

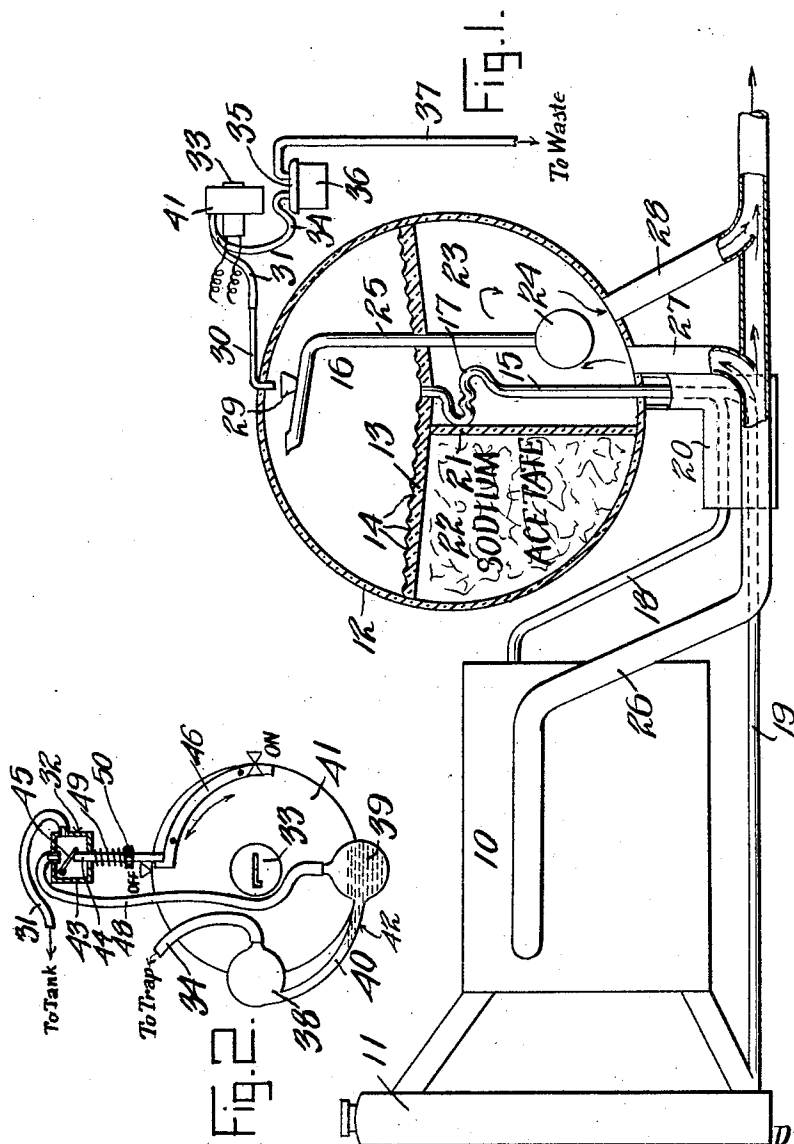
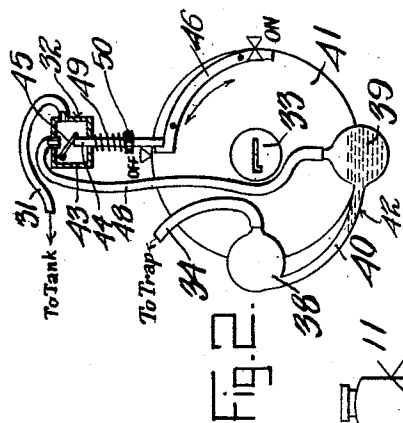
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# DEVICE FOR HEATING AUTOMOBILE MOTORS

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## UNITED STATES PATENT OFFICE

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DEVICE FOR HEATING AUTOMOBILE MOTORS

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This invention relates to a device for heating an automobile motor and it is an object of the invention to provide a device for automatically transferring water or other liquids from the radiator and motor of an automobile to and from an insulated tank and one in which the principle of latent heat of fusion is employed as an aid in maintaining a high temperature in the water or other liquid used, all as will be hereinafter more fully described and claimed.

Referring to the accompanying drawing which is made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is a diagrammatic view of the device showing the arrangement of the parts constituting the essentials of this invention, and

Figure 2 is a diagrammatic view of the mercury valve and an auxiliary mechanical valve, both being adapted to be operated in unison.

