

July 24, 1956

H. M. MUNCHERYAN

2,755,666

TEMPERATURE-INDICATING DEVICE

Filed April 23, 1953

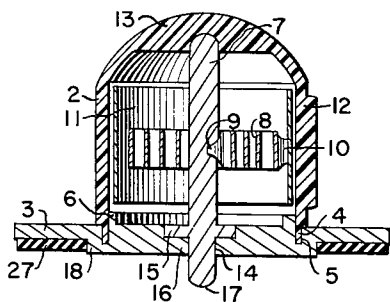


FIG. 1

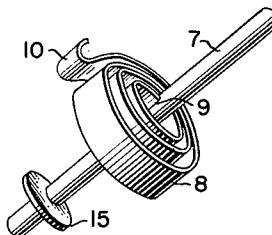


FIG. 5

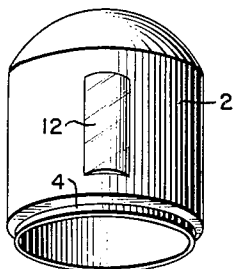


FIG. 2

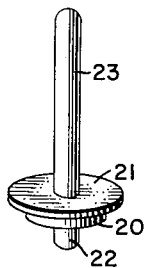


FIG. 6

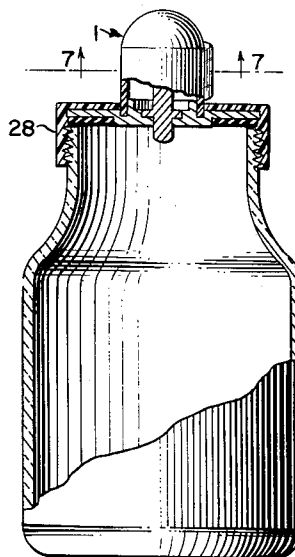


FIG. 8

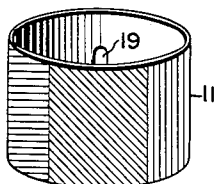


FIG. 3

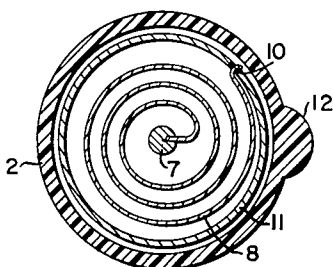


FIG. 7

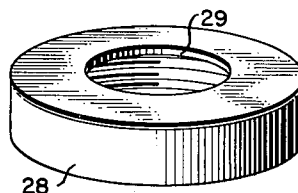


FIG. 9

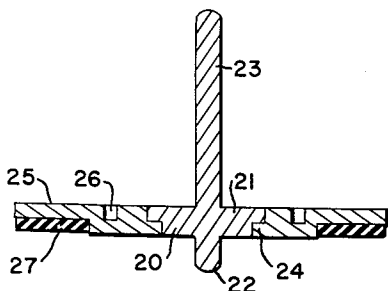


FIG. 4

INVENTOR

Hand M. Muncheryan

1

2,755,666

TEMPERATURE-INDICATING DEVICE

Hrand M. Muncheryan, Duarte, Calif.

Application April 23, 1953, Serial No. 350,626

9 Claims. (Cl. 73—367)

The present invention relates to temperature-indicating devices, and more particularly to an improved liquid-temperature indicator in which thermostatically actuated colored areas designate cold, warm, and hot states of the liquid, such as milk before serving it to an infant, blood plasma or glucose preparatory to administering it to a patient, and the like.

This invention is an improved embodiment of the temperature-indicating device described and claimed in an application filed by me in the United States Patent Office on March 30, 1953, Serial No. 345,346, in which I have disclosed a temperature indicator which, in use, is mounted in the neck of a conventional-type milk bottle or plasma container, with the temperature-indicating portion of the device projecting into the bottle and substantially in contact with the medium whose temperature is to be indicated. Whereas in the present improved embodiment, the temperature-indicating portion of the indicator is located outside of the bottle and projects out through an aperture in the center of the housing which serves to mount and seal the temperature-indicating device on the bottle and which prevents the contents of the bottle from spilling, or spoiling by air entering into the bottle and causing bacterial action therein.

A principal advantage of the invention is the provision of a temperature-indicating device which can easily be mounted on a conventional-type milk or plasma bottle and, after the content of the bottle is heated, the temperature of the liquid can readily be determined by a glance at the device.

Another object of the invention is to provide a temperature indicator which is particularly adaptable to most of the conventional type of plasma containers, baby nursing bottles, or the like, without the use of any accessory parts to hold and secure the indicator on the bottle in order to utilize its temperature-indicating properties.

