ISSN: 2350-0328

International Journal of AdvancedResearch in Science, Engineering and Technology

Vol. 6, Issue 1, January 2019

Device For Exterminate And Drying Cocoon Mulberry Tree Silkworm

Iskandarov Zafar, Abdieva Gulmira, Saidkhujaeva Nafisa

ABSTRACT: In clause the principle of work of the device for exterminate and drying of cocoons mulberry treesilkworm, ensuring complex approach and continuity of manufacture is considered(examined). 2 figures explaining a principle of work of the basic process equipment are given. Some results of experimental researches showing of efficiency of the offered device for морки and drying of cocoons mulberry tree silkworm are submitted. The list of the used literature totals 3 sources.

KEYWORDS: the cocoon, air, dryer, ventilator, effect, silkworm, tray, technology.

I.INTRODUCTION

Uzbekistan is a major producer of silkworm cocoons and ranks third in world by their production and amounts to 25-26 thousand tons annually. However, silkworm cocoons produced by their biological and technological indicators do not meet global market requirements and selling at low prices. The production of silkworm in farms of our Republic is mainly based on shadow drying, where the quality is very low. Using of solar drying systems is hampered due to insufficient productivity and their dependence on weather conditions.

To prevent butterflies coming out of the living (wet) cocoons, pupae will kill in them, or, as they say, the cocoons will pickle and then dried to a moisture content of 10-12%. In practice, only two methods are used: steam, followed by air-drying, and hot-air mortar-drying [1].

The first method requires the presence of steam boilers or steam generators, large areas of air-drying dryers and maintenance personnel for shoveling cocoons. In addition, this method is obsolete and used in a rare case.

Dry hot air in comparison with natural air-shade drying accelerates drying of pupae dozens of times. These advantages of hot air widely used in practice.

Known box coconut dryer consisting of several drying chambers, heater, fan and valves [1]. Disadvantages of coconut dryers include large mass-overall dimensions: the weight of the dryer is up to 2700 kg; dimensions-(2765x350x1550) mm; conditional fuel consumption - 350 kg with a maximum performance of 1920 kg of raw cocoons. In addition, it is difficult to regulate the temperature on the floors of the chambers, which leads to the formation of a marriage: when not drying, the cocoons rot because of the presence of residual moisture, and when drying, the technological properties sharply deteriorate when the cocoon is unwound.

For drying cocoons to standard humidity widely used conveyor cocoon KSK-4,5. This dryer has a capacity of 4500 kg of live (raw) cocoons per day [1]. Overall dimensions: length-5600 mm; width is 1800 mm; height is 3620 mm. Weight is 6800 kg.

Based on this principle was built, a high-performance conveyor dryer SK-150K [1]. Dryer consists of a drying cabinet, a fire heater on diesel fuel, a circulation fan, a water supply system, a fuel supply system, and a blower fan. Daily capacity of the dryer with the lock - up to 14000 kg, with the lock, followed by drying (up to 12% moisture) - 7000 kg. Overall dimensions: (16140 x 2250 x 2900) mm, weight - 24530 kg.

All these coconut dryers are bulky, metal consuming, difficult to operate and are intended for large centralized cocoon receiving stations. For small and medium farms they are not economically feasible.

For farms and private farmsteads, the use of convection-type lightweight tunnel dryers will be cost-effective.

A device for drying agricultural products is known, comprising two parallelly located working chambers, grocery carts, a fan, a heater, and an air distribution manifold [2]. This device is suitable only for cocoons which is past exterminate.

Closest in essence and the achieved effect to the proposed utility model is a device for drying agricultural products, containing two parallelly located working buildings, grocery carts, a fan, a main and electro heaters located between the buildings and an air distribution manifold [3].

The known device is not adapted for exterminate cocoons and requires constructive refinement.

ISSN: 2350-0328

International Journal of AdvancedResearch in Science, Engineering and Technology

Vol. 6, Issue 1, January 2019

Our task is to create a device for wrapping and drying silkworm cocoons in an energy-saving mode and reducing the heat treatment time.

The task is solved by the fact that in the device for drying agricultural products, containing two parallelly located working buildings, grocery carts, a fan, an additional electric air heater and an air-distributing collector located between buildings, latter is made in the form of a Λ figure with lowering two sleeves communicating with lower ends with each of the working buildings, and upper ones are adjacent to the air supply chamber, while at the convergence of the sleeves there is a swivel wind vane through the window, communicating with the exhaust air exhaust pipe, and grocery carts are multi-tier with mesh pallets installed on them, over each of which are mounted in pairs infrared emitters with reflectors connected to power supply system consisting of an electrical contactor installed on each bogie with two old ones, and the current-carrying busbars are fixed through an insulator to the side walls of the enclosures.

Constructive execution of the air distribution collector with rotary vane valves allows you to organize an oscillating drying mode and use low-grade energy shedding of heat and coolant. And the installation on the trolleys in pairs of infrared emitters with reflectors ensures quick peace of cocoons and reduces the total drying time.

