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(54) Title: FRICTION PLUG WELDING METHODS AND SYSTEMS

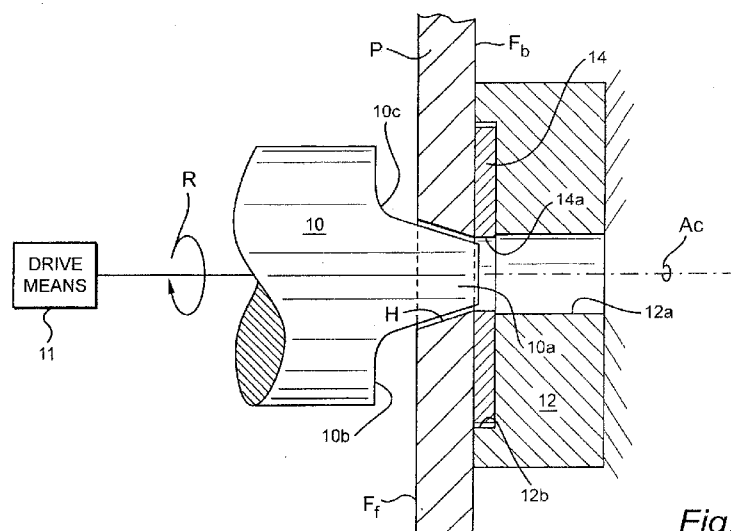


Fig. 1

(57) Abstract: Friction plug welding methods and systems to plug a hole extending through a component part from front and back faces. A sacrificial plate having an opening positioned against the back face of the component part with assistance from a restraint part so that the opening is coaxially aligned with the hole to be plugged. Advancing a male plug into the hole under friction plug welding conditions, a friction weld region being formed between the male plug and defining surfaces of both the hole extending through the component part and the opening extending through the sacrificial plate. The plug rod may include an annular shoulder flange in a plane parallel to the front face of the component part so that flash flow from the friction welding will be displaced laterally of the hole. The male plug may be frustoconically shaped.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/BR 08/00382

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B23K 20/12,31/02 (2009.01)

USPC - 228/112.1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
USPC-228/112.1Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC-228/112.1,114.5

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PUBWEST (USPT, PGPB, EPAB, JPAB), Google

Search Terms Used: welding, friction plug, plug hole, annular weld defects, plate

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/0131364 A1 (Bouet, et al.) 22 June 2006 (22.06.2006) Fig. 1, para [0002], [0003], [0013], [0016], [0017], [0021], [0023], [0024], [0046]	1, 3-5, 17, 19-21, 23
Y		2, 6-16, 18, 22, 24-33
Y	US 5,975,406 A (Mahoney, et al.) 02 November 1999 (02.11.1999) Abstract, Fig. 3d, col 3 ln 27- col 4 ln 15, col 4 ln 41-47, col 4 ln 56-60	2, 7-16, 18, 24-33
Y	US 2006/0060635 A1 (Slattery, et al.) 23 March 2006 (23.03.2006) Fig. 8, para [0043]	6, 14, 22, 33

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