

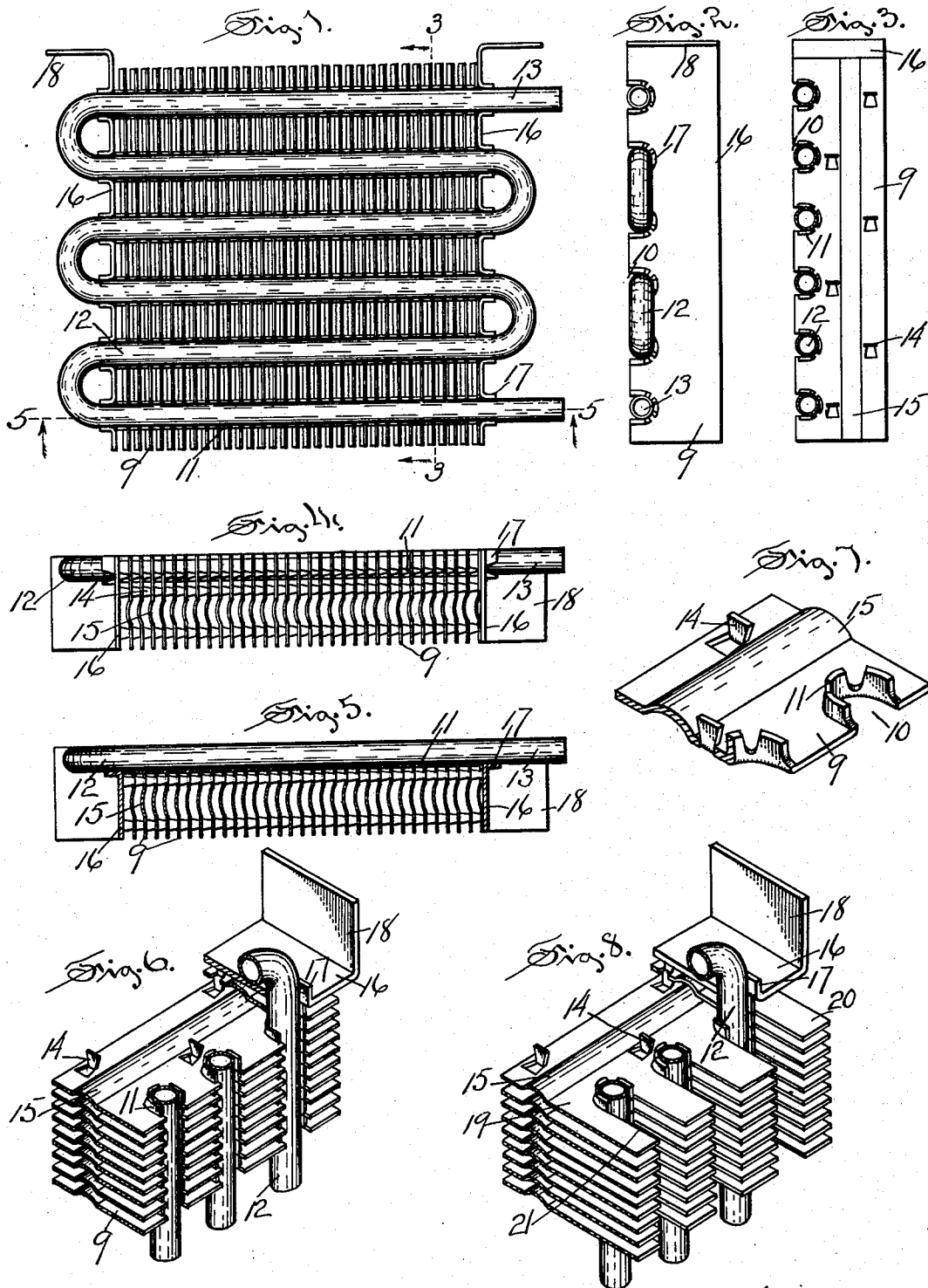
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RADIATOR

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RADIATOR

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5 Claims. (Cl. 257—149)

My invention relates to that class of apparatus which is employed for changing temperatures of fluids for various purposes, and an object of my invention, among others, is the production of apparatus of this sort which is simple in construction and particularly efficient in the results obtained by its use.

One form of a device embodying my invention and in the construction and use of which the objects herein set out, as well as others, may be attained is illustrated in the accompanying drawing, in which

Figure 1 is a side view of a radiator unit embodying my invention.

Figure 2 is an end view of the same.

Figure 3 is a view in section on a plane denoted by the dotted line 3—3 of Fig. 1.

Figure 4 is an edge view.

Figure 5 is a view in section on a plane denoted by the dotted line 5—5 of Fig. 1.

Figure 6 is an isometric view of a fragment of the unit with parts broken away to show construction.

Figure 7 is a detail view on enlarged scale of a portion of one of the radiating plates.

