Feb. 12, 1957 A. N. JOHANNESEN 2,780,922

RECEIVER FOR LIQUID REFRIGERANT

Filed June 16, 1955

Fig. 1.

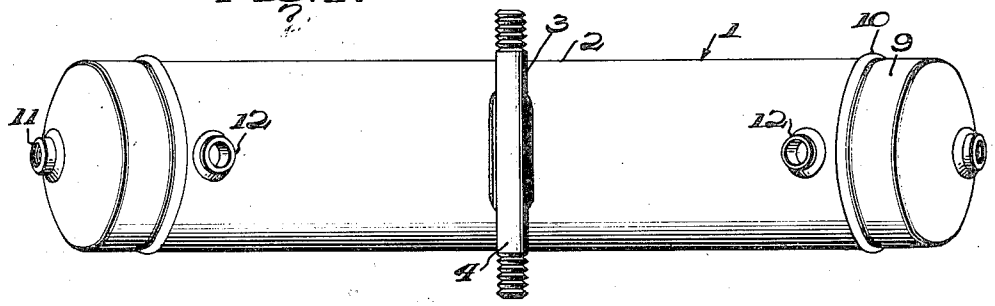


Fig. 2

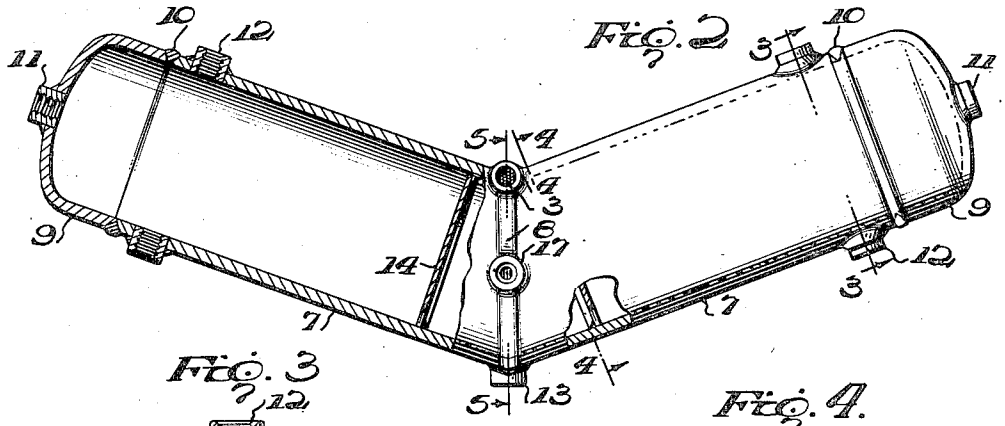


Fig. 3

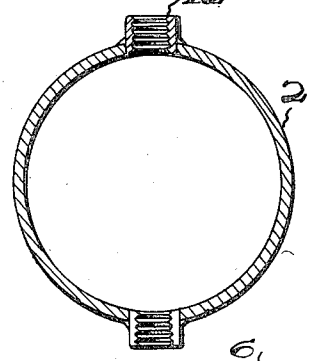


Fig. 4.

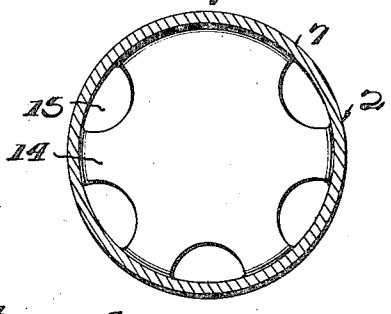
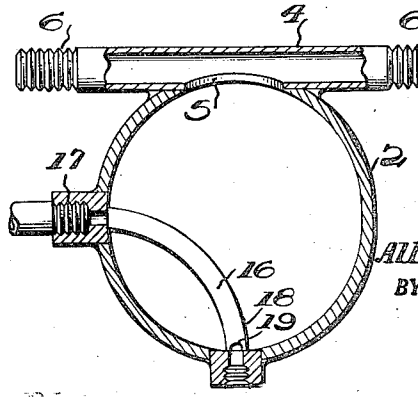


Fig. 5.



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RECEIVER FOR LIQUID REFRIGERANT

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Application June 16, 1955, Serial No. 516,055

3 Claims. (Cl. 62—1)

The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to receivers for liquid refrigerants used in refrigeration equipment. Such receivers are usually of cylindrical form and provided with an inlet at or near the top of the container and a discharge tube opening into the container at a point adjacent the bottom of the container. These structures are somewhat defective for at least two reasons. Firstly, a relatively large volume of condensed refrigerant is required to bring the level of the refrigerant up to the outlet pipe when the receiver is tilted to an appreciable extent. And secondly, they present the danger of hydraulic rupture in the refrigeration system when the refrigerant has been "pumped down" for the purpose of shipping to another location or for storage, especially if extra refrigerant has been added, as is sometimes necessary, due to the fact that no space for expansion is provided as when the volume of liquid is increased due to increase in temperature.

