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- (54) Title: HIGH SPEED ROLLER PRESS

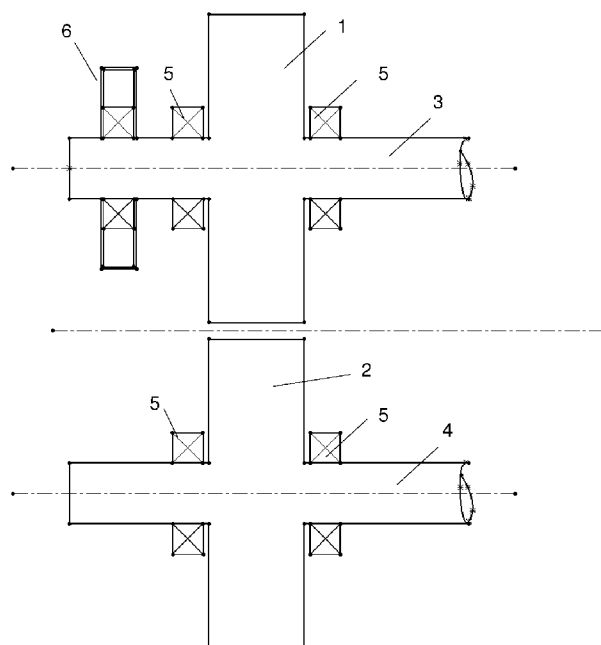


FIG. 1

- (57) Abstract: High speed roller press comprising two op-  
positely rotating rollers (1, 2) each comprising a roller shaft  
(3, 4), and which are driven by means of a drive system. The  
high speed roller press comprises a torsional vibration redu-  
cing element (6) which is connected to the roller shaft (3, 4).



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**Published:**

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## High speed roller press

The present invention relates to a high speed roller press comprising two oppositely rotating rollers, each comprising a roller shaft, and which are driven by means of a drive system.

High speed roller presses are known *inter alia* from international patent application No. WO 92/00141. There are many different configuration options for the drive system of a high speed roller press. In one embodiment it may comprise two motors which drive separate rollers, either directly or via separate gear units. In a second embodiment it may comprise one motor used either for driving one roller directly or for driving one or both rollers via a gear unit. Also the drive system often includes a safety coupling. For variability of the roller gap width, power to one or both rollers may be transmitted through a cardan shaft.

Sometimes, the operation of high speed roller presses may entail operational problems manifested by torsional vibrations of the rollers. This may result in substantial torque variations in the drive system and, as a consequence hereof, overloading of the gear unit or cut-out of the safety coupling or main motor. This tendency seems to increase with an increase in the roller peripheral velocity, and, therefore, it is often a limiting factor for the roller peripheral velocity with which a high speed roller press can be operated. Further, this tendency seems to increase with fineness of the ground material and the force applied for pressing the rollers against each other. Thus, several operating parameters seem limiting in enhancing the capacity of a high speed roller press without causing damaging vibrations.

Therefore, it is the objective of the present invention to provide a high speed roller press which can be driven within a broader range of the operating parameters, such as the roller peripheral velocity, material fineness, pressing force etc. without generating any undesirable torsional vibrations in the drive system.

This is achieved by means of a high speed roller press of the kind mentioned in the introduction, and being characterized in that it comprises a torsional vibration reducing element, which is connected to the roller shaft.

- 5 It will thus be possible to operate the high speed roller press with an increased production capacity either by increasing the roller peripheral velocity or the applied pressing force or both without entailing damaging torsional vibrations. This is due to the fact that the torsional vibrations, which are generated during operation of the high speed roller press, are reduced.

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In principle, the torsional vibration reducing element may be constituted of any suitable element, which reduces the torsional vibrations. However, it is preferred that the torsional vibration reducing element is a torsional vibration damper, preferably a viscous vibration damper.

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In situations where both rollers of the high speed roller press are directly driven via each their roller shaft, the high speed roller press may advantageously comprise a torsional vibration reducing element for each roller shaft.

