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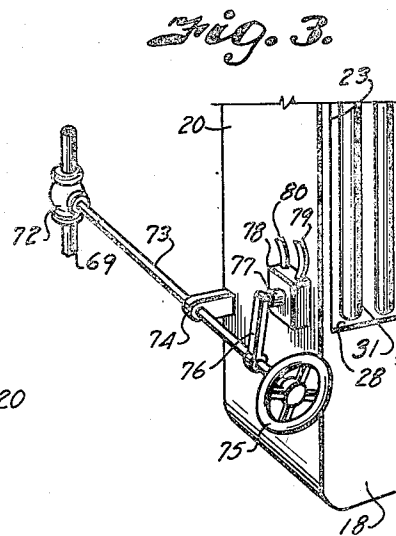
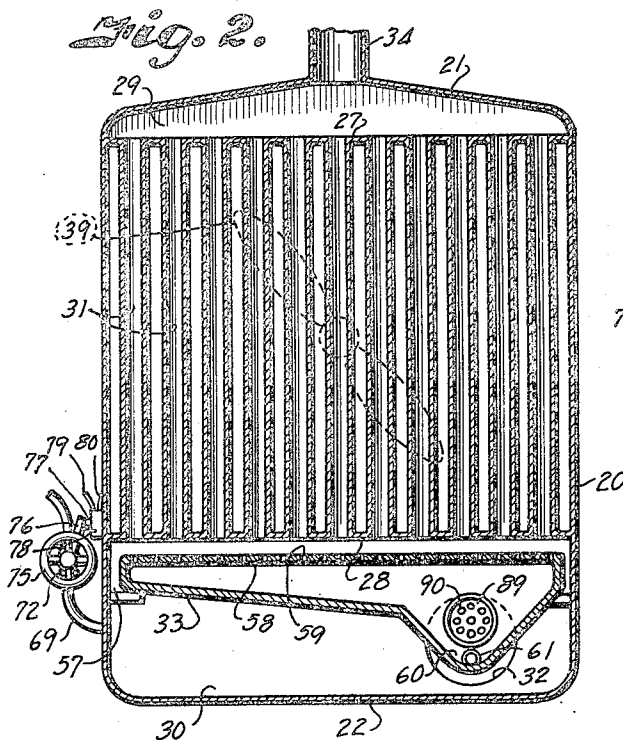
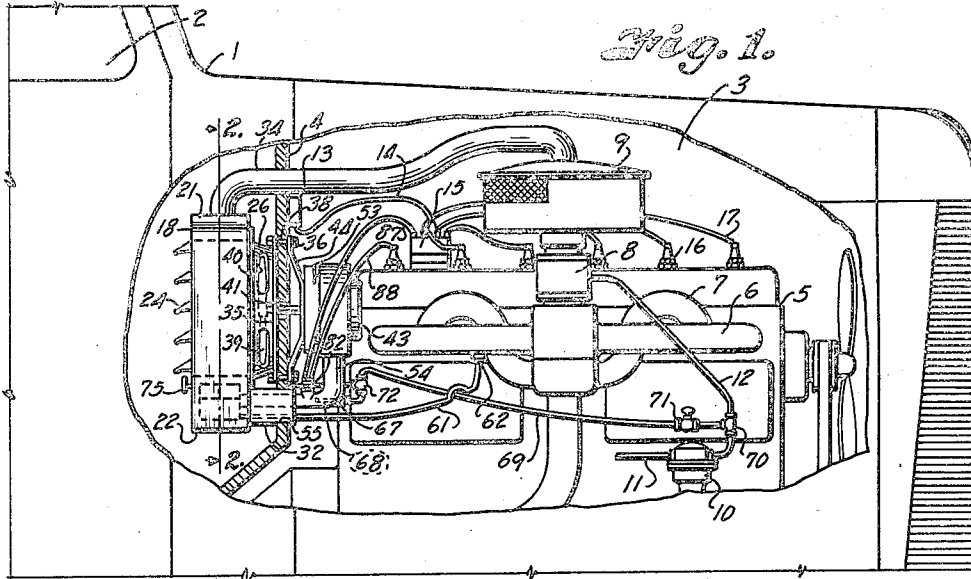
H. D. PINKERTON ET AL

