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AN INSTALLATION FOR HEAT TREATMENT AND DRYING OF MATERIALS, WHICH DO NOT CONDUCT ELECTRICITY

(Description of the invention for an author's certificate 339735)

by

S.G. Romanovskiy

HUMAN TRANSLATION

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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
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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

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AN INSTALLATION FOR HEAT TREATMENT AND DRYING OF MATERIALS, WHICH DO NOT CONDUCT ELECTRICITY
(Description of the invention for an author's certificate 339735)

S. G. Romanovskiy

There are installations used for heat treatment and drying of materials, which do not conduct electricity, for example, wood, which contain a chamber with an electromagnetic winding fed by currents at industrial frequency and heat-producing elements, for example, made of ferromagnetic steels arranged between the layers of the material being dried.

The purpose of the invention is to intensify the heat exchange and to reduce the cost.

The goal is achieved by the fact that the contiguous phases of the electromagnetic winding are immediately adjacent to one another with a counter switch-on of the middle winding relative to the outer ones and the heat-producing elements are arranged in the material with their overlapping in the contiguous phases to provide magnetic coupling between the latter; moreover, each phase of the winding can be outfitted with a supplementary regulating winding arranged in the external layer, and the heat-producing elements are distributed unevenly with respect to phases: their number in the middle phase is less, for example, by 1/3 than in the contiguous phases. The heat-producing elements can made in the form of grids, grates from wire with a circular cross section with an interval between the adjacent rods at not more than two to three of their diameters; in this case, the grids and grates are arranged beyond the bounds of the phases at a distance of 15 to 20 cm.

Fig. 1 shows a schematic of the chamber being described; Fig. 2 - an axonometric projection of the chamber; Fig. 3 - a stack of material with the heat-producing elements arranged in it with a discrete-conductive and convective heat supply; Fig. 4 - a stack with the heat-producing elements with a radiation-convective heat supply; Fig. 5 - a heat-producing element (grate) in the plan; Fig. 6 - A-A section on Fig. 5 with cover plates made of ferromagnetic steel or aluminum; Fig. 7 - A-A section on Fig. 5 with cover plates made of wood or noncombustible dielectrics; Fig.

8 - a heat-producing element (grid); Fig. 9 - electrical schematic of the installation with a counter switch-on of the middle winding; and Fig. 10 - a variant of the electrical circuit for activating the electromagnetic windings.

Into chamber 1 is placed stack 2 of the material to be dried, arranged in which are heat-producing elements 3 made either in the form of grates 4 (Figs. 5, 6, 7) or grids 5 (Fig. 8) from wire with a circular cross section. It is recommended that the interval between the adjacent rods 6 be not more than two to three diameters of the rods. The material is heated by means of the electromagnetic winding fed by currents at industrial frequency. The contiguous phases of the main winding 7 are arranged right next to each other with an interval between the coils of the adjacent phases not more than 5-10 cm. The middle winding has a counter switch-on relative to the outer windings (Fig. 9). To preclude the phase misalignment, the zero point can be grounded. Preferably, the winding should be made from aluminum (copper) buses with a rectangular or square cross section, which makes it possible to create a uniform magnetic field of high density. The supplementary regulating windings 8 are installed in the external layer.

The heat-producing elements in the stack are arranged in such a way that in the middle phase their number is about 1/3 less than in the contiguous phases. This also permits one to diminish the phase misalignment and to ensure a uniform heating of the material throughout the stack. The heat-producing elements of each phase have the length, which exceeds the distance between the outer coils of this phase; therefore, when laying them in the stack the elements of the contiguous phases overlap one another by at least 15-20 cm. The elements protrude beyond the terminal coils of the outer windings by the same length. Thus is ensured magnetic coupling between the contiguous phases of a winding. The heat-producing elements can be laid in the stack in various ways. Fig. 3 shows a stack, whose drying is accomplished with a discrete-conductive heat supply from elements, which are in contact with the material being treated, and convective heat supply from all the elements as a whole. In this case, radiation plays a definite role also. In the stack shown in Fig. 4, heat is supplied from the elements, which are not in contact with the material and, therefore, drying is accomplished in a radiation-convective manner.

Patent Claims

1. The installation for heat treatment and drying of nonelectroconductive materials, for example, wood, which contains a chamber with an electromagnetic winding fed by currents at industrial frequency and heat-producing elements, for example, made from ferromagnetic steels arranged between the layers of the material being dried is distinguished by the fact that in order to intensify the heat exchange and to reduce cost, the contiguous phases of the electromagnetic winding are arranged right next to one another with a counter switch-on of the middle winding relative to the outer windings and the heat-producing elements are arranged in the material with their overlapping in the contiguous phases for providing a magnetic coupling between the latter.

