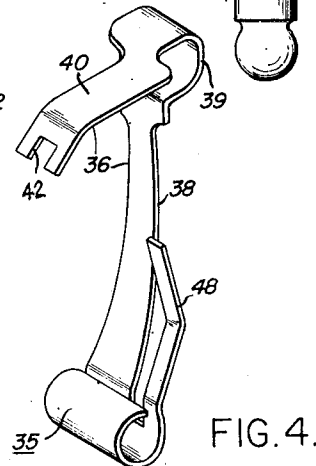
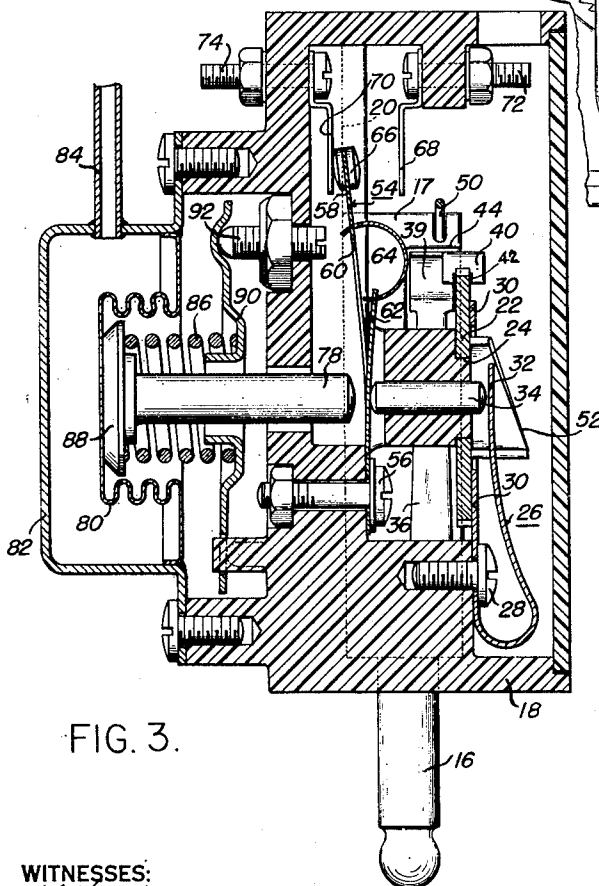
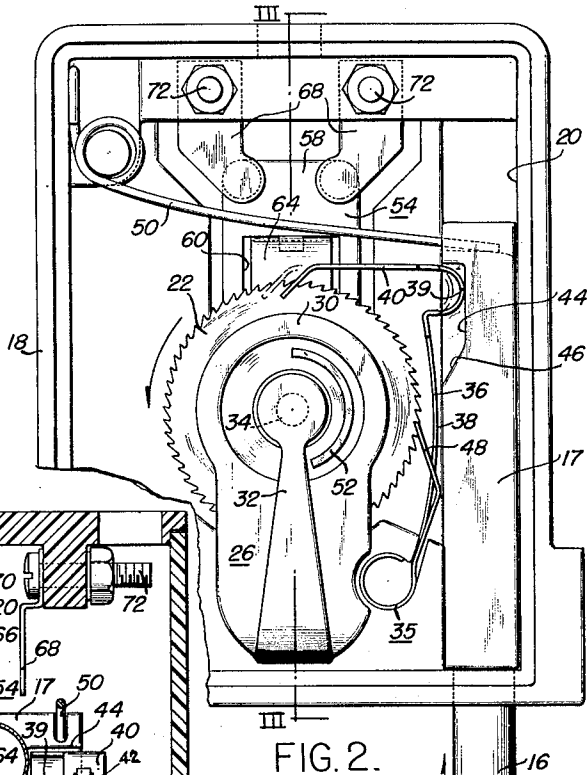
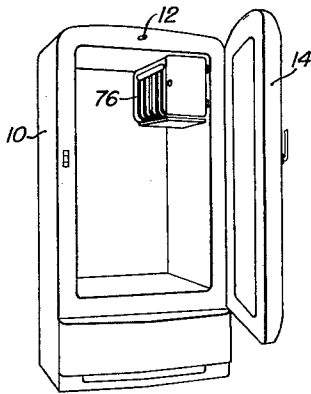