In the drawing reference character 10 indicates a motor of an automobile provided with a radiator 11 connected in the usual conventional manner. An insulated tank 12 is mounted on a fender or at any other desirable point and is provided with a heavy metallic plate 13 which divides the tank into two compartments. The plate 13 is provided with a series of indentations 14 and slopes downward from all sides towards a pipe 15 which serves as an outlet from the upper compartment. This compartment serves as the storage tank proper and is designated by numeral 16.

The pipe 15 is provided with a zig-zag trap 17 and extends downward through the lower portion of the tank 12 where it is divided into branches 18 and 19 leading to the motor 10 and the bottom of the radiator 11, respectively. An insulated housing 20 surrounds the connection between the pipe 15 and the branch pipes 18 and 19.

The lower compartment of the tank 12 is divided by an insulated wall 21 into compartments 22 and 23. The compartment 22 is filled with a chemical compound such as sodium acetate or any other suitable com-

pound, the purpose of which will later be described. The compartment 23 forms a heating chamber in which a boiler 24 is positioned. A pipe 25 is connected to the boiler 24 and extends upwardly through the plate 13 terminating near the top of the storage tank 16. The exhaust pipe 26 from the motor 10 is connected to the heating chamber by a branch pipe 27 where the hot gases and vapors circulate about the boiler 24 and escape through branch pipe 28 and pass out through the muffler in the usual way.

The pipe 25 is provided with a funnel 29 which serves as an aid when it is necessary to fill the boiler. A pipe 30 extends from a point over the funnel to a hose 31 which is in turn connected to one side of a mercury valve 42 which is secured in any suitable manner to the ignition switch disc 41 so as to be operated when the switch is operated. A similar hose 34 is connected to and extends from the other side of the mercury valve to a trap 35. The trap 35 is provided with a detachable bottom 36 through which, when the bottom is removed, water may be forced through the hose 34, the mercury valve, into the funnel 29, hence to the boiler. It may also serve as a catch for any water vapor which might ordinarily escape through the pipe 37 to the atmosphere. The pipe 37 extends well to the rear axle of the car as a safeguard against any mercury vapor which might escape from the device.

The mercury valve 42 consists of two bulbs 38 and 39 connected by a tube 40. The bulbs are firmly secured to the key-hole switch disc 41. The bulb 38 is connected to the pipe 34 and the bulb 39 is connected to a valve 32, a description of which will follow later. A sufficient quantity of mercury is contained in the valve 42 so as to prevent air from passing through the valve when in the "off" position.

In order to be doubly sure that no air can pass through the mercury valve 42 when in "off" position, an auxiliary valve 32 is provided and is connected to operate in unison with the valve 42. This valve consists of a housing 43 in which a plunger 44 is operable to seat against a valve flap 45 to close the pas-

sage through the valve. The plunger 44 is operated by means of an eccentric strip 46 which is secured by any suitable means to the disc 41. A spring 49 tends to force the  
5 plunger 44 against the eccentric and is positioned around the plunger between the housing 43 and a pin 50. A hose 48 connects one side of the valve to the bulb 39 and the other side is connected by a hose 31 through  
10 pipe 30 to the storage tank 16. In other words, while the ignition is "on" the valve 32 is interposed between the mercury valve 42 and the storage tank 16, so that the valve flap 45 is closed by pressure in the tank and opened by vacuity in the tank, but while the  
15 ignition is "off" the valve 42 is closed against movement of air either way.

The operation of the device is as follows:

While in the "off" position the bulb 38 is  
20 lower than the bulb 39, and the mercury in the tube 40 connecting the bulbs prevents air from entering the pipe 31 leading to the tank. The valve 32 is also closed and serves as a safety valve in case the mercury valve  
25 42 fails to function properly.

The ignition switch 33 is unlocked by inserting the key and making a quarter turn in a clockwise direction, thus occupying the position shown in Figure 2. The mercury  
30 flows from the bulb 38 into the bulb 39 and at the same time the weight of the water in the tank will draw air through the pipe 37, the trap 35, the mercury valve 42, the valve 32 and hence to the tank. As the air passes  
35 through the mercury in the bulb 39, the water in the tank passes from the tank into the pipes 18 and 19 thus filling the motor and the lower part of the radiator. The water has been kept warm since previous use of the  
40 car by the heavy insulation around the tank and the sodium acetate in the chamber 22. The latent heat of fusion given off by the sodium acetate in cooling tends to aid in keeping the water warm. In a short time after  
45 turning on the ignition switch all of the warm water is in the motor and radiator, thus making it possible to start the engine even if heavy lubricating oil is used without use of the choke and without flooding the cylinders  
50 with gasoline. The motor is then started by simply pressing down on the starter pedal.

