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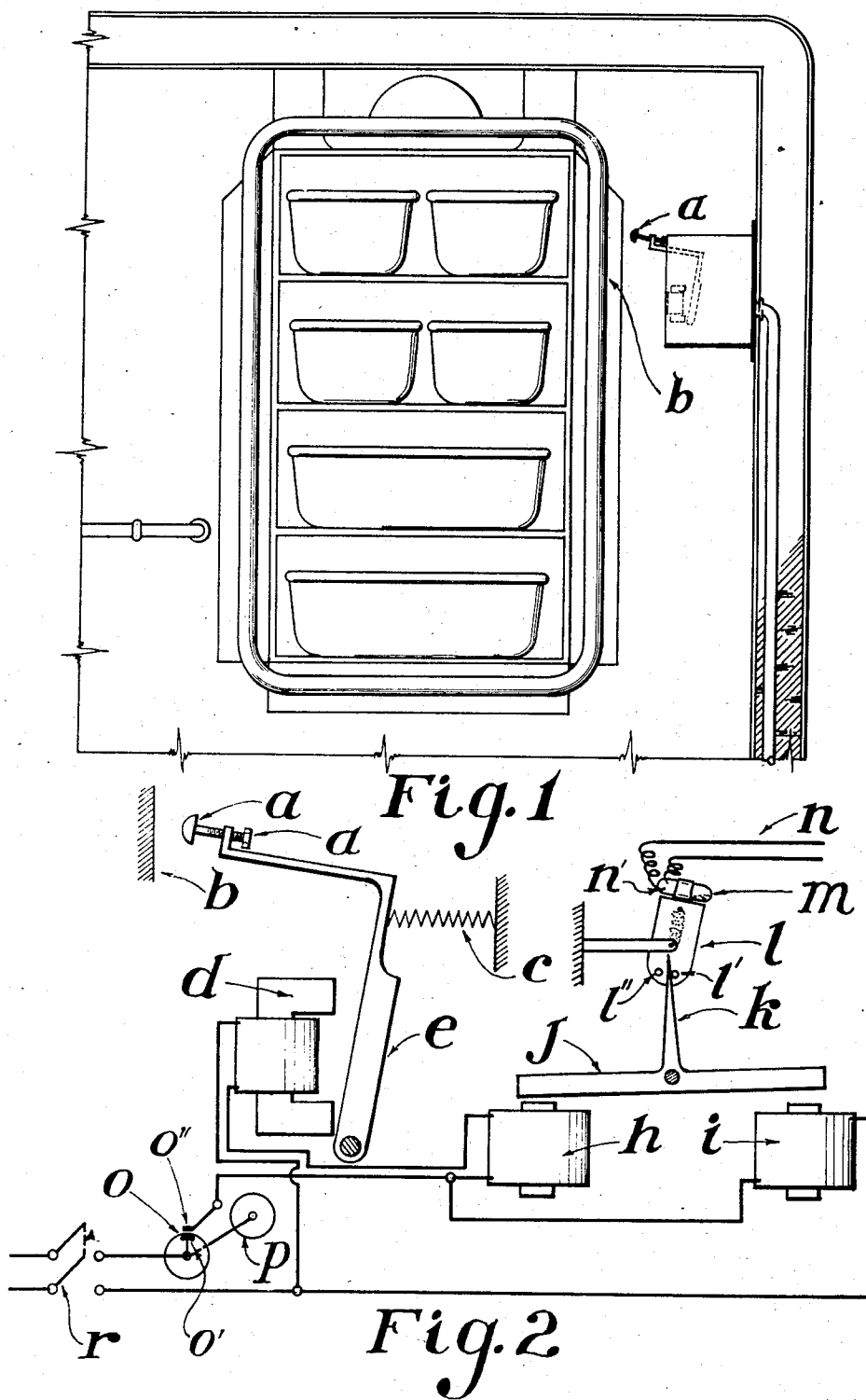
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2,229,181

