Sept. 30, 1947. L. H. COOK 2,428,145

HEAT TRANSFER FIN

Filed Sept. 11, 1944

Fig. 1

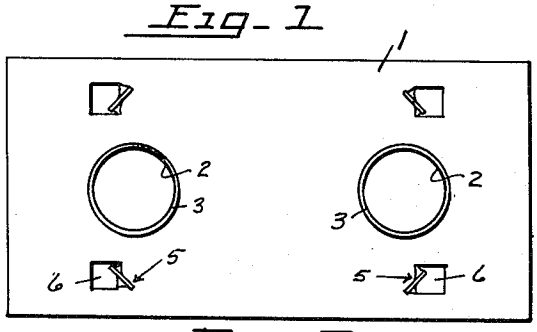


Fig. 2.

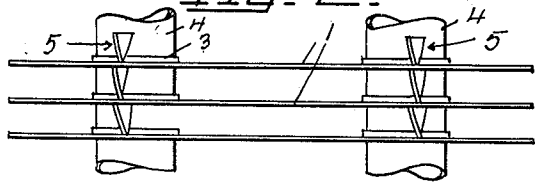


Fig. 3.

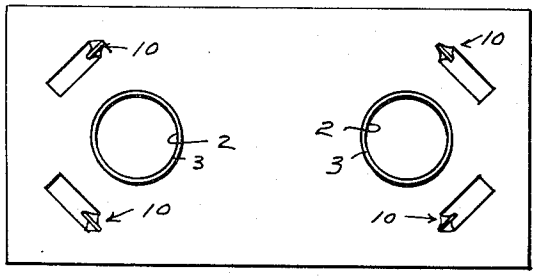
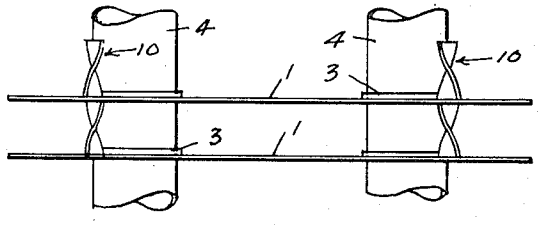


Fig. 4.



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2,428,145

HEAT TRANSFER FIN

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5 Claims. (Cl. 257—262)

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This invention relates to heat transfer fins as are used on refrigeration pipes, radiator tubes, and the like.

One of the objects of the invention is fin structure including improved spacing lugs for spacing the fins of a row apart without requiring unsymmetrical arrangements of spacers in adjacent plates and which spacers materially contribute to causing desirable turbulence in fluid, whether gaseous or liquid, that may be adapted to flow between plates.

Other objects and advantages will appear in the description and in the drawings.

In the drawings,

Fig. 1 is a plan view of a fin of this invention.

Fig. 2 is a fragmentary end edge view of part of a row of fins on tubing.

Fig. 3 is a plan view of a fin having a slightly different structure than the fin of Fig. 1.

Fig. 4 is a fragmentary end edge view of part of a row of fins on tubing or pipe.

In detail, the fin of Fig. 1 is a flat plate 1 provided with a pair of openings 2 for pipe or tubing, said plate being rectangular and said openings being formed with flanges 3 to provide a snug and satisfactory heat transfer contact between the plate and tubing 4 (Fig. 2). This structure is conventional.

At each end of said plate 1 is a pair of spaced lugs 5 of similar shape and size, said lugs being struck from the plate thereby providing an opening 6 adjacent each lug corresponding in outline to the outline of each lug prior to distortion of the latter, as will be explained later.

The said lugs are symmetrically arranged relative to the center of the plate 1, as are the openings 6. Normally such an arrangement, and no more, is not satisfactory since the lugs do not insure proper spacing of the fins inasmuch as the lugs on each plate tend to pass into the openings 6 in adjacent plate thereby nesting the fins whereas they should be positively spaced.

To insure proper spacing of plates the lugs 5 are preferably slightly twisted from a quarter to half a turn so that the straight outer edges of each lug of the corresponding lugs in the row will extend transversely across the base edge of the lug adjacent thereto.

