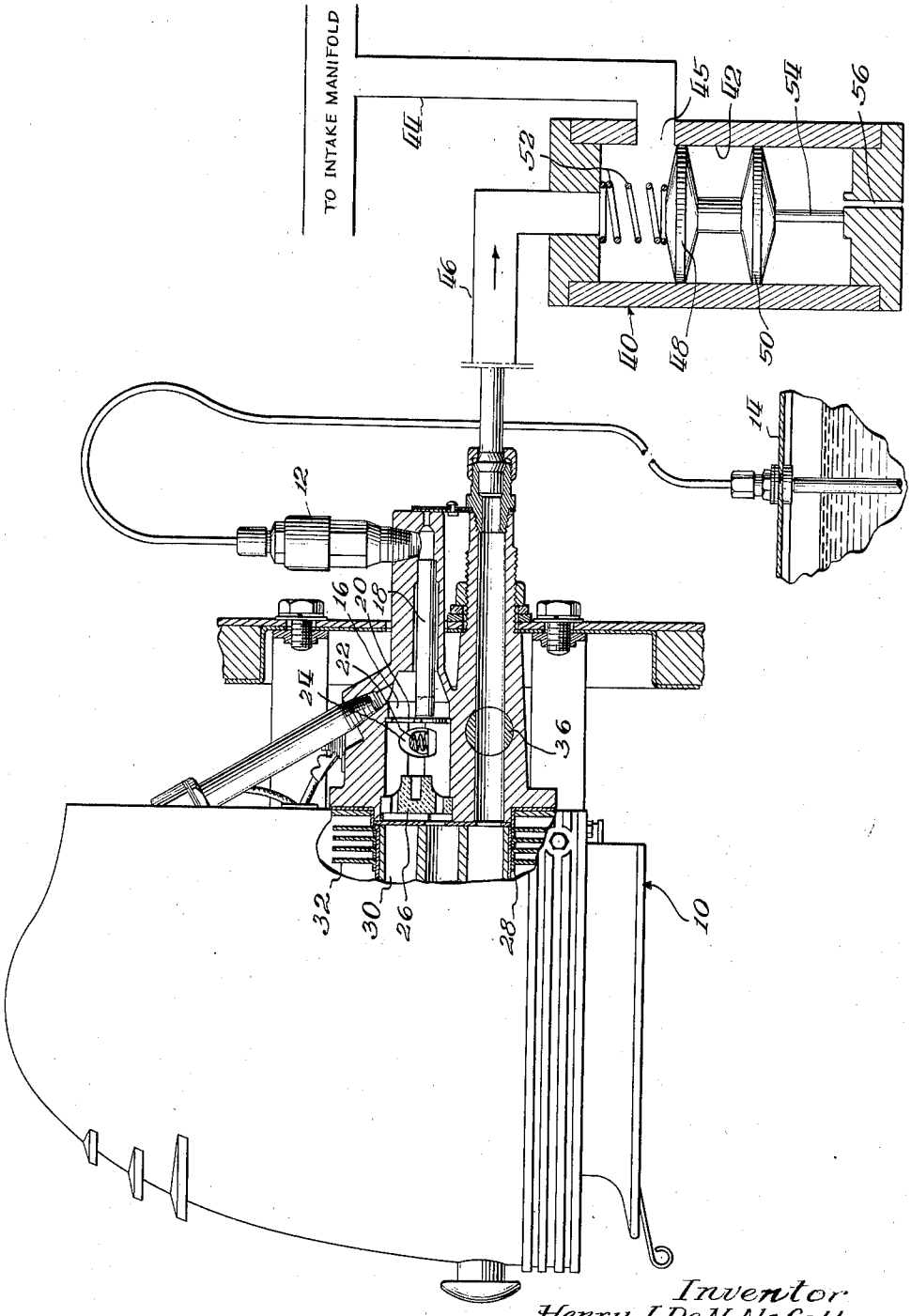
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AUTOMOBILE HEATER

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AUTOMOBILE HEATER

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3 Claims. (Cl. 237—12.3)

The invention relates generally to automobile heaters and the present application is a continuation in part of a copending application, Serial No. 61,213, filed January 28, 1936.

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 copending 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 26 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 compensator for a heater of the class described which is instantly responsive to the changes in the degree of vacuum to which the heater is subjected and operates to compensate therefor without fluttering and rapid fluctuation.

Another object of the invention is to provide a compensator for a heater of the class described wherein the wide fluctuation in the degree of vacuum at the source is exertible at all times to actuate a piston valve closing a port through which the vacuum is applied to the heater notwithstanding the fact that the valve may be almost completely closed.

Another object of the invention is to provide a compensator for an internal combustion heater for regulating the pressure differential employed in the operation of the heater, which is fully operable throughout all vacuum differentials and easily disassembled for repair and maintenance.

