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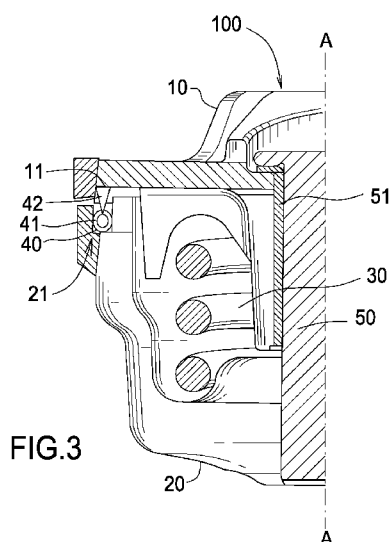
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(54) **Title:** TENSIONER WITH AXIAL SEAL



(57) **Abstract:** A tensioner having an axial seal comprising a base having a receiving portion, the receiving portion extending about a circumference of the base, a pivot arm pivotally engaged with the base, the receiving portion in continuous proximity to the pivot arm, a spring urging a movement of the pivot arm, and an axial seal engaged with the receiving portion, the axial seal comprising members extending in an axial direction (A-A), the members in sliding contact with a pivot arm surface.

Title

Tensioner with Axial Seal

5 Field of the Invention

The invention relates to a tensioner axial seal, and more particularly, to a tensioner having an axial seal engaged with the receiving portion, the axial seal comprising members extending in an axial direction (A-A),
10 the members in sliding contact with a pivot arm surface.

Background of the Invention

Labyrinth seals are an established technology for tensioners. However, such seals do not comprise flexible members and therefore can be severely limited in their ability to prevent infiltration of debris into a tensioner body. This can lead to premature wear and failure.

Brush seals are well established in turbomachinery. They are used in power turbines to prevent debris entry and to provide a pressure barrier to reduce steam and seal air leakage.

Representative of the art is US patent no. 8,777,563 which discloses a brush seal assembly for turbomachinery having a rotor can include a stationary seal component, a floating seal component coupled to the stationary seal component and circumferentially angled bristles arranged in a bristle pack, disposed in the floating seal component and extended axially with respect to the rotor.

30 What is needed is a tensioner having an axial seal engaged with the receiving portion, the axial seal comprising members extending in an axial direction (A-A),

the members in sliding contact with a pivot arm surface. The present invention meets this need.

Summary of the Invention

5 The primary aspect of the invention is to provide a tensioner having an axial seal engaged with the receiving portion, the axial seal comprising members extending in an axial direction (A-A), the members in sliding contact with a pivot arm surface.

10 Other aspects of the invention will be pointed out or made obvious by the following description of the invention and the accompanying drawings.

 The invention comprises a tensioner having an axial seal comprising a base having a receiving portion, the receiving portion extending about a circumference of the base, a pivot arm pivotally engaged with the base, the receiving portion in continuous proximity to the pivot arm, a spring urging a movement of the pivot arm, and an axial seal engaged with the receiving portion, the axial seal comprising members extending in an axial direction (A-A), the members in sliding contact with a pivot arm surface.

Brief Description of the Drawings

25 The accompanying drawings, which are incorporated in and form a part of the specification, illustrate preferred embodiments of the present invention, and together with a description, serve to explain the principles of the invention.

30 Figure 1 is a perspective cross-section of a prior art tensioner.

 Figure 2 is a cross-section elevation view of the prior art tensioner in Figure 1.

Figure 3 is a cross-section elevation view of the inventive seal arrangement.

Figure 4 is a perspective view of the brush seal.

Figure 5 is a perspective view of an alternate brush seal.

Detailed Description of the Preferred Embodiment

Figure 1 is a perspective cross-section of a prior art tensioner. Tensioner A comprises a pivot arm B and base C. Pivot arm B pivots about shaft E. Shaft E is typically press fit into base C. Spring D urges pivot arm B into a belt (not shown), thereby applying a preload.

Figure 2 is a cross-section elevation view of the prior art tensioner in Figure 1. The tensioner in Figure 1 comprises a labyrinth seal F. Seal F is formed by pivot arm portion B1 overhanging base portion C1. The relationship forms the seal tortuous path. Labyrinth seal F is intended to prevent debris from entering the tensioner which can lead to failure of various components including bush G.

In a typical installation a pulley (not shown) is journaled to the pivot arm at threaded portion H.

Figure 3 is a cross-section elevation view of the inventive seal arrangement. Tensioner 100 comprises a pivot arm 10 journaled or pivotally engaged with shaft 50. Shaft 50 is press fit into base 20. Pivot arm 10 pivots on a low friction bush 51.

