

May 16, 1944.

A. D. SIEDLE

2,348,860

REFRIGERATION

Filed June 25, 1941

2 Sheets-Sheet 1

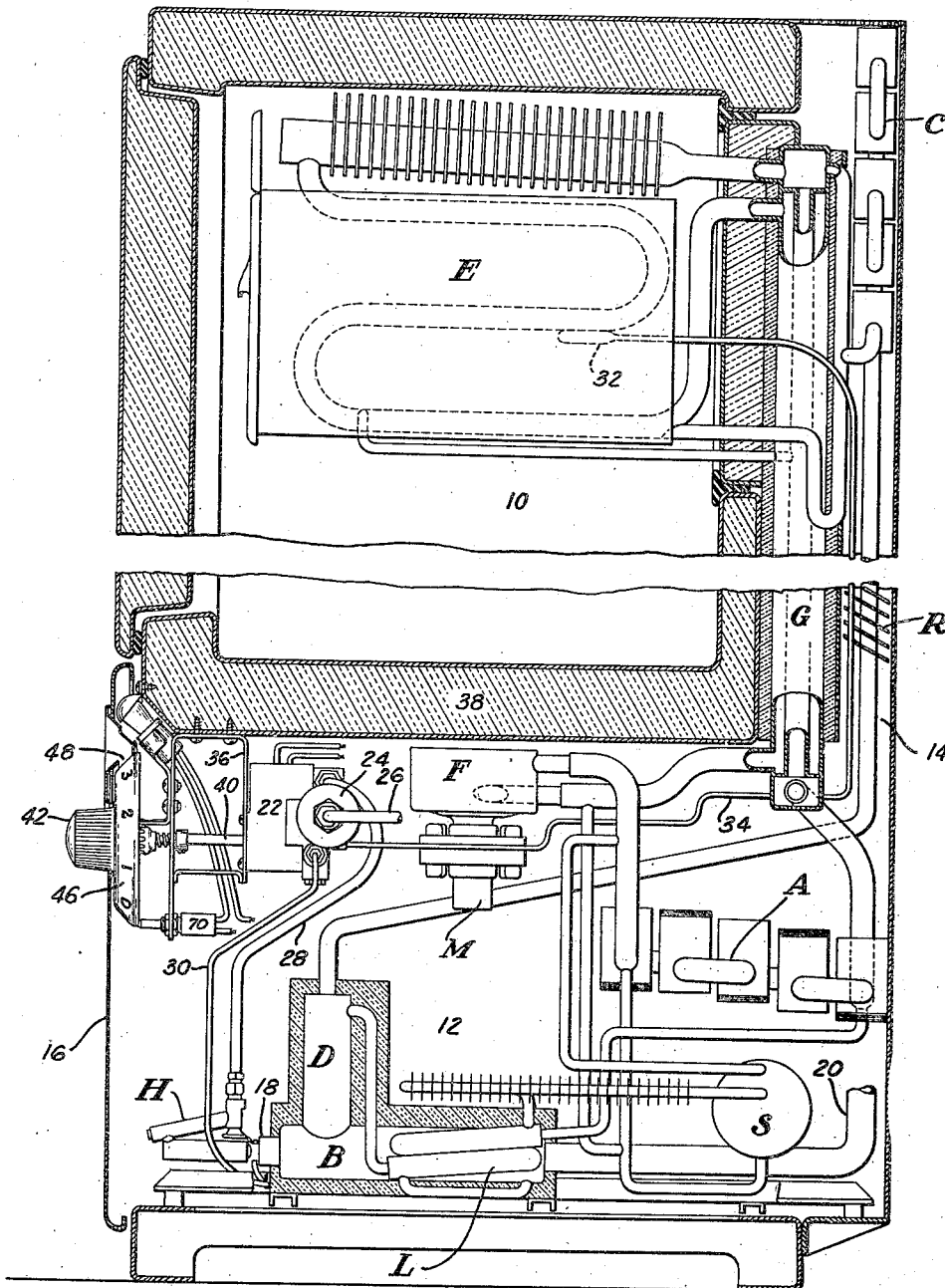


Fig. 1

INVENTOR
Arnold D. Siedle
BY
Harry J. Duvarre
ATTORNEY

May 16, 1944.