A further object of the invention is to provide a readily "readable" temperature indicator having a thermostatically actuated cylinder with a plurality of variously colored areas on its surface, each color designating a specific degree of temperature between room-temperature to the temperature of boiling water.

A still further object of the invention is to provide a temperature-indicating device which is rugged in construction and which can withstand without damage the ranges of temperatures encountered in warming or sterilizing any liquid.

Further objects and advantages of the invention will be made manifest in the following specification taken in conjunction with the accompanying drawing, in which like numerals designate corresponding parts throughout the several views of the invention, and wherein:

Figure 1 is a sectional detail view of the temperature-indicating device.

Figure 2 is the isometric view of the cylindrical cap member of the indicating device.

Figure 3 is a view in elevation of the multiple-color indicating cylinder.

2

Figure 4 is the vertical sectional view of the alternate embodiments of both the axial pin holding the thermostatic element and the integral flanged plate.

Figure 5 is an isometric view of the thermostatic element and the axial pin shown in Figure 1.

Figure 6 is an isometric view of the axial pin sectionally shown in Figure 4.

Figure 7 is a cross-sectional view of the temperature-indicating device taken on lines 7—7 of Figure 8.

Figure 8 is a typical conventional-type bottle equipped with the present invention, showing a cutaway section to illustrate the position of the temperature-indicating device normally mounted in use.

Figure 9 illustrates the plan view of the internally-threaded housing which serves to secure the temperature-indicating device on the bottle.

With reference to the drawing, the numeral 1 illustrates the plan view of the temperature-indicating device, which may be made of opaque plastic or other suitable material, or it may be made of transparent plastic and lined with a suitable opaque material. The device 1 consists of a cylindrical cap member 2 hermetically secured to a circular flanged plate 3, forming a chamber therein. The end of the cap member 2 which is secured to the plate 3 is peripherally reduced as at recessed section 4 which fits into the circular groove 5 disposed in coaxial relation to the flanged plate 3 and in peripheral relation to the collar 6 integrally formed on the flanged plate 3. During assembly, the recessed portion 4 of the cylindrical cap member 2 fits into the groove 5 and is sealed therein, with a suitable binder, between the collar 6 and the flanged portion of plate 3.

An axial pin 7 extends centrally between the dome of the cylindrical member 2 and the flanged plate 3. This pin is made of a heat-conducting material, such as copper, brass, aluminum, or the like. Coiled around the pin 7 is a thermostatic or bimetallic element 8, whose inner end 9 is secured permanently by welding or crimping to the midpoint of pin 7 and supported thereupon. The outer end of the thermostatic element 8 is formed into a hook-like terminal 10 and fastens the element 8 to a peripheral temperature-indicating member 11, which is made of a thin cylinder of plastic, paper, copper, aluminum, or the like, and has on its outside surface at least three consecutive rectangular areas colored blue, green, and red, respectively, or any other suitable colors. The blue designates cold, the green warm, and the red hot, the normal temperature of the milk or plasma being limited to the green area, which covers a range of about 20 degrees Fahrenheit; this range is in the neighborhood of human-body temperature and is the normal range desired.

The temperature-indicating member or indicator 11, in order to indicate the relative temperature of the liquid in the bottle, is actuated by the thermostatic element 8 which is made of a bimetallic material and calibrated against a precision mercury thermometer so that the blue area will cover a range from 90° F. down to 40° F., the green will cover a range between 90° F. to 110° F., and the red area will extend from 110° F. to the boiling temperature of water. The cylindrical member 11 is held around the element 8 in a freely rotatable position in the cavity of the body member 2, so that when the temperature of the indicator is raised the element 8 expands and its free end causes the indicating member 11 to rotate counterclockwise, and when the temperature is lowered the indicating member 11 rotates clockwise. In doing so, the variously colored rectangular areas of the member 11 rotate with it. Through a transparent magnifying window 12 provided in the wall of the opaque cylindrical body 2, any colored area appearing behind this window is visible and gives a relative measure of the temperature. For instance, a green area appearing behind the window 12 will designate normal injection temperature for blood

3

plasma, glucose, or normal nursing temperature for milk.

The spherical dome 13 of cap member 2 provides a support to the upper end of the axial pin 7, whose opposite end passes through an aperture 14 of the flanged member 3 and is hermetically sealed therein with a binding material. The integral shoulder 15 of pin 7 rests on the recessed portion 16 of flanged member 3. The shoulder 15 has dual purposes: it collects heat from the terminal portion 17 of pin 7 and transmits it to the thermostatic element 8, and also serves to form a tight seal with the recessed portion 16. The terminal portion 17 or pin 7 projects into the medium whose temperature is to be determined and because of its high heat conductivity it rapidly transfers the heat to the thermostatic element 8. The numeral 18 designates a discal protrusion at the lower surface of the flanged member 3 and serves to provide extra thickness to that portion of member 3 which contains the concentric groove 5 for accommodating the recessed rim 4 of cylindrical member 2.

