

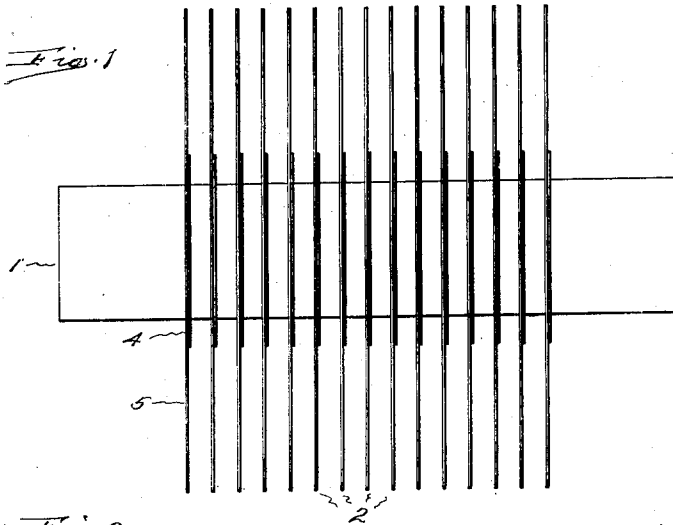
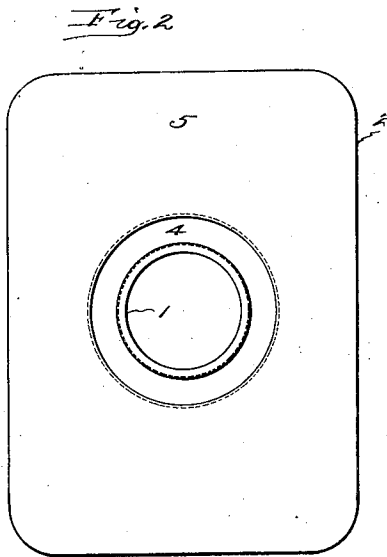
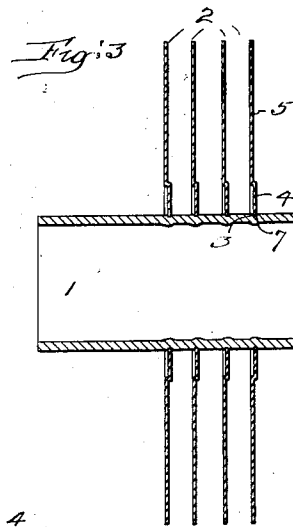
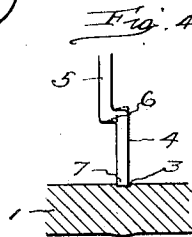
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W. R. CLARKE

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HEAT TRANSFER UNIT

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HEAT TRANSFER UNIT

Application filed June 15, 1931. Serial No. 544,479.

This invention relates to heat transfer units, more particularly heat radiators of the type described in United States Patent No. 1,646,384, October 25, 1927, which comprise a central tubular metallic core with a plurality of fins of sheet metal which provide extended radiating surfaces spaced thereon and held by the expansion of the tube outwardly against the edges of holes in the fins.

10 In the prior construction the expansion of the tube tended to stretch the holes in the fins and distort the surrounding metal, particularly if the fins were made of thin or soft metal, so that the inner edges of the
15 fins would not be contacted squarely and flatly against the surface of the tube, that is, there would be line contacts between the fins and the tube with the result that the heat
20 conducting paths from the tube to the fins would be reduced to a minimum causing a lowering of efficiency, and the outer sections of the fins would be more or less cupped or
25 buckled so that they would look irregularly spaced and not parallel and at right angles to the tube, thus detracting from the appearance of the unit. Thin fins if their edges are
30 flatly and wholly engaged and tightly embedded in the surface of the tube and they are not buckled or distorted by the process
35 of securing them, not only ensure rapid radiation but allow more fins to be applied to the tube per unit of length, without detracting from the appearance. Furthermore, if the
40 fins cup when the tube is expanded they are more or less resilient and their bite or hold against the tube is thus reduced, which is particularly the case if the inner edges of the fin are provided with flanges that lie against
45 and extend along the tube.

