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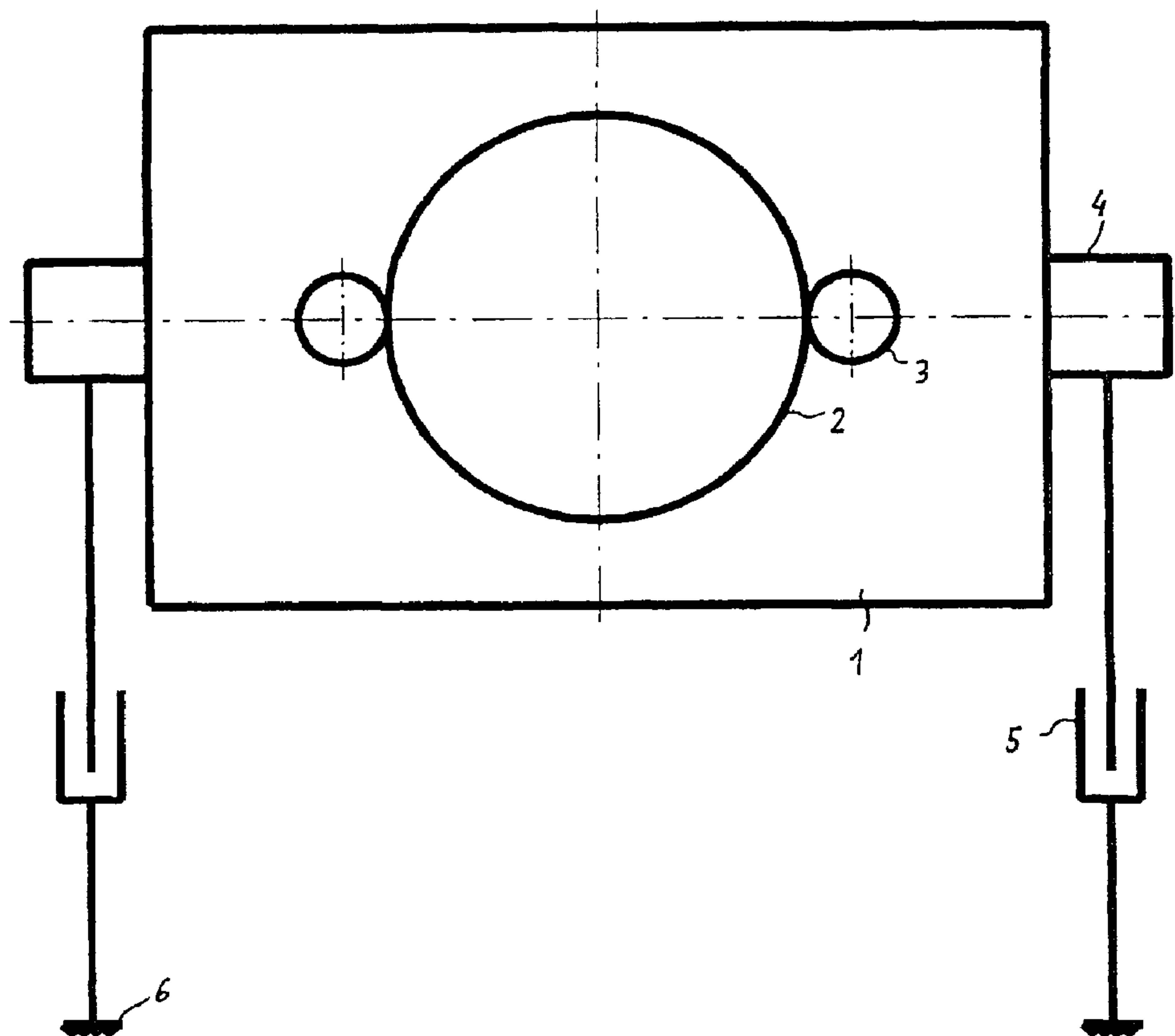
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(54) Title: TORQUE SUPPORT FOR A CONVERTER TILTING DRIVE



(57) Abrégé/Abstract:

1. Torque support 2.1. The invention is directed to a torque support for a converter tilting drive mounted on a shaft journal, wherein supports are provided at the gear unit housing (1) receiving the shaft journal to be driven for support on the structure (6) carrying

(57) **Abrégé(suite)/Abstract(continued):**

the converter. 2.2. For this purpose, the supports are each constructed as double-acting hydraulic piston-cylinder units (5), each of which is anchored independently at the structure (6) in an articulated manner.

Abstract

1. Torque support 2.1. The invention is directed to a torque support for a converter tilting drive mounted on a shaft journal, wherein supports are provided at the gear unit housing (1) receiving the shaft journal to be driven for support on the structure (6) carrying the converter. 2.2. For this purpose, the supports are each constructed as double-acting hydraulic piston-cylinder units (5), each of which is anchored independently at the structure (6) in an articulated manner.
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- 2.3. Drawings

TORQUE SUPPORT FOR A CONVERTER TILTING DRIVE

The invention is directed to a torque support for a converter tilting drive mounted on a shaft journal, wherein supports are provided at the gear unit housing receiving the shaft journal to be driven for support on the structure
5 carrying the converter.

A torque support for drives mounted on shaft journals, particularly for converter tilting drives in which the gear unit housing is mounted on the shaft journal to be driven, is known from DE 38 27 329 A1.

