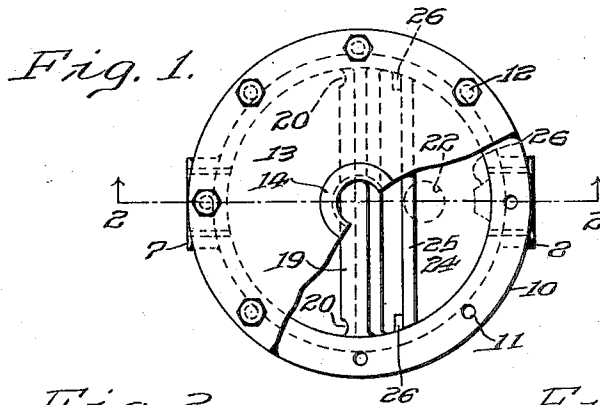
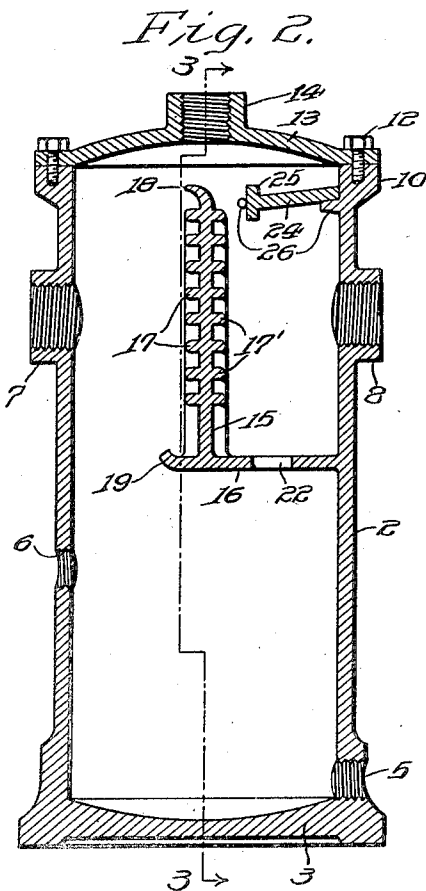
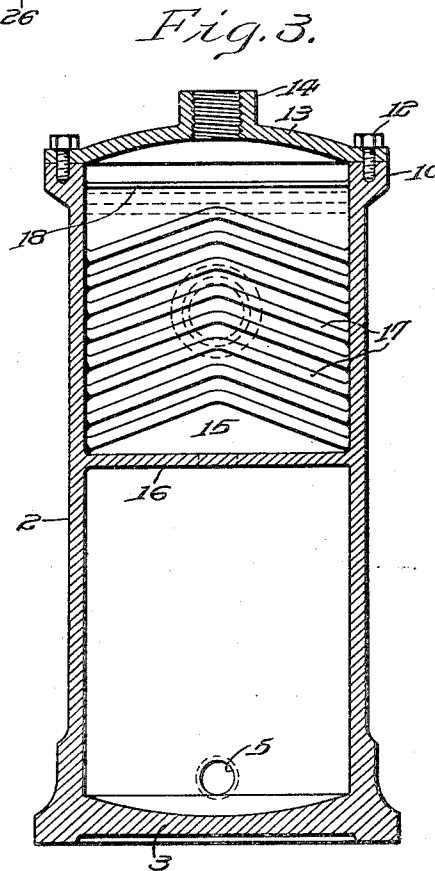


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C. P. WOOD
FLUID SEPARATOR

Filed March 8, 1922



WITNESS

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UNITED STATES PATENT OFFICE.

CLARENCE P. WOOD, OF PHILADELPHIA, PENNSYLVANIA.

FLUID SEPARATOR.

Application filed March 8, 1922. Serial No. 542,158.

To all whom it may concern:

Be it known that I, CLARENCE P. WOOD, a citizen of the United States, and a resident of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Fluid Separators, of which the following is a specification, reference being had to the accompanying drawing.

My invention relates to that class of devices utilized for effecting the separation of fluids and is particularly adapted for employment in refrigerating systems for separating the oil or other lubricant from the refrigerant. More specifically, as it is customary in certain types of compression refrigeration systems to circulate in certain parts of the system a suitable lubricating medium in conjunction with the refrigerant for the purpose of lubricating the working parts of the pump or compressor, it is requisite to effect a separation of the lubricant from the refrigerant after the mixture has passed through the pump or compressor in order that the lubricant may be returned to the mechanism which it is desired to lubricate in a form suitable for that purpose.

