

(54) Title of the invention : A FIXTURE WITH EXPANDABLE MANDREL FOR FRICTION STIR WELDING OF VARIOUS DIAMETER PIPES

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(57) Abstract :  
 The present invention is related to the fixture support used in the friction stir welding technique for hollow cylindrical workpieces. The present invention is an expandable mandrel designed for friction stir welding pipes with various diameters. The expandable mandrel consists of a fixture base (1) that carries support blocks (10, 11) and rotating blocks (4, 5). Three jaw chuck assemblies (2, 3) are attached to the rotating blocks, providing a means to hold the workpiece. An expanding stem (8) and moving block (7) are connected by lever pins (9), which, in turn, are connected to roller assemblies (13, 14, 15). When the moving block rotates and translates towards the expanding stem, the roller assemblies expand radially, applying a pre-load to the inner surface of the workpiece. This expansion balances the working pressure exerted by the tool during welding. As the workpiece rotates, the roller assemblies rotate on their own axis, maintaining contact with the inner surface of the workpiece. The expanding mechanism remains stationary, ensuring that the roller assembly stays aligned with the tool's axis.

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