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FIRE DETICTION IN AIRCRAFT ENGINE MACULLES

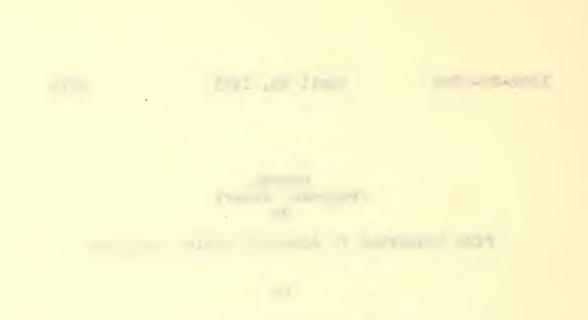
by

C. S. NeCamy and Wm. F. Roeser

Covering period 25 January, 1953 to 25 April, 1953

for Headquarters Wright Air Development Center Wright-Fatterson Air Force Base Dayton, Chio Project No. 52-660A45

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Fire Detection in Aircraft Infine Lacelles

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1. Summary

Measurements of the spectral distribution of radiation, the frequency of the flicker, and the amplitude of the flicker from various types of flames are being made in five spectral bands covering the range 0.23 to 3 u.

Arrangements are being made to study the limitations of Ceiger-Hullor tubes and of thermistor bolometers in fire detecting systems. The feasibility of utilizing fusible electrolytes in fire detecting systems is also being studied.

2. Hadiation from Flames

heasurements are being made of the radiation characteristics of flames in five different spectral bands covering the range 0.23 to 3 u with a calibrated spectroradiometer in conjunction with a low frequency wave analyzer and a continuously recording oscillograph. These measurements yield: 1) the spectral distribution of the radiation; 2) the frequency of the flicker; and 3) the anglitude of the flicker. Although measurements made thus far have been limited to flames with various fuel-air ratios and diffusion flames in still air, it is planned to make similar measurements on flames in air moving at various speeds.

3. Geiger-Muller Tube

An ultra-violet sensitive Ceiger-Muller tube and the necessar, accessory circuits have been assembled for experiments to determine the applicability of such tubes to fire detection.

4. Thermistor Bolometer

One of the major problems encountered in the desi a of radiation type fire detectors is the inability of existing photoelectric detectors to retain their sensitivity at the high ambient temperatures encountered in engine spaces. A cursory investigation of a or Harry and Presents

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radiation receiver known as a "thermistor bolometer" indicates that it may retain its sensitivity at high temperatures. Arrangements have been made to obtain and test such a bolometer.

5. Fusible lectrolytos

There are certain chemical compounds which, in the solid state, produce no perceptible electrolytic effect but which, the liquid state, become active electrolytes. The use of such a material in conjunction with two dissimilar metals to form a battery when the temperature is raised above the melting point has been used in a number of applications and has recently been proposed for use in fire detecting systems. This principle may be adapted to either a "spot" or "continuous" type system.

Demonstrations with relatively simple equipment indicate that it is possible to obtain the required time of response with such a system. No study has been made of the materials required to withstand the reaction that may take place at the very high temperatures attainable in flames. One possible objection to a system of this type is that, once installed in an engine macelle, the temperature at which it operates cannot be altered because the melting point of the electrolyte is an inherent property of the material.

6. Financial Condition

Expenditures and commitments on this project:

Apr11 25	through December 31, 1952	10,733.37
January 1	through Narch 31, 1793	L
lotal	through March 31, 1953	15,000.01

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