T. C. HOUGH.

AUTOMOBILE HEATER.

APPLICATION FILED SEPT. 8, 1914.

1,214,921. Patented Feb. 6, 1917.

Fig. 6. Fig. 5

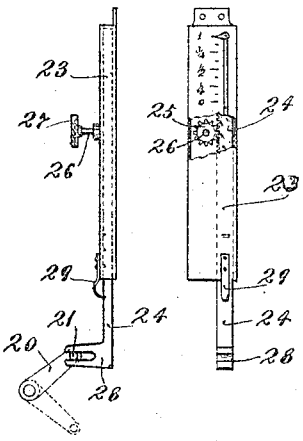


Fig. 1

Fig. 3

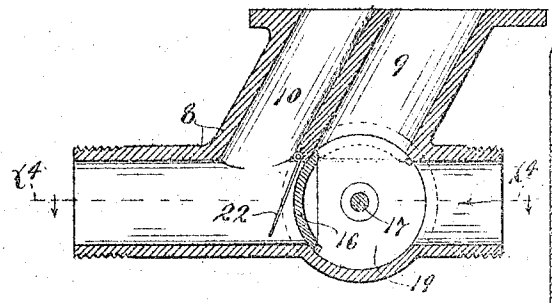


Fig. 2

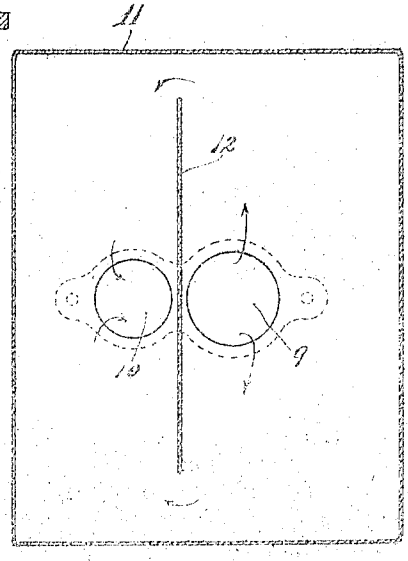
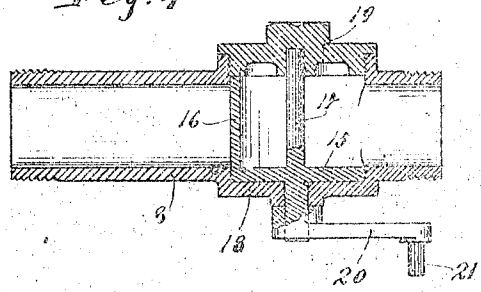


Fig. 4



Witnesses.
A. H. Shaal
E. C. Shinkle

Inventor:
Thos. C. Hough.
By his attorneys:
Williamson Whitehead

UNITED STATES PATENT OFFICE.

THOMAS C. HOUGH, OF MINNEAPOLIS, MINNESOTA.

AUTOMOBILE-HEATER.

1,214,921. Specification of Letters Patent. Patented Feb. 6, 1917.

Application filed September 8, 1914. Serial No. 860,512.

To all whom it may concern:

Be it known that I, THOMAS C. HOUGH, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Automobile-Heaters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to improve that type of automobile heaters wherein the radiator is supplied with heat by the exhaust from the explosive engine; and generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

The invention is illustrated in the accompanying drawings wherein like characters indicate like parts throughout the several views.

Referring to the drawings:

Figure 1 is a fragmentary view partly in side elevation and partly in vertical section illustrating the improved heater as applied to an automobile;

Fig. 2 is a section taken through the radiator proper on the line x^2 x^2 on Fig. 1;

Fig. 3 is an enlarged view of the switch valve and casing of the heating system;

Fig. 4 is a section taken on the line x^4 x^4 on Fig. 3 with some parts removed;

Fig. 5 is a front elevation with some parts broken away, showing the switch valve opening device; and

Fig. 6 is a side elevation of the parts shown in Fig. 5.

The numeral 1 indicates the body of an ordinary automobile, the same having an inclined foot board 2 and the customary dash board 3. The numeral 4 indicates a portion of the explosive engine and the numeral 5 indicates the discharge end of the exhaust manifold thereof. The numeral 6 indicates an ordinary exhaust muffler.

The manifold 5 is connected to the exhaust muffler 6 by an exhaust pipe 7 and a switch valve casing 8. This switch valve casing 8 has inlet and outlet upwardly extended ports 9 and 10, respectively, the upper extremities of which connect to a radiator 11, which, as shown, is of rectangular hollow form, and is provided with an internal partition 12 that extends between the upper extremities of the ports 9 and 10, and at its ends, terminates short of the end walls of the said radiator, so as to leave passages for the hot exhaust products of combustion, as indicated by arrows marked on Fig. 2. As shown, the radiator 11 is secured to flanges on the upper extremities of the ports 9 and 10, by means of screw bolts 13. The said radiator 11 is a thin flat structure which is inclined to correspond to, and closely engages the inclined foot board 2, and is preferably covered by a thin sheet metal perforated casing 14, upon which the feet of the chauffeur, or driver, may be placed.

