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[54] **TEMPERATURE LIMIT ALARM**

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[52] **U.S. Cl.**..... **340/227.1**, 340/321, 337/376, 73/363.7

[51] **Int. Cl.** **G08b 17/06**

[58] **Field of Search**..... 340/227, 227.1, 283, 340/321; 337/333, 376; 240/1, 6.4; 73/363, 363.7, 363.9; 200/166 BA; 317/66; 236/94

[56] **References Cited**

UNITED STATES PATENTS

3,015,811 1/1962 Rubin 340/227.1

3,171,109 2/1965 Appel 340/227.1

FOREIGN PATENTS OR APPLICATIONS

559,097 2/1944 Great Britain 337/376

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[57] **ABSTRACT**

A bimetal temperature responsive coil exposed to ambient atmosphere is connected at its fixed inner end to one battery terminal and adjustable contact elements in the form of arches enclosing a lamp are connected to the other terminal to be contacted by the tail of the coil as it moves in response to temperature change to either the lower or the upper limit.

9 Claims, 3 Drawing Figures

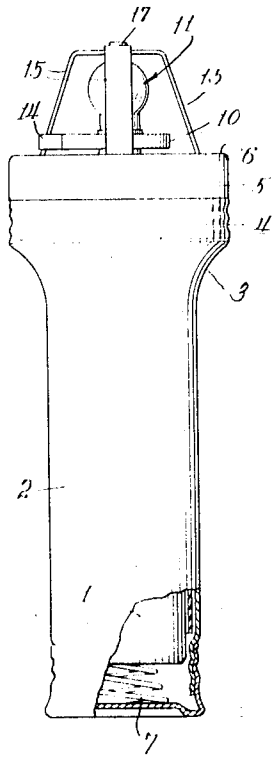


Fig. 1

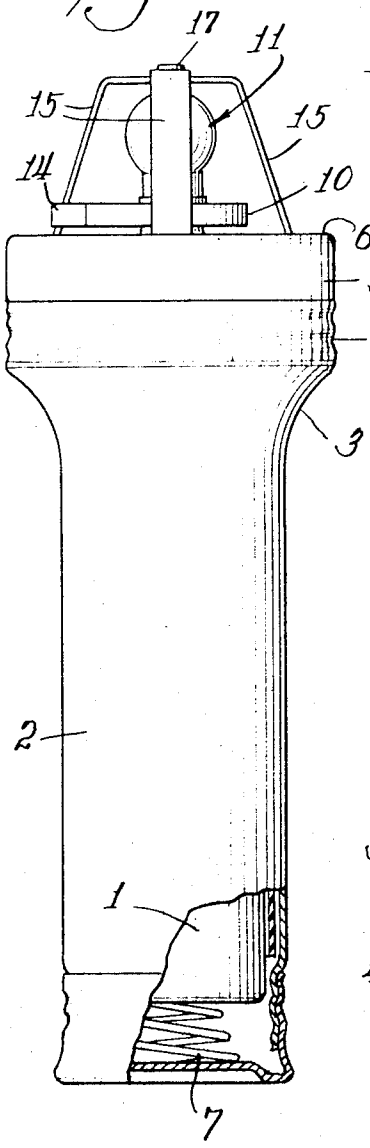


Fig. 2

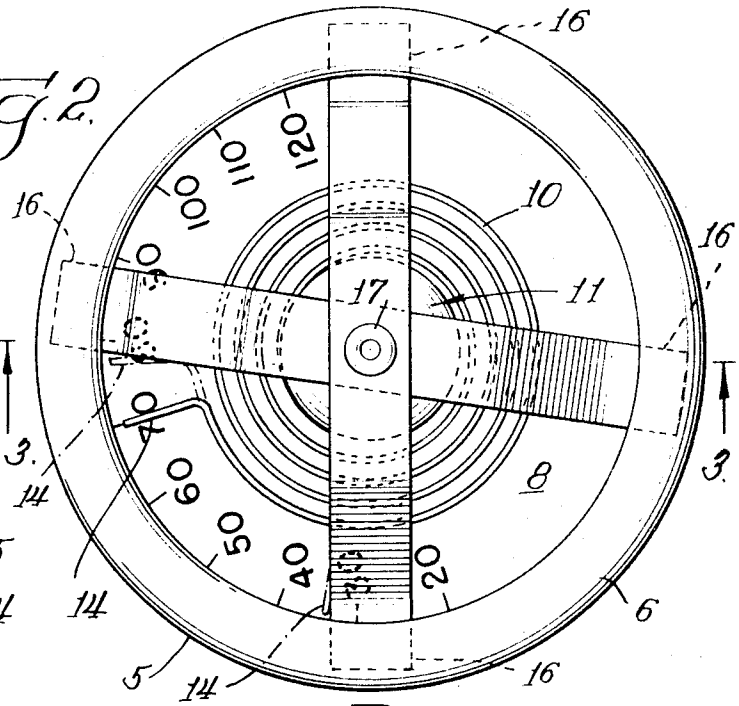
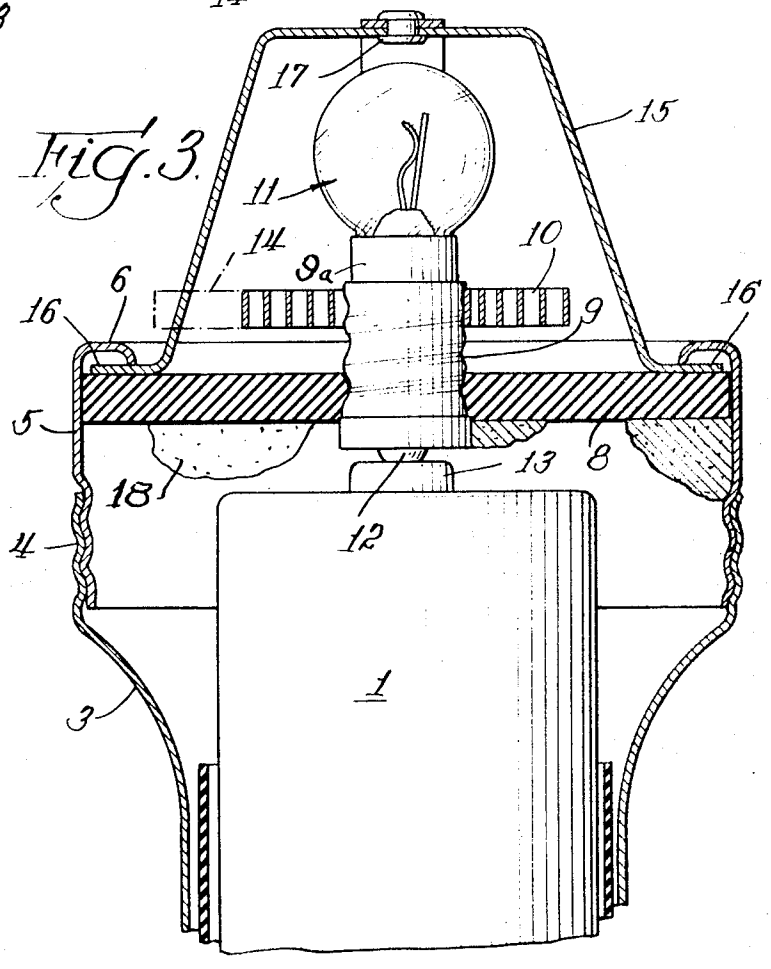


Fig. 3



TEMPERATURE LIMIT ALARM

BACKGROUND AND SUMMARY OF THE INVENTION

In latitudes where the temperature falls below the freezing point requiring dependable heating of homes and other buildings, not only for comfort but to prevent the freezing of pipes and appliances containing water with resulting damage, there is always some danger that the heating system will fail during periods of temporary or extended unoccupancy due to some malfunction or exhaustion of fuel or loss of electrical power, etc. Lake or other country homes, for example, which are heated only to the level, say 40° F., which provides a reasonable factor of safety above the freezing point between weekend visits, great damage can result from the freezing of water in the house and the subsequent thawing with possible water damage in addition to structural damage due to freezing. Many such homes have neighbors who, if they had knowledge of the failure of the heating system, could prevent or at least mitigate the damage.

