



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶: E05F 1/00	A1	(11) International Publication Number: WO 00/11296 (43) International Publication Date: 2 March 2000 (02.03.00)
(21) International Application Number: PCT/NZ99/00139 (22) International Filing Date: 16 August 1999 (16.08.99) (30) Priority Data: 331456 19 August 1998 (19.08.98) NZ (71) Applicant (for all designated States except US): FISHER & PAYKEL LIMITED [NZ/NZ]; 78 Springs Road, East Tamaki, Auckland (NZ). (72) Inventors; and (75) Inventors/Applicants (for US only): SPONG, Keith, Brookes [AU/NZ]; 2 Te Akau Crescent, Bucklands Beach, Auckland (NZ). FULLER, Graeme, Colin [NZ/NZ]; Unit 4, 121 Bayview Road, Dunedin (NZ). DUNCAN, Gerald, David [NZ/NZ]; 12 Cedar Road, Epsom, Auckland (NZ). (74) Agents: CALHOUN, Douglas, C. et al.; A J Park & Son, Huddart Parker Building, 6th floor, Post Office Square, P.O. Box 949, Wellington 6015 (NZ).		(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 With international search report.

(54) Title: DOOR OPENING AND CLOSING SYSTEM**(57) Abstract**

A door state changing apparatus assists a user to move a door between a closed state where the door (8, 9) is positioned adjacent a door frame and an open state. The door state changing apparatus includes a permanent magnet (13, 14) provided on the door and having a permanent magnetic field. An electromagnet (11, 12) is located on the door frame adjacent the permanent magnet with the door in a closed state and is energisable to provide a magnetic field which reinforces the permanent magnetic field of the permanent magnet or to provide a magnetic field in opposition to the permanent magnetic field of the permanent magnet. A door position detector detects the open or closed state of the door and a user interface detects the presence of a user attempting to alter that state. A controller (6) receives input from the door position detector and the user interface and energises the electromagnet (11, 12) to provide a reinforcing magnetic field if a user is attempting to move the door (8, 9) from an open state to a closed state and provides an opposing magnetic field to the permanent magnetic field of the permanent magnet if the door is closed and the user interface indicates that a user is attempting to open the door. The invention is particularly adapted for use in a domestic refrigerator.

