

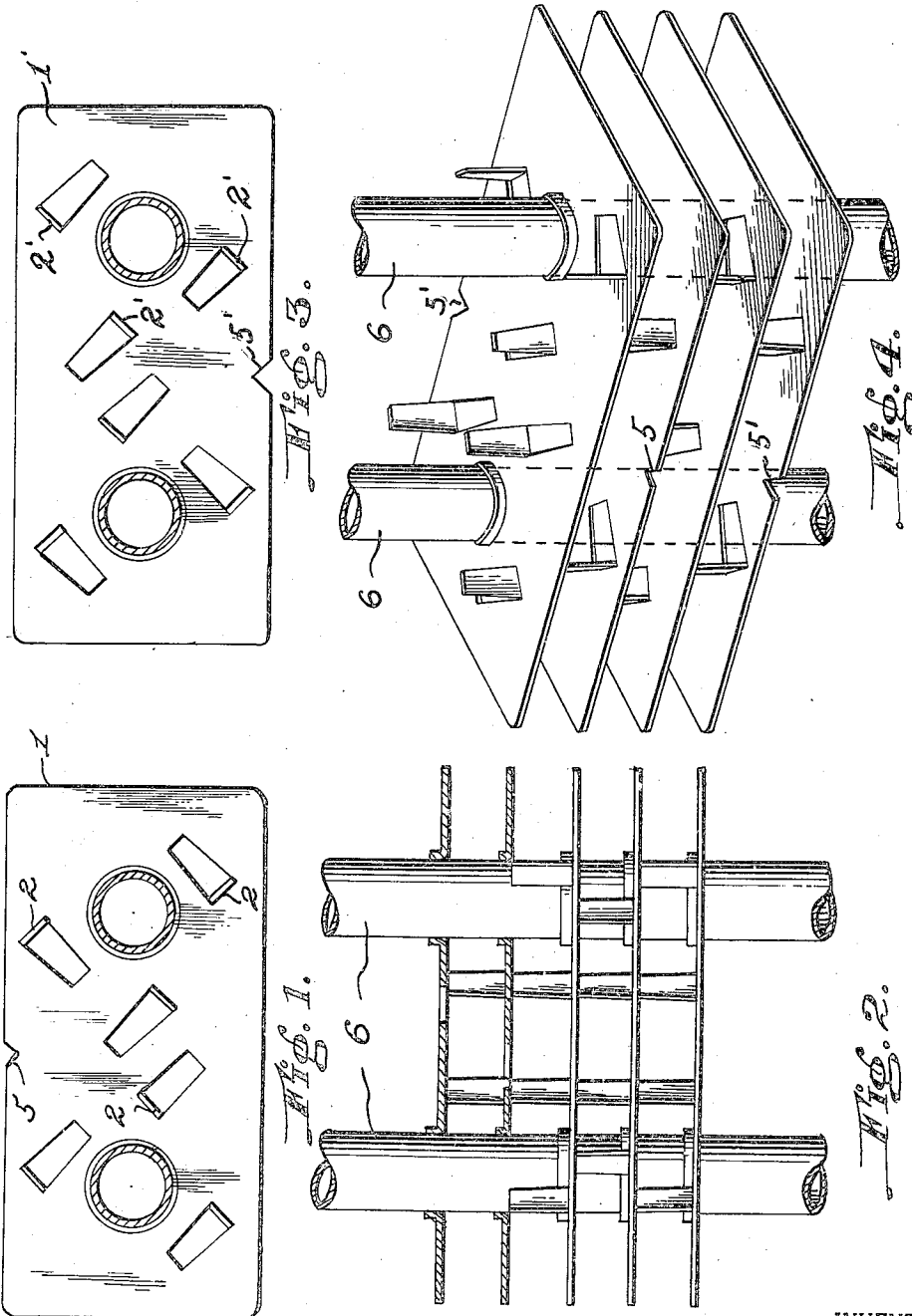
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RADIATOR FIN

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## UNITED STATES PATENT OFFICE

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## RADIATOR FIN

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2 Claims. (Cl. 257—262)

This invention relates to radiators, and particularly to radiators having plate fins to increase the radiating surfaces of tubes in which flows the fluid to be heated or cooled.

5 The object of the invention is to provide an improvement in the construction of the plate fins which have spacer lugs formed integrally with the fins and punched therefrom on three sides, leaving one side uncut, and the lug bent at right  
10 angles to the fin to space the plate fins apart when assembled upon tubes. These lugs, as heretofore constructed, as shown for example in the patent to Seward No. 1,873,052, have been in a trapezoidal shape, the longest side of the trapezoid being at the outer end of the lug and the  
15 smaller end of the trapezoid being attached to the fin plate. This construction prevented the trapezoidal lug passing into the space made by bending the lug at right angles to the fin. This construction reduces the contact area between the  
20 lug and the adjoining fin plate. Furthermore, the smaller end of the trapezoid is closest to the part of the fin plate from which it radiates, causing choking of the heat from the plate to the lug. After assembling the plate fins on the tubes, it  
25 being heretofore the practice to expand the tube outward to make a tight fit, the lugs had a tendency to bend out of shape because they were structurally weak or narrowest at the point of maximum strain.

