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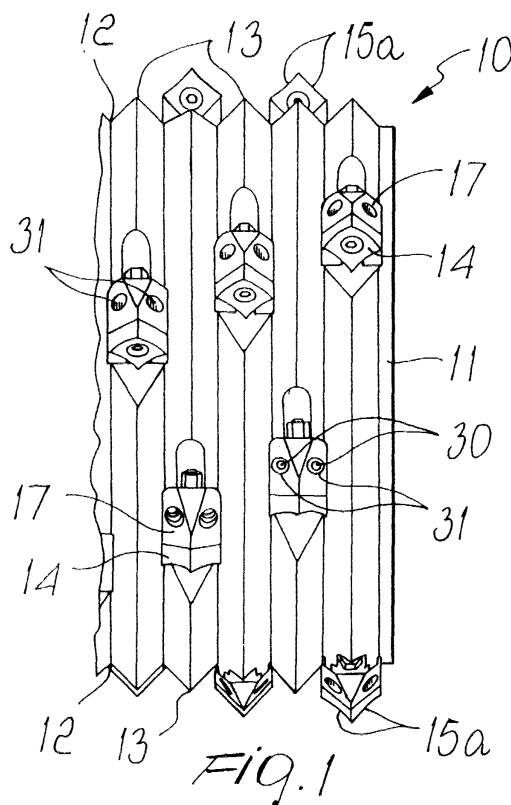
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(54) **Rotor with cutting tools particularly for shredders**

(57) A rotor (11) particularly for shredders, of the type provided, on its active surface, with circumferential grooves having a substantially V-shaped profile, and comprising at least one tool (14) fixed detachably to a corresponding support (17) which is in turn fixed detach-

ably to the rotor (11). The support (17) comprises a flat base portion (19) and a back portion (20) which rest on a complementarily shaped flat pocket (26) provided in the rotor (11) in the direction of an imaginary chord which lies on a plane being perpendicular to the rotation axis of the rotor.



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Description

[0001] The present invention relates to a rotor particularly for shredders.

[0002] Shredders are now widely used especially in the field of disposal of municipal waste, waste materials and of recycling.

[0003] An important component of this type of machine is the rotor with protruding cutting inserts, which by cooperating with a fixed contrast blade being rigidly coupled to the machine frame allows to shred the material.

[0004] The rotor can be of the smooth type or can be provided with circumferential grooves which usually have a V-shaped profile.

[0005] In particular, rotors provided with circumferential grooves having a V-shaped profile are particularly suitable for shredding soft materials, owing to the tendency of such materials to accumulate at the back of the cutting inserts.

[0006] There are currently commercially available rotors with circumferential grooves having a V-shaped profile, provided with cutting inserts constituted by plates having a square plan shape which are supported by elements being accommodated in corresponding grooves, which also have a substantially V-shaped profile, formed along an imaginary chord on a plane which is perpendicular to the longitudinal axis of the rotor.

[0007] The cutting inserts are usually associated by screws with the supporting element, which is accommodated in the grooves and is welded thereat.

[0008] The supporting elements thus rest on the grooves and are joined thereto with a permanent coupling provided by welding.

[0009] However, this constructive choice does not allow optimum absorption of the shocks to which the supporting element is subjected during use and a uniform distribution of the impact.

[0010] Although replacement of the cutting element is very quick, the operation for replacing the supporting element, which entails cutting and unwelding the element, is not as rapid.

[0011] Constraints linked to the weldability of the material of the supporting element do not allow to use tempered or wear-resistant material for the element in order to avoid early deterioration of its dimensional and structural characteristics.

[0012] The aim of the present invention is to provide a rotor particularly for shredders which solves or substantially reduces the problems of conventional rotors.

[0013] Within this aim, an object of the present invention is to provide a rotor having tools and tool supporting elements which can absorb in an optimum manner the stresses to which they are subjected during use.

[0014] Another object of the invention is to provide a rotor by virtue of which there are no constraints regarding the use of material to provide the tool holder.

[0015] Another object of the invention is to provide a

rotor in which the tool and the tool holder can be replaced and/or interchanged easily and rapidly.

[0016] Another object is to provide a rotor which can be manufactured by means of known equipment and technologies and at low costs.

[0017] This aim and these and other objects which will become better apparent hereinafter are achieved by a rotor with cutting tools particularly for shredders of the type provided, on their active surface, with circumferential grooves having a substantially V-shaped profile, characterized in that it comprises at least one tool fixed detachably to a corresponding support which is in turn fixed detachably to the rotor, said support comprising a flat base portion and a back portion which rest on a complementarily shaped flat pocket provided in the rotor in the direction of an imaginary chord which lies on a plane being perpendicular to the rotation axis of the rotor.

[0018] Further characteristics and advantages of the present invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a front view of a portion of the rotor according to the invention;

Figure 2 is a partially sectional plan view of the rotor of Figure 1;

Figure 3 is a perspective view of a detail of the rotor;

Figure 4 is an exploded view of the detail of Figure 3.

[0019] With reference to the figures, a rotor with cutting elements particularly for shredding machines is generally designated by the reference numeral 10.

[0020] The structure 10 comprises a rotor 11 on whose active surface there are a plurality of substantially V-shaped circumferential grooves which form in succession troughs 12 and crests 13.

[0021] The rotor 11 is further provided with at least one and preferably a plurality of cutting tools 14.