Figure 3 shows the temperature-indicating cylinder 11, with hatched rectangular areas representing the various colors which designate specific temperature ranges, as stated above. Midway between the two edges of the cylinder 11 is a slot 19 into which the terminal portion 10 of thermostatic element 8 enters and is secured therein by welding or crimping, depending on the material used.

In Figure 4 is shown a modified embodiment of axial pin 7, together with the modified embodiment of flanged member 3. The numerals 20 and 21 designate the integral concentric discs which form, together with the projecting terminal portion 22, the heat-absorbing body of the axial pin 23. The integral concentric discs 20 and 21 are fitted over the shoulder 24 of flanged member 25 and are hermetically sealed therein by use of a suitable binding material. In assembly, the recessed rim 4 of the cap member 2 is inserted into the circular groove 26 and is hermetically sealed therein so that no moisture or air can enter the chamber of the cap member 2. A distinct difference between the axial pin 7 and its equivalent embodiment 23 is that the discal portion 20 in conjunction with the terminal pin 22 presents a larger surface area and larger mass which are exposed to the thermal medium. This feature of the member 23 serves to expeditiously transfer the heat from the heating medium to the thermostatic element. The annular disc or gasket 27 is a resilient material, such as rubber, and is attached to flange 3 or 25; it serves to seal the temperature-indicating device on the bottle when the indicator housing 28 is screwed thereon.

Figure 8 presents a conventional-type bottle with which the present temperature-indicator will be used. This figure illustrates the usual manner in which the present temperature-indicating device is arranged in the housing 28, by being accommodated in the aperture 29, and on the bottle during storage, sterilizing, or warming of its contents. It will be noted that the annular gasket 27 being made of live rubber serves as a seal between the rim of the bottle and the temperature indicator, and the housing, when screwed by the threads formed on its inner peripheral surface onto the bottle similarly threaded, provides the necessary pressure for the seal.

Although preferred embodiments of my invention are shown and described, it is susceptible to further modifications in the detail of construction without departing from the spirit and scope thereof.

I claim:

1. A temperature-indicating device comprising a cap having a magnifying window, a circular plate secured to said cap and forming a peripheral flange about the outer periphery of said cap, said plate having a circular aperture and an annular recess in the periphery of said aperture, a heat-conducting pin extending axially between said cap and said plate, said pin having one end in the form of a straight rod and the other end being provided

4

with a discal shoulder adjacent its terminal portion, said discal shoulder of said pin being secured in the annular recess in said plate with the terminal portion extending to the interior through the aperture thereof, a peripheral thin cylinder disposed circumjacent to said pin and having a plurality of colored areas thereon for designating temperature, a thermostatic spiral disposed around said pin and having one end secured to said pin and the other end to said cylinder so that said cylinder rotates, impelled by said spiral, relative to said window in said cap, and a collar means for securing said temperature-indicating device on the mouth of a baby-nursing milk bottle.

2. A temperature-indicating device, comprising a cap provided with a magnifying window, a circular flanged plate adapted to receive the open end of said cap and having centrally disposed heat-conducting concentric disks integrally formed with oppositely projecting pins one of which extending to said cap and the other projecting externally to said plate, a peripheral indicator circumjacent said pin extending to said cap and having a plurality of colored consecutive areas thereon to represent various temperatures, a temperature-responsive coil spirally disposed around said pin extending to said cap and having one end secured to said pin and the other end to said indicator, so that upon application of heat to said coil it expands and causes the rotation of said indicator relative to said window, a resilient annular member affixed to said flanged plate, and a housing adapted to removably incase said flanged plate for securing said temperature-indicating device to the mouth of a baby-nursing milk bottle.

3. A temperature-indicating device, comprising a cylindrical cap provided with a magnifying window in its cylinder wall and recessed peripherally at its open end to form a circular shoulder, a circular disk provided with a centrally located aperture and a concentric groove disposed peripherally in remote relation to said aperture in said disk, said groove adapted to receive the decessed end of said cap and to secure the latter at its circular shoulder to said disk, thermostatically-actuated temperature-indicating means disposed in said cap and having different colored areas consecutively arranged thereupon for representing various temperatures, said circular disk having a peripheral section extending beyond the periphery of said cap and an annular gasket affixed under said section, and means for securing said temperature-indicating device to a baby-nursing milk bottle.

