April 20, 1926.

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A. P. ANDERSEN ET AL

RADIATOR INDICATOR

Filed Oct. 30, 1923

Fig. 1.

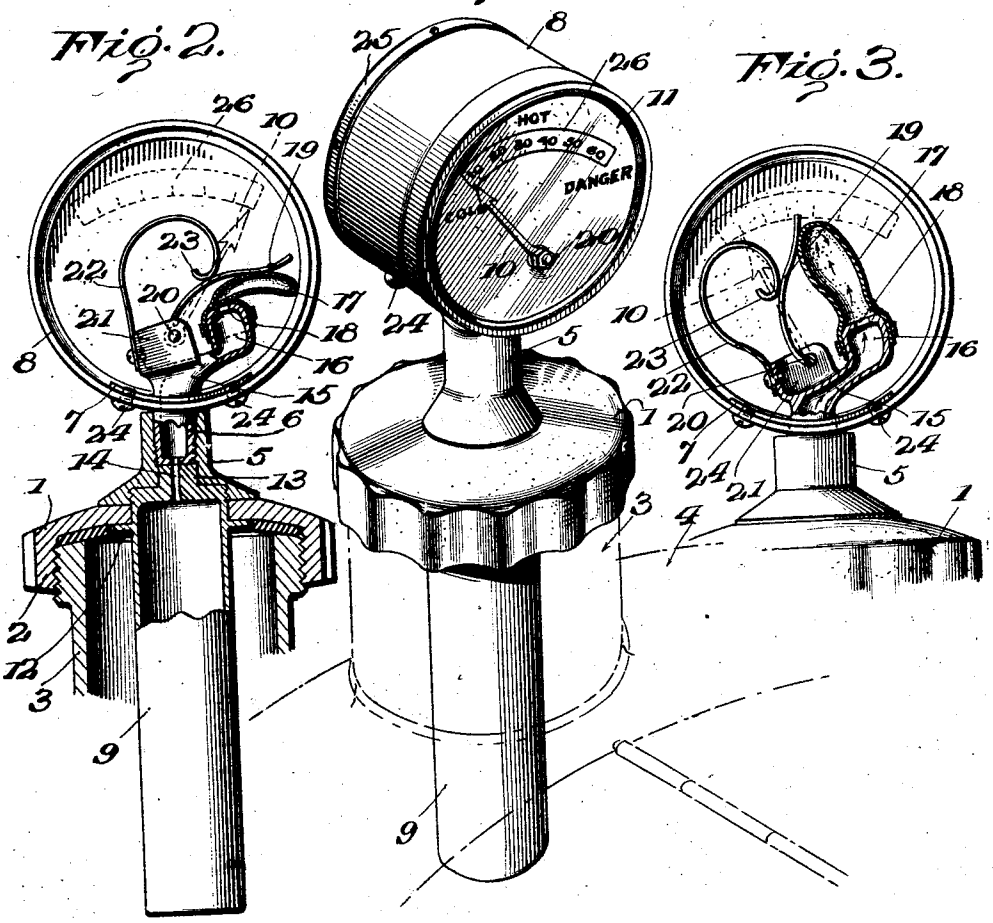



Fig. 2.



Fig. 3.



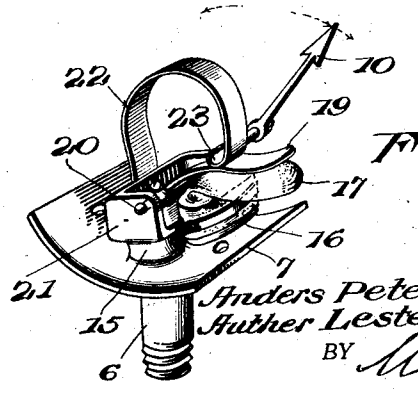


Fig. 4.

WITNESSES

W. A. Williams.

J. T. Schrott

INVENTORS

Anders Peter Andersen and

Auther Lester Tyrrell.

BY Munn & Co.

ATTORNEYS

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# UNITED STATES PATENT OFFICE.

ANDERS PETER ANDERSEN AND AUTHER LESTER TYRRELL, OF DETROIT, MICHIGAN.

## RADIATOR INDICATOR.

Application filed October 30, 1923. Serial No. 671,816.

*To all whom it may concern:*

Be it known that we, ANDERS PETER ANDERSEN and AUTHER LESTER TYRRELL, citizens of the United States, and residents of Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Radiator Indicators, of which the following is a specification.

Our invention relates to improvements in indicators and it consists of the constructions, combinations and arrangements herein described and claimed.

An object of the invention is to provide an indicator adapted primarily for use on automobile radiators for the purpose of showing the temperature condition of either the water in the radiator or the engine.

Another object of the invention is to provide a combined radiator cap and indicator, the cap being adapted to be screwed on the radiator inlet in place of the usual cap, the indicator including a tube which extends into the radiator for the purpose of effecting direct communication between the indicator and the interior of the radiator and causing certain registrations of temperature conditions.

Other objects and advantages will appear from the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of the improved indicator in place on the radiator inlet, also showing how the indicator appears to the driver.

Figure 2 is a rear elevation, parts being in section, illustrating the position of the parts before being affected by heat.

Figure 3 is a somewhat similar view showing the position of the parts after being affected by heat, and

Figure 4 is a perspective view of the holder by which the working parts of the indicator are carried.

In carrying out the invention provision is made of a cap or base 1 which is internally threaded at 2 so that it may be screwed in place on the inlet 3 of the radiator 4 in the customary manner. The cap itself is very much like the ordinary cap, the exception being that the improved indicator is combined therewith so that the two form an article of manufacture per se.

