connection between the upper end of the engine cooling jacket and one end of the conduit 2 as shown.

The valve 6 is in the form of a plate or disc co-operating with a fixed annular seating provided in the main valve casing, and is attached to one end of a sliding valve stem whose other end is secured to one end of an expansible metal bellows 11, the other end of this bellows being attached to a suitable fixed support constructed so as to permit the cooling fluid to flow round the metal bellows chamber and through the opening controlled by the valve 6. A quantity of volatile liquid or other suitable fluid is confined in the bellows chamber so that the bellows chamber will expand and open the valve 6 when the temperature rises above a preset limit.

A by-pass conduit 8 is connected at one end to the return conduit leading from the lower end of the radiator to the lower end of the engine cooling jacket and is connected at the other end to a duct 12 which projects into the main valve casing as shown and communicates with the interior of the casing through an annular opening 12*a* formed round the main valve stem. This annular opening 12*a* is controlled by an auxiliary valve element 11*a* formed by or attached to the movable end of the metal bellows chamber 11 to which the main valve stem is attached.

The main valve stem has a sliding fit in an opening 12*b* formed in a wall of the duct 12 in line with the opening 12*a* and is thus guided by this opening 12*b*.

The parts are arranged so that when the bellows chamber is cold the main valve 6 is closed and the auxiliary valve 11*a* is open as shown, with the result that fluid can circulate through the engine cooling jacket 1 and by-pass conduit 8 but does not circulate through the radiator.

When the temperature of the bellows chamber rises above a preset limit the valve 6 begins to open so as to permit a regulated circulation of cooling fluid through the radiator 3. As the valve 6 opens the valve 11*a* gradually closes so that the rate of flow of fluid through the by-pass conduit is gradually reduced as the rate of flow through the radiator 3 increases, the flow through the by-pass being completely stopped or nearly completely stopped when the valve 6 is opened to its fullest extent.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A thermostatic valve for controlling the circulation of cooling fluid in a circulating fluid cooling system of the kind referred to, wherein a duct connected to the by-pass conduit projects into the main thermostatic valve chamber and communicates with the interior of this chamber through an annular opening formed round the main valve stem and controlled by an auxiliary valve member carried directly by the expansible chamber.

2. A thermostatic valve as claimed in Claim 1 wherein the main valve stem is fixed at one end to the expansible chamber and is guided by an opening in the wall of the aforementioned duct, the main valve element being in the form of a plate or disc attached to one end of the valve stem and co-operating with a fixed annular seat carried by the main valve casing and disposed coaxially to the valve stem.

3. A thermostatic valve as claimed in Claim 1 or 2 located in the flow conduit between the upper end of the engine cooling jacket and the upper end of the cooling radiator and provided with a flange or other suitable means for attaching it directly to the upper end of the engine cooling jacket, the valve casing being thus used as a connector for connecting the engine cooling jacket to the usual flexible pipe leading to the upper end of the cooling radiator.

4. A thermostatic valve for controlling the circulation of cooling fluid in an engine cooling system of the kind referred to, comprising a main thermostatic valve in the form of a plate or disc carried by a sliding valve stem attached to one end of an expansible metal bellows chamber whose other end is fixed to a suitable support in the valve casing so that fluid can flow round the bellows chamber, and a by-pass duct projecting laterally into the valve chamber and communicating with the interior of the chamber through an annular opening formed round the sliding valve stem and controlled by the movable end of the bellows chamber or by a valve member provided thereon, the said valve stem being fixed at one end to the movable end of the bellows chamber and being guided in an opening formed in a wall of the said duct in line with the said annular opening.

5. A thermostatic valve for controlling the circulation of cooling fluid in an engine cooling system of the kind referred to, constructed, arranged and adapted to operate substantially as described and as illustrated in the accompanying drawing.

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