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(54) Title: PARK LOCK ROLLER ASSEMBLY

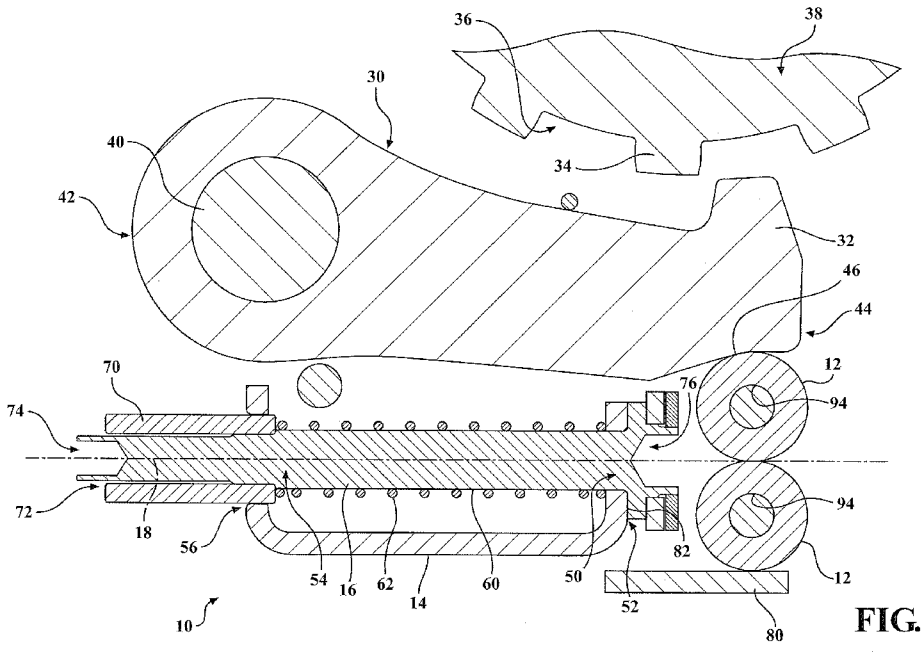

FIG. 1

(57) Abstract: A park lock roller assembly (10) includes at least one roller (12), a shaft rod (16), and a guide plate (14). The roller (12) is rotably coupled to one of the shaft rod (16). The shaft rod (16) is located within the guide plate (14) for longitudinal movement relative thereto. The park lock roller assembly (10) is pulled towards a pawl (30) to actuate the pawl (30) into locking engagement with a locking gear (38) to reliably lock a vehicle transmission in a parked position.

[Continued on next page]

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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Published:

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PARK LOCK ROLLER ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to and all the benefits of U.S. Provisional Patent Application No. 62/750,533, filed October 25, 2018, the disclosure of which is hereby incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates to a park lock roller assembly for selectively locking a gear of a vehicle transmission between an unlocked and locked position.

2. Description of the Related Art

[0003] It is commonly known for a transmission of a vehicle to include a park lock mechanism for electronically or manually shifting the vehicle into a parked position by locking a gear in the transmission. The park lock mechanism typically includes a shift lever and rod actuated by the vehicle operator for actuating a park lock rod assembly between an unlocked position and a locked position camming a pawl member into engagement with a parking lock gear to prevent rotation thereof and lock the transmission in a parked position. An example of a park lock mechanism is disclosed in US Patent No. 5,295,412.

[0004] The park lock rod assembly includes a rod and a spring loaded and captured in a guide member between the shift lever and the pawl member. The park lock rod assembly is typically pushed longitudinally during actuation towards the pawl member to force the pawl member to the locked position with the parking lock gear.

[0005] It is desirable to provide a park lock roller assembly which is pulled laterally towards the pawl member for actuation between the unlocked and locked positions to improve strength and packaging requirements.

SUMMARY OF THE INVENTION

[0006] According to one aspect of the invention, a park lock roller assembly is provided for actuating a pawl into locking engagement with a park lock gear to lock a vehicle transmission in a locked position. The park lock roller assembly includes at least one roller and a guide plate, wherein the roller is attached to the guide plate. The park lock roller assembly further includes a shaft rod, the shaft rod being located within the guide plate. The park lock roller assembly is pulled towards a pawl causing the pawl to engage with a locking gear to lock the vehicle transmission in the locked position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

[0008] FIG. 1 is a cross-sectional view of a park lock roller assembly in an unlocked position;

[0009] FIG. 2 is a cross-sectional view of the park lock roller assembly in a locked position; and

[0010] FIG. 3 is side view of the park lock roller assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0011] Referring now to the Figures, the invention will be described with reference to specific embodiments, without limiting same, and wherein like numerals indicate like or corresponding parts throughout the several views.

