

No. 642,771.

Patented Feb. 6, 1900.

G. E. WHITNEY.
MOTOR VEHICLE.

(Application filed Feb. 4, 1899.)

(No Model.)

2 Sheets—Sheet 1.

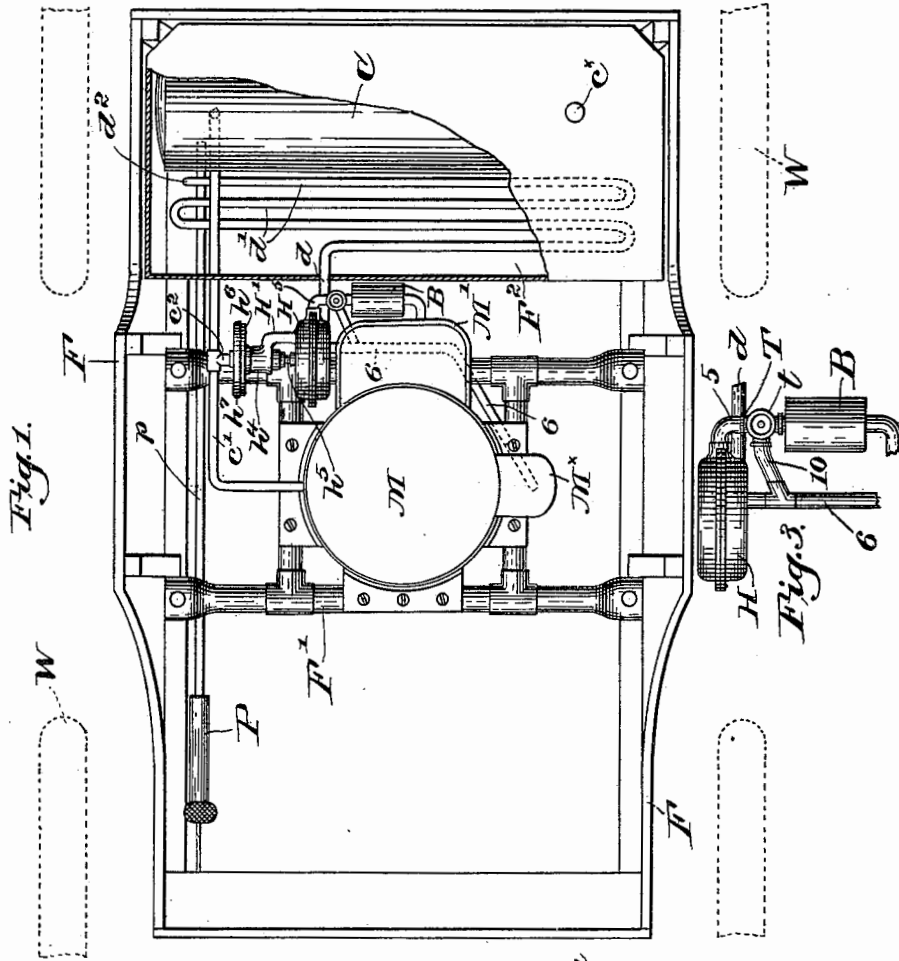


Fig. 1.

Fig. 3.

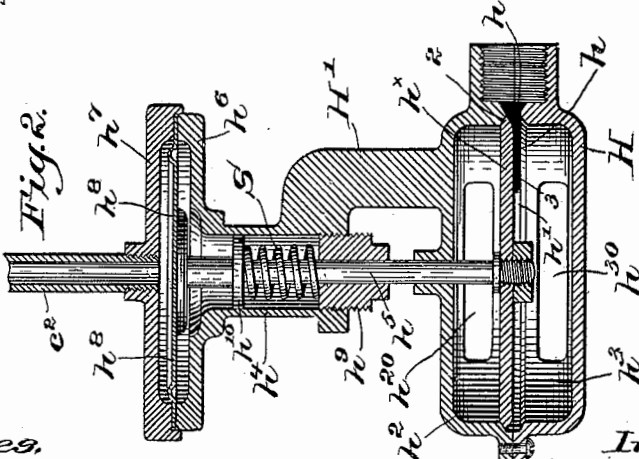


Fig. 2.

