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GENERATOR OF ALTERNATING CURRENT WITH COMBINED EXCITATION, (U)  
JUL 78 F F GALTEYEV, L L TALANOV  
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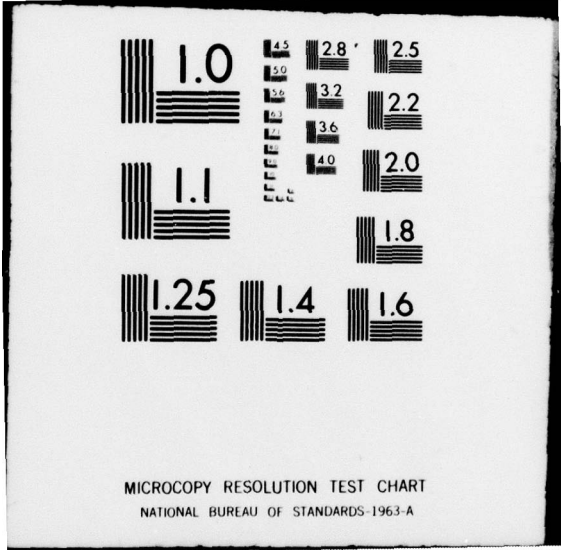
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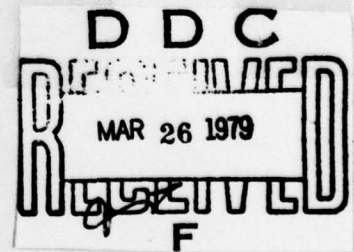
# FOREIGN TECHNOLOGY DIVISION



GENERATOR OF ALTERNATING CURRENT WITH  
COMBINED EXCITATION

by

F.F. Galteyev, L.L. Talanov,  
and P.A. Tyrichev



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## EDITED TRANSLATION

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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

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

\*ye initially, after vowels, and after ъ, ь; e elsewhere.  
When written as ë in Russian, transliterate as yë or ë.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	sinh <sup>-1</sup>
cos	cos	ch	cosh	arc ch	cosh <sup>-1</sup>
tg	tan	th	tanh	arc th	tanh <sup>-1</sup>
ctg	cot	cth	coth	arc cth	coth <sup>-1</sup>
sec	sec	sch	sech	arc sch	sech <sup>-1</sup>
cosec	csc	csch	csch	arc csch	csch <sup>-1</sup>
		Russian	English		
		rot	curl		
		lg	log		

## GENERATOR OF ALTERNATING CURRENT WITH COMBINED EXCITATION

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The invention refers to electrical generators of combined excitation with excitation from permanent magnets and two excitation windings the voltage control of which is carried out by a pulse key, for example, automotive.

Known are a-c generators with combined excitation from permanent magnets and also from the main and additional windings.

In such generators the additional excitation winding is switched directly to the rectified voltage of the generator and the main winding to the output of the voltage regulator, and here the magnetizing force of the additional excitation winding is connected opposed to the main winding. With the opening of the pulse key the flux of the permanent magnet by means of the magnetizing force of the additional winding is branched into the magnetic circuit of the electromagnetic winding, and the flux in the operating air gap is decreased.

A shortcoming of such generators is the high minimal rate of self-excitation of the generator, since for the actuation of the pulse key of the voltage regulator a definite voltage of the generator is required, which is possible with the reaching of a high rotation rate by the generator; a drop in the voltage on the pulse key also increases the minimal rate of self-excitation. Furthermore, the connection of the additional winding

directly to the rectified voltage of the generator begins to lower the voltage of the generator from the beginning of its rotation.

The purpose of the invention is to provide reliable self-excitation of the a-c generator of combined excitation under a load at low initial rotation rate, to expand the range of voltage control with respect to the rate and to decrease the magnetizing force of the additional winding of the excitation.

To do this, the additional winding is connected series-opposed with the main winding shunted by the pulse key, and both of them are directly connected to the terminals of the rectified voltage, and connected in series with the main winding is a non-linear element, for example, a semiconductor diode.

A diagram of the connection of windings of the generator is shown on the drawing.

A thyristor 1 is used as the pulse key. With rotation of the generator 2 through the main 3 and additional 4 winding, current flows, and thyristor 1 is disengage, and both windings are under the rectified voltage of the generator 2. In spite of the fact that the magnetizing forces of the windings are opposed, the generator is normally self-excited, since the magnetizing force of the additional winding 4 with respect to the main winding 3 is small.

With an increase in the voltage of the generator 2 above that required, the control signal which engages it enters from the control circuit 5 to the thyristor 1. The thyristor 1 shorts the main winding 3, and the voltage of the generator 2, rectified by the rectifier 6, is applied to the additional winding 4, its magnetizing force increases, and the working flux in the air gap from the permanent magnet drops, lowering the voltage of the generator 2.

When the voltage of the generator becomes lower than the required level, the thyristor 1 is disengaged, since the signal of the control circuit 5 stops entering, and the voltage of the generator increases.

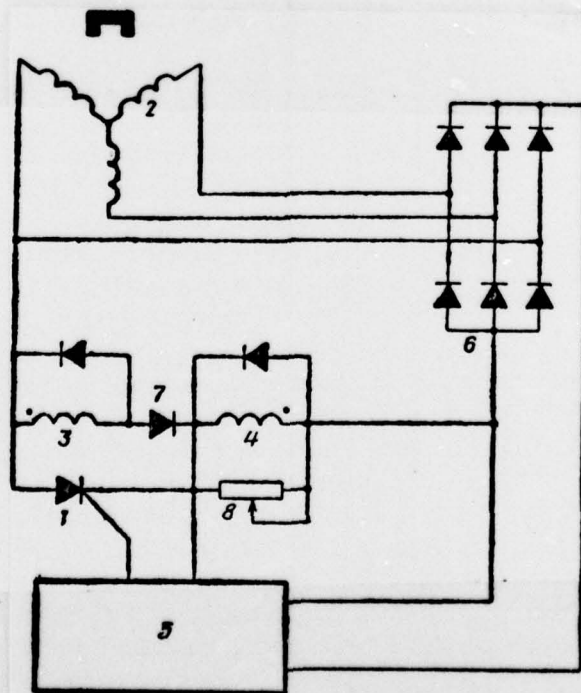
With the series connection with the main winding 3 of the

diode 7, the current of the main winding 3 is lowered, which is caused by the voltage drop on the disengaged thyristor 1.

The resistor 8 is used for changing the upper limit of the control with respect to the rate and compensation of scattering of parameters of the circuit.

Object of the invention

The object of the invention is an a-c generator with combined excitation from permanent magnets and also from the main and additional windings shunted by diodes and with a voltage regulator in the form of a pulse key, which is distinguished by the fact that for the purpose of lowering the initial rate of excitation, expansion of the control range and decrease in the magnetizing force, the additional winding is connected in a series-opposed manner with the main winding, and both of them are directly connected to the terminals of the rectified voltage, and connected in series with the main winding is the nonlinear element, for example, a semiconductor diode.



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