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3,621,668

REFRIGERATOR INCLUDING AN AUTOMATIC ICE MAKER
AND A DOOR MOUNTED ICE RECEPTACLE

Filed Dec. 17, 1969

2 Sheets-Sheet 1

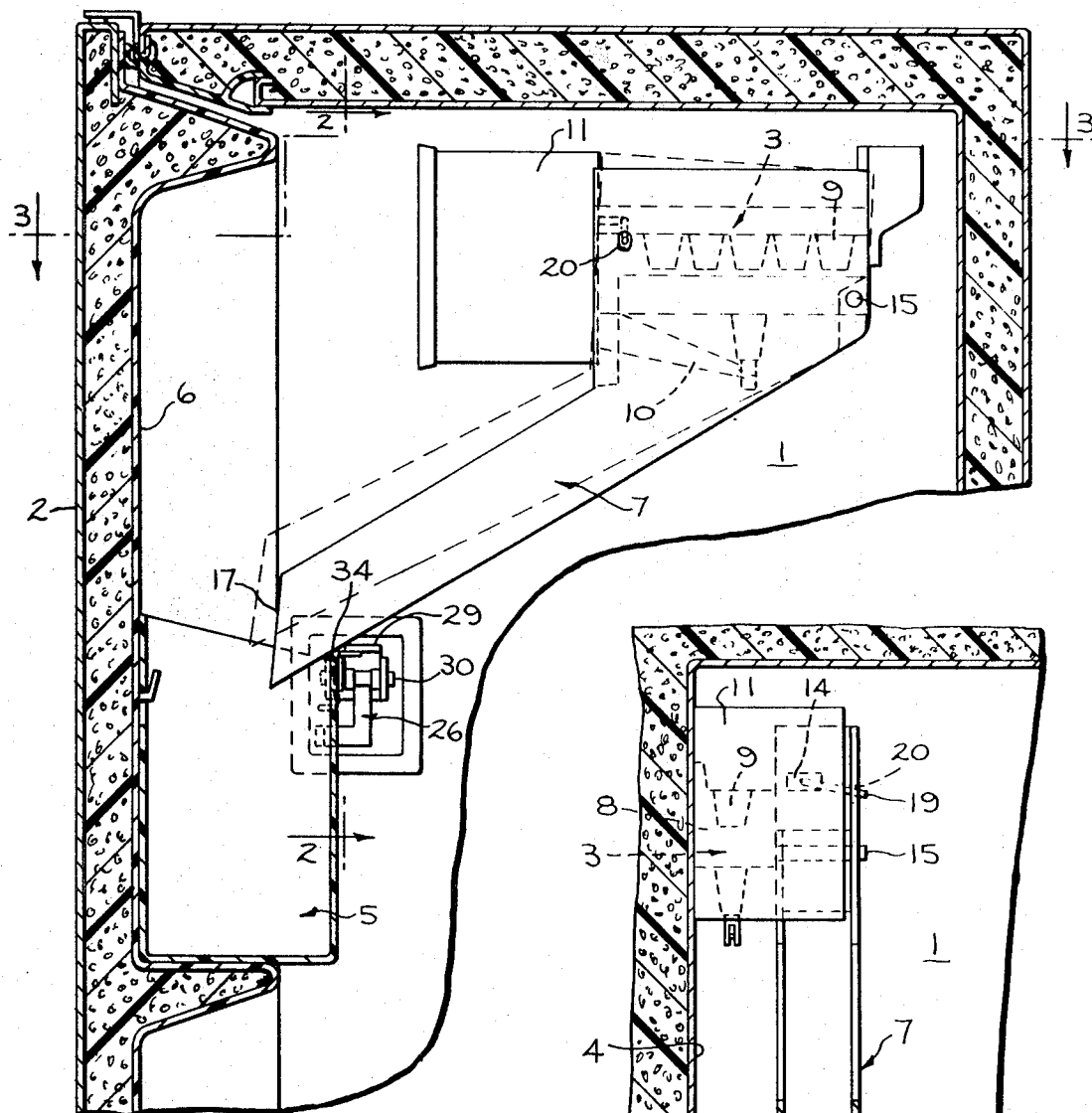


FIG. 1

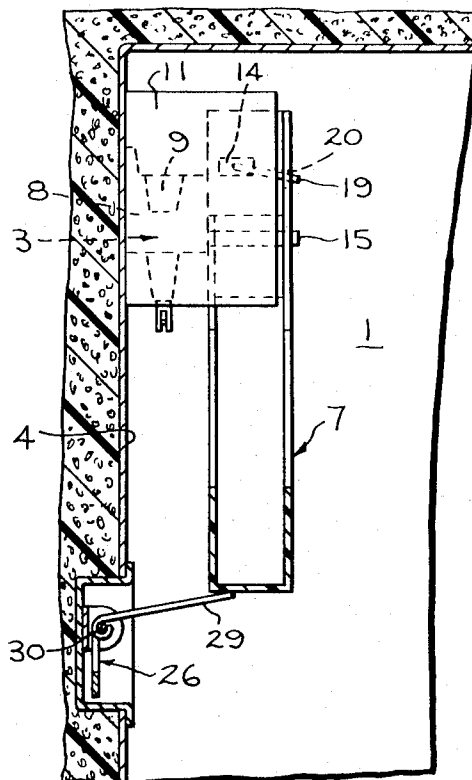


