

A FEEDING, MIXING AND DOSING DEVICE FOR SAWDUST USED AT PELLETS MILLS

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Abstract: This article presents some aspects regarding the reduction of the negative impact generated by economical activities in the field of wood processing by realizing some equipments of pressed sawdust and refers mainly at the fuelling, dosage and homogenization mechanism which is a component part of the pellet grinders. The Fuelling, dosage and homogenization mechanism (picture 1) is installed on the pellet manufacture grinder is composed from a dosage device (position 1) and a fuelling and homogenization device (position 2).

1. INTRODUCTION

Our country alignment to the ecological requests imposed by the UE environment standards, and the fulfillment of the assumed obligations by Romania early from the negotiation process in Chapter 22 of the communitarian acquis, demands the total elimination of wastes.

Romania, according to the official data, has a surface of forests of approximately 6.300 thousand ha, representing approx. 27% from the whole country surface. The forestry fund of Romania represents approx. 0,30 ha / inhabitant.

The regulations foreseen in the UE environmental legislation, namely to exploit the wood waste resulting from primary and secondary processing, can meet by placing stationary compacting equipments in the technological flux specific for the economical agents from this field.

The wood pellets are a approximately new fuel which appeared as a response to the new requests for using "clean" and regenerative energy. These represent a cleaner alternative of domestic heating, and as the classic fuel prices are aligned to the European prices, it soon will become in Romania too a cheaper and in the same time a comfortable alternative.

Pellets are produced by pressing the sawdust resulted from the saw mill, from minced wood and in generally from the waste resulted from wood processing.

The pellet production in generally does not require any additives or binders due to existence of natural resins in the basic raw material.

2. TECHNOLOGY OF PELLET PROCESSING

The regulations included in EU legislation on environmental ecology on the almost full recovery of wood waste materials requires a processing technology for these wastes in order to have a efficient exploit. This technology includes:

- first a manual sorting, during which are removed the unwanted materials, such as: metallic objects, rocks, etc.;
- a mechanical separating operation , during which is selected only the wood waste with an optimum granulation for pelleting;
- an operation of **wood waste pelleting**;

- a packing in plastic bags, boxes, and wood or metallic containers, etc, for handling, storage and efficient transportations.

The packing operation brings to :

- a) efficient handling of the pellet bales in the landfill and beyond it ;
- b) possibility of bales storage vertically;
- c) efficient transportation of waste bales to the consumers (a reduction of the transport by 5-25 for the same quantity of wastes) ;
- d) growing the pellet quality by avoiding the contact with contaminant agents during transportation.

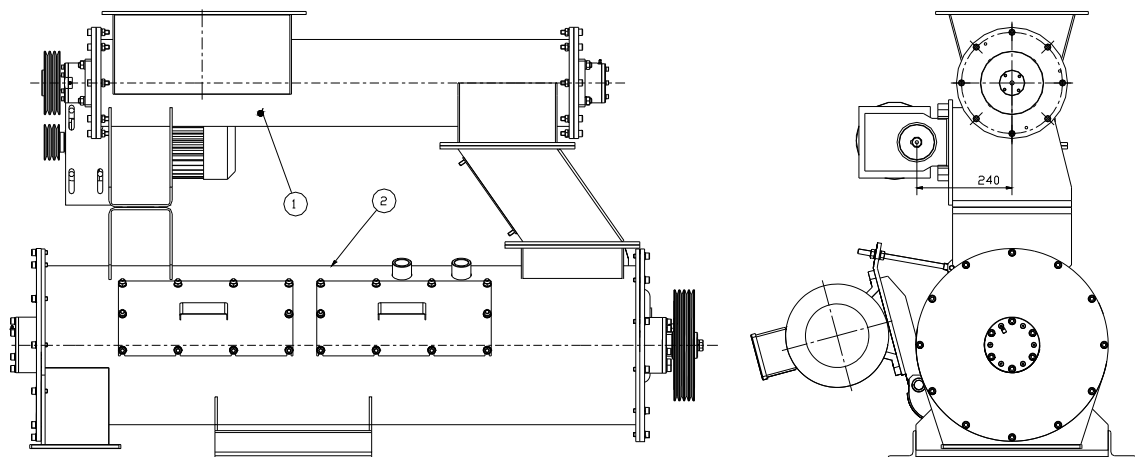
The technological flux for pellet production consists from: chopping and storing of wet sawdust; drying and storing the dried sawdust; pressing the sawdust for pelleting ; weighting and packing the pellets.

