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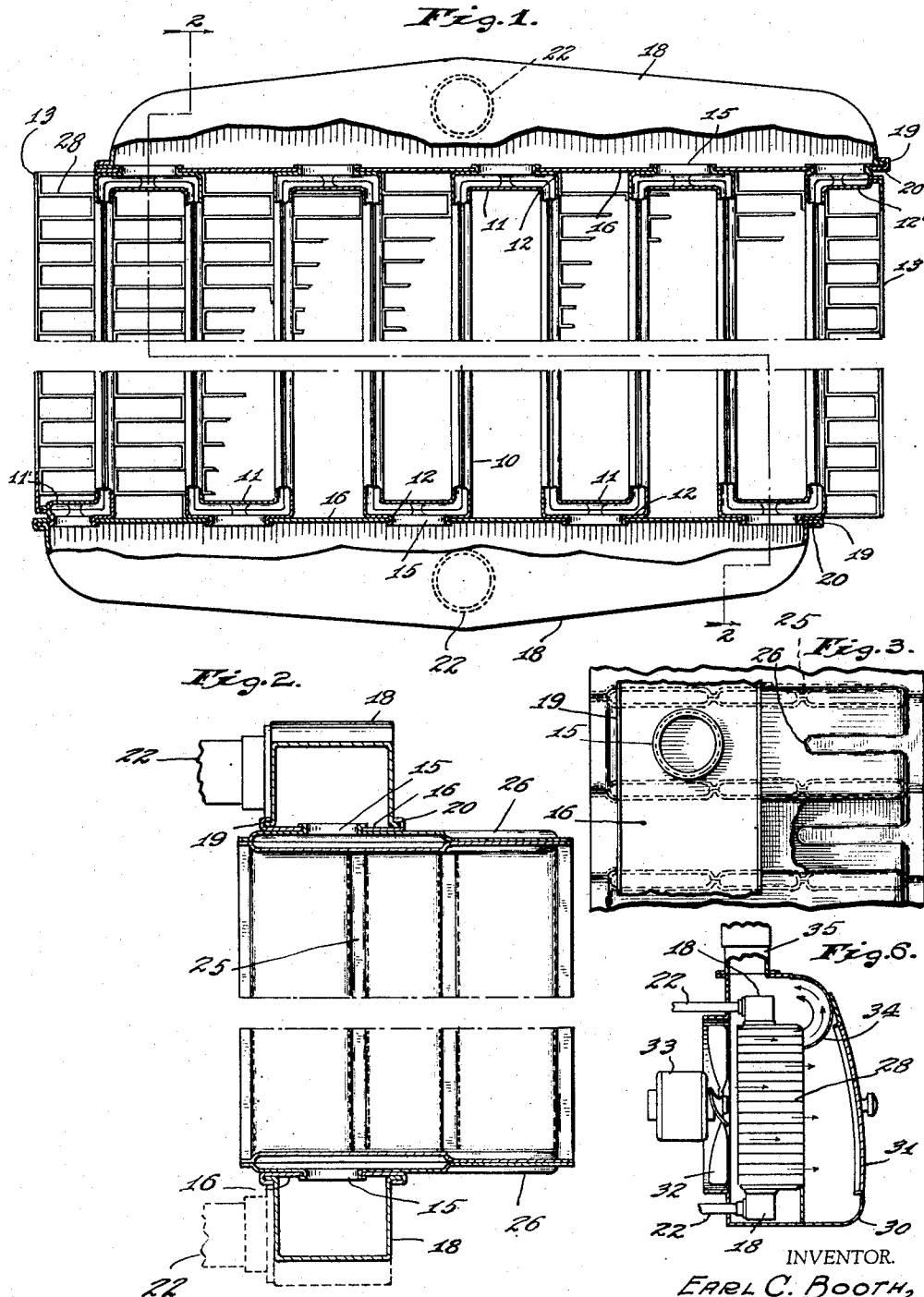
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2,164,005

RADIATOR CORE CONSTRUCTION

Filed April 1, 1937

2 Sheets-Sheet 1



BY

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2 Sheets-Sheet 2

Fig. 4.

