G. E. WHITNEY.

EXHAUST DISSIPATING APPARATUS FOR MOTOR VEHICLES.

APPLICATION FILED DEC. 1, 1899.

922,741. Patented May 25, 1909.

Fig. 1.

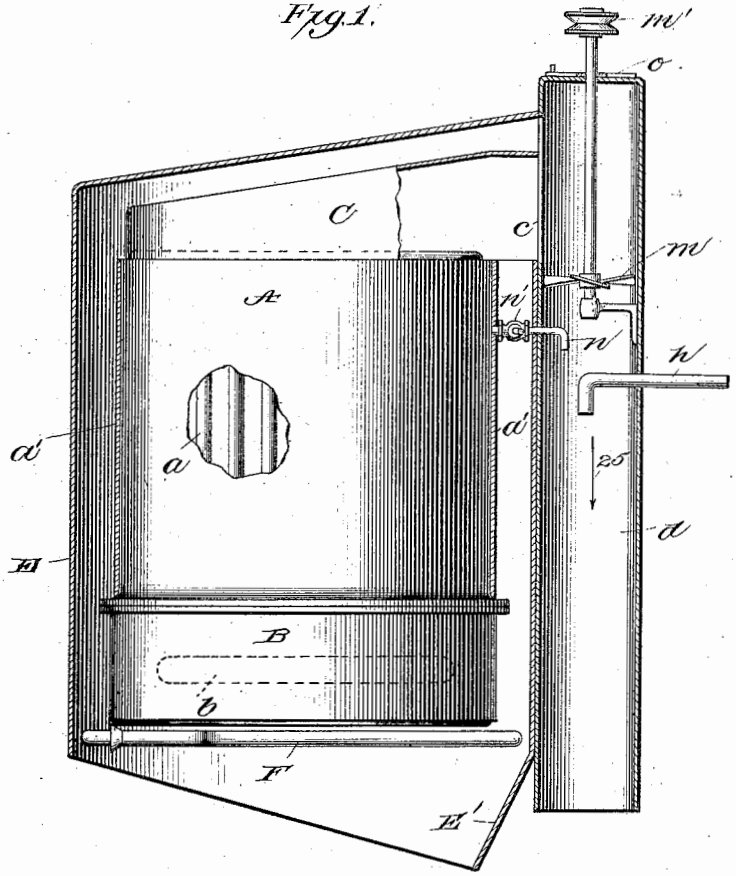
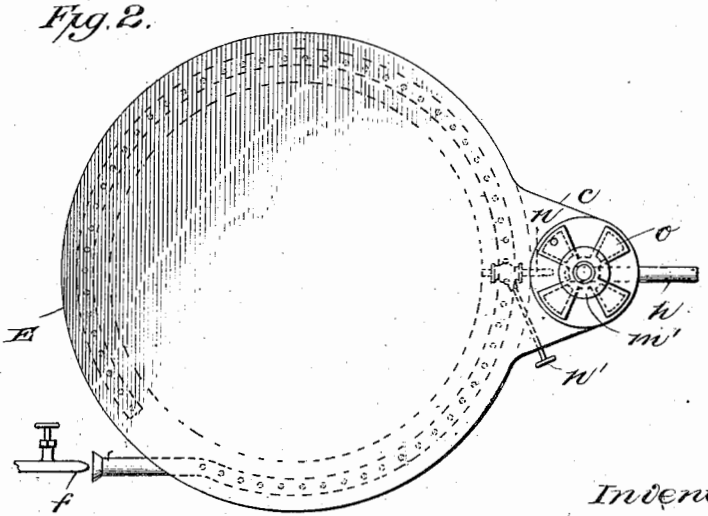


Fig. 2.



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UNITED STATES PATENT OFFICE.

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EXHAUST-DISSIPATING APPARATUS FOR MOTOR-VEHICLES.

No. 922,741. Specification of Letters Patent. Patented May 25, 1909.

