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### RECONDITIONED HARMONIC BALANCER

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#### Abstract

A reconditioned harmonic balancer to replace a worn out or damaged harmonic balancer that is not available otherwise. The reconditioned harmonic balancer includes two or more pieces of metal held together with a cleaned hub, a cleaned inertia ring, a plurality of new elastomer material, a plurality of timing marks that need to be located on a keyway indicator at a precise location, and a plurality of mounting apertures. The timing marks are engraved, single-notched hash marks, or are painted on an outer surface of the cleaned inertia ring. The mounting apertures are disposed on the cleaned hub to secure the reconditioned harmonic balancer to a crankshaft of a vehicle.

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#### Background/Summary

##### BACKGROUND OF THE INVENTION

[0001] The present invention relates to a harmonic balancer. More specifically, the present

invention relates to a reconditioned harmonic balancer.

[0002] Many replacement automotive parts are sometimes subject to not being available because of obsolescence (planned or otherwise) and/or not being made in an aftermarket. The restoration of collectable vehicles helps keep Original Equipment Manufacturer or OEM number matching parts from increasing their value. This may really present big problems for a person who needs an auto replacement part, such as a new harmonic balancer, that may not be available at all.

[0003] What is needed is a reconditioned harmonic balancer to replace a worn out or damaged harmonic balancer that is not available otherwise.

[0004] In light of the harmonic balancer devices disclosed in the known art, it is submitted that the present invention substantially diverges in functional and design elements from the known art and consequently it is clear that there is a need in the art for an improvement to existing reconditioned harmonic balancers. In this regard the present invention substantially fulfills these needs.

#### SUMMARY OF THE INVENTION

[0005] In view of the foregoing disadvantages inherent in the known types of harmonic balancers now present in the prior art, the present invention provides a reconditioned harmonic balancer, wherein the same OEM parts are utilized for providing convenience for a user when using a reconditioned harmonic balancer that was originally used on that respective engine.

[0006] The present system comprises a reconditioned harmonic balancer having a cleaned hub adapted to attach directly to a crankshaft of an engine of a vehicle, a cleaned inertia ring surrounding the cleaned hub, a plurality of elastomer material disposed between the cleaned hub and the cleaned inertia ring, a plurality of timing marks disposed on an outer surface of the cleaned hub and an outer surface of the cleaned inertia ring, a keyway indicator adapted to align the reconditioned harmonic balancer with the crankshaft of the vehicle, a plurality of mounting apertures disposed on the cleaned hub and the cleaned inertia ring to allow the reconditioned harmonic balancer to be adapted to be properly aligned and bolted to a crankshaft flange, a plurality of hash or witness marks disposed on an outer circumference of the cleaned inertia ring, a timing cover pointer aligned with the hash or witness marks disposed on the outer circumference of the degraded harmonic balancer to indicate the elastomer material is failing and allows ignition timing to be checked or corrected to no longer remove harmful vibrations leading to failure of the engine, and a whitened surface area disposed along the thickness of the hash or witness marks to show wear and tear on the hash or witness marks.

[0007] It's an object of the present invention to provide a reconditioned harmonic balancer that replaces a worn out or degraded harmonic balancer.

[0008] It's an object of the present invention to provide a reconditioned harmonic balancer that replaces a worn out or degraded harmonic balancer without having to go to an aftermarket.

[0009] It's an object of the present invention to provide a reconditioned harmonic balancer that prevents the risk of the reconditioned harmonic balancer not being available for replacement.

[0010] Other objects, features, and advantages of the present invention will become apparent from the following description taken in conjunction with the accompanying figures.

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## Description

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Although the characteristic features of this invention will be particularly pointed out in the claims, the invention itself and manner in which it may be made and used may be better understood after a review of the following description, taken in connection with the accompanying drawings wherein like numeral annotations are provided throughout.

[0012] FIG. 1 shows an environmental perspective view of one embodiment of a degraded harmonic balancer installed on an engine of a vehicle.

[0013] FIG. 2 shows an overhead perspective view of one embodiment of the degraded harmonic balancer.

[0014] FIG. 3 shows an overhead perspective view of one embodiment of a reconditioned harmonic balancer.

[0015] FIG. 4 shows an overhead perspective view of one embodiment of a cleaned hub of the reconditioned harmonic balancer.

[0016] FIG. 5 shows an overhead perspective view of one embodiment of the reconditioned harmonic balancer.

#### DETAILED DESCRIPTION OF THE INVENTION

[0017] Reference is made herein to the attached figures. For the purposes of presenting a brief and clear description of the present invention, the preferred embodiment will be discussed as used for providing a reconditioned harmonic balancer. The figures are intended for representative purposes only and should not be considered to be limiting in any respect.