DEFROSTER FOR REFRIGERATING SYSTEMS

Filed April 20, 1937

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

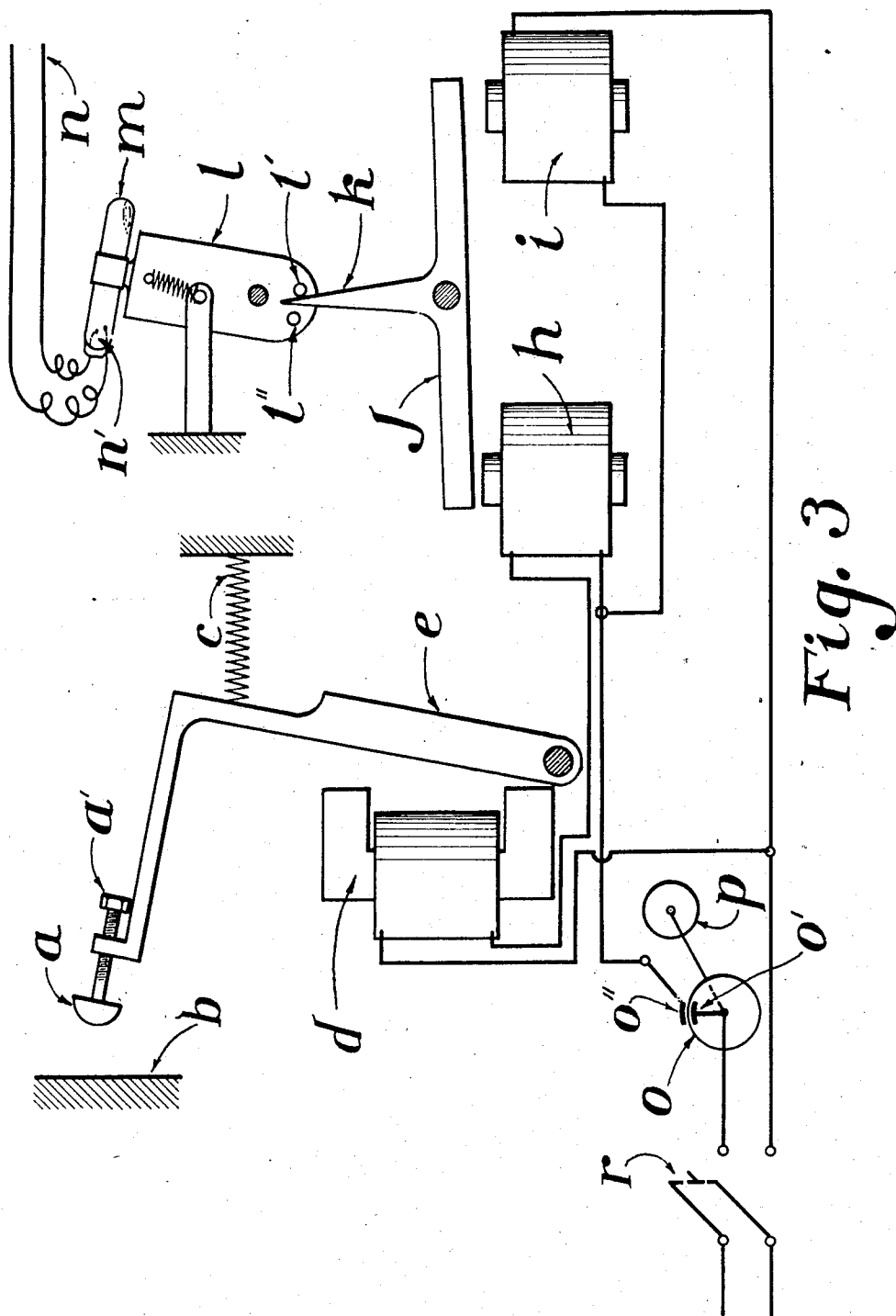


Fig. 3

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DEFROSTER FOR REFRIGERATING
SYSTEMS

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1 Claim. (Cl. 62-4)

This invention relates to improvements in defrosters for refrigerating systems.

In the ordinary household refrigerators the cooling elements become covered with ice or frost after the apparatus has been operated for varying lengths of time. As this frost accumulates it forms a partial heat insulating covering and decreases the cooling effectiveness of the refrigerating unit. On the cooling coils of commercial or industrial units it is also for the same reason objectionable to permit excessive ice or frost accumulation on the refrigerating elements.

As the amount of frost that accumulates upon the refrigerating elements depends upon the quantity and humidity of the air coming into contact with the cold surface, it is obvious that time required for the same amount of accumulation of frost will vary widely. In a hot humid climate the frost would form much more rapidly than in a dry climate under the same conditions of use of the refrigerating system. Therefore, it is the purpose of the inventor to provide defrosting means to correct this condition, that in no way interferes with the normal operation of the equipment, one which is rugged, simple, free from changes in atmospheric or operating conditions, and without adjustments or attention by the operator, after being set for a predetermined operating condition.

An important object of the present invention is to provide means whereby an apparatus of this class, consisting essentially of a timing device, which may be adjustable, comprising means whereby at predetermined intervals causes an ice or frost thickness gauge to operate, which gauge, in the event the frost thickness equals or exceeds a predetermined thickness, is actuated and the refrigerating mechanism is shut off for a predetermined length of time, when the mechanism is again operated.