2,289,208

VEHICLE HEATER

Filed Oct. 20, 1939

2 Sheets-Sheet 1



BY

INVENTORS
Harry D. Pinkerton, and
Clarence S. Phenicie.
Arthur L. Brown
ATTORNEY

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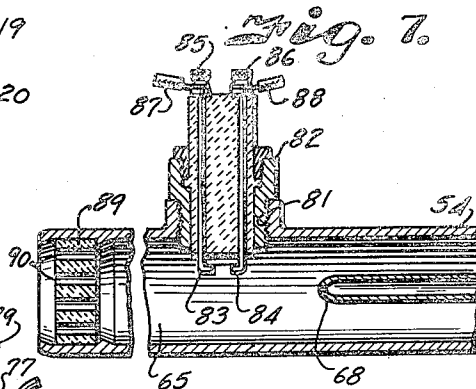
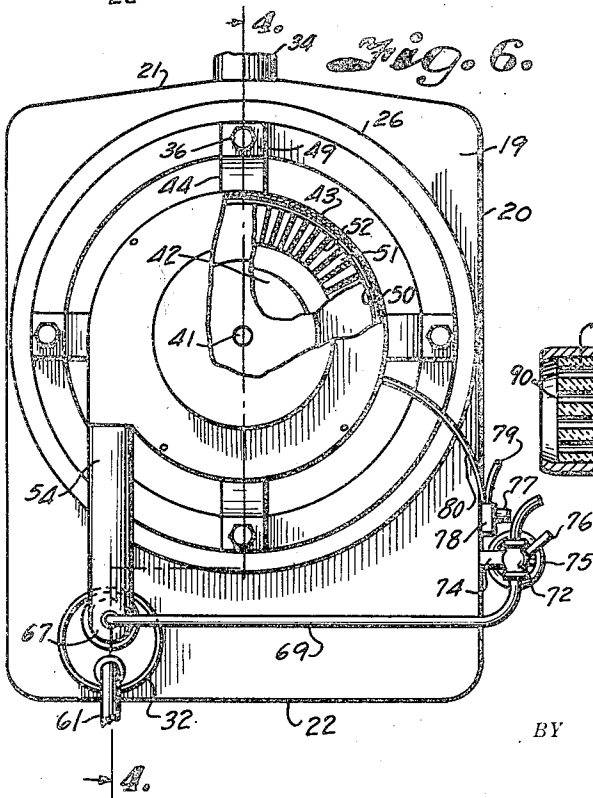
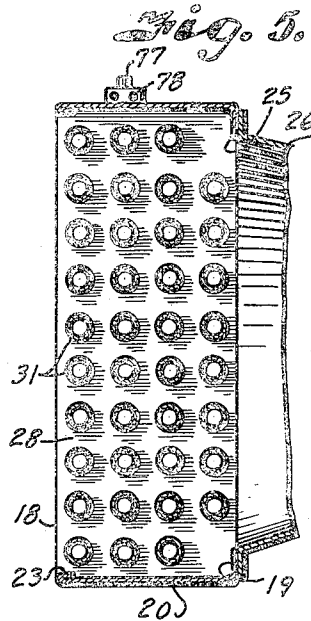
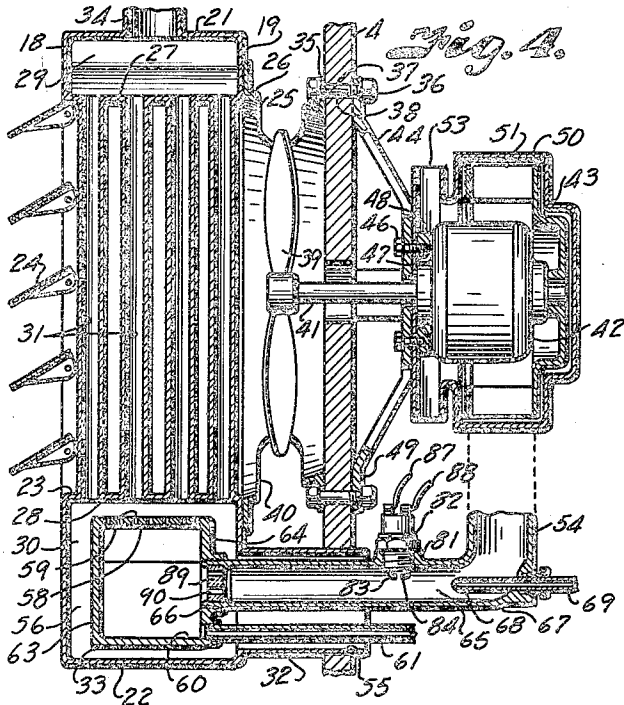
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VEHICLE HEATER