[0018] FIG. 1 shows an environmental perspective view of one embodiment of a degraded harmonic balancer **100** installed on an engine EN of a vehicle V.

[0019] The degraded harmonic balancer **100** may be replaced by a reconditioned harmonic balancer (FIG. 3, **200**) and may also be called a vibration damper or a crankshaft damper. The reconditioned harmonic balancer **200** may reduce torsional vibrations and harmonics in the engine EN of the vehicle V.

[0020] The degraded harmonic balancer **100** may include a plurality of hash or witness marks **115**, a timing cover pointer **125**, and a whitened surface area **135**.

[0021] The hash or witness marks **115** may be disposed on an outer circumference **100A** of the degraded harmonic balancer **100**. The timing cover pointer **125** may be aligned with the hash or witness marks **115** disposed on the outer circumference **100A** of the degraded harmonic balancer **100** to indicate a plurality of elastomer material **130** is failing and allows ignition timing to be checked or corrected to no longer remove harmful vibrations leading to failure of the engine EN. The whitened surface area **135** may be disposed along the thickness of the hash or witness marks **115** to show wear and tear on the hash or witness marks **115**.

[0022] FIG. 2 shows an overhead perspective view of one embodiment of a degraded harmonic balancer **100**.

[0023] The degraded harmonic balancer **100** may include a hub **110**, an inertia ring **120**, a plurality of elastomer material **130**, a plurality of timing marks **140**, and a keyway indicator **150**. The degraded harmonic balancer **100** may sustain damage that includes cracking, misalignment, deterioration of elastomer material, separation of components, rust, corrosion or the like.

[0024] The hub **110** may be a central part of the degraded harmonic balancer **100** and is adapted to attach directly to a crankshaft (not shown) of an engine EN of a vehicle V. The inertia ring **120** may add mass to help smooth out any rotational motion of the crank shaft. The elastomer material (FIG. 1, **130**) may be exposed to a plurality of elements selected from the group consisting of a plurality of oil, a plurality of dirt, a plurality of grease, a plurality of water, a plurality of heat, a plurality of cold, and the like to degrade the elastomer material **130** and require replacement of the degraded harmonic balancer **100**. The timing marks **140** may be adapted to align with the timing marks on the engine's timing cover or other components (all not shown), allowing for precise timing adjustments during engine maintenance or repairs. The keyway indicator **150** may also be known as a crankshaft pulley, may be used to align the degraded harmonic balancer **100** with the crankshaft of the engine EN.

[0025] FIG. 3 shows an overhead perspective view of one embodiment of a reconditioned harmonic balancer **200**.

[0026] The reconditioned harmonic balancer **200** may include a cleaned hub **210**, a cleaned inertia ring **220**, a plurality of elastomer material **230**, a plurality of timing marks **240**, and a keyway indicator **250**.

[0027] The cleaned hub **210** may be a central part of the reconditioned harmonic balancer **200** and is adapted to attach directly to a crankshaft (not shown) of an engine (FIG. 1, EN) of a vehicle (FIG. 1, V). The cleaned hub **210** may be cleaned in a shot blaster and furnace (not shown) or the like.

[0028] The cleaned inertia ring **220** may be designed to store and be adapted to absorb energy from the crankshaft's torsional vibrations. Additional vibration reduction may be accomplished by adding a plurality of grooves, a plurality of slots, or a plurality of divots to either the cleaned hub **210** or the cleaned inertia ring **220** increasing rubber volume in those areas. The cleaned inertia ring **220** may be cleaned in a shot blaster and furnace (not shown) or the like to eliminate any possible contamination from a plurality of prior materials, a plurality of oils, a plurality of rust, or the like.

[0029] The elastomer material **230** may be disposed between the cleaned hub **210** and the cleaned inertia ring **220**. The elastomer material **230** may serve as a damping medium and helps absorb and dissipate vibrations adapted to be generated by the engine EN. The elastomer material **230** may act as a cushion between the cleaned hub **210** and the cleaned inertia ring **220** and is adapted to reduce transmission of vibrations to the crankshaft (not shown). The elastomer material **230** may be made of another elastomer, or the like.

[0030] The timing marks **240** may be engraved or painted on an outer surface of the cleaned hub **210** and the outer surface of the cleaned inertia ring **220** or the like. The timing marks **240** may be factory balanced to correct an inherit metal imbalance. The timing marks **240** may be cut in a timing V-notch **240A** or the like.

[0031] The keyway indicator **250** may locate and maintain the reconditioned harmonic balancer **200**.

[0032] FIG. 4 shows an overhead perspective view of one embodiment of a cleaned hub **210** of a reconditioned harmonic balancer **200**.

[0033] The cleaned hub **210** may be made of steel, cast iron, or the like and is adapted to be responsible for transmitting a rotational motion from the crankshaft to the reconditioned harmonic balancer **200**.