- 20 The torsional vibration reducing element may in principle be connected to the roller shaft anywhere over its length, however it is preferred that it is connected to the roller shaft where the vibration amplitude is biggest. Tests have indicated that the vibration amplitude is biggest close to the roller, and it is therefore preferred that the torsional vibration reducing element is connected to the roller shaft adjacent to the roller.

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The high speed roller press according to the invention can be utilized in connection with grinding of particulate material, such as cement raw materials, cement clinker and similar materials.

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In an embodiment of the invention, the roller shafts are supported by bearings arranged on both sides of the rollers and the at least one torsional vibration-reducing element is arranged between the rollers and the bearings adjacent to the

roller such that the damping is done between the bearing and the roller. In this way it is possible to arrange the torsional vibration-reducing element right next to the roller.

- 5 In another embodiment of the invention, the roller shafts are supported by bearings arranged on both sides of the rollers and wherein the at least one torsional vibration-reducing element is arranged in close fit with at least one of the bearings adjacent to the roller. Arranging the torsional vibration-reducing element in close fit with one of the bearings provides a very compact design where the dampening  
10 occurs as close to the roller as possible.

The invention will now be explained in further details with reference to the drawing, being diagrammatical, and with its only figure showing a top view of a high speed roller press.

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In the figure is seen a high speed roller press comprising two rollers 1 and 2, each having a roller shaft 3, 4 and being supported by bearings 5. One or both rollers are via each their roller shaft 3, 4 connected to a drive system, not shown, which typically comprises a motor and possibly a gear unit and a safety coupling.

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- Thus, in order to be able to operate the high speed roller press with an increased production capacity either by increasing the roller peripheral velocity or the applied pressing force or both without entailing damaging torsional vibrations, it is suggested according to the invention the high speed roller press comprises a  
25 torsional vibration reducing element 6, which is connected to the roller shaft 3. In this way the torsional vibrations, which are generated during operation of the high speed roller press, are reduced.

- In the shown embodiment, the torsional vibration reducing element 6 is a viscous  
30 torsional vibration damper, which is placed in close vicinity to the respective roller 1.

**Patent claims**

1. A high speed roller press comprising two rotating rollers (1, 2) arranged opposite each other and said rotating rollers (1,2) comprising roller shafts (3, 4) having a longitudinal extension in an axial direction, said high speed roller press furthermore comprising at least one torsional vibration reducing element (6) connected to at least one of the roller shafts (3, 4) in a position adjacent to the rotating rollers (1, 2) in the axial direction preferably in a position adjacent to the rotating rollers (1, 2) where a vibration amplitude of the roller shafts (3, 4) is biggest.
2. A high speed roller press according to claim 1 **characterized in** that the torsional vibration reducing element (6) is a torsional vibration damper, preferably a viscous vibration damper.
3. A high speed roller press according to claim 1, **characterized in** that the high speed roller press comprises a torsional vibration reducing element (6) for each roller shaft (3, 4).
4. A high speed roller press according to claim 1, **characterized in** that the torsional vibration-reducing element (6) is connected to the roller shaft (3, 4) adjacent to the roller (1, 2).
5. A high speed roller press according to claim 1, characterized in that the roller shafts (3, 4) are supported by bearings (5) arranged on both sides of the rollers and wherein the at least one torsional vibration-reducing element (6) is arranged between the rollers (1, 2) and the bearings (5) adjacent to the roller (1, 2).
6. A high speed roller press according to claim 1, characterized in that the roller shafts (3, 4) are supported by bearings (5) arranged on both sides of the rollers and wherein the at least one torsional vibration-reducing element (6) is arranged in close fit with at least one of the bearings (5) adjacent to the roller (1, 2).