A device for the washing and drying of silkworm cocoons contains two parallelly located working housings 1 and 2 with doors 3, a fan 4, a main 5 and an additional electroheater 6, an air distribution manifold 7, made in the form of a Λ- figure (Fig. 1).

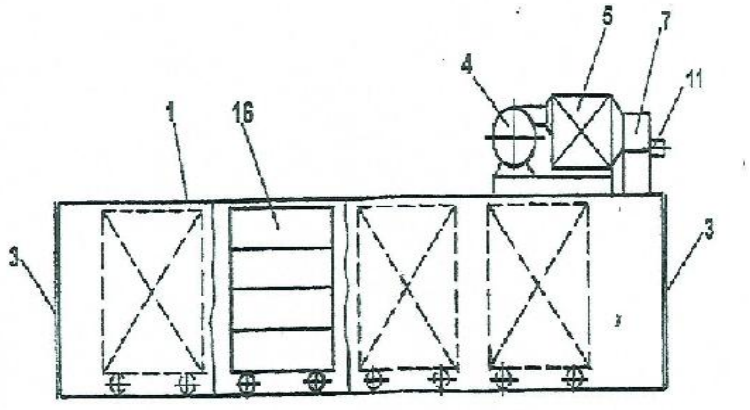

Fig.1.General view of the device.

1.2 - working buildings; 3-door; 4 - fan; 5, 6 - electric air heater; 7- air distribution manifold; 8, 9-sleeves; 10-camera; 11- shutter; 12-window; 13- pipe; 14- lattice insert; 15-channel guide; 16- trolley; 17 - tier; 18 - mesh pallet; 19 infrared emitter; 20- reflector; 21- electric; 22 - contactor; 23- current supply bus; 24- insulator.

Final consists of two lower running arms 8 and 9, which lower ends connect respectively with each of working buildings 1 and 2, while the upper ends adjoin chamber 10, while at the descent of the sleeves 8 and 9 a rotary vane gate 11 is installed and windows are provided 12 contact with the nozzle 13 waste waste drying agent. A lattice insert 14 is installed above the intercase space. Inside housings 1 and 2, on the channel guides 15, grocery carts 16 with tiers 17 are installed on which mesh trays 18 with cocoons are laid. An infrared emitter 19 and a reflector 20 are installed in pairs in each pallet 18. The emitters 19 are connected to an electrical supply system 21 consisting of an electrical circuit contactor 22 installed on both sides of the carriage 16 and current busbars 23 fixed via insulator 24 to the side walls of the buildings, respectively (Fig.2).

Installation of the emitters 19, the contactor 22, the electrical busbars 23 and the wiring of the electrical circuit carried out strictly in accordance with the requirements of safety regulations.

ISSN: 2350-0328
International Journal of AdvancedResearch in Science, Engineering and Technology
Vol. 6, Issue 1, January 2019

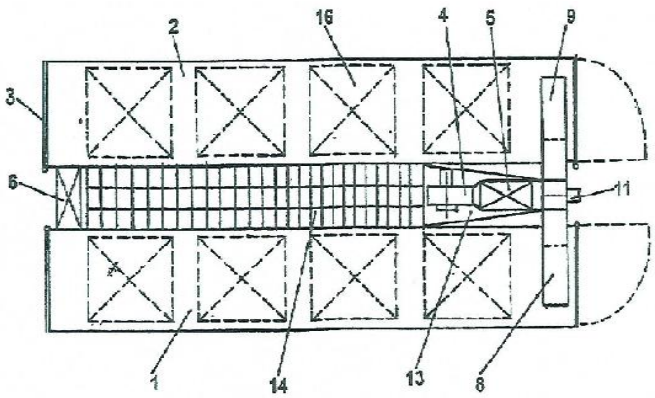

Fig.2. View device (top).

Fan 4, the main heater 5, the air-distributing manifold 7, the additional heater 6 and the working bodies 1 and 2 constitute a single closed system of movement of the drying agent.

Device for exterminate and drying of silkworm cocoons works as follows [4]. In the working buildings 1 and 2 through the doors 3 are loaded grocery carts 16 with 18 raw cocoons laid on the mesh pallets. With the passage of the trolleys 16 along channel guides 15, the contactors 22 are closed with the current-carrying tires 23 (Fig. 3).

