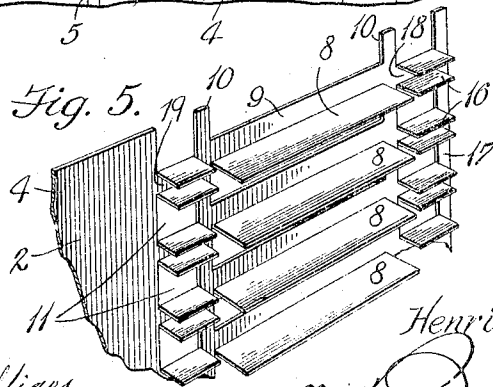
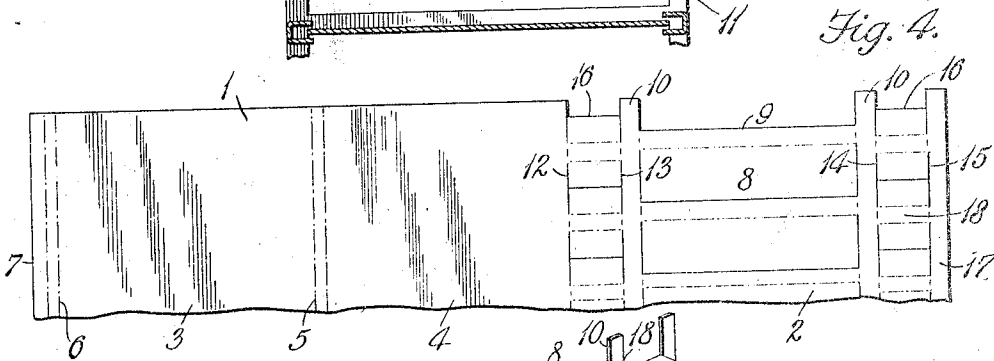
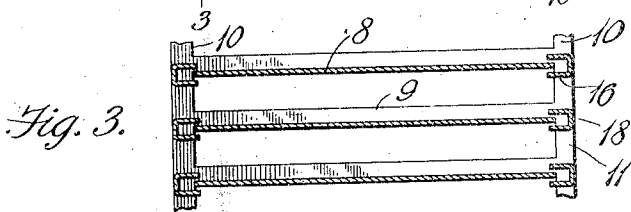
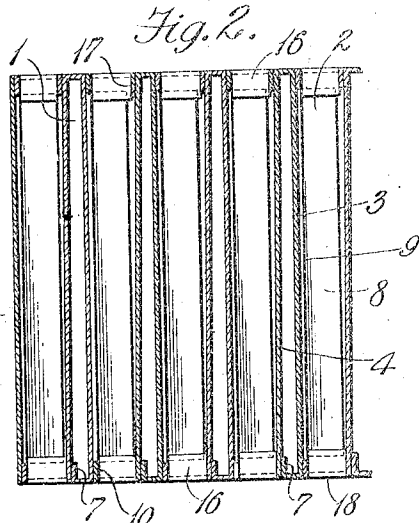
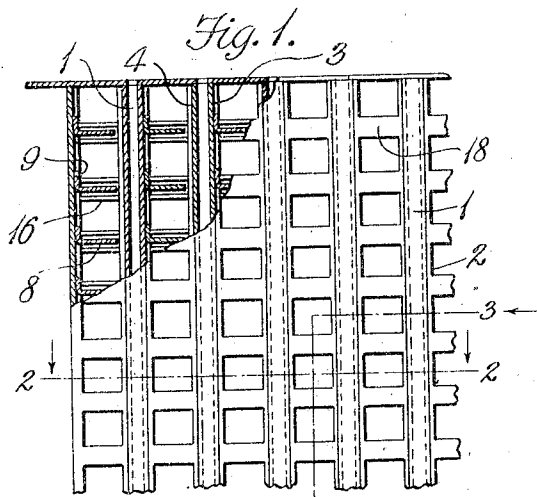


H. DE BOISCHEVALIER.
 RADIATOR.
 APPLICATION FILED DEC. 23, 1912.

Patented July 7, 1914.

