

## Abogados

### Apartado 3692

**Cra. 7 16-56**

**SUPERMISTRIA Y COMERCIO**

**Radicacion : 01001216 00000004**

**Folios: 2**

**Fecha (MM):** 2003-09-25 16:31:34

Transite 1 002 PATENTED D 1 REGISTRO/ 534 PETICION

**Dependencia: 2020 DIVISION DE NUEVAS CREACIONES**

L.N.M.A.M.I.R.A.M.B.M.T.P.Y.A.U.Y.A.S.S.U.COM.CO

**AS: 83.968**

## Señores

**SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO**  
**DIVISION DE NUEVAS CREACIONES**

**E. S. D.**

**REF.: Expediente No. 01 001.316 solicitud de Patente  
a nombre de MULTIBRAS S.A. ELETRODOMÉSTICOS**

**RAMIRO CASTRO DUQUE**, vecino de Bogotá, portador de la tarjeta profesional No. 1003 del Consejo Superior de la Judicatura, obrando como apoderado de la Sociedad MULTIBRAS S.A. ELETRODOMÉSTICOS, según lo acredita el documento de poder protocolizado en la Secretaría General, de acuerdo con el Artículo 44 de la Decisión 486 de la Comisión de la Comunidad Andina, me permito solicitar que se examine si la invención contenida en la solicitud en referencia es patentable.

De acuerdo con lo anterior, me permito anexar el recibo oficial de caja No. 03-69,423 por valor de \$335.000.

**Señor Superintendente,**

**RAMIRO CASTRO DUQUE**  
C.C. No. 170.322 de Bogotá  
Código 340  
T.P. No.1003 del C.S.J.  
Cra 7 No. 16-56 Piso 9

**Septiembre 25, 2003**  
**CHP/MEV/hsr**

7479

SUPERINDUSTRIA Y COMERCIO  
Radicacion : 01001316 00000004  
Fecha (AGD): 2003-09-25 16:31:34  
Tramite : 002 PATENTES D 1 REGISTRAD/ 530 PETICION  
Dependencia: 2020 DIVISION DE NUEVAS CREACIONES  
Folios: 2

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 03 - 69,423  
FECHA : SEPTIEMBRE 22 DE 2003

\*\*\*\*\* CONSIGNACION \*\*\*\*\*

| DEPOSITANTE           | TIPO PAGO    | BANCO         | CUENTA      | No. PAGO | FECHA PAGO | Vr. PAGO     |
|-----------------------|--------------|---------------|-------------|----------|------------|--------------|
| BRIGARD & CASTRO LTDA | CONSIGNACION | BANCO POPULAR | 050-00110-6 | 1257819  | 22/09/2003 | 5,025,000.00 |

\*\*\*\*\* CONCEPTO \*\*\*\*\*

| CANT. HISTORICO           | CONCEPTO                             | TOTAL CONCEPTO |
|---------------------------|--------------------------------------|----------------|
| 1 50005-01-01 SOLICITUDES | 85 EXAMEN DE PATENTABILIDAD DE INVEN | 335,000.00     |
|                           | TOTAL :                              | 335,000.       |

SON: TRESCIENTOS TREINTA Y CINCO MIL PESOS

RESPONSABLE : 

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. \_\_\_\_\_

**DIVISION DE NUEVAS CREACIONES**

**RADICACIÓN EXPEDIENTE No 01-001316**

**EL EXTRACTO DE LA PRESENTE SOLICITUD DE PATENTE DE INVENCION**

**FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No 530, DE**

**FECHA 31 DE JULIO DE 2003, EL TERMINO HABIL SEÑALADO POR LA LEY**

**EXPIRA EL 28 DE OCTUBRE DE 2003**

**NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.**

**SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.**

**SI    \_ \_ \_**

**NO   \_ \_ \_ ☒ \_ \_ \_**

**Bogotá D.C, JUNIO DE 2005**

**SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO**

**DIVISIÓN DE NUEVAS CREACIONES**

2020  
Bogotá D.C.

**Doctor:**  
Ramiro Castro Duque  
Apoderado

|                    |                   |                 |
|--------------------|-------------------|-----------------|
| <b>REFERENCIA:</b> | <b>Radicación</b> | <b>01-1.316</b> |
|                    | <b>Trámite</b>    | <b>002</b>      |
|                    | <b>Evento</b>     | <b>001</b>      |
|                    | <b>Actuación</b>  | <b>430</b>      |
|                    | <b>Oficio No</b>  | <b>13969</b>    |
|                    | <b>Folios</b>     | <b>022</b>      |

Como resultado del examen de fondo, realizado conforme a lo establecido por el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

**1. Documentos estudiados:**

Para el presente estudio se tuvo en cuenta la descripción de los folios 6 a 10, los dibujos 1 a 5 de los folios 14 a 15 y las reivindicaciones 1 a 4 de los folios 11 a 12, que corresponden a los documentos inicialmente radicados y aceptados.

El artículo 9 de la Decisión 486 de la Comisión del Acuerdo de Cartagena establece que, "La primera solicitud de patente de invención... conferirá al solicitante o su causahabiente el derecho de prioridad para solicitar... misma materia. El alcance y los efectos del derecho de prioridad serán los previstos por el Convenio de París... a) doce meses para las patentes de invención y modelos de utilidad...".

La solicitud en estudio fue radicada el 10 de enero de 2001, en ese momento se reclamó prioridad para las solicitudes brasileras PI 0000827- 3 y PI 0005655-3 del 11 de enero de 2000 y 30 de octubre de 2000, respectivamente; luego del estudio correspondiente se determinó que acorde a lo estipulado por los artículos 9 a 11 de la Decisión 486, las prioridades reivindicadas, son válidas.

**2. Objeto de la invención**

Según la descripción, el objeto de la solicitud consiste en suministrar un indicador de formación de hielo para refrigeradores.

De otra parte, el pliego reivindica: dispositivo indicador de formación de hielo en aparatos de refrigeración, tales como refrigeradores de uso doméstico, del tipo que presenta un gabinete de refrigeración (10) provisto de una puerta frontal (20) y que aloja un evaporador (30), relacionado en las reivindicaciones 1 a 4.

Según la IPC la clasificación del objeto reclamado es F25D 21/02.

**3. Claridad de la solicitud:**

El artículo 30 de la citada Decisión indica que: "las reivindicaciones definirán la materia que se desea proteger mediante la patente. Deben ser claras y concisas y estar enteramente sustentadas por la descripción".

Las reivindicaciones son confusas por deficiencias en la redacción y traducción, lo cual, no permite determinar, con claridad, el alcance de la protección solicitada; no estamos de acuerdo con la inclusión, en ellas, de afirmaciones tales como: "sobre este último", "y estando formado por una región", "cuando está sujeta ¿dónde?", "acumulado sobre el evaporador", "está configurada... es activada térmicamente", "deshelar", "está definido ¿dónde?... tipo master...".

La reivindicación 2 incluye explicaciones ajenas a una aclaración (delimitación) de una característica incluida en la independiente en, "donde el evaporador... refrigeración 10" porque el objeto de la solicitud no es una nevera, refrigerador o lo similar, sino un indicador de formación de hielo. Esa explicación debe ser retirada.

Finalmente, como se informa en el folio 80, no se presentaron oposiciones por parte de terceros.

#### **4. Evaluación de la unidad de invención:**

El artículo 25 de la Decisión 486 establece que, "La solicitud de patente sólo podrá comprender una invención o un grupo de invenciones relacionadas entre sí, de manera que conformen un único concepto inventivo".

El pliego estudiado se refiere a un único objeto, en consecuencia, cumple el requisito establecido.

#### **5. Determinación del estado de la técnica:**

La fecha para determinar el estado de la técnica es 11 de enero de 2000.

Consultadas las fuentes de información con que cuenta este despacho, se encontraron los siguientes documentos, anteriores a la fecha de la prioridad 11 01 2000 relacionados con la materia de la solicitud:

| <b>N .</b> | <b>Documento</b>    | <b>Título</b>                                                       | <b>Fecha de publicación</b> |
|------------|---------------------|---------------------------------------------------------------------|-----------------------------|
| <b>1</b>   | <b>US 1 945 100</b> | Defrosting indicator for mechanical refrigerators                   | 30 01 1934                  |
| <b>2</b>   | <b>US 2 225 932</b> | Refrigeration apparatus                                             | 15 07 1939                  |
| <b>3</b>   | <b>FR 2 176 422</b> | Étiquettes de couleur variable en fonction de la température        | 26 10 1973                  |
| <b>4</b>   | <b>US 4 345 441</b> | Defroster for the evaporator of a refrigerator                      | 24 08 1982                  |
| <b>5</b>   | <b>GB 2 284 254</b> | Thermally-insulated cooling arrangement with removable gel cassette | 31 05 1995                  |

#### **6. Evaluación de los requisitos de patentabilidad:**

En cumplimiento del artículo 14 de la Decisión 486, el cual, dispone que "Los países miembros otorgarán patentes para las invenciones, sean de producto o de procedimiento, en todos los campos de la tecnología, siempre que sean nuevas, tengan nivel inventivo y sean susceptibles de aplicación industrial", se procedió a evaluar los requisitos de fondo

con el objeto de establecer la patentabilidad de las reivindicaciones contenidas en la solicitud.

