Oct. 29, 1946. J. A. SMITH 2,410,310

REFRIGERATING APPARATUS

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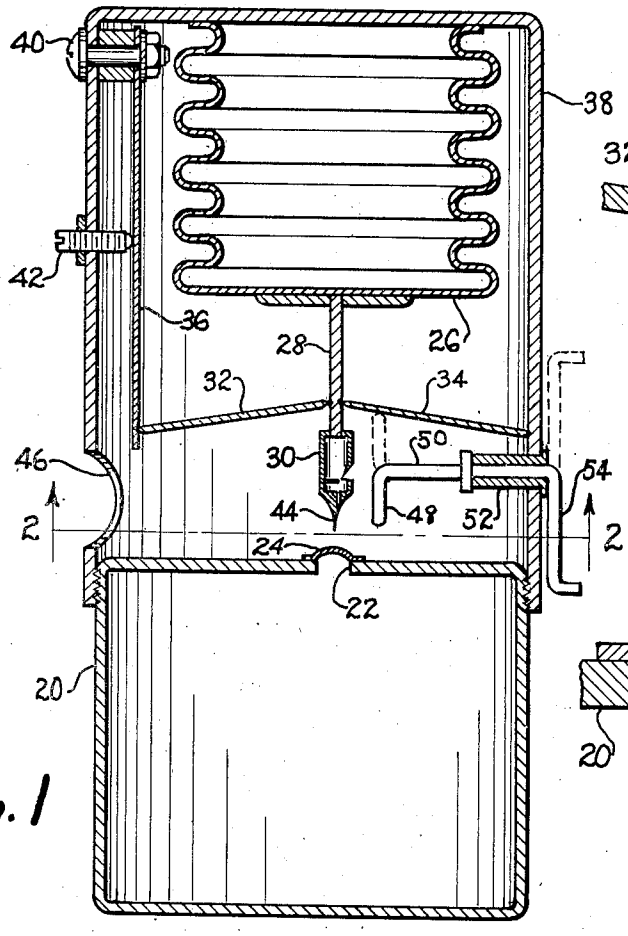


Fig. 1

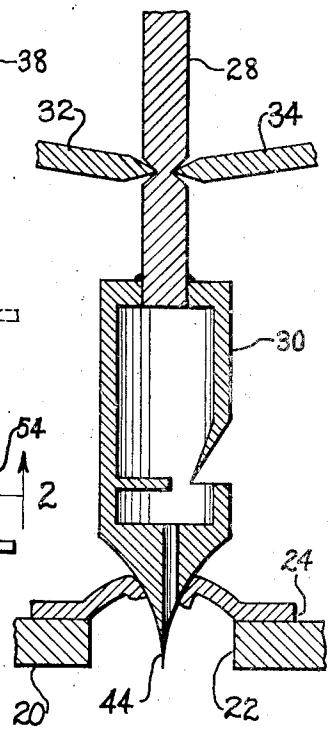


Fig. 3

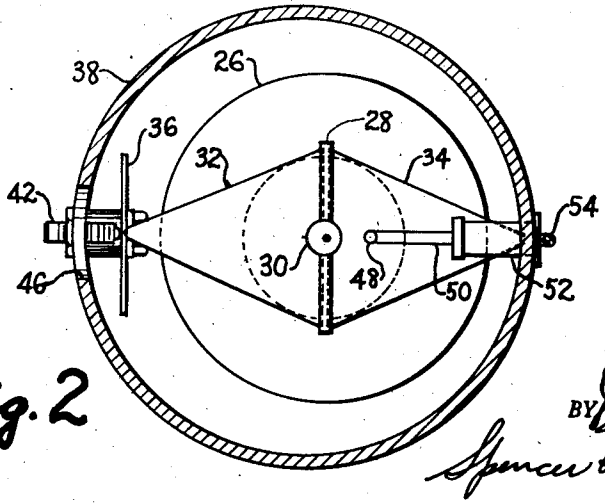


Fig. 2

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REFRIGERATING APPARATUS

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1 Claim. (Cl. 116—103)

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This invention is related in one of its aspects to refrigerating apparatus, but more particularly relates to self-contained warning devices operative when a critical temperature is reached.

There are many instances where it is desired that a warning be given when a critical temperature is reached by a rise or fall in temperature. Very frequently where power-operated devices are used it is necessary in order to insure operation under all conditions, to provide a power source independent of the normal power supply. This is sometimes provided by dry cells. Dry cells, however, deteriorate in time without use, and may be incapable of supplying the power necessary to operate the warning device when required.

One application for warning devices in which a separate power source is desired is that of frozen food cabinets. In frozen food cabinets it is desired to provide a warning in the event that the refrigeration fails and the temperature rises to a critical temperature. For this purpose electrically powered temperature control warning devices have been provided which were operated by the same power supply as the frozen food cabinet. Such a warning system, however, is apt to fail to operate when the refrigeration fails due to failure of the power supply. The power supply may fail due to failure of the power source or by the blowing of a fuse in the power line or even by accidental removal of the connecting terminal plug from the power line receptacle. Because of this, dry cells have sometimes been used as a power supply for the warning device. Since the dry cells deteriorate whether used or not it is necessary to replace them regularly. If this replacement is left to the owner it is often forgotten. If a service organization takes the responsibility of replacing the dry cells the cost is quite high.

