March 10, 1925.

1,529,176

I. FLORMAN

TEMPERATURE INDICATING DEVICE

Filed Sept. 18, 1924

Fig. 2.

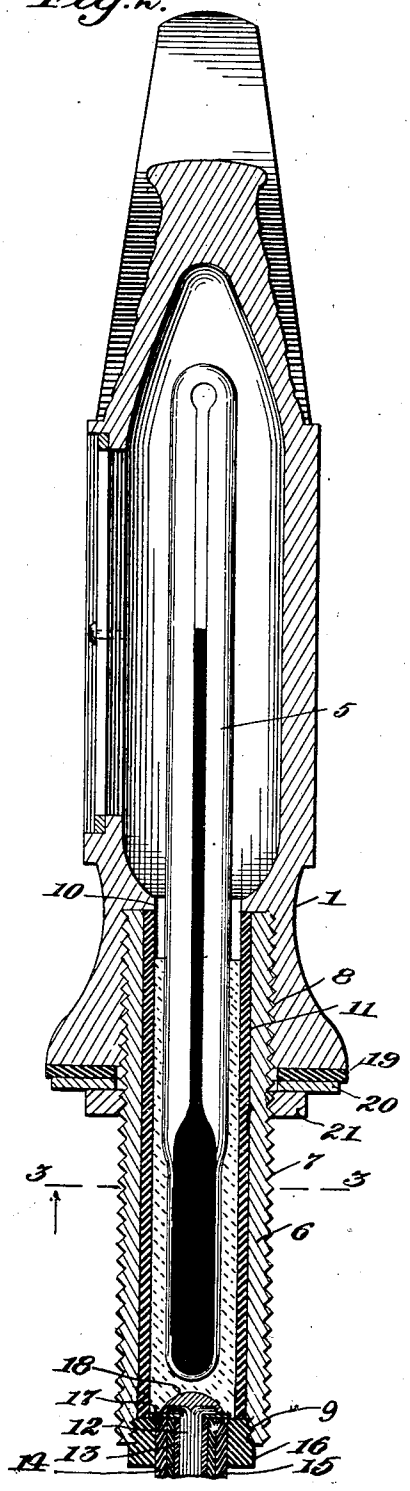



Fig. 1.

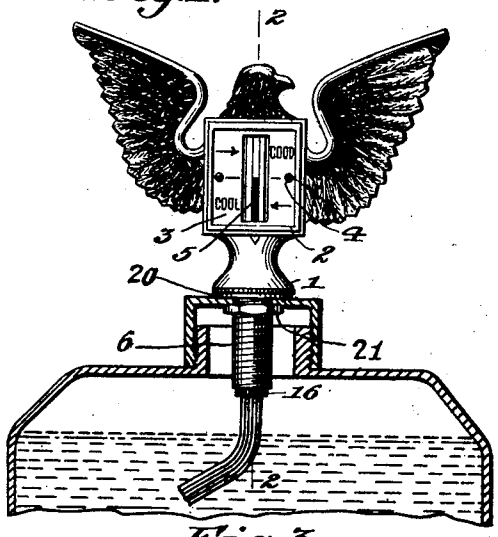



Fig. 3.

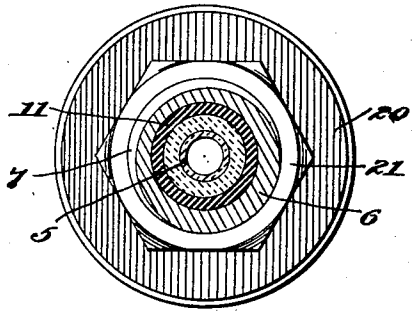
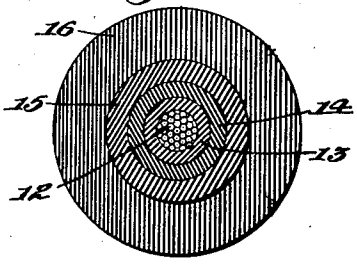



Fig. 4.




