July 19, 1938. S. W. E. ANDERSSON 2,123,920

REFRIGERATION

Filed June 1, 1934 5 Sheets-Sheet 1

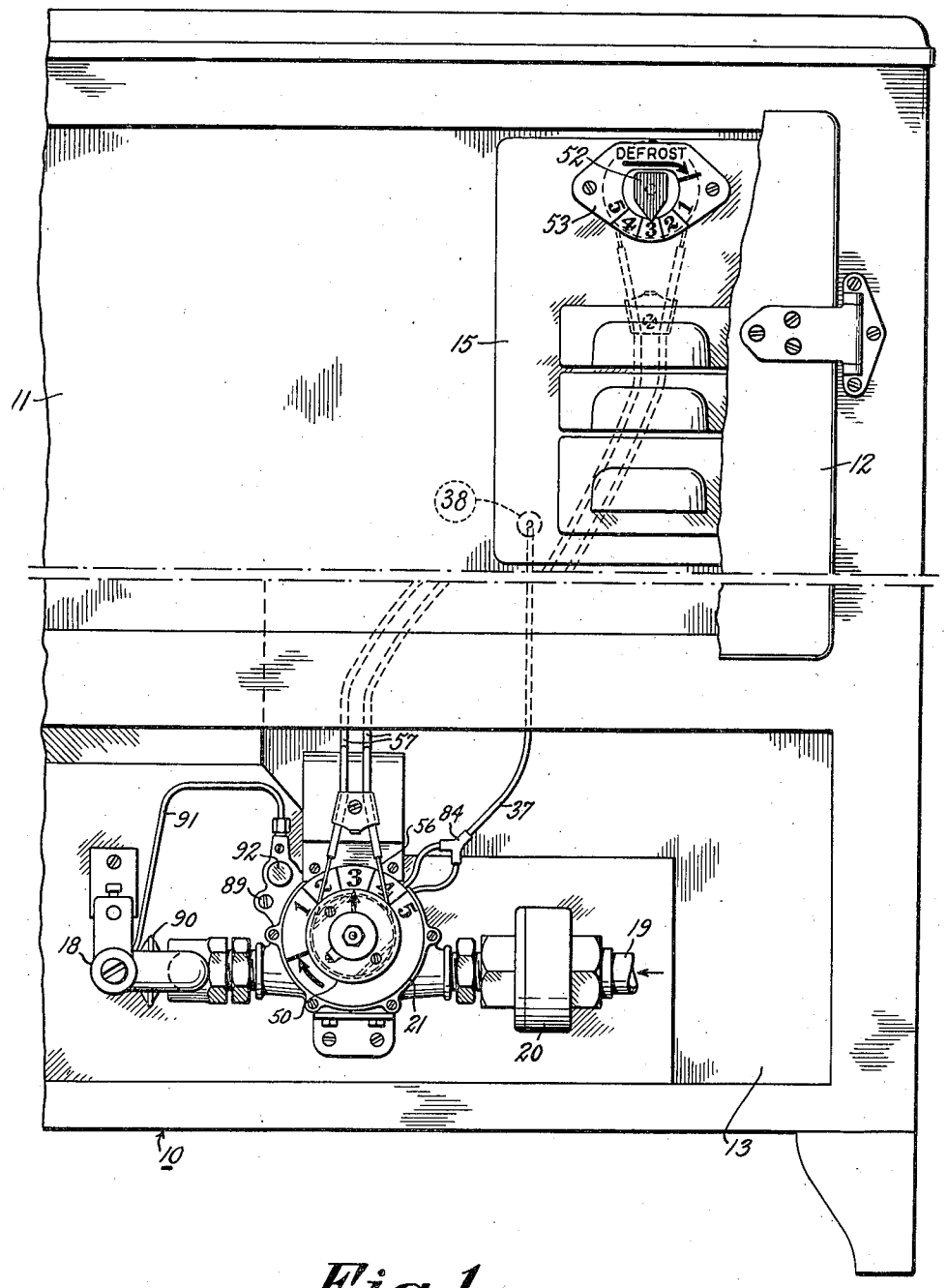

Fig. 1.

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REFRIGERATION

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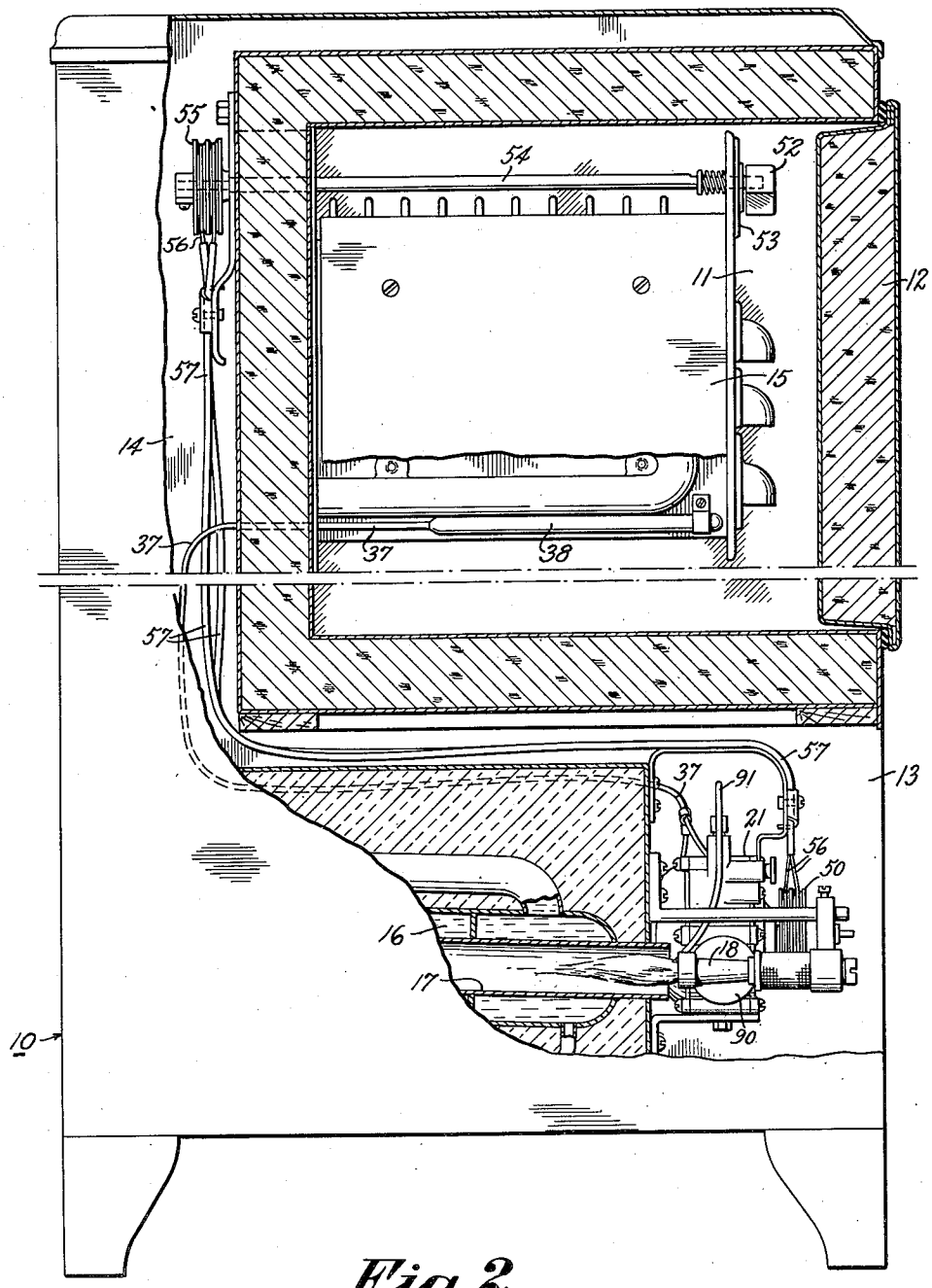

Fig. 2.