### **Evaluación del nivel inventivo**

Conforme al artículo 18 de la decisión 486 que establece "Se considerará que una invención tiene nivel inventivo, si para una persona del oficio normalmente versada en la materia técnica correspondiente, esa invención no hubiese resultado obvia ni se hubiese derivado de manera evidente del estado de la técnica".

La persona del oficio, normalmente versada en la materia técnica correspondiente, que se puede encargar de solucionar el problema planteado por el presente caso, puede ser un ingeniero electromecánico con experiencia en refrigeración, que conozca la composición y los principios básicos de funcionamiento de esos aparatos o, por lo menos, que cuente con las condiciones necesarias para informarse acerca de esos principios al consultar la literatura técnica respectiva.

El antecedente 1, (ver líneas 28 a 46 columna 1; líneas 85 a 102 columna 2; las figuras), divulga un gabinete de refrigeración 1, como el de los refrigeradores de uso doméstico, que tiene una puerta frontal que aloja un evaporador 2 y un dispositivo 5, 9, 11, 12 para indicar la formación de hielo; dicho indicador incluye un exhibidor 11 que se monta dentro del gabinete de refrigeración a una distancia equivalente al grosor límite predeterminado de acumulación de hielo en el evaporador y, se forma con una zona demarcada 9 definida por un elemento sensible al calor cuya indicación cambia cuando se alcanza determinada condición de temperatura al ser contactada la zona demarcada por la capa de hielo acumulada en el evaporador.

Al comparar lo anterior con la reivindicación 1, la única diferencia que se encuentra consiste en que el color del elemento sensible se refuerza y distingue de acuerdo a la temperatura.

Por consiguiente, el problema que resuelve la presente solicitud consiste en encontrar una alternativa para la pantalla (exhibidor) de un termómetro.

Sin embargo, se trata de una técnica conocida en el arte como se puede ilustrar con cada uno de los antecedentes 3 y 5, que revelan un elemento sensible que cambia de color de acuerdo a la temperatura, para dar información o aviso.

La persona normalmente versada en la materia técnica correspondiente, consideraría obvio combinar las enseñanzas del antecedente 1 con las del documento 3 o con las del documento 5 y habría llegado a lo reivindicado en 1 sin ningún esfuerzo intelectual adicional; por ello la citada reivindicación carece de **nivel inventivo**.

Respecto a las reivindicaciones dependientes 2 a 4, de un lado, quedan sin soporte al no depender de una con nivel inventivo.

De otro lado, tampoco tienen **nivel inventivo** porque, parcialmente, son reveladas por el arte anterior o se refieren a detalles de construcción, que una persona del arte podría derivar de forma evidente.

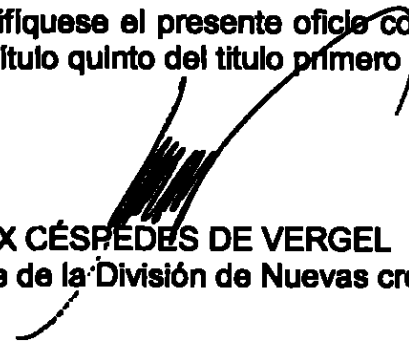
Por último, los antecedentes 2 y 4 divulgan elementos esenciales contenidos en las reivindicaciones, los cuales, no permiten establecer un límite cierto entre lo reivindicado y el estado del arte.

En conclusión los requisitos de patentabilidad de la presente solicitud se encuentran afectados así:

| No. | Documento                                                                                                                            | Reivindicación(es)<br>Afectada(s) | Requisito<br>que<br>afecta |
|-----|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------|
| 1   | US 1 945 100; ver: líneas 28 a 46 página 1; líneas 78 a 97 página 1; líneas 24 a 87 página 2; reivindicaciones 1 a 4; figuras 1 a 3. | 1 a 4                             | Nivel inventivo            |
| 2   | US 2 225 932; ver: líneas 1 a 28 página 1; de línea 98 página 1 a línea 35 página 2; reivindicaciones 1 a 5; figuras 1 a 4.          | 1 a 4                             | Estado del arte            |
| 3   | FR 2 176 422; ver: reivindicaciones 1 a 13; figuras 1, 7, 9.                                                                         | 1 a 4                             | Nivel inventivo            |
| 4   | US 4 345 441; ver: líneas 22 a 33, 60 a 61 columna 2; de línea 37 col 3 a línea 50 col 4; reivindicación 1; figuras 1 a 7.           | 1 a 4                             | Estado del arte            |
| 5   | GB 2 284 254; ver: el extracto; reivindicación 1.                                                                                    | 1 a 4                             | Nivel inventivo            |

En cumplimiento del artículo 45 de la decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de sesenta días contados a partir de la fecha de notificación de la presente comunicación. En el caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsisten impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única No 10 de 2001.

  
**ALIX CÉSPEDES DE VERGEL**  
 Jefe de la División de Nuevas creaciones

El anterior requerimiento fue notificado por fijación en lista, de fecha **23 JUL 2013**

|                  |                       |                     |
|------------------|-----------------------|---------------------|
| Concepto Técnico | Examinador Técnico IE | Examinador jurídico |
| Número: 824      | Código: 202004        | Código:             |

## UNITED STATES PATENT OFFICE

1,945,100

## DEFROSTING INDICATOR FOR MECHANICAL REFRIGERATORS

Frederick J. Troll, Towson, Md.

Application August 24, 1932. Serial No. 630,315

4 Claims. (Cl. 177-311)

It is a well known fact to all those acquainted with the art of mechanical refrigeration that an accumulation of frost on the coils, whether they be evaporation coils or brine coils, which are placed in the cooling chamber to cool the food or other commodities stored in the refrigerator and to form ice cubes, has a marked tendency to decrease the efficiency of cooling or refrigeration and therefore to result in the consumption of an excess of current as compared to what is required when the accumulation of frost is restricted or limited to the minimum:

While all purchasers of electrical refrigerators for domestic use are informed either directly by the salesman or service man, or by printed instructions as to the necessity for defrosting at intervals which are sufficiently frequent to prevent what is regarded as undue accumulation of frost on the chilling or cooling unit, the fact is that there is no means for determining with any degree of accuracy when due regard to efficiency of operation requires that the defrosting operation should be performed. As a result of this condition the majority of domestic refrigerators are operated for a large portion of the time at a very low efficiency with a consequent unnecessarily large consumption of current.

The inventor in the present instance has discovered that when the bulb or other sensitive element of a thermometer is brought in direct contact with the frost, there is an immediate drop in the temperature indicated of about ten degrees below that resulting from contact of the sensitive element with the air in the immediate vicinity of the frost. The knowledge of this fact has been utilized in the construction of an instrument or indicator whereby the accumulation of frost on the chilling unit or cooling unit, whether it be brine coils or expansion coils, to a definite predetermined thickness, as indicated and announced instantaneously either by means of a signal or by an indicating pointer so that the housewife is relieved of all uncertainty as to the necessity for defrosting and immediately informed that it is time to defrost in order to maintain the normal efficiency of the refrigerating apparatus.

In the accompanying drawing I have illustrated an apparatus for indicating the accumulation of frost on the chilling unit and hence the necessity for defrosting in a refrigerating apparatus of the mechanical or electrical type.

In the drawing:

Figure 1 is an elevation of a chilling unit and the surrounding portion of a refrigerator to which

an indicating device embodying the features of the invention has been applied.

Figure 2 is a similar illustration showing a different type of instrument for the same purpose similarly applied.

Figure 3 shows still another type of instrument.

All of the drawing is more or less of a diagrammatic nature, the refrigerator cabinet being shown fragmentarily, and the chilling unit with the trays for the ice cubes being shown in elevation.

Referring to the drawing by numerals, each of which is used to indicate the same or similar parts in the different figures, and having particular reference to the form shown in Figure 1, the fragmentary showing of the cabinet is indicated by reference character 1. This cabinet contains a cooling coil or chilling unit 2 which is enclosed in a casing 3 which serves as a support for the sliding trays 4 of familiar construction adapted to contain water or be frozen to form ice cubes.

In the form of the invention illustrated in Figure 1, a mechanically operated type of dial thermometer 5 is supported on a bracket 6 secured to the chilling unit casing or frost plate 3 in any suitable manner. This bracket is formed in two parts which are adjustably connected by a thumb screw 7 which fits in slots 8 formed in the respective parts of the bracket. The thermometer 5 has its temperature sensitive element 9 projecting laterally and spaced from the coil or chilling elements 2 by a distance which is determined by the manufacturer or by the service department as the case may be, or if preferred this may be adjusted by the owner of the refrigerator, it being understood that the adjustment may be made such as to call for frequent defrosting, giving a high degree of efficiency, or the frost may be permitted to accumulate to one eighth or even to one quarter inch if desired, so that defrosting will be less frequent.

The thermometer 5 includes an indicating hand 11 and calibrations 12 which calibrations correspond to the temperature at which time defrosting is necessary according to the predetermined thickness to which the frost is allowed to accumulate.

