May 2, 1933. A. F. IHDE 1,906,969

RADIATOR CORE AND SHELL ASSEMBLY

Filed Jan. 8, 1931

Fig. 1

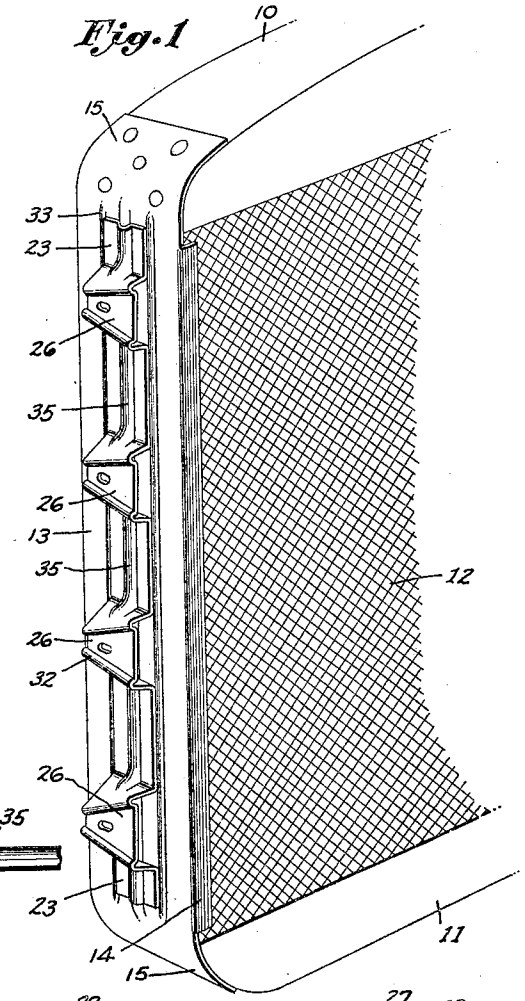
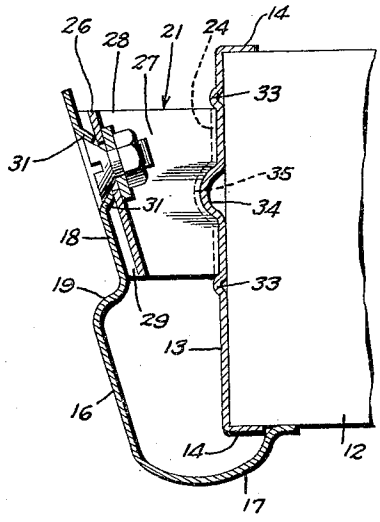


Fig. 2



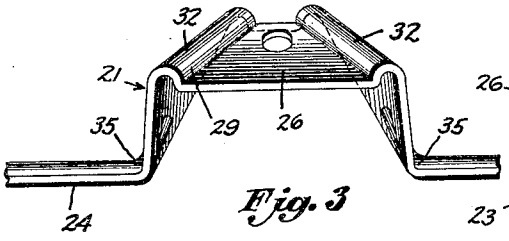


Fig. 3

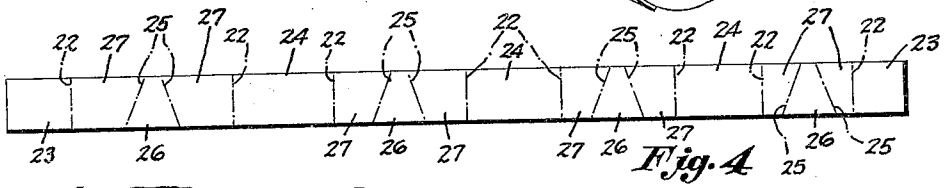


Fig. 4

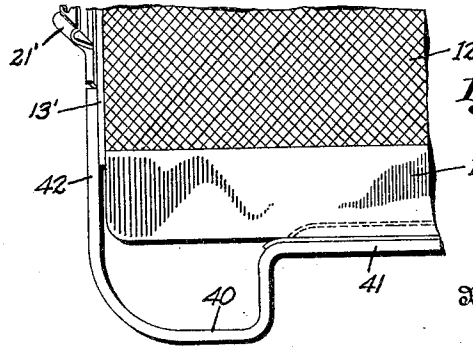


Fig. 5

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UNITED STATES PATENT OFFICE

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RADIATOR CORE AND SHELL ASSEMBLY

Application filed January 8, 1931. Serial No. 507,468.