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REFRIGERATION

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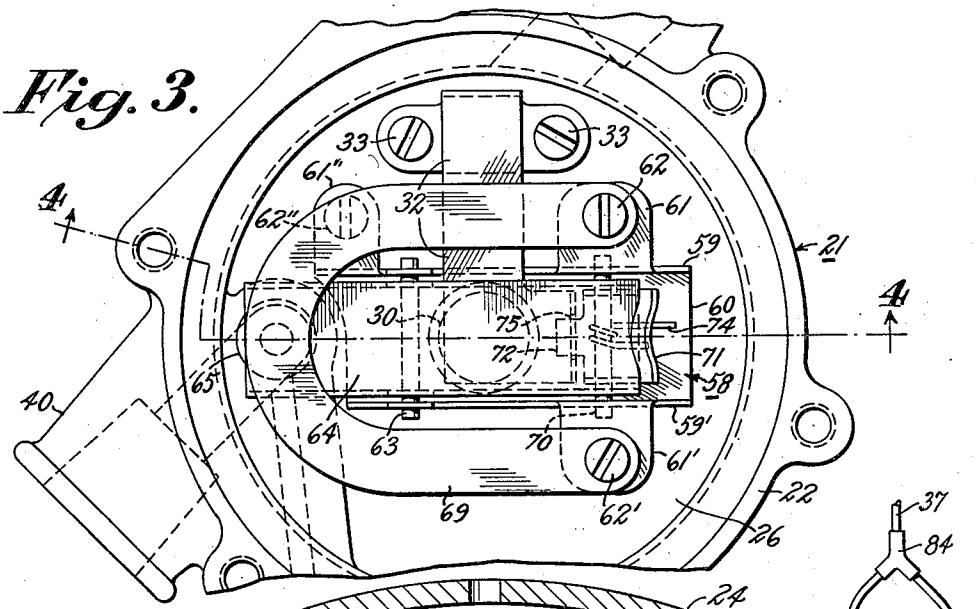
Fig. 3.



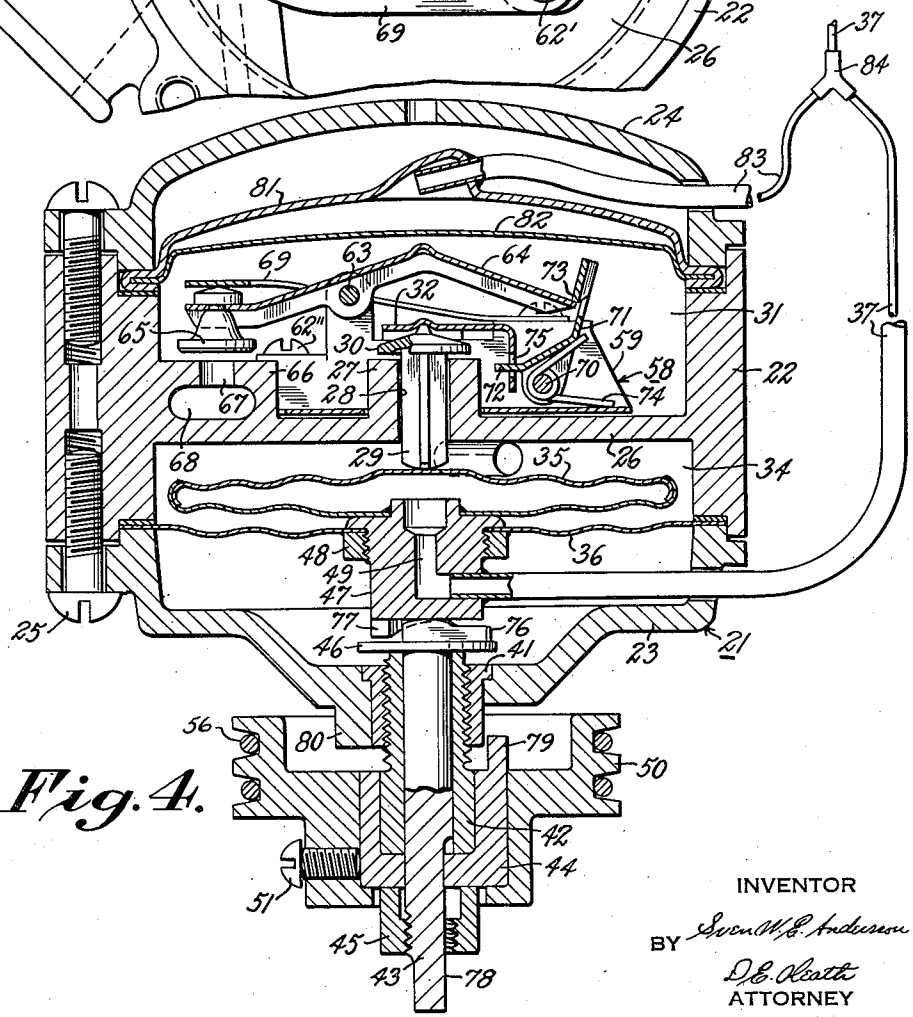


Fig. 4.

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REFRIGERATION

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Fig. 5.

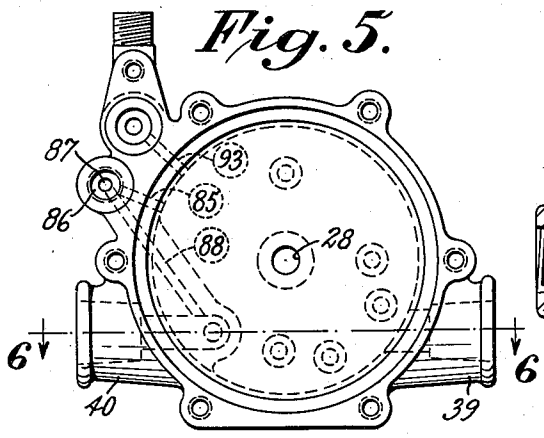


Fig. 6.

