Sept. 27, 1932. L. D. NILSON 1,879,428

TEMPERATURE INDICATOR

Filed Nov. 29, 1929 2 Sheets-Sheet 1

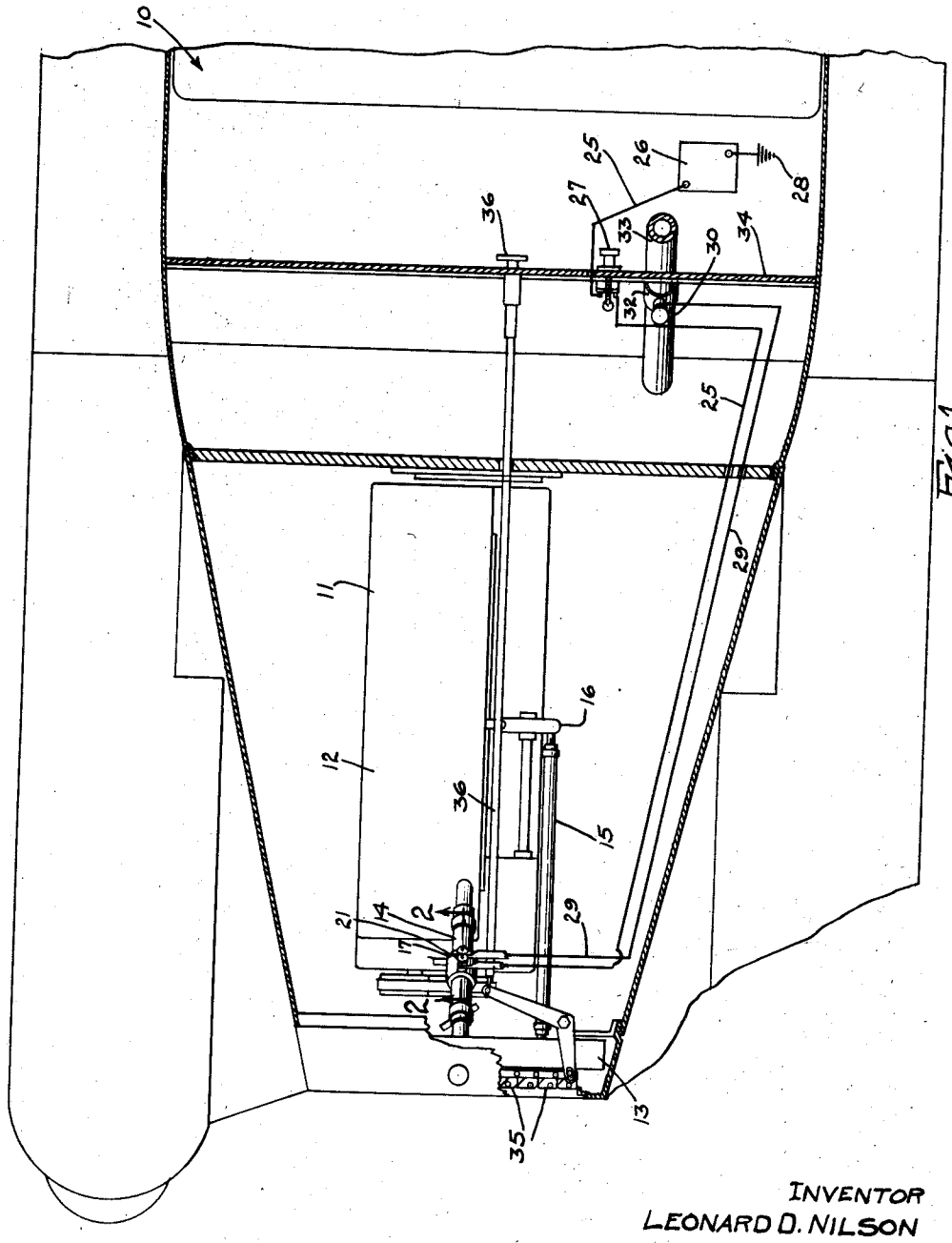


Fig. 1

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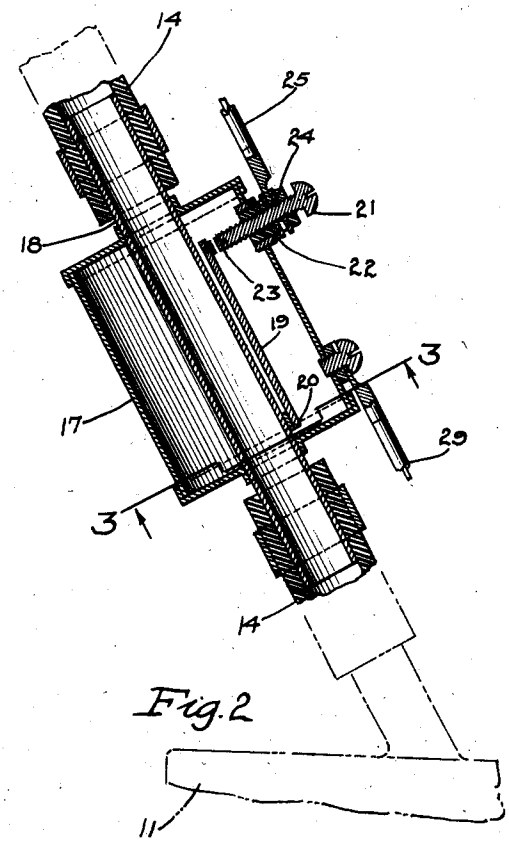


Fig. 2

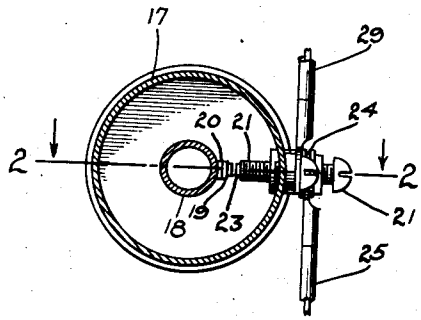


Fig. 3

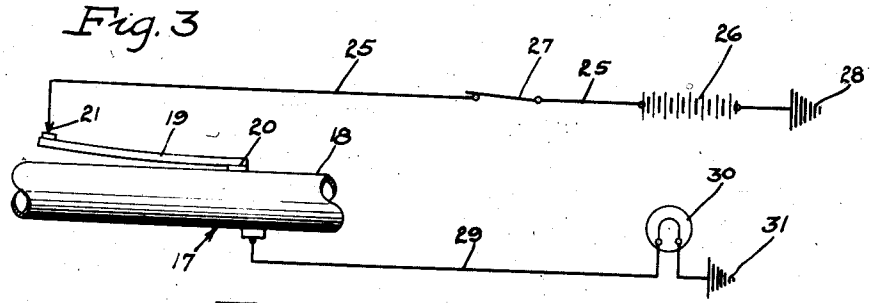


Fig. 4

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UNITED STATES PATENT OFFICE

LEONARD D. NILSON, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO TROPIC-AIRE, INCORPORATED, OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF DELAWARE

TEMPERATURE INDICATOR

Application filed November 29, 1929. Serial No. 410,465.

This invention relates to a water-circulating cooling system for internal combustion engines, and an object of the invention is to provide a water-circulating cooling system which will be equipped with a thermostatic element for making a discernible signal intended to be indicative to an operator of a vehicle having the water-circulating cooling system that the water of said system is above a predetermined temperature.

A further object is to provide a water-circulating cooling system for internal combustion engines which will include a thermostatic element responsive to the temperature of the water in said water-circulating cooling system.

