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(54) **SHREDDER**

ZERKLEINERUNGSMASCHINE

DECHIQUETEUR

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Description

BACKGROUND OF THE INVENTION

[0001] The invention relates to a shredder for shredding material, the shredder comprising a frame, a shredder rotor rotatably arranged to the frame, a feeding chamber for directing the material to be shred into the shredder and for bringing the material in touch with the shredder rotor, a press arranged into the feeding chamber to perform substantially horizontal or pendulous motion for pushing the material towards the shredder rotor, whereby the press is arranged to move along a bottom structure of the feeding chamber.

[0002] When materials are being shred using slowly rotating rotor shredders, the capacity is increased by pushing material to be shred by means of a press against the surface of the shredder rotor in the shredder. Thus, the first shredding event takes place already when the material is ground between the shredder rotor and the press, while the actual shredding takes place later at the shredder rotor and the counter blades thereof.

[0003] A known press solution is a box-like press, which is controlled using guide bars in a particular kind of tunnel provided with a straight bottom. The problem in such a structure is that fines end up between the box and the bottom structure, which causes buoyancy to the press, wear to the bottom structure and causes the press to wedge and to jam.

[0004] Another known structure refers to a pendulous press, which may, if need be, move along a similar bottom structure. The advantage of the pendulum press is that the motion can be controlled more reliably but the drawback is the short distance.

Further similar structures are known for example from US-A-5,509,613 and US-A-5,405,093.

BRIEF DESCRIPTION OF THE INVENTION

[0005] It is an object of the invention to eliminate the problems described above, especially those in connection with the box-like press. This object is achieved by means of a shredder of the type mentioned above, which is in accordance with the invention and having the combined features of the characterising portion of claim 1.

[0006] An advantage of the solution according to the invention is to even out the blows over a larger area and to stiffen the entire bottom structure and also that wear can now be focused to a changeable wear part. Compared with previous flat-bottom structures, a more precise adjustment can now be provided to compensate for wear, resulting in a reduction in wear and making the entry of, for instance, sand or a corresponding material between the press and the bottom structure more difficult.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] In the following the invention will be described in greater detail by means of a preferred embodiment with reference to the accompanying drawings, in which:

Figure 1 is a side view showing a shredder according to the invention in cross-section,
Figure 2 is an oblique top view showing a shredding chamber of the shredder, and
Figure 3 shows the shredding chamber of the shredder in cross-section.

DETAILED DESCRIPTION OF THE INVENTION

[0008] With reference to Figure 1, a shredder according to the invention comprises a frame 1, a shredder rotor 2 rotatably arranged to the frame, a feeding chamber 3 for directing the material to be shred (not shown) into the shredder and for bringing the material in touch with the shredder rotor 2, a press 4 arranged into the feeding chamber 3 to perform substantially horizontal or pendulous motion for pushing the material towards the shredder rotor 2, whereby the press 4 is arranged to move along a bottom structure 5 of the feeding chamber 3.

[0009] The shredder rotor 2 and shredding elements 6 on the surface thereof are arranged to co-operate with counter blades 7 provided in the frame 1 and with a trough-like screen plate 8. Naturally the press 4 is also at the end of the pushing phase thereof involved in a similar co-operation with the shredder rotor 2 and the shredding elements 6 thereof. A conveyor belt 9 is arranged below the screen plate 8 for removing the shredded material falling through the screen plate 8.

[0010] The feeding chamber 3 opens up as a "funnel-shaped" structure 10 upwards from the frame 1 and continues as a "tunnel-like" structure 11 within the frame 1 and is restricted at the bottom to the bottom structure 5. The funnel 10 may direct the material to be shred directly above the shredder rotor 2 and to the tunnel 11.

[0011] The press 4 resembles a box-like piston, which is moved together with the material running in front of the piston by means of an appropriate drive unit (not shown) towards the shredder rotor 2 with such a force that the material is shred to a great extent before encountering the counter blades 7. The bottom structure 5, which basically forms a part of the frame structure of the shredder, is to be kept as a part that is not subjected to wear. As such it is subjected to rough and abrasive wear. In accordance with the invention, the wear of the actual bottom structure 5 is presented in such a manner that a replaceable wear surface structure 12 is arranged on top of the bottom structure 5 at least substantially within the area covering the path of the lower surface of the press 4.