The exhaust from the motor is led into the chamber 23 by the pipe 27 and out through the pipe 28 to the muffler. The hot  
55 gases circulate about the boiler 24 causing the water in the boiler to evaporate thus creating pressure in the tank which closes the valve flap 45 and if air leaks through this valve, the pressure of the air forces the mercury in  
60 the bulb 39 back into the tube 40. When the mercury in the tube has reached a certain level above the bulb 39, it being borne in mind that a column of mercury one inch in height will counter-balance a column of water  
65 thirteen inches high, the air from the tank

will pass through the pipe 15 and the pipe 18 and such water vapor as is present in the air will condense with the water that is in the motor. After the water in the boiler has been  
70 evaporated the water from the motor will again enter the tube 15 and will find a point somewhere in the tube where it boils gently. Rapid boiling will not be possible because it will generate pressure which will tend to  
75 drive the water down away from the heated portion of the pipe. It will automatically find and remain near the point where it will boil gently at its upper surface in the pipe 15. By this time the small quantity of water  
80 in the boiler 24 has been converted into seventeen hundred times its volume of steam, a large part of which accumulates above the air in the tank and being much lighter than air, forces the air downward through the  
85 pipe 15 and out through the motor and radiator overflow, the steam accompanying it condensing in the water contained in the motor. The upper surface of the plate 13 is formed with a series of indentations 14 each of which  
90 contains a few drops of water and upon evaporation creates a compression in the tank. In a short time after starting the motor, the boiler 24 and the tank will be quite dry and filled with hot dry steam practically free  
95 from air.

The sodium acetate chamber 22 has a sufficient covering or insulation to prevent scorching of the chemical. The pipe 30 and the hose 31 are full of air and little, if any,  
100 condensation will take place in them, the pipe and hose should be sufficiently long and small in diameter to prevent heat from being conducted to the mercury in the bulbs. Any water which may accumulate in this connection will be drawn back when the engine  
105 is started again after the next rest.

All during the foregoing there has been no need of giving any attention to this device. The only necessary step is the turning  
110 on of the ignition switch of the car which operates the mercury valve and the mechanical valve, after which a short interval of time should elapse before starting the motor in order to allow the warm water to enter the motor and radiator. After driving a short  
115 distance the tank and boiler will be full of hot dry steam and will remain in this condition as long as the motor runs.

When the motor is stopped by turning off the ignition the boiler 24 will be the first  
120 part of the device to reach a temperature lower than the boiling point of water and this condition is due to the fact that the boiler 24 is not insulated. The steam in the boiler 24 will begin to condense, thus drawing in  
125 steam from the tank and in doing so creates a vacuum in the tank which cannot be filled by air entering through the pipe 31, as the turning of the ignition switch 33 to the "off" position has raised the bulb 39 and caused the  
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mercury to fill the tube 40 and the valve 32 is also in closed position. The condensation of the water in the boiler 24 will therefore be sufficient to bring the water out of the motor and the radiator into the tank. Since the plate 13 of the tank is heavy metal and retains considerable heat it will cause some of the water to boil, thus supplying the boiler 24 with an additional quantity of water, the object being to have an extra supply of water in the boiler. The metal bottom 13 will soon cool since the specific heat of metal is only a fraction of that of water. As soon as the boiling ceases, the continued condensation in the boiler 24 will bring air through the radiator, motor and the pipes to the tank and into the boiler 24 so that it will contain about two-thirds part of air and one-third part of water. It will probably freeze in cold weather during the time the engine is at rest, if glycerine is used in the system, since the water in the boiler 24 gets there only by condensation of steam; and since there will be no glycerine in the steam none will be present in the water supplied to the boiler. However, the boiler 24 will not burst from freezing, since it is at least two-thirds full of air. The trap 17 in the pipe 15 will check the circulation of water by convection and will counteract the effect of the expansion of water cooled below 39° F. since some of the air drawn in through the pipe 15 on its way to the tank will find lodgment in the trap 17 and create dead air spaces in the trap which will prevent the water in the lower end of the pipe 15 from circulating upward into the tank so long as the dead air spaces are in the trap 17. The water in the tank will remain warm for at least twelve hours. The foregoing completes the cycle of operation.

When the apparatus is first attached to the motor it will be necessary to get water into the boiler 24. This is accomplished by removing the bottom 36 off the trap 35, attaching a fountain syringe to the exposed end of the pipe 34, pouring a tumbler full of clear water into the fountain syringe and elevating it about seven feet with the ignition turned on. In this way the water from the syringe will bubble through the mercury into the hose 30 and the pipe 31 and pass through the funnel 29 into the boiler 24. The fountain syringe can be removed and the bottom of the trap replaced. The trap bottom 36 should be removed occasionally and if water is found in it, it should be poured into the radiator.