Witnesses,
Thomas J. Drummond,
James M. Urquhart,

Inventor
George E. Whitney,
by *Wm. S. Gregory*
Attys.

No. 642,771.

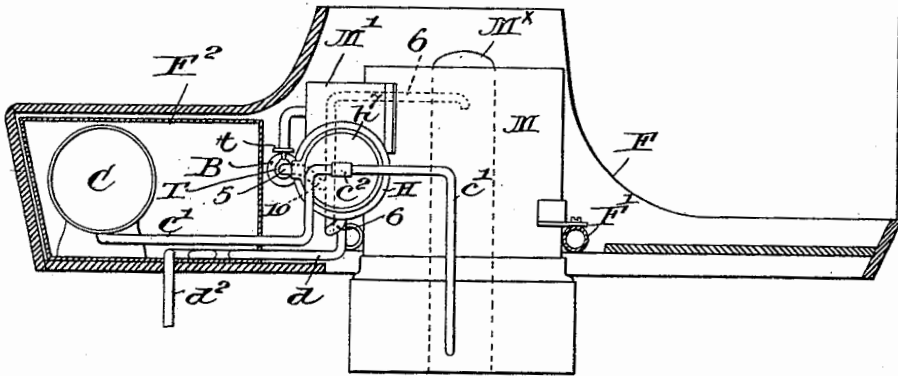
Patented Feb. 6, 1900.

G. E. WHITNEY.
MOTOR VEHICLE.
(Application filed Feb. 4, 1899.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 4.



Witnesses,
Edward F. Allen,
Gustave F. Magwitzky

Inventor,
George E. Whitney,
by Crosby Gregory,
attys.

UNITED STATES PATENT OFFICE.

GEORGE E. WHITNEY, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE
WHITNEY MOTOR WAGON COMPANY, OF KITTERY, MAINE.

MOTOR-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 642,771, dated February 6, 1900.

Application filed February 4, 1899. Serial No. 704,462. (No model.)

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 Motor-Vehicles, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates more particularly to motor-vehicles of the type wherein the power is provided by a steam or other expandible medium motor burning hydrocarbon or other liquid fuel; and it has for its objects, primarily, the utilization of heat, preferably from the motor, to create a pressure sufficient to effect the feed of the fuel to the point at which it is used, and, secondarily, the heating of the feed-water and, if desired, the condensation of the exhaust of the motor more or less completely, these several features being adapted to be employed with special advantage in motor-vehicles. It is well known that in such vehicles a gravity-feed of the liquid fuel can be used to a very limited extent, if at all, pressure upon the fuel being utilized to feed the same; but this pressure has been heretofore created manually by suitable pumping devices manipulated from time to time, as required. In my present invention I create or generate pressure upon the liquid fuel sufficient to effect feed thereof by or through thermal action, preferably by utilizing the exhaust of the motor, means being provided for automatically controlling or governing the generation of the feeding pressure by or through the variation of such pressure.

Various novel features of my invention will be hereinafter fully described in the specification and particularly pointed out in the claims.

Figure 1 is a top or plan view of a sufficient portion of a motor-vehicle and motor to be understood, with one embodiment of my invention applied thereto, the body of the vehicle being shown and the feed-water tank partially broken out. Fig. 2 is an enlarged sectional view of an automatic controlling device for regulating the generation of pressure on the liquid fuel for the motor. Fig. 3 is an en-

larged detail in plan of a portion of the automatic controlling device, with a by-pass and a manually-operated controller therefor, to be described. Fig. 4 is a partial side elevation of the motor, the feed-water tank, and the controlling device, with the various connection shown in Fig. 1, and part of the vehicle-body being shown in vertical longitudinal section.