[0012] The preferable wear surface structure 12 shown in Figure 2 comprises longitudinal ridges 13 in the direction of the path of the press 4 placed towards the shredder rotor 2 and longitudinal recesses 14 between the ridges 13. The cross-section of this structure may for instance be wavelike or angular, as shown in Figure 2. The wear surface structure 12 may be formed of a plate

or profile structure, for example of beams 13, which form the ridges, and the gaps thereof forming the recesses 14. The profiles required in this structure may be finished commercial products, different shapes bended of metal for this purpose or special solutions implemented by means of casting. At least the beams 13 concerned can preferably be arranged to the bottom structure 5 using a separate installation plate 15 to be provided between the two, in which case the beams 13 can at first be fastened to the installation plate 15, and then to mount the entire structure 13, 15 formed in this way to the bottom structure 5. The beams 13 can preferably be fastened using bolts 16, whereby an element structure is provided in which individual beams 13 subjected to wear can be replaced without having to replace the entire structure.

[0013] The shape of a bottom part 18 of a front surface 17 in the press 4 is compatible with the cross-section profile of the wear surface structure 12, whereby it is preferable that the ridges 13 of the structure 12 taper upwards and the structure 12 is arranged to be adjustable, especially inclinable or to be lifted in relation to the bottom structure 5, in which case the wear occurring at the bottom part of the press 4 and/or in the structure 12 can be compensated, thus keeping the play between these parts as small as possible with simple adjusting measures.

[0014] In Figure 2, the press 4 and the bottom structure 5 are placed apart, but when used the teeth of the bottom part 18 of the press 4 naturally coincide with the recesses 14 of the bottom structure. As the "spline" formed in this way (the teeth of the bottom part 18 and the recesses 14) is formed in both counterparts 4 and 5, the spline functions as a substantial seal of the shredder's press 4 against the counterpart, i.e. the bottom structure 5. The plate-like material to be shred can therefore not slide away therefrom.

[0015] In some cases, for instance, when a heavy material always falls into a particular spot at the bottom of the structure 12, it is preferable to use at this particular spot a more solid design or shape that endures blows to a greater extent and an otherwise better sealing design.

[0016] If the wear resistance of the intermediate spaces 14 between the ridges 13 is to be improved, this can be carried out for instance using a ceramic coating. The ceramic coating poorly resists blows, and should therefore preferably be placed only between ridges 13 that endure wear.

[0017] In accordance with Figure 3, the wear surface structure 12 may also form a part of the guide structure of the press 4 from in such a manner that lower guide rollers 19 are fastened to the bottom of the press that move along the tracks formed of the intermediate spaces 14 and the ridges 13. Corresponding side guide rollers 20 can also be arranged on the side of the press 4 as well as a track arrangement, which may be similar to the wear surface structure 12. The movement of the press 4 is now considerably easier to handle without any impaction, which has often been a problem in presses provided with side steering only.

[0018] The description of the invention above is merely intended to illustrate the basic idea of the invention. However, those skilled in the art may implement the details of the invention in various ways within the scope of the appended claims.

Claims

1. A shredder for shredding material, the shredder comprising a frame (1), a shredder rotor (2) rotatably arranged to the frame, a feeding chamber (3) for directing the material to be shred into the shredder and for bringing the material in touch with the shredder rotor, a press (4) arranged into the feeding chamber to perform substantially horizontal or pendulous motion for pushing the material towards the shredder rotor, whereby the press is arranged to move along a bottom structure (5) of the feeding chamber, **characterized in that** a replaceable wear surface structure (12), comprising longitudinal ridges (13) in the direction of the path of the press (4) towards the shredder rotor (2) and recesses (14) between the ridges, is arranged on top of the bottom structure (5) of the feeding chamber (3) at least substantially within the area covering the path of the lower surface of the press, wherein the wear surface structure (12) is arranged to be adjustable, particularly liftable or inclinable in relation to the bottom structure (5).

2. A shredder as claimed in claim 1, **characterized in that** the cross section of the wear surface structure (12) is wavelike or angular.

3. A shredder as claimed in claim 1 or 2, **characterized in that** the wear surface structure (12) is arranged onto the bottom structure (5) using a separate installation plate (15) provided between the two.

