

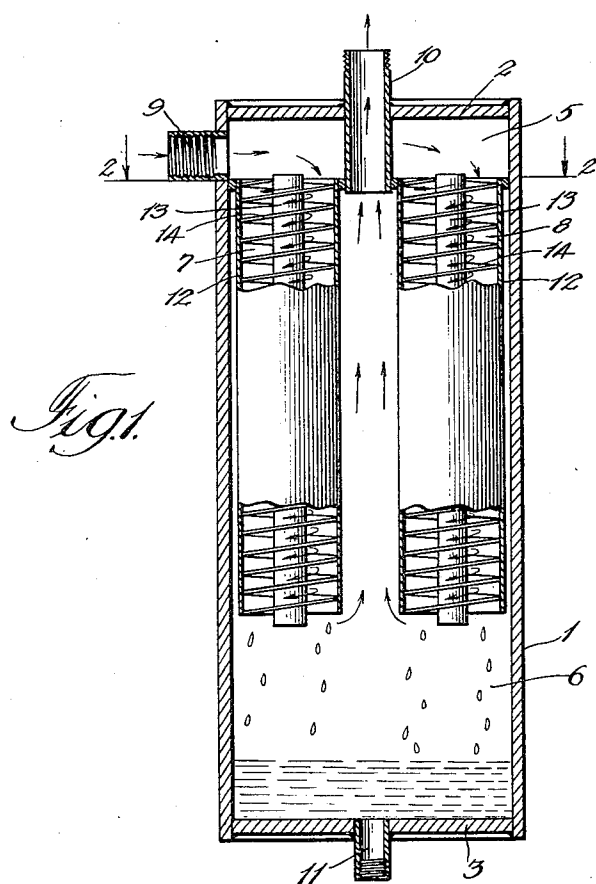
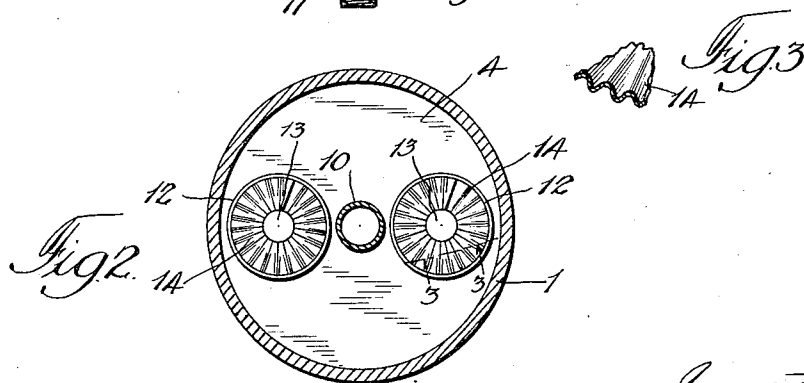
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2,446,882

OIL SEPARATOR

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UNITED STATES PATENT OFFICE

2,446,882

OIL SEPARATOR

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1 Claim. (Cl. 183—34)

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My invention relates to oil separators.

Oil in the refrigerating systems is an absolute necessity in the compressor. The bearings, wrist pins and cylinder walls must have oil. The suction and discharge valves act quicker and close tighter when they are lubricated. A compressor which passes a little oil through the discharge can be more efficient than one which doesn't lose a drop. But from here through the rest of the system, oil is a waster of power and water and is a brake on the production of desired temperatures.

It is a waster in the condenser and lowside. Therefore, it is highly desirable to provide a positive means of separating oil from the gas immediately after it leaves the compressor.

One of the objects of my invention is to provide an oil separator for use with refrigerating systems and the like, in which the oil mist as well as the drops of oil will be separated out from the gasified refrigerant.

Further objects and advantages of the invention will be apparent from the description and claim.

In the drawings, in which an embodiment of my invention is shown,

Figure 1 is an axial sectional view of an oil trap;

Fig. 2 is a section on the line 2—2 of Fig. 1; and Fig. 3 is a section on the line 3—3 of Fig. 2.

The construction shown comprises a hollow cylindrical shell 1 having upper and lower heads 2 and 3 and an intermediate partition 4 which provides upper and lower expansion chambers 5 and 6, a pair of helical passageways 7 and 8 leading downwardly from the expansion chamber 5 at the upper end of the cylinder into the expansion chamber 6 in the lower part of the cylinder, a gas inlet 9 from the compressor to the upper expansion chamber, a gas outlet 10 from the lower expansion chamber 6 to the condenser side, and an oil drain 11 from the bottom of the lower expansion chamber 6.

The helical passageways 7 and 8 are similar in construction and the description of one will be sufficient for both. Each comprises an outer cylindrical shell 12, an inner cylindrical core 13, and a helical partition 14 extending between the outer shell and the inner cylinder and forming therewith a helical passageway 7 or 8 leading from the upper expansion chamber 5 to the lower expansion chamber 6.

The discharge gas from the compressor enters the oil separator at the side near the top at 9. The gas passes into the inlet header 5 and is distributed around the inside of the separator. Due

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to a velocity drop of 80 per cent and a change in direction of flow due to distribution the large drops separate out and drain down to the header plate 4 and down the helical passages 7 and 8.

From the inlet header the gas and oil mist enters the helical passages. The helical partitions 14 are welded into the header and the header is welded into the walls of the cylinder 1, so that all the gas and oil must pass down the helical passages. The sum of the free area of the helical passages is equal to the area of the inlet pipe 9. When the gas enters the helical passages, its velocity is stepped up again equal to the inlet velocity, traveling at a high speed inside the helical passages. The created centrifugal force throws the oil vapor and gas against the helical inside wall of the casing 12. The helical partition 14 is corrugated. During the passage down the helical passages, the oil vapor in the discharge gas is thrown against the walls, mixed and churned so that the vapor becomes large drops, which flow down the helical passages. The helical passage travel is a lineal distance of 12 to 18 feet.

At the bottom of the helical passage, the velocity of the gas is again reduced 80 per cent and the directional flow is reversed. The drops of oil fall into the oil basin and the oil-free gas passes up and through the outlet 10 at the top of the separator.

For certain types of work, I have found that satisfactory results are obtained using a construction in which the cylinder 1 is about 30 inches high and 8½ inches in diameter and in which the inlet pipe 9 and the outlet pipe 10 are 1¼ inch pipe. The apparatus may be designed to stand pressures up to 200 pounds or more.

It will be noted that the construction includes no moving parts. While I have shown a construction in which there are only two helical passageways 7 and 8, it is obvious that the number might be increased if higher capacity were desired. In practice, they have been constructed with twenty or more of these helical passageways.

Further modifications will be apparent to those skilled in the art and it is desired, therefore, that the invention be limited only by the scope of the appended claim.

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

An oil separator for separating oil from a gas or vapor comprising a vertical elongated casing having a horizontal partition therein adjacent its upper end to provide a distribution chamber thereabove and a separator chamber therebelow,

an inlet passage to said distribution chamber, a plurality of separators in said separator chamber extending downwardly from said partition and terminating a substantial distance above the bottom of said separator chamber, each separator comprising a helical passage in communication with said distribution chamber at its upper end and with said separator chamber at its lower end, and a discharge passage leading from the upper end of said separator chamber, the size of the passages and chambers being such as to provide a substantial velocity drop in the distribution chamber and in that part of the separator chamber below the separator, each separator comprising a central core, a cylindrical shell surrounding said core and spaced therefrom, and a helical ribbon extending around said core between said core and shell having radial corrugations flaring outwardly from the core to the shell.

JOSEPH I. MORRISON.

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