[0009] subassemblies together by joining the uncut ends of the deflector blades in the first and third sets in one of the adjacent static mixing subassemblies to the spaced apart and aligned ends of the deflector blades in the second and fourth sets in the other one of the adjacent static mixing subassemblies

BRIEF DESCRIPTION OF THE DRAWINGS

[00010] In the accompany drawings that form part of the specification and in which like reference numerals are used to indicate like components in the various views:

[00011] Fig. 1 is a side perspective view of a static mixing device constructed according to an embodiment of the present invention and shown in a fragmentary portion of a conduit;

[00012] Fig. 2 is a side elevation view of the static mixing device and conduit shown in Fig. 1;

[00013] Fig. 3 is a top plan view of the static mixing device and conduit shown in Figs. 1 and 2;

[00014] Fig. 4 is a side perspective view of one embodiment of the subassembly of the static mixing device;

[00015] Fig. 5 is a side perspective view of the subassembly of the static mixing device taken from an opposite side from the view shown in Fig. 4;

[00016] Fig. 6 is an end elevation view of two of the subassemblies of the static mixing devices prior to being joined together;

[00017] Fig. 7 is a side perspective view of a second embodiment of a subassembly of the static mixing device that incorporates apertures in deflector blades;

[00018] Fig. 8 is a front elevation view of a blank with a series of fold and cut lines that may be used to form a subassembly of the static mixing device; and

[00019] Fig. 9 is a perspective view of the blank shown in Fig. 8.

DETAILED DESCRIPTION

[00020] Turning now to the drawings in greater detail and initially to Figs. 1-3, one embodiment of a static mixing device is designated generally by the numeral 10 and is shown within a cylindrical conduit 12 through which fluid streams are intended to flow and mix together as they pass through the static mixing device 10. The static mixing device 10 fills a cross section of the conduit 12. Although only a single static mixing device 10 is illustrated, multiple static mixing devices 10 are normally positioned in end-to-end relationship within the conduit 12, with adjacent ones of the static mixing devices 10 rotated with respect to each about a longitudinal center axis of the conduit 12.

[00021] The static mixing device 10 comprises intersecting grids 14 and 16 comprised of crossing elements in the form of spaced-apart and parallel deflector blades 18 and 20, respectively. The grids 14 and 16, and the individual deflector blades 18 and 20, cross each other at an included angle that may in one embodiment be within the range of 45 to 135 degrees and in another embodiment be within the range of 60 to 120 degrees. The grids 14 and 16 and deflector blades 18 and 20 are also positioned at an angle, which is normally one-half of the included angle, with respect to the longitudinal center axis of the conduit 12.

[00022] The deflector blades 18 in each of the grids 14 are interleaved with and cross the deflector blades 18 in each of the associated intersecting grids 16. The deflector blades 18 and 20 may be in the form of rectangular strips, except that the deflector blades 18 and 20 that are positioned nearest the inner surface of the conduit 12 are shaped to conform to the shape of the inner surface of the conduit 12. The deflector blades 18 may be planar and the deflector blades

CLAIMS

What is claimed is:

1. A static mixing device subassembly, said subassembly comprising:

a first grid formed of a first set of spaced-apart and parallel-extending deflector blades, wherein the deflector blades of the first set are planar;

a second grid formed of a second set of spaced-apart and parallel-extending deflector blades that are interleaved with and cross the first set of deflector blades at a preselected angle, adjacent ones of the interleaved deflector blades in the first and second sets each having opposite ends and side edges, the side edges having uncut portions that join the adjacent ones of the interleaved deflector blades along a transverse strip where the deflector blades cross and cut portions that extend from the uncut portions to the opposite ends of the deflector blades, the deflector blades in the second grid each having a bent portion that places segments of the deflector blade on opposite sides of the uncut portion in offset planes;

a third grid formed of a third set of spaced-apart and parallel-extending deflector blades, wherein the deflector blades of the third set are planar; and

a fourth grid formed of a fourth set of spaced apart and parallel-extending deflector blades that are interleaved with and cross the third set of deflector blades at a preselected angle, adjacent ones of the interleaved deflector blades in the third and fourth sets each having opposite ends and side edges, the side edges having uncut portions that join the adjacent ones of the interleaved deflector blades along a transverse strip where the deflector blades cross and cut portions that extend from the uncut portions to the opposite ends of the deflector blades, the deflector blades in the fourth grid each having a bent portion that places segments of the deflector blade on opposite sides of the uncut portion in offset planes,

wherein one of the ends in at least some of the deflector blades in the first set is uncut and is interconnected with an uncut one of the ends of the deflector blades in the third set along a reverse bend that aligns the first and second grids of deflector blades with the third and fourth grids of deflector blades.

2. The static mixing device subassembly of claim 1, wherein the offset planes of the segments of the deflector blades in the second set are parallel to each other and the offset planes of the segments of the deflector blades in the fourth set are parallel to each other.

3. The static mixing device subassembly of claim 2, wherein one of the ends in each of the deflector blades in the second set is spaced apart from and aligned with one of the ends in each of the deflector blades in the fourth set.

4. The static mixing device subassembly of claim 2, wherein the first, second, third and fourth grids have a least one side shaped to conform to a curved longitudinal plane.

5. The static mixing device subassembly of claim 2, wherein each of the deflector blades in the first and third sets is planar, and each of the segments of the deflector blades in the second and fourth sets is planar.

6. The static mixing device subassembly of claim 2, wherein the cut portions of the side edges joining the adjacent ones of the deflector blades in the first, second, third and fourth sets are each linear.

7. The static mixing device subassembly of claim 2, wherein the first and second grids cross at an included angle within the range of 45 to 135 degrees and the third and fourth grids cross at an included angled within the range of 45 to 135 degrees.

8. The static mixing device subassembly of claim 2 or claim 7, including apertures in at least some of the deflector blades in the first, second, third and fourth sets.

9. The static mixing device subassembly of claim 2, wherein said one of the ends of each of the deflector blades in the first set is uncut and is interconnected with an uncut one of the ends of the deflector blades in the third set along a reverse bend.

10. A static mixing device comprising static mixing device subassemblies of one of claims 3-9 in which the interconnected uncut ends of the deflector blades in the first set and the deflector blades in the third sets in one of the static mixing subassemblies are joined to said spaced apart and aligned ends of the deflector blades in the second set and the deflector blades in the fourth sets in an adjacent one of the static mixing subassemblies.

11. A method of making a static mixing device, comprising the steps of:

cutting and bending a sheet of material to form a plurality of static mixing device subassemblies of claim 3; and

joining adjacent ones of static mixing subassemblies together by joining the uncut ends of the deflector blades in the first and third sets in one of the adjacent static mixing subassemblies to the spaced apart and aligned ends of the deflector blades in the second and fourth sets in the other one of the adjacent static mixing subassemblies.

12. The method of claim 11, wherein the uncut ends of the deflector blades in the first and third sets in one of the adjacent static mixing subassemblies are joined by welding to the spaced apart and aligned ends of the deflector blades in the second and fourth sets in the another one of the adjacent static mixing subassemblies.