

Title (en)

METHOD OF APPARATUS FOR EXPANDING AND SEALING A SLEEVE INTO A SURROUNDING TUBE

Publication

EP 0309078 A3 19901024 (EN)

Application

EP 88306743 A 19880722

Priority

- US 10065487 A 19870924
- US 10069087 A 19870924

Abstract (en)

[origin: EP0309078A2] A method and apparatus for locating a sleeve within a surrounding tube and pressure-tightly sealing the sleeve within the tube to repair leaks in the tube. The sealing method utilizes dual elongated pressurizable tools. The first tool device includes a housing having a reduced-diameter forward extension portion attached to a front cylinder, and containing a rear piston. The front cylinder, is attached to a collet having multiple radially expandable fingers and contains a front piston attached to a tapered mandrel which is axially movable within the fingers, and has a forward tapered nose portion to facilitate inserting the tool into a tube. The rear piston is attached to the front piston by an elongated rod. By pressurizing the tool front piston by a hydraulic fluid pressurizing unit, the mandrel is forced forward through the collet fingers to expand the fingers against the sleeve and thereby expand the sleeve tightly into the tube to form the seal joint. After withdrawing the tool from the tube, the tool rear piston is similarly pressurized to retract the front piston and attached mandrel back through the collet expandable fingers to reset the tool prior to its further use. The second tool includes a housing containing an axially movable piston and a forward reduced diameter portion and having an elastic expander unit for inserting into the sleeve and tube in a tubesheet. The expander unit consists of at least two elastic rings composed of an elastomer material and each having a chamfer provided at the outer edge of the unit forward and rear faces. By pressurizing a port at the housing front end, the piston is moved rearwardly to axially compress and expand the expander rings radially outwardly sufficiently to expand the sleeve firmly into the tube and provide a pressure-tight seal therebetween. Following such expansion of the sleeve, the piston is pressurized and moved forward to release the compression on the expander unit rings, so that the tool can be easily withdrawn from the expanded sleeve and tube and inserted into another sleeve and tube for repeated usage.

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Citation (search report)

- US 4694677 A 19870922 - RABE GEORGE B [US]
- US 4654943 A 19870407 - RABE GEORGE B [US]
- FR 2345243 A1 19771021 - COMBUSTION ENG [US]
- US RE30802 E 19811124
- US 4006619 A 19770208 - ANDERSON JAMES HILBERT
- US 4418457 A 19831206 - MUELLER RICHARD A [US]
- US 4607426 A 19860826 - KELLY JOHN W [US]
- US 4387507 A 19830614 - KELLY JOHN W
- EP 0140586 A2 19850508 - WESTINGHOUSE ELECTRIC CORP [US]
- GB 2074914 A 19811111 - NUOVO PIGNONE SPA, et al
- EP 0041835 A2 19811216 - BABCOCK & WILCOX CO [US]
- US 2458854 A 19490111 - HULL HENRY E, et al

Cited by

CN107052175A; FR2652440A1; US5101559A; EP0612571A1; FR2701658A1; US5509184A; DE10031902A1; DE10031902B4; CN110549291A; US7597703B2

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