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Patented Mar. 10, 1925. 1,529,176

# UNITED STATES PATENT OFFICE.

IRVING FLORMAN, OF NEW YORK, N. Y.

## TEMPERATURE-INDICATING DEVICE.

Application filed September 18, 1924. Serial No. 738,460.

*To all whom it may concern:*

Be it known that I, IRVING FLORMAN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Temperature-Indicating Devices, of which the following is a specification.

This invention relates to improvements in a temperature indicating device.

One of the objects of this invention is to indicate the temperature of the water in the radiator of an automobile.

Another object of the invention is to protect the heat conducting means so that the temperature indicator will not be affected by the steam which may be formed in the air space above the water.

Another object of the invention is to provide a neat and attractive protective housing for the same which will protect the thermometer or other thermo-responsive device from damage and will provide a unitary housing therefor.

Another object of the invention is to provide a temperature indicating device which may be readily inserted on the radiator cap of automobiles, and which may be removed when it is desired to refill the radiator or to remove the radiator cap for any other reason.

Other objects and advantages of the invention will appear in the annexed specification, taken in connection with the drawing, in which:

Figure 1 represents a front elevational view of my improved temperature indicating device, the tube projecting into the radiator being shown fragmentarily;

Figure 2 represents a cross sectional view on the line 2—2 of Figure 1;

Figure 3 is a cross sectional view looking upwardly on the line 3—3 of Figure 2; and

Figure 4 is an enlarged cross sectional view of the flexible tubing.

Referring more particularly to the drawings, in which like reference characters are used throughout, I provide a housing 1, preferably made of metal formed in some pleasing or ornamental shape, such as the eagle shown. The rearward face is provided with an opening 2, in which is inserted a piece of metal or glass 3 adapted to close the said opening, said metal closure being provided with an opening in the form of a slot, through which the heat-responsive device may be clearly seen by the operator of an automobile. On the sides of the housing adjacent the opening, I preferably form inwardly extending lugs, not shown, provided with openings adapted to receive screws 4, whereby the metal closure may be screwed in place.

A thermometer 5 or other heat-responsive device is inserted in the body of the housing and extends for a considerable distance below the same. A thimble 6 surrounded with male threads 7 is adapted to engage the female threads 8 of the lower portion of the housing. The said thimble 6 is internally screw-threaded as at 9. The thimble 6 is screwed into the housing 1 until the same meets a shoulder 10 of the said housing. In order to protect the thermometer from the heat of the steam in the air space of the radiator, I provide a rubber tube 11 adapted to be inserted in the thimble 6 and to likewise abut against the shoulder 10. Instead of using rubber for this tube, I may use any other suitable material which would serve to insulate the thermometer from the surrounding temperature.

After inserting the thermometer in its proper position in the housing and tube, I insert between the rubber tube 11 and the thermometer a binder composed of litharge and glycerine, or one made of any suitable material which is a good conductor of heat and would also serve as a support for the thermometer.

I provide a flexible connector adapted to extend from the heat-responsive device or thermometer into the cooling fluid of the internal combustion engine. A cross section of this tube is shown in Figure 4, in which fine wires 12 of copper or of any other good heat conductive material are surrounded by three layers of rubber 13, 14, and 15. Preferably the inner layer 13 is a very fine grade of rubber and the succeeding

layers 14 and 15 are made of coarser and tougher material. The upper extremities of the rubber layers are cut away, leaving the wires 12 exposed. A cap 16, having an opening therethrough, is adapted to be inserted over the upper end of the flexible tube, and to tightly embrace the same. An apertured plate 17 is adapted to receive the exposed ends of said wires through the said aperture, and to extend over the upper extremities of the rubber layers and slightly over the inner portion of the cap 16. The exposed portions of the wire extending over the said cap and plate are then bent over and soldered as at 18 to the said plate. This provides a most compact structure, which prevents the said parts from becoming separated. The cap 16 is provided with external threads adapted to engage the internal threads of the thimble 6. The soldered portion 18 contacts with the heat-conducting binder of litharge and glycerin or other suitable material. The wires 12 in the lower end of the flexible tube are exposed to the surrounding medium such as water in the radiator.