[0034] The cleaned hub **210** may include the keyway indicator **250**, which may be a slot **252** or the like. The slot **252** may be approximately **40** degrees to a centerline of the hub to maintain a balance. The cleaned hub **210** may include one of the timing marks **240** disposed on a top edge **212** of the cleaned hub **210**.

[0035] The cleaned hub **210** may include a plurality of mounting apertures **260** that may secure the reconditioned harmonic balancer **200** to the crankshaft (not shown). The mounting apertures **260** may allow the reconditioned harmonic balancer **200** to be properly aligned and bolted to the crankshaft flange (not shown). The mounting apertures **260** may be a plurality of circular apertures **262**, or the like.

[0036] FIG. 5 shows an overhead perspective view of one embodiment of a reconditioned harmonic balancer **200**. More specifically, FIG. 5 shows the cleaned inertia ring **220** in relation to the cleaned hub **210**. The cleaned inertia ring **220** and the cleaned hub **210** must be centered to one another and spin in unison after being refurbished.

[0037] The cleaned inertia ring **220** may be made of steel or the like and may have a plurality of serpentine or V-belt grooves **222** to drive accessories on its surface to improve its effectiveness.

[0038] It is therefore submitted that the instant invention has been shown and described in various embodiments. It is recognized, however, that departures may be made within the scope of the invention and that obvious modifications will occur to a person skilled in the art. With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and

all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

## Claims

1. A reconditioned harmonic balancer, comprising: a cleaned hub adapted to attach directly to a crankshaft of an engine of a vehicle; a cleaned inertia ring surrounding the cleaned hub; a plurality of elastomer material disposed between the cleaned hub and the cleaned inertia ring; a plurality of timing marks disposed on an outer surface of the cleaned hub and an outer surface of the cleaned inertia ring; a keyway indicator adapted to align the reconditioned harmonic balancer with the crankshaft of the vehicle; a plurality of mounting apertures disposed on the cleaned hub and the cleaned inertia ring to allow the reconditioned harmonic balancer to be adapted to be properly aligned and bolted to a crankshaft flange; a plurality of hash or witness marks disposed on an outer circumference of the cleaned inertia ring; and a whitened surface area disposed along the thickness of the hash or witness marks; wherein the cleaned hub is cleaned in a shot blaster and furnace; wherein the cleaned inertia ring is cleaned in a shot blaster and furnace; and wherein the timing marks are factory balanced to correct an inherit metal imbalance.
2. The reconditioned harmonic balancer, according to claim 1, wherein the cleaned hub is adapted to be responsible for transmitting a rotational motion from the crankshaft to the reconditioned harmonic balancer.
3. (canceled)
4. The reconditioned harmonic balancer, according to claim 1, wherein the cleaned hub is made of steel.
5. The reconditioned harmonic balancer, according to claim 1, wherein the cleaned hub is made of cast iron.
6. The reconditioned harmonic balancer, according to claim 1, wherein the cleaned inertia ring is designed and adapted to store and absorb energy from the crankshaft of the vehicle and its torsional vibrations.
7. The reconditioned harmonic balancer, according to claim 1, wherein the cleaned inertia ring includes a serpentine pattern on its surface to improve its effectiveness.
8. (canceled)
9. The reconditioned harmonic balancer, according to claim 1, wherein the cleaned inertia ring is made of steel.
10. The reconditioned harmonic balancer, according to claim 1, wherein the elastomer material serves as a damping medium and helps absorb and dissipate vibrations adapted to be generated by cycles of balance imbalance in the engine of the vehicle.
11. The reconditioned harmonic balancer, according to claim 1, wherein the elastomer material is vulcanized rubber with a variable durometer result.
12. The reconditioned harmonic balancer, according to claim 11, wherein the elastomer material is silicone vulcanized rubber.
13. The reconditioned harmonic balancer, according to claim 1, wherein the timing marks are cut in a timing V-notch disposed on the outer surface of the cleaned inertia ring.
14. (canceled)
15. The reconditioned harmonic balancer, according to claim 1, wherein the timing marks are permanently painted on the outer surface of the cleaned inertia ring.
16. (canceled)
17. The reconditioned harmonic balancer, according to claim 1, wherein the keyway indicator is a slot.
18. The reconditioned harmonic balancer, according to claim 17, wherein the slot is 40 degrees to a centerline of the hub to maintain a balance.

**19.** The reconditioned harmonic balancer, according to claim 1, wherein the mounting apertures are a plurality of circular holes.

**20.** The reconditioned harmonic balancer, according to claim 1, wherein the reconditioned harmonic balancer reduces torsional vibrations and harmonics in the engine of the vehicle.

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