4. A shredder as claimed in any one of the preceding claims, **characterized in that** the ridges (13) of the wear surface structure (12) taper upwards.

5. A shredder as claimed in any one of the preceding claims, **characterized in that** the recesses (14) of the wear surface structure (12) are provided with a ceramic coating.

6. A shredder as claimed in any one of the preceding claims, **characterized in that** the wear surface structure (12) also forms a part of the guide structure of the press (4).

Patentansprüche

1. Zerkleinerungsmaschine zum Zerkleinern von Material, aufweisend: einen Rahmen (1), einen am Rah-

men drehbar angeordneten Rotor (2) der Zerkleinerungsmaschine, eine Zuführungskammer (3) zum Einführen des zu zerkleinernden Materials in die Zerkleinerungsmaschine und zum Bringen des Materials in Kontakt mit dem Rotor der Zerkleinerungsmaschine, eine Presse (4), die in der Zuführungskammer angeordnet ist, eine wesentlich horizontale oder pendelartige Bewegung auszuführen, um das Material gegen den Rotor der Zerkleinerungsmaschine zu schieben, wobei die Presse angeordnet ist, sich entlang einer Bodenkonstruktion (5) der Zuführungskammer zu bewegen, **dadurch gekennzeichnet , dass** eine auswechselbare Verschleissflächenkonstruktion (12), die längliche Erhöhungen (13) in Richtung der Fahrbahn der Presse (4) gegen den Rotor (2) der Zerkleinerungsmaschine und Vertiefungen (14) zwischen den Erhöhungen aufweist, auf der Bodenkonstruktion (5) der Zuführungskammer (3) zumindest wesentlich innerhalb des die Fahrbahn der Unterfläche der Presse deckenden Bereichs angeordnet ist, wobei die Verschleissflächenkonstruktion (12) einstellbar, insbesondere hebbar oder neigbar, in Bezug auf die Bodenkonstruktion (5) angeordnet ist.

2. Zerkleinerungsmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** der Querschnitt der Verschleissflächenkonstruktion (12) wellenförmig oder ekkig ist.

3. Zerkleinerungsmaschine nach Anspruch 1 oder 1, **dadurch gekennzeichnet, dass** die Verschleissflächenkonstruktion (12) auf der Bodenkonstruktion (5) anhand einer separaten, zwischen diesen angeordneten Montageplatte (15) angeordnet ist.

4. Zerkleinerungsmaschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet , dass** sich die Erhöhungen (13) der Verschleissflächenkonstruktion (12) nach oben zuspitzen.

5. Zerkleinerungsmaschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet , dass** die Vertiefungen (14) der Verschleissflächenkonstruktion (12) mit einer Keramikbeschichtung versehen sind.

6. Zerkleinerungsmaschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet , dass** die Verschleissflächenkonstruktion (12) auch einen Teil der Leitkonstruktion der Presse (4) ausbildet.

Revendications

1. Déchiqueteur pour déchiqueter un matériau, le déchiqueteur comportant un bâti (1), un rotor déchiqueteur (2) monté rotatif sur le bâti, une chambre d'alimentation (3) pour diriger le matériau destiné à être déchiqueté dans le déchiqueteur et pour mettre le matériau en contact avec le rotor déchiqueteur, une presse (4) agencée dans la chambre d'alimentation pour effectuer un mouvement substantiellement horizontal ou pendulaire pour pousser le matériau en direction du rotor du déchiqueteur, la presse étant agencée pour se déplacer le long d'une structure inférieure (5) de la chambre d'alimentation, **caractérisé en ce qu'**une structure formant surface d'usure (12) remplaçable, comportant des arêtes longitudinales (13) disposées dans la direction du passage de la presse (4) allant vers le rotor déchiqueteur (2) et des cavités (14) agencées entre les arêtes, est agencée sur la partie supérieure de la structure inférieure (5) de la chambre d'alimentation (3) au moins substantiellement dans la zone couvrant le passage que comprend la surface inférieure de la presse, la structure formant surface d'usure (12) étant agencée pour être réglable, particulièrement pouvant être élevée ou inclinée par rapport à la surface inférieure (5).