Application filed December 1, 1899. Serial No. 738,781.

To all whom it may concern:

Be it known that I, GEORGE E. WHITNEY, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Exhaust-Dissipating Apparatus for Motor-Vehicles, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In motor vehicles and the like where steam is employed as the motive power, more or less difficulty is encountered in disposing of the exhaust steam from the engine or motor in such a manner as to render it invisible.

Devices have been provided for so dissipating the exhaust at ordinary or moderate temperatures that it is not visible to any appreciable extent, but in cold or cool weather the lower temperature of the atmosphere greatly increases the difficulty in rendering the exhaust invisible.

The object of the present invention is to provide improved means for dissipating the exhaust so that it is rendered practically invisible at any atmospheric temperature.

The various features of my invention will be hereinafter fully described in connection with the accompanying drawings and pointed out in the claims.

In the drawing, Figure 1 in elevation partial section shows a steam generator of ordinary construction, equipped with means embodying my invention for dissipating the exhaust steam, and Fig. 2 is a top or plan view of the apparatus, Fig. 1.

In the embodiment of my invention selected for illustration herein and illustrated in the drawing, A is a vertical boiler of ordinary or suitable construction, it being herein shown as provided with vertically arranged tubes *a*, through which the products of combustion are caused to pass from the combustion chamber below the boiler, to be described, to the outlet or bonnet, also to be described, at the opposite end of the boiler, the water and steam space being within the boiler shell and surrounding said tubes.

Below the boiler I have shown a heating chamber B, within which is arranged a suitable burner or burners, typified at *b*, by which to heat the water within the boiler and generate the steam required for the engine or other motor.

C is a bonnet inclosing the upper end of the boiler and communicating at one side, at *c*, with the downwardly extended stack *d*, constituting one form of exit passage, so that the products of combustion from the burner rising through the flues in the boiler will be collected in the bonnet C and conducted through the neck *c* to the stack *d*, down which they are caused to pass, escaping at the lower end thereof.

The boiler A preferably will be lagged, coated or otherwise covered as at *a'* to prevent as far as possible radiation of heat therefrom: but however thoroughly the boiler will be lagged or protected there is bound to be very considerable radiation of heat from the boiler and this I propose to utilize as follows: Surrounding the boiler and the heating chamber B, I have arranged a jacket E of suitable material, such for example as sheet metal, the same dropping somewhat below the bottom of the combustion chamber B, as shown, and rising somewhat above the top of bonnet C, as shown, and closed at its top so as to form a complete jacket about and inclosing the sides and top of the boiler. This forms an annular air space surrounding the boiler and communicating at its top with an air space between the top of the jacket and the top of the bonnet, which latter communicates also with the downwardly extended stack *d*, as shown. At the bottom of this annular air space, and between the combustion chamber and the jacket, I have shown a circular or ring-like burner F, supplied with a liquid fuel and air in suitable quantities by a suitable jet device *f*, Fig. 2; this burner being provided as shown with a large number of jets through which the combined air and vaporized fuel issue and are burned.

The exhaust device shown in the form of an exhaust pipe *h* from the engine, not shown, enters the stack *d* at a suitable point, as shown, and is directed toward the outlet end of the stack, so that the exhaust is projected from the pipe *h* in the direction of the arrow 25, and the object of my invention is to so dissipate this exhaust that it will not show where it issues from the outlet end of

the stack. This is accomplished by the construction shown, as follows: The heat radiated from the boiler A and combustion chamber B is sufficient to raise to a high temperature the air between the boiler and combustion chamber and inclosing jacket. The action of the exhaust issuing from the pipe *h* creates a down-draft in the stack *d*, that not only draws the products of combustion from the bonnet C into and expels them from the stack, but also draws the heated air from the annular chamber referred to, up and over the bonnet C where it is further heated by radiation therefrom, and impels it downwardly also through the stack *d* in a highly heated condition, such as will enable it to mingle thoroughly with the exhaust steam issuing from the pipe *h*, thereby dissipating the exhaust in such a manner that it is not ordinarily visible at the outlet end of the stack.