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SWITCH FOR REFRIGERATORS

2 SHEETS--SHEET 1



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2,595,967

SWITCH FOR REFRIGERATORS

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2 SHEETS—SHEET 2

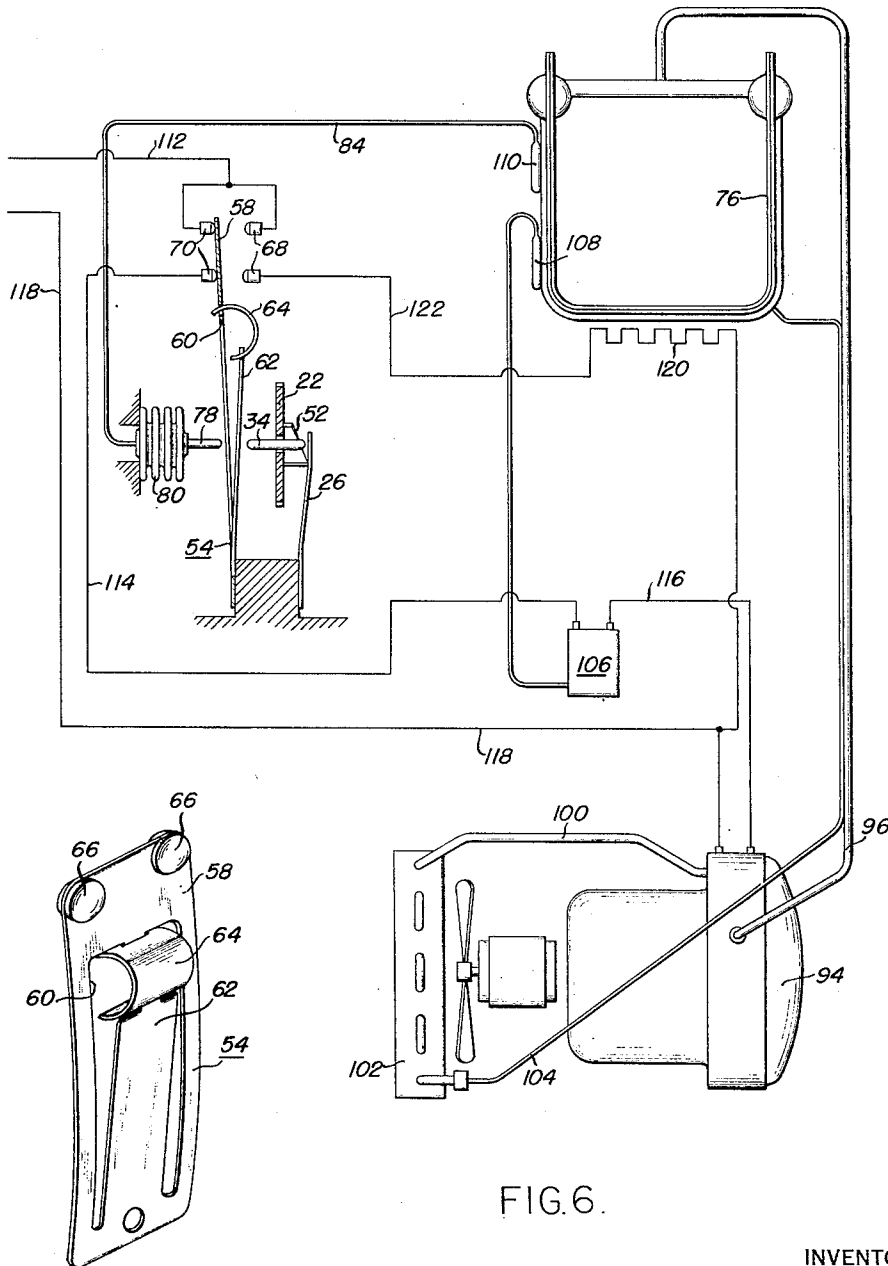


FIG. 5

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SWITCH FOR REFRIGERATORS

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3 Claims. (Cl. 200—83)

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This invention relates to refrigerating apparatus and more especially to a defrosting control for such apparatus.