Figure 2 shows a similar fragment of a refrigerator 1 provided with cooling unit 2, and trays 4 for ice cubes. In this instance the indicating instrument consists of a bimetallic strip 14 carrying an electrical contact 15. The bimetallic strip and the electrical contact are supported by a screw slot adjustment 16 on a bracket 17. The

contact 15 which it will be understood is controlled as to its position by the strip 14 which is secured at one end at 18 to the bracket, the other end carrying the contact 15 being free, cooperates with a stationary contact 19. Both the contacts 15 and 19 are included in a secondary circuit 20 which is induced from a primary circuit 21 by means of induction coils 22, and includes a light 24 or other suitable indicator which it will be understood is energized by the closing of the circuit at 15, 19, when the strip 14 is brought in contact with the frost, when it accumulates to the predetermined thickness, causing the strip 14 to curl or bend to accomplish this result.

The parts are so arranged and proportioned as to place the points 15 and 19 in contact at the temperature of the strip 14 which corresponds to contact with the same at the end at 18 with the frost accumulated on the coil. In this way the accumulation of the frost to a predetermined thickness is indicated and the fact of this accumulation is communicated to the person in charge of the operation of the refrigerator.

Figure 3 shows an indicator comprising a copper or similar tube 25 having a bulb 26 at one end. The copper tube is supported on a bracket 27 having a thumb screw clamp or other suitable clamping means 28 through which the tube may be adjusted to determine the distance of the bulb 26 from the coil or chilling unit 2 and hence the thickness to which the frost may accumulate. The apparatus also includes a gauge 29 of the Borden tube type which may be supported as shown on the outside of the refrigerator by the bracket 30. The Borden tube 34 as shown operates a small arcuate gear 31 which engages a pinion 32 on an indicating hand 33. In the form of the invention shown the arcuate gear 31 is operated by a link 33 which is connected by its opposite end to the end of the Borden tube 34. The gauge includes calibrations 35 corresponding to the defrosting temperature of the indicator. It will be understood that the bulb 26 is adjusted by drawing the tube 25 through the clamp 28 when the latter is loosened so that it can be located at a suitable distance from the coil or chilling unit.

When the frost comes in contact with the bulb 26 it chills the air or other gas in the tube 25 communicating the resulting change of pressure to the Borden tube 34 which is correspondingly actuated in accordance with the well known Borden tube principle, moving the gauge hand to and over the calibrations 35 whereby the person in charge of the operation of the refrigerator is informed that the time for defrosting has arrived.

The operation of the various indicating instruments has been fully described in connection with the description of their construction, the principle involved in all these indicators being that by accumulation of the frost on the coil to a thickness corresponding to the adjustment of the indicator, the sensitive portion of the indicator comes in contact with the frost and the temperature of the indicator immediately drops through a range which it is believed corresponds to about ten degrees F. The chilling of the sensitive in-

strument is translated either by means of an indicating hand or a light or other signalling device whereby the operator is informed that the defrosting period has arrived, making it possible for the operator who may not be skilled or in any way otherwise informed as to the proper time for defrosting to operate the refrigerator with as high a degree of efficiency as it could be operated by an expert having the highest degree of skill and familiarity with the apparatus.

I have thus described specifically and in detail an apparatus embodying the preferred and other forms of the invention in order that the method of constructing, operating, applying and using the same may be fully understood, however, the descriptive terms herein are used descriptively rather than in a limiting sense, the scope of the invention being defined in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a mechanical refrigerator a chilling element and means for indicating the accumulation of frost thereon to a predetermined thickness whereby the operator is advised of the need for defrosting.

2. In a mechanical refrigerator having a chilling element, an indicating instrument to announce the defrosting period, the same consisting of indicating means and a thermally sensitive element for operating said indicating means, the thermally sensitive element being so located relatively to the chilling element as to contact the frost coating on said chilling element and operate the indicating means on the accumulation of the frost on the chilling element to a predetermined thickness, which is permissible prior to defrosting.

3. In a mechanical refrigerator having a chilling element, an indicating instrument to announce the defrosting period, the same consisting of indicating means and a thermally sensitive element for operating said indicating means, the position of said thermally sensitive element being adjustable through a range relatively to the chilling element of the refrigerator, which range corresponds to the possible variation in thickness of the predetermined permissible accumulation of frost, the thermally sensitive element being so located relatively to the refrigerating element at all times during the operative period of the apparatus as to indicate the accumulation of the frost on the chilling element to a predetermined thickness, which is permissible prior to defrosting.

4. An indicating instrument for use in connection with a mechanical refrigerator having a chilling element, the same consisting of a thermally sensitive element, an indicating device connected thereto to be controlled thereby, the thermally sensitive element being located immediately adjacent the chilling element and spaced therefrom by an interval equal to the thickness to which the frost is to be permitted to accumulate, contact of the frost with the thermally sensitive element serving to operate the indicator, thereby to indicate the need for defrosting.

FREDERICK J. TROLL.

Jan. 30, 1934.

F. J. TROLL

1,945,100

DEFROSTING INDICATOR FOR MECHANICAL REFRIGERATORS

Filed Aug. 24, 1932

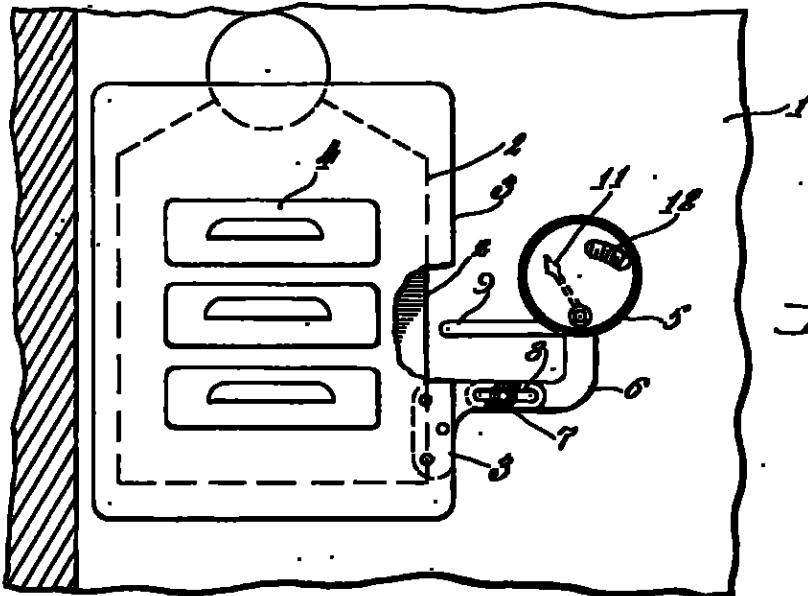


Fig. 1.

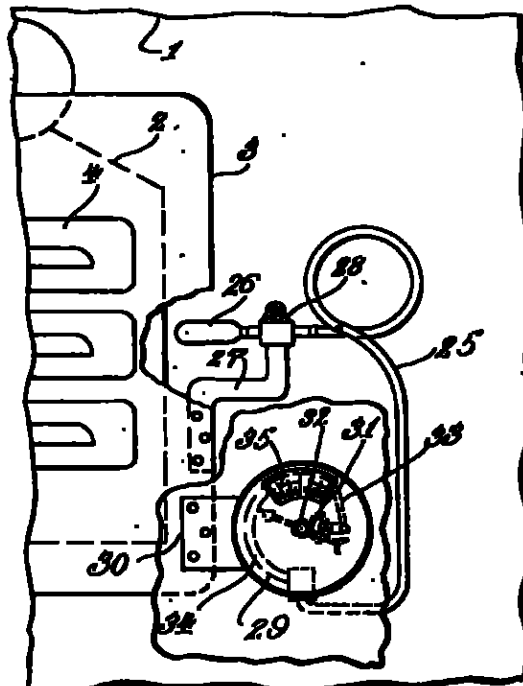
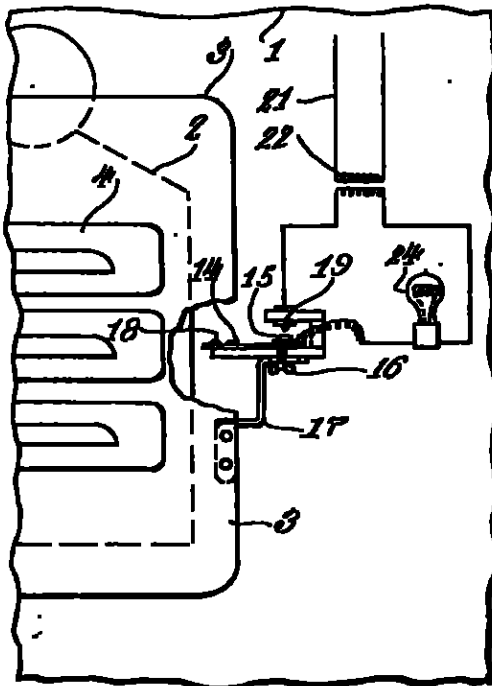


Fig. 2.  
WITNESSES  
Peter K. Flauto

Fig. 3.  
Inventor  
Frederick J. Troll  
By Edwin J. Samuels  
Attorney

## UNITED STATES PATENT OFFICE

2,225,932

## REFRIGERATION APPARATUS

Harold D. Shaw, Longmeadow, Mass., assignor to  
Westinghouse Electric & Manufacturing Com-  
pany, East Pittsburgh, Pa., a corporation of  
Pennsylvania

Application July 15, 1939, Serial No. 284,935

5 Claims. (Cl. 68—1)

My invention relates to refrigeration apparatus and particularly to a defrosting signal for refrigeration apparatus.

