

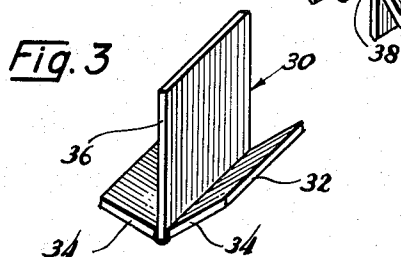
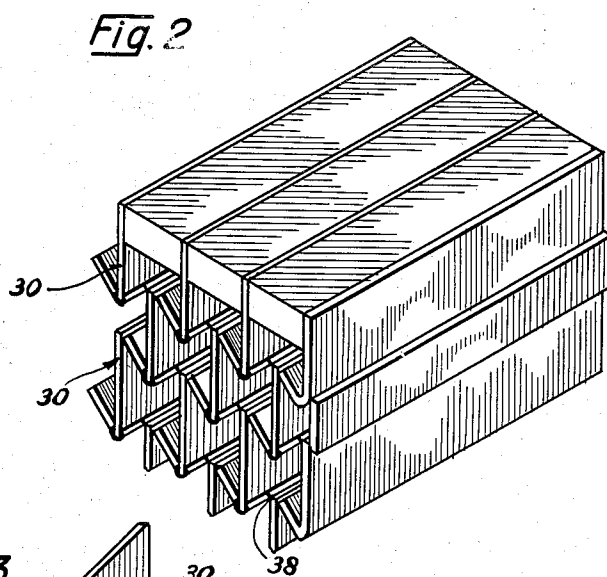
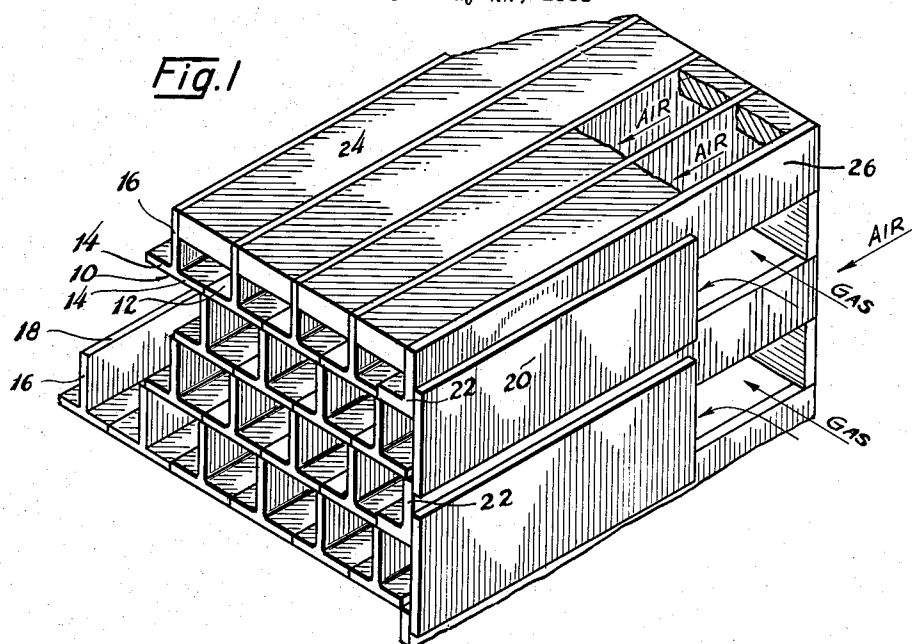
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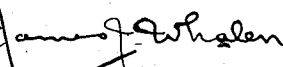
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HEAT EXCHANGER CORE WITH BEAM COMPONENTS

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HEAT EXCHANGER CORE WITH BEAM COMPONENTS

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The present invention relates to plate type exchangers utilized for the transmission of heat between two confined fluids and particularly to an improved heat exchanger core having wall members bounding the fluid passages provided with extended surface in the form of fins.

A well known type of apparatus for the transfer of heat between two confined fluids, such as hot gases and relatively cool air, is made up of a plurality of spaced metallic plates, forming passages through alternate ones of which the hot gas flows in heat exchange relationship with the air that traverses the intermediate passages. The spaces between the parallel plates are closed along one pair of opposite edges to bound the sides of the passage for air to be heated and the heating gas passage is likewise closed along one pair of opposite side edges which sides may be those extending parallel to the closed edges of the air passage in case of parallel flow, or along the adjacent sides in case of transverse flow. Such spaced plates form a core that is usually enclosed within a housing with which are associated the inlet and outlet manifolds and the supply and discharge ducts for the two fluids.

To increase the heat transfer efficiency heat exchangers of this type frequently have the walls of the fluid passages provided with extended surface in the form of fins extending into the path of the fluids and serving to increase the conduction of heat to and through the walls bounding the passages.

The present invention is directed to an improved heat exchanger core having surface extending fins located in both the air and gas passages, these fins according to the invention being integral with the passage walls that separate the fluids and constituting parts of structural shaped members that are assembled in multiples to form the passage walls of the core and the extended surface for these walls.