The technological flux contains the following main assemblies: Hammer mill; Pneumatically transporter; Sawdust drying installation; Snail transporter; Conditioning installation; Module for pellet pressing; Pellet evacuation transporter; Pellet elevator; Vibrating separator; Snail transporter; Pellet elevator; Exhausting unit; Pellet weighting machine; Automated packing machine; Electrical auctioning installation.

In a research project financed from research funds, will be realized a mechanism for fueling, homogenization and dosage of sawdust adapted for pellet manufacturing presses type CMP (California Pellet Mill)

3. DESCRIPTION OF THE FUELING, HOMOGENISATION AND DOSAGE MECHANISM.

The mechanism for fuelling, homogenization and dosage of sawdust adapted for a pellet manufacturing process type CMP (California pellet Mill) presented in picture 1 is composed from a dosage device (picture 1) and a fueling and homogenization device (picture 2).

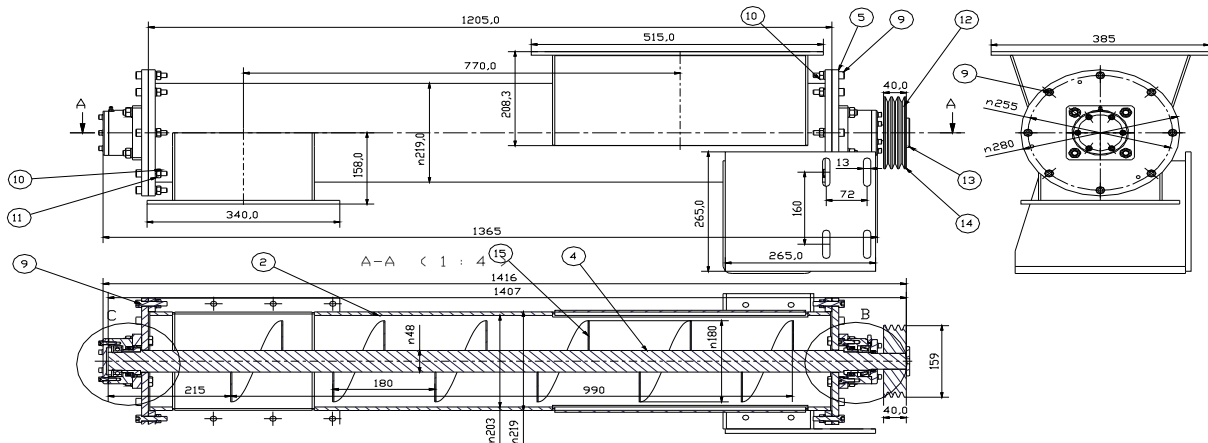


Picture. 1. Fuelling, homogenisation and dosage mechanism

The dosage device presented in picture 2 is composed from the following main assemblies: snec assembly (position 4), snec body (position 2), bearings (position 1 and 3), motto-reducers (position 12), transmission V-belts (position 14).

The dosage device is fitted on the upper side of the pellet press and has the role of assuring a constant flow of sawdust according to the pressing capacity of the press.

The adjustment of the sawdust flow is made by changing the overall driving speed of the motto-reducer of the snec assembly with the help of the frequency converter. The sawdust enters in the device by a superior trunk and is sent to the fuelling device and mixed by the inferior trunk.

