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C. B. HIGGINS

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RADIATOR TUBE

Filed April 16, 1926

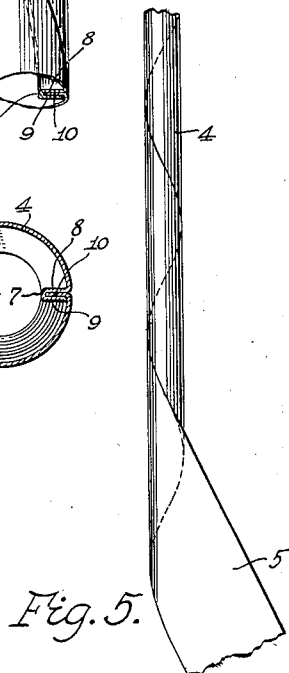
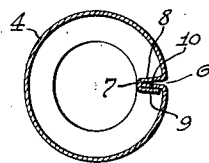
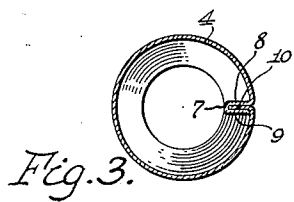
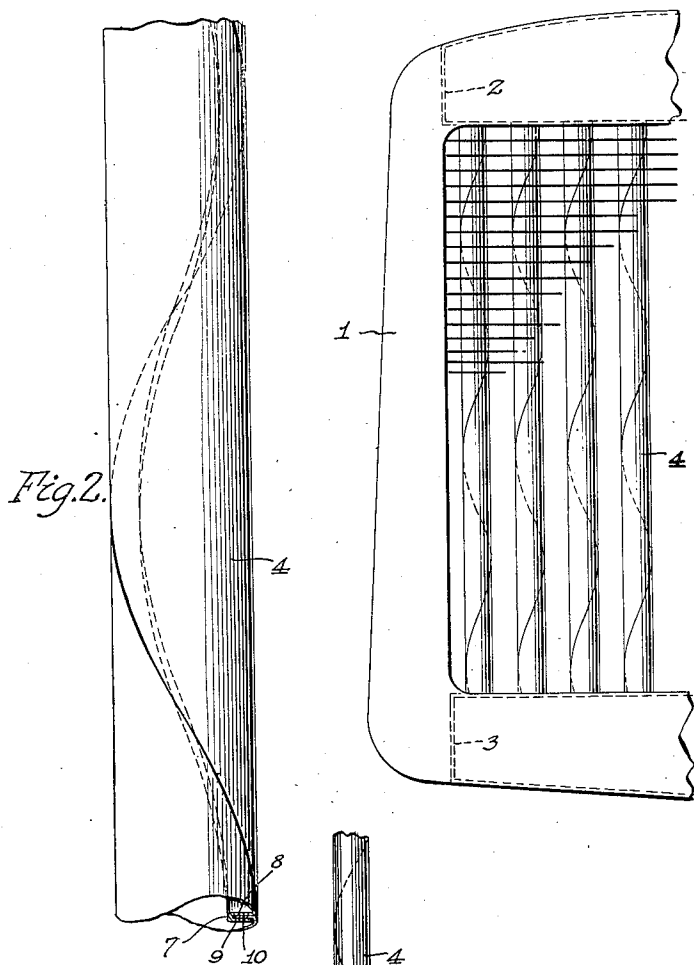


Fig. 1.

Fig. 3.

Fig. 4.

Fig. 5.

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RADIATOR TUBE

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This invention relates to radiator tubes and has special reference to that type of sheet metal tube used in a radiator forming part of the cooling system of an internal combustion engine. Such radiators are extensively used in the automobile industry and ordinarily include headers connected by a series of tubes or water conduits through which circulates water adapted to be cooled by air impinging against the tubes. Fins and various types of heat disseminating members are ordinarily arranged exteriorly of the tubes, but my invention has special reference to the interior of the tubes.