This invention relates to radiator assemblies and means for mounting them, and particularly to an improved means for associating the radiator core and radiator shell of a motor vehicle for mounting upon the chassis.

Radiators adapted to cool the cooling water of vehicle engines are customarily mounted upon the forward portions of the vehicle chassis, in front of the engines. Such radiators usually comprise a water cooling unit, a shell for covering the sides of the radiator and for imparting a finished appearance to the assembly, and a strap or side wall member for unifying and strengthening the cooling unit and for associating or connecting the cooling unit to the shell. The shell may also function to support the forward portion of the hood which covers the engine.

In certain radiator constructions the core is resiliently mounted upon the vehicle frame and, through the strap or side members, serves to support the shell. In other constructions the shell is mounted upon the vehicle frame and supports the core and saddle, the core being without direct connection to the frame.

This invention comprehends an improved means for associating the core and shell in either of these types of construction. Essentially the means comprises a strip of metal, undulated to strengthen and to adapt it to the contour of the surfaces of the radiator shell and the core side member with which it contacts. The undulated reinforcing means may be formed of a single strip of straight metal with a minimum distortion of the metal, the lines of bending being so arranged that the strip may be shaped, by bending, to the desired form without undue elongation or upsetting of the metal. This results in a lowered cost of production of the reinforcing strip from straight strips of standard, light gauge strap or sheet metal as it permits of the use of light and inexpensive tools and dies. The completed core and shell assembly is of maximum strength as the metal of the reinforcing strip is substantially undistorted, except for the bending, and retains substantially its original strength.

Stress reducng sections are also contemplated which may cooperate with the substantially undulated contour of the associating strip to reduce relative angular movement of the various faces of the strip, or stresses tending to produce such angular movement, when loads are imposed upon it. Means may also be provided upon the associating strip whereby the bolts which may serve to attach the shell to the strip may be countersunk in the shell in order that the engine hood may have a plane seat against the shell.

These and other objects and advantages of the present invention will become apparent from the following description of typical embodiments of the invention illustrated in the accompanying drawing, wherein:—

Fig. 1 is a perspective view showing the side wall reinforcing and mounting strip of the present invention in one type of radiator core assembly;

Fig. 2 is an enlarged horizontal sectional view showing the side wall reinforcing and mounting strip in assembled relation with the radiator core, including the side wall, and radiator covering shell;

Fig. 3 is an enlarged fragmentary side elevation of the reinforcing and mounting strip;

Fig. 4 is a plan view of the blank from which the associating or reinforcing and mounting strip is formed, the lines along which the blank is bent to form the completed strip being indicated by broken lines; and

Fig. 5 is a fragmentary front elevational view of a modified assembly of radiator and radiator mounting, and radiator shell mounting means incorporating the reinforcing and mounting strip.

The core assembly shown in Fig. 1 is of the type adapted to be supported by a shell which is mounted upon the vehicle frame, as distinguished for an assembly wherein the core, or the side members attached thereto, support the shell. The core comprises an upper water tank 10, a lower tank 11 and an intermediate cooling portion 12. Extending along each vertical side edge of the cooling

portion 12 is a side member 13, which may have flanges 14 extending over the front and rear faces of the portion 12, and which may have inwardly turned portions 15 permanently connected, as by soldering, riveting or the like, to the upper and lower tanks 10, 11.

The radiator shell, indicated at 16 in Fig. 2, may be secured to the vehicle chassis in any desired manner, and comprises a casing which substantially envelopes the periphery or side edge and top of the core. It may be provided with a forward, inwardly directed flange 17, adapted to overlie the edge portions of the front core surface, and a rearwardly directed flange 18, recessed at 19, to seat and support the forward edge of the motor covering hood of the vehicle (not shown).

The reinforcing member 21 is attached to the side wall member 13 and is connected to the rearward shell portion for associating the core and shell. In the form shown in Fig. 1 the member 21 serves to support the core, the shell 16, which may be of light gauge sheet metal, serving as a resilient cushion for absorbing violent road shocks and vibrations in the vehicle frame which might otherwise be transmitted to the core.

Member 21 may be formed of a blank of strap metal as shown in Fig. 4 by bending upon lines approximated by the dotted lines indicated on the drawing. The formed strip has a plurality of spaced co-planar sections formed by bending the blank upon the lines 22. The outer of these sections 23 and the surfaces 24, between adjacent lines of bend 22 may be of rectangular shape as illustrated or they may be of other shape, such as trapezoidal. Between the sections 23, 24 and spaced laterally therefrom as in Fig. 2, are a plurality of substantially co-planar sections located between lines of bend 25, these sections being designated at 26. Connecting the sections 23, 26 and 24, 26 are a plurality of sections, angularly related to the sections 23, 24 and 26, and designated 27.

