(57) The invention relates to a device for fixing beater bars 9 in peripheral cut-outs 8 of impact crusher rotors 2. Provided in the peripheral cut-outs 8 and firmly attached to rotor 2 are securing means 10, 11, which engage with, corresponding parts of the fitted beater bar 9, securing it against radial movement outwards. Also, provided in the peripheral cut-outs are wedges 16, which force into engagement securing means 10, 11 with the beater bar 2 and which are held in their clamping position by thrust elements 17, 18 which press them against the rotor 2. Thrust elements 17, 18 allocated to one beater bar are connected via transverse holes with the longitudinal hole 20 of an axis-parallel-extending component 19. According to the invention, the component 19 is formed as a pressure line rail, which is arranged at the base of the peripheral cut-outs 8, whereby the thrust elements 17 are arranged on the side of the pressure line rail facing towards the wedges 16, so that they are supported against the pressure line rail and thus against the rotor 2.
Device for Fixing Beater Bars in Peripheral Cut-outs of Impact Crusher Rotors

Abstract

The invention relates to a device for fixing beater bars 9 in peripheral cut-outs 8 of impact crusher rotors 2. Provided in the peripheral cut-outs 8 and firmly attached to rotor 2 are securing means 10, 11, which engage with corresponding parts of the fitted beater bar 9, securing it against radial movement outwards. Also, provided in the peripheral cut-outs are wedges 16, which force into engagement securing means 10, 11 with the beater bar 2 and which are held in their clamping position by thrust elements 17, 18 which press them against the rotor 2. Thrust elements 17, 18 allocated to one beater bar are connected via transverse holes with the longitudinal hole 20 of an axis-parallel-extending component 19. According to the invention, the component 19 is formed as a pressure line rail, which is arranged at the base of the peripheral cut-outs 8, whereby the thrust elements 17 are arranged on the side of the pressure line rail facing towards the wedges 16, so that they are supported against the pressure line rail and thus against the rotor 2.
Device for Fixing Beater Bars in Peripheral Cut-Outs of Impact Crusher Rotors

Description

The invention relates to a device for fixing beater bars in the peripheral cut-outs of impact crusher rotors, in particular rotors where the peripheral cut-outs are provided in rotor disks arranged with spaces in between each other, whereby on one side of the peripheral cut-outs and firmly attached to the rotor are provided securing means which engage in corresponding parts of the beater bars, securing the latter against radial movement outwards, and whereby on the other side of the peripheral cut-outs between the side wall of each cut-out and the beater bar are provided wedges which force into engagement the beater bars with the securing means and which are retained in their clamping position by thrust elements pressing against the rotor, whereby the thrust elements allocated to one beater bar are connected with a common axis-parallel pressure line which features a connecting piece with valve.
In a known impact crusher with devices of this kind (DE-OS 21 48 752 and impact crusher constructed according thereto), the necessary pressure lines are provided in the actual rotor body, for example as axial and radial holes drilled in the rotor shaft and rotor disks. As a consequence of the severe percussive shocks occurring during impact crusher operation, the connections of the thrust elements at the openings of the holes drilled in the rotor disks easily become untight, which leads to costly repairs. In addition, drilling of the holes provided in the rotor is difficult and costly.

Also known in another design (DE-OS 35 21 588) is the common axis-parallel pressure line provided as a longitudinal hole drilled in the wedges which are independent of the rotor, with the thrust elements formed as plungers arranged in radially inwardly-directed transverse holes drilled in the wedges so that they are supported against the rotor, in order to press the wedges radially outwards into their clamping position.

The wedges must thereby extend over at least half or over the full width of the rotor, since such a design is only meaningful if several thrust elements are connected to one pressure line. However, this does have considerable drawbacks, since in the light of beater bar casting inaccuracies, the extended wedges can have no individually matched contact with the beater bars where they are supported against the rotor disks. Furthermore, the wedges located in the exposed outer zones of the rotor are subjected to considerable wear between the rotor disks, so that these costly to manufacture parts have to be replaced frequently.
The aim of the invention is to avoid the drawbacks of the two prior art designs and at the same time obtain a rotor-independent pressure line system cheaper to produce and because of its arrangement features minimize the damage caused by wear.