The object of the present improvement is to so construct and assemble the elements of a unit of the type referred to, that thin sheet metal can be utilized for the fins, and a
45 strong, tight, uniform and efficient contact of the thin fins with the surface of the tube can be attained without distorting or cupping the fins and thus detracting from the appearance of the finished unit.

50 In attaining this end the fins are stamped from thin sheet metal, and small areas

around the holes made to fit the exterior of the tube, are slightly offset from the outer areas, leaving the inner and outer areas parallel, which shaping stiffens the fins and provides means which allow a slight outward
55 expansion of the inner areas when the tube is expanded, without distorting or cupping the entire fins or throwing the inner edges out so that they will not embed flatly in the metal of the tube.

In the accompanying drawing Fig. 1 shows a side view of a radiator section constructed in accordance with this improvement. Fig. 2 shows a face view of the same. Fig. 3 is a longitudinal section showing only
65 a few of the fins on the tube. Fig. 4 is a detail with the thickness of the metal greatly increased in order to illustrate the manner in which the fins contact with the tube.

The unit shown has a central tubular core 1 which is commonly made of copper or similar good heat conducting metal, of the required thickness, diameter and length. The fins 2 desirably copper or other suitable
70 metal may be of any approved size and outline. The fins are stamped to shape from thin sheet metal with a central perforation 3 which has substantially the same diameter as the original outer diameter of the tube upon which the fins are to be placed. Preferably at
75 the same time that the fins are stamped to shape circular areas 4 surrounding the perforations are offset from the larger outer areas 5. The offset areas are displaced but slightly, are small, and they remain parallel
80 with relation to the outer areas.

Offsetting fins of thin sheet metal in this manner stiffens them as a whole. After these offset fins have been placed on the tube and held at the specified distances apart the
85 tube is expanded from the interior according to the disclosure in the patent above referred to.

On fins of this shape the outward strains resulting from the expansion of the tube are resisted and absorbed by the restricted stiff offset areas which surround the tube so that the outer areas of the fins are not
90 buckled or distorted. Such flexing or distortion of the metal of the fins as occurs takes
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place at the angular junction 6 between the small inner areas 4 and the large outer areas 5, as is roughly indicated to an exaggerated degree in Fig. 4. This leaves the outer areas 5 of the fins smooth and parallel with each other without any substantial obstruction to the flow of air between and against the surfaces of the fins, and the inner areas as well as the outer areas extending in planes at right angles to the surface of the tube with the inner edges 7 of the inner areas flatly and fully binding against and very slightly embedded in the surface of the metal of the tube, so that the conductivity of the joint will have maximum efficiency and will be sufficiently tight to remain so. Such expansion of the tube as occurs in use is transmitted through the small offset inner areas to and expended at the angular junction between the inner and outer areas. Any desired number of these fins may be threaded on the tubes and any number of units may be assembled with the required piping to produce the predetermined radiation.

The invention claimed is:

1. A radiator unit comprising a metallic tubular core, and a plurality of thin sheet metal fins with central perforations located upon said core, said fins having inner areas that are offset from but are parallel with the outer areas, both said inner and outer areas extending at right angles to the axis of the tubular core with the thin inner edges of the inner areas in close contact with and embedded in the exterior surface of the tubular core perpendicular thereto.

2. A radiator unit comprising a metallic tubular core, and a plurality of thin sheet metal fins with central perforations the thin edges of which are closely engaged with and embedded in the core perpendicular thereto, said fins having small inner annular areas surrounding the perforations and large outer areas offset from the inner areas, said areas extending parallel with each other and at right angles to the axis of the tubular core and connected by sections designed to yield under stress due to expansion of the tubular core.

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