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(54) **Pellet machine with oleodynamic control extruder group**

Pelletpresse mit hydrodynamisch gesteuerter Extrudiergruppe

Presse à granuler avec groupe d'extrusion à contrôle hydrodynamique

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EP 1 619 012 B1

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DescriptionField of the Invention

[0001] This invention concerns vertical, cylindrical extruder pellet machines in general with internal pressure rollers, and refers in particular to an extruder group for such machines.

State of the Technique

[0002] The machines taken into consideration here and used for pelletising wood, usually include a rotating annular extruder, having a large number of radial holes and pressing rollers, also turning, positioned and operating at a tangent to the inner surface of the perforated extruder.

[0003] The starting raw material to be made into pellets is forwarded and crushed between the pressure rollers and the inner surface of the extruder and forced, in this way, to be extruded through the holes in the die. The pressure rollers are usually knurled to increase the crushing action on the material to be extruded and to prevent the latter from slipping out of the pressure area. The resulting extruded material is sheared by means of fixed blades operating on the external surface of the extruder to form the pellets.

[0004] In the known pellet machines, the rotation of the extruder is powered by an external motor unit using a belt or pulley drive, which besides being extremely cumbersome is also noisy. Furthermore, there are two or more pressure rollers and adjustment of their position with reference to the extruder is always a problem.

[0005] EP-A-0371519 discloses a wood pellet machine according to the preamble of claim 1, comprising a treatment chamber, a rotating annular extruder turning in said chamber and provided with a plurality of radial holes, and rotating pressure rollers, positioned and operating at a tangent to the internal surface of the perforated extruder. A pressure roller is associated with the extruder and can be positioned radially to the internal surface of the extruder by means of an oleodynamic actuator fixed to the housing defining the treatment chamber.

[0006] DE 3813081 discloses a wood pellet machine provided with a die, which itself is provided with bores, and a pan grinder head with pan grinder rollers which roll on the die. A hydraulic device is connected to a pump for pressing the pan grinder rollers towards the die. A volumetric device is provided to control the flowing of the hydraulic fluid thereby permitting the distance between the pan grinder rollers and the die to be measured and controlled or regulated.

[0007] JP 2002283346 discloses a wood pellet machine wherein the temperature of the die and the rollers is measured to feedback control the operation of the machine with respect to the adjustment of the distance between the rollers and the die.

[0008] SU 709386 discloses another prior art machine.

Object of the Invention

[0009] The object of this invention is to resolve the problems of the pellet machines of the known technique, by providing a simplified and effective design.

[0010] The advantage of the above is that the pellet machine with cylindrical extrusion is simpler, less cumbersome and not as noisy and can be easily adjusted to the pressure of the extrusion of the initial material so as to optimise on the machine operating capacity and productivity.

[0011] Furthermore, the pressure roller can also be set up for axial positioning, which offers the possibility of using an extruder on the same pellet machining with at least two work sessions and usable alternatively, depending on the material to be pelletised, by simply moving the pressure roller from one work section to another.

[0012] The object and the advantages mentioned above are achieved, in compliance with the invention, using an improved wood pellet machine according to at least claim 1.

Brief description of the drawings

[0013] The invention will however become more evident in the continuation of this description made in reference to the enclosed exemplifying drawings, in which:

Fig.1 is a schematic lateral view of the extruder group; and

Fig. 2 is a front view of the extruder-pressure roller connection.

Detailed Description of the Invention

[0014] In said drawing 10 indicates generically the casing of a pellet machine supporting an annular extruder 11, that is cylindrical, at a horizontal axis, to which a pressure roller 12 is actively associated.

[0015] The extruder 11 is supported by two rings or flanges 13 and turns powered preferably by an oleodynamic motor 14. As is known, the extruder 11 is equipped with numerous radial holes - not shown - for extruding the initial material and is housed and operates in a chamber formed by the casing 10 and closed at the front by a door 15.

[0016] The pressure roller 12 is coordinated and interacts with the internal surface of the annular extruder 11 where the material to be pelletised arrives from an external source. Said roller has a knurled peripheral surface 16 and is assembled, by the use of a bearing 17, on a relative shaft 18 parallel to the rotation axis of the extruder 11.