Brush seal 40 is mounted to base 20 in receiving portion 21. Receiving portion 21 is disposed about an outer circumference of base 20. The receiving portion is configured to be in continuous proximity to the pivot arm 10.

Brush seal 40 is circular and comprises a flexible base portion 41. Bristles 42 extend in an axial direction from circular base portion 41. Bristles 42 are flexible to accommodate variations in the form of the pivot arm surface. The axial direction is parallel to the axis of rotation of the pivot arm A-A.

Bristles 42 are in sliding contact with surface 11 of pivot arm 10, thereby forming a seal about the entire perimeter of the base.

Figure 4 is a perspective view of the brush seal. Bristles 42 extend in an axial direction parallel to axis A-A. Base portion 41 can comprise any suitable flexible material in order to allow the seal 40 to conform to receiving portion 21. The brush seal provides sealing against debris while allowing free pivotal movement of the pivot arm 10. An advantage of the brush seal is that it does not require any lubricant or lubricious qualities to operate.

Figure 5 is a perspective view of an alternate brush seal. In an alternate embodiment bristles 42 are replaced with a plurality of flexible members 43 which form a barrier to debris entry. Flexible members 43 comprise a planar form and are disposed adjacent to one another about the circumference of brush seal 40. Members 43 extend in an axial direction from the base portion 41. An end 44 of each member 43 slidingly engages surface 11.

In yet another alternate embodiment members 43 or bristles 42 extend in a radial direction either inward or outward from an axis of rotation A-A. The radial direction is normal to the axial direction.

Although forms of the invention have been described herein, it will be obvious to those skilled in the art that variations may be made in the construction and

relation of parts and method without departing from the spirit and scope of the inventions described herein.

Claims

I claim:

1. A tensioner having an axial seal comprising:

5 a base having a receiving portion, the receiving portion extending about a circumference of the base;

 a pivot arm pivotally engaged with the base, the receiving portion in continuous proximity to the pivot arm;

10 a spring urging a movement of the pivot arm; and
 an axial seal engaged with the receiving portion, the axial seal comprising members extending in an axial direction (A-A), the members in sliding contact with a pivot arm surface.

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2. The tensioner having an axial seal as in claim 1, wherein the members comprise flexible bristles.

3. The tensioner having an axial seal as in claim 1,
20 wherein the members comprise flexible planar members.

4. The tensioner having an axial seal as in claim 1, wherein the base comprises a shaft, the pivot arm journaled to the shaft.

25

5. A tensioner having an axial seal comprising:

 a base having a receiving portion, the receiving portion extending about a circumference of the base;

 a shaft mounted to the base;

30 a pivot arm journaled to the shaft, the receiving portion in continuous proximity to the pivot arm;

 a spring urging a movement of the pivot arm; and

 a seal engaged with the receiving portion, the seal comprising flexible members extending in an axial

direction (A-A), the members in sliding contact with a pivot arm surface.

6. A tensioner having an axial seal comprising:

5 a base having a receiving portion, the receiving portion extending about a base circumference;

a shaft mounted to the base;

a pivot arm journalled to the shaft;

10 the receiving portion disposed in continuous proximity to the pivot arm;

a spring urging a movement of the pivot arm; and

15 a circular seal engaged with the receiving portion, the circular seal comprising flexible planar members extending in an axial direction (A-A), the members in sliding contact with a pivot arm surface.

