CLAIMS

1. A method for coaxially welding together a first metal tube having a first tube wall and a second metal tube having a second tube wall, wherein the inner diameter of the first tube equals the inner diameter of the second tube and wherein an axial end of the first tube wall is machined in such a way that the axial end of the first tube wall, when seen in a longitudinal cross section, has a first stepped shape over at least a first part of the first tube wall thickness, the first part extending from the inner side of the first tube wall, and wherein an axial end of the second tube wall is machined in such a way that the axial end of the second tube wall, when seen in a longitudinal cross section, has a second stepped shape over at least a first part of the second tube wall thickness, the first part extending from the inner side of the second tube wall, and wherein the first stepped shape and the second stepped shape complement each other, the method comprising the subsequent steps of

A positioning the first tube and the second tube coaxially with respect to each other, wherein the respective machined axial ends contact each other at least at the location of the first part of the first tube wall thickness and the first part of the second tube wall thickness, the first stepped shape of the machined axial end of the first tube wall and the second stepped shape of the machined axial end of the second tube wall fitting into each other such that, as a result of the fit of the first stepped shape and the second stepped shape a movement of the first tube and the second tube with respect to each other in the radial direction is blocked,

B fixating the first tube and the second tube at a number of discrete positions at the circumference of the seam via attachment welds,

C circumferentially welding the first tube and the second tube over the entire circumference of the first tube and the second tube, wherein the circumferential weld extends over the entire thickness of the first tube wall and over the entire thickness of the second tube wall, and

wherein the first part extends from the inner side of the first tube wall and comprises an inner annular end face and an outer annular end face, and

the outer annular end face is smaller than the inner annular end face and has a thickness of at least 1.0 mm.

2. Method according to claim 1, wherein the stepped shape, seen in the axial direction of the first tube, extends within a length having a magnitude of between 0.01 mm and 1.50 mm.

3. Method according to claim 1 or 2, wherein the first part of first tube wall thickness, seen in the radial direction of the first tube, extends within a length having a magnitude of between 2.0 and 12 mm.

4. Method according to claim 1 or 2, wherein the first stepped shape comprises the outer annular end face and the inner annular end face, the outer annular end face and the inner annular end face, seen in the axial direction of the first tube, being arranged at a distance of each other.

5. Method according to claim 4, wherein the outer annular end face and/or the inner annular end face extend(s) parallel to a radial plane that is oriented perpendicular to the axial direction of the first tube.

6. Method according to claim 1 or 2, wherein the first part of the first tube wall extends over the entire thickness of the first tube wall and/or wherein the first part of the second tube wall extends over the entire thickness of the second tube wall.

7. Method according to claim 1 or 2, wherein the machined end of the first tube wall, seen in radial direction, is further machined at the outer side of the first part of the first tube wall thickness over a second part of the first tube wall thickness connecting to the first part of the first tube wall, and wherein the machined end of the second tube wall, at the outer side of the first part of the second tube wall thickness, is further machined over a second part of the second tube wall thickness connecting to the first part of the second tube wall, wherein after performing step A an open seam is present between the second parts of the first tube and the second tube thicknesses.

8. Method according to claim 7, wherein the open seam is substantially V-shaped or U-shaped when seen in a longitudinal cross section.

9. Method according to claim 7, wherein when seen in the axial direction the first parts of the first tube and the second tube thicknesses are arranged within the maximum axial dimension of the open seam.

10. Method according to claim 1 or 2, comprising the step of, before step A, milling the axial ends of the first tube wall and the second tube wall for obtaining the machined ends of the first tube wall and the second tube wall.

11. Method according to claim 1 or 2, wherein when performing step C a single welding layer is welded that extends at least entirely over the first parts of the first tube wall and the second tube wall thicknesses.

12. Method according to claim 1 or 2, wherein when performing step C at least a part of the circumferential weld which extends over the first parts of the first tube wall and the second tube wall thicknesses, is welded by TIG welding.

13. Method according to claim 12, wherein the welding supply material is supplied to the welding pool during the TIG welding as a wire in an automated manner or in a preheated condition.

14. Method according to claim 1 or 2, wherein while performing step C a welding torch is positioned at a fixed position with respect to the seam between the first tube and the second tube fixated to each other during step B, and wherein the fixated first tube and second tube are rotated about their coaxial axes.