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AN ELECTROMECHANICAL PULSE SOURCE,(U)
AUG 81 G A SIPAYLOV, A V LOOS, Y A ROMANOV
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AN ELECTROMECHANICAL PULSE SOURCE

by

G. A. Sipaylov, A. V. Loos, et al.

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By: (10) G. A. Sipaylov, A. V. Loos [redacted] Yu. A. Romanov, V. F. Sergeyev

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Block	Italic	Transliteration	Block	Italic	Transliteration
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

*<u>ye</u> initially, after vowels, and after ъ, ь; <u>e</u> elsewhere.
When written as ё in Russian, transliterate as yё or ё.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

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

Russian	English
rot	curl
lg	log

An Electromechanical Pulse Source

G. A. Sipaylov, A. V. Loos, Yu. A. Romanov and V. F. Sergeyev

An electromechanical pulse source is known which contains a synchronous generator, the main stator winding of which is connected to the load across a commutator.

In order to increase the impact power in the proposed pulse source, the damper winding of the generator's rotor is nonsymmetrical, and on the stator, perpendicular with the main winding, there is placed an additional winding, short-circuited across another commutator.

Fig. 1 shows the schematic of this pulse source, while fig. 2 shows diagrams for the currents and emf in the various circuit elements.

On the stator of the pulse source there is arranged a two-phase winding, consisting of two magnetically-independent windings 1 and 2 (fig. 1), displaced relative to each other by 90°, while on the rotor there is an excitation winding 3, energized by a source of dc voltage, as well as damper windings 4 and 5. Winding 4 is thicker than winding 5 along the axis coinciding with the axis of winding 3. The auxiliary stator winding 1 may be short-circuited across a commutator 6, while the working winding 2 is hooked up to the load 8 across the commutator 7.

In the starting position, the contacts of commutators 6 and 7 are open and the generator is under no load. In windings 1 and 2 of the stator there are induced emf e_1 and e_2, displaced relative to each other by 90° (fig. 2).

At the moment of time t_1 when the emf e_1 of the auxiliary winding 1 passes through zero, the contacts of the commutator 6 are closed. The generator is converted to the short-circuit duty, the kinetic energy of the rotor being transformed into the electromagnetic energy of the fields associated with the stator and rotor windings.

All the rotor windings have a magnetic coupling with the working winding 2 of the stator, and therefore the size and nature of the currents in these are determined by the emf in the working winding. If the damper system is symmetrical, the total effects of the transient currents in the rotor windings will not result in an increase in the emf in the working winding. In this case, the damper system is nonsymmetrical: the damper winding 5 has a larger total resistance than winding 4 and, consequently, current i_5 is less than current i_4. The windings 3 and 4 have the greatest influence on the emf in winding 2. The currents in windings 3 and 4 magnetize the machine along the axis of the poles in a single direction and, consequently, the primary magnetic flux increases considerably. This increase in the magnetic flux results in a considerable increase of the emf in winding 2.

At the moment of time t_2 which corresponds to the beginning of the working half-wave of the emf in winding 2, the contacts of commutator 7 are closed. As a result of the increase in the emf, the impact power of the generator and the proportion of kinetic energy of the rotor which is converted into electromagnetic energy and transferred to the load are significantly increased.

At the moment when the currents i_1 and i_2 pass through zero, the contacts of commutators 6 and 7 are opened.

Thus, the proposed pulse source can significantly enhance the capabilities of impact synchronous generators as sources of large quantities of electromagnetic energy.

The Subject of the Invention

An electromechanical pulse source, containing a synchronous generator, the main stator winding of which is connected to the load across a commutator, distinguished by the fact that, in order to increase the impact power, the damper winding of the generator's rotor is nonsymmetrical and, on the stator, perpendicular with the main winding, there is arranged an auxiliary winding, short-circuited across another commutator.

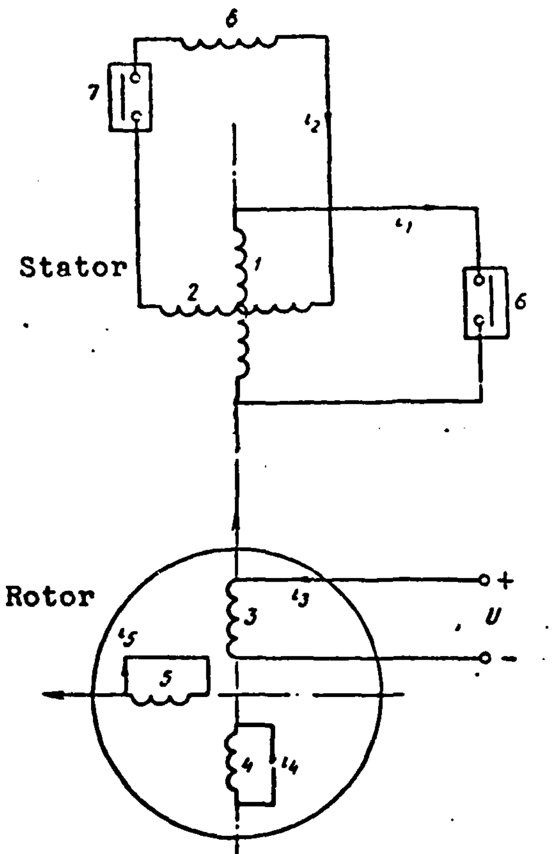

Fig. 1

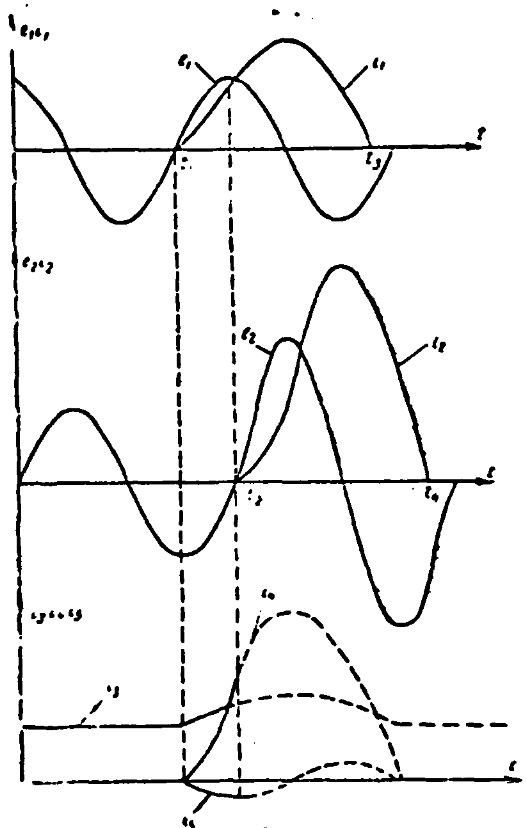

Fig. 2

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