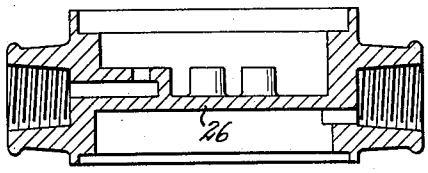
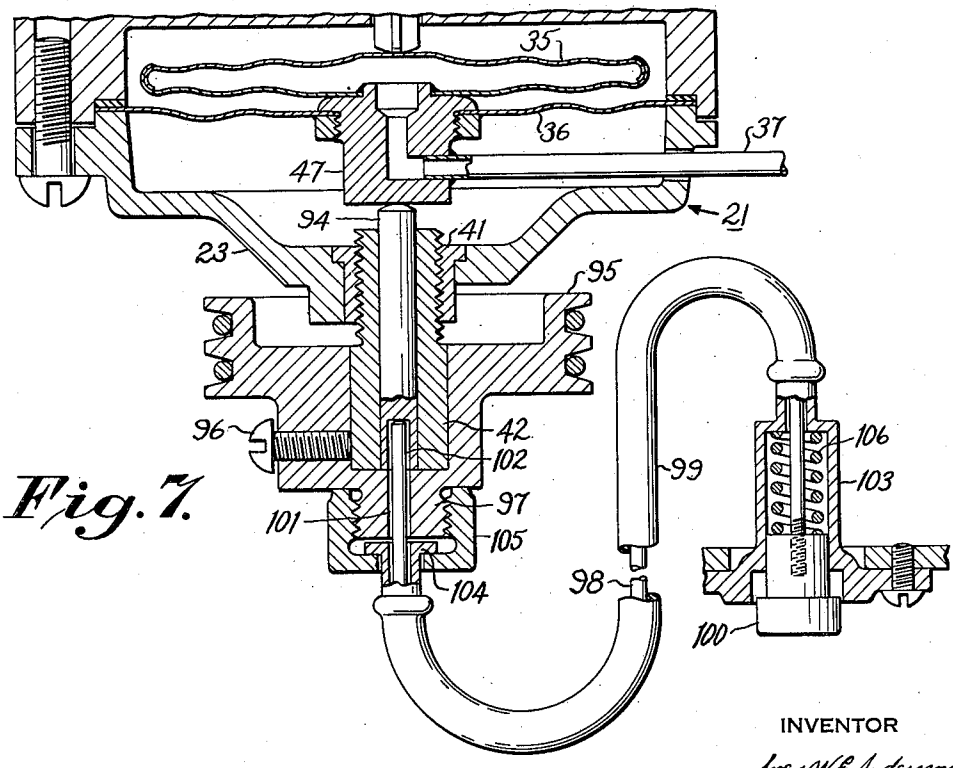


Fig. 7.



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REFRIGERATION

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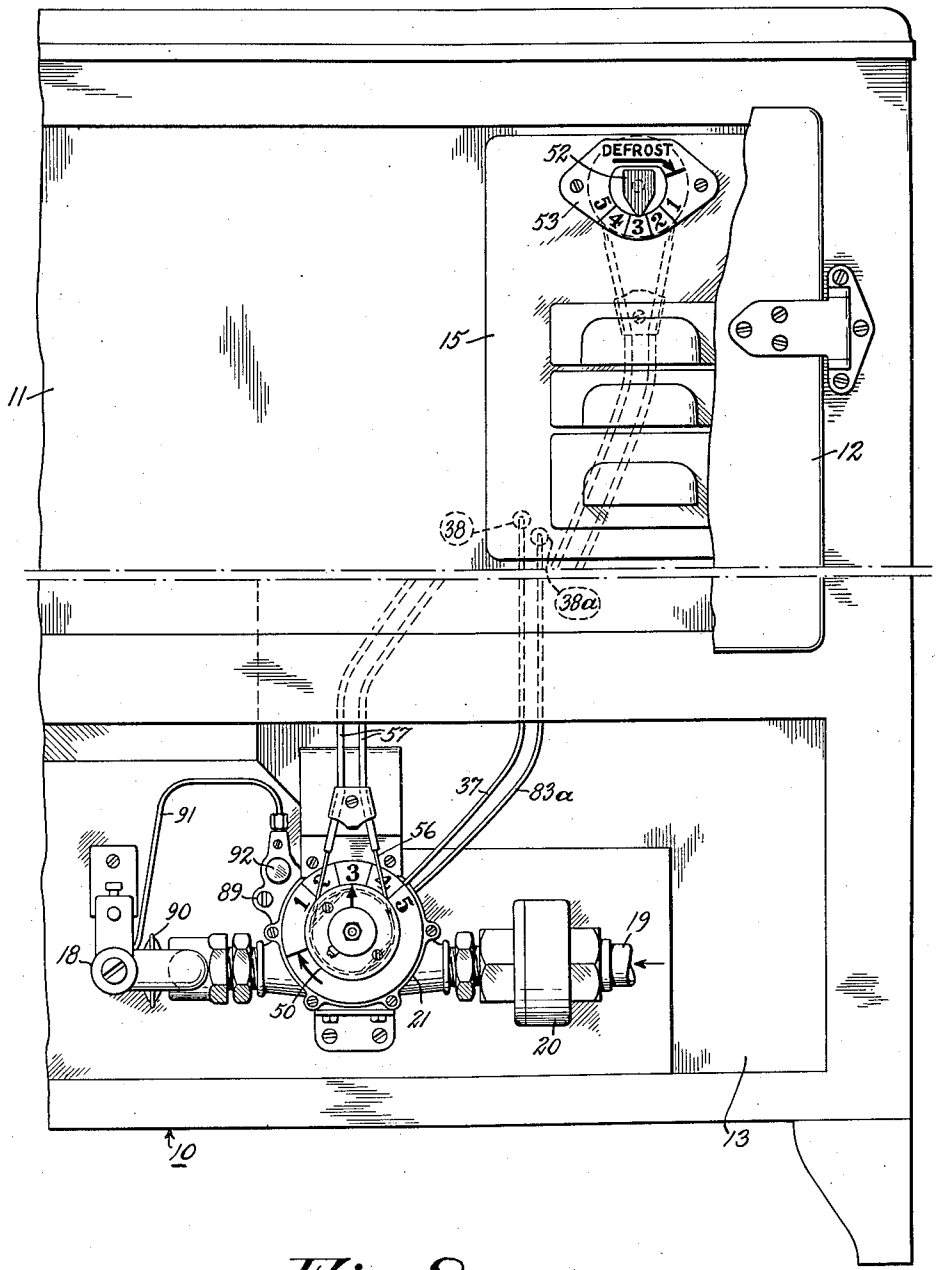

Fig. 8.

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Patented July 19, 1938 2,123,920

UNITED STATES PATENT OFFICE

2,123,920

REFRIGERATION

Sven W. E. Andersson, Evansville, Ind., assignor, by mesne assignments, to Servel, Inc., Dover, Del., a corporation of Delaware

Application June 1, 1934, Serial No. 728,525

35 Claims. (Cl. 62—5)

My invention relates to refrigeration, and more particularly to a control device for refrigeration systems of the continuous absorption type.

When a refrigerator is provided with a single cooling element for the purpose of freezing ice cubes and also cooling a food storage compartment, as is usual in refrigerators of the household type, it is necessary to operate the cooling element at a temperature below the freezing point of water, and, due to the presence of water vapor in the air of the compartment to be cooled, moisture condenses and freezes on the cooling element, producing a layer of frost which gradually increases in thickness and seriously decreases the efficiency of refrigeration and is otherwise undesirable from the standpoint of sanitation. In order to remove the frost, commonly referred to as "defrosting", it is necessary to raise the temperature of the cooling element to a value at which the frost melts, as by interrupting operation of the refrigeration apparatus for a sufficient period. Since the rate of accumulation of frost is not uniform, and since the times when it is convenient to defrost may vary considerably, it is desirable that defrosting may be instigated at will. However, since return of the apparatus to normal operation is liable to be forgotten after the frost has melted, it is desirable that this be done automatically.

