July 9, 1968 C. B. MURRAY 3,391,732

RADIATOR CONSTRUCTION

Filed July 29, 1966

FIG. 1

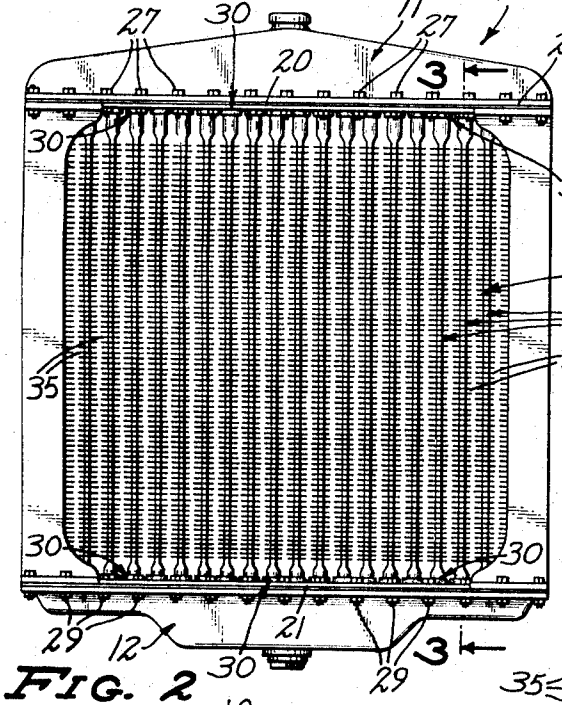


FIG. 2

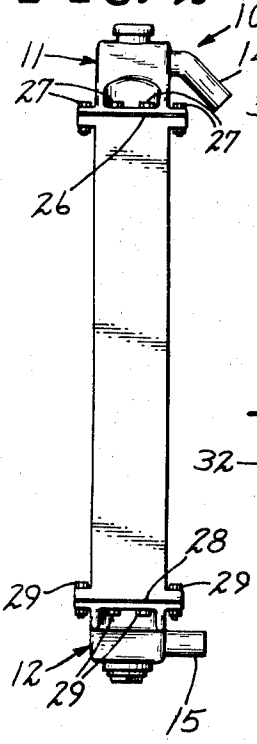


FIG. 3

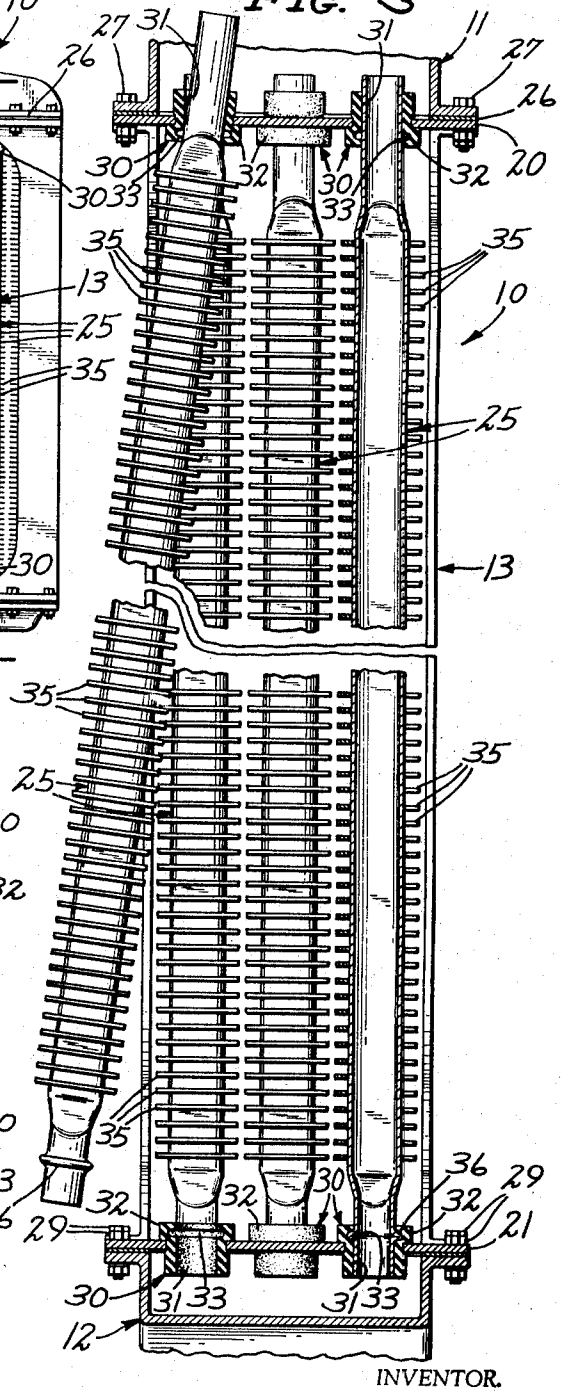


FIG. 4

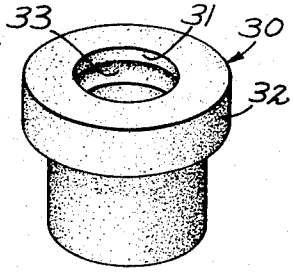
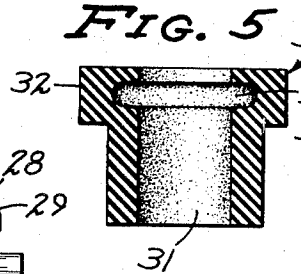


FIG. 5



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United States Patent Office

3,391,732

Patented July 9, 1968

3,391,732

RADIATOR CONSTRUCTION

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Filed July 29, 1966, Ser. No. 568,515
1 Claim. (Cl. 165—76)

ABSTRACT OF THE DISCLOSURE

Upper and lower radiator tank members having holes in the lower and upper surfaces, respectively, with removable lengths of finned conduit extending therebetween and resilient grommets positioned in the holes so as to surround the conduits adjacent the ends thereof to prevent leakage therearound. A radially outwardly extending flange is formed adjacent the lower end of each of the conduits and the lower grommets have grooves in the inner surfaces thereof, which grooves receive the flanges on the conduits and substantially prevent inadvertent disengagement thereof from the holes.

This invention pertains to a new and novel radiator construction and more specifically to a radiator including a plurality of conduits removably mounted between a pair of coolant tanks.

In all prior art radiators and especially radiators for heavy earth moving equipment, the core of the radiators is constructed from a plurality of conduits fixedly attached in communication with an upper and lower tank assembly. The upper and lower tanks are adapted to receive cooling fluid, such as water or the like, from a circulating pump and supply water to the circulating pump, respectively. The cooling fluid flows from the upper tank through the plurality of conduits to the lower tank and air is passed rapidly over the conduits to cool the fluid therein. To aid the cooling process a plurality of cooling fins are fixedly attached to each of the conduits. Because each of the conduits is fixedly attached to the upper and lower tanks at their upper and lower ends when the core develops a leak the entire core must be replaced or removed and repaired. Also, the continual vibrating and jarring of the heavy equipment has a tendency to rupture the connections between the tanks and the conduits.