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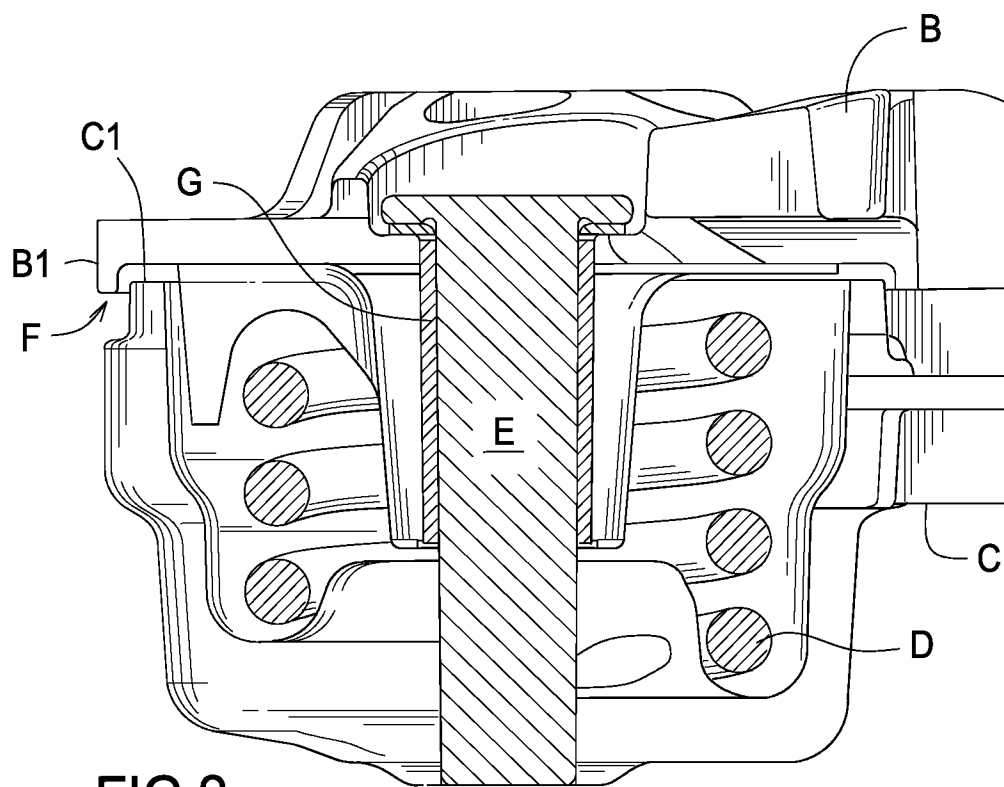
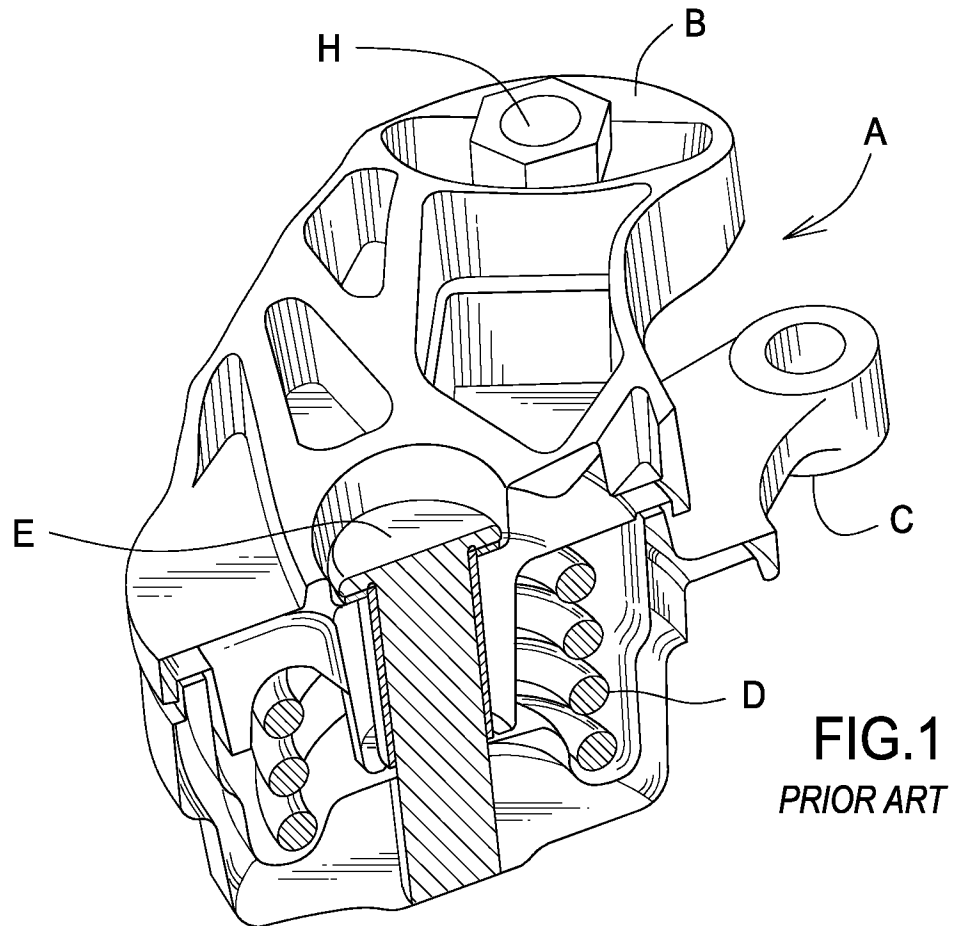
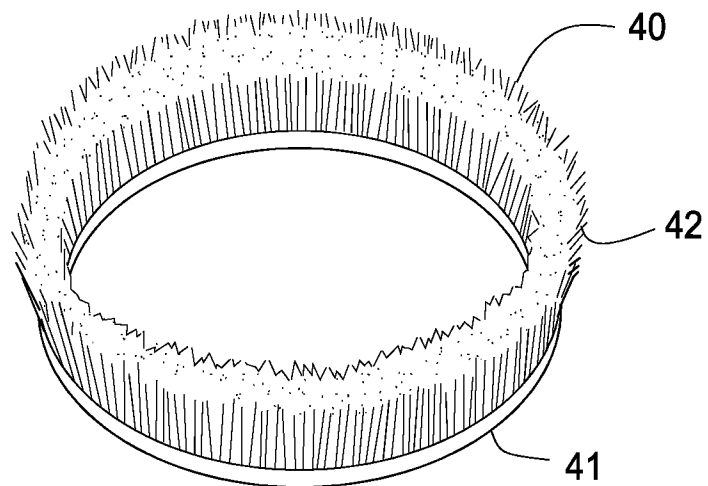
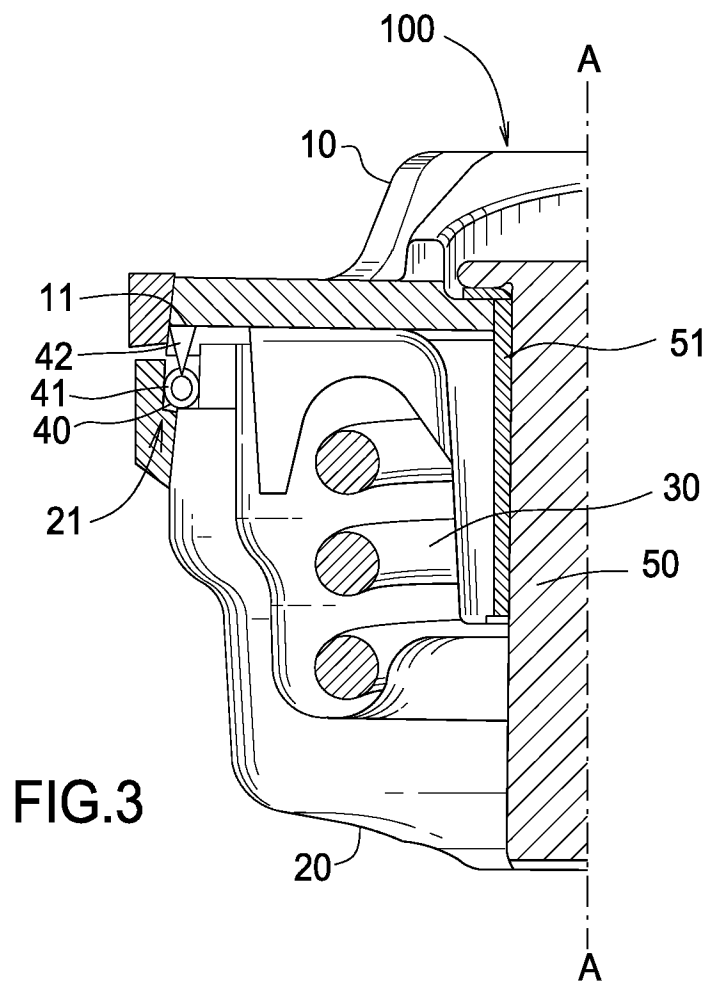