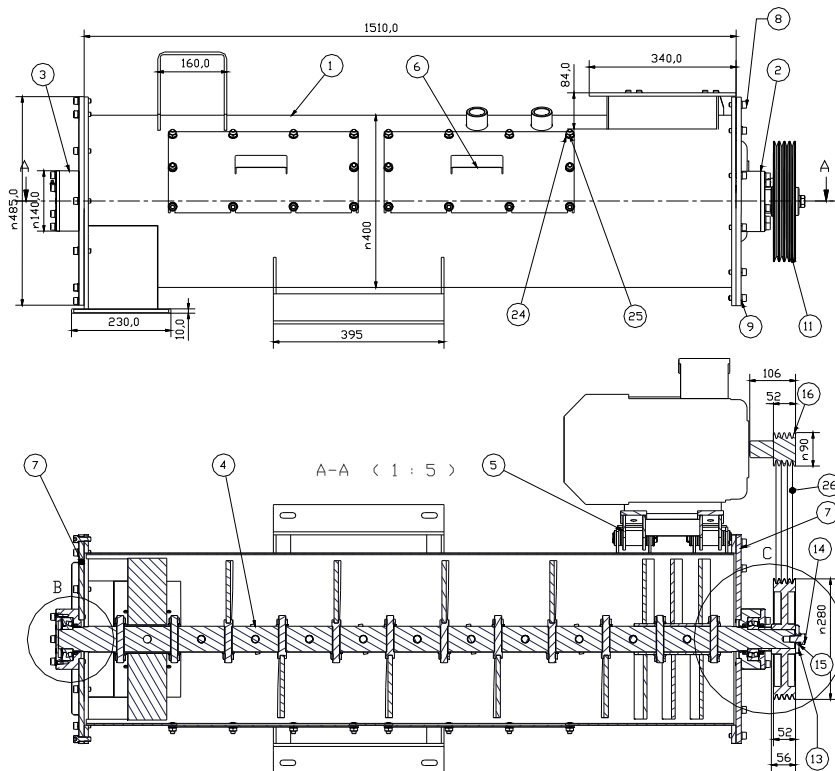


Picture 2. Dosage Device

The fuelling and homogenization device presented in picture 3 is composed by the following main components: case (position 1), bearings (position 2 and 3), mixer (position 4), electric engine (position 5), transmission V-belts (position 11).

Fuelling and homogenization device makes the connections between the dosage device and the upper side of the pellet press and has the role of assuring the fueling at a constant flow of the sawdust and its mixture according to the pressing capacity of the press. Also this device is foreseen with a water spraying installation over the received sawdust received from the dosage device and trained forward with the help of the motion mixer (position 4) which is foreseen with several blades. The aim of spraying a certain quantity of water and mixing the sawdust is to assure a smooth passing trough the mold pressing holes.

The adjustment of the sprayed water flow over the sawdust, passing towards the press, is correlated with the humidity of the sawdust moisture and is controlled with the help of a humidity sensor mounted in the supply circuit of the press.



Picture. 3. Fuelling and homogenization device

The sawdust enters in the device by the upper trunk and is sent towards the pellet press by the inferior trunk which makes a direct connection to the press.

The fuelling, dosage and homogenization mechanism in the presented variety is realized for the pellet presses type CMP (California pellet mill) with a maximum productivity of 1000 kg/hour.

5. Conclusions.

The implement of pellet production technologies and the realization in our country of the fuelling, homogenization and dosage mechanism will bring a major contribution to the reduction of environment pollution by capitalizing the sawdust wastes and not in the last the realization of supplementary achievements for the manufacturer of such devices.

6. Bibliography

- [1] Linii de fabricatie peleti. www.ecopellets.ro;
- [2] Linii de fabricatie peleti. www.sebaenergy.ro;
- [3] Linii de fabricatie peleti. www.akahl.de;
- [4] Linii de fabricatie peleti. www.promeca.it;
- [5] Contract PNCDI nr. 251 www.ictcm.ro/pncdi2007_2008/index.html;
- [6] Cerere de brevet de inventie nr. A/00923 din 12.11.2009