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REVIEW AND ANALYSIS OF THE PROBLEM OF THE MICROWAVE OVEN OF RADIATION AND HEATING

A variety of industrial and technological systems with use of the microwave oven is greatest. Such variety includes many branches, among which agriculture, medicine, the industry and others. For needs of agriculture of research processings of seeds, quality control of products regarding a gene modifitsirovannost are directed on studying of viability, productivity increase, acceleration of processes of a sbrazhivaniye, destruction of wreckers. The wide front of researches is carried out in medicine on studying of influence of the microwave oven on bioorganisms, defrosting of bodies and fabrics after a cryopreservation. In the industry of the microwave oven it is used for acceleration of processes of polymerization of pitches, processing of wood, oil products [1,2], etc.

classification will allow to take substantially more certain detour of tasks for the subsequent research. In particular use of the microwave oven of energy seems both in purely radio engineering devices and systems, and in industrial and agricultural needs though use in the subsequent two is impossible without microwave oven of installations capable to generate and bring energy to these or those objects. Thus classification of use of the microwave oven of energy looks as follows

Finally creation of the installation determined by the microwave oven will require a set of functional blocks and knots, reasonable scientific and which engineering interfaces will allow to increase significantly technical and economic efficiency of the developed microwave ovens of installations of radiation in comparison with the earlier known. From a set of functional blocks and knots we will allocate such links as the generator with an adjustable output power, a power transmission line to object, distribution of energy on volume, devices of utilization of unclaimed energy.

In this case the fact of existence in any microwave oven installation of the generator and device of distribution of energy on volume is important: free space, the closed volume, the irradiated object, etc. Depending on the demanded power of influence the microwave oven generator of fluctuations gets out, and the choice of frequency is defined by purpose of installation. Frequencies in the range of 2450 50 MHz, and to the MHz plants 435,92 0,88 and 915 25 MHz are allocated to so household Microwave ovens. In this regard the instrument of distribution of energy on object depends on purpose of the microwave oven of installation generally.

Household Microwave ovens demand the small closed volume in which the electromagnetic field concentrates.

Installations of agricultural purpose demand or concentration of energy in small areas (research on processing of seeds, pest control), or its distributions on length and width of this or that agricultural landing.

Plants are also very various in use of the irradiated volumes and surfaces. So, the

bitumen warming up in tanks demands installation of a radiator of the microwave oven of energy directly in them whereas open capacities with it demands a warming up on the certain platforms determined by width and length of a bitumokhranilishch.

Similarly business when drying wood is. Most often it is dried by a group method in the form of parties. By means of the microwave oven of energy rather large number of works is devoted to drying of material [3]. The main objective of such works consists in ensuring effective heat treatment of forest product regardless of initial humidity on cross sections, low power and economic expenses in realization of technological process of drying.

Drying by means of the microwave oven of energy is carried out in the camera in which place prepared a stack of wood materials. Give to the camera to the microwave oven the radiation, and also the heat carrier. Radiation of material is made evenly from the opposite parties of a stack. Apply various technological operations and control modes to improvement of processing. Treat change of the direction of giving of the heat carrier concerning a stack with material such operations; ensuring the dosed giving of the microwave oven of power taking into account the power of the heater regulating, in turn, giving of the heat carrier; performance of the modes of moisture thermal treatment and others. When drying consider breeds, the geometrical sizes and humidity of the processed wood materials.

When drying consider the physical phenomena which are the cornerstone of process. So, moisture moves in wood fibers from a zone of more heated to less heated, and also from more damp local volumes to less damp (dry). Such movement of moisture demands creation of uniform heating of material to exclude formations of external and internal damages.

Creation of the mode of uniform heating of material is a difficult task and is usually provided with increase in number of the microwave oven of generators.

We will note that for round forest products considerable unevenness of distribution of humidity on cross sections is characteristic that at the microwave oven to drying leads to thermal underheating of the central layers of wood and an overheat of external layers.

For giving of the microwave oven of radiation in the camera usually use ruporny aperture antennas which place since the face ends of the camera.

The sizes of wood materials vary in wide limits and, respectively, cameras for drying have to consider the available material sizes. Even more often the express drying of lengthy samples of a tree, small on width, is required. In ordinary plants it isn't possible for a number of reasons. In this regard systems of distribution and concentration of energy of the microwave oven are an object of research.

We will consider the main technical links which do possible realization of this process. All process of the microwave oven of heating can be divided into radiation, drying and heating though radiation is followed by exudation of moisture, i.e. drying, and the last is accompanied by heating. Therefore in each case a criterion are time of radiation and level of the irradiated power. From process of traditional heating by means of the microwave oven furnace heating is carried out in all volume practically at the same time. Naturally, the microwave oven impact on materials organic and inorganic substantially depends on their electrophysical properties. The power which is so

allocated in them depends both on frequency and on a tangent of angle of dielectric losses. At great values of a tangent of angle of dielectric losses in big degree the carrying-out properties of object therefore starts playing a role depth of penetration of a field are shown. On this basis at a big thickness of the irradiated sample the skin-effect more and more will be shown.

The existing systems connected with radiation substantially depend on appointment. So household Microwave oven provides heating of foodstuff to the demanded temperature in electrically the closed volume with rather small sizes (500x200x300). In such furnace resonant properties of the volume resonator at a frequency of 2,4 GHz are used. For example, the medical purposes require the smaller volume, but strictly normalized level of a field and higher frequency.

On the other hand, it is expedient to carry out processing of seeds in the conveyor way that won't always be coordinated with a camera resonator design. Here too the field level normalization is required. When drying wood into the forefront problems of creation of a uniform electromagnetic field on all length and width of object act. Thus length can reach several meters, and width not to reach 0,5 m.

At traditional ways of drying the considerable part of power is lost (leaves "for nothing") because of unevenness on length and because of a big aperture of irradiators. At sublimated drying of products it is necessary to provide impact of the microwave oven of energy on the local volume of object that demands installation of the similar household Microwave oven, but bigger volume.

The microwave oven impact on oil products is of special interest. In particular, in winter time the warming up of bituminous masses for giving of fluidity to them is required. Today it is carried out in the majority by the dry superheated steam. Giving part it is warm, steam leaves irrevocably in free space, thus heating lasts about several days. The released capacities don't solve yet a problem since the merged bituminous weight again stiffens and consequently, demands repeated heating. In this case the microwave oven heating substantially reduces energy consumption since 4 days till 18 o'clock, but thus the special tools for the organization of technological process are required. In particular, the directed radiation is required we weed directly in the tank, in bitumokhranishche, etc.

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