In accordance with this invention, I provide a control device whereby refrigerators of the continuous absorption type can be defrosted at will and the defrosting period is terminated automatically upon melting of the frost.

It is an object of my invention to provide such a device in combination with the temperature control means for the refrigeration apparatus utilizing a minimum number of parts.

It is a further object of my invention to provide a device of such character which may be remotely operated, for instance, from a point adjacent the cooling element within the storage compartment of a refrigerator.

Other objects and advantages will be apparent and a full understanding of the nature of my invention may be had from the following description taken in connection with the accompanying drawings forming a part of this specification, and of which:

Fig. 1 is a broken view in front elevation of a refrigerator showing the cooling element and a control device contemplated by my invention;

Fig. 2 is a side view partly in vertical section of the arrangement shown in Fig. 1;

Fig. 3 is an enlarged rear end view of the interior of the control device shown in Figs. 1 and 2;

Fig. 4 is a section of the control device on line 4—4 in Fig. 3;

Fig. 5 is a front end view of the housing of the control device;

Fig. 6 is a section taken on line 6—6 in Fig. 5;

Fig. 7 is a partial view of the device similar to Fig. 4, illustrating a modification of the invention; and

Fig. 8 is a view similar to Fig. 1 illustrating another modification of the invention.

Referring to Figs. 1 and 2 of the drawings, a refrigerator cabinet 10, shown schematically in broken view, is of a type well known in the art, comprising an upper heat insulated chamber or food storage compartment 11, accessible by means of an insulated door 12, and a lower apparatus compartment 13, from which a passage 14 extends upwardly at the back of the refrigerator in the rear of the insulated storage compartment 11. In the cabinet is mounted an absorption refrigeration apparatus of the pressure equalized continuous type which itself is well known in the art and needs no further description here. Briefly, however, such apparatus comprises essentially an evaporator or cooling element in which refrigerant fluid, such as ammonia, evaporates by diffusion into an inert pressure equalizing gas, such as hydrogen. The resulting gas mixture flows into an absorber where the refrigerant is absorbed by a suitable liquid absorbent such as water. The inert gas returns to the evaporator and the enriched absorption liquid is conducted to a generator. In the latter, the refrigerant is expelled from solution by heating and the weakened absorption liquid is again conducted through the absorber. The expelled refrigerant is condensed and returned to the evaporator, thus completing the cycle. The generator may be heated by any suitable means such as a gas burner.

Referring again to Figs. 1 and 2, the apparatus, of which only the parts necessary for this description are shown, is mounted in the cabinet with the evaporator 15 located in the storage compartment 11 and the generator 16 located principally in the lower apparatus compartment 13. The other parts of the apparatus are located either in the apparatus compartment 13 or the vertical passage 14. The generator 16 is provided with a flue 17 and is heated by a gas burner 18 directed into the lower end of the flue as best shown in Fig. 2. Gas is supplied to the

burner 18 from conduit 19 through a gas filter 20 and a control device 21 respectively.

The control device 21, shown in detail in Figs. 3 to 6, comprises an annular casing or housing consisting of an annular body member 22, a front cover plate 23, and a rear cover plate 24, the cover plates being circular and secured to the body member 22 by screws 25, or other suitable means. The interior of the body member 22 is divided by a partition 26 having a central boss 27 through which is drilled a valve opening 28. Extending through the latter is a stem or valve lifter 29 provided at one end with a valve member 30 in the upper valve chamber 31. The valve member 30 is adapted to seat on the boss 27 to close the valve opening 28. The valve member 30 is biased to its closed position by a suitable leaf spring 32 having one end overlying the valve member and the other end secured by screws 33 to the partition 26. In the valve chamber 34 on the other side of the partition 26 there is located the expansible diaphragm or element 35 of an expansible fluid thermostat. The expansible element 35 is mounted on a resilient diaphragm 36 which is secured at its edge with suitable gaskets between the body member 22 and cover plate 23, thus sealing the valve chamber 34. The expansible element 35 is connected by a capillary tube 37 to a sensitive bulb 38 located in thermal transfer relation with the evaporator 15, as is shown in Figs. 1 and 2. The sensitive bulb 38, capillary tube 37, and expansible element 35 are charged with a suitable temperature sensitive fluid as well known in the art, and the expansible element 35 is located in operative relation with the valve stem 29, whereby movement of the expansible element 35 responsive to variation in temperature of the evaporator 15 is transmitted by the valve stem 29 to the valve member 30 to control the valve passage 28. The body member 22 is provided with an external boss 39 drilled for passage of gas therethrough into the valve chamber 34 and tapped for gas pipe connection from the gas filter 20 if the latter is employed, or direct connection to the gas supply line 19. A second external boss 40 is drilled for passage of gas from the other valve chamber 31, as more fully described hereinafter, and is tapped for gas pipe connection to the burner 18. Thus the flow of gas to the burner 18 is controlled by valve member 30 which is operated by the expansible element 35 in accordance with the temperature of the evaporator 15.

The cover plate 23 is provided centrally with an inset bushing 41 which is internally threaded to receive in threaded engagement an adjusting assembly comprising a sleeve 42, a pin 43, a cap member 44 and retaining nut 45. The pin 43 is provided near one end with a circular flange 46 so that when the pin 43, sleeve 42, and cap 44 are assembled they are secured together as a unit by the retaining nut 45 which is threaded on the other end of the pin 43 and tightened down against the cap 44. The end of the pin 43 beyond the flange 46 forms an abutment for a member 47. The latter extends centrally through the resilient diaphragm 36 and is secured thereto by a retaining nut 48, thus forming the means by which the expansible element 35 is mounted on the resilient diaphragm 36 and also the means by which the capillary tube 37 is connected to the expansible element, the passage 49 through the member 47 serving this purpose. On the cap member 44 of the adjustment assembly, a grooved pulley 50 is mounted and secured by a set screw 51, or other suitable device. Rotation of the pulley 50 moves the pin 43 on account of the threaded engagement of the sleeve 42 with the fixed cover plate 23, thereby varying the abutment of member 47 on the end of pin 43 to effect the adjustment or setting of the thermostatically operated valve previously described.

It will be understood that the pulley 50 may be replaced by a control knob or dial. However, in the arrangement illustrated it is preferable to have the control knob in the upper part of the refrigerator cabinet on the front of the evaporator, as is shown in Figs. 1 and 2. The adjusting knob 52 is provided with a suitable fixed dial or index plate 53 and is mounted on the end of a rod 54 which extends from the front of the evaporator 15 through the rear wall of the storage compartment 11 into the vertical passage 14 where it is provided with a grooved pulley 55 similar to the pulley 50 on the control device 21. These pulleys are operatively connected by a flexible wire belt 56 provided with a guide casing 57. Turning the knob 52 on the front of the evaporator 15 causes rotation of rod 54, pulley 55, and pulley 50, whereby the adjustment of the control thermostat is varied as previously described. For a purpose which will hereinafter appear, the arrangement just described is so constructed that only a half turn of the control adjustment knob 52 and the parts operated thereby is utilized to obtain full range adjustment of the thermostat.