In the present device a radiator core is constructed from a plurality of conduits each of which has either end removably mounted in an upper and lower framework which forms a portion of the upper and lower tanks. In addition to being removable, the means mounting either end of the conduits is resilient so that it operates as a shock absorber to reduce the possibility of rupturing the connections between the conduits and the upper and lower tanks. Thus, in the present device, leaks are less likely to occur, but in the event that a leak does occur, a single conduit can be removed from the radiator core and replaced without removing the core from the machine.

It is an object of the present invention to provide a new and improved radiator construction.

It is a further object of the present invention to provide a radiator having conduits between the upper and lower tanks which are removable and replaceable without removing the entire core.

It is a further object of the present invention to provide a radiator having shock mounted conduits to greatly reduce the possibility of ruptures.

These and other objects of this invention will become apparent to those skilled in the art upon consideration of the accompanying specification, claim, and drawings.

Referring to the drawings, wherein like characters indicate like parts throughout the figures:

FIGURE 1 is a front view of a radiator assembly including the present core;

FIGURE 2 is a side view of the radiator assembly illustrated in FIGURE 1;

FIGURE 3 is an enlarged sectional view as seen from the line 3—3 in FIGURE 1, also illustrating the method of removing a single conduit therefrom;

FIGURE 4 is a view in perspective of a mounting grommet; and

FIGURE 5 is an axial sectional view of the grommet illustrated in FIGURE 4.

In the figures, the numeral 10 generally designates a radiator having an upper tank 11, a lower tank 12, and a core 13. The upper tank 11 has an inlet 14 adapted to be connected to the outlet of a circulating pump by a flexible hose or the like. The lower tank 12 has an outlet 15 adapted to be connected to the inlet of a circulating pump or the like. The upper tank 11 and the lower tank 12 are connected by the core 13.

The core 13 includes an upper header plate 20, a lower header plate 21, and a plurality of conduits generally designated 25 therebetween. The upper header plate 20 is connected to the lower end of the upper tank 11 with a gasket 26 therebetween by a plurality of bolts 27. The upper header plate 20 actually forms the lower wall of the upper tank 11. In a similar fashion the lower header plate 21 is connected to the upper end of the lower tank 12 with a gasket 28 therebetween by a plurality of bolts 29. Also, the lower header plate 21 forms the upper wall of the lower tank 12. Each of the header plates 20 and 21 have a plurality of openings therethrough.