It will be understood that customarily the refrigerant, in the form of a vapor, is pumped from the refrigerating or expansion coils to the condenser where it is returned to liquid form and that as the refrigerant comes from the expansion coils there is mixed therewith in finely divided form and held in mechanical suspension thereby, a certain quantity of the lubricant employed in the system for lubricating the working parts. In installations in which sulphur dioxide is utilized as the refrigerant this lubricant is generally in the form of a suitable oil, or if ethylchloride is used as the refrigerant glycerine is frequently employed as the lubricant, and it is the function of the separator to effect a separation of the lubricant from the vaporized refrigerant ordinarily prior to the passage of the latter to the condensing coils.

It is therefore an object of my invention to provide means for effecting this separation which are efficient for the purpose intended, simple in form, not liable to get out of order and which may be manufactured at a relatively low cost.

My invention further comprehends all of the other objects and novel features of construction and arrangement which will here-

inafter appear from the following description of a preferred form of the invention or which are more particularly illustrated in the accompanying drawing forming a part thereof.

In the said drawing, in which I have illustrated a preferred form of my invention, Fig. 1 is a top plan view thereof with the cover partially broken away to show the interior construction of the separator; Fig. 2 is a vertical central section on line 2—2 in Fig. 1, and Fig. 3 is a vertical section on the line 3—3 in Fig. 2. Like numerals are used to designate similar parts in the several figures.

Referring more particularly to the form of the invention illustrated, the same comprises a cylindrical hollow body or casing 2 having a preferably integral base 3 which closes the lower end thereof. The casing is provided adjacent the base with a suitably threaded opening 5 for the reception of a pipe through which the lubricant after separation from the refrigerant may be withdrawn from the separator and may also be provided with a similar opening 6 positioned at a convenient distance above the base in which in practice a try-cock may be connected for determining the height of the liquid in the separator. The body of the separator is also provided at a point toward the upper end thereof with an interiorly threaded nipple or connection 7 for the attachment of a pipe through which the fluid whose constituents are to be separated is conducted to the separator and with a similar connection or nipple 8, preferably diametrically opposite the inlet connection and substantially in the same horizontal plane therewith, for the attachment of a pipe through which one of the constituents, for example the refrigerant, is removed from the separator after the separation has been effected.

The upper extremity of the body may be provided with a perimetral flange 10 to provide sufficient thickness of metal for the accommodation of the interiorly threaded holes 11 disposed at spaced intervals thereabout and which are entered by the cap screws 12 passing through a cover 13 adjacent its perimeter, this covering being operative to close the end of the body. As shown, the cover is provided with a central interiorly threaded nipple 14 which in certain installations is utilized for the attach-

ment of a pipe connection but under ordinary conditions may be operatively closed with a suitable pipe plug.

Positioned within the body 2 and extending preferably entirely across the same and at right angles to the axis of the inlet 7 is a partition 15 adjoining at its lower extremity a horizontally disposed shelf 16 preferably disposed at a point about midway the length of the body, the partition being provided on each side with a plurality of vertically spaced corrugations or ridges 17, 17' preferably formed integral with the partition, which in turn is preferably integral with the shelf. While in certain constructions the partition and shelf, if desired, may be formed separately from the body and operatively secured therein, I prefer to cast or otherwise form them integrally with the body in the manner indicated in the drawing. The ridges 17, 17' are, as stated, disposed one above the other on each side of the partition in vertically spaced relation, each ridge being preferably in the form of a relatively blunt inverted V when viewed as in Fig. 3, the apex of the V being substantially on the center line of the body and the ridge being inclined downwardly therefrom in either direction to its point of juncture with the wall of the body.

To assist in deflecting the incoming vapor current toward the top of the separator I preferably curve the upper extremity of the partition toward the inlet connection 7, thus providing a sort of hook-shaped element 18 overhanging the ridges 17, this element being disposed at a relatively short distance below the under side of the cover, and I also preferably extend the shelf 16 beyond the partition and in the direction of the inlet and provide a transversely extending upwardly curved lip 19 adjacent its edge, thus in effect forming a gutter below the ridges 17 operative to catch the separated lubricant as it drips downwardly from the ridges. Preferably, however, I terminate the lip a short distance from the points where it would otherwise join the wall of the body, thereby forming vents 20 through which the lubricant accumulated in the gutter may readily find its way downwardly to the bottom of the casing. Similarly, to permit the lubricant which would otherwise collect above the main portion of the partition 16 to find its way to the bottom of the body, I provide the partition with a relatively small aperture 22 through which the lubricant may flow.