In refrigeration apparatus, particularly of the domestic type, it is well known that frost builds up on the evaporator or cooling element of the refrigerator and that periodic defrosting is necessary. While many automatic defrosting schemes have been suggested, it is still advantageous for reasons of cleanliness and cost of manufacture to manually defrost the cooling element. However, the operator of the refrigerator in many instances neglects to defrost the cooling element and, if frost builds up to a sufficient thickness, it deleteriously affects the operation and efficiency of the refrigerating mechanism.

It is, therefore, an object of my invention to provide a visual signal which indicates when the cooling element of the refrigerator should be defrosted.

It is another object of my invention to provide a visual defrosting signal which utilizes the same light source that is used for illuminating the food storage compartment of the refrigerator.

It is another object of my invention to provide for changes either in quality or quantity of light which is transmitted from a light source to indicate when defrosting is necessary.

It is a further object of my invention to provide a novel light transmitting means for indicating when defrosting is necessary.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawing, forming a part of this application, in which:

Fig. 1 is a front view of a portion of a domestic refrigerator illustrating one embodiment of my invention;

Fig. 2 is a sectional view of the refrigerator shown in Fig. 1 taken on line II—II thereof;

Fig. 3 is a fragmentary detailed view of a portion of a refrigerator illustrating a second embodiment of my invention; and,

Fig. 4 is a fragmentary detailed view of a portion of a refrigerator illustrating a third embodiment of my invention.

Referring specifically to Figs. 1 and 2 for a detailed description of my invention, numeral 11 generally indicates a refrigerator cabinet including heat insulated walls 12 which define a food storage compartment 13. A cooling element 14, preferably of the evaporative type, abstracts heat from the food storage compartment 13, refrigerant being circulated therethrough by a conven-

tional refrigerating system (not shown). A shelf 15 is positioned in the food storage compartment and supports a receptacle 16 for storing meats and the like directly below the evaporator 14.

A door 17 closes the food storage compartment 13 and, when in its closed position, forces a plunger 18 of a door-operated switch 19 inwardly, thus breaking an electrical circuit from line L<sub>1</sub> L<sub>2</sub> to contacts 21 and to an incandescent lamp 22. When the door 17 is opened, the plunger 18 is forced outwardly by a spring 23 so that the contacts 21 are closed and the incandescent lamp 22 is energized to illuminate the interior of the food storage compartment 13.

In accordance with the first embodiment of 15 the invention shown in Figs. 1 and 2, heat-insulating blocks 25 and 26 are attached to the bottom of the evaporator 14 by screws 27, the block 25 being positioned near the front of the evaporator and the block 26 near the rear thereof. The front block 25 is provided with an ornamental front surface 28 and with a cut-out portion 29 in communication with the compartment 13 and preferably adjacent a corrugation 31 of the evaporator 14.

As best shown in Fig. 2, a light-transmitting device 30 comprises two rods 32 and 33. The rods 32 and 33 are supported by the blocks 25 and 26 and are spaced apart at 34 in the cut-out portion 29 of the block 25. One end 35 of the rod 32 extends outwardly of the block 25 and an end 36 of the rod 33 is bent downwardly at 37 and extends in close proximity to the incandescent lamp 22. The rods are preferably formed of a methyl methacrylate resin known by the trade-marked name "Lucite", although they may be formed of fused quartz, glass or any fairly efficient light-transmitting material. The trade-marked material "Lucite" is especially applicable because it is an efficient light transmitter, may be made of 40 different colors, and transmits light around bends with very little loss in intensity.

In operation, when the cooling element 14 is not in need of defrosting and the door 17 is opened, the incandescent lamp 22 is energized 45 and light therefrom not only illuminates the food storage compartment 13, but is also transmitted along rod 33, across the space 34 between the rods and through rod 32 to the visible end 35 thereof. The end 35 therefore glows and shows that the 50 cooling element 14 is not in need of defrosting. When frost builds up on the cooling element 14 to a predetermined degree, for example,  $\frac{1}{4}$  of an inch, it also builds up on corrugation 31 and closes the space 34 between rods 32 and 33. 55

When this occurs, light is no longer transmitted to the front rod 32 and the exposed end 35 thereof ceases to glow, thereby giving a visual indication that the cooling element 14 should be defrosted. Either or both rods 32 and 33 may be made of colored material so that colored light is visible at the exposed end 35 of the rod 32.

In the second embodiment of my invention shown in Fig. 3, the rods 32 and 33 are arranged as shown in Figs. 1 and 2 but a third continuous rod 34 is also supported by the blocks 25 and 26. Rod 34 has one end 36 adjacent the incandescent lamp 22 and the other exposed end 41 thereof positioned directly below end 35 of rod 32. The advantage of such an arrangement is that the end 41 of rod 34 will always glow when door 17 is open whether defrosting is necessary or not, thus calling the operator's attention to the defrost indicator. If desired, end 35 of rod 32 may glow with light of one color, for example, green, while end 41 of rod 34 may glow with another color, for example, red.

The third embodiment of my invention disclosed in Fig. 4 of the drawing is constructed exactly the same as that shown in Fig. 3 except that an exposed colorless focusing device 42 collects light from rods 32 and 34 so that, if rods 32 and 34 are of different colors, as frost builds up in the space 34 between rods 32 and 34, the color of the light will change in the focusing device 42, this indicating the need for defrosting. This embodiment also has the advantage that the device 42 always glows when the door 17 is open with some color of light, thus calling the operator's attention to the defrost indicator.

From the foregoing, it will be apparent that I have provided an improved defrosting indicator for refrigerators in which the source of light which illuminates the interior of the food storage compartment is utilized. I furthermore provide a defrosting indicator which is attractive in appearance and inexpensive to install in a refrigerator.

While I have shown my invention in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In refrigeration apparatus, the combination of a cooling element which collects frost during normal operation, a source of light and means for transmitting light from the source to a location where it is readily visible and for varying the light transmitted as a signal when defrosting is necessary, said means comprising a light-transmitting material having at least a part thereof disposed adjacent to the cooling element and having a break therein so positioned that when the frost builds up on the cooling element to a predetermined degree it enters the break and varies the light transmitted by said light-transmitting material.

2. In refrigeration apparatus, the combination of a cooling element which collects frost dur-

ing normal operation, a source of light and means for transmitting light from the source to a location where it is readily visible and for varying the light transmitted as a signal when defrosting is necessary, said means comprising a plurality of light-transmitting devices, at least one of which is disposed adjacent the cooling element with a break therein so arranged that when the frost on the cooling element builds up to a predetermined thickness it enters the break and varies the light transmitted by one of the devices.

3. In refrigeration apparatus, the combination of a cooling element which collects frost during normal operation, a source of light, means for transmitting light from the source to a location where it is readily visible and for varying the light transmitted as a signal when defrosting is necessary, said means comprising a plurality of light-transmitting devices, at least one of which is disposed adjacent to the cooling element with a break therein so arranged that when the frost on the cooling element builds up to a predetermined thickness, it enters the break and varies the light transmitted by one of the devices, and means for focusing the light from both of said devices at a single point.

4. In refrigeration apparatus, the combination of a cooling element which collects frost during normal operation, a source of light, means for transmitting light from the source to a location where it is readily visible and for varying the light transmitted as a signal when defrosting is necessary, said means comprising a plurality of light-transmitting devices, at least one of which is disposed adjacent to the cooling element with a space therein so arranged that when the frost on the cooling element builds up to a predetermined thickness, it enters the space and varies the light transmitted by one of the devices, and means for focusing the light for both of said devices at a single point, said devices transmitting different colored light so that the color changes at said point when the frost builds up to a predetermined thickness.

5. In refrigeration apparatus, the combination of a refrigerator cabinet embodying a food storage compartment and having an access opening thereto, a door for closing the access opening, a cooling element disposed in the food storage compartment which collects frost during normal operation, a source of light, means for transmitting light from the source to a location where it is readily visible and for varying the light transmitted as a signal when defrosting is necessary, said means comprising a light-transmitting material having at least a part thereof disposed adjacent to the cooling element and having a break therein so positioned that when the frost builds up on the cooling element to a predetermined degree it enters the break and varies the light transmitted by said light-transmitting material, said source of light also serving to illuminate the food storage compartment and means for energizing the source of light only when the door is open.

HAROLD D. SHAW.