2. Déchiqueteur selon la revendication 1, **caractérisé en ce que** la section transversale de la structure formant surface d'usure (12) est ondulée ou angulaire.

3. Déchiqueteur selon la revendication 1 ou la revendication 2, **caractérisé en ce que** la structure formant surface d'usure (12) est agencée sur la surface inférieure (5) en utilisant une plaque d'installation (15) séparée disposée entre ces dernières.

4. Déchiqueteur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les arêtes (13) de la structure formant surface d'usure (12) présentent une section allant en décroissant vers le haut.

5. Déchiqueteur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les cavités (14) de la structure formant surface d'usure (12) sont recouvertes d'un enduit céramique.

6. Déchiqueteur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la structure formant surface d'usure (12) forme également une partie de la structure de guidage de la presse (4).

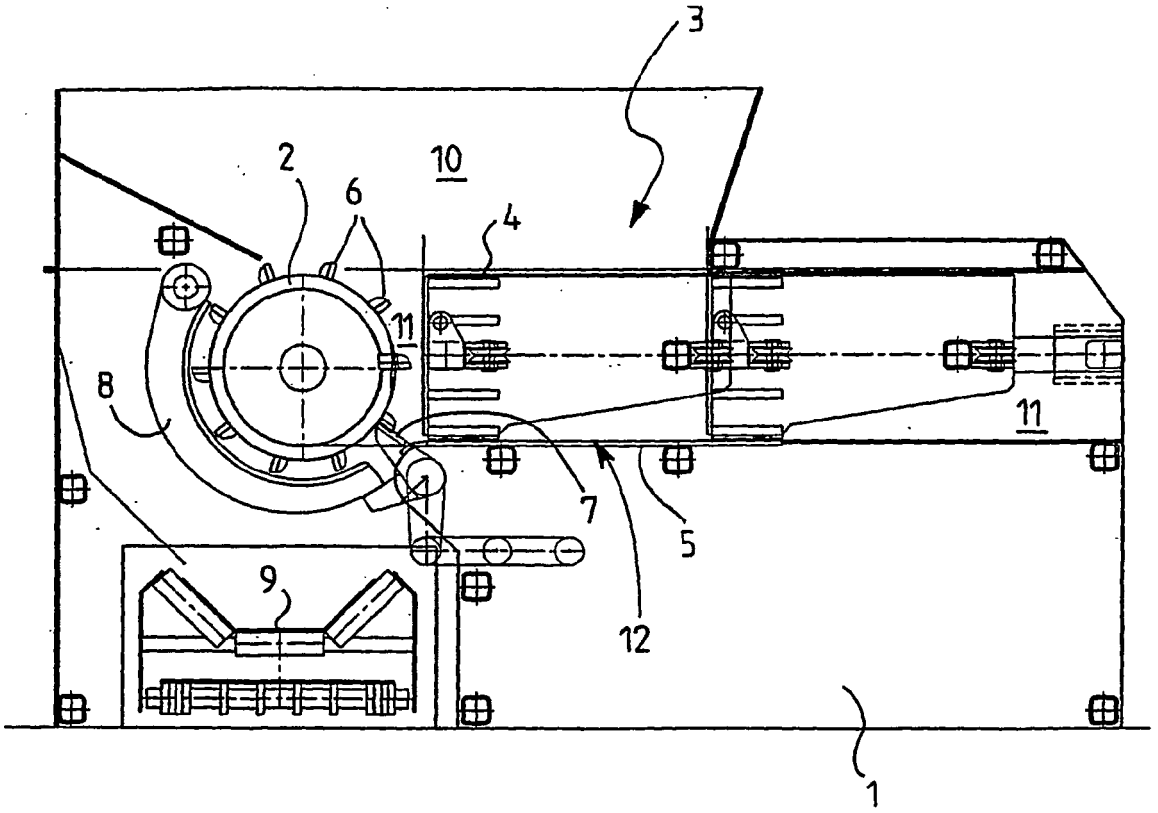

FIG. 1

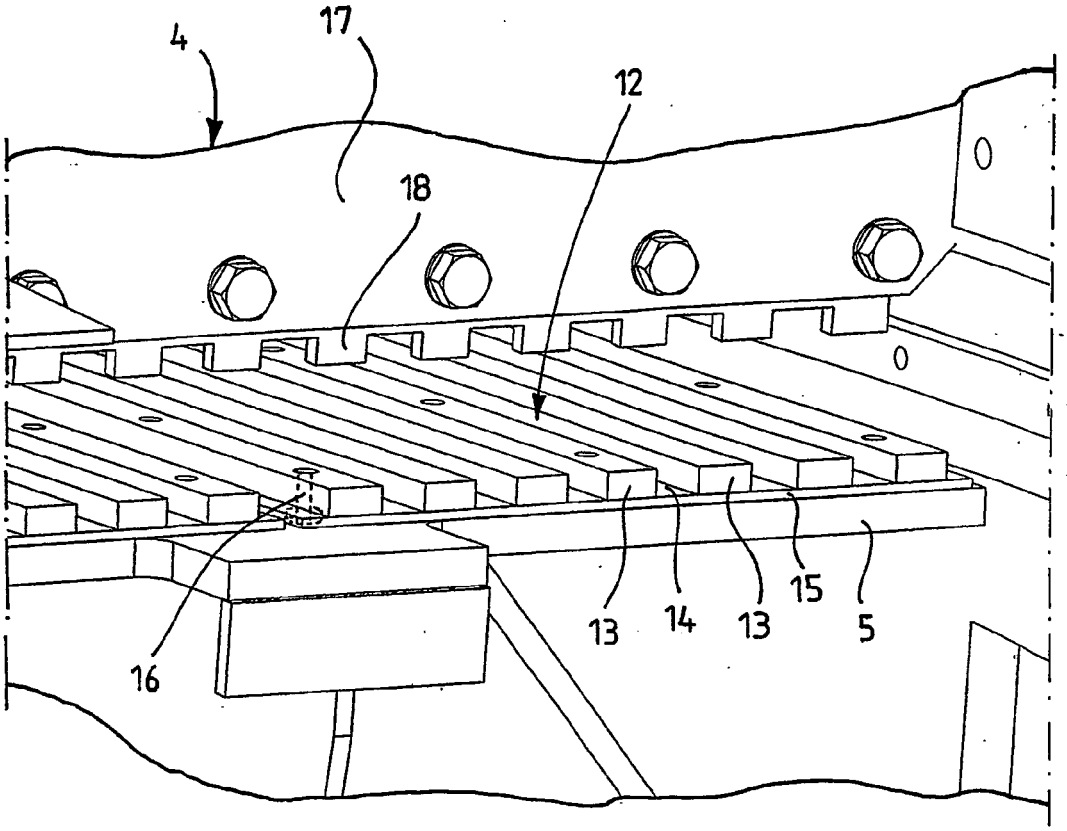

FIG. 2

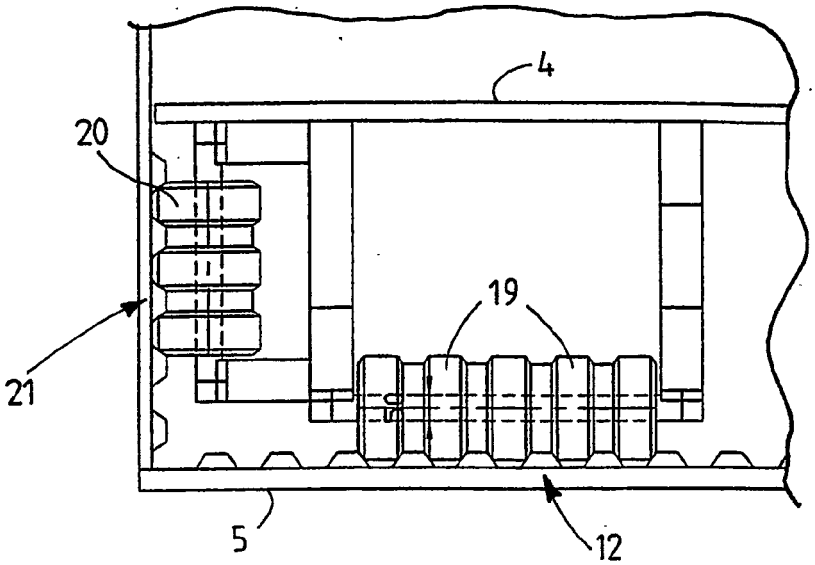

FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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