

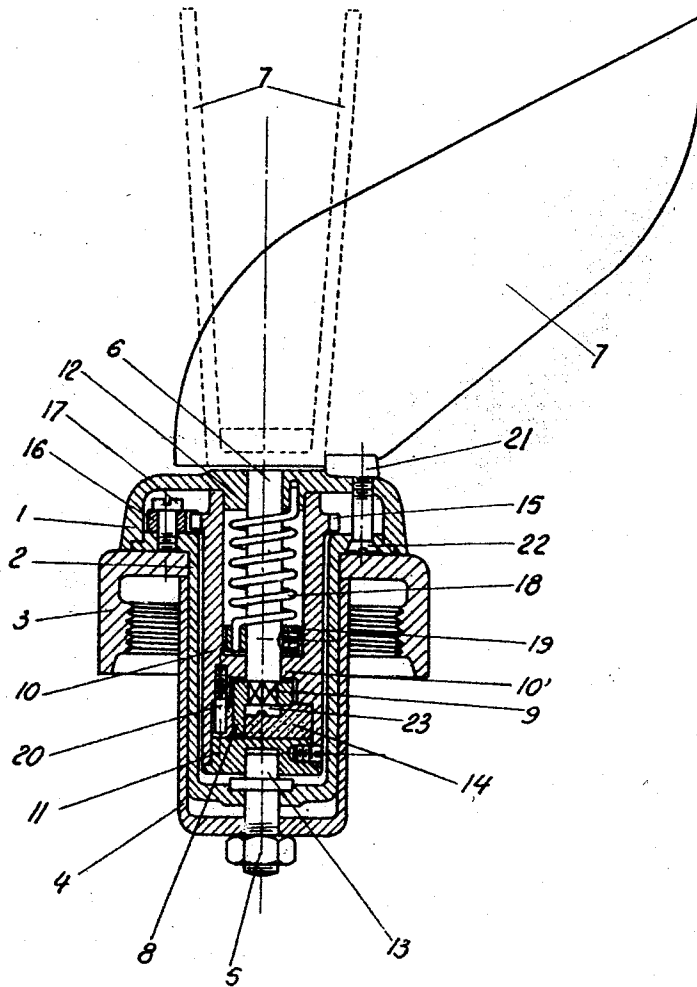
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TEMPERATURE INDICATOR

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UNITED STATES PATENT OFFICE

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TEMPERATURE INDICATOR

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It is well known that in the case of motor vehicles, the temperature of the water for cooling the engine should not exceed a certain limit, and the water should not be allowed to boil, as such heat would offer great prejudice to the functioning of the engine.

Various devices are in use in order to indicate to the driver that the critical temperature is attained. For this purpose, the signals may be of an optical or an acoustic nature, or the like, and these are set off by the use of any suitable force such as the expansion of a spring, the action of gravity, the dynamic action of air upon a suitable device etc. . . . and the action is produced, when the critical temperature is attained, by the melting of a suitable fusible metal, such as an alloy which melts at a low temperature, for instance the Darcet alloy.

The present invention relates to a device of this class which offers marked improvements over the known devices, due to the fact that the fusible metal, after its action, is recovered and resumes its original form as a connecting device, and it also maintains its operating position in the indicating apparatus, so that the said apparatus is always ready to operate, and, after the indicating signal has been set off, it is not necessary to remove or to open the apparatus in order to place the fusible metal piece in the operating position.

The appended drawing shows an embodiment of the invention in longitudinal section, as applied to a radiator for motor vehicles.

The said device consists of a casing comprising a cover 1 which is secured for instance by screws 22 to a case 2 which extends through the radiator plug 3 and rests by its flange upon the upper face of the latter, it being held by a socket 4 which is secured by a nut 5.

In the interior of the said case 2 is disposed a shaft 6 secured to the indicating device 7 which has the form of a pair of small wings. On the said shaft 6 is mounted a stud 8, having the eccentric position with reference to the said axle 6, by means of a square end 9 and a screw 23 or by like means.

The said shaft 6 is rotatable at one end in the sleeve 10 provided with a cross web 10' forming a bearing, and at the other end in the central boss 12 of the cover 1.

The sleeve 10 is closed at the lower part by a plug 11 secured by a screw, or by other means, and said sleeve is rotatable at the top about the said boss 12, and at the bottom about the pivot axle 13 which is secured to the said case 2 and consists for example of an appendage of the nut 5.

The lower face of the web 10' and the plug 11 form the ends of a chamber 14 containing the fusible metal.

The sleeve 10 carries at the outer part a ratchet wheel 15 cooperating with a spring pawl 16 rotatable on the axle 17 secured to the case 2.

A spring 18 surrounds the axle 6, and is secured at one end to the cover 1 and at the other end to said axle 6 through the medium of a washer 19 secured to the same by a screw.

A stud 20 is mounted at one side of the web 10' in such position that it will not meet the stud 8 in its rotation. In these conditions, the shape of the fusible mass in the chamber 14 is defined by the form of said chamber, and also by the relative position of the studs 8 and 20. In practice, the fusible mass may consist of a washer of a suitable alloy having the same height and diameter as the chamber 14, it being pierced with two eccentric holes corresponding to the studs 8 and 20. Obviously, it may be directly cast in the melted state into the said chamber, thus filling the same.