The object of this invention is to provide an extremely simple device for providing a flashing alarm light in the event that ambient temperature falls below the level for which the device is set to give the alarm. Adjustable limit contacts may provide an upper as well as a lower limit to warn of overheating which may indicate fire. The contact arms are in the shape of an arch which also serves to provide mechanical protection for the exposed bimetal coil and lamp.

The achievements and advantages of the temperature limit alarm of this invention will become more fully apparent as the description thereof proceeds in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevational view of the temperature limit alarm.

FIG. **2** is a top view thereof.

FIG. **3** is a detailed view in cross section of the head or upper part of the alarm.

DESCRIPTION OF SPECIFIC EMBODIMENT

Although the device of the invention may be employed to ring a bell for alarm purposes, as well as provide a flashing light, for purposes of clarity and by way of example, the visual alarm is shown and described. It will be understood that it is intended to be placed on a table or other surface far enough away from a window to be substantially unaffected by the local temperature conditions peculiar to the vicinity of the window but still in a position to be seen by a neighbor or passerby when flashing.

Batteries **1** are contained within a cylindrical case **2** which is similar to an ordinary flashlight case. The top or head end of the case is preferably flared outwardly somewhat, as at **3**, to enlarge the diameter and the top portion is threaded as at **4**. A retaining ring **5**, threaded to screw into the threaded portion **4** of the case, has an internal flange **6** intended to hold the head assembly in against the pressure exerted through the batteries by the usual coil spring **7**.