A. D. SIEDLE

2,348,860

REFRIGERATION

Filed June 25, 1941

2 Sheets-Sheet 2

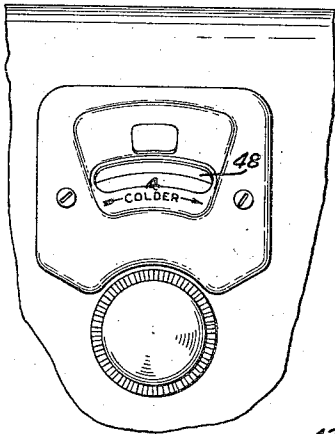


Fig. 3

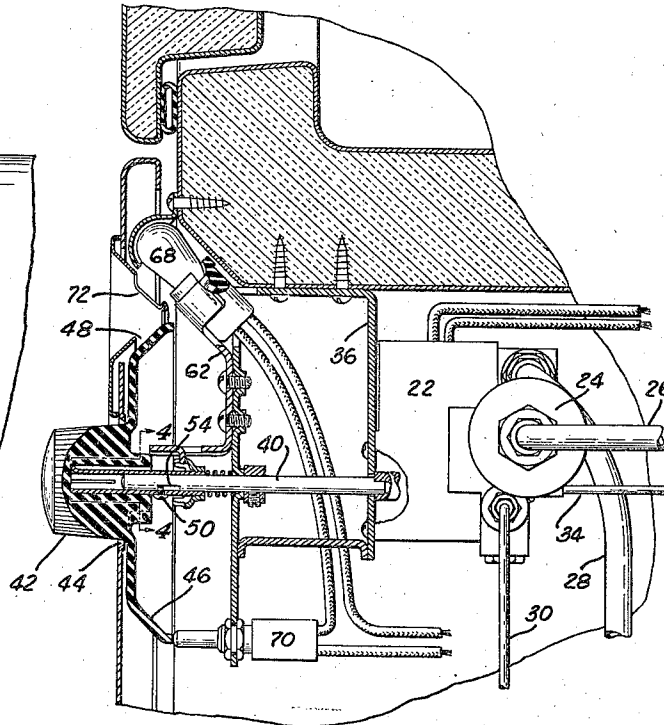


Fig. 2

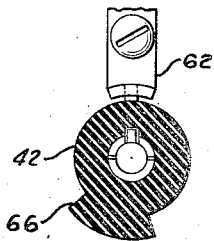


Fig. 4

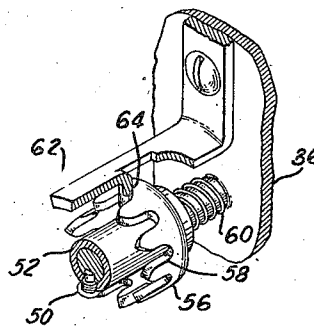


Fig. 5

INVENTOR
Arnold D. Siedle
BY
Harry S. Duane
ATTORNEY

UNITED STATES PATENT OFFICE

2,348,860

REFRIGERATION

Arnold D. Siedle, Cleveland Heights, Ohio, assignor to The Hoover Company, North Canton, Ohio

Application June 25, 1941, Serial No. 399,631

16 Claims. (Cl. 62-5)

This invention relates to refrigeration and more particularly to the positioning of the manual control knob for a gas-fired refrigerator in a position adjacent to the gas burner and also in a position where it will be readily accessible for manual operation.

In present day household refrigerators, it is usual practice to provide a manual control knob so that the evaporator temperature can be regulated for fast freezing or defrosting or otherwise adjusted as desired.

