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CHARGED-PARTICLE ACCELERATOR, (U)
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FOREIGN TECHNOLOGY DIVISION

CHARGED-PARTICLE ACCELERATOR

By

Ye. G. Komar and O. A. Gusev

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CHARGED-PARTICLE ACCELERATOR

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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

*ye initially, after vowels, and after ъ, ь; e 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

1423,gw

CHARGED-PARTICLE ACCELERATOR

Ye. G. Komar and O. A. Gusev

A charged-particle accelerator is known in which the path of the beam is surrounded by a coil. The voltage on this coil is created through a transformer connection from the primary winding connected with a pulsed power source the operation of which is synchronized with the moments of transition through zero voltage on the preheating cathode.

The beam of accelerated particles leaves the accelerator in the form of sheaves, the energy of individual particles of which in time repeats the shape of the pulse of voltage from the pulsed power source.

The proposed direct-effect accelerator uses the energy of an inductive accumulator for acceleration of the particles, and for focusing, the magnetic field of this accumulator connected by one of the leads to the current receiver at the output of the accelerator and by the other, through the direct-current voltage source, to the cathode of the charged particle source. For improving the focusing of accelerated particles the accumulator is made in the form of a hollow cylindrical solenoid, the axis of which is combined with the axis of the accelerated beam.

The drawing shows a schematic of the device.

The accelerator consists of an inductive accumulator 1 solenoid and a source of particles with a preheating cathode 2, a guide electrode 3, a drawing electrode 4, and of a source of drawing voltage 5 and of a current receiver 6.

It is possible to construct an electron accelerator in this form. An ion accelerator differs only in the structure of the ion source and in the polarity of connection of the voltage source.

The accelerator operates in the following manner.

Following triggering of the particle source by electrode 3 the

beam of particles between cathode 2 and electrode 4 is accelerated by the voltage of power source 5 and through inertia it passes inside of the solenoid 1 to the current receiver 6. The voltage source 5 through the beam of particles turns out to be shorted to the winding of the solenoid and the current rises in it.

When the current of the solenoid reaches the assigned value of the current of the beam, the transition process ceases.

Solenoid 1 turns out to be surrounded by a magnetic field with stored energy equal to half of the product of its inductance and the square of the current in the winding. The field inside of the solenoid is directed along the axis and provides focusing of the beam. In order to increase the energy of the particles it is sufficient to begin to decrease the value of the current of the beam of particles acting on the guide electrode 3 of the particle source.

With a decrease of the current of particles between the ends of the solenoid a voltage arises which is equal to the product of its inductance and the derivative of the current. This voltage combines with the voltage of the source and brings about supplementary acceleration of the particles. Regulating the rate of change of the current it is possible to change the accelerating voltage.

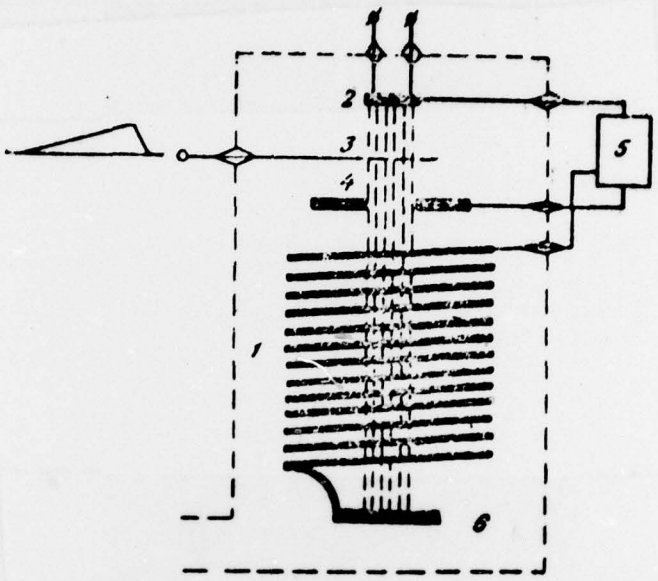
The inductive accumulator can be preliminarily charged from the source and without passage of a beam of particles from the source. For this it is sufficient to place a commutator, a mechanical one, for example, between the cathode of the particle source and the lower lead of the accumulator. After charging of the inductive accumulator it is necessary to pass a beam of particles through the commutator equal to the current in the accumulator, to break the commutator and decreasing the current of the beam, to create a voltage on the accumulator.

Object of Invention

1. A charged-particle accelerator containing a particle source, a source of drawing voltage, and an accelerating system is distinguished by the fact that for the purpose of obtaining sheaves of accelerated particles with energy regulated during the pulse the source of the accelerating voltage is made in the form of an inductive accumulator connected by one lead to the current receiver at the output of the accelerator and by another, through a direct-current voltage source, to the cathode of the charged-particle source.

2. The accelerator described in paragraph 1 is distinguished by the fact that for improving focusing of the accelerated particles the

accumulator is in the form of a hollow cylindrical solenoid, the axis of which is combined with the axis of the accelerated beam.



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