

Sept. 19, 1939.

S. M. BÄCKSTRÖM

2,173,150

REFRIGERATOR

Filed Aug. 24, 1937

Fig. 1.

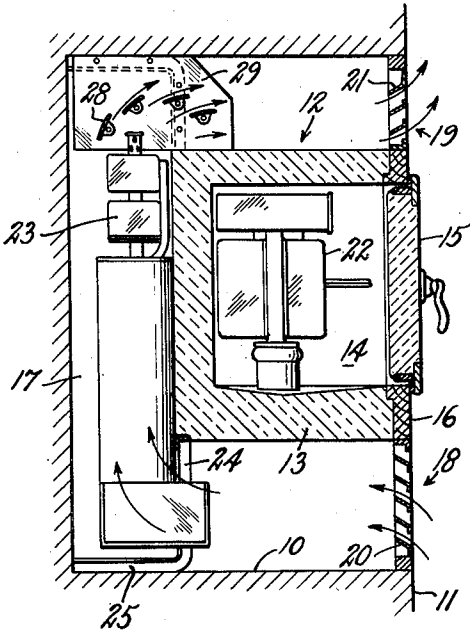


Fig. 3.

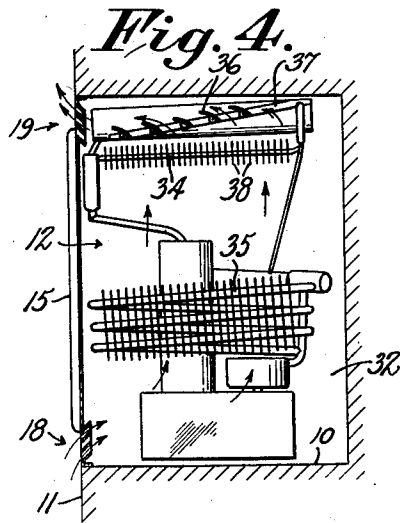
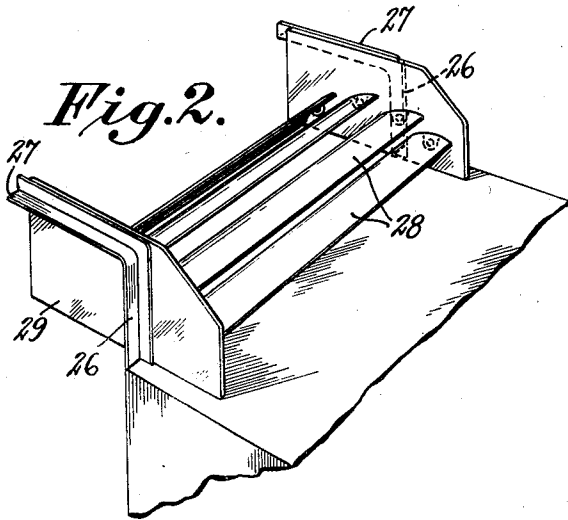
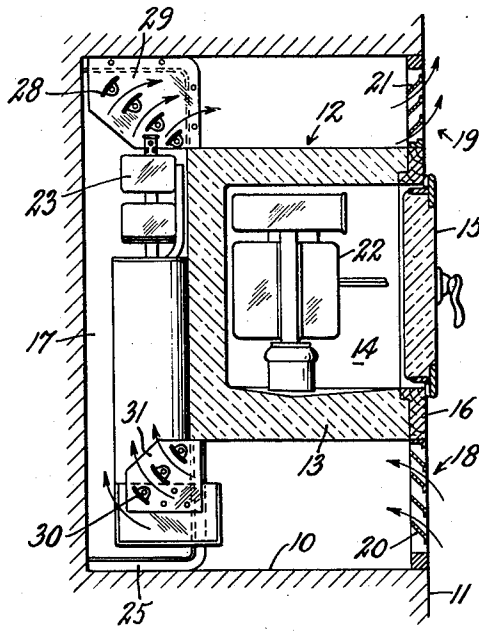
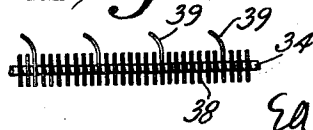


Fig. 5.



INVENTOR
BY *Sigurd Mattias Bäckström*
his *E. A. Fenander* ATTORNEY.

UNITED STATES PATENT OFFICE

2,173,150

REFRIGERATOR

Sigurd Mattias Bäckström, Stockholm, Sweden,
assignor, by mesne assignments, to Servel, Inc.,
New York, N. Y., a corporation of Delaware

Application August 24, 1937, Serial No. 160,591
In Germany September 15, 1936

6 Claims. (Cl. 62—89)

My invention relates to refrigerators, and more particularly to refrigerators which are located in a recess of a wall and have one or more parts cooled by circulation of air which is induced either by forced or natural draft.

