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(21) International Application Number: PCT/AU99/00708 (22) International Filing Date: 1 September 1999 (01.09.99) (30) Priority Data: PP 5583 1 September 1998 (01.09.98) AU (71) Applicant (for all designated States except US): GALBRAITH ENGINEERING PTY. LTD. [AU/AU]; 9 Montreal Road, West Midland, W.A. 6056 (AU). (72) Inventor; and (75) Inventor/Applicant (for US only): GALBRAITH, Peter, Afton [AU/AU]; 9 Montreal Road, West Midland, W.A. 6056 (AU). (74) Agents: NOONAN, Greg et al.; Freehills Patent Attorneys, Level 47, 101 Collins Street, Melbourne, VIC 3000 (AU).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>

(54) Title: RECIPROCATING MACHINE WITH TWO SUB-CHAMBERS**(57) Abstract**

A reciprocating machine includes a housing (12) and piston means (20) that are cyclically relatively displaceable along an axis (11) to define a variable volume working chamber (50). There is further provided air inlet means and fuel inlet means (100) admitting air and fuel to the working chamber for forming an ignitable mixture after compression of the air therein, and means to exhaust combustion products from the working chamber. The variable volume working chamber (50) includes at least two sub-chambers, a combustion chamber (54) and a main chamber (52) mutually displaced on the axis (11) and in communication at a cross section (53) at which gas in the combustion chamber (54) may expand at least partially laterally as it flows from the combustion chamber (54) into the main chamber (52). The air admission means, the exhaust means and the chambers (52, 54) are arranged so that a swirl of gas is generated and maintained about the axis (11) in both chambers (52, 54) during operation of the machine. The combustion chamber (54) is sealed and defined laterally and at one end by integral heat resistant and/or low thermal conductivity wall structure (40) having a surrounding heat insulation jacket (48) and associated heat dissipation means (47, 49) arranged so that, during operation of the machine, the surfaces (42a, 44) of the wall structure bounding the combustion chamber are maintained at a temperature which is substantially higher than wall surfaces (31) bounding the main chamber (52).

