F. F. JUNGERHELD.

RADIATOR TUBE.

APPLICATION FILED JAN. 7, 1920.

1,417,387.

Patented May 23, 1922.

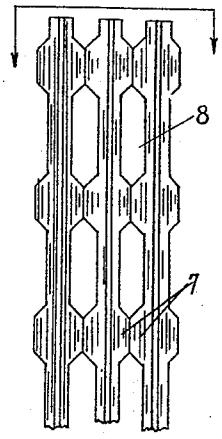


Fig. 7

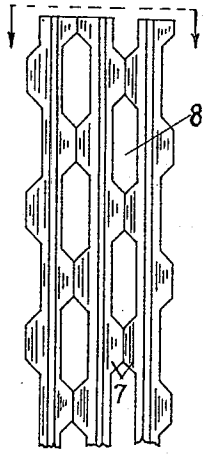


Fig. 9

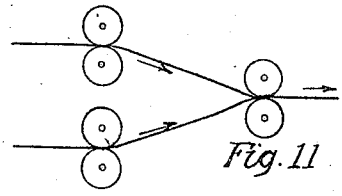


Fig. 11

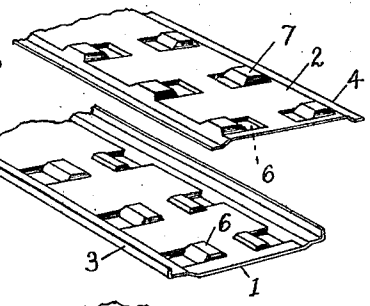


Fig. 3

Fig. 2

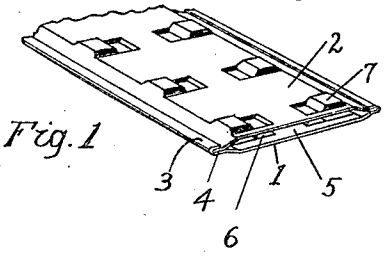


Fig. 1

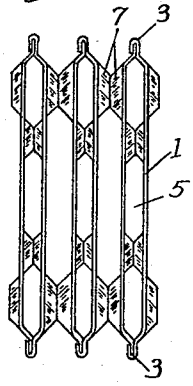


Fig. 8

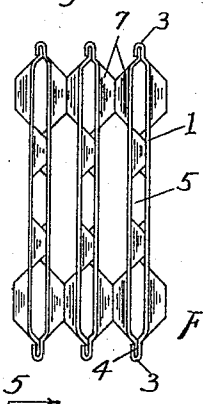


Fig. 10

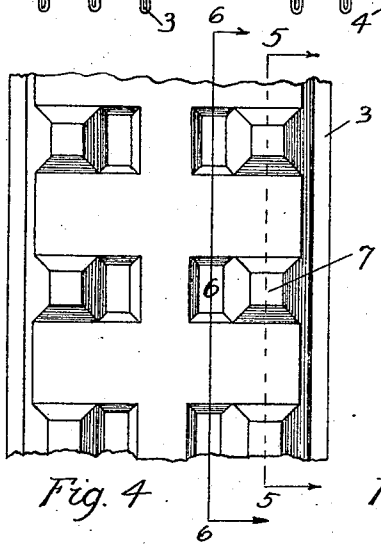


Fig. 4

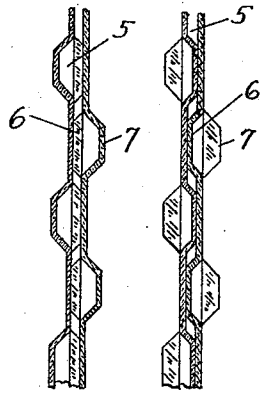


Fig. 5

Fig. 6

INVENTOR

Frederick F. Jungerheld

BY

Geo. B. Willcox ATTORNEY

UNITED STATES PATENT OFFICE.

FREDERICK F. JUNGERHELD, OF SAGINAW, MICHIGAN, ASSIGNOR OF ONE-FOURTH TO WELLINGTON B. WYLIE, OF SAGINAW, MICHIGAN, AND ONE-FOURTH TO STORK MOTOR COMPANY, OF SAGINAW, MICHIGAN, A CORPORATION.

RADIATOR TUBE.

1,417,387. Specification of Letters Patent. Patented May 23, 1922.

Application filed January 7, 1920. Serial No. 349,903.

To all whom it may concern:

Be it known that I, FREDERICK F. JUNGERHELD, a citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Radiator Tubes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the manufacture of flat sheet metal tubes adapted to be assembled to form cores of radiators or coolers, as for example the radiators of automobiles.