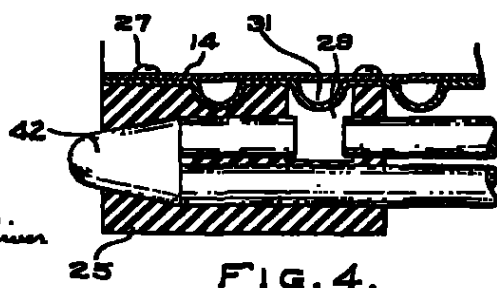
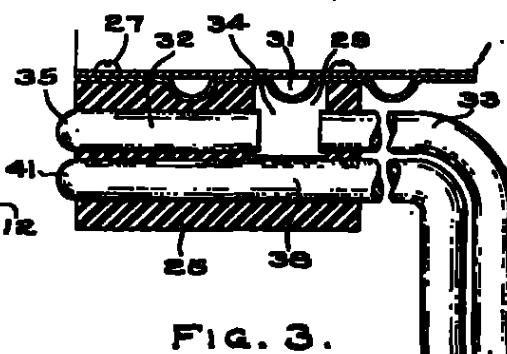
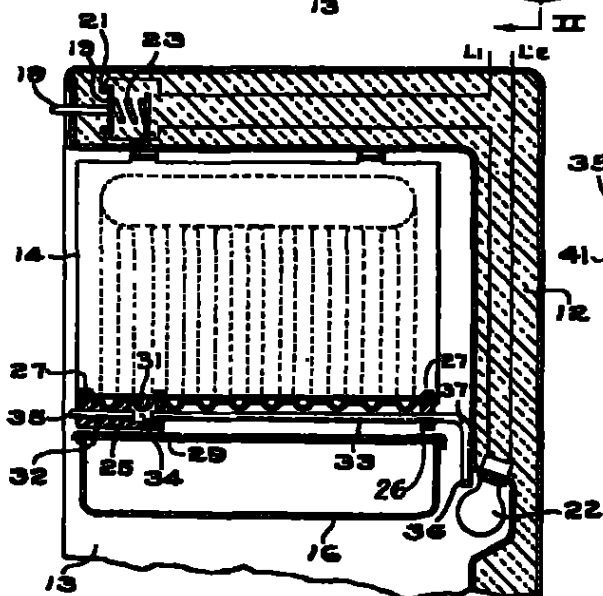
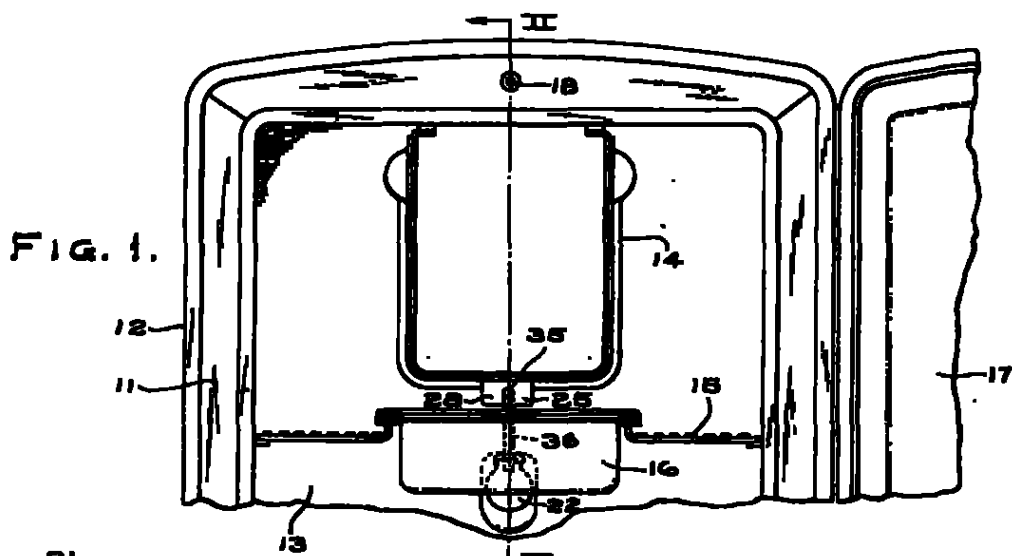
Dec. 24, 1940.

H. D. SHAW

2,225,932

REFRIGERATION APPARATUS

Filed July 15, 1939



WITNESSES:  
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# BREVET D'INVENTION

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(74) Mandataire : Jean Casanova, Ingénieur-Conseil.

(54) Étiquettes de couleur variable en fonction de la température.

(72) Invention de :

(33) (32) (31) Priorité conventionnelle : *Demande de brevet déposée en République Fédérale d'Allemagne  
le 15 mars 1972, n. P 22 12 341.7 au nom du demandeur.*

## REVENDICATIONS

1. Etiquettes et analogues, caractérisées par le fait qu'elles sont constituées, en tout ou partie, par au moins une feuille de matière plastique en deux épaisseurs, transparente et incolore ou bien transparente et colorée sur une de ses faces ou sur les deux; qui est fermée de tous côtés et contient une substance de remplissage qui se colore ou change de couleur une ou plusieurs fois, réversiblement ou non, en fonction de la température.
2. Etiquettes selon la revendication 1, caractérisées par le fait que la feuille de matière plastique comporte plusieurs chambres séparées les unes des autres, surtout par des soudures et en particulier de forme et/ou de dimensions différentes, chambres dont certaines ou toutes sont garnies de la substance de remplissage.
3. Etiquettes selon la revendication 2, caractérisées par le fait que les diverses chambres contiennent, le cas échéant, des substances de remplissage de couleurs différentes qui donnent lieu à un changement de couleur ou à l'apparition d'une couleur à des températures à chaque fois différentes.
4. Etiquettes selon l'une quelconque des revendications 1 à 3, caractérisée par le fait que la substance de remplissage change réversiblement de couleur.
5. Etiquettes selon la revendication 4, caractérisées par le fait que la substance de remplissage est constituée par au moins un type de cristaux liquides, le cas échéant sous forme d'une pâte et éventuellement additionnés de colorants et/ou de pigments.
6. Etiquettes selon la revendication 5, caractérisées par le fait que les cristaux liquides sont des cristaux cholestériques.
7. Etiquettes selon l'une quelconque des revendications 1 à 6, caractérisées par le fait que la substance de remplissage se colore ou change de couleur entre environ -5 et +20°C.
8. Etiquettes selon l'une quelconque des revendications 2 à 7, caractérisées par le fait que les chambres ont la forme de caractères.
9. Etiquettes selon l'une quelconque des revendications 1 à 8, caractérisées par le fait que des caractères et/ou des idéogrammes sont mis en place sur la feuille de matière plastique et

ont en particulier une couleur qui correspond à la couleur de la matière de remplissage avant ou après son changement de coloration.

10. Etiquette selon l'une quelconque des revendications 1 à 9, caractérisée par le fait qu'elle est revêtue sur sa face  
5 dorsale d'une couche auto-collante.

11. Etiquette selon l'une quelconque des revendications 1 à 9, caractérisée par le fait qu'elle n'est constituée qu'en partie par ladite feuille de matière plastique, celle-ci étant placée sur, ou à l'intérieur de, une pièce en matière plastique, le cas échéant,  
10 de forme annulaire, circulaire, elliptique, polygonale ou, le cas échéant, en forme de cadre, pièce qui, dans le cas où la feuille de matière plastique est placée en son intérieur, est transparente tout au moins dans la région de ladite feuille de matière  
15 plastique et sur une face, et est réalisée éventuellement en deux ou plusieurs pièces.

12. Etiquette selon la revendication 11, caractérisée par le fait que ladite pièce de matière plastique est sensiblement circulaire ou elliptique et est réalisée sous forme de cachet ou de plaquette.

20 13. Etiquette selon l'une quelconque des revendications 1 à 12, caractérisée par le fait que la paroi inférieure de la feuille de matière plastique à deux parois est rendue opaque par noircissement, blanchiment, le cas échéant par coloration couvrante.

