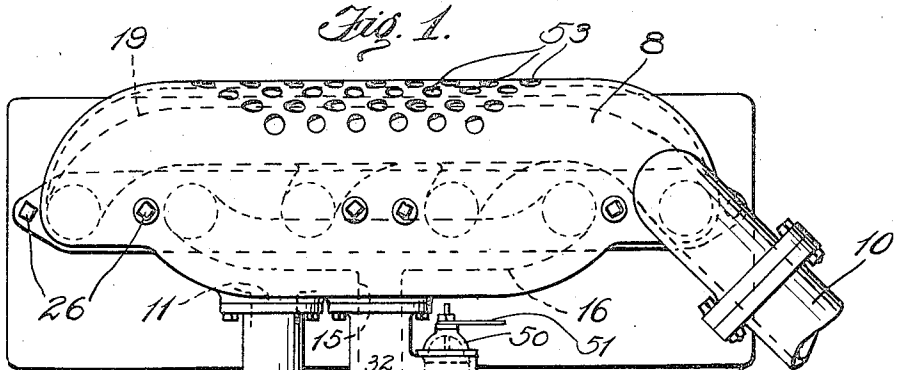


Fig. 6.

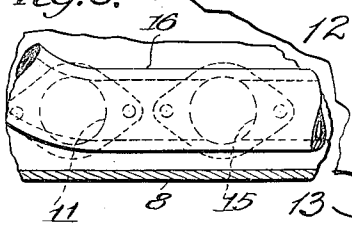


Fig. 2.

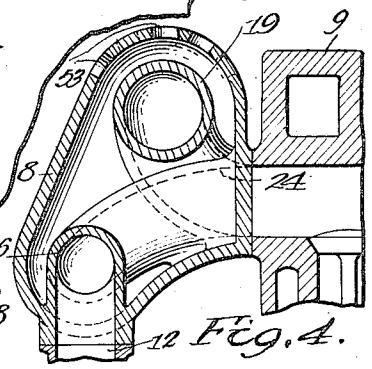


Fig. 4.

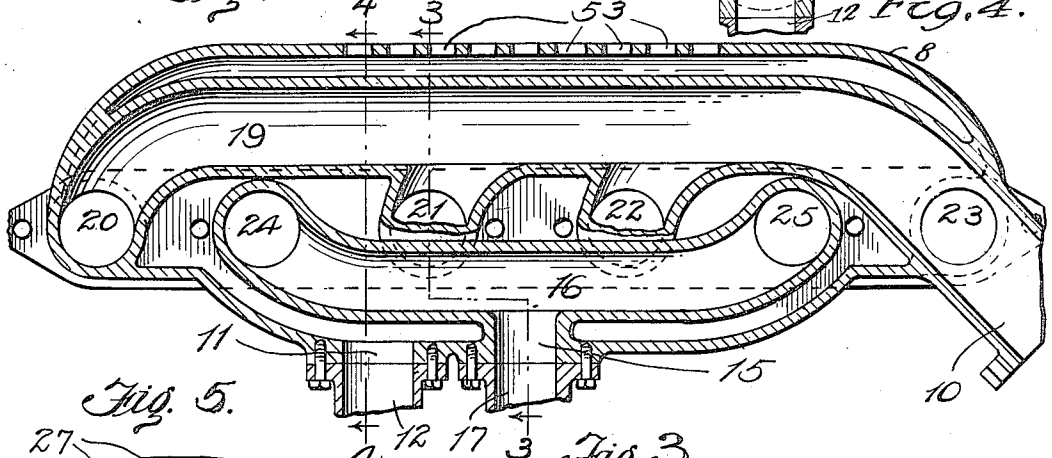


Fig. 5.