FIG.2
PRIOR ART

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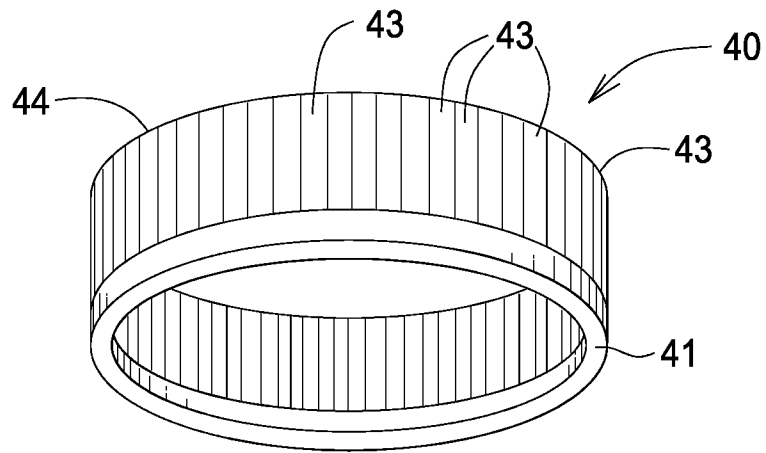


FIG.5

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2015/060919

A. CLASSIFICATION OF SUBJECT MATTER

INV. F16H7/12 F16J15/3288
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)

F16H F16J

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

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A	----- DE 197 20 649 A1 (MTU MUENCHEN GMBH [DE]) 19 November 1998 (1998-11-19) abstract	1,2,5,6
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Further documents are listed in the continuation of Box C.



See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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