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DIRECT CURRENT ELECTRICAL COLLECTING MACHINE, (U)
JUL 81 V V IVASHIN, & A SIPAYLOV
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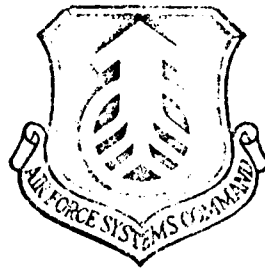


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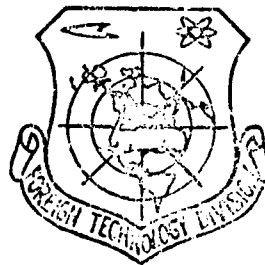
FOREIGN TECHNOLOGY DIVISION



DIRECT CURRENT ELECTRICAL COLLECTING MACHINE

by

V. V. Ivashin and G. A. Sipaylov



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EDITED TRANSLATION

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(5) DIRECT CURRENT ELECTRICAL COLLECTING MACHINE

By (10) V. V. Ivashin and G. A. Sipaylov

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Date 17 Jul 1981

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U. S. BOARD ON GEOGRAPHIC NAMES transliteration SYSTEM

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

*ye initially, after vowels, and after ъ, ь; e elsewhere.
When written as ё 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
cos	cos	ch	cosh	arc ch	cosh
tg	tan	th	tanh	arc th	tanh
ctg	cot	cth	coth	arc cth	coth
sec	sec	sch	sech	arc sch	sech
cosec	csc	csch	csch	arc csch	csch

Russian English

rot curl
lg log

Description of Invention for Certificate of Authorship

200648

Dependent on certificate of authorship No. -

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with attachment of claim No. -

Priority -

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Kl. 21d¹, 39

MPK H 02k

UDC 621.313.2.014.2(088.8).

Authors of invention V. V. Ivashin and G. A. Sipaylov

Applicant -

Direct Current Electrical Collecting Machine

There are known direct current electrical collecting machines that contain saturation chokes included between the armature winding and the collector.

In the suggested electrical collecting machine, in order to improve the commutation conditions, the armature is supplied with an additional collector and additional saturation chokes, while the main saturation chokes are made with three windings. One winding is the magnetizing, while the other two, connected in series, are included in the auxiliary circuit which consists of an additional collector and brushes that are connected through a rectifier with the main brushes. The winding of the additional choke is connected to the midpoint of the two indicated windings. The second end of the choke is attached to the plates of the main collector.

Figure 1 illustrates the plan of the commutation assembly. Figure 2 shows the diagram of the commutation currents.

The commutation assembly of the electrical collecting machine includes choke Π_1 consisting of main winding W_1 , additional winding W_2 and magnetizing winding W_0 , choke Π_2 with magnetic drive made from magnetically soft steel with square hysteresis loops and with the minimum remagnetization current, main collector plate K, main brush $\mathcal{U}$, auxiliary collector plate K_1 , auxiliary brush $\mathcal{U}_1$ and rectifier B.

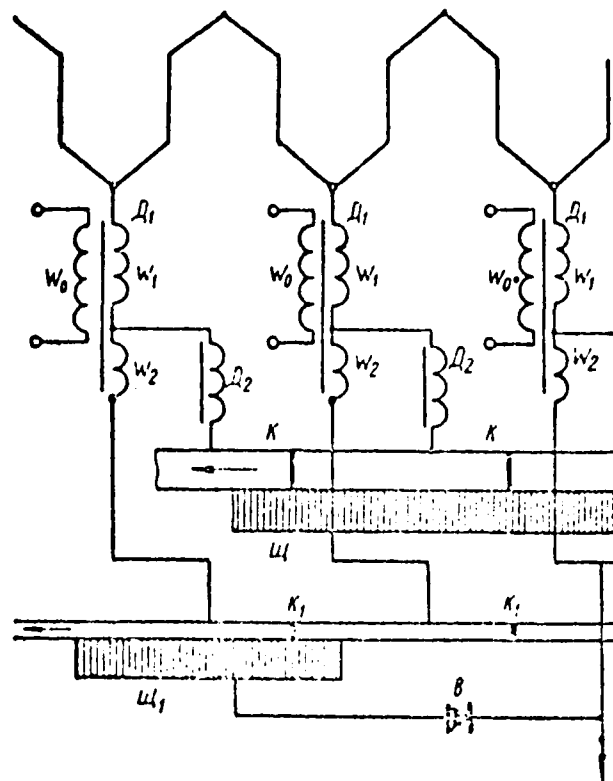


Figure 1.