[0012] Referring to FIGS. 1-3, the present invention relates to a park lock roller assembly 10 for selectively locking a vehicle transmission in a locked, or park, position. The park lock roller assembly 10 includes a set of rollers 12, a guide plate 14, and a shaft rod 16. The rollers 12 are rotatably attached to the shaft rod 16 and the shaft rod 16 is located within the guide plate 14. The guide plate 14 acts as a support

for the entire park lock roller assembly 10 as the rollers 12 and shaft rod 16 move longitudinally from one position to another position along a central axis 18.

[0013] During actuation between an unlocked and locked position, the park lock roller assembly 10 is pulled towards a pawl 30. The pawl 30 has a locking tooth 32 for selectively engaging between a plurality of teeth 34 on an outer surface 36 of a locking gear 38 to the lock the transmission in the locked, or Park, position. The pawl 30 is pivotally mounted to a bracket 40 at a second end 42 adjacent the park lock roller assembly 10. The pawl 30 further includes a first end 44 opposite the second end 42. The first end 44 defines a ramped surface 46 engaged by the park lock roller assembly 10.

[0014] The park lock roller assembly 10 is assembled in a manner which allows the rollers 12 to be pulled towards the ramped surface 46 of the pawl 30 rather than pushed. This allows for flexibility and package benefits as further described below.

[0015] Referring to FIG. 1, the guide plate 14 is shown having a first opening 50 at a first end 52 and a second opening 54 at a second end 56. The shaft rod 16 is inserted axially through the first opening 50 and second opening 54 of the guide plate 14 when the park lock assembly 10 is fully assembled. The shaft rod 16 has an outer surface 60 which is in contact with a spring rod 62. The spring rod 62 extends and is compressed between the first end 52 and the second end 56 of the guide plate 14. The spring rod 62 creates a pressure which allows the park lock roller assembly 10 to return to an unlocked position by pushing the rollers 12 back down the ramped surface 46 of the pawl 30.

[0016] The park lock assembly 10 further includes a collar 70. The collar 70 is attached to the second end 56 of the guide plate 14. The collar 70 has a central opening 72 through which a second end 74 of the shaft rod 16 passes through. The second end 74 being opposite a first end 76 of the shaft rod 16. The collar 70 allows for a large span for the shaft rod 16 to be controlled along the central axis 18. The collar 70 also has the purpose of holding the spring rod 62 between the first end 52

and second end 56 of the guide plate 14. Finally, the collar 70 acts as a support for the shaft rod 62.

[0017] An abutment plate 80 is shown in contact with the roller 12. The abutment plate 80 assures the movement of the park lock roller assembly 10 is restricted to movement along the central axis 18.

[0018] Further included is a U-shaped collar 82 located at the first end 76 of the shaft rod 16. The collar 82 couples the rollers 12 to the shaft rod 16 to provide axially movement therewith. The collar 82 forms a rivet swage feature making the coupling more robust as well as removing the need for a washer or other faster between the rollers and shaft rod 16 which many prior assemblies typically require.

[0019] Referring to FIG. 3, a roller bracket 88 is shown attaching the first end 52 of the shaft rod 16 to the rollers 12. The roller bracket 88 includes a first rod 90 and a second rod 92. The first rod 90 and second rod 92 each passing through a central opening 94 in each of the rollers 12 of the park lock roller assembly 10. The rollers 12 then being able to rotate about a rod axis 96, the rod axis 96 being a central point on each of the first rod 90 and second rod 92.

