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(51) International classification :F23C0009000000, C01B0003040000, B01D0053860000, F23G0005000000, F23R0003000000 (86) International Application No :PCT// Filing Date :01/01/1900 (87) International Publication No : NA (61) Patent of Addition to Application Number :NA Filing Date :NA (62) Divisional to Application Number :NA Filing Date :NA	(71)Name of Applicant : 1)INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD Address of Applicant :Dhanbad - 826004, Jharkhand, India Dhanbad ----- Name of Applicant : NA Address of Applicant : NA (72)Name of Inventor : 1)Sandipan Kumar Das Address of Applicant :Department of Mechanical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad - 826004, Jharkhand, India Dhanbad ----- 2)Arunkumar Samanta Address of Applicant :Department of Chemical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad – 826004, Jharkhand, India Dhanbad ----- 3)Soumyajit Sen Gupta Address of Applicant :Department of Chemical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad – 826004, Jharkhand, India Dhanbad -----
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(57) Abstract :

The present invention is related to a system (100) for ammonia combustion with two stage coupled combustor (1) having two chambers coupled to each other, a first chamber (1a) for ammonia decomposition and containing a first inlet (In1) for receiving ammonia, and an entrance (In3) for hot flue gases, to come in from a second chamber (1b) for hydrogen combustion. 10-30% by volume of the exhaust flue gas is recirculated back to the first chamber (1a) via a third inlet (In3) from the chamber (1b). The chamber (1a) serves twin purposes: mixing of the hot flue gas through the third inlet (In3) with the Ammonia thereby increasing its temperature and finally, the subsequent decomposition into Nitrogen and Hydrogen in the presence or absence of a catalyst. There are separate compressors (C1, C2, C3) to provide high pressure gases while one or more turbines (T) run the compressors and provide power for applications like propulsion, alternators etc. The proposed design can be added to existing jet engine designs. The invention eliminates the disadvantages associated with unfavourable combustion characteristics of Ammonia like high ignition delay, slow kinetics, and low flame speed.

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