1,103,011.



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RADIATOR.

1,103,011.

Specification of Letters Patent.

Patented July 7, 1914.

Application filed December 23, 1912. Serial No. 733,167.

To all whom it may concern:

Be it known that I, HENRI DE BOISCHEVALIER, a citizen of France, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Radiators, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to radiators especially adapted for use upon motor vehicles and more particularly to a core for such structures, certain objects of the invention being to provide a simple, cheap and rigid construction which is such as to facilitate manufacture and obviate waste of material.

With these and other objects in view, the invention consists in forming all of the radiating members between each pair of tubes from a single sheet of metal stamped into shape to form a plurality of air passages and give the appearance of the common rectangular tube construction, and further, to provide certain other new and useful features in the construction and arrangement of parts, all as hereinafter more fully set forth and pointed out in the claims, reference being had to the accompanying drawings in which,

Figure 1 is a front elevation of a portion of a radiator core embodying the invention, with portions broken away to show the construction; Fig. 2, a horizontal section through the same on the line 2—2 of Fig. 1; Fig. 3 is a vertical section on the line 3—3 of Fig. 1; Fig. 4 is a face view of a portion of a blank from which the tubes and radiating members of the core are formed; and Fig. 5 is a perspective view of a portion of the blank partially formed up.

It will be understood that a radiator embodying this invention will be constructed in the usual manner with top and bottom tanks which are not shown in the drawing as they form no part of this invention which resides entirely in the cooling core forming the connection between such tanks.

As shown in the drawing, the core comprises a plurality of thin flat tubes which are

equal in width to the thickness of the core, extending through the same from front to rear thereof, and these tubes open in the usual manner into the top tank of the radiator at their upper ends and into the bottom tank at their lower ends to form thin water passages connecting the tanks.

To divide the spaces between the tubes into a plurality of horizontal air passages extending through the core and form radiating members or fins to dissipate the heat contained in the water flowing through the tubes, fin members 2 are provided in the said spaces between the tubes and also serve to space said tubes apart. These fin members each extend the full length of the tubes and are of the same width as said tubes, extending from the front to the rear face of the core. As shown, each tube 1 and adjacent fin member may be stamped from a single sheet of metal, which sheet is shown in Fig. 4 of the drawing. That portion of the sheet which forms the side walls 3 and 4 of each tube is folded longitudinally upon itself along the dotted lines 5 shown in Fig. 4 and the sheet is then folded along the dotted lines 6 adjacent to its free edge and bent inwardly to form an inwardly extending flange 7 to engage the opposite side of the tube and close the edge thereof.

Integral with that portion of the sheet which forms the side 4 of the tube, is the portion of the sheet which is stamped up to form the fin member, said member comprising, when so stamped out and folded into shape, a series of spaced horizontal strips formed by severing the metal along horizontal spaced parallel lines; thence vertically from the ends of said lines and bending the portions 8 thus partially severed, at right angles to the plate. These strips or walls thus formed extend across the space between adjacent tubes in the assembled radiator with an integral vertical stiffening flange 9 along one edge of each strip formed by the body of metal left between the openings from which the walls 8 are struck up. These flanges 9 are connected at each end by vertical strips 10 which thus support said flanges