It is also usual practice to mount the control knob on the evaporator casing on the interior of the food storage compartment. In such a case, the control mechanism is usually mounted adjacent to the knob so that the control knob may be directly connected to the control adjusting mechanism.

In compression refrigerating apparatus, this presents no serious difficulties since it is only necessary to lead electrical conductors from the control switch positioned on the evaporator casing to the compressor motor.

However, in gas operated refrigerators a serious difficulty presents itself since the gas valve must be operated by the control and the gas burner must be positioned in the apparatus compartment beneath the food storage compartment adjacent to the generator.

In the past, movement has been transmitted from the control knob to the control for the gas valve by complicated motion transmitting mechanisms, such as pulleys and ropes, etc., as exemplified by the United States patent to Smith 2,207,701 of July 16, 1940, or by positioning the gas valve and control directly back of the control knob mounted on the evaporator casing and directly connecting the knob to the control adjusting mechanism as is exemplified by the United States patent to Kitto et al. 2,203,497 of June 4, 1940.

In the former case, it is necessary to provide an expensive and complicated movement transmitting mechanism from the control knob to the gas valve control which mechanism is likely to get out of order during use.

In the latter case, it is necessary to provide a gas pipe from adjacent to the floor up to the gas valve and from the gas valve down again to the gas burner in the apparatus compartment. If a pilot light is provided, as is usual, it is also necessary to provide a pilot tube from the gas valve down to the gas burner in the apparatus compartment.

It is therefore an object of this invention to

obviate the above disadvantages and to position the control for the gas valve of a gas-fired refrigerator in the apparatus compartment beneath the food storage compartment adjacent to the gas burner with the manual control knob directly connected to the control and accessible from the exterior of the apparatus compartment.

In domestic refrigerating apparatus, it is usual practice to provide a control knob with indicia to indicate the position in which the control is set.

It is another object of this invention to provide a control knob for a domestic refrigerator in which the indicia carrying member is located on the interior of the apparatus compartment door with the indicia thereon visible through an opening in the apparatus compartment door.

When the control knob of a domestic refrigerator is readily accessible near the floor in the reach of children, it is necessary to provide some means to prevent casual operation thereof. Otherwise, children might tamper with the control and set it at some undesirable control setting.

It is therefore another object of this invention to position the control knob of the domestic refrigerator so as to be readily accessible from the exterior of the apparatus compartment beneath the food storage compartment and to provide means for preventing casual operation thereof.

Sometimes domestic refrigerator cabinets are placed in dark corners. When the control knob is positioned to be accessible from the exterior of the apparatus compartment beneath the food storage compartment, the indicia thereon would not be readily visible in such a case.

It is another object of this invention, therefore, to provide illuminating means for the indicia-carrying member of the control knob of a domestic refrigerator.

When means is provided for illuminating the indicia-carrying member of the control knob of a domestic refrigerator, some means should be provided for energizing the illuminating means only when the control setting is being changed.

It is therefore another object of this invention to provide means actuated by the control knob of a domestic refrigerator for energizing the illuminating means for the indicia-carrying member of the control knob.

Other objects and advantages of this invention will become apparent as the description proceeds when taken in connection with the accompanying drawings in which:

Figure 1 depicts a domestic refrigerator cab-

inet with an absorption refrigerating apparatus positioned therein. Certain parts of the refrigerating apparatus are positioned in an apparatus compartment beneath the food storage compartment and the control mechanism of this invention is applied thereto;

Figure 2 discloses an enlarged view of a control mechanism according to this invention; and

Figures 3, 4 and 5 disclose details of the control mechanism according to this invention.

Referring to Figure 1, the domestic refrigerator cabinet comprises a food storage compartment 10 and an apparatus compartment. The apparatus compartment comprises a chamber 12 located beneath the food storage compartment 10 and a flue 14 for inducing a flow of air over the heat rejecting parts of the apparatus. The compartment 12 may be open at the bottom to provide for the entrance of cooling air and is provided with a door 16 for closing the front of the compartment.

