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F. E. LAMMERT

FLUID SEPARATOR AND HEATER

Filed Feb. 18, 1926

Fig. 1.

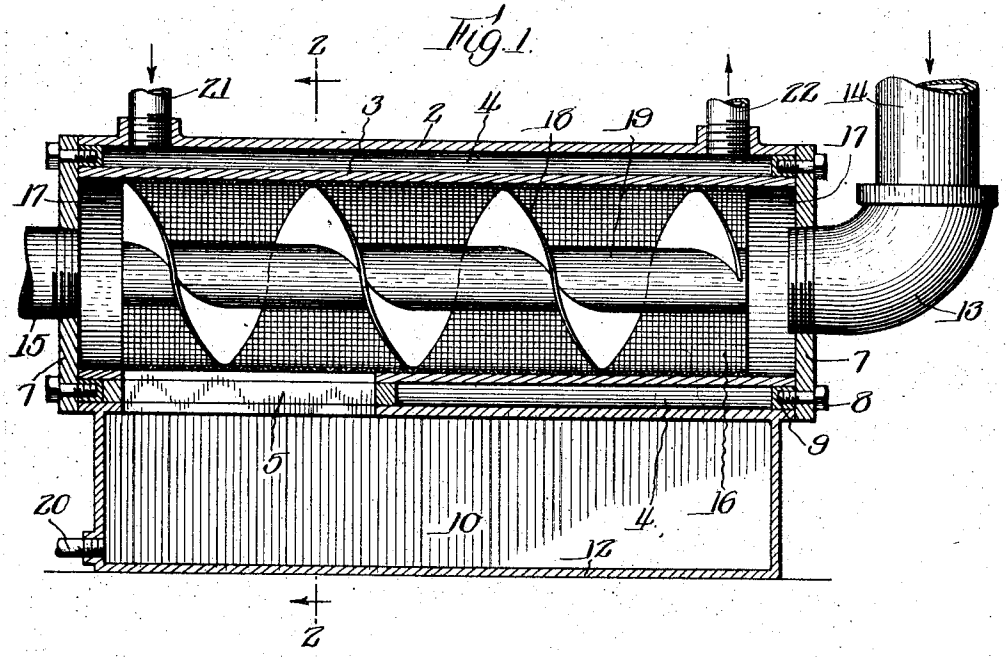
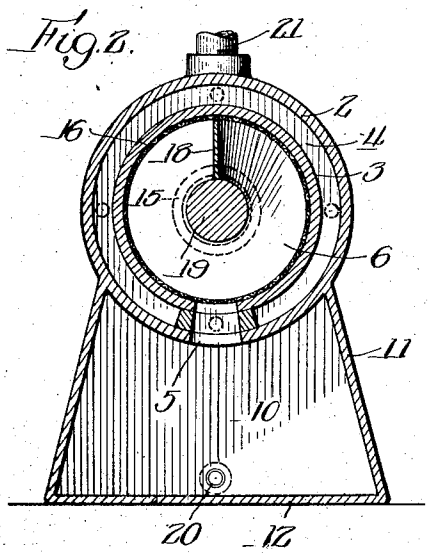


Fig. 2.



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FLUID SEPARATOR AND HEATER.

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My invention relates primarily to a peculiar type of oil separator used in separating oil from the discharge of a pump of the air compressor or exhaust type, the pump being either a rotary or a piston pump of the class wherein considerable lubricant is used and more or less of the lubricant passes out with the air or gases discharged from the pump. When the pump is one which is used in connection with an oil burning apparatus or other apparatus wherein a heating effect is desired my invention not only separates oil but uses the heat due to the compression of the air or gases to heat the fuel oil for an oil burner or other heating that may be used wherewith a conservation of the heat is of value.

The object of the invention is to collect in the simplest manner possible as much of the entrained oil as is possible to collect from air or gases that have passed through the pump and at the same time in collecting the oil use the same oil collecting apparatus as a radiator to radiate heat to heat the fuel oil in the case of oil burners as an assistance in making the fuel oil more fluid and more easily atomized by the burner and in any case to conserve as much of the heat as possible that is imparted to the discharged fluid of the pump and thus save a loss of this heat by using the heat over again for a heating purpose in some medium wherein this heat may be conserved for a useful purpose or in the absence of using this heat thus collected in the oil separator the object in some instances will be that of cooling down the discharge from the pump rapidly and quickly by using the oil separator, as it were, as a cooling apparatus. Thus, in either case, the heat from the fluid discharged by the pump will be taken up by the oil separating apparatus to be used either for heat for a useful purpose or to be quickly carried away for the purpose of cooling the discharged fluid.

Reference will be had to the accompanying drawings in which Fig. 1 is a longitudinal vertical elevation of my apparatus.

Fig. 2 is a transverse sectional elevation on line 2—2 of Fig. 1.