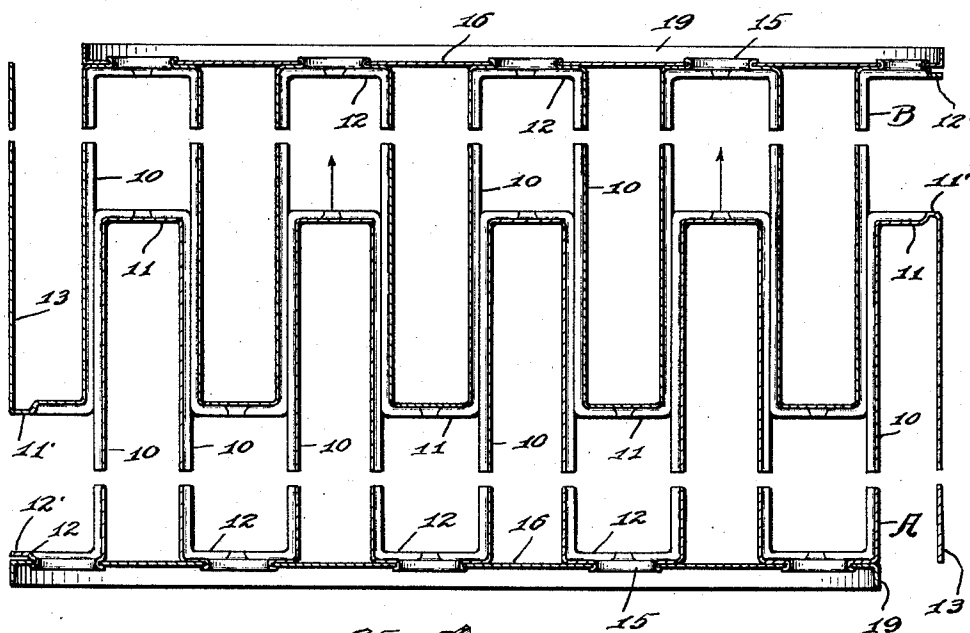
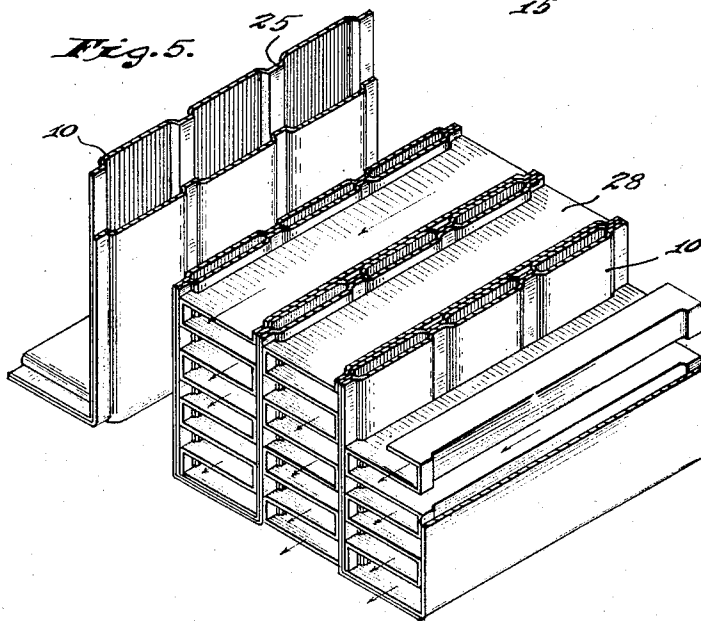


Fig. 5.



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UNITED STATES PATENT OFFICE

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RADIATOR CORE CONSTRUCTION

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7 Claims. (Cl. 257—130)

My invention relates to radiator cores, and especially to cores suitable for use in automobile-body heaters of the circulating fluid type. It is the object of my invention to produce a core which will have advantages over prior cores in the way of lightness of weight and economy of manufacture. Another object of my invention is to produce a core that will be made up of relatively few parts which can be easily assembled at low cost.

In carrying out my invention I form the body of the core with a plurality of fluid-passages comprising generally parallel stretches of what is, in effect, a continuous tube repeatedly bent back on itself at intervals. This tube may be and preferably is formed in its entirety of two sheet-metal stampings each of which comprises a strip of sheet metal of channel-section so shaped that it will nest with the other to form the continuous, retroverted tube. In one modification of my invention the ends of the tube formed by the two stampings are adapted for connection respectively to supply and discharge conduits; but in another modification headers are employed at the ends of the core body and, at the closed end of each loop of the tube, the outer wall thereof is provided with an opening communicating with the adjacent header. If desired, there are interposed between the parallel stretches of the tube a series of fins, each fin conveniently being a strip of sheet-metal bent into a zig-zag form and secured to the walls of the liquid passages, as by soldering.