4. A temperature-indicating device, comprising a cylindrical cap having a magnifying window, a flanged disk secured to the open end of said cap, a pin extending between said disk and said cap, a thin cylinder rotatably mounted in said cap and peripherally to said pin, a bimetallic coil spirally disposed around said pin and having one end attached to said pin and the other end to said thin cylinder, said cylinder having temperature-representing colors on the outer surface and positioned to show through said magnifying window, said flanged disk forming an annular recess on the side opposite from that securing the open end of said cap and a resilient gasket made fast to said recess, and means for hermetically sealing said temperature-indicating device by means of said resilient gasket on the mouth of a baby-nursing milk bottle.

5. A temperature-indicating device for use on a baby-nursing milk bottle, comprising an opaque cap member having a vitreous window in its side wall, a circular disk secured to the open end of said cap and extending substantially beyond the outer periphery of said cap to form an annular flange thereon, an axial pin extending between said circular disk and said cap, a thin cylinder having a slot in its wall and being disposed circumjacent to said pin, said cylinder having consecutively arranged three differently colored areas thereon to represent three conditions of temperature, a bimetallic coil

5

spirally positioned around said pin and having one end secured to said pin and the other end secured in the slot of said cylinder, said thin cylinder being rotative relative to said vitreous window by means of said bimetallic coil, when heat is applied thereto, for indicating temperature condition, and an internally threaded cylindrical housing for removably encasing said flanged section of said temperature-indicating device and securing said device on the mouth of a baby-nursing milk bottle.

6. In a temperature-indicating device, the combination which comprises a cap having a discal closure extending beyond the periphery of said cap and forming an annular flange thereon, a transparent window disposed in said cap, a temperature-indicating cylindrical means rotatively mounted in said cap and having blue, green and red areas displayed on its peripheral surface for representing respectively cold, warm, and hot temperature conditions, a thermostatic element inside said cylinder and having one end secured to said cylinder and the other end to an axial pin extending from said closure to said cap, said element causing rotation of said indicating means relative to said window, and a short internally threaded cylindrical housing having one end open and the other partially closed by means of an integral disk having a centrally located aperture for accommodating said cap, with said annular flange in abutting relation to said integral disk, and for securing said cap together with said flange on the mouth of a baby-nursing milk bottle.

7. A temperature-indicating device, comprising a cylindrical cap having a magnifying window in its cylinder wall, a circular plate providing a closure at the end of said cap and extending peripherally beyond the outer diameter of said cap to form an annular flange thereon, a resilient gasket affixed to the undersurface of said flange, a temperature-indicating means disposed in said cap and including a thermosensitive means to cause rotation of said indicating means relative to said magnifying window, said indicating means having thereon variously colored areas to represent conditions of temperature and arranged in register with said window, and an annular housing having a discal closure at one end with a centrally located aperture therein, said cylindrical cap with said flange being mounted during use in said housing with said cap projecting through said aperture and said flange abutting against the underside of said discal closure, said housing being adapted so that the entire assembly can be mounted on the correspondingly adapted mouth of a baby-

6

nursing milk bottle and secured thereon hermetically by means of said gasket therebetween.

8. A temperature-indicating device, comprising a cap having a window, a circular plate secured to said cap and forming a flange around the periphery of said cap, a chamber formed in said cap and an indicating means having consecutively arranged blue, green, and red areas thereon being disposed in said chamber, thermosensitive means axially positioned in said chamber and secured to said indicating means to cause movement of said indicating means relative to said window upon change of temperature, a thermoconductive member disposed in the center of said circular plate, integral thereof, and extending externally to said chamber for conducting heat into said chamber and being secured, internally to said chamber, to said thermosensitive means thereof, a resilient disc affixed to said flange, and a housing with an apertured top detachably accommodating said flanged cap with said cap projecting through said aperture, said housing being adapted to secure said cap together with said flange on the mouth of a baby-nursing milk bottle, with said indicating device determining the temperature of the contents thereof.

9. A temperature-indicating device, comprising a cap having a window, a circular plate secured to said cap and extending substantially around the periphery of said cap, a chamber formed in said cap, means with colored areas thereon to represent temperature conditions being disposed in said chamber, thermosensitive means secured to said first means to cause its movement relative to said window, and means for supporting both of said means axially in said chamber and extending to the exterior of said chamber for conducting heat thereinto, and a housing for detachably accommodating said cap with said flange and adapted to secure same on the mouth of a baby-nursing milk bottle, for indicating the temperature of the contents thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

1,403,228	Brach	Jan. 10, 1922
1,478,258	Schlaich	Dec. 18, 1923
1,754,455	Boyce	Apr. 15, 1930
1,973,838	Zubaty	Sept. 18, 1934
2,483,979	Morrill	Oct. 4, 1949
2,655,810	La Coe	Oct. 20, 1953
2,674,882	Doggett	Apr. 13, 1954