The gas-fired refrigerator which is assembled with the cabinet of Figure 1 is a three-fluid absorption refrigerating system comprising a generator, including a boiler B, an analyzer D, an air-cooled rectifier R, a tubular air-cooled condenser C, and evaporator E, a gas heat exchanger G, a tubular air-cooled absorber A, a solution reservoir S, a liquid heat exchanger L, and a circulating fan F which is driven by an electric motor M. The above described elements are interconnected by various conduits to form a plurality of gas and liquid circuits constituting a complete refrigerating system.

The construction and operation of this system is shown and described in detail in the United States patent to Coons et al. 2,239,143 of April 22, 1941. The particular system disclosed forms no part of the present invention and will not be described in detail herein.

The location of the various parts of the refrigerating apparatus in the apparatus compartment is substantially the same as that shown and described in my application Serial No. 248,699 filed December 31, 1938, and which matured on Feb. 9, 1943, into Patent No. 2,310,875, with the exception that in this application the motor fan unit is mounted in the compartment 12 beneath the food storage compartment rather than in the air flue at the rear of the cabinet.

The boiler B is provided with a central combustion flue 18 having an extension 20, which in actual construction, is extended to the top of the air flue 14 for the disposition of the products of combustion.

The boiler B is heated by burner H of well known construction. The flow of gas to the burner H and electricity to the motor M is controlled by a control mechanism 22 which may be of any desired construction but is preferably of the type disclosed and claimed in the United States Patent to Kitto et al., No. 2,203,497 of June 4, 1940.

As in the Kitto et al. patent, the gas valve 24 is mounted on the casing of the control 22 so as to be directly actuated thereby.

The valve 24 is supplied with gas from the gas main by conduit 26 and conduit 28 connects the outlet of the valve 24 to the burner H. A conduit 30 leads from the casing of the valve 24 to provide a pilot flame for the burner H as is well known in the art. For cycling operation, the control 22 is connected to a bulb 32 positioned against the coils of the evaporator E, by a con-

duit 34 of small diameter. The bulb 32 and conduit 34 are filled with an expansible fluid as is well known in the art. The expansion and contraction of the fluid in the bulb 32, by changes in temperature of the evaporator E, operates to cyclically energize the motor M and supply gas to the burner H as is fully described in the patent to Kitto et al. above referred to.

The control 22 is mounted on a U-shaped bracket 36 having its closed end secured to the insulated wall 38 which separates the food storage compartment 10 from the compartment 12, adjacent the front of the compartment 12 immediately behind the apparatus compartment door 16.

Extending forwardly from the control 22 through the legs of the bracket 36 is a shaft 40 which is directly connected to the adjusting mechanism for the control 22. Mounted for sliding movement on the forward end of the shaft 40 is a control knob 42 which extends through an opening 44 in the door 16 of the apparatus compartment.

The knob 44 carries a dish-shaped disc 46 positioned on the inside of the apparatus compartment door 16. On its outer face the disc carries suitable indicia, as seen in Figure 1, to indicate the various settings for the control. A single indicia is visible through the opening 48 in the apparatus compartment door 16 for any particular setting of the control knob.

The shaft 40 is constrained to rotate with the knob 42 by means of a screw 50 extending through the sleeve 52 which is rigidly attached to the knob 42. The end of the screw 50 extends into an elongated groove 54 in the shaft 40 so that the knob 42 can be reciprocated on the shaft 40 but the shaft 40 will rotate with the knob 42 as it is rotated in either direction.

Rigidly secured to the inner end of the sleeve 52 is an outwardly facing cup-shaped member 56, the rim of which is provided with a plurality of notches 58 corresponding in number to the number of control positions of the control knob 42. The knob 42, sleeve 52 and the cup-shaped member 56 are biased outwardly by a coiled spring 60 which surrounds the shaft 40 and abuts against the front leg of the bracket 36.