My invention aims to provide, as an article of manufacture, a tube having a spiral seam therein affording an internal rib. Distinct advantages are gained by such a rib. First, the seam which forms the rib has a constructive arrangement of interlocking parts by which the seam may be slightly open should there be expansion of the tube incident to water freezing therein. This chance to slightly expand prevents flexure of the metal without causing leakage at the seam. Second, the tube surface exposed to water is materially increased; third, the spiral arrangement of the seam or rib induces a spiral or rotary motion of water flowing through the tube whereby the water is brought into engagement with the entire tube wall without any stratification of the water within the tube; fourth, the spiral formation of the seam adds rigidity to the tube which permits the employment for and manufacture of certain metals which otherwise could not be used, and fifth, augmentation, in a very great proportion, of the transmission of heat by reason of the increased middle area exposed to water in the tube.

The above are a few of the advantages gained by my tube construction and others will probably appear as the nature of my invention is better understood. Reference will now be had to the drawing, wherein—

Figure 1 is a front elevation of a portion of a radiator having water tubes in accordance with my invention;

Figure 2 is an enlarged side elevation of a portion of one of the tubes;

Fig. 3 is a cross sectional view of the same; Fig. 4 is a similar view showing a tube that is slightly expanded, and

Fig. 5 is an elevation of a portion of the tube showing its spiral formation from a strip of sheet metal.

An extensively used radiator includes a frame 1 containing headers 2 and 3 connected by water tubes or conduits 4 so that water may circulate from one header to the other. The tubes 4 ordinarily form part of a core that may be of the honey comb construction by which heat may be rapidly disseminated from the tubes and the core construction permits of air passing between the tubes or circulating thereabout so that the water may be rapidly cooled.

Considering one of the tubes, as best shown in Figures 2 to 5 inclusive, a strip of metal 5 has one edge thereof intumed and bent on itself to form a pocket or channel 6 having a bottom wall 7 and opposed walls 8 and 9. The opposite edge of the strip of metal is intumed to provide a flange or intermediate wall 10.

In forming the tube the flange 10 is placed in the pocket 6 and on the bottom wall 7. The flange 10 may be spot-welded, soldered, or otherwise connected to the walls 7 and 9 so as to be practically integral therewith, and the purpose of this connection will be understood by reference to Figure 4 where the tube is shown in expanded condition. The flange 10 moves with the wall 9 away from the wall 8, without completely opening the seam. This is a distinct advantage because the tube may freely expand without flexing the seam. Furthermore, the three-ply seam may be subjected to a solder bath so that the flange 10 is secured to the walls 8 and 9 of the pocket and should there be expansion of the tube, it is obvious that the connection between the wall 8 and the flange 10 may be broken without breaking the connection between the wall 9 and the flange 10. The seam simply expands under such conditions, but otherwise the seam is tight, as shown in Figure 3.

From the foregoing, it will be observed that the three-ply seam, in cross section, is

substantially at a right angle to the inner wall of the tube, and that it extends into the tube an appreciable distance to provide a spiral water deflector. This deflector will
5 cause water passing through the tube to travel other than in a straight path, consequently the water will be brought into engagement with all walls of the tube and may be quickly cooled thereby. The spiral rib formed
10 by the seam not only adds rigidity to the tube, but provides an expansible joint which may partly open without destroying the connection of the same. This is very desirable in thin sheet metal tubes, and it is obvious
15 that the seam may be formed as the strip of metal is fashioned into a tube.

One embodiment of my invention has been illustrated, but it is to be understood that the structural elements are susceptible to such
20 variations and modifications as fall within the scope of the appended claim.

What I claim is:—

A sheet metal tube having an inwardly extending radial pocket at one edge of
25 the material forming the tube, said pocket being open at its outer end and having an internal width substantially equal to the thickness of said material, and a flange at the other end of said material and received
30 in said pocket, said pocket and flange being formed spirally with respect to the axis of the tube and extending a considerable distance into the tube.

In testimony whereof I affix my signature.

35 CLIFFORD B. HIGGINS.

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