The switch valve is placed at the junction of the lower extremity of the inlet port 9 with the main or direct exhaust conduit of the switch valve casing 8; and this valve comprises a disk-like head 15, a segmental flange 16 and a shaft 17, which latter projects in both directions from the said head 15. One end of the shaft 17 works through an axial perforation in a disk-like head 18 that is formed integral with the casing 8, while the other end of the said shaft 17 is seated in the axial depression of a removable cap or disk like head 19 that has screw-threaded engagement with the said casing 8. To the outwardly projecting end of the shaft 17 is attached a crank arm 20 having a wrist pin 21. The circumferentially opposite edges of the segmental valve flange 16 are preferably quite sharp, so that they will closely engage and scrape against the cylindrical walls of the valve seat formed therefor, within the casing 8. When the switch valve just described is in the position shown in Figs. 1 and 3, all of the hot exhaust will be caused to pass upward through the port 9, through the radiator 11, downward through the port 10 and from thence on through the casing 8 and pipe 7 into and through the muffler 6. When the said switch valve is moved into the position indicated by dotted lines in Fig. 3, the segmental flange 16 will close the port 9 and will leave open the main or direct passage through the valve casing 8, so that the exhaust will then not pass through the radiator but will directly pass to and through the exhaust muffler. In this position of the said switch valve, the exhaust will not circulate through the radiator, but might back up into the said radiator slightly through the port 10. To prevent this, a very light gravity opened check valve 22 of the flapper type is loosely hinged at its

upper edge to the lower front wall of the said port 10. The force of the exhaust passing through the direct conduit of the casing 8 will blow the said check valve 22 upward into a position to close the lower end of the said port 10.

The switch valve may be set in either of the two extreme positions noted, to-wit, in a position to cause all of the exhaust to pass through the radiator on its way to the exhaust muffler, or in a position to cut off the exhaust from the radiator and to cause the same to pass directly to the exhaust muffler. The said switch valve may also be set in different intermediate positions, so as to cause more or less, but not all of the exhaust to pass through the radiator, and thus give a desired variable amount of heat in the radiator. I therefore also provide a simple and efficient device for setting the said valve in certain predetermined positions, to-wit, in the two extreme positions shown, and in several intermediate positions. This valve setting device, preferably comprises a casing 23, which is secured in an upright position on the dash board 3, and is graduated on its face to indicate, for example, full, open, completely closed, one-fourth open, one-half open, and three-fourths open, positions of the said switch valve. Mounted to slide vertically in the casing 23 is a rack bar 24, the teeth of which mesh with a small pinion 25 carried by a short stem 26 that is journaled in the front plate of the casing 23 and is provided with an operating knob 27. The lower end of the rack bar 24 is provided with a fork 28 that embraces the wrist pin 21 of the crank arm 20 of the switch valve. The numeral 29 indicates a spring applied to the casing 23 that is frictionally engageable with the rack bar 24, the said rack bar being preferably provided with indentations that engage with the free end of the said spring in the several above noted positions of the rack bar 24.

The so-called switch valve is itself of highly efficient construction. The sharp edges of its segmental flange 16 keep carbon scraped from the walls of the valve casing and prevent the valve from being stuck by the accumulation of carbon. Its shaft 17, at one end only, projects through the casing, and at that side, the disk like head 15 of the said valve engages the flat head 18 of the valve casing, and is pressed tightly against the same by the internal pressure from the exhaust, so that leakage is thereby prevented around the projecting end of the said valve shaft or stem. If at any time it should become necessary to remove the valve or to open up the casing for cleaning purposes, it is only necessary to remove the cap or head 19, and this gives access not only to the interior of the valve casing but also to the interior of the switch valve itself.

The radiator is preferably utilized as a foot rest and warmer. The perforated casing 14 keeps the shoes out of direct contact with the hot radiator and thus prevents burning of the shoes. Furthermore, the said perforated casing 14 may be cheaply stamped from sheet metal and plated, so that it is given a neat and finished appearance, whereas the radiator proper would usually be a casting without finish.

It will be noted that when the bolts 13 are unscrewed, the radiator may be removed from the foot board. This is important, because in the summer time it is desirable to take off the radiator, and also it is sometimes desirable to remove the radiator for the purpose of cleaning the interior thereof.

What I claim is:

1. The combination with the exhaust conduit from an explosive engine, of a radiator having inlet and outlet ports connecting the same to the exhaust conduit, and a switch valve movable from a position in which it closes said inlet port and opens the direct exhaust conduit, into a position in which it opens said inlet port and closes the direct exhaust conduit at a point between said inlet and outlet ports, and a gravity opened check valve of the flapper type hung in said direct exhaust conduit between said inlet and outlet ports and adapted to be blown by the exhaust into a position to close said outlet port, when the said inlet port is closed by said switch valve.

2. The combination with the exhaust conduit of an explosive engine, of a radiator having inlet and outlet ports connecting the same to said exhaust conduit, an oscillatory cut-off valve located at the junction of said inlet port with said exhaust conduit and having a segmental flange movable from a position in which it closes the said inlet port and opens the direct exhaust conduit, into a position into which it will open said inlet port and close the direct exhaust conduit at a point between said inlet and outlet ports, and a gravity opened check valve of the flapper type loosely hung in said direct exhaust conduit between said inlet and outlet ports and adapted to be blown into a position to close said outlet port, when said cut-off valve is in a position to close said inlet port.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS C. HOUGH.

Witnesses:

BERNICE G. WHEELER,

HARRY D. KILGORE.