Struck outwardly from an L-shaped bracket 62, secured to the front leg of bracket 36 is a lug 64 which is adapted to enter any one of the notches 58 and prevent rotation of the knob 42 until it is pushed rearwardly against the action of the spring 60 a sufficient distance that the lug 64 will clear the ends of the notches 58. A lug 66 extends radially from the inner end of knob 42 and cooperates with bracket 62 to limit rotation of the control knob 42 in either direction.

In order to illuminate the indicia on the front of the dish-shaped disc 46, a light bulb 68 is mounted in a socket in an upwardly and forwardly extended extension of bracket 62. In order to control the flow of current to the bulb 68, a push-button switch 70 is mounted on a downward extension of the front leg of bracket 36. The rim of the dish-shaped disc 46 contacts with the operating button of the switch 70 so that when the control knob is pushed inwardly to operate the control, the bulb is energized. The bulb 68 is mounted behind the apparatus compartment door 16 which door is provided with an opening 72 so positioned that the light rays from the bulb 68 will fall on the

indicia on the front of the disc 46, when the bulb is energized.

Bulb 68, switch 70, the switch of the control 22 and the motor M may be connected to a power line, by electrical conductors as shown, in any suitable and well known manner.

From the foregoing, it can be seen that this invention provides for the positioning of the control for the burner of a gas operated refrigerator in which the control is positioned adjacent the burner and yet is readily accessible for operation whereby it is unnecessary to provide a complicated operating mechanism for the gas valve or to position the gas valve in a position remote from the burner. This renders it unnecessary to provide a complicated movement transmitting mechanism or added gas pipes.

It also can be seen that this invention provides a control positioned on the interior of the apparatus compartment below the food storage compartment of a domestic refrigerator with a manual control knob readily accessible from the exterior of the apparatus compartment, with means to prevent casual operation of the control knob and means actuated by the control knob for illuminating the indicia on the control knob so that it is a simple and convenient matter to adjust the control and at the same time prevent casual operation thereof by children.

While I have shown but a single embodiment of my invention, it is to be understood that this embodiment is to be taken as illustrative only and not in a limiting sense. I do not wish to be limited to the particular structure shown and described, but to include all equivalent variations thereof except as limited by the claims.

I claim:

1. In a gas operated refrigerator of the type having a cabinet with an upper food storage compartment and a lower apparatus compartment with a front closure therefor, a gas-fired refrigerator associated therewith having the gas burner therefor positioned in the apparatus compartment, an adjustable control for the gas supplied to the burner and an axially movable manually operated member for adjusting the control, that improvement which consists in positioning the adjustable control for the gas supply in the apparatus compartment adjacent to the gas burner with the manually operated member directly connected thereto and positioned to be readily accessible from the exterior of the closure member for the apparatus compartment and releasable means associated with the manually operated member and releasable by axial movement thereof to prevent casual operation thereof.

2. In a gas operated refrigerator of the type having a cabinet with an upper food storage compartment and a lower apparatus compartment with a front closure therefor, a gas-fired refrigerator associated therewith having the gas burner therefor positioned in the apparatus compartment, an adjustable control for the gas supplied to the burner and a manually operated member for adjusting the control, that improvement which consists in positioning the adjustable control for the gas supply in the apparatus compartment adjacent to the gas burner with the manually operated member directly connected thereto and positioned to be readily accessible from the exterior of the closure member for the apparatus compartment, releasable means associated with the manually operated

member to prevent casual operation thereof and means operated by said manually operated member for illuminating said manually operated member.

3. A refrigerating apparatus comprising, a cabinet having an upper food storage compartment and a lower apparatus compartment, a three-fluid absorption refrigerator associated with said cabinet, said refrigerator comprising a generator, an absorber, an evaporator, an inert gas circuit between the absorber and evaporator including said absorber and evaporator and electrically operated means for circulating an inert gas in said inert gas circuit, said generator and electrically operated means being positioned in said apparatus compartment, a gas burner adjacent said generator, an adjustable control for controlling the supply of gas to said burner and electricity to said electrically operated means, positioned in said apparatus compartment adjacent to said burner and said electrically operated means, and a manually operated member for adjusting said control directly connected to said control and positioned to be readily accessible from the exterior of said apparatus compartment.

