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MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
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(54) Title: HEAT REMOVAL AND RECOVERY IN BIOMASS PYROLYSIS

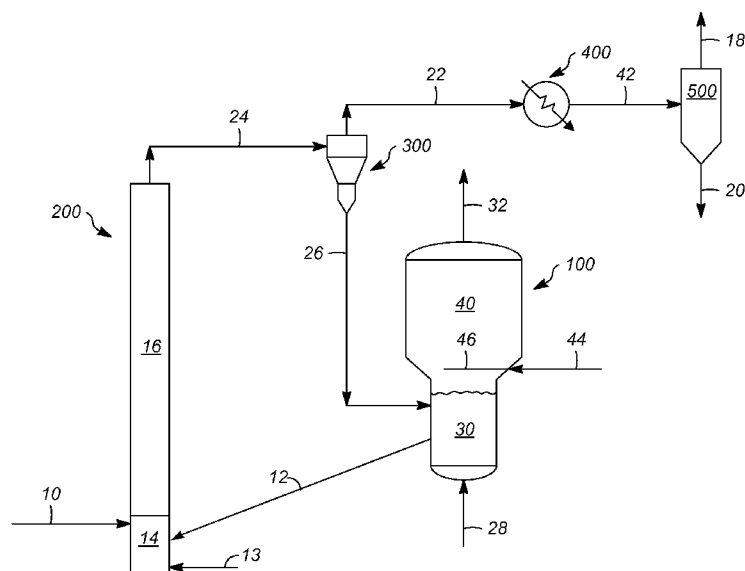


FIG. 1

(57) Abstract: Pyrolysis methods and apparatuses that allow effective heat removal, for example when necessary to achieve a desired throughput or process a desired type of biomass, are disclosed. According to representative methods, the use of a quench medium (e.g., water), either as a primary or a secondary type of heat removal, allows greater control of process temperatures, particularly in the reheater where char, as a solid byproduct of pyrolysis, is combusted. Quench medium may be distributed to one or more locations within the reheater vessel, such as above and/or within a dense phase bed of fluidized particles of a solid heat carrier (e.g., sand) to better control heat removal.



UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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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)

C10G 3/00; C10J 3/72; C10B 49/00; C10B 53/02; C10J 3/68; C10G 9/32; B01J 19/00; B03C 3/16

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: quench, burner, cooling, pyrolysis, reheater, sand, heat carrier, char

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2010/0162625 A1 (MILLS, KEVIN J.) 1 July 2010 See abstract, figures 1-3, paragraphs [0055]-[0056], [0059], [0071]-[0072], claims 1, 14	1-10
A	US 2010/0325954 A1 (TIWARI, PRASHANT et al.) 30 December 2010 See abstract, figures 1-2, paragraphs [0039]-[0040], claims 1, 21	1-10
A	US 2009/0139851 A1 (FREEL, BARRY) 4 June 2009 See abstract, figures 1, 3, paragraphs [0028]-[0036], claims 1, 12	1-10
A	US 2010/0043634 A1 (SHULFER, JOSEPH et al.) 25 February 2010 See abstract, figures 1A, paragraphs [0021]-[0026], claims 1, 3, 7, 17-19	1-10
A	US 5792340 A (FREEL, BARRY A. et al.) 11 August 1998 See abstract, column 9, lines 36-67, column 12, lines 9-14, claim 1	1-10



Further documents are listed in the continuation of Box C.



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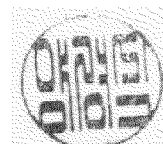
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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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