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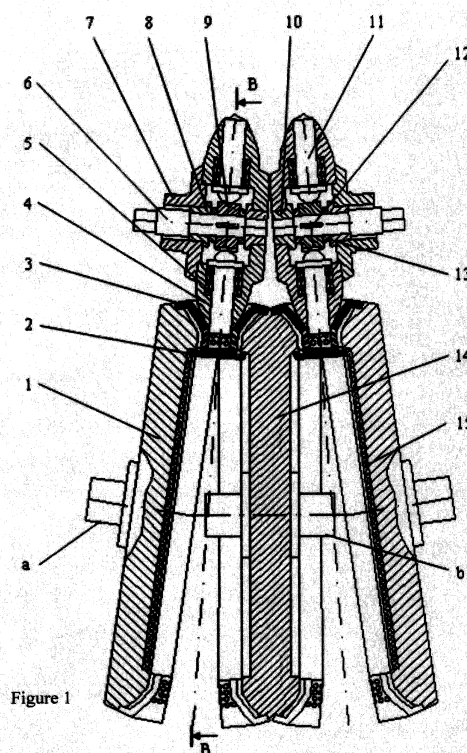
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(54) **DISC PRESS FOR THE OIL EXTRACTION FROM OILSEED**

(57) Device for oil extraction from oilseed, comprising three discs, one disc (14) with a horizontal rotation axis and two discs (1) with their rotation axes inclined to the horizontal. The discs (1, 14) have a truncated part in which are mounted half-cups (3) which together with the perforated plate (2) form a cavity for pressing the seeds. The seeds from tank (20) fill by free fall the dosing cavities of the rotary selector (19), pass through the gutter (23) and reach the half-cups (3) where they will be pressed. The mechanical pressing is performed in a first step by driving the half-cups (3) with the outer punches (4) and then by the radial movement of the inner punches (11), which reciprocate inside the outer punches (4) driven by radial cam (9). The outer punches (4) are radially arranged on two rotating punch-carrying wheels and ensure the synchronous rotation of the outer discs (1) and the inner disc (14). Starting with the seed loading area, the half-cups (3) are joined due to the inclination of the rotational axes of the discs (1, 14) and then, continuing the rotation movement after pressing, their separation takes place to release the pellets. In the area where the separation of the half-cups (3) begins, the plate (2) has no holes and ensures the pellets slide on the inclined trough (17) to the pellet tank (16). The electrical resistors (15) on the outer discs (1) provide a constant extraction temperature.



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Description

[0001] The invention relates to a device with three rotary disks and two groups of punches for oil extraction from oilseeds. Various oil extraction devices from oilseeds which are based on extraction using screws are known (US 2009/0126583 A1). Their disadvantage consists of exerting a pressure that does not have the same value in the whole mass of seeds subjected to pressure. The lack of a uniform pressure causes a low extraction yield. Another disadvantage is given by the difficult evacuation of the shed.

[0002] The technical problem that the invention solves consists of the use, for the oil extraction by mechanical pressing of the seeds, of three vertical discs, one with the horizontal axis of rotation and two with the axes of rotation inclined with respect to the axis of horizontal rotation, in which the half-cups are mounted on the truncated surfaces. The half-cups form a cavity together with the plate in which the pressing is carried out. The outer punch is made of two shapes that are generated by rotating around the axis of symmetry of an involute curve on a circle that determines at the base a shape that ensures seed pressing and engagement with the surfaces of the two half-cups. The inner punch is driven by the radial cam and by the shape of the pick, obtained by rotating a parabolic curve on a circle, ensuring a constant pressure throughout the mass of seeds subjected to pressing and amplifying the mechanical work that is exerted on the seeds. The half-cups are composed of two forms; an upper one which is generated by rotating around the axis of symmetry on a circle of an involute curve and a lower one generated by the rotation on a circle around the axis of symmetry of a line. One of the sides of the half cup is flat and the other has a profile formed by teeth which ensures the filling of a cavity before the complete closure, before further pressing with the inner punch.

[0003] The oil extraction device eliminates the disadvantages of the known solutions and solves the proposed technical problem, in that, by using the semi-cups, mounted the three discs that join and together with a plate forms a pressing cavity into which a punch of a shape first enters. Complex construction, and then an additional punch, ensures uniform pressing and rotation of the disks in rotation to bring another seed filled cavity in front of the next punch. By continuing to rotate the disks, due to the inclination of the axes of rotation, the half-cups open and allow easy evacuation of the pallets on a gutter trough to a tank.