The apparatus is composed primarily of a double-walled drum the outer wall of which is indicated by 2, an inner shell by 3, and 4 indicates the space between the two walls. This double-walled drum is substantially a solid drum with the exception of a short space at the left of Fig. 1 wherein there is a clear opening 5 for a short distance in the bottom of the drum. The inner shell encloses a cylindrical chamber 6 and this chamber 6 as well as the space 4 between the two walls of the drum are closed at each end by headers or head pieces 7 secured by bolts 8 into the separator rings 9 which rings are integral with the wall 2 and the shell 3 or else permanently secured therein by welding or other means. The drum is supported as here shown upon the walls of the tank or reservoir 10 having the vertically inclined walls 11 with the flat bottom 12. This reservoir opening up through the space 5 into the interior of the cylindrical chamber 6 of the drum. At the right end of the drum there is entered through the elbow 13 a pipe passageway into the cylindrical space 6 of the drum, the elbow 13 connecting to the pipe 14 which receives the discharge from a compressor of any suitable type of either rotary or piston construction and the discharge from the cylindrical chamber passes out through the pipe 15 at the left of the machine through the end of the drum 7 at the left end.

On the inside of this cylindrical chamber 6 there is a wire netting drum 16 which acts as a lining for the chamber 6 but this lining is omitted at each end as shown by the clear spaces 17 Fig. 1. Within this wire netting lining there is supported a spiral conveyor flange 18 wound upon a central shaft 19 which may be either tubular or solid but in the case of its being tubular the ends will be closed and thus the discharged fluid coming through the pipe 14 and the elbow 13 into the cylindrical chamber 6 is forced by the fixed spiral conveyor flange 18 to rotate around the shaft 19 and round and round, as it were, within the wire netting lining 16 and finally passes out through the pipe 15 thus there is centrifugal, whirling, turbulent action produced on the fluids discharged through the chamber 6. A peculiar turbulence is brought about in the passage of this fluid due to the combination of the spiral flange 18 and the wire netting which results not only in producing a centrifugal or cyclonic action of the fluid passing through but also produces, as it were, a rotary individual movement of the different particles of air bringing about a revolving

contact with the wire netting which serves to bring the oil in contact either with the spiral flange 18 or the wire netting and thus lodge the oil free from the air or gases in which it is entrained and thus the oil is readily separated from the discharging fluids and runs down the walls of the chamber 6 and wire netting 16 to the bottom of the chamber finally passing through the space 5 into the reservoir or tank 10 at the bottom and from this tank the oil may be used over again or drawn off through the pipe 20 at the bottom of the tank.

The centrifugal, cyclonic, and turbulent action of the discharging gases imparts heat to the inner shell 3 of the drum and thus this becomes a radiator wall highly efficient in taking the heat away from the gases which pass through the cylindrical chamber 6 and the wire netting lining assists in absorbing and taking the heat from the gases and transmitting it to the shell 3. In the case of the oil burner with which a compressor is often used the oil to be burned is circulated into the space 4 between the two walls of the drum coming into this space by the pipe 21 being discharged therefrom by the pipe 22 thus circulating around the inner shell 3 of the drum and becoming heated thereby and thus the heat which has cost energy in making it in compression of the fluids in the compressor is utilized in heating the oil which goes to the burner and helps to put the oil in better condition to be atomized by the burner apparatus. Of course, where it is desirable, to cool the chamber rapidly with no thought of using the heat taken from the discharged fluids from the compressor then instead of fuel oil, a cooling fluid such as water may be circulated through this space 4 between the outer and inner walls of the drum.

Thus my apparatus not only brings about a very efficient separation of the entrained oil from the fluid from the compressor but likewise abstracts the heat from this fluid in a very efficient manner and conserves the said heat when opportunity affords for using the conserved heat.

The peculiar turbulence brought about by the spiral flange 18 and the wire netting lining of the cylindrical chamber 6 is highly efficient in producing the results desired.

What I claim is:

1. In an apparatus of the class described having a cylindrical horizontally arranged shell lined with a wire netting within which there is a spiral air deflector having a cylindrical core forming a spiral passageway for a fluid to be cooled, an aperture in the lower side of the said shell for the escape of a separated liquid, in combination with a jacket about the said cylinder in which there may be passed a medium adapted to absorb the heat.

2. In an oil recovery and fuel oil heating apparatus, the combination with a cylindrical shell provided with an oil outlet, of a lining of wire netting for said shell, a header provided with a compressed air inlet closing one end of said shell, a second header provided with a discharge opening closing the opposite end of said shell, an outer concentric wall, provided with oil inlet and discharge openings, spaced from and concentric with said shell terminally closed by said headers and provided with a passage connecting with said oil outlet of said shell, and a spiral air deflector having a cylindrical core fitting inside said wire lining.

3. In an apparatus of the class described, the combination with a cylindrical shell provided with a fluid inlet at one end and a fluid outlet at an opposite end, a lining of wire netting within said shell, an outer concentric wall spaced from said shell provided with liquid inlet and discharge openings, a spiral fluid deflector fitting inside said wire lining and a reservoir arranged for receiving liquid from said shell.

Signed at Chicago, in the county of Cook and State of Illinois, this 29th day of January, 1926.

FERDINAND ERNST LAMMERT.