

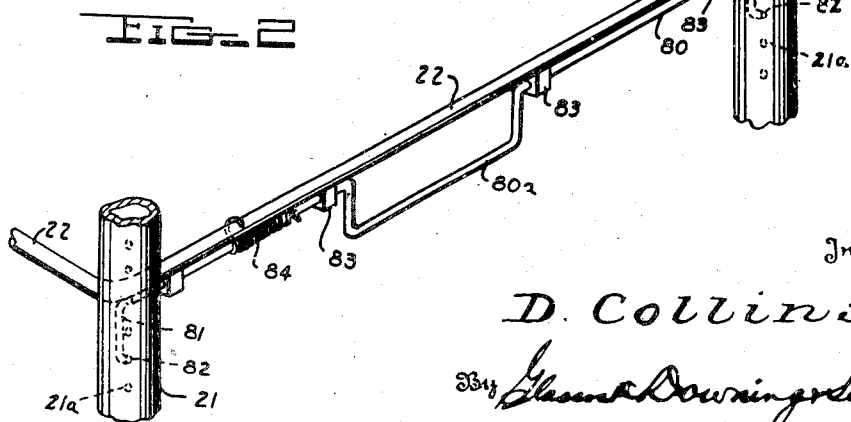
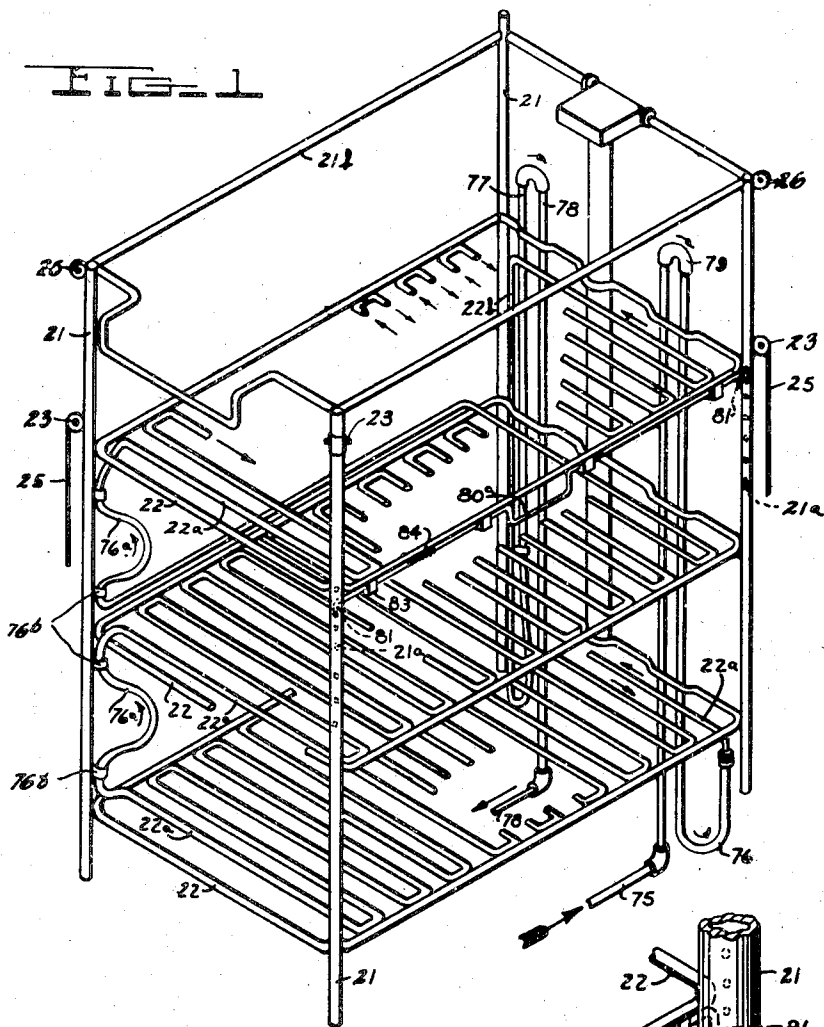
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FREEZER SHELF CONSTRUCTION

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FREEZER SHELF CONSTRUCTION

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7 Claims. (Cl. 62-126)

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This invention relates to improvements in refrigerators of the type disclosed in my copending application Serial No. 586,899, filed April 6, 1945, wherein shelf frames are movable vertically through the open top of a top door refrigerator cabinet.

The primary object of the invention is to so construct the shelves of the movable shelf frame located in the freezing compartment of the refrigerator that they constitute a conduit for the passage of the fluid refrigerating medium and thereby provide physical contact with the articles supported upon the shelves and thus expedite and accelerate the initial freezing of such articles.

A further object is the provision of means enabling the relative position of the shelves within the frame to be varied as desired depending upon the nature, size and shape of the food or other articles to be stored and frozen.

In the accompanying drawings wherein an improved embodiment of the invention is illustrated:

Figure 1 is a perspective view of the shelf frame removed from the refrigerator cabinet.

Figure 2 is an enlarged detail perspective view showing the shelf locking means.

Referring to the drawing in detail, the numerals 21 designate the corner posts of the shelf frame which is mounted for vertical movement between guide rollers 26 in the freezing compartment of the refrigerator cabinet and is moved to a raised position above the open top of the cabinet by pull exerted upon motor driven cables 25 attached to the frame and extending over pulleys 23.