Referring again more particularly to Figs. 3 and 4, there is provided in the upper valve chamber 31 a bracket 58 which is substantially a channel member comprising side walls 59 upturned from a flat bottom 60. An opening in the bottom 60 of the bracket 58 allows the latter to fit around the central valve boss 27 and the bracket is secured in place on three bosses formed on the partition 26, by tabs 61, 61' and 61'' which extend from the side walls 59 of the bracket and are fastened by screws 62, 62' and 62''. On a pin 63 carried by the bracket 58 is pivoted a valve lever 64 having at one end a valve member 65. A boss 66 on the partition 26 is drilled to form a valve opening 67 and the boss 66 is machined to form a seat for the valve member 65 so that the latter may control flow of gas through the valve opening 67. The latter communicates with a passage 68 which extends through the external boss 40 for passage of gas from the valve chamber 31 to the gas burner 18 as previously described. The valve member 65 and valve lever 64 are biased to the valve closing position by a U-shaped leaf spring 69, the ends of which may be secured by the same screws 62 and 62' which secure the bracket 58 in place as previously described. On another pin 70, carried by the bracket 58, is pivoted a lever 71 having a projection 72 at one end and a catch 73 at the other end, which catch may be formed by striking out a portion of the lever. This lever comprises a trigger and is tensioned by a spring 74 coiled around the pin 70. The valve closing spring 32 is provided with a downturned tab 75, in which tab is a slot which receives the projecting end 72 of the trigger 71. It will now be understood that the catch 73 of the trigger 71 normally engages the end of valve lever 64 to retain the valve member 65 in its open position against the action of the U-shaped spring 69. The engagement of the tab 75 with the end 72 of trigger 71 is such that the trigger 71 will not be tripped

to release lever 64 during normal operation of the control valve member 30 and the latter must be moved beyond its fully open position for the tab 75 of the valve spring 32 to lift the end 72 of the trigger 71 against the action of the coiled trigger spring 74.

In order to move the control valve member 30 and the valve spring 32 through an abnormal distance, the previously described pin 43 of the temperature control adjustment is provided with a ridge 76 which cooperates with a spiral cam 77 on the thermostat connecting member 47. This cam extends only 180° and the pin 43 is assembled so that the ledge 76 does not engage the cam during normal operation through the full adjustment range, as previously described. However, when the temperature control adjustment is turned through a further 180° in the direction indicated by the arrows in Fig. 1, the ridge 76 engages the spiral cam 77 and raises the expansible element 35, valve lifter 29, valve member 30, and valve spring 32 whereby the tab 75 operates the trigger 71 to release member 64, as previously described, which allows the valve member 65 to snap closed under the action of the U-shaped spring 69. The adjusting pin 43 is provided with a flat side 78 which cooperates with a corresponding flat side of the aperture through the cap member 44 whereby these parts may be assembled in only one position. The cap member 44 of the temperature control adjustment is provided with a lug 79 which cooperates with a stop 80 on the cover plate 23 to prevent turning of the temperature control adjustment more than one revolution.

An expansible element 81 provided with a snap action diaphragm 82 is secured with suitable gaskets between the body member 22 and the cover plate 24 thereby sealing the valve chamber 31. The snap action diaphragm 82 of the expansible element 81 and the valve lever 64 are arranged so that downward movement (as seen in Fig. 4) of the center of the diaphragm carries the tigger end of the valve lever 64 into position to be retained by the trigger 71, in which position the valve 65 is open. This valve will be referred to as the defrosting valve, whereas the valve 30 is known as the temperature control valve, or merely control valve. The expansible element 81 is connected by a capillary tube 83 and a T 84 to the capillary tube 37 with the sensitive bulb 38 on the evaporator 15. It will be understood, however, from the following description of operation that a separate bulb 38*a* and capillary tube connection 83*a* may be provided for the expansible element 81, as illustrated in Fig. 8, without changing the result. With the first arrangement, however, only one capillary tube is required between the evaporator in the storage compartment and the control device in the lower apparatus compartment of the refrigerator.

In order to provide a minimum flow of gas to the burner for maintaining a pilot flame when either or both of the valves are closed, there is provided a by-pass conduit comprising passages 85, 86, 87 and 88, as best seen in Fig. 5. The bypassed flow of gas from passage 86 into passage 87 is adjusted by a screw type needle valve not shown in Fig. 5, but which is threaded from the exterior into passage 86 which is then closed by a cap screw 89, as shown in Fig. 1. Since the burner 18 is provided with a thermostatic safety device 90, of a type well known in the art, for cutting off the supply of gas to the burner when the flame is extinguished, there is also provided a burner lighter tube 91 controlled by a normally closed manually operated push valve 92. As may be seen in Fig. 5, gas is admitted to the burner lighter valve through a passage 93 from valve chamber 34.

In operation, the gas burner 18 is lighted by opening valve 92 and igniting the gas which issues from the end of the burner lighter tube 91. If the operation is being started for the first time, the evaporator will be at substantially room temperature, wherefore both expansible elements 35 and 81 of the control device 21 will be expanded and valves 30 and 65 will be open. Upon heating of the thermostatic safety valve 90, the latter opens and gas will be admitted to the burner 18 which will become ignited from the flame at the end of the burner lighter tube 91, whereupon the burner lighter valve 92 may be released. After operation of the refrigeration apparatus for a sufficient length of time, the temperature of evaporator 15 will decrease. At a predetermined temperature, the expansible element 81 contracts, that is, the diaphragm 82 snaps inwardly, leaving the defrosting valve lever 64 detained in the open valve position by the trigger 71. The flow of gas to the burner 18, and therefore the operation of the refrigeration apparatus is controlled by the temperature control valve 30 which is operated by the expansible element 35 responsive to the temperature of the cooling element 15 to maintain the latter at a substantially constant value. Turning the control knob 52 on the front of the evaporator 15 over the lower half of the scale varies the adjustment of the control thermostat, as previously described, and thereby varies the temperature at which the evaporator or cooling element 15 will be maintained.

After a further period of operation it will become desirable to remove the frost formation from the evaporator 15, that is, defrost the evaporator. To accomplish this, the control knob 52 on the front of the evaporator 15 is turned clockwise, as indicated by the arrow, to the position marked Defrost. Movement in this direction is limited by the lug 79 contacting the stop 80 on the control device 21, as previously described. The control knob 52 may then be turned back immediately to the setting at which it is desired the apparatus should operate following the defrosting period. In turning the control knob to the Defrost position, the ledge 76 on the adjustment pin 43 of the control device engages the spiral cam 77 on the connecting member 47 thereby shifting the expansible element 35, valve lifter 29, valve member 30 and valve spring 32 an abnormal distance, and the trigger 71 is swung clockwise, as seen in Fig. 4, by the downturned lug 75 on the valve spring 32 to release the defrosting valve lever 64, whereupon the defrosting valve 65 is snapped closed by the U-shaped spring 69, cutting off the supply of gas to the burner 18 except for that which flows through the by-pass, as previously described, to maintain a minimum pilot flame. The operation of the refrigeration apparatus being interrupted, the temperature of the evaporator 15 will rise to the melting point of the frost coating thereon, whereupon the latter will melt and drop into a suitable receptacle, not shown, positioned beneath the evaporator for this purpose. The expansible element 81 is so designed that upon increase in temperature of the evaporator to the melting point of the frost, the pressure therein increases

sufficiently to snap the diaphragm 82 outwardly, thereby opening the defrosting valve 65 and moving the valve lever 64 into such position that it is caught and retained by the projection 73 of the trigger 71, as previously described. Flow of gas to the burner 18 is again resumed and operation of the refrigeration apparatus under control of the thermostatic control valve 30 occurs and the temperature of the evaporator 15 is again decreased to a value determined by the setting of the control knob 52 which was made upon instigation of the defrosting period.