The invention provides an impact crusher rotor comprising a plurality of rotor disk coaxially arranged side-by-side and rigidly interconnected, each rotor disk having a plurality of spaced peripheral cut-outs, the cut-outs of said disks being axially spaced and angularly aligned, wherein one side of each said peripheral cut-out has retaining means which engage with appropriate parts of an associated beater bar and is firmly attached to the rotor, thus securing the beater bar against movement radially outwards; a wedge being arranged between an opposite side wall of each peripheral cut-out and the beater bar, said wedge being adapted to force the beater bar into engagement with said retaining means, and being held in clamping position by a thrust element supported against the rotor; a plurality of axially spaced thrust elements being allocated to each beater bar and connected by transverse holes with a common longitudinal passage containing a pressure medium, one end of said passage having a connecting piece with valve; each said passage being provided in an axis-parallel extending member arranged in the aligned peripheral cut-outs of each rotor disk; wherein said axis-parallel member is formed as pressure line rail, positioned in a base of each aligned peripheral cut-out; and wherein each said thrust element is arranged radially outwardly of the pressure line rail facing towards the corresponding wedge, so that when pressing against the wedge each thrust element is supported against the pressure line rail and thus against the rotor.

The pressure line rail can be formed quite smoothly over its whole length, so that it can be fabricated from
commercial semi-finished steel, and if damaged can be easily
dismantled and replaced. Also, in contrast to the prior art
construction according to DE-OS 35 21 588, the length of the
wedges in the axial direction of the rotor can be limited to
the width of the rotor disks, which is in fact standard
practice, and which means that they are completely shielded by
the rotor disks and thus protected against wear. The flush
fitting of the individual wedges against the beater bars is
thus assured. Lastly, those parts of the pressure line rails
located between the rotor disks are subjected to a lesser
amount of wear, since they are arranged nearer to the axis of
the rotor, where there is little penetration of material to be
crushed.

The pressure line rail is held in position by the
counter-forces acting thereupon, so that, except for securing
in an axis-parallel direction, no fixing means is necessary.
It is advantageous, however, if
co-aligned grooves are provided in the peripheral cut-outs of the rotor, in which the pressure line rail is laterally guided during insertion into the rotor and then retained in the correct position.

So that the pressing force of the thrust elements is not affected by a leaking pressure line, the thrust elements are connected with the pressure line via non-return valves.

The connecting pieces for the pressure lines can be provided in the known manner at one end of each pressure line rail and thus in the vicinity of an end face of the rotor. They are then accessible via an appropriate lockable opening provided in the housing side wall for the purpose of connecting to a pressure pump or similar.

The connecting pieces can also be arranged outside the housing. To avoid the necessity of having to drill the required holes in the rotor shaft according to prior art technology, a further modification of the invention provides for the connection between the pressure lines in the pressure line rails and the connecting pieces to be effected through holes drilled in a bushing which co-rotates with the rotor shaft and which encircles the rotor shaft where it passes the housing wall. Provided in the bushing for each pressure line rail is a drilled hole, which features a connecting nozzle inside and outside the housing respectively. Attached to the inner connecting nozzle and leading in protected manner to the corresponding pressure line is a connecting line, for example a hose or pipe, whereas the connecting piece with valve is screwed into the outer connecting nozzle.
Also, in parallel with this connecting piece can be provided a spring-operated pressure indicator which, for instance, interacts with a sensor to give a signal when there is a pressure drop in one of the pressure lines.

The drawing illustrates an impact crusher rotor with a hydraulic fixing device for the beater bars according to the invention, as follows: Fig. 1 shows an end face view of the rotor, and Fig. 2 shows a partial sectional view of the rotor along Lines I-II and III-IV in Fig. 1.

Inside the impact crusher housing, of which only a side wall 1 is shown, and arranged on a shaft 3 which is mounted externally of the housing is a rotor 2. It consists of a plurality of steel cast rotor disks 4, the widened naves 5 of which are in contact with each other, are centred by means of locating bolts 6 and welded together by annular weld seams 7 to form a rigid drum, which is connected to the shaft 3 only at each end.

