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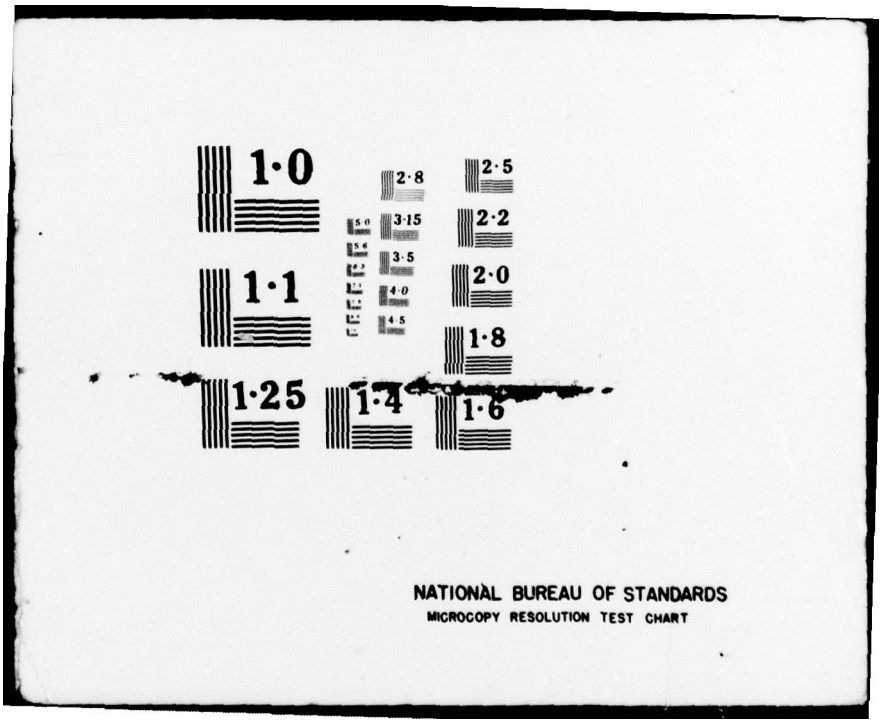
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FTD-ID(RS)T-1136-77

FOREIGN TECHNOLOGY DIVISION

(1)

PYROELECTRIC DETECTOR

by

S. D. Peltz

EDITED TRANSLATION

FTD-ID(RS)T-1136-77 3 August 1977

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PYROELECTRIC DETECTOR

By: S. D. Peltz

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А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

*ye initially, after vowels, and after ъ, ь; e elsewhere. When written as ë in Russian, transliterate as yë or ë. The use of diacritical marks is preferred, but such marks may be omitted when expediency dictates.

GREEK ALPHABET

Alpha	A	α	*α*	Nu	N	ν	
Beta	B	β		Xi	Ξ	ξ	
Gamma	Γ	γ		Omicron	O	o	
Delta	Δ	δ		Pi	Π	π	
Epsilon	E	ε	*ϵ*	Rho	P	ρ	*ϱ*
Zeta	Z	ζ		Sigma	Σ	σ	*ς*
Eta	H	η		Tau	T	τ	
Theta	Θ	θ	*ϑ*	Upsilon	T	υ	
Iota	I	ι		Phi	Φ	φ	*ϕ*
Kappa	K	*κ*	κ *ϰ*	Chi	X	χ	
Lambda	Λ	λ		Psi	Ψ	ψ	
Mu	M	μ		Omega	Ω	ω	

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English
sin	sin
cos	cos
tg	tan
ctg	cot
sec	sec
cosec	csc
sh	sinh
ch	cosh
th	tanh
cth	coth
sch	sech
csch	csch
arc sin	$\sin^{-1}$
arc cos	$\cos^{-1}$
arc tg	$\tan^{-1}$
arc ctg	$\cot^{-1}$
arc sec	$\sec^{-1}$
arc cosec	$\csc^{-1}$
arc sh	$\sinh^{-1}$
arc ch	$\cosh^{-1}$
arc th	$\tanh^{-1}$
arc cth	$\coth^{-1}$
arc sch	sech^{-1}
arc csch	csch^{-1}
rot	curl
lg	log

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PYROELECTRIC DETECTOR

S. D. Peltz

This is an invention in field of measurement technology.