In Fig. 7 there is shown a portion of the control device 21 in a sectional view similar to Fig. 4 illustrating a modification of the arrangement for instigating the defrosting period by shifting the expansible thermostatic element 35. In this modification, the sleeve 42 of the adjustment assembly is provided with an ordinary pin or rod 94 which is reciprocable in the sleeve and has a plain rounded end which forms the abutment for the connecting member 47 of the thermostat. A grooved pulley 95 secured on the sleeve 42 by a set screw 96 is similar to the pulley 50 previously described in connection with Fig. 4 except that the pulley 95 has a hub extension 97 which closes the end of the sleeve 42 and serves as an abutment for the end of the pin 94. There is provided a flexible wire or similar element 98 in a flexible tube or casing 99. One end of the flexible wire 98 is connected to a push button 100 and the other end extends through an opening 101 in the pulley hub extension 97 and is seated in a socket 102 in the end of the adjustment pin 94. The push button 100 is reciprocable in a casing 103 which may be suitably located for ready access by the user as, for instance, on the front of the evaporator 15. One end of the flexible tube 99 is secured to the push button casing 103 and the other end is provided with a flanged member 104 which is secured against substantial axial movement with respect to the pulley hub extension 97 by a retaining ring 105 threaded on the latter. The retaining ring 105 is so designed as to allow rotation of the pulley independently of the flanged member 104 except for a possible slight amount of friction which is substantially constant and therefore unobjectionable.

The push button 100 is biased to its position shown in Fig. 7 by a coil spring 106 in the push button housing 103. To instigate a defrosting period, the push button is manually depressed. This movement of the push button is transmitted by the flexible wire 98 to the pin 94 which shifts the connecting member 47 and expansible element 35 to operate the defrosting valve in the manner previously described. When the push button 100 is released, the parts return to their normal position under the action of the spring 106 and at the end of the defrosting period, operation of the refrigeration apparatus will be resumed, as previously described, to produce refrigeration at the temperature for which the temperature control adjustment described above may be set. In this modification, the temperature adjustment need not be disturbed to effect defrosting.

It will be apparent to those skilled in the art that various other changes may be made in the construction and arrangement without departing from the spirit of the invention, and therefore the invention is not limited to that which is described in the specification and shown in the drawings, but only as indicated in the following claims.

What I claim is:

1. Absorption refrigeration apparatus including a gas burner, a cooling element, a valve for controlling flow of gas to said burner, a thermostat element for actuating said valve to normally maintain the temperature of said cooling element at a substantially constant value, a second valve operable to reduce the supply of gas to said burner to allow the temperature of said cooling element to rise above said constant value, means for adjusting said thermostat element to change said constant value and operable to operate said second valve, and a second thermostat element for rendering said second valve inoperative upon rise in temperature of said cooling element.

2. In an absorption refrigeration apparatus, a cooling element, a generator, a fluid fuel burner for heating said generator, and a control device comprising two valves in series for controlling the supply of fuel to said burner, an expansible fluid thermostat element for operating one of said valves responsive to the temperature of said cooling element, adjustment means for said thermostat element, means for closing the other of said valves and operably associated with said adjustment means, and automatic means for opening said other valve upon predetermined rise in temperature of said cooling element.

3. In a refrigerator, a cabinet having a thermally insulated storage compartment and an apparatus compartment, an absorption refrigeration apparatus including a cooling element in said storage compartment and a generator in said apparatus compartment, a gas burner for heating said generator, a valve for controlling the supply of gas to said burner, a thermostat element for actuating said valve responsive to the temperature of said cooling element, a second valve in series with said first valve, means operable from within said storage chamber for adjusting said thermostat element and operative to close said second valve, and automatic means for opening said second valve responsive to a predetermined rise in temperature adjacent said cooling element.

4. In a refrigerator, an absorption refrigeration apparatus including a cooling element, a generator, a fluid fuel burner for heating said generator, a thermostatic valve for normally controlling the supply of fuel to said burner to maintain said cooling element at a substantially constant temperature, and a defrosting control device comprising a second valve for controlling the supply of fuel to said burner, means urging said second valve toward its closed position, a thermostat element for opening said second valve above a predetermined temperature of said cooling element, a catch for detaining said second valve in its open position, and remotely operable means for operating said catch to release said second valve.

5. In a refrigerator, a cabinet having a thermally insulated storage compartment and an apparatus compartment, an absorption refrigeration apparatus including a cooling element in said storage compartment and a generator in said apparatus compartment, a gas burner for heating said generator, and a control device comprising a valve for controlling the flow of gas to said burner, a thermostat element for operating said valve responsive to temperature of said cooling element, a second valve for controlling flow of gas to said burner, a spring urging said second valve to its closed position, a catch for detaining said second valve in its open position

against the action of said spring, means manually operable from within said storage compartment for adjusting said thermostat element, means including a push button within said storage compartment for releasing said catch to allow said second valve to close, and a thermostat element for opening said second valve upon predetermined rise in temperature of said cooling element.

6. In an absorption refrigeration apparatus operated by a fluid fuel burner, a control device comprising two valves for controlling the flow of fuel to said burner, a thermostat element for operating one of said valves, a second thermostat element operative to open the second of said valves above a predetermined temperature, means urging said second valve toward its closed position, a catch for detaining said second valve in its open position, and means for releasing said catch to allow said second valve to close.

7. Absorption refrigeration apparatus including a cooling element, a generator, a fluid fuel burner for heating said generator, and a control device comprising an expansible fluid thermostat having a plurality of expansible elements, a valve operated by one of said expansible elements for controlling the supply of fuel to said burner to normally maintain the temperature of said cooling element at a substantially constant value, a second valve operable to decrease the supply of fuel to said burner to allow the temperature of said cooling element to rise above said constant value, and means including another of said expansible elements for rendering said second valve inoperative upon predetermined rise in temperature of said cooling element.

8. In an absorption refrigeration apparatus including a cooling element, a generator, and a gas burner for heating said generator, a control device comprising two valves in series in the gas line to said burner for controlling the flow of gas to said burner, an expansible thermostat element for operating one of said valves, an adjustment screw for adjusting the position of said thermostat element, a stop for limiting rotation of said screw to substantially one revolution, a cam between said screw and said thermostat element whereby the latter is moved distances increasingly greater than the corresponding pitch of the screw thread during one-half revolution of said screw, a second expansible thermostat element of the snap-action type operative to open the second of said valves above a predetermined temperature, an expansible fluid thermostat bulb on said cooling element and connected to both said expansible elements, means urging said second valve toward its closed position, a catch for detaining said second valve in its open position, and means for releasing said catch operative upon abnormal displacement of said thermostat element by the action of said cam.