[0004] The oil extraction device, according to the invention, has the following advantages:

- provides the necessary pressure to break the seeds in order to extract the oil they contain;
- two groups of parallel punches to increase productivity are used;
- uniform extraction pressures are provided through-

out the mass of seeds subjected to extraction by using the additional punch;

- the two half-cups participate in cavity formation and exert additional radial pressure;
- 5 - the half-cups have sloping holes to allow easier oil leakage;
- in case of clogging the half-cups can be easily cleaned or replaced;
- 10 - the sieve-shaped part ensures the passage of the oil to the collection tank and if its clogging occurs can be easily replaced or cleaned;
- better separation between the meal and the oil is ensured;
- 15 - obtaining pellets that can be used for different purposes (addition of fiber in food, fertilizer, burning briquettes, etc.).

[0005] The following is an example of an embodiment of the invention, in connection with Figures 1, 2 and 3 which show:

- Figure 1, cross-section through the device;
- Figure 2, radial section through the device;
- Figure 3, half cup.

[0006] The device, according to the invention, consists of two discs **1** which have rotational axes inclined to the horizontal plane and which are bearings on the surfaces **a** and a disc **14** with the axis of rotation horizontally bearings on the surfaces **b**. The three discs are driven at the same time by engaging the groups of punches **4** and the half-cups **3** mounted on the front of the discs, Figure 1, section A-A. The operating in the sequential rotation of the groups of punches **4** is accomplished by coupling the lid with axis **7** to a kinematic chain acting synchronously and the axis **6** to drive the cam **9**. Inside the two truncated discs are placed electrical resistors of disc **15** which ensures constant extraction temperature.

[0007] The groups of punches are formed by the outer punches **4** inside which are the internal punches **11**. The outer punch **4** has a complex shape that includes a basic volume generated by rotating an involute curve in a vertical plane to ensure the engagement with the half-cups **3**. The punch **11** has the pick generated by rotating a parabola vertically to ensure constant pressure throughout the mass of seeds subjected to pressure. The shaft cover **7** is fixed to the body of the outer punch **4** and supports the bearing **8**. In the body of the outer punch **4** is fixed in opposition with the bearing **10**. The bearings **8** and **10** support the shaft **6** on which the radial cam **9** is fixed through the feather **12**. Between the front parts of the cam and bearings the spacers **13** are fixed. The radial cam acts the internal punches **11** which are in contact due to the helical springs **5**.

[0008] The half-cups **3**, Figure 2 are composed of two forms at interior. One of the sides of the half cup is flat and the other has a profile formed by teeth **d** which ensures the filling of a cavity before the complete closure.

[0009] The loading with the oil seeds that will be subjected to the pressing is made from the tank **20**, by free fall, Figure 3, section B-B. The seeds will fill the quantitative dosing cavity formed of the housing **22** and the rotary selectors **19** located on the axis of rotation **21**, pass through the gutter **23** and reach the half-cups **3** where they will be pressed. 5

[0010] The pressing area comprises the cavity formed by the two pair half-cups **3**, plate **2** and the punch **4**, Figure 1. The plate **2** of semi-cylindrical shape has holes near the pressing area, that allow the oil obtained from the pressed process to drain, and then have an area which supports the pellets, as a result of pressing, until the two half-cups **3** are opened to allow the pellets to detach. After removal, the pellets will slide on the inclined gutter **17** in the pellet tank **16**. At the bottom of the plate **2** is the oil collector **18**, Figure 3, section B-B. 10 15

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Claims

1. The device for oil extraction from oilseeds, **characterized in that** it consists of two discs (**1**) with inclined axes and a disc (**14**) with a horizontal axis, which allow the formation of an oil extraction cavity in the upper area and then allow the semi-coups (**3**) to be unloaded and the pellets to be ejected. 35
2. The device for the oil extraction from oilseeds, **characterized in that**, through the shape of the punches (**4**) and of the half-cups (**3**), gearing and a first pressing of the seeds to obtain the oil can be achieved, and by acting the radial cam (**9**) by means of the punches (**11**) the mechanical pressing is continued. 40 45
3. The extraction of the oil is carried out in a cavity, **characterized in that** it is formed by the plate (**2**) and the two half-cups (**3**) that are even and have a profiled constructive shape, with an alternating rectangular shape with rectangular cavity **d**, on one of the sides, to allow the entry of the pair profiles into the holes in order to form the cylindrical cavity and better compaction of the seeds before pressing. 50 55

