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TELLTALE FOR OVERHEATED BLOOD STORAGE
CONTAINERS AND THE LIKE
Filed Dec. 14, 1959

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FIG. 1.

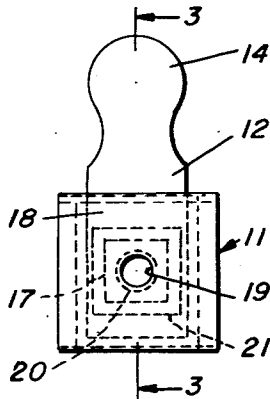


FIG. 2.

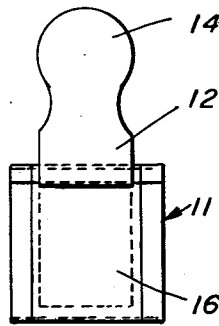


FIG. 3.

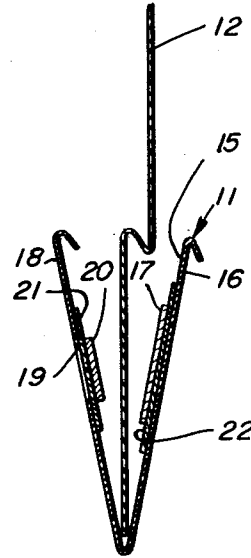


FIG. 5.

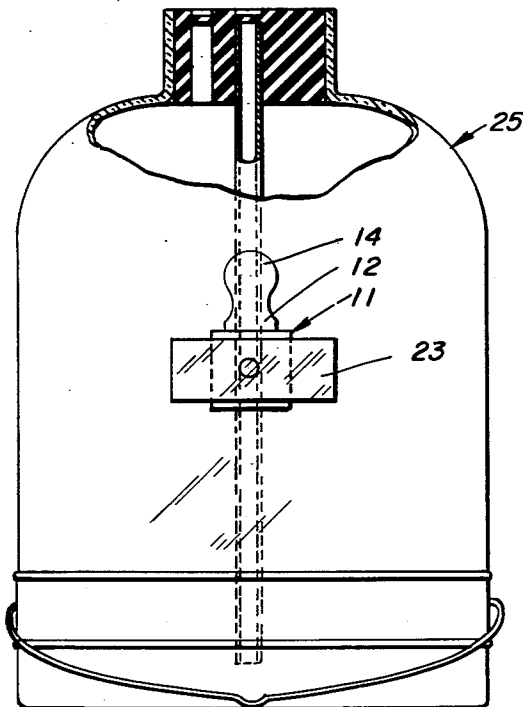
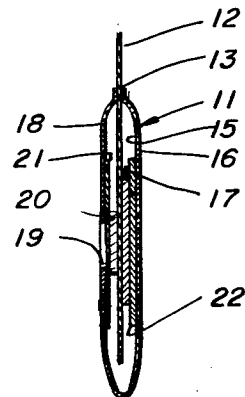


FIG. 4.



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TELLTALE FOR OVERHEATED BLOOD STORAGE CONTAINERS AND THE LIKE

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7 Claims. (Cl. 116—114)

This invention relates to a visual telltale device which irreversibly indicates if the content of a container has been warmed to a higher temperature than is permissible, and in particular to a telltale device for a storage bottle of human blood to indicate whether or not it has been permitted to warm up after original refrigeration above a critical temperature at which the blood is dangerous or unfit for transfusion.

The principal object of the invention is to provide a simple telltale device which may be readily attached to a blood storage bottle and which by its color change in the indicator window indicates whether or not the content of the bottle has ever, since the initial refrigeration, reached a temperature high enough to make the blood unsafe for transfusion use. Another object is to provide a telltale which is attachable to a container to show if the contents have attained a selected critical temperature above the ambient temperature.

These and other objects are attained by our invention which will be understood from the following description, reference being made to the accompanying drawing in which

FIG. 1 is a front elevational view of a preferred form of our invention;

FIG. 2 is a rear elevational view of the same;

FIG. 3 is a cross-sectional view taken on the line 3—3 of FIG. 1;

FIG. 4 is a sectional view of an alternative form of our invention; and

FIG. 5 is a front elevational view of a typical blood storage bottle with the telltale attached and the separator still in place.

