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[Continued on next page]

(54) Title: WELL DEPLOYED HEAT FIN FOR ESP MOTOR

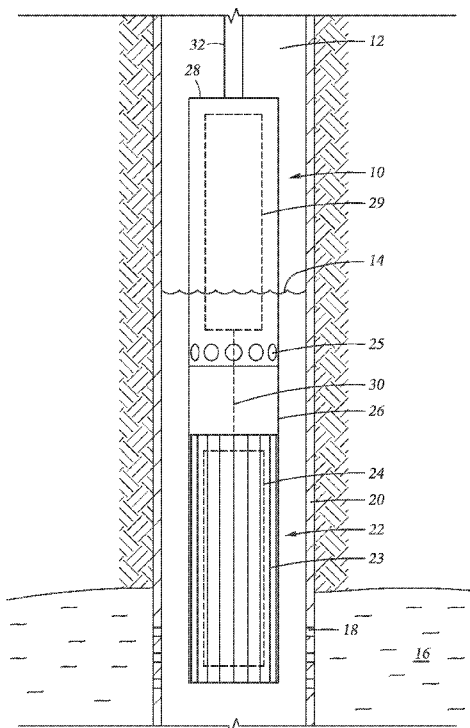


Fig. 1

(57) Abstract: An electrical submersible pumping system (ESP) for use in pumping fluids from a wellbore. The ESP includes fins on an outer portion of the ESP that transfer heat from a motor in the ESP to fluid flowing past the fins. A self removing material is provided over the fins when the ESP is deployed into the wellbore to protect the fins against being damaged when the ESP contacts a wall of the wellbore. The material can corrode, erode, melt, dissolve, disintegrate, or otherwise automatically decouple from the fins when the ESP is disposed in the wellbore.



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

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A. CLASSIFICATION OF SUBJECT MATTER***E21B 43/12(2006.01)i, E21B 43/00(2006.01)i***

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E21B 43/12; F04B 39/02; F04B 17/00; E21B 43/22; F04B 17/03; F04B 39/06

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: electrical submersible pump, cooling, fins, cover and protective layer.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2009-0053075 A1 (COX DON C.) 26 February 2009 See abstract, paragraph [0022], figure 2 and claim 1.	1-13
Y	US 6543539 B1 (VINEGAR; HAROLD J. et al.) 08 April 2003 See abstract, column 12, lines 45-65 and figure 5.	1-13
A	US 2010-0143160 A1 (FORSBERG MICHAEL A.) 10 June 2010 See abstract, paragraph [0033] and figure 2.	1-13
A	US 2010-0150739 A1 (BROOKBANK EARL B. et al.) 17 June 2010 See abstract, paragraph [0025] and figure 3.	1-13



Further documents are listed in the continuation of Box C.



See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

20 AUGUST 2012 (20.08.2012)

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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
US 2009-0053075 A1	26.02.2009	CA 2695554 A1 DE 112008002227 T5 WO 2009-026044 A2	26.02.2009 17.06.2010 26.02.2009
US 6543539 B1	08.04.2003	None	
US 2010-0143160 A1	10.06.2010	CA 2745801 A1 NO 20110979 A WO 2010-077666 A2	08.07.2010 06.07.2011 08.07.2010
US 2010-0150739 A1	17.06.2010	CA 2746388 A1 EP 2417330 A2 NO 20110978 A WO 2010-074997 A2	01.07.2010 15.02.2012 22.08.2011 01.07.2010