[0020] In operation, movement of the shaft rod 16 along the central axis 18 is translated to the roller bracket 88. The roller bracket 88 pulls the rollers 12 along the ramped surface 46 of the pawl 30. The rollers 12 rotate about the rod axis 96 to roll along the ramped surface 46. Movement of the rollers 12 up the ramped surface 46 pivots the pawl 30 about the bracket 40 to force the locking tooth 32 of the pawl 30 into engagement with the teeth 34 on the outer surface 36 of the locking gear 38 placing the park lock roller assembly 10 into the locked position as shown in Figure 2. The park lock roller assembly 10 is unlocked when the spring rod 62 pushes the rollers 12 back down the ramped first end 44 of the pawl 30 disengaging the locking tooth 32 of the pawl 30 from the teeth 34 of the locking gear 38.

[0021] In order to prevent the park lock roller assembly 10 from moving along the central axis 18 to a point where contact between the rollers 12 extends beyond the

first end 44 of the pawl 30, a stop feature 100 is included. Thus stop feature 100 prevents the rollers 12 from disengaging with the pawl 30.

[0022] While the invention has been described in detail in connection with only a limited number of embodiments, it should be readily understood that the invention is not limited to such disclosed embodiments. Rather, the invention can be modified to incorporate any number of variations, alterations, substitutions or equivalent arrangements not heretofore described, but which are commensurate with the spirit and scope of the invention. Additionally, while various embodiments of the invention have been described, it is to be understood that aspects of the invention may include only some of the described embodiments. Accordingly, the invention is not to be seen as limited by the foregoing description.

What is claimed is:

1. A park lock roller assembly comprising;
at least one roller,
a guide plate, the roller being attached to the guide plate, and
a shaft rod, the shaft rod being located within the guide plate,
the park lock roller assembly being pulled towards a pawl causing the pawl to engage with a locking gear.

2. The park lock roller assembly of claim 1, wherein the pawl has a first end and a second end, the first end being ramped and the second end being pivotally mounted via a bracket.

3. The park lock roller assembly of claim 2, wherein the pawl has a locking tooth at the first end.

4. The park lock roller assembly of claim 3, wherein the locking gear includes a plurality of teeth on an outer surface, the teeth selectively engaging with the locking tooth of the pawl to lock a transmission of a vehicle into a park position.

5. The park lock roller assembly of claim 4, wherein the guide plate acts as a support for the park lock roller assembly as the rollers move from one position to another along a central axis.

6. The park lock roller assembly of claim 5, wherein the guide plate includes a first opening at a first end and a second opening at a second end

7. The park lock roller assembly of claim 6, wherein the shaft rod is inserted through the first opening and second opening of the guide plate.

8. The park lock roller assembly of claim 7, wherein the shaft rod has an outer surface, the outer surface being in contact with the spring rod, the spring rod extending from the first end of the guide plate to the second end of the guide plate.

9. The park lock roller assembly of claim 8, wherein a collar is attached to the second end of the guide plate.

10. The park lock roller assembly of claim 9, wherein the collar has a central opening through which a second end of the shaft rod passes through, the second end of the shaft rod being opposite a first end.

11. The park lock roller assembly of claim 10, wherein the collar allows for a large span for the shaft rod to be controlled along the central axis, the collar also holding the spring within the first end and second end of the guide plate.

12. The park lock roller assembly of claim 11, wherein the collar further acts as a support for the shaft rod.

13. The park lock roller assembly of claim 12, wherein the first end of the shaft rod is attached to the rollers via a roller bracket, the roller bracket allowing the shaft rod to act as a back stop.

14. The park lock roller assembly of claim 13, wherein the roller bracket has a first rod and a second rod, each rod passing through a central opening in each of the rollers of the park lock roller assembly.

15. The park lock roller assembly of claim 14, wherein the rollers rotate about a rod axis, the rod axis being a central point on each of the first rod and second rod.

16. The park lock roller assembly of claim 15, wherein movement of the shaft rod along the central axis is translated to the roller bracket, the roller bracket

pulling the rollers along the ramped first end of the pawl, the rollers rotating about the rod axis, bringing the locking tooth of the pawl into contact with the locking gear.

17. The park lock roller assembly of claim 16, wherein a stop feature prevents the park lock roller assembly from moving along the central axis to a point wherein the roller would disengage with the pawl.

18. The park lock roller assembly of claim 17, wherein an abutment plate is in contact with a roller restricting movement of the park lock roller assembly to movement along the central axis.