[0017] The shaft 18 of the pressure roller 12 is supported by a support 19 integrated with a piston 20 that is housed and slides in a corresponding oleodynamic cyl-

inder 21 fixed to the door 15. The piston and relative cylinder are oriented radially to the shaft 18 of the pressure roller 12, and when said roller is associated with the extruder 11 it is inside the extruder itself. Thanks to this type of assembly, the pressure roller 12 can be positioned radially to the internal surface of the extruder, approaching or moving away from it according to needs, simply by means of an external activation command of the oleodynamic cylinder.

[0018] The material to be pelletised is conveyed from the outside to the inside of the extruder, between the surface of the latter and the pressure roller, where an action is developed that pushes the material through the holes of the extruder, extruding it to form pellets.

[0019] In addition, the pressure roller 12 with its connected radial oleodynamic positioning system 20, 21 can be assembled on a guided plate parallel to the roller axis and moved by at least one cylinder 22. In this way and as stated above, it will be possible to set up an extruder with at least two parallel, side by side, work sections, and use one or the other work section by axially moving the pressure roller from one work section to the other.

[0020] Worthy of mention is the fact that the supply of the material to the extruder of the machine is achieved by screw feed driven by a device with auto-adjusted rotating speed by an electronic and oleodynamic retroaction (Load-Sensing) and that the extruder can be associated with an automatic cleaning and lubricating system by an electro-oleodynamic control (Easy-Start).

Claims

1. A wood pellet machine, comprising a treatment chamber, a rotating annular extruder (11) turning in said chamber and provided with radial holes, and rotating pressure rollers (12) positioned and operating at a tangent to the internal surface of the perforated extruder (11), wherein said annular extruder (11) is associated with a pressure roller (12) supported by a movable support and which is able to be positioned radially to the internal surface of the extruder (11) by means of an oleodynamic actuator (20, 21), wherein the pressure roller (12) has a shaft (18) parallel to the rotating axis of the extruder (11), and wherein said shaft (18) is supported by a support (19) integrated with a piston (20) housed and sliding in an oleodynamic cylinder (21), **characterized in that** said oleodynamic cylinder (21) is fixed to a closing door (15) of the treatment chamber, said piston (20) and relative cylinder (21) being radially oriented to the shaft (18) of said pressure roller (12).
2. Pellet machine according to claim 1, wherein the extruder (11) has two different work sections placed side by side and wherein said pressure roller (12) is able to be moved and positioned axially in correlation with one or the other of said work sections of the

extruder (11).

3. Pellet machine according to claim 2, wherein, for its axial positioning, said pressure roller (12) is assembled on a means of support (19) movable by means of at least one oleodynamic cylinder (21).
4. Pellet machine according to any of the previous claims, wherein the rotating annular extruder (11) is driven by an oleodynamic motor (14).
5. Pellet machine according to any of the previous claims, wherein said pressure roller (12) is associated with said extruder (11) and is able to be moved and positioned both radially and axially to the internal surface of the extruder (11) by means of a remote controlled oleodynamic actuator.

Patentansprüche

1. Eine Holzpellet-Maschine, umfassend eine Behandlungskammer, einen rotierenden ringförmigen Extruder (11), der sich in besagter Kammer dreht und mit radialen Löchern versehen ist, und rotierende Druckrollen (12), die tangential zur Innenfläche des perforierten Extruders (11) positioniert und tätig sind, wobei besagter ringförmiger Extruder (11) mit einer Druckrolle (12) verbunden ist, die von einem beweglichen Träger gestützt wird und mittels eines öldynamischen Aktuators (20, 21) radial zur Innenfläche des Extruders (11) positioniert werden kann, wobei die Druckrolle (12) eine Welle (18) besitzt, die parallel zur rotierenden Achse des Extruders (11) verläuft, und wobei besagte Welle (18) von einem Träger (19) gestützt wird, der durch einen Kolben (20) integriert ist, der in einem öldynamischen Zylinder (21) untergebracht ist und hineingleitet, **gekennzeichnet dadurch, dass** besagter öldynamischer Zylinder (21) an einer schließbaren Tür (15) der Behandlungskammer befestigt ist, wobei besagter Kolben (20) und der entsprechende Zylinder (21) radial zur Welle (18) der besagten Druckrolle (12) ausgerichtet sind.
2. Pellet-Maschine gemäß Anspruch 1, wobei der Extruder (11) zwei verschiedene Arbeitssektionen besitzt, die nebeneinander positioniert sind, und wobei die besagte Druckrolle (12) in Korrelation zu der einen oder der anderen der besagten Arbeitssektionen des Extruders (11) bewegt und axial positioniert werden kann.
3. Pellet-Maschine gemäß Anspruch 2, wobei besagte Druckrolle (12), für ihre axiale Positionierung, auf einem Trägermittel (19) eingesetzt ist, das mittels mindestens eines öldynamischen Zylinders (21) bewegbar ist.