Referring particularly to FIGS. 1 to 3, an envelope 11 preferably of aluminum foil is provided with one open edge through which a separator 12 extends inside the envelope, the outer end serving as a pull-tab 14 by which the separator may be withdrawn from the envelope. The envelope is preferably sealed at the three edges by a heat sealing agent, for example polyvinyl acetate. On the inside wall 15 of the envelope back 16 is affixed a reservoir absorbing pad 17 containing an absorbed indicator material which is in a solid state below a selected critical temperature, and is in a liquid state above the said critical temperature.

The envelope front 18 is provided with a window 19 through which may be observed an indicator pad 20. The separator 12, which is made of parchment or other nonabsorbing paper-like material, when in place, prevents contact between the indicator pad 20 and the reservoir pad 17.

The reservoir pad 17 consists of a piece of absorbent or blotter paper, which is substantially saturated with a colored material which is in a solid state below the selected critical temperature and is in a liquid state above the selected critical temperature. It is contemplated that the container and contents, along with the telltale device, will have been cooled below the critical temperature before the separator 12 is pulled out, to bring the indicator pad 20 in surface contact with the reservoir pad 17 and the solidified colored material absorbed therein. Since below the critical temperature the material is solidified it does not absorb in the indicator pad 20, which therefore

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remains the original color, for example white, as viewed through window 19 in the envelope front 18. When the temperature of the reservoir pad 17 rises above the selected critical temperature, the melted material is absorbed in the indicator pad 20, and the new color is seen at the window 19. This indicator is not reversible, and the window appears colored whether the temperature is raised still more, or if the temperature is subsequently lowered below the solidification temperature.

The composition of the material absorbed in the reservoir may be selected to have any desired melting temperature to correspond to the critical temperature to be indicated by the telltale. In the application to blood storage bottles, it has been found that n-undecyl alcohol having a melting range of 59° to 63° F. is preferred. Any oil soluble dye (for example "Dupont oil red") up to about 5 percent may be mixed with the n-undecyl alcohol or other indicated materials to give a strong color in the indicator pad when the melting point has been reached or exceeded. Other critical temperatures in approximately the range for blood storage are indicated by iso-amyl stearate with a melting range of 50 to 59° F.; ethyl myristate with a melting range of 50 to 54° F. Other chemical compounds or mixtures thereof may be selected and colored with dyes for use as the melting and freezing indicator material with which the reservoir pad is saturated, and which when melted will be absorbed by the indicator pad and be colored and therefore visible through the window of the telltale device.

It is desirable to have the indicator pad of smaller area and smaller absorbing capacity in order that it will become visibly colored without too much delay after the absorbed material in the reservoir pad has become melted. For the same reason the indicator pad is preferably relatively thin.

The envelope 11 is preferably made of aluminum foil because this not only is a good heat conductor, but also because by its impervious nature it slows down the evaporation of certain indicator materials having high volatilization rates. For example, in the case of the n-undecyl alcohol used in the preferred embodiment of the invention, the telltale device would become inactive in two or three weeks if the reservoir pad 17 were not enclosed in the sealed aluminum foil envelope.

A modified form of our device is shown in FIG. 4, in which a strip of aluminum foil is folded in the middle, an opening for the window 19 provided on the envelope front 18 and the indicator pad 20 is still attached to the inside surface of the front 18 by a piece 21 of double coated pressure adhesive tape 21. The reservoir pad 17 after saturation with the indicator material is attached to the inside wall 15 of the back 16 by another strip 22 of double coated pressure adhesive tape. The other edges of the envelope, except the slit 13 for the pull tab 14 are sealed by folding over or by adhesive sealing, or both, and the top edge 13 (which is not sealed) together with the pull tab 14 are double folded to form a temporary seal which is effective until the pull tab 14 is removed.

