

Waste press device

5 This invention relates to a waste press device consisting of a rotating drum having an inner eccentric shaft, from which striking rods pass through an inlet hole and through the drum, with the rod end reciprocating axially during one revolution.

10 Waste presses known *per se* comprise pendulum piston presses, screw presses, axial-piston presses, baling presses, crusher presses, roll crushers and hook crushers. FI 41935, US 3 279 357 and GB 1 024 726, for instance, disclose waste press devices known *per se*. These waste presses known *per se* have the following shortcomings:

15 Pendulum piston press: a small-sized press opening, hydraulics; screw press: slowness due to simultaneous crushing and pressing (inadequate force for both operations); axial-piston press: an intermediate lid with low fault tolerance (detachment under wear), discontinuous feed, hydraulics; bale press: intended for low requirements alone, hydraulics, (relatively) high cost; crusher press: only crushing, no pressing, goods required to be transferred to a separate press; roll
20 crusher: only reduction of treated goods, goods clogged between the teeth and removed the wrong way, goods required to be transferred to a separate press; so-called hook crusher: only shredding and crushing, goods required to be transferred to a separate press.

25 This invention has the purpose of overcoming the drawbacks mentioned above. The waste press device of the invention is characterised by the rack of the device being fixed to rolls moving on vertical rails.

30 The waste press device of the invention has the following advantages:

Low power consumption < 15W per device: low operating costs. High jaw speed: time saving. Easy maintenance: no long delays for the customer in case of malfunction. Straightforward mechanism: reliability.

35 Versatility: Available in any size, with any width and height.

Low operating costs compared to hydraulic presses.

Higher continuous feed speed: receives larger amounts of goods in a shorter time compared to other presses.

- 5 No hydraulics: More environment-friendly and easier maintenance (also in the winter).

Owing to separate shredder rolls, it also reduces the goods to be treated (board and wood) if desired, so that the container receives a larger amount of goods and requires less frequent emptying. Slowly rotating mechanism: low operating costs and higher reliability. The device rises and clears the way for larger objects: Higher fault tolerance. Controlled by PLC logic: no need for physical monitoring of the device.

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15 The invention is explained below by means of an example and with reference to the accompanying drawings, in which

Figures 1-3 are axonometric views of the waste press from three different directions.

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The power supply is 400V/50Hz, fuse requirement: slow 32A. (1) over a current wire cable to the device, from the plug contact to the electric cable (3), from there to the electric motor (4) having a power in the range 40W-40kW.

- 25 The electric motor is connected to a reduction gear (5) having the approximate ratio 1:7. From the reduction gear a sprocket wheel (6) and power transmission by means of a chain (7).

30 The chains drive two members: the outer drum (8) and the inner shaft (9). The outer drum has a number (n) of holes in rows (10) and the inner shaft comprises striking rods (12) between flanges (11), the striking rods being "locked" by locking shafts (13).

- 35 All the members 4-13, 17, 22 mentioned above are fixed to the same "rack", which has a vertical degree of freedom in the vector Z. Movement in the direction of the X and Y planes is limited by a rail (15).

As the rack rises on the rails (15) under the control of rolls (16) to the set (limited) height, a stop switch (17) performs short-circuiting and the operation/drive is interrupted. The fed goods are directly reduced by means of "shredders" (18) placed between the paths of the striking rods (the shredders being e.g. "rolls").

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The striking rods pass through the perforations of the drum radially outwardly on the jaw side (19) and inwardly on the container (20) side. When the striking rods have been completely retracted, the drum wedge (21) (included in the rack) mechanically removes all the small residues from the drum surface. During the drive, the drum and the inner shaft rotate at the same speed of rotation. The device is controlled by PLC logic (25). The goods are fed through the feed opening and arrive on the feed ramp (26). The ramp (27) directs the goods upwardly into the container.

15 The device can be manufactured in a variety of sizes for many purposes of use by utilising different variants: a household waste press, a board and paper press, a timber press, a press for expanded polystyrene and other packaging materials, a small household waste press, a waste press unit for waste tankers, a waste bin pre-pressing unit, a pre-pressing unit for restaurant waste bins.

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Examples of shredders: roll shredders, toothed shredders, fixed shredders, axe head shredders.

The shock absorption of the device can be carried out with the entire rack supported by springs and shock absorbers.

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The shock absorption and the spring suspension may be adjustable.

The drum may have adjustable height relative to the ramp.

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The feed trough can be supplied from the side and from the top in the feed opening.

The feed inlet ramp may be straight, oblique, inclined, convex, concave or mobile.

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A compressing ramp disposed immediately after the drum may be straight, oblique inclined, convex, concave or mobile.

The power transmission may consist of a chain, a rope, a pinion gear, a worm gear or any other drive member. It can also be implemented by hydraulic means. The power transmission may also be manual.

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The rod shape may be: sharp, blunt, conical, chisel point, crosshead, toroidal head and even a moving member at the end of the rod.

The press may comprise n rods disposed in n rows.

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The same device may comprise two or more drums and rods.

The striking rods can be protected with an elastic material inside the drum.

15 The inner shaft can be protected e.g. by encapsulation or rubber mass lining.

All the parts can be coated e.g. with a suitable resin.

The outer drum proper may be flexible and radially adjustable.

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The drum 8 does not necessarily move vertically on the rails 15, but equally well horizontally: thus, for instance, in a low space, the entire waste press device may be turned upside down by 90 degrees on principle. The device may also operate with the drum 8 in stationary position and the device member separated from the drum if material gets between them and is pressed through.

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The striking rods 12 in the drum 8 forming an elongated comb may also be replaced with a plate-like member, which ensures better transport of liquid or similar substances through the waste press device than do striking rods.

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Since the drum 8 consists of a mobile unit and its device, it can be readily lifted upwardly on the rails 15 and removed for service or repair.

Claims

1. A waste press device consisting of a rotating drum (8) having an internal eccentric inner shaft (9), from which striking rods (12) pass through a inlet hole
5 (10) and through the drum, with the rod end reciprocating axially during one revolution, **characterised** in that the device rack is fixed to rolls (16) moving on vertical rails (15).
2. A waste press device as defined in claim 1, **characterised** in that the power
10 source of the device is an electric motor (4) rotating both the drum (8) and the inner shaft (9) via a transmission.
3. A waste press device as defined in claim 1 or 2, **characterised** in that
15 shredders (18) are fixed to the device frame between the drum (8) and the striking rods (12).
4. A waste press device as defined in any of the preceding claims, **characterised**
in that a ramp (27) is provided in the extension of the feed ramp (26) of the device
20 for directing the goods through the waste press device upwardly and further into the container.