Any suitable steam-motor or other expandible medium may be employed comprising a steam or other generator and an engine, and such a steam-motor may be used as shown and described in United States Patent No. 601,218, granted to me the 22d day of March, 1898, and in Fig. 1 the boiler M, stack or flue M^x for the escape of the products of combustion, and a hood or jacket M, surrounding the cylinders and valve-chests of the engine and mounted on the boiler, may be substantially as shown and described in said patent, the exhaust passing through a muffler B of any suitable construction to deaden the sound of the exhaust and thence to the means for utilizing the exhaust to effect the feed of the fuel, to be described.

I have herein shown in Figs. 1 and 4 the motor as mounted on cross-bars F', secured to the body F of a motor-vehicle, the wheels W being partially indicated by dotted lines in Fig. 1, and the boot or back of the body is in the present instance shown as provided with a tank F² for the feed-water, the top or cover of the tank being partly broken out, the said tank being suitably connected with the boiler.

A preferably cylindrical receptacle C for naphtha or other liquid fuel is herein arranged to be heated by the exhaust from the motor, and a convenient means to achieve this end is to mount the receptacle C in the tank, so that the water in the latter will more or less surround said receptacle, a manually-operated air-pump P being connected with the latter by a pipe p to generate the necessary pressure when raising steam in the motor, and a filling-inlet c^x is provided for the receptacle. Inasmuch as it is also advantageous to heat the feed-water, I have herein shown the apparatus so constructed that the

feeding pressure for the liquid fuel is created or generated by the heating of the feed-water, and in connection with the latter, if the exhaust-steam from the motor is used, such exhaust-steam may be more or less condensed, so that when it finally escapes into the atmosphere there is little or no visible vapor. In the patent referred to other means are provided for coacting upon or treating the exhaust so that it will be invisible, or substantially so, at ordinary temperatures of the atmosphere.

Referring to Figs. 1 and 4, a pipe d enters the feed-water tank F^2 and is connected with a series of bends d' therein, preferably extended lengthwise thereof, the end d^2 of the bends passing out of the tank to the outer air, while the pipe d communicates with the source of the heating medium through a three-way cock T and the muffler B , if the motor-exhaust is utilized.

By the construction now to be described the variation of pressure upon the liquid fuel is made to automatically control the generation of such pressure.

It is to be understood that while I have herein shown the apparatus as constructed and arranged to utilize the motor-exhaust as the medium for generating feeding pressure for the fuel my invention is not restricted thereto, as live steam or other heating medium could be employed.

A pipe c' , Figs. 1 and 4, leads from the receptacle C to the furnace of the motor, (not shown,) at which the fuel is to be utilized and of any suitable construction, and between this pipe and the muffler B , I interpose an automatic controlling device which governs the effective operation of the exhaust to generate feeding pressure upon the liquid fuel. Referring to Fig. 2, the illustrated form of controlling device comprises a preferably annular case H , having an inlet h , segmental in form, forming a part of a valve-seat h' within the case, said seat having two opposed beveled faces 2 3 for a disk-like valve h^x , peripherally beveled, as shown, and dividing the case into two compartments $h^2 h^3$, having outlet-ports $h^{20} h^{30}$, respectively. When the valve is in the position shown in Fig. 2, the inlet-port h' communicates with the compartment h^3 , and when the valve is seated on the seat-face 3 the compartment h^2 communicates with the inlet-port, the latter being shown as connected by a pipe 5 with the muffler B . A pipe 6 (partially shown in dotted lines, Fig. 1) connects the port h^{20} with the stack or flue M^x , and the port h^{30} is connected by pipe d with the heating-bends d' . A standard H' on the exterior of the valve-case has a tubular portion h^4 concentric with the valve-stem h^5 and is enlarged at its upper end, as at h^6 , to form one wall of a chamber, the other wall being formed by a recessed cap h^7 , secured to the enlargement h^6 . The chamber thus formed is divided transversely by a flexible diaphragm h^8 , held at its edges between the

