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SECURITY INFORMATION

CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

REPORT

CD NO

COUNTRY East Germany

DATE DISTR. 22 May 1953

SUBJECT Germanium Transistors and Detectors Manufactured by Werk fuer Fernmeldewesen HF (OSW)

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1. The germanium detector is given shake tests because the detector is subject to severe shaking in its probable actual application, which causes the wires to break off at the points where they are welded. The germanium detector is suitable for frequencies greater than three megacycles ($\lambda < 10$ meters) (sic).

2. The Oberspreewerke complex also produces silicon and galena detectors.

3. The transistors and detectors withstand a shake test which is ten times the acceleration of gravity. These transistors and detectors have hitherto been used by the Oberspreewerke in the following sets:

   High-frequency wattmeters of from one to ten watts
   Heterodyne wavemeter (in the high-frequency input stage)
   Apparent resistance measuring device, 3 centimeters (in mixing head)

4. The disadvantages of the transistor amplifier in contrast to the electronic tube amplifier is the occurrence of increased noise and the limitation to frequencies higher than 3 megacycles.1/ The advantages are the very small requirements for power and space.

25 YEAR RE-REVIEW

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5. The following is a diagram of a high-frequency germanium amplifying circuit (transistors):

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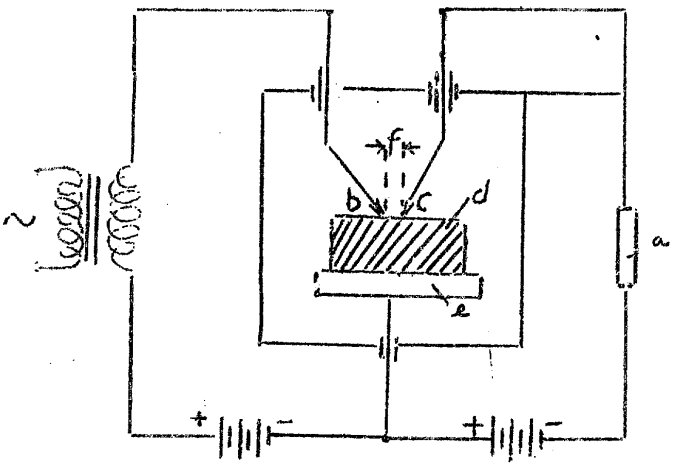

a. external working resistance
b. control point (Steuerspitze)
c. worl point (Arbeitsspitze)
d. germanium block
e. base plate
f. space 0.05 to 0.25 millimeters

6. The above circuit makes a high-frequency amplification possible without the use of electronic tubes. It consists of a small germanium block with two point electrodes and a surface electrode.

7. The electron holes (Defektelektronen) in addition to the electrons of the atomic shells (conduction electrons) in germanium are capable of moving about, whereby they form a regular current. Generally the conduction electrons are predominant inside the germanium block. However, electron holes can be moved from the circuit into the block through a positively charged point electrode which is opposite a surface type flat base electrode (Gebereleektrode).

8. At the collector, this hole current (Loecherstrom) produces an equally large increase in the normal electron current through the working resistance. The increased voltage obtained exceeds by many times the voltage which causes the hole current in the base electrode.

9. The part of the germanium block from the collector to the base acts as a germanium detector. Despite the high input voltage, only a few electrons flow in this direction. The rectifier barrier layer offers no resistance to the electron holes.

10. Because of the presence of electron holes at the collector the number of conduction electrons (Stromstaerke) which flows between the collector and the base is increased.

1. [redacted] Comment: The original German reads as follows:

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"Nachteile der Transitoren-Verstaerker gegenueber den Elektronenroehren-Verstaerkern sind das staerkere Rauschen und die Begrenzung der Frequenz unter 3 MGz". In the original German the word "unter" had been crossed out and the word "ueber" substituted.

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