As it is desirable that the flange portion 18 of the shell be angularly related to the side wall of the core in plan, as shown in Fig. 2, in order to properly seat the forwardly converging side walls of the engine hood, the sections 26 of the strip, which lie adjacent the flange portion 18 of the shell, are disposed in a plane at the substantial angle to the plane of sections 23, 24, this being illustrated best in Fig. 2. In order to permit of the forming of the strip from a single, straight blank of strap metal, or ribbbon of sheet metal, and at the same time form the strip without unduly distorting the metal of the blank, the lines of bend have been angularly disposed relative to one another as shown in Fig. 4. It will be noted that the sections 23, 27, 26 and 24 are complementary so that the total of the linear dimensions of the sections on one side of the strip equals the total of the linear dimensions of the sections on the opposite side of the strip, while the distance of lateral displacement of the sections 26 from the sections 24 is considerably greater at one side of the strip than at the opposite side thereof.

It will also be noted in Figs. 1 and 4 that this distance of displacement is greater at one end of the strip than at the other end thereof, due to the greater mean length of the sections 27 at one end of the strip than at the opposite end thereof. This feature of formation may be resorted to when it is necessary or desirable to have the opposite side walls of the shell, as viewed from the front, converge or diverge from top to bottom.

In order to allow the outer surfaces of the flange portions 18 of the shell to present a continuous, substantially plane surface for contact with the engine hood, it may be desirable to countersink the heads of the bolts which connect the shell and associating strip. The sections 26 of the strip may be recessed as at 29 to provide space for the countersunk portions 31 of the flange portion, the strip contacting the shell along the ridged edges 32 of sections 26.

In order to facilitate the proper alignment of the mounting strip for welding or other securement to the side wall 13, and to increase the effectiveness of the mounting of shell and core, aligning beads 33, spaced a distance equal to the width of the mounting strip, may be formed longitudinally of the side wall.

The wall members 13 are in addition each formed with a longitudinal raised bead or rib 34, which serves both as a reinforcement and as a mounting means for complementary reinforcing ribs or beads 35 formed on the sections 23, 24 of the members 21. By means of this arrangement of reinforcing portions, the members 13 and 21 are not only easily assembled in proper relation, but, subsequent to the connecting operation, are integrated so that excessive loads are directed to and distributed over the rib portions.

In the modified construction depicted in Fig. 5, the core is supported by a saddle comprising portions 40 adapted for attachment to a vehicle frame, and a central portion 41 for seating the bottom tank 11′ of the core. The sides of the saddle comprise upwardly extended portions 42 of the bottom strap and the side wall members 13′ which are secured to the portions 42. The side wall members lie adjacent to the side edges of the cooling portion 12′ and are connected to the upper water tank. In this form of construction the radiator shell may be supported by the side walls 13′, without direct connection between the vehicle frame and the shell. A side wall reinforcing and shell associating strip 21′, of form substantially like that depicted at 21 in Figs. 1, 2 and 3, may be attached to the side wall 13′ for supporting the shell.

It will now be understood that the present invention provides an improved means for associating the shell and core of a vehicle radiator assembly. The reinforcing and mounting strips may be economically formed of straight, light ribbons or straps of metal, which may, in accordance with the teachings herein disclosed, be formed of the desired contour to properly engage both the shell and core without undue change in the molecular relationship of the strip metal. The shell contacting faces of the strips may have recessed faces produced by a bending operation to provide for proper engagement with the countersunk surface of the shell. Beads may be formed on the side walls of the core for aiding in the alignment and retention in alignment of the strip upon the side wall, and for cooperating to prevent displacement, under conditions of great stress, of the interconnected portions of these members. The walls 18 of the shell, the side walls of the core, and the strip 21 cooperate to form a unitary protective assembly, trussed by the angular strip sections 27, along the side edges of the core.

It will further be understood that the illustrated and described embodiments are merely illustrative of the principles of the invention; that certain ones or all of these principles may be employed in other structures of a similar nature; and that the invention is accordingly to be limited in scope only as defined by the appended claims.