Resting against the top of the cap 1 is a bearing 5 onto which the nipple 6 of the holder 7 is screwed in order to mount the indicator casing 8 upon the cap. Screwed or otherwise secured into the bearing 5 from beneath is the tube 9.

This tube projects into the radiator so that the internal temperature of the radiator may act on the air column in the tube 9 and thus cause the movement of the hand 10 over the dial 11. The tube has a flange 12 which rests against the interior of the cap 1 when the parts are screwed together. It is intended that both the bearing 5 and tube 9 be fitted tightly upon the cap 1 so that they will not come apart. The upper end of the tube may have a short boss 13 which occupies an extension of the opening into which the nipple 6 is screwed, both the boss and end of the nipple having registering apertures which form the passage 14.

Arranged in continuation of the nipple 6 on the upper side of the holder 7 is an air tube 15 which communicates with the head 16 upon which the expansible balloon diaphragm 17 is mounted. The head has an opening 18 through which communication with the interior of the diaphragm is had. In the present instance the diaphragm consists of nothing more than a tube or bag of some suitable flexible material, but in practice it may be of any other material suitable for the purpose of moving the lever 19 upon expansion of the air on the inside.

The lever 19 is carried by the shaft 20 upon the exposed end of which the hand 10 is mounted. The shaft is supported in bearings 21 which form part of the air tube 15. Secured to one side of the bearings 21 is a spring 22 which bears against that side of the lever 19 opposite to the diaphragm 17.

The free end of the spring 22 is curled in to provide a contact 23 which will readily move over the surface of the lever 19 as the lever is moved upon expansion of the diaphragm 17. The spring 22 is very light and offers but little resistance to the movement of the lever 19. Notwithstanding this lightness the spring is strong enough to return the lever 19, hand 10 and diaphragm 17 to the expanded position (Fig. 2) upon contraction of the air column in the tube 9. The holder 7 is secured in the casing 8 by means of screws 24 which enter from the outside. The back of the head 8 is closed by a suitable cover 25 which may be secured in place by any suitable means.

In reference to the dial 11 provision is

made of a scale 26 which is graduated in numbered spaces which are intended to convey to the motorist a general idea of temperature conditions of either the engine or the radiator. The numbering of the scale is supplemented by the legends "Cold," "Hot," and "Danger." The legend "Cold" appears next to the lowest end of the scale, "Danger" next to the highest end and "Hot" intermediate of the two ends.

Upon observing the hand 10 to be upon the graduations "20" or "30" the motorist will know that the general temperature conditions are safe. Upon observing the hand 10 to be on either "40" or "50" he will know that the temperature conditions are beginning to become dangerous. Upon observing the hand 10 to be on the numeral "60" the warning is supplemented by the adjacent legend "Danger" which should cause the motorist to stop and make an examination for the cause of the overheating.

The operation of the indicator may be readily understood from the foregoing description. The combined indicator and cap is screwed on the inlet 3 of the radiator so that the tube 9 projects sufficiently far in the radiator for the purposes intended. The tube 9 is closed all around with the exception of the passage 14 which communicates with the diaphragm 17 through the nipple 6, air tube 15, head 16 and hole 18.

Indications of the hand 10 may occur upon the happening of either the overheating of the engine or the diminution of the water in the radiator to such an extent that the water becomes excessively hot and turns largely to steam. The overheating of the engine, for such causes as lack of oil, etc., will cause even a good supply of water in the radiator to become excessively hot.

In either event the air column in the tube 9 and in communicating parts will expand in accordance with the increase of temperature through which the tube is projected. The expansion of air will cause the diaphragm 17 to rise against the lever 19 so that the lever 19 and shaft 20 are turned toward the left (Fig. 3) thereby causing the hand 10 to move over the scale 26 toward the high end (Fig. 1).

The graduations of the scale 26 are not intended to indicate degrees of temperature. They merely give the motorist an idea of temperature conditions within the radiator. As the hand 10 nears the "Danger" mark the motorist will know that either the water in the radiator requires replenishing, additional oil is needed in the crank case or that there is something else that is causing the overheating of the engine.

While the construction and arrangement of the improved indicator as herein described and claimed is that of a generally preferred form, obviously modifications and changes may be made without departing from the spirit of the invention or the scope of the claims.

We claim:

1. An indicator comprising a casing, an air tube entering the casing and being directed to one side, a head at the terminus of the tube having an opening, a diaphragm fitted upon the head over the opening thereby occupying one side of the casing, means carried by the tube, situated on the other side of the casing and manifesting a resistance toward the diaphragm, a lever carried by the tube interposed between said means and the diaphragm, and a hand carried by the lever and movable according to the predominating power of either said means or the diaphragm.

2. An indicator comprising a nipple having a tube extending laterally of the axis of the nipple, a head at the terminus of the tube having an opening, a diaphragm carried by the head and communicating with the opening, means providing bearings and carried by the tube, a shaft journaled in said bearings substantially at right angles to said axis, means carried by the bearing means at the other side of the axis and manifesting resistance toward the diaphragm, a hand carried by the shaft, and a lever on the shaft and interposed between said resistance means and the diaphragm and being movable according to the predominating power of said means or the diaphragm.

3. An indicator comprising a cap, a tube having a threaded end extending through the cap and provided with a flange engaging beneath the cap, a boss on said end of the tube having a hole communicating with the interior, a holder, indicating mechanism carried by the holder, a nipple pendant from the holder having a hole communicating with the hole in the tube to form an air passage, and a bearing into which both the tube and nipple are screwed to mount both upon the cap.

ANDERS PETER ANDERSEN.
AUTHER LESTER TYRRELL.