Fig. 1

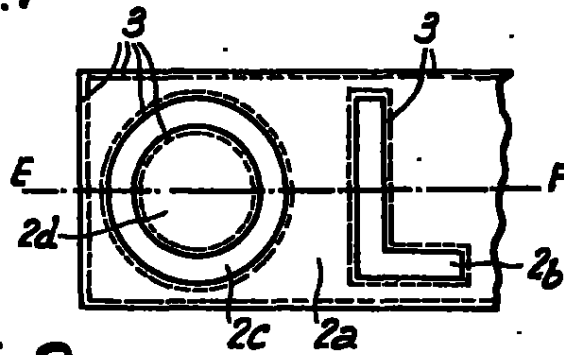


Fig. 2

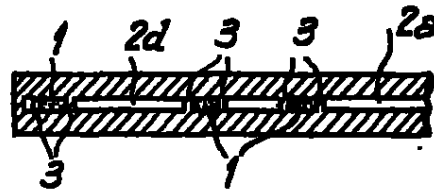


Fig. 9

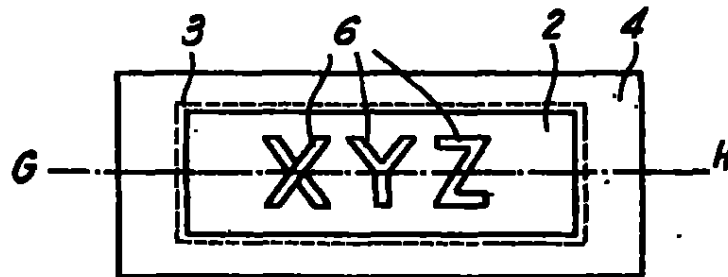


Fig. 10

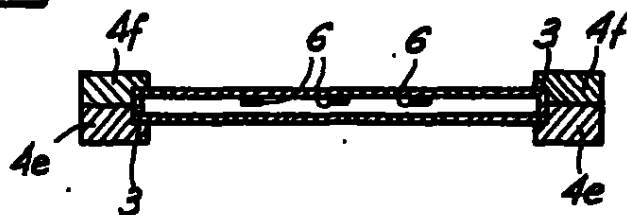


Fig. 3

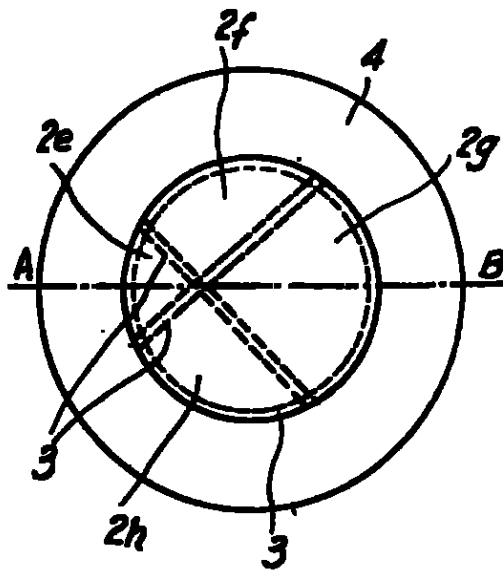


Fig. 7

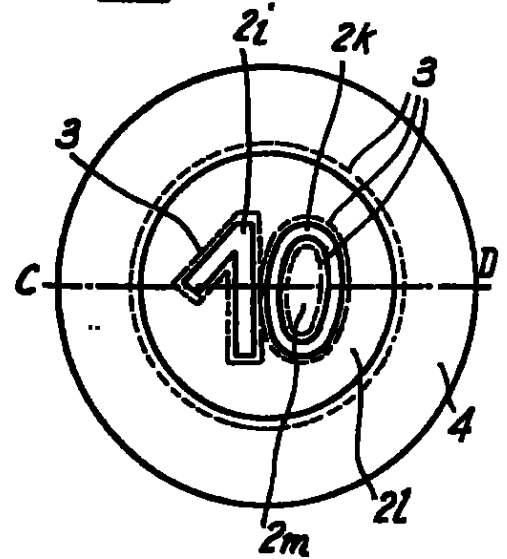


Fig. 4

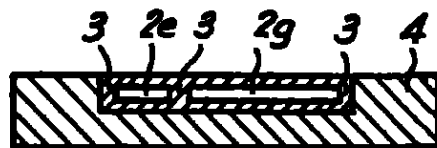


Fig. 8

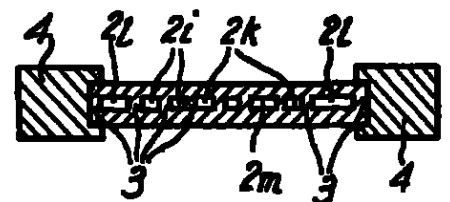


Fig. 5

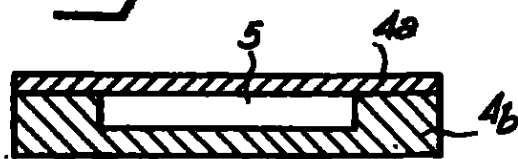
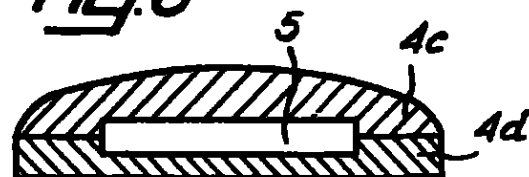


Fig. 6



[34] DEFROSTER FOR THE EVAPORATOR F A REFRIGERATOR

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[22] Filed: Jan. 5, 1981

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[51] Int. Cl.<sup>3</sup> ..... F25D 21/02; F25D 21/06

[52] U.S. Cl. .... 62/140; 62/156

[58] Field of Search ..... 62/140, 156, 128

[36] References Cited

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Primary Examiner—Albert J. Makay

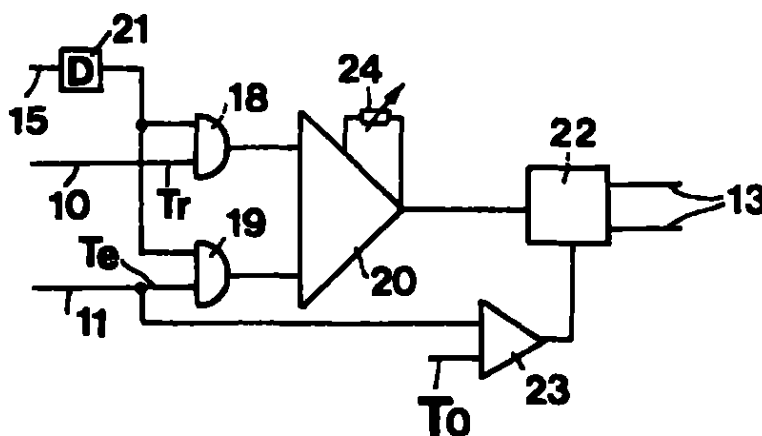
Assistant Examiner—Harry Tanner

Attorney, Agent, or Firm—Wayne B. Easton

[57] ABSTRACT

The invention relates to defroster control apparatus for the evaporator of a refrigerator. A frost sensor for measuring temperature is mounted a predetermined distance from a surface of the evaporator which corresponds to the permissible thickness of frost layer. Control apparatus including a comparator circuit initiates defrosting when the frost sensor temperature falls below a reference temperature. In this construction the frost layer grows in the direction of the frost sensor which is swept by the surrounding air. During each operating cycle the frost sensor initially measures a temperature approximating to the surrounding temperature. As the frost progressively increases, this temperature falls because the air circulation in the vicinity of the frost sensor is progressively more influenced as the thickness of the frost layer increases. In the extreme case, the frost sensor can come into contact with the frost layer. Depending on the choice of reference temperature, defrosting can therefore be initiated when the frost layer screens the frost sensor to a predetermined degree from the surrounding air or has made contact with the frost sensor.

1 Claim, 7 Drawing Figures



# DEFROSTER FOR THE EVAPORATOR OF A REFRIGERATOR

The invention relates to a defroster for the evaporator of a refrigerator, comprising a control apparatus which initiates defrosting and comprises a frost sensor responsive to the presence of a frost layer.

In a known defroster of this kind, there is an optical system in which a light-sensitive element serving as the frost sensor is exposed to a light source. An incident surface of the optical system is so thermally conductively connected to the evaporator that it becomes coated with a frost layer substantially conforming to the surface of the evaporator. This reduces the radiation striking the frost sensor. This is utilised to initiate defrosting. This defroster operates inaccurately and is prone to faults because unavoidable soiling simulates a frost layer and the heat of the light source permits the frost to melt.

In practice, therefore, defrosting is not initiated with the aid of a sensor responsive to the presence of a frost layer but as a result of any data which lead one to suspect the presence of a frost layer. Thus, defrosters operate in response to a time or programme control, in response to the number of door movements, the number of compressor starts or a particular operating time of the compressor. Initiations of this kind are necessarily inaccurate and consequently defrosting is initiated too frequently or too seldom.

Another kind of indirect initiation is typified by a defroster in which the evaporator temperature and the temperature in the refrigerated space are measured and an evaluating circuit checks whether the measuring result is disposed on the one or other side of a particular characteristic curve. With measurements on the one side of the characteristic curve, it is assumed that a frost layer is present. In this case, thermistors serve as temperature sensors.

The invention is based on the problem of providing a defroster of the aforementioned kind which operates more accurately and is less prone to faults.

This problem is solved according to the invention in that the frost sensor is a temperature sensor which is disposed at a spacing from a surface of the evaporator corresponding to the permissible thickness of frost layer and that the control apparatus comprises a comparator circuit which initiates defrosting when the frost sensor temperature falls below a reference temperature.

In this construction, the frost layer grows in the direction of the frost sensor which is swept by the surrounding air. During each operating cycle, therefore, the frost sensor initially measures a temperature approximating to the surrounding temperature. As the frost progressively increases, this temperature falls because the air circulation in the vicinity of the frost sensor is progressively more influenced as the thickness of the frost layer increases. In the extreme case, the frost sensor can even come into contact with the frost layer. Depending on the choice of reference temperature, defrosting can therefore be initiated when the frost layer screens the frost sensor to a predetermined degree from the surrounding air or has made contact with the frost sensor.

Desirably, the surface of the evaporator is vertical. The frost sensor will then be disposed in a continuous air flow even in the case of evaporators without frost air flow.

It is particularly favourable to provide a second sensor which measures the evaporator temperature to form the reference temperature. The reference temperature will then not have a constant value but will change with the evaporator temperature which, in turn, is subjected to fluctuations during each operating cycle and also assumes different values depending on the temperature set for the refrigerated space. In all cases, however, it will be ensured that the comparison circuit responds when the frost layer which has substantially the same temperature as the evaporator approaches the frost layer sensor.

The frost sensor and the second sensor may be closely juxtaposed to result in a space-saving construction.

More particularly, the second sensor may be a contact sensor and both sensors may be disposed in a common sensor holder of thermally insulating material. In a single assembly step, therefore, the frost sensor will be installed at the correct spacing from the evaporator and the second sensor will be installed in contact with the evaporator surface.

In a preferred embodiment, the frost sensor is disposed in a depression of a guide surface extending at a spacing from the surface of the evaporator. Together with the evaporator wall, the guide surface forms a passage through which the surrounding air can flow. The cross-section of this passage is reduced as the frost layer increases. Consequently, the temperature of the frost sensor will not only fall because it is more intensively cooled by the approaching frost layer but also because it is progressively less heated by the surrounding air. This results in a very steep temperature drop for the frost sensor when the frost layer approaches same.

