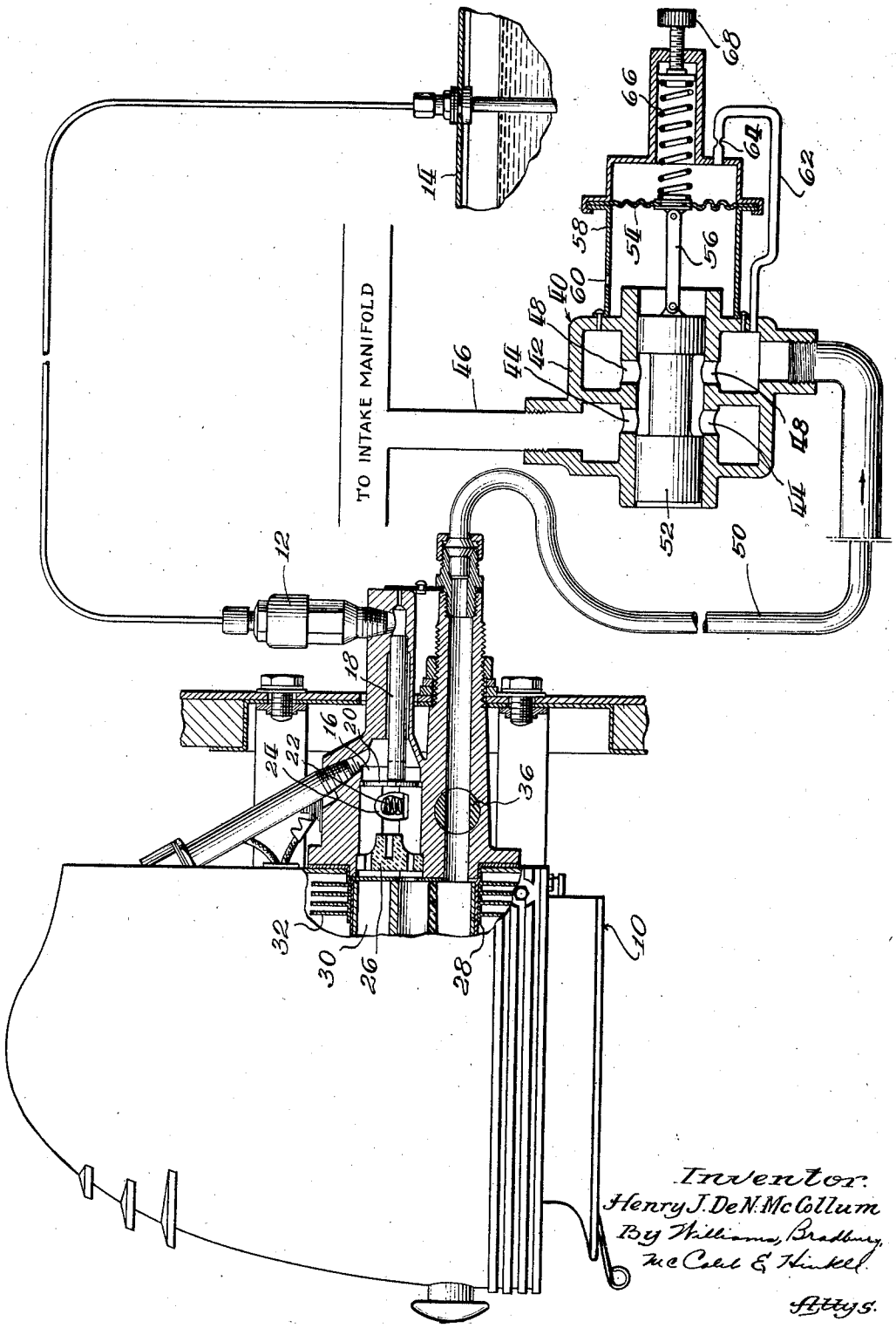
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AUTOMOBILE HEATER

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AUTOMOBILE HEATER

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8 Claims. (Cl. 237—12.3)

The invention relates generally to automobile heaters and the present application is a continuation in part of a co-pending application, Serial No. 61,213 filed January 28, 1936, which has matured into Patent No. 2,191,173.

More particularly, the present invention relates to the operation and control of those engine-created vacuums which may be used as a source of power to provide the fluid pressure differential needed for the production and movement of a stream of hot gases through a radiator in the operation of the independent heat generator illustrated and described in said co-pending application.

In the particular embodiment illustrated, the vacuum which is utilized for the purposes mentioned is that which is developed in the intake manifold of the engine. However, it is appreciated that, with this particular source, the degree of vacuum created ranges from zero to approximately twenty-six inches of mercury, depending upon the speed and the load to which the engine is subjected under operating conditions. Under such circumstances, if the degree of vacuum applied to the heat generator to draw the combustible mixture and hot gases through the heater were permitted to vary likewise, it is apparent that the operation of the heater would be irregular and unsatisfactory.