Automatic defrosting controls actuated by a predetermined number of door openings frequently employ a ratchet wheel which is advanced by the opening and closing of the refrigerator door. When this wheel completes one revolution, it engages and moves a control member into position to effect defrosting. This member must be released automatically after it has fulfilled this function so that the defrosting operation may be terminated by another device even though no further door openings and closings have taken place.

It is an object of the invention to provide a novel means for releasing the defrost control member when the defrosting cycle has been initiated.

It is another object of the invention to provide a novel defrosting control in which the defrosting period may be terminated without further movements of the actuating member after the defrosting cycle has been initiated.

It is a still further object of the invention to provide novel means for actuating a ratched wheel.

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 drawings, forming a part of this application, in which:

Fig. 1 is a view in perspective of a refrigerator cabinet embodying the defrost control of this invention;

Fig. 2 is a view of the defrost control of this invention with the cover removed;

Fig. 3 is a sectional view of the defrost control of this invention taken on the line III—III of Fig. 2;

Fig. 4 is a slightly enlarged view in perspective of the movable dog of the ratched device of the defrosting control;

Fig. 5 is a view in perspective of the snap-acting switch plate element of the defrost control; and

Fig. 6 is a schematic drawing of the defrost control of this invention and its application to refrigerating apparatus.

Referring to the drawings and more especially to Fig. 1, the reference numeral 10 designates a refrigerator cabinet embodying the defrosting control of this invention. A plunger 12 is projected from the cabinet 10 by a spring 50 when the door 14 of the cabinet 10 is opened and is depressed by the door 14 when the door 14 is

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closed. The plunger 12 is joined by means not shown to a sliding element 16, best shown in Figs. 2 and 3. The sliding element 16 comprises a rectangular portion 17 which projects into a housing 18 and slides in a rectangular groove 20 therein. The closing of the door 14 moves the sliding element 16 upwardly as viewed in Figs. 2 and 3 and the spring 50 moves the element downwardly when the door 14 is opened.

A toothed ratchet wheel 22 is journaled on a portion 24 (best shown in Fig. 3) of the housing 18. A U-shaped spring element 26, cut from flat sheet material, is secured to the housing 18 by means of a screw 28. One leg 30 of the spring element 26 overlies the ratchet wheel 22 to hold it on its journal. The other leg 32 overlies the journal of the ratchet wheel 22 and is preferably spaced slightly from a sliding pin 34 which projects through the journal.

A spring 35, formed of sheet material and best shown in Figs. 2 and 4, comprises a generally L-shaped actuating element 36. One leg 38 of this element 36 is fixedly secured at its lower end to the housing 18. The upper end of the leg 38 includes a portion 39 which is bowed to the right as viewed in Fig. 2. The other leg 40 of the L-shaped actuating element 36 extends horizontally to the left. The free end of the leg 40 is notched at 42 and overrides the ratchet wheel 22 to engage a tooth on the periphery thereof.

The sliding element 16 has a depression 44 including an inclined face 46. The bowed out portion 39 of the actuating element 36 is biased by the leg 38 into the depression 44, and as the element 16 slides upwardly, as seen in Figs. 2 and 3, in response to the closing of the refrigerator door 14, the inclined-face 46 engages the bowed out portion 39 of the actuating element 36 and moves it together with the leg 40 to the left as viewed in Fig. 2. This leftward movement of the leg 40 advances the ratchet wheel 22 in a counter-clockwise direction. The spring 35 also comprises a stationary dog 48, which also engages a tooth of the ratchet wheel 22 and prevents clockwise rotation thereof.