The invention will best be understood upon consideration of the following detailed description of illustrative embodiments thereof when read in conjunction with the accompanying drawings in which:

Figure 1 is a fragmentary perspective view of a portion of a heat exchanger core or matrix composed of a series of structural elements assembled and bonded together in accordance with the invention.

Figure 2 is a similar perspective view of a core made up of individual components one of which is shown individually in fragmentary form in Figure 3.

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As shown in Figure 1 the heat exchanger matrix or core is made up of a plurality of T-shaped metallic structural members 10 which in assembly are inverted and mounted in side by side relation so that the longitudinal edges 12 of the lateral flanges 14 forming the cross bar of the T are in abutment. The stems 16 of the T members extend in upright relation to subdivide the fluid passage whose wall is formed by alinement of the lateral flanges 14. Each successively laid row of T-members is offset with respect to the T-members in the row below so that the abutting edges 12 of the lateral flanges 14 in one row rest upon the longitudinal faces 18 of the stems of the T-members in the row on which the last laid T-members are superimposed. Welds are formed along the abutting edges 12 of the lateral flanges of each row of T-members as it is laid upon those of the row below so that the lateral flanges 14 of one row become bonded to the faces 18 of the stems 16 of the T's in the row below thereby forming a unitary honeycomb-like core or matrix. This assembled core may be utilized as a matrix for use as a heat exchange mass in a regenerative heat exchanger. However, it is primarily intended as a core for a two fluid heat exchanger in which the fluids between which heat is exchanged flow in adjacent passages. Accordingly, the sides of the core are closed by plates 20 lying against angle members 22 utilized to fill in at the end of the rows, where necessary, in place of T-members. The top of the core is enclosed by a plate lying upon the stems 16 of the T-members in the uppermost row or by bars 24 welded between adjacent stems of T's in the uppermost row. The core is then connected in usual manner to a manifold structure 26 for directing streams of air into alternate passages 27 and streams of gas into the intermediate passages 28, both sets of passages being subdivided by the longitudinal fins constituted by stems 16 connecting their opposite walls.

In the form shown in Figure 3 the core is made up of a series of components 30 with two lateral flanges 34 each extending at an acute angle with respect to the plate or strip 36 that forms the stem of the component. Here the longitudinal edges of the lateral flanges 34 lie against the sides of the stems of the contiguous members and are welded thereto along lines 38 extending longitudinally of the core.

What I claim is:

1. A heat exchanger core made up of a plurality of rows of metallic structural shapes mounted in side by side relation in each row and having upright stems intermediate lateral flanges with

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the side faces of the latter in abutment and in contact with the end portions of the upright stem of the members in the adjacent row to form fluid passage sections bounded on two opposite sides by the stems of contiguous members and on the other pair of sides by the abutting lateral flanges of two contiguous members in one row and on the other side by the lateral flanges of the member in the adjacent row; and weld joints uniting the said lateral flanges of contiguous members in one row together and to the stems of members in the adjacent row.

2. A heat exchanger core made up of a plurality of superimposed rows of metallic T-shaped members mounted in side by side relation in each row with the side faces of the lateral flange parts of the T's in abutment and in contact with the end face of the upright stem of the T's in the adjacent row to form rectangular fluid passage sections bounded on two confronting sides by the stems of contiguous T-members and on the other two sides by the abutting lateral flanges of two contiguous T-members in one row on one side and on the other side by the cross bar of the T-member in the adjacent row; and weld joints uniting the said lateral flanges of contiguous T-members in one row together and to the bases of T-members in the adjacent row.

3. A heat exchanger core made up of a plurality of superimposed rows of inverted T-shaped metal members mounted in side by side relation in each row with the side faces of the lateral flange parts of the T's in abutment and in contact with

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the end face of the base of the upright stem of the T's in the row below to form rectangular fluid passage sections bounded by the stems and lateral flanges of T-members in the adjacent rows; and weld joints uniting the said lateral flanges of contiguous T-members in one row together and to the bases of T-members in the adjacent rows.

4. A heat exchanger core made up of a plurality of superimposed rows of inverted T-shaped metal members mounted in side by side relation in each row with the side faces of the lateral flange parts of the T's in abutment and in contact with the end face of the base of the upright stem of the T's in the row below to form rectangular fluid passage sections bounded by the stems and lateral flanges of T-members in the adjacent rows; and weld joints uniting the said lateral flanges of contiguous T-members in one row together and to the bases of T-members in the adjacent rows; closure means bridging the spaces at the sides of the core between the T-members in adjacent rows and between the end portions of the T-members in the upper row of the core.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,076,527	Streichert	Oct. 21, 1913
1,101,109	White	June 13, 1913
1,234,166	Hinger	July 24, 1917
1,850,211	Muir	Mar. 22, 1932
2,033,402	Smith	Mar. 10, 1936