Consequently, it is one of the objects of the present invention to convert the widely varying degree of vacuum created in the intake manifold of an automobile engine into a substantially uniform working vacuum for operating a combustion heat generator of the class described.

Another object of the invention is to provide an improved means for causing a substantially uniform rate of flow of the gases of combustion through the heater.

Another object of the invention is to provide a heater of the class described of a character such that heat units are supplied uniformly to the radiator for heat transfer purposes, regardless of variations in the pressure differential employed to operate the heater.

Another object of the invention is to provide a vacuum compensator for heaters of the class described which provides a gradual compensating correction for wide or sudden variations in the degree of vacuum developed in the intake manifold of an internal combustion engine.

Another object of the invention is to provide a control for an internal combustion device of a character whereby the operation of the device is governed for uniform performance by variably restricting the exhaust flow of the gases of combustion.

Another object of the invention is to provide in a heater of the class described, a compensator therefor which is simple in construction and operation, effective in use, and inexpensive to manufacture and operate.

These being among the objects of the invention, other and further objects will become apparent from the drawing herein, the description relating thereto and the appended claims.

Referring now to the embodiment of the invention illustrated, partly in section, in the single view of the accompanying drawing, the heater construction 10, which is more particularly described in said co-pending application, comprises generally, a carbureting device 12 supplied with gasoline preferably from the float bowl 14 of the usual engine carburetor. Suitable means is provided to control the flow of gasoline to the heater 10 and the amount of air mixed therewith in order to supply to the heater several combustible mixtures of different degrees of richness to take care of the various heater requirements encountered under starting and running conditions.

The combustible mixture supplied by the carbureting device is fed into the combustion chamber 16 through a tube 18 and a perforated baffle plate 20 by means of which pre-heat and turbulence are effected to thoroughly vaporize the mixture entering the combustion chamber. The mixture is ignited by an electrical heating element 22 located in a recess 24 in the side of the chamber, and, in event the flame ever becomes extinguished, the mixture is reignited by a refractory ceramic plug 26 at the outlet of the combustion chamber which acquires a sufficiently high temperature for such purpose by being directly exposed to the flame during the normal operation of the heater.

From the combustion chamber 16 the hot gases pass through a radiator 28 comprising a circuitous tube 30 to which heat radiating fins 32 are thermally connected. Over these fins air is circulated in a manner whereby heat is transferred from the hot gases to the passenger compartment of the automobile for the comfort of the passengers.

The flow of gases through the heater 10 is controlled in two ways: one, by the valve 36 which starts and stops the flow, and the other, by a compensator 40 interposed between the heater 10 and the intake manifold for regulating and rendering uniform the degree of vacuum to which the heater is subjected.

In the particular embodiment of the compensator illustrated by enlargement in the accompanying drawing, the compensator 40 comprises a valve chamber 42, the outlet 44 of which is connected to the intake manifold by the pipe 46, and the inlet 48 of which is connected to the heater 10 by the pipe 50.

Within the valve chamber 42 is a balanced valve member 52 which is adapted partially to cover ports 44. The balanced valve 52 is in the form of a piston and is connected to the central portion of a diaphragm 54 by means of a link 56, the diaphragm being suitably mounted in a casing 58. One side of the diaphragm is subjected to atmospheric pressure because of the provision of a vent 60 in the casing 58, while the other side of the diaphragm is normally maintained at the same pressure as is present in the pipe 50 to which it is connected through a tube 62 which is provided with a damping restriction 64. The central portion of the diaphragm is normally pressed to the left as viewed in the drawing by a light compression coil spring 66, the tension of which may be adjusted by means of a thumb screw 68.

This particular compensator operates in the following manner: Upon an increase in vacuum in the intake manifold, the pressure in the pipe 46 will be decreased, and if the decrease in pressure in sufficiently great and maintained for a sufficient length of time, the pressure within the casing 58 at the right side of the diaphragm 54 will be decreased accordingly and the valve 52 moved to the right against the force of the spring 66 under the force of atmospheric pressure acting upon the opposite side of the diaphragm. Thus, the ports 44 are partially covered which results in a decrease in the flow of the gases of combustion therethrough and a consequent decrease in degree of vacuum present in the pipe 50. Because of the restriction 64, fluttering of the valve 52 will be prevented and the compensating correction applied by this valve will be effected gradually.

In this way an improved means is provided of a character causing a substantially uniform rate of flow of the hot gases of combustion through a heater of the class described, where the heater derives its power from a source of widely varying pressure-differentials such as the intake manifold of an internal combustion engine. Moreover, the improved device is one providing a gradual compensating correction for the wide and sudden variations encountered with the vacuum as developed in the intake manifold, and otherwise comes within the expressed and implied objects outlined herein.