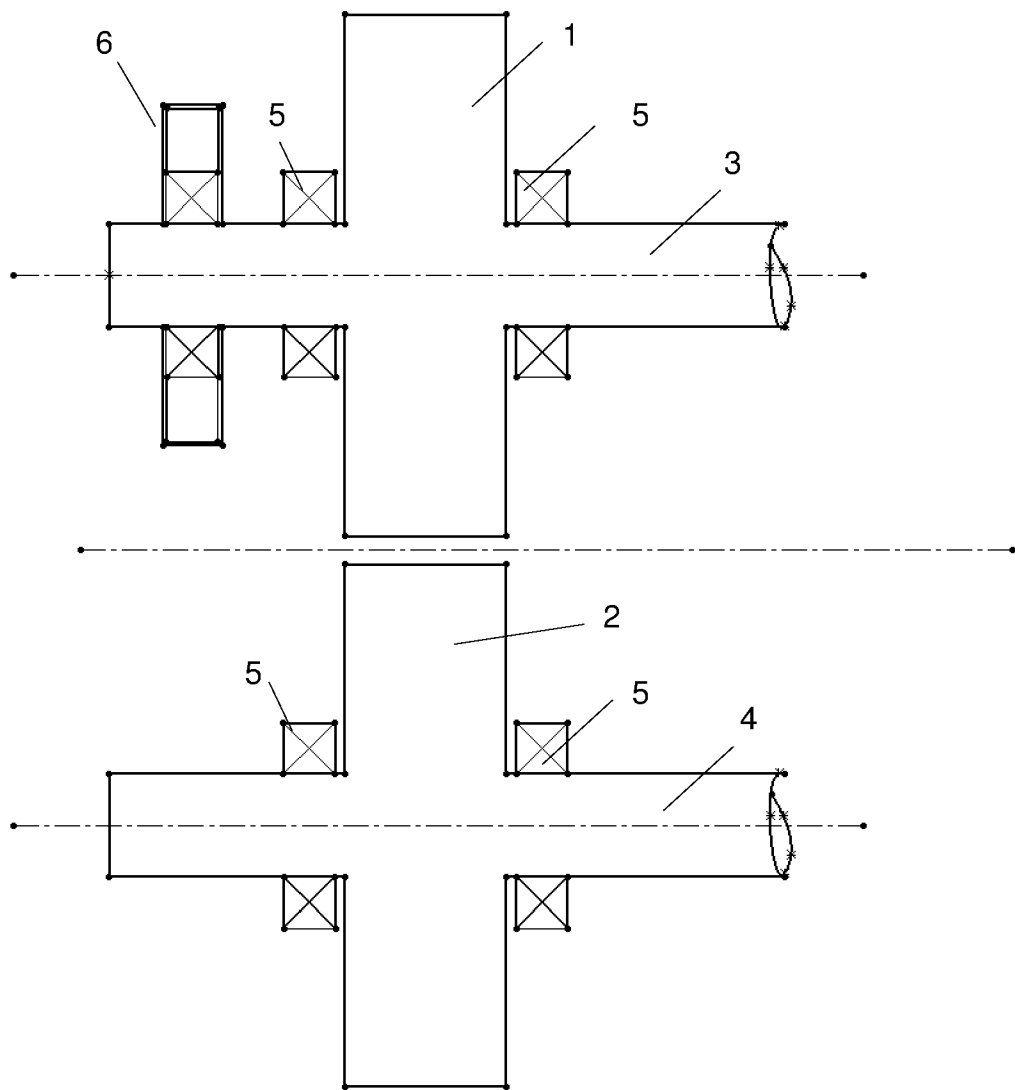


FIG. 1

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## A. CLASSIFICATION OF SUBJECT MATTER

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ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B30B B02C F16F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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| Y         | US 2010/225121 A1 (BRADLEY STUART IAN [GB]<br>ET AL) 9 September 2010 (2010-09-09)<br>abstract<br>paragraph [0019]<br>claims 1-4<br>figures | 1-6                   |
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|           | -----<br>-/--                                                                                                                               |                       |



Further documents are listed in the continuation of Box C.



See patent family annex.

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"&" document member of the same patent family

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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