When the refrigerator door 14 is again opened, the sliding element 16 is urged downwardly as viewed in Fig. 2 by the spring 50 so that the bowed out portion 39 of the actuating element 36 together with the leg 40 moves to the right and into the depression 44. The leg 40 is resilient so that the free end of the leg 40 rides over one or more teeth of the ratchet wheel 22 to engage an adjacent tooth.

It will be observed that the bowed portion 39

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of the actuating element 36 forms a follower for the cam surface 46 of the sliding element 16. It is biased against the cam surface 46 by the leg 38 which is relatively straight to afford stiffness against vertical movement of the bowed portion 39 as viewed in Fig. 2. The leg 40 lies substantially tangentially to the ratchet wheel 22 to afford stiffness to insure transmission of the movement of the bowed portion 39 to the teeth of the ratchet wheel 22. The tangential position of the leg 40 also affords resilience to the movement of the free end of the leg 40 radially of the wheel 22 which movement allows the free end of the leg 40 to ride over the teeth of the ratchet wheel 22.

The ratchet wheel 22 carries a wedge shaped cam 52 which is gradually forced under the leg 32 of the spring element 26 as the wheel 22 revolves and moves the leg 32 away from the sliding pin 34. Upon further movement of the ratchet wheel 22 in the counterclockwise direction, the cam 52 releases the leg 32 which, due to its resiliency, swings back to its normal position and then, because of its inertia, swings beyond its normal position to drive the pin 34 to the left. The leg 32 thereafter returns to its normal position.

A snap-acting switch element 54 is secured at its lower end in the casing 18 by a bolt 56. This element 54 is best shown in Figs. 3, 5 and 6. The element 54 comprises a switch blade 58 formed of flat spring material. The blade 58 has an inverted U-shaped slot 60 defining an upwardly extending tongue 62 in the center of the blade 58. A C-shaped compression spring 64 is interposed between the top of the tongue 62 and the upper edge of the slot 60. The spring 64 biases the upper portion of the blade 58 away from the upper portion of the tongue 62.

Two double-faced contact buttons 66 are affixed to the upper end of the switch blade 58. Two sets of contact fingers 68 and 70 are secured in the upper portion of the casing 18 by bolts 72 and 74 respectively, which bolts also form binding posts for electric conductors. The contact fingers 68 and 70 are so disposed that when the switch blade is in the left-hand position as viewed in Fig. 3, the two contact fingers 70 are bridged and when the switch blade 58 is in the right-hand position, the two contact fingers 68 are bridged. Also, if the tongue 62 is moved to the left-hand position, as viewed in Fig. 3, the switch blade 58 snaps to the right-hand position and if the tongue 62 is then moved to the right-hand position, the switch blade 58 will snap to the left-hand position.

The tongue 62 is positioned adjacent the pin 34 so that when the latter is struck by the leg 32 of the spring element 26 and the tongue 62 is in the right-hand position, it will be moved to the left-hand position under the impact of the pin 34. The bridging of the contact 68 which results, causes a cooling unit 76 to be defrosted as will be explained later. Since the leg 32 returns to its normal position after it strikes the pin 34, the tongue 62 may be moved to its right-hand position without further movement of the door 14.

When the cooling unit 76 is completely defrosted, the switch blade 58 must again be moved to its left-hand position which is the position for the normal operation of the refrigerating apparatus as will be explained later. For this purpose, a second pin 78 is positioned to the left of the tongue 62. The pin 78 is moved to the right

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as viewed in Fig. 3 by a flexible metal bellows 80 which forms one wall of the vessel 82 which vessel communicates with a tube 84. The movement of the pin 78 to the right is opposed by a spring 86, one end of which engages the head 88 of the pin 78 and the other end of which engages a plate 90, the position of which is adjusted by means of a screw 92.

The connection of the defrost control of this invention to a refrigerating unit is shown diagrammatically in Fig. 6 in which the various elements of the defrost control are designated with the previously used reference numerals. The refrigerating unit comprises a sealed casing 54 which encloses a refrigerant compressor and a motor for driving the compressor. The compressor and motor are not shown in the drawings. The compressor withdraws refrigerant vapor through a suction tube 96 from an evaporator or cooling unit 76, compresses the vapor and forces it through a tube 100 into an air-cooled condenser 102. A capillary tube 104 leads the refrigerant liquid from the condenser 102 to the evaporator 76. A thermostatic switch 106 has a thermo-sensitive bulb 108 in contact with the evaporator 76. A second thermostatic bulb 110 connects with the tube 84.