The head assembly is mounted in and supported by a dial disk **8**. The threaded lamp socket **9** is cemented or otherwise affixed at the axis of the disk and bimetal thermometer coil **10** is soldered or otherwise secured

to the outside of socket **9** with electrical connection therewith. Flasher lamp **11**, when screwed into socket **9**, makes electrical connection therewith and either exposes its central terminal **12** for engagement and electrical contact with the terminal **13** of the battery or engages a fitting **9***a* which makes contact with the battery terminal.

It will be understood that with the inner end of the bimetal coil anchored to the fixed socket structure, the free end, which becomes electrical contact **14**, revolves in a counterclockwise direction with lowering temperature and clockwise direction when ambient temperature increases.

To complete the lamp circuit, it is necessary to connect the coil with case **2** which is connected with the negative terminal of the battery through spring **7**. For this purpose, and also for the purpose of providing a mechanical guard for the lamp and coil, a pair of metal arches **15** are mounted by their ends **16** between dial disk **8** and flange **6** making electrical contact with the latter. The arches **15** are pivotally joined where they cross, as by rivet **17**,which establishes frictional engagement but permits relative movement between the two arch members.

Since the ends **16** of the arches are only frictionally held in the assembly, the position of each may be shifted by applying manual force. They may be arranged to provide a low temperature limit alarm, a high temperature limit alarm, or both low and high temperature alarms. When they have been adjusted, movement of the coil responsive to ambient temperature to the point at which the contact end **14** makes contact with the edge of one of the arches, the lamp circuit is completed and the lamp commences flashing, continuing so long as the batteries last or the temperature change reverses to again disengage contact **14** with an arch.

To ensure reliable electrical contact between the coil contact **14** and arch, it is preferable that at least engaging surfaces be nickel plated or otherwise surfaced to prevent corrosion.

As a convenience in assembling the head structure of the device, several blobs **18** of an adhesive which remains somewhat resilient when set, such as a silicone adhesive, may be applied at the juncture of the disk **8** with ring **5**. The resiliency of the adhesive and of spring **7** permit limited depression of the disk for easier movement of the arches in adjusting the alarm.

I claim:

1. In a temperature limit alarm which includes an alarm signal device and a battery operatively connected thereto through an ambient temperature responsive control switching structure, the improvement wherein the switching structure comprises a conductive open-topped cylindrical housing connected with one terminal of the battery and having an inturned flange defining a circular opening in the top thereof, a nonconductive disk arranged in said housing to close said opening, a hollow column mounted in and extending coaxially through and above said disk, a bimetal coil arranged concentrically upon said column with its inner end fastened to and electrically connected with said column, said column being adapted to support an alarm signal device thereabove, an arch-shaped conductive bar clamped at its ends between said disk and said inturned flange and rising above said coil and leaving space therebelow for an alarm signal device, said bar being located for electrical contact engagement by

the free end of said coil, and means for electrically connecting said column with one terminal of an alarm signal device and the other terminal of the battery through said hollow column with the other terminal of said signal device.

2. A temperature limit alarm comprising a conductive cylindrical housing containing a battery having a central positive terminal at its top, said housing having an inturned flange defining a circular opening at its top end, a nonconductive disk arranged in said housing to close said opening, a threaded lamp socket sleeve mounted in and extending coaxially through and above said disk, a central terminal lamp in said socket with said terminal in contact with said central terminal of said battery, a bimetal coil arranged concentrically upon said socket sleeve with its inner end fastened to and electrically connected with said socket sleeve, an arch-shaped conductive bar clamped at its ends between said disk and said inturned flange and rising above said coil and said lamp, said bar being located for electrical contact engagement by the free end of said coil, and a coil spring arranged in the bottom of said housing to electrically connect the negative terminal of said battery with said housing and press said battery upwardly against said central terminal of said lamp.

3. Structure in accordance with claim 2 wherein the contact surface of the free end of the coil is nickel plated.

4. Structure in accordance with claim 3 wherein the arch-shaped bar is nickel plated.

5. Structure in accordance with claim 2 wherein the arch-shaped bar is frictionally held in position and is adjustable with respect to its position at the periphery of the disk.

6. Structure in accordance with claim 5 wherein the disk is provided with temperature degrees indicia whereby the bar may be adjusted to a particular ambient temperature.

7. Structure in accordance with claim 2 and including a second arch-shaped bar also arranged for electrical contact engagement with the end of the coil whereby to provide for both high temperature and low temperature limit alarms.

8. Structure in accordance with claim 7 wherein both arch-shaped bars are frictionally held in position and are independently adjustable with respect to their positions at the periphery of the disk.

9. Structure in accordance with claim 7 wherein the two arch-shaped bars are pivotally connected to each other where they cross at the axis of the housing.

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