4. A refrigerating apparatus comprising, a cabinet having an upper food storage compartment and a lower apparatus compartment, a three-fluid absorption refrigerator associated with said cabinet, said refrigerator comprising a generator, an absorber, an evaporator, an inert gas circuit between the absorber and evaporator including said absorber and evaporator and electrically operated means for circulating an inert gas in said inert gas circuit, said generator and electrically operated means being positioned in said apparatus compartment, a gas burner adjacent said generator, an adjustable control for controlling the supply of gas to said burner and electricity to said electrically operated means, positioned in said apparatus compartment adjacent said burner and said electrically operated means, a manually operated member for adjusting said control directly connected to said control and positioned to be readily accessible from the exterior of said apparatus compartment, and means associated with said manually operated member for preventing casual operation thereof.

5. A refrigerating apparatus comprising, a cabinet having an upper food storage compartment and a lower apparatus compartment, a three-fluid absorption refrigerator associated with said cabinet, said refrigerator comprising a generator, an absorber, an evaporator, an inert gas circuit between the absorber and evaporator including said absorber and evaporator and electrically operated means for circulating an inert gas in said inert gas circuit, said generator and electrically operated means being positioned in said apparatus compartment, a gas burner adjacent said generator, an adjustable control for controlling the supply of gas to said burner and electricity to said electrically operated means positioned in said apparatus compartment adjacent said burner and said electrically operated means, a manually operated member for adjusting said control directly connected thereto and positioned to be readily accessible from the exterior of said apparatus compartment, and releasable means operated by said manually operated member for preventing casual operation thereof.

6. A refrigerating apparatus comprising a cabinet having an upper food storage compartment

and a lower apparatus compartment with a front closure therefor; controllable means positioned in said apparatus compartment, an adjustable control for said controllable means in said apparatus compartment adjacent to said controllable means, a manually operated member for adjusting said control directly connected thereto and extended through said front closure so as to be readily accessible from the exterior of said apparatus compartment, releasable means associated with said manually operated member to prevent casual operation thereof and means operated by said manually operated member for illuminating the same, said releasable means and illuminating means being simultaneously operable by said manually operated member.

7. A refrigerator including a cabinet having an apparatus compartment with a front closure therefor, an adjustable control in said apparatus compartment, a manually operated member for adjusting said control directly connected thereto and extending through an opening in said front closure member, said manually operated member having an indicia carrying member behind said front closure and visible through a second opening therein.

8. A refrigerator including a cabinet having an apparatus compartment with a front closure therefor, an adjustable control in said apparatus compartment, a manually operated member for adjusting said control directly connected thereto and extending through an opening in said front closure, said manually operated member having an indicia carrying member positioned behind said front closure and visible through a second opening therein and releasable means operated by said manually operated member for preventing casual operation thereof.

9. A refrigerator including a cabinet having an apparatus compartment with a front closure therefor, an adjustable control in said apparatus compartment, a manually operated member for adjusting said control directly connected thereto and extending through an opening in said front closure, said manually operated member having an indicia carrying member positioned behind said front closure and visible through a second opening therein and illuminating means positioned rearwardly of said front closure so as to illuminate said indicia carrying member through a third opening in said front closure.

10. A refrigerator including a cabinet having an apparatus compartment with a front closure therefor, an adjustable control in said apparatus compartment, a manually operated member for adjusting said control directly connected thereto and extending through an opening in said front closure, said manually operated member having an indicia carrying member positioned behind said front closure and visible through a second opening therein, releasable means for preventing casual operation of said manually operated member and illuminating means for said manually operated member, said manually operated member being operable to simultaneously release said releasable means and to energize said illuminating means.

