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DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,

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patent (Rule 4.17(ii))

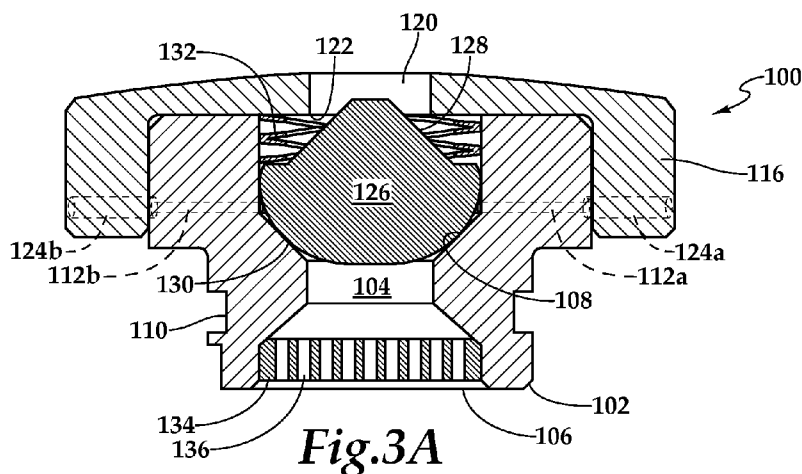
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(54) Title: CHECK VALVE ASSEMBLY FOR WELL STIMULATION OPERATIONS



(57) Abstract: A check valve assembly for well stimulation operations. The check valve assembly includes a valve body having an axially extending passageway including an inlet and a valve body seat. The valve body has a discharge port extending laterally from the passageway. A valve cap slidably engages with the valve body and has an opening with a valve cap seat. A piston is disposed within the passageway. In a closed position, a first sealing surface of the piston engages the valve body seat to prevent fluid communication between the inlet and the discharge port. In an open position, a second sealing surface of the piston engages the valve cap seat allowing fluid communication between the inlet and the discharge port. A spring disposed within the passageway between the piston and the valve cap biases the piston toward the closed position.

A. CLASSIFICATION OF SUBJECT MATTER**E21B 34/08(2006.01)i, E21B 43/04(2006.01)i, E21B 49/00(2006.01)i, G09B 9/00(2006.01)i**

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)

E21B 34/08; E21B 4/14; E21B 43/12; E21B 33/035; E21B 34/10

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: "well", "check valve", "valve body", "valve cap", "piston", "spring", "passageway", "inlet", "valve body seat", "discharge port", "opening", "valve cap seat" and "filter member"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 06119773 A (GARIEPY, JAMES A. et al.) 19 September 2000 See column 2, line 60 - column 5, line 33 and figures 1-4.	1-20
A	US 05988282 A (JENNINGS, CHARLES et al.) 23 November 1999 See column 2, line 3 - column 4, line 50 and figures 1,2.	1-20
A	US 6170581 B1 (LAY, WARREN T.) 09 January 2001 See column 3, line 63 - column 8, line 33 and figures 3-6.	1-20
A	US 04030550 A (MOTT, JAMES D.) 21 June 1977 See claims 1,6 and figures 1A-1F.	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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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
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