By the structure herein recited, the heat is conducted by means of the wires 12 from the cooling fluid of the engine to the soldered part 18, which may or may not be in direct contact with the thermometer or other heat responsive device. In the example shown, it is not in contact therewith. The heat is conducted directly to the thermometer from the soldered portion 18 if the same is in contact, but if it is not in contact, as shown, the same result is obtained on account of the highly conductive properties of the mixture of litharge and glycerin. Both the flexible tube and the thermometer are at all times protected from the temperatures of the engine other than the temperature of the cooling fluid.

I fully realize that there have heretofore been devices made with the object of testing or indicating the temperature of the air or steam space above the cooling fluid, but so far as I am aware, there has been no device heretofore made which would correctly test the temperature of the cooling fluid itself.

It is desirable to have some means of securing the device to the radiator cap. In the example shown, washers 19 and 20 are provided immediately below the housing proper, the washer 19 being preferably made of resilient material, and the washer 20 of steel or other metal. The washer 20 is adapted to be inserted on top of the radiator cap with the thimble 6 projecting through an orifice therein. The nut 21 should then be secured against the inside of the radiator cap by turning the same on the thread 7.

I have herein shown the preferred embodiment of my invention by way of example, and I fully realize that many changes may be made therein without departing from the spirit and scope of this invention. I therefore, do not care to limit myself to the specific embodiment herein shown, but reserve the right to make all such changes as would fairly be embraced in the scope of the appended claims.

I claim:

1. A temperature indicating device for automobiles including a thermometer, flexible heat-conductive means communicating therewith and extending in to the cooling medium of the engine, the sides of said flexible heat-conductive means being insulated by means of a cover of rubber.

2. A temperature indicating device for automobiles including a temperature-responsive device, and an insulated flexible heat-conductive means communicating therewith and extending into the cooling medium of the engine, said flexible heat-conductive means comprising a plurality of wires insulated except at its ends by means of a rubber coating.

3. A temperature indicating device for automobiles including a temperature-responsive device, flexible heat-conductive means communicating therewith and extending into the cooling medium of the engine, said flexible heat-conductive means comprising a plurality of wires insulated by means of a rubber coating, and means whereby one extremity of said heat-conductive means is secured adjacent the said thermometer.

4. A temperature indicating device for automobiles including a thermometer, a housing therefor, a thimble adapted to be secured to said housing and to surround said thermometer, an insulating means within said thimble, a flexible conductor insulated except at its ends and adapted to extend into the cooling medium of the engine, and heat-transmitting holding means inserted in the space between said thimble, thermometer, and the upper end of said connector.

5. A temperature indicating device for automobiles including a housing, having a bore in the lower portion thereof, a shoulder carried by said housing at the upper end of said bore, a tubular thimble within said bore abutting against said shoulder and extending below said housing, an insulating tube within said thimble, a thermometer extending centrally of said insulating tube and projecting into the housing and a heat conducting means between said insulating tube and the lower portion of said thermometer.

6. A temperature indicating device for automobiles including a housing having a

bore in the lower portion thereof, a shoulder carried by said housing at the upper end of said bore, a tubular thimble within said bore abutting against said shoulder and extending below said housing, an insulating tube within said thimble, a thermometer extending centrally of said insulating tube and projecting into the housing, a heat conducting means between said insulating tube and the lower portion of said thermometer, and means extending into the cooling medium of the thimble whereby the heat therefrom may be conducted to the said thermometer.

In testimony whereof I affix my signature.

IRVING FLORMAN.