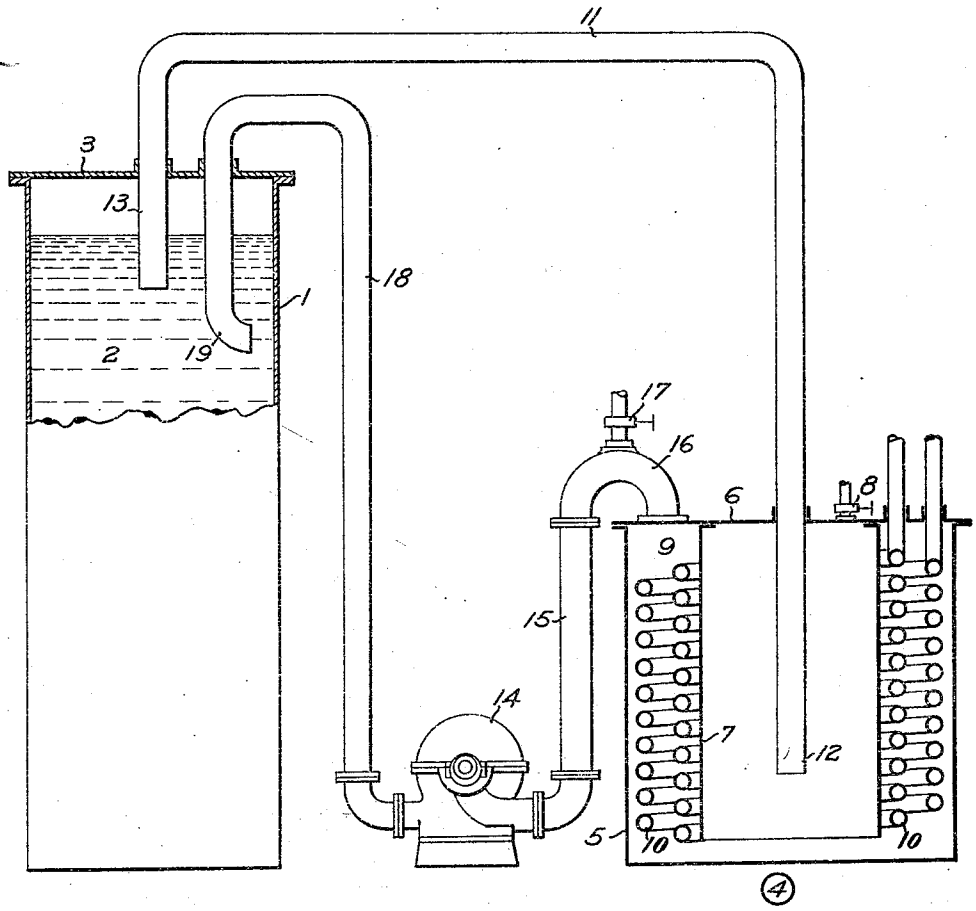
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Nov. 23, 1926. 1,607,801

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OIL CIRCULATING SYSTEM

Filed Dec. 20, 1920



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Patented Nov. 23, 1926. 1,607,801

UNITED STATES PATENT OFFICE.

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OIL-CIRCULATING SYSTEM.

Application filed December 20, 1920. Serial No. 432,140.

This invention relates in general to fluid circulating systems. It may be applied for circulating and cooling oil which is used for cooling transformers.

It sometimes occurs that the radiating surface of a transformer is not large enough to carry away the heat generated. This is more particularly true if the transformer is overloaded. The capacity of such a transformer may be increased by the present invention. One of the objects of the present invention is the provision of means and a method of operating such means whereby the oil in a transformer may be circulated and cooled to a predetermined desired extent thus increasing the capacity thereof.

Another object of the invention is the provision of an oil circulating system which may be applied to existing transformers in a simple and efficient manner. Other objects will appear hereinafter as the description of the invention proceeds.

The novel features of the invention will appear from this specification and the accompanying drawing forming a part thereof and disclosing one embodiment of said invention, and all these novel features are intended to be pointed out in the claims.

The single figure of the drawing illustrates in diagrammatic form a circulating system embodying the features of the invention and the manner in which it may be applied to a transformer.

In the drawing a transformer 1 has been illustrated diagrammatically by the usual tank forming a part thereof. This tank is adapted to contain oil 2 and is provided with a cover 3, preferably not air tight. Means are usually provided (not shown) whereby the oil 2 may be cooled and the form of this means, as far as the present invention is concerned, is immaterial. The oil circulating system disclosed includes a cooling device 4 comprising a tank 5 provided with an air-tight cover 6. Within the tank 5 is disposed a baffle member 7 which may be cylindrical or of other suitable form and which forms, in the instance disclosed, an air-bell-like chamber or air-trap with the cover 6, the member 7 being fitted air-tight to said cover. It is of course apparent that the member 7 may be provided with a cover independent of the cover 6. A valve 8 is provided communicating with the upper portion of the air-bell-like chamber and is here shown as fitted to the cover 6.