FIG. 2

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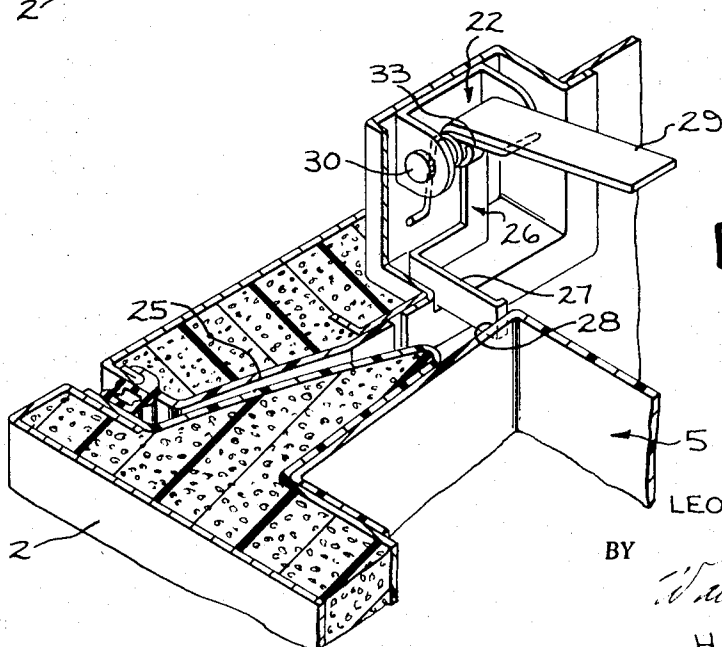
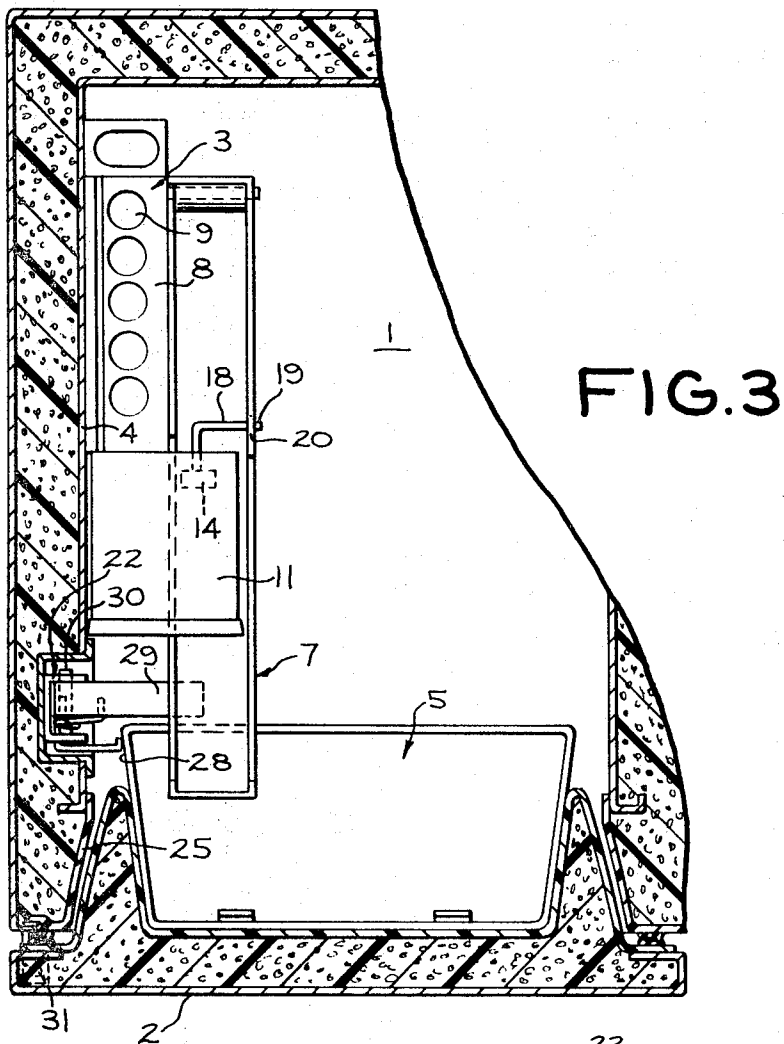
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REFRIGERATOR INCLUDING AN AUTOMATIC ICE MAKER AND A DOOR MOUNTED ICE RECEPTACLE