The main collecting plate, the auxiliary collecting plate and the chokes are arranged on the rotating part of the machine, while the main brush, auxiliary brush and rectifier are arranged on the fixed part.

With magnetization of the choke Δ_1 so that with current $i_1 = I_1$ (fig. 2) in winding W_1 , it begins to remagnetize, voltage $U_{\Delta\phi\phi}$ will begin to be induced on winding W_2 . This voltage is applied to the rectifier in a straight direction, while winding W_2 in this case is shorted through the auxiliary collecting plate, the auxiliary brush, the rectifier, the main brush, the main collecting plate and choke Δ_2 . Current i_2 will flow in the circuit. Current i_1 will be reduced through the main brush under the influence of current i_2 in time $t_2 - t_1$ from the quantity I_1 to zero. In this case, choke Δ_2 is remagnetized on the condition of zero current, and consequently,

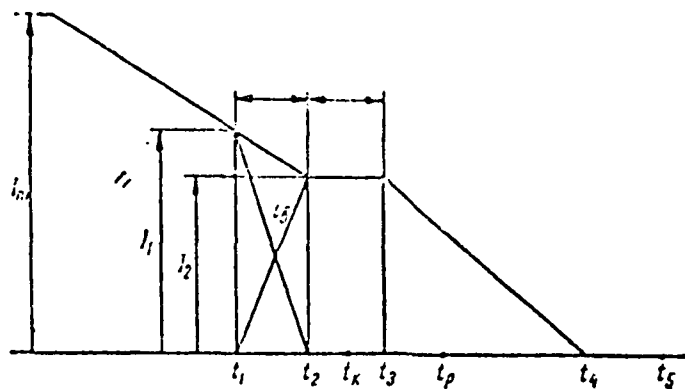


Figure 2.

the current through it and the main collecting plate cannot change direction until the magnetic drive of choke Δ_2 is remagnetized. Together with the change in current in the main collector plate from I_1 to zero, the current in the rectifier and the auxiliary collector plate increases from zero to I_2 .

During remagnetization of the chokes, there are steps in the current curve. In the main collecting plate this is the step of almost zero current, while in the auxiliary collecting plate this is the step that is determined by the magnetizing current i_n of choke Δ_1 . During time $t_4 - t_2$, the main brush can open the dead main collecting plate without a spark. When the current passes through zero, i.e., at the moment t_4 , the rectifier closes the circuit. The auxiliary brush breaks the current only after time t_4 when it is already actually opened by rectifier B.

The remagnetization time of choke Δ_1 must be shorter than the remagnetization time of choke Δ_2 . This guarantees a lengthy step of de-energizing of the main collecting plate and its sparkless disengagement.

When the main brush is opened for time segment $t_4 - t_3$, for example, with t_p , a voltage is applied to the main brush-main collecting plate interval that is equal to the sum of drop in voltage for active resistance of winding W_2 , on the auxiliary brush and the driving rectifier. All of these voltages are insignificant and cannot result in sparking on the main brush.

The main collector is designed for a current load of roughly 85-90%. The auxiliary collector is designed for a load of 15-10%. The auxiliary rectifiers also carry a load of 10-15% of the rated current of the machine. The inverse voltage of the rectifiers can be selected low. The number of rectifiers and the number of auxiliary brushes equal the number of poles, and the circuit on poles of varying polarity is distinguished by the opposite engagement of the rectifier and the winding of remagnetization of choke Δ_1 .

Subject of Invention

The direct current collecting electrical machine that collects saturation chokes included between the armature winding and the collector is distinguished by the fact that in order to improve the commutation conditions, the armature is equipped with an additional collector and additional saturation chokes, while the main saturation chokes are made with three windings. One of them is the magnetizing, while the other two, connected in series, are included in the auxiliary circuit that consists of an additional collector and brushes that are connected through the rectifier with the main brushes. At the same time, a winding of an additional choke is attached to the midpoint of the two indicated windings. The second end of the choke is attached to the plates of the main collector.

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