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BAFFLED HEADER MANIFOLD FOR COOLING SYSTEMS OF TRANSFORMERS

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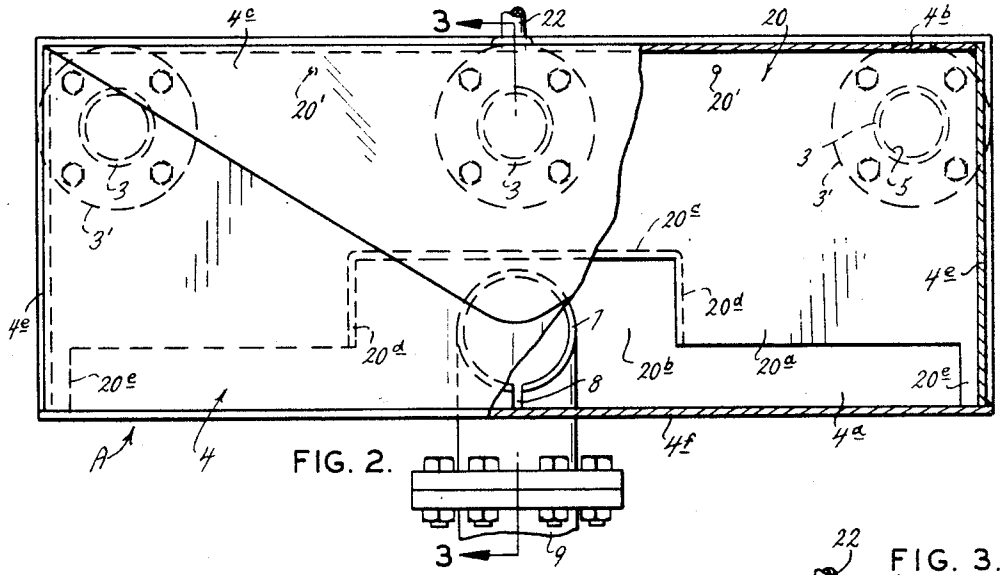


FIG. 2.

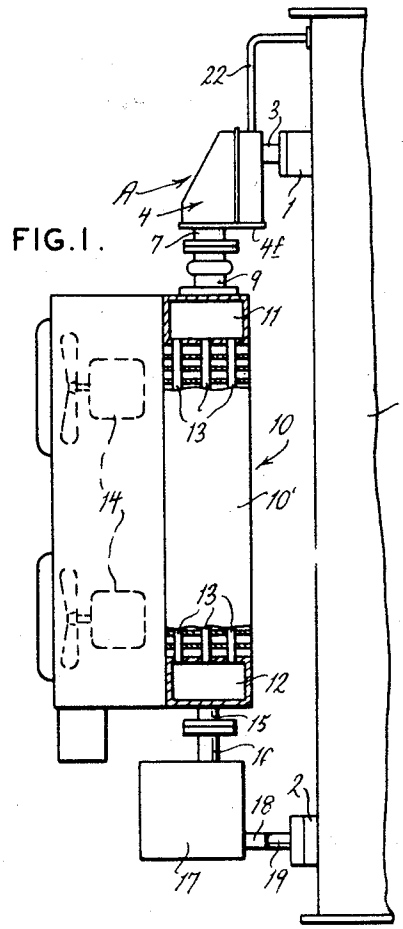


FIG. 1.

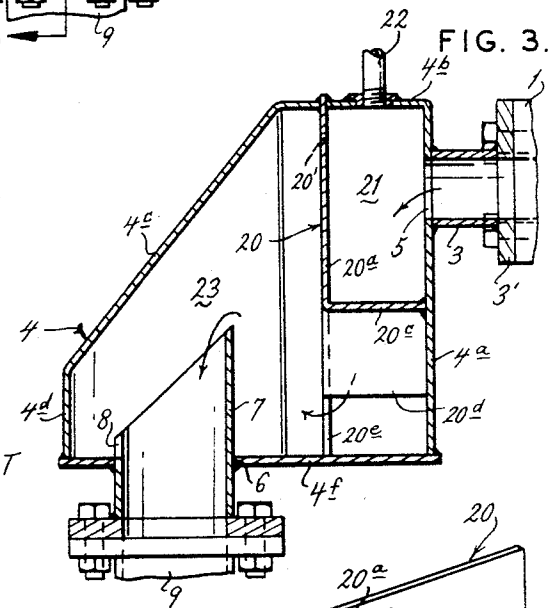


FIG. 3.

