US005652409A

United States Patent [19]

[11] Patent Number: 5,652,409

[45] Date of Patent: Jul. 29, 1997

[54] **BISMUTH AND COPPER BALLISTIC MODIFIERS FOR DOUBLE BASE PROPELLANTS**

[75] Inventors:

[73] Assignee: **The United States of America as represented by the Secretary of the Navy**, Washington, D.C.

[21] Appl. No.: **605,816**

[22] Filed: **Feb. 23, 1996**

[51] Int. Cl.[6] **C06B 45/10**; C06B 25/26

[52] U.S. Cl. 149/98; 149/17.8; 149/96; 149/97

[58] Field of Search 149/19.8, 96, 98, 149/97

[56] References Cited

U.S. PATENT DOCUMENTS

4,202,714	5/1980	Alley et al.	149/109.4
4,243,444	1/1981	Alley et al.	149/98
4,420,350	12/1983	Camp et al.	179/98

FOREIGN PATENT DOCUMENTS

19544528 5/1996 Germany .

OTHER PUBLICATIONS

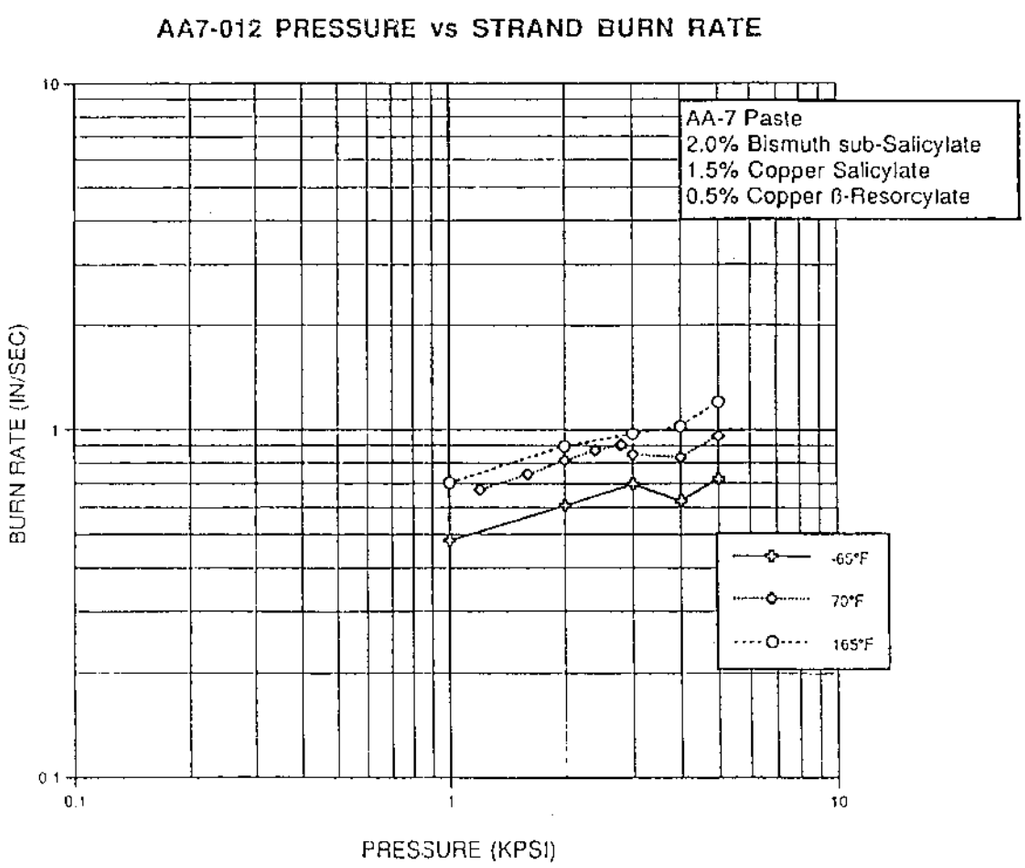
Neidert et al. *Chem. Abs.*, 121:283123, abstract of Proc., Annu. Meet.—Air Waste Manage. Assoc (1993) 86th (vol. 10). 93/WP/107.06. 16 pp.

Berteleau et al., *Chem. Abs.*, 125:62504, abstract of DE 19544528.

Primary Examiner—Edward A. Miller

Attorney, Agent, or Firm—John Forrest; Roger D. Johnson

[57] ABSTRACT

Double base propellants having a mixture of bismuth and copper salts of hydroxy-substituted benzoic acids added as burning rate (ballistic) modifiers.

12 Claims, 15 Drawing Sheets