4. Pellet-Maschine gemäß einem jeglichen der vorhergehenden Ansprüche, wobei der rotierende ringförmige Extruder (11) von einem öldynamischen Motor (14) angetrieben wird.

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5. Pellet-Maschine gemäß einem jeglichen der vorhergehenden Ansprüche, wobei die besagte Druckrolle (12) mit dem besagten Extruder (11) verbunden ist und mittels eines ferngesteuerten öldynamischen Aktuators sowohl radial als auch axial zur Innenfläche des Extruders (11) bewegt und positioniert werden kann.

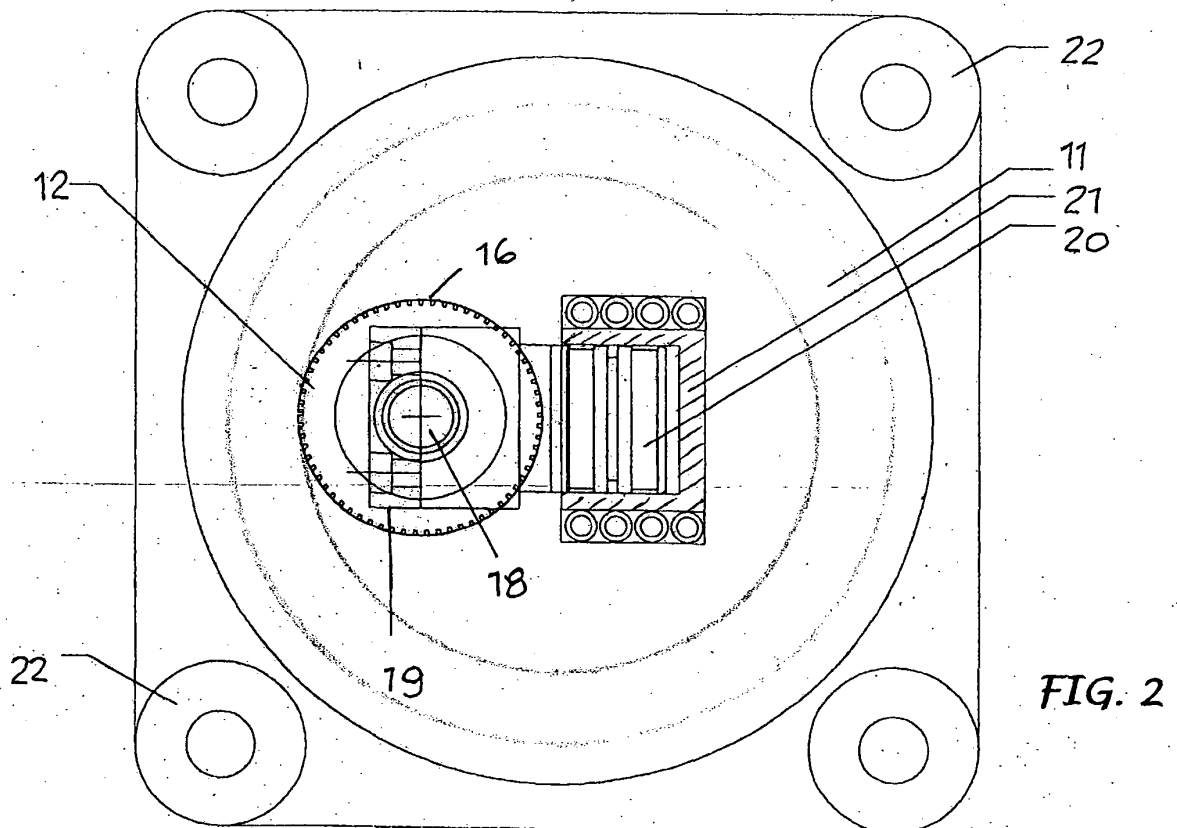
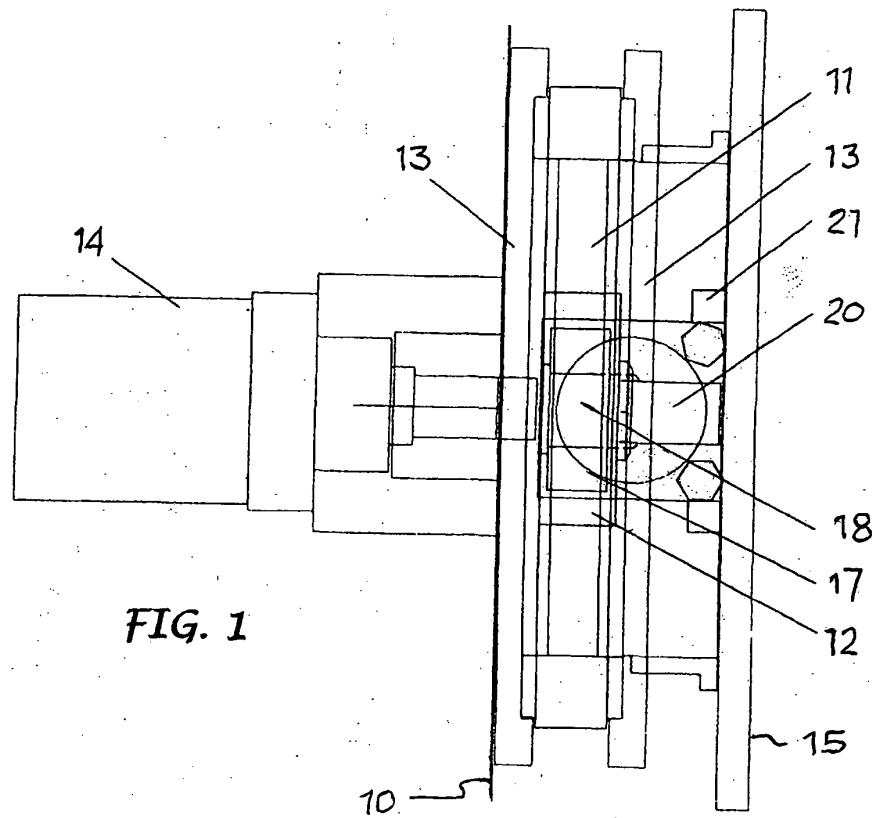
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Revendications