The parts of the refrigerator thus far described are constructed and arranged substantially the same as the corresponding parts disclosed in my earlier application above referred to, and such parts are designated by the same reference characters.

In accordance with the present invention the shelves forming part of the shelf frame constitute the cooling elements of the closed refrigerating system which may be of the well-known type including the usual motor driven compressor and condenser (not shown). Each shelf is formed from a length of pipe or tube bent as clearly shown to form a plurality of spaced parallel tubular members 22a extending transversely of the longitudinal axis of the shelf frame and connected in series at the opposite sides of the frame thereby forming a flat circuitous conduit for the passage of the refrigerant. The short

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connecting portions of each conduit are welded or otherwise rigidly secured to a rim member 22 and the several rim members are supported one above the other by the corner posts 21.

To provide the shelf frame with a requisite degree of strength and rigidity the upper extremities of the posts 21 are connected by connecting members 21b and the rim of at least the lowermost shelf is also welded or otherwise rigidly attached to the lower extremities of the corner posts.

Continuity of flow of the refrigerant from the conduit of one shelf to the next adjacent shelf is made possible by connecting pipes 76a formed of flexible material of such length as to accommodate relative adjustment of the shelves as will be hereinafter more fully described. The flexible pipes 76a are connected with the shelf conduits by couplings 76b. The rigid inlet pipe 75 for the refrigerant is extended vertically at the back of the shelf frame and is connected by an elbow 79 and a flexible pipe section 76 with the free end of the conduit of the lowermost shelf. The free end of the conduit of the uppermost shelf is downwardly directed as indicated at 22b and is connected by a flexible pipe section 77 with the upper end of the vertically disposed portion of the outlet pipe 78 for the refrigerant.

The lower portions of the pipe sections 76 and 77 are looped and the flexibility thereof permits freedom of vertical movement of the shelf frame within the compartment in which it is located.

For convenience in changing position of the top shelf with relation to the other shelves, the top shelf is shown as mounted for adjustment vertically of the corner posts. It will be understood, however, that if desired other shelves may also be adjustably mounted.

In order to effectively lock the shelf in an adjusted position, the opposite sides of the related rim member 22 are provided with apertured lugs 83 receiving shafts 80 having depending portions 81 terminating in outwardly directed ends 82 selectively engageable in apertures 21a arranged in vertical rows along the inner portions of the corner posts 21. Springs 84 coiled about the shafts 80 are engaged at one end with the rim member 22 and at the other end with the shafts and the tension thereof tends to turn the shafts in the direction to engage and retain the angular ends 82 in the apertures 21a. For facilitating the release and readjustment of the shelf, the medial portion of the shafts are in the form of depending cranks 80a which can be conveniently grasped in the hand to enable the

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shafts to be turned, thereby disengaging the angular ends from the apertures 21a. When the shelf has been shifted to the desired position, the hand cranks are released and the shafts are turned under the influence of the springs 84.

As will be understood, the shelf frame is intended for accommodation within the freezing compartment of the refrigerator cabinet. In addition, the direct physical contact of the food or other articles or containers for such articles with the cooling conduits 22a, through which the refrigerant is conducted, expedites and accelerates freezing and thus improves the efficiency of the refrigerator while also affording the advantages of an article supporting frame which may be adjusted vertically for convenience of access. According to the invention the tendency for air to circulate within the cabinet is greatly reduced due to the fact that the cooling conduits are dispersed throughout the interior of the cabinet. Naturally, this lessens the dehydrating effect on unwrapped articles in the cabinet.

What I claim is:

1. In a refrigerating device a vertically movable frame, a conduit for the passage of a fluid refrigerant, said conduit being carried by and movable with the frame and constituting a shelf for supporting and maintaining intimate thermal contact with the articles to be frozen, and means for guiding the vertical movement of said frame.

2. In a refrigerating device, a vertically movable frame, a conduit carried by and movable with the frame for the passage of a fluid refrigerant, said conduit constituting a shelf for supporting and maintaining intimate thermal contact with articles to be frozen, stationary inlet and outlet pipes for refrigerant, and flexible connections between the stationary pipes and the conduit accommodating movement of the frame.

3. In a refrigerating device, a movable frame, a conduit for the passage of a fluid refrigerant

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and constituting a shelf for supporting and maintaining intimate thermal contact with articles to be frozen, means adjustably supporting said conduit in the frame for movement therewith.

4. A refrigerating device as claimed in claim 1 provided with means for adjustably securing the conduit in selected positions in said frame.

5. A refrigerating device as claimed in claim 1 provided with means for adjustably securing the conduit in selected positions in said frame, said adjustable securing means including releasable spring actuated lock shafts carried by the conduit and engageable with the frame.

6. A refrigerating device as claimed in claim 1 provided with means for adjustably securing the conduit in selected positions in said frame, said adjustable securing means including releasable spring actuated lock shafts carried by the conduit and provided with locking projections engageable with the frame, and crank portions on said shafts for facilitating rotation thereof.

7. In a refrigerating device a vertically movable frame, a plurality of conduits carried by and movable with the frame and each constituting a shelf for supporting and maintaining intimate thermal contact with the articles to be frozen, pipes connecting said conduits, said conduits and pipes forming passages for the circulation of a fluid refrigerant, and means for guiding the vertical movement of the frame.

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

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