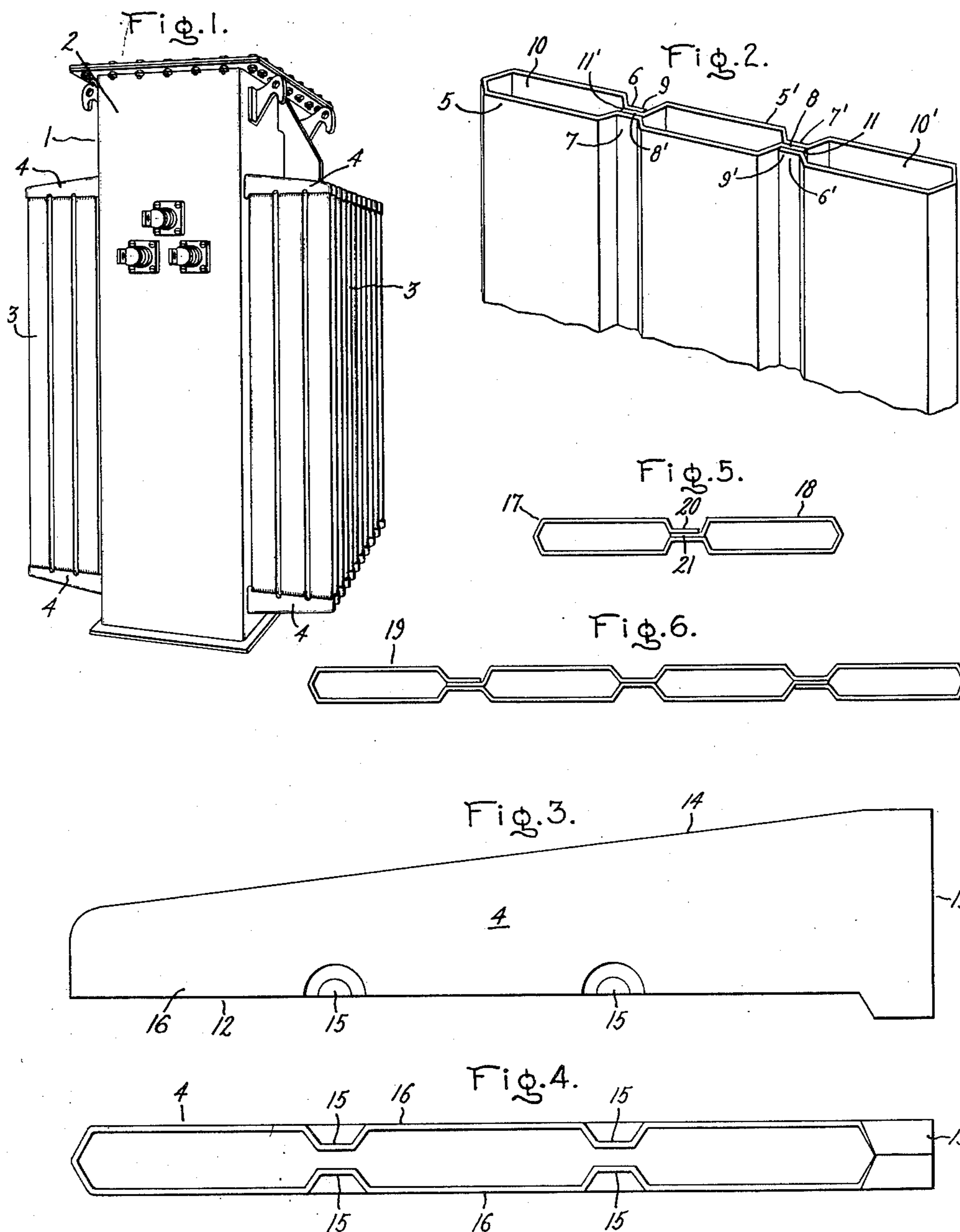


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MULTISECTIONED RADIATOR

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MULTISECTIONED RADIATOR

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1 Claim. (Cl. 257—191)

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This invention relates to radiators and more particularly to the construction of a multisectioned radiator for liquid cooled transformers.

It is common practice in the construction of radiators for liquid cooled transformer units to utilize a plurality of vertical cylindrical tubes arranged in alignment and having their ends terminate in headers connected near the top and bottom of the transformer tank. This allows for the cooling of the transformer liquid by radiation and convection. Though thermodynamically satisfactory, this type of radiator is quite expensive to construct. The present invention discloses a multisectioned radiator construction which allows for ease in fabrication and a reduction in the cost of construction.

The radiator tubes herein described are fabricated from flat sheets of metal having indented portions or ribs, thus dividing the sheets into a plurality of sections. At least one edge of the metal sheet—the edge being parallel to the ribs—is folded back upon itself or bent through an angle of 180° so that it comes in contact with one of the ribs. An unfolded end of the radiator sheet may be inserted between the folded portion of the first sheet and the indented portion or rib it abuts. The ribbed portions of the metal sheets of the radiator are placed in contiguous relationship to each other and may be securely fastened together by any suitable means such as resistance welding.