Other objects and advantages of the invention will become apparent from the full description thereof now to be made, it being understood that the disclosure herein is merely illustrative and intended in no sense as limiting, changes in details of construction and arrangement of parts being permissible so long as within the spirit of the invention and the scope of the claims which follow.

In the accompanying drawings forming a part of this specification,

Fig. 1 is a sectional plan view of an automotive vehicle, disclosing the internal combustion engine thereof having a water-circulating cooling system in which the features of the invention are incorporated;

Fig. 2 is a detail longitudinal sectional view of the thermostatic element of the invention, taken as on line 2—2 in Fig. 1 or Fig. 3;

Fig. 3 is a detail transverse sectional view of said thermostatic element, taken as on line 3—3 in Fig. 2; and

Fig. 4 is a diagrammatic view of the wiring system for the thermostatic element.

With respect to the drawings and the numerals of reference thereon, 10 represents an automotive vehicle having an internal combustion engine 11 provided with a water-circulating cooling system comprising a water jacket 12, a cooling radiator 13, a connection 14 between the water jacket and the cooling radiator, and a connection 15 between the cooling radiator and the water jacket, the connection 15 including an ordinary pump 16 for causing a circulation of water through the water cooling system, the passage of the water being from the water jacket 12 through the connection 14 to the cooling radiator 13, and from the cooling radiator through the connection 15 back to the water jacket.

