Our invention relates to heat exchangers, and more particularly to supporting and spacing structures for multiple coil and header assemblies of the same.

It is an object of the present invention to provide supporting and spacing structure for the tubes of heat exchangers, which structure may be quickly and readily assembled.

Another object of the invention is to provide supporting structure as described above, which is simple in construction and may be fabricated from standard parts.

The invention also contemplates providing supporting structure for the tubes of heat exchangers, in which the weight of the tubes will be evenly distributed among the various parts.

Finally, the invention further contemplates providing supporting structure for heat exchangers, which will be inexpensive to manufacture, easy to assemble, and rugged and durable in use.

Other objects and advantages will become apparent from the following description taken in conjunction with the accompanying drawings, in which:

Figure 1 is a perspective view of a multiple coil and header assembly of a heat exchanger according to our invention;

Figure 2 is an enlarged, fragmentary perspective view of a portion of the structure shown in Figure 1;

Figure 3 is a transverse cross-sectional view of our invention taken on the line 3—3 of Figure 1 and omitting some of the central portion thereof to avoid an undue multiplicity of lines;

Figure 4 is a fragmentary cross-sectional view on the line 4—4 of Figure 3;

Figure 5 is a fragmentary perspective view of a portion of a device according to our invention, showing the arrangement for attaching the supporting members;

Figure 6 is a plan view of a device according to our invention; and

Figure 7 is an elevational cross-sectional view taken on the line 7—7 of Figure 6.

Referring now to the drawings in greater detail, we have shown in Figure 1 a multiple coil and header assembly of a heat exchanger comprising a plurality of lengths of tubing 3 arranged in the form of sinuous coil flats and adapted to conduct heat exchange fluid to and from header pipes 5 attached to the ends of the tubing. As best seen in Figure 7, lengths of tubing 3 incline slightly downward from upper header pipes 5 to lower header pipes 5 so as to facilitate drainage of the system.

Supporting structure for the assembly is provided, comprising a pair of outer side sheets 7 and a plurality of pairs of inner side panels 9. Each pair of side panels 9 carries between the individual panels thereof at least one pair of horizontal supports 11, each pair of horizontal supports carrying between it divider support means 13 comprising a plurality of vertically disposed, flat, elongated slats 15 disposed in side-by-side relationship with their longitudinal edges vertical and contiguous, so that the slats comprising divider support means 13 lie in a common plane transverse to the heat exchanger as a whole and perpendicular to lengths of tubing 3. Each slat 15 is provided along the opposite longitudinal edges thereof with alternately disposed notches 17 separated by straight edge portions 19. Thus, when slats 15 are arranged in a common plane in side-by-side contiguous relationship, the notches 17 in each slat 15 will open onto straight portions 19 of the adjacent slat. As seen in Figure 7, the slats 15 most closely adjacent header pipes 5 do not contact the uppermost and lowermost lengths of tubing 3, since adequate support in these regions is given by header pipes 5.

Slat 15 may of course be formed from metal or any other strong, rigid material; but it is preferred to form them from an insulating material such as wood and more particularly plastic so as to minimize electrolytic corrosion in the system.

It will be noted that notches 17 define a plurality of openings through divider support means 13, through which lengths of tubing 3 pass. Each length of tubing 3 is received entirely within a notch 17 and thus lies entirely within the contour of its associated slat 15 as defined by the longitudinal edges of the slat. In addition to the notched relationship, it will also be noted that straight portions 19 of the edges of the slats retain lengths of tubing 3 within the notches 17 of adjacent slats.

Horizontal supports 11 are spaced apart longitudinally of lengths of tubing 3 a distance substantially equal to or a little greater than the thickness of divider support means 13 as defined by the thickness of individual slats 15. In this way, horizontal supports 11 are adapted to retain slats 15 between them in the upright, side-by-side relationship shown in the drawings and to prevent slats 15 from buckling or turning out of line. The individual supports of a pair of horizontal supports 11 are also spaced apart vertically, so that one of the horizontal supports will support some of the lengths of tubing 3 while the other of the horizontal supports will support others of the lengths of tubing 3. In this way, the weight of the tubing is divided among the horizontal supports; and hence, the horizontal supports 11 do not need to be so strongly constructed as otherwise.

In order better to perform their stated functions, horizontal supports 11 are in the form of angle members and are assembled so as to open away from divider support means 13, with their upper horizontal legs 21 providing support for lengths of tubing 3 and their dependent vertical legs 23 disposed inwardly adjacent divider support means 13 to provide a broad area of contact between slats 15 and horizontal supports 11.

