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(54) Title: CARRIER FOR PLUNGER DURING DISASSEMBLY

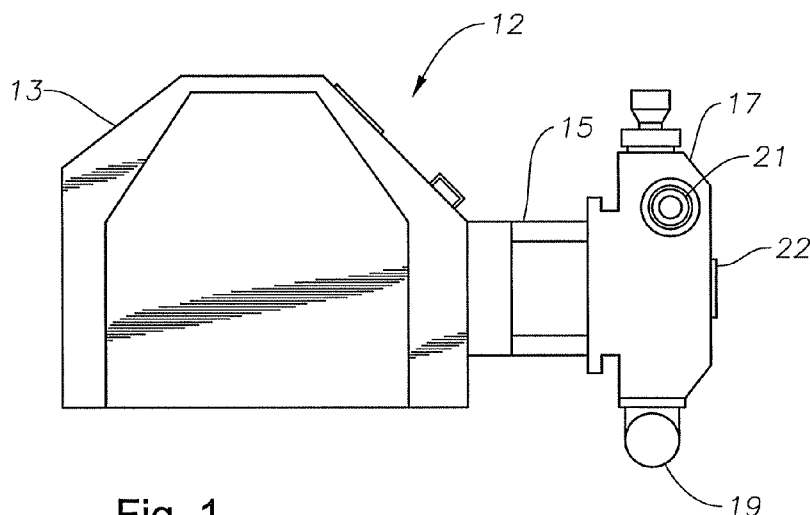


Fig. 1
(Prior Art)

(57) Abstract: A carrier that holds a plunger for a reciprocating pump during maintenance. Maintenance of the pump typically includes repacking of the packing that surrounds the plunger and revalving of the pump's inlet and outlet valve. To allow repacking or revalving, the pump is disassembled and the plunger is removed. The carrier mates with the pump to hold and support weight of the plunger during disassembly, allowing one person to perform pump revalving and repacking.



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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F04B 53/00; F04B 43/067; F04B 35/00; F04B 43/073; F04B 43/02; F04B 53/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: pump, shaft, plunger, cylinder, assembly, crank, rod

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-1999-0079544 A (EMP CO., LTD.) 05 November 1999 See claims 1-11 and figure 1.	1-20
A	WO 2008-137515 A1 (WANNER ENGINEERING, INC. et al.) 13 November 2008 See claims 1-21 and figure 1.	1-20
A	JP 2008-539364 A (WANNER ENGINEERING, INC.) 13 November 2008 See paragraphs [0015]-[0039] and figures.	1-20
A	KR 10-0402825 B1 (KIM, DO HOON) 22 October 2003 See claim 1 and figure 2.	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 10-1999-0079544 A	05.11.1999	None	
WO 2008-137515 A1	13.11.2008	CN 101743403 A EA200901475A1 EP 2145109 A1 JP 2010-526239 A KR 10-2010-0022966 A KR20100022966A US 2008-0273997 A1 US 7665974 B2	16.06.2010 30.04.2010 20.01.2010 29.07.2010 03.03.2010 03.03.2010 06.11.2008 23.02.2010
JP 2008-539364 A	13.11.2008	CN 101203676 A0 EP 1880106 A1 US 2006-0239840 A1 US 7425120 B2 WO 2006-116509 A1	18.06.2008 23.01.2008 26.10.2006 16.09.2008 02.11.2006
KR 10-0402825 B1	22.10.2003	None	