parts h^6 and h^7 and having secured to its inner side the valve-stem h^5 , which passes through a boss into the compartment h^2 and the tubular part h^4 of the standard H' . A nut h^9 is screwed into the open end of the tubular part, and between the nut and an annular flange or disk h^{10} , fast on the stem, is interposed a spring S , the tension thereof being adjusted by the nut, said spring normally holding the valve in the position shown to close the compartment h^2 . The compartment at the outer side of the diaphragm is connected by a branch pipe c^2 with the fuel-feed pipe c' , Fig. 1, so that a pressure in the fuel-receptacle C greater than the force of the spring S will flex the diaphragm h^8 and move the valve h^x from its position shown in Fig. 2 onto the face 3 of the valve-seat h' . This operates to shut off the motor-exhaust from the bent piping or condenser d' and to turn it into the stack M^x in the present instance or to any other desired exit, the inlet h and the ports $h^{20} h^{30}$ being made large enough to prevent any throttling of the exhaust.

As to the operation of the apparatus herein illustrated, the necessary feeding pressure on the fuel is generated by the pump P when it is desired to first start the motor, and thereafter the pressure is generated or maintained by or through heating of the liquid fuel in the receptacle C , the apparatus herein shown being adapted to heat such receptacle by the rise in temperature of the feed-water, due to passage of the motor-exhaust to the bends d' . With the controlling device herein described its normal condition is shown in Fig. 2; but when the pressure to which the fuel is subjected has arisen to a predetermined point, governed by the tension of the spring S , the valve h^x will be operated as described to shut off the heating medium from the bends d' . The fall in the temperature of the fuel in the receptacle will be accompanied by a corresponding decrease in pressure on the fuel until the spring S can operate to move the valve into its former position. It will thus be obvious that the operation of the means for heating the fuel and generating feeding pressure thereupon is automatically controlled by or through variation of such pressure in the fuel-receptacle or its connections. If it is desired to control the generation of such pressure manually rather than by the automatic controlling device described, the third port of a three-way cock T of usual construction will be connected by a by-pass 10 with the pipe 6, leading to the smoke-flue M^x , as shown clearly in Fig. 3.

When the automatic controlling device is operative, communication from the muffler to the valve-case H will be effected through the cock T , the by-pass 10 being closed thereat; but to prevent the operation of or throw out of action the automatic controller the valve-handle t , Fig. 3, is turned to close the passage from the muffler to the valve-case and to open the passage to the by-pass. The heating

medium will then pass through the three-way cock to the by-pass and out through the stack, the heating means being cut out, so that there will be no operation of the diaphragm h^s in opposition to the spring S, feeding pressure upon the fuel being maintained by a suitable pump.

I prefer to use such a diaphragm in the automatic controlling device as will operate with a quick snap, to thereby change the position of the valve rapidly instead of by a gradual movement.

From the foregoing description it will be obvious that the heating of the liquid fuel will tend to vaporize a portion thereof with an attendant creation or generation of pressure, this pressure being utilized to effect the feed of the fuel to the combustion-point, and the pressure increases or decreases with the rise or fall of the temperature to which the main body of the liquid fuel is subjected.

My invention is not restricted to the precise construction and arrangement shown, as the same may be modified or rearranged without departing from the spirit and scope of my invention, and, so far as I am aware, it is broadly new to automatically govern the generation of feeding pressure upon the fuel due to thermal action by or through the variation of such pressure.

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

1. In a motor-vehicle, a receptacle for liquid fuel, means to subject the liquid fuel to feeding pressure by or through thermal action, and a controlling device to automatically govern the thermal action by or through variation of the feeding pressure.

2. In a motor-vehicle, an expansible-medium motor, a receptacle for liquid fuel therefor, means to subject the liquid fuel to feeding pressure by or through thermal action of the motor-exhaust, and a controlling device to automatically govern such thermal action by or through variation of the feeding pressure.