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2 Sheets-Sheet 2



INVENTORS
Harry D. Pinkerton, and
Clarence S. Phenice.
Arthur C. Brown
ATTORNEY

UNITED STATES PATENT OFFICE

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VEHICLE HEATER

Harry D. Pinkerton and Clarence S. Phenicie,
Kansas City, Kans., assignors of one-third to
Ellsworth H. Munford, Kansas City, Mo.

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7 Claims. (Cl. 237—1)

This invention relates to vehicle heaters and particularly to those of the fuel burning type. Heaters of this character have many advantages over the water heated type, but they do not operate with trouble free dependability when using motor vehicle fuel due to clogging of the burner parts and slow burning characteristics of the various antiknock preparations used in most vehicle fuels of today. Even though straight gasolines without antiknock preparations were readily available, the inconvenience of an additional fuel supply separate from the motor fuel supply would make such heaters impracticable. It is therefore essential that heaters of the burner type be designed for trouble free operation on the fuel used in operating the motor of the vehicle.

It is, therefore, the principal object of the present invention to provide a heater of the burner type which operates efficiently and satisfactorily on motor fuels and particularly those employing an antiknock preparation.

Another object of the invention is to provide a burner type heater constructed so that only the radiator unit is mounted within the passenger compartment with the motor and burner connections housed within the engine compartment, thereby permitting ready access to the working parts and less danger of fumes escaping into the passenger compartment.

Further objects of the invention are to provide a heater construction permitting closer mounting of the radiator unit to the dash of the passenger compartment; to provide a motor and fan arrangement with a minimum over-hang into the engine compartment and with the discharge of the fan aligning with the primary air inlet to the burner; and to provide the burner of the heater with a fuel igniting device connected with the high tension ignition system of the engine.

In accomplishing these and other objects of the invention, as hereinafter pointed out, we have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawings, wherein:

Fig. 1 is a side elevational view of a portion of a motor vehicle equipped with a heater embodying the features of the present invention; a portion of the vehicle body being broken away to illustrate the heater and its connection to the ignition, exhaust, and fuel systems of the vehicle motor.

Fig. 2 is a vertical section through the heater unit on the line 2—2 of Fig. 1.

Fig. 3 is a detail perspective view of the fuel and fan control mechanism.

Fig. 4 is a vertical section on the line 4—4 of Fig. 6.

Fig. 5 is a horizontal section through the heater unit.

Fig. 6 is an elevational view of the heater assembly as it appears prior to installation on the dash of a motor vehicle.

Fig. 7 is a detail sectional view of the fuel injection and ignition parts of the burner system.

Referring more in detail to the drawings:

1 designates a motor vehicle body having a passenger compartment 2 and an engine compartment 3, separated by a dash 4. The engine 5 of the vehicle is of the ordinary internal combustion type having intake and exhaust manifolds 6 and 7, a carburetor 8, and air cleaner 9 connected with the air intake of the carburetor, and a fuel supply pump 10 as in conventional automotive construction. The fuel supply pump 10 is connected through a pipe 11 with a fuel tank usually mounted at the rear of the vehicle, and discharges the fuel under pressure through a pipe 12 to the fuel inlet of the carburetor. The engine 5 has the customary ignition system including a high tension coil 13 for supplying a high tension current through a conductor 14 to a distributor 15 which delivers a pulsating current to the spark-plugs 16 through conductors 17.

The motor vehicle parts just described are utilized in connection with our improved heater which is now to be described.