2. The installation as per i. 1 is distinguished by the fact that each phase of the winding is provided with a supplementary regulating winding arranged in the external layer.

3. The installation as per i. 1 is distinguished by the fact that the heat-producing elements are distributed unevenly with respect to phases, for example, their number in the middle phase is 1/3 less than in the contiguous phases.

4. The installation as per i. 1 is distinguished by the fact that the heat-producing elements are made in the form of grates, grids from wire with a circular cross section with an interval between the adjacent rods not larger than two-three diameters of the rods; the grates or grids are located beyond the bounds of the phases at a distance of 15-20 cm.

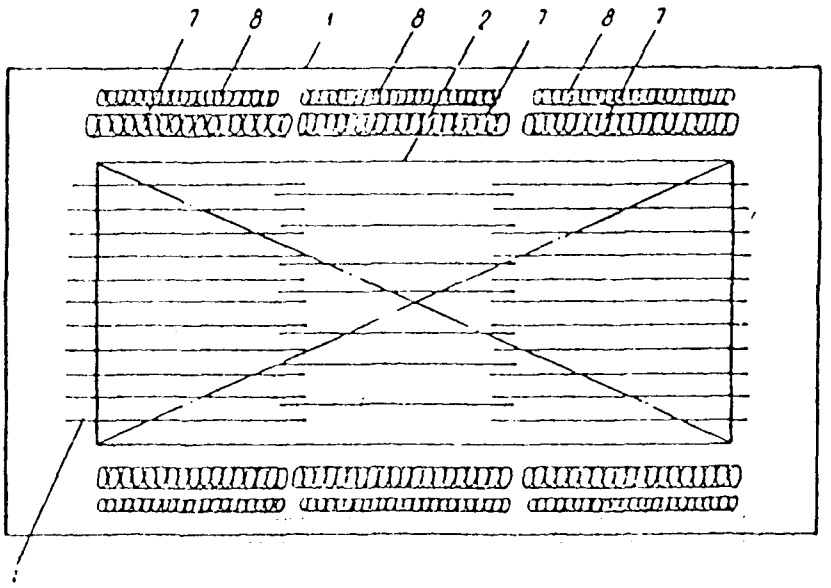

Fig. 1

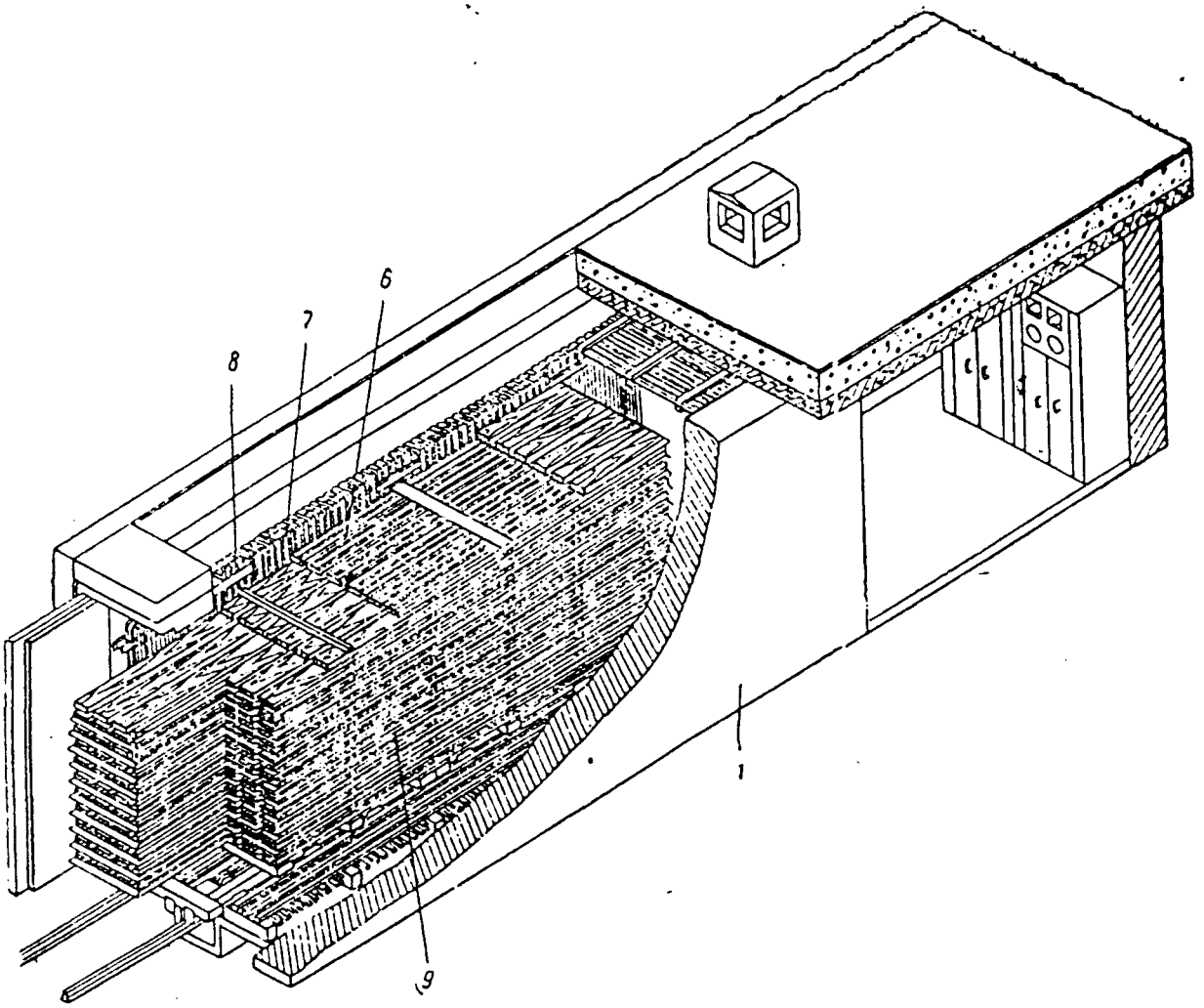

Fig. 2

