The invention relates to certain new and useful improvements for refrigerators of the general type exemplified by Letters Patent No. 1,893,769, issued January 10, 1933, and Nos. 2,004,691 and 2,004,692, issued June 11 1933 which use a cooling coil or evaporator for chilling the air within the cabinet. These refrigerators usually have been operated by electrically driven compressor systems, such as the well known "Frigidaire" system.

My present invention has for its object to provide a refrigerating unit which employs ice and salt-brine and is designed so that it may be set against the refrigerator cabinet as a distinct unit and coupled up with the cooling coil or evaporator of the refrigerator to circulate cold brine through the same by forced circulation under thermostatic control.

Further, it is the object of the invention to provide an ice unit to take the place of the refrigerating machines now commonly employed, especially in localities where ice and salt-brine may be used economically.

Generically the invention consists in providing a box containing a suitably insulated tank for the reception of ice and salt-brine, and also containing an electrically driven motor and brine circulating pump and brine circulating pipes adapted for connection with the usual refrigerating coil of the refrigerator, provisions being made to insure an effective circulation of the brine, and provisions also being made for draining off excess brine created by the melting of the ice.

Other objects of the invention will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends, the invention still further resides in the novel details of construction, combination and arrangement of parts, all of which will be faithfully described in the following detailed description, and then be particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which:

- Figure 1 is a vertical longitudinal section of the invention associated with a refrigerator of the kind described in my patents aforesaid, so much of the interior of the structure of the refrigerator being shown as may be necessary to the understanding of the present invention, and being indicated in dotted lines.
- Figure 2 is a horizontal section on the line 2—2 of Figure 1.
- Figure 3 is a detail section on the line 3—3 of Figure 2.
- Figure 4 is a detail section on line 4—4 of Figure 2.

In the drawings, in which like numerals indicate like parts in all the figures, 1 represents the refrigerating coil 32; 41 represents the return air duct (see Patent No. 2,004,692); 25 indicates the blower or air circulator and 28 the motor for driving the blower. These parts, i.e., 1, 32, 25 and 28, are numbered the same as in Patent No. 2,004,692, for convenience of reference.

The present invention comprises a casing or box 2 having a vertical cross partition 3 to divide the box into two chambers, one of which is provided with a brine tank 4 and in a suitable insulating lining 5, and there is provided a lid or top door 6, also lined at 7 and insulated at 8.

The other chamber or compartment of the box 2 serves as a chamber for the motor 15 and brine circulating pump 8. The motor has its circuit wires 11 connected to a thermostatically controlled switch 12 which may be mounted on the wall of the refrigerator against which the casing 2 is set, the wall of the refrigerator serving, in the embodiment of the invention illustrated, as the closure for the motor-pump chamber.

13 is a thermostatic bulb which is preferably located in the return air duct 45 and connected in the usual manner with the switch 12 to control the operation thereof.

From the pump 8 a return line pipe 14 leads to the brine tank 4 and preferably delivers into the overflow pipe 15, the latter being provided with overflow receiving apertures 16. The overflow pipe 15 communicates with the overflow pipe 33 by which the overflow brine is conducted away from the apparatus.

17 designates the floor of the casing which is also insulated at 18 and provided with a bottom lining 36. 26 designates what I term the inlet line for conveying cold brine from the tank to the inlet end 21 of the cooling coil 32 of the refrigerator. The entrance end of the inlet line within the brine tank is shielded at 19, the shield being perforated at 35 adjacent the entrance end of the pipe 33, which entrance end is provided with a suitable strainer 24 of relatively fine mesh.

The outlet end 32 of the refrigerating coil 32 is connected with the return line 23 to the pump 8.

The motor 10 and pump 8 are mounted on a base 25 that is, in turn, supported on the floor 37 by an interposed insulation 29 of cork to deaden the sound of the motor and pump. 31 is a gasket carried by the lid 7 to prevent entrance of heated air into the brine tank.

The overflow pipe 33 where it passes through the brine is suitably insulated as at 34 in order not to conduct heat into the cold brine within the tank.