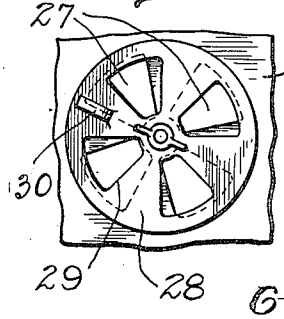
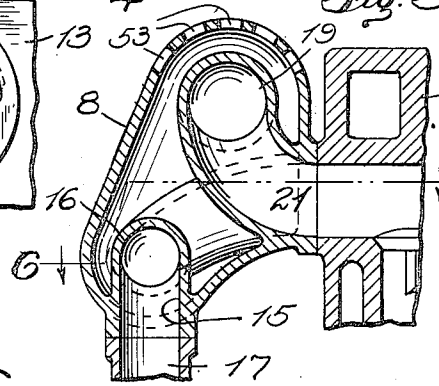


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

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MANIFOLD.

1,289,868. Specification of Letters Patent. Patented Dec. 31, 1918.

Application filed March 20, 1916. Serial No. 85,369.

To all whom it may concern:

Be it known that I, WATT L. MORELAND, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Manifolds, of which the following is a specification.

This invention relates to improvements in manifolds, and particularly such as afford a combined intake and exhaust manifold structure adapted to being applied directly to the inlet ports of internal combustion engines at their inlet and exhaust valves. The device is particularly useful as a distinct article of manufacture adapted to constitute the entire manifold mechanism of the engine, to which it may be applied, with the exception of connections necessary to accommodate the particular kind of carbureters that may be used.

It is an object of the invention to provide a manifold device for internal combustion engines, the same being provided with an exhaust passage and an inlet passage and having a surrounding casing adapted to form a heating zone through which air may be initially heated for forming the gaseous mixture with the fuel employed and through which zone the fuel mixed with the said air is passed for a second heating thereof.

It is an object of the invention also to provide a manifold affording a combined exhaust and inlet device and having a heating jacket thereon.

It is a further object of the invention to provide a new article of manufacture comprising an integral exhaust and inlet manifold member having an inclosing casing for affording a heating zone whereby the air employed is heated a second time before being admitted with the vaporized fuel into the cylinders of an engine.

With these and other objects in view the invention comprises certain novel constructions, combinations and arrangements of parts as will be hereinafter more fully described and claimed.

In the accompanying drawing forming a part of this specification:

Figure 1 is a side elevation of the improved manifold device, applied upon the sides of the cylinders of an internal combustion engine, a carbureter being also shown connected with the manifold.

Fig. 2 is a longitudinal central sectional view taken through the said manifold, showing the same upon an enlarged scale.

Fig. 3 is a vertical transverse sectional view taken upon the line 3—3 of Fig. 2.

Fig. 4 is a similar transverse sectional view taken upon the line 4—4 of Fig. 2.

Fig. 5 is an enlarged detail view looking at the bottom of the inlet portion of the carbureter and showing the air inlet valve or controlling damper or register employed thereon.

Fig. 6 is a fragmentary sectional view taken on the line 6—6 of Fig. 3 showing a portion of the intake manifold in plan view.

The device of this invention is designed to provide a manifold member for internal combustion engines, having tubular passage ways, one of which communicates with the valve controlled exhaust ports of the engine, while the other communicates directly with the valve controlled inlet ports of the engine, the said tubular exhaust and inlet portions having a casing or housing surrounding the same and provided with inlets for the admission of air. The air thus admitted will become heated by passing around the exhaust piping of the manifold and will also keep the piping of the inlet manifold thoroughly warm for preventing any cooling or condensing of the gaseous mixtures which will enter the cylinders of the engine through the same inlet manifold. Some of the ingredients of the mixture used in operating the engine are thus heated a second time, and at the second heating are in a position to enter the cylinders of the engine without being again taken out of the heating zone and thus subjected to the exterior cooling influence.

The manifold constructed in accordance with this invention is especially well adapted for use where high gravity oils and distillates are employed for operating gas engines for not only does the air which forms so important a part of the mixture pass through the heated zone twice, once before mixing and once afterward, but the first heating facilitates, the mixing of the air with the fuel and the breaking up of the fuel for forming a good gaseous mixture, while the second heating as the mixture passes through the said zone completes the thorough mixing of the ingredients and delivers the mixture from said zone directly into

the cylinders without again passing out of the said heating zone. The use of this device has in practice demonstrated the necessity of delivering the mixed ingredients in heated and thoroughly gasified condition to the engine's cylinders, when using distillates or high gravity petroleum products for operating the engine and has marked the difference between success and failure in this regard.

