

Form PTO-1595 (Rev. 07/05)
OMB No. 0651-0027 (exp. 6/30/2008)

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This document is being filed together with a new application.

A. Patent Application No.(s)
10/693,127

B. Patent No.(s)

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6. Total number of applications and patents involved: 1

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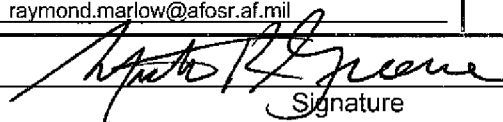
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January 19, 2006

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4015 Wilson Blvd, Room 713
Arlington, VA 22203-1954

Invention Title: Vaporizing liquid metal anode for Hall-effect space propulsion systems

Inventor (s): Lyon Brad King

Patent or Application Serial No.: 10/693,127

U.S. Filing/Issue Date: 1/24/03

Grant/Contract Identification Number (s): F49620-03-10027

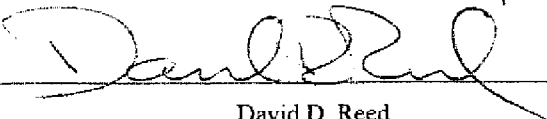
Foreign Applications filed/intended (countries):

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Signed this 25th day of January, 2006

By 
David D. Reed

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PATENT

REEL: 018125 FRAME: 0144

Mayer, R.X., "A Space-Charged-Sheath Electric Thruster," AIAA Journal 5(11), Nov. 1967, pp. 2057-2059; presented as Paper 66-627 at the AIAA Third Annual Meeting, Boston, Mass., Nov. 29 - Dec. 2, 1966. cited by other.

Primary Examiner: Kim; Ted

Attorney, Agent or Firm: Michael Best & Friedrich

Government Interests

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

This invention was made with United States Government support under federal Grant No. F49620-03-1-0027 awarded by the United States Air Force, Air Force Research Labs. The United States Government has certain rights in this invention.

Claims

I claim:

1. A thruster for use with an external power supply, the thruster comprising: a propellant that exists in a non-gaseous state at standard temperature and pressure, the propellant having a melting point $T_{sub.m}$, and a boiling point $T_{sub.b}$; a plasma comprising ionized propellant vapors; a reservoir adapted to house the propellant in a non-gaseous state, the reservoir heated by the plasma; and at least one electrode positioned to intercept a fraction of the plasma to control heat input to the reservoir to maintain the temperature of the propellant between $T_{sub.m}$ and $T_{sub.b}$.
2. The thruster set forth in claim 1, wherein the propellant comprises a metal.
3. The thruster set forth in claim 1, wherein the propellant comprises at least one of bismuth, mercury, cesium, cadmium, iodine, tin, indium, lithium and germanium.
4. The thruster set forth in claim 1, wherein the propellant exists in a solid state at standard temperature and pressure.
5. The thruster set forth in claim 1, wherein the amount of power from the external power supply deposited into the reservoir is approximately 20% of the total power supplied to the thruster.
6. The thruster set forth in claim 1, wherein the amount of power from the external power supply deposited into the reservoir ranges from approximately 15% to approximately 25% of the total power supplied to the thruster.
7. The thruster set forth in claim 1, wherein the reservoir comprises an anode in an electric circuit, and further comprising: a body having an axial direction and a radial direction; at least one passage in the reservoir to allow propellant vapors to escape the reservoir; a cathode positioned to emit electrons downstream of the body to create a substantially axial electric field with respect to the body, the electrons adapted to ionize the propellant vapors that have escaped the reservoir; and magnetic poles arranged to create a radial magnetic field that interacts with the axial electric field to produce a current

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