In practice the unit constituting the present invention is made in a suitable size to function properly with a counter such as that described in Patent No. 2,004,692; for example, the present unit has a capacity of about five hundred pounds.
of cracked ice and about eight to ten per cent of coarse ice-cream salt is used. The brine water \( W \) is maintained at a depth of about fifteen inches. Assume the tank to be supplied with ice and water, as indicated at \( S \) in Fig. 1, and connected up as a trap-seal. When the pump is in operation it will cause cold brine to be drawn from the tank through the coils 32 and the warm brine returned to the tank through the return lines. The returned brine is deposited in the tank at a place remote from that where the cold brine is taken in. Preferably the warm brine is deposited adjacent the waste pipe, and more preferably it is deposited into the overflow trap 15 so that as much as possible of the returned warm brine is carried off by the waste pipe and as little as possible of the cold brine overflows through the waste pipe.

The thermostatic bulb, when inserted in the return air duct of the refrigerator, so regulates the action of the motor that the brine pump runs for about fifteen minutes, which cools the refrigerator cabinet sufficiently to throw the switch, and then the brine pump stands idle from about forty-five minutes to an hour.

Of course, modifications in the timing of the operation, as well as modifications in the arrangement of parts, may be made without departing from the spirit of the invention or the scope of the appended claims.

What I claim is:

1. A brine cooling and circulating unit for refrigerating cabinets having cooling coils; said unit comprising a case, said case having two chambers one of which is provided with a heat insulated tank to receive ice and salt-brine, a brine circulating pump and a motor for driving the same located in the other of said chambers, a pipe for conducting cold brine from said tank to the cooling coil of the refrigerator, a pipe from said cooling coil of the refrigerator to said pump, a return flow pipe from said pump to said tank, and means to control the operation of said motor according to the temperature within the refrigerator.

2. A brine cooling and circulating unit for refrigerating cabinets having cooling coils; said tank comprising a case, said case having two chambers one of which is provided with a heat insulated tank to receive ice and salt-brine, a brine circulating pump and a motor for driving the same located in the other of said chambers, a pipe for conducting cold brine from said tank to the cooling coil of the refrigerator, a pipe from said cooling coil of the refrigerator to said pump, a return flow pipe from said pump to said tank, and means to control the operation of said motor according to the temperature within the refrigerator.

3. A brine cooling and circulating unit for refrigerating cabinets having cooling coils; said unit comprising a case, said case having two chambers one of which is provided with a heat insulated tank to receive ice and salt-brine, a brine circulating pump and a motor for driving the same located in the other of said chambers, a pipe for conducting cold brine from said tank to the cooling coil of the refrigerator, a pipe from said cooling coil of the refrigerator to said pump, a return flow pipe from said pump to said tank, and means to control the operation of said motor according to the temperature within the refrigerator.

4. A brine cooling and circulating unit for refrigerating cabinets having cooling coils; said unit comprising a case, said case having two chambers one of which is provided with a heat insulated tank to receive ice and salt-brine, a brine circulating pump and a motor for driving the same located in the other of said chambers, a pipe for conducting cold brine from said tank to the cooling coil of the refrigerator, a pipe from said cooling coil of the refrigerator to said pump, a return flow pipe from said pump to said tank, and means to control the operation of said motor according to the temperature within the refrigerator.

5. A brine cooling and circulating unit for refrigerating cabinets having cooling coils; said unit comprising a case, said case having two chambers one of which is provided with a heat insulated tank to receive ice and salt-brine, a brine circulating pump and a motor for driving the same located in the other of said chambers, a pipe for conducting cold brine from said tank to the cooling coil of the refrigerator, a pipe from said cooling coil of the refrigerator to said pump, a return flow pipe from said pump to said tank, and means to control the operation of said motor according to the temperature within the refrigerator.

6. A brine cooling and circulating unit for refrigerating cabinets having cooling coils; said unit comprising a case, said case having two chambers one of which is provided with a heat insulated tank to receive ice and salt-brine, a brine circulating pump and a motor for driving the same located in the other of said chambers, a pipe for conducting cold brine from said tank to the cooling coil of the refrigerator, a pipe from said cooling coil of the refrigerator to said pump, a return flow pipe from said pump to said tank, and means to control the operation of said motor according to the temperature within the refrigerator.

7. A brine cooling and circulating unit for refrigerating cabinets having cooling coils; said unit comprising a case, said case having two chambers one of which is provided with a heat insulated tank to receive ice and salt-brine, a brine circulating pump and a motor for driving the same located in the other of said chambers, a pipe for conducting cold brine from said tank to the cooling coil of the refrigerator, a pipe from said cooling coil of the refrigerator to said pump, a return flow pipe from said pump to said tank, and means to control the operation of said motor according to the temperature within the refrigerator.

GEORGE E. FRIEDRICH.