The accompanying drawings illustrate my invention: Fig. 1 is an elevation of the core with parts thereof broken away; Fig. 2 is a vertical section on the line 2—2 of Fig. 1; Fig. 3 is a fragmental top plan view of the core with a portion of the tank removed; Fig. 4 is a vertical section illustrating the two parts of the core in process of being assembled; Fig. 5 is a fragmental isometric view of the core; and Fig. 6 is a vertical section through an automobile-body heater with my improved core in place therein.

In the modification of my invention illustrated in Figs. 1 to 5, the body of the core is formed of two similar sheet-metal stampings A and B (Fig. 4). Each of these stampings is, in effect, a continuous strip of channel-section having a series of pairs of right-angle bends to provide a plurality of parallel legs or stretches 10. Adjacent legs 10 of the stamping are interconnected by connecting legs 11 or 12, the legs 11 being all located in one face of the stamping with the channel opening outwardly and the legs

12 being located in the opposite face of the stamping with the channel opening inwardly. In both stampings, the legs 10 are evenly spaced so that the two stampings can be brought into nesting relationship. In Fig. 4, the two stampings are illustrated as they are in process of being moved together, while Fig. 1 illustrates the stampings completely nested to form the body of the core, with the connecting legs 11 of one stamping abutting against the connecting legs 12 of the other and with the opposed channels of the two stampings forming an elongated cavity, continuous from one corner of the core to the diagonally opposite corner.

The channel formed in the strip constituting each of the stampings terminates at one end of the strip midway of a leg 12, and at the other end of the strip midway of a leg 11, so that the two stampings may be similar. Beyond the point at which the channel terminates, the strip may continue for a short distance to form a flange 12' or 11' co-planar with the edges of the strip. If desired, each flange 11' may be provided with an extension 13 which is bent perpendicularly to parallel the adjacent leg 10, for a purpose which will hereinafter become apparent.

At an intermediate point, each of the connecting legs 12 is provided with an opening the material at the edge of which is formed into an outwardly extending annular flange 15. Each stamping has associated with it an inner tank-wall 16 provided with a series of openings positioned to register with and receive the flanges 15 on the several legs 12 of the stamping. In the preferred method of manufacture, the inner tank-wall 16 is assembled with the associated stamping A or B, and the edges of the flanges 15 are turned over against the opposite face of the inner tank-wall. The joint thus formed is sealed, preferably by soldering.

The tank, of which the inner wall 16 forms a part, may be constructed in any desired manner. I prefer to form each tank with a body portion 18 in the form of a sheet-metal stamping having an open side adapted to be closed by the tank-wall 16. To this end, the tank-wall 16 may be provided with a peripheral flange 19 of such dimensions that it will receive an outwardly turned flange 20 on the side walls of the tank 18. After the inner tank-wall 16 has been assembled with its associated stamping A or B, the tank 18 is put in place, the flange 19 is turned over the flange 20, as indicated in Fig. 2, and the joint between the flanges sealed, as by soldering.

Each of the tanks 18 is provided with a connecting tube 22 by means of which the core can be connected into the cooling system of an automobile engine in the usual manner.

To strengthen the walls of the water passages extending between the two tanks, each leg 10 of each stamping may be offset inwardly along one or more longitudinal lines, as indicated at 25 in the drawings. The offset portions 25 are desirably co-planar with the edges of each leg 10 so that in the assembly the offsets 25 of associated legs 10 will abut against each other to prevent the walls of the liquid passages from collapsing inwardly. If desired, similar reinforcements, indicated at 26, may be provided in the legs 11 and 12.

To aid in effecting the transfer of heat from liquid flowing through the passages 10 to the air which is blown through the core between such passages, the core may be provided with heat-radiating fins. As indicated in the drawings, these fins take the form of a sheet-metal strip 28 bent into a zig-zag form so as to fit snugly between adjacent legs 10 of each stamping. For the sake of appearance, the longitudinal stretches of each fin-forming strip may be displaced outwardly at its edges to seat against the edges of the material forming the legs 10 of the core. The flange extensions 13, if provided, overlie the fins 28 at the sides of the core, as is clear from Fig. 1, and serve to protect such fins from injury.

