

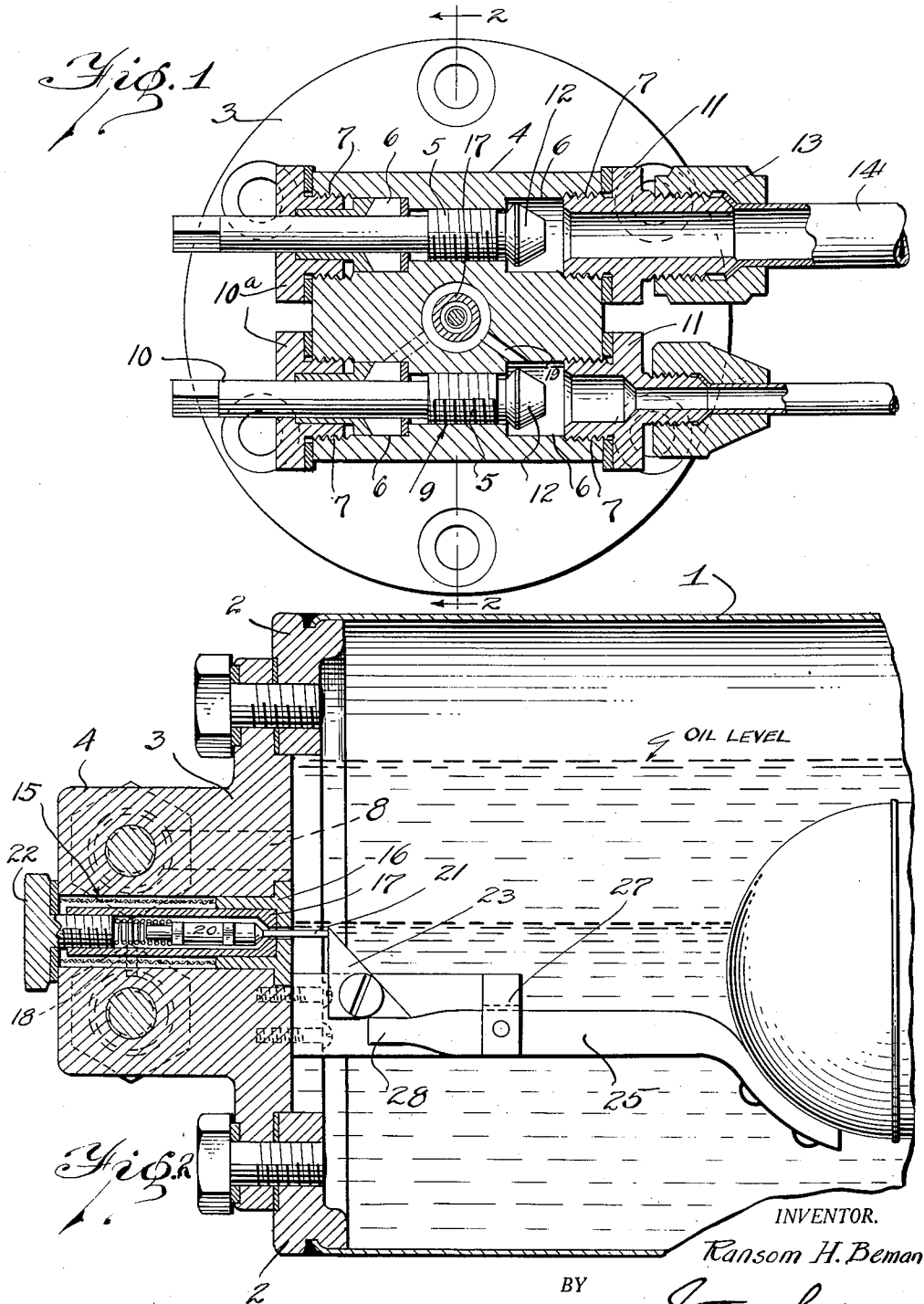
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EVAPORATOR STRUCTURE FOR REFRIGERATING SYSTEMS

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EVAPORATOR STRUCTURE FOR REFRIGERATING SYSTEMS

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This invention relates to evaporator structure for refrigerating systems, and has to do particularly with mechanism for controlling passage of liquid refrigerant to and from the evaporator unit of a refrigerating system of the flooded type.

float unit and its combination with and manner of actuating the inlet valve unit.

Further features of the invention will be apparent from the following description and claims.

In the drawing:

Fig. 1 is a front view, partly in section, of the evaporator and illustrating the preferred arrangement of forming the valve structure integral with the header or closure member.

