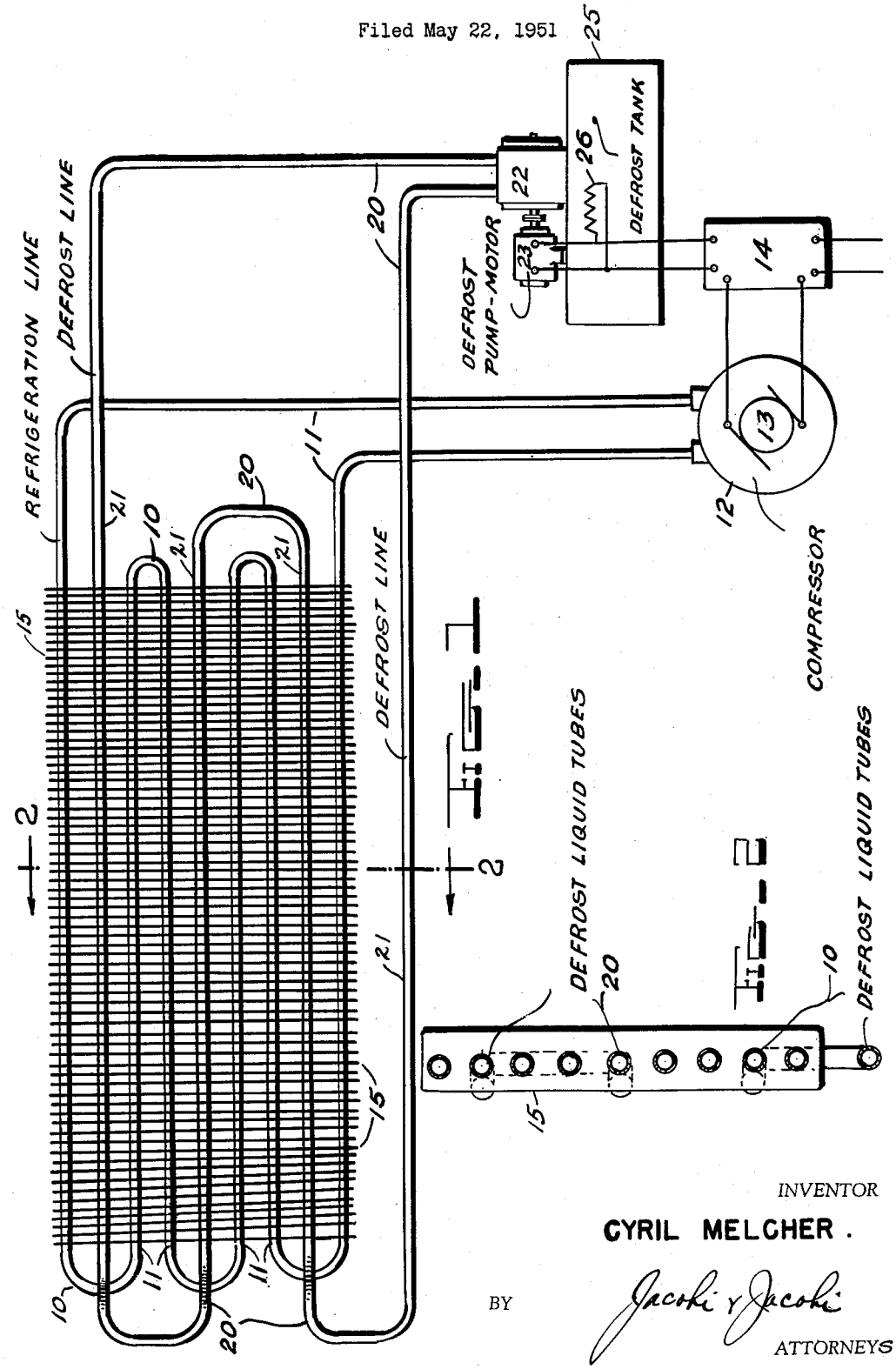
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AUTOMATIC DEFROSTING SYSTEM AND ASSEMBLY

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AUTOMATIC DEFROSTING SYSTEM AND ASSEMBLY

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1 Claim. (Cl. 62—115)

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This invention relates to refrigerating equipment and more particularly to a defrosting system and assembly for use in a refrigerator.