A particularly simple construction is obtained if the sensor holder comprises a contact face which is adapted to abut the vertical surface of the evaporator and has a depression for receiving the second sensor and adjoining the guide surface by way of a step. The step should extend in the direction of the air flow so that sweeping of the surrounding air along the frost sensor cannot be impeded by anything other than the frost layer.

For this purpose it is also advisable for the space above and below the frost sensor to be free from built-in components.

Further, the holder may be provided with recesses for receiving conductor connections leading to the sensors. This results in a compact unit which is easy to install.

A similar result is obtained if the conductor connections leading to the sensors are in the form of a printed circuit.

Desirably, the conductor connections leading to the sensors extend close to the evaporator. The conductor connections are therefore cooled before reaching the temperature sensors. They can therefore not act as heat conductors for conveying heat to and influencing the temperature of the sensors from outside the refrigerated space where, for example, the electric circuit arrangement is accommodated.

Suitable sensors are for example thermistors or thermocouples.

It is also favourable to have an evaluating circuit which evaluates the sensor temperatures each time the compressor of the refrigerator is switched on or off. In this way one can leave fluctuations of the evaporator temperature occurring during an operating cycle out of consideration. The evaluating circuit may be disposed in the sensor holder. This saves space.

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A preferred example of the invention will now be described in more detail with reference to the drawing, wherein:

FIG. 1 is a diagrammatic representation of a refrigerator with defroster;

FIG. 2 is a much simplified circuit diagram of a comparator circuit;

FIG. 3 is a pictorial representation of a first embodiment for applying a sensor holder to the evaporator;

FIG. 4 is a rear view of a second embodiment of a sensor holder;

FIG. 5 is a horizontal section on the line A—A in FIG. 4;

FIG. 6 is a view of the sensor holder from the side abutting the evaporator, and

FIG. 7 is a graph of the temperature of the frost sensor and the second sensor against the thickness of the frost layer.

The refrigerator 1 of FIG. 1 comprises a compressor 2 which feeds refrigerant to a condenser 3. The latter is connected to an evaporator 5 by way of a throttle 4. The evaporator outlet leads to the suction side of the compressor 2. The evaporator is disposed in a refrigerated space 6 of, for example, a refrigerator or freezer. In this refrigerated space there is a thermostat 7 connected by a conduit 8 to the compressor 2 which it switches on when a set temperature for the refrigerated space is exceeded and off when the temperature falls below a second lower temperature.

Secured to the compressor there is a sensor holder 9 connected by conductors 10 and 11 to a defroster circuit 12. The latter is connected by conductors 13 to a defroster 14 in the refrigerated space 6. In the present example, the defroster is in the form of an electrical heating resistor. It may, however, be of any other known form, for example formed by warm refrigerant being led through the evaporator 5. Further, it will be evident that the conductor 8 is connected to the defrosting circuit 12 by way of a branch line 15.

The sensor holder 9 contains two sensors, namely a frost sensor 16 and a second sensor 17 which measures the evaporator temperature and will be explained hereinafter. By way of the conductor 10, the defrosting circuit 12 is fed with a signal which corresponds to the frost sensor temperature  $T_r$  and by way of the conduit 11 with a signal which corresponds to the evaporator temperature  $T_e$ . These signals are applied to the inputs of a comparator 20 by way of a respective AND element 18 or 19. The AND circuits 18 and 19 are in addition supplied with a signal from the conductor 15 by way of a differentiating element 21. This signal occurs whenever the compressor 2 receives a start signal from the thermostat 7. Consequently, a comparison of temperature takes place in the comparator 20 on each commencement of an operating cycle of the compressor 2. If the frost sensor temperature  $T_r$  falls below a reference temperature depending on the evaporator temperature  $T_e$ , the comparator 20 will operate a switching apparatus 22 with which the defroster 14 is operated for as long as the evaporator temperature  $T_e$  has risen beyond the melting point of the ice. For this purpose there is a second comparator 23 which compares the signal corresponding to the evaporator temperature  $T_e$  with a melting point temperature  $T_o$  and, when it responds, switches off the switching apparatus 22. An adjustable resistor 24 serves to set a reference value which exceeds the evaporator temperature  $T_e$  by a predetermined amount.

In FIG. 3, the evaporator 5 is shown as a plate evaporator to the vertical front face 25 of which the sensor holder 9 is secured by a screw 32a. The construction of this sensor holder corresponds to that of FIGS. 4 to 6

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except that connecting conductors are provided at the back in the form of a printed circuit 26.

In FIGS. 4 to 6, a sensor holder 27 is shown. It comprises a contact surface 28 and a guide surface 30 which is connected thereto by way of a step 29 and which, together with the vertical face 25 of the evaporator 5, forms a passage 31. A bore 32 serves for the passage of the screw 32a. The frost sensor 16 is disposed in a bore 33 and the contact sensor 17 in a bore 34, both being in the form of a temperature sensor. A channel 35 in the contact surface 28 accommodates the conductors 10 and 11 leading to the temperature sensor 17. At this position, the conductors 10 and 11 are cooled so that no heat can reach the temperature sensor 17 from beyond the refrigerated space 6. Alternatively, it is also often sufficient to arrange the supply cable leading to the sensor holder closely against the evaporator surface 25. The rear sides of both bores 34 and 33 are interconnected by way of a channel 36 through which connecting conductors 10 are passed to the frost sensor 16.

FIG. 7 shows how the evaporator temperature  $T_e$  and the frost sensor temperature  $T_r$  varies in relation to the thickness  $d$  of the frost layer which forms on the surface 25 beyond the sensor holder 27 and thereby influences the air circulation through the passage 31. The measurements were in each case made on switching on of the compressor 2. It will be seen that the difference between these two temperatures decreases gradually up to a frost layer thickness of 2 mm and subsequently more steeply until they are equal from 3 mm. This applies to a depth of 2 mm for the passage 31. The corresponding temperatures  $T_e'$  and  $T_r'$  for the switching off point of the compressor 2 are shown in broken lines. They are at a somewhat lower temperature level and approach each other up to a difference of 2° C. In both cases it is possible, particularly in the zone between 2 and 3 mm of layer thickness, to set a difference between the evaporator temperature  $T_e$  and the frost sensor temperature  $T_r$  where, when the temperature falls below same, the defroster is actuated, which instant corresponds to an accurately defined frost layer thickness. If it is desired to monitor frost layer thicknesses other than 2 to 3 mm, it is sufficient to select an appropriate depth of passage.

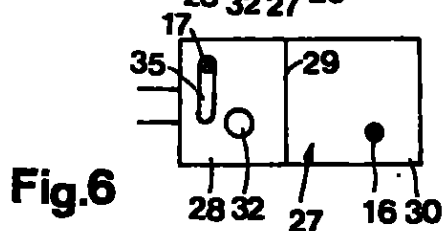
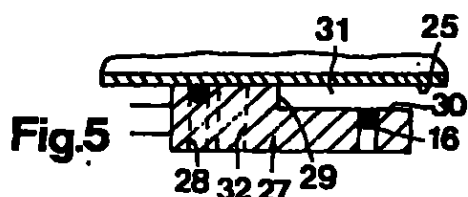
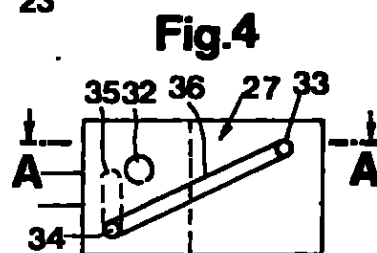
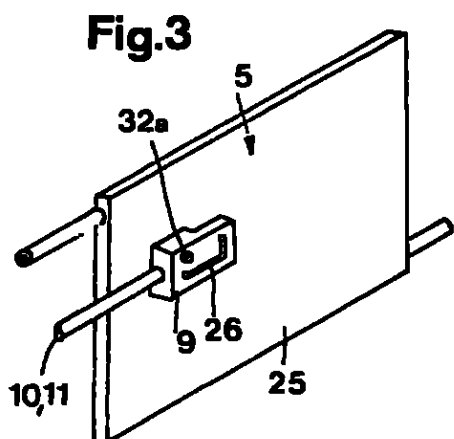
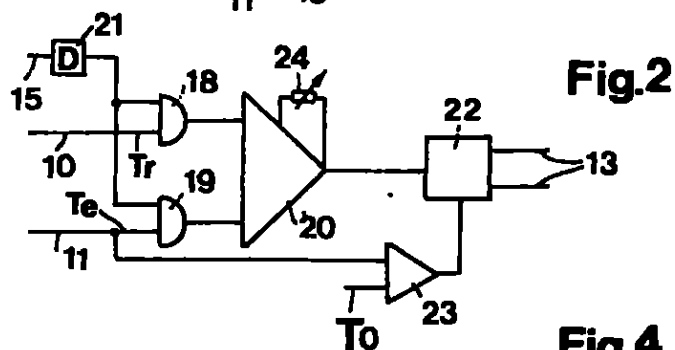
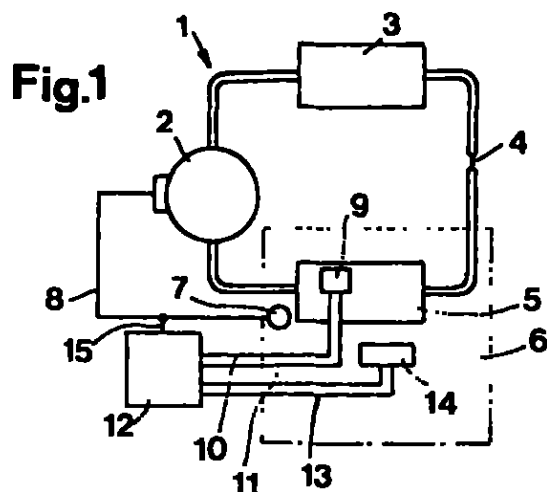
From the curves it will also be seen that the frost sensor temperature initially fluctuates only slightly because it predominantly depends on the surrounding air. However, as the frost layer progressively screens the frost sensor more and more from the circulation of air, the frost sensor temperature will more closely follow the temperature fluctuations of the evaporator during the switching on and switching off period.

