C. H. CLARK.

VEHICLE ENGINE HEATER.

APPLICATION FILED FEB. 18, 1920.

1,359,871. **Patented Nov. 23, 1920.**

Fig. 1.

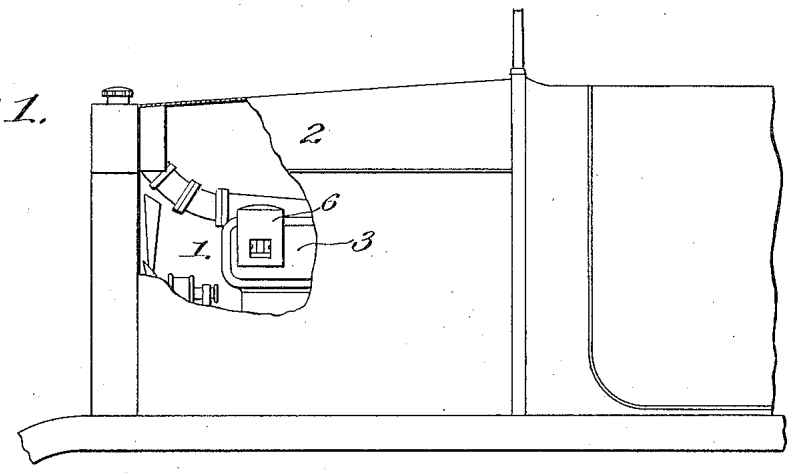


Fig. 3.

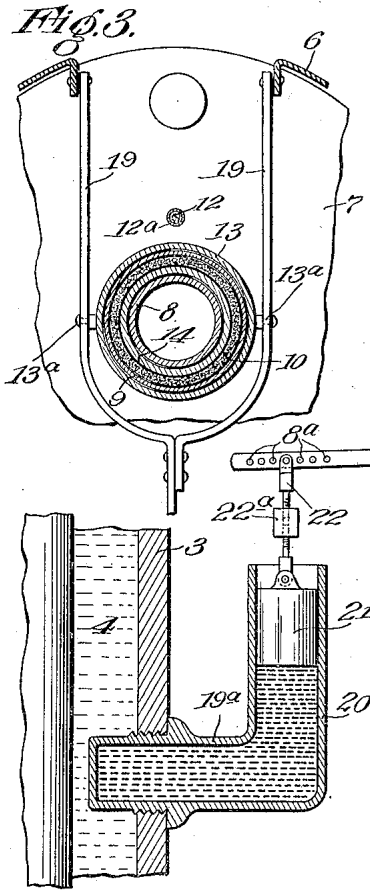
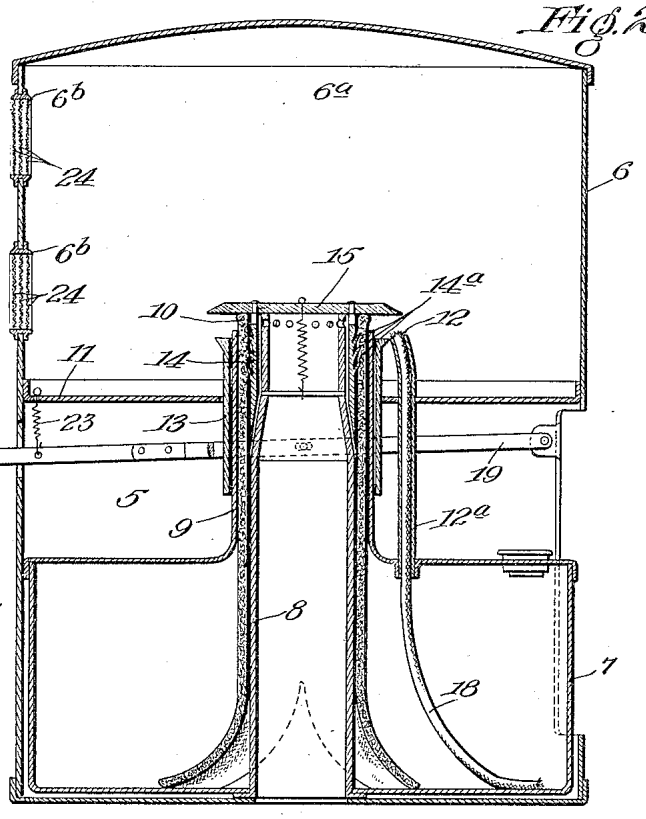


Fig. 2.



WITNESS:

P. J. Gathmann

INVENTOR

Chester H. Clark

BY Burton & Burton

HIS ATTORNEYS

UNITED STATES PATENT OFFICE.

CHESTER H. CLARK, OF DAVENPORT, IOWA.

VEHICLE-ENGINE HEATER.

1,359,871. Specification of Letters Patent. Patented Nov. 23, 1920.

Application filed February 18, 1920. Serial No. 359,720.

