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**Declarations under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

[Continued on next page]

(54) Title: METAL SURFACE SCALE CONDITIONING METHOD AND APPARATUS THEREOF

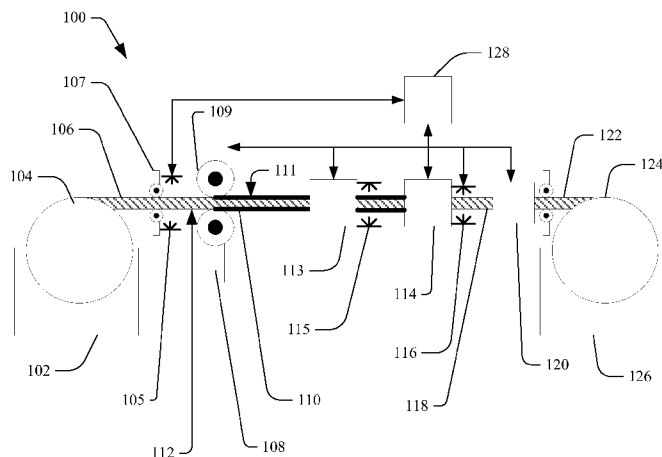


FIG 5

(57) Abstract: Methods and systems are provided for treating oxide scale on the surface of a metal object. In one embodiment, a system (100) temperature control apparatus (105) controls the temperature of metal object's (106) surface (112) to an application temperature below the Leidenfrost temperature point of an alkali metal hydroxide aqueous conditioning solution. An application apparatus (108) wets the metal object's surface at the controlled temperature with a thin layer (111) of the solution that engages the oxide scale, and a heating apparatus (113) heats the wetted surface to a final conditioning temperature above a melting point of the alkali metal hydroxide by an additional value selected to effect conditioning of the oxide scale at a reasonable but not excessive rate by the melting alkali metal hydroxide reacting with the oxide scale. The system terminates additional conditioning to prevent creation of additional oxide scale beyond the conditioned depth.

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— *of inventorship (Rule 4.17(iv))*

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# INTERNATIONAL SEARCH REPORT

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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. C23G3/00      C23G3/02      B08B3/04      B21B45/06      B08B1/02 ADD.
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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)  
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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Y	US 3 617 039 A (FUKUI SABURO ET AL) 2 November 1971 (1971-11-02)  figure 2 column 3, line 67 - line 69 examples 1-4 column 5, line 34 - line 63 column 5, line 68 - column 6, line 63 column 7, line 1 - column 9, line 20 claims 1-3 ----- -/--	1-11,14, 16, 18-27, 31,33

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
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- "&" document member of the same patent family

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	US 3 174 491 A (FALER JOHN A) 23 March 1965 (1965-03-23) the whole document -----	1-34

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International application No PCT/US2011/020479
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