Consequently, although a single embodiment of the invention has been described herein, it will be apparent to those skilled in the art that various and further uses, modifications, and changes may be made without departing from the spirit and substance of the invention, the scope of which is commensurate with the appended claims.

What is claimed is:

1. In an automobile heater of the internal combustion type in which the products of combustion are drawn into the intake manifold of the internal combustion engine of the automobile, the combination of a conduit connecting the heater with the intake manifold of the engine, a spool valve operably mounted in said conduit to regulate the flow of fluid through said conduit, a casing, a diaphragm in said casing, said diaphragm being exposed on one side to spring pressure and restrictedly to the vacuum existing in said conduit, and on the other side to atmosphere for operating said valve, thereby to compensate for variations in the vacuum of the intake manifold.

2. In an automobile heater of the internal combustion type in which the products of combustion are drawn into the intake manifold of the internal combustion engine of the automobile, the combination of a conduit connecting the heater with the intake manifold of the engine, a balanced spool valve operably mounted in said conduit to regulate the flow of fluid through said conduit, a casing, a diaphragm in said casing, said diaphragm being exposed upon one side to spring pressure and vacuum in said conduit and upon the other side to atmosphere for operating said valve, thereby to compensate for variations in the vacuum of the intake manifold.

3. In an automobile heater of the class described which utilizes vacuum developed in the intake manifold of the automobile engine, the combination comprising, means providing a heater combustion chamber, means for feeding fuel to the combustion chamber, a conduit connecting the combustion chamber to the intake manifold to effect a reduction of pressure within the combustion chamber and to remove products of combustion from the combustion chamber, and means compensating for variations in pressure in the intake manifold to effect more even pressure in the combustion chamber, the last mentioned means comprising a valve adapted to variably restrict said conduit, and a control mechanism for said valve including a movable element responsive to the degree of vacuum in the conduit between the valve and the combustion chamber for controlling the position of the valve.

4. In an automobile heater of the class described which utilizes vacuum developed in the intake manifold of the automobile engine, the combination comprising, means providing a heater combustion chamber, a conduit connecting the combustion chamber to the intake manifold to effect a reduction of pressure within the combustion chamber and to remove products of combustion from the combustion chamber, and means compensating for variations in pressure in the intake manifold to effect more even pressure in the combustion chamber, the last mentioned means comprising a valve adapted to variably restrict said conduit, a flexible diaphragm connected by a link to the valve, a housing providing a chamber on one side of the diaphragm, and means connecting the chamber to the conduit to effect flexure of the diaphragm and consequent movement of the valve responsive to variations in pressure within the conduit.

5. In an automobile heater of the class described which utilizes vacuum developed in the intake manifold of the automobile engine, the combination comprising, means providing a heater combustion chamber, a conduit connecting the combustion chamber to the intake manifold to effect a reduction of pressure within the combustion chamber and to remove products of combustion from the combustion chamber, and means compensating for variations in pressure in the intake manifold to effect more even pressure in the combustion chamber, the last mentioned means comprising a balanced spool valve adapted to variably restrict said conduit, a flexible diaphragm connected by a link to the valve, a housing providing a chamber on one side of the dia-

phragm, and means connecting the chamber to the conduit to effect flexure of the diaphragm and consequent movement of the valve responsive to variations in pressure within the conduit.

6. In an automobile heater of the class described which utilizes vacuum developed in the intake manifold of the automobile engine, the combination comprising, means providing a heater combustion chamber, a conduit connecting the combustion chamber to the intake manifold to effect a reduction of pressure within the combustion chamber and to remove products of combustion from the combustion chamber, a valve for shutting off said conduit, and means compensating for variations in pressure in the intake manifold to effect more even pressure in the combustion chamber, the last mentioned means comprising a valve adapted to variably restrict said conduit, a flexible diaphragm connected by a link to the valve, a housing providing a chamber on one side of the diaphragm, and means connecting the chamber to the conduit to effect flexure of the diaphragm and consequent movement of the valve responsive to variations in pressure within the conduit.

7. In an automobile heater of the class described which utilizes vacuum developed in the intake manifold of the automobile engine, the combination comprising, means providing a heater combustion chamber, means for feeding fuel to the combustion chamber, a conduit connecting the combustion chamber to the intake manifold to effect a reduction of pressure within the combustion chamber and to remove products of combustion from the combustion chamber, and means compensating for variations in pressure in the intake manifold to effect more even pressure in the combustion chamber, the last mentioned means comprising a valve adapted to variably restrict said conduit.

8. In an automobile heater of the internal combustion type adapted to be connected to a source of varying suction created by the operation of the automobile engine, the combination comprising, a heater combustion chamber, means providing fuel to the combustion chamber, a conduit connecting the combustion chamber to said source of varying suction to provide the draft for combustion, a valve in the conduit, and a valve control means responsive to pressure in the conduit between the valve and the combustion chamber for controlling the valve to compensate for variations in said pressure.

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