9. In an absorption refrigeration apparatus including a cooling element, a generator, and a gas burner for heating said generator, a control device comprising two valves in series for controlling the flow of gas to said burner, a thermostat for operating one of said valves responsive to the temperature of said cooling element, an adjustment screw for adjusting the position of said thermostat, a stop for limiting rotation of said screw to substantially one revolution, a cam between said screw and said thermostat whereby the latter is moved distances increasingly greater than the corresponding pitch of the screw thread during one-half revolution of said screw, a second thermostat operative to open the second of said valves above a predetermined temperature, means urging said second valve toward its closed position, a catch for detaining said second valve in its open position, and means for releasing said catch operative upon abnormal displacement of said first thermostat by the action of said cam.

10. In an absorption refrigeration apparatus including a cooling element, a generator, and a gas burner for heating said generator, a control device comprising two valves in series for controlling the flow of gas to said burner, a thermostat for operating one of said valves, an adjustment screw for adjusting the position of said thermostat and including a pin extending axially therethrough and reciprocable therein for moving said thermostat an abnormal distance, a second thermostat operative to open the second of said valves above a predetermined temperature, means urging said second valve toward its closed position, a catch for detaining said second valve in its open position, means for releasing said catch operative upon abnormal displacement of said thermostat by the action of said pin, and an operating member connected to reciprocate said pin.

11. Refrigeration apparatus including a cooling element, automatic control means operative to normally maintain the temperature of said cooling element within a substantially constant value or range, means operable to modify the effect of said control means to allow the temperature of said cooling element to rise above said constant value or range, means for adjusting said control means to change said temperature value or range and operable to operate said modifying means, and automatic means for rendering said modifying means inoperative upon predetermined rise in temperature of said cooling element.

12. Absorption refrigeration apparatus including a heater, a cooling element, automatic means for controlling said heater to normally maintain the temperature of said cooling element at a substantially constant value, means operable to modify the effect of said control means to allow the temperature of said cooling element to rise above said constant limit, means for adjusting said control means to change said constant value and operable to operate said modifying means, and automatic means for rendering said modifying means inoperative upon predetermined rise in temperature of said cooling element.

13. Refrigeration apparatus including a cooling element, automatic control means operative to normally maintain the temperature of said cooling element within a substantially constant limit, means operable to modify the effect of said control means to allow the temperature of said cooling element to rise above said constant limit, means for remotely adjusting said control means to change said temperature limit and operable to operate said modifying means, and automatic means for rendering said modifying means inoperative upon predetermined rise in temperature of said cooling element.

14. Absorption refrigeration apparatus including a gas burner, a cooling element, a thermostatic valve for controlling flow of gas to said burner to normally maintain the temperature of said cooling element at a substantially constant value, means operable to modify the normal effect of said valve to allow the temperature of said cooling element to rise above said constant value, means for adjusting said thermostatic valve to

change said temperature value and operable to operate said modifying means, and a thermostat for rendering said modifying means inoperative upon predetermined rise in temperature of said cooling element.

15. In a refrigerator, a cabinet having a thermally insulated storage compartment and an apparatus compartment, an absorption refrigeration apparatus including a cooling element in said storage compartment and a generator in said apparatus compartment, means for supplying heat to said generator, means in said apparatus compartment for decreasing the supply of heat to said generator and manually operable from within said storage compartment, and automatic means for resuming the supply of heat responsive to a predetermined increase in temperature of said cooling element.

16. In a refrigerator, a cabinet having an apparatus compartment, an absorption refrigeration apparatus including a generator in said apparatus compartment and a cooling element, means for supplying heat to said generator, means in said apparatus compartment for decreasing the supply of heat to said generator including an expansible element and means to bodily move said expansible element, said last-mentioned means being operative at will from without said compartment, and means for resuming supply of heat to said generator responsive to rise in temperature of said cooling element without bodily moving said element.

17. Absorption refrigeration apparatus including a cooling element, a generator, a fluid fuel burner for heating said generator, and a device for controlling supply of fuel to said burner comprising a valve enclosure in part flexible, valve means within said enclosure, thermostatic means operative responsive to temperature of said cooling element and normally operatively associated with said valve means in a manner to actuate said valve means to maintain said cooling element substantially at a desired normal temperature, and members within and outside of said enclosure operable due to the flexibility of said enclosure to alter said normal operative relation between said valve means and said thermostatic means to cause the temperature of said cooling element to change to an abnormal value and automatically operative to restore said normal operative relation between the valve means and the thermostatic means responsive to said abnormal change in temperature of the cooling element.

18. Absorption refrigeration apparatus including a cooling element, a generator, a fluid fuel burner for heating said generator, and a device for controlling supply of fuel to said burner comprising a valve enclosure in part flexible, valve means within said enclosure, thermostatic means operative responsive to temperature of said cooling element and normally operatively associated with said valve means in a manner to actuate said valve means to maintain said cooling element substantially at a desired normal temperature, and members utilizing the flexibility of the enclosure for adjusting said thermostatic means to obtain said desired normal temperature and operable to alter said normal operative relation between said valve means and said thermostatic means to cause the temperature of said cooling element to change to an abnormal value and automatically operative to restore said normal operative relation between the valve means and the thermostatic means responsive to said abnormal change in temperature of the cooling element.

19. Absorption refrigeration apparatus including a cooling element, a generator, a fluid fuel burner for heating said generator, and a device for controlling supply of fuel to said burner comprising valve means, thermostatic means operative responsive to temperature of said cooling element and normally operatively associated with said valve means in a manner to actuate said valve means to maintain said cooling element substantially at a desired normal temperature, and members including a common manipulating member for adjusting said thermostatic means to obtain the desired normal temperature and operable to alter said normal operative relation between said valve means and said thermostatic means to cause the temperature of said cooling element to change to an abnormal value and means automatically operative to restore said normal operative relation between the valve means and the thermostatic means responsive to said abnormal change in temperature of the cooling element.

20. Absorption refrigeration apparatus including a cooling element, a generator, a heater for said generator, means for regulating said heater, thermostatic means operative responsive to temperature of said cooling element and normally operatively associated with said heater regulating means in a manner to actuate said regulating means to maintain said cooling element substantially at a desired normal temperature, and members including a common manipulating member for adjusting said thermostatic means to obtain the desired normal temperature and operable to alter said normal operative relation between said regulating means and said thermostatic means to cause the temperature of said cooling element to change to an abnormal value and means automatically operative to restore said normal operative relation between the regulating means and the thermostatic means responsive to said abnormal change in temperature of the cooling element.

21. In an absorption refrigeration apparatus including a cooling element, a generator, and a source of heat for said generator, a control device including a control element for controlling supply to said source of heat, an operating element for actuating the control element, a catch having an engaging surface for holding said operating element in a first given position relative to the catch, means to move the catch to release said operating element from said engaging surface to give said catch and operating element a second relative position, and means responsive to temperature of said cooling element representing defrosted condition to restore said first relative position.

22. In an absorption refrigeration apparatus including a cooling element, a generator, and a source of heat for said generator, a control device including a control element for controlling supply to said source of heat, an operating element for actuating the control element, a catch having an engaging surface for holding said operating element in a first given position relative to the catch, manual means to move the catch to release said operating element from said engaging surface to give said catch and operating element a second relative position, and means automatically responsive to temperature of said cooling element representing defrosted condition to restore said first relative position.