To all whom it may concern:

Be it known that I, CHESTER H. CLARK, a citizen of the United States, residing at Davenport, in the county of Scott and State of Iowa, have invented certain new and useful Improvements in Vehicle-Engine Heaters, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide a heater for a motor vehicle engine, adapted for maintaining the engine's temperature at an effective degree, and automatically regulated for that purpose, by a thermostatic device exposed to the engine temperature or some resultant temperature, so as to increase the heat generated by the heater when the temperature of the engine falls below a predetermined point, and diminish the heat generated when the engine temperature rises above a predetermined point. It consists in the elements and features of construction shown and described, as indicated in the claims.

In the drawings:—

Figure 1 is a side elevation of a motor vehicle engine equipped with this device, the hood being partly broken away to disclose the heater there-within.

Fig. 2 is a vertical section through the heater and the thermostatic governing connection which extends into the water jacket which comprises part of a cooling water circulating system of the engine.

Fig. 3 is a section at the line, 3—3, on Fig. 2.

In the structure shown in the drawings, the engine is represented conventionally at 1, 2 being the hood, 3 being the wall of the water jacket, and 4 being the cooling water space therein. 5 is the heater. 6 is an inclosure for the heater which is itself inclosed within the engine's hood. The heater shown may be understood as employing liquid fuel. It comprises the liquid fuel chamber, 7, which constitutes the lower element of the heater, said chamber having a centrally situated neck, 9, which constitutes the outer element of a wick tube as hereinafter shown, the inner element of said wick tube being a vertically extending tube, 8, constituting an air draft passage to the combustion or flame-generating end of the wick, 10, which extends between the tubular neck, 9, and the air draft tube, 8, down into the fuel chamber. The upper end portion of the tube, 9, is contracted in diameter to admit around it inside the wick a wick lifter which is a sleeve, 14, having ratchet teeth, 14ª, struck out from its outer surface for engaging the wick, such engagement occurring when the lifter is drawn upwardly, causing the points of said teeth to be intruded deeply into the wick. On the upper end of the wick-lifting sleeve, 14, there is secured a cap plate, 15, which serves as a means of operating said wick-lifting sleeve, said cap plate having its marginal portion extending over the upper end of the wick and over the upper end of the neck or outer member of the wick tube, 9, and also over an exterior sleeve, 13, which is mounted for sliding up and down on said neck, 9. 12 is a pilot light device comprising a tube, 12ª, connected at its lower end into the top of the fuel chamber, 7, and extending up alongside the neck at a short distance therefrom, terminating a short distance below the upper end of said neck, accommodating a pilot wick, 18. The upper end of the sleeve, 13, hereinafter termed the regulating sleeve for reasons which will appear, is outwardly flared so that when adjusted to bring said upper end slightly above the upper end of the pilot wick tube, it tends to deflect outwardly the flame of the pilot wick to prevent it from causing ignition at the exposed end of the main wick, 10. 19 is a forked lever fulcrumed by its forked ends on the inclosure, 6, and extending across the same embracing the neck and sleeves of the heater between the fork arms, the stem extending out through the opposite side of the inclosure for connection with a thermostatically-actuated operating means. The fork arms are pivotally connected at opposite sides to the regulating sleeve, 13, as seen at 13ª. The inclosure, 6, has a horizontal partition, 11, positioned below the upper or flame end of the wick tube, and above the level of the operating lever, 19, such partition being apertured for the wick tube and sleeve, 13, and the pilot tube, which extend up through it into the upper chamber, A, of the inclosure.

A spring, 23, connected at its upper end with the partition, 11, and at the lower end to the operating lever, 19, tends to uphold the operating lever for positioning the regulating tube at a certain predetermined height with respect to the upper end of the wick tube.

Considering the operation of this heater and the inclosure, it will be seen that the pilot light being lighted and the parts being adjusted to the position shown in Fig. 2, the upper end of the main wick will be ignited and the flame will be discharged therefrom out around the cap, 15, ultimately filling the upper chamber, 6ª, of the inclosure with the hot products of combustion. From said upper chamber, 6ª, apertures, 6ᵇ, lead outwardly into the hood space, and said apertures are guarded with triple fine wire screens, 24, preventing any flame from being discharged from said apertures which might ignite unconsumed combustible vapor which might exist in the hood. It will be seen that by lifting the operating lever, 19, carrying the regulating sleeve, 13, upward past the upper end of the neck or outer element of the wick tube, 9, the exposed portion of the wick at which the flame is produced will be masked, and that by carrying said sleeve upward to the cap plate, 15, the entire exposed flame area of the wick will be masked and the flame extinguished. It will be further observed that if the operating lever, 15, is lifted farther, carrying the sleeve, 13, up against the cap, 15, and then farther so as to lift the cap, the cap will in turn lift the wick-lifting sleeve, 14, and draw the wick upward. And this constitutes the means for compensating for the burning away of the wick from time to time. The ratchet-wise operation of the teeth, 14ª, it will be understood permits the lowering of the wick-lifting tube, 14, without lowering the wick.