This distortion of the lugs has a material and beneficial effect on the heat transfer efficiency of the fins since the fluid passing between the fins and encountering the lugs is deflected differently at different points along the lugs longitudinally thereof, thereby causing a high degree of turbulence in the fluid. This turbulence results in a

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thorough heat exchange contact between all strata of the fluid and the fins.

Where the desired spacing between plates is relatively small the spacing lugs are shorter than in the case of larger spacing. The shorter lugs may therefore be fairly wide (Fig. 1) if desired, and each lug may be only partially distorted so that the outer edge is at about a 45° angle relative to the base edge. This is adequate in most instances.

Where longer spacing is desired, and where the lugs may be relatively narrow, the twist or distortion may be such that the outer edge of each lug 10 (Figs. 3, 4) is at substantially a 90° angle relative to the base edge.

The foregoing description and the drawings are not to be considered restrictive of the invention, but are merely illustrative thereof, although the description and drawings disclose the preferred form of the invention.

It is obvious that the lugs 5 or 10 may be stamped from the plate 1 so that the openings adjacent thereto in each plate may be at any side of each lug relative to the center of the plate. Also any number and arrangement of lugs may be employed.

I claim:

1. A heat transfer fin comprising a flat plate having spacing lugs struck therefrom and projecting from one side thereof at right angles thereto providing an opening in said plate adjacent each such lug having an outline corresponding to that of the latter, the longitudinal axis of each lug being at right angles to the plane of said plate and said lugs being symmetrically arranged relative to the center of said plate, the outer end edge of each lug extending angularly relative to the base edge of said plate for extending angularly across the base edge of the corresponding lug of a similar plate adapted to be positioned alongside said plate in opposition thereto, the base edge of each of said lugs being the edge thereof integrally connected with said plate.

2. A heat transfer fin comprising a flat plate having spacing lugs struck therefrom and projecting from one side thereof at right angles thereto providing an opening in said plate adjacent each such lug having an outline corresponding to that of the latter, the longitudinal axis of each lug being at right angles to the plane of said plate and each of said lugs being partially twisted about its longitudinal axis whereby a fluid moving over the plate and into engagement with said lugs will be deflected differently at different points along said lugs longitudinally thereof.

3. A heat transfer fin comprising a flat plate having spacing lugs struck therefrom and projecting from one side thereof at right angles thereto providing an opening in said plate adjacent each such lug having an outline corresponding to that of the latter, the longitudinal axis of each lug being at right angles to the plane of said plate and each of said lugs being partially twisted about its longitudinal axis whereby a fluid moving over the plate and into engagement with said lugs will be deflected differently at different points along said lugs longitudinally thereof, said lugs being symmetrically arranged on said plate at two opposite sides of the center thereof and the outer edges of said lugs being straight and extending transversely relative to the base edges of said lugs respectively whereby a portion of the outer edge of each lug will engage the body of a similar plate adjacent thereto when such similar plate is adjacent said plate in opposed relation thereto with its similar edges in corresponding positions.

4. A row of similar heat transfer fins similarly apertured for a pipe and a pipe supporting said fins in opposed relation and in alignment on said pipe, corresponding spacing lugs on each of said fins struck therefrom to one side thereof providing an opening adjacent each lug corresponding in outline with the latter, the corresponding openings in said fins being in alignment longitudinally of said row with the outer edge of each lug extending in a direction transversely across the base edge of the corresponding lug in the plate adjacent thereto and in engagement with such latter plate adjacent said base edge to space adjacent plates apart in said row.

5. A row of similar heat transfer fins similarly apertured for a pipe and a pipe supporting said fins in opposed relation and in alignment on said pipe, corresponding spacing lugs on each of said fins struck therefrom to one side thereof providing an opening adjacent each lug corresponding in outline with the latter, the corresponding openings in said fins being in alignment longitudinally of said row with the outer edge of each lug extending in a direction transversely across the base edge of the corresponding lug in the plate adjacent thereto and in engagement with such latter plate adjacent said base edge to space adjacent plates apart in said row, said lugs being twisted about their longitudinal axes to so position said outer edges thereof.

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