In case the automobile is stopped by stalling or killing the engine and the operator fails to turn off the ignition, no harm will result except the harm which always results from leaving the car standing with the ignition turned on. In such a case the battery will be exhausted, but such would happen without this device as well as with it. If it

happens, it will be necessary to introduce water in the manner indicated above.

If the automobile is run only a short distance after starting, the air will not be expelled from the tank and after stopping the water will remain in the motor and radiator, but no harm will result from this except that a cold start will be made when the automobile is next used. The normal operation will be restored after driving the car a reasonable distance.

It will be obvious to those skilled in the art that various changes may be made in my device without departing from the spirit of the invention and therefore I do not limit myself to what is shown in the drawing and described in the specification, but only as indicated by the appended claims.

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

1. A device for automatically transferring water to and from the cooling system of an automobile comprising a tank mounted on said automobile having fluid connections to said cooling system, means for creating a suction in said tank to draw the warmed water from said system, a heat retaining compound positioned adjacent the warmed water in said tank which, upon cooling of said compound, transfers heat to the water and a control valve operatively positioned to effect the release of the warmed water from said tank to the cooling system, substantially as set forth.

2. A device for automatically transferring water from the radiator and motor of an automobile to and from a tank comprising an insulated tank divided into a plurality of compartments, the upper compartment serving as a storage tank for the cooling liquid being in communication with said motor and radiator, a heat retaining compound positioned in a lower compartment, a similar compartment positioned adjacent thereto in which hot gases from the exhaust circulate, a boiler mounted in said last named compartment adapted to create pressure in said storage compartment while being heated and upon cooling creates a vacuum in said storage compartment effecting the withdrawal of the warmed water from said motor and radiator, and a mercury valve in communication with and for controlling the flow of air to said storage tank to effect the discharge of the warm water therefrom to the motor and radiator, substantially as set forth.

3. A device for automatically transferring water from the radiator and motor of an automobile to and from a tank comprising an insulated tank mounted on said automobile, heat retaining means positioned in said tank adapted to give off heat upon cooling, means mounted in said tank for creating a vacuum therein to withdraw the warm water from

- said motor and radiator, and a mercury valve operatively connected to the ignition of said car which, upon operation of the ignition switch, actuates the mercury valve to effect the discharge of the liquid from the tank, substantially as set forth.
4. A device for automatically transferring water from the radiator and motor of an automobile to and from a tank comprising an insulated tank mounted on said automobile, heat retaining means positioned in said tank adapted to give off heat upon cooling, means mounted in said tank for creating a vacuum therein to withdraw the warm water from said motor and radiator, a mercury valve operatively connected to the ignition of said car which upon operation of the ignition switch, actuates the mercury valve to effect the discharge of the liquid from the tank, and an auxiliary valve connected to said mercury valve serving as a safety valve to said mercury valve, substantially as set forth.
5. A device for automatically effecting the transfer of water to and from the radiator and motor of an automobile comprising a tank having a chemical compound associated therewith for maintaining high temperature in water stored therein, means mounted on the automobile adapted to permit air to flow into said tank to effect the discharge of the water therefrom, and means mounted in said tank adapted upon cooling to create a vacuum therein for withdrawing the warmed water from the radiator and motor, substantially as set forth.
6. A device for effecting the transfer of water to and from the radiator and motor of an automobile comprising an insulated tank having a plate therein dividing the said tank into upper and lower compartments, the surface of said plate being provided with a plurality of indentations and sloping downward to the center, an outlet pipe connected to the center of said plate in communication with said motor and radiator, an upright wall dividing the lower compartment in two chambers, a heat absorbing compound adapted to give off heat upon cooling in one of said chambers, a boiler having an outlet pipe extending into the upper compartment mounted in the other chamber, means for conveying the exhaust gases to and from the last named chamber, and means for controlling the flow of air to the upper compartment, substantially as set forth.
7. A device for maintaining heat in the cooling fluid of an automobile comprising a tank mounted on said automobile having fluid connections to the cooling system, means mounted in said tank which upon cooling creates a vacuum therein to draw the fluid from said cooling system, and means for effecting the discharge of the fluid from said tank to said cooling system, substantially as set forth.
- In witness whereof, I have hereunto set my hand at Memphis, Tennessee, this eleventh day of March, A. D. nineteen hundred and thirty-two.
- ROBERT BLYTHE GOODWIN.

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