19. The park lock roller assembly of claim 18, wherein a joint is included at the first end of the shaft rod.

20. The park lock roller assembly of claim 19, wherein the joint has a rivet swage feature, the rivet swage feature making the joint more robust as well as removing the need for a washer or collar.

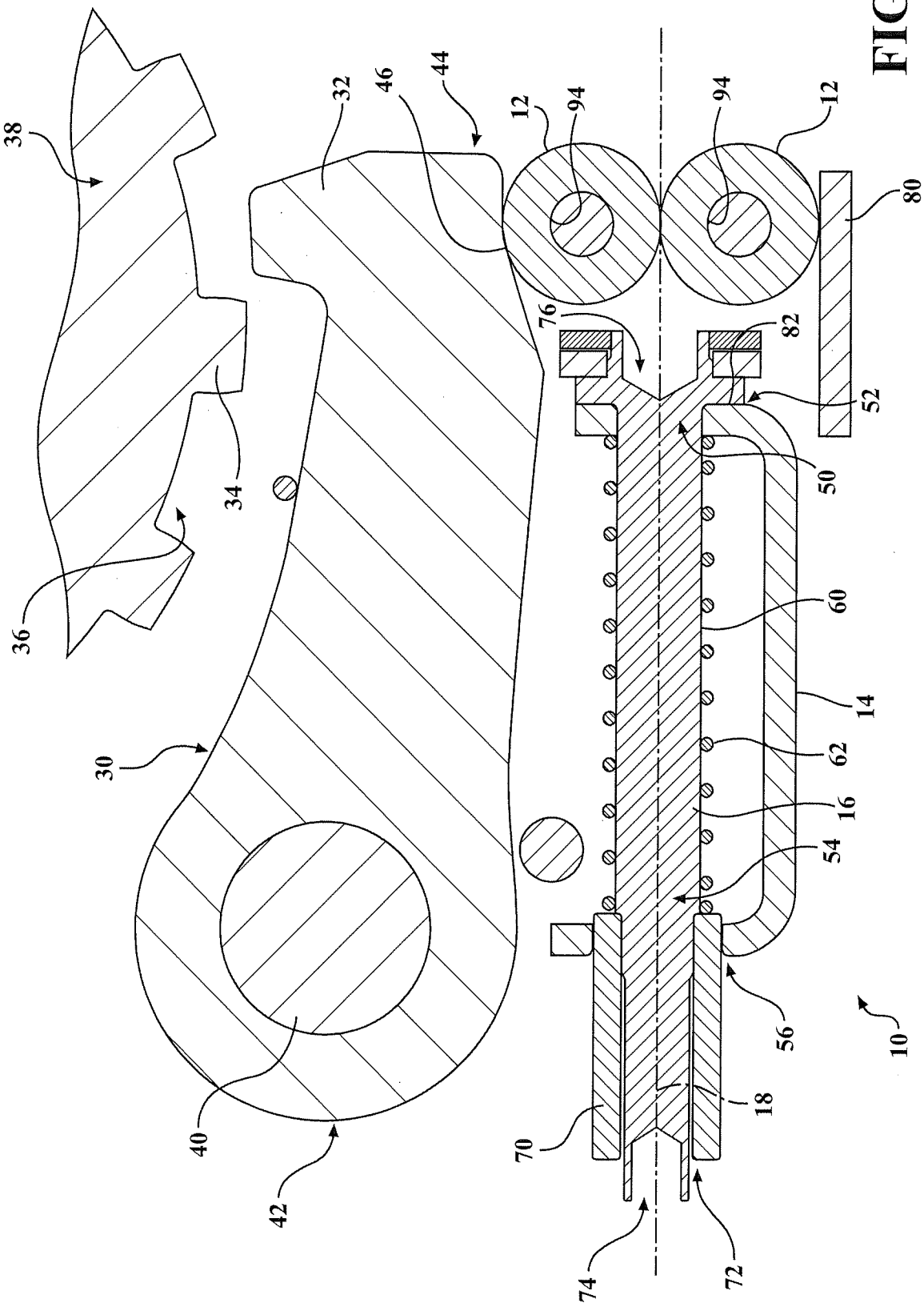
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FIG. 1