11. In a gas operated refrigerator of the type having a cabinet with an upper food storage compartment and a lower apparatus compartment with a front closure therefor, a gas-fired refrigerator associated therewith having the gas burner therefor positioned in the apparatus compartment, an adjustable control for the gas supply

to the burner and a manually operated member for adjusting the control, that improvement which consists in positioning the adjustable control for the gas supply in the apparatus compartment adjacent to the gas burner with the manually operated member directly connected thereto and positioned to be readily accessible from the exterior of the closure member for the apparatus compartment, means associated with the manually operated member to prevent casual operation thereof and means operable upon release of said releasable means for illuminating said manually operated member.

12. In a gas operated refrigerator of the type having a cabinet with an upper food storage compartment and a lower apparatus compartment with a front closure therefor, a gas-fired refrigerator associated therewith having the gas burner therefor positioned in the apparatus compartment, an adjustable control for the gas supplied to the burner and a manually operated member for adjusting the control, that improvement which consists in positioning the adjustable control for the gas supply in the apparatus compartment adjacent to the gas burner with the manually operated member directly connected thereto and positioned to be readily accessible from the exterior of the closure member for the apparatus compartment, releasable means for preventing casual operation of said manually operated member and illuminating means for said manually operated member, said manually operated member being operable to simultaneously operate said releasable means and to energize said illuminating means.

13. A refrigerating apparatus comprising, a cabinet having an upper food storage compartment and a lower apparatus compartment, a three-fluid absorption refrigerator associated with said cabinet, said refrigerator comprising a generator, an absorber, an evaporator, an inert gas circuit between the absorber and evaporator including said absorber and evaporator, and an electrically operated means for circulating an inert gas in said inert gas circuit, said generator and said electrically operated means being positioned in said apparatus compartment, a gas burner adjacent to said generator, an adjustable control for controlling the supply of gas to said burner and electricity to said electrically operated means, positioned in said apparatus compartment adjacent said burner and said electrically operated means, a manually operated means for adjusting said control directly connected thereto and positioned to be readily accessible from the exterior of said apparatus compartment, releasable means for preventing casual operation of said manually operated member, and illuminating means for said manually operated member, said manually operated member being operable to simultaneously operate said releasable means and to energize said illuminating means.

14. The refrigerating apparatus comprising, a cabinet having an upper food storage compartment and a lower apparatus compartment with a front closure therefor, a refrigerating system associated with said cabinet having controllable means positioned in said apparatus compartment, an adjustable control for said controllable means in said apparatus compartment adjacent thereto, a manually operated member for adjusting said control directly connected thereto and extending through said front closure so as to be readily accessible from the exterior of said apparatus compartment, releasable means associ-

ated with said manually operated member to prevent casual operation thereof and means operated by said manually operated member for illuminating the same.

15. A three fluid absorption refrigerating apparatus comprising a cabinet having an apparatus compartment positioned below the food storage compartment, a generator for said apparatus in said apparatus compartment, a gas burner for heating said generator in said apparatus compartment, an adjustable control for supplying gas to said gas burner positioned in said apparatus compartment adjacent thereto, a front closure for said apparatus compartment, axially movable and rotatable manually controllable means for adjusting said control directly connected thereto and extending through an opening in said front closure so as to be readily accessible from the exterior of said apparatus compartment and means for preventing casual operation of said manually controllable means, said last named means being releasable by axial movement of said manually controllable means.

16. A three fluid absorption refrigerating apparatus comprising a cabinet having an apparatus compartment positioned below the food storage compartment, a generator for said apparatus in said apparatus compartment, a gas burner for heating said generator in said apparatus compartment, an adjustable control for supplying gas to said gas burner positioned in said apparatus compartment adjacent thereto, a front closure for said apparatus compartment, manually controllable means for adjusting said control directly connected thereto and extending through an opening in said front closure so as to be readily accessible from the exterior of said apparatus compartment, means for preventing casual operation of said manually controllable means, said last named means being operable by said manually controllable means and means operable by said manually controllable means for illuminating the same.

ARNOLD D. SIEDLE.