In a particular form of domestic or commercial refrigerator, there is experienced periodical difficulty due to the formation of ice on its partition, trays and other incidental interior surface. This is the result of the freezing action by the coiling coils continuing for a length of time sufficient to cause a covering of ice on these parts without a tendency to melt off by itself or under the conditions which the refrigerator is employed. The covering of ice reduces the efficiency of the refrigerator from the beginning and more so, as the ice accumulates and increases in thickness. Therefore, the user is directed by the instructions of the manufacturer, to take steps from time to time to eliminate the covering of ice. To do so, the user frequently turns off the motor and unit that provides the refrigeration and leaves it off until the temperature rises within the refrigerator sufficiently to melt off all the ice, or in some instances the ice is scraped off with a tool, while the refrigeration system is in operation. In more recent construction some form of defrosting mechanism may be provided. After a certain period, the ice is formed again and the process of melting it off is repeated. The time of defrosting, as it is termed usually, requires the attention of the user for quite some period of time, depending on the type of cabinet, the room temperature, the amount of food in the cabinet, and other factors. In the interim of defrosting, there is a possibility of some of the articles of food, medicine or otherwise becoming spoiled by being uncooled too fast or too long, and also the water from the melting ice may spill over and cause inconvenience.

This invention is designed to take care of the defrosting automatically at predetermined intervals. The user is freed from the trouble of watching the interior condition as to frosting, and the labor and attention and time required to personally attend to the process of defrosting. The system employed is simple and requires little additional room within the refrigerator for its use therein. It consists primarily of a system embodying a series of defrosting piping coils located in alternate or adjacent rows between the piping coils of the refrigerating line. The coils are placed close enough to induce a transfer of heat (or cold) from one class of coils to the other, when the time comes for this to be done. In addition, a timing device is embodied in the system to activate the defrosting piping

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at predetermined intervals without the help of the user and heat the components covered or about to be covered, with ice in the form of frosting. The timing device controls the period of such defrosting and then stops it to permit the normal process of refrigerating to proceed. This is done effectively in a short period without materially affecting the refrigerating conditions of parts and items within the refrigerator.

With these features in mind it is an object of this invention to provide a new and improved refrigerating system and assembly that will avoid one or more, of the disadvantages and limitations of the prior art.

Another object of the invention is to provide a new and improved refrigerating system and assembly that will automatically operate to overcome frosting in an effective and expeditious manner.

A further object of the invention is to provide a new and improved refrigerating assembly in a refrigerator that will include a self contained defrosting arrangement in conjunction with the refrigerating unit, arranged to counteract the effect of its cooling system and piping at predetermined times to prevent undesirable frosting or icing within refrigerator.

An additional object of this invention is to provide a new and improved defrosting assembly incorporatable into the cooling system of a refrigerator that will directly control such system at designated periods to eliminate frosting or icing induced thereby.

Other objects of the invention will become apparent as the details of a structure embodying its principles are outlined herein.

In order that a full understanding of this invention may be had, reference is made to the accompanying drawings, wherein a particular form thereof is indicated. The description following, in conjunction with these drawings, indicate the principles and operation of the invention, while the appended claim emphasizes the scope thereof.

Referring to the drawings:

Figure 1 is a diagrammatic picture of a defrosting system and assembly embodying this invention, and

Figure 2 is a side elevational section taken on line 2—2 of Figure 1.

Similar reference numerals designate the same parts throughout the drawings.

In Figure 1, is shown a cooling coil 10 for the conveyance of a refrigerating liquid or refrigerant through it for cooling the interior of a refrigerator or freezing cabinet not shown. The coil consists

of a plurality of parallel spaced runs of piping 11, leading from a compressor 12 with which the usual components of a driving motor 13, condenser and expansion valve are included, although not indicated in the drawing. A suitable refrigerant of any well known type commonly used for the purpose is used in this piping and cools the articles in the refrigerator to a set temperature while it flows through the system during the refrigerating cycle. The motor 13 is under the control of a timing switch 14 that shuts it off and turns it on at designated times through the use of a clock mechanism, not shown.