My invention consists in an improved construction or form of the sheet metal walls of the tube and the means by which the two walls are secured together, whereby I am enabled to manufacture radiator tubes of the class described very cheaply and at a high rate of production and with expenditure of only a small amount of manual labor.

My invention more specificially has for its object the production of flat radiator tubes, the two walls of which are capable of being formed by passing strips of sheet metal through forming rollers, one of the strips being wider than the other and formed with flanges. The two strips, upon emerging from the rolls are joined together and the flanges of the wider strips are closed about the edges of the narrow strip. By so constructing the tube walls and arranging the lateral projections thereon so as to permit the metal strips to be formed by rolling without becoming bent, I am enabled to produce completed radiator tubes in the form of long ribbons or bands of great length that need only to be cut to length in order to adapt them to be assembled as radiator cores.

With the foregoing and certain other objects which will appear later in the specification, my invention comprises the devices described and claimed and the equivalents thereof.

In the drawings, Fig. 1 is a perspective view of one end of a completed radiator tube.

Fig. 2 is a perspective view of the flanged side of the radiator tube before being assembled.

Fig. 3 is a similar perspective of the other side of the tube.

Fig. 4 is an enlarged face view of part of a radiator tube.

Figs. 5 and 6 are respectively sections on the lines 5 and 6 of Fig. 4.

Fig. 7 is an edge view of a number of radiator tubes assembled, as in forming a radiator core, the lateral projections of each tube being opposite each other.

Fig. 8 is an end view of the parts shown in Fig. 7.

Fig. 9 is a side view similar to Fig. 7, except that the lateral projections of the two sides of the tube are arranged in staggered relation.

Fig. 10 is an end view of the parts shown in Fig. 9.

Fig. 11 is a diagrammatic view showing the method of forming the sides of the tube and assembling them by the continuous method of rolling.

As is clearly shown in the drawings, Figs. 1 to 3 inclusive, the tube consists of a wider ribbon or strip of sheet metal 1 which forms one side of the tube and a narrower strip 2 which forms the other side.

The longitudinal edges 3 of the strip 1 are folded upon themselves to enclose the longitudinal edges 4 of the narrower strip. The faces of the two strips are offset with respect to their lateral edges to form a water space 5 between the tubes, as is usual in radiator tubes of this character. The two walls are kept properly spaced apart by internal projections 6 formed in the opposing sheets, to prevent flattening or collapsing of the tubes.

External projections 7 are likewise provided to keep adjoining tubes spaced apart in the core assembly, forming air spaces 8 between the tubes.

The external projections 7 on the two walls of a tube may be directly opposite each other, as in Fig. 7, or may be staggered with respect to each other, as in Fig. 9, but in each case the projections 7 of adjacent tubes abut against each other, as in Figs. 7 and 9.

It will be noticed by reference to Figs. 1 to 4 inclusive that each outward projection 7 is adjacent an inward projection 6 and that the series of projections are symmetrical with respect to a longitudinal center-line along the tube.

By this arrangement I am enabled to form the projections and flanges in the side tubes by rolling, as indicated diagrammatically in Fig. 11, without warping or distorting the strips, that is to say, they emerge from the rolls without any lateral twist or weave, and consequently the two strips can be laid together as they emerge from the two sets of forming rolls and the flanges of the wider strip can be folded down upon the edges of the narrower strip by a second rolling operation, after which the long tube may be cut to proper length and the flanged edges soldered by dipping or otherwise.

By this means I have prduced a radiator tube that is capable of being formed by rolling without lateral distortion, the forming operation being capable of being performed automatically by machinery. The two ribbons of metal may be fed from large coils into the respective rolls, after which the operation is continuous until all of the material has passed through the rolls and been formed into completed tubes.

Having thus described my invention, what I claim and desire to secure by Letters Patent is as follows:

1. A radiator core comprising a plurality of water tubes, the sides of each tube made from two sheets of metal, one sheet wider than the other, the two longitudinal edges of said wider sheet bent upon and enclosing respectively the two longitudinal edges of the narrower sheet, each sheet provided with a plurality of rows of outwardly projecting offsets to form abutments between adjacent tubes, and inwardly projecting offsets intermediate said outward offsets to form spacers for the sides of said tube.

2. A radiator core comprising a plurality of water tubes, the sides of each tube made from two sheets of metal, one sheet wider than the other, the two longitudinal edges of said wider sheet bent upon and enclosing respectively the two longitudinal edges of the narrower sheet, each sheet formed with a plurality of rows of outwardly projecting offsets to form abutments between adjacent tubes, and inwardly projecting offsets adjacent each of said outwardly projecting offsets, said inward offsets comprising spacers for holding apart the sides of said tube.

In testimony whereof I affix my signature.

FREDERICK F. JUNGERHELD.