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(54) **COUNTERBALANCE ASSEMBLY FOR A FOLD OUT RAMP**

4,657,233 A 4/1987 Vroom

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(Continued)

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FOREIGN PATENT DOCUMENTS

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

DE 4413444 A1 10/1995

(Continued)

This patent is subject to a terminal disclaimer.

OTHER PUBLICATIONS

(21) Appl. No.: **12/114,647**

"EZ-Access Hitchhiker™ Wheelchair Ramp," EZ-ACCESS, a division of Homecare Products, Inc., n.d., <http://www.homecareproducts.com/dealers/PDF_Brochures/HitchHiker.pdf> [retrieved Oct. 20, 2008], 1 page.

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Related U.S. Application Data

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(57) **ABSTRACT**

(51) **Int. Cl.**
E01D 1/00 (2006.01)

A counterbalance for a ramp assembly includes a chain assembly and a spring assembly. The spring assembly includes a spring and first and second spring fittings. The first spring fitting restrains a first end of the spring when the ramp portion is between a neutral position and the stowed position and moves the first end of the spring toward a second end of the spring when the ramp portion moves from the neutral position toward the deployed position. The second spring fitting is spaced from the first spring fitting and restrains the second end of the spring when the ramp portion is between the neutral position and the deployed position. The second spring fitting moves the second end of the spring toward the first end of the spring when the ramp portion moves from the neutral position toward the stowed position.

(52) **U.S. Cl.** **14/71.3**; 414/921; 74/89.2

(58) **Field of Classification Search** 414/465, 414/522, 537, 541, 55, 546, 548, 921; 14/69.5, 14/71.1, 71.3; 74/89.2, 89.21, 89.22; 16/280, 16/308; 224/497; 297/DIG. 4
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,154,107 A 4/1939 Nystrom
4,503,722 A 3/1985 Suzuki
4,550,623 A * 11/1985 Gysling 74/89.2

20 Claims, 24 Drawing Sheets