Figure 8 is a view similar to Fig. 6 but illustrating a modified form of the invention.

As hereinbefore mentioned my improved apparatus is for the purpose of changing temperatures by means of fluids circulating through tubes, in some instances the apparatus being employed to lower the temperatures of fluids circulating through such tubes and in other instances the temperatures of fluids flowing through the tubes being radiated to lower temperatures outside of the tubes.

A unit comprising a portion of such an apparatus and embodying my invention includes a series of radiating plates all of which plates are generally of the same construction, each plate 9 preferably being of considerable width as compared with its length and having notches 10 formed in one edge and preferably evenly spaced from one another. A flange 11 extends around the border of each notch, these flanges being formed by bending the material outwardly substantially at right angles to the plane of the plate to form the notches and as clearly shown in Fig. 7 of the drawing. These flanges may each be unbroken, but I prefer to form them in sections, in the structure shown each flange comprising three pieces, but it will be understood that my invention is not limited in this respect but may consist of any desired number of pieces.

The notches 10 are formed to receive a con-

ducting tube or tubes 12 which preferably are bent to provide parallel lengths separated at distances equal to the distances between the notches 10 so that a tube so bent may be placed in the notches in the plates, and as shown in Figs. 1 and 2 of the drawing. The ends 13 of the tube are extended for the purpose of connection to sources of fluid and for the discharge of such fluid which is circulated through the tubes.

The flanges 11 are for the purpose of properly spacing the conducting plates so that the intervals between the plates will be substantially the same throughout the unit, the flanges on each plate resting against the surface of the adjoining plate and thereby avoiding any necessity for special means for properly spacing the plates, the flanges serving this purpose.

As a means for maintaining uniform spacing of the plates between the tubes and the opposite edges of the plates spacers 14 are stamped out from the plate and bent at an angle thereto and as shown in Fig. 3 of the drawing. These spacers are tapered from a narrow dimension at the surface of the plate to a wider dimension at the outer end of the spacer. When the spacers are thus bent into spacing position it will be noted that the wide outer end of each spacer is located opposite the narrow end of the opening in the adjacent plate so that there is no danger of the spacer entering said opening and the plates are thus properly spaced.

As a means for deflecting currents of air flowing through the unit between the radiating plates curved ribs 15 extend lengthwise of the plates between the two rows of spacers 14 and as shown in Fig. 3 of the drawing. These ribs are curved crosswise of the plates, and as clearly shown in Fig. 7, and in addition to the function of deflecting currents of air these ribs also serve to stiffen the plates and thereby provide a very rigid structure.

Each unit is provided at opposite sides with holding plates 16 having flanges 17 similar to the flanges 11 hereinbefore described, the flanges 17 encountering the curved portions of the tubes serving to position the set of radiating plates and thereby to secure such plates in place upon the tubes. Brackets 18 are formed at the ends of the holding plates for the purpose of securing the unit as a whole in place for use.

The structure shown in Fig. 8 is substantially the same as that hereinbefore described with the exception that the radiating plates 19 are extended as at 20 beyond the tube 12, as shown in Fig. 8, but as in the case of the apparatus first

described the tube when bent is inserted in place in the unit from one edge thereof, being placed in the notches 21 and then slid into position. Any suitable means for securing the tube within the notches in the radiating plates may be employed as desired.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the device which I now consider to represent the best embodiment thereof; but I desire to have it understood that the device shown is only illustrative and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim:

1. A radiator unit including a radiating plate having notches in one edge, said plate also having spacers at the edges of said notches, a bent tube having branches set into said notches through the openings thereof at the edge of the plate, said plate being bent to form a ridge extending lengthwise thereof at a distance from said notches, and means for securing said tube in place.

2. A radiator unit including a plurality of radiating plates each having registering notches in the edges thereof, said plate also having spacers at the edges of said notches, a bent tube having branches set into said notches through the openings thereof at the edges of said plates, said plate being bent to form a ridge extending lengthwise thereof at a distance from said

notches, and means for securing said tube in place.

3. A radiator unit including a plurality of radiating plates having registering notches in the edges thereof with spacers bent out of and located at the edges of said notches to engage and support adjacent plates, a bent tube having branches set into said notches from the edges of said plates, supporting plates located at opposite sides of the unit comprising said plates and having notches in one edge for the reception of said tube and with spacers bent out of said notches to engage and support a radiating plate, and means for securing said tube in place.

4. A radiator unit including a plurality of radiating plates having registering notches in the edges thereof, a bent tube having branches set into said notches from the edges of said plates, spacers bent out of and surrounding said notches to engage and support adjacent plates, spacers bent out of holes in said plates at a distance from said tubes, and means for securing said tubes in place.

5. A radiator unit including a plurality of radiating plates having registering notches in the edges thereof, said plates being bent to form ridges extending lengthwise thereof at a distance from said notches, a bent tube having branches set into said notches from the edges of said plates, and means for securing said tube in place.

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