The member 7 forms a space 9 between it and the walls of the tank 5. Cooling coils 10 in which a cooling fluid, as water, may be circulated are adapted to be disposed in the space 9.

A siphon 11 is provided, here shown as passing with an air-tight fit through the cover 6 into the air-bell-like chamber, the lower end 12 of said siphon preferably ending short of the bottom of said chamber. The upper end 13 of the siphon is submerged below the surface of the oil 2.

A pump 14 has its suction end connected, by means of a pipe 15 and elbow 16, with the space 9. The elbow 16 is provided with a valve 17. The discharge end of the pump is connected by means of a pipe 18 with the oil in the transformer, the end 19 of said pipe being here shown as having an opening below and discharging away from the upper end 13 of the siphon.

The operation of the system is as follows:

Assuming that the siphon and other parts of the circulating system are empty of oil and it is desired to start the circulation in said system the valve 8 is opened, the valve 17 is opened and oil is introduced through the latter valve to prime the pump 14 and fill the tank 5. Valves 8 and 17 are then closed and the pump 14 is started. The withdrawal of oil from the tank 5 by the pump produces suction at the lower end of the siphon and air contained therein bubbles up through the oil in the air-bell-like chamber to the top thereof. This action continues until oil from the transformer has completely filled the siphon. At this time the lower end of the siphon is still covered with a predetermined head of oil. The pump 14 is then stopped and the valve 8 is open permitting the air in the upper part of the air-bell to escape. As air escapes through the valve 8 its place is taken by oil drawn from the transformer tank by the siphon and when oil appears at the valve 8 the latter is closed. The entire system is now completely filled with oil and the pump is again re-started whereby oil may be continuously circulated through the system and cooled by means of the coil 10.

It is preferable, although not absolutely necessary, to open the valve 8 and permit the

air which was in the siphon to escape as described above. Oil may, clearly, be circulated in the system, even though there is a certain quantity of air in the air-bell, as long as the lower end of the siphon is covered with oil, but a small quantity of air is carried through the siphon from time to time in the form of minute bubbles and this air will gradually fill the air-bell so that if, when starting the system, the air-bell is empty of air and filled with oil, the system will operate a longer time before it is necessary to again open the valve 8 permitting the accumulated air to escape.

It should be understood that it is not desired that the invention claimed be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

It is claimed and desired to secure by Letters Patent:

1. The method of starting and maintaining the circulation of fluid in a fluid circulating system including a pump and siphon associated with a fluid containing tank, which comprises priming said pump, running said pump until said siphon is filled, stopping said pump, eliminating the air originally contained in said siphon from said system and then re-starting said pump.

2. In an oil circulating system for oil immersed apparatus, a receptacle, means for drawing oil out of said receptacle, a pump for forcing said oil back into said receptacle, and means for trapping air carried over in said first named means and preventing the entrance thereof into the suction side of said pump.

3. In an oil circulating system for oil immersed apparatus, a receptacle, a siphon having its upper portion communicating with the oil in said receptacle, a pump having its discharge end communicating with said oil, and means whereby operation of said pump starts said siphon, traps the air therefrom and prevents entrance thereof to the suction side of said pump.

4. In an oil circulating system for oil immersed apparatus, a receptacle, a siphon having its upper portion communicating with the oil in said receptacle, a pump having its discharge end communicating with said oil, and means whereby operation of said pump starts said siphon, and means for preventing air reaching the pump discharge including means disposed between said siphon and the suction side of said pump for eliminating from said circulating system air carried over in said siphon.

5. In an oil circulating system for oil immersed apparatus, a receptacle, a covered tank, an air-bell-like chamber within said covered tank and spaced from the walls thereof, a pump having its suction side connected to said space and discharge side to the oil in said receptacle, means whereby oil may be introduced on the suction side of said pump, a valve for permitting the escape of air from said air-bell chamber, and a pipe, one end of which communicates with the oil in said receptacle and the other end of which is disposed within said air-bell chamber.

6. In an oil circulating system for oil immersed apparatus, a receptacle, a covered tank, an air-bell-like chamber within said covered tank and spaced from the walls thereof, a pump having its suction side connected to said space and discharge side to the oil in said receptacle, means whereby oil may be introduced on the suction side of said pump, a valve for permitting the escape of air from said air-bell chamber, and a siphon, the upper end of which communicates with the oil in said receptacle and the lower end of which is disposed within said air-bell chamber.

In testimony whereof, the signature of the inventor is affixed hereto.

LOUIS C. NICHOLS.