The operation of the said device is as follows:

As long as the device remains below the critical temperature, the indicating signal, whose wings 7 are now situated in the centre line of the vehicle hood, as shown by the dotted lines in the figure, will not be observed by the driver. This position may be determined by a stop 21, disposed upon the cover 1 and in contact with the said signal.

When the fusible metal is in the solid state, the spring 18 cannot expand in order to turn the said signal, since the axle 6 is now secured to the sleeve 10 by the fusible metal, thus

preventing all relative displacement of the studs 8 and 20. On the other hand, the sleeve 10 cannot rotate in the direction in which it is urged by the expansion of the spring 18, as this rotation is prevented by the device consisting of the pawl 16 and the ratchet wheel 15.

When the critical temperature is attained, the fusible metal melts, thus releasing the stud 8, and the axle 6 can now rotate under the action of the spring 18, thus turning the said indicating member 7. The rotation of said indicating member may be stopped after $\frac{1}{4}$ revolution by a suitable abutment, which may consist of an extension of the stop 21. The indicating member is thus placed crosswise of the centre line of the vehicle, as shown in the full lines in the figure, and it is thus clearly visible to the driver.

When the fusible metal becomes solid after cooling, it holds the stud 8 in the chamber 14, and the stud is now at 90° from its original position. To again set the indicating member in the disappearing position, it is turned through $\frac{1}{4}$ revolution into its first position, thus contracting the spring 18. The sleeve 10 is drawn back by the solid fusible metal, and this motion is not prevented by the studs 8 and 20, since in this direction of rotation the pawl 16 slips upon the ratchet wheel.

Obviously, the several details of construction as hereinbefore described are given solely by way of example, and these are susceptible of numerous modifications in detail without departing from the spirit of the invention. For example, the axle 6 need not set directly upon the said indicating member, but it may control, by means of gearing, levers, links or other devices, a certain number of indicators, and for instance a pair of wings which spread out when the critical temperature is attained.

Such indicators may be separately disposed, and may be made to appear at the same time by the action of fusible metal pieces having the same melting point, or can appear successively by the use of fusible metal pieces which melt at different temperatures, so that the driver will have a certain margin of safety between the two signals.

It may be advantageous to connect the indicator 7 to the axle 6 by a removable device, preferably disposed at the outside of the case containing the mechanism, and in this manner the indicating apparatus may employ a signal device consisting of a figurine of the type in common use on the radiator plug.

Although the apparatus according to the invention is chiefly adapted for use upon the radiators of motor vehicles, it is not limited to this particular application.

What I claim is:

1. A temperature indicating device, comprising in combination a casing which is subjected at the exterior to the action of the temperature, which casing contains a fusible

member melting at a relatively low temperature, an axle inserted into said fusible member, a spring urging the said axle in rotation, an indicating device which is actuated by said axle and is released when the fusible member melts, means by which the said fusible member will constantly maintain its form and its operating position in the apparatus, and means by which the said indicating device will be returned to the operative position after it has been set off, without requiring the dismounting of the apparatus.

2. A temperature indicating device, comprising in combination a casing which is subjected at the exterior to the action of the temperature, a cover provided upon said casing, a fusible member contained in said casing, an axle traversing the said cover, an eccentric stud which is mounted on said axle and is inserted into the said fusible member, an indicating device secured to said axle, a spring urging the said axle in rotation, a sleeve which is disposed in said casing and is rotatable with reference to the same, a stud which is mounted on said sleeve and is inserted into said stud secured to the axle, and means preventing said sleeve from rotating in the direction corresponding to the expansion of the said spring, but permitting said sleeve to rotate in the contrary direction.

3. A temperature indicating device, comprising in combination a casing which is subjected at the exterior to the action of the temperature, a cover provided upon said casing, a fusible member contained in said casing, an axle traversing the said cover, an eccentric stud which is mounted on said axle and is inserted into the said fusible member, an indicating device secured to said axle, a spring urging the said axle in rotation; a sleeve which is disposed in said casing and is rotatable with reference to the same, a stud which is mounted on said sleeve and is inserted into said fusible member, it being spaced apart from the said stud secured to the axle, a ratchet wheel mounted on said sleeve, and a pawl which allows the said sleeve to rotate only in the direction contrary to the direction corresponding to the expansion of the spring.

4. A temperature indicator comprising a casing submitted to the action of the temperature, a socket rotatably carried therein, means for preventing any rotation of the socket in a given direction with reference to the casing, a part inside the socket, a fusible member contained in the socket and adapted when non-melted to rigidly secure the said part with the socket, a spring connecting the said part with the casing and urging it to rotate with reference to the casing in the direction opposed to the allowed rotation of the socket and means for detecting any angular movement of the part inside its socket.

5. A temperature indicator comprising a casing submitted to the action of the temperature, a socket rotatably carried therein, means for preventing any rotation of the
5 socket in a given direction with reference to the casing, a part inside the socket, a fusible member contained in the socket and adapted when non-melted to rigidly secure the said part with the casing and urging it to rotate
10 with reference to the casing in the direction opposed to the allowed rotation of the socket, an indicating device carried by the part inside the socket and a stop on the casing cooperating with the indicating device for stop-
15 ping same in a predetermined angular position.

In testimony whereof I have signed my name to this specification.

MICHEL CHARLES BLONDIN.

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