Sectionalized tubing formed by pressing indentations in sheet metal is not new in the art of heat exchanger construction, but this sectionalized radiator construction presents an advantage over the sectionalized radiators now in use by providing protected welded areas. That is, all welded portions are located away from edges or surfaces exposed to possible injury by abrasion or denting. A resistance weld is usually made a short distance, $\frac{1}{8}$ " to $\frac{3}{8}$ ", from the edge of the material being welded. This leaves a small crack where the material is lapped. If the seam, thus formed, is not adequately protected by paint or the like, moisture will be held in the crack by capillary action and the corrosion of the material will be accelerated. If the seam is on an exposed edge of the radiator tube, the protective coating may be easily damaged by any blow or rough handling and the metal, thus exposed, is extremely vulnerable to corrosion. The construction disclosed in this invention eliminates any possibility of having any exposed welded edges by having all welds recessed in the ribbed portions of the sectionalized radiator.

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Therefore, it is an object of this invention to provide a new and simple multisectioned radiator construction which is both simple and economical to construct.

It is a further object of this invention to provide such a multisectioned radiator which may be fabricated from sheet metal.

Another object of this invention is to provide such a multisectioned radiator wherein the welded portions are recessed and protected from damage.

Still another object of this invention is to provide a wide flat radiator tube divided into several sections by welded ribs which strengthen and stiffen the radiator tube and enable it to withstand the internal pressures which may be encountered.

The invention will be better understood from the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claim.

In the drawing, Fig. 1 is a perspective view of a liquid cooled transformer incorporating a particular embodiment of the invention. Fig. 2 is an enlarged perspective view of the particular embodiment of this invention shown in Fig. 1. Figs. 3 and 4 are a front elevation and cross-sectional view of the elbow or header used in this invention. Figs. 5 and 6 are cross-sectional views of alternative constructions of this invention.

Referring now to the drawing, there is shown therein by way of example, a liquid cooled transformer unit 1 having a casing 2 which houses the enclosed electric transformer device. Since heat is generated during the operation of the transformer, it is necessary that means be provided to permit the dissipation of this energy. Cooling liquid, which surrounds the electric device and is housed within the casing 2, circulates through the multisectioned radiators 3 which are secured to the transformer housing 2 by the elbows 4. The warm liquid enters the radiator 3 through the upper elbows 4 and, after dissipating a large portion of its heat energy to the surrounding atmosphere by convection and radiation, re-enters the transformer housing 2 through the lower elbows 4.

The multisectioned radiator 3, shown in Fig. 2, is constructed from two similar sheets of metal 5 and 5', which are indented to form a plurality of parallel ribs 6, 7, and 8 and 6', 7', and 8'. The edges 9 and 9' adjacent to the ribs 6 and 6' are bent back through an angle of substantially 180° so that the ribs 6 and 6' abut the ribs 7 and 7' respectively, thus forming the tubular sec-

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tions 10 and 10'. The two halves, 5 and 5', of the multisectional radiator 3 are then arranged so that the edge 11', which is parallel to and opposite the edge 9', and the rib 8' are then placed between the ribs 6 and 7; similarly, the edge 11 and rib 8 are placed between the ribs 6' and 7'. The contiguous ribs of the radiator halves 5 and 5' are then welded together.

The elbow 4, shown in Figs. 3 and 4, is a hollow substantially triangular shaped member having a base side 12 and an altitude side 13 which are open; the hypotenuse side 14 is closed. The side 13 is welded to the casing 2 of the transformer unit 1 and the base 12 is provided with indented portions 15 which fit securely over the welded ribs of the radiator 3. The edge 16 of the side 12 is then welded to the multisectioned radiator 3.

In Fig. 5, a two sectioned radiator 17, which is constructed of only one sheet of metal 18, is shown, and in Fig. 6, a four sectioned radiator 19 is illustrated. The construction of these radiators is essentially the same as the three sectioned unit 3 which has been described. In the two sectioned radiator 17 both edges, 20 and 21, which are parallel to the ribs, are bent back through an angle of 180°.

While there have been shown and described particular embodiments of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention and, therefore, it is aimed, in the appended claim, to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

In a radiator unit, a liquid tube member having at least three flat tubes, and individual header members for opposite ends of said tube member, said tube member comprising two similar bent rectangular pieces of sheet metal, each piece

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having one side bent to form one integral tube extending the length of said piece along one side thereof, said tube having a slit extending its entire length and facing toward the opposite side edge of said piece, each piece also being bent to form the same number of longitudinally extending ribs parallel to its sides, said pieces being reversed relative to each other and being face-to-face with each other with said opposite side edge of each piece in the slit of the tube formed by the other piece and with complementary ribs of said pieces in contact with each other so as to form a tube member having at least three tubes with closed sides, welds joining said pieces where they contact each other to seal the sides of said separate tubes in said tube member, said header members each having an open side which receives an end of said tube member, said open side of each header member having indented portions for closely embracing the end of said tube member between the ends of its tubes, said header members each having an additional opening for making liquid-tight connections to said radiator unit.

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