Fig. 2 is a longitudinal sectional view taken on line 2-2 of Fig. 1 and illustrating the manner of positioning the inlet valve and valve seat within the header member and the preferred construction of the float mechanism.

The present invention may be used in connection with any suitable evaporator member of the flooded type and in the drawing I have indicated the evaporator casing as at 1 and provided with a suitable annular collar 2 secured at the end thereof and in leak-proof relation thereto, in the standard manner.

Instead of securing the standard cover plate or header member to this collar 2 I have provided a specially formed cover member 3 in which the inlet and outlet connections are integrally formed in the cover member. In other words, the cover member 3 is provided with a suitable extension 4 which is adapted to enclose all of the valve mechanism which has heretofore been usually positioned in various positions on the front of the closure member.

To accomplish this compact assembly, the extension 4 is machined in the novel manner as is best illustrated in Fig. 1, the apertures for receiving the inlet and outlet conduit members, service valve stems, et cetera, being machined exactly in duplicate from both ends. In other words, positioned at each end of the central threaded portion 5 are two duplicate enlarged chambers 6 terminating in duplicate threaded portions 7.

In the particular embodiment illustrated in Figs. 1 and 2, one of the chambers 6 utilizes a packing gland while the other chamber 6 registers with the outlet port 8, as shown in Fig. 2. The lower aperture, generally designated 9, is machined to provide ex-

Heretofore, in the manufacture of an evaporating unit or boiler of the flooded type, it has been customary to provide valve and float control mechanism mounted interiorly of the evaporator and usually supported on the inner surface of the head or closure member, with the result that much difficulty has been encountered both in initial installation and in the servicing of such control mechanism. Furthermore, it has been customary to provide a closure member and separate coupling members and service valves for controlling the inlet and outlet of refrigerant. Such separate construction has of necessity produced a very complicated arrangement at the front of the evaporator in addition to requiring a somewhat expensive construction and fabrication.

It is the object of the present invention to provide an extremely simple and compact refrigerant control structure adapted to control the flow of refrigerant to and from the evaporator and to control the level of refrigerant in the evaporator. The control structure including the valve controlled passageways to and from the evaporator and the coupling units are all formed as one integral member which forms the head or closure member for the evaporator.

Another feature of the present invention resides in the forming of the valve controlled refrigerant passageways as an integral part of the closure member of the evaporator and the connecting of the inlet passageway in a novel manner with the inlet valve structure, which directly controls the flow of refrigerant into the evaporator. In this case, the inlet valve structure is directly insertible and removable from the front of the evaporator closure member and is closed by pressure means independent of the float.

A still further feature of the present invention resides in the construction of the

actly the same dimensions as the upper aperture, and the threaded portions at the ends of each aperture are adapted to receive the packing nut 10a and the coupling nut 11 in the standard manner, one end of the coupling nut 11 forming a valve seat for the service valve 12 and the other end being adapted to receive a suitable union 13 for receiving the outlet conduit 14. It will be obvious that with both apertures fabricated and machined in an identical manner that the entire unit is reversible, that is, it can be used for either a right hand or a left hand assembly.

The cover member 3 is preferably provided with an aperture 15 which is positioned axially of and extends through the cover member, as clearly shown in the drawing. One end of this aperture 15 is provided with a plug 16 which positions a cylindrical member 17 in the manner shown in Fig. 2. This cylindrical member 17 forms the housing of the inlet valve and is provided at its inner end with a valve seat and an opening for receiving the valve stem. A cylindrical screen is positioned around this member 17 and an aperture 18 is formed in the wall of the member 17 so as to receive a volatile liquid refrigerant which enters by way of the conduit 19 as shown in Fig. 1.

The inlet valve member 20 is provided with a stem 21 at one end and a suitable shoulder at the other end for receiving a coil spring which in turn is positioned by means of the threaded member 22. It will thus be obvious that the only means for forcing the valve 20 against its seat is the coil spring. The many troubles incident to the proper fitting of the float valve in the evaporator are thus eliminated and in addition to this the wear on the valve seat is much less due to the constant uniform pressure from the coil spring instead of the unequal pressure, and sometimes a very great pressure, due to the position and buoyancy of the float.

In addition to presenting an inlet valve structure which is directly removable from the front of the header, and parts of which are also easily removable, the valve itself is so positioned that the incoming pressure from the high side has some tendency to force the valve against its seat rather than away from its seat so as to equalize the action of the float valve, as will be disclosed. Instead of directly connecting the valve with the float structure, the valve stem 21 protrudes through the inlet orifice so as to contact with a pivoted member or lever 23. A bracket member 24 is designed to support this pivoted member 23 and also to pivotally support the arm 25 of the float 26. The arm 25 is so positioned on the bracket 24 that it is limited in its upward movement by stop 27 and in its downward movement by contact between the end of the arm as at 28 and the

pivoted member 23. It will thus be seen that regardless of any quick action of the float it will positively be prevented from hitting either the top or the bottom of the evaporator.