In the accompanying drawing preferred embodiments of the features of the invention have been illustrated, and the details thereof will now be more particularly described, reference being had to the illustration. In the said drawing, there is shown an improved manifold device comprising an exhaust manifold and an inlet manifold inclosed in a casing 8 and applied directly over the inlet and exhaust ports of an engine 9. One end of the exhaust manifold connects with an exhaust pipe 10 which usually leads to a muffler, not shown. The bottom portion of the casing is provided with an opening at 11 which is connected with a connecting pipe 12 which extends from said opening 11 to the inlet portion 13 of a carbureter 14. The said casing 8 is also provided with an inlet opening 15 which leads into the inlet manifold 16 and having a connection member 17 applied thereto and connecting the same with the outlet portion of the carbureter 14. The carbureter may be of any desired type and is provided with a fuel supply pipe 18. The casing 8 is formed with its outer walls of ample size to inclose the tubular exhaust manifold portion 19 and also the tubular inlet manifold portion 16. The exhaust manifold portion 19 has branching portions extending to openings 20, 21, 22 and 23, the walls of the casing 8 being formed to fit against the openings of the exhaust ports of the engine. The intake manifold 16 extends to openings 24 and 25 which are applied directly against the intake ports of the said engine. The outer walls of the casing 8 are made large enough to entirely inclose the manifolds 16 and 19 so that an air space is maintained almost entirely around the said parts. The casing is provided with a series of holes 53, usually in the upper portion thereof through which atmospheric air may enter the casing. The air entering this casing is thoroughly heated by passing around the exhaust manifold and the air in turn warms and keeps thoroughly heated the intake manifold 16. The heated air passes through the pipe 12 so as to enter the carbureter and form with the incoming distillate and other fuel a gaseous mixture in the usual way. The mixture then passes upwardly through the connection piping 17 and into the heating zone within the casing 8 before it reaches the cylinders of the engine whereby the mixture is more thoroughly vaporized. The openings 20, 21, 22, 23, 24, and 25 are in one face of the casing 8 and adapted to be applied directly against the apertured walls of the engine cylinders as clearly shown in Figs. 3 and 4 of the drawing. One or more bolts or screws 26 are passed through portions of the casing and into threaded holes properly located in the adjacent cylinder walls, for binding the casing in position over the ports of the engine. To modify the heat of the air which enters the carbureter through the pipe 12, an air inlet opening or openings 27 may be formed in the bottom of the inlet portion 13 of said carbureter the said openings being controlled by a pivoted damper or register member 28 which is pivoted in position upon the carbureter as indicated in Figs. 1 and 8. Said damper or register is provided with openings 29 which may be moved over openings 27 to a greater or less extent and according to the amount of atmospheric air it is desired to introduce at this point. A knob or handle 30 on said damper or register is provided for facilitating the adjustment thereof.

It will be observed that the manifold member is a complete integral article of manufacture and employs all of the exhaust and inlet manifold structures whereby a superior result in the breaking up of liquid fuels and a complete and substantially perfect vaporization thereof and mixing therewith of air is accomplished. It will be understood that the manifold may be changed in shape to accommodate it to engines of different sizes and engines having any desired number of cylinders without departing in the least from the spirit of the invention.

What is claimed is:

1. A manifold head for internal combustion engines comprising a casting of tubular form having a longitudinal plane side attachable to the side of the motor head and having a line of ports, the casting having longitudinal, laterally parallel exhaust and intake tubes spaced throughout from the shell of the head and each having branches leading and attached to the side at the ports, the bottom of the shell having ported means for attachment of an outlet air pipe, the shell being perforated adjacent to the longitudinal side of the exhaust tube for admission of fresh air, the integrality of the head facilitating the heating of the air drawn through, the intake tube having ported connection to the shell for attachment to a carbureter.