Another object of the invention is to provide means whereby the foregoing operation may be repeated for each instance where the frost thickness reaches that for which the apparatus is set. Obviously, with such a device, climatic changes are automatically taken care of, as the cold is shut off when the ice accumulates to a certain thickness on the refrigerating unit or coils.

A still further object of the invention is to provide means broadly applicable to automatically defrost not only household equipment of the present type but also in the use of a gas refrigerator to function to act as auxiliary means to shut off the gas and other connections that may be necessary to the operation of this type of

unit; also on commercial refrigeration coils the brine refrigerant or other cooling medium may be shut off through operation of suitable valves or controls that would be caused to function by the present mechanism.

It is understood that alarms, signals or other warning devices may be caused to operate in conjunction with the present equipment, either with or without the present automatic control.

With these and other objects in view, the invention consists in certain novel features, combination and arrangement of parts as will be hereinafter more fully described, pointed out in the accompanying drawings, and claimed.

In the accompanying drawings I have illustrated diagrammatically, my preferred form of automatic defrosting device for refrigerating systems, the same embodying the various features of my invention in their preferred form.

Figure 1 is a fragmentary view of a household type of refrigerating unit, illustrating the application thereto of my frost control device.

Figure 2 is a diagrammatic view of my invention, illustrating the defrosting gauge member and the actuating electrical circuit that controls the stopping and starting of the refrigerating equipment.

Figure 3 is a view on an enlarged scale, which is similar to Figure 2.

Referring to the drawings by reference letters, *aa'* is the feeler or frost contacting gauge which is periodically moved towards the ice or frost covered surface *b*, by the pull of alternating current in the electrical system, hereinafter described. A magnet *d* attracts armature *e*, which is mechanically linked to *aa'*. The armature *e*, is actuated by electric current passing through the circuit when cutout switch *r* is in closed position. A timing mechanism *p*, of the ordinary clock or electric type, drives the contact carrying disc *o* for purposes of electric circuits shown through contacts *o'* and *o''* at predetermined time intervals. It is understood that *p* may be replaced by other suitable timing mechanisms. Closing of the circuit through the contacts *o'* and *o''* causes a current to flow in the magnets *d* and *h* connected, as shown, in series and also through magnet *i*. The winding of coil *h* is such as to have a normally stronger magnetic pull than magnet *i*. Thus upon the feeler or gauge *aa'* touching *b*, the current through *d* and *h* is such that with no ice on *b* the pull of magnet *i* is stronger at that time because of the additional choking action of the armature *e* in contact with both pole pieces of

magnet *d*, that is, reducing the air gap in the magnetic field circuit of magnet *d*. The current passing through the coil circuit of magnet *d*, is reduced as the air gap in the magnetic circuit of magnet *d* is reduced, but the current through coil *i* is always the same. The pivoted armature *j* is pulled down toward the magnet *i*, which action through arm *k* and the pin members *l'* and *l''* throws the toggle controlled element *l* to such a position that the mercury switch *m* closes the circuit *n* through contacts *n'* controlling the operation of the driving motor of the refrigerating system. If accumulated ice or frost holds the feeler off of *b* a sufficient amount of time, the armature *e* will not approach close enough to member *d* to reduce the current flowing in magnets *d* and *h* sufficiently to enable the pull of magnet *i* to overcome the pull of *h* and the toggle will be tripped causing the mercury switch to open the refrigerating motor circuit *n*. A spring *c* is provided to return the feeler *a* to the open position, so that the normal rate of formation of frost on *b* is not interfered with. This feeler or gauge *a* is adjustable through its threaded end *a'* for causing the same to operate the control mechanism for a predetermined thickness of frost on the refrigerating unit *b*.

I have thus described my invention in detail in order that its operation and structure may be fully understood; however, the terms herein are used in their descriptive sense only and not in a limited manner. The scope of the invention being defined in the claim, wherein it is understood that this invention is not to be limited wholly to an apparatus but also to a system as well for automatically controlling the defrosting of refrigerating apparatus, units and systems. Having fully described my invention, what I claim as new is:

A defrosting device for refrigerating systems including a refrigeration circuit comprising the evaporator, compressor, motor and motor control switch, a refrigerating element, an electrical magnet associated with said element, a feeler movable towards and away from said refrigerating element and controlled by said electrical magnet, an electrically operated means to control the magnet and feeler at predetermined intervals to move the feeler towards and away from the refrigerating element so that the defrosting action of the refrigerating element may be made at predetermined intervals by the electrically controlled device, all of said elements being in the refrigeration circuit.

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