

PLUMS DRYING PROCESS AUXILIARY OPERATIONS MECHANISATION

Țislinscaia N., Bernic M., Balan M., Vișanu V., Melenciuc M.

Technical University of Moldova, Chisinau, Republic of Moldova

Abstract: Implementing auxiliary operations in the production process has a lot of advantages: excludes fruits and vegetables drying process manual labor, increases productivity and reduces the final product's cost.

Keywords: auxiliary operations mechanization, stacking mechanism, cleaning brush, duple action tray.

Introduction

Nowadays Republic of Moldova drying installations practice lot of auxiliary operations as: sorting, calibration, trays cleansing, trays downloading, etc.

Those operations are manual, being mechanized only the basic operations as: washing, drying, etc.

Such procedure is good enough for low capacity facilities holding 2 – 3 drying installations of 6 – 8 t, but larger facilities, holding 8 and more drying installations, confronts difficulties regarding row material supplying.

Materials and methods

For such enterprises one proposes a technological line which will reduce manual labor.

The technological line permits to mechanize the following operations:

- product trays downloading;
- trays cleansing;
- product trays uploading;
- on trays product leveling;
- trays stacking.

The elaboration and implementation of such a technological line is a primarily directions that bring such advantages as productivity and products quality increasing as well as minimizing manual labor.

There are also other advantages as: plums drying process auxiliary operation duration time reduction, labors number reduction, final product production duration reduction, as well as lowering its cost.

In Figure 1 is presented the general view of the auxiliary operations mechanization technological line, for drying process.

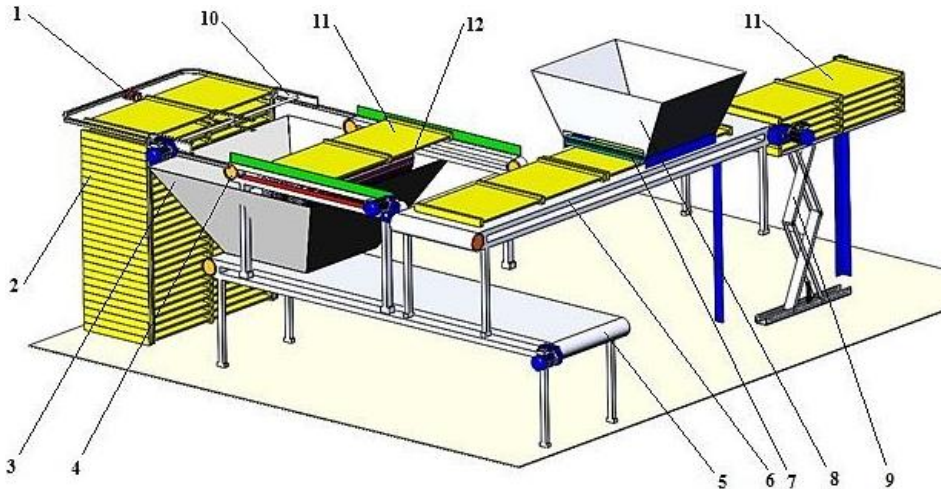


Fig. 1. The technological line for drying process auxiliary operations mechanization.

For line's trays alimentation are used trays-trolleys 2. The trays 2 have two working surfaces, each of which are used time after time.

Trays 2 cleansing is assured by the brush 12. For stacking the trays 2 there is provided a scissors mechanism 9.

For plums downloading there is installed the mechanism 10 (Figure 2), and for trays 2 uploading is used the bunker 8.

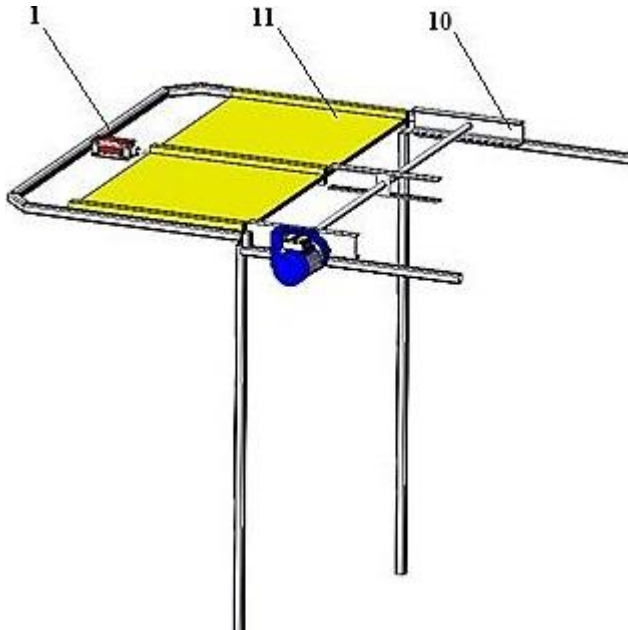


Fig. 2. Trays downloading mechanism.