2. As a new article of manufacture, an elongated integral manifold member having spaced upper and lower exhaust and intake tubes and an inclosing casing forming an air chamber about the said tubes, said casing having a face at one side for adjustment against an engine head, and branches from said tubes leading to said face.

3. An integral combined inlet and exhaust manifold member adapted to be interposed between the cylinders of an engine and a carbureter and having separate intake and exhaust flues and an air jacket surrounding the flues.

4. An integral combined inlet and exhaust manifold member adapted to be interposed between the cylinders of an engine and a carbureter, for pre-heating air for the latter, having parallel separate intake and exhaust manifolds, a casing surrounding and spaced from the manifolds, and provided with an air inlet and an air outlet, respectively, on opposite upper and lower portions, and a fuel inlet at the bottom of the casing and connected to the intake manifold.

5. An integral combined inlet and exhaust manifold member adapted to be interposed between the cylinders of an engine and a carbureter, having separated intake and exhaust manifolds, a casing surrounding the manifolds, and provided with an air inlet and an air outlet, respectively, at the outermost points on the jacket.

6. An integral manifold member for internal combustion engines having an outer casing forming an air chamber for maintaining a heated zone, an exhaust pipe therein extending from end to end thereof and spaced from the walls of the casing, and a fuel inlet manifold parallel to the pipe and arranged within and spaced from the walls of the casing, through which latter air for carbureter purposes may be passed from the intake apertures in the wall adjacent the longitudinal surface of the pipe.

7. A preheating manifold head comprising a tubular casing for the circulation of air and having a ported face plate on one side for application to an engine, the casing having elongated, upper and lower parallel portions, parallel exhaust and intake tubes in the upper and lower portions of said casing, the ends of the upper tube merging into the downwardly curved ends of the casing, said intake having a central intake connection with the bottom of the casing.

8. A preheating manifold head comprising a tubular casing for the circulation of air and having a ported face plate on one side for application to an engine, the casing having elongated, upper and lower parallel portions and being wider than said plate, parallel exhaust and intake tubes in the upper and lower portions of said casing, the ends of the upper tube merging into the downwardly curved ends of the casing, said intake having a central intake connection with the bottom of the casing.

9. A preheating manifold head comprising a tubular casing for the circulation of air and having a face plate with ports arranged in a line on one side for application to an engine, the casing having elongated, upper and lower parallel portions and being wider than said plate, the upper portion curving down, parallel exhaust and intake tubes concentric to and in the upper and lower portions of said casing, the ends of the upper tube merging into the downwardly curved ends of the casing, said intake having a central intake connection with the bottom of the casing, the latter having in its bottom an air outlet connection to a carbureter, and in its top and above the exhaust tube, inlet apertures for air.

10. A preheating manifold casting comprising a ported face plate to register with the inlet and outlet ports of an internal combustion engine, an exhaust tube connected parallel to the plate by downwardly and outwardly curved branches, an intake tube arranged outwardly beyond, below, and parallel to the exhaust tube and connected to the plate by upward and outwardly curved branches, and a tubular casing having longitudinally extending upper and lower offset portions concentric to the tubes, the casing having a longitudinal series of air inlets above the top of the exhaust tube, and supply and return ports connectible to a carbureter.

11. In combination with the cylinders of an internal combustion engine, a carbureter, a manifold device comprising a housing forming a hot air chamber having an exhaust manifold passage spaced from and surrounded by the wall thereof, and provided with openings at one side adapted to be applied to the exhaust ports of the cylinder, said passage having an outlet for the exterior discharge of exhaust products, said manifold also having and surrounding an inlet manifold passage spaced from its walls and having branch portions adapted to be applied over the inlet ports of said cylinders, the housing having an air outlet opening, and piping joining the manifold to the inlet and outlet portions of the carbureter, the structure being such that heated air may be taken from the housing, and used for forming explosive mixtures in the carbureter, said mixtures being then returned through the heated manifold and delivered into the cylinders of the engine.

In testimony whereof, I have hereunto set my hand in presence of two witnesses.

WATT L. MORELAND.

Witnesses:
CASSELL SEVERANCE,
EARLE R. POLLARD.