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CERTIFICATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the results of these proceedings.

I declare under penalty of perjury under the laws of the United States of America that the translation into ENGLISH is true and accurate of the attached document relating to:

DE 196 54 894 A1

written in GERMAN.

NEWTYPE COMMUNICATIONS, INC.

Sworn to and subscribed before me
this 21st day of October, 2016

NOTARY PUBLIC

BRIAN G. BROWN
Notary Public, State of New York
No. 01BR6151227
Qualified in Suffolk County
Commission Expires August 14, 2018

Translator's note re DE 196 54 894 A1:

1. It appears that some of the description was copied from another application with different Figure numbers:

   In the paragraph spanning pp. 5 and 6, and describing Fig. 3, the phrase "already described with respect to Fig. 4" does not make sense.

   In the same paragraph, the sentence beginning "As already explained..." refers to "air" acting as "insulation", even though no such explanation appears anywhere else.

   On p. 6, the paragraph describing Fig. 5 refers to a Fig. 8, even though the description contains only 6 figures.

   On p. 7, a reference is made to Fig. 12.

   The wording of the claims hardly reflects that in the description. In particular, the phrase "additional travel section ... measured on" in claim 9 is not mentioned anywhere in the description.

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12 **Unexamined Application**

10 **DE 196 54 894 A1**

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54 Torsional vibration damper with a compensating inertial mass

57 A torsional vibration damper is constructed with a drive-side transmission element and a power-takeoff-side transmission element capable of rotating relative thereto, at least one of which has an activating means for elastic elements of a damping device, and with at least one of which a compensating inertial mass is associated.

DE 196 54 894 A1

The following text is taken from the documents filed by the Applicant

Description

The invention relates to a torsional vibration damper according to the preamble of claim 1.

DE 36 30 398 C2 describes a torsional vibration damper with a drive-side transmission element and a power-takeoff-side transmission element capable of rotating relative thereto, at least one of which has an activating means for elastic elements of a damping device. Even relatively large torsional vibrations, which are also transmitted to the drive-side transmission element upon introduction of a torque by a drive, such as an internal combustion engine, can be reduced by such a torsional vibration damper. The reduction takes place during transmission of the respective torsional vibrations from the drive-side to the power-takeoff-side transmission element via the elastic elements – which are supported by a friction means – of the damping device.

In contrast to a massive flywheel, both inertial masses are relatively light, and so the large primary-side mass, which is composed of the drive and the primary-side inertial mass, is counteracted by a small secondary-side inertial mass, which is braced on the gear-train side. Thereby the resisting torque for a drive, which is determined by the inertia of the primary side and a reaction torque formed by the action of the springs, by friction and by the inertia of the secondary inertial mass, is relatively small, and so it is capable of smoothing out synchronization fluctuations of the drive to only a small extent. The synchronization fluctuations cause torque fluctuations in the secondary aggregates, such as a generator, connected to the front end of the engine. The torque fluctuations may cause damage to these aggregates.

A further possibility for damping drive-side torsional vibrations may lie in providing, according to DE 36 43 272 A1, a torsional vibration damper with a compensating inertial mass, which is mounted to rotate freely relative to the actual inertial mass and by virtue of its mass inertia develops a resisting torque upon introduction of a torsional vibration.

By the use of the additional compensating inertial mass, the torsional vibration damper is bulkier, especially when it is equipped, as is that of DE 36 30 398 A1 appraised in the foregoing, with a chamber filled at least partly with a viscous fluid for receiving the damping device.

The task of the invention is to improve a torsional vibration damper with a compensating inertial mass to the effect that the increase in overall space requirement due to the compensating inertial mass as well as the structural complexity is minimal.

This task is accomplished according to the invention by the features specified in the bodies of claims 1, 3, 5, 8 and 10.

The compensating inertial mass is preferably matched to a particular order of the drive. One possibility for the order is the ignition excitation, which depends on the number of cylinders of the internal combustion engine, so that, depending on the degree of matching of the compensating weights, the ignition excitations can be absorbed at least partly or even completely. Thereby the advantage is achieved that torsional vibrations that, for example in a torsional vibration damper with two inertial masses capable of rotating relative to one another, lead to deformation of the elastic elements acting between the inertial masses, can be reduced at least considerably. This is of special significance in particular when passing through the resonance range of the torsional vibration damper because, if no reduction of the ignition excitations were to be achieved, these could lead to damage or even destruction at least in the region of the elastic elements. Normally this problem is alleviated by making the elastic elements particularly flexible with large spring deflections and disposing them in a chamber filled with viscous fluid, while constructing the inertial masses with large weight. By these features it is possible to limit instability of the motion of the inertial masses relative to one another, especially during passage through the resonance range since, due to the flexible elastic elements constructed with long-stroke spring action and the high inertial mass, the resonance range of the torsional vibration damper is lowered sufficiently that it lies just above the ignition frequency of the internal combustion engine, i.e. in a frequency range in which the ignition excitations have not yet reached full intensity. By using the compensation inertial mass according to the claims, it is now possible to increase the stiffness of the elastic elements of the damping device since, by virtue of the reduced effect of the ignition excitations, the deflection angle between the two inertial masses can be made smaller. Furthermore, it is possible to reduce the weight of the inertial masses. Although the resonance range of the torsional vibration damper is indeed shifted to higher rotational speeds by these aforesaid features, this is uncritical because of the at least partial absorption of the ignition excitations. Furthermore, because of the smaller deflection angle between the inertial masses, it is possible to construct the damping device without viscous fluid as the damping medium. On the whole, therefore, it is possible to reduce the costs and weight of the torsional vibration damper by using the compensating inertial mass.

Advantageously, the compensating inertial mass is disposed in a completely or partly sealed housing, which is filled with a viscous fluid, preferably oil, in order to safeguard the

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