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6 Claims

ABSTRACT OF THE DISCLOSURE

A refrigerator including a freezer compartment containing an automatic ice maker within the compartment and an ice storage receptacle mounted on the freezer compartment door includes a chute for transferring ice pieces from the ice maker to the storage receptacle. The chute is pivotally supported and connected to the ice maker operating mechanism to provide a vertical movement of the outlet or receptacle end of the chute which is employed to sense the level of ice in the receptacle and stop operation of the ice maker when the receptacle is filled.

BACKGROUND OF THE INVENTION

A number of modern household refrigerators feature ice services including an automatic ice maker and a receptacle for receiving and storing ice pieces produced by the ice maker disposed in a freezer compartment. For stopping the automatic operation of the ice maker when the ice storage receptacle is filled with ice, the receptacle is positioned adjacent the ice maker so that a feeler arm structure forming part of the ice maker and movable at some time during each cycle of operation of the ice maker can sense the existing level of ice in the receptacle and stop the operation of the ice maker when the movement of the feeler arm is restrained by the accumulated ice.

There are a number of advantages in being able to mount the ice storage receptacle on the interior surface of the freezer access door or closure member and the ice maker in a stationary position within the freezer compartment. The advantages include increased accessibility to the stored ice and a wider choice in the positioning of the receptacle on the door. However in an ice service of this type, such as that described in the copending application, Ser. No. 866,832 of Philip J. Direci filed Oct. 16, 1969 and assigned to the same assignee as the present invention, a chute is used to transfer ice pieces from the ice maker to the storage receptacle and as the receptacle is remote from the ice maker, the usual feeler arm associated directly with the ice maker cannot be employed for sensing the ice level in the receptacle and stopping the ice maker when the receptacle is filled.

SUMMARY OF THE INVENTION

The present invention is directed to and has as its general object the provision of a household refrigerator including an automatic ice maker mounted in a freezer compartment, a storage receptacle mounted on the freezer door and a movable chute or ice transfer means operatively connected to the ice maker mechanism so that the chute means is employed both to transfer ice pieces from the ice maker to the door mounted ice receptacle and to sense the level of ice in the receptacle and interrupt the operation of the ice maker when the ice receptacle is full.