A supply of electric current connects through lead 112 with one of the contact fingers 68 and one of the contact fingers 70. The other contact finger 70 connects through lead 114, the thermostatic switch 106 and lead 116 with one terminal of the electric motor in the sealed casing 94. Another lead 118 connects the power supply with the other terminal of the electric motor and with one terminal of an electric heater 120. The other terminal of the heater 120 is connected with the other of the contact fingers 68 through a lead 122.

Thus, when the switch blade 58 is in the left-hand position, as viewed in Fig. 6, the contact fingers 70 are bridged and the operation of the refrigerating unit is under the control of a thermostatic switch 106. The heater 120 is deenergized. When the switch blade 58 is in the right-hand position, the contact fingers 68 are bridged, the heater 120 is energized and the refrigerating unit is rendered inactive.

In some defrosting systems the refrigerating unit operates during the defrosting period. For such units the two contacts 70 are not required and the lead 114 is connected directly to lead 112.

It will be apparent from the above that the invention provides a defrosting control in which the defrosting period may be terminated without further movements of the actuating member 12. It will be further apparent that this invention provides a novel movable dog 36 for a ratchet wheel.

While I have shown the invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What I claim is:

1. A refrigerator defrosting switch comprising a housing, a switch blade in said housing and biased for snap-acting movement to two positions, a spring element stationarily secured at one end in said housing, a cam positioned for rotary movement within said housing and adapted to engage the free end of said spring element to flex the same and thereafter release said spring, whereupon said free end swings back to its normal position, the momentum of said free end

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being such that it continues in its swing to beyond its normal position, said free end eventually returning to its normal position, a member positioned in the path of said free end when swinging beyond its normal position and adapted to be moved by said free end, said member when so moved being adapted and arranged to move said switch blade from one of its positions if the switch blade is in said one position to the other of said positions of the switch blade, and means responsive to a number of refrigerator operations for rotating said cam.

2. A refrigerator defrosting switch responsive to the opening and closing of a refrigerator door, said switch comprising a housing, a switch blade in said housing and biased for snap-acting movement to two positions, a spring element stationarily secured at one end in said housing, a cam positioned for rotary movement within said housing and adapted to flex the free end of said spring element and thereafter release it, whereupon said free end swings back to its normal position, the momentum of said free end being such that it continues in its swing to beyond its normal position, said free end eventually coming to rest in its normal position, a member positioned in the path of said free end when swinging beyond its normal position and adapted to be contacted by said free end, said member when so contacted being adapted and arranged to move said switch blade from one of its positions if the switch blade is in said one position to the other of said positions of the switch blade, means for rotating said cam in response to the opening and closing of a refrigerator door, and independent means for returning said switch blade to said one position.

3. A refrigerator defrosting switch comprising a housing, a switch blade in said housing and biased for snap-acting movement between a first and a second position, a spring element sta-

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tionarily secured at one end in said housing, the opposite end of said spring element being free and disposed in a region spaced from said switch blade when said spring element is unflexed, means for transmitting movement of the free end of said spring element to the switch blade and including a member positioned between the free end of said spring element and said switch blade, a cam positioned for rotary movement within said housing and engageable with the free end of said spring element to flex the same in a direction away from said switch blade and, thereafter, to release said spring element, the construction and arrangement being such that the bias of the spring element, when released, returns the spring element toward its unflexed position, the inertia of the spring element carrying it beyond said unflexed position before the spring element comes to rest in its unflexed position, said movement transmitting means being actuated by the spring element as the latter passes beyond its unflexed position for moving said switch blade from its first to its second position, means for actuating said cam, and means for moving said switch blade from its second position to its first position.

GRAHAM S. McCLOY.

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