In using the telltale device on a blood bottle, indicated at 25 in FIG. 5, the envelope 11 is attached to the outer face of the bottle by a piece of adhesive tape 23, the window 19 being maintained visible by the use of transparent tape. After the blood in the bottle has been originally refrigerated below the critical temperature, the pull tab 14 is withdrawn. Thereafter, if the telltale on the bottle reaches a temperature at which the indicator material becomes liquid, the indicator pad will become colored, and this may be observed at the window 19. The color remains even though the bottle and the telltale are subsequently cooled below the critical temperature,

because the indicator pad is permanently stained by the melted colored indicator material.

The advantages of our telltale device will be apparent. The devices may be stored over relatively long periods, with the separator strips in place, without loss of activity, until needed. The telltale devices may be number coded for each source of blood and the supply of unused telltale devices may be rigidly controlled. The used telltales may not be reversed and reused. The objectives stated have been attained.

We claim:

1. A telltale device comprising an envelope having a window in its front face; an absorbent indicator pad within said envelope visible through said window; a reservoir pad within said envelope in juxtaposed position relative to said indicator pad; a removable impervious separator initially disposed between said indicator pad and said reservoir pad; and means for manually removing said separator to bring said indicator pad into contact with said reservoir pad; said reservoir pad having absorbed therein a material whose melting point corresponds to a selected critical temperature for said telltale, whereby when said separator is removed while the temperature is lower than the critical temperature, said material, if subsequently heated above said critical temperature, melts and absorbs into said indicator pad and becomes visible through said window.

2. A telltale device comprising an envelope having a window in its front face and having an opening on one edge; an absorbent indicator pad within said envelope visible through said window; a reservoir pad within said envelope in juxtaposed position relative to said indicator pad; and a removable impervious separator initially disposed between said indicator pad and said reservoir pad, said separator having a means extending through said opening for manually removing said separator to bring said indicator pad into contact with said reservoir pad; said reservoir pad having absorbed therein a material whose melting point corresponds to a selected critical temperature for said telltale, whereby when said separator is removed while the temperature is lower than the critical temperature, the indicator pad remains unchanged, whereas when the temperature exceeds the critical temperature, said material melts and absorbs into said indicator pad and becomes visible through said window.

3. A telltale device comprising an envelope having a window in its front face and having an opening on one edge; an absorbent indicator pad within said envelope

visible through said window; a reservoir pad within said envelope in juxtaposed position relative to said indicator pad; and an impervious separator initially disposed between said indicator pad and said reservoir pad, said separator having a pull tab extending through said open slit in one edge of said envelope, and adapted to bring said indicator pad into contact with said reservoir pad; said reservoir pad having absorbed therein a material whose melting point corresponds to a selected critical temperature for said telltale, whereby when said separator is withdrawn while the temperature is lower than the critical temperature, the indicator pad remains unchanged, whereas when the temperature exceeds the critical temperature, said material melts and absorbs into said indicator pad and becomes visible through said window.

4. A telltale device comprising an aluminum foil envelope having a window in its front face and having an opening on one edge, the other edges being sealed; an absorbent indicator pad within said envelope visible through said window; a reservoir pad within said envelope in juxtaposed position relative to said indicator pad; and an impervious separator initially disposed between said indicator pad and said reservoir pad, said separator having a pull tab extending through said open slit in one edge of said envelope, and adapted to bring said indicator pad into contact with said reservoir pad; said reservoir pad having absorbed therein a colored material whose melting point corresponds to a selected critical temperature for said telltale, whereby when said separator is withdrawn while the temperature is lower than the critical temperature, the indicator pad remains unchanged, whereas when the temperature exceeds the critical temperature, said material melts and absorbs into said indicator pad and becomes visible through said window.

5. The telltale device defined in claim 1 in which the material absorbed in said reservoir pad is n-undecyl alcohol.

6. The telltale device defined in claim 1 in which the material absorbed in said reservoir pad is iso-amyl stearate.

7. The telltale device defined in claim 1 in which the material absorbed in said reservoir pad is ethyl myristate.

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