23. In an absorption refrigeration apparatus including a cooling element, a generator, and a

source of heat for said generator, a control device including a control element for controlling supply to said source of heat, an operating element for actuating the control element, a catch having an engaging surface for holding said operating element in a first given position relative to the catch, manual means to move the catch to release said operating element from said engaging surface to give said catch and operating element a second relative position, and means automatically responsive to temperature of said cooling element representing defrosted condition to restore said first relative position, said manual means including a cam, a pulley for turning the cam, a second pulley, a rod adjacent said cooling element for turning said second pulley, and means interconnecting the pulleys.

24. In an absorption refrigeration apparatus including a cooling element, a generator, and a source of heat for said generator, a control device including a control element for controlling supply to said source of heat, an operating element for actuating the control element, a catch having an engaging surface for holding said operating element in a first given position relative to the catch, means to move the catch to release said operating element from said engaging surface to give said catch and operating element a second relative position, a spring urging said catch into said first position of engagement between the catch and operating element, and means responsive to temperature of said cooling element representing defrosted condition to restore said first relative position.

25. In an absorption refrigeration apparatus including a cooling element, a generator, and a source of heat for said generator, a control device including a control element for controlling supply to said source of heat, a pivoted operating element for actuating the control element, a pivoted catch having an engaging surface for holding said operating element in a first given position relative to the catch, manual means to turn the catch to release said operating element from said engaging surface to give said catch and operating element a second relative position, springs acting against the catch and operating element, and automatic means responsive to temperature of said cooling element representing defrosted condition to restore said first relative position.

26. In a refrigerator, a cabinet having an apparatus compartment and an insulated compartment, an absorption refrigeration apparatus including a generator in said apparatus compartment and a cooling element in said insulated compartment, means for supplying heat to said generator, and means for controlling the supply of heat including an expansible element, a temperature responsive element connected to said expansible element responsive to changes of temperature of said cooling element, parts having different relative positions for normal control and defrosting respectively, and means to bodily move said expansible element to change said parts from normal control status to defrosting status.

27. In a refrigerator, a cabinet having an apparatus compartment and an insulated compartment, an absorption refrigeration apparatus including a generator in said apparatus compartment and a cooling element in said insulated compartment, means for supplying heat to said generator, and means for controlling the supply of heat including an expansible element, a temperature responsive element connected to said expansible element responsive to changes of temperature of said cooling element, parts having different relative positions for normal control and defrosting respectively, and means to bodily move said expansible element in one direction to change said parts from normal control status to defrosting status and to move said expansible element back bodily while retaining the parts in defrosting status and to automatically change said parts from defrosting status to normal control status when the temperature of the cooling element rises to a value representing defrosted condition.

28. In a refrigerator, a cabinet having an apparatus compartment and an insulated compartment, an absorption refrigeration apparatus including a generator in said apparatus compartment and a cooling element in said insulated compartment, means for supplying heat to said generator, and means for controlling the supply of heat including an expansible element, a temperature responsive element connected to said expansible element responsive to changes of temperature of said cooling element, parts having different relative positions for normal control and defrosting respectively and including a spring-pressed valve operating lever and a spring-pressed catch lever for holding the valve operating lever in a given position, and means to bodily move said expansible element to change said parts from normal control status to defrosting status.

29. In a refrigerator, a cabinet having an apparatus compartment and an insulated compartment, an absorption refrigeration apparatus including a generator in said apparatus compartment and a cooling element in said insulated compartment, means for supplying heat to said generator, and means for controlling the supply of heat including an expansible element, a temperature responsive element connected to said expansible element responsive to changes of temperature of said cooling element, parts having different relative positions for normal control and defrosting respectively, and means to bodily move said expansible element to change said parts from normal control status to defrosting status including a cam and remote control mechanism for turning said cam.

30. In a refrigerator, a cabinet having an apparatus compartment and an insulated compartment, an absorption refrigeration apparatus including a generator in said apparatus compartment and a cooling element in said insulated compartment, means for supplying heat to said generator, and means for controlling the supply of heat including an expansible element, a temperature responsive element connected to said expansible element responsive to changes of temperature of said cooling element, and means to bodily move said expansible element including a turnable rod adjacent said cooling element, a pulley turnable with said rod, a second pulley near the expansible element, and operating mechanism between said pulleys.

31. In refrigeration apparatus provided with a cooling element and having a source of energy supply, mechanism to normally control said energy supply automatically to maintain said cooling element in a predetermined temperature range, structure cooperating with said mechanism to modify said normal control to instigate a defrosting period to permit defrosting of said cooling element, said structure being constructed and arranged to terminate said modified control automatically and permit resumption of said

normal control by said mechanism when said cooling element is substantially defrosted, said structure including a single member manually movable to instigate a defrosting period, and means including said manually movable member to adjust the normal control effected by said mechanism to raise or lower the temperature range in which said cooling element is maintained.

32. In refrigeration apparatus provided with a cooling element and having a source of energy supply, structure to normally control said energy supply automatically to maintain said cooling element in a predetermined temperature range, to adjust said normal control to raise or lower the temperature range in which said cooling element is maintained, to modify said normal control to instigate a defrosting period to permit defrosting of said cooling element, and to automatically terminate said modified control and permit resumption of said normal control to terminate said defrosting period, said structure including a single member movable between predetermined limits to adjust the normal control of said energy supply and also movable beyond said predetermined limits to modify said normal control to instigate a defrosting period, and said structure being so constructed and arranged that, after said member is moved beyond said predetermined limits to modify said normal control, it may be immediately returned to a position between said predetermined limits whereby normal control of said energy supply is automatically resumed when said defrosting period is terminated to maintain said cooling element in a temperature range determined by the position of said member.

33. In refrigeration apparatus provided with a cooling element and having a source of energy supply, a member to control said energy supply automatically to maintain said cooling element in a predetermined temperature range, a part movable to impart movement to said control member to adjust the normal control effected by the latter to raise or lower the temperature range in which said cooling element is maintained, structure including said part to modify said normal control to instigate a defrosting period to permit defrosting of said cooling element, said structure being constructed and arranged to terminate said modified control automatically and permit resumption of said normal control by said control member when said cooling element is substantially defrosted, and means associated with said structure to vary the ratio of the movements of said control member and said part when it is desired to modify said normal control to instigate a defrosting period.

34. In a refrigerator, a cabinet having a thermally insulated storage compartment and an apparatus compartment, an absorption refrigeration apparatus including a cooling element in said storage compartment and a generator in said apparatus compartment, means for supplying heat to said generator, means in said apparatus compartment for decreasing the supply of heat to said generator, a hand operable member mounted adjacent said cooling element in said storage compartment, mechanism connecting said hand operable member to said means for decreasing heat supply for manual operation of said means from within said storage compartment, and automatic means for resuming the supply of heat responsive to a predetermined increase in temperature of said cooling element.

35. A refrigerator as set forth in claim 34 in which said hand operable member is a knob and said mechanism connecting the knob to said means for decreasing heat supply includes a shaft turnable by said knob, a pulley on said shaft, a second pulley connected to operate said means for decreasing heat supply, and a belt operably connecting said pulleys.

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