

EQUIPMENT FOR BREAKING-UP AND CRUMBLING WOOD SCRAPS RESULTED OF THE CLEANING OF TREES FROM THE FOREST AREAL AND PARKS, IN ORDER TO OBTAIN THE VEGETAL COMPOST

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Abstract: The paper presents the research-development activities in order to realize an equipment for breaking-up and crumbling which processes mechanized the wood scraps, resulted of the cleaning/cutting of trees and bushes from the forest areal and parks, in order to obtain the vegetal compost used to develop an ecological agriculture with good (positive) effects on environment, but also used to obtain biomass, which is necessary to produce regenerable fuel, as an unconventional energy resource. This equipment is an absolute novelty for Romania and it responds to EU requirements concerning the environment protection.

1. INTRODUCTION

In the last years, it has developed an ecological agriculture about elimination of utilization, if is possible, a chemicals fertilizers. In order to increase the soil fertility are used, frequently, the naturals fertilizers, biodegradations. The utilization a vegetal compost strength chip of wood has the roll to provide for protection and rehabilitation of degraded areas, in according with the principles of development an ecological and durable agriculture. Hereby, the production of alimentary goods will be realize in conformity of requests stipulated in Romanian standard CEE no. 2092/91 – already alignment to requests of European Union.

For the purpose of this complex objective, the work collective has proposed to research and development activities in order to realize an equipment for breaking-up and crumbling which processes mechanized the wood scraps, resulted of the cleaning/cutting of trees and bushes from the forest areal and parks.

This equipment represents a necessity for Romanian economy, which will need to accord about the European requests concerning the environment protection and to produce the complete range of machinery for use the news environment technologies.

2. DESCRIPTION OF FUNCTIONAL MODEL OF EQUIPMENT FOR BREAKING-UP AND CRUMBLING WOOD SCRAPS

The design of this equipment has basic set a broad technical documentary for accomplishments on world device, but original technical solutions from different mechanism for work. These technical solutions may become the object for technical patent.

The major problem, which must resolve bay the researchers, is the success of implant for that three systems for work of this equipment, mechanical, hydraulic and

electrical, specially for realization the optimal technology for breaking-up and crumbling the wood scraps and to obtain the performance parameters.

The technological equipment for breaking-up and crumbling the wood scraps is done at once cascading of the crusher and loading/disposal machinery of the working material.

We have adopted a system which is done from a breaking-up stage and a crumbling stage.

For to illustrate the complex condition of the equipment may be pursue the illustrations 1 and 2, about is report the kinematic device of equipment, respectively the hydraulic device for him actuating; thereby is prefigure the constructive-functionally solution which shell adopted.

The technological equipment is making, in principle, from:

- The obdurate with a structure type of hinged shutter which to allow the access in the storage bunker;
- A cylindrical bunker, vertical, with tilting motion, who push the wood waste in the crusher;
- The crusher for breaking up for wood scraps and waste;
- The crusher for crumbling for fragmentarily wood scraps;
- The band conveyor for evacuation the products;
- The mechanical drive source (proper thermal engine or power take-off from the movement tractor);
- The hydraulic installation for driving;
- The electrical installation for actuation and control for optimal working of the equipment.

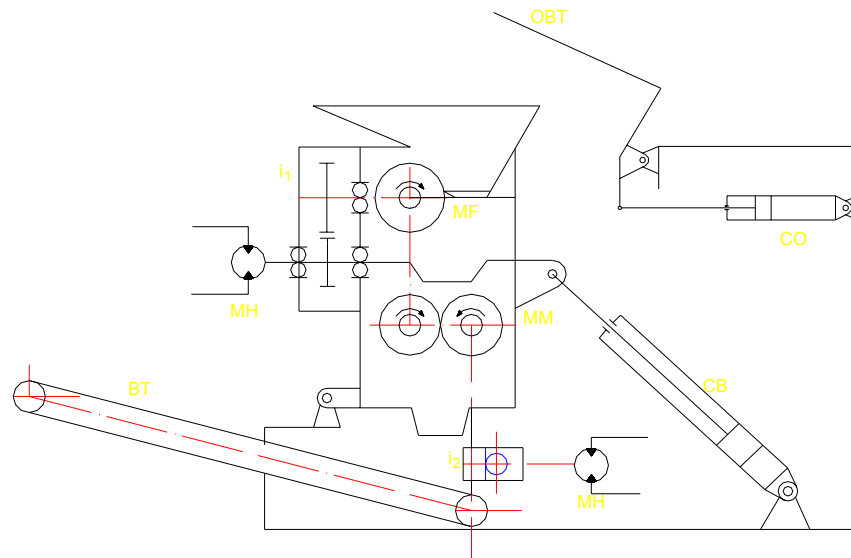


Fig. 1 – The kinematic device of equipment for breaking-up and crumbling

Every stage for breaking up of wood scraps is driven by proper power take-off by power distribution from an only engine. The option for a certain breaking up and crumbling system refers to proposed productivity and nature of processed material.

