

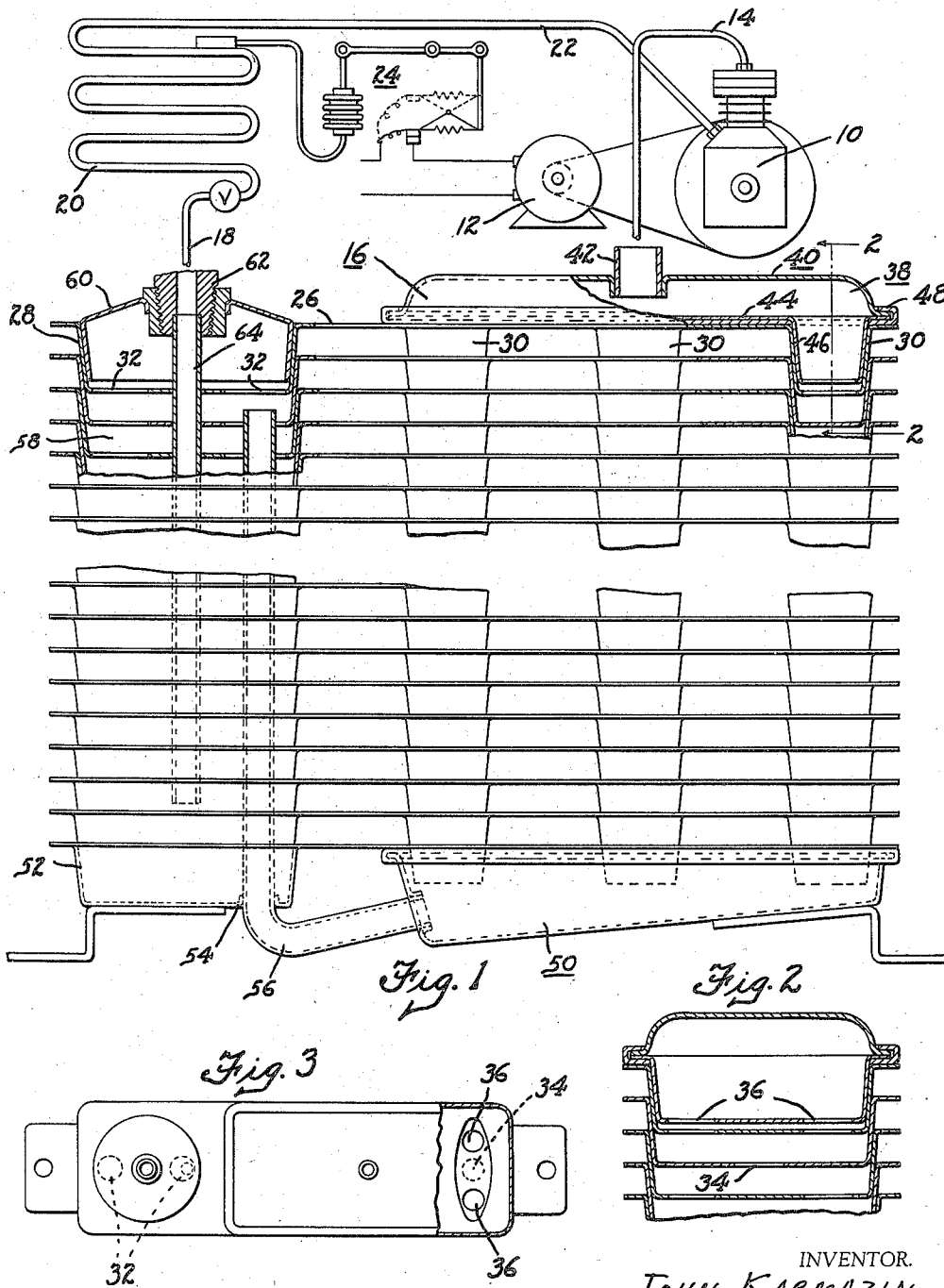
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REFRIGERATING APPARATUS

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## REFRIGERATING APPARATUS

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4 Claims. (Cl. 257-46)

This invention relates to refrigerating apparatus and more particularly to a combined condenser and receiver for use in refrigerating apparatus.

It is an object of the invention to provide a combined condenser and receiver which may be economically constructed and which is arranged to form a compact assembly by which the space required for the condenser and receiver ordinarily employed may be reduced.

It is also an object to provide a combined condenser and receiver wherein a receiver portion is mounted vertically along side the condenser portion and is connected thereto in a manner to store condensed refrigerant to a level above the bottom of the heat exchange portion without flooding the heat exchange portion.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a preferred form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a side view partly in cross section of a combined condenser and receiver embodying the present invention and showing diagrammatically the principal elements of a complete refrigerating system;

Fig. 2 is a cross section on line 2-2 of Fig. 1; and

Fig. 3 is a top view partially in section of the combined condenser and receiver.