It is therefore an object of my invention to provide a warning device powered by a power supply which will not fail.

It is another object of my invention to provide a small compact warning device having its power supply self-contained.

It is still another object of my invention to provide a warning device giving a warning which may be detected by several of the human senses.

To attain these objects I have provided a self-contained unit including a sealed receptacle charged with a propellent, a perfume and a smoke, A temperature responsive element is provided in the unit for puncturing the sealed receptacle when the critical temperature is reached. The

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puncturing device incorporates a whistle so that as the propellent perfume and smoke escape from the sealed receptacle it produces a whistle. The unit is placed within the frozen food cabinet or any other place having a critical temperature. The propellent carrying the perfume and smoke escapes to all parts of the house. By this arrangement even a person who is deaf or blind will receive a warning.

Further objects and advantages of the present invention will be aparent from the following description, reference being had to the accompanying drawing wherein a preferred form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a vertical sectional view of one form of my improved warning device;

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1; and

Fig. 3 is an enlarged fragmentary view showing the puncturing of the sealed receptacle.

Referring now to the drawing and more particularly to Fig. 1, there is shown a sealed receptacle **20** having a relatively heavy wall provided with a smaller opening **22** in its upper face. This opening **22** is sealed by a thin cover **24** of a readily piercable soft metal, such as tin, lead, copper or aluminum or alloys thereof. This cover **24** is preferably soldered or welded to the edges of the aperture **22** and curved outwardly as shown so that the pressure may be held by a relatively thin, low strength wall. Where the warning device is intended to be placed within a frozen food or frozen storage cabinet the sealed receptacle is preferably charged with a propellent such as difluorodichloromethane, a perfume such as vanilla, vanillin or coumarin and a smoke such as carbon black. The perfumes mentioned will not impart any seriously objectionable taste or smell to the food and are not harmful. Where the warning device is used for warning of fires or excessive heat tetrafluorodichloroethane may be used as the propellent.

Above the sealed contaner **20** is a metal bellows **26** containing a vapor, such as difluorodichloromethane. The bellows **26** is sealed to the top wall of the housing **38** and at its lower end is provided with a follower **28** having a whistle **30** fastened at its lower end. The bellows **26** and its follower **28** is normally kept in retracted position by a toggle device including a pair of triangular shaped toggle links **32** and **34**. A compound cantilever spring **36** supports one end of the link **32** while the other end of the link **34** is supported by the adjacent wall of the housing

38. The adjacent wide parts of the link are pivotally connected by knife edges to the bellows follower 28. The opposite end of the spring 36 is fastened by a bolt 40 to the housing 38 while the middle portion of the spring 36 is contacted by the set screw 42 which adjusts the tension on the spring 36. The tension of the spring 36 determines the critical temperature at which the pressure of the volatile liquid within the bellows 26 will overcome the force of the toggle mechanism.

The whistle 30 is provided with a sharp point 44 and the toggle links 32 and 34 guide the bellows follower so that when this critical temperature is reached and the force of the toggle mechanism overcome, the whistle will be thrust through the cover 24 as shown in Fig. 3. This allows the contents of the sealed chamber 20 to escape through the passages of the whistle 30 to produce a whistling sound providing an audible warning. Inasmuch as frozen food cabinets are not pressure tight, the propellent, perfume and smoke will escape through the hole 46 in the housing 38 and will leak out of the frozen storage cabinet into the room where the perfume will be detected by its smell and the smoke will be visible.

The sealed chamber 20 is threaded into the housing 38 so that it may readily be removed and a new chamber substituted after the original chamber has been punctured. The bellows and its toggle mechanism may be locked in its retracted position by the rotatable locking arm 48 at the inner end of the shaft 50. This shaft 50 is rotatably mounted in the bearing 52 provided in the adjacent wall of the housing 38. Outside the housing 38, the shaft 50 is provided with a manipulating arm 54 by which the locking arm 48 may be rotated to its upper position, shown in dotted lines, where it serves as a stop to prevent the downward movement of the toggle links and the bellows and bellows follower assembly regardless of temperatures. This stop may be used to prevent tripping of the toggle mechanism prior to the actual use of the device. After the device is placed in the actual place of use and brought to the temperature thereof, the locking arm 48 may be turned down to unlock the device.

With this type of warning device there is no deterioration of either the bellows and its charge or the sealed chamber and its charge. The whistling will continue for a considerable period of time while the odor of the perfume and the smoke will remain until the room or residence is ventilated. The warning device may be applied wherever it is desired to provide a warning when a critical temperature or pressure is reached. In the case of pressure, the bellows 26 may be connected to the source of pressure. It may be used as a warning device for heating systems, stoves and ovens of any type, as well as many refrigeration installations.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claim which follows.

What is claimed is as follows:

A self-powered warning device for frozen food storage comprising a container containing a pleasant tasting and smelling odiferous fluid and a non-toxic volatile propellent normally a gas at atmospheric pressure maintained in liquid form therein under pressure, means responsive to a predetermined high temperature below 32° F. for releasing the fluid and propellent from the container whereby the existence of an abnormal temperature in the food storage device is indicated.

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