I have found that the higher the temperature of the air caused to mingle with the exhaust, the more effectively is the exhaust dissipated and rendered invisible, and I have also found that there is usually sufficient heat radiated from the combustion chamber and the boiler, even though the latter be lagged or protected to heat the air to the required temperature for this purpose. If for any reason the temperature of the air thus heated is not sufficiently high, the burner F is lighted and the flame issuing therefrom, in addition to the heat radiated from the combustion chamber and boiler, is amply sufficient to raise the air to the required temperature.

While ordinarily the exhaust from the pipe *h* is sufficient to draw the required quantity of heated air and products of combustion into the stack *d* to dispose of the exhaust, yet my invention comprehends the use of other means for creating the required draft when necessary. For example I have shown arranged in the stack *d*, just below the neck *c* of the bonnet, a rotary fan or blowing device *m* journaled in suitable bearings and provided with a pulley *m'* by which it may be belted to a suitable driving shaft, it may be the engine shaft, and rotated to increase the draft in the stack. In addition to this blower I have also provided a fixed jet device *n*, controlled by a suitable valve *n'*, which may be used in addition to the blower or in lieu thereof for increasing the draft of the stack.

If the atmospheric temperature is extremely low, it may be found advisable to use the fixed jet device or the blower *m*, or both, in addition to the normal exhaust from the pipe *h;* while at higher atmospheric temperatures the jet device and the blower, or either of them, may be cut out and the other device alone depended upon.

It will be noticed that the burner F is somewhat below the bottom of the combustion chamber, in order to provide at its opposite sides and between the jacket and the edge of the combustion chamber an area equal to the most contracted area of the annular chamber above the burner and between the boiler and the jacket; in other words, the arrangement is such that the presence of the burner does not reduce the area of the air space.

The utilization of the radiating heat of the boiler in accordance with my invention, has the added advantage that the occupant of the vehicle is not subjected to the heat, which, at times, might be uncomfortable and as would be the case were it permitted to radiate freely without performing any work.

The top of the stack *d* is shown as provided with a damper *o*, which may be moved to open the upper end of the stack and provide for an up-draft when required, as for instance when firing-up, and may thereafter be more or less closed to completely close the upper end of the stack or partially close the latter, if it is desired to admit additional air into the stack while the down-draft is being utilized.

To facilitate the entrance of air into the annular space surrounding the boiler and likewise to assist in moving the air upwardly through this chamber and into the exhaust passage or stack, I have shown the rear portion of the jacket E as dropped and inclined forward somewhat to form a sort of scoop E' to catch the air as the vehicle moves forward and direct it upwardly into the said annular air space. In other words, this formation of the depending portion of the jacket constitutes in effect a mouth or channel turned in the direction of movement of the vehicle for the purpose of drawing in the air and projecting it upwardly.

I have herein illustrated and described my invention in connection with the best embodiment thereof now known to me, but I desire it to be understood that my invention is not necessarily restricted to the particular embodiment or construction shown, for it may be varied in many ways within the spirit and scope of my invention as disclosed and claimed.

I consider it broadly new to employ the heat radiating from the barrel or cylindrical portion of the generator, either with or without radiation from the combustion chamber, and with or without radiation from the bonnet, in addition thereto, to heat air. I also consider it broadly new to employ independently of the burner or heating devices for generating the steam in the generator, a burner or heating device expressly to heat air or gas to be mixed with the exhaust for dissipating the latter to render it invisible.

Having fully described my invention what I claim and desire to secure by Letters Patent, is:—

1. The combination with a steam generator for a motor vehicle, and a steam engine and its exhaust device, of means utilizing the radiating heat from said generator to supply heated air to said exhaust device.