In refrigerators of the above type, where the front of a refrigerator cabinet closes the front of a recess in which the cabinet is disposed, the front of the cabinet is provided with an inlet and outlet to permit circulation of air in a space in which parts of the refrigeration apparatus are housed. Since the recesses are generally formed with right angle corners, abrupt changes in direction of air flow take place in the apparatus space with the result that the velocity of air is decreased considerably. When circulation of air in the apparatus space is induced by natural draft, this loss in air velocity is particularly objectionable because the heat rejecting parts of refrigeration apparatus are not efficiently cooled.

It is an object of my invention to provide an improvement in a wall type refrigerator whereby one or more heat rejecting parts of refrigeration apparatus are efficiently cooled by circulation of air in a space in which such parts are housed. I accomplish this by providing in the apparatus space vanes or blades which are contacted by heated air and preferably curved or rounded and arranged to avoid abrupt changes in direction of the flow of air.

The invention, together with the above and other objects and advantages thereof, will be better understood from the following description taken in conjunction with the accompanying drawing forming a part of this specification, and of which Fig. 1 is a side vertical sectional view of a wall type refrigerator embodying my invention; Fig. 2 is a fragmentary perspective view of the upper rear part of the refrigerator shown in Fig. 1; Fig. 3 is a side sectional view similar to Fig. 1 illustrating a modification of the invention; Fig. 4 is a side vertical sectional view of a refrigerator illustrating a further modification of the invention in which the refrigeration apparatus is disposed at one side of the cabinet; and Fig. 5 is a fragmentary view of a heat rejecting part of refrigeration apparatus to illustrate a still further modification which may be employed in Fig. 4.

Referring to Fig. 1, I have shown a refrigerator disposed in a recess 10 of a wall 11. The refrigerator comprises a cabinet 12 having thermally insulated walls 13 defining a storage compartment 14 into which access may be had by a door 15 hinged at the front 16 of the cabinet. The front 16 of the cabinet closes the front of the

recess 10 and is substantially in the plane of the wall 11. The cabinet 12 is of less height and depth than the recess 10 to provide a space or channel 17 at the rear of and above and below the storage compartment 14.

The front 16 of the cabinet adjacent the lower and upper horizontal portions of channel 17 is provided with an inlet 18 and an outlet 19 for circulation of air in the channel. The inlet 18 and outlet 19 may be provided with louvres 20 and 21, respectively, the louvres 20 being inclined upward and inward to direct air into the lower horizontal space of the channel and the louvres 21 being inclined upward and outward to direct air out of the upper horizontal space of the channel. The louvres 20 and 21 may be made adjustable, if desired, so that the angle of inclination of the louvres may be regulated.

Within the storage compartment 14 is disposed a cooling element or evaporator 22 of suitable refrigeration apparatus. Although I do not wish to be limited thereto, I preferably employ refrigeration apparatus of a uniform pressure absorption type, generally as described in Patent No. 1,609,334 to von Platen and Munters. The heat rejecting portions of such apparatus including a condenser 23 may be disposed in the channel 17 at the rear of the storage compartment 14.

The refrigeration apparatus and cabinet 12 are preferably removably supported in the recess 10. This may be accomplished by providing the cabinet 12 with supporting legs 24 having rearwardly extending horizontal portions 25. The supporting legs 24 and horizontal portions 25 serve as runners whereby the cabinet 12 may be slidably positioned in the recess 10. The horizontal portions 25 of the supporting legs serve as stops to limit the extent of rearward movement of the cabinet 12. Similar supporting members 26 having horizontal portions 27 may be secured to the upper part of cabinet 12, as shown most clearly in Fig. 2, so that the cabinet will be supported in a stable upright position in the recess 10.

The channel 17 at the rear of cabinet 12 constitutes a flue whereby natural cooling of condenser 23 may be effected during operation of the refrigeration apparatus. Air is drawn into the lower horizontal portion of the channel at inlet 18, as indicated by the arrows in Fig. 1. The heat radiated from condenser 23 and other heat rejecting parts (not shown) causes sufficient upward flow of air by natural draft to effect cooling of the apparatus during its operation. Since air is only admitted into channel 17 at the inlet 18, the column of air in the vertical space at the

rear of cabinet 12 is at a higher temperature and lighter than an equivalent column of surrounding air at room temperature. By providing a channel of this character, a relatively high velocity air stream is produced which flows upward and is discharged through the outlet 19 at the top horizontal space of the channel.