A defrosting coil 20 for conveying a heated defrosting liquid, preferably of a standard antifreeze nature, consists of a series of runs of piping 21 parallel to those of the coil 10. The runs of piping 21 are alternately spaced in the same plane with the runs of the piping 11 and placed relatively close to them. In addition a series of heat dissipating fins 15 of metal or heat conducting material are mounted on all of the runs 11 and 21 at right angles thereto in such a manner as to tie them conductively together and for the purpose of keeping them in line with one another as well as structurally strong and rigid. The piping 21 leads to a pump 22 for forcing the defrosting liquid through it when its driving motor 23 is operating. A tank 25 contains an adequate quantity of the defrosting liquid for this system. This defrosting liquid is raised to a suitable temperature by an electrical heating element 26 during the time it is flowing and the pump 22 with its motor 23 are in operation. When it is in operation, the compressor 12 with its motor 13 stops operating and the coolant flow of the refrigerant is prevented from circulating during the period. The defrosting cycle likewise is stopped when the refrigerant cycle is flowing.

Ordinarily the refrigerant passes through the coil 10 and cools the interior of the refrigerator until such time as the frosting or icing tends to become excessive. At the time set by the timing device 14, which is adjusted to act when such frosting is determined or empirically found to take place, the refrigerant cycle motor 13 is stopped and the defrosting cycle motor 23 started up. The heating element 26 is also put in operation and warms up the defrosting liquid. This liquid is forced through the defrosting coil 20 and transmits its heat to the ice in the refrigerator and to the refrigerant in the coil 10. This removes the ice by melting it and does it quickly. The defrosting coil 20 being close the refrigerating coil 10, quickly transfers its heat to it and the ice formed by the latter. The fins 15 cooperate in this by conducting the heat quickly and effectively to the ice as the conducting material or metal of which they are composed, permits it. As the work of defrosting is done expeditiously by this arrangment, the food items in the refrigerator being located at some distance from the coils, do not have the time to lose their lowered or storage temperature, and therefore are not materially affected by the system. As long as the water derived from the ice is at 32 degrees which will be for a relatively short time, the food will not be warmed up by the defrosting system. Therefore the defrosting arrangement is safe and convenient to use.

The manner of placing the combination coil in a refrigerator offers no problem because it is all together and can be compactly constructed. If placed horizontal, the fins will facilitate the warming of the refrigerant section by conduction.

In vertical placement of the plane of the combination coil, the fins will be augmented in their work by convection from the currents of air rising from the defrosting section.

If the service supplying current to the motors, heating and clock should be interrupted at the source, all components of the system will be out of service together, so that it will not be liable to damage from that situation. The arrangement is so simple that designs including it, can be readily incorporated into conventional equipment now available. It is effective, and does its work quickly, with a minimum amount of energy to operate it. It is therefore economical from the practical points of view arising in adapting the system to present needs.

While but one form of the invention is disclosed in this particular outline of the invention, it is not intended to limit this application for Letters Patent to ths special form, but to such structures and systems that would employ the same principles and come within the scope of the appended claim.

Having thus described the invention what is claimed is:

A refrigerating system and defroster comprising a refrigeration line consisting of tubing having portions thereof bent to form a coil, the convolutions of which are straight throughout the length of the coil and extend horizontally in a single vertical plane one above another in spaced parallel relation to each other and connected at their ends by arcuate portions of the tubing, a compressor connected with ends of said refrigeration line and serving to circulate a cooling medium through the refrigeration line, a defrosting line consisting of tubing having portions bent to form a coil, the convolutions of which are straight throughout the length of the coil and extend horizontally and longitudinally of the convolutions of the coil of the refrigeration line and are located directly between and in spaced parallel relation to the said convolutions of the refrigeration line and at their ends are connected with each other by arcuate portions of the tubing, a container for a defrosting medium, a pump for withdrawing the defrosting medium from said container supported thereon and forcing the defrosting medium through the defroster line, the outlet end of the defroster line communicating with said container through the top thereof, a heater in said container, motors for individually driving said compressor and said pump, a switch for controlling operation of said motors adapted for shutting off the motor for the compressor when the motor for the pump and the heater in circuit therewith are started, and thin plates disposed vertically and spaced from each other longitudinally of the coils and formed midway their width with openings through which the convolutions of the said coils pass in close fitting contacting engagement with the plates.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,513,823	Shreve	July 4, 1950
2,522,199	Shreve	Sept. 12, 1950
2,551,163	Rickert et al.	May 1, 1951
2,554,848	Warren	May 29, 1951