Referring now to Fig. 1, there is illustrated a refrigerating apparatus comprising a compressor 10 driven by a motor 12 for delivering compressed refrigerant through a conduit 14 to a combined condenser and receiver 16. Refrigerant liquefied in the condenser-receiver 16 is delivered through a conduit 18 to an evaporator 20. The evaporated refrigerant is withdrawn through a conduit 22 to the compressor 10 for recompression. Suitable automatic control means comprising a low pressure control switch 24 are provided for intermittently operating the motor 12 in accordance with the temperature conditions at the evaporator 20.

The combined condenser and receiver 16 is formed from a plurality of sheet metal fins 26 each of which is formed with an integral tapered tubular projection 28 of cylindrical form and a plurality of tapered tubular projections 30 of oval form as illustrated in Fig. 3. The bottoms of the tubular projections 28 are perforated centrally and at diametrically opposed points adjacent the side walls thereof as illustrated at 32.

The bottoms of the tubular projections 30 are alternately perforated centrally as at 34 in Fig. 3 and perforated near the ends at 36 as shown in Fig. 3. A plurality of such fins are stacked together in the manner illustrated in Fig. 1 so that the projections are telescoped together, the projections 28 providing a cylindrical receiver chamber and the projections 30 providing a plurality of condensing tubes. An inlet header 38 comprising a trough-like stamping 40 having an inlet connection 42 and a plate 44 having tapered tubular projections 46 and a peripheral clamping member 48 for clamping the member 40 to the plate 44 is attached to the upper-most fin 26 by telescoping the projections 46 into the projections 30 of that fin. A similarly formed bottom header 50 is secured to the bottom fin 26 so that the headers 40 and 50 together with the condensing tubes formed by the projections 30 provide a refrigerant flow circuit through the condensing portion of the device. The bottom of the projection 28 of the lower-most plate is enclosed by a cup-like header member 52 having an opening 54 therein. A conduit 56 leads from the header 50 through the opening 54 and into the receiver chamber 58 near the top thereof, the tube 56 passing upwardly through the perforations 32 in the plates 26. An upper closure member or header 60 is telescoped into the projection 28 of the top-most fin and carries a liquid refrigerant outlet connection 62 and a downwardly extending tube 64 which passes through the perforations formed in the central part of the projections 28 and extends to a point adjacent the bottom of the chamber 58.

In operation of the combined condenser and receiver, compressed gaseous refrigerant enters the inlet connection 42 and is distributed by the header 40 to the condensing tubes formed by the projections 30. In passing downwardly through the condensing tubes the latent heat of vaporization is dissipated to the air through the fins 26 and liquefied refrigerant is collected in the header 50. From the header 50 the liquid refrigerant passes through the tube 56 to the upper portion of the chamber 58 where it spills over into the chamber 58 and is stored therein. Liquid refrigerant is withdrawn from the chamber 58 as required through the tube 64. It will thus be seen that the present invention provides a combined condenser and receiver in which the cost of the receiver is represented only by the additional material which is added to the fins above that required for the construction of the condenser portion plus the slight cost for the some-

what more complicated dies necessary to produce the receiver portion. A substantial saving results from the fact that the receiver is fabricated simultaneously with the fabrication of the condenser portion, thus eliminating a considerable item of labor cost.

I claim:

1. A combined condenser and receiver for refrigerating apparatus comprising in combination a plurality of similar fins stacked in superposed relation, each of said fins including an integrally formed tapered tubular projection, said fins being assembled with the projections in telescoping engagement to form a chamber, means forming a plurality of condenser tubes passing through said fins in heat exchange relation therewith and spaced from each other and from said projections, conduit forming means connecting the ends of said tubes in a refrigerant flow circuit in communication with said chamber, inlet means for admitting refrigerant to said tubes, and outlet means for withdrawing refrigerant from said chamber.
2. A combined condenser and receiver for refrigerating apparatus comprising in combination a plurality of similar fins stacked in superposed relation, each of said fins including an integrally formed tapered tubular projection, said fins being assembled with the projections in telescoping engagement to form a chamber, other integral tapered tubular projections forming a plurality of condenser tubes passing through said fins in

heat exchange relation therewith and spaced from each other and from said first projections, conduit forming means connecting the ends of said tubes in a refrigerant flow circuit in communication with said chamber, inlet means for admitting refrigerant to said tubes, and outlet means for withdrawing refrigerant from said chamber.

3. A combined condenser and receiver for refrigerating apparatus comprising a vertically disposed chamber, a plurality of vertical condensing tubes, a plurality of horizontal fins extending across said tubes and said chamber, header means for connecting the ends of said tubes in a refrigerant flow circuit and for closing the ends of said chamber and including means for conducting refrigerant first through said tubes and then into said chamber.

4. A combined condenser and receiver for refrigerating apparatus comprising a vertically disposed chamber, a plurality of vertical condensing tubes, a plurality of horizontal fins extending across said tubes and said chamber, header means for connecting the ends of said tubes in a refrigerant flow circuit and for closing the ends of said chamber and including means for conducting refrigerant first through said tubes and then into said chamber, and means for preventing reverse flow of liquid refrigerant from said chamber when the liquid level therein is above the level of the bottom of said tubes.

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