A generally cylindrical grommet 30 has an axial opening 31 therethrough adapted to receive either end of one of the conduits 25 therein. One end of the grommet 30 has a radially outwardly extending flange 32 around the outer periphery thereof. A radially outwardly extending groove 33 is formed in the surface of the opening 31 so that it is positioned within the flange 32. It should be understood that the positioning of the flange 32 and the groove 33 are not critical, but the dimensions of the grommet 30 are such that the present positioning is the most convenient. The outer diameter of the main body portion of the grommet 30 is approximately equal to the diameter of the openings through the upper and lower header plates 20 and 21. A grommet 30 is positioned in each of the openings in the upper header plate 20 so that the flanges 32 butt against the lower surface thereof and a grommet 30 is placed in each of the openings in the lower header plate 21 so that the flanges 32 butt against the upper surface thereof.

Each of the conduits 25 is formed from a generally cylindrical piece of tubing in which all but the extreme ends has been slightly flattened. The flattened portions of the conduit 25 have a plurality of cooling fins 35 fixedly attached thereto in a spaced apart position. Each of the cooling fins 35 lies in a plane perpendicular to the axial direction of the conduit 25 so that air blowing around the conduit 25 cools both sides of the fins 35 and, consequently, the conduit 25. A flange 36 extends radially outwardly from the outer periphery of the conduit 25 adjacent the lower end thereof. The flange 36 is adapted to be received within the groove 33 in the grommet 30 and has slightly larger dimensions. The upper end of the conduit 25 has a smooth outer periphery and the unflattened portion extends somewhat further than it does at the lower end. Thus, as illustrated in FIGURE 3, to insert a conduit 25 in the core 13 the upper end of the conduit 25 is forced into the opening 31 in a grommet 30 in the upper header plate 20. The conduit 25 is pushed into the grommet 30 far enough to allow the lower end of the conduit 25 to swing free of the upper edges of the grommet 30 in the lower header plate 21. The lower end of the conduit 25 is then engaged in an opening 31 in a grommet 30 in the lower header plate 21 and the conduit 25 is moved ver-

tically downwardly until the flange **36** is firmly engaged in the groove **33** of the grommet **30**. To remove the conduit **25** from the core **13** the above procedure is simply reversed.

Thus, a core **13** made up of a plurality of removable conduits is disclosed. Either end of each of the conduits is mounted in a grommet from which it can be quickly and easily extracted. In addition, the grommets are composed of a material, such as synthetic rubber, plastic, etc., which is resilient and resistant to any of the modern anti-freeze or rust inhibitors which may be placed in a radiator. Because the grommets **30** are resilient, they operate as shock absorbers for the conduits **25** to prevent undue stress thereon due to vibration, twisting, etc. of the equipment upon which the radiator **10** is mounted. Also, the outer dimensions of each of the conduits **25**, including the flanges **36** are slightly larger than the inner dimensions of the axial openings **31** in the grommets **30**, including the grooves **33**, so that the grommets **30** are expanded slightly to provide a seal of the opening in the header plates **20** and **21**. In addition to sealing the openings the flanges **36** on the conduits **25** prevent axial movement.

While I have shown and described a specific embodiment of this invention, further modifications and improvements will occur to those skilled in the art. I desire it to be understood, therefore, that this invention is not limited to the particular form shown, and I intend in the appended claim to cover all modifications which do not depart from the spirit and scope of this invention.

I claim:

1. A radiator core assembly comprising:

(a) upper and lower frame members each having a header plate with a plurality of openings therethrough;

(b) a plurality of grommets having a flange around the outer periphery, an axial opening therethrough and a radially outwardly extending groove in the surface of said axial opening, said grommets being positioned in the openings of said header plate so that the flanges butt against the lower surface of said upper frame member and the upper surface of said lower frame member,

(c) a plurality of elongated conduits each of approximately equal length and fluid carrying capacity having ends adapted to be received within said grommets in said header plates of the upper and lower frame members, said conduits each having a radially outwardly extending flange around the outer periphery adjacent the lower end thereof adapted to be received within said outwardly extending grooves in said grommets;

(d) a plurality of spaced apart cooling fins on each of said conduits; and

(e) each of said conduits having the upper end removably engaged in a grommet in said header plate of the upper frame member and the lower end removably engaged in a grommet in said header plate of the lower frame member with said radially outwardly extending flange engaged in said radially outwardly extending groove so that said conduits are in an approximately parallel spaced apart relationship.

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