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NATIONAL BUREAU OF STANDARDS REPORT

NBS PROJECT **NBS REPORT**

1002-12-10421 February 20, 1963 7802

Fourteenth Progress
Report
on the

Mechanisms of Fire Ignition and Extinguishment

by
E. C. Creitz

Covering the period 1 November 1962 to 31 January 1963

for
Bureau of Ships
Department of the Navy
Code 638

NBS

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

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Mechanisms of Fire Ignition and Extinguishment

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1. Summary

A new ion source, particularly adapted to the production of ions from low energy electrons has been designed and partially constructed. New calculations have been made on a scheme in which velocity modulation can be used to improve resolution and duty cycle. Velocity modulation was the limiting factor in the previous design.

2. The Mass Spectrometer

Mr. Mills has designed a new electron bombardment ion source. It has essentially cylindrical symmetry with the electron source at the center. This design should result in improved ion production efficiency since electrons can travel away from their source in many directions instead of along a single straight line as in most conventional designs as is required in instruments using a collimated beam and narrow slits. The new source should be especially useful in the study of the appearance potentials of ions formed by the attachment of low energy electrons. The inner parts of the new source were built during the quarter and drawings prepared for the outer vacuum shell.

In earlier calculations on the theory of operation of the mass spectrometer, velocity modulation was neglected. Calculations made during the quarter indicated it to be a limiting factor on resolution and on duty cycle, which is related to sensitivity. New calculations on line shapes and duty cycles have been made in which the effects of velocity modulation can be utilized to improve resolution.