The heater illustrated includes a substantially rectangular casing having front, rear and side walls 18, 19 and 20 respectively connected by a top 21 and a bottom 22. Formed in the front wall, in spaced relation with the top 21 and bottom 22, is an air discharge opening 23 in which is pivotally mounted a plurality of deflecting vanes or louvers 24. The rear wall 19 is provided with a registering opening 25 which may be of circular form as illustrated and covered by a ring-like shield 26, later described.

Extending transversely across the casing at the upper and lower edges of the discharge opening 23, are partitions 27 and 28 cooperating with the top and bottom to provide manifold chambers 29 and 30 that are interconnected by a plurality of tube-like flues 31 through which hot products of combustion pass from the lower manifold chamber to the upper manifold chamber as later described. Connected with the lower manifold chamber, offset from the vertical

median line of the casing, is a tube 32 through which secondary air is supplied to a burner including a flame distributor 33 contained within the lower manifold chamber. The upper manifold chamber is provided in the center of the casing with a vent pipe 34 adapted to be connected to the air cleaner 9.

The shield 26 is of frusto-conical shape with the base attached in covering relation with the opening 25 with the smaller end provided with a circumferential flange 35 adapted for connection with the dash 4 by fastening devices 36 extending through openings 37 in the flange and through registering openings 38 that are drilled through the dash 4. The shield 26 is of a depth to mount a fan 39, which, in the illustrated instance, is of the propeller type and arranged to draw air from the interior of the passenger compartment through openings 40 in the shield and discharge the air between the flues 31 for return to the passenger compartment through the opening 23.

The fan 39 is fixed to the armature shaft 41 of a motor 42 that is enclosed in a blower housing 43 fixed to the engine side of the dash by bracket arms 44, the bracket arms being secured to the motor by fastening devices 46 extending through openings in the bracket, registering openings in a front wall 47 of the blower housing, and into threaded sockets that are formed in bosses 48 on the motor. The outer ends of the arms terminate in foot portions 49 adapted to be fixed to the motor side of the dash by the fastening devices 36, previously mentioned.

The blower housing includes a rotor chamber 50 arranged circumferentially of the motor to mount, preferably, a sirocco type rotor 51 that is carried on the end of the armature shaft opposite the fan 39. The vanes 52 of the rotor are arranged to revolve around the motor as shown in Fig. 4, thereby providing a compact arrangement with a minimum overhang into the engine compartment. Formed between the rotor chamber 50 and the wall 47 are air inlet passageways 53 for admitting air circumferentially of the motor into the rotor chamber, the air being discharged tangentially through a pipe 54 registering with the tube 32, previously mentioned. The tube 32 is of longer length than the shield so that it projects through an opening 55 that is formed in the dash 4 to permit taking in of the combustion supporting air from the motor compartment, thereby avoiding any likelihood of fumes from the burner escaping into the passenger compartment through the air inlet.

The flame distributor 33 previously mentioned includes a hollow body preferably conforming in shape to the horizontal cross-sectional shape of the lower manifold chamber and of smaller dimensions to provide passageways 56 and 57 at the sides and ends thereof for movement of secondary air into contact with the burner flame. The hollow body includes a top wall 58 having a plurality of orifices 59 for admitting jets of flame adapted to play in the direction of the partition 28 to directly heat the tube-like flues so that the air moved by the fan 38 is heated thereby. The bottom of the flame distributor slopes downwardly toward the end registering with the tube 32 to form a sump 60 that is connected by a pipe 61 leading through the tube 32 and having connection with the intake manifold 6, as indicated at 62. The flame distributor body also includes side walls 63 and 64 which cooperate with the top and bottom walls to form a

combustion chamber having connection with an ignition chamber 65. The ignition chamber 65 is formed by a tube, which extends through the tube 32 and has its forward end threaded in an opening 66 of the flame distributor. The opposite end of the ignition chamber connects by an elbow portion 67 with the air discharge pipe of the blower so that primary air is discharged under pressure into the ignition chamber and through the ignition chamber into the flame distributor. Fuel is delivered to the ignition chamber through a nozzle 68 that extends through the elbow portion in concentric arrangement with the ignition chamber and is connected by a pipe 69 with the fuel pipe 12 through a T connection 70, the pipe 69 being provided adjacent the T 70 with a stop valve 71.