[0022] The tools 14 are plates provided with two mutually opposite surfaces which have a square plan shape and are much larger than the other surfaces; one surface 16a is flat and is designed to rest on a support which is generally designated by the reference numeral 17, and one surface 16b is concave and adapted to form four cutting edges 15, of which two, upon assembly, protrude partially from the dimensions of the rotor 11.

[0023] Advantageously, the tools can be plates provided with two mutually opposite flat surfaces having a square plan shape which are much larger than the other surfaces or can be plates having a circular plan shape.

[0024] The support 17 has a tapering upper portion 18, a flat base portion 19, a back portion 20 with rounded edges, and a front portion 21 for accommodating a tool 14.

[0025] The tool 14 rests on the front portion 21 with the flat surface 16a and with two contiguous lateral sur-

faces 22.

[0026] In practice, the tool 14 is arranged on a plane which is perpendicular to the lower portion 19 of the support 17, with its lateral surfaces 22 inclined at 45° with respect to the rotor axis.

[0027] The tool 14 is fixed to the support 17 by means of a removable coupling, i.e., a screw 23, which passes through the tool 14 and the support 17 in corresponding through holes 24a and 24b, and a locking nut 25 which is arranged at the back portion 20 of the support 17.

[0028] Being arranged in this manner, as mentioned, the tool 14 has two consecutive cutting edges, generally designated by the reference numeral 15a, which lie outside the dimensions of the rotor 11 and shred the material by cooperating with a contrast blade which is rigidly coupled to the frame of the shredder and is not shown in the figure but is in any case of a per se known type.

[0029] The support 17 is arranged on the rotor 11 at a flat pocket generally designated by the reference numeral 26.

[0030] The pocket 26 is formed by milling in the direction of an imaginary chord which lies on a plane being perpendicular to the longitudinal axis of the rotor 11.

[0031] The pocket 26 comprises a first flat portion and a second flat portion, designated by the reference numerals 27 and 28 respectively, which are separate and are formed by a shoulder 29.

[0032] Since the second portion 28 of the pocket 26 has a smaller transverse dimension than the first portion 27, the shoulder 29 is substantially U-shaped.

[0033] The support 17 rests with the base portion 19 on the first portion 27 of the pocket 26 and with the back portion 20 on the shoulder 29.

[0034] The support 17 is fixed to the rotor 11 by means of two screws 30 which pass through corresponding holes 31 of the support 17 and are arranged at right angles to the pocket 26.

[0035] In practice, the second portion 28 of the flat pocket 26 allows to easily access the locking nut 25 for possible replacement of the tool 14.

[0036] Being accommodated in a seat formed by the first portion 27 of the pocket 26 and by the shoulder 29, the support 17 is capable of absorbing in an optimum manner the shocks to which it is subjected during use, further ensuring uniform impact distribution.

[0037] Moreover, the possibility to remove and/or replace easily the support 17 simply by removing two screws 30 ensures very short maintenance times and avoids problems linked to the replacement of conventional supports, which are welded to the rotor body, thus entailing the cutting and unwelding of said support.

[0038] Advantageously, this support 17 can be made of tempered or wear-resistant material in order to avoid early deterioration of its dimensional and structural characteristics.

[0039] The tool 14 is fixed by means of a through screw 23 which allows immediate interchangeability thereof.

[0040] It is evident that the tools 14 are in practice only rested against the support 17, since the impact is absorbed by the support and cushioned by the rotor 11.

[0041] In practice it has been observed that the present invention has achieved the intended aim and objects.

[0042] The present invention is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

[0043] The technical details can be replaced with other technically equivalent elements.

[0044] The materials and the dimensions, so long as they are compatible with the contingent use, may be any according to requirements.

[0045] The disclosures in Italian Patent Application No. PD2000A000116 from which this application claims priority are incorporated herein by reference.

[0046] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A rotor with cutting tools particularly for shredders of the type provided, on their active surface, with circumferential grooves having a substantially V-shaped profile, **characterized in that** it comprises at least one tool fixed detachably to a corresponding support which is in turn fixed detachably to the rotor, said support comprising a flat base portion and a back portion which rest on a complementarily shaped flat pocket provided in the rotor in the direction of an imaginary chord which lies on a plane being perpendicular to the rotation axis of the rotor.
2. The rotor according to claim 1, **characterized in that** said pocket comprises a first flat portion and a second flat portion which are separate and are defined by a shoulder for the resting of said back portion of the support.
3. The rotor according to claim 2, **characterized in that** said second flat portion of the pocket has a smaller transverse dimension than the first portion so as to form a substantially U-shaped shoulder.
4. The rotor according to claim 1, **characterized in that** said tool is a plate provided with two mutually opposite surfaces which have a square plan shape and are much larger than the other surfaces, one of said surfaces being flat and designed for resting on said support, the other one being concave and adapted to form four cutting edges, two of which,

upon assembly, protrude at least partially from the dimensions of the rotor.

5. The rotor according to one or more of the preceding claims, **characterized in that** said support has a tapering upper portion, a flat base portion for resting on the first portion of the corresponding pocket, a back portion with rounded edges, and a front portion for accommodating a tool, with a flat resting surface for the corresponding flat surface of the tool and a lower part for resting two contiguous lateral surfaces of the tool. 5 10
6. The rotor according to one or more of the preceding claims, **characterized in that** said tool and said support are fixed by means of a through screw and an end nut which is arranged on the back of the support. 15
7. The rotor according to one or more of the preceding claims, **characterized in that** said support is fixed to the flat pocket by means of screws. 20

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