In the process of manufacture, each of the stampings A and B is formed from flat stock. Each stamping is then assembled with its associated tank-wall 16, and the joints between the flanges 15 and tank-wall 16 are soldered. If desired, the tank can be completed by assembling the tank 18 and tank-wall 16 before the two parts of the core are brought together. Fig. 4 illustrates the two parts of the core in process of assembly. When completely assembled the legs 11 of each stamping will engage the legs 12 of the other, and the core is held assembled by dipping its faces into solder to solder together the edges of the several legs 10, 11, and 12. The core thus formed provides a continuous fluid passage having longitudinal stretches each formed by a pair of opposed legs 10 and transverse stretches each formed by a pair of legs 11 and 12. The fins 28 may be put in place in association with each individual stamping either before or after the header-wall 16 is secured in place; or, if desired, they may be inserted in the assembled core. In any event, I prefer to have the fins in position when the faces of the core are dipped in solder, so that operation will then fix the fins in position as well as sealing together the edges of the stampings A and B.

In Fig. 6 I have illustrated the core of Figs. 1 to 5 installed in an automobile-body heater. The heater illustrated comprises a casing 30 which encloses the core and which is provided in its front face with a main air discharge opening associated with which is an adjustable closure 31. In rear of the core there is disposed a fan 32, conveniently driven by an electric motor 33, which operates to force air through the core. A portion of the air passing through the core is collected by a baffle 34 and directed rearwardly over the top of the core to a conduit 35 which may lead to a windshield defroster. By locating the flanges 15 nearer one face of the core than the other, and by using a tank 18 whose width is materially less than the total thickness of

the core, it is possible to so arrange the parts that in the assembled heater the tank 18 will be located near the rear face of the core where it will not interfere with the flow of air collected by the baffle 34.

I claim as my invention:

1. In a radiator, two spaced headers and a core disposed between said headers, said core comprising a pair of retroverted interfitting metal strips having their edges sealed together and their adjacent faces provided with opposed channels defining a plurality of longitudinally extending fluid passages and a plurality of transverse fluid passages interconnecting said longitudinal passages, the adjacent walls of said transverse passages and of said headers being provided with registering openings affording communication between said headers and said core.

2. The invention set forth in claim 1 with the addition that the material of said strips is formed into an outwardly extending annular flange surrounding the opening in the outer wall of each transverse passage, said flange extending through the associated header-wall opening and being turned over against the inner surface of the header wall.

3. In a radiator, two spaced headers and a core disposed between said headers, said core comprising a pair of mating metal strips bent oppositely at longitudinally spaced points, said strips having their edges sealed together and their adjacent faces provided with opposed channels defining a fluid-passage having a longitudinally extending intermediate portion and laterally extending end portions projecting oppositely at each end of said intermediate portion, the adjacent walls of said end portions and of said headers being provided with registering openings affording communication between said headers and said passage.

4. In a radiator, two spaced headers and a core disposed between said headers, said core comprising a pair of mating metal strips bent complementarily along transverse lines, said strips having their edges sealed together and their adjacent faces provided with opposed channels defining a fluid-passage having a longitudinally extending portion and a laterally extending end portion, the adjacent wall of said end portion and of one of said headers being provided with registering openings affording communication between said header and said passage, the opposite end of said passage being connected to the other header.

5. The invention set forth in claim 4 with the addition that the outer wall of said end portion is provided with an annular flange surrounding the opening therein, said flange extending through the associated header-wall opening and being turned over against the inner surface of the header wall.

6. In a radiator, a pair of similar sub-assemblies, each comprising a header wall and a metal strip having spaced portions secured to one face of said header wall and intermediate portions each of a general U-shape extending perpendicularly from said header wall, the outer face of said strip being provided with a continuous channel, the spaced portions of said strip and said header wall being provided with registering openings, said two sub-assemblies being disposed in opposed relation with the U-shaped strip-portions of one interfitting with the U-shaped

strip-portions of the other and with the edges of the respective strips sealed together.

5 7. In a radiator, a core comprising a pair of repeatedly retroverted interfitting metal strips having their edges sealed together and their adjacent faces provided with opposed channels defining a continuous retroverted fluid passage

having a plurality of generally parallel longitudinal stretches and a plurality of transverse stretches connecting said longitudinal passages in series, and fluid inlet and outlet fittings connected to the ends of said passage and to the 5 transverse stretches thereof.

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