In assembling and operating my novel evaporating unit a float of predetermined weight and size is secured to the float arm 25 whereby the lever 23 and the valve stem 21 will be actuated to open the valve when the level of the liquid drops to a certain predetermined point. It will be obvious that the entire mechanism will work with refrigerants of different specific gravity, the only difference being that the valve 20 will open at varying heights of the refrigerant level. However, the valve action itself will be identical due to the fact that it is closed by means acting from a direction opposite to the cam 23 and actuating arm of the float. It will thus be a very easy matter to design a float which will work satisfactorily with various refrigerants.

It will thus be seen that I have provided an extremely simple, compact, and inexpensive head or closure means which in itself embodies all the valve mechanism including the service valves and the main controlling inlet valve. It will also be obvious that the main inlet and outlet apertures are adapted to receive the valve mechanism from either end so as to present a completely reversible structure, and in addition it will be obvious that if desired, such head may be provided with duplicate inlet and outlet ports 19 and 8 on each half of the head so that the head may be used for a reversible assembly at any time. In case such duplicate ports are not used, then of course, such ports 19 and 8 will be drilled according to whether the closure member is to be used with a right or left hand cooling unit assembly.

What I claim is:

1. An evaporating unit for refrigerating systems of the flooded type, comprising a vessel for receiving liquid refrigerant having a wall formed to provide inlet and outlet passageways and inlet and outlet service valves positioned within said wall, the apertures in said wall for receiving the service valves and valve seat parts, and said service valve and valve seat parts being so designed as to be completely reversible for right or left hand assembly.

2. An evaporating unit for refrigerating systems of the flooded type, comprising a vessel for receiving liquid refrigerant having a wall formed to provide inlet and outlet passageways and inlet and outlet service valves positioned within said wall, the apertures in said wall for receiving the service valves and valve seat parts, and said service valve and valve seat parts being so designed as to be completely reversible for right or left hand assembly, and an inlet valve unit

including a valve casing and valve positioned intermediate said service valve units and being removable from the outside of said wall.

3. An evaporating unit for refrigerating systems of the flooded type, comprising a vessel for receiving the liquid refrigerant, an inlet aperture in one of the walls thereof, a spring pressed valve positioned on one side of said aperture and movable towards the aperture to contact with a valve seat, said valve having a valve stem extending through said aperture, a float and actuating arm positioned within the vessel and an independently mounted member for transmitting movement from the said float arm to said valve stem and for limiting the movement of the float in one direction independently of the valve stem.

4. An evaporating unit for refrigerating systems of the flooded type, comprising a vessel for receiving the liquid refrigerant, an inlet aperture in one of the walls thereof, service valves for controlling the flow of refrigerant to and from the unit, a spring pressed valve positioned on one side of said aperture and movable towards the aperture to contact with a valve seat, said valve having a valve stem extending through said aperture, a float and actuating arm positioned within the vessel, and an independently mounted cam member for transmitting movement from the said float arm to said valve stem, said valve member being removable from the outside of said wall without disturbing the service valves.

5. An evaporating unit for refrigerating systems of the flooded type, comprising a vessel for receiving the liquid refrigerant, an inlet aperture in one of the walls thereof, a spring pressed valve positioned on one side of said aperture and movable towards the aperture to contact with a valve seat, said valve having a valve stem extending through said aperture, a float and actuating arm positioned within the vessel, an independently mounted member for transmitting movement from the said float arm to said valve stem, said valve member being removable from the outside of said wall, and said float arm and independent member being removable as a unit from the inside of said wall.

6. An evaporating unit for refrigerating systems of the flooded type, comprising a vessel for receiving liquid refrigerant, a closure member provided with an independently positioned and freely movable inlet valve member, a float and actuating arm mounted on the inside of said closure member, and independently positioned means actuated by the movement of said float for unseating said valve member, and for limiting the movement of said float independently of said valve member.

7. An evaporating unit for refrigerating systems of the flooded type, comprising a ves-

sel for receiving the liquid refrigerant, a closure member for said vessel having an inlet passageway, inlet and outlet service valves having the housings and passageways fabricated directly in said closure member and having cooperating parts formed integrally with said closure member, and a valve member and float actuated means for operating the same positioned on opposite sides of said inlet, and being counter-active in normal operation, said valve member being removable without disturbing said service valves.

In testimony whereof I affix my signature.

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