The illustrated embodiment of the invention comprises a household refrigerator including a freezer compartment having a main access opening closed by a door or

other suitable closure member. An automatic ice maker is supported within the freezer compartment and a receptacle for storing the ice pieces produced by the ice maker is mounted on the interior surface of the door. A chute for receiving ice pieces from the ice maker and transferring them to the receptacle is pivotally mounted on the ice maker and operatively connected to the ice maker operating mechanism to provide a vertical movement of the outlet end of the chute overlying the receptacle during each cycle of operation of the ice maker. The movable chute thereby functions in the same manner as the usual feeler arm structure to stop the operation of the ice maker when movement of the outlet end of the chute is restrained by the ice accumulated in the receptacle. In accordance with the preferred embodiment of the invention, means are also provided for moving the chute to a position in which the operation of the ice maker is also interrupted whenever the receptacle is not in position to receive ice pieces from the chute.

BRIEF DESCRIPTION OF THE DRAWING

In the accompanying drawing:

FIG. 1 is a side elevational view, partly in section of a portion of a household refrigerator including the present invention;

FIG. 2 is a sectional view taken generally along line 2—2 of FIG. 1;

FIG. 3 is a horizontal sectional view taken generally along line 3—3 of FIG. 1; and

FIG. 4 is a perspective view, partly in section, of a portion of the chute operating mechanism of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With particular reference to FIGS. 1, 2 and 3 of the accompanying drawing, the illustrated embodiment of the invention comprises a household refrigerator cabinet including a freezer compartment 1 having an access opening at the front thereof closed by a closure member such as a door 2. An automatic ice maker generally indicated by the numeral 3 is supported on a side wall 4 of the freezer compartment and an ice storage receptacle 5 is mounted on the inner panel 6 of the door 2 forwardly from the ice maker 3 when the door 2 is in its closed position. A chute 7 provides means for transferring ice pieces periodically discharged from the ice maker 3 to the receptacle 5.

The ice maker may be any of the well-known types supplied in household refrigerators for the automatic production of ice pieces. The illustrated ice maker is of the type described in Pat. No. 3,163,017 Baker et al. and Pat. No. 3,163,018 Shaw issued Dec. 29, 1964. Such an ice maker includes a mold 8 including a plurality of cavities 9 in which water is frozen into ice pieces and ejecting means 10 for periodically ejecting the formed ice pieces from the mold. A housing 11 contains the power and control means for automatic operation of the ice maker. These means (not shown) include a motor for operating the ejection means 10 and control and operating means for operating the ice maker through a complete cycle which includes the ejection of ice pieces from the mold, and the refilling of the mold cavities with water. The ice maker also includes a switch 14 forming part of the circuitry for controlling the automatic operation thereof and adapted to stop the operation of the ice maker when the ice storage receptacle is filled.

In accordance with the present invention, the ice level sensing means for operating switch 14 to stop the automatic operation of the ice maker includes the chute 7. To this end, the chute is pivotally supported adjacent its inlet end by means of a pivot pin 15 extending through

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the chute and into the ice maker mold 8 and the forward or discharge end 17 of the chute extends into the receptacle 5 or more specifically is positioned above the body of ice pieces accumulated therein. An arm 18 forming part of the operating mechanism of the ice maker 3 and generally comparable in its operation to the usual feeler arm associated with such ice makers has an end portion 19 slidably extending through an opening 20 in one wall of the chute 7 to connect the chute to the arm. This arm 18, like the usual ice maker feeler arm, is adapted during each cycle of operation of the ice maker to pivot from a lower position to an elevated position and to return to its normal position during each cycle of operation of the ice maker. In the event the arm 18 is unable to return to its normal or lower position, switch 14 is operated to de-energize the ice maker. Through the connection of the arm 18 to the chute 7, the chute is also moved by the arm during each ice maker cycle. Specifically the chute pivots about its pivot point 15 so that the discharge end 17 thereof is raised to its dotted line position as shown in FIG. 1 and returned to its lower full line position during each cycle. In the event that the ice accumulated in the receptacle 5 has reached an elevation such that the chute is unable to return to its lower, full line position, movement of arm 18 is also restrained thereby effecting operation of switch 14 to de-energize and stop the automatic operation of the ice maker. Thus the ice maker will continue to operate to produce ice pieces so long as the chute 7 is in its lower position, or returns to its lower position following an ice delivery cycle.