and their integral strips or walls 8 and a vertical row of spaced rectangular openings 11 is formed in the sheet metal along one edge of one strip 10 between it and the adjacent portion 4 of the sheet, by severing the metal at intervals along vertical lines 12 and 13, each slit being equal in length to the desired vertical length of the opening, then cutting the metal transversely between the lines midway of the ends of the several slits and bending the metal thus partially severed, laterally from the plate to form pairs of spaced flanges 16. A like vertical row of openings 11 is formed in a like manner along the outer edge of the other vertical strip 10 at the other ends of the flanges 9 by cutting the metal at intervals along the vertical lines 14 and 15 and bending the same laterally to form similar flanges 16 at that end of the strips 9. The strip of metal along the edge of the blank between said edge and the line 15, forms a supporting strip 17 similar to the strips 10 to connect horizontal bars 18 formed by the metal left between said openings 11 with the edges of which bars the flanges 16 are integral. The metal left between the openings 11 which are formed along the edge of the portion 4 of the sheet, forms like horizontal bars 19 with one end of said bar integral with the adjacent portion 4 of the blank and the other end integral with the adjacent vertical strip 10. The blank thus partially formed up, is shown in Fig. 5, and the forming is then completed by bending the blank along the line 12 at right angles to the wall 4 and again at right angles along the line 13 to bring the side or wall formed by the strips 10 and flanges 9 into parallelism with the wall 4 with the side edges of the horizontal dividing walls 8 adjacent to said wall 4 and their ends between the pairs of inwardly projecting flanges 16. The blank is then folded at right angles along the line 15 to bring the edge strip 17 against the end edges of the outer pairs of flanges 16, and again folded at right angles along the line 14 to bring the cross bars 18 across the ends of the walls 8 with the pairs of flanges 16 embracing said ends.

Rigid open frames are thus formed from a sheet of very thin metal by simply cutting and bending the metal as described, and these frames may be formed integral with that portion of each blank which is folded to form a tube or each may be formed from a separate blank and placed between the separately formed tubes to space the same apart and provide radiating members dividing the spaces between the tubes into a plurality of horizontal air passages extending through the core. The core may be readily assembled after the tubes

and fin members are formed up, by simply placing a sufficient number of the parts side by side and then dipping them in a solder bath in the usual manner, to unite the parts.

Obviously, changes may be made in the construction and arrangement of parts without departing from the spirit of my invention and I do not wish to limit myself to the particular form or arrangement shown.

Having thus fully described my invention what I claim is:—

1. A fin construction for radiators having spaced tubular members, comprising a structure having horizontal spaced walls extending across the space between said tubes and dividing the same into a plurality of air passages extending between said members, and an integral vertical portion extending across the space between said tubular members adjacent to one end of said horizontal walls and formed with openings opposite the ends of said air passages.

2. In a fin construction for radiators having spaced tubular members, each provided with a plurality of horizontally extending walls, having partially severed portions turned at right angles to the body of the blank to form flanges extending across said space between the tubes and dividing said space into a plurality of horizontal air passages extending between said tubular members, and having end portions bent to extend across said space between the tubes at the end of said walls.

3. A fin construction for radiators having spaced tubular members, comprising a fin member formed of portions extending laterally to form horizontal walls, and having vertical strips and horizontal bars integral with said strips, said bars being extended across the space between the tubes.

4. A fin construction for radiators having spaced tubular members, comprising portions extending laterally to form horizontal walls spaced apart and extending across the space between said tubular members, and having vertical members adjacent to the ends of the horizontal walls formed with transverse bars opposite said ends of said walls with openings between the bars to form air passages between said tubular members open at each end, said bars being each formed with inwardly extending flanges embracing the ends of the horizontal walls.

5. In a radiator, a core comprising a series of tubular members having parallel side walls and fin members between the tubular members each formed integral with one of the adjacent tubular members, each tubular member and its fin member being formed from a single sheet of metal, a portion of

the sheet being folded upon itself to form
the tubular member and a second portion
extending laterally from one wall of the
tubular member to form an end face of the
5 fin member, a third portion of said sheet
extending at right angles to said end face to
form one side of the fin member extending
parallel with said wall of the tube and a
fourth portion extending at right angles

thereto to form the other end face of the 10
fin member.

In testimony whereof I affix my signature
in presence of two witnesses.

HENRI DE BOISCHEVALIER.

Witnesses:

LEWIS E. FLANDERS,
ANNA M. DORR.