Initially the trays are transported in stacked form to the downloading mechanism 10. Further the first superior tray is moved by the linear hydraulic motor 1, towards the downloading mechanism fork 10. The downloading mechanism fork retrieves the product tray and rotates it under a 180° angle. While the rotation takes place, the product is downloaded from the tray into the bunker 3, and on the transporter 5, which transports the product to the next technological operation. The tray is retrieved by the transporter 4, at the same time using the brush 12 being is cleansed the dried product surface.

Afterwards the tray is retrieved by the transporter 6, and is transported to the uploading operation towards the uploading bunker 8 (Figure 3).

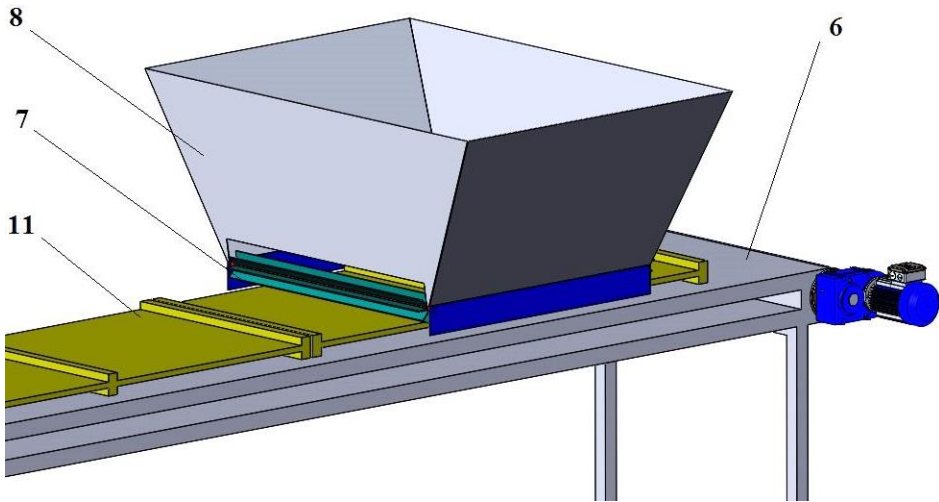


Fig. 3. Uploading bunker.

Here, the tray is uploaded with product, and in the same time the product is leveled using the rubber palletes shaft 7. After uploading operation, the tray is transported by the transporter 6 to the scissors type stacking mechanism (Figure 4), where those are stacked and dried afterwards.

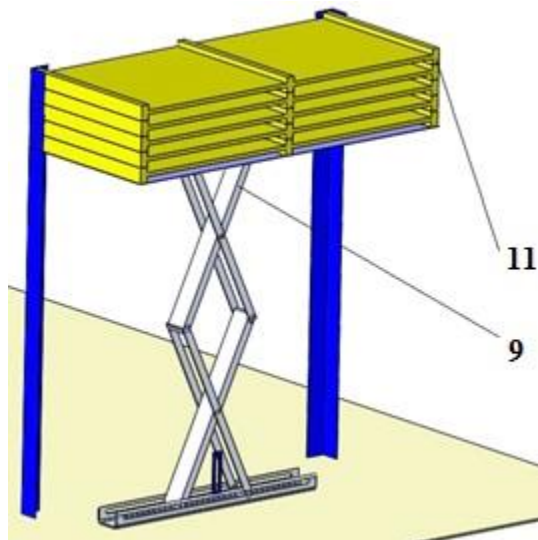


Fig. 4. Mecanism tip foarfece pentru stivuirea tăvilor.

The presented technological line is equipped as well with an automation system that allows synchronizing multiple operations, without using massive mechanical transmissions. There are also provided blocking and emergency shutdown systems, like: “No available trays” – transporters 4 and 6 are blocked. “No product in tray” – downloading mechanism 10, transporters 4, 6 and bunker 8 alimentation – are blocked.

The presented technological line is predicted to be implemented at “Bioproduct” SRL, in village of Bălăbănești, Criuleni district.

Conclusion:

After implementing in production the technological line there will be a 70% reduction of manual labor for the fruits and vegetables drying sector facilities. The automation system used for the construction of the presented technological line has allowed a 20% reduction of line’s metallic mass and has augmented labor’s security, as well as line’s reliability.

The implementation of the line is recommended for the facilities that produce 60 and more t/24 hours of row material.

Bibliography:

1. **Mudreac V., Ganea Gr., Gorea G.**, „Utilaj tehnologic industrial. Elemente de proiectare”, UTM, Chișinău, 2005.
2. **Ganea Gr., Bernic M., Răducanu M.**, „Linii tehnologice automatizate și mecanizate din industria de prelucrare a produselor horticoale”.
3. **Ganea Gr., Gorea G., Cojoc D., Bernic M.**, „Utilaj tehnologic în industria alimentară”, Vol. 1., ”TEHNICA-INFO”, Chișinău, 2.