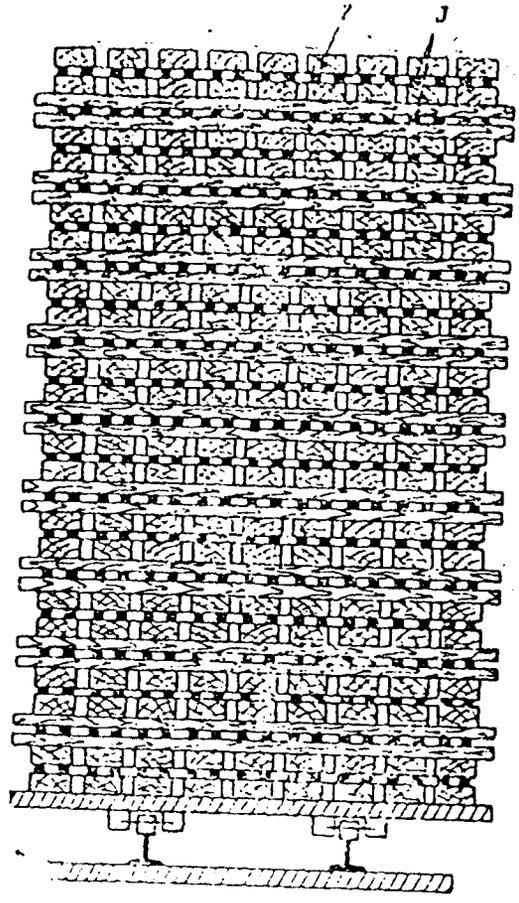

Fig. 3

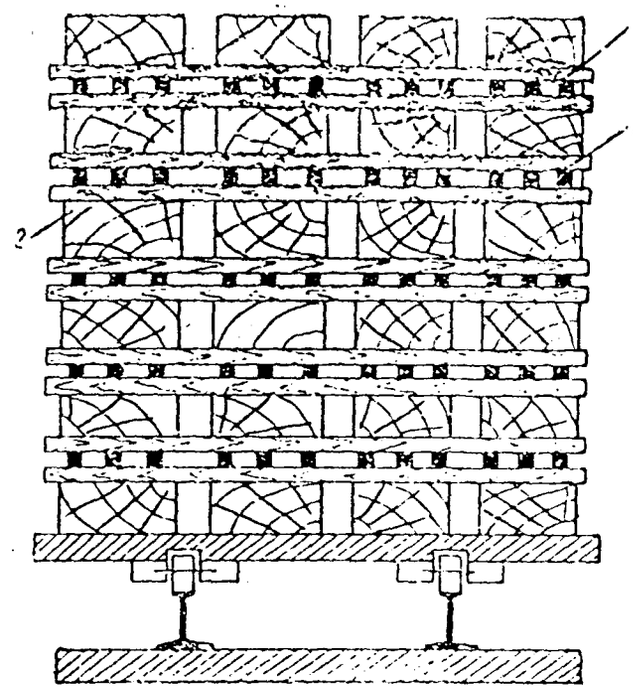

Fig. 4

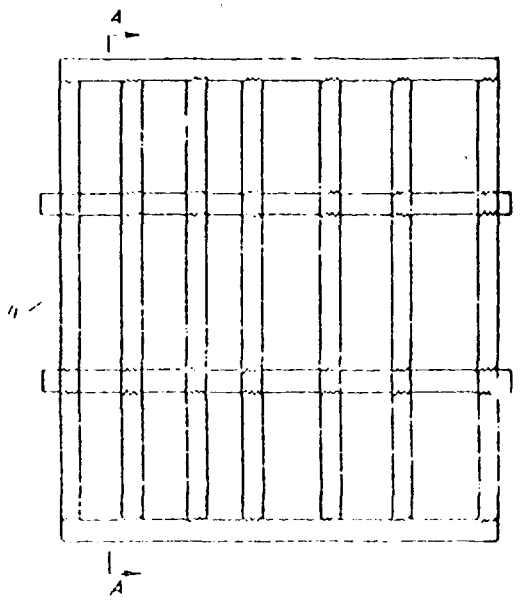

Fig. 5

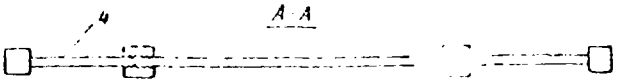

Fig. 6

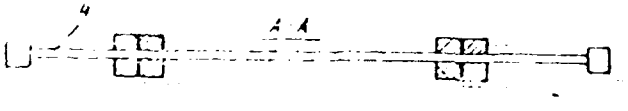

Fig. 7

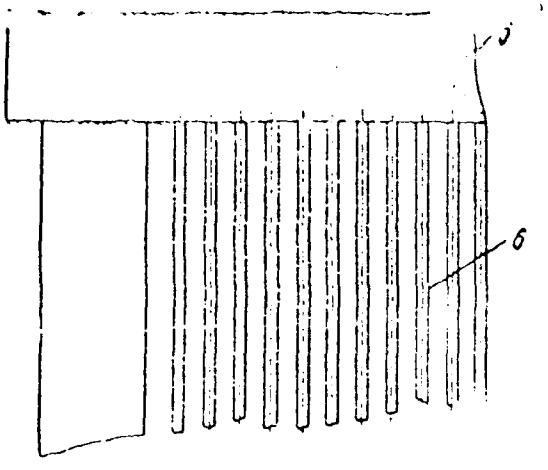

Fig. 8

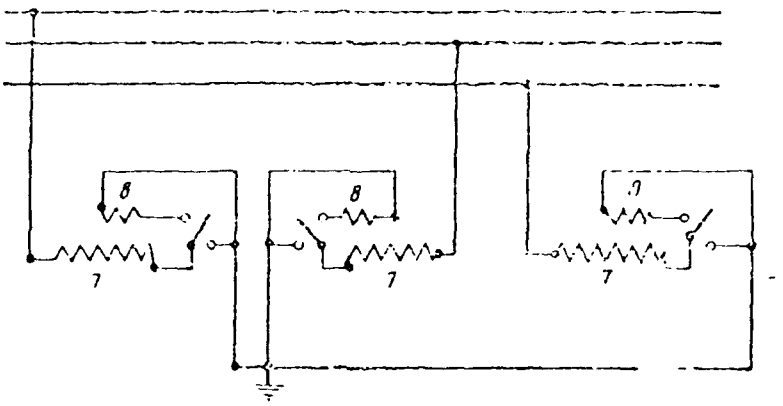

Fig. 9

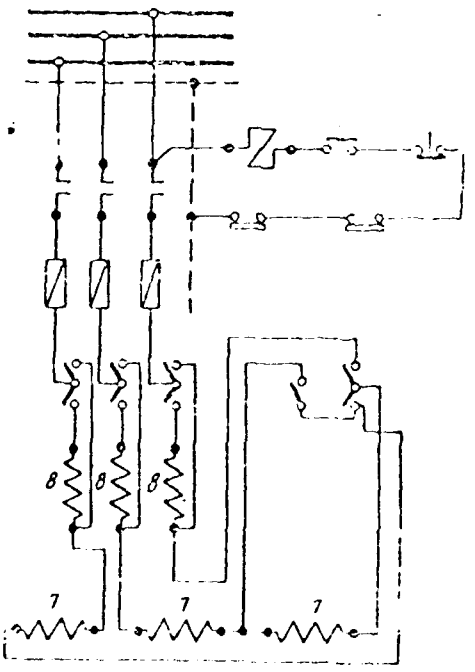

Fig. 10

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