Around its circumference, each rotor disk 4 features six peripheral cut-outs 8, into which the beater bars 9 can be fitted. At the rear side of the peripheral cut-outs as viewed in the rotational direction of the rotor (arrow a), the rotor disks in axial direction feature wider jaws 10 provided with ribs 11, which ribs engage in corresponding grooves of the beater bars 9. The forward face of the peripheral cut-outs viewed in the rotational direction of the rotor has a surface 12, which is slightly inclined rearwards from the radial plane and which is provided with a guide groove 13, whereas provided at the base 14 of each peripheral cut-out is an axis-parallel groove 15.
In each peripheral cut-out between the beater bar 9 and the forward surfaces 12 of the peripheral cut-outs 8 is a wedge 16, which forces into engagement the beater bar with the ribs 11 of the jaws 10. In a more or less radial inside direction from the wedges 16 in each peripheral cut-out 8, a hydraulic thrust element 17 is arranged, the plunger 18 of which presses from the inside against the wedge 16.

The thrust elements 17 allocated to each beater bar are mounted on a pressure line rail 19, which is guided in the grooves 15 and which features a longitudinal hole 20 with transverse holes 21 extending therefrom leading to the thrust elements 17. As a consequence of this arrangement, the thrust elements 17 during pressing against the wedges 16 are inwardly supported against the pressure line rail 19 and thus against the rotor disks 4.

On the left end according to Fig. 2 of each pressure line rail 19 or of the longitudinal hole 20 provided therein, can be arranged a connecting piece with a coupling valve, which is accessible via a lockable opening provided in the housing wall 1.

In the illustrated embodiment, the longitudinal holes 20 in the pressure line rails 19 are connected via pipes 22 with holes 23, which are provided in a bushing 24 which encircles the rotor shaft 3 at the point where it projects outwardly through the housing wall 1. Provided at the outwardly facing openings of the holes 23 are the aforementioned connecting pieces 25 with coupling valve, by means of which the pressure lines 23, 22, 20, 21 and thus the thrust elements 17
can be subjected to pressure by means of a hand pump, for example. At a second external outlet of the holes 23 of the bushing 24, measuring devices 28 can be provided for watching over the pressures in the individual pressure line systems and to which is allocated a sensor 27, which gives a signal when the pressure in one of the systems drops below an acceptable level. To protect the pipes 22, webs 28 are provided which are arranged forward of the pipes in the rotational direction of the rotor.
CLAIMS:

1. An impact crusher rotor comprising a plurality of rotor disk coaxially arranged side-by-side and rigidly interconnected, each rotor disk having a plurality of spaced peripheral cut-outs, the cut-outs of said disks being axially spaced and angularly aligned, wherein one side of each said peripheral cut-out has retaining means which engage with appropriate parts of an associated beater bar and is firmly attached to the rotor, thus securing the beater bar against movement radially outwards;

   a wedge being arranged between an opposite side wall of each peripheral cut-out and the beater bar, said wedge being adapted to force the beater bar into engagement with said retaining means, and being held in clamping position by a thrust element supported against the rotor;

   a plurality of axially spaced thrust elements being allocated to each beater bar and connected by transverse holes with a common longitudinal passage containing a pressure medium, one end of said passage having a connecting piece with valve;

   each said passage being provided in an axis-parallel extending member arranged in the aligned peripheral cut-outs of each rotor disk;

   wherein said axis-parallel member is formed as pressure line rail, positioned in a base of each aligned peripheral cut-out; and

   wherein each said thrust element is arranged radially outwardly of the pressure line rail facing towards the corresponding wedge, so that when pressing against the wedge
each thrust element is supported against the pressure line rail and thus against the rotor.

2. A device according to claim 1, wherein the thrust elements are firmly connected to the associated pressure line rail, so that they can be fitted to and removed from the rotor together therewith.

3. A device according to claim 1 or claim 2, wherein each pressure line rail is guided in aligned grooves in the peripheral cut-outs of the rotor.

4. A device according to anyone of claims 1 to 3, wherein the thrust elements are connected to the pressure line via non-return valves.

5. A device according to any one of claims 1 to 4, wherein a pressure line provided in the pressure line rail is connected with connecting pieces arranged outside a housing of the impact crusher, the said connecting pieces being provided in a bushing encircling a shaft of the rotor where it passes through the housing and which rotates with the rotor shaft.

6. A device according to claim 5, wherein said pressure line is connected with a hole provided in said bushing by means of hoses or pipes.

7. A device according to claim 5, wherein at openings of the holes outside the impact crusher housing provided in the bushings, in addition to the connecting pieces means are provided for monitoring the pressure in said pressure lines.

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PATENT AGENTS
See abstract.
This fig. deals with fig. 2.
(as per agent.)