One of the objects of the present invention is to provide a receiver of a novel shape such that the level of even a small amount of refrigerant will be in operative relation to the discharge tube despite the application of a rather substantial tilt to the receiver.

A further object of the invention consists in so shaping the receiver and so positioning the inlet pipe with respect thereto that a sufficient reserve space for expansion of the refrigerant is provided even through the volume of liquid refrigerant is exceptionally large, as when it is "pumped down" for shipping or storage purposes.

Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings in which,

Figure 1 is a plan view of the improved receiver for liquid refrigerants;

Figure 2 is a front elevational view thereof; and

Figures 3, 4 and 5 are vertical sectional views taken on lines 3—3, 4—4 and 5—5 respectively, of Figure 2.

The receiver which consists of a container provided with inlet and outlet openings is indicated generally by the numeral 1. The container, per se, in the present illustration is somewhat elongated and of V-shaped form, being indicated by the numeral 2, with the vertex at 3. Mounted at this angular portion of the container is an inlet pipe 4 communicating with the interior of the container through the lateral opening 5 and threaded at its opposite ends as indicated at 6 for connection with the necessary piping.

As indicated in the present illustration, the body of the receiver is made up of four sections, the angularly arranged tubes 7—7 which are welded together as indicated by the numeral 8, and the end caps 9 which are welded to the outer ends of the tubes 7 as indicated by the numeral 10. These caps 9 are provided with threaded

openings 11 for the reception of fusible plugs which serve to permit the discharge of the refrigerant in the event of excessive heat as in the presence of uncontrolled fire. The tubular sections 7 are provided with threaded openings 12 which serve as connections for gages. A drain 13 is provided at the extreme low point of the receiver, that is, at the lower joint of the two tubes 7—7 which combine to form the V-shaped container. Mounted within the receiver adjacent the vertex thereof is a pair of baffles 14 provided with notches 15, which in conjunction with the inner wall of the receiver provide passages for the liquid refrigerant, as it may be rocked back and forth during tilting movements of the receiver when in use. As indicated, these baffle plates are positioned to the right and left of the vertex of the receiver, as shown in Figure 2.

Also mounted within the receiver is a quill tube liquid outlet indicated by the numeral 16 and having its upper end connected to outlet 17 which is adapted to be connected to the high pressure side of the refrigerating system. The lower end 18 of the tube 16 is situated at the lowest point in the container, namely the bottom of the vertex, and in order that liquid refrigerant may enter this tube 16 one or more notches 19 are provided in the side wall thereof at the extreme lower end.

In a liquid refrigerant receiver of the general arrangement shown in the drawings the lower end of the outlet tube is ordinarily covered with even the minutest amount of liquid refrigerant in the receiver, and obviously only a relatively small amount of refrigerant is necessary to maintain the lower end of the tube 16 submerged even if the receiver should be tilted a substantial amount, as for instance, if the refrigerating apparatus is mounted in a vehicle or the like. Furthermore, by reason of the V-shaped form of the container with the inlet pipe positioned at the lowest portion of the upper wall, it will be apparent that even when the receiver is charged to its utmost capacity a gas space will be provided in each of the upper ends of the sections 7—9. Therefore, in the event that ambient temperatures become extremely high and create excessive pressures within the receiver the gas spaces in the upper ends of the tubes 7—9 will provide for any increase in volume and thus avoid the possibility of hydraulic rupture of the receiver.

While one specific form of the invention has been shown and described herein in detail, it is to be understood that the particular form shown is merely intended to be illustrative of the invention since reserve space for expansion of the refrigerant may be provided in containers of other forms provided the angular position of the container and the position of the inlet opening are also constructed and arranged as to provide a gas space above the surface of the refrigerant when the container is fully charged.

In accordance with the patent statutes I have described herein the preferred form of the invention, but inasmuch as various changes may be made in structural details it is intended that such changes be included within the scope of the appended claims.

I claim:

1. A receiver for liquid refrigerant comprising a closed container of substantially V-shape in elevation, and an inlet tube connected to the upper wall of the container at its vertex.

2. A receiver for liquid refrigerant comprising a closed container of substantially V-shape in elevation, an inlet tube connected to the upper wall of the container at its vertex, and an outlet tube communicating with the interior of the container adjacent the vertex of the lower wall.

3. A receiver for liquid refrigerant comprising a closed

container of substantially V-shape in elevation, an inlet tube connected to the upper wall of the container at its vertex, and an arcuate outlet tube mounted within the container at the vertex thereof, the lower end of said outlet tube being disposed adjacent the bottom wall of the container, and the upper end of the outlet being secured in an opening in a side wall of the container about halfway of the height of said side wall.

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