In accordance with my invention, in order to minimize the friction losses or loss in velocity due to the abrupt change in direction of air flow at the upper part of the flue, I provide vanes or blades 28 in the channel 17. The blades 28 are preferably curved or rounded and arranged in spaced relation to effect an easy transition in the change of direction of air flow.

The blades 28 are preferably secured to side plates 29, as by welding, for example, and the side plates 29 in turn are secured to the supporting members 26. By securing the blades 28 to the side plates 29, substantially all of the air flowing in contact with the heat dissipating surfaces of condenser 23 must flow in the space between the side plates and strike the blades 28, whereby a smooth path of flow is provided for heated air and an abrupt change in direction of air flow is substantially avoided.

Vanes of guiding members of the character just described have been successfully used in practice with the result that the operation of refrigeration apparatus has been improved considerably. The cooling of the heat rejecting parts has been improved to such an extent that appreciably lower evaporator temperatures have been obtained which was unexpected and unforeseen. For example, when the room air temperature is about 100° F., the increase in air cooling has been sufficient to reduce the temperature of the evaporator or cooling element by about 7° F. when abrupt changes in direction of air flow are avoided.

In Fig. 3 I have shown a modification in which vanes or blades 30 are provided at the lower rear part of recess 10 in addition to the blades 28 at the upper part of the recess. The blades 30 are secured to side plates 31 in a manner similar to that shown in Fig. 2, so that air drawn into the channel 17 at inlet 18 must strike the blades 30 to insure a smooth path of air flow in the channel.

In Fig. 4 I have shown a further modification in which the refrigeration apparatus is disposed in a space 32 at one side of the cabinet. In this case the cabinet is of substantially the same depth and height as the recess 10 but less in width to provide the apparatus space at one lateral side wall of the cabinet. The inlet 18 and outlet 19 are at one side of the door 15 and adjacent the upper and lower parts of the apparatus space 32. The refrigeration apparatus may be of a uniform pressure absorption type having a condenser 34 and an absorber 35 which constitute the heat rejecting parts of the apparatus.

In order to avoid an abrupt change of direction in air flow and thereby increase the velocity of air circulating in space 32, I provide a plurality of blades or vanes 36 in the upper part of the apparatus space over which heated air passes. The blades 36 are curved or rounded and fixed to side members 37 which are secured in any suitable manner to parts of the refrigeration appara-

tus. By providing the blades 36 the velocity of air in the apparatus space 32 is increased considerably to effect efficient cooling of the heat rejecting parts.

If desired, the cooling fins 38 secured to condenser 34 may be shaped to change the direction of air flow. Such a modification is shown in Fig. 5 in which a number of cooling fins 39 are of such height that their upper parts may be rounded or curved to change the direction of air flow toward the outlet 19 with a minimum loss in velocity.

Although particular embodiments of the invention have been shown and described, it will be apparent that various modifications and changes may be made without departing from the spirit and scope of the invention, as pointed out in the following claims.

What is claimed is:

1. In a refrigerator having a vertically extending flue, refrigeration apparatus having a heat rejecting part in said flue, cooling fins secured to said part, and some of said fins being bent to change the direction of air flow in said flue.
2. In a wall type refrigerator having a thermally insulated cabinet disposed in a recess of a wall with the front thereof substantially closing the front of the recess, said cabinet being smaller than the recess to provide a vertically extending space, refrigeration apparatus including a heat rejecting part in said space, said space having an air inlet and outlet, respectively, at the front of the recess whereby circulation of air may be effected in said space by natural draft due to heat rejected by said part, and a plurality of spaced deflectors located in said vertically extending space to be contacted by upwardly flowing air heated by said heat rejecting part, said deflectors being arranged to deflect upwardly flowing heated air and change the direction of air flow toward the outlet.
3. In a wall type refrigerator as defined in claim 2, in which said heat rejecting part is provided with a plurality of cooling fins of which some are curved or rounded, and said spaced deflectors for changing the direction of air flow includes said curved or rounded cooling fins.
4. In refrigeration apparatus, a heat rejecting part provided with cooling fins over which an air stream passes, and at least some of said fins having bent regions located with respect to the direction of air flow so as to be last contacted by the air stream for changing the direction of air flow.
5. In refrigeration apparatus, a heat rejecting part provided with cooling fins over which air flows, and at least some of said fins having curved or rounded regions located with respect to the direction of air flow so as to be last contacted by air for changing the direction of air flow.
6. In refrigeration apparatus, a heat rejecting part provided with a plurality of cooling fins extending in the direction of air flow and over which air passes, some of said fins extending beyond other of said fins, and said extended portions being bent, said bends being located with respect to the direction of air flow so as to be last contacted by the air stream for changing the direction of air flow.

SIGURD MATTIAS BÄCKSTRÖM. 70