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# United States Patent [19]

Frank

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[54] **FLUID PROPULSION DEVICE FOR USE IN A PROJECTILE LAUNCHING SYSTEM**

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[57] **ABSTRACT**

[21] Appl. No.: **09/049,658**

A fluid propulsion device is used to discharge a working fluid at a predetermined variable discharge rate. The fluid propulsion device includes a fluid chamber that is expandable upon receiving the working fluid. The fluid chamber has a plurality of chamber sections that contract at different predetermined rates to discharge the working fluid from the fluid chamber at the variable discharge rate. In one example, an elastomeric bladder defines the fluid chamber and includes a plurality of bladder sections each having a different coefficient of elasticity, causing the bladder sections to contract at the different predetermined rates. In one application, the fluid propulsion device is used in a projectile launching system, such as an airgun. The fluid propulsion system controls the launching of the projectile by discharging the working fluid at the variable discharge rate, resulting in a corresponding acceleration of the projectile.

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[51] Int. Cl.<sup>7</sup> ..... **F41B 11/00**

[52] U.S. Cl. .... **124/70; 124/71; 124/73; 114/238**

[58] Field of Search ..... **124/70, 71, 73, 124/75-77; 114/238; 91/392; 89/1.81**

[56] **References Cited**

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**20 Claims, 4 Drawing Sheets**