What is claimed is:

1. A radiator assembly including a core and a shell, the core having a side wall spaced from a side wall of the shell, and an elongated member extending between and associating said side walls, said member having longitudinally spaced sections abutting said core wall, longitudinally spaced sections abutting said shell wall, and connecting sections joining said spaced sections abutting the core wall to the spaced sections abutting the shell wall, and certain of said spaced sections being formed with ribs extending longitudinally of the member and cooperating therewith to retain said sections in substantially fixed relation.

2. An assembly comprising a radiator core and shell each having a side wall, said side walls being spaced, a member extending between said side walls for associating them, said member comprising a section abutting one of said side walls, a section disposed at each end of said first mentioned section in abutment with the other of said side walls, and connecting sections joining each end of said first mentioned section to an end of one second mentioned section and at least one of said sections being provided with a rib extending longitudinally of the member and cooperating with adjacent sections to retain the sections in substantially fixed relation.

3. An assembly comprising a radiator core and shell each having a side wall, said side walls being spaced, a member disposed between and secured to said side walls, said member comprising a section abutting one of said side walls, a second section at each end of said first mentioned section abutting the other of said side walls, and connecting sections joining each end of said first mentioned section to an end of one second mentioned section, at least one of said first two mentioned sections having a rib extending longitudinally of the member and cooperating with the adjacent connecting section to retain the sections in substantially fixed relation, and the side wall abutted by the section which has the rib having a formation interfitting with a portion of the said rib.

4. A radiator assembly including a core and a shell in which the side walls of the core are spaced from the side walls of the shell, and an elongated member extending between and associating said side walls, said member having spaced sections abutting said core walls, spaced sections abutting said shell walls, and connecting sections joining said spaced sections abutting the core walls to the spaced sections abutting the shell walls, at least some of the spaced sections abutting said core walls having ribs extending longitudinally of the member and cooperating with the adjacent connecting sections to retain the sections in substantially fixed relation, and the side walls of the core having longitudinal beads for interfitting with portions of said ribs.

5. A radiator assembly including a shell having a side wall provided with countersunk apertures for receiving fasteners, a core having a side wall spaced from the side wall of the shell, and a strip for associating said side walls, said strip comprising spaced sections secured in abutting relation to said core side wall, spaced sections between said first mentioned spaced sections and abutting the side walls of the shell, and connecting sections joining the ends of the first and second mentioned sections, said second mentioned sections having recesses for receiving the countersunk portions of the side wall of the shell.

6. An associating strip for a radiator shell and core comprising a strip having a plurality of spaced co-planar sections, a plurality of co-planar intermediate sections offset laterally and in inclined relation to the plane of the first mentioned sections, said intermediate sections having a greater longitudinal dimension at one side of the strip than at the other side, and other sections joining the ends of the first mentioned sections with the ends of the intermediate sections, said other sections having a greater longitudinal dimension at one side of the strip than at the other side, the side of the strip having the greater longitudinal

dimension along the intermediate sections having the lesser longitudinal dimension along the adjacent said other sections.

7. An associating strip for a radiator shell and core comprising a strip having a plurality of co-planar spaced sections, a plurality of intermediate sections offset relative to said first mentioned sections, and connecting sections joining the ends of said intermediate sections with the adjacent ends of adjacent first mentioned sections, said intermediate and connecting sections having opposite sides of unequal length in complementary relation to each other and to said first mentioned sections, whereby the total linear length of all of said sections is equal at opposite sides of said strip.

8. A radiator assembly comprising a shell member and core member, said members having walls that are spaced and angularly related, and a strip for joining said walls having spaced sections abutting a wall of one of said members, an intermediate section abutting a wall of the other of said members, and connecting sections between and joining the adjacent ends of said first and second mentioned sections, said connecting sections and at least some of the other of said sections having opposite sides of unequal length arranged in complementary relation with each other, whereby the total length of all of said sections is equal at opposite sides of said strip.

9. In a radiator assembly, a core, a shell surrounding said core in spaced relation to the walls thereof, one of the walls of said core being formed with spaced raised portions, an elongated connecting member having a plurality of sections abutting said core wall between the raised portions thereof and formed with laterally offset sections abutting the adjacent wall of the shell, said core wall, between the raised portions thereof, and said first sections of the elongated member, being formed with complementary interfitting portions.

10. In a radiator assembly, a core, a shell surrounding said core in spaced relation to the walls thereof, an elongated connecting member interposed therebetween and associating adjacent walls of the core and shell, said member being formed with spaced sections abutting one wall of the core, spaced sections between the first sections abutting an adjacent wall of the shell, and connecting sections joining the ends of the first and second sections, said first sections and said core wall being formed with complementary interfitting portions.

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