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1. Une machine à granulés de bois, comprenant une chambre de traitement, une extrudeuse annulaire rotative (11) tournant dans ladite chambre et dotée de trous radiaux, et des rouleaux presseurs rotatifs (12) positionnés et fonctionnant selon une tangente de la surface interne de l'extrudeuse perforée (11), où ladite extrudeuse annulaire (11) est associée à un rouleau presseur (12) soutenu par un support mobile et qui peut être positionné radialement par rapport à la surface interne de l'extrudeuse (11) au moyen d'un actionneur oléodynamique (20, 21), où le rouleau presseur (12) possède un arbre (18) parallèle à l'axe de rotation de l'extrudeuse (11), et où ledit arbre (18) est soutenu par un support (19) intégré avec un piston (20) logé et coulissant dans un cylindre oléodynamique (21), **caractérisée par le fait que** ledit cylindre oléodynamique (21) est fixé à une porte de fermeture (15) de la chambre de traitement, ledit piston (20) et cylindre correspondant (21) étant orientés radialement par rapport à l'arbre (18) dudit rouleau presseur (12).
2. Machine à granulés selon la revendication 1, où l'extrudeuse (11) possède deux sections de travail différentes placées côte à côte et où ledit rouleau presseur (12) peut être déplacé et positionné axialement en corrélation avec l'une ou l'autre desdites sections de travail de l'extrudeuse (11).
3. Machine à granulés selon la revendication 2, où, en raison de son positionnement axial, ledit rouleau presseur (12) est assemblé sur un moyen de support (19) mobile au moyen d'au moins un cylindre oléodynamique (21).
4. Machine à granulés selon l'une des revendications précédentes, où l'extrudeuse annulaire rotative (11) est entraînée par un moteur oléodynamique (14).
5. Machine à granulés selon l'une des revendications précédentes, où ledit rouleau presseur (12) est associé à ladite extrudeuse (11) et peut être déplacé

et positionné radialement et axialement par rapport à la surface interne de l'extrudeuse (11) au moyen d'un actionneur oléodynamique commandé à distance.



REFERENCES CITED IN THE DESCRIPTION

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