3. In a motor-vehicle, a receptacle for liquid fuel, and means to heat said receptacle, and thereby create pressure within it to effect feed of the fuel therefrom, combined with a controlling device to automatically govern the heating means by or through variation of the feeding pressure.

4. In a motor-vehicle, an expansible-medium motor, a liquid-fuel receptacle therefor, means to utilize heat from the motor to create feeding pressure upon the liquid fuel, and a controlling device governed by variation of such pressure to regulate the utilization of the heat from the motor.

5. In a motor-vehicle, a steam-motor, a feed-water tank, a liquid-fuel receptacle therein, means to utilize the motor-exhaust to heat the contents of the tank, the heating of the feed-water operating to create pressure within the

receptacle to effect feed of the liquid fuel, and a controlling device to automatically govern the operation of said means by or through variation of the feeding pressure.

6. In a motor-vehicle, a steam-motor, a feed-water tank, a liquid-fuel receptacle, means to utilize the motor-exhaust to heat the feed-water and create pressure upon the liquid fuel to effect feed of the same, and a controlling device to govern the operation of said means by or through variation of the feeding pressure.

7. In a motor-vehicle, a steam-motor, a liquid-fuel receptacle, means to utilize the motor-exhaust to create feeding pressure upon the liquid fuel, and a controlling device governed by variation of such pressure to regulate the utilization of the motor-exhaust.

8. In a motor-vehicle, a steam-motor, a feed-water tank, means connected with the motor-exhaust to heat the contents of the tank, a liquid-fuel receptacle in said tank, a valve to govern the passage of the exhaust to said heating means, and a valve-actuator operated by or through variation of pressure in the liquid-fuel receptacle, to close the valve when a predetermined pressure is attained and to open the same when the pressure falls.

9. In a motor-vehicle, a steam-motor, a feed-water tank, means to heat the contents of the tank, a liquid-fuel receptacle within the tank, and means to govern the heating of the tank by or through variation of the pressure in the liquid-fuel receptacle.

10. In a motor-vehicle, a steam-motor having a stack, a feed-water tank, heating means therefor, connections between the motor-exhaust and said heating means and stack, a liquid-fuel receptacle in the tank, a controlling device to govern automatically the passage of the exhaust to the heating means and stack, and independent manually-operated means to deflect the exhaust wholly to the stack.

11. A steam-motor, a feed-water tank therefor, a liquid-fuel receptacle in the tank, the pressure in said receptacle varying according to the temperature of the feed-water, independent means to raise the pressure in the receptacle, a heater in the feed-water tank, connected with the exhaust of the motor, a controlling device operated by or through variation of pressure in the receptacle to automatically govern the operation of the heater, and means to cut out said controlling device and govern the operation of the heater manually.

12. In a motor-vehicle, a steam-motor having a stack, a feed-water tank, a condenser therein connected with the exhaust of the motor, a liquid-fuel receptacle in said tank, a valve to control the passage of the exhaust to the condenser or the stack, operated automatically by or through variation in pressure in the receptacle, a by-pass between the exhaust and the stack, and a manually-operated

three-way cock to control the passage of the exhaust independently of the automatic controlling device.

13. In a motor-vehicle, a steam-motor having a stack, a feed-water tank, a heater therein, a liquid-fuel receptacle within the tank, a valve-case communicating with the exhaust of the motor, a valve dividing said case into two compartments, a connection between one compartment and the heater, and a connection between the other compartment and the stack, and an actuator for the valve, controlled by or through variation of pressure in the fuel-receptacle, to govern the passage of the exhaust into one or other compartment in the valve-case.

14. In a motor-vehicle, a steam-motor, a body, a feed-water tank carried thereby, a liquid-fuel receptacle in the tank, means connected with the exhaust of the motor to heat the contents of the tank, and a controlling device governed by the pressure in the liquid-fuel receptacle to regulate the passage of the exhaust to the tank-heating means.

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

GEORGE E. WHITNEY.

Witnesses:

GEORGE B. UPHAM,
JOHN C. EDWARDS.