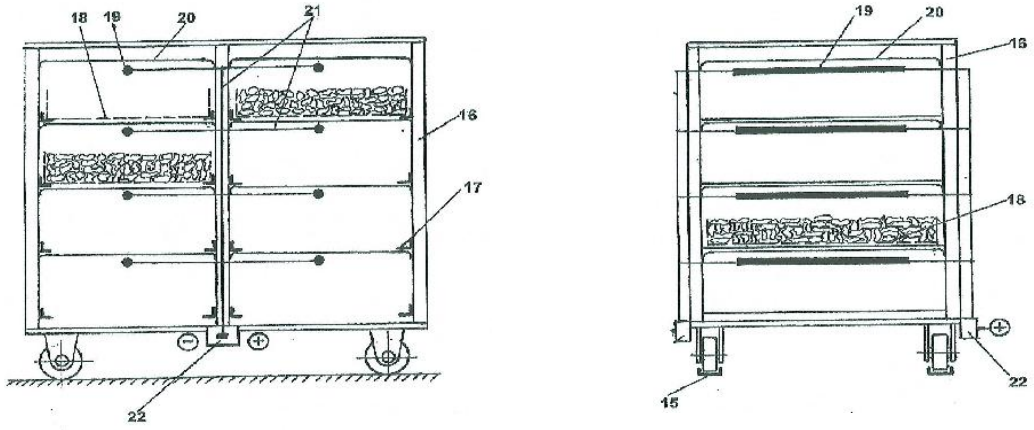

Fig. 3. Type of grocery cart.

Having filled both housings 1 and 2 along entire length, they close the doors 3 and turn on the air and heat supply system: fan 4, main 5 and additional electric air heater 6, and also supply voltage to the busbar 2. At the same time, external air is blown through fan 4 the main electric air heater 5, where it is heated to the required temperature, enters the chamber 10 of the air distribution manifold 7 and, depending on the position of the rotary vane gate 11, enters the working buildings 1 and 2 through one of the sleeves 8 and 9, respectively in which blows 16 layer of cocoons laid on carts.

Initially, when voltage applied to the current-carrying buses 23, contactors 22 of electrical circuit were closed and the infrared emitters 19 installed under reflectors 20 turn on. Heat rays with a temperature of 100-120^{0}C penetrate the silkworm pupa. Period of exposure to infrared radiation is chosen from the condition of the size of the cocoons, their color, thickness of the shell, silkworm breed and should not exceed more than one minute, in order to avoid overheating of the surface of shell. With prolonged exposure to thermal radiation, the gluing protein sericin softens, which penetrates between the threads of the cocoon into the depth of the shell, tightly glues the space between the threads and drastically reduces the water permeability and air permeability of the shell. Such more processes cocoons will not needs to normal vaporing and unwinding.

When blown with hot air of 80-82°C, intensive evaporation of moisture from cocoons occurs (the pupa contains up to 70% of moisture) and the drying process takes place. Then humid air passes through an additional electric air heater 6 and, heating to a temperature of 80 °C, again enters the next working building, where the drying process is intensively proceeding. Next, the exhaust air enters the sleeve 9 and through the window 12 is removed through the

ISSN: 2350-0328

International Journal of AdvancedResearch in Science, Engineering and Technology

Vol. 6, Issue 1, January 2019

pipe 13 to the outside under the lattice box 14, on which additional pallets with cocoons can be laid. The latter are dried at the expense of low potential energy of exhaust air in the mode of active ventilation.

If it is necessary to carry out an oscillating drying mode, as a process intensification factor, it is possible to change the direction of air movement, i.e. changing the position of the rotary vane shutter, direct the air to the opposite side. The principle of oscillation contributes to the reduction of drying time and selected taking into account the morphological characteristics of cocoons.

As the cocoons shrink, the temperature of the hot air reduced from 800°C to 50°C, changing the load on the electric air heaters 5 and 6. When the moisture of the cocoons reached, 10-12% of drying is stopped and the product is discharged.

It has been experimentally proven that the time of marching is 10-12 minutes at a temperature t = 80-90°C. While maintaining these technological conditions, the pupae inside the cocoon die quickly, preserving the integrity of the flesh. The rupture of the body does not occur. With an increase in these parameters, the pupae may burst due to strong overheating, which leads to artificial formation of defects due to the release of moisture.

According to this technology, the time of the cocoon of cocoons reduced by 6-8 times in comparison with the steam sea. Using the proposed device for drying cocoons reduces energy consumption and reduces drying time.

Device designed for small and medium-sized farms that specialize in feeding the silkworm, and can also be used for drying vegetables and fruits in the summer-autumn period.

REFERENCES

1. Akhmedov N.A., Elmuradova I.A. Basics of silk production, Tashkent-2007, 245p. (pp.160-161, pp.165-167, pp.172-173).
2. Patent No. 6113 UZ “Device for drying agricultural products” / Iskandarov Z.S., Yusupov A.M. and Abdullaev, PA, Issue. 12.31.1999, Byul. №4.
3. Patent No. FAP00646 UZ “Device for drying of agricultural products” / Z. Iskandarov, I. Dzhuraev. and Soliev, AS, Publ. 08/30/2011, Byul. №8.
4. PatentFAP 01255 UZ “DeviceforwrappinganddryingofsilkwormcocoonS” / IskandarovZ.S., NorkulovaK.T., ErgashevB.A., BoltaevB.S., ZhumaevB.M., SaidkhujaevaN. S., AbdievaG.M. 30.11.2017 Byul. №11.