Full equipment, which to include every working mechanisms, is installed on specially tow away with one or two axle, with for driving the power take-off from the movement tractor. The movement from power take-off is delivered, mechanical or hydraulically, for

driving the breaking-up and crumbling mechanisms, the obdurate, the cylindrical bunker with tilting motion and evacuation (band conveyor).

The hydraulic installation for driving is illustrate of the hydraulically device from figure no. 2; thereby take it action four mechanisms from two pumps who is driving from two mechanical power take-off.

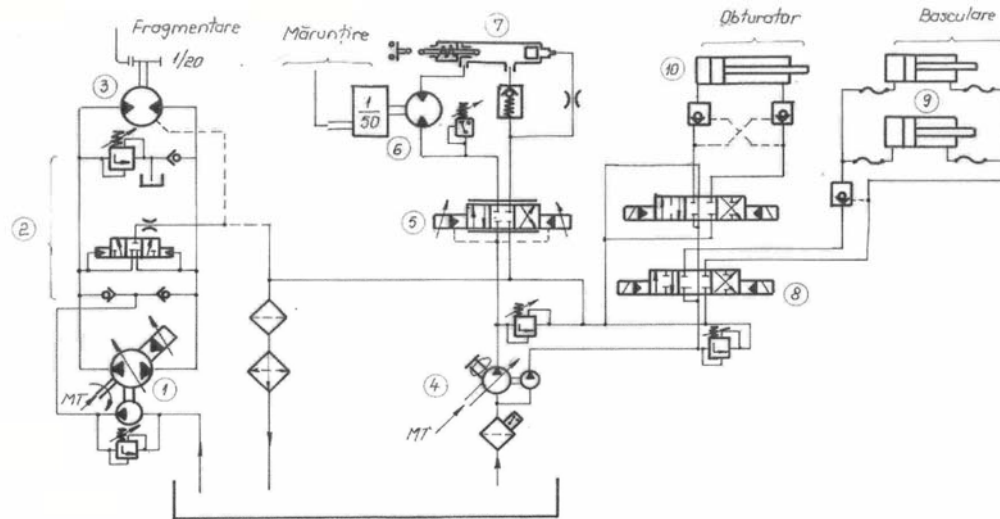


Fig. 2 – The hydraulically device of equipment for breaking-up and crumbling

The breaking-up and crumbling mechanisms functionate in tandem because they are working like this, if the crumbling „stuff oneself“, the obdurate due not allowed against working material.

When the crumbling mechanism has stopped, fact determinable of increase the pressure on driving circuit of speed reducer, position 6, is commanded self acting the movement backward of the mechanism.

The control of speed reducer, position 6, to do from hydraulically proportional distributor position 5, again the adjustment of pump delivery position 4 to do manually.

Adjusting of breaking-up and crumbling mechanisms to do from the electronically system on the basic set indications to supply from the pressure, speed and torsion couple transducers.

The auxiliary mechanisms are oil supply from two stage of the pump delivery, position 4, between the oil distributor position 8. The obdurate is worked from a hydraulically differential cylinder - position 10, who self locking at both direction of movement. The tilting of full assembly for mechanisms about relation of chassis must make with two differential cylinders - position 9, who self locking at direction of lifting.

The electric system for control must allow self acting the following functions:

- the movement coordination of hydraulically engine - position 3 with speed reducer, position 6, by adjusting of geometrical volume of pump - position 1 and by adjusting of proportional distributor - position 5;

- the tilting mechanism may be command only the movement of breaking-up and crumbling mechanisms is stopped.

Operating performance, estimate:

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|---|------------------------------------|
| - power of equipment: | about 40 kW |
| - productivity (quantity of worked material per kWh): | between 20 - 32 g/kWh; |
| - fuel consumption per 100 kg of worked material: | below 0,4 dm ³ /100 kg; |
| - specific weight of equipment: | about 300 kg/kW; |
| - diameter of wood to be cut: | below 100 mm |
| - degree of crumbling material: | |
| - for dry wood: | 4...10 mm |
| - for green wood: | 8...16 mm |
| - noise level: | max 95 dB |

3. CONCLUSIONS

3.1 Observance of the ecological and processing standards for waves (European Directive no. 2001-95 EC), realization of the ecological goods for a hearty alimentation of population, in conformity with the requests stipulated in Romanian standard CEE no.2092/91, has alignment already at the requests of European Union, become the mighty objectives for our country and, therefore, to plan a rapidly development of the compost production, because, in our country, this necessary equipments are missing.

3.2 Realization of the like equipment for breaking-up and crumbling which processes mechanized the wood scraps are resolve a major problem, of large complexity, in thematic area no. 2 - Alimentation, Agriculture, Biotechnologies, remarkably the production and durable management of biological resources of soil and forests (2.1), thematic area no. 6 - Environment, durable management of resources (6.2) and environment technologies (6.3). This project is lanais at European Technological Platform PT 13 - MANUFUTURE, platform already launching in Romania.

3.3 This equipment represents a necessity for Romanian economy, which will need to accord about the European requests concerning the environment protection and to produce the complete range of machinery for use the news environment technologies.

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