Numeral 17 represents a drum, preferably air-tight, positioned about the connection 14. This drum can be situated at any location along the length of the connection 14, and in intimate contact therewith, or can be positioned to contact with any preferred part of the water-circulating cooling system. As shown, the drum 17 is disposed upon a relatively thin metal coupling 18 between parts of the connection 14 of thicker dimension and having relatively greater heat insulating capacity. A bi-metal strip 19, positioned within the drum has one of its ends 20 attached to the metal coupling 18, and the body of the bi-metal strip extends longitudinally of the coupling in close proximity thereto. A contact element 21, which is adjustably mounted in an insulating plug 22 in the drum 17, has its inner end 23 situated adjacent the free end of the bi-metal strip 19 and its outer end disposed outside of the drum 17. As disclosed, the contact element 21 is a screw adjustable in the plug 22 to move its inner end toward and away from the bi-metal strip. The outer portion of the contact element 21 is attached, as at 24, to a wire 25 leading to a battery 26. The lead wire 25 includes a manual switch 27, and a ground 28 is attached to the battery. A wire 29 leads from the drum 17 to a signal, such as a lamp, 30, and the lamp is grounded as at 31. As shown, the lamp 30 is suitably supported in a fixture 32 upon the steering column 33, at position adjacent and a little beneath the instrument board 34.

The arrangement is such that when the temperature of the water in the connection 14, and hence in the water-circulating cooling system, is beneath a predetermined temperature, the bi-metal strip 19 will be out of engagement with the contact element 21. The temperature at which the bi-metal strip engages the contact element is predetermined by adjustment of the contact element rela-

tively to the bi-metal strip, closer to or further away therefrom. In practice, the bi-metal strip 19 and the contact element 21 will be set apart a sufficient distance, by adjustment of the contact element relatively to the bi-metal strip, to remain out of engagement until the temperature of the water in the water-circulating cooling system of the vehicle engine has reached a predetermined high temperature. When the water reaches such temperature, the bi-metal strip 19 and the contact element 21 will come into engagement to operate the signal; that is to say, to light the lamp 30. When the signal is discerned the operator of the vehicle can move the cooling-radiator-shutters 35 to open position, as by means of an actuating rod 36, should said shutters be closed. Then, immediately upon the temperature of the water in the engine cooling system dropping below the predetermined temperature at which the thermostatic switch is set to operate, the bi-metal strip 19 will remove itself from the contact element 21 to break the circuit and render the signal undiscernible, as will be evident.

A circuit is completed through the signal or lamp 30, when the bi-metal strip 19 and the contact element 21 are in engagement, from the battery 26 through the lead wire 25 to the bi-metal strip 19, through the bi-metal strip, the metal coupling 18 and the drum 17 to the lead wire 29, and through the lead wire 29 to the signal or lamp. The manual switch 27 affords means for breaking the circuit to the lamp independently of the thermostatic device.

I claim as my invention.

1. In a device for indicating the temperature of the cooling liquid of an internal combustion engine having a water jacket, a radiator and a connection between said water jacket and said radiator comprising an indicator and an electric circuit therefor; a casing surrounding said water connection and electrically connected in said circuit, a thermostatic element within said casing and electrically connected thereto, and a contact element projecting into said casing and adapted to be engaged by said thermostatic element to complete said electric circuit when the temperature of the cooling liquid has reached a predetermined degree.

2. In a device for indicating the temperature of the cooling liquid of an internal combustion engine having a water jacket, a radiator and a connection between said water jacket and said radiator comprising an indicator and an electric circuit therefor; a metallic casing surrounding said water connection and electrically connected in said circuit, a thermostatic element within said casing and electrically connected thereto, a contact element projecting into said casing and adapted to be engaged by said thermostatic element to complete said circuit when the temperature of the cooling liquid has reached a predetermined degree, and means for adjusting said contact element to vary the temperature at which said circuit will be completed.

3. In a device for indicating the temperature of the cooling liquid of an internal combustion engine having a water jacket, a radiator and a connection between said water jacket and said radiator comprising an indicator and an electric circuit therefor; a metallic casing surrounding said water connection and electrically connected in said circuit, a metallic conduit within said casings and electrically connected thereto, a thermostatic element secured to said conduit, and a contact element projecting into said casing and adapted to be engaged by said thermostatic element to complete said electric circuit when the temperature of said cooling liquid has reached a predetermined degree.

In witness whereof, I have hereunto set my hand this 26th day of November, 1929.

LEONARD D. NILSON.