For the purpose of additionally restricting and retarding the flow of the vapor to the separator as it passes from the inlet to the outlet thereof, I provide adjacent the upper end of the body and on that side of the partition adjacent the outlet a baffle plate

24. This plate is preferably segmental in

form and of a size to fit snugly around a portion of the interior of the casing and terminate adjacent but not in contact with the uppermost of the ridges 17'. It is preferably provided with a vertically positioned lip 25 along its straight edge and is supported within the body in a slightly downwardly inclined position in any suitable manner, conveniently by providing the interior of the body with a plurality of lugs 26 so disposed that the plate when placed in the body will rest upon and be supported thereby. I prefer to form this plate separately from the body and support it therein as just described, but in certain constructions the plate may be cast or otherwise formed integrally with the body similarly with the shelf and partition.

In operation, the several parts of the separator having been assembled as hitherto described and the device so connected that the fluid to be separated is drawn or forced thereinto through the inlet, the major portion of this fluid first impinges on the partition and ridges 17, thence passes upwardly and in a somewhat reverse direction over the partition and thence generally downwardly on ridges 17' and between the partition and the baffle plate and outwardly through the outlet. By reason of the peculiar internal construction of the separator, the velocity of the fluid during its passage therethrough is retarded and eddy currents set up, resulting in a very efficient separation of the suspended lubricant from its vehicle, such as the refrigerant gas, so that the latter passes from the separator substantially free from the lubricant while the latter collects by gravity in the bottom of the body in liquid form and in condition to be returned to the system through the outlet 5. It will, of course, be evident that a certain part of the vapors during their passage through the separator will be deflected in a downward direction to pass beneath the shelf and upwardly through the aperture 22 therein on their way to the outlet, but owing to the fact that the aperture 22 is of relatively small size, a comparatively small proportion of the vapors follow this course and those that do are constrained to move at a relatively low velocity and through a somewhat tortuous path, thus permitting the lubricant contained therein to separate out and pass to the bottom of the casing.

While my invention is particularly adapted for use in effecting the separation of the lubricant from the refrigerant in a refrigerating system and while I have more particularly referred herein to its employment for such purpose, I do not thereby desire or intend to in any manner limit its use solely thereto as the invention may readily be utilized for effecting separation of the

constituents of composite fluids other than those consisting of a refrigerant gas and a lubricant if desired. Moreover, while I have herein illustrated and described a preferred embodiment of my invention, it is not my purpose to thereby limit myself to any precise details of construction or arrangement of the various parts, as suitable changes and modifications may be made therein if desired without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, I claim and desire to protect by Letters Patent of the United States:

1. In a device of the class described, the combination with a cylindrical casing operatively closed at each end and having an inlet and an outlet, of a vertical partition within and extending diametrically of said casing and normal to the axis of the inlet, said partition having a plurality of vertically spaced, inverted V-shaped ridges on each of its sides and its upper extremity curved in the direction of said inlet, and a substantially horizontally disposed shelf extending beneath said partition provided with an upwardly curved transversely extending lip along its edge adjacent the inlet.

2. In a device of the class described, the combination with a cylindrical casing operatively closed at each end and having an inlet and an outlet, of a partition diametrically disposed within the casing substantially at right angles to the axis of the inlet and having a plurality of vertically spaced, substantially V-shaped ridges on each of its sides and terminating below the top of the casing, the upper extremity of the partition

being curved toward the inlet, a shelf beneath and adjoining the partition and provided with an aperture on one side of the partition and an upwardly curved transversely extending lip on the other side of the partition, the ends of said lip being out of contact with the wall of the casing, and a segmental baffle plate disposed above said shelf extending from the wall of the casing toward the partition and terminating adjacent but out of contact therewith.

3. In a device of the class described, the combination with a cylindrical casing operatively closed at each end and having an inlet and an outlet, of a partition diametrically disposed within the casing substantially at right angles to the axis of the inlet and having a plurality of vertically spaced, substantially V-shaped ridges on each of its sides and terminating below the top of the casing, the upper extremity of the partition being curved toward the inlet, a shelf beneath and adjoining the partition and provided with an aperture on one side of the partition and an upwardly curved transversely extending lip on the other side of the partition, the ends of said lip being out of contact with the wall of the casing, and a segmental baffle plate positioned above that portion of the shelf containing the aperture, extending from the wall of the casing toward the partition and terminating out of contact therewith, and means for removably supporting the baffle plate within the casing.

In witness whereof, I have hereunto set my hand this fourth day of March, 1922.

CLARENCE P. WOOD.