In order to prevent operation of the ice maker whenever the receptacle 5 is not in position to receive ice pieces from the chute 7, as for example either when the receptacle 5 has been removed from the support on the door 2 or when the door 2 carrying the receptacle is opened, there is provided a mechanism 22 generally supported on the side wall 23 of the cabinet for raising the chute 7 to its upper or stopping position whenever the door is open or the door is closed and the receptacle is not in position.

This mechanism 22 is generally mounted adjacent the front edge of the cabinet wall 23 or more specifically in the area of the breaker strip 25. It comprises a lever 26 bent to include one end or arm 27 extending forwardly through a suitable opening in the breaker strip 25 at a point where this arm will normally be engaged by an end wall 28 of the receptacle 25 when the receptacle is in position on the door 2 and the door is closed. The lever 26 also includes a second arm 29 extending through the breaker strip 25 at slightly below the bottom of the chute 7. The lever 26 is pivotally mounted within the wall 23 for movement about a pivot pin 30. When the door 2 supported on the hinges 31 is closed, the end wall 28 of the receptacle 5 is in engagement with the arm 27 thereby depressing the lever arm 29 to a position in which it is out of engagement with the chute 5. Upon removal of the receptacle 5 or opening of the door 2, the lever 26 is free to rotate in a counterclockwise position as viewed in FIG. 2 of the drawing, under the biasing action of a spring 33. The arm 29 will then lift the chute to its dotted line position in which operation of the ice maker is prevented. Closing of the door 2 with the receptacle 3 properly mounted thereon will again cause the ice maker to operate unless the ice contained within the receptacle prevents the chute from dropping to its lower position.

An additional function of the lever 26 is to elevate the forward end 17 of the chute during periods when the door is open so that upon closing of the door, the chute end will clear the adjacent top edge 34 of the receptacle.

While there has been shown and described a specific embodiment of the present invention, it is to be understood that it is not limited thereto and it is intended by the appended claims to cover all such modifications as fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

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1. A refrigerator cabinet comprising a freezer compartment having an access opening and a closure member for closing said opening;

an automatic ice maker in said compartment including operating means for periodically operating said ice maker through a cycle of operation including the discharge of ice pieces from said ice maker;

an ice storage receptacle positioned on the inner side of said closure member;

an ice transfer means pivotally mounted on said ice maker for receiving ice pieces discharged by said ice maker and conveying said ice pieces to said receptacle when said closure member is in its closed position;

said transfer means including an ice level sensing portion at the outlet end thereof positioned to be engaged by ice pieces stored in said receptacle when said receptacle is full and being operatively connected to said ice maker operating means for pivotal movement of said transfer means away from the stored ice during a cycle of operation of said ice maker;

and means for stopping automatic operation of said ice maker upon restraint of return movement of said transfer means by contact of said sensing portion with the ice pieces in said receptacle.

2. The refrigerator of claim 1 in which said movement is in a vertical direction.

3. The refrigerator of claim 2 including means for preventing discharge of ice pieces from said ice maker when said receptacle is not in position to receive ice pieces from said transfer means.

4. A refrigerator cabinet comprising a freezer compartment having an access opening and a closure member for normally closing said opening;

an automatic ice maker supported within said compartment and including operating means for periodically operating said ice maker through a cycle including the discharge of ice pieces from said ice maker;

an ice storage receptacle supported on said closure member;

means for transferring ice pieces from said ice maker to said receptacle when said closure member is closed and for interrupting operation of said ice maker when said receptacle is full comprising an ice chute for receiving ice pieces produced by said ice maker and having an outlet end portion normally extending into said receptacle and means for raising said end portion of said chute by said ice maker operating means during each cycle of operation of said ice maker;

and means for stopping operation of said ice maker when said end portion is restrained from returning to its normal position by ice pieces accumulated in said receptacle.

5. The refrigerator cabinet of claim 4 in which said chute is pivotally mounted on said ice maker.

6. The refrigerator cabinet of claim 5 including means for raising said chute end portion whenever said receptacle is not in position to receive ice pieces from said chute.

References Cited

UNITED STATES PATENTS

2,934,912	5/1960	Rodgers	62—137
3,021,686	2/1962	Alt	62—344 X
3,308,632	3/1967	Winfield, Jr.	62—137
3,331,215	7/1967	Shaw	62—137

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U.S. Cl. X.R.

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