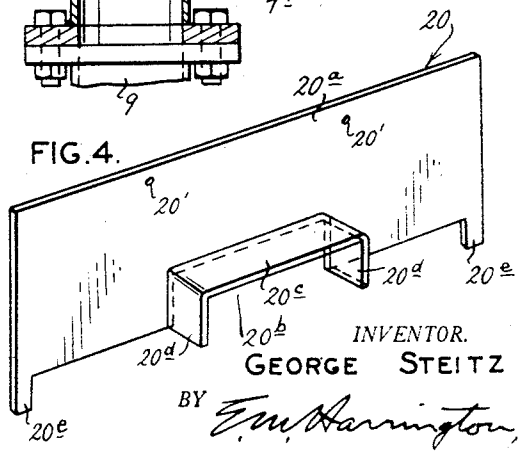


FIG. 4.

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4 Claims. (Cl. 183—2.5)

This invention relates generally to cooling systems for transformers and more specifically to an improved baffled header manifold for forced oil, air cooling systems for transformers, the predominant object of the invention being to provide a baffled header manifold for forced oil, air cooling systems for transformers through the use of which introduction of air bubbles into the oil stream, as a result of pump suction, is eliminated.

Fig. 1 is a fragmentary side elevation showing a forced oil, air cooling system in assembled relation with a transformer, said cooling system including as a part thereof a baffled header manifold constructed in accordance with the present invention.

Fig. 2 is a front elevation of the baffled header manifold shown in Fig. 1.

Fig. 3 is a cross-section taken on line 3—3 of Fig. 2.

Fig. 4 is a perspective of a baffle which forms a part of the baffled header manifold of the present invention.

In the drawings, wherein is shown for purposes of illustration, merely, one embodiment of the invention T designates in Fig. 1 a part of the tank of a transformer, said transformer being provided a pair of radiator valves 1 and 2 which control the passage of oil from and into the interior of the tank T of the transformer. Leading from the housing of radiator valve 1 is a tubular conductor 3 which forms a part of a baffled header manifold A, said tubular conductor being provided with an annular flange 3' which is secured by suitable fastening means to the housing of said radiator valve 1. The end of the tubular conductor opposite to the flanged end thereof is welded, or otherwise secured, to the rear wall 4^a of the housing 4 of the baffled header manifold A at an opening 5, formed through said rear wall, with which the bore through the tubular conductor registers (Fig. 3). The housing 4 of the baffled header manifold includes, also, a top wall 4^b from which is extended downwardly and forwardly an upper front wall portion 4^c, said upper front wall portion merging into a lower, vertical, front wall portion 4^d. The housing 4 of the baffled, header manifold includes opposite end walls 4^e and at their lower ends these opposite end walls, the lower front wall portion 4^d, and the rear wall 4^a, are welded, or otherwise secured, to marginal portions of the bottom wall 4^f of the housing 4 of the baffled, header manifold A. The bottom wall of the housing 4 of the baffled, header manifold A has an opening 6 formed therethrough through which extends a tubular conductor 7, said tubular conductor 7 being welded, or otherwise secured, to said bottom wall, and having a mitered upper end, and a flanged lower end, as shown in Fig. 3, the wall of said tubular conductor 7 being provided with a slot 8, as shown to good advantage in Fig. 3, which serves a purpose to be hereinafter set forth.

Arranged in communication with the bore of the tubular conductor 7 through the instrumentality of a tubular conductor 9 is a cooling structure 10 which comprises a housing 10' a portion of which houses a cooling unit having a top hollow header 11 and a bottom hollow header

12, there being tubes 13 extending from said top to said bottom header which communicate at their opposite ends with the interiors of said top and bottom headers. Also, another portion of said housing 10' houses one or more suction fans 14 which serve to draw air through and about said tubes 13 so as to aid in the cooling of oil passing therethrough. The bottom hollow header is provided with a tubular conductor 15 that is provided with a flange at its lower end, and this flange is suitably secured to a similar flange at the top of a tubular conductor 16 which leads to the housing of a centrifugal pump 17, there being a conductor 18 leading from said pump housing to a lower manifold 19 which is connected to the lower radiator valve 2 of the transformer T.

Arranged within the housing 4 of the baffled manifold A is a baffle 20 which is shaped as is shown to good advantage in Fig. 4. In other words, the baffle 20 comprises a plate 20^a having a centrally located cutout 20^b, there being an elongated wall 20^c that extends rearwardly from the top marginal edge of said cutout, and opposed side walls 20^d which extend rearwardly from opposed side edges of said cutout. The baffle 20 is arranged with respect to the rear wall 4^a of the housing of the baffled header manifold so that the rear edge of the wall 20^c and the rear edges of the opposed side walls 20^d contact with said rear wall 4^a of said manifold A and said rear edges of said walls 20^c and 20^d are welded, or otherwise secured, to said rear wall 4^a. At the opposite sides of the plate 20^a of which the baffle 20 is comprised, said plate is provided with extensions 20^e which project downwardly and contact with the bottom wall of the manifold housing 4, as shown in Fig. 3, and as also shown in that view the top edge of the plate 20^a of which the baffle 20 is comprised contacts with, and is welded, or otherwise secured, to the top wall 4^b of the housing of the manifold A.