Known are pyroelectric radiation detectors which contain a sensitive element with two electrodes, which are sprayed onto a surface and are perpendicular to the direction of polarization. When such a pyrodetector is exposed to a radiant flux, the information obtained does not provide information on the coordinate of focus radiation.

The proposed pyroelectric detector is distinguished from the

above by the fact that the electrodes, which are applied to the sensitive element, are arranged on the plane parallel to the direction of spontaneous polarization, and one of them is made in the form of a strip directed perpendicular to the direction of polarization.

This makes it possible to obtain the coordinate sensitivity of the detector in the direction of polarization.

Figure 1 shows the design of the proposed pyroelectric detector. Figure 2 shows for a fixed moment in time the curve representing the dependence of the potential on distance, which is reckoned from the origin of the coordinates in the direction of the axis of spontaneous polarization, which coincides, for example, with the X-axis.

On pyroelectric element 1, which is made, for example, of a triglycerine sulfate crystal and takes the direction of spontaneous polarization (indicated by an arrow), continuous electrode 2 is applied. It serves simultaneously as an absorption coating. The second electrode 3 is a narrow strip, which is perpendicular to the direction of spontaneous polarization. The distribution of potential φ on a pyroelectric element with a single electrode, caused by the absorption of the heat flux focused at the spot, is subject to the following formula:

$$\varphi(\rho, \psi) = \frac{A\gamma\rho d^{1}\sin(\omega t-\alpha)\cos\psi\exp(-\alpha)}{\varepsilon(\rho^{2}+d^{2})^{3/2}}$$

where ρ, ψ are variables in the cylindrical cocrdinate system, A - constant related to specific power of liberated heat, γ - pyrocoefficient, ε - dielectric constant, d - crystal thickness, ω - modulation frequency of thermal flux, α - phase shift between modulation of thermal flux and potential.

The detector works as follows.

If the radiation spot is to the left of electrode 3, then the pyroelectric signal has a single sign. When the spot moves in the direction of spontaneous polarization from left to right, electrical signal gradually decreases to zero, and then changes its sign.

The curve (see Fig. 2) shows that within the limits of distance CD the detector does supply information on the coordinate.

Object of the Invention

The pyroelectric detector, which contains a polarized sensitive element and two electrodes arranged on cppcsite sides of the

sensitive element, is distinguished by the fact that in order to obtain the coordinate sensitivity of the detector in the direction of polarization, its electrodes lie in the plane parallel to the direction of polarization. One of them takes the form of a strip directed perpendicular to the polarization direction.

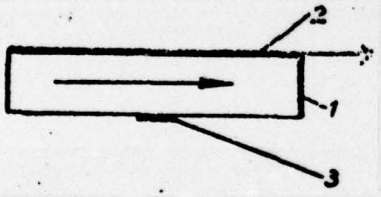

Fig. 1.

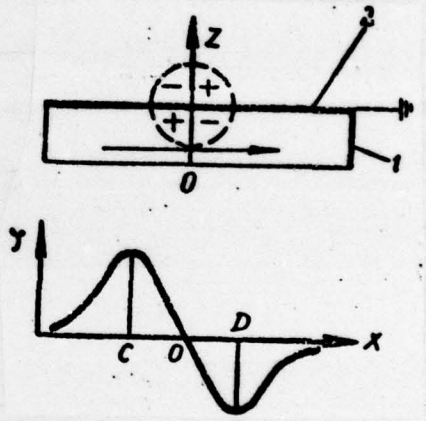

Fig. 2.

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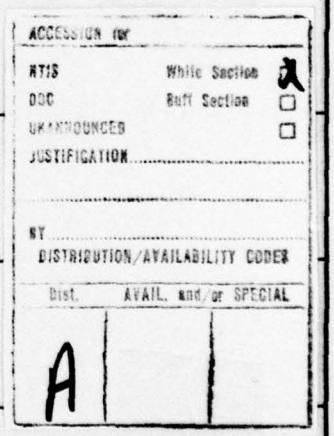

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