The operation of the parts described for regulating the combustion area of the wick and thereby regulating the amount of heat generated by the heater, consists of a thermostatic device comprising a tube, 19ª, which extends through the wall, 3, of the cooling water jacket into the cooling water space, 4, of the engine, said tube containing a liquid substance adequately responsive to changes of temperature by expansion and contraction, to operate to an adequate extent the piston or float, 21, which is located in the upwardly-extending portion of said tube, 20, of which the lower portion is preferably horizontal for convenience of intruding it into the water space of the jacket. The temperature-responsive element of the tube may be mercury, preferably, or glycerin or other relatively non-volatile liquid having substantially uniform coefficient of expansion. The float or floating piston, 21, is connected by a bail, 22, to the outer end of the operating lever, 19, provision being made, as by a plurality of pivot holes at 8ª, for connecting it at varying distances along the outwardly-extending arm of said operating lever, as may be found convenient in mounting the device in each instance. And for adjusting the piston float or weight, 21, to the quantity of temperature-responsive liquid, 20ª, the connecting rod, 22, is made in two parts oppositely threaded at their proximate ends and connected by a right and left threaded coupling, 22ª.

Upon considering the action of this structure it will be understood that, the parts being originally properly adjusted for causing the wick to be unmasked when the temperature of the cooling water in the space, 4, is that resulting from an engine temperature lower than required for effective operation, the main wick will be ignited by the pilot light under those conditions, and thereby the heater will be set in operation for raising the engine temperature. And it will be understood that upon the temperature being raised to the proper point for effective operation, the regulating sleeve will be carried upward gradually masking the wick and diminishing the flame production until the amount of heat generated is just sufficient to maintain the proper engine temperature. Or, if the normal operation of the engine is maintaining that temperature, the wick will be completely masked and the flame extinguished and generation of heat from the heater will be stopped and remain stopped until the temperature of the engine falls, so as to again unmask the wick and cause the pilot light to ignite the latter.

It will be understood that the particular form of temperature responsive element or thermostatic device may be varied from that shown without departing from the substance of the invention, and also that the particular form of the heater may be departed from and an entirely different heater may be substituted, provided only the heater has means for regulating the heat generation thereof, which means are operated by a thermostatic or heat responsive element exposed to the engine temperature.

I claim:—

1. In combination with a motor vehicle engine, a fuel-burning heater having means for discharging the products of combustion under the engine hood; means for regulating the fuel consumption of said fuel-burning device; a temperature-responsive element exposed to engine temperature, and operating connections from such temperature-responsive element to said regulating means of the heater.

2. In the construction defined in claim 1 foregoing, the heater being a liquid fuel burning device; an inclosure for said heater within which the hot products of combustion are initially received and confined, said inclosure having apertures for the escape of said hot products into the engine hood, and fine wire screen masking said apertures.

3. In the construction defined in claim 1, foregoing, the heater being a liquid fuel

burning device employing a wick, and the regulating means consisting of a mask for the wick, said mask constituting heat-generating regulating means; the operating connections being adapted for sliding said mask along the wick at the portion thereof exposed for ignition and flame production.

4. In the construction defined in claim 1, said fuel burner having a pilot light, and the regulating means comprising a shut-off adapted to be interposed between the pilot light and the ignition point of the heater and adapted to be withdrawn and expose the wick to ignition from the pilot light by the movement caused by lowered temperature of the temperature-responsive element.

5. In the construction defined in claim 1, the heater being a liquid fuel burning device having a tubular air draft passage supplying air to the flame, said passage extending up through the liquid fuel supply chamber; a housing for the heater which incloses the fuel chamber and the area of flame production, said housing having an aperture registered air draft passage.

6. In the construction defined in claim 1, the heater being a liquid fuel burner employing a tubular wick and having a tubular sleeve within the wick provided with ratchet-wise-operating wick-engaging projections, adapted to feed the wick upward by reciprocating movement of the sleeve; a cap plate at the upper end of said sleeve, carried by the latter and whose margin overhangs the end of the wick and forms a stop for limiting the upward movement of the latter; and a sleeve mounted for sliding outside the wick, and dimensioned to encounter the cap plate; said operating connections from the temperature-responsive element being connected with the exterior sleeve for lowering it upon fall of temperature of the temperature element.

7. In the construction defined in claim 1, the heater being a liquid fuel burner; an inclosure for said heater having a partition between the lower portion of its inclosed space containing the fuel chamber and the upper portion in which combustion occurs; the heater having an air draft passage extending from the bottom up through the fuel chamber and past the partition into the combustion space there-above, the inclosure having at its bottom an aperture with which the air passage communicates for deriving air from outside the engine closure, the inclosure having apertures above said partition for escape of the products of combustion into the engine hood.

8. In the construction defined in claim 1, the temperature-responsive element being a liquid, a tubular inclosure for said liquid having one end closed and intruded into the cooling water circulating system of the engine; a piston-wise operating float positioned for movement in the other end, and operating connections being extended from piston-wise operating member to the heater regulating means.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 13th day of February, 1920.

CHESTER H. CLARK.