2. The combination with a boiler of a casing above the same to receive the products of combustion, a downwardly extending flue connected with said casing, means for conducting exhaust steam from the engine to said downwardly extending flue, and means for supplying heated air to said downwardly extending flue.

3. The combination with a steam engine exhaust device, of an air supply conduit therefor, and a burner to heat the air in said conduit.

4. The combination with a steam engine exhaust device, of an air supply conduit therefor, and a burner arranged within said conduit to heat the air therein.

5. The combination with a boiler of a casing above the same to receive the products of combustion, a downwardly extending flue connected with said casing, means for conducting steam exhaust from the engine to said downwardly extending flue, an air supply conduit connected with said downwardly extending flue, and means for heating said conduit and the contained air externally.

6. The combination with a steam engine exhaust device, of an air supply conduit therefor, means to heat said conduit externally, and additional heating means within said conduit for heating the air within the conduit.

7. The combination with a steam engine exhaust device, of a steam generator, and an air supply conduit for said exhaust device arranged adjacent the said generator to receive heat therefrom.

8. The combination with a steam engine exhaust device, of a steam generator, and an air supply conduit for said exhaust device arranged to be heated by radiation from said generator.

9. The combination with a steam engine exhaust device, of a steam generator, an air supply conduit for said exhaust device arranged to be heated by radiation from said generator, and additional heating means arranged within said conduit.

10. The combination with a steam engine exhaust device, of a boiler, and an annular air supply conduit outside said boiler and heated thereby to supply heated air to said exhaust device.

11. The combination with a steam engine exhaust device, of a boiler, an annular or ring-like air supply conduit for said exhaust device outside said boiler and receiving heat therefrom, and a ring-like heating burner also arranged in said conduit.

12. The combination with a steam generator having heating means, and an exit passage for the products of combustion from said heating means, of a steam engine exhaust device discharging into said exit passage, an air supply conduit also discharging into said exit passage and heated by radiation from said generator.

13. The combination with a steam generator having heating means, and an exit passage for the products of combustion from said heating means, of a steam engine exhaust device discharging into said exit passage, an air supply conduit surrounding said generator to be heated thereby and connecting with said exit passage to supply heated air within the latter.

14. The combination with a steam generator having heating means, and an exit passage for the products of combustion from said heating means, of a steam engine exhaust device discharging into said exit passage, an air supply conduit surrounding said generator to be heated thereby and connecting with said exit passage to supply heated air within the latter, and additional heating means for said conduit.

15. The combination with a steam generator having heating means, and an exit passage for the products of combustion from said heating means, of a steam engine exhaust device discharging within said exit passage, an air supply conduit communicating with said exit passage, means to heat said conduit and the contained air, and means independent of said conduit to supply air also to said exit passage, and controlling devices for regulating the admission of air through said independent air supplying means.

16. The combination with a steam engine exhaust device of a motor vehicle, and a boiler, of an annular air supply conduit for said exhaust device outside said boiler and heated thereby, said conduit having its entrance end opening in the direction of movement of said vehicle.

17. The combination with a steam boiler, and an engine exhaust device, of a jacket surrounding said boiler forming an air space to supply heated air to said exhaust device, the rear end of said jacket being dropped below the boiler to catch the air as the boiler is moved forward.

18. The combination with a boiler of a casing adapted to receive the products of combustion, above the same provided with a lateral extension and having an upper outlet in said lateral extension, a downwardly extending flue, and means for discharging steam exhaust into said downward flue.

19. The combination with a boiler, of a casing adapted to receive the products of combustion, above the same having an upper outlet and a downwardly extending flue, and an exhaust pipe extending into said flue.

20. The combination with a boiler of a downwardly extending flue for discharging the products of combustion therefrom, an exhaust pipe extending into said flue and means for conducting heated air into said downward flue.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE E. WHITNEY.

Witnesses:

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