

MECHANISM FOR FEEDING, MIXING AND DOSING SAWDUST MILLS TO MANUFACTURE PELLETS USED

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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). The spindle driving of the feeding device is made by a gear motor. The motor speed can be adjust using a speed variable frequency device which is command depending by the required flow of the pellets. The spindle driving of the feeding and mixing device is powered by a constant speed electric motor. Feeding, dosing and mixing mechanism is realised for the CMP type (California Pellet Mill) with a maximum yield of 1000 kg / hour.

Key words: pellets, waists, capitalizing, technologies, equipments

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. ENVIROMENT PROTECTION

Alignment to the ecological requirements of the environmental quality standards of the UE requires

almost total retrieval of wood material waists, and their full recovery. In Romania, the politic and the strategy of waists recovery and recycling from wood materials is accomplished by CNRM - The National Commission for the Material Recovery from the Financial and Economical Ministry.

One of the great advantages of the Romanian pellet manufacturer in competition with the European producers is the large area of forests in our country. So, we cannot talk of forest clearing as to produce pellets.

FOR THE PRODUCTION OF PELLETS WHERE WILL BE NO TREE CUT DOWN.

The rich forests of Romania can assure the raw material for producing pellets as it follows:

- low quality wood resulted from its cleaning;
- the wood resulted from the scheduled cuttings;
- waists (sawdust, chips) resulted after wood processing in the industry.

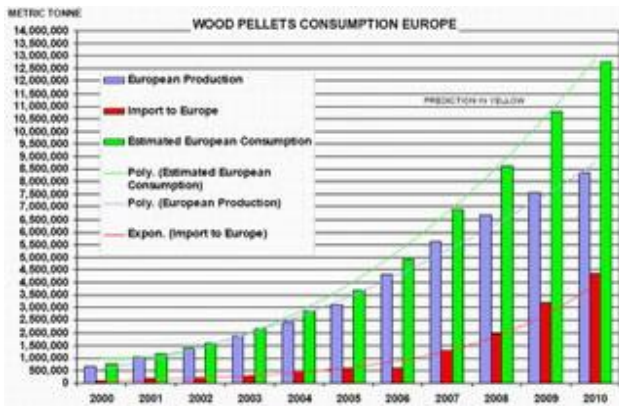
We cannot neglect this last source of raw material. Every year a forest produces thousand of tones of wood material which, by natural causes, without human intervention, reaches the forest floor; for example old trees, landslides or very strong winds. In conditions that more and more forest surfaces are given back to private owners and the European legislation is quite drastic in terms of environmental standards, it's clear that the owners will want to steal a win from forest ownership, becoming suppliers of raw material for the pellet manufacturers.

All these are in quantities higher than the necessary for covering the country necessary and presently there are not used almost none. It's estimated that **1.000.000 m³** can replace approximately **180.000.000 liters of conventional fossil fuel.**

The low carbon dioxide emission means that the environment isn't affected, a proof being is the non-inclusion between the polluting substances, by the and

can be used for heating with help of the heating stations with automatic supplying.

The estimated consumption of pellets in Europe for the period 2000-2008 and the wood pellets price in the period 2002-2003 is presented in the chart/table below :



The export price of pellets is around 190-200 EURO/tonne, and the production costs are approx. 30 EURO/tonne. There haven't been reported cases of allergy provoked by pellet burning or storing

3. 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)

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

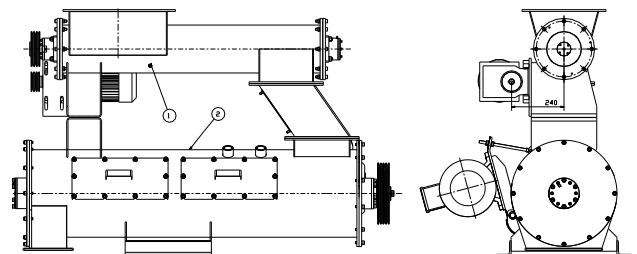
The paper refers to a food facility, mixing and dosing for the execution of the operation of power presses extruded wood waste in the form of sawdust. The mechanism can be used with minor adjustments to achieve both mills and the pellets as the pellets.

Various mechanisms are known to supply chips to mills for pelleting or briquetting press specific to each type. Solve the problem that this mechanism is that allows a continuous supply peletizat mills or plants with sawdust, regardless of its homogeneity and also to ensure a smooth flow of material at the entrance to the exit device of dosing and mixing device food-until the press entrance and ending with the pressing operation. This problem is solved by introducing a pressurized water spray facilities at the entrance of the mixing device and food and by constructive solutions of the two devices. Feed mechanism, mixing and dosing, as designed, has

The following advantages:

- Allows continuous operation power to the mills or mills peletizat plants;
- Allows optimization of dosing with sawdust mills;
- Ensure a smooth flow of sawdust all flow from the entrance up to the operation mechanism and pressing mechanism including due to embedding in a pressurized water spray equipment;
- Allows use on a wide range of typo-dimensions of the gutter press with minimal adaptation of connection;
- Allows easy access to components in case of damage

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 2) and a fueling and homogenization device (picture 3).



Picture. 1. Fuelling, homogenisation and dosage mechanism

These parts are connected with the possibility of attaching the chute to press which will be used, surgery is performed with a chute type flange connection adapted

Determination is made by mixing shaft which is mounted a constant pitch spiral set in motion by variable speed reducer so that the shaft revolutions increase the flow increases and decreases spindle speed control to decrease the flow of chips that will power the press, this speed samples are determined experimentally and can be corrected whenever necessary. On entering the mixing and supply device through the sawdust spray area which is constantly a certain amount of water, after which it is homogenized with the eight flat blades mounted on the spray and set in motion by the entrance of longitudinal media the other 26 blades mounted so that makes a spiral along the axis of the mixing and feeding device.

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. TECHNICAL CHARACTERISTICS.

Main technical characteristics:

Dosing device

Flow Max. 1000 kg / hour;
Step worm 180 mm;
Snail speed Variable;
Power 2.2 kW.

Fuelling and homogenization device

Flow Ca. 1000 kg / hour;
Step worm 180 mm ;
Snail speed 30 rpm;
Power 4 kW.

6. 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.

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