It is plain from the foregoing that a compartment 21 is produced by the plate 20^a of the baffle 20, and portions of the rear wall 4^a and the top wall 4^b of the housing 4 of the manifold A, this compartment being closed at a central portion of its bottom by the wall 20^c and the walls 20^d and being open at its bottom at its opposite ends beyond the walls 20^d. Also, the top wall 4^b of the housing of the manifold has related thereto a vent pipe 22 which communicates with the compartment 21 through an opening formed through the top wall 4^e of the manifold housing, said vent pipe being suitably connected at its opposite end into the interior of the tank T of a transformer. Additionally, the plate 20^a of which the baffle 20 is comprised is provided with a pair of vent holes 20' formed therethrough which serve a purpose to be hereafter set forth.

In the operation of a cooling system which includes as a part thereof a manifold constructed and arranged in accordance with the present invention, the function of said manifold is to direct oil flowing from the transformer tank through the radiator valve 1 and tubular conductor 3, into the compartment 21, said oil in compartment 21 being directed longitudinally of the compartment 21 in opposite directions toward the opposite end portions of said compartment 21 which are open at their bottoms, through which said oil passes downwardly and turns upwardly into the compartment 23, as indicated by the arrows in Fig. 3. The compartment 21 is designed to obtain a very low oil flow velocity so as to allow a time factor for entrapped air bubbles to rise to the top surface of the oil in motion. The upper section of compartment 21 is connected by means of the vent pipe 22 into the transformer tank at a location above the highest level attained by the oil in the transformer tank, and this vent pipe serves two functions, first the equalization of gas pressure at the top of the compartment 21 with the gas pressure

above the oil in the transformer tank. Second, the vent pipe **22** provides a means for the escape of gas bubbles after being released from the low velocity oil stream in compartment **21**. The transformer oil flowing into compartment **23** of the manifold flows slightly upward and passes into the open top of the tubular conductor **7**, this flow also being at very low oil velocity in order to allow a second purging of gas bubbles not purged in compartment **21**. Gas bubbles purged in compartment **23** will rise and vent through the vent holes **20'** into the upper portion of compartment **21**, thence to transformer tank by way of the vent pipe **22**. Also, the slot **8** in the wall of the tubular conductor **7** is provided to facilitate complete draining of the housing of manifold A.

I claim:

1. For use in a transformer cooling system of the type in which oil is pumped from the transformer through an air-cooled radiator and back to the transformer, a header for effecting the purging of air from the oil before it enters the radiator comprising a housing, a vertical plate in the housing dividing it into first and second compartments, said plate having a lower edge portion spaced from the bottom of the housing so that said compartments are in communication with one another toward the bottom of the housing, said housing having an inlet for horizontal entrance of oil to the first compartment opposite said vertical plate toward the top of the first compartment, a horizontal baffle in the first compartment at said lower edge portion of the plate for impeding the flow of oil from the inlet to the space in the housing below the horizontal baffle, said housing having an outlet from the bottom of the second compartment, said outlet comprising a tubular conductor which extends up into the second compartment from the bottom of the housing, the end of said conductor within the second compartment being mitered, the mitered end of the tubular conductor being angled downward in the direction away from the vertical plate, the lowest point of the mitered end of the tubular conductor being above the bottom of the housing, the conductor having a slot from this point to the bottom of the housing, said housing having a vent from the top of the first compartment, and said first and second compartments being in communication adjacent the top of the housing for venting air from the second to the first compartment.

2. For use in a transformer cooling system of the type in which oil is pumped from the transformer through an air-cooled radiator and back to the transformer, a header for effecting the purging of air from the oil before it enters the radiator comprising a housing, a vertical plate in the housing dividing it into first and second compartments, said plate having a lower edge portion spaced from the bottom of the housing so that said compartments are in communication with one another toward the bottom of the housing, said housing having a centrally located inlet for horizontal entrance of oil to the first compartment opposite said vertical baffle toward the top of the first compartment, a centrally located baffle of inverted U-shape in the first compartment at said lower edge portion of the plate for impeding the flow of oil from the inlet to the space in the housing below the baffle, said plate having a cutout bounded by the baffle, said housing having an outlet from the bottom of the second compartment, said outlet extending up into the second compartment from the bottom of the housing, said housing having a vent from the top of the first compartment, and said plate having at least one vent hole adjacent the top of the housing.

3. A header as set forth in claim 2 wherein said outlet comprises a tubular conductor which extends up into the second compartment from the bottom of the housing, the end of said tubular conductor within the second compartment being mitered, the mitered end of the tubular conductor being angled downward in the direction away from the vertical plate.

4. A header as set forth in claim 3 wherein the lowest point of the mitered end of the tubular conductor is above the bottom of the housing, and the conductor has a slot from this point to the bottom of the housing.

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