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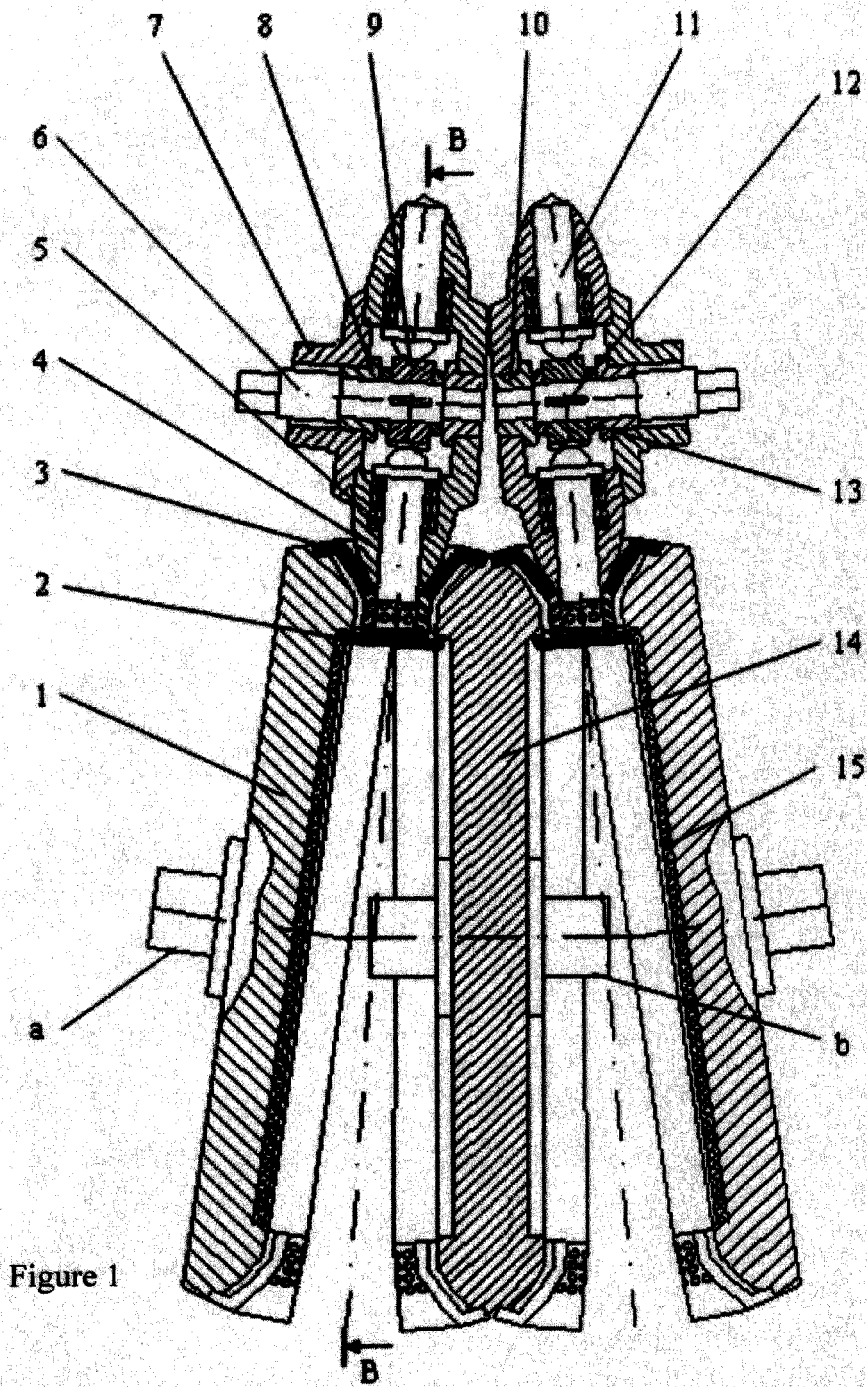