The pipe 69 is preferably arranged to mount a control valve 72 therein so that its stem 73 extends through a suitable opening in the dash and is rotatably mounted in a bracket 74 carried by the heater casing as clearly shown in Fig. 2, the free end of the stem being of sufficient length to carry a hand wheel 75 by which the valve is manipulated from the passenger compartment. Fixed on the stem of the valve is an arm 76 for contacting a push button 77 of a switch 78 that is mounted on the side of the casing 20 and has connection with the motor circuit through wires 79 and 80. Thus when the valve is opened by rotation of the hand wheel 75, the arm 76 moves away from the button to close the motor circuit. Upon actuating the hand wheel to close the valve the arm 76 engages the button 77 to permit opening of the circuit and stop actuation of the motor when the fuel supply to the heater is shut off.

In order to ignite the fuel spray that is discharged under pump pressure through the nozzle 68, the ignition chamber has a threaded opening 81 therein to mount an igniting device 82, having electrode points 83 and 84 arranged near the jet of fuel discharged from the nozzle. The electrodes of the igniting device are insulated from the metal parts of the apparatus and are separately connected by binding posts 85 and 86 with conductors 87 and 88, the conductor 87 leading to one of the distributor terminals of the timer 15 and the conductor 88 leading to the spark-plug ordinarily connected with that terminal of the distributor. The igniting device is thus connected in series with the spark-plug and the burner fuel is ignited by the same high tension current supplied to the plug.

To further assure ignition of the fuel, the discharge end of the ignition chamber carries a disk 89 having a plurality of passageways 90 through which the burner fuel is discharged into the flame distributor. The disk, being formed of refractory material, is heated to incandescence and effects ignition of any portions of the fuel not ignited prior to passage into the flame distributor.

In installing a heater constructed as described, the openings for the fastening devices, tube 32, motor shaft 41 and valve stem may be marked on the dash with the aid of a suitable templet and drilled with the proper size drill and punches. The motor and blower assembly, minus the fan 39, may then be held in position on the engine side of the dash while the fan 39 is secured to the motor shaft 41. The heater unit carrying the burner is then applied from the passenger side of the dash, after which the fastening devices 36 are inserted to secure the motor

and heater unit assemblies to the dash as shown in Fig. 4. The burner nozzle may then be connected with the fuel line 12, after which one of the spark-plug wires is removed and replaced by the conductor 88. The corresponding terminal of the timer is then connected with the other terminal of the igniting device by the conductor 87. When the fuel line is installed it is so arranged that the stem of the valve 72 may project within the passenger compartment and be in position to actuate the switch 78. The drain line is then connected with the intake manifold as indicated at 62, after which the vent pipe is connected with an opening which may be formed in the top of the air cleaner, completing the installation.

With the engine in operation, the pump 10 discharges fuel under pressure into the line 12 and if the valve 71 is open a portion of the fuel passes through the pipe 69 to the valve 72. Also with the motor in operation a high tension current is passing across the electrode terminals of the timing device. Upon opening of the valve 72, through manipulation of the wheel 75 in a counterclockwise direction, the arm 76 effects closure of the motor switch to energize the motor. Combustion supporting air and fuel is now being delivered into the combustion ignition chamber. The finely divided fuel spray contacting the spark passing across the electrode terminals of the igniting device is readily ignited and the fuel begins to burn in the ignition chamber heating the disk 89 to incandescence as the partly burning fuel passes through the openings therein into the combustion or mixing chamber of the flame distributor. The burning fuel then passes through the orifices of the flame distributor into contact with the secondary air which is drawn into the lower manifold or burner chamber through the tube 32. The secondary air produces a blue flame which quickly heats the tube-like flues with the products of combustion passing upwardly through the tubes into the upper manifold chamber and out through the pipe 34 where it is drawn into the engine by way of the air cleaner and carburetor. The motor in operation actuates the fan 39 to circulate air from the passenger compartment past the flues where the air is heated and discharged through the openings 23 under the control of the louvers 24.