Means are provided to lock horizontal supports 11 to the side panels 9 disposed at each end thereof, comprising tongues 25 disposed on each leg of each horizontal support 11 at each end thereof. Legs 21 and 23 are perpendicular to each other; and hence, tongues 25 are also perpendicular to each other. The tongues are received through holes 27 in side panels 9 and have interlocking engagement with the outer sides of side panels 9 by being bent over away from each other as shown in Figure 5. It should be noted that this form of interlocking engagement is extremely strong, inasmuch as it resists torsional and torsional stresses in all directions.

Side panels 9 are provided with outwardly directed flanges 29 along their upper and lower edges; and side sheets 7 are provided with inwardly directed flanges 31 along their upper and lower edges, flanges 31 being complementary to and nestling within flanges 29. Screw-threaded fasteners 33 are provided for fastening together flanges 29 and 31; and in this assembled condition, side sheets 7 and side panels 9 will be parallel to each other.
but spaced apart over their major vertical extent by the tongues 25 which lie between them.

As Figure 3, from which invention has been described in conjunction with preferred embodiments, it is to be understood that modifications and variations may be resorted to without departing from the spirit and scope of the invention, as those skilled in the art will readily understand. Such modifications and variations are considered to be within the purview and scope of the invention and appended claims.

We claim:

1. In a heat exchanger, a pair of spaced horizontal supports, divider support means disposed between said horizontal supports and having a plurality of openings therethrough, and a plurality of lengths of tubing disposed in said openings, some of said lengths of tubing resting on said horizontal supports and others of said lengths of tubing being supported by said divider support means, said horizontal supports being spaced apart longitudinally of said lengths of tubing substantially the thickness of said divider support means to give lateral support to both sides of said divider support means.

2. The invention of claim 1, in which said horizontal supports comprise angle members opening away from said divider support means and having an upper horizontal leg to support said lengths of tubing and a dependent vertical leg adjacent said divider support means.

3. The invention of claim 1, in which said horizontal supports are spaced apart vertically so that different lengths of tubing rest on each said horizontal support.

4. In a heat exchanger, a pair of spaced horizontal supports, divider support means disposed between said horizontal supports and comprising a plurality of flat, identical, elongated slats, each said slat having a plurality of notches disposed in staggered relation in opposite longitudinal edges of said slat, said slats being disposed side-by-side in a common plane, and a plurality of lengths of tubing disposed entirely within said notches and extending perpendicular to said plane, the lengths of tubing in the notches of each said slat being maintained in said notches by straight portions of the edges of adjacent slats, at least some of said lengths of tubing resting on said horizontal supports.

5. In a heat exchanger, a pair of spaced horizontal supports, divider support means disposed between said horizontal supports and comprising a plurality of flat, elongated slats, each said slat having a plurality of notches disposed alternately in opposite longitudinal edges of said slat, said slats being disposed side-by-side in a common plane, and a plurality of lengths of tubing disposed entirely within said notches and extending perpendicular to said plane, the lengths of tubing in the notches of each said slat being maintained in said notches by straight portions of the edges of adjacent slats, at least some of said lengths of tubing resting on said horizontal supports, said horizontal supports being spaced apart longitudinally of said lengths of tubing substantially the thickness of a said slat to give lateral support to both sides of said divider support means and to maintain said slats in said common plane.

6. The invention of claim 5, in which said horizontal supports comprise angle members opening away from said divider support means and having an upper horizontal leg to support said lengths of tubing and a dependent vertical leg adjacent said slats.

7. In a heat exchanger, a pair of spaced horizontal supports having tongues at their opposite ends, divider support means disposed between said horizontal supports and having a plurality of openings therethrough, a plurality of lengths of tubing disposed in said openings, at least some of said lengths of tubing resting on said horizontal supports, a side panel at each end of said horizontal supports, each said side panel having holes therethrough for the reception of said tongues, said tongues having locking engagement with the outer sides of said side panels, and side sheets fastened to each said side panel on the outer side thereof, said tongues being disposed between said side sheets and side panels.

8. The invention of claim 7, in which said horizontal supports comprise angle members having a horizontal leg and a vertical leg, each said leg having a said tongue at each end thereof, the said tongues at each end of a said channel member being disposed at right angles to each other.

9. The invention of claim 7, in which said side panels and side sheets are provided with outwardly directed flanges along their upper and lower edges, the flanges of the side sheets being complementary to and nesting within the flanges of the side panels, and means for fastening together the flanges of the side sheets and the flanges of the side panels.

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