Figure 1

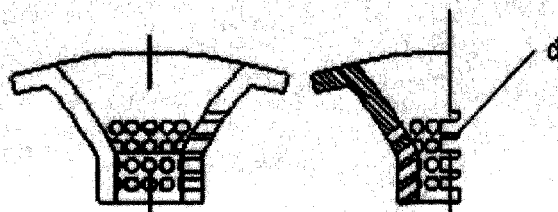
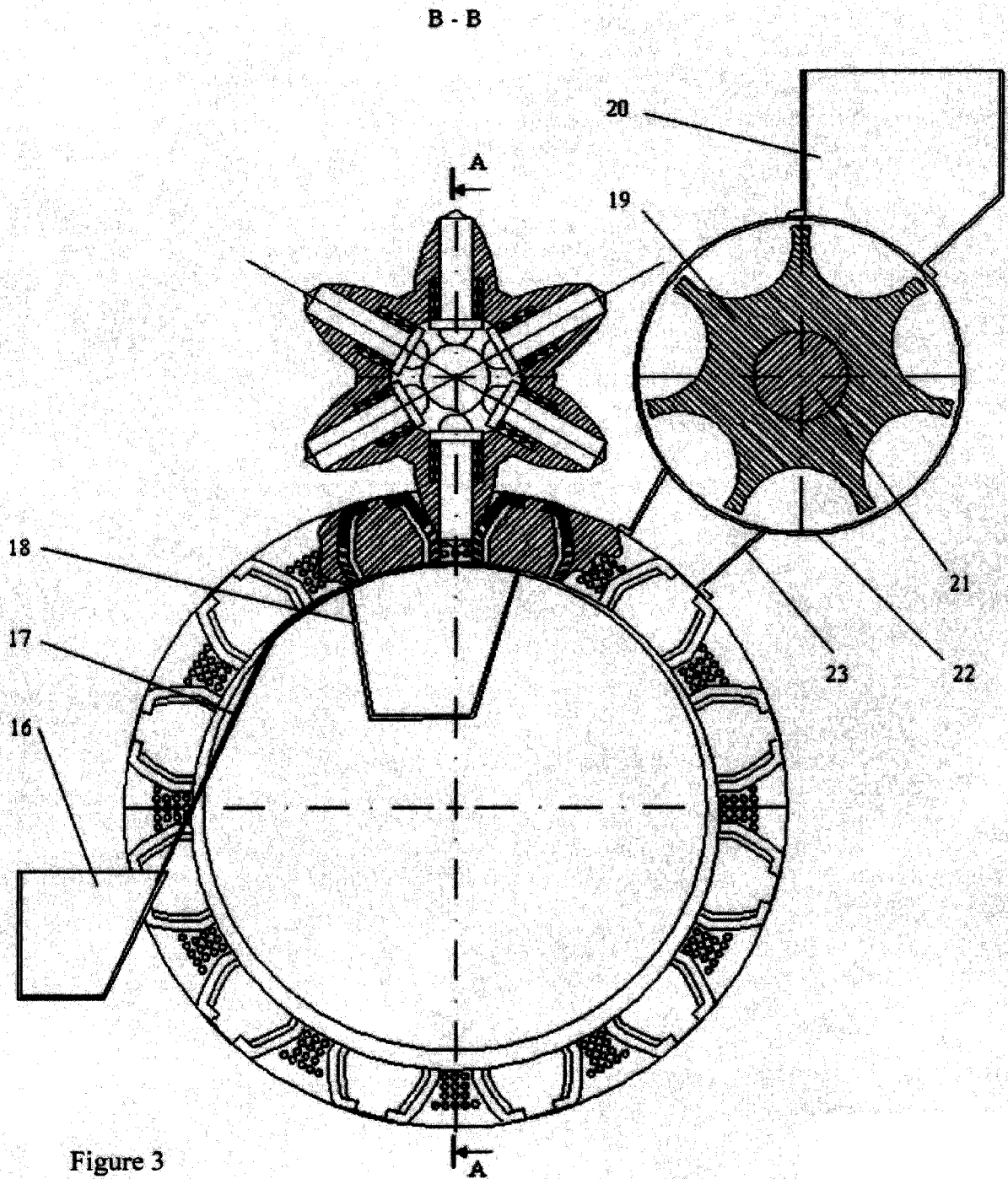


Figure 2





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Application Number
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 15 July 2020	Examiner Papakostas, Ioannis
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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