

Title (en)  
HYDRAULIC DELAY TOE VALVE SYSTEM AND METHOD

Title (de)  
HYDRAULISCHES VERZÖGERUNGSSPITZENVENTILSYSTEM UND VERFAHREN

Title (fr)  
SYSTÈME ET PROCÉDÉ DE SOUPAPE D'ORTEIL DE RETARD HYDRAULIQUE

Publication  
**EP 3135855 A1 20170301 (EN)**

Application  
**EP 16185315 A 20160823**

Priority  
US 201514841245 A 20150831

Abstract (en)  
An apparatus and method for providing a time delay in injection of pressured fluid into a geologic formation. In one aspect the invention is a toe valve activated by fluid pressure that opens ports after a predetermined time interval to allow fluid to pass from a well casing to a formation. The controlled time delay enables casing integrity testing before fluid is passed through the ports. This time delay also allows multiple valves to be used in the same well casing and provide a focused jetting action to better penetrate a concrete casing lining.

IPC 8 full level  
**E21B 17/042** (2006.01); **E21B 17/08** (2006.01); **E21B 34/10** (2006.01); **E21B 34/14** (2006.01)

CPC (source: CN EP US)  
**E21B 17/00** (2013.01 - CN); **E21B 17/042** (2013.01 - EP); **E21B 17/08** (2013.01 - EP); **E21B 34/085** (2013.01 - CN); **E21B 34/108** (2013.01 - EP); **E21B 34/14** (2013.01 - CN EP US); **E21B 43/20** (2013.01 - CN); **E21B 2200/06** (2020.05 - EP)

Citation (applicant)  
US 6763892 B2 20040720 - KASZUBA FRANK [CA]

Citation (search report)  
• [X] US 2014251620 A1 20140911 - GEORGE KEVIN R [US], et al  
• [X] WO 2014094137 A1 20140626 - RESOURCE WELL COMPLETION TECHNOLOGIES INC [CA]  
• [X] US 2011168410 A1 20110714 - DEBOER LUC [US]  
• [X] WO 2015123299 A1 20150820 - SCHLUMBERGER CA LTD [CA], et al  
• [A] GB 2289488 A 19951122 - PETROLEUM ENG SERVICES [GB]

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Designated contracting state (EPC)  
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

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DOCDB simple family (publication)  
**EP 3135855 A1 20170301**; CA 2939576 A1 20170228; CN 106481310 A 20170308

DOCDB simple family (application)  
**EP 16185315 A 20160823**; CA 2939576 A 20160822; CN 201610780140 A 20160830