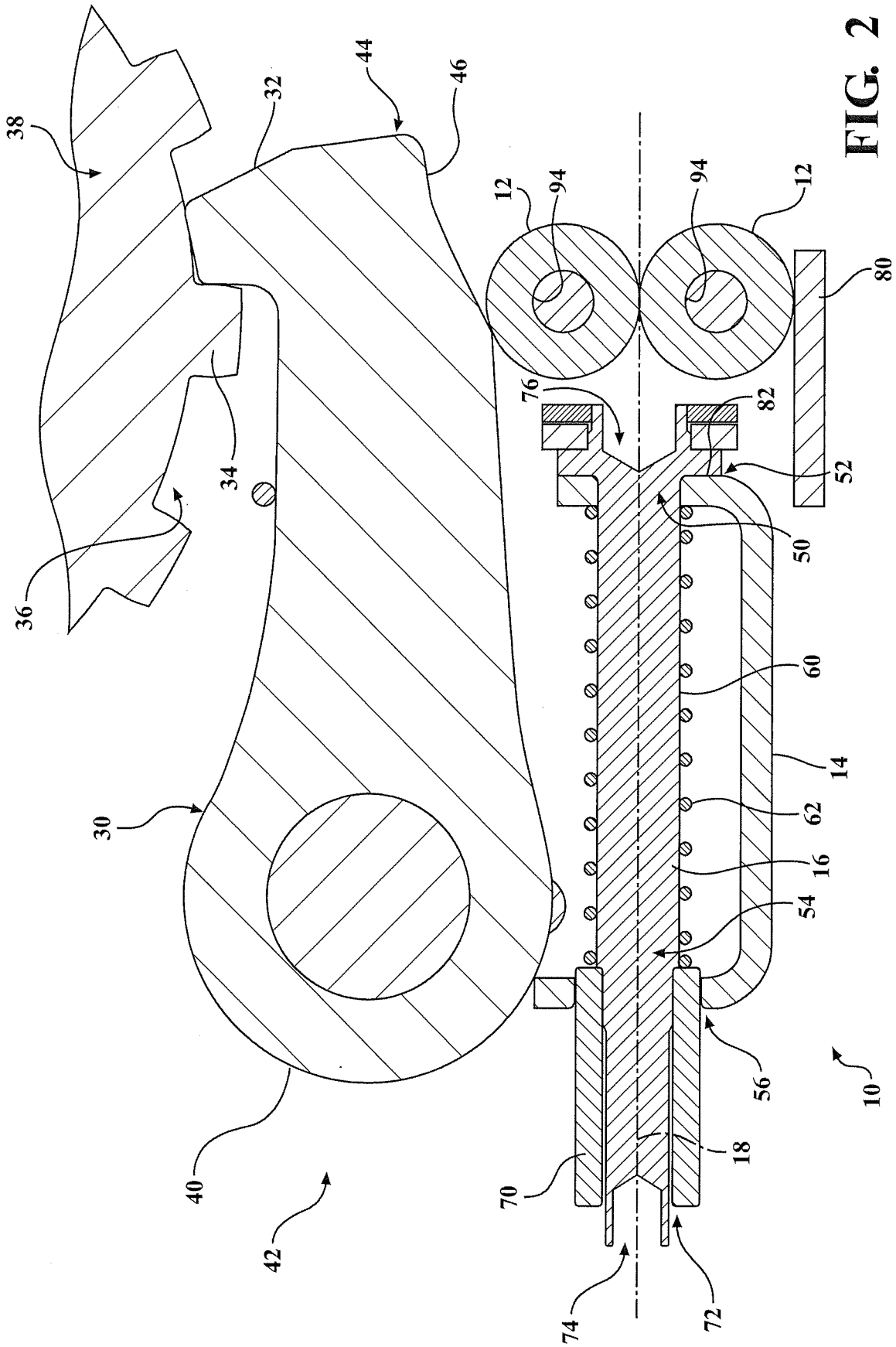
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FIG. 2