What is claimed is:

1. A refrigerator assembly comprising, thermostat and compressor means, an evaporator, a frost sensor spaced a predetermined distance from said evaporator corresponding to a permissible frost layer thickness, a second sensor abutting said evaporator for measuring evaporator temperature, evaporator defroster means, first comparator means monitoring said sensors to turn on said defroster means when said evaporator temperature equals the temperature of said frost sensor, second comparator means overriding said first comparator means monitoring said second sensor and a reference ice melting point temperature to maintain said defrosting means in an off condition while said evaporator temperature exceeds said melting point temperature, and means enabling said first comparator means each time said thermostat means initiates actuation of said compressor means.

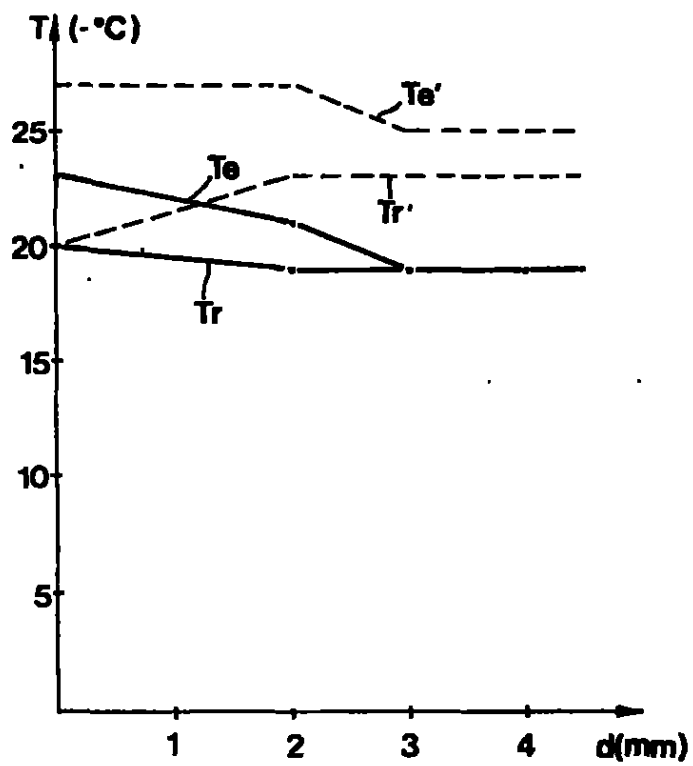
\* \* \* \* \*

94 99



95  
100

Fig.7



96 101

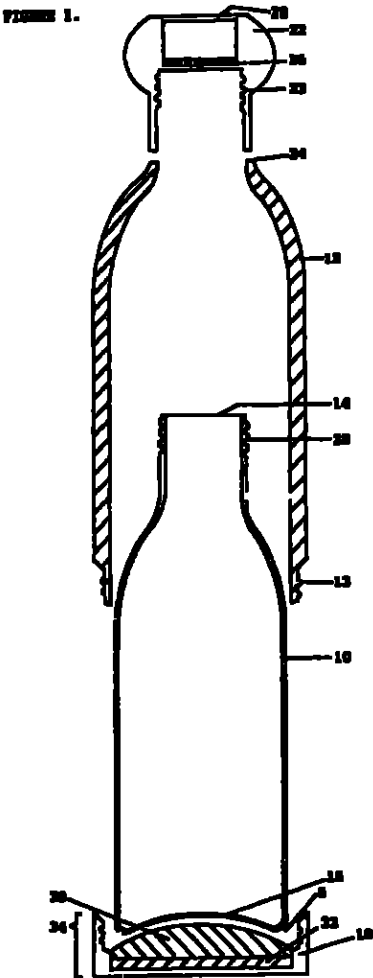
(12) **UK Patent Application** (18) **GB** (11) **2 284 254** (13) **A**

(43) Date of A Publication 31.05.1986

|                                                                                                                                                                                                                                                                                                                  |                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| (21) Application No 8324565.2                                                                                                                                                                                                                                                                                    | (51) INT CL <sup>8</sup><br>F25D 3/08 , G01K 1/14                                                                                   |
| (22) Date of Filing 30.11.1983                                                                                                                                                                                                                                                                                   | (52) UK CL (Edition N )<br>F4H H3<br>G1D DH31A DH31X                                                                                |
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| (72) Inventor(s)<br>Colin Campbell<br>Nicolas Charles Marden<br>Fiona Campbell                                                                                                                                                                                                                                   | (74) Agent and/or Address for Service<br>Colin Campbell<br>21 Kithworth Avenue, SOUTHEND-ON-SEA, Essex,<br>SS1 2DS, United Kingdom  |

(54) Thermally-insulated cooling arrangement with removable refrigerant gel cassette

(57) An insulated cooling arrangement for beverages, or other substances and samples, comprises an outer protection and insulating casement 12, having a screw threaded or other fitment able to accept a closure cassette 34, which contains a capsule of refrigerant gel material 30, a compressible spacer plug 32 and an insulating closure 18. The casement 12 and the cassette 34 contain and keep cold an inner enclosure 10, containing the beverage substance or sample. The enclosure 10 is secured and closed by double-walled insulating closure 22 having a transparent outer surface 28 and an inner surface coated with heat sensitive coloured paint, dye or liquid crystal 36, which gives an indication of internal temperature of the cooling arrangement.



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## CLAIMS

What is claimed is ;

1. An insulated cooling arrangement comprising :  
an outer protection and insulating casement , accommodating a screw threaded or other fitment end able to accept a closure cassette , which contains a capsule of refrigerant material and an insulating closure such that the casement and the cassette can contain and cool an inner sample containing enclosure , which in turn is secured and closed by a dual walled insulating closure with a transparent outer surface and an inner surface coated with heat sensitive coloured paint , dye or liquid crystal which gives an indication of the internal temperature of the cooling arrangement.
2. the arrangement in 1 wherein the refrigerant material capsule is removable as a cassette from the device and distanced or separated from any effective insulation material of the casement such that the capsule may be frozen efficiently and with ease in a remote fridge.
3. an arrangement as in 1 which will store , cool and keep cold beverage can or cans or spare precooled replacement refrigerant capsules.
4. an arrangement as in 1 which will store , cool and keep cold a wine bottle.
5. an arrangement according to 1 which is equipped with heavy duty hook and eye material (brand name VELCRO) on the outer surface such that it can be attached to bicycle frames and also to flat surfaces such as car internal door panels.
6. an insulated cooling arrangement substantially described herein as illustrated in the accompanying drawings.

**SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO**

**RADICACIÓN: 1-1316**

**EDICTO No. 14163**

**LA SECRETARÍA GENERAL AD-HOC  
HACE SABER:**

Que esta Superintendencia profirió Resolución No. 25033 de 28-SEP-2005. Que el contenido de la parte resolutive es como sigue:  
Superintendente de Industria y Comercio Ad-Hoc.

**RESUELVE**

**ARTICULO PRIMERO:** Negar el privilegio de patente de invención para la solicitud correspondiente a "DISPOSITIVO INDICADOR DE FORMACION DE HIELO EN APARATOS DE REFRIGERACION".

**ARTICULO SEGUNDO:** Notificar personalmente el contenido de la presente resolución al doctor Ramiro Castro Duque, o a quien haga sus veces, en su calidad de apoderado de Multibras S.A. Electrodomesticos., entregándole copia de la misma, advirtiéndole que contra ella procede el recurso de reposición interpuesto ante el Superintendente de Industria y Comercio, al momento de la notificación o dentro de los 5 días hábiles siguientes a ella.

**NOTIFÍQUESE Y CUMPLASE**  
Dada en Bogotá, D.C., a los **29 SET. 2005**

**EL SUPERINTENDENTE DE INDUSTRIA Y COMERCIO (E).**

  
**GIANCARLO MARCENARO JIMENEZ**

Para notificar a los interesados, se fija el presente EDICTO en lugar visible al público en la SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO, por el término de (10) diez días hábiles contados a partir de las 8:30 a.m. de hoy.

Secretaría General Ad-Hoc 18-OCT-2005  Este edicto se desfija hoy 31-OCT-2005 a las cinco (5:00 p.m.)   
Secretaría General Ad-Hoc  
EDICTO No. 14163