30 In these heretofore constructed lugs and plates, the lugs straddled the holes and when hot dipping or electroplating with metal in the heretofore constructed trapezoidal lugs which straddle a hole, the coating metal does not join a lug and an adjacent plate except in two small spots which  
35 was a disadvantage and ordinarily the heretofore constructed lugged fin plate did not extend from one row of tubes to the next and this necessitated a gap between the plates on each  
40 tube which further resulted in cutting down the radiating area by the sides of this gap. This gap was found to be disadvantageous for several reasons. For example, condensation accumulated  
45 in the gaps instead of running off and when the condensation gathered in the gaps it frequently turned to ice which gradually spread over the radiating surfaces and formed in such thick masses as to greatly reduce the circulation of air  
50 so vital in air cooled radiators.

55 The advantage of having the plates extend over a plurality of tubes instead of one resulted from the fact that when each plate is pushed on only one tube the plate tended to rotate on the tube

when hot dipped and this gave the finished radiator a poor appearance.

To overcome the difficulties heretofore encountered in radiators of this character, applicant has extended his plate over a plurality of tubes and has cut and punched his lugs from the plate as  
5 will now be more fully described in connection with the attached drawing in which:—

Figure 1 represents a plate with the lugs cut and punched therefrom. 10

Figure 2 shows the plates put on a plurality of tubes.

Figure 3 shows the position of the cut out lugs when the plate is turned at 180° from the position shown in Figure 1. 15

Figure 4 shows the plates on the lugs when half the plates in one series are turned at 180° to the plates in the other series.

1 represents a plate and 2 a series of lugs cut and punched therefrom. These lugs are cut by a  
20 dye in the ordinary way.

When a plate 1' (Fig. 3) has its lugs 2', 2' cut by the same dye, if the plate 1 was placed above the plate 1', the lugs 2 being smaller at their  
25 outer end would pass into the cut out opening of the adjacent fin, but by cutting and stamping the lugs in plate 1 unsymmetrically and then turning the plate through 180° so that a notch 5, for example in plate 1 would be in the position shown in  
30 Figure 1, the corresponding notch 5' (Figure 3) would be in the position shown therein. Then when the plates are put on the tubes, as shown in Figures 2 and 4, the lugs 2 between the plates  
35 would bear on a solid part of the plate and not coincide with the openings in the plates. The notches 5, 5' conveniently guide the assembler in placing the plates one over the other since the cut out notches 5, 5' would be arranged as shown  
40 in Figure 4 and when so arranged the smaller end of each lug would contact with the solid portion of the plate. The tube 6, furthermore, would prevent any rotation of the plates around any tubes and with the smaller ends of the lugs bearing  
45 against the solid portion of the plates when the plates and lugs are assembled as shown in the drawing, my radiator has the maximum strength and the maximum radiating qualities.

It will be observed also that when the plates are assembled on the tube 6, it is desirable that  
50 the holes in the plates be not in alignment. The hole in one plate being out of line with the hole in the next plate will cause a tortuous line of circulation through the plates which, of course, is  
55 advantageous.

By punching out the lugs in both series of plates by the same die and then displacing the lugs in one series to those of the other by turning one plate through 180° relative to the other plate in the next series, the holes and lugs are displaced relatively to each other and produce a superior arrangement. This construction results in having the bottom of the lug where it joins the plate wider than the outermost end of the lug. This aids the flow of heat as compared with the type of lug, where the small end of the lug is attached to the plate and, furthermore, puts a maximum section of the lug at a point of maximum strain when expanding the tube to make a tight fit in a hole and by having each lug abutting a solid part of a fin when the entire construction is coated with metal, the metal will form a fillet on each side of every lug where it touches an adjoining fin plate. This fillet increases the radiating surface as compared to the construction where a lug straddles a hole in the plate.

Having now described my invention and the

manner in which the plates are punched, and the lugs displaced by turning the plates through 180° when the plates are placed on a plurality of tubes, what I claim as new is:—

1. A radiator element including a plurality of tubes and plates extending around at least two tubes, each plate having punched out lugs and the lugs being unsymmetrically arranged on either half of a plate whereby when said plate is turned 180° and fitted to its adjacent plate, the punched out lugs will each rest against and be covered by the solid part of its adjacent plate, said lugs being narrower at their outer ends than at the ends where the lugs join the plate.

2. A radiator including plates and punched out lugs, each lug being narrower at its outer end than where it joins the plates, the lugs on adjacent plates being unsymmetrically arranged so that when the plates are assembled each lug will contact and be covered by a solid portion of the adjacent plate.

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