EVAPORATOR INCORPORATING ACCUMULATOR WELLS AND FEED GRID

Fig. 1

Fig. 2

INVENTOR.

J. A. HALL

BY

James A. Hall

attorney
EVAPO RATOR INCORPORATING ACCUMULATOR WELLS AND FEED GRID

James A. Hall, Louisville, Ky., assignor to Reynolds Metals Company, Richmond, Va., a corporation of Delaware

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1 Claim. (Cl. 62—126)

This invention relates to heat exchange devices, and particularly to evaporators for household refrigerators and deep freeze units, in which customarily the evaporator tubing incorporates an accumulator consisting of an elongated tube of several times the diameter of the tube which encompasses the evaporator box, which box, in household refrigerators, receives trays for the production of ice cubes, and which generally incorporates other compartments for freezing purposes. The invention is particularly directed toward eliminating the said accumulators by means of the circuit tubing itself, so that less parts are handled in the formation of the evaporator, welding of the conventional enlarged accumulator is eliminated, and space is conserved.

The invention will be described with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view showing the right-hand side of the evaporator;
Fig. 2 is a view similar to Fig. 1, with the evaporator turned so as to disclose the left-hand side thereof; and
Fig. 3 is a perspective view of the tubing, the box not being shown.

Referring particularly to Figs. 1 and 2, the evaporator has a refrigerant inlet A and a refrigerant outlet B. The liquid refrigerant led into the inlet A passes upwardly to the top area of the box 1 and longitudinally thereof, thence passing through the tubing C to the bottom of the box. The refrigerant then passes back and forth in a multiplicity of turns so that it is retained for a substantial length of flow in the most effective area for direct bottom contact with items desired for quick freezing.

The liquid refrigerant not evaporated in the tubular turns D passes upwardly through tube E, and thence through transverse pipe F to the left-hand side of the evaporator box and to accumulator well G. Liquid refrigerant which in some cases is present, due to relatively low internal refrigeration temperature, or low external temperature, is retained in accumulator well G, and the refrigerant level maintained depends on the excess of liquid refrigerant from tubes D, E and F.

From accumulator well G, the refrigerant flows upwardly and thus through transverse pipe M to accumulator well H, thence through tube M to accumulator well I, thence to accumulator well K and finally to accumulator well L. The capacity of these accumulator wells H to L inclusive may be equal, or one or more may have greater capacity.

When the accumulator well G has relatively small capacity, refrigeration action occurs in most cases in tube M. If there is sufficient liquid refrigerant to fill accumulator well H, refrigeration action occurs in tube N, and likewise for the remaining tubes and accumulators.

Accumulator G fed from tubes D and E is in the forepart of the evaporator, which makes the front of the evaporator remain cold even though the refrigerator door may meet some warm air. This location gives proper refrigerant distribution.

The greater capacity of accumulator well K is to assure that little, if any, liquid refrigerant will go beyond tube O. The minor amount of refrigerant which does go beyond tube O will be evaporated in the final accumulator well L. During the start of a freezing cycle, that refrigerant which remains in tube D will be immediately effective for quick freezing. The same applies to refrigerator remaining in accumulator wells G, H, J, K and L.

Except for the inlet and outlet members A and B, which may be welded at 2, the evaporator proper (D and C) is a continuation of the same tube that forms the accumulator series, which enables the production of an evaporator-accumulator of low cost and long life.

Under some conditions, surplus liquid refrigerant not evaporated in tube P is fed back into tube O due to internal pressure conditions. This re-feeding accelerates the start of freezing after a defrost cycle or an extended off period.

Close contact between the tubular areas and the box 1 may be secured by brazing the tubes to the box wall. Generally the tubes are bent into flat formation so that they may be laid upon a sheet comprising the box metal blank and brazed thereto, thereupon the metal box wall sheet or blank may be bent into shape, its longitudinal margins being lapped and riveted.

It will be understood that various modifications may be made in the form and arrangement of the elements illustrated in the embodiment above described, without departing from the spirit of the invention.

Having described my invention, what I claim and desire to secure by Letters Patent is as follows:

In heat exchangers, an evaporator consisting of a box-like support having an open front, a top, a bottom, and sides, of a continuous length of tubing passing back and forth across the bottom of the box in a multiplicity of turns, and also passing back and forth across the top of the box in a multiplicity of turns, the last named turns being loops at each side of the box extending downwardly in a vertical plane and contacting the sides of the box, and at least one of said loops comprising a major depending area and a plurality of the remaining loops comprising minor depending areas of lesser capacity, and an inlet and outlet for said tubing, the loop of major depending area being preceded from the inlet by a plurality of the loops of minor area and capacity, said loops constituting accumulator wells confined to vertical planes.

References Cited in the file of this patent

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