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 copending application, comprises generally, a carbureting device 12 supplied with gasoline preferably from the float bowl 14 of the usual engine carburetor. Suitable means are 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 preheat 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 cylinder 42, an end portion of which is

connected to both the heater and the intake manifold. Connection with the intake manifold is accomplished by means of a pipe 44 opening through a side wall of the cylinder to provide a port 45 and connection to the heater is made by means of the conduit 46 opening into the cylinder through the end wall thereof. Within the cylinder is a sliding valve 48 adapted to pass back and forth across the port 45 and provided with an integral guide 50 to maintain the valve in axial alignment with the cylinder.

The valve 48 is normally pressed downwardly by a compression coil spring 52 interposed between the valve and the end wall which limits movement of the valve in one direction relative to the port 45 when completely collapsed, and the downward motion of the valve is limited in the opposite direction by a stop pin 54 abutting against the opposite or lower end of the cylinder, which lower end is provided with a restricted passageway 56 which vents the lower end of the cylinder to the atmosphere.

When the intake manifold vacuum increases greatly or suddenly beyond the normal degree of vacuum desired for the operation of the heater 10, the valve 48 will be raised by atmospheric pressure acting upon its lower surface (or upon the lower surface of the guide 50 if the latter has a sufficiently close fit in the cylinder), thus partially cutting off the port 45 leading to the pipe 44 with a resulting decrease in the vacuum effective upon the heater. The restricted passageway 56 serves as a dash pot damper to prevent rapid fluttering and fluctuations of the valve.

Once the valve 48 is advanced by vacuum differential against the spring 52 so that the lower face of the valve 48 is exposed to the intake manifold, the guide portion of the valve 50 becomes effective to interpret the pressure differential existing between the atmosphere and the vacuum in the intake manifold and will actuate the valve to restrict or enlarge the opening of the port 45 accordingly so that the vacuum imposed upon the heater is substantially constant at all times. In this connection, it will be appreciated that any sudden application of vacuum made by the intake manifold will operate immediately to move the valve instantly to a temporary position to balance the pressures existing upon opposite sides of the valve within the confines of the cylinder and thereafter will yield further as the vented side is gradually replenished with air from the atmosphere through the restricted passageway 56. This provides for an instant response to change in pressure differentials and the reverse is also true. The spring will operate immediately upon a decrease in pressure differential to open the port 45. This builds up a slight pressure upon the atmospheric side of the valve within the confines of the cylinder which pressure is gradually relieved through the restricted passageway 56. With the instant increase in the area of the port 45 the heater will have the full benefit of the manifold vacuum instantly when the degree of vacuum therein drops to or below the degree of vacuum desired for the operation of the heater.

In this way a compensator for a heater of the class described is provided which reacts immediately to sudden changes in the degree of vacuum present in the intake manifold of an internal combustion engine to provide a uniform rate of flow of the hot gases of combustion through the heater without fluttering and without need for adjustment. Moreover, the compensator is simple in form, very effective in use, and easily installed, operated and maintained.

Consequently, although a single embodiment of the invention has been shown and 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 a heater for automobiles which utilizes vacuum developed in the intake manifold of the automobile engine, the combination comprising, means providing a combustion chamber, fuel input means communicating with the combustion chamber for feeding fuel thereto, means providing a communicating connection between the combustion chamber and said intake manifold to reduce the pressure within the combustion chamber, and means included in the last mentioned means for automatically regulating the reduction of pressure in the combustion chamber to compensate for variations in pressure in the intake manifold, the last mentioned means comprising a casing providing a cylinder and having spaced openings therein which form a part of said communicating connection between the intake manifold and combustion chamber, a spool-like valve member having a center portion of reduced section and end flanges slidable within the cylinder, one of said end flanges variably restricting communication between the spaced openings, said casing having a port therein exposing the other of said end flanges to atmospheric pressure, and a spring urging the valve member away from the said spaced openings.

2. In a heater for automobiles which utilizes vacuum developed in the intake manifold of the automobile engine, the combination comprising, means providing a combustion chamber, fuel input means communicating with one part of the combustion chamber for feeding fuel thereto, means providing a communicating connection between another part of the combustion chamber and the said intake manifold to reduce the pressure within the combustion chamber, and means included in the last mentioned means for automatically regulating the reduction of pressure in the combustion chamber and comprising a casing providing a cylinder and having spaced openings communicating with the cylinder, a valve member slidable within the cylinder for variably restricting communication between the spaced openings, a spring on one side of the valve urging the valve member away from the openings, and said casing having an opening therein exposing the other side of the valve to atmospheric pressure.

3. In a heater for automobiles which utilizes vacuum developed in the intake manifold of the automobile engine, the combination comprising, means providing a combustion chamber, fuel input means communicating with one part of the combustion chamber for feeding fuel thereto, means providing a communicating connection between another part of the combustion chamber and the said intake manifold to reduce the pressure within the combustion chamber, a valve for shutting off the connection between the combustion chamber and intake manifold, and means included in the last mentioned means for automatically regulating the reduction of pressure

in the combustion chamber and comprising a casing providing a cylinder and having spaced openings communicating with the cylinder, a valve member slidable within the cylinder for variably restricting communication between the spaced openings, a spring on one side of the valve urging the valve member away from the openings, and said casing having an opening therein exposing the other side of the valve to atmospheric pressure.

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