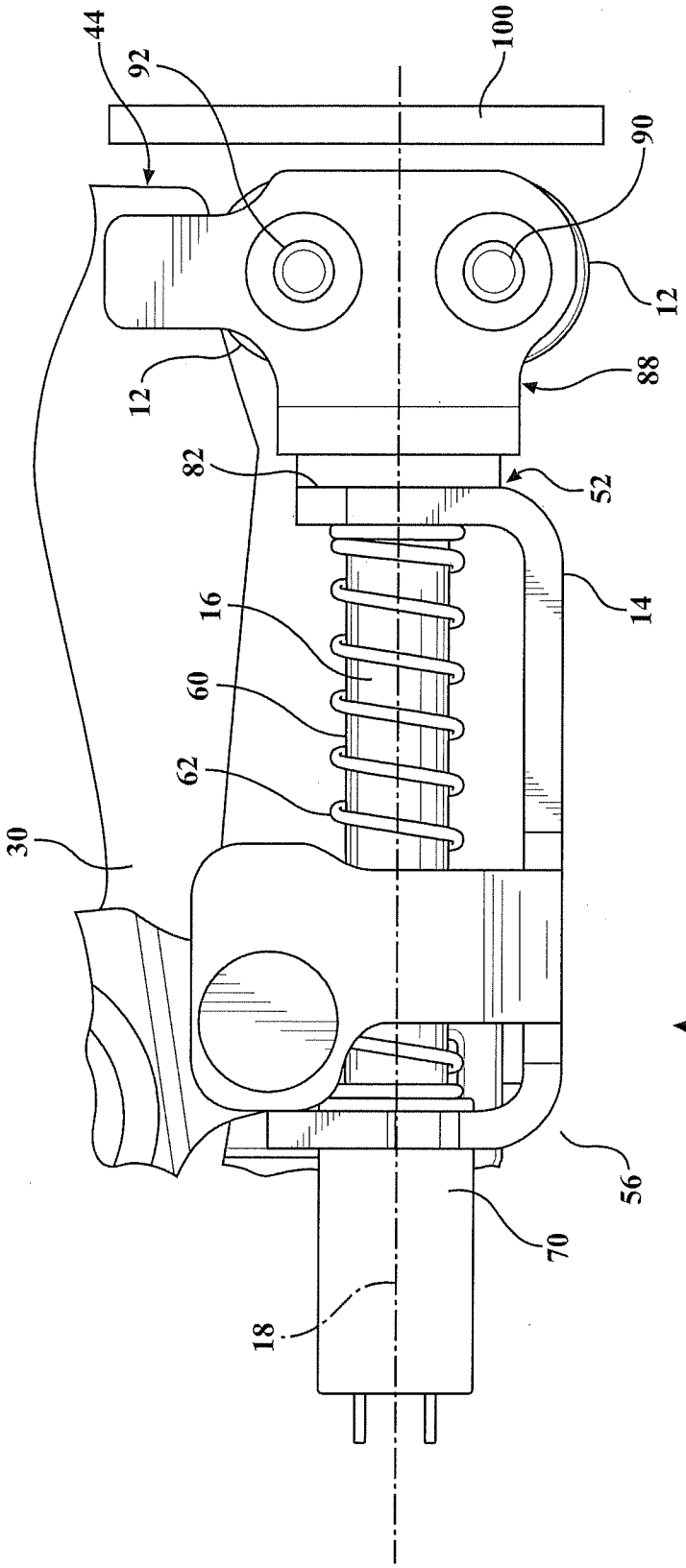

FIG. 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/058107

A. CLASSIFICATION OF SUBJECT MATTER
INV. F16H63/34
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

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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	figures 1, 3	19,20

X	DE 101 31 735 A1 (VOLKSWAGEN AG [DE]) 16 January 2003 (2003-01-16)	1-20
Y	figures 3, 4, 5, 7	19,20

Y	EP 2 960 552 A2 (HUGO BENZING GMBH & CO KG [DE]) 30 December 2015 (2015-12-30) figures 1A-1C	19,20

Y	DE 20 2017 102386 U1 (HUGO BENZING GMBH & CO KG [DE]) 24 April 2018 (2018-04-24) figures 2a, 2b	19,20

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

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"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	Date of mailing of the international search report
16 December 2019	08/01/2020

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/058107

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	US 2019/211928 A1 (PUIU DUMITRU [US] ET AL) 11 July 2019 (2019-07-11) the whole document	1-20
X,P	WO 2019/200099 A1 (LINAMAR CORP [CA]; WILLIAMS CAMERON P [US]; ZIEMBA JEFFEREY [US]) 17 October 2019 (2019-10-17) the whole document	1-20

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2019/058107

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