Steering rods which communicate at the bottom with joint bearings
10 which are in turn connected to one another by a torsion bar are arranged at the gear unit housing so as to be symmetric to the axis of rotation of the shaft journal. Each steering rod comprises two parts between which are arranged spring elements which can be preloaded by mechanical means.

The torsion shaft offers freedom from transverse force (transverse
15 force = bending force due to the application of torque), but is not suitable for the high dynamics arising from the blowing process because large swiveling angles together with high forces in all four pivot points below at the shaft cause friction wear and microcorrosion.

The torsion shaft cannot be regulated, and active influence is
20 impossible.

In another torque support (EP 0003 108A1), single-acting piston cylinders which can be acted upon by compressed gas are provided on both sides of the converter axis for elastic support.

However, this support is not free from transverse force because
25 when torque is introduced along the converter journal axis, only one of the cylinders can be loaded, while the opposite cylinder is relieved. This necessarily results in a bending force on the converter journal, i.e., the axle of the converter journal carrying the gear unit is bent by the one-sided cylinder force multiplied by the distance of the cylinder from the converter axis.

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Some embodiments of the invention may provide an improved torque support for a converter tilting drive.

Some embodiments of the invention may provide a torque support for a converter tilting drive mounted on a shaft journal, wherein supports are provided at the gear unit housing receiving the shaft journal to be driven for support on the structure carrying the converter, and the supports are each anchored independently at the structure in an articulated manner, and wherein the supports are each constructed as double-acting hydraulic piston-cylinder units, and at least one of these hydraulic piston-cylinder units is arranged in such a way that it can be released in order to follow the converter movement without power.

In contrast to the prior art mentioned above, the cylinders in this torque support according to the invention are double acting. They set forces of equal magnitude in opposition to the torque introduced by the converter opposite one another at both sides of the converter axle, these forces cancelling each other out so that no bending forces are generated at the journal by the application of torque.

Therefore, the support presents a connection between the tilting drive and the supporting structure which permits any movement of the drive except the rotation of the drive around the converter journal axis during the blowing process, introducing only torque in the journal, specifically also without bending forces at the journal.

Since the torque at the journal resulting from the blowing process can amount to a multiple of the restoring moment during the tilting of the converter, it is useful to guarantee the absence of bending forces from the application of torque during blowing.

During tilting with smaller forces and without the dynamics of the process, the journal easily also withstands bending forces from applied torque.

The use of double-acting hydraulic piston-cylinder units offers many advantages. For example, the can be controllable for active or passive vibration damping during the blowing of the converter.

They can be controllable separately and differently so that, for example, when tilting, they can be rigid on one side or, even during blowing, rigid on both sides and, therefore, free from transverse force.

This novel system takes into account the displacement of the converter journal axis during tilting (due to different load states and/or deformation due to thermal and/or mechanical influences) in that one of the two cylinders is released. Accordingly, transverse force occurs during tilting due to the restoring moment of the converter and the lever for the locked cylinder, but there is no constraint between the drive and the foundation. During tilting, the drive inclines in the released cylinder by its moving axle with the locked cylinder as fixed support.

This can be summarized as follows:

1. The cylinders can transmit pushing forces and pulling forces of equal and opposing magnitude on both sides (condition for absence of bending forces) when the cylinders are locked hydraulically or are controlled so as to maintain their position.
2. The spring action of the system can be controlled so as to be adapted to different operating states.
3. Due to the fact that the cylinders are connected in an articulated manner and accordingly ensure the necessary degrees of freedom in every direction other than the cylinder axis, the joint bearings experience only negligibly small angles when load is applied and are not subject to friction wear.
4. Small static load deviations of the gear unit/journal axle during blowing are compensated by inner leakages of the cylinders or corresponding cylinder control so that the absence of transverse force is maintained over the blowing period.
5. System offers the possibility of compensating completely or partially, or even overcompensating, for the own weight of the drive so as to further relieve,

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or deliberately load, the journal and supporting ring bearing without transverse forces from the process.

6. An active damping of the vibrations resulting from the blowing process is possible by means of deliberate cylinder control without transverse forces from the
5 process.

7. Position of the blowing vessel can be varied during blowing for optimizing the process by moving the cylinders without transverse forces from the process.

An embodiment example is shown schematically in the drawing; the
10 converter itself is not shown.

The gear unit housing which is arranged so as to be mounted on the shaft journal of the converter, not shown, is designated by 1.

The converter tilting drive is indicated by 2 and 3.

Brackets 4 or the like are provided at the gear unit housing 1 on the
15 sides of the shaft journal to help support the gear unit housing 1 on the supporting structure 6 by means of the piston-cylinder units 5.

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CLAIMS:

1. Torque support for a converter tilting drive mounted on a shaft journal, wherein supports are provided at the gear unit housing receiving the shaft journal to be driven for support on the structure carrying the converter, and the supports are
5 each anchored independently at the structure in an articulated manner, wherein the supports are each constructed as double-acting hydraulic piston-cylinder units, and wherein at least one of these hydraulic piston-cylinder units is arranged in such a way that it can be released in order to follow the converter movement without power.
2. Torque support according to claim 1, wherein the piston-cylinder units
10 can be adjusted for synchronous running.
3. Torque support according to claim 1 or claim 2, wherein the piston-cylinder units can be controlled or locked for active or passive vibration damping during the blowing of the converter.
4. Torque support according to any one of claims 1 to 3, wherein the
15 piston-cylinder units can be controlled individually.