A burner constructed as described operates efficiently using fuels containing antiknock preparations since no needle valves or fine orifices are required to effect minute dispersion of the fuel. The outlet of the nozzle may be relatively large, it being its duty to spread the fuel in the ignition chamber so that it comes in contact with the spark passed across the terminals of the igniting device. Owing to the provision of the igniting chamber and the relatively long travel of the burning fuel, there is ample time for the particles of fuel to be completely ignited when the flame passes through the apertures of the burner.

The construction illustrated and described also provides a compact arrangement with all of the operating parts, with exception of the hand wheel of the fuel control valve, located in the engine compartment. The connection of the igniting device with the ignition system of the engine further simplifies installation and reduces cost of the heater.

What we claim and desire to secure by Letters Patent is:

1. In a heater of the character described, a radiator unit having a chamber, a flame distribu-

tor in the radiator chamber, an ignition chamber connected with the flame distributor, means for discharging liquid fuel into the ignition chamber, means within the ignition chamber and located in the zone of the discharged fuel for igniting the fuel in the ignition chamber, an air supply tube connected with the radiator chamber and housing the ignition chamber to preheat secondary air for mixture with products of combustion discharged from the flame distributor, a blower having individual connection with the ignition chamber for supplying primary combustion supporting air, and a second blower for independently supplying air to the radiator unit.

2. In a heater, a radiator unit for mounting on one side the dash of a motor vehicle, a motor and blower unit adapted for mounting on the opposite side of said dash, said radiator unit including a closed burner chamber, an air supply tube connected with the burner chamber and adapted to extend through said dash, a burner in the burner chamber, fuel conducting means housed within said tube for supplying fuel to the burner, and means connecting the blower with the fuel conducting means for supplying primary air.

3. In a heater, a radiator unit for mounting on one side the dash of a motor vehicle, a motor and blower unit adapted for mounting on the opposite side of said dash, said radiator unit including a closed burner chamber, an air supply tube connected with the burner chamber and adapted to extend through said dash, an ignition chamber housed within said tube, means supplying fuel to said ignition chamber, ignition means in said chamber, and means connecting the blower with the ignition chamber.

4. In a heater, a radiator unit for mounting on one side the dash of a motor vehicle, a motor and blower unit adapted for mounting on the opposite side of said dash, said radiator unit including a closed burner chamber, an air supply tube connected with the burner chamber and adapted to extend through said dash, an ignition chamber housed within said tube, pressure means supplying fuel to said ignition chamber, ignition means in said chamber, and means connected the blower with the ignition chamber.

5. In a heater of the character described, a radiator unit having a chamber, a hollow flame distributor in the radiator chamber and spaced from the walls of said radiator chamber to provide an air passageway on all sides thereof to prevent overheating the walls of said radiator chamber, an ignition chamber connected with the flame distributor, a fuel supply nozzle arranged to discharge liquid fuel into the ignition chamber, and means in the ignition chamber and in the zone of the fuel discharge for igniting the fuel in the ignition chamber.

6. In a heater of the character described, a radiator unit having a chamber, a hollow flame distributor in the radiator chamber and spaced from the walls of said radiator chamber to provide an air passageway on all sides thereof to prevent overheating the walls of said radiator chamber, an ignition chamber connected with the flame distributor, a fuel supply nozzle arranged to discharge liquid fuel into the ignition chamber, means located in the ignition chamber adjacent the fuel discharge for igniting the fuel in the ignition chamber, and a refractory diaphragm between the ignition chamber and the flame distributor and having openings connecting said ignition chamber with the distributor for assuring combustion of said fuel.

7. In a heater of the character described, a radiator unit having a chamber, a flame distributor in the radiator chamber and spaced from the walls of said radiator chamber to provide an air passageway on sides thereof to prevent overheating of said walls, an ignition chamber connected with the flame distributor and located exteriorly of the radiator chamber, means for discharging a liquid fuel directly into the ignition

chamber, means located in the zone of the fuel discharge for igniting the fuel in the ignition chamber, and an air supply tube connected with the radiator chamber and housing the ignition chamber to supply air for circulation through said passageway and to preheat said air for supporting secondary combustion.

HARRY D. PINKERTON.
CLARENCE S. PHENICIE.